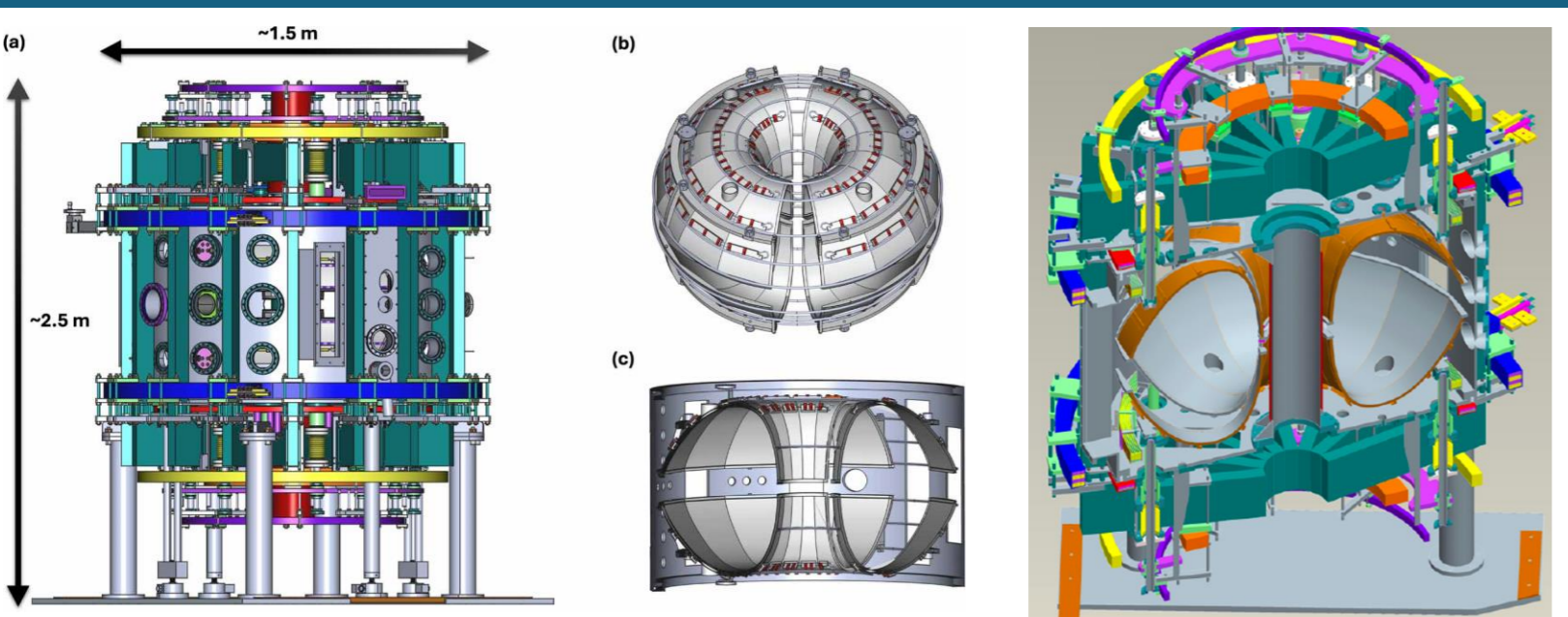


LTX-Beta Machine Parameters

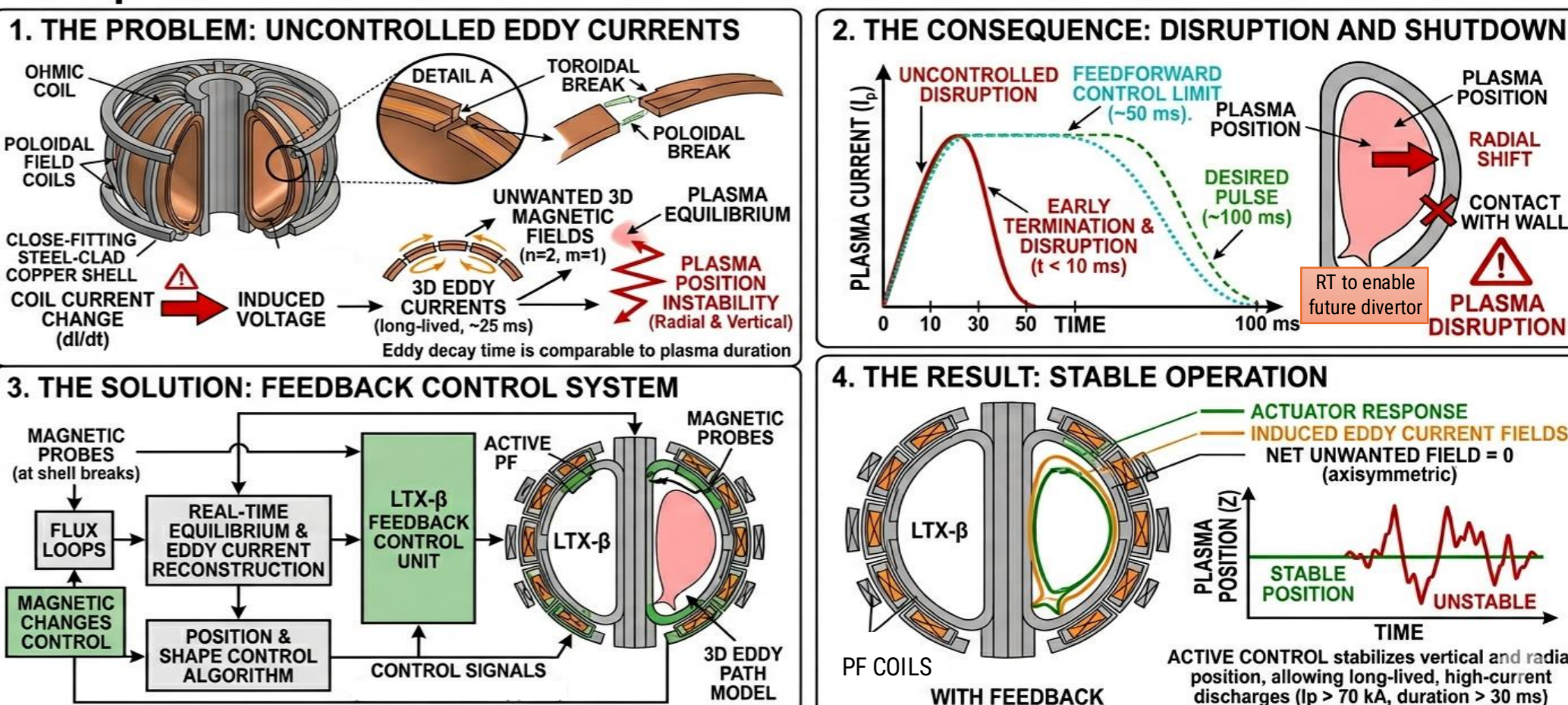


Major radius	0.4 m
Minor radius	0.26 m
Toroidal Field	0.3 T
Plasma Current	135 kA
Beam Power	700 kW
Pulse length	<100ms

The PPPL LTX-β (Lithium Tokamak Experiment Beta) is an upgraded LTX that focuses on the unique benefits of lithium-coated PFCs (plasma-facing components) to enable hotter plasmas with increased confinement while minimizing particle recycling & eliminating thermal gradients

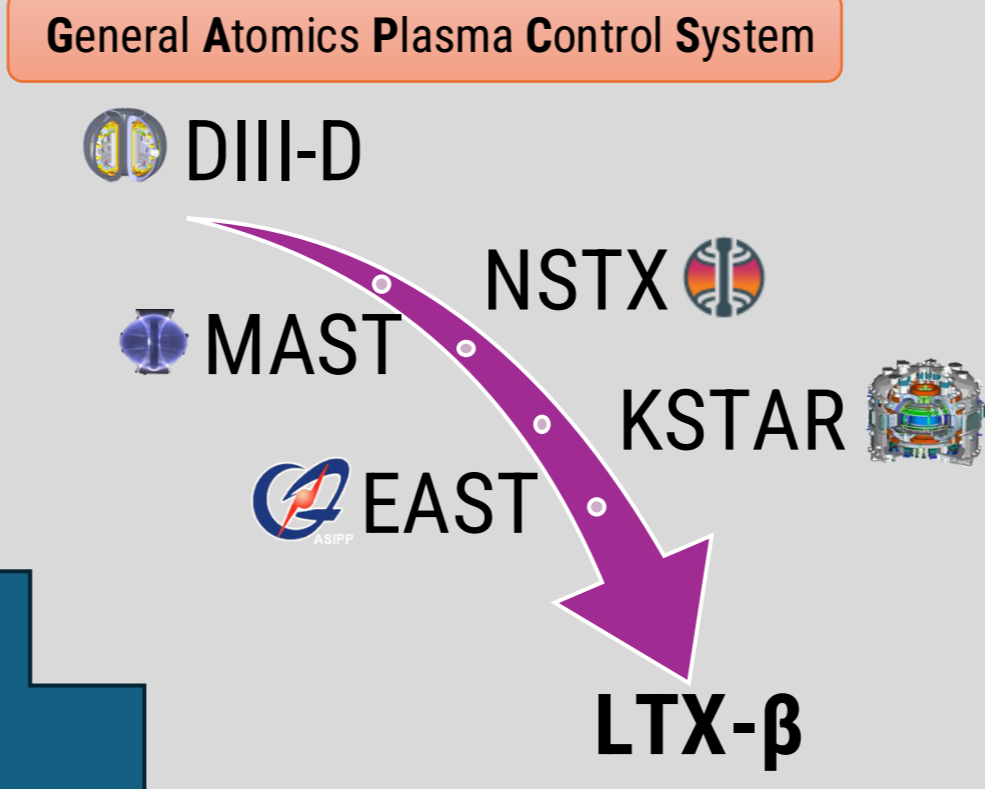
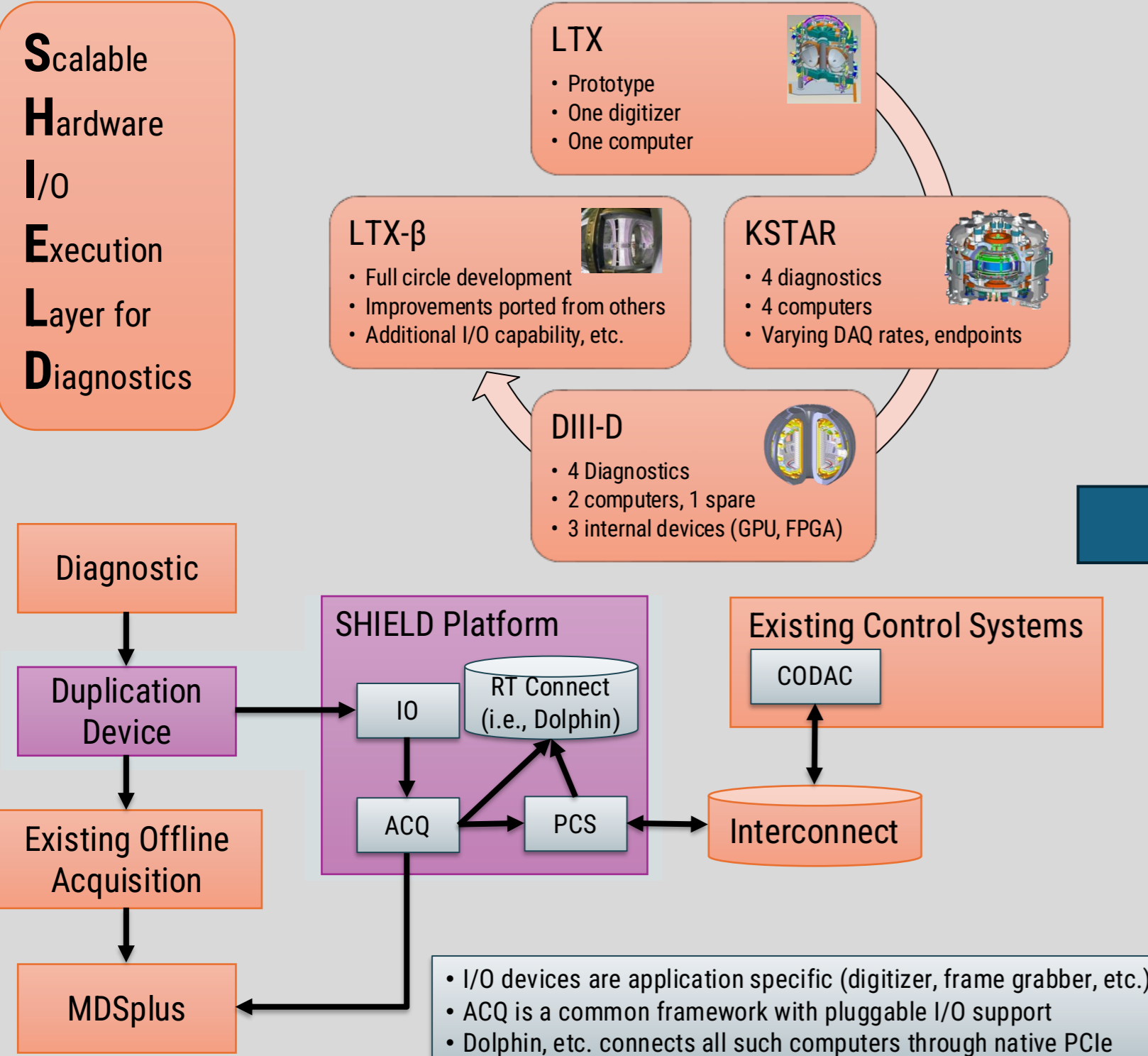
Advancing Operating Envelope Requires Sophisticated Feedback Control

LTX-β TOKAMAK: EDDY CURRENT MITIGATION VIA FEEDBACK CONTROL



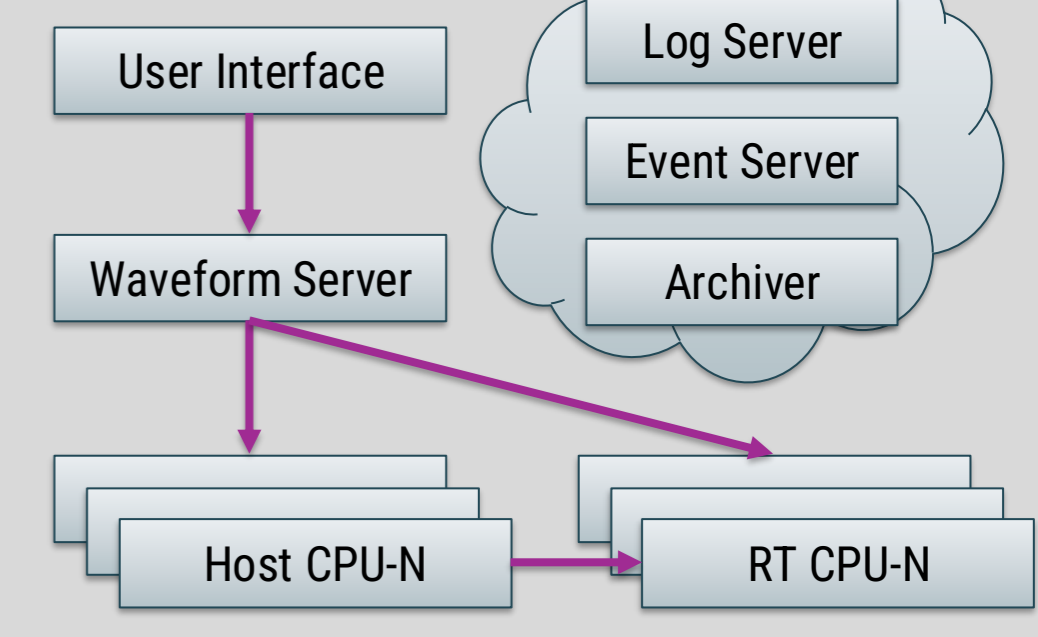
This work was supported by the U.S. Department of Energy under contract number DE-AC02-09CH11466. The United States Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce the published form of this manuscript, or allow others to do so, for United States Government purposes.

Leveraging Shared Technologies to Maximize Capability with Limited Budget

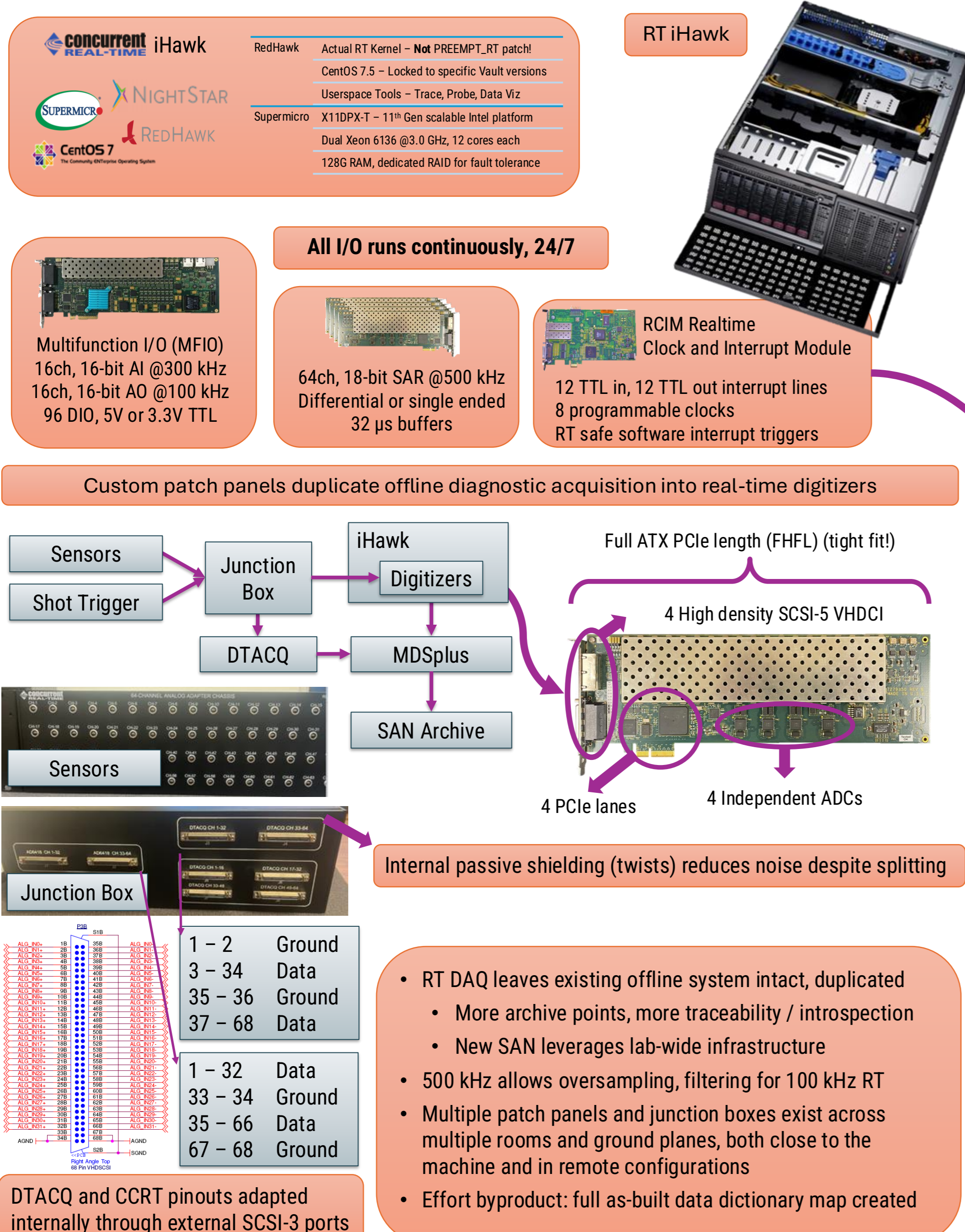


- PCS provides real-time utilities to instrument, manage, deploy, connect, configure, and operate the device with sub-μs overhead
- Initially developed for DIII-D: handwritten Intel i860 assembly, embedded HW
- Ported to C and x86 for NSTX using shared HW abstraction layer
- NSTX version replicated to MAST, EAST, and KSTAR
- Experiences on any machine quickly propagate across the community to other machines, the only obstacle being administrative (governments, IP, NDA, etc.)
- Best elements of all deployments merged into an "empty PCS", configured for LTX-β in a **scalable, modular** way

- Software design isolates functionality across distinct, purpose driven processes deployed in potentially heterogeneous environment
- Installations have wide freedom over communication backend, node deployment, and plant I&C integration technologies
- Platform includes full hardware-in-the-loop and offline simulation modes with optional tokamak digital twin integration for feedback tests
- Algorithm "master" files can potentially be shared between devices
 - DIII-D and KSTAR have several examples of shared code and entire shared experimental programs and objectives (i.e., ELM control, snowflake control, ML platforms, etc.)



Detailed Hardware Design: Mixing New RT DAQ with Existing CODAC



Detailed Software Design: Connecting SHIELD and GA PCS to Power Supply Control

