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REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

on the possibility of introduction of electronic identification for bovine animals

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(Text with EEA relevance)

PREAMBLE

Bovine animals are identified according to Regulation (EC) No 1760/2000 of the European Parliament and of the Council of 17 July 2000 establishing a system for the identification and registration of bovine animals and labelling of beef and beef products and repealing Council Regulation (EC) No 820/97. This system includes the elements "double eartag", "holding register", "cattle-passport" and "computerised database".

According to the aforementioned Regulation, the Commission was required to examine, on the basis of work performed by the Joint Research Centre, the feasibility of using electronic means for the identification of animals. The European Parliament and the Council, acting on the basis of a report from the Commission, are invited to consider the possibility of introducing electronic identification arrangements in the light of progress achieved in this field.

In 1998 the Commission launched a large-scale research project on livestock electronic identification (IDEA). The final report was presented in April 2002 and necessary clarifications were made in July 2002. This project has demonstrated that in principle, the use of electronic identifiers can deliver a substantial improvement in animal identification systems provided a number of conditions concerning the accompanying measures are fulfilled. The conclusions of this project allow recommendations to be made on technical issues and conclusions concerning the conditions of introducing electronic identification arrangements for bovine animals in the EU.

The purpose of this report is to summarise the experience gained on the basis of the IDEA project on the use of electronic identification in bovine animals and to draw conclusions concerning the conditions of introducing electronic identification arrangements for bovine animals in the European Union. It focuses mainly on the results of the IDEA-project but also considers experiences with the existing system.

TABLE OF CONTENTS

1. GENERAL ASPECTS

1.1. Introduction

1.2. Background to the IDEA project

1.3. EC legislation on identification and registration of bovine animals – short description of the system currently in place

1.4. Improvement of the existing system with regard to electronic identification

2. DEVELOPMENTS IN ELECTRONIC IDENTIFICATION AND POSSIBLE IMPROVEMENT - OUTCOME OF THE IDEA-PROJECT

2.1. Performance of electronic identification systems in bovine animals

2.2. Benefits and constraints of electronic identifiers for the identification and registration of bovine animals

2.3. Future requirements and possible options

3. CONCLUSIONS

1. GENERAL ASPECTS

1.1. Introduction

According to the provisions of Article 4 (7) of Regulation (EC) No 1760/2000 of the European Parliament and of the Council of 17 July 2000 establishing a system for the identification and registration of bovine animals and labelling of beef and beef products and repealing Council Regulation (EC) No 820/97[1], the Commission is required to examine the feasibility of using electronic means for the identification of animals. The aim of this report is to explain current progress on the basis of work performed by the Joint Research Centre of the Commission (JRC) and to draw conclusions on the possibility of introducing electronic identification for bovine animals in the European Union.

1.2. Background to the IDEA project

In 1998 the Commission launched a large-scale pilot project, called the IDEA-project (**ID**entification **E**lectronic des **A**nimaux), to investigate the feasibility of using electronic methods for the identification of animals (general Decision C(97)4101 and six individual Decisions C(98)562). The aims of the project were prepared by the JRC, and focused on the reliability and advantages offered by an electronic identification system in real life situations for the purposes of disease monitoring, subsidy eligibility and breeding management. These broad aims formed the basis of a call for participation to all Member States. From the fourteen research proposals received, ten proposals were retained from six Member States (France, Germany, Italy, Netherlands, Portugal, and Spain).

Under the project, approximately 370000 cattle, 500000 sheep, 29000 goats and 15000 buffaloes were identified for application of one of the following electronic identifier types:

– electronic eartag

– ruminal bolus

– injectable transponder

The final report was presented in April 2002 and necessary clarifications were made in July 2002. Further detailed information about the project is available on the web-site: http://idea.jrc.it.

1.3. EC legislation on identification and registration of bovine animals – short description of the system currently in place

Council Directive 64/432/EEC of 17 March 1964 on animal health problems affecting intra-Community trade in bovine animals and swine[2] requires all

[1] OJ L 204, 11.8.2000, p. 1.

[2] OJ 121, 29.7.1964, p. 1977/64. Directive amended and updated by Council Directive 97/12/EC (OJ L 109, 25.4.1997, p. 1) and last amended by Regulation (EC) 21/2004 (OJ L 5, 9.1.2004, p. 8).

animals to be identified for certification purposes. However, the detailed arrangements for identifying the animals or for tracing the holding of origin were to be determined by the competent authority of the Member State.

According to Council Directive 90/425/EEC of 26 June 1990 concerning veterinary and zootechnical checks applicable in intra-Community trade in certain live animals and products with a view to the completion of the internal market[3], animals must be identified in accordance with Community rules and be registered in such a way that the original or transit holding, centre or organisation can be traced.

With the adoption of Council Directive 92/102/EEC of 27 November 1992 on the identification and registration of animals[4], bovine animals should be identified with an eartag bearing a code which makes it possible to identify each animal individually as well as the holding on which it was born.

However past experience showed that the implementation of Directive 92/102/EEC had not been entirely satisfactory and needed further improvement. Therefore it was necessary to adopt a specific Regulation for bovine animals in order to reinforce the provisions of the Directive.

Hence Council Regulation (EC) No 820/97 of 21 April 1997 establishing a system for the identification and registration of bovine animals and regarding the labelling of beef and beef products[5] was adopted. According to this Regulation, bovine animals shall be identified by an eartag applied to each ear and be accompanied by a passport throughout any movement. These requirements are upheld in the current Regulation (EC) No 1760/2000.

The basic objectives of these rules are:

– the localisation and tracing of animals for veterinary purposes, which is of crucial importance for the control of infectious diseases,

– the traceability of beef for public health reasons, and

– the management and supervision of livestock premiums as part of the reform of the common agricultural policy.

The system for the identification and registration of bovine animals includes the elements “double eartag”, “holding register”, “cattle-passport” and “computerised database”.

Eartags. Current requirements are laid down in Commission Regulation (EC) No 911/2004 of 29 April 2004 implementing Regulation (EC) No 1760/2000 of the European Parliament and of the Council as regards eartags, passports and holding registers[6]. Eartags shall contain at least the name, the code or the

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3 OJ L 224, 18.8.1990, p. 29, as last amended by Directive 2002/33/EC (OJ L 315, 19.11.2002, p. 14).
4 OJ L 355, 5.12.1992, p. 32, as last amended by Regulation (EC) 21/2004 (OJ L 5, 9.1.2004, p. 8).
5 OJ L 117, 7.5.1997, p. 1.
6 OJ L 163, 30.4.2004, p. 65.

logo of the competent authority or the central competent authority of the Member State which allocated the eartags, the two-letter country code and a numeric code not exceeding 12 digits. An additional bar code may be authorised by the central competent authorities of the Member States. Furthermore the replacement eartags used in the event of eartag losses may contain a mark with the version number of the replacement eartag expressed in Roman numerals.

Cattle passports. Detailed rules for the model of the passport have been laid down in Commission Regulation (EC) No 911/2004. Passports shall be issued for each bovine animal within 14 days of the notification of its birth, or, in the case of animals imported from third countries, within 14 days of the notification of its re-identification by the Member State concerned. Passports may be issued for animals from another Member State under the same conditions. In such cases, the passport accompanying the animal on its arrival shall be surrendered to the competent authority, which shall return it to the issuing Member State.

Whenever a bovine animal is moved, its passport shall accompany it. By way of derogation from this requirement a Member State may determine that animals can move within its territory without being accompanied by a passport provided the Member State has a computerised database which the Commission deems to be fully operational. In the case of the death of an animal, the keeper shall return the passport to the competent authority. When animals are sent to the slaughterhouse, the operator of the slaughterhouse shall return the passport to the competent authority. When animals are exported to third countries, the last keeper shall surrender the passport to the competent authority at the place where the animal is exported.

The passport shall contain information on the animal (identification code, date of birth, sex, breed or colour of coat, identification code of the mother or, in the case of an animal imported from a third country, the identification number given corresponding to the identification number of origin), identification number of holding where born, and identification numbers of all holdings where the animal has been kept and the dates of each change of holding. In addition the passport shall contain the signature of the keeper(s), and the name of the issuing authority (Transporters whose sole responsibility is the movement of animals are not considered to be keepers and hence their signature will not be required).

Holding registers. Detailed rules for the content of the register are laid down in Commission Regulation (EC) No 911/2004. The register shall contain up-to-date information on each animal (identification code, date of birth, sex, breed or colour of coat), the date of death of the animal on the holding, in the case of departure the identification code of the holding of destination and the date for departure, and in the case of arrival identification code of holding of dispatch and the date of arrival. In addition, checks by the competent authority must be clearly identified in the register.

The computerised national databases play a key role for maintaining a proper control of animal movements and managing subsidies. The database must

contain information for each bovine animal (identification code, date of birth, sex, breed or colour of coat, identification code of the mother or, in the case of an animal imported from a third country, the identification number given corresponding to the number of origin, identification number of holding where born, and identification numbers of all holdings where the animal has been kept, the dates of each change of holding and the date of death or slaughter). In addition the database must contain information for each holding (identification number and name and address of the holder). The database must be able to supply at any time a list of identification numbers for all bovine animals present on a holding, and a list of all changes of holding for each bovine animal starting from the holding of birth or holding of importation.

Controls by national authorities

According to Commission Regulation (EC) No 1082/2003 of 23 June 2003 laying down detailed rules for the implementation of Council Regulation (EC) No 1760/2000 as regards the minimum level of controls to be carried out in the framework of the system for the identification and registration of bovine animals[7] the Member States have to inspect at least 10% of their holdings. By way of derogation, where a Member State has in place a database, which the Commission deems to be fully operational and which provides effective cross-checking facilities, a rate of 5 % may be envisaged. The results of the inspections have to be communicated to the Commission in the form of an annual report.

Sanctions

Commission Regulation (EC) No 494/98 of 27 February 1998 laying down detailed rules for the implementation of Council Regulation (EC) No 820/97[8] sets out the application of minimum administrative sanctions in the framework of the system for the identification and registration of bovine animals in the Member States. Hence competent authorities have the power and the obligation to sanction breaches of identification and registration.

Controls by Community services

The Commission services have carried out a series of missions in order to evaluate the operation of official controls over the traceability of beef and beef products. The whole chain from farm to retail outlet was evaluated, including identification, registration and movement of cattle. Furthermore the services have focused on traceability aspects during missions to evaluate the implementation of certain EC measures aimed at the eradication, control and prevention of certain diseases.

The over-all conclusion based on the outcome of the missions was that Member States generally have farm registration systems in place and, whilst operational deficiencies were widespread, the principles of animal identification are understood and largely applied. However, in many Member

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7 OJ L 156, 25.6.2003, p. 9, as amended by Regulation (EC) No 499/2004 (OJ L 80, 18.3.2004, p. 24).

8 OJ L 60, 28.2.1998, p. 78.

States, the operation of the national database for bovine animals was inadequate, mainly due to delays in entering births, deaths and movements. This meant that animals could either be wrongly recorded or vanish altogether from the official records for lengthy periods. In addition, errors or non-compliances were not automatically detected, and/or followed up, by the responsible authorities.

The main weaknesses found in regard to identification and registration of bovine animals were incorrect identification, not updated holding registers and failures to report to the national database.

Furthermore Commission services have carried out audits in the framework of the clearance of accounts (EAGGF-Guarantee) of animal premiums in several regions of the Member States. These audits also focussed on the identification and registration of bovine animals. Common weak points detected in this area were mainly concerning databases not being up-to-date and insufficient control measures.

1.4. Improvement of the existing system with regard to electronic identification

The main shortcomings within the existing systems that have been identified in the annual reports on controls on identification and registration of bovine animals from Member States and during inspections carried out by Commission services (see 1.3) are listed below and the possibilities to improve the situation by electronic identification are discussed.

– *Incorrect identification of animals*

Incorrectly identified animals (e.g. animals with only one or no eartag) are consistently one of the major problems that are identified during 'on farm' checks. In such cases the introduction of electronic identifiers instead of a classical eartag may not improve the situation, because also these identifiers must be applied correctly.

Lost eartags are a further problem. Even if the quality of classical eartags is improving continuously, eartags may still fall off or be removed. However this risk of loss or fraudulent manipulation is minimised when using electronic identifiers of the type of bolus or injectable transponder. These types can only be removed using surgical methods.

– *Holding register not up to date*

Holding registers that are not properly maintained are a fundamental problem area. The use of electronic identifiers could help to improve this situation, in particular when the holding register is kept in computerised form, which is the case for a growing percentage of farms. Automatic reading and the possibility of automatic entry into the holding register can reduce manual documentation work on farm and thereby reduce these types of discrepancies.

– *Delay in / absence of reporting events to the central database*

Failure (delay, absence or incorrect information) to report births, deaths or movements are the most frequently detected deficiencies in the existing system. In the case of reporting incorrect data, either incorrect data records will be created in the central database or the report will be refused. In both cases the records subsequently generated in the central database are inconsistent with the actual status of the animal. The use of electronic identification can facilitate reports to the central database, in particular for holdings with a computerised holding register. The introduction of electronic identification could be particularly beneficial for traders and markets, as the automated system will generate a higher reporting accuracy for bovine animal movements.

Conclusion

Electronic identification can contribute to improvements in existing systems of cattle identification. For example, electronic identifiers allow a faster reading and a higher reading accuracy than classical eartags. Dynamic reading and direct entry of data into databases is also possible (removing potential errors caused by inaccurate manual database entry). This could in particular ease the procedure to report the movements of animals to the database. However the contribution of electronic identification to improve animal identification and traceability should not be overestimated in view of the nature of difficulties in applying existing systems. Complete tagging of all animals and an efficient data management are preconditions for any system of identification, irrespective of whether electronic identifiers or classic eartags are used.

It should be noted that the growing volume of animal information in the central databases ensures that the reliability of records continues to improve by extending the basis for cross-checking of information. The ability to verify records and cross check with existing data within the system means that errors are increasingly detected automatically. It is an ongoing process to reduce these discrepancies further, and this depends to a large extent on the ability of the competent authorities to take the necessary follow-up measures to ensure that only reliable data is entered and stored in the central databases. However, the main focus for improving the system of tracing of bovine animals remains with the functioning of the central database. Providing appropriate information and training to all people involved is an important element to ensure that the principles of database management are rigorously maintained in order to improve identification and tracing of bovine animals.

2. DEVELOPMENTS IN ELECTRONIC IDENTIFICATION AND POSSIBLE IMPROVEMENT - OVERVIEW OF THE OUTCOME OF THE IDEA-PROJECT (DETAILED INFORMATION IS AVAILABLE ON THE WEB-SITE: http://idea.jrc.it)

2.1. Performance of electronic identification systems in bovine animals

Electronic identification in general is the identification (of animals) by radio frequency. The two elements are the identifier and the reader. The identifier contains a passive transponder (microchip with no energy source inside) which transmits memorised information (identification code) when the reader (transmitter-receiver) activates it at a certain frequency.

In the IDEA-project the electronic identification of bovine animals and buffaloes has been studied using electronic eartags, ruminal boluses or injectable transponders.

2.1.1. Identifier application, reading and recovery

2.1.1.1. Identifier application

The IDEA project demonstrated that the application of an electronic identifier does not present any difficulty when the animal is well restrained. Training is essential, mainly for the application of the ruminal bolus and the injectable transponder.

There is some limitation to the minimum age at which a bolus can be introduced into a bovine animal. The bolus is deposited in the reticulum and this part of the forestomach is formed during the first months in the calf's life. In view of the importance of forestomach maturity for bolus retention, generally, the later the animals are given the bolus, the better the retention rate, although the feeding regime also influences forestomach development, and therefore bolus retention in young animals. Further investigations are necessary to obtain more precise information on the possibility of applying boluses to young animals.

2.1.1.2. Reading performance

The IDEA project demonstrated that the percentage of reading failures of the ruminal bolus for cattle and buffalo is constant and is less than 0.35%. However the reading efficiency of the bolus could be affected when it is applied to an animal, carrying a magnet as a protective device against metallic objects ingested during grazing.

The percentage of reading failures observed for electronic eartags is 0.63% but shows a tendency to increase one month after tagging and may increase up to 2.3% after 14 months. The percentage of reading failures observed for injectable transponders is 0.7% increasing to 1% at one month after tagging and decreasing beyond that time to 0.3%.

Certain deficiencies were reported using dynamic reading system in slaughterhouses. The specific conditions in slaughterhouses (presence of high amounts of metal, interferences due to the various devices used) apparently influence the performance of the stationary readers.

2.1.1.3. Recovery results

There is an essential need to recover electronic identifiers for several reasons. Firstly, electronic identifiers are special waste (electronic waste, contaminated with organic material) which has to be kept out of the food chain as well as the environment. Secondly, recovering each electronic identifier is necessary to avoid any kind of fraudulent use.

The recovery results of electronic eartags and ruminal boluses indicate the absence of recovery problems at slaughter as well as successful reading.

The situation is totally different for the injectable transponder. Only about 80% were recovered and only 52% of these could be successfully read after recovery. The extraction process apparently influences the readability.

2.1.2. Technical characteristics of identifiers and readers

It is recommended that identifiers and readers comply with the ISO-standards. ISO 11784 relates to the code structure of the transponders for animal electronic identification and ISO 11785 relates to the technical aspects of communication between transponders and readers (the ability of a reader to read both HDX and FDX-B transponder types[9]).

Due to development in the field of microelectronics, the efficiency of readers and identifiers is likely to continue to improve. It is also likely that the size of the transponder will continue to shrink, whilst the reading distances between transponders and readers are likely to increase. In the framework of the IDEA project, stationary readers reached reading distances of about 80 cm. In the case of portable readers the mandatory reading distances (in order to get a certificate for a combination reader/transponder) was equal to 22 cm for ear-tags, bolus and injectable transponders. All systems of electronic identifier showed a high readability in dynamic conditions (>97%).

2.2. Benefits and constraints of electronic identifiers for the identification and registration of bovine animals

Compared with the classical eartag, electronic identifiers have the common advantages of automatic reading with higher accuracy than visual reading of classical eartags and the possibility for automatic entry of readings into electronic data processing.

Besides this, some differences exist between the types of electronic identifiers.

2.2.1. Electronic eartag

Advantages

The animal can be tagged in the first week of its life. The application of the eartag needs only a minimum of special training. It is possible to check from a distance if the animal is identified or not.

Disadvantages

In the same manner as the classical eartag, the electronic eartag is not totally protected against loss and possible fraudulent manipulation although the technical development has improved.

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[9] **HDX (Half-duplex):** The information is transmitted-back by the transponder after activation by the reader. An HDX transponder charged with energy during the activation uses the interruption of the activation signal to transmit its signal. The HDX transponder shall respond between 1ms and 2ms after a 3dB decay of the activation signal and uses FSK modulation at (124.2±2) kHz to transmit a binary 1 and at (134.2±1.5) kHz to transmit a binary 0. The encoding signal shall be NRZ. **FDX (Full-duplex):** The information is transmitted-back by the transponder within it is activated by the transmitter. An FDX transponder receiving the activation field shall transmit its code during the activation period. The FDX transponder uses a modified DBP (differential bi-phase encoding) encoded sub-carrier witch is amplitude modulated. The transponder shall send its message back using the frequency bands 129 to 133.2 kHz and 135.2 to 139.4 kHz.

2.2.2. Injectable transponder

Advantages

The transponder can be applied in the first days after birth. The IDEA project demonstrated that losses are directly linked to the size of the transponder, i.e. the longer the transponder the higher the losses in young animals during the first month after tagging. The transponder can only be removed using surgical methods, which would seldom be worth performing when judged against the value of an average animal.

Disadvantages

The identifier is not visible from outside. Without a reader it is not possible to check if the animal carries any electronic identification. The recovery rate of the transponder is low in comparison with the other identifiers. Therefore the risk that identifiers enter the food chain is higher. Only half of the recovered identifiers are readable after extraction, which complicates cross-checking and documentation. Finally the injection of the transponder needs some special training.

2.2.3. Ruminal bolus

Advantages

Once the bolus is correctly applied, losses are nearly impossible. To take out the bolus from a live animal is very difficult and requires the use of surgical methods. The recovery rate in slaughtered animals is almost 100%.

Disadvantages

There is some limitation to apply the bolus to very young animals until the forestomachs have reached a certain stage of maturity, especially the reticulum. This depends not only on the age of the animal but also on the feeding regime. The identifier is not visible from the outside. Without a reader it is not possible to check if the animal carries any electronic identification. The presence of a magnet device to protect against the ingestion of metallic objects can influence the reading efficiency of the bolus.

2.3. Future requirements and possible options

The results of the IDEA project show that electronic identification of cattle is feasible under actual field conditions. Due to high accuracy of reading performance and the possibility of direct entry of readings into electronic data processing systems, electronic identification can contribute to a higher accuracy of holding registers and instant recording of movements etc. However, the introduction of a Community-wide approved identification system implies a consideration of technical characteristics, data management strategies, organisational aspects and legislative requirements. It should also be considered that the introduction of electronic identification would prove useful for other purposes in addition to sanitary and premium controls (e.g. automatic feeding systems, herd management, herdbook keeping, milk recording). It may be more practical and cost-efficient to use a unique electronic identifier, provided that a common/multipurpose technical standard is agreed and established.

3. CONCLUSIONS

The introduction of electronic identification should be considered in the light of its technical feasibility and its capability to improve the existing system of bovine identification. It has been demonstrated that the technology has been developed to the extent that it can be applied. Electronic identification can improve the existing system of identification and registration in certain ways. It can, for example, contribute to a higher accuracy in holding registers, allow instantaneous inputs into central databases and ensure records are continually maintained and updated provided that the current system of identification and registration based on classical eartags is well established. Otherwise the benefits of electronic identification would not be achieved.

To decide on the possibility of introducing electronic identification systems on a Community wide basis, the following general conditions for the identification and registration of bovine animals would have to be considered:

– Organisational structures and data management systems have to be well established.

– Animals would have to be identified at any time by (at least) two identifiers, where one must be a ‘visual’ eartag and the second can be an electronic identifier.

– According to present knowledge the requirement of tagging within a period not longer than 20 days after birth limits the use of the bolus in view of the maturation of the forestomachs of the calf.

– Each type of identifier has to be kept out of the food chain, which would limit the use of the injectable transponder due to its reduced recovery rate.

– The additional costs for electronic identification need to be considered in relation to its increased accuracy.

In view of the above, the options available can be summarised as follows:

1. Introduction of electronic identification as a **compulsory** system in all Member States

   The advantages of electronic identification would be introduced, but the various needs and conditions in the different Member States would not be considered. It is debatable if Member States that are still in the process of establishing the existing system would benefit from an additional change in identification procedure.

2. Introduction of electronic identification as an **optional** system, where Member States may authorise the **replacement** of the second eartag with an electronic identifier in view of the future introduction of a compulsory system in the Member States.

   Common technical standards should ensure compatibility between the Member States.

3. Keeping the **status quo** (two classical eartags, electronic identifier may be used in addition)

   Under this option, electronic identification may be used in addition to classical eartags. However, electronic identifiers would form no part of the official identification system. The existing system should be improved by strengthening the control measures and sanctions already in place.

In view of the direction already taken with regard to the reinforced system for the identification and registration of sheep and goats as laid down in Regulation (EC) No 21/2004[10] it is highly desirable to move overtime to electronic identification of bovine animals taking into account the need to develop the implementing measures required for the proper introduction of the system of electronic identification Community-wide. Therefore option 2 is the preferred option for bovine animals as it can introduce benefits to all current and future Member States irrespective of their capability to introduce advanced identification systems. The introduction of electronic identification should be monitored on the basis of reports from the Member States to the Commission. The efficient functioning of the national databases for bovine animals is an important element for the successful introduction of electronic identification of bovine animals. A decision on the compulsory introduction of electronic identification should take into account the practical experience gained by those Member States which choose to introduce the system on an optional basis during a period of up to three years.

[10] OJ L 5, 9.1.2004, p. 8.

In order to be functionally operational the use of electronic identification must be mutually compatible between national procedures and must therefore be harmonised at Community level. Initially this would primarily relate to the technical standards of electronic identifiers and reading systems. The information on the electronic identification of the animal has to be kept in the national cattle database, the holding register and the cattle-passport. As a precondition for legislative proposals, the Joint Research Centre of the Commission should provide detailed technical guidelines, definitions and procedures in the area of technical characteristics of identifiers and readers; test procedures, acceptance criteria and certification model for agreed test laboratories; procurement of appropriate identifiers and readers; application of identifiers, their reading and recovery; codification of identifiers; common glossary, data dictionary and communication standards.