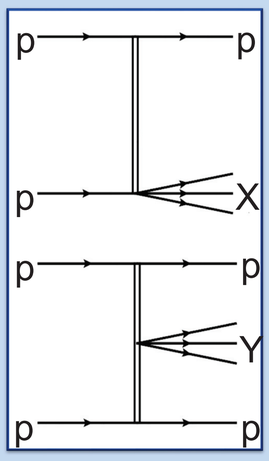
LHCC Poster Session – CERN, 22 February 2017

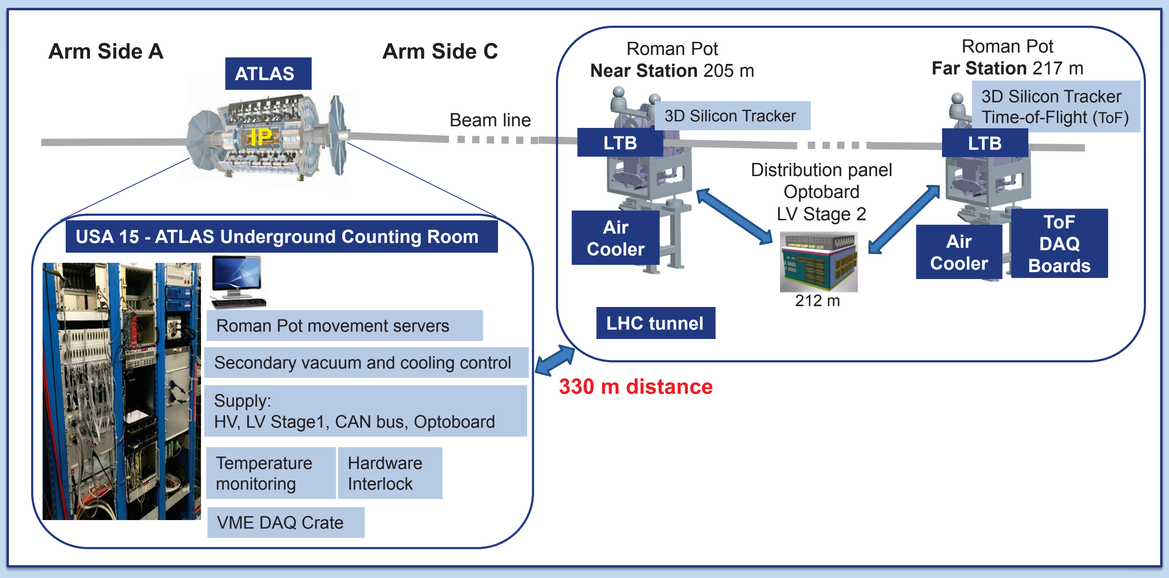
DETECTOR CONTROL SYSTEM FOR THE ATLAS FORWARD PROTON DETECTOR

AFP Detector

- aims to trigger on and to measure protons scattered at micro-radian angles
- the physics focus is on diffractive and two-photon processes with one or both protons remaining intact
- is located in both outgoing beam pipes at 205 m and 217 m from the ATLAS interaction point
- detectors inside Roman Pots approach the LHC beams to a few mm



- in 2016 two Roman Pots with silicon detectors on one side were installed and commissioned; successful data taking: participation in 2 special low-luminosity runs



- the Silicon 3D Pixel Tracker (SiT) measures the proton trajectory
- the Time-of-Flight (ToF) detector allows rejection of protons from pile-up and not from the hard interaction
- the hardware for the operation and Data Acquisition System of the AFP detector, proven to be radiation resistant, is installed in the tunnel; other equipment is located in the underground ATLAS Counting Room

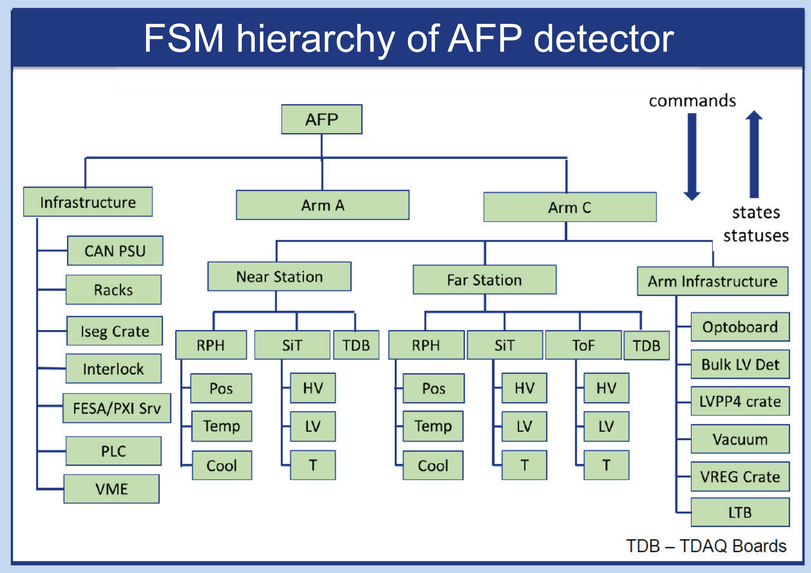
AFP Detector Control System

- enables control of the AFP detector and ensures its coherent and safe operation
- continuously monitors the detector parameters and stores a critical subset of the data in the on-line data bases
- guards crucial parameters by the DCS alarm system
- is built using Siemens WinCCOA SCADA system and CERN tools (FSM and framework components)

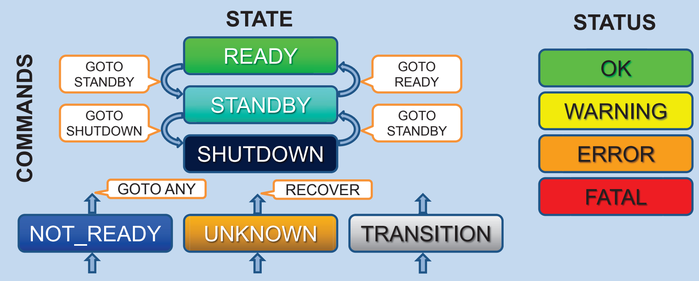
Finite State Machine (FSM)

- the FSM tool is used to create a view of the detector as a hierarchical, tree-like structure of well-defined subsystems – FSM nodes

FSM hierarchy of AFP detector



- the FSM enables full control of the detector hierarchy and serves as a graphical user interface for the operator
- every FSM node has a set of well-defined possible states and transitions



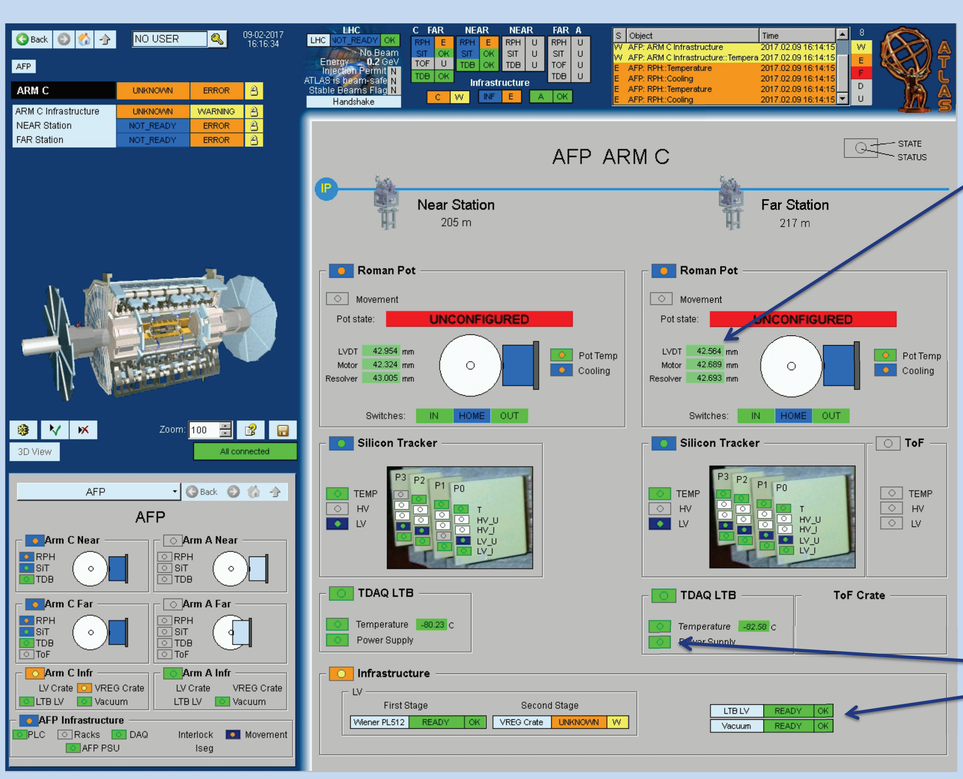
FSM Panels

- every FSM node has a corresponding FSM panel
- FSM panels are intended to control and monitor the detector and also to perform actions connected with its operation
- each panel consists of several parts:

Navigation
navigation through the detector hierarchy

FSM Main and Secondary panels are ready and tested, allow for full control of the AFP detector

Secondary panel
user-set display does not change during navigation through the tree



Parameter Widget
color depends on the parameter alarm; a click shows a corresponding **trend**

Main panel
shows parameters of a chosen FSM node; follows selected FSM node

FSM Widget
shows another nodes from the hierarchy, what facilitates observation and navigation through the tree

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