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Converting the GSECARS APS Beamlines from VME

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Most APS beamlines are using VME crates as a major part of their control system.
The VME hardware is expensive and becoming obsolete, with replacements for many of the above items no longer available. The VxWorks software is also expensive.

Prior to the shutdown for APS-U April 2023 the 4 GSECARS beamlines at sector 13 were using an EPICS system based primarily on 7 VME crates running VxWorks.

During the shutdown we completely replaced the VME systems with the following:
• 52 Galil DMC-4183 motor controllers replaced the OMS-58 and MAXv. VME controllers.
• 7 16-channel Moxa terminal servers replaced the VME serial communication modules.
• Measurement Computing USB-CTR08 replaced the Joerger and SIS 3820 scalers and multi-channel scaler functions.
• Measurement Computing USB-3104 replaced the DAC128V for analog output.
• Measurement Computing USB-1808X replaced the IP-330 for analog input
• Measurement Computing E-DI024 replaced the IP-Unidig for high-density digital I/O.
• ProSoft MV146-MNET with Modbus/TCP replaced the Allen-Bradley 6008-SV and DCM for EPICS communication with the equipment protection system PLCs.

The total hardware cost to replace the 7 VME systems for 2 FOEs and 5 experimental stations was less than $200K. This includes more than 400 motor channels.

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