Electronics - Hardware

European Spallation Source

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ESS/ICS
Date: 2019-11-26

Current Status: Project Overview

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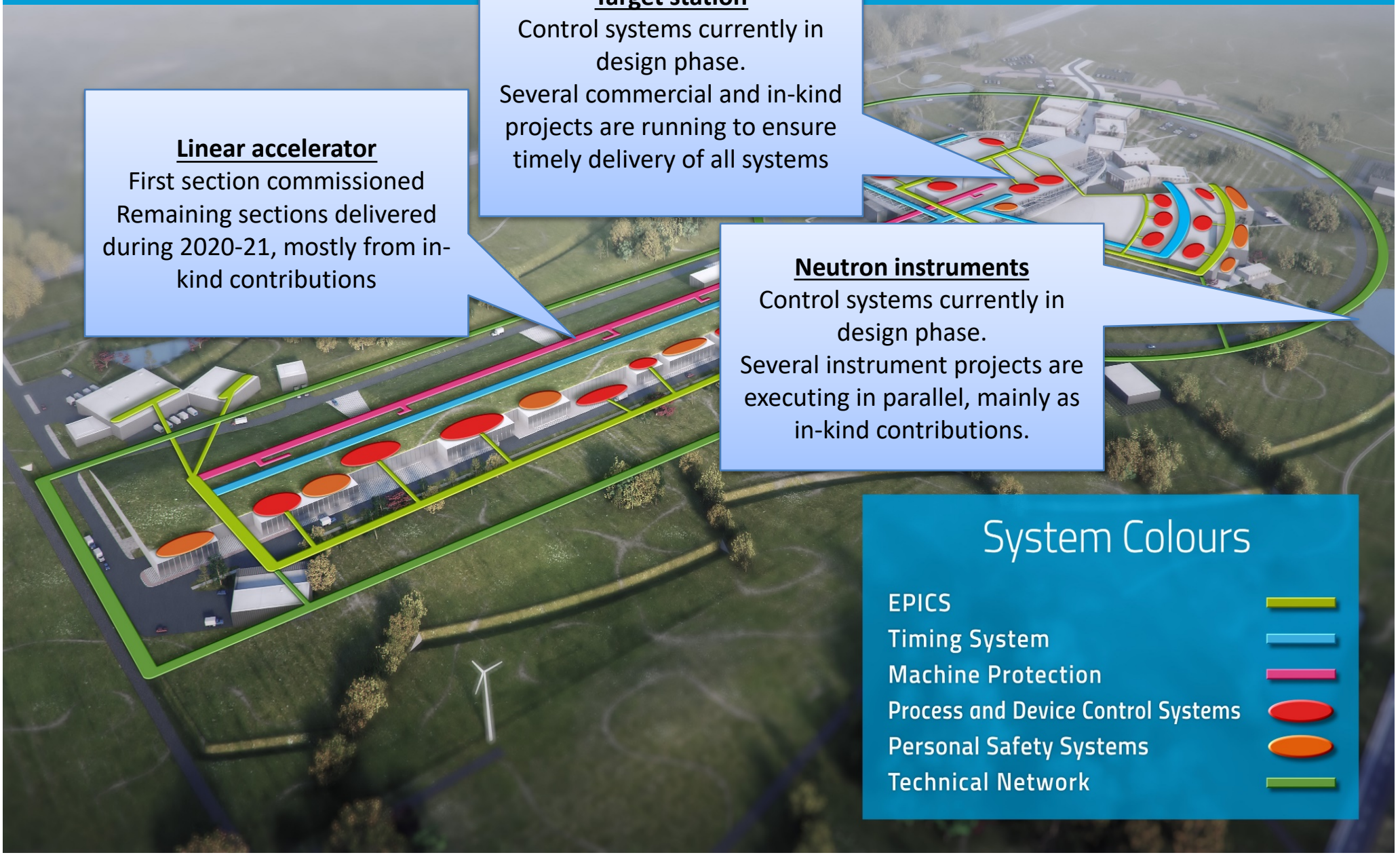
Target station
Control systems currently in design phase.
Several commercial and in-kind projects are running to ensure timely delivery of all systems

Linear accelerator
First section commissioned
Remaining sections delivered during 2020-21, mostly from in-kind contributions

Neutron instruments
Control systems currently in design phase.
Several instrument projects are executing in parallel, mainly as in-kind contributions.



System Colours

- EPICS
- Timing System
- Machine Protection
- Process and Device Control Systems
- Personal Safety Systems
- Technical Network

Current Status: Integrated Control System

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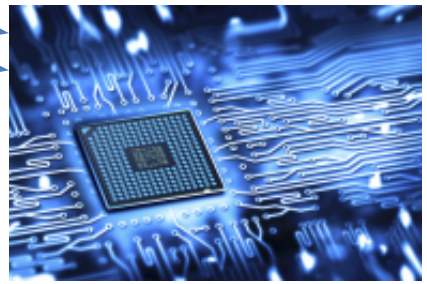
Work package 01	Management and administration
Work package 03	Software core
Work package 04	Hardware core
Work package 05	Machine protection
Work package 06	Equipment
Work package 07	Control system infrastructure
Work package 08	Physics
Work package 09	Personnel safety systems
Work package 10	Integration - Accelerator
Work package 11	Integration - Target
Work package 12	Integration - Instruments
Work package 13	Integration - Conventional facilities
Work package 14	Test Stands
Work package 20	Installation

Software



Electronics

Current Status: Hardware Standardization

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10 MHz

1 MHz

100 kHz

Digital Controls Platform

MicroTCA® is a modular, open standard for building high performance switched fabric computer systems in a small form factor. Because of its modularity and flexibility, MicroTCA is well-suited for industrial control and automation systems. MicroTCA defines fully redundant redundant system configurations including power budgeting, hot-swap, complete component and system management that allows failure detection and isolation. This greatly improves system reliability and availability.

10 kHz

1 kHz

100 Hz

EtherCAT

EtherCAT is a modern high-speed industrial automation system standard which enables faster data interchange with deterministic timing and higher processing power than traditional industrial automation systems. EtherCAT systems at ESS are connected to the EPICS control layer.

10 Hz

1 Hz

0.1 Hz

Industrial automation (PLC)

Slower signals are handled by industrial automation (PLC) for reliability and cost reasons. The standardised platform for ESS applications comes from Siemens.

Upcoming challenges: 3 year perspective

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- Staying on schedule. The installation and commissioning schedule for the next years is challenging.

- Staying on budget. There is not much contingency in the ESS budget.

- Ensuring maintainability of the ESS facility. To ensure a sustainable facility we need to ensure a high level of standardization of hardware and software.

Needed competences and capabilities of suppliers

In order to help us overcome the challenges we need suppliers that can:

- Provide delivery of hardware quickly and be flexible in planning of delivery volumes
- Provide the best possible pricing on every piece of equipment
- Provide equipment from the standardized hardware types selected for the ESS project

Upcoming procurements

- No major procurements of control system hardware currently planned.
- Smaller procurements are done continuously for spares, labs and equipment not covered by the major categories.
- We will be looking to procure hardware maintenance and/or support contracts for installed and commissioned systems
- ESS website for upcoming procurements: https://europeanspallationsource.se/partners-industry

Summary

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- The European Spallation Source is in a hectic phase of parallel design, development, installation and commissioning of control systems.

- To ensure availability and competitive pricing of hardware suppliers are continuously evaluated.

- The ESS project will be running for years to come, and after construction is finalized new needs for hardware will undoubtedly emerge.