

The Trigger-Time-Event-System for Wendelstein 7-X: Overview and First operational Experiences

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Outline

- **Introduction**
- **Operational phase OP1.1 of Wendelstein 7-X**
- **TTE system**

Operational phase OP1.1 of Wendelstein 7-X

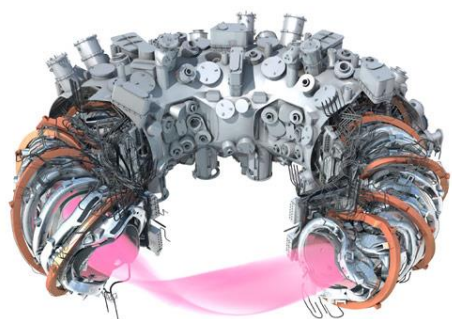
Structure of W7-X control system

The superconducting stellarator W7-X started plasma operation in December 2015:

- I. The main technical and diagnostics systems have been finished successfully.
- II. In operational phase OP1.1 **940** plasma discharges were processed for commissioning, for conditioning, and for physics.
- III. The W7-X control system allows a safe and flexible control of preparation and conducting of discharges.

The Trigger-Time-Event System of W7-X as a part of the CoDa-system worked successfully during commissioning and OP1.1.

W7-X in operation



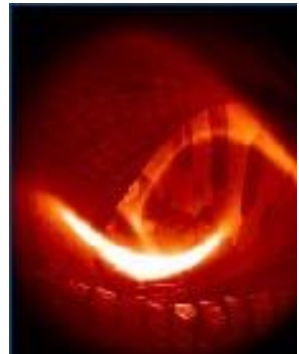
CAD model of W7-X



View on W7-X in the torus hall



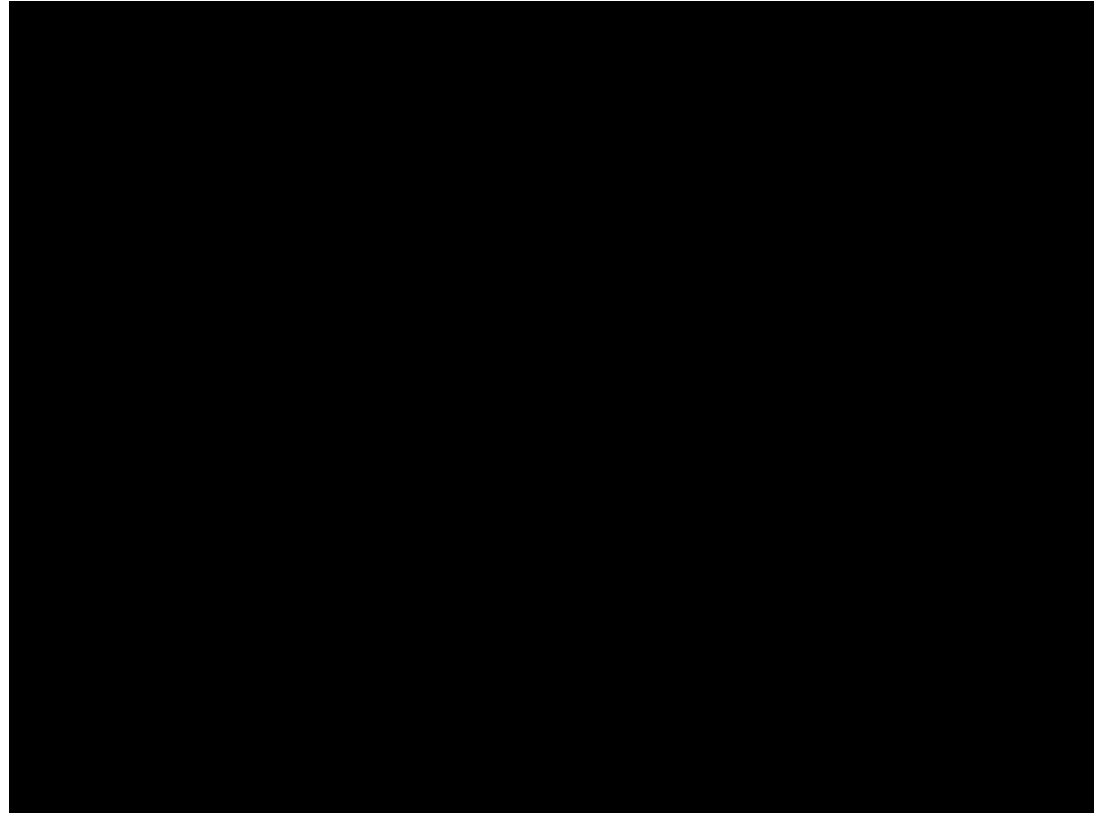
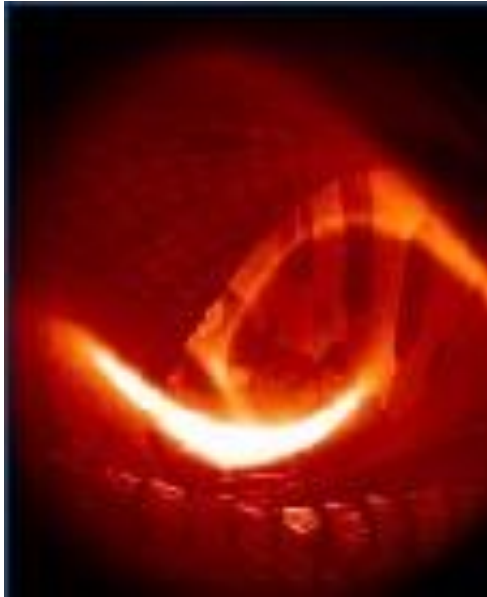
German chancellor Dr. Merkel started the first H2-plasma discharge



Video of the first H2-plasma discharge (3. February 2016)

Operational phase OP1.1

W7-X operation: First discharge in Hydrogen on 3th of February 2016

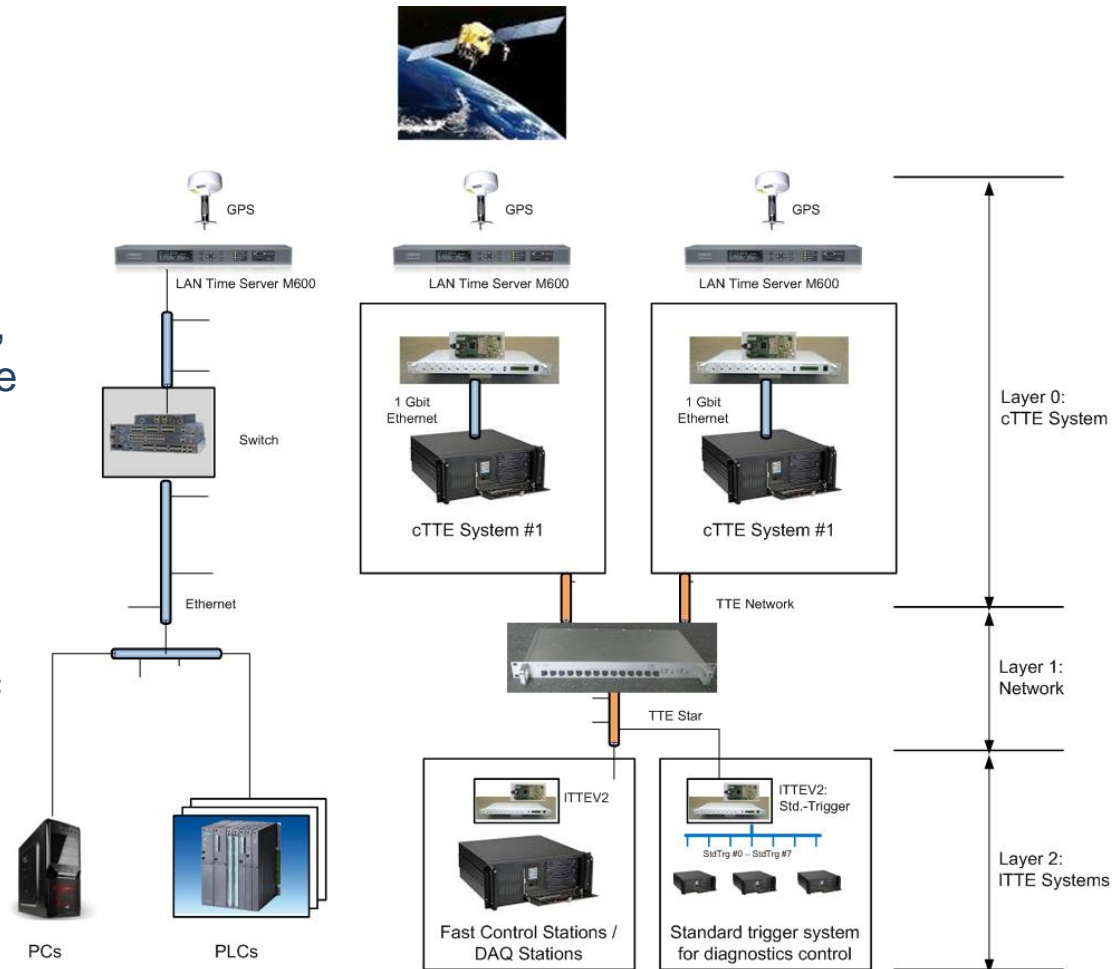


Video (2 min)

TTE system architecture

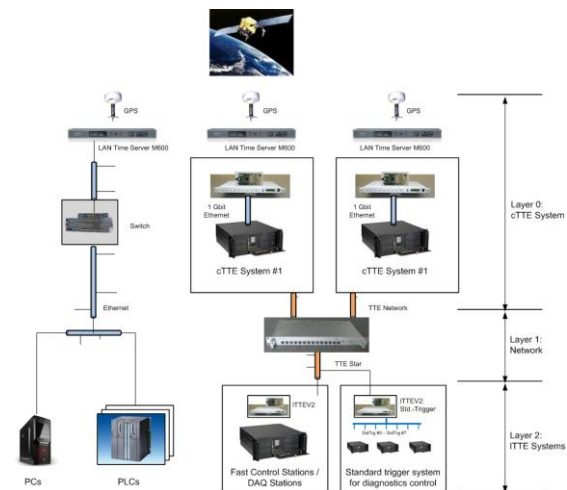
Structure of TTE system:

- Hierarchical: ctte System on top, local TTE systems are part of the control components and diagnostics,
- Distribution of synchronization signals, time information, and event messages via a fiber optic network,
- Good scalability in terms of number of devices.



Functions of the TTE system:

- I. Generation of a global time for all CoDa components of W7-X,
- II. Synchronization of all local time counters of the ITTE systems of the technical components and diagnostics,
- III. Providing event messages processing and standard trigger signals,
- IV. Providing time and trigger related functions like:
 1. Time capturing,
 2. Pulse sequence generation,
 3. Time delays,
 4. Impulse counter,
 5. Event trigger processing.



Thanks for attention!

Please contact me during the poster session!
Poster session 2, Poster ID #83