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Working Group on Sensor Networks

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

TC65: INDUSTRIAL PROCESS MEASUREMENT, CONTROL AND AUTOMATION

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Please take note of the following specific issues of concern to IEC/TC65 which has responsibility for many existing standards in the area of Industrial Process Measurement and Control.

Industrial environments identify networks that include actuators as “Control networks” or “Automation networks” or “SCADA networks” (SCADA = *supervisory control and data acquisition)*.

Within these networks (and others as well), there is considerable concern over protection and ensuring that control networks perform within their original specifications over their entire life cycle. This is because “actuator outputs” interact with the real world, and inappropriate outputs can cause harm to equipment, the environment and people.

Control networks are typically subject to rigorous safety and security analysis to ensure their integrity. They have traditionally been isolated from external networks to ensure this integrity, although today carefully managed interconnections are sometimes included to allow the export of information or the high level input of supervisory commands.

Although the inappropriate use of networks with sensing capabilities and no actuation (“sensor only networks”) can raise privacy and timeliness concerns, traditionally industry has considered such networks as being more benign than Control networks.

Thus a strong tradition has been built that sensors sense and actuators actuate. For example, the entry of “sensor” or “actuator” in the IEV (www.electropedia.org) will provide such definitions.

Similarly the accepted industrial definition of a “Sensor network” is a “network of sensors” and a “Control network” is “a network of sensors and actuators”.

IEC TC65 and its associated subcommittees are concerned that definitions used in WG7 documents and proposed in ISO/IEC WD 29182 (Information technology — Sensor Networks — Reference architecture for sensor network applications and services) specify that a “Sensor network” is a network of “Sensor nodes” and that a “Sensor node” may include actuators.

1) This attempt to redefine “sensor nodes” and “sensor networks” to include an actuator capability is inconsistent with long established industry practice. If a node or a device has both sensing and actuator functions, it is not a “sensor”. It is a control entity with sensor function(s) and actuator function(s).
2) Networks which include actuators are called control networks rather than sensor networks. The use of the term “control network” highlights that what is being controlled will affect the level of safety and security analysis that should be applied. Direct low level interactions with a control network can affect the performance and safe operation of such networks. In industry direct low level interactions by unconstrained external entities is prohibited. Rather, interactions with control networks are made through specific, typically high level, interfaces.
3) The current industrial use of the terms Sensor networks and Control networks are clear and precise. If the term ‘Sensor network’ is expanded to include actuators, then a new term will be needed to identify ‘Sensor only networks’ and much confusion will be caused in the industrial marketplace.

IEC TC65 requests ISO/IEC JTC1 WG7 to agree the following actions:

A). To maintain consistency with long established usage and avoid confusion in the industrial marketplace, please define the term “Sensor networks” to mean networks that contain sensors only.
B). Where appropriate, please maintain a clear distinction between “Sensor networks” and other networks such as “Control networks”, “Automation networks”, “Fieldbus networks”, and “SCADA networks”, all of which typically include actuators.
C). As mentioned above, if a Sensor network wishes to interact with a Control network this can be done through an appropriate high level, interface. IEC TC65 will be interested to contribute to work by WG7 on the services and functions that a Control network should support as part of an external interface to a Sensor network.