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ISO TC23\SC19/WG3/ Project Team on Additional Technologies.
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Guideline

Conditions for the integration of additional technologies in the ISO animal identification Standards

1. Scope

ICAR, in cooperation with the ISO TC23\SC19 group in Agricultural Electronics, has enabled the wide-scale implementation of Electronic Animal Identification on the basis of a standardised technology (ISO11784 & ISO11785, Low Frequency) in numerous national and private schemes, involving several hundred million devices around the world.

In recent times, new technologies, such as UHF technology, have been promoted for use in Animal Identification.

In order to ensure that innovation can be successfully introduced into the field of animal identification and traceability, the vast experience gained over the last 20 years should be reflected in a set of requirements which ensure that solutions and equipment are “fit-for-purpose” before being introduced into the market.

The ISO TC23\SC19 WG3 (identification working group) wishes to create conditions for an efficient integration of additional suitable technologies into the ISO standards for Animal Identification (ISO11784 & ISO11785, ISO14223-1..3, ISO26431-1..7 etc.), and also proposes that ICAR be nominated to oversee such conditions are met.

Promoters of additional technologies for Animal Identification will subsequently be invited:

1) To demonstrate that their proposed technology is comparable with the existing technology, and if so, then
2) To join ISO TC23\SC19\WG3 in view of reviewing and enhancing current and future ISO standards to encompass their technology in Animal Identification.

These Standards will define the performance level and the evaluation of this performance level.

Initially, the parameters will be for ear tags, e.g. readability and retention requirements.

This will ensure Public and Private Operators can be provided with a credible and legitimate framework for decision making within an open market available to any company who wishes to participate.

2. Analysis of Technologies

The ISO TC23\SC19\WG 3 expert team has performed a review and critical analysis of RFID technologies (ISO11784 & ISO11785, ISO15693-1, ISO18000-63 and active systems), utilizing its knowledge of markets and field operations across many species (cattle, sheep, pigs, horses, companion animals) and throughout various parts of the world (Europe, North and South America, Australia and, to a lesser extent, Africa and Asia).

This analysis shows two main aspects:

- LF technology has been and remains successful in large scale implementations, involving several hundred million tags over the last 15 years, mostly in government-regulated identification and traceability systems.
- Other technologies (HF, UHF, MIW, Active RFID, etc.) may bring different characteristics in addition to the current LF Standard. Although these technologies have achieved mature performance, per se, – may require further investigation for adaption into agricultural applications.

3. Requirements prior to introduction

The following points will be essential in the development of expanded ISO Standards:

- Demonstrated field performance of the proposed technology, prior to its consideration by the International Working Group responsible for electronic animal identification.
- Interoperability with currently implemented national and international identification technology and methodology.
- Compatibility with – or integration with ISO11784 (numbering scheme), because of the large installed base, such as maintaining code uniqueness and structure.

3.1 Field Performance

The Project Team proposes that promoters of additional technologies for Animal Identification (researchers, manufacturers etc.) seeking to participate in the proposed work should present credible field performance data, validated by reputable third parties, preferably nominated by ICAR or ISO TC23\SC19\WG3. They shall show a successful implementation of their technologies in the conditions given below (inspired by some of the national accreditation processes that have been in use for many years) with requirements for different species taken into account:

Livestock:
The scope shall be from birth to slaughter, meeting with the following conditions :

Bovine animals, sheep and goats:

- a minimum of 10 farms in at least 2 continents with climatic conditions that include a typical environment in:
  a) Canada or Northern Europe in winter,
  b) Southern US, Northern Australia, Brazil in summer.
- a minimum of 10,000 devices
- test duration of at least 3 years with full data on tag retention and readability over the complete period of tests.

Pigs:

Meat production (life expectancy approx. 6 months)

- a minimum of 10 farms in at least 2 continents with climatic conditions that include a typical environment in:
  a) Canada or Northern Europe in winter,
  b) Southern US, Northern Australia, Brazil in summer.
- a minimum of 10,000 devices
- test duration of at least 3 years with full data on tag retention and readability over the complete period of tests.

Sows:

- a minimum of 10 farms in at least 2 continents with climatic conditions that include a typical environment in:
  a) Canada or Northern Europe in winter,
  b) Southern US, Northern Australia, Brazil in summer.
- a minimum of 8,000 devices
- test duration of at least 5 years with full data on tag retention and readability over the complete period of tests.

Companion Animals:
For companion animals and other animals (e.g. horses) presently identified with ISO11785 injectable transponders, the considerations mentioned above are equally valid. The scope for these animals is for their entire lifespan.
The minimum number of animals for a field test shall exceed 3000.
All other requirements and criteria shall remain precisely the same.

3.2 Evaluation of Field Performance

The results of these tests shall be compared to the requirements of the application. There may be a difference between farm management use and national traceability schemes.
The evaluation shall be performed by an independent third party organisation (preferably nominated by ICAR or ISO TC23\SC19\WG3).

3.3 Hardware Criteria for Introduction of Additional Technologies

There are two basic requirements which animal identification technology must fulfil:

1. Retention
The retention of Electronic identification ear tags must be for an animal's entire lifetime.
Checks should be made at regular intervals: e.g. every 6 months for animals that live for 3 or more years. Animals with a shorter lifespan shall have their checks at shorter intervals. The nominated third party shall monitor the level of retention observed over these periods.

2. Readability (visual and electronic)
Eartags must have a proven readability in various environments including:
a range of temperature zones, humid and dry atmospheric conditions, high UV exposure, high moisture environments (e.g. rain, snow, etc.). This environmental conditions should also include saleyards/auction markets, abattoirs, feedlots etc..

This readability shall be maintained over the lifetime of the animal and shall be verified in the same time intervals as mentioned above e.g. every 6 months for at least 3 years. The nominated third party monitor(s) should state the level of readability observed over these periods.

These two characteristics are to be regarded as a benchmark that the technology is indeed fit for purpose. These characteristics define the entry level for the commencement of the Standardisation process with ISO TC23\SC19\WG3.

Candidates' declared results will have to be audited by third parties. It is critical to note that the intention of these conditions is not to set what values should be achieved by a prospective product, but to provide a basis for assessing whether a product is applicable for its nominated use within an animal identification program.

4. Interoperability with systems presently in use.

Hardware
While the adoption of additional technologies in typical agriculture conditions may seem feasible, the cost and implementation management may be considerable (e.g. dual mode readers are in reality two readers in one housing; tag design faces challenges of reduced size; design features to withstand environmental conditions). There may be certain technologies which cannot integrate with current technology in use, so candidates should provide guidelines for cohabitation with other technology and give supporting evidence of such abilities.

Software
The system and databases presently used operate with an animal code according to ISO11784 with ICAR as Registration Authority for the manufacturer.

As ISO11784 was originally generated for the animal identification, other applications using that numbering scheme have to set a “NON animal” bit.

Other RFID Standards started with numbering schemes where no provision for Animal Identification was foreseen; therefore a provision for animals must be introduced in the Standards such as ISO15459 to maintain the principle of uniformity for the codes.

4.1 Software Criteria for Introduction of Additional Technologies

The individual animal number according to ISO11784 must be maintained, as established databases and procedures used in official schemes for the registration of millions of animals must be protected. Failure to meet this requirement will result in an immediate rejection of a potential technology for use in animal identification.

This means, the structure and content of ISO11784 must be maintained under all circumstances and is non-negotiable

Where additional technology is used in applications other than animal identification, provisions must be taken to ensure that the number used for animal Identification is unique and cannot be allocated to any other application.

In ISO TC23\SC19\WG3 the Project Team “Additional Technologies” works on the possible integration of these technology issues in the future and on expanded standards for Animal Identification.

5. Summary

Before the introduction of a new technology can be seriously considered it shall be compared to existing technology and proven in the field under defined conditions.

Backward compatibility has to be maintained with regard to code structure and inclusion of existing databases.

When alternative technologies are evaluated as suitable for animal identification, the ISO TC23\SC19\WG3 group responsible for animal identification proposes to invite researchers and manufacturers experienced in other technologies to participate in the development of these expanded standards.

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