

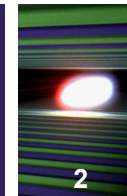
Status of the Accelerator Control System

3rd Collaboration Meeting of the European
XFEL, Hamburg, 7-9 April 2014

Tim Wilksen, DESY - MCS / WP 28 -



Hardware Status - μ TCA Systems



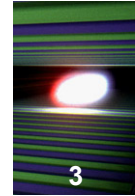
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■ Hardware

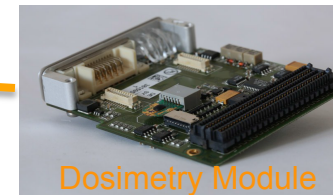
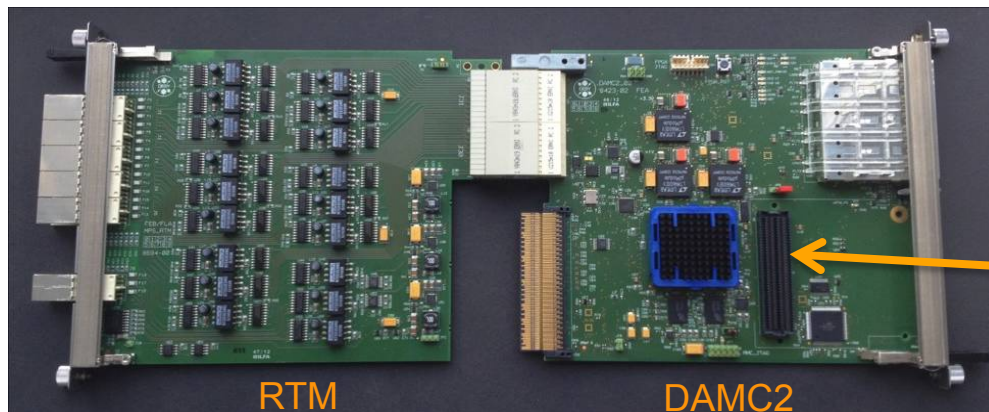
- μ TCA hardware and infrastructure
 - ➔ Crates for diagnostics, special diagnostics, vacuum and magnet support
 - Crates
 - ➔ Schroff or ELMA, including standard backplane
 - Power supplies
 - ➔ N.A.T., Telkoor, Vadatech, Wiener – many issues in design and firmware found, had to be meticulously debugged and issues four be demonstrated to vendors, mostly OK now
 - CPU (Concurrent, Kontron, N.A.T.)
 - ➔ same debugging and testing efforts, especially with remote management firmware (IPMI) important for XFEL operations
 - ➔ performance and evaluation tests not yet finalized.
 - MCH – Management hub (N.A.T.)
 - ➔ Well tested and used already
- Crates are already available for laser and gun system tests in summer
 - Racks for XTL on order, available August/September, XTIN in queue



Hardware Status – Machine Protection System



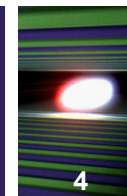
- Progress report given at TC meeting March 5th 2014
- MPS uses two μ TCA modules:
 - DAMC2 board and RTM optionally with FMC



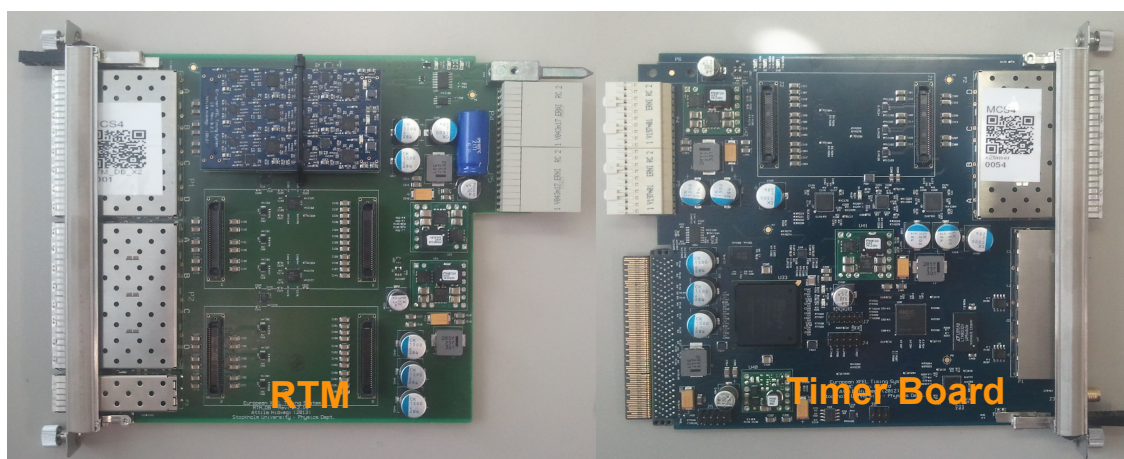
Courtesy J. Jaeger

- RTMs readily available (~28)
- DAMC2 boards on order (750), available in summer
- Pre-Series DAMC2 modules deployed at AMTF and XFEL Gun
- Installed at FLASH / FLASH 2 and being tested currently
- First tests of new μ TCA-based FLASH Laser 2 system to MPS connection have been successful (signal flow works)

Hardware Status – Timing System



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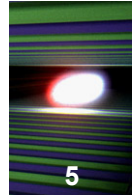


Courtesy C. Stechmann

■ Timing System Modules

- First modules had been installed at XTIN for gun test in December 2013 and at AMTF in fall 2013
- In production mode at AMTF and FLASH / FLASH 2
- Sufficient modules available for gun and laser system test this summer – more on order
- More details on how to use the timing system in the upcoming talks (O. Hensler and C. Stechmann)

Hardware Status – Server Nodes & Network

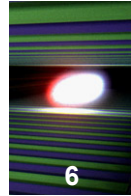


- First **server components** for computer infrastructure already installed (DELL PowerEdge R520 servers) in XTIN UG04/014
- Middle layer services
- PLC systems server
- Name lookup services
- Backup services
- First data acquisition system node (middle layer services using fast shot-synchronous data) is on order



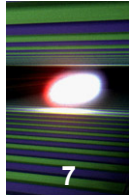
- Control system **network** (IP subnets, addresses, ...) is available and being assigned to subsystems and groups
- Temporarily installed network is currently being replaced by final one (redundant XFEL control system network router, switches) - available ~ May 2014

Status – Subsystem Support

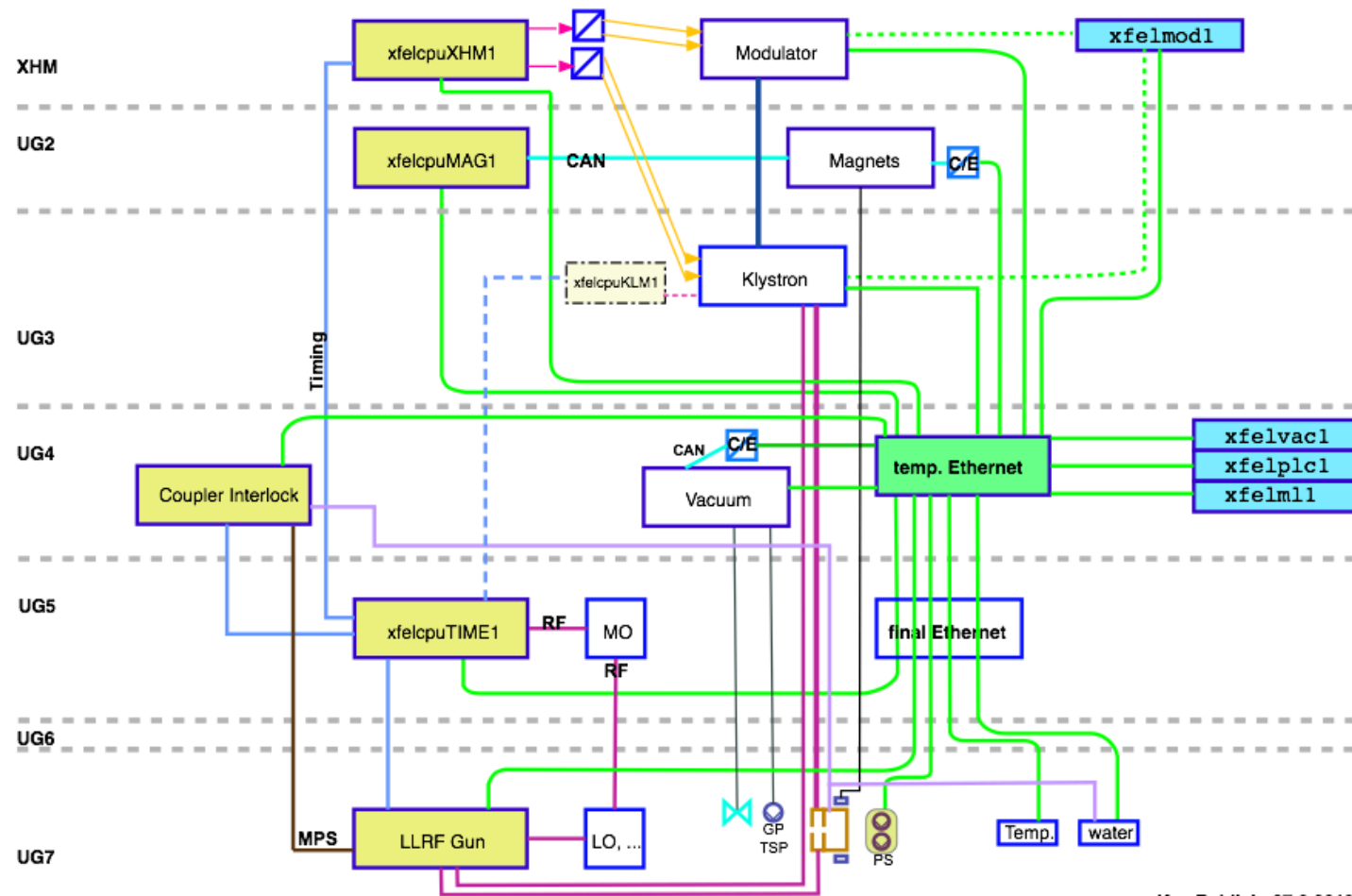


- RF Gun System
 - Basic control system was available and being used for the XFEL gun test in December
- Laser System
 - Turn-key system provided by MBI, Berlin.
 - Requires interface to timing system, hence μ TCA is required
 - Uses DOOCS on Solaris, which fits well into our known architecture
- Diagnostics: BPM, toroid, BLM
 - Servers for μ TCA already running at FLASH / FLASH 2
 - Camera support for μ TCA already tested and used.
- Vacuum
 - Old system has been running for gun test, new system being tested and deployed currently
- Operator panels already available
 - had been provided for gun test, will be extended but can make use heavily from existing ones for FLASH / FLASH 2

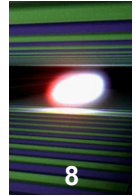
Status – Subsystem Support



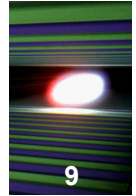
XFEL Gun Test December 2013



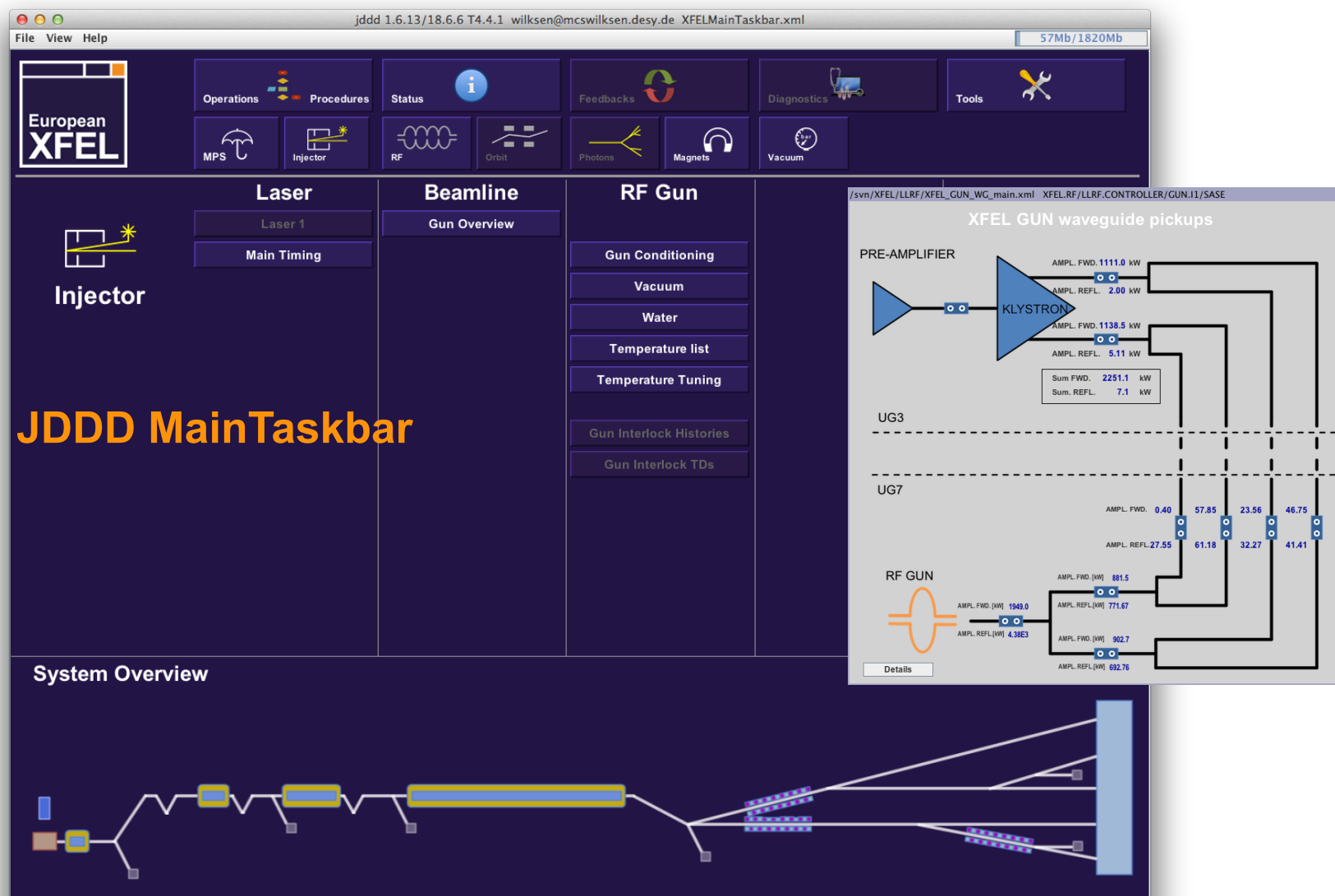
Kay Rehlich, 27.9.2013

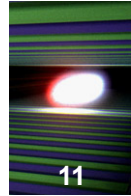


- DOOCS/TINE-based system for European XFEL accelerator control system
 - Integration is progressing well, used at FLASH / FLASH 2
 - Multiple-beamline support is being implemented and tested at FLASH 2 – c.f. Olaf Hensler's talk
- Karabo interface to DOOCS
 - C/C++ implementation has been already demonstrated to work in principle, prototype integration into DOOCS available (work is ongoing)
 - Java-based Karabo version needed for JDDD support, will be provided by WP 76



- **Basic low-level/front-end servers:**
 - BPM, BLM, toroid, ... server software is available and being deployed at FLASH/FLASH 2
 - Multiple-beamline support has been implemented and is being tested and debugged at FLASH / FLASH 2.
 - Any other, standard ADC r/o can be implemented easily.
- **Management server** (IPMI) for μ TCA available
- **Middle layer servers** already available for PLC systems, general purpose ML servers and DAQ-specific servers. Easily adapted from FLASH / FLASH 2 versions.
- JDDD (Java DOOCS Data Display) used as a **graphical user interface** for operators and experts – MainTaskbar (R. Kammering) as access point for all operation- and expert actions





■ Summary

- Hardware, if not installed already, will be available/ installed in time for laser/gun tests in summer.
- μ TCA is a new, but very feasible technology platform for XFEL; has prompted extensive testing and debugging - using this at FLASH / FLASH 2 helped already a lot
- Basic software set for front-end read-out is available, as some middle-layer services and user interfaces for operations (experts & operators).
- For software testing operations with beam is even more important (FLASH 2), nevertheless virtual test servers and setups will be used for proof-of-principle and performance tests (see high-level controls talk).