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ISO/IEC JTC 1/WG 7
Working Group on Sensor Networks

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Report by ad-hoc group formed to review liaison statement from IEC TC65

Members

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Introduction

At the last JTC1/WG7 plenary an ad-hoc activity was formed to investigate the issues raised by TC65 on the scope and work of JTC1/WG7 and to prepare a suitable response to be discussed at the next plenary.

There were two substantive points raised:

1) The title of the work "Sensor Networks" is confusing if the scope of work includes actuators as well as sensors – please remove actuators from scope of work.
2) If actuators are included in Sensor Networks then there is confusion between the work of TC65 on "Control Networks" and WG7 on "Sensor Networks"– please remove Control Networks from scope of work.

The group has discussed the points raised by TC65 and provide the following summary of our work.

Point 1 - Sensor Networks

The work of JTC1/WG7, and the previous Study Group, has always included both actuators and sensors within their definitions of a Sensor Node. Comments are:

1) A system containing just sensors would only satisfy a restricted set of applications and so the standards would not be widely used.
2) For some sensors an actuator, or other output setting, is required for the sensor to perform its function – (e.g. a CCTV camera might contain a pan/tilt or wiper function).
3) Other work in this area e.g. The Internet of Things (particularly the Casagras and Sensai) work funded by the EU includes both sensors and actuators.
4) Examples of the use of the term "Sensor Network" in literature were presented and these have covered systems with output functions without any mention of it being a "special" type of sensor network.

For the above reasons we do not feel that there will be substantive confusion in our use of the term Sensor Networks. We should explicitly clarify in our documents that a Sensor Network can include an actuator, or other form of output, within its implementation.

Point 2 - Sensor Networks and Control Networks

Concern was raised that users may confuse applicability of standards for particular applications (particularly continuous and batch process control applications) and that users might adopt the wrong standard and thus impact control system integrity.

Discussions on this topic covered two approaches:

- Work on Taxonomy of Sensor Network components to avoid potential conflicts.
- Provide a clarification of the characteristics of Sensor Networks and Controls Networks.

Various proposals for the definition of terms that might assist our task have been considered however there was no clear set of definitions that could be agreed. As work on the Taxonomy forms part of the main project work of WG7 it is better that work in this area (taxonomy) is covered by the full committee. Inputs to the plenary have been provided by UKNB and Graeme Wood covering many of the items discussed.

We discussed ways in which we might characterise the differences between the two types of operation:

Sensor Network

Definition:

A system of spatially distributed sensor nodes interacting with each other and, depending on applications, interacting with other infrastructure in order to acquire, process, transfer, and provide information extracted from the physical world with a primary function of information gathering.

- **Note:** A sensor network may have some control capability.
- **Note**: Distinguishing features of a sensor network is that it can include: wide area coverage, radio networks, flexibility of purpose, self-organising topologies, openness, providing data for multiple applications – This requires further discussion.

Control Network

Definition:

A system of spatially distributed control nodes interacting with each other and, depending on application, interacting with other infrastructure in a controlled process, to provide the function of control for a process or machine.

- **Note**: A distinguishing feature of a control networks is that it is typically a closed system of predefined operation with emphasis on deterministic performance to ensure reliability and repeatability as required by safety related and time critical control applications.
- **Note.** The distinction between control networks and sensor networks is changing as technology evolves so devices designed for one type of network application may be reused in another – however the integrity of a control network must not be impacted

These definitions need to be considered by the full working group before inclusion in documents but it is considered that they may assist WG7 in the work on defining Sensor Networks.

Scopes of activity

One area that we did discuss was the respective scopes of work of JTC1, WG7 and TC65 as these should clarify the activities of TC65 and WG7.

JTC 1 scope: Standardization in the field of information technology.

In Tel Aviv resolution establishing WG7 stated "…important for JTC 1 to undertake standardization in the area of generic solutions for sensor networks and application-oriented sensor networks within the overall scope of JTC 1."

JTC 1 WG 7 scope

The WG7 scope of work is covered by the first two points of the JTC1 Resolution that formed the working group:

1) In the area of generic solutions for sensor networks, undertake standardization activities that support and apply to the technical work of all relevant JTC 1 entities and to other standards organizations. This would include activities in sensor networks such as the following:

a) Standardization of terminology
b) Development of a taxonomy
c) Standardization of reference architectures
d) Development of guidelines for interoperability

2) In the area of application-oriented sensor networks, identify gaps and commonalities as they may impact standardization activities within the scope of JTC 1. Further, share this information with relevant entities within and outside of JTC 1. Unless better pursued within another JTC 1 entity, the following standardization activities may be pursued as projects by this Working Group:

a) Addressing the technology gaps within the scope of JTC 1 entities
b) Exploiting technology opportunities where it is desirable to provide common approaches to the use of sensor networks across application domains.

IEC TC 65 scope

To prepare international standards for systems and elements used for industrial-process measurement and control concerning continuous and batch processes.

To co-ordinate the standardization of those features of related elements which affect suitability for integration into such systems. The work of standardization outlined above is to be carried out in the international fields for equipment and systems operating with electrical, pneumatic, hydraulic, mechanical or other systems of measurement and/or control.

Response to TC65

We have considered the points raised and recommend that the response to TC65 is:

> **It is recognised that IEC TC 65 is responsible for international standards for systems and elements used for industrial-process measurement and control concerning continuous and batch processes.**
>
> **For standards, such as the generic reference architecture ISO/IEC WD 29182 parts and collaborative information processing ISO/IEC NP 20005 , developed within WG 7 it should be understood that while these specifications may be applicable to continuous and batch processes systems they have not been specifically designed for such applications.**

WG7 recognises TC65 as experts within the TC65 scope of work and WG7 cannot confirm the applicability, or non-applicability, of the WG7 standards for that scope of work. TC65 is invited to review our work and incorporate/adopt any items of work that they consider suitable for their own activities.

Recommendation for WG7

A generic form of these words should be included in WG7 Standards to clarify that our work has been based on a wide range of application areas and, as such, is designed to have general applicability. Other groups should review the standard and incorporate the parts that they consider suitable to be adopted within their own scope of work.