

TAC 10

Integrated Control System Status and Plans

Garry Trahern
Head of Division

www.europeanspallationsource.se

TAC 10 November 5, 2014, ESS, Lund

Overview

- ICS Project
- Responses to TAC 9 Questions

And if there is time...

- Staffing
- In Kind
- CS Services Framework Agreements

ICS Project Status I

- Interfaces (WP10-14)
 - Proton Source, LEBT control specification agreed with Saclay as In-Kind
 - Cryogenic plant control tendered, vacuum test facility potentially In-Kind
 - CF control architecture and interfaces being discussed in parallel session
 - High level Interfaces with NSS, Target, Accelerator Beam Instrumentation documents being drafted
 - ICS Test stand under development
- Hardware and Integration (WP4)
 - Integration: BCM, LLRF, Data-on-Demand, Detector Bulk Data prototypes/ systems delivered or under development
 - Hardware platform decision discussed in parallel session
- Core software and Applications (WP2-3)
 - RBAC, Configuration, Naming, Lattice, Cable databases and related tools with DISCS collaboration released
 - OpenXAL framework agreed with Accelerator Beam Physics for commissioning

ICS Project Status II

- MPS (WP5)
 - Machine Protection Committee (MPC) has been established by EPG. MPC is empowered to take major decisions related to machine protection. Members: chief engineer for ACC, ICS, E. Pitcher (target), R. Connatser (NSS), A. Nordt, & someone from Operations
 - Research collaboration agreement between ESS and ZHAW (Zurich University), team of Christian Hilbes: helping out on all types of risk analysis (MPS, PSS, TSS), help on interlock system for raster magnets
 - Started prototyping of slow beam interlock system
 - Will start prototyping fast beam interlock system (with external German company supervised by CERN, ZHAW, ESS teams)
- PSS (WP9)
 - Stuart Birch joined ICS from August as PSS lead engineer
 - Scope for ICS has been defined, *but not yet agreed by management ; process to get agreement is underway---* **Scope agreed EPG November 3, 2014**
 - Project plan for 2015 defined
 - PSS hires are underway, a staff of 3 should join in 2015: 2 safety qualified engineers and a super-technician.

ICS Project Status III

- Milestones for 2014
 - **Application framework(s) decision on OpenXAL+** Q3
 - ESS Single PLC vendor decision Q3-> Q4
 - Hardware Platform freeze Q3+
 - MPS External Audit/Review Q3->Q2, 2015
 - PSS Preliminary Design Q4->Q2, 2015
 - High level IDDs for Target, NSS Q4

TAC 9 Recommendations – ICS responses I

- ICS Resources
 - R: Failure to recruit a lead engineer for PSS should be added to ESS project risk register
 - **A: Failure averted → Lead engineer for PSS arrived August, 2014.**
- Are the measures we have proposed to resolve the issues and review/ implement the recommendations of the 1st ESS Annual Review adequate and sufficient?
 - R: Issue ICS standards to IKC partners by Q3 2014 milestone
 - **A: Standards for ICS are delayed: 1) PLC vendor choice has been delayed in order for procurement to put in place a legal strategy for the PLC Open Call for Tenders. We have that strategy now where all our in-kind contributors and collaborators will be able to benefit from our commercial agreements and the tender will be placed in November. Also, another call for tenders specific for PSS will be tendered simultaneously ; 2) Hardware platform decision to use uTCA.4 for higher performance system interfaces has been made. Further development is needed for the choice of modules and further discussions with stakeholders about the development path are required.**

TAC 9 Recommendations – ICS responses II

- Are the technical risks of the constructions plans for Controls comfortably low enough for safely achieving start of initial operation in 2019 on time, budget and performance?
 - R: Reconsider using IKC to deliver part of the PSS
 - **A: *Labor associated with PSS development will be done internally. There is some possibility to procure hardware for PSS/ODH/ARM as in-kind, and we are investigating these possibilities, but the labor to develop PSS will be done in-house. Two engineers have been interviewed recently, and a third (super-tech) will be interviewed before end of the year.***
 - R: Proactively seek IKC agreements with other institutions
 - **A: *ICS has discussed in-kind activities with the following institutions so far: 1) CEA/Irfu controls for Proton Source and LEBT. 2) Uppsala for Spoke Cryomodule Tests. The agreements with CEA and Uppsala are ready to be signed. 3) PSI for electronics collaboration; 4) Evopro, Hungary for PLC integration; 5) Daresbury for vacuum integration; 6) Legnaro for DTL integration; The amount of in-kind funding potential realized by these efforts is not large, but represent collaboration with other project's major in-kind partners such as Accelerator. We are hoping to realize more to meet the goal required.***

TAC 9 Recommendations – ICS responses III

- Continuing...
 - R: Proactively work with owners of accelerator subsystems to be delivered by IKC to see if these subsystems can include IKC of controls
 - ***A: Most of the institutions we have engaged in in-kind discussions are already involved with In-Kind accelerator contributions. We have discussed with CEA/Irfu, Catania, Legnaro, Uppsala, Daresbury, Huddersfield, CNRS, ESS Bilbao with respect to accelerator systems and controls integration and are preparing to join with them in developing controls wherever possible.***
- What intermediate early key milestones are required to be met on the way?
 - R: Add a milestone for hiring PSS Lead Engineer
 - ***A: This was done.***
 - R: Add a milestone to finalize scope of PSS and update cost estimate if needed
 - ***A: The plan is that scope for ICS efforts wrt PSS activities should be decided by end of Q4 2014. Cost estimate for PSS related systems will depend on the scope, but we will provide estimate during Q1 2015***

If there is time...

ICS Staffing 2014

- Hiring status
 - Expected 2014 EOY level: ~24
- Hired so far 2014
 - MPS PLC and FPGA engineers (2), PhD for MPS (1)
 - Software architect and developer (2)
 - PSS Lead Engineer
 - Junior Controls Engineer for timing system development
 - Systems and standardization engineer
 - Intern for System engineering and collaborative tools
 - CS Infrastructure Lead Engineer (Networks, Data Centre)
 - Still pending
 - Lead integrators for: Accelerator, Target (2)
 - PSS PLC, Safety engineers (2), Super-Tech(1)
 - PhD for Physics WP – selection underway
 - MPS Senior Engineer – re-advertising
 - Deputy Head of Division – underway with head hunting agency
- External expertise:
 - 4 Contracted Integrators present onsite
 - PSS contractor Paul Wright
 - Team assistant from consultancy; procurement underway

In Kind status

- 43% of ICS construction project is identified as In-Kind Potential
- Present status of realisation:
 - France / Saclay contribution for NC accelerator control
 - Proton Source/LEBT detailed plan agreed; HoA to be signed
 - MEBT, RFQ, [DTL] details under discussion and to be added to agreements
 - Uppsala contribution for Spoke Cryomodule series test agreed, waiting for signature
 - Hungarian contribution for Integration support WPs discussed with company Evopro; detailed discussions pending
 - PSI contribution (at first MoU) for electronics collaboration beginning
 - Daresbury contribution for vacuum test facility being discussed
 - Italy (Legnaro) DTL discussions to occur
 - GSI contribution awaiting face to face discussions with GSI controls
 - Spain(ESS Bilbao) discussions on Target Wheel controls, Accelerator BI and RF contributions as well
 - Institute for Energy (Halden) EOI for control room design on hold while Norwegian contribution is clarified

CS Services Framework Agreements

- Status
 - Re-tendering of CS EPICS services tender is now closed, proposal(s) begin evaluation this week
 - “Single PLC vendor” tender was delayed to November to understand how IK partners can leverage
 - CS PLC services tender will be published as soon as single PLC vendor tender is awarded
 - Procurement has defined the new FAs as 2 years + 2 year renewal
 - Risk: re-tendering in 2018

Proposed Scope:

- **Personnel Safety System** – Protects workers from prompt radiation due to beam operations. PSS will be required for the accelerator, target and instruments
- **Oxygen Deficiency System** - Protects workers from hazards associated with cryogenic gases. ODH systems will be required for the LINAC tunnel, cryogenic plant and (perhaps) Target building areas
- **Area Radiation Monitors** - Monitors used to protect workers from prompt radiation due to beam operations and activated components (e.g., in Target building)