EUROPEAN COMMISSION

Brussels, 4.5.2018
C(2018) 2879 final

PUBLIC VERSION

In the published version of this decision, some information has been omitted pursuant to Article 17(2) of Council Regulation (EC) No 139/2004 concerning non-disclosure of business secrets and other confidential information. The omissions are shown thus […]. Where possible the information omitted has been replaced by ranges of figures or a general description.

To the notifying party

Subject: **Case M.8658 — UTC/Rockwell Collins**
Commission decision pursuant to Article 6(1)(b) in conjunction with Article 6(2) of Council Regulation No 139/2004[1] and Article 57 of the Agreement on the European Economic Area[2]

[1] OJ L 24, 29.1.2004, p. 1 (the 'Merger Regulation'). With effect from 1 December 2009, the Treaty on the Functioning of the European Union ('TFEU') has introduced certain changes, such as the replacement of 'Community' by 'Union' and 'common market' by 'internal market'. The terminology of the TFEU will be used throughout this decision.

[2] OJ L 1, 3.1.1994, p. 3 (the 'EEA Agreement').

Commission européenne, DG COMP MERGER REGISTRY, 1049 Bruxelles, BELGIQUE
Europese Commissie, DG COMP MERGER REGISTRY, 1049 Brussel, BELGIË

Tel: +32 229-91111. Fax: +32 229-64301. E-mail: COMP-MERGER-REGISTRY@ec.europa.eu.

1. THE PARTIES 5
2. THE CONCENTRATION 5
3. EU DIMENSION 5
4. PROCEDURE 5
5. OVERVIEW OF THE AIRCRAFT MANUFACTURING INDUSTRY 6
5.1. Types of aircraft 6
5.2. Supply chain 7
5.3. Procurement process 7
5.3.1. Large commercial aircraft 8
5.3.2. Regional aircraft/corporate jets 8
5.3.3. Military aircraft 8
5.3.4. Helicopters 8
6. PRODUCT MARKET DEFINITION 9
6.1. Trimmable horizontal stabiliser actuator ("THSA") 10
6.1.1. Introduction 10
6.1.2. Relevant product market 10
6.1.3. Mechanical sub-assemblies for the THSA system: the ball screw 13
6.2. Pilot Controls 14
6.2.1. Introduction 14
6.2.2. Relevant product markets 15
6.3. Ice Protection 19
6.3.1. Introduction 19
6.3.2. Relevant product markets 19
6.4. Oxygen systems 22
6.4.1. Introduction 22
6.4.2. Relevant product market 23
6.5. Aircraft seating 24
6.5.1. Introduction 24
6.5.2. Business jets seating 24
6.5.3. Cabin attendant seating 25
6.6. Interior lighting 26
6.6.1. Introduction 26
6.6.2. Relevant product market 26
6.7. Passenger Service Units 27
6.7.1. Introduction 27

6.7.2. Relevant product markets 27
6.8. Potable water systems 27
6.8.1. Relevant product market: potable water systems 28
6.8.2. Components for potable water systems 28
6.9. Maintenance Repair and Overhaul ('MRO') operations and spare parts 29
6.10. ARINC 31
6.10.1. Introduction 31
6.10.2. Relevant product market 34
6.11. Inertial Measurement Units 36
6.11.1. Introduction 36
6.11.2. Relevant product market 36
6.12. Military GPS receivers 36
6.12.1. Introduction 36
6.12.2. Relevant product market 37
6.13. Air data systems 37
6.13.1. Introduction 37
6.13.2. Relevant product market 38
6.14. Aircraft Engines 39
6.14.1. Introduction 39
6.14.2. Relevant product markets 39
6.15. Avionics 40
6.15.1. Introduction 40
6.15.2. Relevant product markets 40
6.16. Environmental control systems 42
6.16.1. Introduction 42
6.16.2. Relevant product market 42
6.17. Food and beverage preparation and storage equipment 42
7. GEOGRAPHIC MARKET DEFINITION 43
7.1. Original aircraft equipment 43
7.2. MRO and spare parts 44
8. COMPETITIVE ASSESSMENT 44
8.1. Horizontal relationships 44
8.1.1. Analytical framework 44
8.1.2. THSA 45
8.1.3. Pilot Controls 48
8.1.4. Ice Protection 51

8.1.5. Aircraft seating 54
8.1.6. Oxygen Systems 55
8.1.7. Interior lighting 57
8.1.8. PSUs 58
8.1.9. Potable water systems 59
8.1.10. MRO and spare parts 60
8.2. Vertical links 65
8.2.1. Analytical framework 65
8.2.2. Mechanical sub-assemblies for the THSA system: the ball screw 67
8.2.3. Components for potable water systems 67
8.2.4. ARINC 68
8.2.5. IMUs and GPS 79
8.2.6. Air data probes and Air data computers 83
8.3. Conglomerate links 85
8.3.1. Introduction 85
8.3.2. Analytical framework 86
8.3.3. General considerations on conglomerate effects of the Transaction 86
8.3.4. Aircraft engines and avionics 91
8.3.5. Environmental control systems and galley cooling 99
8.3.6. Pilot controls, flight controls and actuation 100
9. PROPOSED REMEDIES 102
9.1. Analytical Framework 102
9.2. Description of the proposed remedies 103
9.2.1. THSA and pilot controls 104
9.2.2. Ice protection systems 104
9.2.3. Oxygen Systems 105
9.3. Assessment of the proposed remedies of 12 April 2018 105
9.3.1. THSA and pilot controls 105
9.3.2. Ice protection systems 108
9.3.3. Oxygen Systems 110
9.3.4. Conclusion on the assessment of the proposed remedies 111
10. CONCLUSION 112

Dear Sir or Madam,

(1) On 12 March 2018, the European Commission received notification of a proposed concentration pursuant to Article 4 of the Merger Regulation by which United Technologies Corporation (UTC) will acquire within the meaning of Article 3(1)(b) of the Merger Regulation control of the whole of Rockwell Collins Incorporated (Rockwell Collins) (the Transaction). UTC is designated hereinafter as 'the Notifying Party'[3]. UTC and Rockwell Collins are designated hereinafter as 'the Parties'.

1. THE PARTIES

(2) UTC provides high-technology products and services for the building systems and aerospace industries worldwide. The UTC group comprises the following business units: (i) Otis Elevator Company, (ii) UTC Climate, Controls & Security, (iii) Pratt & Whitney, and (iv) UTC Aerospace Systems.

(3) Rockwell Collins is a manufacturer and supplier of aviation and integrated solutions for both commercial and government applications. It also manufactures and supplies a variety of aircraft cabin interior products.

2. THE CONCENTRATION

(4) Pursuant to an Agreement and Plan of Merger signed on 4 September 2017, UTC intends to purchase all shares in Rockwell Collins and thus acquire sole control over Rockwell Collins. The Transaction therefore constitutes a concentration pursuant to Article 3(1)(b) of the Merger Regulation.

3. EU DIMENSION

(5) The undertakings concerned have a combined aggregate world-wide turnover of more than EUR 5 000 million (UTC EUR 51,696 million, Rockwell Collins EUR 7,372 million). Each of them has a Union-wide turnover in excess of EUR 250 million (UTC EUR […] million, Rockwell Collins EUR […] million), but they do not achieve more than two-thirds of their aggregate Union-wide turnover within one and the same Member State. The notified operation therefore has an EU dimension pursuant to Article 1(2) of the Merger Regulation.

4. PROCEDURE

(6) For its assessment of the Transaction, the Commission has made use of the available means of investigation pursuant to Article 11 of the Merger Regulation. In particular, the Commission sent extensive questionnaires to competitors (mainly aircraft component suppliers) and customers (airframers[4]

[3] Publication in the Official Journal of the European Union No C 105, 20.3.2018, p. 8.

[4] The company engage in the design and manufacture of the aircraft.

and airlines). The Commission also conducted numerous phone interviews with competitors and customers. In reaction to complaints received from some market participants who highlighted potential adverse effects of the Transaction on competition in different markets, the Commission conducted additional phone calls and addressed written requests for information to various market participants. The Commission also analysed internal documents originating from UTC and Rockwell Collins, including supply contracts with customers in certain selected products and including internal strategy documents for integration plans after the Transaction. The Commission also collected and assessed bidding data from the Parties and their main customers to assess competitive dynamics in the tender processes in different product markets.

5. OVERVIEW OF THE AIRCRAFT MANUFACTURING INDUSTRY

(7) As a matter of general introduction, this section summarises the Commission's understanding of the basic features of the aircraft manufacturing industry, as explained mainly by the Notifying Party in the Form CO and as previously summarized by the Commission in prior decisions, and introduces terms and concepts used in the remainder of the decision.[5]

5.1. Types of aircraft

(8) For the purpose of the merger control assessment of the Transaction, four types of aircraft are relevant: (i) commercial aircraft, (ii) military aircraft, (iii) helicopters and (iv) general aviation.

(9) The commercial aircraft category includes large commercial aircraft, regional aircraft and business/corporate jets.

(a) Large commercial aircraft are generally equipped with over 100 seats, can cover a range of more than 2,000 nautical miles and cost over USD 35 million. A distinction can be drawn between (i) wide-body aircraft equipped with 200-850 seats and carrying passengers over more than 4,000 nautical miles distances, and (ii) narrow-body aircraft equipped with 100-200 seats and carrying passengers over 2,000-4,000 nautical miles distances.

(b) Regional aircraft are generally equipped with 30 to 90 seats and can cover a range of less than 2,000 nautical miles. Regional aircraft are comprised of (i) large regional aircraft which can transport 70-90 passengers and (ii) small regional aircraft which can transport 30-50 passengers.

(c) Business/corporate aircraft/jets are aircraft designed for corporate activities and typically cost between USD 3 million and more than USD 50 million.

[5] A very similar introduction was already included in case M.8425 – *Safran/Zodiac Aerospace*, paras. 9ff.

(10) The military aircraft category comprises aircraft designed for military activities, be it combat aircraft or non-combat aircraft – i.e. designed for search and rescue, reconnaissance, transport, observation and training.

(11) Helicopters include normal and transport rotorcrafts propelled by turbine engines used for civil or military applications[6].

(12) As a fourth category, the industry generally defines aircraft used for flight activities not involving commercial air transportation or aerial work as "general aviation aircraft". General aviation aircraft typically seat 1-6 passengers and are generally equipped with piston-powered engines; they are used inter alia for personal/private travel, air tourism, recreational flying, and air sports.

5.2. Supply chain

(13) The supply chain in the aerospace industry mainly comprises two types of suppliers: Tier-1 and Tier-2 (and Tier-3 as the case may be). Tier-1 suppliers generally have integration capabilities and provide whole systems and equipment. Tier-2 suppliers tend to be active at an upstream stage, supplying components and sub-components which are later integrated into the systems/equipment by either the aircraft manufacturer or the Tier-1 supplier (or third-parties system integrators).

(14) On the demand side, different types of customers purchase systems and equipment depending on the type of aircraft considered.

(a) Large commercial aircraft: depending on the system/equipment considered, purchasers are either (i) aircraft manufacturers (also known as "airframers") with significant integration capabilities or (ii) end-users – inter alia airlines, lessors and national governments – who sometimes directly purchase certain equipment and systems from the Tier-1 supplier.

(b) Regional aircraft/corporate jets: systems and equipment are usually purchased by aircraft manufacturers who then resell the whole aircraft to end-users.

(c) Military aircraft and helicopters: systems and equipment are usually purchased by aircraft and helicopter manufacturers, in some cases also the Ministry of Defence depending on the equipment or system considered. Helicopter/military aircraft manufacturers will in any case provide the integration of main systems and equipment.

5.3. Procurement process

(15) In most cases, customers in the aircraft manufacturing industry source systems and equipment by means of competitive tender offers, often for the duration of the aircraft programme in question. The structure of the tender process can vary according to the aircraft type, customer involved or platform in question.

---

6 Very small light helicopters are also equipped with piston-driven engines.

5.3.1. Large commercial aircraft

(16) Aircraft manufacturers of large commercial aircraft can either source products through build-to-print or build-to-specification ("build-to-spec") processes. The build-to-print process requires the supplier to manufacture equipment, systems and components to the exact specifications provided by the customer. The build-to-specification process, on the other hand, allows the supplier to use its own design and manufacturing skills.

(17) Additionally, a distinction needs to be drawn between buyer-furnished equipment ("BFE") and supplier-furnished-equipment ("SFE"). BFE are purchased by end-users (e.g. airlines), whereas SFE are purchased by the aircraft manufacturer before the sale of the aircraft to the end-user.

(18) With respect to SFE, suppliers for the different systems and equipment of an aircraft platform are selected through a competitive tender process. When launching a new aircraft platform, the aircraft manufacturers first issue Requests for Information ("RFI") to several prospective bidders in order to identify a preliminary list of potential suppliers for the systems/equipment/part that it will not manufacture in-house. The aircraft manufacturers then typically issue Requests for Proposals ("RFP") in order to "down-select" a limited number of final candidates who will submit "Best and Final Offers" on the basis of which final negotiations and selection will be conducted.

(19) Tenders for BFE products typically occur at a later stage of the procurement process, around two years before the delivery of the aircraft.

5.3.2. Regional aircraft/corporate jets

(20) Contrary to the procurement process for large commercial aircraft (which can be based either SFE or BFE), most equipment and systems for regional aircraft/business jets are sold on an SFE basis. The purchasers are therefore in most cases the aircraft manufacturers and not end-customers.

5.3.3. Military aircraft

(21) The procurement process for equipment and systems for military aircraft follows a specific pattern. Due to the low volume of aircraft and to the complexity of the integrated systems, the procurement process requires close cooperation between the airframer, the system supplier and the National Procurement Authority acting on behalf of the end-users.

5.3.4. Helicopters

(22) The procurement of systems and equipment for helicopters is usually organized by the helicopter manufacturer, though certain parts can also be sourced directly by Ministries of Defence for military helicopters (e.g. engines). For helicopters, purchases take place by means of a tender process or through a negotiated procedure.

6. PRODUCT MARKET DEFINITION

(23) UTC and Rockwell Collins are important worldwide suppliers of aircraft equipment and the Transaction is one of the largest in the aerospace industry to date. UTC and Rockwell Collins have broad but generally complementary product portfolios as illustrated by Figure 1. More than [90-100]% of Rockwell Collins' commercial business does not lead to any horizontal overlaps with UTC's activities.

Figure 1 - Complementarity of the portfolios, UTC internal document[7]



(24) This decision analyses the limited number of horizontal[8] and vertical relations created by the transaction, including the Parties' activities on the aftermarket in terms of maintenance, overhaul and repair ('MRO') operations and the sale of spare parts. Given that a number of the Parties' products are complementary, the assessment also extends to the analysis of conglomerate effects.

---

7 Internal document […].

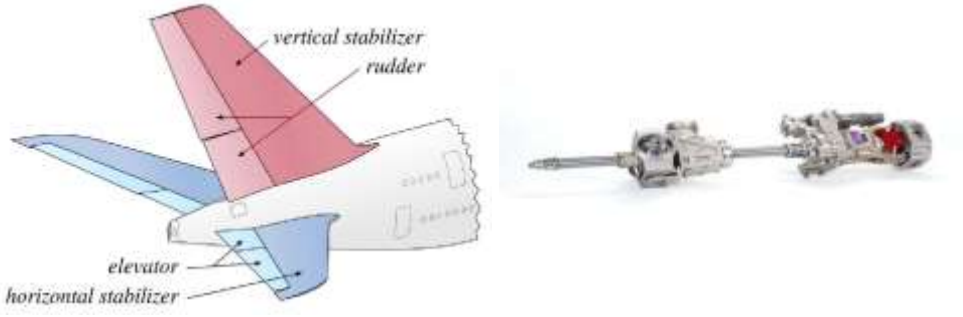
8 In addition to the horizontal overlaps analysed in the following section, the Parties' activities also overlap in the supply of aircraft interface devices ("AID") and air data computers. The combined market shares in those products are below 20% so that no horizontally affected markets arise. It is relevant, however, to assess the vertical and conglomerate links of these activities with other activities of the Parties. For this reason, those horizontal overlaps are assessed in the datalink network services section (section 8.2.4) and in the air data system section (section 8.2.6), respectively.
A further potential horizontal overlap between the Parties' activities concerns electronic engine controls, which are the interface between the throttle and the fuel system of an aircraft. In 2016, Rockwell Collins achieved USD […] turnover supplying electronic engine controls for small piston engines. UTC supplied electronic engine controls for gas turbine engines. Due to Rockwell Collins' limited activities and the Parties' focus on different engines, this horizontal overlap does not lead to serious doubts as to its compatibility with the internal market and is therefore not discussed further in this decision.

6.1. Trimmable horizontal stabiliser actuator ("THSA")

6.1.1. Introduction

(25) THSA systems are a subset of aerospace flight control actuation systems. Actuation systems are hydraulically, mechanically or electronically driven components that are controlled from the cockpit. They physically move flight control surfaces of a plane (such as rudders, ailerons, elevators, slats or flaps) or angle the rotors on a helicopter to steer the aircraft in flight or assist in take-off and landing. The THSA's function is to move the horizontal stabiliser that controls the pitch of the aircraft.[9]

Figure 2 - THSA



Source: Form CO.

6.1.2. Relevant product market

(26) The Commission has not specifically assessed THSAs so far. In a previous case, the Commission considered a segmentation of actuation systems into primary flight control actuators ("PFCA"), secondary flight control actuators ("SFCA") and THSA. The question whether the THSA constituted a separate market or was part of the PFCA or SFCA markets was ultimately left open.

(27) In a previous case, the Commission found that the markets for actuations systems should not be further segmented according to the size of the aircraft.[10]

(28) As regards a differentiation between civil and military applications, in previous decisions,[11] the Commission has left open whether actuation systems for commercial/civil and military aircraft constitute separate product markets.

(29) The Notifying Party agrees[12] that THSAs should indeed be considered a product market separate from other actuation products, due to the absence of demand side substitutability and limited supply side substitutability: not all THSA suppliers are able to manufacture the PFCA and SFCA and *vice versa*. For example, whereas UTC manufactures the full range of actuators, Rockwell Collins is only active in the manufacture of the THSA. The Parties explain that

---

9 Form CO, THSA, paras 6.9-6.10.

10 Case COMP/M.6410 – *UTC/Goodrich*, paras. 94 and 98.

11 Case IV/M.1493 – *United Technologies/Sundstrand*, p. 19; Case COMP/M.2183 – *Smiths Industries/TI Group*, para. 8; case COMP/M.2892 – *Goodrich/TRW Aeronautical Systems Group*, para 10; case COMP/M.6410 – *UTC/Goodrich*, para. 96.

12 Form CO, THSA, paras 6.31-6.34.

THSAs are sometimes tendered together with either the PFCA or the SFCA. They reckon however that in most cases, they are sourced standalone.[13]

(30) In the Notifying Party's' view, in line with the Commission precedent, the size of the aircraft does not further segment the market for THSAs. UTC sees the technology as largely scalable and believes that all THSA producers are capable of supplying any size of aircraft[14]. Furthermore, UTC submits that no dividing line between small and large aircraft is possible to be drawn in this respect.

(31) The Notifying Party considers[15] there is no important distinction between civil and military applications for THSA systems. In the vast majority of cases, THSA products on civil and military applications are similar. The Notifying Party explains that this is because THSA systems are only used on military transport aircraft, rather than specialized military combat aircraft (*e.g.*, fighter jets), which are similar to the commercial application. Moreover, the same suppliers are generally active in both civil and military applications and there will therefore be a similar number of alternative suppliers under either market definition post-Transaction.

(32) The Notifying Party however argues[16] that THSAs can be differentiated according to the technology they use into hydraulic and electric THSAs. UTC submits that in general, large commercial aircraft utilise mechanically controlled hydraulic motors, where the motor provides additional speed, force and reliability needed to move the heavier control surfaces used by the large aircraft. Most regional and business jets on the other hand utilize electric THSAs as less power is required and electric THSAs are lighter in weight and more efficiently operated. The Parties however acknowledge that there have been some exceptions, such as the B787 and A350, large commercial aircraft that use electrical THSAs, and regional and business jets that use hydraulic THSAs, such as the Gulfstream G550.

(33) As concerns the pricing of THSAs, the Notifying Party submits that hydraulic THSAs are significantly more expensive than electric ones, hydraulic ranging from USD […] to USD […] while Rockwell Collins' electric THSAs cost in general USD […]. The […]'s electric THSA fell into the price range of the hydraulic, however, at USD […].[17]

(34) According to the Notifying party, not all suppliers are capable of manufacturing both types: Although UTC has electro-mechanical design capability, it only manufactures hydraulic THSAs[18] whereas Rockwell Collins produces only electro-mechanical ones and claims not being able to manufacture the hydraulic variant. The Notifying Party submits that the hydraulic system alone constitutes half of the price of a hydraulic THSA, limiting supply side substitutability.

---

13 E.g. for the […], the THSA was tendered as part of the PFCA, whereas […] has tendered all THSAs separately for all platform in the past 10 years.

14 The Parties also note that THSAs are only present on the more sophisticated aircraft, most business jets and smaller aircraft do not have THSA systems.

15 Form CO, THSA, para 6.31.

16 Form CO, THSA, para 6.37.

17 Form CO, THSA, para 6.15.

18 The […] supply an electric THSA system.

(35) The results of the Commission's market investigation confirmed the Parties' argument that THSAs were indeed a separate market from the rest of the actuators due to the absence of demand side substitutability and the limited supply side substitutability.[19]

(36) Market participants also confirmed that size of the aircraft did not matter, as scaling up was not an issue for suppliers from a technology standpoint: specification and characteristics of THSAs are always unique and associated to the aircraft type, size and load which they are designed for.[20]

(37) As regards military THSA, respondents mostly thought that in principle they are to be differentiated from civil applications, as the structure of the aircraft that the THSA is mounted on is differed and prices for military THSAs are significantly higher, as platform size did not allow allocating the fixed development costs across a large number of products. It was noted, however, that in general, as also true for the military application, the THSA is custom made for the platform and in this respect commercial and military THSAs were similar.[21]

(38) As regards a sub-segmentation into hydraulic and electro-mechanical THSA, from a technological perspective hydraulic and electric THSAs are different, prices are usually different and the market investigation confirmed that the aircraft OEM will set the aircraft design requirements and specify if they are seeking hydraulic or electrical actuation in most cases.[22]

(39) However, some respondents have also submitted that airframers may ask for studies for both solutions (electric or hydraulic) in some early requests for information. They also explained that electro-mechanical THSAs are gradually replacing hydraulic ones, independently of the size of the aircraft. Hydraulic THSAs and electro-mechanical THSAs have therefore gradually entered more and more in competition with each other.[23]

(40) Even if, in general, it appears that larger aircraft are more likely to use a hydraulic THSA, evidence shows that Rockwell Collins is already present on the […] and Moog on the […] with electro-mechanical THSA. Furthermore, some platforms have hybrid systems with both, hydraulic and electric THSA.

(41) The responding competitors pointed to some supply side substitution, too, stating that manufacturers with electro-mechanical capability could technically also start manufacturing hydraulic THSAs, as these are technologically simpler.[24]

---

19 See minutes of calls with THSA competitors on 30 November 2017, 10 January 2018 and 16 January 2018, see also replies to question 31 of Questionnaire 1 - Competitors.

20 See replies to question 31.3 to Questionnaire 2 - Airframers.

21 See replies to questions 8 and 31 of Questionnaire 1 - Competitors and question 30 of Questionnaire 2 - Airframers.

22 See replies to question 31 of Questionnaire 1 - Competitors and question 31 of Questionnaire 2 - Airframers.

23 See replies to question 32 of Questionnaire 1 - competitors.

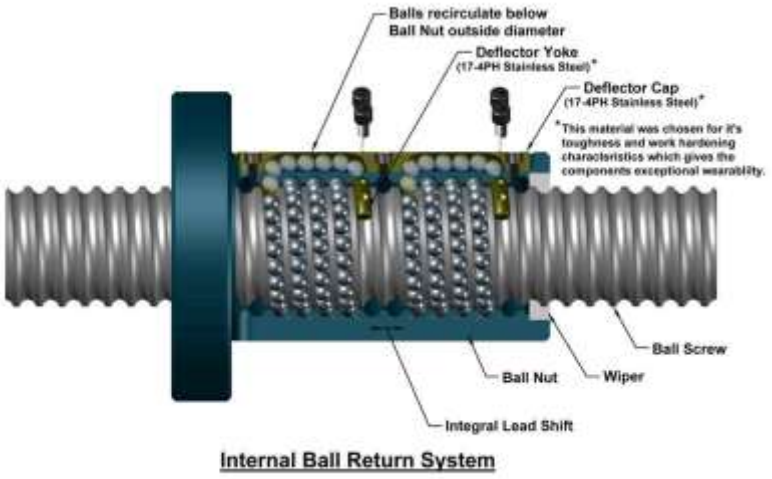
24 See minutes of calls with THSA competitors on 20 February 2018, see replies to question 31 of Questionnaire 1 - Competitors and replies to question 31 of Questionnaire 2 – Airfamers.

(42) In summary, the market investigation did not confirm the justification for further segmenting THSAs into electric and hydraulic THSAs. Therefore, for the purposes of the present decision the Commission considers that the market for THSAs will encompass both electric and hydraulic THSAs for any type of aircraft. Whether the relevant product market for THSAs is to be sub-segmented into civil and military application, will be left open.

6.1.3. Mechanical sub-assemblies for the THSA system: the ball screw

(43) The mechanical ball screw assembly is the main mechanical component of the THSA. Mechanical sub-assemblies include ball screws (a screw and nut assembly that has a rolling ball interface between the screw and nut to give efficient operation), as well as a trunnion assembly, a no-back, and all secondary load path devices. For the purposes of operating the THSA, the screw is rotated and the nut (which is prevented from rotating) translates rotational motion to linear motion.[25]

Figure 3 - Ball screw for the THSA



Source: Form CO.

(44) The ball screw constitutes a major proportion of the value of the THSA system, […] as reported by the Parties.[26]

(45) Only UTC is active in the manufacture of ball screws, Rockwell Collins is not.

(46) Other suppliers of THSA systems, e.g., Liebherr, Moog or Parker, do not have in-house design and production capabilities for ball screws either and will procure the ball screw assembly to specification.[27] Also Boeing has been sourcing components and integrated the THSA system internally.

(47) In a previous decision, the Commission discussed the market for ball screws for THSA and found that these sub-assemblies were specific to the THSA and could

25 Form CO, para 6.39.
26 See reply to question 60 of the Commission's RFI#1 on 21 December, 2017.
27 Form CO, para 6.40, confirmed by the market investigation, see replies to question 34 of Questionnaire 1 - Competitors.

not be used for other actuators.[28] The ultimate market definition was left open however.

(48) For the purposes of the assessment of this case, the Commission will consider the relevant product market for ball screws for THSAs. Even under this narrowest plausible market definition, no serious doubts arise as to the compatibility of the Transaction with the internal market.

6.2. Pilot Controls

6.2.1. Introduction

(49) Pilot controls are equipment directly accessible to the pilot in the cockpit providing the man-machine interface for piloting functions (speed up, brake, land, etc.). Pilot controls typically include throttle quadrants, joysticks and yokes, rudder pedals, flight deck control suites, active side stick units, thrust control assemblies, different kinds of levers (flap slat lever, landing gear control lever, braking control lever, speedbrake lever) and nose wheel steering handles[29]. Pilot controls are based on three main technologies: (i) mechanical or manual, (ii) hydro-mechanical / hydraulic, and (iii) fly-by-wire[30].

(50) The Parties' activities only overlap with regard to three types of pilot controls:

(a) Pilot control sticks (hereinafter also referred to as 'sticks'), that is center yokes and sidesticks, whereas Rockwell Collins manufactures and sells center yokes (but no sidesticks), and UTC manufactures and sells sidesticks (but no center yokes). Pilot control sticks are used primarily to control an aircraft's elevators and ailerons. The elevators are part of the tail, at the rear of an aircraft, and they adjust an aircraft's pitch. This allows the pilot to change the angle of attack, increasing or decreasing the altitude. The ailerons form part of the trailing edge of the wings, and they help to control the aircraft in roll[31].

- Center yokes consist of a grip positioned on a central column front and center for both the pilot and co-pilot. Rotating the control wheel moves the ailerons and rolls the axis. Fore and aft movements of the control column move the elevator and change the pitch of the axis[32].

- A sidestick is located on the side console of the pilot. Sidesticks convert the pilot's hand movements into electrical signals, which are then processed by the aircraft's computers to determine how to move the control surfaces to best achieve what the pilot wants. This replaces mechanical linkages and means that pilot inputs do not directly move the control surfaces[33]. Most sidesticks today are 'passive' sidesticks meaning that there is no tactile feedback from

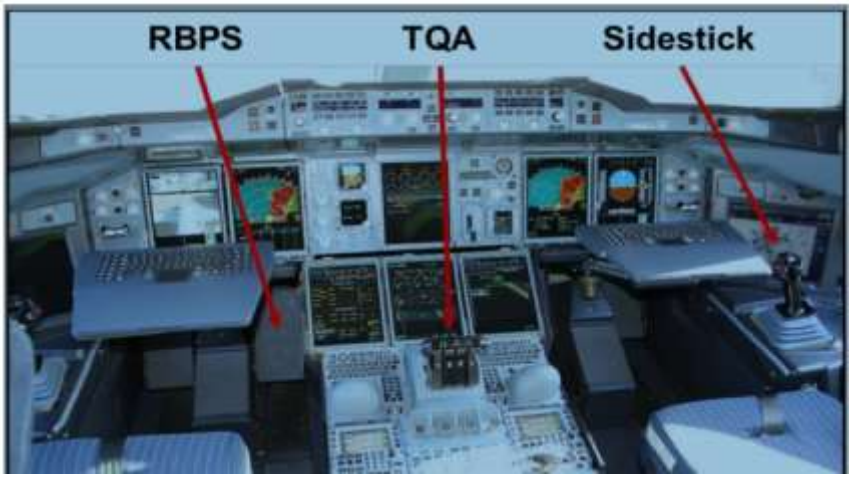
28 Case COMP/M.6410 – *UTC/Goodrich*, paras 102ff.
29 Case M.8425 – *Safran/Zodiac Aerospace*, para. 183.
30 Form CO, Pilot Controls, para. 6.2.
31 Form CO, Pilot Controls, para. 6.5.
32 Form CO, Pilot Controls, para. 6.6.
33 Form CO, Pilot Controls, para. 6.11.

the aircraft or the other pilot. 'Active' sidesticks, introduced only recently, provide tactile and visual feedback in response to pilot and autopilot commands but have not yet been widely adopted in the commercial aircraft space[34].

(b) Rudder brake pedal systems ('RBPS') are located on the floor in front of the pilot. They control the rudder, as well as the brakes on the wheels while the aircraft is touching the ground. The rudder is a vertical flight surface typically attached to the fin (or vertical stabilizer). It allows the pilot to control the yaw of the vertical axis to change the horizontal direction in which the nose is pointing[35].

(c) The throttle quadrant assembly ('TQA') is normally located on the centre console, between the pilot and first officer. It allows the pilot to control the fuel flow in an aircraft, which determines the engines' thrust[36].

Figure 4 - Pilot controls in a cockpit



Source: Form CO.

6.2.2. Relevant product markets

(51) Pilot controls have been subject of Commission precedents only to a limited extent. The Commission previously noted that, according to its market investigation, the pilot controls have very different functions, technologies, requirements, procurement and suppliers and therefore the claim that no distinction should be made between different pilot controls for the purpose of a market definition was not confirmed. However, ultimately, the exact product market definition was left open[37].

34 Form CO, Pilot Controls, paras. 6.14, 6.15.
35 Form CO, Pilot Controls, para. 6.16.
36 Form CO, Pilot Controls, para. 6.18.
37 Case M.8425 – *Safran/Zodiac Aerospace*, paras. 188-191.

6.2.2.1. The Notifying Party's submission

(52) In line with this precedent, the Notifying Party submits that center yokes, sidesticks, RBPS and TQA should all be considered separate products market due to the lack of demand side substitutability and only limited supply side substitutability between the different types of pilot controls[38].

(53) This segmentation should apply both for civil as well as for military applications[39]. Furthermore, no segmentation should be made according to different type of technology[40]. Ultimately, the Notifying Party claims the market should not be further segmented by the type of aircraft (large commercial, regional or business jet)[41], referring by analogy to the decision in *UTC/Goodrich*[42], where the Commission concluded that markets for actuations systems should not be further segmented according to the size of the aircraft[43].

(54) In particular as regards the distinction between the pilot control sticks 'center yokes' and 'side sticks', the Notifying Party maintains that these pilot controls belong to separate markets, which are not affected markets for the purpose of this Transaction. Whereas from a demand-side perspective, yokes and sidesticks perform the same function, both pilot controls are strongly differentiated and subject to airframers' particular preferences (historical design, engineering philosophy). The Notifying Party finally argues from a supply-side perspective that it would be difficult for a supplier of sidesticks to manufacture center yokes and *vice versa*[44].

6.2.2.2. The Commission's assessment

(55) The results of the Commission's market investigation confirmed the Notifying Party's approach to assume separate product markets for pilot control sticks, the RBPS and TQA.

(56) A regards demand side considerations, the vast majority of respondents confirmed that sticks, RBPS and TQA are not substitutable with one another and that they do not have similar prices. Some respondents put forward that the pilot controls have similar technical characteristic, but this was not the majority[45]. One customer responded that "*[d]espite the fact that they are all part of cockpit control, sticks, RBPS and TQA do not have the same function and are not used in the same way (RBPS is used with the feet when the others with the hand). In this context, it is not the same loads that can apply the pilots (i.e. Pilot is able to develop much higher loads with the legs than with the hand).*", whereas another

38 Form CO, Pilot Controls, paras. 6.30 – 6.32.
39 Form CO, Pilot Controls, para. 6.34.
40 Form CO, Pilot Controls, para. 6.33.
41 Form CO, Pilot Controls, para. 6.35.
42 Form CO, Pilot Controls, para. 6.35.
43 Case COMP/M.6410 – *UTC/Goodrich*, para. 98.
44 Form CO, Pilot Controls, paras. 6.37 – 6.40.
45 See replies to question 48 of Questionnaire 1 – Competitors; Replies to question 50 of Questionnaire 2 –Airframers.

stated that "*[s]ticks, RBPS, and TQA are technically different. These products perform different functions*"[46].

(57) The results of the market investigation showed further that there are are no clear indications of sufficient supply side substitutability to include the products in the same relevant market. Even if there are opinions that a supplier of one kind of pilot controls (sticks, RBPS, TQA) may easily start producing another kind of pilot controls, this has been challenged by roughly the same number of respondents in the Commission's investigation[47].

(58) Furthermore, there is no differentiation required as regards the type of the aircraft. Market participants widely agreed that it would not make a difference if the pilot controls are used on a large commercial aircraft, regional aircraft or business jet[4849].

(59) In relation to sidesticks and center yokes, the majority of responses to the market investigation concurred that sidesticks and center yokes are not fully substitutable with one another and that they lack similar technical characteristics. There are differences in prices, even though there is a wide understanding that the purpose of sidesticks and center yokes is the same[50]. As regards the supply-side substitutability, the investigation produced a mixed picture. Some respondents believe that a sidestick manufacturer can easily start producing center yokes and *vice versa*[51]. Others disagree however. One respondent mentioned that: "*Sidesticks and centre yokes may have similar technical characteristics; but sidestick controls 2 axes and centre yoke controls 1 axis*"; and another submitted that "*Suppliers of side sticks can NOT easily start producing centre yokes because the technology of the 2 products is different*"[52].

(60) However, it should be noted that a majority of market participants takes the view that sidesticks and center yokes do compete[53]. This is explained by the fact that "*[s]ide sticks supplier may influence aircraft manufacturers to move from center yokes (older technology) to side stick (newer technology (...))*"[54]

---

46 See a reply to question 50 of Questionnaire 2 –Airframers.

47 See replies to question 48 of Questionnaire 1 – Competitors; replies to question 50 of Questionnaire 2 – Airframers.

48 See replies to question 48.2 of Questionnaire 1 – Competitors. Replies to question 50.2 of Questionnaire 2 – Airframers.

49 As regards a potential segmentation according to either civil or military use of an aircraft, the Commission's market investigation did not provide sufficient evidence that such segmentation should be made for the purpose of the product market definition - Replies to question 30 of Questionnaire 2 – Airframers.

50 See replies to question 51 of Questionnaire 1 – Competitors; Replies to question 51 of Questionnaire 2 – Airframers.

51 See replies to question 51 of Questionnaire 1 – Competitors; Replies to question 51 of Questionnaire 2 – Airframers.

52 See replies to question 51.1 of Questionnaire 2 – Airframers.

53 See replies to question 52 of Questionnaire 1 – Competitors.

54 See a reply to question 52.1 of Questionnaire 1 – Competitors.

(61) On the other hand, the analysis of bidding data submitted by the Notifying Party[55] and other market participants in regards of sticks led to the following result:

Table 1 - Analysis of bidding data for pilot control sticks[56]

Aircraft type[57]	Total number of tenders (either sidesticks or center yokes)	Number of tenders in which both Parties bidded
Large commercial aircraft	[…]	[…]
Regional aircraft	[…]	[…]
Business jet	[…]	[…]
Military aircraft	[…]	[…]

(62) The Commission notes that there were in total […] tenders for sticks, but the Parties tendered only in […] of these against each other.

(63) Based on the information submitted by the Notifying Party and obtained as part of the market investigation, the Commission considers justified at this stage of the proceedings to define a distinct product market for each of certain types of pilot controls, namely sticks (center yokes and sidesticks), RBPS and TQA, given their different functions, technologies and prices, irrespective of the underlying technology, the type of aircraft or its civil or military use, respectively.

(64) As regards sidesticks and center yokes in particular, there are strong indications that both pilot controls belong to separate product markets, namely based on different technologies and their exclusive character (once an aircraft has been designed with center yokes, it appears economically disproportionate to switch to sidesticks, and *vice versa*). This applies particularly due to only a very low degree of competition between those two pilot controls as demonstrated by the past tenders, where the Parties competed only […] times against each other out of […] tender opportunities In any event, the exact product market definition in this regard can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

---

55 Reply of the Parties to the Commission's RFI#1 and RFI#3 on bidding data on 25 January, 2018 and on 25 February respectively.

56 Source: European Commission. The table does not contain tenders relating to future opportunities (that means that there is no award yet).

57 The split between different kinds of aircraft types solely reflects the split in the submitted data and does not indicate any split between different aircraft types for the purpose of the relevant product market definition.

6.3. Ice Protection

6.3.1. Introduction

(65) Ice protection systems are used to prevent the accretion of ice on aircraft surfaces or remove accreted ice, in particular, on propellers and the leading edges of aircraft wings. The systems operate either by preventing the initial accretion of ice or by periodically removing any ice which has formed[58].

(66) There are several applications for ice protection on an aircraft, such as on wings, on the vertical and horizontal stabilizers, on windshields, sensors, etc.[59].

(67) Furthermore, ice protection products for the same application on aircraft may utilize different kinds of technologies, such as pneumatic ice protection, thermal-pneumatic ice protection, chemical ice protection, electro-thermal ice protection and electro-mechanical expulsion ice protection[60].

(68) The Parties are both active in ice protection systems for wings and propeller heaters with the overlap concerning mainly general aviation aircraft. UTC manufactures wing ice protection products based on the pneumatic ice protection technology and to a certain extent electro-thermal technology, and propeller ice protection products based on electro-thermal technology as well as chemical technology. Rockwell Collins produces wing ice protection products based on pneumatic ice protection technology and propeller ice protection products based on electro-thermal technology as well as chemical technology[61,62].

6.3.2. Relevant product markets

(69) There are no Commission precedents as regards ice protection products on aircraft.

6.3.2.1. The Notifying Party's submission

(70) The Notifying Party proposes to define different ice protection markets based on the application on the aircraft. It argues that there is no demand substitution between ice protection products designed for different applications, that

---

58 Form CO, Ice Protection, para. 6.1. For the purpose of this decision, the term 'ice protection' or 'ice protection systems', respectively, is used both for systems that prevent the accretion of ice and for systems that remove already accreted ice.

59 Form CO, Ice Protection, para. 6.39.

60 Form CO, Ice Protection, para. 6.7-6.28.

61 Parties' reply to question 35 of RFI 3 pre-notification of 7 February 2018, as regards the production of ice protection products for propellers based on chemical technology.

62 The Parties overlap in a third product: engine inlet de-icers. These can be either pneumatic or elastromeric and are designed to protect the inlets placed on the wings. According to the Notifying Party, the combined turnover does not exceed EUR […] and the Parties' combined market share is [0-5]% (Form CO, Ice Protection, paras. 6.55 and 6.56). Considering the very limited size of this activity and hence a very limited potential impact on competition as well as the lack of complaints in the market investigation, this product will not be discussed further in the decision.

procurement for each application is carried out separately, and that the supply-side substitution is limited[63].

(71) Hence, the Notifying Party submits that there are two relevant product markets:

(a) for wing ice protection products; and

(b) for propeller ice protection products (that are sometimes also referred to as 'propeller heaters').

(72) In the Notifying Party's view, the relevant product market for wing ice protection also includes ice protection products for vertical and horizontal stabilizers, as there is, as opposed to other applications on aircraft, a high degree of supply-side substitutability since most of wing ice protection suppliers also offer ice protection products for vertical and horizontal stabilizers[64].

(73) The Notifying Party also claims that further segmentations by aircraft type are not warranted[65].

(74) Furthermore, according to the Notifying Party, no distinction should be made between sale of ice protection products on the original equipment market and on the aftermarket[66].

(75) Finally, for wing ice protection products in particular, the Notifying Party brings forward that the relevant product market shall comprise all ice protection technologies that could be used on aircraft that might use pneumatic ice protection. In the Notifying Party's view this excludes thermal-pneumatic ice protection systems (also referred to as 'bleed air systems') as these are used primarily on large commercial aircraft, regional jets and large business jets, which are types of aircraft that do not use pneumatic ice protection[67].

(76) Since virtually all propeller ice protection products utilize the same technology (electro-thermal), no distinction should be made in consideration of the technology in the opinion of the Notifying Party[68].

6.3.2.2. The Commission's assessment

(77) The results of the Commission's market investigation did not indicate anything to the contrary that each ice protection application on the aircraft constitutes a separate product market. More specifically, the market investigation confirmed, in line with the Notifying Party's' view, that ice protection on wings and (vertical and horizontal) stabilizers belong to one product market.[69] One respondent

63 Form CO, Ice Protection, para. 6.40.
64 Form CO, Ice Protection, para. 6.41.
65 Form CO, Ice Protection, para. 6.43.
66 Parties' reply to question 101 of RFI 1 pre-notification of 14 November 2017; Form CO, Ice Protection, footnote 77.
67 Form CO, Ice Protection, para. 6.45.
68 Form CO, Ice Protection, para. 6.46.
69 See replies to question 120 of Questionnaire 1 – Competitors; Replies to question 118 of Questionnaire 2 –Airframers.

pointed out that as regards ice protection for wings and stabilizers "*same physics, same thermodynamics*" apply[70].

(78) However, respondents to the market investigation indicated a further relevant segmentation of the product market by technology for wing ice protection and horizontal and vertical stabilisers. Whereas pneumatic, thermal pneumatic, thermal electric, chemical and electro-mechanical ('EMEDS') ice protection technologies exist for wing ice protection and vertical and horizontal stabilizers, only thermal electric and chemical are the technical options for propeller heaters[71].

(79) For wing ice protection, according to the market participants, the technologies are not substitutable with each other. Whereas the intended use is identical, the majority of respondents held that ice protection systems of these kinds differ in product characteristics and price and are not substitutable with one another in general. Respondents to the market investigation explained that "*[t]he different methods are technically different and thus not substitutable with one another*" and supported the opinion that "*these technologies are not generally interchangeable*". Additionally, suppliers using certain technologies cannot easily start producing wing ice protection using other technologies[72]. Relating to supply side substitution, it was stated that "*[i]t is a significant investment for a supplier to add the capability of another technology (eg it is a significant undertaking for an electro-thermal supplier to add chemical technology, it is a significant investment for a pneumatic supplier to add electro-mechanical technology, etc)*"[73].

(80) This result is supported by further replies received during the market investigation demonstrating that different technologies for wing ice protection cannot be used on all types of aircraft. Market participants stated, among others, that "*[p]neumatic de-icing could certainly hardly be implemented on certain commercial aircraft (…)*" and that "*[d]e-icing [technologies are] generally used on smaller, slower aircraft [whereas] [a]nti-icing (higher performance) [are] generally used on larger faster (jet category) transports*"[74]

(81) The Commission notes that replies from the market investigation do not distinguish between different ice protection products solely in view of the type or size of the aircraft but rather point out that the suitability of an ice protection technology depends on several technical criteria such as the aircraft speed or the wing material. Certain technical criteria may be more common for certain types of aircraft but a type or size of an aircraft, respectively, does not necessarily determine specific technical criteria[75].

---

70 See a reply to question 120 of Questionnaire 1 – Competitors.

71 Form CO, Ice Protection, para. 6.39 including Table 3.

72 See replies to question 119 of Questionnaire 1 – Competitors; Replies to question 117 of Questionnaire 2 – Airframers.

73 For all quotes in this paragraph: See replies to question 119.1 of Questionnaire 1 – Competitors.

74 For all quotes in this paragraph: See replies to question 119.1 of Questionnaire 2 – Airframers.

75 As regards a potential segmentation according to either civil or military use of an aircraft (this applies both for wing and stabilizer ice protection as well as for propeller ice protection), the Commission's market investigation die not provide sufficient evidence that such segmentation should be made for

(82) For propeller ice protection products, the market investigation indicated that propeller ice protection products are in general substitutable in terms of prices (the prices are different in absolute terms but similar in proportion to the size of the propeller) and the intended use, but may, however, differ in terms of certain technical criteria[76].

(83) Furthermore, according to the majority of the market respondents, the original equipment sales market and the aftersales market should not be considered as separate markets in ice protection products[77]. One respondent explained that "*[t]he aftermarket is not necessarily independent from the OE market due to the fact that suppliers normally protect their right to distribute the product, unless you are licensed by the OE to do so.*"[78]

(84) The Commission concludes that for the purpose of defining the relevant product markets for ice protection products on aircraft, different technologies (such as pneumatic, thermal-pneumatic, electro-thermal, chemical, electro-mechanical expulsion), each form a separate product market.

(85) The Commission further concludes that as regards the specific ice protection applications on wings and stabilizers, these belong to the same product market.

(86) There are strong indications for separate markets of the applications of ice protection products on aircraft (wings, propellers, etc.). Therefore, the Commission concludes that, except for the specific constellation of wings and stabilizers, the relevant product market is to be segmented according to different applications for ice protection products.

(87) In conclusion, the Commission takes the view that no further segmentation of the relevant product markets should be made according to the type or size of an aircraft and between original equipment sales market and the aftermarket.

6.4. Oxygen systems

6.4.1. Introduction

(88) Oxygen systems provide supplemental oxygen to passengers and crew members for specific situations or for the provision of emergency oxygen in the event of smoke, fire, fumes, or loss of cabin pressure. They are present throughout the aircraft, and are a regulatory requirement for aircraft which fly above a certain altitude.

(89) Oxygen systems consist of a number of individual yellow oxygen masks stored in the compartments near passenger seats (as presented in Figure 5) and near areas like lavatories and galleys, and an oxygen source, such as a centralized gaseous cylinder or decentralized chemical oxygen generator. A chemical

---

the purpose of the product market definition – See replies to question 30 of Questionnaire 2 – Airframers.

76 See replies to question 121 and 121.1 of Questionnaire 1 – Competitors; replies to question 120 and 120.1 of Questionnaire 2 – Airframers.

77 See replies to question 122 of Questionnaire 1 – Competitors; replies to question 121 of Questionnaire 2 – Airframers.

78 See a reply to question 121 of Questionnaire 2 – Airframers.

oxygen generator system connects to a limited number of masks in a certain compartment (*e.g.*, above a passenger seating row). Pulling a mask will trigger the supply of oxygen which will last for at least 15 minutes. The entire system can usually be reset in the cockpit or in some other location in the aircraft.[79]

Figure 5 - Oxygen systems



Source: Form CO.

(90) Aircraft also typically have portable oxygen systems on board for the crew. Portable systems exist in different forms: masks connected to portable devices, or even hoods.

6.4.2. Relevant product market

(91) The Notifying Party considers that oxygen systems form part of a single relevant product market for civil applications.[80] According to the Notifying Party, all oxygen systems, across all aircraft types, both portable and non-portable, have similar underlying technology and a similar production process. Further, oxygen systems generally perform the same function, and are held to the same regulatory requirements, regardless of aircraft type. Moreover, all main market players offer a full range of oxygen systems.[81]

(92) The Commission has not previously considered the market for aircraft oxygen systems.

(93) The market investigation has not brought any evidence that would go against the Notifying Party's proposed market definition. Further, any potential segmentation of the oxygen market (by aircraft type or between portable and non-portable oxygen systems) would have no impact on the competitive assessment. The precise market definition for oxygen systems can therefore be left open.

---

79 Form CO, other products, paragraphs 6.3 to 6.6.

80 Military applications are different from a technological perspective. If military applications are include in the oxygen market, the market share of Rockwell Collins would be lower according to the Notifying Party ([30-40]%). This share is however likely to be underestimated as it is unclear whether all companies identified by the Notifying Party are indeed active in the oxygen sector.

81 Form CO, Other products, paragraphs 6.11.

(94) Furthermore, the Notifying Party suggests that while they may often be incorporated into them, oxygen systems are a separate product from passenger service units (PSUs; for a further discussion of PSUs, see section 6.7).

(95) The results of the Commission's market investigation broadly confirmed that there is no strong preference in the market for PSUs and oxygen bundles. Furthermore, market bids for PSUs and oxygen systems have been seen both separately (for instance the latest Boeing 777X tender) and together.

(96) On this basis, the Commission maintains that oxygen systems may be considered a separate product market from PSUs.

6.5. Aircraft seating

6.5.1. Introduction

(97) There are two basic types of aircraft seating:

(a) Passenger seating and crew seating. Passenger seating is located in the aircraft cabin and is used by passengers. It is found on large commercial aircraft, regional jets, and business jets. Passenger seating, except for business jet passenger seating, can also be divided by class (e.g., economy class, business class, and first class, each with varying degrees of luxury).

(b) Crew seating is non-passenger seating used by the flight crew. It is divided into two types: pilot seating and cabin attendant seating ("CAS"). Pilot seating is located in the aircraft cockpit, and is used by the pilot and co-pilot. CAS is located throughout the aircraft, is used by flight attendants, and is also referred to as "flight attendant seating".[82]

(98) There is no overlap between the Parties in commercial aircraft passenger seating, which represents more than 90% of the overall aircraft seating business. Rockwell Collins produces commercial passenger seats, but UTC does not. The activities of the Parties overlap in business jets seating and CAS leading to affected markets in both areas. They also overlap in pilot seating without leading to affected markets.[83]

6.5.2. Business jets seating

(99) The Notifying Party argues that business jet passenger seating is found on business jets as well as on commercial airframes converted for private or business use. It differs from passenger seating found on large commercial aircraft and regional jets (although there is according to the Notifying party a

[82] Form CO, Aircraft seating, paragraphs 6.6 to 6.8.

[83] The Parties consider there are several differences between pilot seating and other forms of aircraft seating which warrant their being treated separately. Pilot seats must be able to move and be adjusted horizontally and vertically to a greater degree than passenger seats and must conform to more stringent crashworthiness standards. For these reasons, the Parties consider that pilot seating constitute a distinct market which has been overall confirmed by respondents to the market investigation. The Parties achieve a combined market share of [10-20]% in pilot seating. Therefore pilot seating will not be assessed further in this decision.

degree of functional overlap with commercial first-class seating). First, business jet passenger seating typically is highly adjustable; it can often be made to lie completely flat, and more advanced models have a wide range of motion along running tracks. Second, business jet passenger seating can take several forms in addition to upright seats, such as corner units, divans, and even pull-out bed divans. Third, business jet passenger seating is mostly bespoke and is usually manufactured to a higher standard for passenger comfort (premium leather, integrated heating and internet connectivity).[84]

(100) In a previous case, the Commission considered a segmentation between commercial and business jet seats and a further segmentation of commercial seats into first, business and economy class, but left the ultimate market definition open.[85]

(101) A majority of respondents to the market investigation have confirmed that in general business jet seats are materially different from and therefore not interchangeable with passenger commercial aircraft seating (LCA or regional jets).[86] Respondents have in particular submitted that passenger seating for business jets are specific in the functions and in the variety of configurations sought, notably in relation to size, customization, material, complexity, functionality and testing requirements.

(102) However, the question whether business jets seats belong to a separate market or to the overall market for passenger seats (where there is no overlap between the Parties 'activities) can be left open as the transaction does not raise serious doubts regarding its compatibility with the internal market even on a narrow market for business jets seats.

6.5.3. Cabin attendant seating

(103) As with pilot seating, the Notifying party submits that there are differences between CAS and other forms of aircraft seating. CAS has a different form from other seating, as it is often stowable and wall mounted. Additionally, CAS must undergo more stringent crashworthiness testing than passenger seating, as it must be certified to a 16G standard while the industry standard for passenger seating is currently 9G and 12G.[87]

(104) The Commission has not previously considered the market for CAS.

(105) Respondents to the market investigation have in general confirmed that cabin attendant seating are materially different from and therefore not interchangeable with pilot seating[88], notably because pilot seating has many more control and requirements and certification paths than an attendant seat.

---

84 Form CO, Aircraft seating, paragraph 6.11.

85 Case M.8305 – *Rockwell Collins/BE Aerospace*, para. 14.

86 See replies to question 70 of Questionnaire Q2 - Airframers and replies to question 72 of Questionnaire 2 - Competitors.

87 Form CO, Aircraft seating, paragraph 6.25.

88 See replies to question 72 of Questionnaire 2 - Airframers and replies to question 75 of Questionnaire 2 - Competitors.

(106) However, the question whether cabin attendant seats belong to a separate market or to a broader market encompassing pilot seats (where the combined market share is around [10-20]%) can be left open as the transaction does not raise serious doubts even on a narrow market for cabin attendant seating.

6.6. Interior lighting

6.6.1. Introduction

(107) Interior lights illuminate the inside of the aircraft, back-light passenger signs, and cockpit displays and controls. Interior lighting includes main cabin lights (wash lights), reading lights, egress lights, and batteries (which show the way out of the aircraft in the event of an emergency), signage (such as information signs and exit signs), cockpit lights, and cargo lights.

6.6.2. Relevant product market

(108) The Notifying Party argues that all the above mentioned products listed in paragraph (107) belong to the same relevant product market given the degree of supply- side substitutability. The Notifying Party also claims there is no reason to further segment this market by type of aircraft, or to differentiate between original equipment sales and after-market/ retrofit sales.

(109) Moreover, the Notifying Party argues that integrated interior lighting solutions (where the airframer contracts with cabin integrators either for a complete lighting system or for a floor-to-floor interior solution) should not be considered a separate market.

(110) In previous decisions, the Commission distinguished exterior lighting from interior lighting. The Commission also considered a segmentation of the different types of interior lighting products but ultimately left the exact market definition open[89].

(111) Respondents to the market investigation agree in general that interior lighting products have similar characteristics and they all agree that LED is the main technology used in the industry[90]. Not all of them share the view that a supplier of a certain type of product can easily switch production to another type of product[91]. The majority of respondents do not see significant differences in lighting products per type of aircraft but some respondents have singled out that lighting for business jets had different aesthetical requirements and a different economy of scale[92]. The majority of OEM respondents considered the aftermarket to be independent from the original sales market[93].

---

89 Case M.8305 – *Rockwell Collins/BE Aerospace*, paras. 26; case COMP/M.6410 – *UTC/Goodrich*, paras. 134, 138.

90 See replies to questions 94, 96 and 97 of Questionnaire 1 - Competitors and replies to questions 91, 95 and 96 of the Questionnaire 2 – Airframers.

91 See replies to question 94 of Questionnaire 1 - Competitors and replies to question 91 of Questionnaire 2 – Airframers.

92 See replies to questions 94.3 and 94.4 of Questionnaire 1 - Competitors and replies to question 91.2 of Questionnaire 2 – Airframers.

93 See replies to question 105 of Questionnaire 1 - Competitors.

(112) However, the question whether a further segmentation of the interior lighting market is warranted can be left open as the transaction does not raise serious doubts even on narrower markets for interior lighting.

6.7. Passenger Service Units

6.7.1. Introduction

(113) Passenger Service Units ("PSUs") are panels built into the aircraft cabin ceiling, above passenger seats, that contain a combination of components: typically a reading light, attendant call interface, air vent, seat-belt and no-smoking signs, and other passenger-related equipment.

6.7.2. Relevant product markets

(114) In the *UTC/Goodrich*, when assessing the market shares in the interior lighting market and in particular in the cabin signage category the Commission took into account PSU signage[94]. Against this background, the Notifying Party submits that a distinction should be made between PSUs and interior lighting, since PSUs combine lights and other components. The Notifying Party also argues there is no reason to further segment the market by type of aircraft as PSUs are generally only present on large and regional commercial aircraft[95]. According to the Notifying Party there is also no reason to distinguish between PSUs supplied directly to aircraft OEMs and PSUs integrated in floor-to-floor offerings.

(115) The airframers that responded to the market investigation found in general that PSUs and lighting do not have similar technical characteristics nor use similar technologies. The OEM replies were however more dispersed although the majority agree that switching production between the two products is not easy[96]. As explained above in section 6.4, some systems OEM considered that the PSU market should also include the oxygen system although views were split on this issue[97].

(116) Given that the transaction does not raise serious doubts regarding its compatibility with the internal market under any plausible segmentation, the exact product market definition of the PSUs market may be left open.

6.8. Potable water systems

(117) Potable water systems supply water on aircraft for use in sinks and food and beverage preparation, such as tea and coffee boilers. On smaller business jet aircraft, they are also used for immediate water consumption by passengers. The

---

94 Case COMP/M.6410 – *UTC/Goodrich*, paras. 727 and 728. Notwithstanding On a subsequent decision, when defining and assessing the interior lighting market, the Commission did not considered in any way PSUs – see case M.8305 – *Rockwell Collins/BE Aerospace*.

95 According to the Notifying Party, business jets may use a form of PSU, which are large, custom-made pieces. […] – see Form CO, section PSUs, para. 7.23.

96 See replies to question 109 of Questionnaire 1 - Competitors; and replies to question 106 of Questionnaire 2 – Airframers.

97 See replies to questions 110 and 110.1 of Questionnaire 1 - Competitors.

Notifying Party submits that wastewater systems are physically separate from potable water systems, and do not make use of the same equipment.[98]

6.8.1. Relevant product market: potable water systems

(118) The Commission has not yet examined potable water systems in its decisional practice.

(119) The Notifying Party submits that potable water systems should not be further subdivided according to the type of aircraft. According to the Notifying Party, potable water systems for all sizes of aircraft generally consist of the same essential components: water storage tanks, piping (*i.e.*, metal or plastic lines and tubes), water heaters, filtration or purification units, and a control and monitoring system. The Notifying Party submits that a competitor active in the supply of potable water systems to smaller aircraft can easily execute projects for larger ones.[99]

(120) Market participants confirmed that waste water systems and potable water systems were indeed two distinct systems. Sometimes, they report, airframers tender them separately and manufacturers tend to be different.[100]

(121) The market definition for potable water systems can be left open as the transaction does not raise serious doubt with its compatibility with the internal market under any alternative plausible market definition.

6.8.2. Components for potable water systems

(122) The Notifying Party submits[101] that potable water systems consist of several basic plumbing systems, including the storage tank, hose and valves, drain lines and masts, and faucets which hold and route water around the aircraft; filtration / purification systems, which keep the water safe to drink; and heating and control units, which monitor and keep the water liquid and prepare it to a desired temperature.

(123) UTC submits[102] that it […] manufactures […] of the components that are required to complete a potable water system and purchases the rest from competitors such as […].

(124) UTC is also active in the sale of components required to assemble and integrate potable water systems.

(125) The Notifying Party explains[103] that components are produced or procured and integrated by all competitors in the market.

98 Form CO, Potable Water Systems, para 6.1.
99 Form CO, Potable Water Systems, paras 6.11 and 6.12.
100 See e.g. minutes of a call with a competitor on 21 December 2017, replies to question 132 of Questionnaire 1 - Competitors.
101 Form CO, Potable Water Systems, para 6.4.
102 Form CO, Potable Water Systems, para 6.7.
103 Form CO, Potable Water Systems, para 6.25.

(126) In addition, airframers are also customers for components who design and integrate the potable water systems themselves and in the Notifying Party's assessment this is very widespread.[104]

(127) The Notifying Party therefore argues[105] that components and the complete potable water systems should form part of the same relevant product market.

(128) The Commission considers that it can be left open whether components for potable water systems are part of the market for complete potable water systems or whether they constitute separate input markets since no serious doubts arise as the compatibility of the Transaction with the internal market in this respect under the alternative plausible market definitions.

6.9. Maintenance Repair and Overhaul ('MRO') operations and spare parts

(129) In its previous decisional practice the Commission has differentiated four different types of MRO operations (i) line maintenance, (ii) heavy maintenance, (iii) engine maintenance and (iv) component maintenance.[106] The Commission concluded that a further differentiation could be made according to the aircraft type that is serviced.[107]

(130) The Parties are both active in component maintenance for all types of aircraft […]. UTC is also active in engine maintenance, but Rockwell Collins is not [description of the Parties' MRO activities].

(131) Component maintenance comprises inspection, test and alteration of specific equipment and components installed on an aircraft, which can be repaired and are of a significant value.[108] The investigation in this case has not resulted in evidence to deviate from the Commission's previous practice of defining a separate product market for component maintenance.

(132) As part of their component maintenance, the Parties provide MRO services related mainly to their own components and provide spare parts. In this respect, a Commission precedent considered a relevant product market for spare parts that was separate from the provision of MRO services.[109] Nevertheless, the

---

104 The Parties are aware of self-sourcing and design of by each of [description of the Parties' market intelligence regarding airframer self-sourcing].

105 Form CO, Potable Water Systems, para 6.3.

106 See for example case COMP/M.6410 – *UTC/Goodrich*, para. 174; case COMP/M.3280 – *Air France/KLM*, para. 39; case COMP/JV.19 – *KLM/Alitalia*, paras. 56-57.

107 Case COMP/JV.19 – *KLM/Alitalia*, paras 56-57.

108 See case M.8425 – *Safran/Zodiac Aerospace*, para 275.

109 See case COMP/M.6410 – *UTC/Goodrich*, paras. 182-191. In another precedent, the Commission also considered that the distribution of aerospace spare parts could be divided into different sub-segments, such as, on one hand, the distribution of large aerospace parts by airframe and component manufacturers, and, on the other hand, the distribution of small spare parts, requiring regular and quick replacement, by independent distributors. The Commission considered another possibility of separate segments for spare parts dedicated for large commercial aircraft and for general aviation/regional aircraft. The Commission also identified a possible distinction between spare parts dedicated for commercial aircraft and those for military aircraft. The Commission ultimately left open the precise scope of the relevant product market. See case COMP/M.4241 – *Boeing/Aviall*, paragraph 10.

provision of MRO services may also include the provision of spare parts, blurring the lines between those two types of activities.

(133) MRO services, including component maintenance, are provided either by:

(a) The original system, equipment or component manufacturers ('OEM', such as the Parties) providing MRO services with regard to their own system, equipment or component;

(b) The airlines and airline-owned MRO service providers (such as Lufthansa Technik or Air France Industries, BA Iberia or Air Canada) servicing both their own fleet and that of third parties;

(c) Independent MRO service providers (such as ADAT, Haeco or AJ Walter) and

(d) Airframers (such as Airbus and Boeing).

(134) Airlines and airline-owned MRO service providers, independent MRO service providers and airframers usually offer MRO services for a broader portfolio of products or nose-to-tail ("NTT") MRO services. Once they have won the contract with an airline, they can either undertake the MRO services themselves or sub-contract it to the respective original system, equipment or component manufacturers.[110]

(135) In order for an MRO service provider to perform maintenance on any OEM's equipment, it requires the spare parts, licenses, specific tools and testing equipment, and the technical documentation and manuals how to service the equipment, most of which is obtained from the OEM of the component in question.

(136) The replies received to the Commission's market investigation in this case confirmed that all MRO service providers competed against each other in servicing the Parties' equipment.[111]

(137) Spare parts are sold by OEMs either as stand-alone products or as part of an MRO service. Spare parts can not only be supplied by the manufacturer of the original equipment but also by alternative third party spare part suppliers. For obtaining spare parts that are not OEM, different options exist[112].

(138) It is not necessary to conclude whether spare parts form part of the relevant product market for component maintenance (thus encompassing MRO services and spare parts) or whether separate markets for component MRO and component spare parts should be defined, since the Proposed Transaction does

[110] See case M.8425 – *Safran/Zodiac Aerospace*, paras. 278-279.

[111] See replies to questions 140 and 141 of Questionnaire 2 - Airframers, question 146 of Questionnaire 1 - Competitors and replies to question 44 of Questionnaire 3 – Airlines.

[112] Including the PMA ("Parts Manufacturer Approval"), third party replacement parts tested and approved by the US Federal Aviation Authority, the Owner Operator Produced Parts ("OOPP"), spare parts by the MRO operator or airline, second hand spare parts, or new components supplied by any alternative manufacturer holding a Supplemental or Supplementary Type Certificate ("STC"), for further details see case M.8425 – *Safran/Zodiac Aerospace*, paras. 281-284.

not give rise to serious doubts regarding its compatibility with the internal market under each of the alternative plausible market definitions.

6.10. ARINC

6.10.1. Introduction

(139) Rockwell Collins offers datalink network services and information technology solutions that enable air-to-ground and ground-to-ground secure communications[113]. Air-to ground services include both voice and data capabilities. These services are typically purchased by airlines and function as a virtual "pipe" through which data is transmitted from the aircraft to the parties on the ground, including an airline's operation centre, air traffic control, border control and airline partners (including component manufacturers that receive data to monitor components' performance).

(140) Rockwell Collins' datalink services are generally referred to as ARINC, the acronym of Aeronautical Radio Incorporated, a company which Rockwell Collins acquired in December 2013. At the time, ARINC also included a standard setting organisation which was not acquired by Rockwell Collins. ARINC's standard setting organisation was transferred to SAE International[114] instead. Since December 2013, the network and the standard setting organisation have operated as independent entities. Moreover, ARINC standards are developed and adopted by the Airlines Electronic Engineering Committee (AEEC)[115], which is part of SAE International.

(141) Rockwell Collins datalink networks consist of Very High Frequency (VHF) and High Frequency (HF) radio signals that are sent by a global network of land based radio stations and satellites. Satellite communications are purchased from satellite providers to supplement the (in-house) VHF and HF networks of datalink providers[116]. On the ground, Rockwell Collins uses a network of coper and fibre lines contracted from commercial telecommunication suppliers[117].These networks support air-to-ground and ground-to-ground communications, respectively. The primary functions of Rockwell Collins' datalink network services are set out in Figure 6.

---

113 "Air-to-ground" refers to the network services that connect the aircraft in the air with a variety of ground locations, such as: air traffic controls and airline operational controls. "Ground-to ground" refers to the network services that connect the airlines with a variety of third parties on the ground such as airports, governments/immigration authorities, ground handlers, other airlines and travel agents.

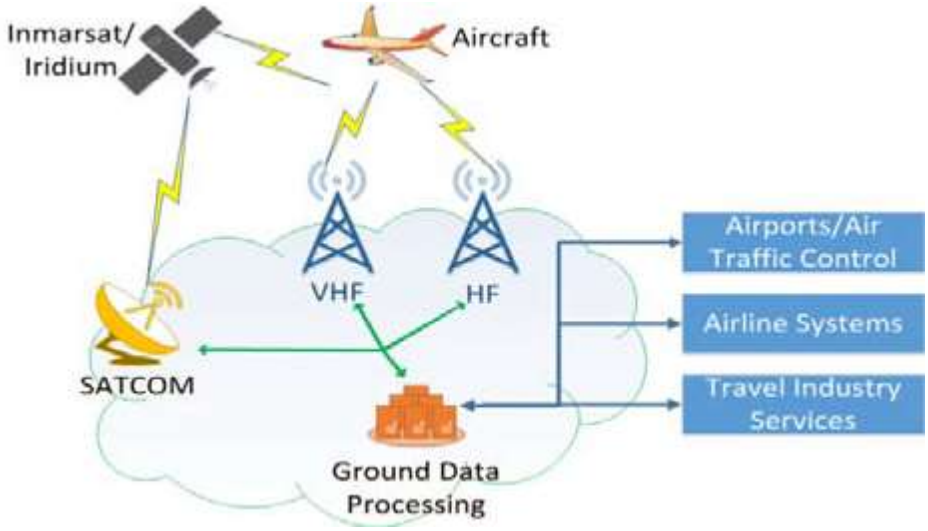
114 SAE international is a professional association and standards developing organization for engineering professionals in various industries- see https://www.sae.org/about/.

115 See: AEEC is a standard-setting committee whose members are airframers, OEMs component manufacturers, airlines and other aerospace players - see: https://www.aviation-ia.com/activities/aeec.

116 Inmarsat and Iridium sell satellite connectivity to datalink providers.

117 See Reply to RFI no 22.

Figure 6 - Primary functions of datalink network services



Source: Form CO.

(142) Data transmitted over the ARINC network uses the ACARS protocol[118]. The ACARS protocol is also administered by the AEEC. All datalink providers adhere to the open ACARS industry standards and all actual or potential users (network providers, avionics equipment manufacturers or airlines) have free access to this standard. When there is need to transmit an ACARS message on the ground-to-ground network, the message is formatted into an IATA Type B message[119].

(143) The datalink network services generally interface with an aircraft's radio system and its communications data management unit (CMU)[120]. Radios and CMUs are provided by avionics suppliers. Any equipment intended for use with ARINC, or other VHF/satellite network, must be tested to ensure that it will not cause disruption to the network and that it adheres to the requisite public specifications. ARINC and its primary competitor SITA - which operates an air-to-ground and ground-to-ground network with a similar geographical coverage- provide such qualification testing for aircraft radios and CMUs.

(144) ARINC does not test other systems or components that interface with the CMU on board of the aircraft, such as aircraft interface devices, flight management systems, aircraft condition monitoring systems or other aircraft health

118 ACARS stands for Aircraft Communications Addressing and Reporting System.

119 Ground to Ground messages are categorised as either IATA Type A or Type B. Type A messaging is a two-way (i.e. query and response) message traffic. Type B messaging, which accounts for approximately 80-901% of all traffic, is used for one-way message traffic that does not require a response. To uplink and downlink messages onto and from air-to-ground network a Message Processor formats the message to unsure it complies with the ACARS protocol or the Type-B format – See reply to question 5 of RFI no. 22.

120 Cockpit/ communication data management unit is a pilot interface device through which the pilot receives and replies to messages from air traffic control and airline operational controls.

management type of units. ARINC has a non-discrimination and confidentiality policy with regards to the testing of components for use in its network[121].

(145) Rockwell Collins' datalink network services are interoperable with avionics from other (non-Rockwell Collins) suppliers and Rockwell Collins' avionics can work with other competitors' datalink network services[122]. Furthermore, ARINC and SITA datalink networks function under open access standards. ARINC and its primary competitor SITA have reciprocal agreements to deliver each other's traffic at no cost in instances where, for example, an airline needs to send traffic to a ground control station operation on the other provider's network.

(146) The ARINC network functions as a utility for the transfer of data at the discretion of airlines. The airlines are the primary customers of datalink network services providers. The airlines own the data that is transmitted via the network and decide who has access to the data[123]. Rockwell Collins does not receive air-to-ground data from ARINC, nor does it have a connection to the ground-to-ground network. Rockwell Collins does not monitor data pertaining to its own components via ARINC[124].

(147) Third parties, such as component manufacturers and health management providers[125], may receive data from the aircraft directly from the data link network where two conditions are met: (i) they have a contract with datalink providers to establish the data usage rates; and (ii) the airline requests for traffic related to its fleet to be delivered to the third party. When the two requirements are in place, the airline and the third party receive the same data flow, at the same speed, pursuant to the Service Level Agreement executed between ARINC and the airline. Under the Service Level Agreement, Rockwell Collins is required to provide airlines on a regular basis with performance reports, which identify the actual performance statistics compared to the overall services goals listed in the Service Level Agreement (examples of service goals: above [90-100]% availability rate of datalink network services; above [90-100]% success delivery rate of uplink messages). The performance reports cover a number of metrics broken down by aircraft, geographic area, time periods, avionics systems and communication technologies[126].

(148) Alternatively, the airline can choose to receive the ACARS message from the data link network to its local ACARS terminal and subsequently route the ACARS message to the third party[127].

---

121 Rockwell Collins' qualification policy available online: https://www.rockwellcollins.com/-/media/Files/Unsecure/Services-And-Support/Information-Management/ARINC-Aviation/ARINC_GLOBALink_Avionics_Qualification_Policy.ashx.

122 See Form CO, Section datalink services, para 6.19.

123 Market participants have confirmed that airlines own the data and that OEMs need the airlines authorisation to access the data – responses to Follow-up questions of 6 and 9 April 2018.

124 See Form CO, Section datalink services, para 6.23.

125 In addition to the component or system manufacturer, airframers, airlines can also provide health management services, which consist of diagnostics of aircraft systems, maintenance requirement prognostics and component design improvements.

126 See Parties' response to pre-notification RFI no 2.

127 Airframer reply of 11 April to EC questions of 9 April.

(149) Three types of data are transmitted air-to-ground over the ARINC network: (i) air traffic control, (ii) airline operational control and (iii) performance data (that is to say engine and other components monitoring data). The Parties estimate that […] of the data transmitted pertains to traffic control, […] to airline operational control and […] to performance data.

(150) The performance data that is currently transmitted through ACARS messages on the ARINC or SITA networks pertains to the so-called "first generation performance data". The ACARS protocol sets a limit on the size of each individual message, making it possible to transmit only short low volume messages.

(151) Large sets of performance data used in advanced monitoring of the aircraft systems, so-called aircraft health management services[128], are currently offloaded when the aircraft is on the ground through commercial cellular and Wi-Fi networks, or manually (through the use of USB sticks or PCMCIA cards).

(152) Figure 7 is a diagram of the different data flows within the aircraft, from air-to ground and from ground-to-ground.

Figure 7 - Diagram of the different data flows

[…]

Source: Annex 4 Annex 4c-12 to Form CO, slide 38.

6.10.2. Relevant product market

6.10.2.1. The Notifying Party's views

(153) The Notifying Party submits that there is a high degree of substitutability among datalink network services that rely on different types of connectivity, including VHF and SATCOM as provided by ARINC and SITA. The Notifying Party explains that for safety and efficiency reasons, airlines generally have access to both ARINC and SITA networks. According to the Parties' estimates, […] of the airlines dual-source[129], having one network as the primary and the other as the secondary provider[130]. Despite some differences in the network coverage (as the two networks are not identical) the Parties submit that SITA supplies the same utility function as ARINC and is a direct substitute with respect to air-to-ground and ground-to-ground communication.

(154) The Notifying Party further submits that in addition to the ARINC and SITA networks, there are broadband satellite service providers making inroads into offering datalink services. Most of these providers started by offering passenger

[128] Aircraft health management services provide diagnostics of aircraft systems, maintenance requirement prognostics and component design improvements. These services rely on performance data generated by various sensors installed on aircraft systems. Such sensors generate large volumes of high-frequency data, such as vibration levels, speed, temperature, pressure, etc – see Parties' reply to questions 1 and 2 RFI no 7.

[129] Even when an airline does not have a contract with the datalink provider, it can still access the network of that provider on an *ad hoc* basis, but the unit price for data usage will be higher.

[130] The majority of airlines that responded to the Questionnaire confirmed that they dual source – See Replies to Question 17 of Questionnaire to Customers- Airlines.

inflight connectivity and today some also offer datalink services for the airlines operational use, such as real-time weather monitoring. This has resulted in the migration of same data traffic of ARINC and SITA's networks onto to these alternative networks according to the Notifying Party.

(155) Notwithstanding, the Notifying Party submits that the VHF/Satellite datalink networks do not have the bandwidth or the configuration to transmit large sets of data as the second generation network services which rely on broadband satellite solutions or other means of data transmission. According to the Notifying Party, in light of differing technology, suppliers and performance levels, first generation network services are wholly distinct from second generation network services.

(156) The Notifying Party further submits that a sub-segmentation of the datalink network services based on type of aircraft is not warranted. With the exception of helicopters which do not use these services, all other aircraft are offered and use these services in a similar manner.

6.10.2.2. The Commission's assessment

(157) The results of the Commission's market investigation have shown that the majority of airlines consider the datalink services offered by ARINC and SITA to be interchangeable. The geographic coverage difference has nonetheless been singled out[131]. In fact, while Rockwell Collins is the exclusive supplier of VHF in […], SITA is the exclusive supplier of VHF in […]. Nonetheless both airlines can provide coverage using other connectivity means[132]. The majority of OEMs therefore considered that ARINC and SITA compete[133].

(158) Market participants have also corroborated that large sets of data used in advanced health management services are offloaded when the plane is on the ground through cellular or Wi-Fi networks or manually[134] and that broadband connectivity providers which are already offering services related to passenger inflight connectivity and some cabin operational data could also in the near future transmit performance data[135].

(159) However, the question whether first generation and second generation datalink services constitute separate markets or belong to a single product market can be left open as the transaction does not raise serious doubts regarding its compatibility with the internal market under any of those segmentations.

---

131 See replies to question 18 of Questionnaire 3 - Airlines.

132 SITA has mentioned that it has satellite coverage in China – See SITA's reply to EC questions of 6 April 2018. The Parties submitted they also provide services in […] using HF or satellite instead of VHF – See Form CO.

133 See replies to question 156 of Questionnaire 1 – Competitors.

134 On this matter the Commission sent specific questions to two airlines, two airframers, two engine OEMs and a few datalink network providers. They all agree that the large sets of data required for health management is offloaded pre or post flight when the aircraft is on the ground using cellular or Wi-Fi connectivity or manually – Replies to 6 and 9 April EC questions.

135 Broadband provider's reply of 14 April 18 to the EC questions of 9 of April.

6.11. Inertial Measurement Units

6.11.1. Introduction

(160) Inertial Measurement Units (IMUs) are devices that sense rotation, acceleration, and occasionally the surrounding field (through gyroscopes, accelerometers and magnetic sensors). IMUs are often incorporated into Inertial Navigation System (INS).

(161) IMUs are often used in conjunction with positional tracking systems, such as Global Positioning Systems (GPS) receivers. Using IMUs on their own can lead to measurement errors that arise from continually integrating acceleration with respect to time to calculate velocity and position. Navigation systems often include GPS and IMUs to increase precision.

(162) IMUs can be categorised by performance, by their ability to work in different environment (space, air, land and maritime) and technology type (automotive and electronics).

6.11.2. Relevant product market

(163) UTC proposes to segment the market according to performance: high-grade IMUs for use in aircraft navigation systems; (ii) low-grade military IMUs for use in drones, missiles and land vehicles; and (iii) IMUs for use in consumer electronics, such as smartphones.

(164) While generally acknowledging the differences in performance levels, not all respondents to the market investigation agree with the specific segmentation suggested by UTC. One competitor adds another category for an ultra-high grade; while another considers five categories: strategic, navigation, tactical, industrial and consumer[136].

(165) As the transaction does not raise serious doubts regarding its compatibility with the internal market under the alternative plausible market definitions, the exact market definition for the IMUs market may be left open.

6.12. Military GPS receivers

6.12.1. Introduction

(166) The GPS is a radio-navigation system that provides geolocation data to users via satellite triangulation. Although the term has become synonymous with global positioning systems generally, it refers to the system operated by the United States. Other countries have developed their own radio-navigation systems, e.g. European Union's Galileo, Russia's GLONASS or China's BeiDou.

(167) GPS satellites broadcast two types of codes: (i) the unencrypted coarse/acquisition (C/A) code, which is made freely available to the public; and (ii) the restricted precision P(Y) code, which incorporates system to prevent potential interference with its signals through spoofing or jamming. In 1998, the

[136] See replies to question 6 of the Questionnaire_IMU_Competitors.

United States Joint Chiefs of Staff selected a Selective Availability Anti-Spoofing Module (SAASM) as the United States' preferred GPS security architecture. SAASM GPS systems are exclusively used in military applications under the control of the United States Department of Defence[137].

6.12.2. Relevant product market

(168) The Notifying Party considers that C/A code and SAASM GPS receivers constitute two separate markets. According to the Notifying Party, C/A code GPS receivers are manufactured by many suppliers for applications available to the public. By contrast, SAASM GPS receivers require authorisation from the United States Department of Defence both to manufacture and to purchase. They are used exclusively for military applications.

(169) Based on their use, the Notifying Party further segments the SAASM GPS receivers for aircraft applications and for non- aircraft applications.

(170) In a previous decision the Commission has considered the segmentation of the GPS receivers between commercial, military, and institutional but ultimately left the market open[138].

(171) Given that the transaction does not raise serious doubts regarding its compatibility with the internal market under the plausible alternative market definitions, the exact product market definition of the GPS receivers market may be left open.

6.13. Air data systems

6.13.1. Introduction

(172) Air data systems provide a range of flight parameters such as pressure, air speed, altitude, angle of attack and sideslip. Traditional, non-integrated air data systems rely on a combination of external probes (sensors), pressure transducers or air data computers. The more recent integrated air data systems rely on air data computers integrated in the sensors themselves ("smart probes") without pressure transducers or separate air data computers.

6.13.1.1. Air data sensors

(173) Air data sensors are exterior devices used to measure the aircraft air stream environment in terms of pitot (impact) and static (ambient) pressure[139], temperature, and angle of attack. They include air data probes, angle of attack sensors and temperature sensors. Air data sensors either use pressure transducers or air data computers (ADC) to convert external pressure information into an electronic signal. The pressure from air data probes can travel through pneumatic tubing into pressure transducers, which in turn provide electronic pressure signals directly to the aircraft avionics. Alternatively, an ADC can be

[137] See Parties' response to EC Questions on Vertical Issues, of 31 January 2018.

[138] Case COMP/M.3680 – *Alcatel/Finmeccanica/Alcatel Alenia Space & Telespazio*.

[139] Pitot pressure is the pressure that is measured by a Pitot tube, an open-ended tube connected to a pressure-measuring device

used to convert the outside pressure into signals, perform corrections and transmit the information to the avionics system[140].

(174) Air sensors are engineered to comply with system level requirements that are unique to each aircraft in terms of size, weight, power, and other key performance criteria.

6.13.1.2. Air data computer

(175) ADCs collect information from aircraft sensors and translate it into flight readings, including in particular altitude, airspeed, angle of attack, and temperature. ADCs require specific aircraft architecture, which allows for pneumatic tubing and wiring to connect the aircraft's probes to the ADC.

6.13.1.3. Smart probe

(176) Integrated air data systems combine the functionality of the sensing probes with an integrated air data computer into a single component that provides all critical air data parameters. This is a different technology from traditional air data systems and it has implications in the aircraft design, namely it can lead to a 50% weight saving when compared to the traditional air data systems because there is no need for pneumatic tubing, and there will be less electrical wiring.

6.13.2. Relevant product market

(177) In line with the Commission's precedent in *UTC/Goodrich*[141], the Notifying Party argues that air data probes form part of a single separate product market. According to the Notifying Party, despite the fact that air data sensors are engineered to comply with specifications unique to each aircraft, all major suppliers are able to manufacture air data probes for a range of different aircraft types and therefore a segmentation of this market per type of aircraft is not warranted.

(178) The Notifying Party is also of the opinion that air data computers are not interchangeable with pressure transducers, but depending on the design of the system, an air data system can use either pressure transducers or ADCs to convert external pressure information into an electronic signal.

(179) The Notifying Party further submits that integrated air data systems (smart probe) are not substitutable with traditional data systems. From a demand perspective, although for a new platform airframers may consider both systems in their trade studies, they make a choice early on in the process which results in very different air data system architecture. From a supply side perspective given the significant differences in technology, suppliers of traditional air data systems are not necessarily able to supply integrated air data systems.

(180) Based on the information collected from the Parties and third parties during the market investigation, the Commission considers that ADCs and air probes belong to separate markets due to their different characteristics and

[140] Form CO, Air Data Sensors section, para. 6.6.
[141] Case COMP/M.6410 – *UTC/Goodrich*, para 169.

functionalities. Regarding the question whether the smartprobe constitutes a separate market from the other air probes, indeed most of the market participants responding to the Commission's investigation recognised the particular features of this product, namely its capability to substitute a complete (traditional) air data system composed of probes, pneumatic tubing, air transducers and/or air computers[142].

(181) As the transaction will not raise serious doubts regarding its compatibility with the internal market under the alternative plausible market definitions, the exact market definition of each one of them may be left open.

6.14. Aircraft Engines

6.14.1. Introduction

(182) Aircraft engines power and propel the aircraft. UTC is active in the market for aircraft engines, operating through Pratt & Whitney, a subsidiary firm, as well as two joint ventures, International Aero Engines and Engine Alliance.[143] Rockwell Collins does not engage in this market.

6.14.2. Relevant product markets

(183) The Notifying Party submits that the definition for the aircraft engine market may be left open on the basis that in the absence of any overlaps, the Transaction should not give rise to competition concerns under any plausible definition of the market.

(184) The Notifying party puts forward three principal engine types, set out as follows:[144]

(a) Turbofan engines, where a fan driven by a turbine provides extra air to the burner and gives extra thrust. These are typically installed in large commercial aircraft (both wide-bodied and narrow-bodied aircraft), regional jets or corporate jets.

(b) Turboprop engines, where thrust is provided by an external propeller rather than an internal fan. These offer the combination of high thrust and low fuel consumption ideal for short-haul aircraft.

(c) Turboshaft engines, which produce shaft power, rather than jet thrust. These are similar to their turboprop counterparts but are procured almost exclusively for helicopters.

---

142 See replies to question 142 of Questionnaire 1 - Competitors and replies to question 22 of Questionnaire 2 - Airframers.

143 IAE AG is a joint venture between P&W, Japanese Aero Engine Corporation ("JAEC"), and MTU Aero Engines, solely controlled by UTC (Case COMP/M.6446 – *Pratt&Whitney/International Aero Engines*). It manages the engineering, sales, production, customer support, and aftermarket services for the V2500 engine. IAG LLC is a joint venture between the same entities that is responsible for the production of parts for combustor components and assembly of the combustor modules for the PurePower PW1100G-JM aero engine. Together IAR AG and IAG LLC constitute IAE. Engine Alliance is a 50/50 joint venture between P&W and GE Aviation

144 Form CO, Aircraft engines, paragraphs 6.2 to 6.5.

(185) The Notifying Party also puts forward that further segmentation of turbofan engines has historically also been considered by the Commission on the basis of the 'mission profile' of the aircraft, i.e. the purpose for which the engine is procured. This refers to the aircraft's seating capacity, flying range, price and operational cost among other things.[145]

(186) On the basis of this approach, the Commission considers that aircraft engines can be distinguished between[146]:

(a) engines for Large Commercial Aircraft or LCA. These can be potentially sub-segmented into engines for narrow-body/single-aisle aircraft and engines for wide-body/double-aisle aircraft due to their different mission profile.

(b) engines for regional aircraft. The Commission has considered splitting this category further into a distinction between engines for small regional jets, designed for the transportation of 30 to 50 passengers, and engines for large regional jets, designed for the transportation of 70 to 90 passengers.

(c) jet engines for Corporate Aircraft. This category may be further segmented into the market for heavy, medium and light corporate aircraft.

(187) As no other major element to distinguish the market has been identified, the Commission will retain the product market definition based on engine type segmentation in this case. This segmentation has been deemed appropriate in earlier decisions[147] and remains broadly so according to the current market investigation, based on the fact that customers do not regard these engine types as substitutable and that the suppliers and their respective strengths differ between engine types.

6.15. Avionics

6.15.1. Introduction

(188) Avionics refers to a series of equipment that is used for navigation, communications and the evaluation of flight conditions. Collectively this equipment forms the 'avionics suite', and the majority of this equipment is located in the cockpit. Rockwell Collins currently manufactures and supplies standardized cockpit avionics equipment, such as communications systems, navigation, and display and flight control systems for both commercial and military customers. UTC does not sell avionics.

6.15.2. Relevant product markets

(189) The Notifying Party submits that the definition for the avionics market may be left open on the basis that in the absence of any overlaps, the Transaction should

145 Form CO, Aircraft engines, paragraphs 6.11 and 6.12.
146 Case M.8242 – *Rolls-Royce/ITP*; Case COMP/M.2220 – *General Electric/Honeywell*.
147 Case M.8425 – *Safran/Zodiac Aerospace*.

not give rise to competition concerns under any plausible definition of the market.

(190) In a previous case the Commission has considered each individual avionics product (aircraft flight-control systems, monitoring systems, communications systems, navigation systems, weather systems and anti-collision systems) to be separate product markets.[148]

(191) More consistently however, previous practice by the Commission has drawn a distinction between the avionics systems required for (i) large commercial aircraft (typically powered by turbofan jet engines), (ii) regional/business jets and (iii) military aircraft.[149]

(a) It has been noted that there is no clear segmentation between the regional transport and the business aviation segment with regard to the avionics products/ (sub-)systems that are offered, since the latter are the same in terms of price, size, capabilities and technical interdependency[150].

(b) The structure of supply and demand and nature of customers differs between large commercial aircraft on the one hand and regional/business jets on the other hand, with airframers seeking a more integrated style of avionics in the cockpit for regional and business aircraft, and a more federated style of avionics for large commercial aircraft (where some products may be chosen or changed by airlines).[151] This is because in the regional and business space, avionics suppliers are selected by the airframer in an SFE model, while in large commercial aircraft they may be offered under an SFE or a BFE procurement model.[152]

(192) These differences in turn will correspond to material, functional and software differences in the avionics systems of an aircraft.

(193) This forms the justification for a distinction in the avionics market consistent with what the Commission has done previously, distinguishing between avionics for large commercial aircraft on the one hand and avionics for regional jets/corporate jets on the other hand. The market investigation in this case has not provided evidence to deviate from this distinction[153].

148 Case COMP/M.2220 – *General Electric/Honeywell*.

149 A further distinction may be drawn for the avionics systems required for helicopters, but as the Parties are not active in avionics for helicopters, avionics for helicopters will not be discussed further in this decision and the relevant product market definition may be left open in this respect.

150 Case COMP/M.1601 – *Allied Signal/Honeywell*; COMP/M.2220 – *General Electric/Honeywell*.

151 Case COMP/M.2220 – *General Electric/Honeywell*.

152 Reply of the Parties to the Commission's RFI#2 dated January 23, 2018.

153 See non-confidential minutes of a call with an engine competitor dated 18 April, 2018 that confirmed that avionics systems do not necessarily differ between aircraft with different engines.

6.16. Environmental control systems

6.16.1. Introduction

(194) Environmental control systems ("ECS") manage the flow of air within the aircraft, which helps to regulate cabin temperature and cabin pressure, as well as to prevent ice from forming on flight surfaces and components.

(195) ECS include many types of products which perform different functions in the aircraft, namely (i) bleed air systems (control the distribution of the air taken from the engine and provide it to the air conditioning, anti-ice and engine starting systems); (ii) air conditioning systems (provide passengers with heated/cooled conditioned air); (iii) ventilation systems (circulate air around the aircraft); (iv) cabin pressure control systems (maintain comfortable pressure in the cabin as the aircraft changes altitude) and (v) anti-ice systems (use hot air taken from the engine and deliver it to the wings and engine inlet surfaces to prevent ice from forming).

6.16.2. Relevant product market

(196) The Notifying Party agrees with the Commissions' approach in the *GE/Honeywell* case, where the Commission reviewed the parties' market shares on the basis of an overall market for ECS.

(197) In *United Technologies/ Sundstrand*, the Commission noted that ECS includes systems which perform different functions in the aircraft, namely bleed air systems, anti-ice systems, air conditioning and cabin pressure control systems, and that a distinction can be drawn between air cycling cooling technology and vapour cycle cooling, but it ultimately left the market definition open[154]. In *GE/Honeywell* the Commission indeed considered the parties' market share for an overall market[155]. In its latest decision, *Safran/Zodiac*, the Commission also considered a distinction according to systems function and according to technology used but ultimately left the market definition open[156].

(198) In the present case there is no indication that would lead to deviate from the Commission precedents. In any case, as the proposed transaction does not raise serious doubts regarding its compatibility with the internal market in any plausible segmentation of this market, the exact market definition can be left open.

6.17. Food and beverage preparation and storage equipment

(199) Food and beverage preparation and storage equipment ("FBPSE") refers to galley inserts adapted for the use of preparing and storing food and beverages. FBPSE includes products such as ovens, refrigerators and coffee machines for installation in aircraft galleys. They are sold as galley inserts to be integrated in the overarching galley structure.

---

154 See case COMP/M.1493 – *United Technologies/Sundstrand*, paras. 18-19.
155 See case COMP/M.2220 – *General Electric/Honeywell*, para.270.
156 See case M.8425 – *Safran/Zodiac Aerospace*, paras 174- 177.

(200) The Notifying Party considers that all FBPSE products form part of a single relevant product market. According to the Notifying Party, FBPSE are somewhat different from other galley inserts with respect to technologies used. Furthermore, the majority, if not all, of Rockwell Collins' competitors in this space can, and do, offer a full portfolio of FBPSE. Moreover, FBPSE is generally purchased as a package according to the Notifying Party.

(201) One of the main competitors has corroborated the Notifying Party's position in the Commission's market investigation. It has distinguished galleys for storage from inserts which refer to domestic electrical appliances such as ovens, refrigerator, and coffee machine. Within inserts, it considered that no distinction is warranted since "*for "visual commonality" reason, Airlines often select a complete set of inserts (depending on their needs) which enables them to have electrical appliances with a similar exterior design*"[157].

(202) As the proposed transaction does not raise serious doubts regarding its compatibility with the internal market in any plausible market definition, the exact definition of the FBPSE market may be left open.

7. GEOGRAPHIC MARKET DEFINITION

7.1. Original aircraft equipment

(203) As is the case for the other markets for civil aerospace applications and in line with Commission's precedents in this sector, the Notifying Party submits that the geographic market definition for all products markets discussed in Sections 6.1 to 6.17 is worldwide.

(204) The market investigation confirmed that most of the aerospace equipment suppliers serve their customers regardless of their location and customers choose their suppliers worldwide.

(205) Competing original equipment manufacturers responding to the market investigation agreed that procurement of aircraft equipment and their manufacturing was taking place on a worldwide scale, suppliers were active across countries and international trade flows were significant. Some respondents remarked that there were some caveats: some countries imposed trade barriers and transport costs were not to be completely disregarded. Furthermore, market respondents noticed some variation in prices, albeit not between the same components sold to different customers across the world but between components manufactured in different regions due to differences in labour costs. All taken into account, the prevailing view of the respondents confirmed the precedents and a worldwide market for different types of aerospace equipment.[158]

(206) Regarding military applications, respondents confirm that restrictions on trade, such as governmental export controls on such components geographically limit

[157] See minutes of a call held with the competitor on 4 January 2018.

[158] See replies to question 28 of Questionnaire 2 - Airframers and replies to question 6 of Questionnaire 1 - Competitors.

the range of suppliers available to customers[159]. In any event, such measures affecting the Parties' products are not susceptible to influence the competitive assessment in the EEA.

(207) The Commission therefore considers that the geographic market for all aerospace equipment discussed in Sections 6.1 to 6.17 is worldwide in scope (for MRO and spare parts, see below).

7.2. MRO and spare parts

(208) In a precedent case, the Commission found that, for component MRO services, the location of the facility is of secondary importance and that such services do not need to be performed at airports. The Commission found that most component MRO service providers are active globally and both the service providers and customers considered that the markets for component MRO services were worldwide in scope, regardless of the type of aircraft or component. The precedent found some indication that wheels and brake MRO services may be an exception to this and could be local in scope, and concluded that for the purposes of that decision it was not necessary to define the precise geographical scope of component maintenance.[160]

(209) As regards spare parts, a precedent[161] found that the distribution of aerospace spare parts takes place at the worldwide level or at least EEA-wide level. In a more recent case, the Commission recognised that it is a worldwide market as spare parts are sold to customers worldwide irrespective of the suppliers' location and the price does not vary substantially depending on whether they are sold in the EEA region or worldwide.[162]

(210) Respondents to the Commission's market investigation considered that component MRO and also spare parts, similar to the original equipment, were part of a worldwide geographic market.[163]

(211) The Commission therefore concludes that for the purposes of this decision the relevant geographic markets for component MRO services and spare parts will be considered worldwide in scope.

8. COMPETITIVE ASSESSMENT

8.1. Horizontal relationships

8.1.1. Analytical framework

(212) The Commission Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings (the

---

159 See replies to question 7 of Questionnaire 1 – Competitors and replies to question 29 of Questionnaire 2 – Airfamers.

160 Case COMP/M.6410 – *UTC/Goodrich*, 26 July 2012, paragraph 198.

161 Case COMP/M.4241 – *Boeing/Aviall*, 18 August 2006, paragraph 11.

162 Case COMP/M.6410 – *UTC/Goodrich*, 26 July 2012, paragraph 199.

163 See replies to question 6.3 of Questionnaire 1 - Competitors and replies to question 28.3 of Questionnaire 2 – Airfamers and replies to question 10.3 to Questionnaire 3 - Airlines.

"Horizontal Merger Guidelines")[164] distinguish between two main ways in which mergers between actual or potential competitors on the same relevant market may significantly impede effective competition, namely non-coordinated and coordinated effects.

(213) Non-coordinated effects may significantly impede effective competition by eliminating important competitive constraints on one or more firms, which consequently would have increased market power, without resorting to coordinated behaviour. In that regard, the Horizontal Merger Guidelines consider not only the direct loss of competition between the merging firms, but also the reduction in competitive pressure on non-merging firms in the same market that could be brought about by the merger[165].

(214) The Horizontal Merger Guidelines list a number of factors which may influence whether or not significant non-coordinated effects are likely to result from a merger, such as the large market shares of the merging firms, the fact that the merging firms are close competitors, the limited possibilities for customers to switch suppliers, or the fact that the merger would eliminate an important competitive force. That list of factors applies equally if a merger would create or strengthen a dominant position, or would otherwise significantly impede effective competition due to non-coordinated effects. Furthermore, not all of those factors need to be present to make significant non-coordinated effects likely and this is not an exhaustive list[166].

(215) Furthermore, in accordance with the Horizontal Merger Guidelines, a merger with a potential competitor can have horizontal anti-competitive effects in two situations: (i) where the potential competitor constrains the behaviour of firms active in the market, notably when the potential competitor possesses assets that could easily be used to enter the market without incurring significant sunk costs or (ii) where the merging partner is very likely to incur the necessary sunk costs to enter the market in a relatively short period of time after which it would constrain the behaviour of firms currently active in the market.[167]

(216) For the merger to have significant anti-competitive effects, two basic conditions must be fulfilled. First, the potential competitor must already exert a significant constraining influence or there must be a significant likelihood that it would grow to become an effective competitive force. Evidence that a potential competitor has plans to enter a market in a significant way could help the Commission reach such a conclusion. Second, there must not be a sufficient number of other potential competitors, which could maintain sufficient competitive pressure after the merger.[168]

8.1.2. THSA

(217) Affected markets arise due to the horizontal overlap of the Parties' activities in the manufacture and sale of THSAs.

---

164 OJ C 31, 5.2.2004, p. 5.
165 Horizontal Merger Guidelines, paragraph 24.
166 Horizontal Merger Guidelines, paragraph 26.
167 Horizontal Merger Guidelines, paragraph 59.
168 Horizontal Merger Guidelines, paragraph 60.

(218) The Parties' combined market share amounted to [50-60]% (increment of [5-10]% by Rockwell Collins) in 2016 and has been relatively stable over the past three years[169]. If airframers' in-house production is excluded and only the merchant market is considered, the combined market share of the Parties rises to [70-80]% (increment of [10-20]% by Rockwell Collins).[170]

(219) Shall a military segment for THSA be considered, the Parties' combined market shares have been varying between [60-70]% and [80-90]% between 2014 and 2016.[171]

(220) The Notifying Party claims[172], however, that irrespective of the market definition, the concentration does not negatively affect competition in THSAs for the following reasons:

(a) UTC submits that historical market shares are not informative in bidding markets Historical market shares therefore reflect the success of the aircraft platform more than the competitive strength of the THSA supplier.

(b) UTC also submits that UTC and Rockwell Collins do not consider each other as competitors: UTC and Rockwell Collins design and manufacture different types of THSA systems for largely different types of aircraft. UTC supplies primarily hydraulic THSA systems, which airframers typically require for large commercial aircraft. Rockwell Collins supplies only electric THSA systems, which airframers usually utilize for regional and business jets.

(c) UTC does not expect this situation to change […] and electric THSA systems to replace hydraulic THSA systems, arguing that both technologies will continue to co-exist in parallel, albeit for largely different applications.

(d) UTC also claims that Rockwell Collins is not a major THSA supplier and at least another eight competitors are active in THSAs, namely Parker Hannifin, Moog, Safran, Liebherr, Thales, Shimadzu, Electromech and Beaver Aerospace, many of these strong and well established in THSA.

(e) In addition to these, UTC argues, airframers represent an additional competitive constraint due to their capability to manufacture the THSA in-house.

(221) The Commission's investigation could not confirm the Notifying Party's assessment.

169 [50-60]% in 2015 and [40-50]% in 2014.
170 According to the Parties, Boeing and Dassault self-supply the THSA for a number of their platforms.
171 Form CO, THSA, para 7.17.
172 Form CO, THSA, para 7.1.

(222) Recent bidding activity indicates that UTC and Rockwell Collins have indeed been competing for the same projects: […].[173] Most notably, both have competed against each other for the large platforms of […] but also for the […].

(223) The market investigation revealed that UTC and Rockwell are the two main suppliers for THSAs and two of the three independent suppliers for large commercial aircraft (with Moog). Although Rockwell traditionally supplies THSAs rather for regional and business jet platforms and UTC for large commercial aircraft, the trend towards electric THSAs has enabled Rockwell Collins to bid and win contracts against UTC for large platforms […].[174]

(224) While UTC is mainly active in hydraulic THSA, it has capacity to manufacture electric THSAs: As also indicated by the Parties, UTC […]. Market participants indicated that, although the substitution is not immediate, the evolution is clearly towards the more electric solutions and these are becoming more and more standard, even for large aircraft.[175] […].

(225) As regards airframers' in-house capacity, Boeing is indeed capable of manufacturing THSAs in house and does so for multiple platforms. For Boeing, all future platforms or derivatives would be evaluated for a make or buy decision. Other airframers indicated that they could possibly insource the manufacture of THSAs, however this is a long-term strategic decision that is not taken on an ad-hoc basis as it requires considerable investment into production capacities.[176]

(226) A number of customers and competitors have expressed concerns regarding the increase of Parties' bargaining power for THSAs and the reduction of choice post- merger.[177]

(227) Some market participants also pointed out that one cannot completely disregard current market shares, as they also reflect the cash generating potential of a competitor's THSA business, which is vital in maintaining and further developing the business, which requires funds.[178]

(228) Some respondents to the investigation have also raised concerns as regards the possibility for the merged entity to bundle actuators such as THSAs and flight control systems (pilot controls and electronic flight controls). According to those respondents, some airframers may seek to source such bundles which could potentially have a negative effect on single product suppliers.[179] These concerns will be assessed in section 8.3.6.

---

173 Reply of the Parties to the Commission's RFI#1 and RFI#3 on bidding data on 25 January 2018 and 26 February, 2018 respectively.

174 See replies to questions 35 and 38 of Questionnaire 1 - Competitors.

175 See replies to questions 31 and 32 of Questionnaire 1 - Competitors and question 32 of Questionnaire 2 - Airframers.

176 See replies to question 41 of Questionnaire 2 - Airframers.

177 See replies to question 45 of Questionnaire 1 -Competitors, See replies to question 46 of Questionnaire 2 - Airframers.

178 See minutes of calls with competitors on 10 January, 2018 and 20 February, 2018.

179 See replies to questions 43 and 44 of Questionnaire 1 - Competitors.

(229) The Commission therefore concludes that theTransaction raises serious doubts with regard to the Parties' activities in the manufacture of THSAs.

8.1.3. Pilot Controls

(230) As mentioned in section 6.2, the Parties are present in the following relevant markets: Sticks, RBPS and TQA.

8.1.3.1. Sticks (center yokes and sidesticks)

(231) In sidesticks, UTC has a market share of [40-50]% on the merchant market, whereas Rockwell Collins has 0%. On the merchant market of center yokes, Rockwell Collins has a market share of [40-50]% whereas UTC has a market share of 0%[180].

(232) Therefore, the Transaction would not raise serious doubts as to its compatibility with the internal market for a separate product market of center yokes or for a separate product market of sidesticks.

(233) If an overall product markets for sticks is defined (including both center yokes and sidesticks), the Parties would have a combined market share of [40-50]% on the overall merchant market for pilot control sticks[181].

(234) The Commission notes that in that case, however, the Parties could not be considered as close competitors in pilot control sticks. For each of types of sticks they would face partially the same competitors as Esterline Corporation, Safran and Woodward produce both types of sticks. In past tenders for pilot control sticks, the Parties competed only in […] tenders out of […] against each other. Whereas in the market investigation the majority of competitors took the view that in general the Parties are close competitors in pilot controls (thus relating also to RBPS and TQA)[182], one customer respondent stated – relating overall to pilot controls - that it does "*not recognize UTC and Rockwell Collins competing in the market*."[183] and another added that it "*considers UTC and Rockwell Collins as being "close competitors" only for RBPS*."[184]

(235) Furthermore, the investigation revealed that the market participants do not expect significant impact in the market of sticks. Whilst the respondents were indifferent about the impact on prices, quality and innovation, some stated that competition may rather increase[185].

(236) In view of the above considerations, the Commission considers that also in the event of a product market comprising center yokes and sidesticks the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to pilot control sticks. In any event, however, the

---

180 Form CO, Pilot Controls, paras. 7.12 and 7.13.

181 Calculated on the basis of the sales volumes for 2016 indicated by the Notifying Party in Form CO, Pilot Controls, paras. 7.12 and 7.13.

182 See replies to question 60 of Questionnaire 1 – Competitors.

183 See a reply to question 58.1 of Questionnaire 2 – Customers-Airframers.

184 See a reply to question 58.1 of Questionnaire 2 – Customers-Airframers.

185 See replies to question 66 of Questionnaire 1 – Competitors; Replies to question 65.1 of Questionnaire 2 –Airframers.

commitments include the divestment of Rockwell Collins' entire activities in pilot controls, thus also its activities in sticks, as discussed in section 9.

8.1.3.2. Rudder Brake Pedal System

(237) The Notifying Party submits that their combined position in RBPS does not lead to affected markets as the Parties' combined market shares on the merchant market for RBPS is rather moderate with [10-20]% based on sales in 2016[186].

(238) However, the analysis of the bidding data draws a different picture of the Parties' current market position. In RBPS, either UTC or Rockwell Collins won […] out of the […]most recent bids for large commercial aircraft, […] out of […]for regional aircraft and […] out of […]for business jets[187]. Considering for instance the most recent bids in large commercial aircraft, all […] have been won either by UTC or Rockwell Collins[188].

(239) The market investigation further revealed that the majority of the respondents does not contemplate to sponsor a market entry of a new supplier for pilot controls[189] and there were no recent market entries in pilot controls in general, which one respondent commented as follows: "*All players have been in this market for decades. The barriers to entry seem quite high*"[190].

(240) The results of the market investigation also show that many of the responding competitors and some of the airframers saw the Parties as the most important competitors in pilot controls (both in TQA and RBPS) some ranking the Parties as number one and two globally[191].

(241) Ultimately, as regards the impact of the Transaction on the market for RBPS, the answers of the market respondents are not homogenous relating to prices, quality and innovation, but some airframers assume that the market power of the Parties will increase, whilst competitors' market power will decrease[192].

(242) The Commission notes that although the market shares for RBPS are moderate, the bidding data and the market investigation points to the Parties being close competitors and particularly strong in recent tenders[193]. Furthermore, the Parties' strong market position resulting from the most recent successes of the Parties in bids was largely confirmed by market participants and there are high barriers to enter the market for potential new suppliers. Finally, the purportedly largest competitor mentioned by the Notifying Party in RBPS is apparently active mainly in the armaments industry and has not been mentioned by any respondent in the market investigation. The Commission concludes, therefore,

186 Form CO, Pilot Controls, paras. 7.15.
187 None of the Parties bid for military aircraft.
188 […].
189 See replies to question 60 of Questionnaire 2 – Airframers.
190 See a reply to question 61.1 of Questionnaire 2 – Airframers.
191 See replies to question 56 of Questionnaire 1 – Competitors, replies to question 56 of Questionnaire 2 – Airframers.
192 See replies to question 67 of Questionnaire 1 – Competitors, replies to question 65.2 of Questionnaire 2 – Airframers.
193 In particular, UTC won the tender for the […] with revenues expected from […].

that the Transaction raises serious doubts as regards its impact on competition for RBPS on aircraft.

8.1.3.3. Pilot Controls – Throttle Quadrant Assembly

(243) The Parties' combined market share is [50-60]% in TQA on the merchant markets according to the Notifying Party's submission[194].

(244) This high market share was also confirmed through the analysis of the bidding data[195]. In TQA, the Parties won […] out of the […] most recent bids for large commercial aircraft, […] out of […] for regional aircraft, […] out of […] for business jets and […] out of […] in military aircraft, thus demonstrating a strong position on the market for TQA.

(245) The Commission notes that the two strongest competitors post-merger would have each a market share of [10-20]%.

(246) The general results of the market investigation relating to pilot controls as reflected in Section 8.1.3.2 of this decision also apply to TQA:

(a) As indicated by the bidding data, the Parties are close competitors. This has been confirmed by a number of market participants during the Commission's market investigation[196].

(b) Many of the responding competitors and some of the airframers saw the Parties as the most important competitors in pilot controls (both in TQA and RBPS) some ranking the Parties as number one and two globally[197].

(c) The majority of the respondents does not contemplate to sponsor a market entry of a new supplier for pilot control[198] and there were no recent market entries in pilot controls in general while barriers to entry are high[199].

(d) Some airframers assume that the market power of the Parties will increase, whilst competitors' market power will decrease[200].

(247) On the basis of the above, the Commission concludes that the Transaction raises serious doubts as regards its impact on competition for TQA on aircrafts.

194 Form CO, Pilot Controls, para. 7.18.
195 Reply of the Parties to the Commission's RFI#1 and RFI#3 on bidding data on 25 January, 2018 and on 25 February respectively.
196 See replies to question 60 of Questionnaire 1 – Competitors, replies to question 58 of Questionnaire 2 – Airframers.
197 See replies to question 56 of Questionnaire 1 – Competitors, replies to question 55 of Questionnaire 2 – Airframers.
198 See replies to question 60 of Questionnaire 2 – Airframers.
199 See replies to question 61 of Questionnaire 2 – Airframers.
200 See replies to question 65.3 of Questionnaire 2 – Airframers.

8.1.4. Ice Protection

(248) In view of the product market definition, the Transaction gives rise to horizontally affected markets regarding pneumatic ice protection products for wings and stabilizers and for electro-thermal (including chemical) ice protection products for propellers.

(249) The Notifying Party argues that the Transaction will not significantly impede competition because there are strong alternative suppliers, in particular in case of wing ice protection a number of more advanced wing ice protection technologies and in the aftermarket competition not only from original equipment suppliers but also from those who seek supplemental type certificates ('STC'), allowing them to replace other producers' ice protection products[201]. Furthermore, the Notifying Party claims that customers source through bidding processes, which renders historic market shares less relevant[202].

(250) According to the estimate of the Notifying Party, 70%-80% of the overall sales in wing ice protection and 50%-60% of the overall sales in propeller ice protection market are accounted for by the aftermarket, the rest by the OE market. The Commission notes that whereas UTC is covering both the OE market as well as the aftermarket, Rockwell Collins is active primarily on the aftermarket.

8.1.4.1. Pneumatic ice protection for wings and stabilizers

(251) Other than the Parties the only other competitor offering pneumatic wing ice protection products is Zodiac Aerospace. Based on this, the Commission notes that post-merger the number of competitors on the pneumatic ice protection market for aircraft wings and stabilizers would decrease from three to two.

(252) The Parties' combined market share in pneumatic wing ice protection is [50-60]% according to the Notifying Party's estimates for the year 2016. The market share remains rather stable considering previous years (2014: [50-60]%; 2015: [50-60]%)[203].

(253) In view of the overall sales value of wing ice protection products including other technologies such as EMEDS or electro-thermal, the pneumatic wing ice protection products accounted for [70-80]% of the sales value in 2016. In assessing the importance of pneumatic ice protection in the future, the Commission notes that also this share remained rather stable through the past years (2014: [80-90]%, 2015: [80-90]%)[204], even though the market investigation revealed that there is a general trend towards electro-thermal ice protection solutions[205].

---

201 Form CO, Ice Protection, paras. 7.1., 7.4 – 7.9.
202 Form CO, Ice Protection, paras. 7.2 and 7.3.
203 Form CO, Ice Protection, paras. 7.13.
204 Form CO, Ice Protection, paras. 7.11.
205 See replies to question 130 of Questionnaire 2 – Airframers.

(254) The market investigation further showed that the Parties are seen as close competitors by their rivals[206]. The Commission received statements such as: "*Both [Rockwell Collins] and UTC make similar pneumatic boots and propeller heaters. They compete directly in the aftermarket with equivalent offerings*."[207] Another respondent noticed that "*UTC and Rockwell Collins are the two biggest suppliers for Wing Ice Protection (pneumatic ice wing ice protection and propeller heaters).*"[208]. Furthermore, the Parties are named frequently amongst the strongest competitors by competing ice protection manufacturers[209]. Customers consider UTC to remain strong also in future[210]. The closeness of competition is further demonstrated by the fact that Rockwell Collins is active primarily on the aftermarket ([…][211]), where it seeks to supply its ice protection products to customers who originally purchased aircraft with ice protection products from UTC[212].

(255) For the impact of the Transaction, the majority of respondents expect competition to decrease[213] and some expect prices to increase[214].

(256) The Commission notes that, regarding the aftermarket, UTC offers certified ice-protection products on […] types of aircraft[215]. On […] out of these, there is no competitor with a certified de-icing product. Post-merger, however, this number would increase to […] out of […], where the merged entity would not have any competitor with a certified ice protection product[216].

(257) On the basis of the above, the Transaction raises serious doubts as regards its impact on competition for pneumatic ice protection products on aircraft wings and stabilizers, first and foremost based on the post-merger duopoly comprising the merger entity and Zodiac, as well as the current strong combined position of the Parties in view of the market shares and the merger entity's forecasted strong market position in the future.

8.1.4.2. Electro-thermal ice protection for propellers

(258) The Parties' combined market share in propeller ice protection is [30-40]% according to the Notifying Party's estimates for the year 2016. The market share remains rather stable considering previous years (2014: [40-50]%; 2015: [40-50]%)[217].

---

206 Airframers do not consider the Parties as 'close competitors' – see replies to question 128 of Questionnaire 2 – Customers. This is in line with […].

207 See replies to question 126.1 of Questionnaire 1 – Competitors.

208 See replies to question 126.1 of Questionnaire 1 – Competitors.

209 See replies to question 124 of Questionnaire 1 – Competitors.

210 See replies to question 125 of Questionnaire 2 – Airframers.

211 Form CO, Ice Protection, paras. 6.11 and 6.36.

212 See minutes of a call with a component OEM, on 23 March, 2018.

213 See replies to question 128 of Questionnaire 1 – Competitors.

214 See replies to question 124 of Questionnaire 1 – Competitors.

215 Document 'Supplemental_Response_to_Q1(b)', submitted to the Competition Bureau Canada as response by the Notifying Party to March 16 RFI of the Competition Bureau Canada.

216 Analysis by the Commission of the Document 'Supplemental_Response_to_Q1(b)', submitted to the Competition Bureau Canada as response by the Notifying Party to March 16 RFI of the Competition Bureau Canada.

217 Form CO, Ice Protection, para. 7.13.

(259) As opposed to wing ice protection, there are several other competitors offering propeller ice protection products with considerable market shares, as shown in Table 2:

Table 2 - Market shares in propeller ice protection[218]

	2014		2015		2016	
Company	**Sales (EUR M)**	**Share (%)**	**Sales (EUR M)**	**Share (%)**	**Sales (EUR M)**	**Share (%)**
UTC	[…]	[30-40]	[…]	[30-40]	[…]	[30-40]
Rockwell Collins	[…]	[5-10]	[…]	[5-10]	[…]	[5-10]
Combined	[…]	[40-50]	[…]	[40-50]	[…]	[30-40]
ITT/ Hartzell	[…]	[20-30]	[…]	[20-30]	[…]	[20-30]
Dowty	[…]	[10-20]	[…]	[10-20]	[…]	[10-20]
Zodiac	[…]	[10-20]	[…]	[10-20]	[…]	[10-20]
Rapco	[…]	[0-5]	[…]	[0-5]	[…]	[0-5]
Total	**[…]**	**100**	**[…]**	**100**	**[…]**	**100**

(260) The market investigation revealed that also in propeller ice protection the Parties are to be considered as close competitors, as they have been frequently named amongst the strongest competitors[219].

(261) Furthermore, the market investigation provided for only few indications that the Transaction may significantly impede effective competition in the market of propeller ice protection. Some competitors, but not the majority, stated that intensity of competition might decrease and that prices in propeller ice protection could increase[220]. However, the vast majority of the respondents were not concerned about any negative impact on innovation and quality of propeller heaters[221]. Additionally, amongst the airframers, none of the responded assumed a negative impact (nor a positive) of the Transaction on competition, prices, quality or innovation. Most of the respondents did not provide any assessment or assessed that the Transaction will not bring about a change[222].

(262) On the basis of the above, the Commission notes that the elevated Parties' combined market share of almost [40-50]% is balanced out by a number of competitors that will be in a position to continuously exert competitive pressure

218 Form CO, Ice Protection, para. 7.23.
219 See replies to question 124 of Questionnaire 1 – Competitors.
220 See replies to question 128 of Questionnaire 1 – Competitors.
221 See replies to question 128 of Questionnaire 1 – Competitors.
222 See replies to question 131.2 of Questionnaire 2 – Airframers.

on the merged entity post-merger as well as the lack of concerns resulting from the market investigation. It can, however, remain open whether there are serious doubts as to the Transaction's compatibility with the internal market in view of propeller ice protection as the propeller ice protection business of Rockwell Collins is part of the commitment entered into by Rockwell Collings relating to its entire ice protection business as set out in section 9.

8.1.5. Aircraft seating

8.1.5.1. Business jets seats

(263) UTC is a Tier 1 supplier for business jet passenger seating. UTC's sales are to airframers or to those firms contracted by the aircraft owner to perform interior completion. UTC's largest customers for business jet passenger seating are […].

(264) Rockwell Collins sells most of its business jet passenger seating products as a Tier 1 supplier to aircraft OEMs, which include […].

(265) The Parties achieve a moderate combined market share of [20-30]% in business jets seats (UTC: [5-10]%, Rockwell Collins: [10-20]%) and face competition from Ipeco ([20-30]%), RCO Engineering ([10-20]%) and PAC ([5-10]%).

(266) The consolidated bidding data shows that UTC and Rockwell Collins are not the closest competitors in business jet passenger seating, and that UTC is a relatively minor ([…]) competitor in this business. According to the consolidated bidding data, UTC bid on […] out of […] opportunities ([…]%) but only was selected for […] opportunities ([…]%) while Rockwell Collins bid on […] out of 25 opportunities ([…]%) and was selected for […] opportunities ([…]%). Rockwell Collins has met […] in a larger number of bids ([…] out of […]) than UTC ([…] out of […]).

(267) No concerns have been expressed during the market investigation as regards the impact of the Transaction on competition for business jets seats.[223]

(268) On the basis of the above, the Transaction does not raise serious doubts as regards its compatibility with the internal market for business jets seats.

8.1.5.2. Cabin attendant seating

(269) UTC is a Tier 1 supplier for CAS. UTC's largest CAS customers are […], with total sales of EUR […].

(270) Rockwell Collins has […].

(271) The Parties achieve a combined market share of [70-80]% in CAS but the increment is particularly small (UTC: [70-80]%, Rockwell Collins: [0-5]%), reflecting Rockwell Collins' […] relevance in this market. The parties face competition from Zodiac ([…]%) and other suppliers like Meggitt and Heico.

[223] See replies to question 90-1 of Questionnaire 2 – Airframers.

(272) No concerns have been expressed during the market investigation as regards the impact of the Transaction on competition for CAS.[224]

(273) On the basis of the above, and notably the very small increment arising from the Transaction, the Transaction does not raise serious doubts as regards its impact on competition for CAS.

8.1.6. Oxygen Systems

(274) Rockwell Collins provides oxygen systems for all types of aircraft. Oxygen systems are sold either directly to aircraft OEMs (Airbus, Boeing, Textron) or to interior integrators. In either case, it is the aircraft OEM who chooses the oxygen supplier and decides whether it will integrate itself or will delegate the integration to a Tier-1 supplier (such as an interior integrator or a PSU supplier) prior to its delivery to the OEM.

(275) In 2016, Rockwell Collins had sales of EUR […] in oxygen systems, corresponding to a market share of [50-60]%.

(276) UTC does not manufacture oxygen systems. UTC is however working on an […]e development program for an oxygen system that [description of UTC's Oxygen Program]. Specifically, UTC is working […] to research and develop a [description of UTC's Oxygen Programme 1] oxygen […] (Programme 1) and to develop […] oxygen [description of UTC's Oxygen Programme 2] (Programme 2).

(277) UTC is therefore a potential competitor of Rockwell Collins in the oxygen systems market. Pursuant to the Horizontal Merger Guidelines, for a merger with a potential competitor to have significant anti-competitive effects, two basic conditions must be fulfilled. First, the potential competitor must already exert a significant constraining influence or there must be a significant likelihood that it would grow into an effective competitive force. Evidence that a potential competitor has plans to enter a market in a significant way could help the Commission to reach such a conclusion. Second, there must not be a sufficient number of other potential competitors, which could maintain sufficient competitive pressure after the merger.[225]

(278) At this stage of the proceedings, the Commission takes the view the merger of Rockwell Collins, which is active in the oxygen systems market with UTC as a potential competitor in this market is likely to have anti-competitive effects and therefore raises serious doubts as to its compatibility with the internal market in this respect.

(279) As regards the likelihood that UTC will grow into an effective or competitive force in the oxygen market, UTC has explained that both programs are [description of UTC's Oxygen Programs]. With respect to Programme 2, [description of UTC's Oxygen Programs].[226]

---

224 See replies to question 90-2 of Questionnaire 2 – Airframers.

225 HMG, paragraph 60.

226 See response to RFI 5, dated 27 March 2018, paragraphs 9.1 to 9.8.

(280) However, the Commission considers that […], there is a significant likelihood that UTC will grow into an effective competitive force in oxygen systems.

(281) The most recent internal document of UTC as regards oxygen systems (dated 8 March 2018)[227] indicates that entry into service […].[228] Another internal document states that [quote from UTC's internal document].[229]

(282) The likelihood of success for these programmes is further enhanced by the […]. In an internal document dated February 2017, UTC mentions that [quote from UTC's internal document][230]. In another internal document, the interest of […] is described as follows [quote from UTC's internal document].[231]

(283) The table in Figure 8 shows the market share objectives of UTC as regards oxygen systems by platforms types for the major customers.[232] [Details of UTC's R&D programs].

Figure 8 - Market share objectives of UTC in oxygen systems

[…]

(284) On the basis of the above, the Commission considers that there is a significant likelihood that UTC post-entry would grow into an effective competitive force in the oxygen market.

(285) As regards the existence of competitors which could maintain sufficient competitive pressure after the merger, the current market for oxygen systems is particularly concentrated, with only two main suppliers. Rockwell Collins holds a market share of [50-60]%, and its only other active competitor, Safran/Zodiac, has a [30-40]% market share[233]. A narrower segmentation by aircraft type or portable and non-portable oxygen systems would not change the picture of a duopoly market in oxygen systems.

(286) Further, the market investigation has shown that Safran/Zodiac ([30-40]% market share), engages mainly in legacy business and has not won any new platforms in the last decade. In an internal document of Rockwell Collins related to oxygen systems, Zodiac is described as a company that [quote from Rockwell Collins' internal document] and [quote from Rockwell Collins' internal document][234]. In another internal document, Rockwell Collins describes Zodiac as follows [quote from Rockwell Collins' internal document].[235]

---

227 See […].
228 See […], slide 8.
229 See […], slide 12.
230 Ibidem, slide 19.
231 […].
232 See […], slide 9.
233 The Notifying Party has explained that "other suppliers" account for the remaining [0-5]% of the market but they have not been identified in the form CO and the Parties' internal documents only discuss Zodiac as an alternative supplier in oxygen systems.
234 See B/E Aerospace (subsequently acquired by Rockwell Collins) […] slide 10.
235 See B/E Aerospace (subsequently acquired by Rockwell Collins) […], slide 17.

(287) This non-competitive market situation is confirmed by UTC in one of its internal documents where they explain that [quote from UTC's internal document][236]. Another company active in a neighbouring area in the aerospace sector explained that there is "*a place in the global commercial passenger plane market for an additional new oxygen technology provider as there is currently no competition*".[237]

(288) Furthermore, barriers to entry in the oxygen market are high, consisting of intellectual property, engineering, regulatory agency compliance, certification and overall programme schedule. They are further increased by the presence of a dominant supplier like Rockwell Collins in the market which states as an objective in one of its internal documents [quote from Rockwell Collins' internal document][238]

(289) The existence of barriers to entry was confirmed by a market player which indicates that *"large players in the military aerospace oxygen area could decide to enter the civilian market. The technologies used are different between the civilian and military markets but the fact that it is airworthy oxygen in both case could be used to develop a dedicated product offering(…) it is not a swift entry and expansion"*[239]. No player active in the oxygen military market has indicated to the Commission that it wishes to enter the oxygen civil aircraft market.

(290) Against that background, the likely entry of UTC in oxygen systems could have beneficial effects on competition in a concentrated market where barriers to expansion and entry are significant. The Commission therefore considers that the Transaction raises serious doubts as regards its impact on competitionto its compatibility with the internal market as regards oxygen systems.

8.1.7. Interior lighting

(291) UTC is present in lighting with a full range of products but does not have "floor-to-floor" interior capabilities. UTC sells both to airframers and Tier 1 suppliers. UTC's aftermarket sales represent circa [50-60]% of its lighting business. Most of these sales are spare parts sales; only […] comes from retrofit sales.

(292) Rockwell Collins is mainly present in cabin lighting and cabin signage. However, Rockwell Collins has "floor-to-floor" capabilities. Rockwell Collins also sells to airframers and Tier 1 suppliers. [70-80]% of Rockwell Collins' revenues in lighting come from sales to airframers, [10-20]% to integrators and the remaining [10-20]% are aftermarket sales.

(293) Both UTC's and Rockwell Collins' OE sales are SFE. In the interior lighting market, the Parties have a combined market share of [20-30]% (UTC [10-20]% and Rockwell Collins [10-20]%). In the OE market, the Parties have a combined market share of [30-40]% (UTC [10-20]% and Rockwell Collins [20-30]%) and in the aftermarket, [10-20]% (UTC [10-20]% and Rockwell Collins [5-10]%). In case the interior lighting market were segmented by aircraft type, the Parties

236 See […], slide 16.
237 See reply to a RFI dated 6 April 2018.
238 See […], slide 24.
239 See reply to a RFI dated 9 April 2018.

would have a combined market share of [30-40]% (UTC [20-30]% and Rockwell [10-20]%) in LCA; [30-40]% (UTC [10-20]% and Rockwell [10-20]%) in regional aircraft; [20-30]% in business jets (UTC [0-5]% and Rockwell [10-20]%); [5-10]% in military aircraft (UTC [5-10]% and Rockwell [0-5]%); and [0-5]% in helicopters (UTC [0-5]% and Rockwell [0-5]%).

(294) The Parties' main competitor is Diehl and there are several other smaller players present in most segments of the lighting market: Koito, Honeywell, Leonardo, Asronics, Bruce Aerospace.

(295) The majority of airframers do not consider the parties to be close competitors[240], which is reflected in the bidding data. The Parties do not seem to meet often (in […]% of the tenders for LCA, […]% for regional aircraft and […]% for business jets). The percentage of tenders in which one of the Parties won is relatively high: […]% for LCA ([…]); […]% for Regional ([…]); […]% for business jets ([…]). However, in most cases that one of the Parties won a tender […][241]. The bidding data also shows that frequently airframers split the tender and multisource from different suppliers.

(296) Although some airframers that participated in the market investigation considered that the Transaction would increase the Parties' market power, none has expressed any concern regarding an increase in prices or a decrease in quality or innovation in the PSU market[242].

(297) On the basis of the above, the Transaction does not raise serious doubts as to its compatibility with the internal market as regards its impact on competition for interior lighting products.

8.1.8. PSUs

(298) UTC is a Tier 1 and a Tier 2 supplier of PSUs. [Description of UTC's sales strategy]. UTC sells standardised PSUs to […] but […] the customised PSUs it sells to other customers, […]. UTC's aftermarket sales represent circa [20-30]% of its PSUs business. […]. UTC's biggest customer in the aftermarket is […].

(299) Rockwell Collins is a Tier 1 and Tier 2 supplier of PSUs. Rockwell Collins sells PSUs as a stand-alone product (to […]) but also with oxygen system (to […]) and as part of a floor-floor offer (to […]). Most of Rockwell Collins' revenues come from […] PSUs. Rockwell Collin's aftermarket sales represent circa [5-10]% of its PSU business. […].

(300) UTC's and Rockwell Collins' OE sales are all SFE. The Parties estimate that their combined market share in an overall PSU market is [40-50]% (UTC [20-30]% and Rockwell Collins [10-20]%). In case the market is segmented per aircraft type, the Parties combined market share raises to [40-50]% in the LCA (although Rockwell Collins market share remain at [10-20]%), and to [40-50]% in the regional aircraft (UTC [20-30]% and

240 See replies to question 100 of Questionnaire 2 – Airframers.
241 [Details of Parties' bids].
242 See replies to question 104 of Questionnaire 2 - Airframers.

Rockwell Collins [20-30]%). In case the relevant market would comprehend both PSU and interior lighting, the Parties combined market share is [20-30]%. In case the relevant market would include PSUs and oxygen systems, the parties combined market share would be [50-60]% (UTC [5-10]% and Rockwell Collins [40-50]%). In a market comprising PSUs, lighting and oxygen systems, the Parties combined market share would be [30-40]% (UTC [10-20]% and Rockwell Collins [20-30]%).

(301) The Parties' main competitors are Safran and Astronics. Both of them are present in interior lighting, oxygen systems (except for Astronics) and both of them have also integration capabilities.

(302) UTC and RC were not perceived as close competitors by the majority of customers[243] which is reflected in the bidding data. The Parties do not seem to meet often ([…]% of the times for LCA, […]% for regional aircraft and […] in business jets). The percentage of tenders in which one of the Parties won is relatively low at […]% for LCA ([…]); […]% for regional aircraft ([…]).

(303) Although some airframers that participated in the market investigation considered that the Transaction would increase the Parties' market power, none has expressed a concern regarding an increase in prices or a decrease in quality or innovation in the PSU market[244].

(304) On the basis of the above, the Transaction does not raise serious doubts as regards its impact on competition for PSUs.

8.1.9. Potable water systems

(305) UTC is active in potable water systems where its focus is […]. It has no presence in […] potable water systems, and has no current plans to expand into this area. UTC provides potable water systems for the […], among others. UTC is […].[245]

(306) The Parties submit that Rockwell Collins which is active in wastewater systems, […]: it has carried out […] so far, with […] and […].[246]

(307) The Parties' activities therefore overlap only marginally in the sale of potable water systems. While UTC estimates its market share at [30-40]% for 2016, Rockwell Collins considers its market share, with its one project carried out so far, to be below [0-5]%. If a sub-segmentation per aircraft type is considered, UTC's share in the business jet segment rises to [80-90]% in 2016, with an increment of [0-5]% by Rockwell Collins.[247]

(308) However, the Notifying Party argues[248] that these estimated market shares largely overestimate UTC's actual presence in potable water systems, as they do

243 See replies to question 110 of Questionnaire 2 – Airframers.
244 See replies to question 115 of Questionnaire 2 – Airframers.
245 Form CO, Potable Water Systems, para 6.8.
246 Form CO, Potable Water Systems, para 6.9.
247 Form CO, Potable Water Systems, Table 2 and Table RFI2.1.
248 Form CO, Potable Water Systems, para 7.4.

not include the sale of components by other OEMs to airframers who have historically been and many are still integrating purchased components to assemble the potable water system themselves and not purchasing the entire system.[249] The UTC sales figures, on the other hand do include UTC's component sales.

(309) In the Notifying Party's estimate, the overall market size could be larger than double for the market encompassing all aircraft types and possibly […]% larger for the business segment.

(310) In any event, the Notifying Party submits[250], Rockwell Collins is […] on this market and Rockwell Collins supplies the […] potable water system […], who is a Rockwell Collins waste system customer. Rockwell Collins has […].

(311) The Notifying Party points to the presence of a number of strong competitors including Zodiac, the market leader, Diehl, Transdigm, JAMCO, as well as a number of other component suppliers, including Cox & Co, International Water-Guard, Yokohama, and DYNAMO Aviation along with many other smaller companies.

(312) UTC expects[251] […] and […] to significantly increase market share in the near future, having recently won tenders for aircraft that are currently ramping up production, such as the […] tender won by […], increasing from […] planes produced in 2016 to […] in 2018.

(313) During the investigation, Zodiac, Diehl and Transdigm confirmed being present as competitors on a large number of platforms[252]. They saw Rockwell Collins present on the market, but held that it was not closely competing with UTC.[253]

(314) Bidding data submitted by the Parties[254] reflects the same picture: since the year 2000, Rockwell has been […] for potable water systems.

(315) On the basis of the above, the Transaction does not raise serious doubts as to its compatibility with the internal market as regards its impact on competition for potable water systems.

8.1.10. MRO and spare parts

(316) The Parties' activities overlap with regard to the provision of component maintenance in terms of providing MRO services and selling spare parts. Both UTC and Rockwell Collins are active in servicing their own components and

---

249 Such as for instance including, […]. See the Notifying Party's reply to question 12 of the Commission's RFI#1 on19 December, 2017 and see also UTC's letter to the US Department of Justice on potable water systems on 6 October, 2017).

250 Form CO, Potable Water Systems, para 7.7.

251 Form CO, Potable Water Systems, para 7.8.

252 See replies to question 130 of Q1 - Questionnaire to competitors.

253 See replies to question 134 of Q1 - Questionnaire to competitors, see also minutes of calls with competitors on 21 December 2017 and 4 January, 2018.

254 Reply of the Parties to the Commission's RFI#1 and RFI#3 on bidding data on 25 January, 2018 and on 25 February respectively.

achieve significant turnover on the aftermarket: [30-40]%[255] of UTC's and [20-30]% of Rockwell Collins' turnover stems from their activities on the aftermarket; revenues from maintenance activities and sale of spare parts.

(317) The Parties do not provide maintenance services on each other's equipment and the Parties […] provide maintenance services on any third party OEM equipment[256], each focussing instead on providing maintenance services on its own equipment.

(318) Some of the Parties' competitors for MRO services voiced concerns about ongoing foreclosure practices by OEMs, including UTC and Rockwell Collins, when competing for carrying out maintenance on their equipment: they claim that OEMs try to limit their access to the technical documentation, spare parts and tools and that OEMs set excessive license fees for third party operators. They argue that spare parts, manuals, tools and testing equipment are all essential inputs without which an independent MRO cannot carry out maintenance on the equipment. The complainants are concerned that the Transaction will increase UTC's incentives to foreclose access to spare parts and manuals[257] and that its increased market power will translate into capturing more MRO revenues from independent MRO service providers.

(319) The Parties' competitors held in this respect that OEM's offering bundles of equipment with associated support services (maintenance and spare parts) was common practice, enabling them to offer customers discounts and competitive prices.[258]

8.1.10.1. The Parties' arguments

(320) The Parties submit that they are not competing against each other in the field of MRO services and spare parts: They do not service each others' equipment […]. Their MRO activities are essentially limited to servicing their own equipment only.[259] Therefore, there is no competitive overlap between their aftermarket activities.

(321) Although their overall market share for component maintenance is estimated at [20-30]% and [5-10]% for UTC and Rockwell Collins respectively,[260] the Parties also argue that they do not enjoy exclusivity on the maintenance of their own equipment: UTC estimates that on average [50-60]% of its equipment has been serviced by third party providers in 2016 and 2017. For Rockwell Collins the estimates differ across product groups, in interior systems it is as high

255 Excluding engine sales and maintenance.

256 UTC has some repair work on one of its repair sites for third party equipment [description of UTC's repair activities]. Rockwell Collins gives a similar estimate ([…]) for the proportion of third party equipment serviced out of all equipment serviced by Rockwell Collins.

257 See minutes of a call with an MRO competitor on 27 March 2018. See also replies to question 44 of Q3 – Questionnaire to customers - airlines.

258 See replies to question 12 of Questionnaire 1 - Competitors.

259 See point 11.1 of UTC's reply to the Commission's RFI#6 on 3 April, 2018.

260 See reply to question 12 of RFI#8 on 10 April, 2018. Figure encompassing MRO services including spare parts.

as […]% whereas in lighting and commercial system products the ratio is lower, [10-20]% and [30-40]% respectively.[261]

(322) UTC explains that complex parts in which the OEM holds relevant IP rights are typically supplied by the OEM and that UTC does have components and spares that can exclusively be replaced by UTC[262]. UTC also explains that often from a business perspective, [details of UTC's contracts with customers].[263]

(323) UTC adds however, that [details of the Parties' repair activities].

(324) UTC also argues that many supply contracts [details of UTC's supply contracts], limiting its ability to foreclose MRO competitors.

(325) The Notifying Party adds that reputational issues discipline its behaviour on the aftermarket also limiting its incentives to foreclose its MRO competitors, who are also its customers at the same time.

8.1.10.2. The Commission's assessment

(A) Horizontal overlap in MRO

(326) As regards the horizontal overlap between the Parties' activities in component MRO services, the Commission concludes that no serious doubts arise since:

(a) The Parties' combined market share would reach [30-40]% which as such is not indicative of strong market power. More importantly, however, the Parties do not service each other's components. Therefore irrespective of their combined market shares, they are not currently competing with each other. As explained, UTC and Rockwell Collins focus on servicing their own components and […].

(b) Furthermore, although some respondents indicated in the market investigation that the larger product portfolio could potentially increase the market power of the merged entity vis-à-vis customers, the Commission considers that the Transaction will not fundamentally change the competitive landscape. That is because the set of products on which the merged entity will carry out MRO services does not reach the full scope of nose-to-tail MRO service providers to be able to fully compete with them after the Transaction. UTC will have on average a [20-30]% presence with its equipment on existing platforms (expressed as the cost of all components supplied by the merged entity as a proportion of the total procurement cost of an aircraft, as set out in paragraph (432)). It will however not be able to substitute the potential need of an airline for a nose-to-tail MRO service provider. Therefore, the Transaction does not lead to significant changes in the competitive dynamics of the existing situation.

261 Replies to question 10 of RFI#8 on10 April, 2018.
262 See UTC's reply to question 102 of RFI 1 as 21 December, 2017.
263 See UTC's reply to question 5 of RFI 12 on 16 April, 2018.

(c) Alternative component MRO service providers will remain available after the Transaction. This is confirmed by the Parties' OEM competitors replying to the market investigation.[264] Furthermore, all but one airframer responding to the market investigation confirmed having its own MRO operations,[265] as did a number of airlines,[266] and the market investigation confirmed that for the servicing of an OEM's equipment, the airlines' MRO providers, airframers and other independent MRO operators are all in competition with each other.[267] The level of competition in providing component MRO services is also reflected by the […] ratio of the Parties' components not serviced by the Parties themselves ([50-60]% for UTC; […][268] for Rockwell Collins, as concerns overlap products, see paragraph (321)). As one large OEM put it: *"As concerns MRO, the largest role is played by the airframers, then the airlines and the role of the equipment manufacturers is less, more of a supportive role"*.[269]

(B) Horizontal overlap in spare parts

(327) Similarly, as regards the horizontal overlap between the Parties' activities in supplying spare parts, the Commission concludes that no serious doubts arise since:

(a) The Parties' combined market share in component MRO including spare parts would reach [30-40]% which as such is not indicative of strong market power. More importantly, however, the Transaction will not change the competitive landscape in the supply of spare parts since the Parties do not manufacture each other's components for the aftermarket. Therefore irrespective of their achieved market shares, they are not currently competing with each other. UTC [description of UTC's spare parts sales]. The Commission notes that a subsidiary of Rockwell Collins (Intertrade Ltd) [description of Rockwell Collins' spare parts sales][270].

(b) The merged entity will continue to face competition from alternative spare parts that can be used instead of their original products, developed and manufactured by third party spare parts suppliers. UTC submits that on average [20-30]% of the spare parts required to service UTC equipment is manufactured by alternative third parties. In case of Rockwell Collins, the third party penetration of spare parts is […], up to [10-20]%. In this regard, the Commission takes note of the concerns raised in the market investigation indicating the customers' dependency on the OEM spare part manufacturers and the merged entity's alleged ability to use its leverage to increase prices. However, the Commission

264 See replies to question 146 of Questionnaire 1 –Competitors.
265 See replies to question 138 of Questionnaire 2 – Airframers.
266 See replies to question 26 of Questionnaire 3 - Airlines.
267 See replies to question 141 of Questionnaire 2 – Airframers.
268 Except for interior lighting, where the third party maintenance for Rockwell Collins products is [0-5]%.
269 See minutes of a call with a competitor on 19 December, 2017.
270 In 2017, […], see the Notifying Party's reply to the Commisison's RFI#12 of April 16, 2018.

considers that these concerns have been present before the Transaction and relate to practices by OEMs that may be aimed at limiting competition from third party spare part manufacturers (e.g., PMA) and are inherent to a possible single-sourcing strategy chosen by the airframer or the airline. In the Commission's view the concern is not exacerbated by the Transaction, as is does not affect competition between the OEM and third party spare part manufacturers on the aftermarket for spare parts, given that the Parties are not competing against each other on that market[271]. Therefore the Transaction will not increase concentration levels on the market for spare parts: For any of the Parties' equipment, either of the Parties and an unchanged number of third party spare part manufacturers will compete.

(C) Access to spare parts and other inputs (upstream) for the provision of MRO services (downstream)

(328) As regards input foreclosure concerns expressed by certain market participants during the Commission's market investigation that the OEMs restrict access to spare parts[272] and other inputs (such as to documentation, IP rights, tooling, testing equipment and maintenance data), the Commission notes that similar concerns were voiced during the investigations of the UTC/Goodrich and Safran/Zodiac transactions by competing MRO service providers. Nevertheless, and for similar reasons as set out in those two previous decisions, the Commission concludes that no serious doubts arise due to foreclosure concerns in this Transaction since:

(a) In UTC/Goodrich the Commission found that such foreclosure practices reported by the independent MRO service providers indeed existed, but that they were unrelated to the concentration. In particular, no link was found between the number of equipment on a given aircraft by any supplier and the existence of or attempts at foreclosure practices by that supplier.[273] The same conclusions hold true in this case. The foreclosure concerns expressed relate to the individual equipment, regardless of how many other types of equipment the same supplier has installed on the same aircraft. The potential incentives to try to foreclose competitors from access to necessary inputs follow from a potential position of market power due to the fact that the individual equipment of one supplier has been chosen for a certain platform (with generally limited possibilities for the airframer to replace the equipment during the lifetime of the platform). Those incentives would therefore not be influenced by the same OEM having more equipment installed on the same platform or with the same customer.

---

271 […].

272 For instance, the market participants refer to the possibility that the merger entity would limit the use of PMAs (Parts Manufacturer Approval). Those are spare parts not manufactured by the OEM but by a third party and certified by the Federal Aviation Agency to meet airworthiness standards. Furthermore, market participants report of practices by which OEMs reject warranty if parts are not replaced by the OEMs own manufactured spares but alternative suppliers were used.

273 See case COMP/M.6410 – *UTC/Goodrich*, paras 735 – 754 and case M.8425 – *Safran/Zodiac Aerospace*, paras 48 -356.

(b) As set out in the Safran/Zodiac decision[274], any potential ability of the merged entity to engage in input foreclosure would not be related to the Transaction but would come from the chosen single source strategy and the limited substitutability of original spare parts. The same holds true in this case. As such, the Transaction is unlikely to impact the ability of the Parties to restrict or frustrate access to spare parts or other necessary input. The market investigation in case Safran/Zodiac precedent also found[275] that the possibilities for input foreclosure also also limited by the OEMs' contractual obligation vis-à-vis the airframers to provide product support, including spare parts and technical documentation to airlines and all MRO service providers chosen by the airline, usually until five aircraft from the platform are still in operation.

(c) The addition of Rockwell Collins' share to UTC's existing share of supply of spare parts or other inputs will not materially alter the competitive dynamics on the aftermarket on any given or future platform, as the Transaction will not lead to an increase in concentration on the market for spare parts for any of the Parties' equipment. Even if some incentive to foreclosure were to exist, the Transaction is unlikely to change that incentive, even for future platforms. Furthermore, for existing platforms the merged entity would be bound by its existing contractual obligations. As a consequence, the competition that the merged entity has been facing on the market for spare parts, including from alternative third party spare part manufacturers, before the Transaction is unlikely to be altered as a result of the Transaction.

(d) The Commission has not found indications during its market investigation in this case that the previous concentration UTC/Goodrich of 2012 has had adverse effects on the MRO and spare parts markets.

8.1.10.3. Conclusion on MRO services and spare parts

(329) On the basis of the above, the Transaction does not raise serious doubts regarding its compatibility with the internal market for MRO services and spare parts. The Commission takes notes of the concerns raised in the market investigation, considers however that the concerns are unrelated to the Transaction, as already similarly found and explained in its UTC/Goodrich and Safran/Zodiac decisions.

8.2. Vertical links

8.2.1. Analytical framework

(330) Vertical mergers involve companies operating at different levels of the same supply chain. For instance, a vertical merger occurs when a manufacturer of a certain product merges with one of its distributors.

[274] See case M.8425 – *Safran/Zodiac Aerospace*, paras 48 -356.
[275] Ibindem, para 645.

(331) Pursuant to the Commission Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings (the "Non-Horizontal Merger Guidelines")[276], vertical mergers do not entail the loss of direct competition between merging firms in the same relevant market and provide scope for efficiencies.

(332) However, there are circumstances in which vertical mergers may significantly impede effective competition. This is in particular the case if they give rise to foreclosure[277].

(333) The Non-Horizontal Merger Guidelines distinguish between two forms of foreclosure: input foreclosure, where the merger is likely to raise costs of downstream rivals by restricting their access to an important input, and customer foreclosure, where the merger is likely to foreclose upstream rivals by restricting their access to a sufficient customer base[278].

(334) Pursuant to the Non-Horizontal Merger Guidelines, input foreclosure arises where, post-merger, the new entity would be likely to restrict access to the products or services that it would have otherwise supplied absent the merger, thereby raising its downstream rivals' costs by making it harder for them to obtain supplies of the input under similar prices and conditions as absent the merger[279].

(335) For input foreclosure to be a concern, the Merged Entity should have a significant degree of market power in the upstream market. Only when the Merged Entity has such a significant degree of market power, can it be expected that it will significantly influence the conditions of competition in the upstream market and thus, possibly, the prices and supply conditions in the downstream market[280].

(336) Pursuant to the Non-Horizontal Merger Guidelines, customer foreclosure may occur when a supplier integrates with an important customer in the downstream market and because of this downstream presence, the Merged Entity may foreclose access to a sufficient customer base to its actual or potential rivals in the upstream market (the input market) and reduce their ability or incentive to compete which in turn, may raise downstream rivals' costs by making it harder for them to obtain supplies of the input under similar prices and conditions as absent the merger. This may allow the Merged Entity profitably to establish higher prices on the downstream market[281].

(337) For customer foreclosure to be a concern, a vertical merger must involve a company which is an important customer with a significant degree of market power in the downstream market. If, on the contrary, there is a sufficiently large customer base, at present or in the future, that is likely to turn to independent

276 OJ C 265, 18.10.2008, p. 6.
277 Non-Horizontal Merger Guidelines, para 18.
278 Non-Horizontal Merger Guidelines, para 30.
279 Non-Horizontal Merger Guidelines, para 31.
280 Non-Horizontal Merger Guidelines, para 35.
281 Non-Horizontal Merger Guidelines, para 58.

suppliers, the Commission is unlikely to raise competition concerns on that ground[282].

8.2.2. Mechanical sub-assemblies for the THSA system: the ball screw

(338) A THSA competitor suggested that UTC could have an increased incentive for input foreclosure of ball screws to competing THSA suppliers following the Transaction.

(339) UTC submits that its production of the ball screw is mainly for captive purposes and that it has […]. UTC estimates that its market share for the ball screw is [0-5]%. It argues that its activity on the merchant market for the sale of the ball screw is related to […] and is therefore limited to […]. UTC further argues that alternative suppliers exist for the ball screw, namely Umbra, Beaver, Thomson Saginaw, Steinmayer and Sumimoto. UTC estimates that Thomson and Umbra in particular are the leading suppliers of ball screws with market shares of [20-30]% and [30-40]% respectively.

(340) The Commission has analysed UTC's contract with […][283] which is […] with [description of UTC's supply contract].

(341) The responses to the market investigation confirmed the presence of alternative suppliers, in particular Umbra, which was reported to be an important and growing[284] ball screw supplier. Umbra is not vertically integrated into the manufacture of THSAs, therefore all its ball screw production is sold on the merchant market. Market participants also mentioned Beaver, Steinmayer and Thomson as alternative manufacturers of the ball screw.[285]

(342) The Commission further notes that UTC was not implementing a foreclosure strategy […] before the Transaction despite being already the leading supplier in THSAs. That indicates that UTC had limited ability or incentives to engage in input foreclosure due to its downstream activities in THSAs.

(343) In any event, the commitments whereby Rockwell Collins' entire THSA business is divested (see Section 9), removes the entire overlap between the Parties' activities in THSA. Therefore, after implementation of the commitments, the Transaction would not bring about any change in the market with relation to the pre-existing vertical link between UTC's activities in the manufacture of ball screws and UTC's activities in the manufacture of THSAs.

8.2.3. Components for potable water systems

(344) The Notifying Party argues that components and the complete potable water systems should form part of the same relevant product market and therefore no vertical link arises.

---

282 Non-Horizontal Merger Guidelines, para 61.

283 Annex to the Commission's RFI #4 on ball screw and THSA on 1 March 2018.

284 At the time of the decision, Umbra was about to take over also Meggit's ball screw operations.

285 See replies to question 34.1 of Questionnaire 1 - Competitors.

(345) If components for potable water systems are considered a relevant market on their own, a vertical link is created between UTC's component sales and the Parties' activities in the sales of complete potable water systems.

(346) The Commission considers however that this vertical link does not lead to any input or customer foreclosure concerns:

(347) Only a minor part of UTC's turnover, less than USD […], is achieved through sales of components to UTC's competitors for potable water systems. This translates into a negligible market share of UTC on the component market. The majority of sales are achieved with airframes. The supply relationships with competitors in potable water systems, notably with large competitors such as […] have existed before the Transaction and there are no indications that UTC, with a [30-40]% market share pre-Transaction in potable water systems has engaged or tried to engage in input or customer foreclosure strategies.

(348) It is unlikely that the marginal addition of Rockwell Collins' potable water business downstream where Rockwell Collins achieves a market share of [0-5]% market share via […] valued at USD […], could change UTC's incentives to continue supplying competitors.

(349) In any event, many of UTC's competitors in complete potable water systems, such as Zodiac or Diehl, Jamco, Cox&Co and International Waterguard Industries are all also all active in the manufacture and sale of components.

(350) Customer foreclosure is equally highly unlikely as Rockwell Collins' purchase share on the procurement market for such components is immaterial, in line with its marginal activities in potable water systems. Conversely, UTC will not be in the position to purchase components from Rockwell Collins to a sufficient extent and accordingly will have to continue purchasing these on the merchant market.

(351) Therefore, the Commission considers that the Transaction does not raise serious doubts regarding its compatibility with the internal market as regards the vertical link that is created between UTC's component business and Rockwell Collins' and UTC's potable water systems.

8.2.4. ARINC

(352) Rockwell Collins provides datalink network services and estimates that it has a market share of [40-50]% in the first generation datalink services. If this market were to be segmented by aircraft size, Rockwell Collins market share would be [30-40]% in the large and regional commercial aircraft and of [50-60]% in the business jets and government aircraft[286]. In second generation datalink services, Rockwell Collins' market share is below [5-10]%.

(353) UTC is not present in this market. UTC supplies two types of components, the aircraft interface device (AID) and Pratt & Whitney's eFast unit that transmit data over several communication networks: WI-FI, satellite communication, cellular, and VFH/satellite networks. Neither of these components

[286] See Form CO, Section Datalink Network Services, paras. 6.33 and 6.37.

communicates directly with the VHF/Satellite networks and therefore is subject to testing by ARINC or SITA.

(a) The AID is a small box that collects, stores and transmits data within the aircraft and off the aircraft[287]. AIDs are generally designed to ARINC industry standard specifications for data transmission. UTC offers its AID to airlines as a retrofit solution.

(b) Pratt & Whitney's eFast is an on-board, near real time data acquisition and transmission unit that automatically downloads, processes and stores data and then uploads it to a customer portal. Although eFAST performs the function of a health monitoring data concentrator and to this extent could be considered as belonging to the same relevant market as an AID, UTC primarily markets eFAST as an engine health management product. UTC supplies eFAST as a standard equipment on the Bombardier Series.

(354) To date, Rockwell Collins has sold fewer than […] units (for a total of approximately USD […]) of its single AID product. All these sales were made to […], which offered it to airlines as an optional add-on to the avionics package available directly from the production line (i.e. a line fit option). Today […] does not market this product anymore[288]. However, Rockwell Collins will supply a modified version of its AID to […] for its flight operations and maintenance exchanger ([…]) for the […] and […] families. […] will be installing […] on all new […] and […] aircraft […]. The Parties' combined market share in 2016 was [10-20]% (UTC [10-20]%, Rockwell Collins [0-5]%). The Parties also estimate that in the next 5 years Rockwell Collins' market share will not exceed [0-5]% (including sales of its new AID to the […] program)[289].

8.2.4.1. Complaints raised during the market investigation

(355) Some market participants raised concerns during the Commission's market investigation that the merged entity would discriminate against its competitors in the supply of aircraft components and in the supply of component MRO[290] services by: (i) hampering the approval of components to be admitted to the ARINC network; (ii) hampering access to the ARINC standards; (iii) using sensitive information; (iv) degrading the ARINC service level; (v) pricing data transmission that pertains to the monitoring of competitors' components higher than data transmission pertaining to the merged entity's components and/or including such preferential data transmission prices in a bundle with the sale of data collection and storage equipment[291]. They submit that such practices would

[287] An AID acquires data from various aircraft systems including the flight management computer, air data inertial reference unit, flight data recorder, digital aircraft condition monitoring systems recorder, and multimode receiver. AIDs provide two way transmission with the ability to send data to the cockpit and back to the avionics system and to the ground operations.

[288] Rockwell Collins […].

[289] Reply to RFI no.16, on 23 April 2018.

[290] High-volume, advance aircraft data is not used for most MRO services that are offered today but my become the basis for advanced MRO services in the future – see Reply to RFI no 7.

[291] See replies to question 155.1 of the Questionnaire 1 - Competitors, replies to question 27.1 of Questionnaire 3 - Airlines, replies to question 149.1 of the Questionnaire 2 - Airframers.

have the effect of making it harder for alternative component and MRO and health management providers to offer their services.

8.2.4.2. Discriminatory conduct regarding the testing of components

(356) One complainant submitted that the merged entity would have the increased ability and incentive to discriminate against competitors' products' access to ARINC, given it would have a bigger portfolio of products that rely on access to ARINC and compete directly with the complainant. According to the complainant, the merged entity could increase prices, establish unfair or discriminatory terms and cause delays in the approval process of components to be admitted to the ARINC network[292].

(357) The Commission considers that these concerns are not merger-specific and are therefore unfounded for the purposes of this merger control procedure. None of UTC's components needs to be tested by ARINC or SITA since none of UTC's components is subject to testing by ARINC. The ability or incentive of Rockwell Collins to adopt discriminatory conduct with respect to ARINC approvals does not change with the Transaction. The Transaction therefore does not bring anything new to the qualification process to be admitted to these networks. As mentioned in paragraph (353) the components supplied by UTC, which use ARINC or SITA networks, are not tested because they do not communicate directly with those networks.

(358) In any event, as mentioned in paragraph (144) Rockwell Collins has a non-discrimination and confidentiality policies[293]. Testing is conducted in ARINC laboratories on an arm's length basis within Rockwell Collins[294]. Each component supplier has access to the tests results and independently tests its equipment for public certification purposes in-house, so any discrepancies between ARINC results and the supplier's own result can be easily detected. Rockwell Collins ARINC adopts testing procedures published by the relevant standard-setting bodies and provides these to the component suppliers, who may attend testing[295]. Furthermore, except for the complainant, no other OEM competitor has argued having experienced attempts by Rockwell Collins to foreclose its access to ARINC[296].

---

292 Complainant' submission of 27 February 2018. In this submission the complainant argues: "*The main interaction between* [the complainant] *and ARINC continues to relate to: (i) being approved to be admitted to the ARINC network, and (ii) sending and receiving data over the network using a licence* (…). *On the approving side,* [the complainant's] *experience has been that the process for new products to be admitted to the ARINC network has become more difficult and the complainant believes that it has been treated unfavourably on at least two occasions"*. This is reiterated by the complainant in its reply to question 154.1 of of the Questionnaire to Competitors of Aircraft Systems.

293 Changing these policies would endanger the commercial success of ARINC, as ARINC works as an open-standard secured network.

294 Form CO, Section Datalink Network Services, para 6.46.

295 Also to ensure transparency and impartiality, Rockwell Collins also publishes a test results index and a qualification annual report - Form CO, Datalink Network Services section, paragraph 6.46. It would be at least suspicious that the results of testing were always, or most of the times negative when components belonged to a competitor - Form CO, Datalink Network Services section, paragraph 6.46.

296 See replies to question 153 of the Questionnaire 1 - Competitors.

8.2.4.3. Discriminatory conduct regarding access to standards

(359) The same complainant submitted that Rockwell Collins' ARINC controls ARINC interface standards and that the merged entity would have an increased ability and incentive to withhold or diminish access to the ARINC standards[297].

(360) The Commission considers that the merged entity would not have the ability or incentive to engage in such practices.

(361) As mentioned in paragraph (140), the AEEC is responsible for the ARINC standards and also administers the ACARS protocol. Rockwell Collins has no control over either. Any proposed modifications to the ACARS standards (i.e. ARINC 618 and 620), as to any other ARINC standards, can be publicly submitted by all participants in the AEEC for review by the AEEC. The merged entity would not have the ability to withhold or diminish access to ARINC standards or modify the ACARS standards to its benefit or in detriment of its competitors.

(362) In addition, the merged entity would not have the incentive to do so. Airlines require that the ARINC network, as well as any components with which it interacts, adhere to stringent open access standards to ensure complete interoperability on all aircraft, which ensures safe and efficient operation. The commercial success of the ARINC network depends on the ability to integrate with all available aircraft systems[298]. As another OEM competitor of the merged entity explained: "(…) *it is unlikely that UTC/Rockwell Collins would attempt to move ARINC from an industry consortium approach to an approach that exclusively benefits UTC/Rockwell products or technology because the remaining industry participants would create an alternate system comparable to the current ARINC organizations*"[299].

8.2.4.4. Access to competitively sensitive information

(363) The complainant also competes with Rockwell Collins in selling ARINC airtime and value-added services to airlines in the business aviation segment. ARINC provides airtime packages to the complainant, which the complainant resells to airlines together with flight support services, such as weather information or aircraft maintenance information.

(364) Through the operation of the ARINC network, Rockwell Collins knows who the complainant's customers for the provision of airtime and flight support services are. According to the complainant, Rockwell Collins could use this information to approach those customers and sell their own Rockwell Collins services to them. The complainant claims it has seen this behaviour by Rockwell Collins in the past[300].

---

297 Complainant's responses of 3 April 2018 to EC follow-up question of 28 March 2018.

298 Form CO, Section Datalink Network Services, para. 6.19

299 OEM competitor's reply to EC questions sent on 6 April 2018.

300 Complainant's reply to the Commission's questions of 26 March 2018 second version sent on 4 April 2018 and reiterated in the call of 4 April 2018.

(365) The Commission considers that this concern is not merger specific and therefore unfounded for the purposes of this merger control procedure. UTC does not provide datalink networks services and does not provide flight support services or resell air time in competition with the complainant. The ability or incentive of Rockwell Collins to adopt such conduct does not change with the Transaction.

8.2.4.5. Restrict access to ARINC network301 by degrading service level to competitors

(366) The complainant also expressed the concern that the merged entity would prioritise the data streams pertaining to their products (more favourable transmission speed) in detriment of its competitors. According to the complainant, the incentive to do so increases as the merged entity has more products that communicate via the data link network, for instance for health management purposes[302]. The complainant also mentioned the possibility that the merged entity's data traffic could crowd out other messages from competitors[303]. In addition, the complainant also argued that Rockwell Collins could access the complainant's components data that is transmitted on ARINC network for Rockwell Collins' commercial use[304].

(367) The Commission considers that the merged entity would not have the ability or the incentive to adopt such conducts.

(368) With regards to ability, although not technically impossible, it would be time consuming and costly to intercept the messages and to change the architecture of the network in order to detect and delay the transmission of some data:

(a) Each ACARS message has a header or "identifier" based on which the data is routed[305]. These "identifiers" are part of the ACARS standard[306]. However, the data that flows from components (such as, the engine or the APU) is encoded[307]. According to the Notifying Party, "*significant resources would need to be expended to access, intercept and interpret this data. This would require proprietary tools and software from the competing component manufacturer, which are not publicly available*[308].

---

301 ARINC network includes the air-to-ground network and also the ground –to- ground network when it is necessary to use that network to transmit ACARS messages.

302 Complainant's reply of 3 of April 2018 to the Commission's questions of 26 March 2018.

303 Minutes of the 4 April 2018 call with the complainant.

304 The complainant refers to both air-to-ground and to ground-to-ground transmissions. It argues that encryption is not a fail-safe protection and that despite contractual protections, it would be difficult to prove any breach. – see Complainant's reply of 3 of April 2018 to the Commission's questions of 26 March 2018.

305 This header identifies the component from which the data flows, the type of data (traffic control, operational, or performance data) and the location to where it needs to be transmitted.-call with the Parties on 18 April.

306 Datalink Network provider reply to EC questions of 6 April 2018.

307 User-defined messages allow the airline to encode or decode messages, and this information is only privy to the component provider by permission of the airline. ARINC does not require the airline to disclose this information. The airline may decide to disclose this information in order for ARINC to help solve network issues – see minutes of 18 April call with the parties. Encryption increases confidentiality treatment and reduces the size of the message and consequently its cost in terms of data usage - Form CO, para. 6.64 of the Datalink Network Services section.

308 Form CO, Section Datalink Network Services para, 6.64.

(b) Any attempt at altering the content of the data would require resources to decipher the code and to make changes to the code. Any changes to the code would render the message unreadable which would be immediately noticed by airlines[309].

(c) To delay the transmission of messages, either message priority indicators would need to be altered (which would have little effect in terms of timing - difference of milliseconds), or a new algorithm would need to be designed, which is also costly.

(369) In addition, such conducts would imply a breach of contract not only with the component OEMs but also with the airlines:

(a) Rockwell Collins operates the ARINC network separately from its other businesses. [Description of Rockwell Collins' use of ARINC and its contractual obligations].

(b) Rockwell Collins is contractually obliged to provide […][310].

(c) Rockwell Collins is required to provide airlines on a regular basis with performance reports, which identify the actual performance statistics compared to the overall services goals listed in the Service Level Agreements.

(370) Moreover, Rockwell Collins is not the only provider of air-to-ground datalink services. SITA is a strong competitor in this business. Although the complainant argued that SITA is not substitutable with ARINC given the differences in geographic coverage and that it is costly to switch from one to another, the market investigation does not support these claims:

(a) A clear majority of airlines and component OEMs considered that ARINC and SITA compete with one another[311].

(b) Although the VHF/Satellite network is not identical and each company has "gaps" in a given region or country, both use satellite connectivity in those areas to bridge those gaps.

As to the easiness of switching frorm one provider to the other, the results of the market investigation were less conclusive. About half of the airlines consider that switching is not easy, because it requires changes in the software. One airline pointed out that reprograming old CMUs (ACARS MU systems) could be costly, while others consider that such switching is easy[312]. However, most of these airlines that responded to the market investigation, including those that claimed that switching was not easy, already dual source today[313] and one large airline has recently changed all

309 Form CO, Section Datalink Network Services, para. 6.52.
310 Form CO, Section Datalink Network Services, para. 6.55.
311 See replies to questions 18 and 18.1 of Questionnaire 3 - Airlines, replies to question 156 of Questionnaire 1 - Competitors.
312 See replies to question 19 and 19.1 of Questionnaire 3 – Airlines.
313 See replies to question 17 of Questionnaire 3 - Airlines.

its global fleet from SITA to ARINC […][314]. As for the older ACARS MU systems, switching may imply removing the system off the aircraft and updating it in a shop, or replacing it. However, the Parties estimate that the number of aircraft that operate this type of system represent [0-5]-[5-10]% of the total active fleet. Moreover, as these MU systems are not compatible with new standards for ATC communications in the EU and USA, they shall all be replaced […][315].

(371) With regards to incentives, such conduct would most likely harm ARINC's reputation as an open datalink network provider and it could only be beneficial for the merged entity if it could convince airlines to buy its products to avoid delays or data tempering, which would not be likely given the lack of legitimate reasons for the discrepancies. Faced with such behaviour airlines would most likely switch to SITA.

(372) In fact, the complainant itself acknowledges that since the acquisition of the ARINC network by Rockwell Collins it never had a problem with its license to send and receive messages through ARINC, or with the actual sending and receiving of messages through ARINC (despite already competing with Rockwell Collins in the provision of certain aircraft components)[316].

(373) Similarly, the merged entity would have neither the ability nor the incentive to crowd out competitors by increasing the number of messages sent over the ARINC network from its own components and leaving less bandwidth for messages originating from competitors' components:

(a) The airframers decide which components generate data and how the data is transmitted within the aircraft and off the aircraft, not the datalink operator.

(b) The airlines also decide on how they want to collect and receive the data from the aircraft and who has access to that data. It is not the datalink network provider who decides how much data and what type of data is transmitted through its network.

(c) Airlines would be aware of any difficulty encountered by components OEMs, who need the airlines' authorisation to access the data, and there is a strong likelihood that they would switch to SITA. Given that the vast majority of ARINC customers are airlines, not components OEM[317] the merged entity would hardly have any incentive to adopt such conduct.

---

314 See Form CO, Datalink Network Services section, para. 6.27.

315 Parties reply to question of 2.4 of RFI no. 8.

316 The complainant's submission of 27 February 2018 reads "The main interaction between [the complainant] and ARINC continues to relate to: (i) being approved to be admitted to the ARINC network, and (ii) sending and receiving data over the network using a licence.[§] On the licensing side, [the complainant] and ARINC continue to have a good working relationship since ARINC was acquired by RC.

317 Parties reply to question of 3 of RFI no. 8.

(d) ARINC's network is not suitable for second generation performance data, as illustrated by the fact that already today the vast majority of performance data used by UTC's and other competitors' health management services is offloaded when the aircraft is on the ground via cellular and Wi-Fi networks.

(374) For similar reasons the merged entity would not have the ability or incentive to access the complainant's data flows or any of its competitors' data flows transmitted through ARINC network and use the information to gain competitive advantage.

(375) The mere fact that data is routed through ARINC network would not give the merged entity immediate access to competitively sensitive information about the competitors' components or systems. To have access to such data flows, the merged entity would have to intercept the data which is costly and contrary to the contracts with airlines and third parties.

(a) As mentioned above, significant resources would need to be expended to access, intercept and interpret the data. This would require proprietary tools and software which are not available. Even in case the intercepting and decoding of the message was successful, the unauthorized reader would need to know the baseline specifications of the component to which the data pertains to interpret the data in a meaningful way.

(b) ARINC is contractually required to […][318]. In addition third parties can request additional confidentiality provisions. For example, in an agreement with a competitor it is established that […][319].

(376) With regards to incentives, again such conduct would most likely harm ARINC's reputation as an open datalink network provider. Moreover, the majority of data routed through ARINC is operational in nature and has limited competitive sensitivity, therefore its value is unlikely to compensate the investment in time and in money to be able (if at all) to intercept and interpret the data.

8.2.4.6. Price discrimination (including bundles) regarding access to the ARINC Network

(377) The complainant submits that the merged entity may price discriminate in ARINC's network services, (i) by charging competitors higher prices, (ii) by offering discounts to the transmission of data pertaining to its own components, and/or (iii) by bundling data transmission services with any data system or component that generates data required for the provision of health management services or MRO services.

(378) The Commission considers that the merged entity would not have the ability to leverage its position in the ARINC network business to improve its position in the aircraft health management services market or in the MRO services. There

[318] See Form CO, Datalink Network Services section, para 6.67.
[319] See Form CO, Datalink Network Services section, para 6.67.

are three main reasons – which will be expanded upon below - for the merged entity's lack of ability: (i) ARINC's VHF/satellite network is not an important input for the transmission of performance data; (ii) airframers determine the hardware and software that gathers and transmits data within the aircraft and off the aircraft; (iii) airlines choose the transmission data provider and authorise the transmission of data to third parties.

(A) ARINC's VHF/satellite network is not an important input for the transmission of performance data

(379) First, ARINC faces competition from SITA in the transmission of real time first generation performance data[320]. Therefore, any attempt to delay data streams, temper with the data or charge higher prices would lead to customers switching to SITA[321].

(380) Second, as confirmed by the market investigation VHF/Satellite networks are not a relevant means to transmit second-generation performance data[322]. On the contrary, the VHF/satellite networks do not have the bandwidth or the configuration to transmit the large sets of data required:

(a) As explained in paragraph (150), the ACARS protocol is only suitable for sending short messages. The performance data transmitted in real time through ACARS pertains to short condition status reports (the so-called first generation performance data).

(b) The large volume, high frequency performance data used in predictive health management services (the so-called second generation data) is transferred when the aircraft is on the ground through cellular, Wi-Fi networks, or manually.

(381) Third, already today there are many alternatives to offload second generation data using cellular and Wi-Fi networks, including the Parties' solutions:

(a) Companies such as Teledyne, Avionica, Sagem, and Astronics, have developed AIDs and other solutions to transfer data when the aircraft is on the ground through these networks.

(b) Also Rockwell Collins' AID product for […] program[323], Rockwell Collins' AIMCS[324] and UTC's eFAST product[325] make use of cellular

320 See paragraph (370) above.

321 See paragraph (370) above.

322 The complainant itself acknowledges that ARINC does not have the capacity to transmit large sets of data: "*Currently only key messages and alerts as chosen by the customer are transmitted through ARINC in "real time". The current ACARS/VHF networks are not fast enough to handle larger amounts of data and can be likened in performance to internet modems from the 1980s.*" – see minutes of the call of 4 of April 2018.

323 Rockwell Collins will provide dual cellular connections for […] and […] aircraft starting in 2018. One channel is reserved for […] data transfers to support its […] Airplane Health Management. The second channel will be for the airline's own use for its operational and maintenance programs, or to use ACARS over IP, instead of a first generation datalink network. More importantly, Rockwell Collins will not have access to the data that is captured and transmitted. It will be limited to providing the hardware component (AID) and managing the data transmission from […] to the […] servers.

connectivity to transmit performance data on the ground. The cellular/Wi-Fi connectivity for these applications is provided by telecommunication networks and not by ARINC (or SITA).

(382) Fourth, given the costs and the limited capacity of VHF/Satellite networks, ACARS over IP is currently being developed to allow the transmission of ACARS messages via cellular, Wi-Fi networks on the ground and through second generation satellite networks in-flight[326]. Hence, this can be expected to further reduce the relevance of ARINC and SITA networks for the transmission of aircraft performance data.

(383) Fifth, the Parties[327] and other market participants[328] expect that real-time performance data will, in the future, be transmitted through high bandwidth satellite connectivity. Second generation air-to-ground links using medium-band and broadband satellite have been developed mainly to enable passenger internet connectivity. Today there are several providers of these services, such as Panasonic, GoGo and Global Eagle Entertainment. Thales, SITA and Rockwell Collins operate as value-added resellers of both of Inmarsat and Iridium's service[329]. In the future, these broadband connectivity services could be used to also transmit in-flight other aircraft data, including performance. Rockwell Collins has around [0-5]% market share as a reseller of satellite broadband connectivity and estimates that its market share will not exceed [5-10]% […][330].

(B) Airframers, not the Parties, determine the hardware and software that gathers and transmits data within the aircraft and off the aircraft

(384) As to the role of the airframers, they determine which components of the aircraft will generate performance data, and what types of data they will generate and how the data is transmitted. As specified by the airframer, these components will "publish" data into the aircraft internal network using ARINC standards, and the Aircraft Condition Monitory System[331] will "listen" to and record the

---

324 […] by Rockwell Collins for the […] platform. It allows the transmission of […]. While the ACARS over IP standard is being developed, […] are transmitted through cellular or WiFi on the ground and, in the future, may also be transmitted in-flight through second-generation satellite services.

325 UTC's solution (eFAST) is installed on […] aircraft and makes use of cellular connection to download large amounts of data to a customer portal.

326 ACARS over IP refers to an industry standard that is being developed by the standard setting body SAE International. The Parties estimate the standard may take […] to become ratified. Rockwell Collins' AID for the […] program and […] are intended to support ACARS over IP when the standard is complete (likely with new software).

327 Parties' submission of 10 April 2018 and the Parties' reply to RFI no. 8. An airframer corroborated that ACARS-over-IP for real time, air-to-ground communications will be certified soon – see airframer reply of 11 of April to EC questions of 9 of April.

328 Replies to Commission flow-up questions of 9 and 12 of April.

329 The value-added consists in managing the relationship with the customer, providing the on-board system to connect passengers to the internet and the ground infrastructure to connect the passenger to the commercial internet once the signal reaches the ground through broadband satellite – see Minutes.

330 See Parties' reply to question 2 of RFI no. 21.

331 Aircraft condition and monitory system (ACMS) is a software that collects and stores performance data generated by aircraft components. ACMS is typically hosted in the aircraft's data management hardware, such as an AID.

specific data streams, as defined by the airframer or the aircraft operator[332]. The merged entity has therefore no control on how much performance data is generated and on how that data is transmitted within the aircraft and off the aircraft.

(385) Furthermore, Airframers are trying to enhance their position in health management[333] and MRO services by taking control of the data generated by aircraft systems in order to create unique datasets, not available to component suppliers. In their most recent platforms, Airbus and Boeing design the data flow in such way that the data will go through the airframers' servers before getting to the component manufacturer or the airline. For example, Airbus has taken the position that data generated by the engine's FADEC should not be available to the engine supplier (in this case Pratt & Whitney) or to the airline directly. Instead the data will be aggregated by Airbus' aircraft data management system (FOMAX) and transferred to Airbus' data centre for processing. Accordingly, the merged entity will face strong competition on health management services, including from Airbus and Boeing, and the control of the ARINC network will not give it a particular advantage.

(C) Airlines choose the transmission data provider and authorise the transmission of data to third parties

(386) As to the role of airlines, the airlines choose the data network provider and authorise third parties' access to the data generated by their fleet. The airline may choose to route their aircraft management data to a health management provider or to develop their own IT infrastructure with analytical capabilities (as FedEX did).

(387) With regards to incentives, as mentioned before any discrimination in the provision of VHF/Satellite services would jeopardise ARINC's reputation as an open network and lead to customers switching to other alternatives.

(388) Similarly, the merged entity would not have the ability or incentive to bundle aircraft components (that generate performance data) or systems (that support the aggregation or transfer of data) with cheaper or free of charge ARINC transmissions.

(389) In addition to all the reasons explained above, the opportunity to offer such kind of bundle is limited to bundling ARINC access either with Buyer Furnished

---

332 In addition to ACMS, another software used to transmit data to the ground is the quick access recorder (QAR). These systems are present on most large commercial and regional aircraft, and must be tested, validated and certified by the airframer before they are put on the aircraft.

333 Today, Boeing offers its health management services to […] airline operators; Airbus services […] airline operators, Lufthansa Technik services […] and Honeywell services […] airline operators. UTC is has […], in addition to its helicopter health management product and the health management services for Pratt & Whitney's engines. UTC currently offers […] a legacy-component which will be decommissioned in […]. Rockwell Collins provides no health management services – Parties reply to question 1 of RFI no. 7 Parties reply to question 1 of RFI no. 8; Parties reply to question 15 of RFI no. 16.

Equipment or with retrofit components, where the merged entity would encounter one and the same customer, the airlines[334]:

(a) Within UTC's portfolio, the only BFE product where UTC has a market share above [30-40]% that can generate performance data is wheels and brakes for LCA. Already today, without Rockwell Collins capabilities UTC offers health management services for its brakes. Taking into consideration the positioning of LCA airframers in the provision of health management services, it is very unlikely that such a bundle would be successful.

(b) As for the retrofit components, in particular UTC's AID (as suggested by a market participant), such bundle would not be very likely. First, not often the airline would be in a position to change the component provider in retrofit solutions and if it did there are other alternatives to UTC's AIDs (UTC has [10-20]% market share). Second, retrofit solutions do not cover necessarily the entire fleet of the airline, while ARINC services are subscription-based service contracts for the entire fleet.

(390) For all the above reasons, it is unlikely that the merged entity would leverage its position in the provision of network services to harm competition in the provision of health management services.

8.2.5. IMUs and GPS

(391) The Parties' activities in IMUs and GPS receivers lead to both vertical and conglomerate links with UTC being active in the supply of IMUs and Rockwell Collins being active in the supply of GPS receivers.

(392) As regards IMUs:

(a) UTC only supplies tactical IMUs and […]. UTC estimates that in 2016 the IMU market was worth EUR […] and that it had a [30-40]% market share. UTC estimates that Honeywell had also a [30-40]% share of this market, while the remaining third is divided among: Safran ([10-20]%), Systron Donner ([10-20]%), Litton ([10-20]%), and Sensanor ([0-5]%)[335]. UTC expects its and its competitors' market shares to be similar in 2017[336].

(b) Rockwell Collins does not manufacture IMUs. However, Rockwell Collins sources tactical IMUs from […] for its integrated offer of IMUs and C/A code GPS receivers[337] and for a Common Range Integrated

334 AID's, ACMS are sold to the airframers as SFE, for example Rockwell Collins' new AID for the […] program, UTC's eFAST product. The complainant mentioned the possibility of the merged entity offering preferential pricing or free transmissions of data pertaining to the merged entity's Auxiliary Power Units but this system is sold as SFE (and thus not to the same customer base as the ARINC data link network services which are sold to airlines).

335 See reply to question 6 of RFI no. 6 and to question 5.1 of RFI no. 21.

336 See reply to question 5.1 of RFI no. 21.

337 Rockwell Collins' Athena 511 product. It sold […].

Instrumentation System ("CRIIS")[338]. Rockwell Collins also purchases tactical IMUs from […]. These tactical IMUs are not incorporated into any Rockwell Collins product, but are used for experimental purposes. Overall, Rockwell Collins has purchased EUR […] of IMUs in 2016 (EUR […] from […] and EUR […] from […]).

(393) As regards GPS receivers:

(a) Rockwell Collins manufactures and supplies both C/A code and SAASM code GPS receivers. As the complaint that was put forward in the market investigation pertains to SAASM code GPS receivers, the Commission's analysis will be focussed on this market and its possible segmentations. According to Rockwell Collins, in 2017 the market size of SAASM GPS receivers for aircraft applications amounted to EUR […] and its market share was approximately [10-20]%. Rockwell Collins estimates that in 2017, the market size of SAASM GPS receivers for non-aircraft applications amounted to approximately EUR […] and its market share was [70-80]%. There are […] other companies authorised by the US Department of Defence to manufacture and supply SAASM GPS receivers: […] and […].

(b) UTC is not present in any of the GPS receivers markets and its tactical grade IMUs can only be integrated with SAASM GPS receivers for non-aircraft applications.

8.2.5.1. Complaint raised during the market test investigation

(394) A competitor of UTC in tactical IMUs, that supplies tactical (low-grade) IMUs to Rockwell Collins, complained that post-Transaction Rockwell Collins would internalise its demand for IMUs and stop purchasing them from the complainant, giving preference to UTC.

(395) In addition, the same complainant, who also sources SAASM GPS receivers from Rockwell Collins, claimed that post-Transaction Rockwell Collins would supply SAAM GPS receivers only on less favourable terms or would stop supplying them. The complainant claims that the merged entity could displace the complaints' integrated offers first in the non-aircraft space and later in the aircraft space[339].

(A) Customer foreclosure concern

(396) Rockwell Collins is not an important customer or channel to sell tactical IMUs. As mentioned above, the tactical IMUs market was worth EUR […] in 2016 and Rockwell Collins total purchase of this product was less than [0-5]%. In addition, Rockwell Collins is also not an important tactical IMU customer of the

338 CRIIS is an integrated system delivered to […] for the operational testing and training of weapon systems. Rockwell Collins sold […] units in the past two years.

339 See complainant's responses of 3 April 2018 to EC follow-up question of 26 March 2018.

complainant since its purchases correspond to far less than [5-10]% of the complainant total sales of tactical IMUs[340].

(397) Even if post-Transaction, Rockwell Collins would stop sourcing IMUs from the complainant, that would not have a significant impact neither in the tactical IMUs market, nor in the complainant's tactical IMUs business.

(B) Input foreclosure concern: SAASM GPS for aircraft applications

(398) The merged entity neither has the ability nor the incentive to stop supplying SAASM GPS receivers for aircraft applications.

(399) With regards to ability, Rockwell Collins' market share is around [10-20]% and there are four other alternative suppliers. The complainant already certified a competitor of Rockwell Collins to be its supplier of SAASM GPS receivers for aircraft applications for one of its integrated offers, substituting Rockwell Collins in new platforms[341].

(400) With regards to incentives, the merged entity would be unlikely to forego a revenue stream (sales of SAASM GPS receivers for aircraft applications) when it does not have the capability to supply an integrated offer similar to the complainant, and consequently recoup the lost revenue through the sale of a competing integrated offer:

(a) On the one hand, the complainant is the most important customer of Rockwell Collins for SAASM GPS receivers for aircraft applications.

(b) On the other hand, and more importantly, UTC does not manufacture high-grade IMUs, which are the suitable IMUs to be integrated with SAASM GPS receivers for aircraft applications.

(401) In fact, to the extent that UTC is not active, nor has plans to enter the high-grade IMUs market, the proposed Transaction changes nothing to what Rockwell Collins could have done on a unilateral basis before the Transaction.

(C) Input foreclosure concern: SAASM GPS for non-aircraft applications

(402) Similarly, the merged entity does not have the ability or the incentive to stop supplying SAASM GPS receivers for non-aircraft applications.

(403) With regards to ability, given procurement characteristics in the industry, the merged entity would not be able to tie or commercially bundle Rockwell

340 This calculation is made based on the value of Rockwell Collins purchases and the complaint's market share in IMUs estimated by the Parties.

341 Around 2010 the complainant implemented a dual source strategy for the SAASM receivers and qualified […] receivers for use in new platforms. In 2013, Rockwell Collins issued a last time buy notice of its GEMV and GEM VI (SAASM) GPS receivers. The complainant chose not to continue purchasing Rockwell Collins' updated GEM GPS receiver (GEM VII) and opted to do a last buy of the legacy technology. Rockwell Collins expects that these deliveries will be completed […] – see Parties reply to RFI no. 11, on 11 April 2018.

Collins' SAAMS GPS receivers with UTC's tactical grade IMUs, displacing the complainant.

(a) First, the integration of SAASM GPS for non-aircraft applications with tactical IMU is generally made for precision weapons. With one exception, all weapons manufacturers procure these two products separately and integrate them in-house. The integration requires proprietary knowledge about the interface, performance parameters and design of the weapon, which is not typically available either to SAASM GPS or to tactical IMUs suppliers. In the exceptional case where the weapon OEM subcontracted the integration of the navigation system, to the Parties' understanding this integration is also done based on the weapon OEM's proprietary knowledge. Therefore, even in this case, the subcontractor cannot integrate independently from the weapon OEM. In fact, the complainant's integrated offer is made for the manufacture of weapons and the complaint also supplies tactical IMUs on a stand-alone basis to other weapons OEMs.

(b) Second, although Rockwell Collins has a strong position in this segment ([70-80]% market share), it does not have a "must-have" product. Currently, […] supply weapons OEMs and […] have been certified by the US Department of Defense and have the capability to do so.

(404) With regards to incentive, since Rockwell Collins and UTC sell respectively and on a stand-alone basis SAASM GPS receivers and tactical grade IMUs to weapons OEM, it is very unlikely that post-Transaction the merged entity would forgo a certain revenue stream ([…]) to push for a new bundle offer when the majority of their potential customers is not open to such integrated offer:

(a) On one hand, […][342].

(b) On the other hand, […][343].

(405) In terms of effects, SAASM GPS receivers are not an (important) input for the manufacture and supply of tactical grade IMUs, so there would be little (if any) impact on the IMUs market. Moreover, in the unlikely scenario where the merged entity would bring to the market a new integrated solution accepted by the weapon OEMs this is not necessarily a negative outcome. It would mean a new product on the market, and, possibly, competition for the complainant, in case already today the complainant can offer integrated solutions independent from the weapons OEMs.

[342] See Parties' reply to question 4 of RFI no.11.
[343] See Parties' submission of 11 April 2018.

8.2.6. Air data probes and Air data computers

(406) UTC supplies air sensors and smart probes. UTC has a leading position in both of these markets, in particular with regards to the smart probe which is a relatively recent product first developed by UTC:

(a) In the overall market for air data probes, UTC has a market share of [60-70]%, followed by Thales ([10-20]%) and Heico ([10-20]%). In large commercial aircraft, UTC has a larger market share ([70-80]%) and its main competitors are Thales ([5-10]%) and Heico ([5-10]%). In business jets, UTC has a market share of [70-80]%, followed by Safeflight ([20-30]%) and Esterline ([0-5]%). In military aircraft, UTC has a market share of [70-80]% and its main competitors are Safeflight ([10-20]%) and Transdigm ([5-10]%). In regional jets, UTC has a lower market share ([50-60]%) and Heico ([20-30]%) and Thales ([10-20]%) are its main competitors. Finally, in helicopters, UTC has a market share of [30-40]% and its main competitors are Thales ([30-40]%) and Safeflight ([10-20]%).

(b) In the overall market for (new) integrated air data systems (smart probe), UTC has market share of [90-100]% followed by Transdigm ([5-10]%) and Meggit ([0-5]%). In LCA and Regional Jets, UTC has [90-100]%. In Business Jets, UTC has [90-100]% and TransDigm has [5-10]%. In Military aircraft, UTC has [60-70]%, Meggit has [20-30]% and Transdigm has [10-20]%.

(c) In case the air data probes market would also include smartprobes, UTC's market share would be [70-80]%, followed by Thales and Heico with [5-10]% each.

(407) Rockwell Collins is not a supplier of either air sensors or smart probes. Rockwell Collins supplies air data computers on a stand-alone basis, but […]. UTC sells air data computers to a […] platforms. The Parties estimate that their combined market share is [10-20]% (Rockwell Collins [10-20]% and UTC [0-5]%). The Parties main competitors in air data computers market are Thales ([30-40]%), Honeywell ([20-30]%) and Curtis-Wright ([10-20]%)[344].

8.2.6.1. Complaint raised during the market investigation

(408) A component OEM who supplies air data computers and recently entered the air data probes market (no turnover yet) argued that Rockwell Collins would be a significant sales channel for its air data probe business but post-merger Rockwell Collins would preferentially select UTC air data probes to the exclusion of other competitors[345].

(409) The complainant further argued that post-merger UTC would no longer have the incentive to supply its competitors with its probes.

---

344 Parties' reply to question 8 of RFI no. 5.

345 Complainant's reply to question 141.1 of Questionnaire to Competitors of Aircraft Systems; and Complainant's responses of 3 April 2018 to EC follow-up question of 26 March 2018.

(410) Another component OEM who is present in the avionics market mentioned that the merged entity could bundle its smart probe with avionics making it more difficult to compete in the avionics market.

(A) Customer foreclosure concern

(411) The merged entity has no ability to engage in customer foreclose in the air probes market. First, air data computer manufacturers are not the only customers or the primary customers for air data probes, but airframers are[346].

(412) Second, Rockwell Collins does not appear to have a sufficiently strong position in ADC to justify the customer foreclosure concern raised by the complainant. As mentioned, there are two other competitors (including the complaint) with a higher market share than Rockwell Collins and there are several other suppliers[347]. Third, as the complainant itself acknowledged two other OEMs, Transdigm/Aerosonic and Aeroprobe have entered the ADC market recently[348].

(413) The merged entity would also not have the incentive to engage in customer foreclose on the air probes market. First, Rockwell Collins […], but it sells its ADC predominantly on a stand-alone basis […][349]. Second, the Parties submitted that ADC is […] for Rockwell Collins ([…]). Third, already today UTC […]. Going forward the merged entity is interested in […].

(414) In terms of effects, without using Rockwell Collins as a channel for its air probe market, the complainant made an entry in this market securing two platforms. Even in case the merged entity will not procure air probes from the complaint it is difficult to envisage how this could negatively affect the complainant's business to any significant extent and consequently the overall air probe market.

(B) Input foreclosure concern

(415) The merged entity will not have the ability or incentive to carry out an input foreclosure strategy.

(416) First, air probes are not a necessary input for air data computers. As mentioned above air probes are usually selected by the airframers and not by the air computer manufacturers. Second, although UTC is the market leader of air probes, there are alternative suppliers. Third, the complainant itself has recently entered the market.

(417) The merged entity will also have no incentive to engage in input foreclose of air data computer manufacturers. First, UTC's […] supply agreement where it was selected by a customer other than an airframer is the contract with the complainant. UTC has submitted that […]. Second, already today UTC supplies air sensors and some ADCs and it has never leveraged its position in air probes

346 The vast majority of airframers confirm that they choose the air probe supplier – see replies to question 133 to the Questionnaire to Customers- Airframers.

347 Respondents to the question 140 of the Questionnaire to Competitor of Aircraft Systems considered that although Rockwell Collins has an important position in the air data computer market there are many alternative suppliers of ADC.

348 Complainant's reply to questions 140 and 141 of Questionnaire to Competitors of Aircraft Systems.

349 […].

to gain a better position in the ADC market, indicating limited incentives to do so after the Transaction.

(418) In terms of effects, the supply agreement between the complainant and UTC is [0-5]% of UTC business and therefore an […] of the air data probes market.

(419) Finally, already today UTC supplies air data probes and air data computers together for two platforms. These offers represent [0-5]% of UTC business in air probes. There are other components OEMs that have the capability to supply both air probes and air computers (e.g. Thales, Transdigm) and some are present with both products in the same platform.

(420) These integrated offers have not had the effect of foreclosing, or raising entry barriers in either the air probe market (where the complainant has just entered) or the air data computers market (where the complainant acknowledges two new entries)[350].

(C) Smart probe and avionics

(421) An OEM competitor explicitly referred to the possibility of the merged entity to bundle its smart probe with avionics to the detriment of the avionics competitors[351].

(422) It is unlikely that the merged entity would have the ability or the incentive to significantly harm competition in the avionics market by offering such commercial bundle.

(423) First, UTC is the market leader in smart probes with high market shares. However there are no indications that UTC has attempted or been successful in leveraging its position in smart probes to increase its position in any other aircraft component, let alone that such strategies have resulted in foreclosure effects. Furthermore, airframers will usually procure air systems and avionics separately. Second, the value of SmartProbes is minimal compared to the value of avionics system, so a discount on SmartProbes would not be important enough to influence the selection of the avionics system. Third, already today there are avionics companies who have the capability to offer traditional air data systems and avionics (e.g. Thales and Honeywell) and this has not impeded other avionics companies without such capabilities from competing.

8.3. Conglomerate links

8.3.1. Introduction

(424) The Commission has applied its analytical framework (described in section 8.3.2) to analyse certain general conglomerate considerations of this Transaction (section 8.3.3) before analysing the specific conglomerate links between the Parties' activities in aircraft engines and avionics (section 8.3.4),

[350] According the Merger Non-Horizontal guidelines bundling or tying may have anti-competitive effects when it leads to the reduction of rival's ability or incentive to compete and/ or deters entry – See paragraphs 111 and 112.

[351] Complainant's reply to the Commission's questions of 26 March, 2018.

environmental control systems and galley cooling (section 8.3.5) and pilot controls, flight controls and actuation (section 8.3.6).

8.3.2. Analytical framework

(425) Pursuant to the Non-Horizontal Merger Guidelines,[352] in most circumstances, conglomerate mergers do not lead to any competition problems. However, foreclosure effects may arise in conglomerate mergers when the combination of products in related markets may confer on the Merged Entity the ability and incentive to leverage a strong market position from one market to another closely related market by means of tying or bundling or other exclusionary practices.

(426) The Non-Horizontal Merger Guidelines distinguish between bundling, which usually refers to the way products are offered and priced by the Merged Entity and tying, usually referring to situations where customers that purchase one good (the tying good) are required to also purchase another good from the producer (the tied good).

(427) Within bundling practices, a distinction is also made between pure bundling and mixed bundling. In the case of pure bundling the products are only sold jointly in fixed proportions. With mixed bundling the products are also available separately, but the sum of the stand-alone prices is higher than the bundled price. Tying can take place on a technical or contractual basis. For instance, technical tying occurs when the tying product is designed in such a way that it only works with the tied product (and not with the alternatives offered by competitors).

(428) While tying and bundling have often no anticompetitive consequences, in certain circumstances such practices may lead to a reduction in actual or potential competitors' ability or incentive to compete. This may reduce the competitive pressure on the Merged Entity allowing it to increase prices or deteriorate supply conditions in other ways. In this particular case regarding the combination of engines and avionics, the complainant has raised concerns of mixed bundling and technical tying.

(429) In assessing the likelihood of such a scenario of conglomerate effects, the Commission examines, first, whether the merged firm would have the ability to foreclose its rivals, second, whether it would have the economic incentive to do so and, third, whether a foreclosure strategy would have a significant detrimental effect on competition, thus causing harm to consumers. In practice, these factors are often examined together as they are closely intertwined.

8.3.3. General considerations on conglomerate effects of the Transaction

(430) UTC and Rockwell Collins manufacture and market a broad range of systems and equipment for the aerospace industry. However, there are a number of factors that make foreclosure due to conglomerate effects of the Transaction

[352] Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings, Official Journal C 265 of 18/10/2008 ("Non-Horizontal Guidelines").

highly unlikely. A full overview of the market shares of the aircraft equipment and components where the Parties' activities do not overlap but where their market shares exceed 30% are set out in Annex 1.

(431) During the market investigation, market participants acknowledged the complementarity between the Parties' portfolios and the limited degree of competition between them in general. Nevertheless, some market participants expressed the concern that the merged entity could have increased ability and incentive to tie or bundle aircraft components and systems, negatively affecting the ability of competitors with a smaller portfolio to compete, which could ultimately lead to a potential limitation of choice for customers. However, most of the voiced concerns were unspecific, without a concrete concept of how tying or bundling could materialize and how this could lead to harming competition. In addition, most market participants noted, equally on a general note, that the merged entity's ability to bundle or tie would ultimately depend on the airframers' willingness to accept such bundled or tied offers.[353]

(432) Taking a broader perspective on the importance of the merged entity as a supplier of aircraft components, and following on some market participants' feedback that UTC's market power could significantly increase after the merger through the sheer number of components they have installed on an aircraft,[354] the Commission notes that a bottom up calculation of the share of components provided by the parties on existing platforms[355] amounts currently to an average of [20-30]% (with an average increment compared to the pre-merger situation of [5-10]% brought by Rockwell Collins). Although there is some variation between platforms and for a number of platforms the Parties' share of components as of the total can be higher, even the highest procurement share is below [50-60]%[356]. This indicates that, generally speaking, there are alternatives available that have been chosen by airframers for many different components on the aircraft.

(433) The Notifying Party adds[357] that o UTC and Rockwell Collins focus on different types, namely on SFE and BFE equipment respectively, as regards their non-overlap products. This in their view limits the bundling opportunities significantly for two main reasons: First, SFE and BFE products are sold to different customers (airfamers and airlines respectively), therefore, there is no scope for bundling. Second, the Transaction does not result in any significant increment to an existing portfolio of BFE products.

---

353 See replies to questions 12, 19, 22, 23, 24, 26 and 161 of Questionnaire 1 -Competitors.

354 Some indicated UTC could have a share of over [50-60]% of the total procurement cost of an aircraft, e.g. see replies to question 9 of Q3 - Questionnaire to customers –airframers, see also minutes of a call with a competitor on 16 January, 2018.

355 See the Parties' replies to questions 26 and 27 of the Commission's RFI#1: Proportion of procurement cost of all equipment installed by the merged entity as a proportion of the total procurement cost of a platform. The calculation was carried out for the major 30 platforms where both Parties are present.

356 Ibid. The highest shares can be noted for […], the merged entity's share is [40-50]% with an [5-10]% increment by Rockwell Collins, the following highest is reported to be on the […] ([30-40]%+[5-10]%) and on the […] ([20-30]% + [0-5]%).

357 See the Notifying Party's reply to the question 23 'Conglomerate' of the Commission RFI#1 as of 11 January, 2018.

(434) UTC's only BFE products are: wheels & brakes and some comfort enhanced Cabin Attendant Seating. The Notifying Party sees bundling in general to occur between systems that fit or work together closely. And none of these products, in their view, is a good candidate to be bundled with Rockwell Collins' BFE products; avionics, commercial passenger seating, datalink network services and food & beverage systems. Therefore, any conglomerate theory should focus on SFE products.

(435) The Notifying Party acknowledges[358] that there is certain room for commercial bundling and quotes for instance a supply agreement with a regional jet manufacturer in 2012 where UTC [details of UTC's supply agreement and bidding strategy].

(436) In this respect, the Notifying Party explains that smaller airfamers of regional and business jets more often seek to procure packages as they value the OEMs integration capacity, whereas large airframers, having more extensive own integration capacity, rather opt for individual packages.

(437) To underline this, the Notifying Party notes that large airframers have the tendency of breaking up product packages, which they had tendered together previously. Rockwell Collins mentions a situation where, having bid on an RFI in 2013 for a large commercial airframer encompassing all pilot controls, where the package, after receipt for the offers, was divided into separate RFIs again for each pilot control.

(438) In any case, the Notifying Party holds[359] that there is no evidence that had UTC entered any commercial bundling practices, based on its already broad product portfolio pre-Transaction, they ever had any anti-competitive effect. The Notifying Party believes that airframers possess both the power and the incentive to reject any attempt at anti-competitive bundling or tying by suppliers because they would be directly harmed by any resulting reduction in competition.

(439) Respondents to the market investigation in general confirmed that commercial bundling of different components is relatively rare in the industry, and that tenders are usually organised for each component separately, although replies were split and indicated that the presence of bundling was dependent on a variety of different factors: Market participants mentioned for instance that there could be a difference in the procurement strategies between the manufacturers of large commercial aircraft and of the regional and business jet segment, as the latter may not have the same level of integration capacity and are more inclined to tender or accept packaged solutions. They also added that it is difficult to generalise and bundling depends also on the functional or technical closeness of the products involved, e.g., an engine is more likely to be bundled with a

[358] See the Notifying Party's reply to the question 25 'Conglomerate' of the Commission RFI#1 as of 11 January, 2018.

[359] Form CO, General Section, para 7.8.

nacelle[360] than with a landing gear[361], thereby largely confirming the Notifying Party's general arguments.

(440) Airframers' practice of braking up previously tendered packages, as reported by the Parties, has been confirmed by over half of the responding airfamers,[362] and this was also reflected in some of the bidding data analysed by the Commission, as described for instance in paragraph (295).

(441) Respondents to the Commission's market investigation generally could not recall specific examples of the Parties' commercial bundling or tying in the past although each of the Parties, and in particular UTC, already supplied a range of aircraft components to the same customer base before the Transaction. In particular, the respondents did not report any instances where actual foreclosure effects occurred by reducing actual or potential competitors' ability and incentives to compete, including by making it harder for specific market entrants to win business, thus causing harm to competition.[363]

(442) Rather, the responses reflect that as a general rule, the airframers, some of which may hold significant buyer power due to the concentrated structure of the market, are in the driving seat to formulate the scope of the tenders:[364] *"This practice is sometimes encountered, and is typically a strategic sourcing choice of each customer. It seems to be more common where a customer has a strategic preference for a small number of suppliers on a given program or for a given commodity. Such sourcing strategies vary from customer to customer and program to program."*[365] and: *"This happens frequently (787, A350) where it benefits the customer, although aircraft manufacturers (primes) seem to be moving away from this"*[366].

(443) The airframers' control over this process is further highlighted through the replies of competing equipment manufacturers, who confirmed having concluded all their supply contracts in the past 10 years as a result of a competitive selection process.[367]

(444) Airframers in their replies seemed to be rather agnostic towards commercial bundling and maintained that there was generally no particular strategy with respect to commercial bundles, even if this was to reduce the purchase price of the equipment: According to these replies, the selection of any product depended on a number of several additional criteria built into the procurement process, not necessarily less important than price, such as the technical compliance, support arrangements or company experience.[368] As a large airframer puts it: *"[Airframer's] priority is to run a fair and equal tender*

---

360 Nacelles are aerodynamic structures that surround jet engines, anchoring them to the airframe, and provide thrust for the flight.

361 See replies to questions 12 and 13 of Questionnaire 1 - Competitors; overall one third of competitors reported having ever made bundled offers.

362 See replies to question 21 of Questionnaire 2 – Ariframers.

363 See replies to question 14 of Questionnaire 1 - Competitors.

364 See replies to question 24 of Questionnaire 1 - Competitors.

365 A competitor's reply to question 12 of Questionnaire 1 - Competitors.

366 A competitor's reply to question 12 of Q1 - Questionnaire to Competitors.

367 See replies to question 6 of Questionnaire 1 - Competitors.

368 See replies to questions 15, 16 and 26 of Questionnaire 2 – Airframers.

process. Such strategies will only be successful where all bidders have an equal chance to offer such multi-products packages."[369]

(445) Many responding airframers therefore prefer to tender individual equipment but reportedly remain open to commercial bundles to be evaluated on a case-by-case basis. Even with a broader portfolio and an increased ability of UTC to offer bundled packages, airframers held that this alone was not sufficient to enable UTC to sell those packages to the airframers.[370]

(446) Regarding technical tying, the Notifying Party submits[371] that the aerospace industry uses standard communications protocols that allow the various aircraft systems to interoperate, and independent third parties establish these protocols. Components are connected via gateways using industry-standard communications protocols specified by the airframer. Any systems that used different (proprietary) communications protocols and thus would not interoperate with other suppliers' systems would not meet airframer specifications and would be rejected by the airframers,

(447) This was largely confirmed by the parties' competitors that held that airframers are conscious of the effect that accepting tied offers could have on the number of competitors they will be able to consider in current and future bids.[372] Market participants also explained[373] that airframers use very standard interfaces precisely in order to avoid the technical tying of systems. Technical tying increases their dependence on the supplier, decreases transparency and can significantly inflate the cost of maintenance as any replacement requirement will affect the entire system instead of a modular approach.[374] As one competitor puts it with respect to tying for buyer furnished equipment; "*a threat for their supply chain*".

(448) Some respondents were of the view that technical tying exists, in particular in case of regional or business jets; however, almost all added the caveat of the countervailing buyer power "*as long as it is accepted by the aircraft manufacturer*"[375].

(449) Furthermore, only a fraction of respondents to the Commission's market investigation identified products of the merged entity, which they considered to be unique, a 'must-have' or impossible to source from alternative suppliers[376], which could help rendering a tying or commercial bundling scenario sufficiently successful.

---

369 See a large airframer's reply to question 19 of Questionnaire 2 – Airframers.

370 See a large airfmaer's reply to question 23 of Questionnaire 2 – Airframers.

371 Form CO, General Section, para 7.89 ff.

372 See replies to question 14 of Questionnaire 1 - Competitors.

373 See replies to question 15 of Questionnaire 1 - Competitors.

374 See replies to question 15 of Questionnaire 1 – Competitors and also minutes of a call with competitors on 11 April, 2018.

375 See a competitor's reply to question 15 of Questionnaire 1 - Competitors.

376 See replies to question 18 of Questionnaire 1 – Competitors, replies to question 22 of Q2 - Questionnaire 2 – Airframers.

(450) Finally, competitors largely agreed that UTC will become by far the largest competitor but companies of large size and similar portfolio, namely Safran Group, GE and Honeywell would compete on par with the merged entity.[377]

8.3.4. Aircraft engines and avionics

8.3.4.1. Complaints from market participants

(451) A market player active in the avionics market expressed the concern that the combination of UTC's strength in engines and Rockwell Collins strong position in avionics would create an industry giant with an almost nose-to-tail offering across avionics and mechanical systems. The combined entity would gain an unrivalled ability to negotiate aggressively with airframers given its size, economic strength and strong portfolio, making it an almost unavoidable trading partner.[378]

(452) According to this complainant, the combined UTC/Rockwell Collins will have significantly enhanced scale, bringing together UTC and RC's generally complementary portfolios. In particular, UTC would be able to combine its strength in propulsion (in relation to which it supplies engines for the range of thrust classes, including air transport at the highest end) and other areas, together with RC's strong suite of avionics products.[379]

(453) From an economic perspective, the combined entity will have an increased incentive to seek to leverage its air transport propulsion offering in particular to bundle together engines with APUs, avionics safety systems, cockpit systems, and potentially other components at a discounted price. Offering engines and avionics products commercial bundles together with a limited discount on the engine (by far the largest cost item on the plane) would incentivize the customers to choose the merged entity's bundle with avionics. It would also be economically viable to do so, given that loss of margin on avionics products provided at low price or at cost can be recouped by securing sale of its propulsion products (being the vast majority of the value of the aircraft). Other avionics players have expressed the concerns regarding risks of commercial bundling of engines and avionics and how such a practice would impact their activities as a pure avionics supplier.[380]

---

377 See replies to question 160 of Questionnaire 1 - Competitors.

378 Responses to the European Commission's follow-up questions dated 26 March 2018.

379 The complainant also argues that their concerns are heightened given that UTC and Rockwell Collins reached on 16 March 2018a commercial agreement, with Boeing which according to public sources, are "*win win agreements win-win agreements with each of them that bring value to our customers and support our companies' competitiveness* "The complainant believes that this agreement could negatively affect its ability (as well as other suppliers' ability) to compete for Boeing's business and is indicative of the combined entity's market power which allows it to lock-in key customers to the exclusion of key competitors. More specifically, the complainant argues that the deal with Boeing is cross products and allegedly helps Boeing with its cost cutting objectives. The Commission has analysed these agreements and has not found any evidence that these agreements enable UTC and Rockwell Collins to bundle or tie products of their portfolio to foreclose rivals with a narrower portfolio.

380 See replies to questions 19 and 161 of Questionnaire 1 - Competitors.

(454) Another potential anticompetitive effect of the merger would be technical tying between engines and avionics. This complainant has explained that there is a possibility that the merged UTC/Rockwell Collins would develop an integrated solution of engines and avionics, based on data exchange between the two components that would improve the performance of the engine. The more data that can be shared between systems will improve the fuel efficiency, operating cost and maintenance requirement of the engine. For instance, the avionics products collect information about the weather, the flight path and the weight of the plane that could be used to optimize the performance of the engine. Data-sharing and a deeper understanding of how the two sub-systems work could significantly improve engine performance.

(455) In particular, the complainant has expressed a specific concern with respect to the degradation of compatibility between UTC engines with competitors' avionics products. The improved integrated offer of engines and avionics could be designed in such a way that the engine of UTC would not work at all or would work less well when combined with a competitor's avionics products. This could lead to foreclosure of avionics competitors.

(456) The engine and the avionics interact already today. However, that interaction is limited to command/control and not much information is actually shared between the components. Increased information sharing through proprietary interconnectivity standards could favour avionics system that interact more in depth with UTC engines and lock out other avionics suppliers.[381]

(457) Finally, the complainant has explained that the Transaction and the combination of engines and avionics would provide the merged entity with a timing advantage. In general, the airframer will set the schedule for tenders of components. The engine is usually chosen first and many parts of an aircraft will fundamentally be connected to this engine once it is chosen. Therefore the engine defines much of the architecture of an aircraft from the very first day. The risk would be that this early procurement of UTC engines would either (i) allow the merged entity to understand the requirements/architecture required by the airframer for its other components earlier than other firms, and therefore be able to use this insight to develop better offerings for the customer before other competitors, or (ii) enable the customer to default towards an engine/avionics bundle without going to tender at all to save time in the procurement process.[382]

(458) In terms of effects on competition in avionics, assuming the complainant is locked out from winning business in avionics because of these practices, it will be difficult for the complainant to stay in the market. Since bids for new platforms are rare, the complainant would not have to lose out on many bids to feel an effect. The long-term nature of the industry requires that investment in research and development takes place far ahead of aircraft programmes, and there is a certain level of foresight required.

381 Non confidential minutes of a call with the complainant on 4 April 2018.
382 Non confidential minutes of a call with the complainant on 4 April 2018.

8.3.4.2. The Commission's assessment

(A) UTC does not hold a sufficient degree of market power in engines

(459) In the first place, the Commission considers that UTC does not hold a sufficient degree of market power in aircraft engines to enable the merged entity to engage into practices leveraging its position in engines to foreclose rivals in avionics. The table below provides the market share of UTC and its competitors as regards engines. These market shares are provided as regards engines for large commercial aircraft on the one hand and engines for regional and business jets on the other hand. As this distinction is the one which is relevant to segment the avionics market, it is also relevant to assess to assess the ability of UTC to leverage its position in engines into the avionics market.

		UTC	UTC/ GE (Engine Alliance)	GE + CFMI	Rolls Royce	Honeywell	Others
Large Commercial Aircraft	Market Value Engines (sales)	[10-20]%	[0-5]%	[60-70]%	[10-20]%	[0-5]%	[0-5]%
	Engines in Service (volume)	[20-30]%	[0-5]%	[60-70]%	[10-20]%	[0-5]%	[0-5]%
	Engines on Order (volume)	[10-20]%	[0-5]%	[70-80]%	[10-20]%	[0-5]%	[0-5]%
Regional/ Corporate Aircraft	Market Value Engines (sales)	[20-30]%	[0-5]%	[30-40]%	[10-20]%	[5-10]%	[20-30]%
	Engines in Service (volume)	[50-60]%	[0-5]%	[10-20]%	[10-20]%	[20-30]%	[5-10]%
	Engines on Order (volume)	[50-60]%	[0-5]%	[20-30]%	[5-10]%	[5-10]%	[10-20]%

(A.i) Large commercial aircraft

(460) UTC, which is active in the market for aircraft engines through Pratt&Whitney, as well as two joint ventures, IAE and EA, has a more limited position in the market for engines for LCAs with market share of [10-20]% in value and [20-30]% in volume and a […] as its engines are […]. It supplies the PurePower PW1000G geared turbofan ("GTF") engine family, which is available as an engine option on the Airbus A320neo family, (ii) the IAE V2500 engine, which is available as an engine option on the Airbus A320 (classic) family and the GP7200 engine, which is available as an engine option on the Airbus A380. For wide-body LCAs, UTC has […] for engines and its share […].[383]

(461) In engines for large commercial aircraft, GE, either by itself or through its 50/50 joint venture with Safran CFMI is the lead engine supplier, for both wide-body aircraft and narrow-body aircraft with market shares above [60-70]%. GE's engines power various LCAs, including in particular the largest Boeing 777

383 See "Response to EC state of play meeting - Potential concern engines /avionics", April 10, 2018.

models, the Boeing 787 Dreamliner, the Boeing 747-8, and the Airbus A380. CFMI sells the CFM56 engine that powers the Airbus A340, Airbus A320 (classic) family as an option and the Boeing 737 (classic), as well as the LEAP-engine that powers the Airbus A320neo as an option, the Boeing 737 MAX on an exclusive basis, and the COMAC C919 on an exclusive basis.

(462) Rolls- Royce is also active in this market for large commercial aircraft, with a portfolio covering the Airbus A330neo, the Airbus A350, the Boeing 787 Dreamliner family (as an option), and the Airbus A380 (as an option).

(463) For large commercial aircraft, Rockwell Collins holds a market share of [30-40]% in avionics, on par with Honeywell ([30-40]%) and ahead of Thalès ([10-20]%). Other suppliers (GE avionics, L3, Teledyne) have shares [0-5]%. A segmentation by avionics component would not dramatically change the picture, with Rockwell Collins being […] in satellite communications, communications, navigation, multi-mode receiver GPS and weather systems, and Honeywell […] in collusion avoidance, flight management systems and flight control electronics (where Rockwell Collins […]), information management and communications management units

(A.ii) Regional and business jets

(464) In engines for regional and business jets, UTC has a stronger position in engines with a combined share of [20-30]% in value and [50-60]% in volumes for both engines in service and backlog orders. UTC supplies several types of engines for regional aircraft and business jets which are available on various platforms of Bombardier, Gulfstream, Embraer, Cessna and Mitsubishi. This share also reflects the fact that UTC [information on UTC's participation in recent tenders]. For these three platforms, the avionics supplier has already been selected (Honeywell for the Embraer platform, Rockwell Collins for the Mitsubishi and Bombardier platforms).

(465) For regional and business jets, Rockwell Collins holds a market share of [40-50]% in avionics, ahead of Honeywell ([30-40]%), Thalès ([10-20]%) and Garmin ([5-10]%). A segmentation by avionics component would not lead to significantly differences in market shares.

(466) One area of regional/business jets where UTC is particularly strong is turboprop engines where they would hold a share of [70-80]% for regional turboprop and more than [90-100]% for business turboprop. These shares are high because UTC has won competitions for old platforms (ATR 42, ATR 72 and Bombardier 400) years ago. There are therefore not necessarily indicative of UTC's capacity to win any new business for a new turboprop platform, should an airframer decide to committing to launch one (which is not the case for the moment). In the event that a new platform is launched, it is likely that new suppliers would emerge as engines manufacturers such as GE which has announced working on a new generation turboprop engine.[384]

[384] See for example Flight Global 27 December 2017 *GE completes first ground test of Advanced Turboprop engine* available at https://www flightglobal.com/news/articles/ge-completes-first-ground-test-of-advanced-turboprop-444489/.

(467) In any case, the Commission has not defined in the past avionics market in relation to the types of engines that power the aircraft (turboprop or turbofan) but rather pursuant to the mission profile of the aircraft. Moreover, the Commission has not found that avionics for aircraft powered by turboprop engines would be significantly different from avionics for aircraft powered by turbofan engines, assuming that the mission profile is the same. There is thus no market for avionics used in aircraft powered by turboprop engines, in which the merged entity could try to leverage potential market power in turboprop engines. Rather, any effect of potential foreclosure practices needs to be assessed on the relevant markets for avionics in business/regional aircraft where the merged entity's market power is insufficient for such strategies to succeed and result in foreclosure of competitors. Furthermore, making it more difficult for competitors to sell avionics products on regional or business aircraft powered by turboprop engines is unlikely to lead to any foreclosure effects on the markets for avionics for regional and business aircraft as a whole (taking also into account that research and development efforts are not tailored or focused specifically on avionics sold on aircraft powered by turboprop engines).

(468) The Notifying party has explained that all the regional jet procurements for aircraft systems have already taken place, notably those won by UTC such as the Embraer E2 family, the Bombardier C Series, the Mitsubishi MRJ, and the Irkut MC-21. There are no plans by any airframer to build a new regional jet in the foreseeable future. All the platforms identified paragraph (464) are still forthcoming or very recently introduced. Successful airframe programs have a useful production life-span of 15-20 or more years. No airframer will introduce a new jet into this extremely crowded market for at least that much time. As a result, even if UTC had market power in regional jet engines, it would have no opportunity to leverage this position to sell other products for many years.[385]

(469) There are other players active in this market for engines for regional and business jets, such as GE (active in regional and business jets), Honeywell (active in regional and business jets), Rolls-Royce (active in regional and business jets with a strong presence in large business jets) and Williams International (active mainly in small business jets). Two of these players are already active in engines and avionics and could provide alternatives to the combination of the merged entity.

(470) Moreover, the avionics market for regional and business jets, on which UTC enjoys a market share of [50-60]% represents ¼ of the overall avionics market ([…] out of […] overall), avionics for LCAs accounting for the remainder. Avionics for regional jets, in which UTC has recently won bids for engines, account for less than one third of the overall regional/business jets avionics market ([…]). Therefore the incentives of UTC to engage into foreclosure practices are restricted by the fact that its market power, if any, is limited to a minor part of the overall avionics market.

[385] See "Response to EC state of play meeting - Potential concern engines /avionics" April 10, 2018.

(B) Commercial bundling is not a regular feature of the industry and timing of the procurement process is in the hands of the airframer

(471) The Notifying Party has explained that airframers control every aspect of the systems procurement process, often driven by the cadence of engineering decisions inherent in aircraft design: they establish the specifications of each component and system being procured, set the bidding timing and process, and invite the suppliers who can participate in any procurement opportunity. Airframers are sophisticated purchasers who have every incentive to maintain a competitive supplier base and the means to ensure this. These realities prevent any effort by aerospace system suppliers to engage in anticompetitive bundling/foreclosure strategies.

(472) This control of airframers has been confirmed by respondents to the market investigation, as explained in section 8.3.3. In general, airframers are reluctant to source bundled offers and prefer to select different suppliers to ensure a high level of competition. Bundled offer are sometimes proposed but they are in general unsolicited and the airframer would consider if only it matches its objectives in terms of cost efficiency and system integration. Airframers also control the timing of the procurement process in full and are unlikely to be influenced by the capacity of a supplier to propose engines and avionics at the same time.

(473) Even when airframers request offers for bundles of related systems (as described in more detail below for the Embraer example), they remain free to and routinely do break up such packages. The current trend is toward airframers procuring more systems individually from more different suppliers, not the opposite. Bundled offers also often require the supplier to also be the systems integrator, responsible for all testing and simulation of aircraft performance.[386]

(474) The Commission's investigation has not brought up evidence on relevant examples of commercial bundling of engines and other products in the last years, neither from the Parties nor from other suppliers active in engines and avionics such as Honeywell and to a lesser extent GE (and accordingly has not brought up evidence of any actual foreclosure effects). An example which was mentioned by the complainant was the procurement decision of Embraer for its E-Jet series. According to the complainant, UTC was selected to provide a bundle comprising Pratt & Whitney engines and APU, primary and secondary electrical distribution systems, emergency electrical generation systems, batteries and converters and wheels and carbon brakes. However, UTC has explained that [details of UTC's supply agreement].[387]

(475) The fact that bundling is an uncommon feature of the aerospace industry is further confirmed by the situation of Honeywell in business jets. Honeywell is one of the suppliers of business jets engines and also competes with Rockwell Collins in avionics. Should customers require and obtain bundled discounted offers combining engines and avionics, one would expect Honeywell to be present in the same platforms for engines and avionics. The reality is that, as

386 See replies to question 17 of Questionnaire 2 - Airframers.
387 Fom CO, General section, para 7.57.

shown in the table below Honeywell supplies engines and avionics systems for several corporate jet platforms, but it almost never supplies both products for the same platform.

Table 3 **- Engines and avionic supplier by business jets platform**

(476) In terms of future plans, [reference to the Parties' internal documents].

(C) As regards technical tying, it is highly speculative that industry will move towards technical integration of engines/avionics

(477) The Commission's investigation has not brought up specific evidence that the aerospace industry is moving towards tighter integration between engines and avionics.

(478) An engine supplier has put forward that the engines and avionics systems are currently rather isolated from each other. In particular certification for each of these systems takes place separately. This is the case for strict safety reasons. The engine must be able to control itself in normal operation in all modes of failure, and must work independently to run or shut itself down safely.

(479) The engine has its own 'computer', known as the FADEC. Only the FADEC is in complete control of the engine. The data that this outputs includes for instance temperature and RPM, but not linked to any avionics.

(480) The potential advantage of linking the engines and avionics systems is that the FADEC footprint would be substantially reduced. The FADEC is currently quite a large box whose weight and size must be accounted for, materially affecting the operation of the aircraft.

(481) In order to link more closely the engine with the avionics, however, the certification process would need to change, and the company proposing this would need to work with regulators to rewrite the regulation behind this. The substantial amount of investment that would be required and the above mentioned technical barriers to certification represent significant obstacles to achieve this closer integration.[388]

(482) There is an ever-increasing breadth of frequency and number of sensors on the engine, and hence the amount of data being transmitted is also increasing. Over time, the process has evolved from capturing a few data points to more automated, rule-based capture of a much larger data set. This does not mean, however, that avionics are more deeply integrated with engines as there might be interferences with safety-critical functions of the engine.[389]

(483) The Parties [details of the Parties' current and future R&D programs].[390]

---

388 See minutes of a call with an engine manufacturer on 20 April 2018.
389 See minutes of a call with an engine manufacturer on 20 April 2018.
390 See reply to RFI 18 submitted on 23 April 2018.

(484) In terms of future plans, [reference to the Parties' internal documents].

(D) Customers are likely to oppose any proprietary communication systems that would more closely connect engines and avionics

(485) Currently, the ARINC 429 communication protocol applies to bidirectional communications between the FADEC (on the engine) and the avionics Data Management Cabinet ("DMC") for the following functions: (i) autoflight; (ii) autothrottle; and (iii) thrust management / flight management, to support coordinated flight manoeuvres. The FADEC communicates with the avionics displays for display indications such as turbine speed. ARINC 429 is the standard protocol for communication between engines and avionics.

(486) The Notifying Party has explained that the engine interoperates with different parts of the avionics system through these industry-standard communication protocols that are specified by the airframer. This precludes according to the Notifying party any possibility of technical tying – systems (including engines and avionics) that do not meet airframers' specifications for the communications interface with the rest of the aircraft, and in particular with major systems such as engines and avionics, would never be selected by an airframer. Airframers would not allow their freedom to select and change suppliers to be limited by suppliers' using non-standard or proprietary communications protocols.[391]

(487) Other engines manufacturers have confirmed during the market investigation that airframers seek to maintain standard protocols between engines and avionics. One engine manufacturer has put forward that the ultimate arbiter of the relationship between the engine and avionics will be the airframer, who will likely prefer more adapted communications systems over more closed systems. The airframer will have a strategy according to which they will place requirements on the components manufacturer to comply with and the merged entity is not in a position to influence this choice.[392]

(488) Another engine manufacturer has explained that airframers exert a lot of control in this market and tend to prefer a greater range of options and more openness. This supplier airframers are the driving force behind openness in the market. They expect airframers to continue to play this role in the future, as if they do not they will be at a disadvantage, having to pay higher prices and potentially getting locked in to supply from a single provider. If costs increase because of proprietary standards, airframers will not be interested in engaging and will continue to prefer open standards for communication.[393]

(E) Overall conclusion on conglomerate effects engines/avionics

(489) The Commission therefore consider that the Transaction does not raise serious doubts as regards conglomerate effects resulting from the combination of UTC's engines and Rockwell Collins 'avionics.

---

391 See reply to RFI 14.

392 Non confidential minutes of a call with an engine manufacturer on 20 April 2018.

393 Non confidential minutes of a call with an engine manufacturer on 20 April 2018.

8.3.5. Environmental control systems and galley cooling

(490) UTC is active in environmental control systems ("ECS"), which manage the flow of air within the aircraft, which helps to regulate cabin temperature and cabin pressure, as well as to prevent ice from forming on flight surfaces and components.

(491) UTC has market share of circa [30-40]% in an overall market. If a segmentation by aircraft type is retained, UTC's market share varies between [40-50]% in large and regional jets and [20-30]% in military aircraft. UTC's present in helicopters and in business jets is not significant with a market share of [0-5]% and below [0-5]%, respectively. If a segmentation by type of system function is retained, UTC's market shares vary from almost [60-70]% in cabin pressure to [10-20]% in bleed air systems. UTC has a market share of circa [40-50]% in air conditioning and circa [30-40]% in ventilation systems.

(492) Rockwell Collins is active in food and beverage preparation and storage equipment ("FBPSE") with a [70-80]% market share. FBPSE includes products such as ovens, refrigerators, and coffee machines for installation in aircraft galleys. One type of such inserts is aircraft galley air chillers.

(493) Although ECS and cooling galley system are totally unrelated in terms of manufacturing process, the cooling of food or beverages can be done by the ECS directly, via the ventilation system[394] (in which case supplemental galley chillers are not required). When the cooling of food or beverages is done by the cooling galleys the interaction between the ECS and the supplemental cooling is limited to the ducting of the exhaust of the latter into the exhaust of the former[395].

(494) An ECS competitor of UTC expressed the concerned that the merged entity could harm its competitors in the ECS market by bundling these products.

(495) It is not likely that the merged entity will have the ability or incentive to significantly impede competition in the ECS market by offering commercial bundles of ECS and galley cooling for the following reasons.

(a) First, UTC has a market share of around [30-40]% in the ventilation system (and in the overall ECS market) and there are several other suppliers, one of them with market share around [20-30]% in the ventilation system (and two others with market shares of around [20-30]% in the overall ECS market).

(b) Second, while ECS is a SFE, galley cooling is a BFE, so each product is sold to a different customer.

(c) Third, already today UTC offers an ECS with a food and beverage trolley cooling function and can thus offer this functionality without Rockwell Collins' aircraft galley air chillers. Zodiac also supplies ECS

394 See Form CO, section ECS, para. 6.3.
395 Parties reply to RFI no. 17.

and FBPSE, including aircraft galley air chillers[396]. Liebherr offers an addition on-board cooling system for food storage or avionics thermal management in addition to its air conditioning system[397].

8.3.6. Pilot controls, flight controls and actuation

(496) Some market participants saw UTC strong in actuation, especially in THSAs, and in pilot controls, while they saw Rockwell Collins strong in flight control electronics, THSAs and pilot controls. Therefore, some market participants argues, the merged entity could offer the entire flight control system to customers.[398] According to some respondents to the Commission's market investigation, combining pilot controls, flight control electronics and actuation products would provide the merged entity with a competitive advantage[399]. To the extent that the OEM would be willing to contract for an entire system solution, that combination could become a natural bundle according to some market participants.[400]

(497) Most of the responses remained vague in terms of potential harmful effects on competition however, The Commission notes in particular that few competitors thought this bundled offer of UTC could harm competition, notably by rendering smaller competitors' single product offers less attractive thereby depriving them of the necessary cash flows for continued viability and making it more difficult for them to compete.[401] Most competitors mentioned rather that the complementarity of its product offering would enable the merged entity to design a better product offering, with optimised and more efficient performance together with higher discounts, which would translate into a competitive advantage.[402]

(498) Taking into account the divestments under the commitments discussed in section 9 according to which all of Rockwell Collins' activities in pilot controls and actuation (THSAs) will be divested, the Transaction would be limited to leading to a new combination of Rockwell Collins' activities in flight control electronics on the one hand and UTC's activities in pilot controls and actuation, including THSAs, on the other hand.

(499) The Commission finds, however, that the merged entity would have insufficient market power and therefore no ability to foreclose competitors through the use of bundling or tying in pilot controls, actuation and flight control electronics. The commitments offered by UTC divesting the entire product overlap in THSAs and pilot controls would in any case prevent the merged entity from

396 Parties reply to RFI no. 17.

397 See Liebherr's site: https://www.liebherr.com/en/deu/products/aerospace-and-transportation-systems/aerospace/products-and-solutions/air-management-systems/air-management-systems.html#!/accordion-start-module=supp-cooling-acc-item-start-module.

398 See replies to questions 19 and 40 of Q1- Questionnaire to Competitors.

399 See minutes of a call with a competitor on 19 December, 2017. See minutes of a call with a competitor on 4 January, 2018.

400 See reply of a competitor to question 39 of Questionnaire 1 – Competitors and replies to question 63 of Questionnaire 1 - Competitors.

401 See reply of a competitor to question 19 of Questionnaire 1 - Competitors.

402 See replies to questions 40 and 41 of Questionnaire 1 - Competitors.

developing significant market power in any of the products involved a potential bundle:

(a) Rockwell Collins' market share in flight control electronics was [50-60]% in regional and business aircraft while its market share was [0-5]% in large commercial aircraft in 2016. Rockwell Collins' strongest competitor in flight control electronics is Honeywell with a market share in flight control electronics of [30-40]% in large commercial aircraft and of [20-30]% in regional and business aircraft in 2016. Other competitors include Garmin, GE, Universal and Teledyne.[403]

(b) Taking into account the divestment of Rockwell Collins' entire activities in pilot controls under the commitments (see section 9), the merged entity's market share was [20-30]% in all types of pilot controls in LCA and less than [5-10]% in each of regional, business and military aircraft in 2016 (including, among others, a market share of [0-5]% in RBPS, [10-20]% in TQAs and [40-50]% in side sticks and [0-5]% centre yokes in 2016 as set out in section 8.1.3).

(c) Taking into account the divestment of Rockwell Collins' entire activities in THSAs under the commitments (see section 9), the merged entity's market share was [40-50]-[60-70]% in THSAs in 2016. As regards other actuation products, the merged entity' market share was [20-30]% in primary flight control actuation (equal in size to competitors Moog and Parker), and [30-40]% in secondary flight control actuation in 2016.[404]

(500) Those market shares are not indicative of the significant degree of market power required to have the ability to foreclose competitors through bundling or tying strategies. (i) As regards large commercial aircraft, the situation would hardly change compared to the situation before the Transaction since no current Rockwell Collins business in flight control electronics would be added to UTC's activities in pilot controls and actuation. (ii) As regards regional, business and military aircraft, the merged entity's capabilities in pilot controls are […] limited at less than [5-10]% while it will continue to face at least one strong competitor, Honeywell, in the sale of flight control electronics and a number of competitors, including the Divestment Business, in the sale of pilot controls and THSA. Furthermore, those products from Rockwell Collins on the one hand (flight control electronics) and UTC on the other hand (pilot controls and actuation) were generally not singled out by market participants as unique products or 'must-have' products or as products for which no alternatives could be found in the market (also taking into account the divestments under the commitments).[405]

(501) Furthermore, as set out earlier in sections 8.3.3 and 8.3.4, airframers' control of the procurement process make successful foreclosure strategies unlikely.

(502) Moreover, Rockwell Collins already had capabilities in flight control electronics, THSAs and pilot controls before the Transaction […]. Similarly,

403 Form CO, Annex RFI2 [Avionics] – Q5.
404 Form CO, Other Products, page 231.
405 See replies to question 18 of Questionnaire 1 - Competitors., replies to question 22 of Questionnaire 2 – Airframers.

none of Rockwell Collins' potential past strategies has resulted in foreclosure of competitors in either of flight control electronics, THSAs or pilot controls. This indicates that the merged entity would not have incentives to engage in foreclosure after the Transaction.

(503) As an answer to a potential commercial bundling strategy by the merged entity on the other hand, a number of competitors indicated that they would resort to finding partners for developing similar packages and engage in joint bidding.[406]

9. PROPOSED REMEDIES

9.1. Analytical Framework

(504) The following principles from the Remedies Notice[407] apply where parties to a merger choose to offer commitments in order to restore effective competition.

(505) Where a concentration raises competition concerns in that it could significantly impede effective competition, in particular as a result of the creation or strengthening of a dominant position, the parties may seek to modify the concentration in order to resolve the competition concerns and thereby gain clearance of their merger[408].

(506) The Commission only has power to accept commitments that are capable of rendering the concentration compatible with the internal market in that they will prevent a significant impediment to effective competition in all relevant markets where competition concerns were identified[409]. To that end, the commitments have to eliminate the competition concerns entirely[410] and have to be comprehensive and effective from all points of view[411].

(507) In assessing whether proposed commitments are likely to eliminate its competition concerns, the Commission considers all relevant factors including *inter alia* the type, scale and scope of the commitments, judged by reference to the structure and particular characteristics of the market in which those concerns arise, including the position of the parties and other participants on the market[412]. Moreover, commitments must be capable of being implemented effectively within a short period of time[413].

---

406 See replies to questions 21, 23 and 44 of Questionnaire 1 - Competitors.

407 Commission's Notice on Remedies acceptable under Council Regulation (EC) No 139/2004 and under Commission Regulation (EC) No 802/2004 ("Remedies Notice"), OJ C 267, 22.10.2008, p. 1.

408 Remedies Notice, paragraph 5.

409 Remedies Notice, paragraph 9.

410 Case C-202/06 P *Cementbouw Handel & Industrie v Commission* [2007] ECR 2007 I-12129, paragraph 54: "*it is necessary, when reviewing the proportionality of conditions or obligations which the Commission may, by virtue of Article 8(2) of Regulation No 4064/89, impose on the parties to a concentration, not to determine whether the concentration still has a Community dimension after those conditions or obligations have been complied with, but to be satisfied that those conditions and those obligations* are *proportionate to and would entirely eliminate the competition problem that has been identified*".

411 Remedies Notice, paragraph 9 and 61.

412 Remedies Notice, paragraph 12.

413 Remedies Notice, paragraph 9.

(508) Where a proposed concentration threatens to significantly impede effective competition the most effective way to maintain effective competition, apart from prohibition, is to create the conditions for the emergence of a new competitive entity or for the strengthening of existing competitors via divestiture by the merging parties[414].

(509) The divested activities must consist of a viable business that, if operated by a suitable purchaser (hereinafter referred to as 'Purchaser'), can compete effectively with the merged entity on a lasting basis and that is divested as a going concern. The business must include all the assets which contribute to its current operation or which are necessary to ensure its viability and competitiveness and all personnel which are currently employed or which are necessary to ensure the business' viability and competitiveness[415].

(510) Personnel and assets which are currently shared between the business to be divested and other businesses of the parties, but which contribute to the operation of the business or which are necessary to ensure its viability and competitiveness, must also be included. Otherwise, the viability and competitiveness of the business to be divested would be endangered. Therefore, the divested business must contain the personnel providing essential functions for the business such as, for instance, group R&D and information technology staff even where such personnel are currently employed by another business unit of the parties —at least in a sufficient proportion to meet the on-going needs of the divested business[416].

(511) Normally, a viable business is a business that can operate on a stand-alone-basis, which means independently of the merging parties as regards the supply of input materials or other forms of cooperation other than during a transitory period[417].

(512) The intended effect of the divestiture will only be achieved if and once the business is transferred to a suitable Purchaser in whose hands it will become an active competitive force in the market. The potential of a business to attract a suitable Purchaser is an important element already of the Commission's assessment of the appropriateness of the proposed commitment. In order to ensure that the business is divested to a suitable Purchaser, the commitments must include criteria to define the suitability of potential Purchasers. This will allow the Commission to conclude that the divestiture of the business to such a Purchaser will likely remove the competition concerns identified[418].

9.2. Description of the proposed remedies

(513) In order to render the concentration compatible with the internal market, the undertakings concerned have modified the notified concentration by entering into the following three packages of commitments, which are annexed to this decision and form an integral part thereof.

---

414 Remedies Notice, paragraph 22.
415 Remedies Notice, paragraph 23-25.
416 Remedies Notice, paragraph 26.
417 Remedies Notice, paragraph 32.
418 Remedies Notice, paragraph 47.

(514) The Notifying Party submitted commitments pursuant to Article 8(2) of the Merger Regulation on 12 April 2018 ('the Commitments of 12 April 2018'). The Commission subjected these commitments to a market test. The market test indicated that the Commitments of 12 April 2018 needed to be completed to entirely eliminate the concerns raised by the Transaction.

(515) In order to address the issues raised in the market test, the Notifying Party submitted a final set of commitments on 26 (for oxygen) and 30 April 2018 (for THSA PC as well as IP, together with oxygen 'the Final Commitments').

9.2.1. THSA and pilot controls

(516) The remedies contain the divestment of Rockwell Collins' ('the THSA-PC Divestment Business'):[419]

(a) Trimmable Horizontal Stabilizer Actuators business, which includes THSAs, legacy flap actuation, and nose wheel steering gear boxes;

(b) Pilot control systems business, which includes center yokes, rudder brake pedal units, throttle quadrant assemblies, auto-throttles and control stand modules; and

(c) 'Special Products' business, which includes *inter alia* fuel sticks, waste water drain valves, aircraft ground support couplings, and ground service couplings.

(517) Relating to these product businesses, the Commitments further contain all tangible and intangible assets and personnel.

(518) The THSA-PC Divestment Business is currently spread over eight sites in the United States, Mexico, India and France[420]. For the purpose of the divestment, it will be concentrated on three sites (Irvine, Melbourne (both United States) and Mexicali (Mexico)), whereas all other Rockwell Collins' activity relating to this business will be transferred to these three sites or replaced accordingly[421]. Conversely, the activities carried out on these sites and that are unrelated to the THSA PC Divestment Business will be extracted from these sites by way of a reverse carve-out. The exact implementation of the measures is partly at the discretion of the Purchaser.

9.2.2. Ice protection systems

(519) The remedies contain the divestment of Rockwell Collins' SMR Technologies business, ('the IP Divestment Business') which manufactures Rockwell Collins' pneumatic ice protection systems and other ice protection products, along with inter alia fuelling systems and other industrial products, hovercraft skirts, composites and commercial aviation products[422].

419 Commitments of 12 April 2018 – THSA/Pilot Controls/Special Products – Schedule, para. 1.
420 Form RM – THSA/Pilot Controls/Special Products - para.27.
421 Commitments of 12 April 2018 – THSA/Pilot Controls/Special Products – Schedule, para. 2.
422 Commitments of 12 April 2018 – Ice Protection – Schedule, para. 1.

(520) Relating to these product businesses, the Commitments further contain all tangible and intangible assets and personnel.

(521) The only site of SMR Technologies is located in Fenwick (West Virginia, United States) that will be completely divested, except for the WEMAC product line (e.g., air gasper valves, interior signage components, etc.) and related equipment and machinery. The WEMAC product line is not related to other activities carried out in Fenwick […]. It will be carved out and retained by Rockwell Collins[423].

9.2.3. Oxygen Systems

(522) The remedies contain the divestment of UTC's oxygen research ('the Oxygen Divestment Business') and development programs, including all intangible assets, such as intellectual property rights; all research and development contracts of the research and development programs concerning the "[…] Oxygen Program" and the "[…] Oxygen Program" as well as the personnel ([…])[424].

(523) Moreover, the Parties agreed not to close the Transaction before they have found a buyer for the oxygen programme (upfront buyer clause).

9.3. Assessment of the proposed remedies of 12 April 2018

9.3.1. THSA and pilot controls

9.3.1.1. The Notifying Party's arguments

(524) In the Parties' view, the Commitments of 12 April 2018 are sufficient to remove the competition concerns identified by the Commission.

(525) The Parties maintain that the THSA-PC Divestment Business creates the conditions for the emergence of a new competitive entity, or the strengthening of an existing competitor, in the area of THSA, pilot controls and Special Products. In their view, the aforementioned competitor will be capable, at the minimum, of replicating the current competitive interaction (to the extent applicable) between Rockwell Collins and UTC[425], as the THSA-PC Divestment Business comprises the entire (global) business of Rockwell Collins relating to THSA, pilot controls and Special Products. The Parties consider that the Divestment Business goes beyond the concerns identified by the Commission[426].

(526) The Parties offer to enter into transitional agreements with the Purchaser where necessary to implement the transfer of the Divestment Business assets as quickly as possible[427].

---

423 Commitments of 12 April 2018 – Ice Protection – Schedule, paras. 2 and 4.
424 Commitments of 12 April 2018 – Oxygen Systems – Schedule, paras. 1 and 2.
425 Form RM – THSA/Pilot Controls/Special Products - para.14.
426 Form RM – THSA/Pilot Controls/Special Products – paras. 15 and 16.
427 Form RM – THSA/Pilot Controls/Special Products – para. 9.

9.3.1.2. The Commission's Assessment

(527) The Commission's assessment focused on (i) whether the Commitments of 12 April 2018 were sufficient to remove the competition concerns caused by the Transaction in terms of horizontal overlaps; (ii) whether the Divestment Business of 12 April 2018 constituted a viable business able to compete effectively with the merged entity a lasting basis; (iii) whether there were specific conditions that a potential purchaser should fulfil and (iv) whether the Divestment Business of 12 April 2018 was sufficiently attractive to find a suitable purchaser.

(528) On 17 April 2018, the Commission launched a market test regarding the Commitments of 12 April 2018 covering all of the questions outlined in paragraph (527). The results of the market test showed that the Commitments of 12 April 2018 were in principle deemed a suitable solution to resolve the competition concerns identified by the Commission. Remaining issues were addressed by the Notifying Party through improvements made to the Commitments of 12 April 2018.

(A) Removal of competition concerns

(529) The Parties propose to divest Rockwell Collins' entire global THSA and entire pilot controls business. Considering that the Commission raised serious doubts for the overlap in THSA (see section 8.1.2) and for the overlaps in certain pilot controls (see sections 8.1.3.2 for RBPS and 8.1.3.3 for TQA) the scope of the Divestment Business is suitable to remove competition concerns in principle.

(530) This is in line with the results of the market test, where the majority of respondents stated that they consider the Commitments of 12 April 2018 as suitable to effectively remove any competition concerns raised by the Transaction in THSA[428] and in pilot controls[429].

(B) Viability and competitiveness of the Divestment Business according to Commitments of 12 April 2018

(531) The Commission considers that the THSA-PC Divestment Business includes all the essential functions and personnel to be viable and competitive from the perspective of research and development, production, marketing and sales, logistics and relations with suppliers and customers. Notably the activities which will be extracted from […] are unrelated to the THSA PC Divestment Business.

(532) From a financial perspective, although the THSA PC Divestment Business has […] in the last two years (2016 and 2017), its financial performances are scheduled to improve […].

[428] See replies to question 3 of Questionnaire on Commitments.
[429] See replies to question 4 of Questionnaire on Commitments.

(533) The market test resulted in the majority of respondents stating that the THSA PC Divestment Business would be viable and competitive both immediately as well as in the next five years[430]. No specific comments have been expressed regarding the reverse carve-out planned by Rockwell Collins.

(534) Apart of the need to clarify certain aspects of the scope of the THSA PC Divestment Business proposed on 12 April 2018 – that clarification was subsequently provided by the Parties[431] - the market test revealed that respondents stress the importance of sufficient transitional support from Rockwell Collins for the potential Purchaser, namely as regards the IT structure, sales channels as well as aftermarket business[432].

(535) The aspects raised by the respondents were subsequently addressed by the Parties in the Final Commitments of 30 April 2018 according to which the Parties are prepared to enter into transitional agreements, notably as regards aftermarket and spare parts when needed, to ensure the viability and competitiveness of the THSA PC Divestment Business[433].

(C) Purchaser criteria

(536) Rockwell Collins is confident that there will be numerous candidate Purchasers interested in the Divestment Business. To date, Rockwell Collins has received expressions of interest from a number of potential purchasers, that all have expressed interest in attending management presentations.[434] These expressions of interest have been confirmed during the market test.[435]

(537) Market test respondents stressed that the more experience the potential Purchaser has in the aerospace industry, including established relationships with established aircraft manufacturers, the more it would foster the viability and competitiveness of the Divestment Business[436].

(538) The Parties took this into account by adjusting the Commitments of 12 April 2018 as set out in paragraph (539)[437].

430 See replies to question 5 and 6 of Questionnaire on Commitments.
431 These aspects related in particular to certain tangible assets and activities that are to be transferred as part of the Divestment Business […].
432 See replies to question 3 to 24 of Questionnaire on Commitments.
433 Form RM – THSA/Pilot Controls/Special Products - para.102; Commitments of 30 April 2018 – Ice Protection – Schedule, para. 5.
434 Form RM – THSA/Pilot Controls/Special Products - para.20.
435 See replies to question 21 of Questionnaire on Commitments.
436 See replies to questions 18 – 20 of Questionnaire on Commitments.
437 Final Commitments of 30 April 2018 – THSA/Pilot Controls/Special Products – para. 16.

9.3.1.3. Description of the Final Commitments of 30 April 2018

(539) The Final Commitments of 30 April 2018 address the comments stemming from the market test by inserting:

(a) A further Purchaser criterion to ensure that the potential Purchaser has sufficient experience in the aerospace industry as well as commercial relationships with major airframers;

(b) A clause clarifying that the scope of any transition agreements will cover all necessary aspects of the Divestment Business, notably in relation to aftermarket and spare parts.

9.3.1.4. Assessment of the Final Commitments of 30 April 2018

(540) The Commission considers that the Final Commitments fully address comments with respect to the Commitments of 12 April 2018.

9.3.2. Ice protection systems

9.3.2.1. The Notifying Party's arguments

(541) In the Parties' view, the Commitments of 12 April 2018 are sufficient to remove the competition concerns identified by the Commission.

(542) The Parties bring forward that the IP Divestment Business encompasses the entirety of Rockwell Collins' global ice protection systems, and that the Commitments will, therefore, remove the overlap between the Parties in this product area in its entirety[438].

(543) In the Parties' opinion, the acquisition of the IP Divestment Business, will provide the potential Purchaser with all tangible and intangible assets (including intellectual property rights), sales, sourcing and supply arrangements and distributor lists and records, to enable the Purchaser to compete in the supply of ice protection systems and other products manufactured by the Divestment Business.[439]

9.3.2.2. The Commission's Assessment

(A) Removal of competition concerns

(544) The Parties propose to divest Rockwell Collins' entire global ice protection business. Considering that the Commission raised serious doubts for the overlap only in the pneumatic ice protection (see section 8.1.4) the scope of the IP Divestment Business is suitable to remove competition concerns in principle.

[438] Form RM – Ice Protection - para.16.
[439] Form RM – Ice Protection – paras. 18 and 19.

(545) This is in line with the results of the market test, where the majority of respondents stated that they consider the Commitments of 12 April 2018 as suitable to effectively remove any competition concerns raised by the Transaction in pneumatic ice protection[440].

(B) Viability and competitiveness of the IP Divestment Business of 12 April 2018

(546) The Commission considers that the IP Divestment Business is a stand-alone business including all the essential functions and personnel to be viable and competitive from the perspective of research and development, production, marketing and sales, logistics and relations with suppliers and customers. SMR Technologies was a stand-alone business until its acquisition by B/E Aerospace in 1998 and it continued to operate as such within B/E Aerospace and now within Rockwell Collins since B/E Aerospace's acquisition by Rockwell Collins in 2017.

(547) Notably the Commission considers that the carve-out of the WEMAC production line has no negative impact on the viability of the Divestment Business. As explained in paragraph (521), the WEMAC product line is unrelated to ice protection systems.

(548) From a financial perspective, the IP Divestment Business generated a turnover of […] in 2017 and achieved an EBITDA of USD […] in 2017. In 2017, the EBITDA margin was […]%. In 2017, SMR Technologies with the inclusion of the WEMAC product line generated a turnover of […] in 2017 and achieved an EBITDA of […], representing a margin of […]%. The exclusion of the WEMAC product line therefore has a […] impact on the viability of the Divestment Business. […].

(549) The market test resulted in the majority of respondents stating that the Divestment Business would be viable and competitive both immediately as well as in the next five years[441]. No specific comments have been expressed regarding the carve-out of the WEMAC product line planned by Rockwell Collins

(550) Apart of the need to clarify certain aspects of the scope of the Divestment Business proposed on 12 April 2018 – that clarification was subsequently provided by the Parties[442] - the market test revealed that respondents stress the importance of the distribution network for the Divestment Business' products[443].

(551) The aspects raised by the respondents were subsequently addressed by the Parties in further submissions according to which all elements of the distribution network being owned by Rockwell Collins shall be sold to the potential Purchaser. The Parties further explained that the distribution network is widely

[440] See replies to question 25 of Questionnaire on Commitments.
[441] See replies to question 26 and 27 of Questionnaire on Commitments.
[442] These aspects related in to re-qualification and re-certification.
[443] See replies to question 26 and 27 of Questionnaire on Commitments.

independent from Rockwell Collins and that also all related distribution agreements will be transferred to the potential Purchaser[444].

(C) Purchaser criteria

(552) Market test respondents stressed that the stronger the existing presence of the potential Purchaser is in the aerospace industry, the more it would foster the viability and competitiveness of the Divestment Business[445]. Several respondents already active in the aerospace industry have expressed interest in purchasing the IP Divestment Business.[446]

(553) The Parties took this into account by adjusting the Commitments of 12 April 2018 as described in paragraph (554)[447].

9.3.2.3. Description of the Final Commitments of 30 April 2018

(554) The Final Commitments of 30 April 2018 address the comments stemming from the market test by inserting a further Purchaser criterion to ensure that the potential Purchaser has an existing presence in the aerospace industry.

9.3.2.4. Assessment of the Final Commitments of 30 April 2018

(555) The Commission considers that the Final Commitments fully address the comments with respect to the Commitments of 12 April 2018.

9.3.3. Oxygen Systems

(556) The Parties propose to divest UTC's entire research programme in oxygen systems. Considering that the Commission raised serious doubts for the removal of potential competition on Rockwell Collins's oxygen systems from UTC, the scope of the Divestment Business is suitable to remove competition concerns in principle.

(557) This was confirmed in the market test where a majority of respondents mentioned that a divestment of the oxygen programmes would enable a purchaser to take advantage of the proposed R&D projects to enter or expand its role in the market for oxygen systems.

(558) The Commission considers that the Oxygen Divestment Business is likely to provide a suitable platform to run a viable oxygen business. The Net Product Value (difference between the present value of cash inflows and the present value of cash outflows over a period of time) until […] is […] at USD […] for both […] programmes.[448]

(559) In terms of viability, the majority of respondents considered the Divestment business as viable to enable a suitable purchaser to enter or increase its market presence in oxygen systems, considering that it includes the IP necessary to pass

444 Form RM – Ice Protection – (new) para. 52.
445 See replies to questions 40 and 40.1 of Questionnaire on Commitments.
446 See replies to question 41 of Questionnaire on Commitments.
447 Final Commitments of 30 April 2018 – Ice Protection – para. 16.
448 See […], slide 20.

the extensive qualification procedures in this area, as well as the […] having worked on the project.[449]

(560) Respondents to the market test have indicated a suitable purchaser should have customer credibility, financial and human capacity to develop a research programme and industrial and engineering capabilities, in order to have proper incentives to bring the project forward in the same way as UTC. Some companies have expressed a preliminary interest in exploring acquisition of the Oxygen divestment business.[450]

(561) The inclusion of the upfront buyer clause in the remedies for oxygen systems enables the Commission to conclude with a high degree of certainty that the divestment will be implemented and will remove any concern with regard to the identity of the potential purchaser and the effective disposal of the Oxygen Divestment Business.

9.3.4. Conclusion on the assessment of the proposed remedies

(562) For the reasons outlined above, the commitments entered into by the undertakings concerned are sufficient to eliminate the serious doubts as to the compatibility of the Transaction with the internal market.

(563) The commitments in sections B of the Annexes 2, 3 and 4 constitute conditions attached to this decision, as only through full compliance therewith can the structural changes in the relevant markets be achieved. The other commitments set out in the Annexes 2, 3 and 4 constitute obligations, as they concern the implementing steps which are necessary to achieve the modifications sought in a manner compatible with the internal market.

(564) In accordance with the distinction described in paragraph (563) as regards conditions and obligations, this Decision should be made conditional on the full compliance by the Parties with Section B of the THSA PC SP Final Commitments (including the Schedule of the THSA PC SP Final Commitments), Section B of the IP Final Commitments (including the Schedule of the IP Final Commitments) and Section B of the Oxygen Final Commitments (including the Schedule of the Oxygen Final Commitments. All other sections of the THSA PC SP Final Commitments, the IP Final Commitments and the Oxygen Final Commitments should be obligations within the meaning of the merger Regulation. The full text of the Commitments is attached as an annex to this Decision and forms an integral part thereof.

[449] See replies to question 46 of Questionnaire on Commitments.
[450] See replies to question 56 of Questionnaire on Commitments.

10. CONCLUSION

(565) For the above reasons, the Commission has decided not to oppose the notified operation as modified by the commitments and to declare it compatible with the internal market and with the functioning of the EEA Agreement, subject to full compliance with the conditions in section B of Annex 2 (including schedule), section B of Annex 3 (including Schedule) and Section B of Annex 4 (including schedule) and with the obligations contained in the other sections of the said annexes. This decision is adopted in application of Article 6(1)(b) in conjunction with Article 6(2) of the Merger Regulation and Article 57 of the EEA Agreement.

For the Commission

(Signed)
Margrethe VESTAGER
Member of the Commission

CASE M.8658 — UTC/ROCKWELL COLLINS

ANNEX 1

SHARES IN MARKETS AFFECTED DUE TO CONGLOMERATE LINKS

Products where either of the parties has a market share above 30%	**UTC**	**Rockwell Collins**	**BFE/ SFE**
SAASM GPS Receivers for Non-Aircraft Applications		[70-80]%	SFE
Cabin Management Systems		[40-50]%	SFE
Avionics (LCA)		[30-40]%	**SFE**/ BFE
Avionics (Business and regional jets)		[40-50]%	**SFE**/ BFE
Commercial Seats		[20-30]%	BFE
First class seats		*[80-90]%*	BFE
Datalink (ARINC)		[40-50]%	BFE
Oxygen systems		[50-60]%	SFE
Food and Beverage		[70-80]%	**BFE**/ SFE
Tactical IMU	[30-40]%		SFE
Electrical generation	[60-70]%		SFE
On large commercial aircraft	*[80-90]%*		SFE
Evacuation systems	[30-40]%		SFE
Ice detection	[80-90]%		SFE
Air data probes	[60-70]%		SFE
Air data Integrated System (Smartprobes)	[90-100]%		SFE
Propeller systems	[50-60]%		SFE
Helicopter engines	[40-50]%		SFE
Regional/corporate jets engines	[50-60]%		SFE
APU (overall)	[30-40]%		SFE
APU (regional jet)	[60-70]%		SFE
Nacelles	[40-50]%		SFE
Helicopter actuation	[30-40]%		SFE
Landing gears (only wheels and brakes)	[30-40]%		**BFE**/ SFE
Cargo systems	[30-40]%		SFE

Annex 2

April 30, 2018

Case COMP/M.8658 – UTC / Rockwell Collins

COMMITMENTS TO THE EUROPEAN COMMISSION

Pursuant to Article 6(2) of Council Regulation (EC) No 139/2004 (the "***Merger Regulation***"), Rockwell Collins (including its Affiliated Undertakings, "***Rockwell Collins***") and United Technologies Corporation (including its Affiliated Undertakings, "***UTC***", and together with Rockwell Collins, the "***Parties***") hereby enter into the following Commitments (the "***Commitments***") vis-à-vis the European Commission (the "***Commission***") with a view to rendering Rockwell Collins' acquisition by UTC (the "***Transaction***") compatible with the internal market and the functioning of the EEA Agreement.

This text shall be interpreted in light of the Commission's decision pursuant to Article 6(1)(b) of the Merger Regulation to declare the Transaction compatible with the internal market and the functioning of the EEA Agreement (the "***Decision***"), in the general framework of European Union law, in particular in light of the Merger Regulation, and by reference to the Commission Notice on remedies acceptable under Council Regulation (EC) No 139/2004 and under Commission Regulation (EC) No 802/2004 (the "***Remedies Notice***").

The Schedule and its Appendices form an integral part of the Commitments.

Section A. Definitions

1. For the purposes of these Commitments, the following terms shall have the following meaning:

   - **Affiliated Undertakings**: undertakings controlled by the Parties, whereby the notion of control shall be interpreted pursuant to Article 3 of the Merger Regulation and in light of the Commission Consolidated Jurisdictional Notice under Council Regulation (EC) No 139/2004 on the control of concentrations between undertakings (the "***Consolidated Jurisdictional Notice***").

   - **Assets**: the assets that are necessary to ensure the viability and competitiveness of the Divestment Business, and insofar as they are not specifically mentioned in the Schedule taking into account the identity and capabilities of the Purchaser, as indicated in Section B, paragraph 6 and as described in more detail in the Schedule.

- **Closing**: the transfer of the legal title to the Divestment Business to the Purchaser.

- **Closing Period**: the later of the period of […] from the approval of the Purchaser and the terms of sale by the Commission or the obtaining of all required regulatory approvals prior to Closing.

- **Confidential Information**: any business secrets, know-how, commercial information, or any other information of a proprietary nature that is not in the public domain.

- **Conflict of Interest**: any conflict of interest that impairs the Trustee's objectivity and independence in discharging its duties under the Commitments.

- **Divestment Business**: the assets as defined in Section B and in the Schedule which UTC and Rockwell Collins commit to divest.

- **Divestiture Trustee**: one or more natural or legal person(s) who is / are approved by the Commission and appointed by Rockwell Collins and who has / have received from Rockwell Collins the exclusive Trustee Mandate to sell the Divestment Business to a Purchaser at no minimum price.

- **Effective Date**: the date of adoption of the Decision.

- **First Divestiture Period**: the period of […] from the Effective Date.

- **Hold Separate Manager**: the person appointed by Rockwell Collins to manage the day-to-day operation of the Divestment Business under the supervision of the Monitoring Trustee.

- **Key Personnel:** all personnel necessary to maintain the viability and competitiveness of the Divestment Business, as listed in the Schedule, including the Hold Separate Manager.

- **Monitoring Trustee**: one or more natural or legal person(s) who is / are approved by the Commission and appointed by Rockwell Collins, and who has / have the duty to monitor Rockwell Collins' compliance with the conditions and obligations attached to the Decision.

- **Parties**: Rockwell Collins and UTC.

- **Personnel**: all staff currently employed by the Divestment Business, including staff seconded to the Divestment Business, shared personnel as well as the additional personnel listed in the Schedule.

- **Purchaser**: the entity approved by the Commission as acquirer of the Divestment Business in accordance with the criteria set out in Section D.

- **Purchaser Criteria**: the criteria laid down in paragraph 16 of these Commitments that the Purchaser must fulfil in order to be approved by the Commission.

- **Rockwell Collins**: Rockwell Collins, Inc., incorporated under the laws of the State of Delaware (U.S.), with its registered office at 400 Collins Road N.E., Cedar Rapids, Iowa 52498, U.S., and its Affiliated Undertakings.

- **Schedule**: the schedule to these Commitments describing more in detail the Divestment Business.

- **Trustee(s)**: the Monitoring Trustee and / or the Divestiture Trustee as the case may be.

- **Trustee Divestiture Period**: the period of […] from the end of the First Divestiture Period.

- **UTC**: United Technologies Corporation, incorporated under the laws of the State of Delaware, United States, with its registered office at Corporation Trust Center, 1209 Orange Street, in the City of Wilmington, County of New Castle, Delaware, 19801, United States.

Section B. The commitment to divest and the Divestment Business

Commitment to divest

2. In order to maintain effective competition, the Parties commit to divest, or procure the divestiture of, the Divestment Business by the end of the Trustee Divestiture Period to a Purchaser and on terms of sale approved by the Commission in accordance with the procedure described in paragraph 17 of these Commitments. To carry out the divestiture, the Parties commit to find a Purchaser and to enter into a final binding sale and purchase agreement for the sale of the Divestment Business within the First Divestiture Period. If the Parties have not entered into such an agreement at the end of the First Divestiture Period, the Parties shall grant the Divestiture Trustee an exclusive mandate to sell the Divestment Business in accordance with the procedure described in paragraph 29 in the Trustee Divestiture Period.

3. The Parties shall be deemed to have complied with this commitment if:

(a) by the end of the Trustee Divestiture Period, Rockwell Collins or the Divestiture Trustee has entered into a final binding sale and purchase agreement and the Commission approves the proposed purchaser and the terms of sale as being consistent with the Commitments in accordance with the procedure described in paragraph 16; and

(b) the Closing of the sale of the Divestment Business to the Purchaser takes place within the Closing Period.

4. In order to maintain the structural effect of the Commitments, the Parties shall, for a period of ten (10) years after Closing, not acquire, whether directly or indirectly, the possibility of exercising influence (as defined in paragraph 43 of the Remedies Notice, footnote 3) over the whole or part of the Divestment Business, unless, following the submission of a reasoned request from the Parties showing good cause and accompanied by a report from the Monitoring Trustee (as provided in paragraph 43 of these Commitments), the Commission finds that the structure of the market has changed to such an extent that the absence of influence over the Divestment Business is no longer necessary to render the Transaction compatible with the internal market.

Structure and definition of the Divestment Business

5. The Divestment Business consists of the following Rockwell Collins' businesses:

- The Trimmable Horizontal Stabilizer Actuators ("***THSA***") business, which includes THSAs, legacy flap actuation, and nose wheel steering gear boxes;

- The Pilot Control Systems ("***PCS***") business, which includes center yokes, rudder brake pedal units, throttle quadrant assemblies, auto-throttles and control stand modules; and

- The Special Products business, which includes *inter alia* fuel sticks, waste water drain valves, aircraft ground support couplings, and ground service couplings.

6. The Divestment Business consists of Rockwell Collins' global THSA, PCS, and Special Products businesses. The legal and functional structure of the Divestment Business as operated to date is described in the Schedule. The Divestment Business, described in more detail in the Schedule, includes all assets and staff that contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Business, in particular:

(a) all tangible and intangible assets (including intellectual property rights);

(b) all licenses, permits and authorizations issued by any governmental organisation for the benefit of the Divestment Business;

(c) all contracts, leases, commitments and customer orders of the Divestment Business; all customer, credit and other records of the Divestment Business; and

(d) the Personnel.

7. For the avoidance of doubt, the Divestment Business will not include any tangible or intangible assets that are used either exclusively or predominantly for activities other than those related to, and that are not necessary for the viability and competitiveness of, Rockwell Collins' THSA, PCS, and Special Products businesses.

Section C. Related commitments

Preservation of viability, marketability and competitiveness

8. From the Effective Date until Closing, Rockwell Collins shall preserve or procure the preservation of the economic viability, marketability and competitiveness of the Divestment Business, in accordance with good business practice, and shall minimise as far as possible any risk of loss of competitive potential of the Divestment Business. In particular Rockwell Collins undertakes:

(a) not to carry out any action that might have a significant adverse impact on the value, management or competitiveness of the Divestment Business or that might alter the nature and scope of activity, or the industrial or commercial strategy or the investment policy of the Divestment Business;

(b) to make available, or procure to make available, sufficient resources for the development of the Divestment Business, on the basis and continuation of the existing business plans;

(c) to take all reasonable steps, or procure that all reasonable steps are being taken, including appropriate incentive schemes (based on industry practice), to encourage all Key Personnel to remain with the Divestment Business, and not to solicit or move any Key Personnel to Rockwell Collins' remaining businesses. Where, nevertheless, individual members of the Key Personnel exceptionally leave the Divestment Business, Rockwell Collins shall provide a reasoned proposal to replace the person or persons concerned to the Commission and the Monitoring Trustee. Rockwell Collins must be able to demonstrate to the Commission that the replacement is well suited to carry out the functions exercised by those individual members of the Key Personnel. The replacement shall take place under the supervision of the Monitoring Trustee, who shall report to the Commission.

Hold-separate obligations

9. The Parties commit, from the Effective Date until Closing, to keep the Divestment Business separate from the business(es) they are retaining and to ensure that unless explicitly permitted under these Commitments: (i) management and staff of the business(es) retained by the Parties have no involvement in the Divestment Business; (ii) the Key Personnel and Personnel of the Divestment Business have no involvement in any business retained by the Parties and do not report to any individual outside the Divestment Business.

10. Until Closing, Rockwell Collins shall assist the Monitoring Trustee in ensuring that the Divestment Business is managed as a distinct and saleable entity separate from the businesses which Rockwell Collins is retaining. Immediately after the adoption of the Decision, Rockwell Collins shall appoint a Hold Separate Manager. The Hold Separate Manager, who shall be part of the Key Personnel, shall manage the Divestment Business independently and in the best interest of the business with a view to ensuring its continued economic viability, marketability and competitiveness and its independence from the businesses retained by Rockwell Collins. The Hold Separate Manager shall closely cooperate with and report to the Monitoring Trustee and, if applicable, the Divestiture Trustee. Any replacement of the Hold Separate Manager shall be subject to the procedure laid down in paragraph 8(c) of these Commitments. The Commission may, after having heard Rockwell Collins, require Rockwell Collins to replace the Hold Separate Manager.

Ring-fencing

11. Rockwell Collins shall implement, or procure to implement, all necessary measures to ensure that it does not, after the Effective Date, obtain any

Confidential Information relating to the Divestment Business. Any such Confidential Information obtained by Rockwell Collins before the Effective Date will be eliminated and not be used by Rockwell Collins. This includes measures *vis-à-vis* Rockwell Collins' appointees on the supervisory board and/or board of directors of the Divestment Business. In particular, the participation of the Divestment Business in any central information technology network shall be severed to the extent possible, without compromising the viability of the Divestment Business. Rockwell Collins may obtain or keep information relating to the Divestment Business which is reasonably necessary for the divestiture of the Divestment Business or the disclosure of which to Rockwell Collins is required by law.

Non-solicitation clause

12. The Parties undertake, subject to customary limitations, not to solicit, and to procure that Affiliated Undertakings do not solicit, the Key Personnel transferred with the Divestment Business for a period of […] after Closing.

Due diligence

13. In order to enable potential purchasers to carry out a reasonable due diligence of the Divestment Business, Rockwell Collins shall, subject to customary confidentiality assurances and dependent on the stage of the divestiture process:

(a) provide to potential purchasers sufficient information as regards the Divestment Business; and

(b) provide to potential purchasers sufficient information relating to the Personnel and allow them reasonable access to the Personnel.

Reporting

14. Rockwell Collins shall submit written reports in English on potential purchasers of the Divestment Business and developments in the negotiations with such potential purchasers to the Commission and the Monitoring Trustee no later than ten (10) days after the end of every month following the Effective Date (or otherwise at the Commission's request). Rockwell Collins shall submit a list of all potential purchasers having expressed interest in acquiring the Divestment Business to the Commission at each and every stage of the divestiture process, as well as a copy of all the offers made by potential purchasers within five days of their receipt.

15. Rockwell Collins shall inform the Commission and the Monitoring Trustee on the preparation of the data room documentation and the due diligence procedure and shall submit a copy of any information memorandum to the Commission and the Monitoring Trustee before sending the memorandum out to potential purchasers.

Section D. The Purchaser

16. In order to be approved by the Commission, the Purchaser must fulfil the following criteria:

(a) The Purchaser shall be independent of and unconnected to the Parties and their Affiliated Undertakings (this being assessed having regard to the situation following the divestiture);

(b) The Purchaser shall have the financial resources, proven expertise and incentive to maintain and develop the Divestment Business as a viable and active competitive force in competition with the Parties and other competitors;

(c) The Purchaser shall have an existing presence in the aerospace industry, and shall have existing relationships with major aircraft manufacturers;

(d) The acquisition of the Divestment Business by the Purchaser must neither be likely to create, in light of the information available to the Commission, *prima facie* competition concerns nor give rise to a risk that the implementation of the Commitments will be delayed. In particular, the Purchaser must reasonably be expected to obtain all necessary approvals from the relevant regulatory authorities for the acquisition of the Divestment Business.

17. The final binding sale and purchase agreement (as well as ancillary agreements) relating to the divestment of the Divestment Business shall be conditional on the Commission's approval. When Rockwell Collins has reached an agreement with a purchaser, it shall submit a fully documented and reasoned proposal, including a copy of the final agreement(s), within one (1) week to the Commission and the Monitoring Trustee. Rockwell Collins must be able to demonstrate to the Commission that the purchaser fulfils the Purchaser Criteria and that the Divestment Business is being sold in a manner consistent with the Commission's Decision and the Commitments. For the approval, the Commission shall verify that the purchaser fulfils the Purchaser Criteria and that the Divestment Business is being sold in a manner consistent with the Commitments including their objective to bring about a lasting structural change in the market. The Commission may approve the sale of the Divestment Business without one or more Assets or parts of the Personnel, or by substituting one or more Assets or parts of the Personnel with one or more different assets or different personnel, if this does not affect the viability and competitiveness of the Divestment Business after the sale, taking account of the proposed purchaser.

Section E. Trustee

I. Appointment procedure

18. Rockwell Collins shall appoint a Monitoring Trustee to carry out the functions specified in these Commitments for a Monitoring Trustee. Rockwell Collins commits not to close the Transaction before the appointment of a Monitoring Trustee.

19. If Rockwell Collins has not entered into a binding sale and purchase agreement regarding the Divestment Business one (1) month before the end of the First Divestiture Period or if the Commission has rejected a purchaser proposed by Rockwell Collins at that time or thereafter, Rockwell Collins shall appoint a Divestiture Trustee. The appointment of the Divestiture Trustee shall take effect upon the commencement of the Trustee Divestiture Period.

20. The Trustee shall:

(i) at the time of appointment, be independent of the Parties;

(ii) possess the necessary qualifications to carry out its mandate, for example have sufficient relevant experience as an investment banker or consultant or auditor; and

(iii) neither have nor become exposed to a Conflict of Interest.

21. The Trustee shall be remunerated by Rockwell Collins in a way that does not impede the independent and effective fulfilment of its mandate. In particular, where the remuneration package of a Divestiture Trustee includes a success premium linked to the final sale value of the Divestment Business, such success premium may only be earned if the divestiture takes place within the Trustee Divestiture Period.

Proposal by Rockwell Collins

22. No later than two (2) weeks after the Effective Date, Rockwell Collins shall submit the name or names of one or more natural or legal persons whom Rockwell Collins proposes to appoint as the Monitoring Trustee to the Commission for approval. No later than one (1) month before the end of the First Divestiture Period or on request by the Commission, Rockwell Collins shall submit a list of one (1) or more persons whom Rockwell Collins proposes to appoint as Divestiture Trustee to the Commission for approval. The proposal shall contain sufficient information for the Commission to verify that the person or persons proposed as Trustee fulfil the requirements set out in paragraph 20 and shall include:

(a) the full terms of the proposed mandate, which shall include all provisions necessary to enable the Trustee to fulfil its duties under these Commitments;

(b) the outline of a work plan which describes how the Trustee intends to carry out its assigned tasks; and

(c) an indication whether the proposed Trustee is to act as both Monitoring Trustee and Divestiture Trustee or whether different trustees are proposed for the two functions.

Approval or rejection by the Commission

23. The Commission shall have the discretion to approve or reject the proposed Trustee(s) and to approve the proposed mandate subject to any modifications it deems necessary for the Trustee to fulfil its obligations. If only one (1) name is approved, Rockwell Collins shall appoint or cause to be appointed the person or persons concerned as Trustee, in accordance with the mandate approved by the Commission. If more than one (1) name is approved, Rockwell Collins shall be free to choose the Trustee to be appointed from among the names approved. The Trustee shall be appointed within one (1) week of the Commission's approval, in accordance with the mandate approved by the Commission.

New proposal by Rockwell Collins

24. If all the proposed Trustees are rejected, Rockwell Collins shall submit the names of at least two (2) more natural or legal persons within one (1) week of being informed of the rejection, in accordance with paragraphs 18 and 23 of these Commitments.

Trustee nominated by the Commission

25. If all further proposed Trustees are rejected by the Commission, the Commission shall nominate a Trustee, whom Rockwell Collins shall appoint, or cause to be appointed, in accordance with a Trustee mandate approved by the Commission.

II. Functions of the Trustee

26. The Trustee shall assume its specified duties and obligations in order to ensure compliance with the Commitments. The Commission may, on its own initiative or at the request of the Trustee or Rockwell Collins, give any orders or instructions to the Trustee in order to ensure compliance with the conditions and obligations attached to the Decision.

Duties and obligations of the Monitoring Trustee

27. The Monitoring Trustee shall:

(i) propose in its first report to the Commission a detailed work plan describing how it intends to monitor compliance with the obligations and conditions attached to the Decision.

(ii) oversee, in close co-operation with the Hold Separate Manager, the on-going management of the Divestment Business with a view to ensuring its continued economic viability, marketability and competitiveness and monitor compliance by Rockwell Collins with the conditions and obligations attached to the Decision. To that end the Monitoring Trustee shall:

(a) monitor the preservation of the economic viability, marketability and competitiveness of the Divestment Business, and the keeping separate of the Divestment Business from the businesses retained by Rockwell Collins, in accordance with paragraphs 8 and 9 of these Commitments;

(b) supervise the management of the Divestment Business, in accordance with paragraph 10 of these Commitments;

(c) with respect to Confidential Information:

– determine all necessary measures to ensure that Rockwell Collins does not after the Effective Date obtain any Confidential Information relating to the Divestment Business,

– in particular strive for the severing of the Divestment Business' participation in a central information technology network to the extent possible, without compromising the viability of the Divestment Business,

– make sure that any Confidential Information relating to the Divestment Business obtained by Rockwell Collins before the Effective Date is eliminated and will not be used by Rockwell Collins, and

– decide whether such information may be disclosed to or kept by Rockwell Collins as the disclosure is reasonably necessary to allow Rockwell Collins to carry out the divestiture or as the disclosure is required by law;

(d) monitor the splitting of assets and the allocation of Personnel between the Divestment Business and Rockwell Collins;

(iii) propose to Rockwell Collins such measures as the Monitoring Trustee considers necessary to ensure Rockwell Collins' compliance with the conditions and obligations attached to the Decision, in particular the maintenance of the full economic viability, marketability or competitiveness of the Divestment Business, the holding separate of the Divestment Business and the non-disclosure of competitively sensitive information;

(iv) review and assess potential purchasers as well as the progress of the divestiture process and verify that, dependent on the stage of the divestiture process:

(a) potential purchasers receive sufficient and correct information relating to the Divestment Business and the Personnel in particular by reviewing, if available, the data room documentation, the information memorandum and the due diligence process, and

(b) potential purchasers are granted reasonable access to the Personnel;

(v) act as a contact point for any requests by third parties, in particular potential purchasers, in relation to the Commitments;

(vi) provide to the Commission, sending the Parties a non-confidential copy at the same time, a written report within fifteen (15) days after the end of every month that shall cover the operation and management of the Divestment Business as well as the splitting of assets and the allocation of Personnel so that the Commission can assess whether the Divestment Business is held in a manner consistent with the Commitments and the progress of the divestiture process as well as potential purchasers;

(vii) promptly report in writing to the Commission, sending the Parties a non-confidential copy at the same time, if it concludes on reasonable grounds that Rockwell Collins is failing to comply with these Commitments;

(viii) within one (1) week after receipt of the documented proposal referred to in paragraph 17 of these Commitments, submit to the Commission, sending the Parties a non-confidential copy at the same time, a reasoned opinion as to the suitability and independence of the proposed purchaser and the viability of the

Divestment Business after the sale and as to whether the Divestment Business is sold in a manner consistent with the conditions and obligations attached to the Decision, in particular, if relevant, whether the sale of the Divestment Business without one or more Assets or one or more Key Personnel affects the viability of the Divestment Business after the sale, taking account of the proposed purchaser;

(ix) assume the other functions assigned to the Monitoring Trustee under the conditions and obligations attached to the Decision.

28. If the Monitoring and Divestiture Trustee are not the same legal or natural persons, the Monitoring Trustee and the Divestiture Trustee shall cooperate closely with each other during and for the purpose of the preparation of the Trustee Divestiture Period in order to facilitate each other's tasks.

Duties and obligations of the Divestiture Trustee

29. Within the Trustee Divestiture Period, the Divestiture Trustee shall sell at no minimum price the Divestment Business to a purchaser, provided that the Commission has approved both the purchaser and the final binding sale and purchase agreement (and ancillary agreements) as in line with the Commission's Decision and the Commitments in accordance with paragraphs 16 and 17 of these Commitments. The Divestiture Trustee shall include in the sale and purchase agreement (as well as in any ancillary agreements) such terms and conditions as it considers appropriate for an expedient sale in the Trustee Divestiture Period. In particular, the Divestiture Trustee may include in the sale and purchase agreement such customary representations and warranties and indemnities as are reasonably required to affect the sale. The Divestiture Trustee shall protect the legitimate financial interests of Rockwell Collins, subject to Rockwell Collins' unconditional obligation to divest at no minimum price in the Trustee Divestiture Period.

30. In the Trustee Divestiture Period (or otherwise at the Commission's request), the Divestiture Trustee shall provide the Commission with a comprehensive monthly report written in English on the progress of the divestiture process. Such reports shall be submitted within fifteen (15) days after the end of every month with a simultaneous copy to the Monitoring Trustee and a non-confidential copy to the Parties.

III. <u>Duties and obligations of Rockwell Collins</u>

31. Rockwell Collins shall provide and shall cause its advisors to provide the Trustee with all such co-operation, assistance and information as the Trustee may reasonably require to perform its tasks. The Trustee shall have full and complete access to any of Rockwell Collins' or the Divestment Business' books, records, documents, management or other personnel, facilities, sites and technical information necessary for fulfilling its duties under the Commitments and Rockwell Collins and the Divestment Business shall provide the Trustee upon request with copies of any document. Rockwell Collins and the Divestment

Business shall make available to the Trustee one or more offices on their premises and shall be available for meetings in order to provide the Trustee with all information necessary for the performance of its tasks.

32. Rockwell Collins shall provide the Monitoring Trustee with all managerial and administrative support that it may reasonably request on behalf of the management of the Divestment Business. This shall include all administrative support functions relating to the Divestment Business which are currently carried out at headquarters level. Rockwell Collins shall provide and shall cause its advisors to provide the Monitoring Trustee, on request, with the information submitted to potential purchasers, in particular give the Monitoring Trustee access to the data room documentation and all other information granted to potential purchasers in the due diligence procedure. Rockwell Collins shall inform the Monitoring Trustee on possible purchasers, submit lists of potential purchasers at each stage of the selection process, including the offers made by potential purchasers at those stages, and keep the Monitoring Trustee informed of all developments in the divestiture process.

33. Rockwell Collins shall grant or procure Affiliated Undertakings to grant comprehensive powers of attorney, duly executed, to the Divestiture Trustee to effect the sale (including ancillary agreements), the Closing and all actions and declarations which the Divestiture Trustee considers necessary or appropriate to achieve the sale and the Closing, including the appointment of advisors to assist with the sale process. Upon request of the Divestiture Trustee, Rockwell Collins shall cause the documents required for effecting the sale and the Closing to be duly executed.

34. Rockwell Collins shall indemnify the Trustee and its employees and agents (each an "***Indemnified Party***") and hold each Indemnified Party harmless against, and hereby agrees that an Indemnified Party shall have no liability to Rockwell Collins for, any liabilities arising out of the performance of the Trustee's duties under the Commitments, except to the extent that such liabilities result from the wilful default, recklessness, gross negligence or bad faith of the Trustee, its employees, agents or advisors.

35. At the expense of Rockwell Collins, the Trustee may appoint advisors (in particular for corporate finance or legal advice), subject to Rockwell Collins' approval (this approval not to be unreasonably withheld or delayed) if the Trustee considers the appointment of such advisors necessary or appropriate for the performance of its duties and obligations under the Mandate, provided that any fees and other expenses incurred by the Trustee are reasonable. Should Rockwell Collins refuse to approve the advisors proposed by the Trustee the Commission may approve the appointment of such advisors instead, after having heard Rockwell Collins. Only the Trustee shall be entitled to issue instructions to the advisors. Paragraph 34 of these Commitments shall apply *mutatis mutandis*. In the Trustee Divestiture Period, the Divestiture Trustee may use advisors who served Rockwell Collins during the Divestiture Period if the Divestiture Trustee considers this in the best interest of an expedient sale.

36. Rockwell Collins agrees that the Commission may share Confidential Information proprietary to Rockwell Collins with the Trustee. The Trustee shall not disclose such information and the principles contained in Article 17 (1) and (2) of the Merger Regulation apply *mutatis mutandis*.

37. Rockwell Collins agrees that the contact details of the Monitoring Trustee are published on the website of the Commission's Directorate-General for Competition and they shall inform interested third parties, in particular any potential purchasers, of the identity and the tasks of the Monitoring Trustee.

38. For a period of ten (10) years from the Effective Date the Commission may request all information from the Parties that is reasonably necessary to monitor the effective implementation of these Commitments.

IV. Replacement, discharge and reappointment of the Trustee

39. If the Trustee ceases to perform its functions under the Commitments or for any other good cause, including the exposure of the Trustee to a Conflict of Interest:

(a) the Commission may, after hearing the Trustee and Rockwell Collins, require Rockwell Collins to replace the Trustee; or

(b) Rockwell Collins may, with the prior approval of the Commission, replace the Trustee.

40. If the Trustee is removed according to paragraph 39 of these Commitments, the Trustee may be required to continue in its function until a new Trustee is in place to whom the Trustee has effected a full hand over of all relevant information. The new Trustee shall be appointed in accordance with the procedure referred to in paragraphs 18-25 of these Commitments.

41. Unless removed according to paragraph 39 of these Commitments, the Trustee shall cease to act as Trustee only after the Commission has discharged it from its duties after all the Commitments with which the Trustee has been entrusted have been implemented. However, the Commission may at any time require the reappointment of the Monitoring Trustee if it subsequently appears that the relevant remedies might not have been fully and properly implemented.

Section F. The review clause

42. The Commission may extend the time periods foreseen in the Commitments in response to a request from the Parties or, in appropriate cases, on its own initiative. Where the Parties request an extension of a time period, it shall submit a reasoned request to the Commission no later than one (1) month before the expiry of that period, showing good cause. This request shall be accompanied by

a report from the Monitoring Trustee, who shall, at the same time send a non-confidential copy of the report to the Parties. Only in exceptional circumstances shall the Parties be entitled to request an extension within the last month of any period.

43. The Commission may further, in response to a reasoned request from the Parties showing good cause waive, modify or substitute, in exceptional circumstances, one or more of the undertakings in these Commitments. This request shall be accompanied by a report from the Monitoring Trustee, who shall, at the same time send a non-confidential copy of the report to the Parties. The request shall not have the effect of suspending the application of the undertaking and, in particular, of suspending the expiry of any time period in which the undertaking has to be complied with.

Section G. Entry into force

44. The Commitments shall take effect upon the date of adoption of the Decision.

[Signed]

SCHEDULE

1. The proposed Commitments offered by Rockwell Collins consist of the divestiture to the Purchaser of Rockwell Collins' global: (i) Trimmable Horizontal Stabilizer Actuators ("**THSA**") business, which includes THSAs, legacy flap actuation, and nose wheel steering gear boxes; (ii) Pilot Control Systems ("**PCS**") business, which includes center yokes, rudder brake pedal units, throttle quadrant assemblies, auto-throttles and control stand modules; and (iii) Special Products business, which includes *inter alia* fuel sticks, waste water drain valves, aircraft ground support couplings, and ground service couplings. These businesses, as defined in this Schedule, are hereinafter referred to as the "**Divestment Business**". If there is any asset or personnel which is not covered by this Schedule but which is both used (exclusively or not) in the Divestment Business and necessary for the continued viability and competitiveness of the Divestment Business, that asset or adequate substitute will be offered to potential purchasers.

2. The Divestment Business is comprised of the following tangible assets:

   (a) Rockwell Collins' rights to use:

      i. Buildings […] (United States);

      ii. Building […] (United States); and

      iii. Buildings […] (Mexico).

      Should the Purchaser so choose, and at the Purchaser's sole discretion, Rockwell Collins will:

      iv. Retain Building […], and transfer the requisite assets to Building […];

      v. Retain Building […], and transfer the requisite assets to a location at the Purchaser's discretion; and

      vi. Retain Building […], and transfer the requisite assets to Building […].

   (b) The inventory of finished goods, components, sub-components, and raw materials to the extent related to Rockwell Collins' THSA, PCS, and Special Products businesses, and owned by Rockwell Collins as of the date of Closing, as well as all rights to market and sell such inventory (to the extent applicable);

   (c) The manufacturing, testing and servicing equipment and machinery owned or licensed by Rockwell Collins and used in the manufacturing and

testing of Rockwell Collins' THSA, PCS and Special Products. A non-exhaustive list is included at **Appendix 1** to the Commitments. This includes all documentation (for example, machine records, design history files and technical files) related to this manufacturing, testing and servicing equipment and machinery;

(d) All business records, books of account, financial records, and tax records to the extent related to Rockwell Collins' THSA, PCS, and Special Products businesses; all information, including customer and supplier lists and details, product and pricing information, account histories, research data and commercial data to the extent relating to Rockwell Collins' THSA, PCS, and Special Products.

(e) To the extent applicable, all sales and promotional literature and other sales-related materials to the extent used or held for use for Rockwell Collins' THSA, PCS, and Special Products businesses.

(f) For the avoidance of doubt, the Divestment Business will not include any tangible assets that are used either exclusively or predominantly for activities other than those related to, and that are not necessary for the viability and competitiveness of, Rockwell Collins' THSA, PCS, and Special Products businesses.

3. The Divestment Business includes the following personnel:

Subject to the applicable local employment legislation, Rockwell Collins commits to transfer to the Purchaser the following personnel:

i. The Key Personnel; and

ii. The Personnel.

An exhaustive list of the Key Personnel, and the Personnel is enclosed herewith at **Appendix 2**.

4. The Divestment Business is comprised of the following intangible assets:

(a) **Patents.** Rockwell Collins will transfer or license the patents and applications, including the rights thereto, owned by Rockwell Collins that are used by Rockwell Collins in the manufacturing, sale and servicing of its THSA, PCS, and Special Products businesses. A non-exhaustive list of the patents and applications to be transferred is included at **Appendix 3** to the Commitments.

(b) **Know-how.** Rockwell Collins will transfer the trade secrets, confidential and/or proprietary know-how, confidential customer data, or other confidential information and other intellectual property owned by Rockwell Collins that are used by Rockwell Collins in Rockwell Collins' THSA, PCS, and Special Products businesses.

(c) **Trademarks.** Rockwell Collins will transfer the trademarks owned by Rockwell Collins, that are used by Rockwell Collins in the manufacturing of its THSA, PCS, and Special Products businesses. An exhaustive list is included at **Appendix 3** to the Commitments.

(d) Other intangible assets:

The Divestment Business will also include:

i. Any contracts related to Rockwell Collins' THSA, PCS, and/or Special Products businesses (or are otherwise necessary to operate the Divestment Business) entered into by Rockwell Collins prior to Closing.

ii. In order to confer the benefit of such contracts to the Purchaser, Rockwell Collins will use its best efforts to transfer (in whole or in part) any sales, sourcing, and supply agreements to the extent they relate to the manufacture and/or commercialization of Rockwell Collins THSA, PCS, and/or Special Products businesses. An non-exhaustive list of such customers and suppliers is included at **Appendix 4** to the Commitments.

iii. All licenses, permits and authorizations issued by any governmental organization to the extent transferable under applicable legal requirements, and the Purchaser and its affiliates do not own substantially similar licenses, permits and authorizations.

(e) For the avoidance of doubt, the Divestment Business will not include any intangible assets that are used exclusively or predominantly for activities other than those related to, and that are not necessary for the viability and competitiveness of, Rockwell Collins' THSA, PCS, and Special Products businesses.

Transitional agreements

5. The Parties will enter into any necessary transitional agreements with the Purchaser (covering, depending on the Purchaser's profile and preferences, *inter alia* IT, HR, aftermarket and spare parts, purchasing, contract support,

manufacturing assistance *etc*.) to effectuate the move of the assets described herein to the Purchaser as quickly as possible.

* * *

Appendices 1-4 […]

Annex 3

April 30, 2018

Case COMP/M.8658 – UTC / Rockwell Collins

COMMITMENTS TO THE EUROPEAN COMMISSION

Pursuant to Article 6(2) of Council Regulation (EC) No 139/2004 (the "***Merger Regulation***"), Rockwell Collins (including its Affiliated Undertakings, "***Rockwell Collins***") and United Technologies Corporation (including its Affiliated Undertakings, "***UTC***", and together with Rockwell Collins, the "***Parties***") hereby enter into the following Commitments (the "***Commitments***") vis-à-vis the European Commission (the "***Commission***") with a view to rendering Rockwell Collins' acquisition by UTC (the "***Transaction***") compatible with the internal market and the functioning of the EEA Agreement.

This text shall be interpreted in light of the Commission's decision pursuant to Article 6(1)(b) of the Merger Regulation to declare the Transaction compatible with the internal market and the functioning of the EEA Agreement (the "***Decision***"), in the general framework of European Union law, in particular in light of the Merger Regulation, and by reference to the Commission Notice on remedies acceptable under Council Regulation (EC) No 139/2004 and under Commission Regulation (EC) No 802/2004 (the "***Remedies Notice***").

The Schedule and its Appendices form an integral part of the Commitments.

Section A. Definitions

1. For the purposes of these Commitments, the following terms shall have the following meaning:

   - **Affiliated Undertakings**: undertakings controlled by the Parties, whereby the notion of control shall be interpreted pursuant to Article 3 of the Merger Regulation and in light of the Commission Consolidated Jurisdictional Notice under Council Regulation (EC) No 139/2004 on the control of concentrations between undertakings (the "***Consolidated Jurisdictional Notice***").

   - **Assets**: the assets that are necessary to ensure the viability and competitiveness of the Divestment Business, and insofar as they are not specifically mentioned in the Schedule taking into account the identity and capabilities of the Purchaser, as indicated in Section B, paragraph 6 and as described in more detail in the Schedule.

   - **Closing**: the transfer of the legal title to the Divestment Business to the Purchaser.

- **Closing Period**: the later of the period of […] from the approval of the Purchaser and the terms of sale by the Commission or the obtaining of all required regulatory approvals prior to Closing.

- **Confidential Information**: any business secrets, know-how, commercial information, or any other information of a proprietary nature that is not in the public domain.

- **Conflict of Interest**: any conflict of interest that impairs the Trustee's objectivity and independence in discharging its duties under the Commitments.

- **Divestment Business**: the assets as defined in Section B and in the Schedule which UTC and Rockwell Collins commit to divest.

- **Divestiture Trustee**: one or more natural or legal person(s) who is / are approved by the Commission and appointed by Rockwell Collins and who has / have received from Rockwell Collins the exclusive Trustee Mandate to sell the Divestment Business to a Purchaser at no minimum price.

- **Effective Date**: the date of adoption of the Decision.

- **First Divestiture Period**: the period of […] from the Effective Date.

- **Hold Separate Manager**: the person appointed by Rockwell Collins to manage the day-to-day operation of the Divestment Business under the supervision of the Monitoring Trustee.

- **Key Personnel:** all personnel necessary to maintain the viability and competitiveness of the Divestment Business, as listed in the Schedule, including the Hold Separate Manager.

- **Monitoring Trustee**: one or more natural or legal person(s) who is / are approved by the Commission and appointed by Rockwell Collins, and who has / have the duty to monitor Rockwell Collins' compliance with the conditions and obligations attached to the Decision.

- **Parties**: Rockwell Collins and UTC.

- **Personnel**: all staff currently employed by the Divestment Business, including staff seconded to the Divestment Business, shared personnel as well as the additional personnel listed in the Schedule.

- **Purchaser**: the entity approved by the Commission as acquirer of the Divestment Business in accordance with the criteria set out in Section D.

- **Purchaser Criteria**: the criteria laid down in paragraph 16 of these Commitments that the Purchaser must fulfil in order to be approved by the Commission.

- **Rockwell Collins**: Rockwell Collins, Inc., incorporated under the laws of the State of Delaware (U.S.), with its registered office at 400 Collins Road N.E., Cedar Rapids, Iowa 52498, U.S., and its Affiliated Undertakings.

- **Schedule**: the schedule to these Commitments describing more in detail the Divestment Business.

- **Trustee(s)**: the Monitoring Trustee and / or the Divestiture Trustee as the case may be.

- **Trustee Divestiture Period**: the period of […] from the end of the First Divestiture Period.

- **UTC**: United Technologies Corporation, incorporated under the laws of the State of Delaware, United States, with its registered office at Corporation Trust Center, 1209 Orange Street, in the City of Wilmington, County of New Castle, Delaware, 19801, United States.

Section B. The commitment to divest and the Divestment Business

Commitment to divest

2. In order to maintain effective competition, the Parties commit to divest, or procure the divestiture of, the Divestment Business by the end of the Trustee Divestiture Period to a Purchaser and on terms of sale approved by the Commission in accordance with the procedure described in paragraph 17 of these Commitments. To carry out the divestiture, the Parties commit to find a Purchaser and to enter into a final binding sale and purchase agreement for the sale of the Divestment Business within the First Divestiture Period. If the Parties have not entered into such an agreement at the end of the First Divestiture Period, the Parties shall grant the Divestiture Trustee an exclusive mandate to sell the Divestment Business in accordance with the procedure described in paragraph 29 in the Trustee Divestiture Period.

3. The Parties shall be deemed to have complied with this commitment if:

(a) by the end of the Trustee Divestiture Period, Rockwell Collins or the Divestiture Trustee has entered into a final binding sale and purchase agreement and the Commission approves the proposed purchaser and the terms of sale as being consistent with the Commitments in accordance with the procedure described in paragraph 17; and

(b) the Closing of the sale of the Divestment Business to the Purchaser takes place within the Closing Period.

4. In order to maintain the structural effect of the Commitments, the Parties shall, for a period of ten (10) years after Closing, not acquire, whether directly or indirectly, the possibility of exercising influence (as defined in paragraph 43 of the Remedies Notice, footnote 3) over the whole or part of the Divestment Business, unless, following the submission of a reasoned request from the Parties showing good cause and accompanied by a report from the Monitoring Trustee (as provided in paragraph 43 of these Commitments), the Commission finds that the structure of the market has changed to such an extent that the absence of influence over the Divestment Business is no longer necessary to render the Transaction compatible with the internal market.

Structure and definition of the Divestment Business

5. The Divestment Business consists of Rockwell Collins' SMR Technologies – which manufactures *inter alia* Rockwell Collins' pneumatic ice protection systems and other ice protection products, along with fueling systems and other industrial products, hovercraft skirts, composites and commercial aviation products – as detailed in the Schedule. The structure of the Divestment Business as operated to date is described in the Schedule.

6. The Divestment Business, described in more detail in the Schedule, includes all assets and staff that contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Business, in particular:

(a) all tangible and intangible assets (including intellectual property rights);

(b) all licenses, permits and authorizations issued by any governmental organisation for the benefit of the Divestment Business;

(c) all contracts, leases, commitments and customer orders of the Divestment Business; all customer, credit and other records of the Divestment Business; and

(d) the Personnel.

7. For the avoidance of doubt, the Divestment Business will not include:

(a) the WEMAC product line (*e.g.*, air gasper valves, interior signage components, *etc*.);

(b) any manufacturing equipment related to the WEMAC product line; and

(c) any tangible or intangible assets which are exclusively related to the WEMAC product line;

(d) any tangible or intangible assets that are used either exclusively or predominantly for activities other than those related to, and that are not necessary for the viability and competitiveness of SMR Technologies' businesses.

Section C. Related commitments

Preservation of viability, marketability and competitiveness

8. From the Effective Date until Closing, Rockwell Collins shall preserve or procure the preservation of the economic viability, marketability and competitiveness of the Divestment Business, in accordance with good business practice, and shall minimise as far as possible any risk of loss of competitive potential of the Divestment Business. In particular Rockwell Collins undertakes:

(a) not to carry out any action that might have a significant adverse impact on the value, management or competitiveness of the Divestment Business or that might alter the nature and scope of activity, or the industrial or commercial strategy or the investment policy of the Divestment Business;

(b) to make available, or procure to make available, sufficient resources for the development of the Divestment Business, on the basis and continuation of the existing business plans;

(c) to take all reasonable steps, or procure that all reasonable steps are being taken, including appropriate incentive schemes (based on industry practice), to encourage all Key Personnel to remain with the Divestment Business, and not to solicit or move any Key Personnel to Rockwell Collins' remaining businesses. Where, nevertheless, individual members of the Key Personnel exceptionally leave the Divestment Business, Rockwell Collins shall provide a reasoned proposal to replace the person or persons concerned to the Commission and the Monitoring Trustee. Rockwell Collins must be able to demonstrate to the Commission that the replacement is well suited to carry out the functions exercised by those individual members of the Key Personnel. The replacement shall take place under the supervision of the Monitoring Trustee, who shall report to the Commission

Hold-separate obligations

9. The Parties commit, from the Effective Date until Closing, to keep the Divestment Business separate from the business(es) they are retaining and to ensure that unless explicitly permitted under these Commitments: (i) management and staff of the business(es) retained by the Parties have no involvement in the Divestment Business; (ii) the Key Personnel and Personnel of the Divestment Business have no involvement in any business retained by the Parties and do not report to any individual outside the Divestment Business.

10. Until Closing, Rockwell Collins shall assist the Monitoring Trustee in ensuring that the Divestment Business is managed as a distinct and saleable entity separate from the businesses which Rockwell Collins is retaining. Immediately after the adoption of the Decision, Rockwell Collins shall appoint a Hold Separate Manager. The Hold Separate Manager, who shall be part of the Key Personnel, shall manage the Divestment Business independently and in the best interest of the Divestment Business with a view to ensuring its continued economic viability, marketability and competitiveness and its independence from the businesses retained by Rockwell Collins. The Hold Separate Manager shall closely cooperate with and report to the Monitoring Trustee and, if applicable, the Divestiture Trustee. Any replacement of the Hold Separate Manager shall be subject to the procedure laid down in paragraph 9(c) of these Commitments. The Commission may, after having heard Rockwell Collins, require Rockwell Collins to replace the Hold Separate Manager.

Ring-fencing

11. The Parties shall implement, or procure to implement, all necessary measures to ensure that it does not, after the Effective Date, obtain any Confidential Information relating to the Divestment Business. Any such Confidential Information obtained by Rockwell Collins before the Effective Date will be eliminated and not be used by Rockwell Collins. This includes measures vis-à-vis Rockwell Collins' appointees on the supervisory board and/or board of directors of the Divestment Business. In particular, the participation of the Divestment Business in any central information

technology network shall be severed to the extent possible, without compromising the viability of the Divestment Business. Rockwell Collins may obtain or keep information relating to the Divestment Business which is reasonably necessary for the divestiture of the Divestment Business or the disclosure of which to Rockwell Collins is required by law.

Non-solicitation clause

12. The Parties undertake, subject to customary limitations, not to solicit, and to procure that Affiliated Undertakings do not solicit, the Key Personnel transferred with the Divestment Business for a period of […] after Closing.

Due diligence

13. In order to enable potential purchasers to carry out a reasonable due diligence of the Divestment Business, Rockwell Collins shall, subject to customary confidentiality assurances and dependent on the stage of the divestiture process:

(a) provide to potential purchasers sufficient information as regards the Divestment Business; and

(b) provide to potential purchasers sufficient information relating to the Personnel and allow them reasonable access to the Personnel.

Reporting

14. Rockwell Collins shall submit written reports in English on potential purchasers of the Divestment Business and developments in the negotiations with such potential purchasers to the Commission and the Monitoring Trustee no later than ten (10) days after the end of every month following the Effective Date (or otherwise at the Commission's request). Rockwell Collins shall submit a list of all potential purchasers having expressed interest in acquiring the Divestment Business to the Commission at each and every stage of the divestiture process, as well as a copy of all the offers made by potential purchasers within five days of their receipt.

15. Rockwell Collins shall inform the Commission and the Monitoring Trustee on the preparation of the data room documentation and the due diligence procedure and shall submit a copy of any information memorandum to the Commission and the Monitoring Trustee before sending the memorandum out to potential purchasers.

Section D. The Purchaser

16. In order to be approved by the Commission, the Purchaser must fulfil the following criteria:

(a) The Purchaser shall be independent of and unconnected to the Parties and their Affiliated Undertakings (this being assessed having regard to the situation following the divestiture);

(b) The Purchaser shall have the financial resources, proven expertise and incentive to maintain and develop the Divestment Business as a viable and active competitive force in competition with the Parties and other competitors;

(c) The Purchaser shall have an existing presence in the aerospace industry;

(d) The acquisition of the Divestment Business by the Purchaser must neither be likely to create, in light of the information available to the Commission, *prima facie* competition concerns nor give rise to a risk that the implementation of the Commitments will be delayed. In particular, the Purchaser must reasonably be expected to obtain all necessary approvals from the relevant regulatory authorities for the acquisition of the Divestment Business.

17. The final binding sale and purchase agreement (as well as ancillary agreements) relating to the divestment of the Divestment Business shall be conditional on the Commission's approval. When Rockwell Collins has reached an agreement with a purchaser, it shall submit a fully documented and reasoned proposal, including a copy of the final agreement(s), within one (1) week to the Commission and the Monitoring Trustee. Rockwell Collins must be able to demonstrate to the Commission that the purchaser fulfils the Purchaser Criteria and that the Divestment Business is being sold in a manner consistent with the Commission's Decision and the Commitments. For the approval, the Commission shall verify that the purchaser fulfils the Purchaser Criteria and that the Divestment Business is being sold in a manner consistent with the Commitments including their objective to bring about a lasting structural change in the market. The Commission may approve the sale of the Divestment Business without one or more Assets or parts of the Personnel, or by substituting one or more Assets or parts of the Personnel with one or more different assets or different personnel, if this does not affect the viability and competitiveness of the Divestment Business after the sale, taking account of the proposed purchaser.

Section E. Trustee

I. Appointment procedure

18. Rockwell Collins shall appoint a Monitoring Trustee to carry out the functions specified in these Commitments for a Monitoring Trustee. Rockwell Collins commits not to close the Transaction before the appointment of a Monitoring Trustee.

19. If Rockwell Collins has not entered into a binding sale and purchase agreement regarding the Divestment Business one (1) month before the end of the First Divestiture Period or if the Commission has rejected a purchaser proposed by Rockwell Collins at that time or thereafter, Rockwell Collins shall appoint a Divestiture Trustee. The appointment of the Divestiture Trustee shall take effect upon the commencement of the Trustee Divestiture Period.

20. The Trustee shall:

(i) at the time of appointment, be independent of the Parties;

(ii) possess the necessary qualifications to carry out its mandate, for example have sufficient relevant experience as an investment banker or consultant or auditor; and

(iii) neither have nor become exposed to a Conflict of Interest.

21. The Trustee shall be remunerated by Rockwell Collins in a way that does not impede the independent and effective fulfilment of its mandate. In particular, where the remuneration package of a Divestiture Trustee includes a success premium linked to the final sale value of the Divestment Business, such success premium may only be earned if the divestiture takes place within the Trustee Divestiture Period.

Proposal by Rockwell Collins

22. No later than two (2) weeks after the Effective Date, Rockwell Collins shall submit the names of one (1) or more natural or legal persons whom Rockwell Collins proposes to appoint as the Monitoring Trustee to the Commission for approval. No later than one (1) month before the end of the First Divestiture Period or on request by the Commission, Rockwell Collins shall submit a list of one (1) or more persons whom Rockwell Collins proposes to appoint as Divestiture Trustee to the Commission for approval. The proposal shall contain sufficient information for the Commission to verify that the person or persons proposed as Trustee fulfil the requirements set out in paragraph 20 and shall include:

(a) the full terms of the proposed mandate, which shall include all provisions necessary to enable the Trustee to fulfil its duties under these Commitments;

(b) the outline of a work plan which describes how the Trustee intends to carry out its assigned tasks; and

(c) an indication whether the proposed Trustee is to act as both Monitoring Trustee and Divestiture Trustee or whether different trustees are proposed for the two functions.

Approval or rejection by the Commission

23. The Commission shall have the discretion to approve or reject the proposed Trustee(s) and to approve the proposed mandate subject to any modifications it deems necessary for the Trustee to fulfil its obligations. If only one (1) name is approved, Rockwell Collins shall appoint or cause to be appointed the person or persons concerned as Trustee, in accordance with the mandate approved by the Commission. If more than one (1) name is approved, Rockwell Collins shall be free to choose the Trustee to be appointed from among the names approved. The Trustee shall be appointed within one (1) week of the Commission's approval, in accordance with the mandate approved by the Commission.

New proposal by Rockwell Collins

24. If all the proposed Trustees are rejected, Rockwell Collins shall submit the names of at least two (2) more natural or legal persons within one (1) week of being informed of the rejection, in accordance with paragraphs 18 and 23 of these Commitments.

Trustee nominated by the Commission

25. If all further proposed Trustees are rejected by the Commission, the Commission shall nominate a Trustee, whom Rockwell Collins shall appoint, or cause to be appointed, in accordance with a Trustee mandate approved by the Commission.

II. Functions of the Trustee

26. The Trustee shall assume its specified duties and obligations in order to ensure compliance with the Commitments. The Commission may, on its own initiative or at the request of the Trustee or Rockwell Collins, give any orders or instructions to the Trustee in order to ensure compliance with the conditions and obligations attached to the Decision.

Duties and obligations of the Monitoring Trustee

27. The Monitoring Trustee shall:

(i) propose in its first report to the Commission a detailed work plan describing how it intends to monitor compliance with the obligations and conditions attached to the Decision.

(ii) oversee, in close co-operation with the Hold Separate Manager, the on-going management of the Divestment Business with a view to ensuring its continued economic viability, marketability and competitiveness and monitor compliance by Rockwell Collins with the conditions and obligations attached to the Decision. To that end the Monitoring Trustee shall:

(a) monitor the preservation of the economic viability, marketability and competitiveness of the Divestment Business, and the keeping separate of the Divestment Business from the businesses retained by Rockwell Collins, in accordance with paragraphs 8 and 9 of these Commitments;

(b) supervise the management of the Divestment Business, in accordance with paragraph 10 of these Commitments;

(c) with respect to Confidential Information:

– determine all necessary measures to ensure that Rockwell Collins does not after the Effective Date obtain any Confidential Information relating to the Divestment Business,

– in particular strive for the severing of the Divestment Business' participation in a central information technology network to the extent possible, without compromising the viability of the Divestment Business,

– make sure that any Confidential Information relating to the Divestment Business obtained by Rockwell Collins before the Effective Date is eliminated and will not be used by Rockwell Collins, and

– decide whether such information may be disclosed to or kept by Rockwell Collins as the disclosure is reasonably necessary to allow Rockwell Collins to carry out the divestiture or as the disclosure is required by law;

(d) monitor the splitting of assets and the allocation of Personnel between the Divestment Business and Rockwell Collins;

(iii) propose to Rockwell Collins such measures as the Monitoring Trustee considers necessary to ensure Rockwell Collins' compliance with the conditions and obligations attached to the Decision, in particular the maintenance of the full economic viability, marketability or competitiveness of the Divestment Business, the holding separate of the Divestment Business and the non-disclosure of competitively sensitive information;

(iv) review and assess potential purchasers as well as the progress of the divestiture process and verify that, dependent on the stage of the divestiture process:

(a) potential purchasers receive sufficient and correct information relating to the Divestment Business and the Personnel in particular by reviewing, if available, the data room documentation, the information memorandum and the due diligence process, and

(b) potential purchasers are granted reasonable access to the Personnel;

(v) act as a contact point for any requests by third parties, in particular potential purchasers, in relation to the Commitments;

(vi) provide to the Commission, sending the Parties a non-confidential copy at the same time, a written report within fifteen (15) days after the end of every month that shall cover the operation and management of the Divestment Business as well as the splitting of assets and the allocation of Personnel so that the Commission can assess whether the Divestment Business is held in a manner consistent with the Commitments and the progress of the divestiture process as well as potential purchasers;

(vii) promptly report in writing to the Commission, sending the Parties a non-confidential copy at the same time, if it concludes on reasonable grounds that Rockwell Collins is failing to comply with these Commitments;

(viii) within one (1) week after receipt of the documented proposal referred to in paragraph 17 of these Commitments, submit to the Commission, sending the Parties a non-confidential copy at the same time, a reasoned opinion as to the suitability and independence of the proposed purchaser and the viability of the Divestment Business after the sale and as to whether the Divestment Business is sold in a manner consistent with the conditions and obligations attached to the Decision, in particular, if relevant, whether the sale of the Divestment Business without one or more Assets or one or more Key Personnel affects the viability of the Divestment Business after the sale, taking account of the proposed purchaser;

(ix) assume the other functions assigned to the Monitoring Trustee under the conditions and obligations attached to the Decision.

28. If the Monitoring and Divestiture Trustee are not the same legal or natural persons, the Monitoring Trustee and the Divestiture Trustee shall cooperate closely with each other during and for the purpose of the preparation of the Trustee Divestiture Period in order to facilitate each other's tasks.

Duties and obligations of the Divestiture Trustee

29. Within the Trustee Divestiture Period, the Divestiture Trustee shall sell at no minimum price the Divestment Business to a purchaser, provided that the Commission has approved both the purchaser and the final binding sale and purchase agreement (and ancillary agreements) as in line with the Commission's Decision and the Commitments in accordance with paragraphs 16 and 17 of these Commitments. The Divestiture Trustee shall include in the sale and purchase agreement (as well as in any ancillary agreements) such terms and conditions as it considers appropriate for an expedient sale in the Trustee Divestiture Period. In particular, the Divestiture Trustee may include in the sale and purchase agreement such customary representations and

warranties and indemnities as are reasonably required to affect the sale. The Divestiture Trustee shall protect the legitimate financial interests of Rockwell Collins, subject to Rockwell Collins' unconditional obligation to divest at no minimum price in the Trustee Divestiture Period.

30. In the Trustee Divestiture Period (or otherwise at the Commission's request), the Divestiture Trustee shall provide the Commission with a comprehensive monthly report written in English on the progress of the divestiture process. Such reports shall be submitted within fifteen (15) days after the end of every month with a simultaneous copy to the Monitoring Trustee and a non-confidential copy to the Parties.

III. Duties and obligations of Rockwell Collins

31. Rockwell Collins shall provide and shall cause its advisors to provide the Trustee with all such co-operation, assistance and information as the Trustee may reasonably require to perform its tasks. The Trustee shall have full and complete access to any of Rockwell Collins' or the Divestment Business' books, records, documents, management or other personnel, facilities, sites and technical information necessary for fulfilling its duties under the Commitments and Rockwell Collins and the Divestment Business shall provide the Trustee upon request with copies of any document. Rockwell Collins and the Divestment Business shall make available to the Trustee one or more offices on their premises and shall be available for meetings in order to provide the Trustee with all information necessary for the performance of its tasks.

32. Rockwell Collins shall provide the Monitoring Trustee with all managerial and administrative support that it may reasonably request on behalf of the management of the Divestment Business. This shall include all administrative support functions relating to the Divestment Business which are currently carried out at headquarters level. Rockwell Collins shall provide and shall cause its advisors to provide the Monitoring Trustee, on request, with the information submitted to potential purchasers, in particular give the Monitoring Trustee access to the data room documentation and all other information granted to potential purchasers in the due diligence procedure. Rockwell Collins shall inform the Monitoring Trustee on possible purchasers, submit lists of potential purchasers at each stage of the selection process, including the offers made by potential purchasers at those stages, and keep the Monitoring Trustee informed of all developments in the divestiture process.

33. Rockwell Collins shall grant or procure Affiliated Undertakings to grant comprehensive powers of attorney, duly executed, to the Divestiture Trustee to effect the sale (including ancillary agreements), the Closing and all actions and declarations which the Divestiture Trustee considers necessary or appropriate to achieve the sale and the Closing, including the appointment of advisors to assist with the sale process. Upon request of the Divestiture Trustee, Rockwell Collins shall cause the documents required for effecting the sale and the Closing to be duly executed.

34. Rockwell Collins shall indemnify the Trustee and its employees and agents (each an "**Indemnified Party**") and hold each Indemnified Party harmless against, and hereby agrees that an Indemnified Party shall have no liability to Rockwell Collins for, any liabilities arising out of the performance of the Trustee's duties under the Commitments, except to the extent that such liabilities result from the wilful default, recklessness, gross negligence or bad faith of the Trustee, its employees, agents or advisors.

35. At the expense of Rockwell Collins, the Trustee may appoint advisors (in particular for corporate finance or legal advice), subject to Rockwell Collins' approval (this approval not to be unreasonably withheld or delayed) if the Trustee considers the appointment of such advisors necessary or appropriate for the performance of its duties and obligations under the Mandate, provided that any fees and other expenses incurred by the Trustee are reasonable. Should Rockwell Collins refuse to approve the advisors proposed by the Trustee the Commission may approve the appointment of such advisors instead, after having heard Rockwell Collins. Only the Trustee shall be entitled to issue instructions to the advisors. Paragraph 34 of these Commitments shall apply *mutatis mutandis*. In the Trustee Divestiture Period, the Divestiture Trustee may use advisors who served Rockwell Collins during the Divestiture Period if the Divestiture Trustee considers this in the best interest of an expedient sale.

36. Rockwell Collins agrees that the Commission may share Confidential Information proprietary to Rockwell Collins with the Trustee. The Trustee shall not disclose such information and the principles contained in Article 17 (1) and (2) of the Merger Regulation apply *mutatis mutandis*.

37. Rockwell Collins agrees that the contact details of the Monitoring Trustee are published on the website of the Commission's Directorate-General for Competition and they shall inform interested third parties, in particular any potential purchasers, of the identity and the tasks of the Monitoring Trustee.

38. For a period of ten (10) years from the Effective Date the Commission may request all information from the Parties that is reasonably necessary to monitor the effective implementation of these Commitments.

IV. <u>Replacement, discharge and reappointment of the Trustee</u>

39. If the Trustee ceases to perform its functions under the Commitments or for any other good cause, including the exposure of the Trustee to a Conflict of Interest:

(a) the Commission may, after hearing the Trustee and Rockwell Collins, require Rockwell Collins to replace the Trustee; or

(b) Rockwell Collins may, with the prior approval of the Commission, replace the Trustee.

40. If the Trustee is removed according to paragraph 39 of these Commitments, the Trustee may be required to continue in its function until a new Trustee is in place to whom the Trustee has effected a full hand over of all relevant information. The new Trustee shall be appointed in accordance with the procedure referred to in paragraphs 18-25 of these Commitments.

41. Unless removed according to paragraph 39 of these Commitments, the Trustee shall cease to act as Trustee only after the Commission has discharged it from its duties after all the Commitments with which the Trustee has been entrusted have been implemented. However, the Commission may at any time require the reappointment of the Monitoring Trustee if it subsequently appears that the relevant remedies might not have been fully and properly implemented.

Section F. The review clause

42. The Commission may extend the time periods foreseen in the Commitments in response to a request from the Parties or, in appropriate cases, on its own initiative. Where the Parties request an extension of a time period, it shall submit a reasoned request to the Commission no later than one (1) month before the expiry of that period, showing good cause. This request shall be accompanied by a report from the Monitoring Trustee, who shall, at the same time send a non-confidential copy of the report to the Parties. Only in exceptional circumstances shall the Parties be entitled to request an extension within the last month of any period.

43. The Commission may further, in response to a reasoned request from the Parties showing good cause waive, modify or substitute, in exceptional circumstances, one or more of the undertakings in these Commitments. This request shall be accompanied by a report from the Monitoring Trustee, who shall, at the same time send a non-confidential copy of the report to the Parties. The request shall not have the effect of suspending the application of the undertaking and, in particular, of suspending the expiry of any time period in which the undertaking has to be complied with.

Section G. Entry into force

44. The Commitments shall take effect upon the date of adoption of the Decision.

[Signed]

SCHEDULE

1. The proposed Commitments offered by Rockwell Collins consist of the divestiture to the Purchaser of SMR Technologies – which manufactures *inter alia* Rockwell Collins' pneumatic ice protection systems and other ice protection products, along with fueling systems and other industrial products, hovercraft skirts, composites and commercial aviation products – as defined in the Schedule, including the tangible and intangible assets listed below (hereinafter referred to as the "**Divestment Business**"). For the avoidance of doubt, the Divestment Business does not include the WEMAC product line (*e.g.*, air gasper valves, interior signage components, *etc.*) and related equipment and machinery, as specified below.[1] If there is any asset or personnel which is not covered by this Schedule but which is both used (exclusively or not) in the Divestment Business and necessary for the continued viability and competitiveness of the Divestment Business, that asset or adequate substitute will be offered to potential purchasers.

2. The Divestment Business is comprised of the following tangible assets:

   (a) SMR Technologies' facility located in Fenwick (West Virginia, United States);

   (b) The inventory of finished goods to the extent related to the SMR Technologies business with the exclusion of those related to the WEMAC product line, and owned by SMR Technologies as of the date of Closing, as well as the right to market and sell such inventory;

   (c) The manufacturing and testing equipment and machinery owned by SMR Technologies and used in the manufacturing of ice protection systems, fueling systems and other industrial products, hovercraft skirts, composites and commercial aviation products, with the exclusion of those used exclusively or predominantly in the WEMAC product line.[2] This includes all documentation (for example, machine records, design history files and technical files) related to the manufacturing equipment and machinery. An exhaustive list of the equipment is included at **Appendix 1** to the Commitments;

   (d) All business records, books of account, financial records, and tax records to the extent pertaining to SMR Technologies, with the exclusion of those related to the WEMAC product line;

---

1 As submitted in response to RFI 2 on March 22, 2018, the Parties intend to retain the WEMAC product line by way of a reverse carve-out. […].

2 For completeness, one piece of equipment called […] manufactures both the ice protection systems and the WEMAC product line. This piece of equipment will be included in the Divestment Business. Only machinery exclusively used for the WEMAC product line will be excluded.

(e) For the avoidance of doubt, the Divestment Business will not include any tangible assets that are used either exclusively or predominantly for activities other than those related to, and that are not necessary for the viability and competitiveness of SMR Technologies' businesses, with the exclusion of the WEMAC product line.

3. The Divestment Business is comprised of the following intangible assets:

(a) **Pipeline products.** All pipeline products and projects initiated before Closing, including […], by SMR Technologies and that are reflected in the books and records, with the exception of those exclusively related to the WEMAC product line.

(b) **Patents.** Rockwell Collins will transfer the patents and applications, including the rights thereto, owned by Rockwell Collins that are used by SMR Technologies in its ice protection product line or in any of the other products manufactured in its Fenwick facility. […]. A non-exhaustive list of the patents and applications to be transferred is included at **Appendix 2** to the Commitments.

(c) **Know-how.** Rockwell Collins will transfer the trade secrets, confidential know-how, confidential customer data, or other confidential information and other intellectual property owned by Rockwell Collins that are used by SMR Technologies in Rockwell Collins' ice protection product lines, as well as in other products manufactured in its Fenwick facility, with the exception of the WEMAC product line. A non-exhaustive list is included at **Appendix 3** to the Commitments.

(d) **Brands.** Rockwell Collins will transfer the ice protection brand names […]. Rockwell Collins will also transfer the brand names associated with any of its other products manufactured SMR Technologies, with the exception of those related to the WEMAC product line. A non-exhaustive list is included at **Appendix 4** to the Commitments.

(e) **Other intangible assets.**

(i) Any contracts related to Rockwell Collins' Divestment Business product line or pipeline projects (or are otherwise necessary to operate the Divestment Business and to develop the pipeline projects) entered into by Rockwell Collins prior to Closing.

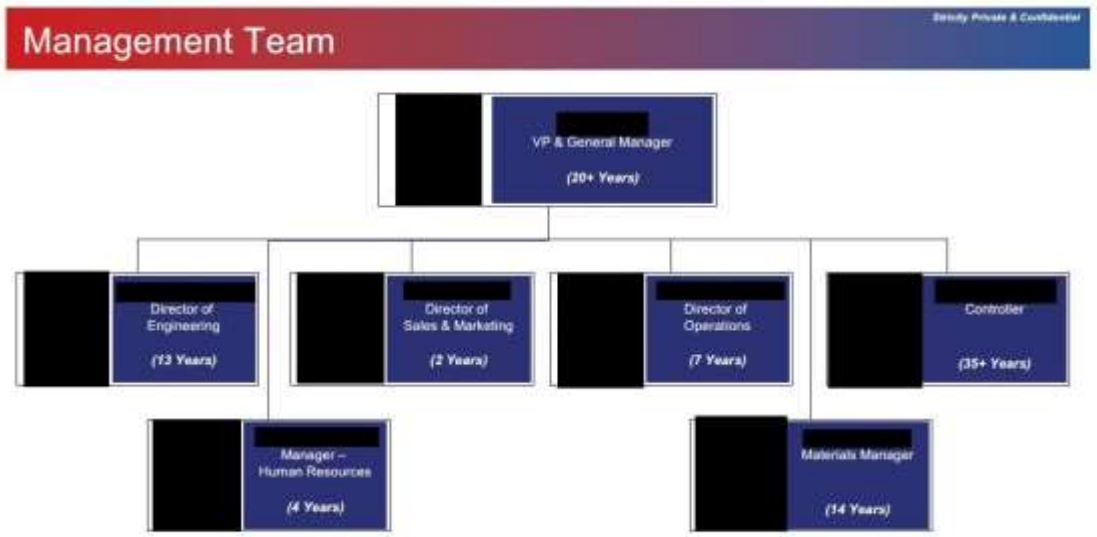
(ii) In order to confer the benefit of such contracts to the Purchaser, Rockwell Collins will use its best efforts to transfer (in whole or in part) any sales, sourcing, supply and distribution agreements to the extent they relate to the manufacture and/or commercialization of the Divestment Business product lines or pipeline projects (or are otherwise necessary to operate the Divestment Business and to develop the pipeline projects).

(iii) All licenses, permits and authorizations issued by any governmental organization (including, where applicable, the CE mark) specifically identified by reference to a schedule, to the extent transferable under applicable legal requirements and Purchaser and its affiliates do not own substantially similar licenses, permits and authorizations. A non-exhaustive list is included at **Appendix 5** to the Commitments.

(f) The Divestment Business will not include any intangible assets that are used either exclusively or predominantly for activities other than those related to, and that are not necessary for the viability and competitiveness of SMR Technologies' businesses.

4. For the avoidance of doubt, the Divestment Business concerns SMR Technologies, including its tangible and intangible assets with the exclusion of the WEMAC product line (*e.g.*, air gasper valves and related components as well as interior signage components). The WEMAC product line will be transferred to Rockwell Collins' facility […]. The WEMAC product line is unrelated to the manufacturing of ice protection systems.

5. The Divestment Business includes all Personnel employed at SMR Technologies including Key Personnel set out below. An exhaustive list of the Key Personnel, and the Personnel is enclosed at **Appendix 6** to the Commitments.



- […]: Manufacturing Engineering Manager;
- […]: Quality Manager;
- […]: Program Manager;
- […]: Marketing Specialist;
- […]: Inside Sales Representative;
- […]: Inside Sales Representative;
- […]: Manufacturing Supervisor (De-ice product line);
- […]: Materials Supervisor;

- […]: Accounting Manager; and
- […]: Maintenance Supervisor.

6. At the request of the Purchaser, customary transition services may be put in place notwithstanding the stand-alone business that constitutes SMR Technologies.

* * *

Appendices 1-6 […]

Annex 4

April 26, 2018

European Commission
DG Competition
Place Madou
1210 BRUSSELS

CASE COMP/M.8658 – UTC/ROCKWELL COLLINS

COMMITMENTS TO THE EUROPEAN COMMISSION

Pursuant to Article 6(2) of Council Regulation (EC) No 139/2004 (the "Merger Regulation"), United Technologies Corporation ("UTC") hereby enters into the following Commitments (the "Commitments") vis-à-vis the European Commission (the "Commission") with a view to rendering the acquisition of Rockwell Collins, Inc. ("Rockwell Collins", together with UTC the "Parties") (the "Concentration") compatible with the internal market and the functioning of the EEA Agreement.

This text shall be interpreted in light of the Commission's decision pursuant to Article 6(1)(b) of the of the Merger Regulation to declare the Concentration compatible with the internal market and the functioning of the EEA Agreement (the "Decision"), in the general framework of European Union law, in particular in light of the Merger Regulation, and by reference to the Commission Notice on remedies acceptable under Council Regulation (EC) No 139/2004 and under Commission Regulation (EC) No 802/2004 (the "Remedies Notice").

Section A. Definitions

1. For the purpose of the Commitments, the following terms shall have the following meaning:

   Administrative Support: any administrative support provided by UTC to the Hold Separate Manager and the Divestment Programs, including at the Hold Separate Manager's request, to assist with day-to-day management of the Divestment Programs, including but not limited to legal advice and use of IT resources or administrative resources.

   Affiliated Undertakings: undertakings controlled by the Parties, whereby the notion of control shall be interpreted pursuant to Article 3 of the Merger Regulation and in light of the Commission Consolidated Jurisdictional Notice under Council Regulation (EC) No 139/2004 on the control of concentrations between undertakings (the "Consolidated Jurisdictional Notice").

   Assets: the assets that contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Programs as indicated in Section B, paragraphs 6 (a), (b) and (c) and described more in detail in the Schedule.

   [Details of UTC's R&D programs] Oxygen Program: [details of UTC's R&D programs].

Closing: the transfer of the Divestment Programs to the Purchaser.

Closing Period: the period of […] from the approval of the Purchaser and the terms of sale by the Commission or the obtaining of all required regulatory approvals prior to Closing, whichever occurs later.

Confidential Information: any business secrets, know-how, commercial information, or any other information of a proprietary nature that is not in the public domain.

Conflict of Interest: any conflict of interest that impairs the Trustee's objectivity and independence in discharging its duties under the Commitments.

[Details of UTC's R&D programs] Oxygen Program: [details of UTC's R&D programs].

Divestment Programs: the oxygen research and development programs that UTC commits to divest, as defined in Section B and in the Schedule.

Divestiture Trustee: one or more natural or legal person(s) who is/are approved by the Commission and appointed by UTC and who has/have received from UTC the exclusive Trustee Mandate to sell the Divestment Programs to a Purchaser at no minimum price.

Effective Date: the date of adoption of the Decision.

First Divestiture Period: the period of […] from the Effective Date.

Hold Separate Manager: the person appointed by UTC for the Divestment Programs to manage the day-to-day business under the supervision of the Monitoring Trustee.

Key Personnel: all personnel necessary to maintain the viability and competitiveness of the Divestment Programs, as listed in the Schedule.

Monitoring Trustee: one or more natural or legal person(s) who is/are approved by the Commission and appointed by UTC, and who has/have the duty to monitor UTC's compliance with the conditions and obligations attached to the Decision.

Parties: UTC and the undertaking that is the target of the concentration, Rockwell Collins.

Personnel: all staff currently solely engaged in the Divestment Programs, as listed in the Schedule.

Proposed Transaction: the acquisition of Rockwell Collins by UTC.

Purchaser: the entity approved by the Commission as acquirer of the Divestment Programs in accordance with the criteria set out in Section D. Any singular reference to the Purchaser should be considered to refer to one or more Purchasers.

Purchaser Criteria: the criteria laid down in paragraph 16 of these Commitments that the Purchaser must fulfil in order to be approved by the Commission.

Rockwell Collins: Rockwell Collins, Inc., incorporated under the laws of the State of Delaware, United States, with its registered office at 400 Collins Road N.E., Cedar Rapids, Iowa 52498, United States.

Schedule: the schedule to these Commitments describing more in detail the Divestment Programs.

Trustee(s): the Monitoring Trustee and/or the Divestiture Trustee as the case may be.

Trustee Divestiture Period: the period of […] from the end of the First Divestiture Period, subject to any extensions granted in accordance with Section F (The Review Clause) of these Commitments.

UTC: United Technologies Corporation, incorporated under the laws of the State of Delaware, United States, with its registered office at Corporation Trust Center, 1209 Orange Street, in the City of Wilmington, County of New Castle, Delaware, 19801, United States, and registered with the Delaware Division of Corporations under file number 0334827.

Section B. The commitment to divest and the Divestment Programs

Commitment to divest

2. In order to maintain effective competition, UTC commits to divest, or procure the divestiture of the Divestment Programs by the end of the Trustee Divestiture Period to a purchaser and on terms of sale approved by the Commission in accordance with the procedure described in paragraph 17 of these Commitments. To carry out the divestiture, UTC commits to find a purchaser and to enter into a final binding sale and purchase agreement for the sale of the Divestment Programs within the First Divestiture Period. If UTC has not entered into such an agreement at the end of the First Divestiture Period, UTC shall grant the Divestiture Trustee an exclusive mandate to sell the Divestment Programs in accordance with the procedure described in paragraph 29 in the Trustee Divestiture Period.

3. The Concentration shall not be implemented before UTC or the Divestiture Trustee has entered into a final binding sale and purchase agreement for the sale of the Divestment Programs and the Commission has approved the purchaser and the terms of sale in accordance with paragraph 17.

4. UTC shall be deemed to have complied with this commitment if:

   (a) by the end of the Trustee Divestiture Period, UTC or the Divestiture Trustee has entered into a final binding sale and purchase agreement and the Commission approves the proposed purchaser and the terms of sale as being consistent with the Commitments in accordance with the procedure described in paragraph 17; and

   (b) the Closing of the sale of the Divestment Programs to the Purchaser takes place within the Closing Period.

5. In order to maintain the structural effect of the Commitments, UTC shall, for a period of […] after Closing, not acquire, whether directly or indirectly, the possibility of exercising influence (as defined in paragraph 43 of the Remedies Notice, footnote 3) over the whole or part of the Divestment Programs, unless, following the submission of a reasoned request from UTC showing good cause and accompanied by a report from the Monitoring Trustee (as provided in paragraph 43 of these Commitments), the Commission finds that the structure of the market has changed to such an extent that the absence of influence over the Divestment Programs is no longer necessary to render the proposed concentration compatible with the internal market.

Structure and definition of the Divestment Programs

6. The Divestment Programs consist of all of UTC's activities in the development of aircraft oxygen generation systems, consisting of two R&D programs: the […] Oxygen Program and the […] Oxygen Program. The legal and functional structure of the Divestment Programs as operated to date is described in the Schedule. The Divestment Programs, described in more detail in the Schedule, include all assets and staff that contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Programs, in particular:

   (a) all intangible assets, including intellectual property rights;

   (b) all research and development contracts of the Divestment Programs concerning the […] Oxygen Program and the […] Oxygen Program;

   (c) the Personnel.

7. [*Intentionally left blank*].

Section C. Related commitments

Preservation of viability, marketability and competitiveness

8. From the Effective Date until Closing, UTC shall preserve or procure the preservation of the economic viability, marketability and competitiveness of the Divestment Programs, in accordance with good business practice, and shall minimise as far as possible any risk of loss of competitive potential of the Divestment Programs. In particular UTC undertakes:

   (a) not to carry out any action that might have a significant adverse impact on the value, management or competitiveness of the Divestment Programs or that might alter the nature and scope of activity, or the industrial or commercial strategy or the investment policy of the Divestment Programs;

   (b) to make available, or procure to make available, sufficient resources for the development of the Divestment Programs, on the basis and continuation of the existing business plans;

   (c) to take all reasonable steps, or procure that all reasonable steps are being taken, including appropriate incentive schemes (based on industry practice), to encourage all Key Personnel to remain with the Divestment Programs, and not to solicit or move any Personnel to UTC's remaining business. Where, nevertheless, individual members

of the Key Personnel exceptionally leave the Divestment Programs, UTC shall provide a reasoned proposal to replace the person or persons concerned to the Commission and the Monitoring Trustee. UTC must be able to demonstrate to the Commission that the replacement is well suited to carry out the functions exercised by those individual members of the Key Personnel. The replacement shall take place under the supervision of the Monitoring Trustee, who shall report to the Commission.

Hold-separate obligations

9. UTC commits, from the Effective Date until Closing, to procure that the Divestment Programs are kept separate from the businesses that UTC will be retaining and, after closing of the notified transaction to keep the Divestment Programs separate from the business that UTC is retaining and to ensure that unless explicitly permitted under these Commitments: (i) management and staff of the businesses retained by UTC have no involvement in the Divestment Programs, with the exception of providing Administrative Support; (ii) the Key Personnel and Personnel of the Divestment Programs have no involvement in any business retained by UTC . These provisions will not apply to any involvement necessary after the Effective Date by UTC personnel not engaged in the Divestment Programs, in the negotiation and signing of any agreements with […] for additional research in the best interests of the […] Oxygen Program. For the avoidance of doubt, any such agreements shall be considered a contract relating to the Divestment Programs as set out in paragraph 2 of the Schedule.

10. Until Closing, UTC shall assist the Monitoring Trustee in ensuring that the Divestment Programs are managed as distinct and saleable research and development programs separate from the businesses which UTC is retaining. Immediately after the adoption of the Decision, UTC shall appoint a Hold Separate Manager. The Hold Separate Manager, who shall be part of the Key Personnel, shall manage the Divestment Programs independently and in the best interest of the Divestment Programs with a view to ensuring their continued economic viability, marketability and competitiveness and their independence from the businesses retained by UTC, with UTC's Administrative Support where needed. The Hold Separate Manager shall closely cooperate with and report to the Monitoring Trustee and, if applicable, the Divestiture Trustee. Any replacement of the Hold Separate Manager shall be subject to the procedure laid down in paragraph 8(c) of these Commitments. The Commission may, after having heard UTC, require UTC to replace the Hold Separate Manager.

11. [*Intentionally left blank.*]

Ring-fencing

12. UTC shall implement, or procure to implement, all necessary measures to ensure that it does not, after the Effective Date, obtain any Confidential Information relating to the Divestment Programs except to the extent needed and only for the purposes of providing Administrative Support, and that any such Confidential Information obtained by UTC before the Effective Date will be eliminated and not be used by UTC. In particular, the participation of the Divestment Programs in any central information technology network shall be severed to the extent possible, without compromising the viability of the Divestment Programs. UTC may obtain or keep information relating to the Divestment Programs which is reasonably necessary for the divestiture of the Divestment Programs or the disclosure of which to UTC is required by law.

Non-solicitation clause

13. The Parties undertake, subject to customary limitations, not to solicit, and to procure that Affiliated Undertakings do not solicit, the Key Personnel transferred with the Divestment Programs for a period of […] after Closing.

Due diligence

14. In order to enable potential purchasers to carry out a reasonable due diligence of the Divestment Programs, UTC shall, subject to customary confidentiality assurances and dependent on the stage of the divestiture process:
    (a) provide to potential purchasers sufficient information as regards the Divestment Programs;
    (b) provide to potential purchasers sufficient information relating to the Personnel and allow them reasonable access to the Personnel.

Reporting

15. UTC shall submit written reports in English on potential purchasers of the Divestment Programs and developments in the negotiations with such potential purchasers to the Commission and the Monitoring Trustee no later than 10 days after the end of every month following the Effective Date (or otherwise at the Commission's request). UTC shall submit a list of all potential purchasers having expressed interest in acquiring the Divestment Programs to the Commission at each and every stage of the divestiture process, as well as a copy of all the offers made by potential purchasers within five days of their receipt.

16. UTC shall inform the Commission and the Monitoring Trustee on the preparation of the data room documentation and the due diligence procedure and shall submit a copy of any information memorandum to the Commission and the Monitoring Trustee before sending the memorandum out to potential purchasers.

Section D. The Purchaser

17. In order to be approved by the Commission, the Purchaser must fulfil the following criteria:
    (a) The Purchaser shall be independent of and unconnected to the Parties and their Affiliated Undertakings (this being assessed having regard to the situation following the divestiture).
    (b) The Purchaser shall have the financial resources, proven expertise and incentive to maintain and develop the Divestment Programs as a viable and active competitive force in competition with the Parties and other competitors and, in particular, to continue to commit resources as UTC would otherwise have done to progress the Development Programs;
    (c) The acquisition of the Divestment Programs by the Purchaser must neither be likely to create, in light of the information available to the Commission, *prima facie* competition concerns nor give rise to a risk that the implementation of the Commitments will be delayed. In particular, the Purchaser must reasonably be expected to obtain all necessary approvals from the relevant regulatory authorities for the acquisition of the Divestment Programs.

18. The final binding sale and purchase agreement (as well as ancillary agreements) relating to the divestment of the Divestment Programs shall be conditional on the Commission's approval. When UTC has reached an agreement with a purchaser, it shall submit a fully documented and reasoned proposal, including a copy of the final agreement(s), within one week to the Commission and the Monitoring Trustee. UTC must be able to demonstrate to the Commission that the purchaser fulfils the Purchaser Criteria and that the Divestment Programs are being sold in a manner consistent with the Commission's Decision and the Commitments. For the approval, the Commission shall verify that the purchaser fulfils the Purchaser Criteria and that the Divestment Programs are being sold in a manner consistent with the Commitments including their objective to bring about a lasting structural change in the market. The Commission may approve the sale of the Divestment Programs without one or more Assets or parts of the Personnel, or by substituting one or more Assets or parts of the Personnel with one or more different assets or different personnel, if this does not affect the viability and competitiveness of the Divestment Programs after the sale, taking account of the proposed purchaser.

Section E. Trustee

I. Appointment procedure

19. UTC shall appoint a Monitoring Trustee to carry out the functions specified in these Commitments for a Monitoring Trustee. UTC commits not to close the Concentration before the appointment of a Monitoring Trustee.

20. If UTC has not entered into a binding sale and purchase agreement regarding the Divestment Programs one month before the end of the First Divestiture Period or if the Commission has rejected a purchaser proposed by UTC at that time or thereafter, UTC shall appoint a Divestiture Trustee. The appointment of the Divestiture Trustee shall take effect upon the commencement of the Trustee Divestiture Period.

21. The Trustee shall:
    (i) at the time of appointment, be independent of the Parties and their Affiliated Undertakings;
    (ii) possess the necessary qualifications to carry out its mandate, for example have sufficient relevant experience as an investment banker or consultant or auditor; and
    (iii) neither have nor become exposed to a Conflict of Interest.

22. The Trustee shall be remunerated by UTC in a way that does not impede the independent and effective fulfilment of its mandate. In particular, where the remuneration package of a Divestiture Trustee includes a success premium linked to the final sale value of the Divestment Programs, such success premium may only be earned if the divestiture takes place within the Trustee Divestiture Period.

Proposal by UTC

23. No later than two weeks after the Effective Date, UTC shall submit the name or names of one or more natural or legal persons whom UTC proposes to appoint as the Monitoring Trustee to the Commission for approval. No later than one month before the end of the First Divestiture Period or on request by the Commission, UTC shall submit a list of one or more persons whom UTC

proposes to appoint as Divestiture Trustee to the Commission for approval. The proposal shall contain sufficient information for the Commission to verify that the person or persons proposed as Trustee fulfil the requirements set out in paragraph 20 and shall include:

(a) the full terms of the proposed mandate, which shall include all provisions necessary to enable the Trustee to fulfil its duties under these Commitments;

(b) the outline of a work plan which describes how the Trustee intends to carry out its assigned tasks;

(c) an indication whether the proposed Trustee is to act as both Monitoring Trustee and Divestiture Trustee or whether different trustees are proposed for the two functions.

Approval or rejection by the Commission

24. The Commission shall have the discretion to approve or reject the proposed Trustee(s) and to approve the proposed mandate subject to any modifications it deems necessary for the Trustee to fulfil its obligations. If only one name is approved, UTC shall appoint or cause to be appointed the person or persons concerned as Trustee, in accordance with the mandate approved by the Commission. If more than one name is approved, UTC shall be free to choose the Trustee to be appointed from among the names approved. The Trustee shall be appointed within one week of the Commission's approval, in accordance with the mandate approved by the Commission.

New proposal by the UTC

25. If all the proposed Trustees are rejected, UTC shall submit the names of at least two more natural or legal persons within one week of being informed of the rejection, in accordance with paragraphs 18 and 23 of these Commitments.

Trustee nominated by the Commission

26. If all further proposed Trustees are rejected by the Commission, the Commission shall nominate a Trustee, whom UTC shall appoint, or cause to be appointed, in accordance with a trustee mandate approved by the Commission.

II. Functions of the Trustee

27. The Trustee shall assume its specified duties and obligations in order to ensure compliance with the Commitments. The Commission may, on its own initiative or at the request of the Trustee or UTC, give any orders or instructions to the Trustee in order to ensure compliance with the conditions and obligations attached to the Decision.

Duties and obligations of the Monitoring Trustee

28. The Monitoring Trustee shall:

(i) propose in its first report to the Commission a detailed work plan describing how it intends to monitor compliance with the obligations and conditions attached to the Decision.

(ii) oversee, in close co-operation with the Hold Separate Manager, the on-going management of the Divestment Programs with a view to ensuring their continued economic viability, marketability and competitiveness and monitor compliance by UTC with the conditions and obligations attached to the Decision. To that end the Monitoring Trustee shall:

(a) monitor the preservation of the economic viability, marketability and competitiveness of the Divestment Programs, and the keeping separate of the Divestment Programs from the business retained by the Parties, in accordance with paragraphs 8 and 9 of these Commitments;

(b) supervise the management of the Divestment Programs as a distinct and saleable research and development program, in accordance with paragraph 10 of these Commitments;

(c) with respect to Confidential Information:

- determine all necessary measures to ensure that UTC does not after the Effective Date obtain any Confidential Information relating to the Divestment Programs,
- in particular strive for the severing of the Divestment Programs' participation in a central information technology network to the extent possible, without compromising the viability of the Divestment Programs,
- make sure that any Confidential Information relating to the Divestment Programs obtained by UTC before the Effective Date is eliminated and will not be used by UTC and
- decide whether such information may be disclosed to or kept by UTC as the disclosure is reasonably necessary to allow UTC to carry out the divestiture or as the disclosure is required by law;

(d) monitor the splitting of assets and the allocation of Personnel between the Divestment Programs and UTC or Affiliated Undertakings;

(iii) propose to UTC such measures as the Monitoring Trustee considers necessary to ensure UTC's compliance with the conditions and obligations attached to the Decision, in particular the maintenance of the full economic viability, marketability or competitiveness of the Divestment Programs, the holding separate of the Divestment Programs and the non-disclosure of competitively sensitive information;

(iv) review and assess potential purchasers as well as the progress of the divestiture process and verify that, dependent on the stage of the divestiture process:

(a) potential purchasers receive sufficient and correct information relating to the Divestment Programs and the Personnel in particular by reviewing, if available, the data room documentation, the information memorandum and the due diligence process, and

(b) potential purchasers are granted reasonable access to the Personnel;

(v) act as a contact point for any requests by third parties, in particular potential purchasers, in relation to the Commitments;

(vi) provide to the Commission, sending UTC a non-confidential copy at the same time, a written report within 15 days after the end of every month that shall cover the operation and management of the Divestment Programs as well as the splitting of assets and the allocation of Personnel so that the Commission can assess whether the Divestment Programs are held in a manner consistent with the Commitments and the progress of the divestiture process as well as potential purchasers;

(vii) promptly report in writing to the Commission, sending UTC a non-confidential copy at the same time, if it concludes on reasonable grounds that UTC is failing to comply with these Commitments;

(viii) within one week after receipt of the documented proposal referred to in paragraph 17 of these Commitments, submit to the Commission, sending UTC a non-confidential copy at the same time, a reasoned opinion as to the suitability and independence of the proposed purchaser and the viability of the Divestment Programs after the Sale and as to whether the Divestment Programs are sold in a manner consistent with the conditions and obligations attached to the Decision, in particular, if relevant, whether the Sale of the Divestment Programs without one or more Assets or not all of the Personnel affects the viability of the Divestment Programs after the sale, taking account of the proposed purchaser;

(ix) assume the other functions assigned to the Monitoring Trustee under the conditions and obligations attached to the Decision.

29. If the Monitoring and Divestiture Trustee are not the same legal or natural persons, the Monitoring Trustee and the Divestiture Trustee shall cooperate closely with each other during and for the purpose of the preparation of the Trustee Divestiture Period in order to facilitate each other's tasks.

Duties and obligations of the Divestiture Trustee

30. Within the Trustee Divestiture Period, the Divestiture Trustee shall sell at no minimum price the Divestment Programs to a purchaser, provided that the Commission has approved both the purchaser and the final binding sale and purchase agreement (and ancillary agreements) as in line with the Commission's Decision and the Commitments in accordance with paragraphs 17 and 17 of these Commitments. The Divestiture Trustee shall include in the sale and purchase agreement (as well as in any ancillary agreements) such terms and conditions as it considers appropriate for an expedient sale in the Trustee Divestiture Period. In particular, the Divestiture Trustee may

include in the sale and purchase agreement such customary representations and warranties and indemnities as are reasonably required to effect the sale. The Divestiture Trustee shall protect the legitimate financial interests of UTC, subject to UTC's unconditional obligation to divest at no minimum price in the Trustee Divestiture Period.

31. In the Trustee Divestiture Period (or otherwise at the Commission's request), the Divestiture Trustee shall provide the Commission with a comprehensive monthly report written in English on the progress of the divestiture process. Such reports shall be submitted within 15 days after the end of every month with a simultaneous copy to the Monitoring Trustee and a non-confidential copy to UTC.

III. Duties and obligations of the Parties

32. UTC shall provide and shall cause its advisors to provide the Trustee with all such co-operation, assistance and information as the Trustee may reasonably require to perform its tasks. The Trustee shall have full and complete access to any of UTC's or the Divestment Programs' books, records, documents, management or other personnel, facilities, sites and technical information necessary for fulfilling its duties under the Commitments and UTC and the Divestment Programs shall provide the Trustee upon request with copies of any document. UTC and the Divestment Programs shall make available to the Trustee one or more offices on their premises and shall be available for meetings in order to provide the Trustee with all information necessary for the performance of its tasks.

33. UTC shall provide the Monitoring Trustee with all managerial and administrative support that it may reasonably request on behalf of the management of the Divestment Programs. This shall include all administrative support functions relating to the Divestment Programs which are currently carried out at headquarters level. UTC shall provide and shall cause its advisors to provide the Monitoring Trustee, on request, with the information submitted to potential purchasers, in particular give the Monitoring Trustee access to the data room documentation and all other information granted to potential purchasers in the due diligence procedure. UTC shall inform the Monitoring Trustee on possible purchasers, submit lists of potential purchasers at each stage of the selection process, including the offers made by potential purchasers at those stages, and keep the Monitoring Trustee informed of all developments in the divestiture process.

34. UTC shall grant or procure Affiliated Undertakings to grant comprehensive powers of attorney, duly executed, to the Divestiture Trustee to effect the sale (including ancillary agreements), the Closing and all actions and declarations which the Divestiture Trustee considers necessary or appropriate to achieve the sale and the Closing, including the appointment of advisors to assist with the sale process. Upon request of the Divestiture Trustee, UTC shall cause the documents required for effecting the sale and the Closing to be duly executed.

35. UTC shall indemnify the Trustee and its employees and agents (each an "***Indemnified Party***") and hold each Indemnified Party harmless against, and hereby agrees that an Indemnified Party shall have no liability to UTC for, any liabilities arising out of the performance of the Trustee's duties under the Commitments, except to the extent that such liabilities result from the wilful default, recklessness, gross negligence or bad faith of the Trustee, its employees, agents or advisors.

36. At the expense of UTC, the Trustee may appoint advisors (in particular for corporate finance or legal advice), subject to UTC's approval (this approval not to be unreasonably withheld or delayed) if the Trustee considers the appointment of such advisors necessary or appropriate for the performance of its duties and obligations under the Mandate, provided that any fees and other expenses incurred by the Trustee are reasonable. Should UTC refuse to approve the advisors proposed by the Trustee the Commission may approve the appointment of such advisors instead, after having heard UTC. Only the Trustee shall be entitled to issue instructions to the advisors. Paragraph 34 of these Commitments shall apply *mutatis mutandis*. In the Trustee Divestiture Period, the Divestiture Trustee may use advisors who served UTC during the Divestiture Period if the Divestiture Trustee considers this in the best interest of an expedient sale.

37. UTC agrees that the Commission may share Confidential Information proprietary to UTC with the Trustee. The Trustee shall not disclose such information and the principles contained in Article 17 (1) and (2) of the Merger Regulation apply *mutatis mutandis*.

38. UTC agrees that the contact details of the Monitoring Trustee are published on the website of the Commission's Directorate-General for Competition and they shall inform interested third parties, in particular any potential purchasers, of the identity and the tasks of the Monitoring Trustee.

39. For a period of 10 years from the Effective Date the Commission may request all information from the Parties that is reasonably necessary to monitor the effective implementation of these Commitments.

IV. Replacement, discharge and reappointment of the Trustee

40. If the Trustee ceases to perform its functions under the Commitments or for any other good cause, including the exposure of the Trustee to a Conflict of Interest:

(a) the Commission may, after hearing the Trustee and UTC, require UTC to replace the Trustee; or

(b) UTC may, with the prior approval of the Commission, replace the Trustee.

41. If the Trustee is removed according to paragraph 39 of these Commitments, the Trustee may be required to continue in its function until a new Trustee is in place to whom the Trustee has effected a full hand over of all relevant information. The new Trustee shall be appointed in accordance with the procedure referred to in paragraphs 18-25 of these Commitments.

42. Unless removed according to paragraph 39 of these Commitments, the Trustee shall cease to act as Trustee only after the Commission has discharged it from its duties after all the Commitments with which the Trustee has been entrusted have been implemented. However, the Commission may at any time require the reappointment of the Monitoring Trustee if it subsequently appears that the relevant remedies might not have been fully and properly implemented.

Section F. The review clause

43. The Commission may extend the time periods foreseen in the Commitments in response to a request from UTC or, in appropriate cases, on its own initiative. Where UTC requests an extension of a time period, it shall submit a reasoned request to the Commission no later than one month

before the expiry of that period, showing good cause**.** This request shall be accompanied by a report from the Monitoring Trustee, who shall, at the same time send a non-confidential copy of the report to UTC. Only in exceptional circumstances shall UTC be entitled to request an extension within the last month of any period.

44. The Commission may further, in response to a reasoned request from UTC showing good cause waive, modify or substitute, in exceptional circumstances, one or more of the undertakings in these Commitments. This request shall be accompanied by a report from the Monitoring Trustee, who shall, at the same time send a non-confidential copy of the report to UTC. The request shall not have the effect of suspending the application of the undertaking and, in particular, of suspending the expiry of any time period in which the undertaking has to be complied with.

Section G. Entry into force

45. The Commitments shall take effect upon the date of adoption of the Decision.

[Signed]

SCHEDULE

1. The Divestment Programs consist of UTC's activities in the development of aircraft passenger oxygen generation systems, consisting of two R&D programs, the […] Oxygen Program and the […] Oxygen Program. They include all of UTC's oxygen-related assets necessary to continue developmental R&D efforts on the […] Oxygen Program and the […] Oxygen Program.

2. In accordance with paragraph 5 of these Commitments, the Divestment Programs comprise:

(a) All intangible assets owned by UTC or Affiliated Undertakings at the Effective Date, including all UTC's rights in intellectual property, research data generated in the course of business, patents, invention disclosures, research results, and know-how, necessary to continue R&D efforts on the […] Oxygen Program and the […] Oxygen Program. In particular, UTC's intangible assets to be transferred include all patents and patent applications listed in **Confidential Annex – Oxygen – 4**.

(b) All research and development contracts relating to the Divestment Programs and necessary to continue R&D efforts on the […] Oxygen Program and the […] Oxygen Program, entered into by UTC prior to Closing. In particular, UTC will make best efforts to either assign any existing contracts with the partner universities involved in the […] Oxygen Program (including the […] identified in **Confidential Annex – Oxygen – 2**), and the […] Oxygen Program (including the agreement with […] identified in **Confidential Annex – Oxygen – 3.3**) to the Purchaser, as well as any future agreements with […] for additional oxygen-related research, or alternatively and at the Purchaser's discretion, will make best efforts to terminate any existing contracts with the universities, as well as any new agreements with […], so as to provide the Purchaser with the ability to enter into new contracts with the partner universities or carry out the research concerning the […] Oxygen Program and […] Oxygen Program alone or with partners of its own choosing;

(c) The following Personnel and Key Personnel: the Divestment Programs' […].

3. The Divestment Programs shall not include:

(a) Any intangible assets owned by UTC that are used either exclusively or predominantly for activities other than those related to, and that are not necessary for the viability and competitiveness of, the […] Oxygen Program or the […] Oxygen Program.

(b) The employees who currently provide limited general engineering and project support to the Divestment Programs, or management oversight, and reflect the general non-specialized expertise that any qualified aerospace Purchaser would have and will not be transferred.

(c) Certain UTC employees assisting with the negotiation and signing of any agreements with […] for additional research in the […] Oxygen Program.

(d) Certain commercially available engineering software owned or licensed by UTC and used to analyse data generated by the Divestment Programs.

4. If there is any asset or personnel which is not covered by paragraph 2 of this Schedule but which is both used (exclusively or not) in the Divestment Programs and necessary for the continued viability and competitiveness of the Divestment Programs, that asset or adequate substitute will be offered to potential purchasers.

* * *

Annexes: [Details of UTC's R&D programs]