EUROPEAN COMMISSION

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C(2020) 1718 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 Where possible the information omitted has been replaced by ranges of figures or a general description.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.9434 – UTC/Raytheon**
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]

Dear Sir or Madam,

(1) On 24 January 2020, the European Commission received notification of a concentration pursuant to Article 4 of the Merger Regulation resulting from a proposed transaction whereby United Technologies Corporation ("UTC", USA) intends to acquire control, within the meaning of Article 3(1)(b) of the Merger Regulation, of the whole of Raytheon Company ("Raytheon", USA).[3] UTC is referred to hereinafter as the "Notifying Party" and together with Raytheon as the "Parties". The undertaking that would result from the proposed transaction is referred to as "the merged entity".

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').

3 Publication in the Official Journal of the European Union No C 32, 31.1.2020, p. 19.

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

(2) **UTC** supplies products and services for the building systems and aerospace industries. In the aerospace industry, via its subsidiary Collins Aerospace Systems (USA), UTC supplies aerospace products and aftermarket service solutions for aircraft manufacturers and operators mainly in the commercial sector but also for integration into military aircraft. Furthermore, via its subsidiary Pratt & Whitney (USA), UTC supplies aircraft engines for the commercial, military, business jet, and general aviation industries, as well as fleet management services and aftermarket maintenance, repair, and overhaul services. UTC also produces, sells, and services auxiliary power units for military and commercial aircraft.

(3) By way of context, UTC currently comprises Otis Elevator Company, Carrier, Pratt & Whitney and Collins Aerospace Systems. Before closing the proposed acquisition of Raytheon, UTC has announced its intention to spin off its Otis and Carrier business units into standalone, publicly traded companies. It will then combine the remainder of UTC (consisting of UTC's aerospace businesses Pratt & Whitney and Collins Aerospace Systems) with Raytheon.

(4) **Raytheon** is a defence contractor that supplies defence, civil government and cybersecurity solutions with a core focus on missiles and air defence systems, radars and electronic warfare.

2. THE CONCENTRATION

(5) On 9 June 2019, the Parties entered into a binding agreement setting out the terms of the acquisition by UTC of sole control over Raytheon (hereinafter the "Transaction" or the "Concentration"). The Transaction is structured as a merger of a subsidiary of UTC with Raytheon. In consideration for their existing shareholdings, Raytheon shareholders will receive 2.3348 shares in the merged entity for each Raytheon share they hold. Consequently, following the Transaction, UTC shareowners will own approximately 57% of the merged entity, while Raytheon shareowners will own approximately 43%.

(6) Prior to the Transaction, no shareholder holds an interest in any of the Parties' issued share capital that is sufficient to confer control within the meaning of Article 3 of the Merger Regulation.

(7) It follows that the Transaction would result in a concentration within the meaning of Article 3(1)(b) of the Merger Regulation.

3. UNION DIMENSION

(8) The Parties have a combined aggregate worldwide turnover of more than EUR 5 000 million (UTC: EUR 53 377.1 million, Raytheon: EUR 22 951 million).[4] Each of them has a Union-wide turnover in excess of EUR 250 million (UTC: EUR […] million, Raytheon: EUR […] million), but each of them does not achieve more than

[4] Turnover calculated in accordance with Article 5(1) of the Merger Regulation and the Commission Consolidated Jurisdictional Notice (OJ C95, 16.4.2008, p. 1).

two-thirds of its aggregate Union-wide turnover within one and the same Member State. The Concentration therefore has a Union dimension pursuant to Article 1(2) of the Merger Regulation.

4. INTRODUCTION TO THE MILITARY AEROSPACE INDUSTRY

(9) The Transaction brings together UTC's and Raytheon's production and supply of systems and components for military airborne platforms, in particular for military aircrafts and precision-guided munities ("PGMs"). Military aircrafts comprise aircrafts designed for military activities, be it combat aircrafts or non-combat aircrafts – i.e. designed for search and rescue, reconnaissance, transport, observation and training. For the purpose of the merger control assessment of the Transaction, this section introduces the Commission's understanding of the basic features of the military aerospace industry.

4.1. Supply chain in the military aerospace industry

(10) The supply chain in the aerospace industry mainly comprises tier suppliers: Tier-1 suppliers, Tier-2 suppliers (and Tier-3 suppliers as the case may be) and aircraft and helicopter manufacturers (referred to as original equipment manufacturers or "OEMs"). 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 for integration into the systems/equipment by either the Tier-1 supplier or the OEM.

(11) Systems and equipment for military aircrafts are purchased by the OEMs or by armed forces and ministries of defence depending on the equipment or system in question. Helicopter/military aircraft OEMs carry out the integration of main systems and equipment in both cases.

4.2. Procurement of US military aerospace equipment

(12) Due to the lower volumes of military aircraft (compared to commercial aircraft) and the complexity of their integrated systems, the procurement process for equipment and systems for military aircraft requires close cooperation between the relevant OEM, system suppliers and the national procurement authorities acting on behalf of the end-users.

(13) The Parties produce military equipment in the US that is ultimately acquired by the US Department of Defence ("US DoD") and armed forces of EEA countries and other allied countries.

(14) The production of military systems and components in the US is driven by the requirements of the US government and its annual defence budget. The US DoD plans the development of new platforms, defines product specifications, funds development, and manages suppliers. Manufacturers then compete to persuade the US DoD and OEMs that they should select them to develop and supply products for these opportunities.

(15) After developing their defence products in the US, suppliers also market them in US allied countries, including in the EEA. These sales to countries in the EEA largely

take place through the US Foreign Military Sales ("FMS") program and to a limited extent through direct commercial sales ("DCS").[5]

(16) The US FMS program is a program administered by the US Defence Security Cooperation Agency ("DSCA")[6] for transferring defence articles, services, and training to US allied countries and international organizations. The US FMS program is funded by administrative charges levied on foreign purchasers.

(17) Under the FMS program, the DSCA serves as an intermediary (usually handling procurement, logistics, and delivery and providing product support and training) between foreign customers and US defence contractors. This framework provides several advantages to foreign customers in US allied countries, such as, *inter alia*, the US DoD's procurement infrastructure and purchasing practices and greater economies of scale (although it includes administrative charges). The US FMS program uses a total package approach for its contracts, which means that they include training, spare parts, and other support needed to sustain a system through its first few years.[7]

(18) Besides administrative charges, purchases via the US FMS program may include nonrecurring costs, which are those one-time costs incurred by the US government in support of research, development, or production of certain major defence equipment. The US DoD may waive nonrecurring costs to allied countries if (i) the sale would significantly advance US government's interests in standardization with allied armed forces, (ii) the imposition of the charge likely would result in the loss of the sale; or (iii) the increase in quantity resulting from the sale would result in a reduced unit cost for the same item being procured by the US government.

(19) US allied countries, including in the EEA, can also acquire military equipment from US defence manufacturers via DCS.

(20) Cost comparisons between FMS and DCS are often not possible as, if a purchaser requests US FMS data after soliciting bids from contractors, the purchaser must demonstrate that commercial acquisition efforts have ceased before any US FMS data is provided. If the purchaser obtains FMS data and later determines to request a commercial price quote, the FMS offer may be withdrawn. DCS purchasing agreements may or may not include training, spare parts, and general support.

(21) Military equipment produced in the US is subject to International Traffic in Arms Regulations ("ITAR") and Export Administration Regulations ("EAR") and can only be exported to the EEA subject to relevant US legislation and/or authorization.

5. PRODUCT MARKET DEFINITION

(22) The Transaction brings together UTC's aerospace businesses, which include commercial and military aero engines and aircraft systems, and Raytheon's defence business, which focuses on missiles and missile systems, electronic warfare, and other defence systems.

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5 Questionnaire to European (EEA) armed forces Q2, question 10.

6 The DSCA administers the US FMS program for the US DoD.

7 https://www.dsca.mil/resources/faq

(23) Both Parties are active in the production and supply of systems and components for military aircraft platforms. Although their respective product portfolio is largely complementary, there are some horizontal overlaps between the Parties' activities. Those horizontal overlaps lie in the supply of military global navigation satellite systems ("GNSS") receivers, military airborne communications systems (voice and data) and electro-optical/infrared (EO/IR) sensors for military aircraft platforms.

(24) The Transaction also gives rise to some vertical links because of UTC's supply of components for PGMs manufactured by Raytheon and rival suppliers. Those vertical links involve primarily the supply of GNSS receivers, actuation systems, inertial measurement units ("IMUs") and propulsion systems for PGMs.

(25) According to the Notifying Party, there are no overlaps between UTC's commercial aerospace products and Raytheon's activities.

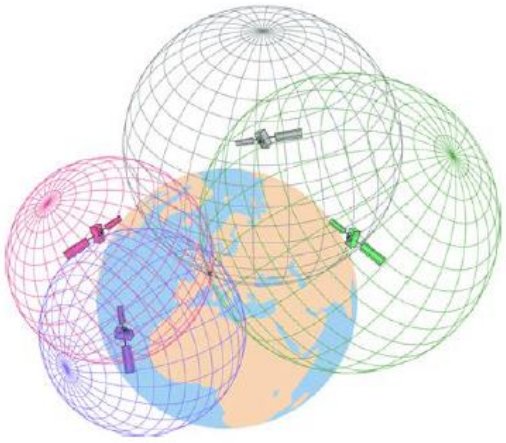
(26) The present section examines product market definition for all products in relation to which the Parties' activities overlap horizontally, are vertically related or could potentially be regarded as complementary to one another.

5.1. GNSS receivers

5.1.1. Introduction

(27) GNSS serve to determine position and follow a route. GNSS have three components: (1) constellations of satellites orbiting the earth, (2) ground control systems managing the satellites and (3) equipment that receives and processes GNSS signals (GNSS receivers). All GNSS receivers calculate their location by measuring the distance between their position and four or more satellites.

Figure 1: GNSS constellation of satellites



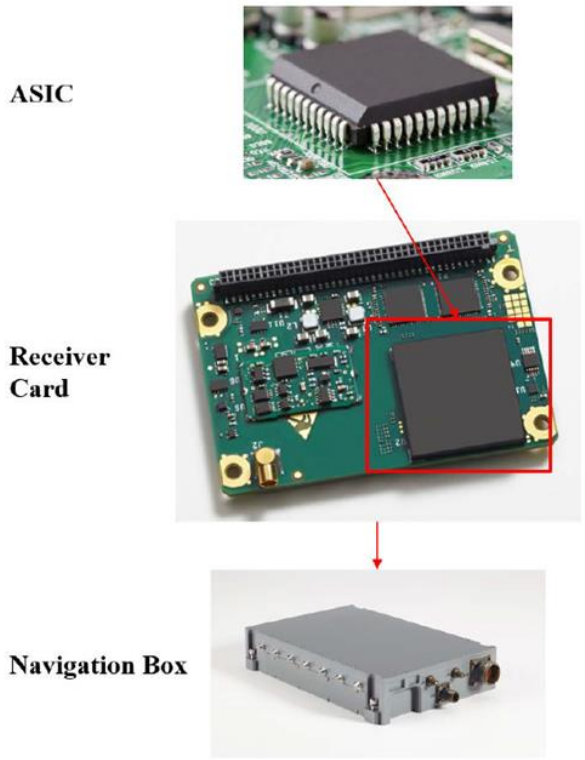
Source: Form CO, Chapter D, para 11.

(28) GNSS receivers interact with satellites and calculate their position through an Application-Specific Integrated Circuit ("ASIC"), which is a semiconductor chip that receives, digitizes, and processes GNSS signals and shares the data with other systems (e.g., avionics). ASICs used in military GNSS receivers also incorporate cryptographic processing capabilities to decode encrypted signals.

(29) The ASIC is incorporated into a receiver card, which includes ancillary hardware and software (e.g., storage, memory, and a basic operating system). GNSS receiver

cards can be sold as standalone products or incorporated into other systems (e.g., missile guidance) or in boxes, which are then mounted on a platform like an airframe. These boxes house the receiver card and related components (e.g., an inertial measurement unit).

Figure 2: ASIC, receiver card and navigation box



Source: Form CO, Chapter D, para 14.

(30) GNSS can operate signals that are openly available to anyone (typically used for civil purposes) and encrypted signals that can only be accessed with governmental consent (typically used for military or security-related purposes). Armed forces use military GNSS receivers to decrypt secured GNSS signals. Anti-jamming, which counters interference with GNSS signals, is not a component of GNSS receivers but is an ancillary capability typically included alongside a military GNSS receiver.

(31) The first GNSS system was the Global Positioning System ("GPS"), which was developed by the US government in the 1970s. Other countries have since developed similar systems, including the EU Galileo system.[8] Both the US GPS and EU Galileo systems operate both signals openly available to anyone and encrypted signals.

(32) GPS receivers can use different ranging signals. These include (i) C/A-code, an unencrypted civil signal used by the vast majority of civilian GPS applications (e.g., mobile phones and passenger vehicles); (ii) P(Y)-code, an encrypted signal used for government applications, e.g., missile and aircraft guidance, ground vehicles, handheld devices, and as a source of precision timing information for a

8 Further GNSS systems are the Russian GLONASS and Chinese BeiDou systems. India and Japan operate smaller constellations (NAVIC and QZSS) with regional coverage.

variety of applications; and (iii) military code ("M-code"), an encrypted GPS signal for military use that is currently under development.

(33) The US DoD has awarded funding to UTC, L3Harris, Raytheon and Trimble to develop M-code GPS receivers. According to the Notifying Party,[9] all GPS equipment purchased by the US DoD after 2017 must be M-code compatible by law. However, as this would not yet be feasible, the US DoD has issued individual waivers permitting continued use of P(Y)-code GPS receivers. The Notifying Party expects that an exhaustive transition to M-code will take approximately 10-15 years.[10]

(34) The authorization of the US DoD is required to manufacture, sell, and use P(Y)-code or M-code receivers. Such authorization covers the entire receiver, not just the ASIC.

(35) The EU Galileo system is a GNSS developed by the European Union and operated by the European GNSS Agency and European Space Agency. Although it already enjoys widespread adoption in the mobile, automotive, marine, search-and-rescue, and industrial sectors, it is only scheduled to reach full operational capacity in 2020 with 30 satellites.[11]

(36) Member States and the Commission, Council, and European External Action Service may authorize companies established in the EU to manufacture Galileo PRS receivers. Non-EU countries may also be authorized to produce Galileo PRS receivers under bilateral agreements. The Parties understand that EU companies with access to the Galileo PRS signal currently include, at a minimum, GMV (Spain), Leonardo (Italy), QinetiQ (UK), Siemens (Germany), and Thales (France).[12]

5.1.2. The Notifying Party's view

(37) The Notifying Party submits that civilian and military GNSS receivers likely constitute distinct markets and that it is appropriate to define a relevant product market for the supply of military GNSS receivers without further segmentation.[13]

(38) First, according to the Notifying Party, while civilian GNSS receivers are manufactured by a wide range of suppliers for applications available to the public (e.g., handheld devices, sports watches, and passenger vehicles), both the manufacture and purchase of military GNSS receivers require authorization from national authorities (e.g., the U.S. DoD for GPS and EU Member States and institutions for Galileo). Once that authorization is granted, it would generally be possible for a civilian GNSS receiver supplier to start producing military receivers. Nevertheless, the Notifying Party submits that the additional needs of military users and the need for manufacturers to obtain governmental authorization likely provide sufficient supply- and demand-side differentiation to warrant a distinction for purposes of product market definition.[14]

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9 Form CO, Chapter D, para. 21.
10 Form CO, Chapter D, para. 21.
11 Form CO, Chapter D, para. 23.
12 Form CO, Chapter D, para. 26.
13 Form CO, Chapter D, para. 34.
14 Form CO, Chapter D, paras. 35-36.

(39) Second, the Notifying Party argues that there is no need to segment the supply of GNSS receivers based by military application.[15] From a demand-side perspective, UTC argues that the same GNSS receiver card can typically be used in a variety of platforms. On the supply side, UTC submits that suppliers of military GNSS receivers for one platform could start producing receivers for another, provided they have the necessary US DoD authorization.

(40) Finally, according to the Notifying Party, the GPS and the EU Galileo systems (once it is fully operational) are substitutes.[16]

5.1.3. The Commission's precedents

(41) In the past, the Commission has identified an overall market for GPS receivers but has ultimately left open the question of whether the market should be further segmented by product type (type of mission and class of reliability) or by final customer (military, commercial or institutional).[17]

5.1.4. The Commission's assessment

(42) From a demand side perspective, according to the results of the market investigation, most market participants consider that civilian and military GNSS receivers constitute separate product markets due to limited substitutability for customers in terms of, e.g., product characteristics, applications and prices.[18] One respondent to the market investigation indicated that '*[m]ilitary receivers utilize a different signal and have technical features that ordinary, civilian receivers do not include, such as enhanced security to prevent disruption of signals*'.[19]

(43) From the point of view of suppliers, the results of the market investigation have revealed that the production of civilian and military GNSS receivers entail significantly different technical features, expertise and costs.[20] This is irrespective of the fact that the manufacture and supply of military GNSS receivers requires authorisation from relevant national authorities. One market participant indicated that '*in terms of technical features, the military receivers are more complex and require much more expertise and costs*'.[21] In line with this, another respondent to the market investigation indicated that '*the product complexity is far higher for a military GNSS receiver, due to cyber constraints and cyber certification*'.[22]

(44) Respondents to the market investigation indicated that, for assessing the relevant competitive dynamics, it may be appropriate to consider further segmentations of military GNSS receivers by military application (i.e. by platform).[23] In particular, the results of the market investigation suggest that the strengths and market position of

15 Form CO, Chapter D, para. 37.
16 Form CO, Chapter D, para 38.
17 Case M.3680 – *Alcatel/Finmeccanica/Alcatel Alenia Space & Telespazio*.
18 Questionnaire to suppliers of military equipment Q1, question 98.
19 Questionnaire to suppliers of military equipment Q1, question 98.1.
20 Questionnaire to suppliers of military equipment Q1, question 99.
21 Questionnaire to suppliers of military equipment Q1, question 99.1.
22 Questionnaire to suppliers of military equipment Q1, question 99.1.
23 Questionnaire to suppliers of military equipment Q1, question 100.

the different suppliers of GPS receivers may vary for ground equipment, aviation, maritime equipment, PGMs and handheld applications, respectively.[24]

(45) In turn, the results of the market investigation are not conclusive on the demand and supply-side substitutability between Galileo PRS receivers and P(Y)-code and M-code GPS receivers. Some respondents indicated that with the introduction of the Galileo PRS receivers, the situation has shifted from single mode receivers to dual mode receivers integrating multi-constellation capabilities. Accordingly, Galileo PRS receivers appear to be perceived as a complementary constellation to GPS receivers rather than a substitute.[25] However, although the Galileo PRS signal should be operational as of 2020, the final operational capabilities (e.g., the infrastructure dedicated to maintenance the signal) will be delayed.[26] Furthermore, military Galileo PRS receivers have not yet been fielded.

(46) Based on the assessment laid down in paragraphs (42) to (45), the Commission considers it appropriate to define a separate product market for military GPS receivers. The Commission will in addition factor into its assessment a possible differentiation in the production and supply of military GPS receivers by type of application/platform.

5.2. Military communication systems

5.2.1. Introduction

(47) Communication systems are devices used for the transmission of information for military or civil purposes. While civil and military communication systems share some basics features, military communication systems require specific features necessary to ensure reliability in the demanding environments of battlespace. These include anti-jamming, anti-spoofing, multi-band, multi-channel, encryption capabilities and resilience under arduous climate and transport conditions. Military communication systems include military (air and ground) radios, data links and satellite communication systems (SATCOMs).

(48) Military airborne radios provide secure air-to-air and air-to-ground connectivity to support voice and data communications, therefore enabling an aircraft to communicate with other (air or ground) platforms. Depending on the operational requirements of an aircraft, military airborne radios will operate in the high frequency (HF), very high frequency (VHF) or ultra-high frequency band (UHF).

(49) HF radios enable single-channel communication at frequencies up to 30 MHz and provide beyond line-of-sight communications (they are typically used by armed forces for communications over great distances, such as cross-continental communication). VHF/UHF radios enable single-channel communication at frequencies between 30 MHz and 1000 MHz and can only support line-of-sight communication (they are typically used at distances up to hundreds of kilometres). VHF/UHF radios can incorporate narrowband SATCOM functionality, which allows for beyond line-of-sight communications.

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24 Questionnaire to suppliers of military equipment Q1, question 100.1.

25 Questionnaire to suppliers of military equipment Q1, question 101.1.

26 Questionnaire to suppliers of military equipment Q1, question 101.2.

Figure 3: HF military airborne radio



Source: Form CO, Chapter C, para 11.

Figure 4: VHF/UHF military airborne radio



Source: Form CO, Chapter C, para 11.

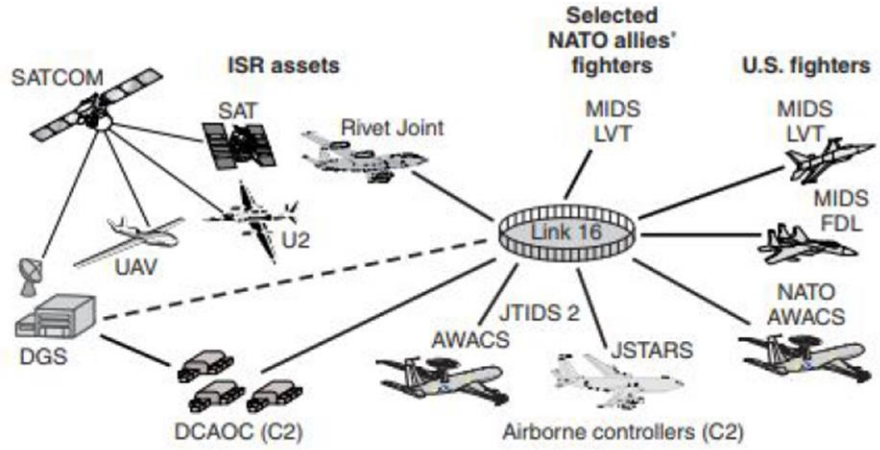
(50) Military ground radios enable secure ground-to-ground and ground-to-air communications. Since they usually need to communicate with airborne radios, ground radios generally operate at the same frequency bands as airborne radios (HF or VHF/UHF) and may as well feature narrowband SATCOM capabilities. Depending on the frequency band and other technical characteristics, ground radios allow data, image, voice and video communication. They can be fixed (typically at a military or government building) or deployable. Deployable ground radios can be used in land vehicles or carried by a soldier (in the hand or in the back).

(51) Military data links provide secure air-to-air, air-to-ground and ground-to-ground communications. While radios are primarily used for voice communications, the main purpose of data links is to transfer data, even though they can also transfer voice. Moreover, while radios allow only for point-to-point communications, data links devices enable communications between multiple points simultaneously. Finally, data links have higher bandwidth than radios. There are two types of data links: situational awareness ("SA") data links, which use radio waves to create a "picture" of where assets and targets are in the battlespace; and intelligence, surveillance and reconnaissance ("ISR") data links, which provide connectivity to offload large amounts of intelligence information from platforms such as aircraft carrying cameras.

(52) Different data links communicate using different protocols generally designed and implemented by governments. The main military data links protocols are Link 11, Link 22, Link 16, Situational Awareness Data Link ("SADL") and Enhanced Position Location Reporting System ("EPLRS"). To enable interoperability between

armed forces, protocols are sometimes defined at a military alliance level. NATO countries, for example, use the Link 16 data link network.

Figure 5: NATO Link 16 data link architecture



Source: Form CO, Chapter C, para 17.

(53) Military platforms may also use commercial data link products and related network services when operating in commercial airspace or other. The main commercial data links networks are ARINC[27] and SITA. Both networks use the traditional, low-bandwidth Aircraft Communications Addressing and Reporting System ("ACARS") protocol, first deployed in 1978.

(54) Military SATCOMs relay their radio signals via satellite, enabling secure communications between two locations at significant distances, including beyond line-of-sight communications. They can be narrowband, wideband or protected. narrowband SATCOMs operate in the UHF frequency. Wideband SATCOMs operate in frequencies higher than UHF and are used to transfer large amounts of data. Protected SATCOMs offer additional levels of resistance to interference.

5.2.2. The Notifying Party's view

(55) First, the Notifying Party submits that civilian and military communication systems are not substitutable and likely constitute distinct markets. According to the Notifying Party, military customers require distinct features (e.g., anti-jamming, anti-spoofing, multi-band, multi-channel, encryption capabilities, and resilience under arduous climate or transport conditions) which requires manufacturers to make significant investments in engineering, which applies equally across radios and data links.[28]

(56) Second, with regard to military airborne radios in particular, the Notifying Party argues that military airborne and ground radios may be distinct markets, although there is significant supply-side substitutability. In this regard, according to the Notifying Party, there are significant demand-side differences between airborne and ground radios, given the conditions in which they operate (e.g., vibration and

27 UTC owns and operates the ARINC network. However, SAE International stewards the ARINC standards, which are a set of communications standards for avionics, wiring, and other aircraft electronics.

28 Form CO, Chapter C, para. 67.

temperature ranges). That said, the Notifying Party argues that companies that currently manufacture military ground radios can switch production to manufacture military airborne radios, given the similarity of the fundamental radio technology and design, and vice versa.[29]

(57) Third, according to the Notifying Party, there is no need to segment radios by frequency (i.e. HF, VHF/UHF) because although HF and VHF/UHF radios are not perfect substitutes from the demand-side due to their different operational functionalities, the addition of narrowband SATCOM functionality to VHF/UHF radios enables beyond line-of-sight communications similar to that of HF radios. In addition, the Notifying Party argues that HF and VHF/UHF radios are highly substitutable from a supply-side perspective as current manufacturers of HF radios would able to produce VHF/UHF radio without any significant increase in cost or change of expertise, and vice versa.[30]

(58) Lastly, the Notifying Party submits that data links (i.e., SA and ISR data links) may comprise a distinct market, though data link functionality is increasingly incorporated into airborne radios – and there is increasing technological convergence between radios and data links.[31]

5.2.3. The Commission's precedents

(59) In M.3735 – *Finmeccanica/AMS*, the Commission identified different segments within military communication systems depending on the functionality, the platform (ground, air, sea) and the force for which they are intended.[32] In that case, the Commission distinguished between (i) military ground communications systems and (ii) military naval information and communication systems, while leaving open the exact market definition and the potential need for further segmentation.

5.2.4. The Commission's assessment

(60) From a demand-side perspective, according to the results of the market investigation, most market participants consider that military airborne radios and military ground radios constitute separate product markets due to limited substitutability for customers in terms of, e.g., product characteristics, applications and prices.[33] As a market participant explained, '*[m]ilitary airborne radios and military ground radios have different requirements to suit different environmental conditions (e.g. vibration, temperature and atmospheric pressure etc.) and differ in size, and weight*'.[34] Another market participant indicated that '*requirements of airborne and ground radios are different enough that there is almost no overlap in utilization*'.[35]

(61) From a supply-side perspective, the market investigation has revealed that most market participants consider that the production of military airborne radios and the production of military ground radios entail significantly different technical features,

29 Form CO, Chapter C, paras. 68-70.
30 Form CO, Chapter C, paras.72-74.
31 Form CO, Chapter C, para. 75.
32 See case M.3735 – *Finmeccanica/AMS*, paras. 12-15.
33 Questionnaire to suppliers of military equipment Q1, question 35.
34 Questionnaire to suppliers of military equipment Q1, question 35.1.
35 Questionnaire to suppliers of military equipment Q1, question 35.1.

expertise and costs.[36] One market participant explained that '*[a]lthough the basic technology (i.e. software defined radios) can be the same for both airborne and ground radios, that notwithstanding the main steps for the development, production and, even more, certification are different, with direct consequences on the required expertize and the final cost of the equipment*'.[37] Another market participant indicated that '[i]*t is often very difficult to use systems that were designed for ground use in an airborne environment*' and '*[t]his is because the control, integration with other avionic systems, environmental, size, weight and power of the systems for the different environments can differ significantly and are not easy to adapt*'.[38]

(62) Respondents to the market investigation indicated that, for assessing the relevant competitive dynamics, it may be appropriate to consider further segmentations of military airborne radios by frequency band between HF and VHF/UHF.[39] In turn, the market investigation has revealed that military HF and VHF/UHF radios have different characteristics and applications, irrespective of whether VHF/UHF radios include narrowband SATCOM capabilities.[40] The results of the market investigation are however not conclusive as to whether, from the point of view of the suppliers, the production of military radios of different frequency bands (e.g. HF, VHF/UHF) entail significantly different technical features, expertise and costs. However, at least one market participant indicated that '*[t]he production of every new airborne radio requires major investments in terms of production and test equipment on modul- and radio level, e.g. coating procedures, soldering and quality adjustments*' and '*[s]ame for new ground based radios*'.[41]

(63) With regard to military ground radios, the results of the market investigation show that most market participants consider that fixed and deployable ground radios constitute separate product markets due to limited substitutability for customers.[42] The results of the market investigation are however not conclusive as to whether, from the point of view of suppliers, the production of fixed and deployable military ground radios entail significantly different technical features, expertise and costs. The results of the market investigation are similarly not conclusive as to whether further segmentations within deployable ground radios should be considered.

(64) With regard to military data links, the market investigation has revealed that most market participants consider that, from both demand and supply side perspectives, it is appropriate to consider that military radios and data links constitute separate product markets.[43] One market participant has explained that, '*[r]adios are largely narrow band and low data rate, whereas data links can be very wide band, high bandwidth, and specialized to handle advanced network topologies and data routing*' and '*[d]ata links are therefore different products and are not substitutable with radios*'.[44] Within data links, the results of the market investigation are however

36 Questionnaire to suppliers of military equipment Q1, question 36.
37 Questionnaire to suppliers of military equipment Q1, question 35.1.
38 Questionnaire to suppliers of military equipment Q1, question 36.1.
39 Questionnaire to suppliers of military equipment Q1, question 38.
40 Questionnaire to suppliers of military equipment Q1, questions 38.1 and 39.
41 Questionnaire to suppliers of military equipment Q1, question 40.1.
42 Questionnaire to suppliers of military equipment Q1, question 41.
43 Questionnaire to suppliers of military equipment Q1, question 46.
44 Questionnaire to suppliers of military equipment Q1, question 46.1.

not conclusive as to whether further segmentations of the market between SA and ISR data links are appropriate.

(65) As to SATCOMs, most respondents to the market investigation indicated that it is appropriate to consider that SATCOMs constitute a separate product market from other military airborne communications systems (i.e. military radios and data links) due to limited substitutability for customers and suppliers.[45] Within SATCOMs, most respondents consider that, from a demand side perspective, further segmentations between (i) narrowband SATCOMs, (ii) wideband SATCOMs and (iii) protected SATCOMs are should be considered due to limited substitutability for customers.[46] However, the results of the market investigation are not conclusive as to whether, from the supply side perspective, the market for the supply of SATCOMs should be further segmented.

(66) Based on the assessment laid down in paragraphs (60) to (65), the Commission considers it appropriate to define separate product markets for the production and supply of, respectively, military airborne radios, military ground radios, military data links and SATCOMs. The Commission concludes that, for the purposes of the present Decision, no further segmentation of said markets is necessary, as the conclusion would remain the same, though a possible differentiation of military airborne radios by frequency band will be taken into account in the competitive assessment.

5.3. EO/IR sensors

5.3.1. Introduction

(67) Electro-optical and infra-red sensors ("EO/IR sensors") are devices that convert light, changes thereof, or changes of its infrared radiation, into an electrical signal. These devices are installed on certain equipment used by military forces, law enforcement personnel, and other government and industry operators and allow users to identify and track objects, conduct threat assessments, assess intent, and, in some cases, provide laser targeting for guided precision munitions.

(68) EO/IR sensors working principle is based on measuring the light that is reflected by an object or, in the absence of light, on measuring the infrared radiation emitted by a heated object (such as a building, an engines, a person, or an animal).

(69) EO/IR sensors can be classified according to different criteria. The most common ways to classify them is according to their technical characteristics and to the intended use.

(70) From a technical characteristic point of view, EO/IR sensors can be classified according to their range of use, i.e. according to the distance within which an object can be detected by the sensor. In this respect, EO/IR sensors can be classified as low-, mid- and long-range.

(71) From an end-use point of view, EO/IR sensors can be classified according to the intended mission of the aircraft where they are installed. In this respect, EO/IR

45 Questionnaire to suppliers of military equipment Q1, questions 53 and 54.

46 Questionnaire to suppliers of military equipment Q1, question 55.

sensors can be classified as for targeting, for reconnaissance and for surveillance missions. While the objective of a targeting mission is to detect, identify, and track a certain target in sufficient detail in order to, for example, permit the effective delivery of a guided munition, a surveillance mission involves the persistent and systematic observation of an already known and usually static point of interest for an extended period of time. Compared to a surveillance mission, a reconnaissance mission involves broader intelligence gathering, covering multiple points of interest in a limited period of time.[47]

(72) In terms of integration into an aircraft, EO/IR sensors can be podded on or embedded in the aircraft. For illustration purposes, Figure 6 shows two different EO/IR sensors podded in the Dassault's jet fighter named Rafale.

Figure 6: Dassault's Rafale jet fighter carrying a podded EO/IR sensor for reconnaissance (left) and a podded EO/IR sensor for targeting (right)



Source: Form CO, Chapter B, figure 1.

5.3.2. The Notifying Party's view

(73) According to the Notifying Party, EO/IR sensors of long-, mid-, and short-range should be considered as separate product markets, due to limited demand- and supply-side substitutability.[48]

(74) From a demand-side view point, the Notifying Party argues that customers cannot substitute sensors of different ranges because: (i) EO/IR sensors of different ranges are not substitutable for the same application; (ii) EO/IR sensors of different ranges generally are not mounted on the same types of platform; (iii) EO/IR sensors of different ranges are procured by distinct customer groups because long-range EO/IR sensors tend to be purchased by the final customer, whereas short- and mid-range EO/IR sensors are typically purchased by OEMs. The Notifying Party also claims that the strong price difference between short-, medium- and long-range EO/IR sensors is an indication of the lack of demand-side substitutability.

(75) From a supply-side view point, the Notifying Party considers that no substitutability between long-, mid-, and short-range sensors exist because: (i) EO/IR sensors of

47 Form CO, Chapter B, para. 8.

48 Form CO, Chapter B, paras. 34-62.

different ranges require different production processes and technologies and are typically manufactured in different production lines; (ii) suppliers active in one category of EO/IR sensors cannot easily enter other segments because they would require to develop new technologies, to procure different materials, to establish new production facilities and to develop commercial relationships with different customer groups. According to the Notifying Party, the lack of supply-side substitutability is confirmed by the fact that most manufacturers of short-range EO/IR sensors are not active in mid- or long-range EO/IR sensors.

(76) The Notifying Party considers that a market segmentation by applications, as for example, by targeting, reconnaissance and surveillance missions, would not be appropriate because it would include entirely different products in the same category (without reflecting differences in size, weight, range, coverage, and, ultimately, their prices).[49]

(77) With respect to a possible distinction between podded and integrated EO/IR sensors, the Notifying Party considers that these two types of EO/IR sensors do not belong to separate product markets because they have the same capabilities and applications and often compete with each other.[50]

5.3.3. The Commission's precedents

(78) In a previous decision,[51] the Commission considered electro-optic systems as "*active or passive systems used in military applications such as targeting, fire control or surveillance*". Due to limited supply-side substitutability, and a lack of demand-side substitutability, the Commission considered electro-optic systems as distinct markets "*as they are conceived, designed and manufactured according to the very specific requirements of the applications they serve*".

(79) With respect to possible segmentations of EO/IR sensors, in a more recent decision,[52] the Commission considered that the supply and demand landscapes are not necessarily the same for all EO/IR products, and therefore the segment of "sights" where a vertical relationship arose from that transaction, may constitute a distinct relevant market separate from other optronics equipment. Ultimately, the Commission left the market definition open because no competition concerns arose irrespective of the exact product market definition.

5.3.4. The Commission's assessment

(80) The market investigation indicates that the Notifying Party's proposed product market segmentation by range of EO/IR sensors, that is to say EO/IR sensors with short-, mid-, and long-range, reflects market conditions in terms of, for example, product characteristics, applications and prices. However, alternative market segmentations have also been suggested by respondents to the market investigation. In any event, as explained below, the exact product market definition can ultimately be left open because no competition concern would arise as a result of the Transaction, irrespectively of the exact product market definition.

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49 Form CO, Chapter B, paras. 38-40.

50 Form CO, Chapter B, paras. 50-51.

51 M.3649 – *Finmeccanica/BAES Avionics & Communications*, paragraphs 9–10.

52 M.8425 – *Safran/Zodiac Aerospace*, paragraph 257.

(81) First, with respect to demand-side substitutability, the market investigation confirms the Notifying Party's claim that customers have limited possibilities of substitution among EO/IR sensors with short-, mid-, and long-range.

(82) In particular, a large majority of the suppliers of military equipment that replied to the market investigation agree with the Notifying Party's view that short-, mid-, and long-range EO/IR sensors should be considered to constitute separate product markets due to limited substitutability for customers in terms of, e.g., product characteristics, applications and prices.[53]

(83) However, the market investigation does not seem to confirm the Notifying Party's claim that long-, mid- and short-range EO/IR sensors are typically mounted on different types of aircrafts.[54]

(84) Second, with respect to supply-side substitutability, a large majority of the suppliers of military equipment that replied to the market investigation agree with the Notifying Party's view that the production of long-, mid- and short-range sensors entail significantly different technical features, expertise and costs, therefore suggesting limited supply-side substitutability among these three types of EO/IR sensors.

(85) One supplier manufacturer also explained that *'[a] supplier of sensors in one of these ranges cannot begin producing sensors in another range without making significant investments and engaging in substantial design efforts'*.[55] While another manufacturer explained that *'[t]he production of long-range sensors requires telephoto optics, high spatial stability, high sensitivity, and high resolution, which require very specialized skills and trigger much higher costs of production. On the other hand, short-range sensors require much lower technology and expertise. The costs of production are also much lower compared to long-range sensors'*.[56]

(86) Third, notwithstanding the lack of demand- and supply-side substitutability for short-, mid-, and long-range EO/IR sensors, a majority of the suppliers of military equipment that expressed a view in the market investigation considers that for assessing the relevant competitive dynamics, it may also be appropriate to consider an alternative segmentation based for example on the type of mission they serve (e.g., surveillance, reconnaissance, targeting).[57] In that respect, however, the Notifying Party has explained that there was a significant overlap between the segmentation by ranges and by mission types.[58]

(87) Further, some of the suppliers of military equipment that replied to the market investigation suggested other possible market segmentations. For example, a prominent EEA-based defence contractor indicated that *'the relevant airborne product segmentation within EO/IR sensors is the destination in terms of missions: - Targeting pods (delivering a laser guided ammunition from a fighter type aircraft);-*

53 Questionnaire to suppliers of military equipment Q1, question 8.
54 Questionnaire to suppliers of military equipment Q1, question 12.
55 Questionnaire to suppliers of military equipment Q1, question 9.1.
56 Questionnaire to suppliers of military equipment Q1, question 9.1.
57 Questionnaire to suppliers of military equipment Q1, questions 10 and 11.
58 Form CO, Chapter B, paras. 37-41.

Reconnaissance pod; - Surveillance products (for UAVs and mission aircraft)'.[59] Similarly, an OEM indicated that it *'[…] segments EO/IR sensors differently due to their functionalities, but not on the ranges particularly*'.[60] Another supplier of military equipment further explained that *'[a]ll these applications [i.e. surveillance, reconnaissance, targeting] require different technical approaches. Target tracking systems need much more accuracy, resolution, sightline spin rate than surveillance systems*'.[61]

(88) With respect to a possible distinction between integrated and podded EO/IR sensors, a large majority of suppliers of military equipment, including OEMs, confirmed the Notifying Party's claim that embedded and podded EO/IR sensors can have the same capabilities and applications.[62] However, a number of respondents also highlighted several differences between these two types of sensors, in terms of, *e.g.*, performance, effects on aerodynamic and observability, and space requirements, thus highlighting that the two types of sensors are not completely interchangeable.[63]

(89) In conclusion, the market investigation appears to confirm the Notifying Party's claim that long-, mid-, and short-range EO/IR sensors constitute three distinct product markets due to limited demand-side and supply-side substitutability. However, the market investigation also suggests that an alternative way of defining product markets for EO/IR sensors would be based on their final use, i.e. that the markets for EO/IR sensors for surveillance, for reconnaissance, and for targeting would constitute three distinct product markets. At the end though, while there might be some overlaps between a segmentation by ranges and by mission types, the exact product market definition can be left open because, as explained in Section 7.1.3 and for the purposes of this Decision, no competition concern would arise as a result of the Transaction, irrespective of whether product markets are defined based on sensors range or based on final application.

5.4. Precision guided munitions ('PGMs')

5.4.1. Introduction

(90) Innovation in the field of military weapons and munitions increased exponentially during the 20th century driven by advances in technology. Basic projectiles and unguided missiles (known as rockets) developed into sophisticated guided systems, which are now commonplace today.

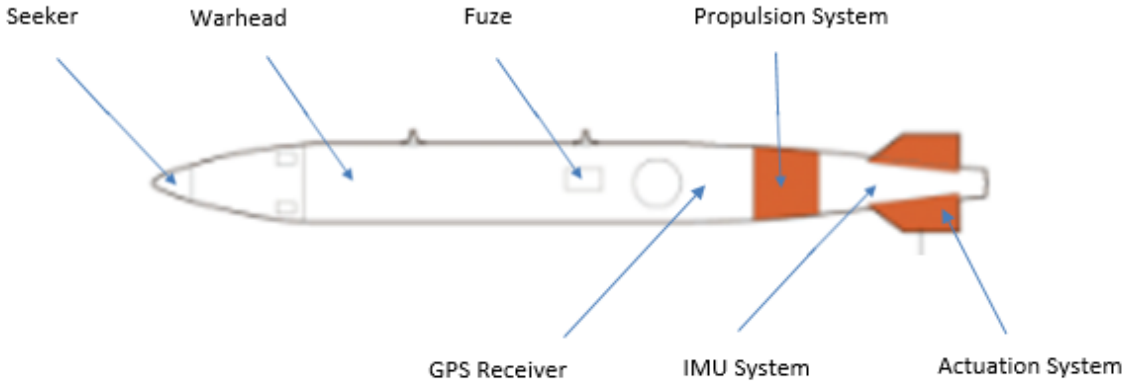
(91) Modern day PGMs rely on sophisticated subsystems and components to strike their intended target. As a result, the number of aircrews and equipment in high-risk environments, in particular, is considerably reduced. The advent of PGMs resulted in the renaming of older unguided bombs as "dumb" or "gravity" bombs.

(92) PGMs contain a number of subsystems and components. Each subsystem performs a particular function that allows the PGM to perform specific actions; e.g., propulsion, flight, target identification, and detonation. The same subsystems and components

59 Questionnaire to suppliers of military equipment Q1, question 8.1.
60 Questionnaire to suppliers of military equipment Q1, question 8.1.
61 Questionnaire to suppliers of military equipment Q1, question 10.1
62 Questionnaire to suppliers of military equipment Q1, question 13.
63 Questionnaire to suppliers of military equipment Q1, questions 13.1 and 13.2.

are used to provide the guidance capabilities to guided projectiles, guided bombs and guided missiles. Additional subsystems and components are required for a guided missile to function i.e., propulsion systems. The precise specifications of those subsystems and components may vary and be tailored to the specific mission purpose.

Figure 7: General anatomy of a conventional guided missile.



Source: Form CO, Chapter E, figure 1.

(93) The exact combination of systems and components will vary depending on the type of PGM, and the mission-specific purpose it is intended for (e.g., a guided bomb or guided projectile would not contain a propulsion system). However, PGMs will generally include some or all of the following subsystems, as described by the Parties.[64]

(a) Seeker: Acquires and tracks the target. The seeker is mounted at the head of the weapon and allows the weapon to detect energy; e.g., infrared or radar to help direct the weapon to its target. A GPS guided weapon may contain an infrared or radar seeker (referred to as multi-mode) but GPS guidance itself does not require a seeker and uses the GPS satellite constellation to provide position and velocity information to enable the weapon to strike its target.

(b) Warhead: The energetic, explosive part of the weapon. There are a range of conventional warheads (blast, fragmentation, continues-rod, etc.) or alternatively a nuclear or chemical/biological warhead could be used.

(c) Fuze: Detects that the weapon is in the vicinity of the target and detonates a weapon's warhead. The triggering functionality is normally based on engaging in contact with or close proximity to the target but can also be based on time, laser functionality, etc. A safety and arming mechanism is built into the fuse to prevent premature detonation.

(d) GPS Receiver: The receiver uses the GPS satellite constellation to provide position and velocity information to enable the weapon to strike its target.

64 Form CO, Chapter E, para 52.

(e) Actuation System: Helps control the weapon's flight. The actuation system controls the adjustable aerodynamic surfaces of the weapon to determine its flight path. The weapon's fins or thrust vector move in response to steering commands from the flight computer to steer the weapon.

(f) The IMU measures the weapon's rotation, angular rate, and acceleration/force.

(g) Propulsion System: Provides the required initial thrust to enable the weapon to fly with sufficient velocity to reach the target. Various technologies can be used in the propulsion system of a weapon, e.g., solid rocket motors, ramjets, turbojets, etc.

(94) In addition to the main systems and components described above, other components may be necessary depending on the type of PGM and its mission-specific purpose.

5.4.2. The Notifying Party's view

(95) The Parties define three criteria that drive the segmentation of the weapons market '*There are three common ways to distinguish between military weapons: (i) the warhead; (ii) whether the weapon is self-propelled or not; and (iii) whether it uses a guidance system*'[65].

(96) The Parties view on the market segmentation is the following: '*The Parties consider that it is likely appropriate to segment the weapons market between: (i) bombs; (ii) projectiles; (iii) rockets; and (iv) missiles. The Parties do not consider it necessary to segment these further.*'[66]

(97) With regards to PGMs, more specifically, the Parties distinguish three different markets:

(a) Guided Bombs: A bomb is typically deployed by an aircraft and uses only gravity to find its target. As with projectiles, technological advances now enable bombs to include guidance systems and other components that increase the accuracy of their strike rate. These are referred to as guided bombs. Guided bombs differ from guided missiles in that they do not contain any propulsion technology.

(b) Guided Projectiles: Projectiles, also referred to as shells, are non-self-propelled airborne explosive devices fired from a separate object (gun) with force. As technology has evolved, projectiles have become more sophisticated and now commonly contain additional guidance systems or components that increase the accuracy of their strike. Guided projectiles differ from guided missiles in that they do not contain their own propulsion technology but rely on the force from the propellant platform.

(c) Guided Missiles: Guided missiles are powered by jet or rocket propulsion and rely on a guidance system, which has the ability to change course mid-air and direct the missile to a precise target. This minimizes collateral damage,

65 Form CO, Chapter E, para 7.

66 Form CO, Chapter E, para 34.

increases the effectiveness of the strike and creates fewer risks for the person and/or equipment deploying the missile. Guided missiles are also referred to as precision missiles.

(98) Considering specifically guided missiles, the Parties specify that that they are designed or adapted for specific operational purposes, primarily:

(a) Surface-to-surface missiles, launched from the land (or from a ship) to strike targets located elsewhere on land or sea;

(b) Air-to-surface missiles, launched from aircraft to strike targets on land or at sea;

(c) Surface-to-air missiles, launched from land (or from a ship) to strike targets in the air;

(d) Air-to-air missiles, launched from aircraft to strike targets in the air.

(99) The Parties do not consider the point of origin or destination as a relevant segmentation. '*The Parties consider that all guided missiles should be considered part of the same product market irrespective of their point of origin and destination. Guided missiles are designed or adapted for specific operational purposes. The point of origin and destination of a missile are largely immaterial for the majority of missiles.*'[67] The Parties state that even if, at conception, a guided missile is typically designed for a specific launch platform, based on the needs of the customer it is common for guided missiles to be subsequently adapted for other launch platforms. Raytheon gives examples of guided missile product that can be used across different launch platforms. '*For example, the AIM-9X Sidewinder may be operated as an air-to-air, air-to-surface and surface-to-air missile,14 and the AMRAAM (Advanced Medium-Range Air-to-Air Missile) has also been adapted for use as a surface-to-air interceptor missile, where it is the baseline weapon on the NASAMSTM launcher.*'[68] There are numerous guided missiles that span categories based on point of origin and destination as described in Figure 8 below.

67 Form CO, Chapter E, para 36.

68 Form CO, Chapter E, para 36.

Figure 8: Selected Examples of Raytheon Missiles Spanning Categories of Point of Origin and Destination

Missile	Category by origin-to-destination	Description
AIM-9X Sidewinder	Air-to-Air Air-to-Surface Surface-to-Air	A true tri-use missile, the AIM-9X® Sidewinder missile is effective in air-to-air, air-to-surface or surface-to-air applications with no modifications required.
AMRAAM® Missile and NASAMS™ Launcher	Air-to-Air Surface-to-Air (Land)	The AMRAAM® missile is a versatile and proven weapon with operational flexibility in a wide variety of scenarios, including air-to-air and surface-launch engagements. NASAMS was the first surface-based application for the AMRAAM. The missile itself is named SLAMRAAM (Surface Launched AMRAAM).
Griffin® Missile System	Air-to-Surface Surface-to-Surface	The Griffin® missile system is an air- and ground-launched, precise, low-collateral-damage weapon for irregular warfare operations. It is a multi-platform, multi-service weapon that has a proven track record for successful rapid integration on land, sea and air platforms.
Sparrow® Missile	Air-to-Air Surface-to-Air (Naval)	The Sparrow® Missile is a medium-range, all-weather, all-aspect, semi-active guided missile used in multiple roles by multiple services. In its air-to-air role, the missile is used on fighter aircraft of the US Navy, Air Force and allied countries, including the F-4, F-15, F-16 and F/A-18. The surface-to-air version, the Evolved SeaSparrow Missile (ESSM), is used for shipboard point defense on more than 150 ships of various classes for the U.S. and numerous other countries.
SM-2™ Missile	Surface-to-Surface Surface-to-Air (Naval)	The Standard Missile-2 is the world's premier fleet-area air defense weapon, providing superior anti-air warfare and limited anti-surface warfare capability against today's advanced anti-ship missiles and aircraft out to 90 nautical miles. The SM-2™ missile is an integral part of layered defense that protects the world's important naval assets and gives warfighters a greater reach in the battlespace.

Source: Form CO, Chapter E, Table 1.

(100) The Parties consider that the traditional "strategic" versus "tactical" distinction is not anymore relevant with technological advancements blurring the segmentation. Strategic missiles are, historically, weapons designed to strike targets far beyond the battle area whereas tactical missiles are intended for battlefield use or shorter range and usually employ conventional warheads. Raytheon, to substantiate the irrelevance of this segmentation, gives example of guided missile product that would be qualified as "tactical" that can now be fired from much further distances with greater accuracy. '*For example, Raytheon's Tomahawk cruise missile is designed to be launched at long range away from the battlefield and to strike distant targets (previously considered a "strategic" capability) but with a conventional high explosive warhead (previously considered "tactical"). They are guided missiles that follow a controlled, non-ballistic profile to remain within the Earth's atmosphere during flight but have the range of a strategic missile.*'[69]

5.4.3. The Commission's precedents

(101) The Commission has not previously assessed the relevant product market for projectiles and bombs. The Commission has previously assessed the relevant product

69 Form CO, Chapter E, para 35.

market for guided weapons and guided weapons systems (herein also referred to as "guided missiles"), competition for which takes place at the prime contract level.[70] In particular, the Commission has previously distinguished between "strategic" and "tactical" guided weapons.

(102) In *Roxel/Protac* the Commission stated '*[t]actical missiles are used for specific, geographically limited actions, either to protect territorial property against the threat of attack (e.g., from tanks, planes or ships) or to dispose of enemy capacity in destroying or damaging its infrastructure. Tactical weapons typically carry a conventional high explosive warhead. Strategic missiles, on the other hand, are dedicated to State defense and typically have a longer range and greater destruction capabilities than tactical missiles. The decision to employ strategic missiles is generally reserved to the highest levels whereas the decision to use tactical missiles is normally made by commanders in the field.*'[71] In Airbus/Safran/JV, the Commission described '*[m]issiles are guided weapons carrying either a high explosive (tactical missiles) or a nuclear (strategic missiles) warhead.*'[72]

(103) Most recently, in *Safran/Zodiac Aerospace*, the Commission stated that strategic missiles are '*dedicated to critical state defense applications. They have a long range and great destruction capabilities relying on nuclear warheads'* whereas tactical missiles have historically been used for '*specific geographically limited actions to protect against the threat of attack or to destroy the enemy infrastructure or capacity'*.[73]

(104) Further, the Commission previously stated that '*tactical missiles can be classified according to functionality and products characteristics such as their point of origin and destination (e.g., air-to-air, surface-to-air/land, surface-to-air/naval, air-to-surface, anti-ships and anti-tanks) and range (very short range, short range, medium range and long range),'* but ultimately left the exact product market definition open.[74]

5.4.4. The Commission's assessment

(105) The results of the market investigation reveal that the Notifying Party's proposed product market segmentation by type of weapon, that is to say bombs, projectiles and missiles, reflects market conditions in terms of product characteristics, applications and prices. However, alternative market segmentations have also been suggested by respondents to the market investigation. In any event, as explained below, the exact product market definition can ultimately be left open because no competition concern arise as a result of the Transaction, irrespectively of the exact product market definition.

(106) First, with respect to demand-side substitutability, the market investigation confirms the Notifying Party's claim that customers have limited possibilities of substitution among bombs, projectiles and missiles.

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70 COMP/M.7353 – *Airbus/Safran/JV*, paragraph 496.

71 COMP/M.5032 – *Roxel/Protac*, footnote. 5.

72 COMP/M.7353 – *Airbus/Safran/JV*, paragraph 495.

73 COMP/M.8425 – *Safran/Zodiac Aerospace*, paragraph 249.

74 COMP/M.8425 – *Safran/Zodiac Aerospace*, para. 250; COMP/M.5032 – *Roxel/Protac*, para. 14; COMP/M.1745 – *EADS*, para. 122; and COMP/M.4653 – *MBDA/Bayern-Chemie*, para. 17.

(107) A large majority of the suppliers of military equipment that replied to the market investigation agree with the Notifying Party's view that bombs, projectiles and missiles constitute separate product markets due to limited substitutability for customers in terms of, e.g., product characteristics, applications and prices.[75] As described by a market participant: '*The capabilities and market pricing associated with each product market would be different. Customers would look at each category independently. For example, if they wished to purchase a bomb, they would purchase one, it would not be substituted for a projectile or missile.*'[76]

(108) Second, with respect to supply-side substitutability, a large majority of the suppliers of military equipment that replied to the market investigation agree that the production of bombs, projectiles and missiles entail significantly different technical features, expertise and costs.

(109) One supplier manufacturer also explained that '*Cost – the price of bombs is significantly lower; and Technical features – the capability of each will differ. For example, a bomb could be dropped on an intended target from above. However, a missile would contain other key technical features such as an engine to ensure that it could travel to its intended target.*'.[77] While another manufacturer explained that '*[v]ery specific knowhow and technical/engineering experience required for each of the niches*.'[78]

(110) Third, some of the suppliers of military equipment that replied to the market investigation suggested alternative market segmentations. For example a segmentation based on the distinction between tactical and strategic missiles. A majority of the respondents to the market investigation considered that is it appropriate to consider that tactical missiles (used for specific, geographically limited actions) and strategic missiles (dedicated to state defence with longer range and greater destruction capabilities) constitute separate product markets due to limited substitutability for customers in terms of, e.g., product characteristics, applications and prices.[79] A military equipment supplier explains: '*There is no substitution in product application between tactical and strategic systems. They perform different functions. Strategic systems also tend to be extremely expensive systems given their massive size and other attributes, such as nuclear warheads.*'[80]

(111) With respect to supply-side substitutability, a large majority of the suppliers of military equipment that replied to the market investigation agree that - bombs, projectiles and missiles entail significantly different technical features, expertise and costs.[81] A market participant describes the difference in facilities able to produce the tactical and strategic missiles: '*The manufacture of strategic missiles requires different types of facilities and capabilities than the manufacture of tactical missiles. Strategic missiles are much larger weapons systems, so the equipment needed to handle and manufacture systems of that size is different in scale than that needed for*

75 Questionnaire to suppliers of military equipment Q1, question 126.
76 Questionnaire to suppliers of military equipment Q1, question 126.1.
77 Questionnaire to suppliers of military equipment Q1, question 127.1.
78 Questionnaire to suppliers of military equipment Q1, question 127.1.
79 Questionnaire to suppliers of military equipment Q1, question 130.
80 Questionnaire to suppliers of military equipment Q1, question 130.1.
81 Questionnaire to suppliers of military equipment Q1, question 131.

manufacturing tactical missiles.'[82] The market investigation further substantiate the absence of supply-side substitutability with a majority of the market participants confirming the inability for a company that produces either strategic missiles or tactical missiles, to start producing the other type of missiles without having to incur major investments and within a short timeframe (based on industry standards)[83].

(112) With respect to a possible distinction based on point of origin and destination, the market investigation provides mixed results. Some market participants responded that is it necessary to consider further segmentations within tactical missiles based on their point of origin and destination (air-to-air, surface-to-air/land, surface-to-air/naval, air-to-surface). A military equipment supplier explains that '*[t]he different mission sets lead to specific missile designs that make it difficult to be interchangeable. For example, an air-to-air missile may have a much higher end propulsion or seeker solution compared to an air-to-surface missile intended for stationary targets.*'[84] Other market participant claim that this further segmentation of the market is not relevant arguing that '*[o]verall, the same class of products and technologies is currently used for the different applications.*'[85]

(113) In conclusion, the market investigation confirms the Notifying Party's claim that the markets for bombs, projectiles and missiles constitute distinct product markets due to limited demand-side and supply-side substitutability. However, the market investigation also suggests that a further segmentation of product markets specifically for missiles could be based on their final use, i.e. that strategic and tactical missiles would constitute distinct product markets. At the end, though, the exact product market definition can be left open because no competition concern would arise as a result of the Transaction, irrespective of whether product markets are defined based on the type of PGM, or based on their final use.

5.5. Actuation systems

5.5.1. Introduction

(114) As described in paragraph (93), PGMs contain a number of subsystems and components. Each subsystem performs a particular function that allows the PGM to perform specific actions.

(115) Actuation Systems help control the weapon's flight. The actuation system controls the adjustable aerodynamic surfaces of the weapon to determine its flight path. The weapon's fins or thrust vector move in response to steering commands from the flight computer to steer the weapon.

(116) There are two main types of PGM actuation systems: (i) thrust vector-based actuation systems ('TVA'); and (ii) fin-based actuation systems. While there are limited other types of actuation systems, TVA and fin-based are used for the vast majority of PGMs.

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82 Questionnaire to suppliers of military equipment Q1, question 131.1.

83 Questionnaire to suppliers of military equipment Q1, question 132.

84 Questionnaire to suppliers of military equipment Q1, question 133.1.

85 Questionnaire to suppliers of military equipment Q1, question 133.1.

(117) TVA typically relies on engines or thrust nozzles to change the weapon's trajectory, and is therefore used only if the weapon is self-propelled (i.e., guided missiles). In general, the technology, components, and production costs for TVA systems are significantly higher than fin-based solutions. TVA systems are typically used on higher-end guided missile systems, and in particular, are required for systems which fly at very high altitudes where the atmosphere is too thin for a guided missile's actuation fins to be effective. TVA is becoming more common with the increasing development of guided missiles which exit the Earth's atmosphere.

(118) Fin-based actuation systems use control surfaces (i.e., fins) to alter the flight path of a PGM, in the same way as a conventional commercial aircraft. The fins use air resistance to guide the PGM, and need only be small because tiny movements are capable of having a directional impact when the PGM is travelling at high speed. Due to the reliance on air resistance, fin-based actuation systems must have adequate air density and require airflow across the surface to maintain the necessary control authority. For this reason, they are inoperable in low air density or exoatmospheric conditions.

5.5.2. The Notifying Party's view

(119) The Parties consider that fin-based actuation systems are suitable for a vast majority of the lower end missile systems but are not applicable to guided bombs or guided projectiles while TVA is most commonly used in strategic and high-end tactical guided missiles. Although the underlying actuation technology is consistent across multiple PGMs, each system is tailored to the specific application. In contrast to fin-based actuation systems, the Parties are not aware of TVA systems being used interchangeably across multiple PGMs.

(120) Therefore the Parties consider it may also be appropriate to segment the relevant product market for PGM actuation systems between: (i) TVA, and (ii) fin-based actuation systems.

5.5.3. The Commission's precedents

(121) The Commission has previously decided that guided missile actuation systems constitute a separate product market.[86]

(122) The Commission's market investigations into these products have previously suggested a potential delineation between fin-based actuation systems and TVA systems: '*In fin-based missiles, the actuation system controls the position of aerodynamic fins in response to steering commands from the flight computer, while the actuation system in thrust vector control missiles steers the missile by moving the missile engine's exhaust nozzle and thereby changing the direction of the thrust coming from the engine. Thrust vector control is used for ballistic missiles (missiles that fly outside the atmosphere) since aerodynamic control surfaces (movable fins) are ineffective for ballistic missiles that fly outside the atmosphere*'.[87]

86 COMP/M.6410 – *UTC/Goodrich*, para. 92; COMP/M.2892 – *Goodrich/TRW Aeronautical Systems Group*, paras. 6 and 7.

87 COMP/M.6410 – *UTC/Goodrich*, para. 99.

5.5.4. The Commission's assessment

(123) The market investigation indicates that a market segmentation distinguishing TVA and fin-based actuation systems for PGMs reflects market conditions in terms of, e.g., product characteristics, applications and prices. In any event, the exact product market definition can ultimately be left open because no competition concern would arise as a result of the Transaction, irrespectively of the exact product market definition.

(124) First, with respect to demand-side substitutability, a majority of the suppliers of military equipment that replied to the market investigation agree with the view that it is appropriate to consider that thrust vector-based (TVA) and fin-based actuation systems for PGMs constitute separate product markets due to limited substitutability for customers in terms of, e.g., product characteristics, applications and prices.[88]

(125) As described by a market participant, '*[a]s is the case with many other aspects of precision guided munitions, the application and environment in which a missile will operate will drive the selection of the guidance system to be used. If the operating parameters call for a TVA, then the missile provider cannot use a fin-based guidance setup, and vice versa*.'[89]

(126) Second, with respect to supply-side substitutability, a large majority of the suppliers of military equipment that replied to the market investigation agree that the production of TVA and fin-based actuation systems for PGMs entail significantly different technical features, expertise and costs.[90] A market participant explains that '*[t]he materials, technology and complexity can be significantly different between these two systems.*'[91].

(127) The absence of substitutability and the inability to switch between TVA and fin based actuators is also explained by a market participant '*The choice between TVA and fin-based actuation is done at the beginning of the programme. The switch from one solution to another solution is likely not to be a realistic option*'[92].

(128) In conclusion, the market investigation confirms that TVA and fin-based actuation systems constitute distinct product markets due to the limited demand-side and supply-side substitutability. At the end, though, the exact product market definition can be left open because no competition concern would arise as a result of the Transaction, irrespectively if product markets are defined based on the type of actuators, or not.

5.6. IMUs

5.6.1. Introduction

(129) An IMU is an electronic device that measures and reports how specific forces cause a body to change its vector. The IMU works from within a PGM's control systems

88 Questionnaire to suppliers of military equipment Q1, question 141.
89 Questionnaire to suppliers of military equipment Q1, question 141.1.
90 Questionnaire to suppliers of military equipment Q1, question 142.
91 Questionnaire to suppliers of military equipment Q1, question 142.1.
92 Questionnaire to suppliers of military equipment Q1, question 142.2.

where gyroscopes and accelerometers measure the PGM's rotation and angular rate in relation to a fixed point and to control the PGM's velocity and flight path. The IMU system communicates these measurements to the PGM's guidance and control systems.

5.6.2. The Notifying Party's view

(130) The Parties submit that the relevant product market for IMUs should be segmented by grade: (i) high performance navigation grade IMUs, (ii) lower performance tactical grade IMUs, and (iii) consumer grade IMUs.[93]

(131) The Parties argue that IMU products across these three categories are generally not interchangeable. This is based on the fact that a customer's product selection is based on the specific performance and cost requirements. Therefore, switching to a navigation grade IMU where this is not functionally required would be cost prohibitive. Alternatively, switching to a tactical grade IMU for an aircraft or long range guided missile application would not be possible as it would be unable to achieve the required operational performance level.

(132) More specifically for PGMs, navigation grade systems for aircraft and cruise missiles operate over long periods of time, must provide highly accurate information and use much more sophisticated components. By contrast, other types of PGM have much shorter flight times and ground vehicles operate at much lower speeds so these applications are able to use lower performing tactical grade sensors

(133) For tactical IMUs, the Parties submit that the relevant product market includes all tactical grade IMUs irrespective of their application (missiles, land vehicles, UAVs, etc.). UTC estimates that its market share in the overall market of tactical grade IMUs is lower than [20-30]%.

5.6.3. The Commission's precedents

(134) The Commission has previously considered there to be a separate product market for inertial guidance systems within guided weapons.[94] In other cases, the Commission has referred to separate markets for: (i) sensor avionics, and (ii) mission avionics, itself further segmented into flight avionics and CNI avionics.[95]

5.6.4. The Commission's assessment

(135) The results of the market investigation indicate that a market segmentation distinguishing lower end tactical IMUs from navigation IMUs systems for PGMs reflects market conditions in terms of, *e.g.*, product characteristics, applications and prices. In any event, though, the exact product market definition can ultimately be left open because no competition concern would arise as a result of the Transaction, irrespectively of the exact product market definition. Consumer grade IMUs are used in electronics products (smartphones use IMU sensors to determine movement). The consumer grade sensors price point is no more than USD 1 per unit and these sensors

93 Form CO, Chapter E, para 105.

94 COMP/M.1745 – *EADS*, para. 126; COMP/M.797 – SAAB/Celsius, para. 19.

95 COMP/M.3649 – *Finmeccanica/BAES Avionics & Communications*, para. 9; COMP/M.3735 – *Finmeccanica/AMS*, para. 9.

are not used for PGMs. Therefore they are not considered in this section and in the remaining of the Decision.

(136) First, with respect to demand-side substitutability, a large majority of the suppliers of military equipment that replied to the market investigation agree with the view that lower performance tactical grade IMUs (used in short-range PGMs, land vehicles, sensor stabilization, and low altitude tactical UAVs) constitute a product market separate from other IMUs due to limited substitutability for customers in terms of, e.g., product characteristics, applications and prices.[96]

(137) As described by a market participant, '*[l]ower performance tactical grade IMUs constitute a product market separate from other IMUs, due to the important difference in terms of performance. These IMUs are suited for low cost and short range PGMs.*'[97] Another market participant explains that '*Performance characteristics, complexity and price vary significantly between short range and longer range applications.*'[98]

(138) Second, with respect to supply-side substitutability, a majority of the suppliers of military equipment that replied to the market investigation agree that the production of lower performance tactical grade IMUs and other IMUs for PGMs entail significantly different technical features, expertise and costs.[99] A market participant explains that '*[t]he materials, technology and complexity can be significantly different between these two systems.*'[100]

(139) The absence of substitutability is mainly explained by the fact that it would not be economically viable to substitute one with another given the prices of IMUs is strongly linked to their performance. As explained by a market participant '*The price is a key parameter for the cost of operations and the IMU must be optimized to the use case requirement.*'[101] Another market participant confirms '*Performance drives cost at IMUs!*'[102]

(140) In conclusion, the market investigation seems to confirm that tactical IMUs systems and other IMUs for PGMs constitute distinct product markets due to the limited demand-side and supply-side substitutability. At the end, the exact product market definition can be left open because no competition concern would arise as a result of the Transaction, irrespectively if product markets are defined based on the type of IMU, or not.

5.7. ARINC

(141) As a matter of clarity, the ARINC network should be distinguished from ARINC standards.

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96 Questionnaire to suppliers of military equipment Q1, question 143.
97 Questionnaire to suppliers of military equipment Q1, question 143.1.
98 Questionnaire to suppliers of military equipment Q1, question 143.1.
99 Questionnaire to suppliers of military equipment Q1, question 142.
100 Questionnaire to suppliers of military equipment Q1, question 142.1.
101 Questionnaire to suppliers of military equipment Q1, question 143.1.
102 Questionnaire to suppliers of military equipment Q1, question 143.1.

(142) The ARINC network is a low-bandwidth air-to-ground and ground-to-ground communications network that is owned and operated by UTC. It is used predominantly by airlines to transfer data between aircraft and counterparties on the ground (e.g., between an airline's operation centre, air traffic control, border control, and airline partners). Military aircraft may use ARINC to communicate with air traffic control or operations centres while operating in commercial airspace, or – notably for VIP and maritime patrol aircraft – to transmit data or messages in support of their operations.

(143) ARINC standards are a set of communications standards for avionics, wiring, and other aircraft electronics. They are stewarded by SAE International, an independent industry body that is unrelated to UTC. An example of an ARINC standard is ARINC Specification 618, which defines the low-bandwidth ACARS protocol used to send short messages between aircraft and the ground.

(144) As described by the Parties: '*The ARINC and SITA networks use the traditional, low-bandwidth Aircraft Communications Addressing and Reporting System ("ACARS") protocol, first deployed in 1978. The ACARS protocol also allows aircraft operators to transmit low-volume snapshot information on the aircraft status (akin to text messages), typically several times per flight, or repair messages in case of a component fault in flight*.'[103]

(145) Only the ARINC network is controlled by UTC. It shares the "ARINC" name with the ARINC standards because both the network and standards were previously under the umbrella of ARINC Incorporated, which UTC (then Rockwell Collins) acquired in 2013. As part of this acquisition, however, UTC transferred management of the ARINC standards to SAE International, precisely to preserve independence and pre-empt foreclosure.

5.7.1. The Notifying Party's view

(146) 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.

5.7.2. The Commission's precedents

(147) In UTC/Rockwell Collins '*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. 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. The majority of OEMs therefore considered that ARINC and SITA compete'*.[104]

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103 Form CO, Chapter E, para 105.

104 COMP/M.8658 UTC/Rockwell Collins, paragraph 157.

5.7.3. The Commission's assessment

(148) Market investigation shows that both ARINC and SITA are used as datalink network services and that market participant consider that they are alternative providing a similar service. A market participant explains that '*[the company] considers that SITA is the alternative to ARINC*'[105] and further specifies that '*the question refers to the role of ARINC as Communication Service Provider (CSP) for civil Datalink services. The same service is provided by SITA in Europe*.'[106]

(149) In conclusion, the market investigation appears to confirm that ARINC and SITA are considered to offer alternative datalink network services. However, the question of whether ARINC and SITA 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.

6. GEOGRAPHIC MARKET DEFINITION

(150) As explained in its Market Definition Notice, a relevant geographic market is the geographic area in which the conditions of competition are sufficiently homogeneous and which can be distinguished from neighbouring areas because the conditions of competition are appreciably different in those areas.[107]

6.1. The Notifying Party's view

(151) The Notifying Party submits that the relevant geographic market for military products is EEA-wide. In particular, the Notifying Party submits that, although transportation costs represent a negligible share of the overall cost of the supply of military products, conditions of competition in the EEA are differentiated from those prevailing elsewhere (including in the US) for several reasons.[108]

(152) First, the Notifying Party submits that some military products produced in the US are subject to ITAR or EAR restrictions and can only be exported to the EEA subject to relevant US legislation and/or authorization. Second, the Notifying Party argues that the EEA features an autonomous legal regime for the international trade of military products, which do not apply to non-EEA suppliers. Third, according to the Notifying Party, EEA governments would typically have preferred long-established relationships with local suppliers. Fourth, the leading suppliers to the EEA defence industry would be distinct from the US-based manufacturers that typically supply the US DoD.

(153) In addition, the Notifying Party submits that, although some early Commission decisions concerning the defence industry defined national markets on the basis of national preferences of the monopsonistic buyers, a national geographic market definition is not instructive for purposes of the assessment of the Transaction. This would be because these Commission decisions tended to concern concentrations involving the incumbent supplier in a Member State and the Parties are not

105 Questionnaire to suppliers of military equipment Q1, question 58.1.

106 Questionnaire to suppliers of military equipment Q1, question 57.1.

107 Commission Notice on the definition of the relevant market for the purposes of Community competition law (OJ C372, 9.12.1997, p. 5), paragraphs 8 and seq. and 28 and seq.

108 Form CO, Chapters B, C, D and E.

incumbent players in any Member State. Further, according to the Notifying Party, there would be a trend towards internationalization in the defence industry (particularly among EEA Member States).

6.2. The Commission's precedents

(154) In the past, the Commission has left open the possibility of defining markets for specific military and defence applications on an EEA-wide or national basis due to, *e.g.*, the existence of specific government regulations (such export restrictions) or national security-related preferences for local suppliers.[109]

6.3. The Commission's assessment

(155) The results of the market investigation suggest that the geographic scope of the relevant product markets is EEA-wide. This is because, when asked at what geographical level EEA-based customers procure the relevant products, none or very few respondents to the market investigation indicated that EEA-based customers typically procure the relevant products at nation-wide level. Conversely, most respondents indicated that EEA-based customers typically procure the relevant products at EEA level and from the US.[110] The geographic scope of the relevant product markets should thus reflect the fact that sales of defence equipment in the EEA generally originate from EEA-based or US-based suppliers.

(156) The market investigation has also revealed that the conditions of competition are not homogeneous in the EEA and in the US. In particular, relevant segments of the US market are *de facto* closed to EEA suppliers of military equipment,[111] as it is difficult for EEA-based suppliers to be awarded military projects in the US unless they collaborate with US-based suppliers.

(157) The Commission therefore considers that the geographic market for all military equipment discussed in Section 7 below, is EEA-wide in scope.

7. COMPETITIVE ASSESSMENT

(158) Under Article 2(2) and (3) of the Merger Regulation, the Commission must assess whether a proposed concentration would significantly impede effective competition in the internal market or in a substantial part of it, in particular through the creation or strengthening of a dominant position. In this respect, a merger can entail horizontal and/or non-horizontal effects.

(159) In this respect, horizontal effects are those deriving from a concentration where the undertakings concerned are actual or potential competitors of each other in one or more of the relevant markets concerned. The Commission appraises horizontal

109 COMP/M.8425 – *Safran/Zodiac Aerospace*, paragraph 300.

110 Questionnaire to suppliers of military equipment Q1, questions 18, 60, 106 and 145.

111 Minutes of a call with a EEA-based competitor, 30.09.2019.

effects in accordance with the guidance set out in the Horizontal Merger Guidelines.[112]

(160) As regards non-horizontal effects, the Commission Non-Horizontal Merger Guidelines[113] distinguish between the effects of vertical mergers, which involve companies operating at different levels of the supply chain, and of conglomerate mergers, which involve companies that are active in closely related markets.

(161) The Horizontal Merger Guidelines and the Non-Horizontal Merger Guidelines distinguish between two main ways in which mergers may significantly impede competition, namely non-coordinated or coordinated effects. The present section assesses successively whether the Transaction is likely to raise horizontal, vertical or conglomerate non-coordinated effects on the markets examined in Section 5 above.

7.1. Horizontal non-coordinated effects

7.1.1. Military GPS receivers

7.1.1.1. Introduction

(162) Both UTC and Raytheon produce military P(Y)-code GPS receivers[114] and are currently being funded by the DoD to develop military M-code GPS receivers. […].

(163) Both UTC and Raytheon produce ASICs (chips) for use in their own military GPS receiver cards. Raytheon also supplies ASICs to third parties, but UTC does not.[115] UTC produces military GPS receiver cards for use in embedded systems or other circuitry (e.g., that does not require the interface or chassis provided by a navigation box) and for its own navigation boxes or those of third parties. Raytheon produces military GPS receiver cards for incorporation into its own navigation boxes but does not sell any receiver cards as stand-alone products to third parties. Both UTC and Raytheon manufacture military navigation boxes that include receiver cards and use the US GPS satellite constellation to sell them to third parties.

(164) For the purposes of the competitive assessment of the Transaction, military GPS receivers refer to military GPS receiver cards, including (i) those for use in embedded systems or other circuitry, and (ii) navigation boxes.

(165) The Commission assesses in the following section the impact of the combination of the Parties' production and supply of military GPS receivers in the EEA.

7.1.1.2. Market structure

(166) According to the Parties, and apart from them, there are a number of suppliers of military GPS receivers in the EEA and worldwide. These include L3Harris, Trimble, Mayflower and Thales.

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112 Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings ("Horizontal Merger Guidelines"), OJ C 31, 05.02,2014.

113 Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings ("Non-Horizontal Merger Guidelines") (2008/C 265/07).

114 UTC also supplies commercial GPS receivers but Raytheon does not.

115 Raytheon sells ASICs (chips) to third parties in the EEA. Raytheon's sales of ASICS in the EEA amounted to USD […], USD […] and USD […] in 2016, 2017 and 2018, respectively.

(167) The Notifying Party submitted EEA estimated market shares for military GPS receivers (including both receiver cards used in embedded systems or other circuitry and navigation boxes) expressed in sales value of both Parties and of their rivals. Total sales include direct sales of military GPS receivers made by US and EEA-based suppliers to EEA-based OEMs and armed forces. EEA market shares provided by the Notifying Party cover the period 2014 to 2018.

(168) Table 1 shows the Parties' and their competitors' EEA market shares estimates (value) in the supply of military GPS receivers for the period 2014 to 2018.

Table 1: EEA market shares estimates in military GPS receivers for 2014–2018 period

	Market shares in value (%)						
Year	**UTC**	**Raytheon**	**Combined**	**Trimble**	**L3Harris**	**Thales**	**Total sales (USD million)**
2014	[70-80]%	[0-5]%	**[70-80]%**	[10-20]%	[5-10]%	[5-10]%	[10-20]
2015	[80-90]%	[0-5]%	**[80-90]%**	[10-20]%	[5-10]%	[0-5]%	[10-20]
2016	[70-80]%	[0-5]%	**[70-80]%**	[10-20]%	[5-10]%	[0-5]%	[0-5]
2017	[70-80]%	[0-5]%	**[80-90]%**	[10-20]%	[0-5]%	[0-5]%	[5-10]
2018	[70-80]%	[10-20]%	**[80-90]%**	[10-20]%	[0-5]%	[0-5]%	[5-10]

Source: Form CO, Annex A.5.44.

(169) For the purposes of assessing the indirect effects of the Transaction in the EEA, Table 2 shows the Parties' and their competitors' US average market shares (value) in the supply of military GPS receivers for 2016 to 2018 period. Total sales include all sales of military GPS receivers to US-based OEMs, including for platforms ultimately sold to EEA armed forces (through the US FMS program or otherwise).

Table 2: US average market shares estimates of in military GPS receivers for 2016-2018 period

	Market shares in value (%)								
Period	**UTC**	**Raytheon**	**Combined**	**Trimble**	**L3Harris**	**Cobham**	**Mayflower**	**Others**	**Total sales (USD million)**
2016-2018	[40-50]%	[20-30]%	**[60-70]%**	[10-20]%	[5-10]%	[5-10]%	[0-5]%	[5-10]%	[200-250]

Source: Form CO, Annex A.5.44.

7.1.1.3. The Commission's assessment

(170) Based on the information provided by the Notifying Party with regard to direct sales made to EEA-based OEMs and armed forces, the EEA market for the supply of military GPS receivers would be horizontally affected, as the combined market share of the Parties amounts to [80-90]% (2018).

(171) The above EEA market data indicate that the Parties' combined market share in the supply of military GPS receivers has constantly been above 50% for the past years.

(172) According to the Notifying Party, the Transaction should not give rise to competitive concerns in the EEA in respect of military GPS receivers as post-Transaction the merged entity will remain constrained by several established DoD authorised competitors including L3Harris, Trimble and Mayflower.[116]

(173) However, in the EEA, the market shares of such of alternative manufacturers of military GPS receivers remains well below the combined market share of the Parties. In 2018, for instance, the market share of Trimble and L3Harris only amounted to [10-20]% and [0-5]%, respectively. In addition, it appears that in the past years Trimble's and L3Harris' market shares have declined. Moreover, as reported by the Notifying Party, Mayflower [confidential insight into the Parties' knowledge of the market].

(174) The Notifying Party further claims that, as M-code GPS receivers are still in development and military Galileo receivers have not yet been fielded, current market shares would essentially reflect sales of P(Y)-code GPS receivers, which are becoming obsolete, and likely overstate the Parties' position going forward.[117]

(175) However, as also explained by the Notifying Party, the DoD has awarded funding only to three companies, including the Parties, to produce M-code GPS receivers for ground equipment, aviation, maritime equipment, PGMs and handheld applications.[118] Thus, following the Transaction, only the merged entity and L3Harris would be receiving DoD funding to develop the future generation of GPS receivers. As a respondent to the market investigation pointed, '*it is difficult to predict as of now the market positions on M-code which can evolve during the next four years*'.[119] Nonetheless, when M-Code GPS receivers will be operational, the market would be even more concentrated and the merged entity would likely be in a similar dominant position as it is for P(Y)-code GPS receivers, if not more. Precisely, a market participant indicated that '*absent a remedy, the proposed transaction would eliminate competition for airborne, maritime and ground M-Code receivers*' as '*UTC and Raytheon are two of only three suppliers, along with L3Harris (...), developing new, congressionally mandated ASIC based M-Code receivers*'.[120]

(176) Moreover, contrary to what the Notifying Party argues, the results of the market investigation suggest that military Galileo PRS receivers, when fully operational, will be a complementary, rather than a competing product in the EEA compared to military GPS receivers.[121]

(177) Lastly, the Notifying Party claims that the Parties' customers (the DoD, prime contractors, etc.) are powerful, sophisticated entities that can – and do – determine competitive conditions for military GPS receivers. Therefore, according to the Notifying Party, should the merged entity attempt to increase its prices for military GPS receivers post-Transaction, the DoD could simply authorize more companies to

116 Form CO, Chapter D, para. 47.
117 Form CO, Chapter D, paras. 49-51.
118 Form CO, Chapter D, para. 20.
119 Questionnaire to suppliers of military equipment Q1, question 110.3.1.
120 Letter from a market participant, 07.02.2020.
121 Questionnaire to suppliers of military equipment Q1, question 101.1.

produce such products.[122] For this, third parties could produce military GPS receivers using ASICs (sourced from the US) provided they have US DoD authorization to do so.

(178) In this regard, whereas suppliers of GPS receivers producing ASICs internally (e.g., the Parties, Trimble) appear to compete with suppliers of GPS receivers sourcing ASICs externally (e.g., Thales),[123] the latter are inherently dependent on the former. Conversely, one market participant indicated that '*the price of ASICs (sold from GPS receivers producing ASICs internally to suppliers of GPS receivers sourcing ASICs externally) is regulated by the government*'.[124]

(179) In any event, for existing platforms, most customers indicated during the market investigation that, when sourcing military GPS receivers, it is not possible to switch to an alternative supplier in a cost efficient and timely manner and without integration and interoperability constraints.[125]

(180) In particular, a respondent to the market investigation explained that:[126] '*[s]witching to a new GPS receiver will require many changes to the platform to accommodate differences between the current and new GPS receivers, such as: power requirements, weight, physical volume (height / width), the precise timing of its processing and outputs, and many others*'. Therefore, '*[s]ystem integrators cannot simply "swap in" off-the-shelf receivers from alternative suppliers*'. The same market participant indicated that '*once a GPS receiver has been designed into a platform such as a missile, switching to an alternative supplier will be difficult, expensive and time consuming*' and '*[i]n some cases, it may be impossible*'.

(181) In addition to the necessary changes for existing platforms, adding a new supplier generally implies costly and lengthy qualification processes. In this regard, one respondent to the market investigation indicated that there are '*significant costs and schedule impacts associated with qualifying a new source*'.[127]

(182) Overall, the Transaction is likely to result in both direct and indirect effects in the EEA. In turn, the significant industry concentration resulting from the combination of the Parties' activities raises serious doubts in relation to the supply of military GPS receivers.

(183) The Transaction will give rise to **direct anti-competitive effects** in the EEA as it is clear from the market investigation that the Parties are the two main suppliers of the core military GPS receiver technology in the EEA. Such technology constitutes critical input for a broad range of systems with ground, sea, airborne or weapon applications, as well as for competing suppliers of GPS receivers sourcing ASICs externally. Direct effects would primarily affect EEA-based OEMs acquiring military GPS receivers for the manufacture of new military platforms (as there is no material competition for existing platforms) or PGMs.

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122 Form CO, Chapter D, paras. 54-55.

123 Questionnaire to suppliers of military equipment Q1, question 111.

124 Questionnaire to suppliers of military equipment Q1, question 111.1.

125 Questionnaire to suppliers of military equipment Q1, question 119.

126 Questionnaire to suppliers of military equipment Q1, question 119.1.

127 Questionnaire to suppliers of military equipment Q1, question 119.1.

(184) In this regard, one market participant expressed that the combination of the Parties' capabilities in the supply of GPS receivers would result in '*fewer choices of supply for customers, a reduction in the incentive and ability to innovate, giving the customers fewer options, and less of a constraint on price increases*'.[128]

(185) Further to the direct anti-competitive effects of the Transaction in the supply of GPS receivers in the EEA, the merger between UTC and Raytheon will also give rise to **indirect effects** in the EEA. Indirect effects would result from purchases by EEA armed forces of military platforms or PGMs containing military GPS receivers manufactured by US OEMs (through the FMS program or DCS). One market participant indicated that '*European armed forces do rely on US platforms significantly, and increasingly so for some of them*'.[129] In this regard, the results of the market investigation show that most armed forces generally procure military equipment "as a complete package" (with all systems/subsystems/components selected by the OEM/DoD)[130] and that only exceptionally could they buy GPS receivers on a standalone basis.[131]

(186) The results of the market investigation suggest that the majority of the EEA armed forces consider it either possible or very likely that an increase in the price of GPS receivers would typically be reflected in the price of the platform in question (and therefore "passed on" to the customers of such platform, i.e., armed forces).[132] In this regard, the highly concentrated nature of the market at OEM level and the critical nature of GPS receivers in military platforms makes it more likely that any price increase of such products will be passed on to the acquirers of the platforms. Moreover, armed forces and OEMs would not have sufficient countervailing buyer power to avoid it. Furthermore, as one competitor expressed during the market investigation, GPS receivers are used every day by European armed forces and any supply-chain disruption would be "*highly catastrophic*".[133]

(187) Based on the combined market shares of the Parties and further qualitative evidence available to the Commission as explained in this Section, the Commission concludes that the Transaction raises serious doubts as to its compatibility with the internal market due to the creation or strengthening of a dominant position in the supply of military GPS receivers in the EEA.

7.1.2. Military communication systems

7.1.2.1. Introduction

(188) Both UTC and Raytheon supply military airborne radios, military ground radios and military data links devices in the EEA, either through the US FMS program or via DCS. The Parties integrate SATCOM capabilities in their military airborne radios but do not supply such systems as stand-alone systems.

128 Letter from a market participant, 21.10.2019.
129 Minutes of a call with a market participant, 30.09.2019.
130 Questionnaire to European (EEA) armed forces Q2, question 11.
131 Questionnaire to European (EEA) armed forces Q2, question 19.
132 Questionnaire to European (EEA) armed forces Q2, question 21.
133 Questionnaire to suppliers of military equipment Q1, question 119.1.

(189) UTC manufactures and supplies military airborne radios operating at HF and VHF/UHF frequencies, certain of which include narrowband SATCOM capabilities.[134] UTC provides military narrowband SATCOM capabilities integrated in its airborne radios but does not supply stand-alone Narrowband SATCOM for military applications.[135] In addition, UTC manufactures fixed HF and VHF/UHF ground radios and a deployable VHF/UHF ground radio. Lastly, UTC produces military Link 16 SA data links and owns the ARINC network.[136]

(190) Raytheon manufactures and supplies VHF/UHF military airborne radios, certain of which include Narrowband SATCOM capabilities. Raytheon also manufactures and supplies military ground radios. However, according to the information made available to the Commission,[137] it is Raytheon's intention to exit the segment and it has ceased responding to tenders for military ground radios opportunities both globally and in the EEA. Moreover, Raytheon […]. Lastly, Raytheon produces SA data links that use SADL and EPLRS protocols[138] (which cannot communicate directly with data links using more advanced protocols such as Link 16 data links produced by UTC) and it manufactures and supplies military wideband SATCOM products.

(191) According to the Notifying Party, there are no affected markets in the area of military communication systems.

(192) The Commission assesses in section 7.1.2.3 the impact of the combination of the Parties' production and supply of military airborne radios, military ground radios and data links in the EEA.

7.1.2.2. Market structure

(A) Military airborne radios

(193) Apart from the Parties, there are a number of suppliers of military airborne radios in the EEA and the US. These include Thales, Leonardo, Rohde & Schwarz, Cobham and Viasat, among others.

(194) The Notifying Party submitted EEA estimated market shares for military airborne radios expressed in sales value of the Parties and their rivals. Total sales include direct sales of military airborne radios made by US and EEA-based suppliers to EEA-based OEMs and armed forces. EEA market shares provided by the Notifying Party cover the period 2014 to 2018.

(195) Table 3 shows the Parties' and their competitors' EEA market shares (value) in the supply of military airborne radios for 2014 to 2018 period.

134 UTC also supplies radios for civil applications, although Raytheon does not.

135 UTC does not produce military Wideband or protected SATCOM. UTC only produces stand-alone Wideband SATCOM transceivers for commercial applications.

136 UTC produces and sells most of its data links through Data Link Solutions ("DLS"), a joint venture formed with BAE Systems.

137 Form CO, Chapter C, paras. 53-56.

138 Raytheon […].

Table 3: EEA market shares estimates in military airborne radios for 2014–2018 period

	Market shares in value (%)							
Year	**UTC**	**Raytheon**	**Combined**	**Rohde & Schwarz**	**Thales**	**Leonardo**	**Others**	**Total sales (USD million)**
2014	[5-10]%	[0-5]%	**[10-20]%**	[40-50]%	[30-40]%	[10-20]%	[0-5]%	[250-300]
2015	[5-10]%	[0-5]%	**[10-20]%**	[40-50]%	[30-40]%	[10-20]%	[5-10]%	[200-250]
2016	[10-20]%	[0-5]%	**[10-20]%**	[40-50]%	[20-30]%	[10-20]%	[0-5]%	[150-200]
2017	[5-10]%	[5-10]%	**[10-20]%**	[40-50]%	[30-40]%	[10-20]%	[0-5]%	[150-200]
2018	[10-20]%	[5-10]%	**[10-20]%**	[40-50]%	[20-30]%	[10-20]%	[0-5]%	[100-150]

Source: Form CO, Annex A.5.44.

(196) For the purposes of assessing the indirect effects of the Transaction on the EEA, Table 4 shows the Parties' and their competitors' US average market shares (value) in the supply of military airborne radios for 2016 to 2018 period. Total sales include all sales of military airborne radios to US-based OEMs, including for platforms ultimately sold to EEA armed forces (through the US FMS program or otherwise).

Table 4: US average market shares estimates in military airborne radios for 2016-2018 period

	Market shares in value (%)						
Period	**UTC**	**Raytheon**	**Combined**	**Northrop Grumman**	**Rohde & Schwarz**	**Others**	**Total sales (USD million)**
2016-2018	[40-50]%	[20-30]%	**[60-70]%**	[10-20]%	[5-10]%	[10-20]%	[450-500]

Source: Form CO, Annex A.5.44.

(B) Military ground radios

(197) Apart from the Parties, there are a number of suppliers of military ground radios in the EEA and worldwide. These include Thales, Leonardo and Rohde & Schwarz, among others.

(198) The Notifying Party has only provided average market share information for the supply of military ground radios in the EEA for the three-year period 2016-2018 as, according to it, Raytheon has effective withdrawn from competing for ground radios. Total sales include direct sales of military ground radios made by US and EEA-based suppliers to EEA-based OEMs and armed forces.

(199) Table 5 shows the Parties' and their competitors' EEA average market shares (value) in the supply of military ground radios for 2016 to 2018 period.

Table 5: EEA average market shares estimates in military ground radios for 2016–2018 period

	Market shares in value (%)								
Period	**UTC**	**Raytheon**	**Combined**	**L3Harris**	**Thales**	**Rohde & Schwarz**	**Leonardo**	**Others**	**Total sales (USD million)**
2016-2018	[0-5]%	[0-5]	**[0-5]%**	[20-30]%	[40-50]%	[10-20]%	[5-10]%	[0-5]%	-

Source: Form CO, Annex A.5.44.

(C) Data links

(200) Regarding the market structure, apart from the Parties, there are a number of suppliers of military data links in the EEA and worldwide. These include Thales, Leonardo, Rohde & Schwarz and Viasat, among others.

(201) The Notifying Party has provided EEA estimated average market shares for military data links expressed in sales value of both Parties and of their rivals for the three-year period 2016-2018. Total sales include direct sales of military data links made by US and EEA-based suppliers to EEA-based OEMs and armed forces.

(202) Table 6 shows the Parties' and their competitors' EEA average market shares (value) in the supply of military data links for 2016 to 2018 period.

Table 6: EEA average market shares estimates in data links for 2016–2018 period

	Market shares in value (%)								
Period	**UTC**	**Raytheon**	**Combined**	**EuroMIDS**	**L3Harris**	**Viasat**	**TransDigm**	**Others**	**Total sales (USD million)**
2016-2018	[5-10]%	[0-5]%	**[5-10]%**	[50-60]%	[10-20]%	[10-20]%	[5-10]%	[10-20]%	-

Source: Form CO, Annex A.5.44.

(203) In the supply of Link 16 military data links, the combined market share of the Parties in 2018 would amount to [0-5]% in the EEA (UTC: [0-5]%; Raytheon: [0-5]%).[139]

7.1.2.3. The Commission's assessment

(204) Based on the information provided by the Notifying Party, the EEA market for the supply of military airborne radios would not be a horizontally affected market.

(205) According to the Notifying Party, the Transaction should not give rise to competitive concerns in the EEA with respect to military communication systems for a number of reasons.[140] First, according to the Notifying Party, the Parties' combined share in

139 Form CO, Chapter C, Annex A.5.44.

140 Form CO, Chapter C, Section 7.

military airborne radios in Europe is low and they will remain far behind the market leaders in Europe. Second, the Notifying Party argues that the Parties have not competed against each other for the supply of any military communication systems in the EEA within at least the last five years. Third, the Notifying Party argues that the Transaction would have no material effect on procurement for existing applications, as competition for upgrades to existing platforms is limited. Fourth, according to the Notifying Party, competition for future opportunities is robust and market entry is likely. Lastly, sophisticated buyers for these products would have significant buyer power.

(206) According to the Parties' estimates, their combined EEA market shares in the supply of military airborne radios remained below 20% in the past years (2014-2018). Moreover, there are at least three other EEA-based competitors with similar or higher market shares compared to the Parties, namely, Rohde & Schwarz, Thales and Leonardo. Rohde & Schwarz and Thales would seem to have particularly strong positions in the supply of military airborne radios in the EEA, with Rohde & Schwarz holding near half of the sales value.

(207) Notwithstanding the above, in the US market for the supply of military airborne radios, the combined market share of the Parties would remain well above 50%, at almost 70%, with the next competitor, Northrop Grumman, with a fifth of the market share of the merged entity. Post-Transaction, the Parties would have a prevailing position in the US market for the supply of military airborne radios, being the only real supplier option for some US based OEMs. In this context, most respondents pointed to the fact that US based OEMs generally favour US based suppliers.[141]

(208) Indeed, although there are alternative EEA-based suppliers serving EEA-based OEMs with military airborne radios, the US market is *de facto* closed to those EEA suppliers. As one competitor of the Parties has explained, '*it is impossible for European suppliers to be awarded projects for radio or other communication systems for US platforms*'.[142] At the same time, EEA armed forces procure a variety of US military aircraft platforms via the FMS program or DCS. Consequently, it is likely that the Transaction may result at least in indirect harm to European armed forces, notably as they consider likely that an increase in the price of military airborne radios would typically be reflected in the price of the platform in question (and therefore "passed on" to the customers of such platform, i.e., armed forces).[143] In this regard, as for military GPS receivers, the highly concentrated nature of the market at OEM level and the critical nature of radios in military aircrafts makes it more likely that any price increase of such products will be passed on to the acquirers of the aircrafts. Moreover, armed forces and OEMs would not have sufficient countervailing buyer power to avoid it.

(209) Regarding the overall buyer power of customers of military airborne radios, one competitor of the Parties explained during the market investigation that '*[f]or small quantities the buyer power is very limited*' and that '*[i]f the supplier base reduces buyer power will only be given to customers who order large quantities*'.[144] With

141 Questionnaire to suppliers of military equipment Q1, question 89.3.

142 Minutes of a call with a EEA-based competitor, 30.09.2019.

143 Questionnaire to European (EEA) armed forces Q2, question 21.

144 Questionnaire to suppliers of military equipment Q1, question 83.

regard to existing platforms in particular, one respondent explained that '*[a]n aircraft integrator cannot simply "swap in" a radio from a new supplier without make other changes to the aircraft*' and that '*[t]he time and cost required to switch to a new supplier of airborne radios depends on the platform and the degree of difference between the old and new radios*'.[145]

(210) In addition, the market investigation confirms that there has not been any new supplier of military radios to EEA-based customers over the last five years and there are no alternative suppliers likely to start supplying military radios to EEA-based customers in the coming future.[146]

(211) Therefore, with regard to military airborne radios, it cannot be excluded that the Transaction gives rise to **indirect effects** in the EEA that would result from purchases by EEA armed forces of military platforms containing military airborne radios manufactured by US OEMs (through the FMS program or DCS).

(212) With regard to military ground radios, the combined market share of the Parties would remain well below 20% in the EEA. In particular, UTC's market share only amounts to [0-5]% at EEA level (period 2016-2018), and it appears that Raytheon is no longer competing in the market. A number of alternative suppliers with higher market shares would compete with the merged entity in the supply of military ground radios post-Transaction, including L3Harris, Rohde & Schwarz, Thales and Leonardo. Consequently, the Transaction does not raise serious doubts as to its compatibility with the internal market with regard to military ground radios.

(213) With regard to military data links, the combined market share of the Parties would remain below 20% in the EEA. Furthermore, the data links products offered by the Parties do not use the same protocols, as UTC's data links use the Link 16 NATO protocol and Raytheon's data links use SADL and EPLRS protocols. A number of alternative suppliers would compete with the merged entity in the supply of data links post-Transaction, including L3Harris, EuroMIDS and Viasat (at least EuroMIDS and Viasat supply Link 16 data links). At EEA level, EuroMIDS ([50-60]%), L3Harris ([10-20]%), Viasat ([10-20]%) and TransDigm ([5-10]%) would have larger market shares than the merged entity. Consequently, the Transaction does not raise serious doubts as to its compatibility with the internal market with regard to military data links.

(214) One market participant indicated that the Parties are the two primary Identification Friend-or-Foe ("IFF") transponder manufacturers serving the US and two of the three major IFF transponder manufacturers in the EEA.[147] IFF transponders perform identification friend or foe functionality and thus serve to determine whether other platforms are ally or enemy operated. According to this market participant, the Transaction would effectively reduce the major players in the supply of IFF transponders. However, according to the information provided by the Parties, UTC does not develop or supply such technology.[148] The same market participant indicated that there is a potential horizontal concern as the Parties have important

145 Questionnaire to suppliers of military equipment Q1, question 73.

146 Questionnaire to suppliers of military equipment Q1, questions 84 and 85.

147 Letter from a market participant, 21.10.2019.

148 Form CO, Chapter C, para. 42.

combined market shares in the supply of military SATCOMs. However, with regard to the supply of SATCOMs, the activities of the Parties do not overlap.

(215) Based on the quantitative and qualitative evidence described in this Section, the Commission cannot exclude that the Transaction raises serious doubts as to its compatibility with the internal market with regard to the supply of military airborne radios in the EEA. In any event, the remedies offered by the Parties, as explained in Section 8, would solve any such serious doubts.

7.1.3. EO/IR sensors

7.1.3.1. Introduction

(216) Both UTC and Raytheon supply EO/IR sensors in the EEA either through the US FMS program or via DCS.

(217) UTC manufactures and supplies long-range and short-range EO/IR sensors for surveillance.

(218) Raytheon manufactures and supplies mid-range sensors for targeting. In addition, Raytheon has one radar product with multiple features that also includes certain long-range EO/IR capabilities, but Raytheon has never supplied this product in the EEA.

(219) The Commission assesses in the following section the impact of the combination of the Parties' production and supply of EO/IR sensors in the EEA.

7.1.3.2. Market structure

(220) The Notifying Party submitted EEA estimated average market shares in sales value with respect to the two alternative product market definitions explained in Sections 5.3 and 6. More specifically, market data is presented at EEA level for long-, mid- and short-range EO/IR sensors as well as for EO/IR sensors used for surveillance, reconnaissance and targeting missions. EEA market shares provided by the Notifying Party cover the period 2016 to 2018.

(221) Table 7 shows UTC's and competitors' average market shares estimates (value) in the supply of long-range EO/IR sensors in the EEA for the period 2016 to 2018.

Table 7: EEA market shares estimates in long-range EO/IR sensors for 2016-2018 period

	Market shares in value (%)			
Period	**UTC**	**Thales**	**Rafael**	**Total sales (USD million)**
2016-2018	[5-10]%	[70-80]%	[20-30]%	[200-250]

Source: Form CO, Annex A.5.44.

(222) Table 8 shows Raytheon's market shares estimates (value) in the supply of mid-range EO/IR sensors in the EEA for the period 2016 to 2018.

Table 8: Raytheon's EEA market shares estimates in mid-range EO/IR sensors for 2016-2018 period

Market shares in value (%)		
2016	**2017**	**2018**
[0-5]%	[0-5]%	[5-10]%

Source: Form CO, Annex A.5.44.

(223) Table 9 shows UTC's and competitors' market shares estimates (value) in the supply of short-range EO/IR sensors in the EEA for the period 2016 to 2018.

Table 9: EEA market shares estimates in short-range EO/IR sensors for 2016-2018 period

	Market shares in value (%)						
Period	**UTC**	**Controp**	**L3Harris**	**FLIR**	**Ascent Vision Tech.**	**Others**	**Total sales (USD million)**
2016-2018	[0-5]%	[20-30]%	[10-20]%	[10-20]%	[5-10]%	[40-50]%	[80-90]

Source: Form CO, Annex A.5.44.

(224) With respect to market definitions made according to the type of mission of the EO/IR sensors, i.e. reconnaissance, targeting and surveillance missions, the Parties overlap only in the EEA market for EO/IR sensors for surveillance missions.[149]

(225) In the market for **EO/IR sensors for targeting**, only Raytheon is active, while UTC does not offer any EO/IR sensor for targeting. The Notifying Party estimates that the market share of Raytheon is [5-10]% at EEA-level.[150]

(226) In the market for **EO/IR sensors for reconnaissance,** only UTC is active, while Raytheon does not offer any EO/IR sensor for reconnaissance. The Notifying Party estimates that the market share of UTC is below [5-10]% at EEA-level.[151]

(227) In the market for **EO/IR sensors for surveillance**, Raytheon offers only one product, which is the Enhanced Integrated Sensor Suite ("EISS"). The EISS cannot be offered as a stand-alone EO/IR sensor and, in any event, Raytheon has never sold EISS to the EEA market, […]. Therefore, the Transaction would not change the market shares of UTC pre-Transaction, which are less than [0-5]% for the EEA market.[152]

(228) The Notifying Party did not provide market shares with respect to a possible distinction between podded and integrated EO/IR sensors. However, if such a distinction is made, the resulting overlaps of the Parties would either remain

149 Form CO, Chapter B, table 2.

150 The Notifying Party's reply to the Commission request for information RFI 2, question 2.

151 The Notifying Party's reply to the Commission request for information RFI 2, question 2.

152 The Notifying Party's reply to the Commission request for information RFI 2, question 2.

unchanged or would further reduce, because such a distinction would entail an narrower definition of the relevant markets.

7.1.3.3. The Commission's assessment

(229) The Transaction gives rise to a horizontal overlap between the activities of the Parties with regard to long-range EO/IR sensors or EO/IR sensors for surveillance missions. However, the Transaction would result in limited impact on the EEA markets for EO/IR sensors because the Parties' EO/IR sensors are complementary in nature and because, pre-Transaction, no close competition took place between them.

(230) According to the Notifying Party, the overlap between the Parties' activities in relation to EO/IR sensors is limited as UTC only supplies short- and long-range EO/IR sensors and Raytheon mainly supplies mid-range EO/IR sensors, and, to a limited extent, long-range EO/IR capabilities.[153] Alternatively, UTC would only supply EO/IR sensors for reconnaissance and surveillance missions, while Raytheon would mainly supply EO/IR sensors for targeting missions.

(231) In this respect, Raytheon has only one product that includes long-range EO/IR and surveillance functionalities, which is the EISS sensor. According to the Notifying Party,[154] this product cannot be offered as a stand-alone EO/IR sensor, but is part of a sensor suite that has a synthetic-aperture radar as its primary element. Further, the Notifying Party explains that Raytheon has never sold EISS to the EEA market, […].

(232) Therefore, although an overlap between the Parties exists in terms of products offering, no material overlap in terms of sales occurred over the period 2016-2018 because, […],[155] […] at EEA-level [Raytheon] never sold any [long-range EO/IR] sensors at all.[156]

(233) According to the market shares estimates provided by the Notifying Party, UTC's market share in the EEA amounts only to [5-10]%. Table 7 also shows that in the EEA Thales had the largest sales in the period 2016-2018, representing [70-80]% market share, followed by Rafael with a market share of [20-30]%.

(234) Therefore, the combination of the Parties' capabilities in long-range EO/IR sensors will have no impact on the EEA as pre-Transaction Raytheon has never sold any EISS sensor in the EEA […].

(235) In addition, the market investigation has confirmed that the Parties' EO/IR sensor capabilities are complementary.[157] Thus, the Transaction will result in the merged entity having a full range of sensor capabilities but this will not result in a direct and/or significant loss of competition. In this regard, whereas customers do sometimes procure different types of sensors together or as part of a suite of mission systems, other suppliers appear to be able to offer the same range of sensors.[158]

153 Form CO, Chapter B, Table 2.
154 Form CO, Chapter B, paragraph 28.
155 Form CO, Chapter B, paragraph 86.
156 Form CO, Chapter B, paragraph 68.
157 Questionnaire to suppliers of military equipment Q1, question 22.
158 Questionnaire to suppliers of military equipment Q1, question 2.

(236) Furthermore, the majority of the respondents to the market investigation indicated that EEA-based customers would have sufficient alternative suppliers of EO/IR sensors available upon completion of the proposed acquisition of Raytheon by UTC.[159]

(237) Lastly, the majority of the Parties' customers that expressed a view in the market investigation consider that the Transaction would not have any impact on their businesses with regard to the supply of EO/IR sensors.[160]

(238) Based on the information available as explained in this section, the Commission concludes that Transaction does not raise serious doubts as to its compatibility with the internal market with regard to EO/IR sensors.

7.1.4. Conclusion on horizontal non-coordinated effects

(239) In light of the considerations in section 7.1 and based on the results of the market investigation and on all the information available to it, the Commission concludes that the Concentration raises serious doubts as to its compatibility with internal market with respect to horizontal non-coordinated effects in the markets for the supply of military GPS receivers and military airborne radios. The Commission considers that the commitments offered by UTC as described in Section 8 are adequate and sufficient to eliminate any serious doubts as to the compatibility of the Transaction with the internal market in relation to those markets.

7.2. Vertical non-coordinated effects

(240) This section considers the following vertical relationships: UTC's (upstream) manufacture and supply of:

(a) GNSS receivers;

(b) actuation systems;

(c) lower performance tactical grade IMUs;

(d) And the supply of ARINC certification for military equipment; and

(e) Raytheon's (downstream) integration of these systems into PGMs.

(241) As shown in Table 4 below, the Transaction only results in one affected market in the EEA for the supply of GPS Receivers used in PGMs. In effect, UTC's market shares in the upstream markets are negligible in the EEA and modest on a worldwide basis, with the exception of GPS receivers ([30-40]% EEA and [40-50]% worldwide).

(242) Equally, Raytheon's downstream market shares in the manufacture of PGMs are low in the EEA [5-10]% and modest worldwide [10-20]%. This picture holds true for the relevant individual narrower segments within PGMs. Raytheon's estimated EEA and worldwide shares remains below 30% in all cases.

159 Questionnaire to suppliers of military equipment Q1, question 24.

160 Questionnaire to suppliers of military equipment Q1, question 32.

(243) Nevertheless, for completeness, and given that some market participants expressed concerns on some of these vertical relationship, these markets are further assessed in the next sections[161].

Table 10: Parties' market shares in the relevant markets

<table>
<tr><td rowspan="2">Upstream</td><td>Actuation</td><td>Tactical IMUs</td><td>GPS receivers</td><td>Propulsion</td></tr>
<tr><td>UTC:
[0-5]% EEA
<20% WW

Raytheon:
[0-5]%</td><td>UTC:
<20% EEA
<20% WW

Raytheon:
[0-5]%</td><td>UTC:
[30-40]% EEA
[40-50]% WW

Raytheon:
[10-20]% EEA
[40-50]% WW</td><td>UTC:
[0-5]% EEA
[0-5]% WW

Raytheon:
[0-5]%</td></tr>
<tr><td rowspan="4">Downstream</td><td colspan="3">PGM</td></tr>
<tr><td colspan="3">UTC: [0-5]% EEA / [0-5]%WW

Raytheon: [5-10]% EEA / [10-20]% WW</td></tr>
<tr><td>Precision Guided Bombs</td><td>Precision Guided Projectiles</td><td>Precision Guided Missiles</td></tr>
<tr><td>UTC: [0-5]% EEA / [0-5]%WW

Raytheon: [20-30]% EEA / [20-30]% WW</td><td>UTC: [0-5]% EEA / [0-5]%WW

Raytheon: [0-5]% EEA / [10-20]% WW</td><td>UTC: [0-5]% EEA / [0-5]%WW

Raytheon: [0-5]% EEA / [10-20]% WW</td></tr>
</table>

Source: Form CO, Chapter E, Table 2.

7.2.1. Downstream PGM

7.2.1.1. Description of the vertical relationship and market context

(244) UTC does not manufacture any guided missiles.

(245) Raytheon manufactures a range of guided missiles. Raytheon's guided missiles cover the spectrum of short, medium, and long-range capabilities, and are operated from ground, sea, and air-based launch platforms. Raytheon does not manufacture nuclear guided missiles.

(246) As described in section Precision guided munitions ('PGMs')5.4 above, the types of subsystems and components manufactured and supplied by UTC (i.e., GPS receivers, actuation systems, lower performance tactical grade IMUs) are broadly similar irrespective of the type of PGM into which they are integrated.

(247) The competitive assessment is therefore similar for each of precision guided bombs, precision guided projectiles, and precision guided missiles (tactical and strategic).

(248) Nonetheless, given the potential segmentation of the PGM market, market share on each category of PGM is detailed below.

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161 Given the very low market share of UTC in propulsion systems and its minimal presence in this market in terms of products, the propulsion systems for PGMs does not raise concerns linked to the ability for the Parties to attempt a foreclosure strategy.

Table 11: Raytheon PGM market shares in the EEA

PGM segment	EEA-wide market share estimated					
	2018	2018	2016	2015	2014	Average (2014-2018)
Guided bombs	[20-30]%	[20-30]%	[20-30]%	[50-60]%	[20-30]%	[20-30]%
Guided projectiles	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[30-40]%	[5-10]%
Guided missiles (all)	[0-5]%	[5-10]%	[5-10]%	[5-10]%	[0-5]%	[5-10]%
Guided missiles (strategic)	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Guided missiles (tactical)	[0-5]%	[5-10]%	[5-10]%	[5-10]%	[5-10]%	[5-10]%

Source: Form CO, Chapter E, Table 3.

(249) There are two instances of Raytheon's estimated market shares being above 30%. First, in respect of precision guided projectiles in 2014 (estimated [30-40]% EEA-wide); and, second, in respect of precision guided bombs in 2015 (estimated [50-60]% EEA-wide).

(250) Average market share estimates as an average over the last 5 years, for guided projectiles is [5-10]% on an EEA-wide basis, while its estimated market share for guided bombs is [20-30]% (on both an EEA-wide and a worldwide basis). In any event, in each of the last 3 years, Raytheon's market share is below 30% in each segment of PGMs.

(251) The market investigation evidenced a majority of respondents replying that they do not expect that the acquisition of Raytheon by UTC would have any impact on their business with regard to the supply of subsystems or components for PGMs such as GPS receivers, actuation systems, IMUs, and propulsion systems.[162]

(252) Focusing more specifically on the downstream market of PGMs a majority of the respondents to the market investigation do not expect that the acquisition of Raytheon by UTC would have any impact on their business with regard to the supply of PGMs.[163]

(253) However, some market participants raised concerns on specific components and subsystems arguing that the transaction may in some situation lead potential input or customer foreclosure opportunities for the Parties. As described by a market participant, '*[i]ssues may potentially arise at the supply chain level as the new company resulting from the merger could stop supplying the Company, could do so at worse conditions, based on the influence that Raytheon could have on this activity*.'[164]

162 Questionnaire to suppliers of military equipment Q1, question 169.
163 Questionnaire to suppliers of military equipment Q1, question 170.
164 Questionnaire to suppliers of military equipment Q1, question 169.1.

(254) The specific components or subsystems that raised concerns are further assessed in the following sections.

7.2.1.2. Customer foreclosure ability: PGM

(255) A market participant mentioned that post-transaction, the merged entity would have no incentive to source from alternative suppliers (contrary to Raytheon pre-transaction), foreclosing UTCs competitors from a significant part of the market and reduction in incentives to innovate and develop products to the detriment of customers.

(256) First, Raytheon's estimated market share for PGMs in the EEA is limited. In 2018 Raytheon had an estimated market share for all PGMs of [5-10]% in the EEA and [10-20]% worldwide.

(257) Raytheon's estimated EEA shares are also below 30% in the narrower segments within PGMs: [0-5]% for precision guided projectiles, [20-30]% for precision guided bombs and [0-5]% for precision guided missiles.

(258) Second, there are a number of competitors producing PGMs, on both an EEA and a global basis, which suppliers could turn to in order to frustrate a customer foreclosure strategy. These include MBDA (the largest guided missile prime contractor in Europe) and Lockheed Martin (the largest guided missile prime contractor globally), as well as other smaller competitors.

(259) Third, for existing contracts the ability to switch is limited. Contracts between Raytheon and the customer (typically the U.S. Government) for a PGM will specify that a change in certain components (including GPS receivers) are classified as a 'Class 1' change. All Class 1 changes require buyer approval prior to implementation. This reflects the importance of these components in the performance of PGMs. As such, Raytheon is not authorized to make this change without first submitting an engineering change proposal for prior customer approval. Raytheon is therefore not able to foreclose demand on any of its GPS receiver suppliers

(260) Fourth, more specifically on the components mentioned by the complainants such as IMUs and Actuators Raytheon's spend on this components does only provide limited downstream market power. As a result, it is unlikely that Raytheon is a sufficiently important customer to suppliers in the EEA to foreclose demand.

7.2.2. Upstream components and subsystems

7.2.2.1. Introduction

(261) A market participant raised concerns about the impact of the vertical integration on some components and subsystems for PGMs stating that '*Raytheon could become more competitive and aggressive downstream due to the vertical integration resulting from the transaction. On this point, the Company believes that issues may potentially arise at the supply chain level as the new company resulting from the merger could stop supplying the Company, could do so at worse conditions, based on the influence that Raytheon could have on this activity.*' However the same market participant specifies that '*[o]n balance, however, the Company believes that*

the risks that may arise post-transaction are manageable. There are alternative suppliers [...].'[165]

(262) The coming sections will further assess the incentives and ability of the merged entity to engage into input foreclosure in components and subsystems for PGMs.

7.2.2.2. Input foreclosure ability: GPS Receivers

(A) Description of the vertical relationship and market context

(263) The market structure of GPS receivers is further described in detail in section 7.1.1.

(264) The Parties' combined market share in the supply of military GPS receivers is particularly high and has constantly been above 50% for the past years.

(265) The Transaction results in a vertically affected market in the EEA – the supply of GPS receivers which are used in precision guided bombs, precision guided projectiles, and precision guided missiles.

(266) Both UTC and Raytheon produce P(Y)-code military GPS receivers. Both are also being funded by the DoD to develop M-code GPS receivers.

(267) In 2018, UTC generated military GPS receiver revenues of USD […] million, of which USD […] million were generated in the EEA. UTC supplies GPS receivers to third parties, […], for incorporation into a range of different military applications.

(268) Raytheon produces military GPS receivers through its Space and Airborne Systems business unit. Raytheon has historically focused on the supply of GPS customized for high performance weapons. Raytheon's military GPS receiver activity is vertically integrated […], with approximately […]% of its GPS receiver production used internally ([…]% for Raytheon's guided weapons alone). As well as sourcing internally, Raytheon purchases GPS receivers from various third parties, including UTC.

(B) Commission assessment

(269) First Raytheon's PGMs are predominantly sold to the U.S. Government, which controls the suppliers of GPS receivers. Some of Raytheon's PGMs are sold to customers in the EEA through the FMS channels. Raytheon is unable to sell PGMs to any customer without DoD approval and the vast majority of its sales in PGM are made through FMS. The DoD therefore plays an important, if not decisive role in defining product characteristics and specifications.

(270) The DoD funds new product development and determines which suppliers will to produce these products. Indeed, the development of a significant proportion of military products are directly funded by the U.S. Government. The DoD's significant role in the market, makes it significantly more difficult to successfully adopt foreclosure strategies. The U.S. Government's ability to influence the competitive landscape mean any such strategies could result in intervention by the DoD.

165 Minutes of a call with a market participant, 11.10.2019 and Questionnaire to suppliers of military equipment Q1, question 166.1.

(271) Second, the procurement process makes it difficult to engage into foreclosure strategies. PGM prime contractor will issue a competitive tender for various components and request associated pricing over a series of production lots and quantities over multi-year timeframes. These typically mirror the duration of the contract the customer has negotiated for the supply of PGMs, so that the components supplier remains consistent for the duration of the contract. Moreover, GPS receivers are classified as a 'Class 1' change as further explained in paragraph xx. All Class 1 changes require buyer approval prior to implementation. As a result, in respect to PGMs supplied to a customer under an existing contract, a components supplier would not be able to engage in foreclosure strategies as this would be in breach of contract.

(272) Third, with regard to PGMs produced for the U.S. Government, while a prime contractor will typically determine the suppliers it uses (so long as the product and components meet the required specifications of the U.S. Government), under the Federal Acquisitions Regulation 'FAR', the U.S. Government is permitted to direct procurement when it has a requirement for a particular subsystem or component (or supplier).

(273) The regulatory rights of the U.S. Government under FAR, allows the U.S. Government to prevent an input foreclosure strategy. This legislation also benefits European customers as it means that when the original PGM procurement occurs, it occurs competitively and subsequent sales of already designed off-the-shelf PGM products yields competitively influenced pricing.

(274) Fourth, although the Parties are currently the two main suppliers of the core military GPS receiver technology worldwide however, the commitments further developed in section 8.3.4 will result in the divestment of the entirety of UTC's military GPS receiver activities. Accordingly, it will alleviate the merged entity market power and ability to engage in input foreclosure strategies.

7.2.2.3. Input foreclosure ability: Actuators

(A) Description of the vertical relationship and market context

(275) As described in section 5.5, actuation systems control the altitude or angular velocity of the PGM and effectively steer the PGM. There is a distinction between: (i) fin-based actuation systems; and (ii) TVA systems.

(276) Raytheon uses all types of actuation systems across its PGM portfolio. Raytheon uses TVA in its high-end guided missiles, such as its ballistic missile intercept systems, and fin-based actuation in a number of guided missiles. UTC is active in the supply of both TVA and fin-based actuation systems and supplies Raytheon with both of these for integration into various PGMs.

(277) However, considering the market for actuators, UTC has limited market shares in actuators under any plausible market definition.

(B) Commission assessment

(278) First, considering fin-based actuation systems, in Europe UTC does not supply actuation systems. Its market share in this segment is therefore [0-5]%. In the United States the market share is [10-20]% in 2019 and there are other competitors

including Woodward ([40-50]%), Parker ([20-30]%), Moog ([10-20]%), and GD-OTS ([0-5]%).

(279) Considering thrust vector-based actuation systems, in Europe UTC does not supply actuation. Its market share in this segment is therefore [0-5]%. In the United States UTC only supplies thrust vector-based actuation systems for […]. Accordingly, it has no significant market share in this area.

(280) Second, there are several credible competitors are active in the supply of each of TVA and fin-based actuation systems, both globally and the EEA. These players are well-established and sophisticated defence contractors. The main competitors to UTC in the supply of each of TVA and fin-based actuation systems include:

- Parker Hannifin Corporation - Parker Hannifin is a U.S. based company. It is one of the largest companies in the world in motion control technologies, Parker's Aerospace actuator and cylinder selection comprises hydraulic, pneumatic, and electromechanical actuators and cylinders.

- Woodward Inc. Woodward is one of the oldest and largest designers, manufacturers and service providers of control systems and control system components in the world. The company delivers an array of actuation technologies, systems and components for a broad range of U.S. missile programs.

- Nordic Ammunition Company (Nammo). Nammo is a Norwegian/Finnish aerospace and defence group specialising in ammunition, rocket engines and space applications. Nammo provides missile actuation systems for various applications and platforms.

(281) Therefore, such that any attempt at input foreclosure would be frustrated by the ability of downstream competitors to switch to an alternative supplier.

(282) Third, UTC does not supply any actuation products directly to customers in the EEA. As such, the merger cannot give rise to input foreclosure in respect of PGM prime contractors in the EEA. The PGM actuation systems produced by UTC are [details of UTC's PGM actuation sales].

(283) The respective market shares in the US and in the EEA indicates that input foreclosure concerns is unlikely to arise, due to the lack of market power on the upstream market and the availability of alternative sources of supply for customers. Moreover, other purchasers of each of TVA and fin-based actuation systems include major missile primes with strong buyer power such as MBDA, Lockheed Martin, Northrop Grumman, Boeing, BAE Systems, etc.

7.2.2.4. Input foreclosure ability: IMUs

(A) Description of the vertical relationship and market context

(284) As described in section 5.6, there are two segments of IMUs for PGMs: (i) high performance navigation grade; (ii) lower performance tactical grade.

(285) UTC is […] active in the supply of lower performance tactical grade IMUs, and currently supplies […] with this grade of IMU.

(286) Raytheon purchases both high performance navigation grade IMUs, which it incorporates into products such as its ballistic missile defence systems and cruise missiles; and lower performance tactical grade IMUs, which it integrates within a number of different products, including guided missiles.

(B) The Commission's assessment

(287) First, considering tactical grade IMUs, UTC's market share in the United States was [20-30]% in 2019. Considering a product market including all tactical grade IMUs irrespective of their application (missiles, land vehicles, UAVs, etc.), UTC's market share is lower than 20%.

(288) Although UTC supplies tactical IMUs to certain European missile manufacturers, its market position is […]. UTC market share in the European segment of tactical IMUs for missiles to be below [10-20]%.

(289) Second, there are a number of alternative providers for tactical IMUs, which UTC competes with on a regular basis. These competitors include Honeywell, Northrop Grumman, Analog Devices, L3, Emcore (which acquired Systron Donner in June 2019), Sensonor, Safran (Sagem brand), and SBG Systems. The existence of these competitors means that UTC's customers can switch their IMU demand to any one of a wide range of alternative suppliers, thus frustrating any attempt at an input foreclosure strategy.

(290) Third, some of Raytheon's largest competitors with regard to the supply of PGMs, including Lockheed Martin and Northrop Grumman, are vertically integrated with regard to the supply of IMUs, meaning that they also have the option of diverting some of their demand to in-house supply.

(291) Fourth, lower performance tactical IMUs are largely similar and allow for demand side substitution across a number of applications. As such, competition between suppliers at a given performance requirements is typically based around price, delivery and quality performance of the supplier.

(C) Input foreclosure incentive: components and subsystems for PGMs

(292) There are several reasons why the merged entity would have no incentive to engage in any foreclosure strategies, regardless of the nature of the vertical relationships.

(293) First, a fear of retaliation as PGM systems are comprised of a large number of highly technical subsystems and components and the market is characterized by significant cross-supply between competitors.

(294) Raytheon estimates that it relies on third party sourcing for over [50-60]% of its PGM subsystems and components; which is equivalent to between USD […] worth of expenditure across the business. This includes individual components across a range of applications (e.g., guidance and control, propulsion, etc.) as well as subsystems and assemblies, and notably, includes a number of components for which it also manufactures and supplies.

(295) Raytheon spends an estimated USD […] on subsystems and components for its PGM business each year. In this context, UTC is only a mid-sized supplier to Raytheon,

supplying components worth approximately […] per year – approximately […]% of its total annual component spend for PGMs.

(296) In this context, the merged company would not stand to gain by adopting any foreclosure strategies. If the merged entity engaged in input or customer foreclosure towards its competitors, it would risk facing similar retaliation strategies.

(297) Retaliation from competitors may occur, including exclusion by a PGM prime contractor from bidding for a future opportunity to supply components for a program, or an active move by a PGM prime contractor to introduce an additional or alternative supplier, subject to DoD's approval in respect of existing programs involving UTC components.

(298) Moreover, PGMs prime contractors such as Raytheon typically have a number of customer-supplier commercial relationships with their competitors. If the merged company were to engage in foreclosure strategies, it would risk missing the contracts for PGM systems to its downstream competitors, who would still be sourcing components based on the most advantageous quality and price.

(299) Second, foreclosure strategies would undermine existing business strategies as UTC supplies PGM components to many different PGM prime contractors. Indeed a significant proportion of UTC's business is dedicated to supplying various components to PGM prime contractors with well-established relations and strong reputation in the market. UTC has significant historical relationships with a number of PGM prime contractors. Changing business strategy and diminishing the business relationships would impact UTC's position as a PGM components supplier.

(300) The merged entity could also expect to lose profits as a result of withholding PGM subsystems and components in the upstream market without any confidence that they could be recouped through increased business in the downstream business. The relatively small downstream market share of Raytheon in PGMs in the EEA ([5-10]% for all PGMs in 2018 as further developed in section 7.2.1) and the competitive dynamics in the downstream PGM market makes it unlikely that the Parties would have incentive to engage in a foreclosure strategy.

(301) Similarly, Raytheon seems to have followed a strategy that is not or not always based on vertically integrating components. To obtain the highest quality components for the most competitive price, Raytheon has moved to sourcing PGM components from third parties notwithstanding that it is already has vertically integrated capabilities, for example:

- moving from in-house supply to purchase from […] of […], to obtain a higher quality product and to lower the cost of production; and

- moving from in-house supply to third party supply of […] on […], to increase quality and lower cost.[166]

(302) Third, the merged entity would face the risk of reputational damage by attempting to engage in such a strategy. The impact on the merged entities reputation would be particularly important in the market given the importance of cross-supplies.

166 Form CO, Chapter E, para. 201.

Attempting to engage in foreclosure strategies would do lasting damage to the reputation of the merged entity.

(303) The reputational damage could not only influence competitors and suppliers, but also the U.S. Government and its allies rely on the Parties for elements of their national defence infrastructure. They have the ability to punish the companies and divert future business elsewhere if they consider a party's actions are undermining their defence capabilities and national security. Therefore, risking the market reputation by engaging into foreclosure strategies would be a very high risk for the Parties given the specifies of national security and defence industry.

7.2.3. ARINC

(304) As explained above in Section 5.7, ARINC is a commercial datalink network that is owned and operated by UTC. As operator of the ARINC network, UTC is responsible for testing and approving aircraft communications equipment that send and receive data via ARINC, including testing and approving other manufacturers' products for compatibility with the network.

(305) One market participant expressed concerns that post-merger the merged entity would deprioritise competitors' ARINC testing and approvals, and that the combined entity would have an increased ability and incentive to influence the testing data centres to this end. This would put competitors' products at a disadvantage in terms of testing out some products, including new products, which will involve incorporation with the ARINC network.

(306) Raytheon is a defence contractor. According to the Notifying Party, none of Raytheon's existing products are developed or sold for use with ARINC[167], and Raytheon is not aware of any of its products having been tested and qualified to enable use with ARINC.

7.2.3.1. Input foreclosure ability

(307) First, as regards the testing of equipment for compatibility with the ARINC network, the procedure known as Aviation Qualification Procedures ("AQP") testing treats all manufacturers equally and is explicitly provided for in ARINC's AQP policy: ARINC does not discriminate among avionics manufacturers in connection with the testing processes described in this Policy.

(308) This means that (a) ARINC processes testing requests on a "first in, first out" basis; (b) ARINC provides all parties with the same level of service; and (c) ARINC grants the same official AQP status or classification designation to avionics that achieve the same AQP testing results.

(309) Second, as regards the operation of the ARINC network, UTC is contractually bound to neutrality and quality requirements, which can be monitored by airlines (i.e., ARINC customers) through regular performance reports. For example:

(a) Open standards. Airlines require that ARINC adhere to strict open access standards to ensure complete interoperability on all aircraft. UTC's contracts

167 Form CO, Chapter E, para. 347.

with these airlines require, for instance, that the exchange of data messages from aircrafts conform to the industry-wide standards.

(b) Quality requirements. UTC is bound by strict quality requirements set out in its contracts with airlines. These requirements include a series of high-standard service goals such as >[90-100]% availability rate of the datalink network services and >[90-100]% success delivery rate of uplink messages. UTC is required to provide airlines on a regular basis with performance reports, which identify the actual performance statistics compared to these overall service goals. Failure to achieve the service goals typically gives airlines the right to rebates or early termination.

(310) UTC therefore does not have the ability to discriminate between ARINC data flows. As explained above, ARINC directly competes with SITA as confirmed by a market participant '*[the company] considers that SITA is the alternative to ARINC*'[168]. Any attempt by UTC to reduce the performance of data flows related to third party aircraft components (or in any other way to discriminate against such third parties, e.g., through its pricing policy) would likely result in ARINC data traffic being diverted to SITA.

7.2.3.2. Input foreclosure incentive

(311) UTC has no incentive to engage into input foreclosure strategies post-Transaction as Raytheon's portfolio does not include products that could benefit from discriminatory treatment and could potentially result into traffic diverted from ARINC to SITA.

7.2.4. Conclusion

(312) The Commission finds that the merged entity would have no ability and incentive to foreclose competitors through the input foreclosure of components and subsystems for PGMs or testing and certification of ARINC products.

(313) The downstream shares of PGMs are not indicative of the significant degree of market power required to have the ability to foreclose competitors through input foreclosure strategies. The merged entity will continue to face at strong competitors with equivalent alternative products. Moreover, US DoD control of the procurement process make successful foreclosure strategies unlikely.

(314) Furthermore, potential retaliation, business strategy rational and reputational damage are a combination of factors that remove the incentive to engage into foreclosure strategies. This indicates that the merged entity is unlikely to have the incentives to engage in foreclosure after the Transaction.

(315) Based on the assessment laid down in paragraphs (244) to (313) and in view of the results of the market investigation and of all the evidence available to it, the Commission concludes that the Transaction does not raise serious doubts as to its compatibility with the internal market with regard to vertical non-coordinated effects.

168 Questionnaire to suppliers of military equipment Q1, question 57.1.

7.3. Conglomerate effects

(316) Considering the complementary nature of the product portfolio of the Parties a market participant expressed concerns that '*[r]egarding electro-optical sensors and GPS receivers, the Company does not anticipate any horizontal issue but rather conglomerate effects as the Parties would be able to supply combination of components, such combination being expected to be more and more required by customers.*'[169]

(317) While the combination of UTC and Raytheon will increase the number of systems that both Parties can supply to OEMs, this is unlikely to give rise to harm to competition.

(318) First, the customers for the Parties' products are largely different. Raytheon's focus is guided weapons manufactured by its five business units, among which Raytheon Missile Systems generates the most global sales. While these guided weapons are deployed by aircraft, it is unlikely that they could form the basis for any bundling or other foreclosure strategy with UTC aircraft components and systems, as Raytheon's guided weapons are directly sold to armed forces, not aircraft OEMs.

(319) Second, UTC's flight-critical systems and Raytheon's mission-critical systems are not procured simultaneously. UTC's flight-critical systems are procured early in an aircraft's development, while Raytheon's mission-critical systems are procured at a later stage.

(320) Third, OEMs select systems suppliers and control the procurement process, determining supply opportunities, as well as who will be the supplier. OEMs set the specifications of each component and system being procured, bidding timing and process, and the suppliers participating in each procurement opportunity.

(321) Generally, the Parties will increase scale, engineering capabilities and financial strength from the transaction. However, the combined entity will not become uniquely placed in that respect. In fact, the market investigation has revealed that the Transaction will enable the Parties to gain the critical size to compete with other large Tier 1 suppliers and OEMs. As further explained by the same market participant that mentioned potential conglomerate effects: '*the proposed transaction will enable the Parties to become a premier defence contractor, on par with the likes of Boeing, Northrop Grumman or Lockheed Martin. Their combined size, capabilities and capacities will impact their competitiveness, for example by limiting their exposure to safety risks and by spreading qualification costs. It will also give the Parties a wider portfolio of systems, which will further enable them to expand their combined systems' range and functions in the areas of, e.g., surveillance, targeting, reconnaissance (so-called "ISR"), as well as, communication and ammunition.*'[170]

(322) Based on the information available and the outcome of the market investigation, the Commission concludes that the Transaction does not raise serious doubts as to its compatibility with the internal market in relation to possible conglomerate effects.

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169 Minutes of a call with a market participant, 25.09.2019.

170 Minutes of a call with a market participant, 25.09.2019.

8. MODIFICATIONS TO THE TRANSACTION

8.1. Framework of assessment

(323) The Commission recalls that the following principles apply where parties to a concentration offer commitments in order to have the transaction approved in Phase 1 after serious doubts have been identified by the Commission. Those principles are referred to in Commission Regulation (EC) No 802/2004 and in the Commission Notice on remedies acceptable under the Merger Regulation (the "Remedies Notice").[171]

(324) In Phase I commitments offered by the parties can only be accepted where the competition problem is readily identifiable and can be remedied easily. The competition problem therefore needs to be so straightforward and the remedies so clear-cut that it is not necessary to enter into an in-depth investigation. The commitments should be sufficient to clearly rule out serious doubts within the meaning of Article 6(1)(c) of the Merger Regulation. Where the assessment confirms that the proposed commitments remove the grounds for serious doubts on this basis, the Commission clears the merger in Phase I.

(325) In assessing whether the proposed commitments will likely eliminate the competition concerns identified, the Commission considers all relevant factors including the type, scale and scope of the proposed commitments. It does so on the basis of the structure and particular characteristics of the market in which the competition concerns arise, including the position of the parties and other participants on the market. As set out in the Remedies Notice, the commitments have to eliminate the competition concerns entirely, and have to be comprehensive and effective from all points of view. The Commission only has power to accept commitments that can make the concentration compatible with the internal market. In order to do so, they need to prevent the significant impediment to effective competition in all relevant markets where competition concerns have been identified.

(326) In order for the commitments to comply with those principles, they must be able to be implemented effectively within a short period of time. The Commission must determine with the requisite degree of certainty, at the time of its decision, that they will be implemented fully and that they are likely to maintain effective competition in the market.

(327) As regards the form of acceptable commitments, the Merger Regulation leaves discretion to the Commission as long as the commitments meet the requisite standard.

(328) Divestiture commitments are often the most effective way to eliminate competition concerns resulting from horizontal overlaps. The intended effects of a divestiture will only be achieved if and once the business to divest is transferred to a suitable purchaser in whose hands it will become an active competitive force in the market.

(329) In order to ensure that the business is divested to a suitable purchaser, the commitments have to include criteria to define its suitability, which will allow the

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171 Commission notice on remedies acceptable under Council Regulation (EC) No 139/2004 and under Commission Regulation (EC) No 802/2004.

Commission to conclude that the divestiture of the business to such a purchaser will likely remove the competition concerns identified.

8.2. Procedure

(330) In order to render the Concentration compatible with the internal market, the Parties modified the notified concentration by proposing remedies, which were originally the result of discussions between the Parties and the US DOJ, with which the case team has been cooperating closely.

(331) On 21 February 2020 the Parties submitted commitments pursuant to Article 6(2) of the Merger Regulation (the "Initial Commitments"). The Commission launched a market test of the Initial Commitments on 25 February 2020, seeking responses from competitors and customers. On 3 March 2020 the Commission informed the Notifying Party of the results of the market test.

(332) On 5 March 2020 a number of items were clarified with the Parties, notably about: (i) the appropriateness of the list of key personnel who need to be specifically incentivised to remain with the divestment businesses and are subject to a non-solicitation requirement; and (ii) the transfer of the active security clearances of the relevant Raytheon employees to BAE.

(333) On 11 March 2020 the Parties submitted a revised set of commitments addressing the Commission's comments, notably regarding Key Personnel (the "Final Commitments").

(334) The Initial Commitments submitted by the Notifying Party were conceived as a pure fix-it-first remedy as described in paragraphs 56 and 57 of the Remedies Notice. The Final Commitments are structured in a more conventional way, providing for a post-closing buyer approval. However, the new approach still includes elements of a fix-it-first solution in that the Parties have already signed agreements with BAE as the purchaser of the Divestment Businesses.

(335) The Final Commitments are annexed to, and form an integral part of, this decision.

8.3. Initial Commitments

8.3.1. Description of the Initial Commitments

(336) The Initial Commitments provide for the divestiture of two different businesses (the "Divestment Businesses"):

(a) Raytheon's military airborne radios (the "Radios Divestment Business");

(b) UTC's GPS receivers business (the "GPS Divestment Business").

(337) The Radios Divestment Business consists of Raytheon's existing military airborne radios business, which develops, assembles, tests, markets, sells, and repairs airborne radios for military aircraft together with the necessary crypto capabilities to encrypt these products for military use.

(338) The GPS Divestment Business consists of UTC's military GPS receiver and anti-jamming business located in Cedar Rapids and Coralville, Iowa, United States,

which designs, develops, manufactures, assembles, tests, certifies, and provides support for its military GPS receivers and anti-jamming products.

(339) The Divestment Businesses include all assets and staff that contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Businesses, in particular:

(a) all tangible and intangible assets (including intellectual property rights);

(b) all licences, permits and authorisations issued by any governmental organisation for the benefit of the Divestment Businesses, to the extent transferable;

(c) all contracts, leases, commitments and customer orders of the Divestment Businesses; all customer, credit and other records of the Divestment Businesses;

(d) the Personnel, including Key Personnel; and

(e) transitional service agreements with UTC and Raytheon to ensure the orderly separation of the Divestment Businesses.

(340) In addition, the Parties have entered into related commitments regarding matters such as the separation of the divested businesses from their retained businesses, the preservation of the viability, marketability and competitiveness of the divested businesses, including the appointment of a monitoring trustee.

(341) The Initial Commitments include a proposal to sell both Divestment Businesses to BAE Systems Information and Electronic Systems Integration Inc. ("BAE"), with whom UTC and Raytheon entered into binding asset purchase agreements on January 17, 2020.

8.3.2. The Parties' arguments

(342) With regard to the Radios Divestment Business the Parties submit that the Initial Commitments (i) will remove the entire horizontal overlap between the Parties for military airborne radios globally; (ii) create the conditions for the emergence of a new competitive entity in military airborne radios with the necessary resources and capabilities to operate the divested business as a standalone viable competitor and (iii), as a result, effectively and comprehensively eliminate any potential loss of competition as a result of combining the Parties' military airborne radios businesses.

(343) As for the GPS Divestment Business the Parties contend that the Initial Commitments (i) will remove all overlap between UTC and Raytheon in the area of military GPS receivers on a global basis; (ii) allow for the emergence of a new competitive entity in military GPS receivers with the necessary resources and capabilities to compete; (iii) eliminate any concerns in this area and (iv) can be implemented effectively within a short period of time.

8.3.3. Commission's assessment of the commitments regarding military airborne radios

8.3.3.1. Results of the market test

(344) On 25 February 2020, the Commission launched a market test on the Initial Commitments and the suitability of BAE as a purchaser, seeking responses from both competitors and customers.

(345) With regard to the elimination of competition concerns, a large majority of respondents expressing an opinion considered that the Initial Commitments regarding Radios are suitable to effectively remove any competition concerns raised by the Transaction in the supply of military airborne radios.[172]

(346) As regards the viability of the remedy, a large majority of those expressing an opinion considered the Initial Commitments regarding Radios to be sufficient in scale and scope to ensure the immediate viability and competitiveness of the Radios Divestment Business.[173]

(347) A large majority of respondents expressing an opinion considered that the Commitments regarding Radios include all necessary tangible and intangible assets to ensure the viability and competitiveness of the Radios Divestment Business on a lasting basis.[174]

(348) With regard to personnel, a large majority of respondents expressing an opinion considered that the transfer of the personnel specified in the Initial Commitments would be sufficient to ensure the viability and competitiveness of the Radios Divestment Business.[175]

(349) As for the transitional agreements for the supply of services, a large majority of those expressing an opinion considered that the proposed arrangements would enable BAE to operate the Radios Divestment Business as a viable and competitive force.[176]

8.3.3.2. Assessment of the Initial Commitments regarding Radios

(A) Suitability to remove serious doubts

(350) In the EEA the Parties' combined market share for military airborne radios amounted to [10-20]% (UTC: [10-20]%; Raytheon: [5-10]%) in 2018. The Commission's investigation has confirmed that the Parties are two major suppliers of airborne radios worldwide and that it is likely that the Transaction will result in at least indirect harm to competition. This is notably because any price increases on US-based platforms will also affect the procurement conditions for EEA-based customers. The Commission has therefore concluded that the combination of the Parties' activities raised potential serious doubts as to its compatibility with the internal market with regard to the supply of military airborne radios in the EEA.

172 Questionnaire on Commitments offered by UTC and Raytheon, Question 1.
173 Questionnaire on Commitments offered by UTC and Raytheon, Question 3.
174 Questionnaire on Commitments offered by UTC and Raytheon, Questions 5 and 6.
175 Questionnaire on Commitments offered by UTC and Raytheon, Question 7.
176 Questionnaire on Commitments offered by UTC and Raytheon, Question 24.

(351) The Initial Commitments offer a structural remedy encompassing the entirety of Raytheon's military airborne radios business. This covers the developing, assembling, testing, marketing, selling and repairing of airborne radios for military aircraft along with rights to the necessary crypto capabilities required to encrypt these products for military use. The Initial Commitments will therefore remove the entire horizontal overlap between the Parties for military airborne radios globally.

(352) The Commission considers that the Initial Commitments create the conditions for the emergence of a new competitive entity in military airborne radios with the necessary resources and capabilities to operate the divested business as a standalone viable competitor following completion of the Proposed Transaction.

(353) On the basis of its assessment and taking into account the results of the market test and its investigation, the Commission concludes that the Initial Commitments are sufficient to remove any serious doubts with regard to the supply of military airborne radios in the EEA.

(B) Viability and competitiveness of the Radios Divestment Business

(354) The Radios Divestment Business consists of (i) the full suite of Raytheon's existing military airborne radio product portfolio; (ii) access to product engineering and product testing, repair and assembly facilities; (iii) supply and transitional support arrangements, where necessary; (iv) about […] highly skilled, full-time employees with significant prior experience across the entire military airborne radio product and process spectrum including Key Personnel; (v) rights in related IP and know-how; (vi) existing R&D projects (both internal and customer funded); and (vii) the transfer of all existing customer relationships worldwide.

(355) The Commission considers that this set of products, assets, personnel and transitional support will be suitable to enable the Radios Divestment Business to continue to compete in the military airborne radios sector on a viable basis. The Radios Divestment Business will have access to the expertise and resources that Raytheon currently accesses and will be able to build on the R&D efforts already undertaken by Raytheon.

(356) In addition, the Commission considers that the transitional arrangements are sufficient to ensure a smooth and effective transition of all assets, equipment and personnel from Raytheon's existing multi-use facilities to the new location operated by the Purchaser. This will limit the risk of disruption to the Radios Divestment Business and ensure that it can operate as a viable standalone business as soon as possible.

(357) On the basis of its assessment and taking into account the results of the market test and its investigation, the Commission concludes that the Commitments are sufficient to ensure the viability and competitiveness of the Radios Divestment Business.

8.3.4. Commission's assessment of the commitments regarding military GPS

8.3.4.1. Results of the market test

(358) With regard to the elimination of competition concerns, a large majority of respondents expressing an opinion considered that the Initial Commitments are

suitable to effectively remove any competition concerns raised by the Transaction in the supply of GPS receivers.[177]

(359) As regards the viability of the remedy, a large majority of those expressing an opinion considered the Commitments to be sufficient in scale and scope to ensure the immediate viability and competitiveness of the GPS Divestment Business.[178]

(360) A large majority of respondents expressing an opinion considered that the Commitments regarding GPS include all necessary tangible and intangible assets to ensure the viability and competitiveness of the GPS Divestment Business on a lasting basis.[179]

(361) With regard to personnel, a large majority of respondents expressing an opinion considered that the transfer of the personnel specified in the Commitments would be sufficient to ensure the viability and competitiveness of the GPS Divestment Business.[180]

(362) As for the transitional agreements for the supply of services, a large majority of those expressing an opinion consider that the proposed arrangements would enable BAE to operate the GPS Divestment Business as a viable and competitive force.[181]

8.3.4.2. Assessment of the Commitments regarding GPS

(A) Suitability to remove serious doubts

(363) The combined market share of the Parties in the supply of military GPS receivers amounted to [80-90]% (UTC: [70-80]%; Raytheon: [10-20]%) in the EEA in 2018. The Commission's investigation has confirmed that the Parties are the two main suppliers of the core military GPS receiver technology worldwide and that the Transaction would be likely to result in both direct and indirect effects in the EEA. The Commission has therefore concluded that the combination of the Parties' activities raises serious doubts as to its compatibility with the internal market due to the creation or strengthening of a dominant position in the supply of military GPS receivers in the EEA.

(364) The GPS Commitments provide for the divestment of the entirety of UTC's military GPS receiver activities to BAE. The GPS Divestment Business designs, develops, manufactures, assembles, tests, certifies, and provides support for its military GPS receivers and anti-jamming products. Accordingly, they remove all overlap between the Parties in this area on a global basis.

(365) The Commission considers that the Commitments regarding GPS will also enable a new competitive entity to emerge in military GPS receivers with the necessary resources and capabilities to compete.

177 Questionnaire on Commitments offered by UTC and Raytheon, Question 14.
178 Questionnaire on Commitments offered by UTC and Raytheon, Question 16.
179 Questionnaire on Commitments offered by UTC and Raytheon, Questions 18 and 19.
180 Questionnaire on Commitments offered by UTC and Raytheon, Question 20.
181 Questionnaire on Commitments offered by UTC and Raytheon, Question 24.

(366) On the basis of its assessment and taking into account the results of the market test and its investigation, the Commission concludes that the Commitments are sufficient to remove the serious doubts with regard to the supply of military GPS receivers in the EEA.

(B) Viability and competitiveness of the Divestment Business

(367) The GPS Divestment Business includes (i) UTC's existing military GPS receiver product portfolio; (ii) access to product engineering and product testing, repair and assembly facilities; (iii) transitional support arrangements, where necessary; (iv) c. […] highly skilled, full-time employees with significant prior experience across the entire military GPS receiver product and process spectrum; (v) rights in related IP and know-how; (vi) existing R&D projects; and (vii) the transfer of existing customer relationships worldwide.

(368) The Commission considers that this set of products, assets, personnel and transitional support will be suitable to enable the GPS Divestment Business to continue to compete in the military GPS sector on a viable basis. The GPS Divestment Business will have access to the expertise and resources that Raytheon currently accesses and will be able to build on the R&D efforts already undertaken by Raytheon.

(369) In addition, the Commission considers that the transitional arrangements will ensure a smooth and effective transition of all assets, equipment and personnel from Raytheon's existing multi-use facilities to the new location operated by the Purchaser. This will limit the risk of disruption to the GPS Divestment Business and ensure that it can operate as a viable standalone business as soon as possible.

(370) On the basis of its assessment and taking into account the results of the market test and its investigation, the Commission concludes that the Commitments are sufficient to ensure the viability and competitiveness of the GPS Divestment Business.

8.4. Final Commitments

8.4.1. Description of the Final Commitments

(371) In addition to the extension of the list of Key Personnel for both Divestment Businesses, the Final Commitments reflect the Parties' change of approach in opting for a post-closing buyer approval instead of a pure fix-it-first solution. This means that the Final Commitments now include standard clauses on potential purchasers and standard clauses on the Closing Period, the Divestiture Period and the Divestiture Trustee, and that BAE is no longer referred to as the Purchaser. However, the new approach still includes aspects of a fix-it-first in that the Parties have already signed asset purchase agreements to transfer both Divestment Businesses to BAE.

8.4.2. Assessment of the Final Commitments

(372) The Commission takes note of the Parties' change of approach and considers that the Final Commitments are in line with a conventional remedy solution whereby the Commission approves the buyer after the transaction has been closed. In addition, the Commission understands from the Parties and from BAE that they continue to

have full confidence in their ability to complete the sale of the Divestment Businesses as currently contemplated.

(373) Likewise, materials submitted by the Parties over the course of the proceedings reveal that the sale of the Divestment Businesses has attracted interest from a broad range of market participants. The potential of a business to attract suitable purchasers is relevant for the Commission's assessment of the appropriateness of the proposed commitment.

(374) In any event, the appropriateness of the Divestment Businesses has been tested on a standalone basis and the suitability, viability and competitiveness thereof are not related to, let alone dependent on, a purchase by BAE. In other words, the Commission has not taken a particular purchaser's resources into account in its assessment. Thus, in determining to what extent the divestiture of the business will likely remove the competition concerns identified, the Commission has assessed the sufficiency of the commitments irrespective of BAE's characteristics.

(375) In particular, the Commission's questions on the scale, scope and viability of the Initial Commitments in the market test, both for Radios and GPS, did not contain a reference to BAE as the buyer.[182] Moreover, a large majority of respondents expressing an opinion considered that the scale and scope of the Divestment Businesses and related commitments, as described in Section 8.3.1 above, are sufficient to ensure the immediate viability and competitiveness of both the Radios and the GPS Divestment Business.[183]

(376) The Commission has made its assessment in the light of the usual principles that apply where parties to a concentration offer commitments to restore effective competition, as set out in the Remedies Notice. In particular, the divested activities must consist of a viable business that, if operated by a suitable 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.

(377) Paragraph 17 of the Final Commitments reflects the standard criteria for a purchaser's suitability as set out in the Remedies Notice, while specifying that the purchaser should have proven expertise in the supply of military aerospace systems. Under the Final Commitments, in order to be approved by the Commission, the Purchaser must be (i) independent of and unconnected to the Notifying Party and its Affiliated Undertakings; (ii) have the financial resources, proven expertise in the supply of military aerospace systems and incentive to maintain and develop the Divestment Businesses as viable and active competitive forces; and (iii) its acquisition of the Divestment Business must not give rise to prima facie competition concerns or a risk that the implementation of the Commitments will be delayed.

(378) As the assessment of the Initial Commitments was carried out on a stand-alone basis, the removal of the buyer's identity from the Final Commitments does not affect the

182 Questionnaire on Commitments offered by UTC and Raytheon, Questions 3 to 7 (Radios) and Questions 16 to 20 (GPS).

183 Questionnaire on Commitments offered by UTC and Raytheon, Questions 3 (Radios) and 16 (GPS).

validity of the Commission's conclusions set out in paragraphs (366) and (370). Therefore, the Commission maintains its conclusion that the Commitments are sufficient to ensure the viability and competitiveness of the Radios and GPS Divestment Businesses.

8.5. *Prima facie* suitability of BAE as a buyer of the Divestment Businesses

(379) On the basis of the Initial Commitments, which expressly referred to BAE as the Purchaser, the Commission assessed *prima facie* its suitability as a buyer of the Divestment Businesses. BAE's suitability was also market-tested.

(380) In accordance with paragraph 48 of the Remedies Notice BAE must fulfil the following criteria:

(a) be independent of and unconnected to the Parties;

(b) possess the financial resources, proven relevant expertise and have the incentive and ability to maintain and develop the Divestment Businesses as a viable and active competitive force in competition with the Parties and other competitors; and

(c) the acquisition of the Divestment Businesses by BAE must neither be likely to create new competition problems nor give rise to a risk that the implementation of the commitments will be delayed. Therefore, BAE must reasonably be expected to obtain all necessary approvals from the relevant regulatory authorities for the acquisition of the Divestment Businesses.

(381) The Commitments submitted on 21 February 2020 proposed BAE as a purchaser of both Divestment Businesses and included copies of the Radios Purchase Agreement between Raytheon and BAE and the GPS Purchase Agreement between UTC and BAE. Therefore, in accordance with paragraph 56 of the Remedies Notice, the Commission assessed the suitability of BAE as a purchaser of the Divestment Businesses.

(382) On 5 March 2020, audit and accountancy services provider Mazars submitted to the Commission, at the request of the Parties,[184] a report on BAE's suitability as a purchaser ("the Mazars Report") in which it concluded that BAE fulfils the criteria of the purchaser requirements. In its report, Mazars also concluded from its review of the Radios and GPS Purchase Agreements that the Divestment Businesses would be sold in a manner consistent with the Commitments.

(383) On 5 March 2020, a number of items were clarified with BAE, notably about BAE's suitability as a purchaser, including past supply chain management issues and allegations of possible vertical issues arising from the acquisition of the Divestment Businesses.

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184 On 19 February 2020, UTC appointed Mazars to prepare a report assessing the proposed purchaser's suitability and independence, the Divestment Businesses' viability and whether the Divestment Businesses will be sold in a manner consistent with the proposed Commitments. Under the terms of the agreement between UTC and Mazars, the report was to be delivered to the European Commission without prior review or amendment by UTC. In addition, Mazars confirmed that it is independent of UTC, Raytheon, and BAE, and that neither it, nor any of its employees or experts have any direct or indirect work, consulting or other relationship with either of the Parties.

8.5.1. The Commission's assessment of BAE's suitability

(384) BAE appears, *prima facie*, to be a suitable buyer. It is a well-established, multinational defence, security and aerospace company with extensive experience in the full range of defence and security products. BAE is a publicly listed company with its common stock listed on the London Stock Exchange and FTSE 100. It is the largest defence contractor in Europe and among the world's largest defence companies. Its largest operations are in the UK and United States ("US"), where its BAE Systems Inc. subsidiary is one of the six largest suppliers to the US Department of Defence. Other major markets include Australia, India, and Saudi Arabia. BAE plays a significant role in the production of military equipment. The company has a diverse portfolio, broadly balanced between an enduring services and support business, long-term platform and product programmes, electronic systems, and activities in cyber and intelligence.

(385) A large majority of respondents to the market test considered that (i) BAE is currently independent of and unconnected to UTC and Raytheon[185]; and (ii) has the financial resources[186]; (iii) the relevant expertise[187]; (iv) the R&D capabilities and resources/assets[188]; (v) the sales organisation[189]; and (vi) the incentives[190] to maintain and develop the Divestment Businesses in a viable and competitive way so as to replicate UTC's and Raytheon's respective constraints in the markets where the Commission has identified concerns.

8.5.1.1. Independence from the Parties

(386) A number of ownership, cooperation and commercial links exist among UTC, Raytheon and BAE.

(387) In particular, UTC participates with BAE in the Data Link Solutions Joint Venture, while Raytheon participates with BAE in the Exostar B to B Joint Venture.

(388) The existing commercial relationships between BAE and any of UTC or Raytheon appear to be immaterial to BAE in view of their overall size in terms of revenues.

(389) The Mazars Report indicates that it is a feature of the military aerospace production and defence industry to have supplier relationships and that cooperation among manufacturers is common.

(390) Based on the Mazars Report, and the information provided, the Commission does not consider that any of these relationships impede BAE's independence from UTC or Raytheon.

(391) On the basis of the information provided by the Parties, the Mazars Report and the results of the market test, BAE appears, *prima facie*, to be independent of, and unconnected to, the Parties and their affiliates.

185 Questionnaire on Commitments offered by UTC and Raytheon, Question 27.
186 Questionnaire on Commitments offered by UTC and Raytheon, Question 28.
187 Questionnaire on Commitments offered by UTC and Raytheon, Question 29.
188 Questionnaire on Commitments offered by UTC and Raytheon, Question 31.
189 Questionnaire on Commitments offered by UTC and Raytheon, Question 32.
190 Questionnaire on Commitments offered by UTC and Raytheon, Question 30.

8.5.1.2. Financial resources, proven expertise and incentive to maintain and develop the Divested Business as a viable and active competitor

(392) With regard to financial resources, BAE recorded net sales of GBP 20 109 million in 2019. The company has been [BAE financial data].

(393) As regards proven expertise, both Divestment Businesses will fit well into existing BAE operations. […].

(394) As for incentives, the GPS technology of the Divestment Business would contribute towards achieving BAE's strategic aim to target the market for precision guided munitions and offers significant commonality with BAE's own customer base, particularly in relation to […].

(395) In addition, the product offering of the Radios Business complements BAE's existing airborne radio product portfolio and BAE has identified a number of its own products into which the technologies of the Radios Business may be incorporated.

(396) On the basis of the information provided by the Parties, the Mazars Report and the results of the market test, BAE appears, *prima facie*, to have the financial resources, proven expertise and incentive to maintain and develop the Divestment Business as a viable business and active competitor in competition with the Parties and other competitors.

8.5.1.3. Absence of *prima facie* competition problems

(397) The Commission considers that the divestiture to BAE does not appear to give rise to any significant competition concerns. There do not seem to be any direct horizontal overlaps between BAE and the Divestment Businesses. The vertical relationships identified so far, such as between GPS receivers and precision guided munitions ("PGM"), seem unlikely to be problematic either.

(398) On the basis of the information provided by the Parties, the Mazars Report and the results of the market test, prima facie competition concerns are not likely to arise as a result of the acquisition of the Divestment Businesses by BAE.

(399) The Commission notes that this prima facie assessment is based on the information available for the purpose of the Commission's assessment of BAE's suitability and does not prejudge the competition assessment of the acquisition of the Divestment Businesses by BAE by another competent competition authority under applicable merger control rules.

8.5.2. Assessment of the Purchase Agreements

(400) Paragraph 101 of the Commission's Remedies Notice requires that the Divestment Businesses be divested in a manner consistent with the Commission's decision and the commitments.

(401) On 17 January 2020 Raytheon and BAE signed the Radios Purchase Agreement selling Raytheon's military airborne radios business to BAE and on the same day UTC and BAE signed the GPS Purchase Agreement transferring UTC's GPS Business to BAE. Both transactions take the form of an asset sale.

(402) Mazars reviewed both Purchase Agreements and indicated in its draft report of 25 February 2020 that it would seek clarification from the Parties on a number of subjects, including:

(a) conditions precedent in the GPS and the Radios Purchase Agreements;

(b) the termination right by the seller in the GPS and the Radios Purchase Agreements;

(c) non-solicitation periods for Key Personnel in the GPS and Radios Purchase Agreements;

(d) assets not related to the Military GPS Business but necessary for a transfer of the business pursuant to the Commitments;

(e) the exclusion of Export Control Authorizations from the GPS Purchase Agreement, the transfer of Key Personnel in the GPS and Radio Purchase Agreements;

(f) the catch-all clause covering all other assets practiced or used (or held for practice or use) exclusively in the operation or conduct of the Military GPS Business;

(g) the relocation of the GPS Divestment Business.

(403) After receiving clarifications from the Parties, Mazars stated in its report of 4 March 2020 that it was satisfied that the relevant sections of the Radios and GPS Purchase Agreements were in line with the Commitments.

(404) In the same report, Mazars concluded from its review of the Radios and GPS Purchase Agreements that the agreements were broadly in line with the Commitments and that, as a result, the Divestment Businesses would be sold in a manner consistent with the Commitments.

(405) Based on Mazars's review of the Radios and GPS Purchase Agreements, it appears, *prima facie*, that the Divestment Businesses would be sold in a manner consistent with the Commitments.

8.6. Conclusion on the modifications to the Transaction

(406) In view of the above, the Commission considers that the Final Commitments will enable the Radios and GPS Divestment Businesses to compete effectively and viably in the relevant markets. These commitments therefore ensure that the Transaction will not result in adverse effect on competition in the relevant markets.

(407) The Commission thus concludes that the Final Commitments are adequate and sufficient to eliminate the significant impediment to effective competition in the markets for (i) military airborne radios and (ii) GPS receivers.

8.7. Conditions and obligations

(408) Under the first sentence of the second subparagraph of Article 6(2) of the Merger Regulation, the Commission may attach to its decision conditions and obligations

intended to ensure that the undertakings concerned comply with the commitments they have entered into vis-à-vis the Commission with a view to rendering the concentration compatible with the internal market.

(409) The fulfilment of the measures that give rise to the structural change of the market is a condition, whereas the implementing steps which are necessary to achieve this result are generally obligations on the parties. Where a condition is not fulfilled, the Commission's decision declaring the concentration compatible with the internal market is no longer applicable. Where the undertakings concerned commit a breach of an obligation, the Commission may revoke the clearance decision in accordance with Article 6(3) of the Merger Regulation. The undertakings concerned may also be subject to fines and periodic penalty payments under Articles 14(2) and 15(1) of the Merger Regulation.

(410) In accordance with the distinction between conditions and obligations described in the preceding recital, this Decision should be made conditional on full compliance with the requirements set out in Sections B and D of the Final Commitments (including the Schedules), which should constitute conditions. The remaining requirements set out in other Sections of the Final Commitments should constitute obligations imposed on the Parties.

9. CONCLUSION

(411) 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 Sections B and D of the Final Commitments annexed to the present Decision and with the obligations contained in Sections A, C, E, F and G of the said commitments. 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
Executive Vice-President

March 11, 2020

Case M.9434 – *UTC/Raytheon*

COMMITMENTS TO THE EUROPEAN COMMISSION

Pursuant to Article 6(2) of Council Regulation (EC) No 139/2004 (the "Merger Regulation"), United Technologies Corporation ("UTC") (the "Notifying Party") hereby enters into the following Commitments (the "Commitments") vis-à-vis the European Commission (the "Commission") with a view to rendering the acquisition of Raytheon Company ("Raytheon" and, 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 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:

Affiliated Undertakings: undertakings controlled by the Parties and/or by the ultimate parents of 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 Businesses as indicated in Section B, paragraphs 5 to 7 and described more in detail in the Schedules.

Closing: the transfer of the legal title to the Divestment Businesses to the purchaser(s).

Closing Period: each period of […] from the approval of the purchaser and the terms of sale by the Commission in relation to a Divestment Business.

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 Businesses: the GPS Divestment Business and the Radios Divestment Business, as defined in Section B and in the Schedules which the Notifying Party commits to divest.

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 Business(es) 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.

GPS Divestment Business: the business defined in Section B and in the GPS Schedule which the Notifying Party commits to divest.

GPS Schedule: the schedule to these Commitments describing more in detail the GPS Divestment Businesses.

Hold Separate Managers: the persons appointed by UTC for the Divestment Businesses 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 Businesses, as listed in the Schedules, including the Hold Separate Managers.

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: the Notifying Party and the undertaking that is the target of the concentration.

Personnel: all staff currently employed by the Divestment Businesses, including staff seconded to the Divestment Businesses, shared personnel as well as the additional personnel listed in the Schedules.

Purchaser(s): one or more entities approved by the Commission as the acquirer(s) of the Divestment Businesses in accordance with the criteria set out in Section D.

Purchaser Criteria: the criteria laid down in paragraph 17 of these Commitments that the purchaser(s) must fulfil in order to be approved by the Commission.

Radios Divestment Business: the business defined in Section B and in the Radios Schedule which the Notifying Party commits to divest.

Radios Schedule: the schedule to these Commitments describing more in detail the Radios Divestment Businesses.

Schedules: the GPS Schedule and the Radios Schedule, describing more in detail the Divestment Businesses.

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.

Section B. The commitment to divest and the Divestment Businesses

Commitment to divest

2. In order to maintain effective competition, UTC commits to divest, or procure the divestiture of the Divestment Businesses by the end of the Trustee Divestiture Period as going concerns to the purchaser(s) and on terms of sale approved by the Commission in accordance with the procedure described in paragraph 18 of these Commitments. To carry out the divestiture, UTC commits to find one or more purchasers and to enter into final binding sale and purchase agreement(s) for the sale of the Divestment Businesses within the First Divestiture Period. If UTC has not entered into such an agreement at the end of the First Divestiture Period in relation to any Divestment Business, UTC shall grant the Divestiture Trustee an exclusive mandate to sell that Divestment Business in accordance with the procedure described in paragraph 30 in the Trustee Divestiture Period.

3. 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 final binding sale and purchase agreement(s) and the Commission approves the proposed purchaser(s) and the terms of sale as being consistent with the Commitments in accordance with the procedure described in paragraph 18; and

   b) the Closing of the sale(s) of the Divestment Businesses to the purchaser(s) takes place within the Closing Period(s).

4. In order to maintain the structural effect of the Commitments, the Notifying Party 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 Businesses, unless, following the submission of a reasoned request from the Notifying Party showing good cause and accompanied by a report from the Monitoring Trustee (as provided in paragraph 44 of these Commitments), the Commission finds that the structure of the market has changed to such an extent that the absence of influence over one or both the Divestment Businesses is no longer necessary to render the proposed concentration compatible with the internal market.

Structure and definition of the Divestment Businesses

5. The GPS Divestment Business consists of UTC's military GPS receiver and anti-jamming business located in Cedar Rapids and Coralville, Iowa, United States, which designs, develops, manufactures, assembles, tests, certifies, and provides support for its military GPS receivers and anti-jamming products.

6. The Radios Divestment Business consists of Raytheon's existing military airborne radios business which develops, assembles, tests, markets, sells, and repairs airborne radios for military aircraft together with the necessary crypto capabilities to encrypt these products for military use.

7. The legal and functional structure of the Divestment Businesses as operated to date is described in the Schedules. The Divestment Businesses, described in more detail in

the Schedules, include all assets and staff that contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Businesses, in particular:

(a) all tangible and intangible assets (including intellectual property rights);

(b) all licences, permits and authorisations issued by any governmental organisation for the benefit of the Divestment Businesses, to the extent transferable;

(c) all contracts, leases, commitments and customer orders of the Divestment Businesses; all customer, credit and other records of the Divestment Businesses; and

(d) the Personnel;

8. In addition, the Divestment Businesses include the benefit, for certain transitional periods on terms and conditions equivalent to those at present afforded to the Divestment Businesses, of all current arrangements under which UTC or its Affiliated Undertakings supply products or services to the Divestment Businesses, as detailed in the Schedules, unless otherwise agreed with the purchaser(s). Strict firewall procedures will be adopted so as to ensure that any competitively sensitive information related to, or arising from such supply arrangements (for example, product roadmaps) will not be shared with, or passed on to, anyone outside the business units/divisions providing the product/service.

Section C. Related commitments

Preservation of viability, marketability and competitiveness

9. From the Effective Date until Closing, the Notifying Party shall preserve or procure the preservation of the economic viability, marketability and competitiveness of the Divestment Businesses, in accordance with good business practice, and shall minimise as far as possible any risk of loss of competitive potential of the Divestment Businesses. 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 Businesses or that might alter the nature and scope of activity, or the industrial or commercial strategy or the investment policy of the Divestment Businesses;

(b) to make available, or procure to make available, sufficient resources for the development of the Divestment Businesses, 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 Businesses, 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 Businesses, 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

10. The Notifying Party commits, from the Effective Date until Closing, to keep the Divestment Businesses separate from the business(es) it is retaining and to ensure that unless explicitly permitted under these Commitments: (i) management and staff of the business(es) retained by UTC have no involvement in the Divestment Businesses; (ii) the Key Personnel and Personnel of the Divestment Businesses have no involvement in any business retained by UTC and do not report to any individual outside the Divestment Businesses.

11. Until Closing, UTC shall assist the Monitoring Trustee in ensuring that the Divestment Businesses are managed as distinct and saleable entities separate from the business(es) which UTC is retaining. Immediately after the adoption of the Decision, UTC shall appoint the Hold Separate Managers. The Hold Separate Managers, who shall be part of the Key Personnel, shall manage the Divestment Businesses independently and in the best interest of the businesses with a view to ensuring their continued economic viability, marketability and competitiveness and their independence from the businesses retained by UTC. The Hold Separate Managers shall closely cooperate with and report to the Monitoring Trustee and, if applicable, the Divestiture Trustee. Any replacement of the Hold Separate Managers shall be subject to the procedure laid down in paragraph 9(c) of these Commitments. The Commission may, after having heard UTC, require UTC to replace one or both Hold Separate Managers.

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 Businesses 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 Businesses in any central information technology network shall be severed to the extent possible, without compromising the viability of the Divestment Businesses. UTC may obtain or keep information relating to the Divestment Businesses which is reasonably necessary for the divestiture of the Divestment Businesses 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 Businesses 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 Businesses, 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 Businesses; (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 Businesses 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 Businesses 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(s) must fulfil the following criteria:

    (a) The purchaser(s) shall be independent of and unconnected to the Notifying Party and its Affiliated Undertakings (this being assessed having regard to the situation following the divestiture).

    (b) The purchaser(s) shall have the financial resources, proven expertise in the supply of military aerospace systems and incentive to maintain and develop the Divestment Businesses as viable and active competitive forces in competition with the Parties and other competitors;

    (c) The acquisition of the Divestment Businesses by the purchaser(s) 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(s) must reasonably be expected to obtain all necessary approvals from the relevant regulatory authorities for the acquisition of the Divestment Businesses.

18. The final binding sale and purchase agreement(s) (as well as ancillary agreements) relating to the divestment of the Divestment Businesses 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(s) fulfil(s) the Purchaser Criteria and that the Divestment Businesses 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(s) fulfil(s) the Purchaser Criteria and that the Divestment Businesses 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 Businesses 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 Businesses after the sale, taking account of the proposed purchaser(s).

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. The Notifying Party 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 any of the Divestment Businesses one month before the end of the First Divestiture Period or if the Commission has rejected the purchaser(s) proposed by UTC at that time or thereafter, UTC shall appoint a Divestiture Trustee for the Divestment Business(es) in relation to which UTC has not entered into a final and binding sale and purchase agreement or in relation to which the Commission has rejected the purchaser(s) proposed by UTC. The appointment of the Divestiture Trustee shall take effect upon the commencement of the Trustee Divestiture Period.

21. The Trustee shall:

(a) at the time of appointment, be independent of the Notifying Party and its Affiliated Undertakings;

(b) possess the necessary qualifications to carry out its mandate, for example have sufficient relevant experience as an investment banker or consultant or auditor; and

(c) neither have nor become exposed to a Conflict of Interest.

22. The Trustee shall be remunerated by the Notifying Party 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 Businesses, 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 21 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 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 19 and 24 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. <u>Functions of the Trustee</u>

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:

(a) 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.

(b) oversee, in close co-operation with the Hold Separate Manager, the on-going management of the Divestment Businesses 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:

(i) monitor the preservation of the economic viability, marketability and competitiveness of the Divestment Businesses, and the keeping separate of the Divestment Businesses from the business retained by the Parties, in accordance with paragraphs 9 and 10 of these Commitments;

(ii) supervise the management of the Divestment Businesses as distinct and saleable entities, in accordance with paragraph 11 of these Commitments;

(iii) 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 Businesses,

– in particular strive for the severing of the Divestment Businesses' participation in a central information technology network to the extent possible, without compromising the viability of the Divestment Businesses,

– make sure that any Confidential Information relating to the Divestment Businesses 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;

(iv) monitor the splitting of assets and the allocation of Personnel between the Divestment Businesses and UTC or Affiliated Undertakings;

(c) 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 Businesses, the holding separate of the Divestment Businesses and the nondisclosure of competitively sensitive information;

(d) 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:

(i) potential purchasers receive sufficient and correct information relating to the Divestment Businesses and the Personnel in particular by reviewing, if available, the data room documentation, the information memorandum and the due diligence process, and

(ii) potential purchasers are granted reasonable access to the Personnel;

(e) act as a contact point for any requests by third parties, in particular potential purchasers, in relation to the Commitments;

(f) 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 Businesses as well as the splitting of assets and the allocation of Personnel so that the Commission can assess whether the businesses are held in a manner consistent with the Commitments and the progress of the divestiture process as well as potential purchasers;

(g) 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;

(h) within one week after receipt of the documented proposal referred to in paragraph 18 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(s) and the viability of the Divestment Businesses after the Sale and as to whether the Divestment Businesses 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 Businesses without one or more Assets or not all of the Personnel affects the viability of the Divestment Businesses after the sale, taking account of the proposed purchaser(s);

(i) 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 Business(es) in relation to which UTC has not entered into a final and binding sale and purchase agreement or in relation to which the Commission has rejected the purchaser(s) proposed by UTC, to one or more

purchasers, provided that the Commission has approved both the purchaser(s) and the final binding sale and purchase agreement(s) (and ancillary agreements) as in line with the Commission's Decision and the Commitments in accordance with paragraphs 17 and 18 of these Commitments. The Divestiture Trustee shall include in the sale and purchase agreement(s) (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(s) 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 the Notifying Party'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 the Notifying Party.

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 Businesses' 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 Businesses shall provide the Trustee upon request with copies of any document, as permitted by law. UTC and the Divestment Businesses 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 Businesses. This shall include all administrative support functions relating to the Divestment Businesses 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 35 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. The Notifying Party agree 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 40 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 19-26 of these Commitments.

42. Unless removed according to paragraph 40 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 the Notifying Party. 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 the Notifying Party 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 Notifying Party. 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)
duly authorised for and on behalf of UTC

(signed)

duly authorized for and on behalf of Raytheon

GPS SCHEDULE

[…]

RADIOS SCHEDULE

[…]