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Responses to ICS TAC10 Committee Recommendations

General

Issue ICS standards for hardware, software, processes and documentation.

ICS has defined the HW standards for controls (uTCA, EtherCAT, PLC) and is in the process of compiling information needed by users when designing their systems and interfaces (selection guide and a list of recommended hardware).

Furthermore, ICS is preparing EPICS development guidelines that should standardize EPICS development for ICS and all collaborators, either within ESS (e.g. NSS) or in-kind. Tools that support the standardized processes are in preparation, some already deployed (e.g., naming tool) and some under development (e.g., "IOC Factory" to support EPICS IOC development and deployment.)

ICS put in place processes for development and integration according to SE practices. These processes (tasks, reviews) are used when planning and scheduling activities.

Develop Interface Control Documents for the technical systems.

High level interfaces and division of responsibilities have been agreed upon with Target and NSS and are awaiting approval. Interfaces have also been agreed with Accelerator. Several technical ICD documents are being prepared as parts of Target Integration Support.

Proactively seek IKC agreements with other institutions and work with accelerator subsystem IKCs to see if these can include an IKC of controls.

ICS is in discussions or writing agreements for in-kind activities with the following institutions: 1) CEA for Proton Source and LEBT control, 2) CNRS for Cryo Distribution control 3) Uppsala for Spoke Cryomodule Tests, 4) ESS Bilbao for MEBT controls, 5) Legnaro for DTL controls, 6) PSI for controls hw platform development; 8) Poland (Lodz U), high level software, 7) Evopro (Hungary) for Target Systems Integration, 8) IFE (Norway) Main Control Room design, 8) Elettra (Italy) for wire scanner integration

The IKC listed above are primarily associated with Accelerator subsystems for which an IK contribution for the Accelerator project also exists. In addition ICS will develop IKC with Target System IK contributions as evidenced by the discussions with Hungary.

Finalize decision on ESS standard PLC for ICS

The tender for a PLC vendor for ESS is nearly completed. The award of the contract is expected before the 2015 Annual Review.

Hardware Platform

Fix hardware standards and document, so they are available for in house and IKC developments, by Q4 2014.

Hardware standards are in progress of being finalized. Not all components are ready yet for production but the guidelines are fixed (<https://ess-ics.atlassian.net/wiki/display/HAR/Control+System+Hardware+Platforms>) and the detailed work is in progress. First in-kind contributors are already working based on these standards. Standards will be updated as the development goes on.

For the first deployments, solutions have been developed so that the work can proceed, and plans for replacement with the final hardware have been discussed or are under consideration.

PSS

Consider establishing a framework agreement for the provision of IEC61508 support services (examples being, development of processes and documentation, failure mode analysis studies, fault tree analysis, design verification)

A Framework agreement for Research and Development activities regarding Radiation Protection and Safety Systems with ZHAW/Winterthur has been signed by all parties on the 2nd of Feb 2015. ZHAW is the School for engineering in Winterthur/Switzerland. The team with which ICS set up the agreement is located in the IAMP (Institute of applied mathematics and physics), namely as the SKS team (safety critical systems). The team, consisting of 5 people and led by Dr. Christian Hilbes, specializes in hazard and risk analysis methods, formal specification and verification methods, quantitative safety assessment, functional safety application, and hardware in the loop verification tests.

Technical Coordination

ESS should develop engineering standards and distribute to all collaborators as early as possible. PSS interface, lock out tag out (LOTO) standard, electrical safety, X-ray shielding, pressure vessels standards, RF power leakage, are some of the more important things for such a set of standards. Compliance with such standards should part of the design (PDR and FDR) and inspection of progress of IKCs.

The PSS interfaces are currently under definition, and the PSS team is undertaking constructive dialogue with all ESS divisions to identify all potential hazards and interfaces. In line with the lifecycle of IEC61508 this process will be fully documented, and the documents will be completed by the end of 2015 for the Accelerator and Target personnel safety systems. In addition a handbook on "Safety and Health" is being prepared by the ES&H division. Existing "Cross-Functional Working Groups" are dealing with "Norms and Standards" and "Electronic Hardware Harmonization". Their recommendations are expected before the end of 2015.