Multiple Control Systems At Fermilab

Why can't we all just get along?

Dennis Nicklaus, ICALEPCS 2009

Multiple Control Systems: Why?

- Encourage collaboration
- Some systems better for remote development
- Fermilab traditionally single Acnet environment for accelerators
- Even at Fermilab: Labview is used in many applications or instruments, just not usually for main control room usage

Multiple Control Systems: “We”?

- ACNET
- EPICS
- DOOCS
- Labview
- SNMP

Fermilab Experiments

- Photoinjector --- DOOCS
- Horizontal Test Stand --- EPICS
- HTS Cryogenics --- EPICS
- High Intensity Neutrino Source --- EPICS
- NML Cryomodule Test --- Some EPICS
- LLRF Controls with DOOCS

Getting Data from a Foreign Control System: Approaches

- Higher Level: User Interface tools adapt and include alternate protocol
- Lower Level: Bridge between the two systems. Higher level tools only know their same native devices.

E is for extensible ☺

- EDM extended to access ACNET devices
- Great for monitoring one or two ACNET readings on an EDM screen
- Not all EDM widgets supported

ACNET Parameter Pages

EPICS on Parameter Pages

- Secure Framework for Controls amended to include Channel Access
- Parameter Pages still somewhat inflexible about different PV types

Getting Along -- Bridges

- Simplest way to work together
  - DOOCS to ACNET Classic
  - DOOCS to EPICS (DESY)
  - EPICS to HRM
  - ACNET Front-end to EPICS

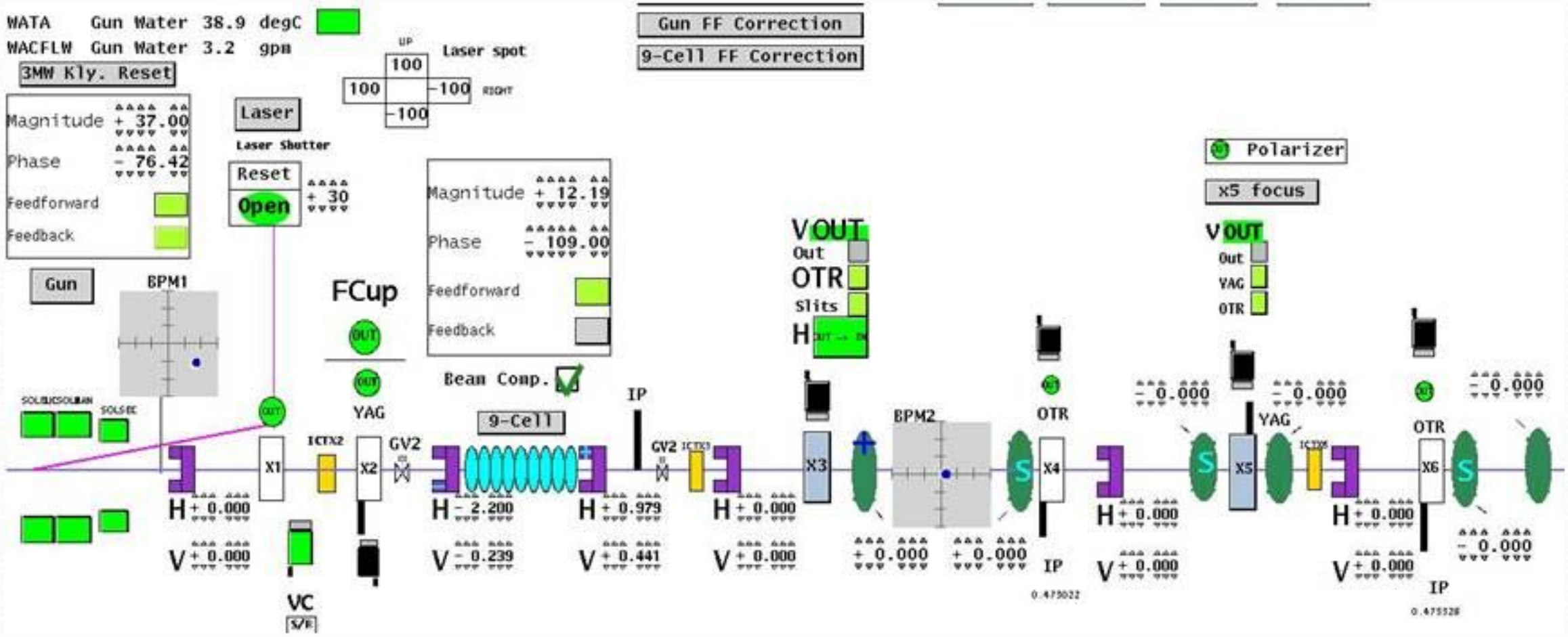
ACNET to EPICS Bridge

- 2009 Work by Duane Voy
- Channel Access from Fermi std. controls front-end
- Translation table supplying ACNET to EPICS name correlation
- PVs are CA *Monitored*
- CA Handles broken connections
- ACNET sampling rate independent of EPICS

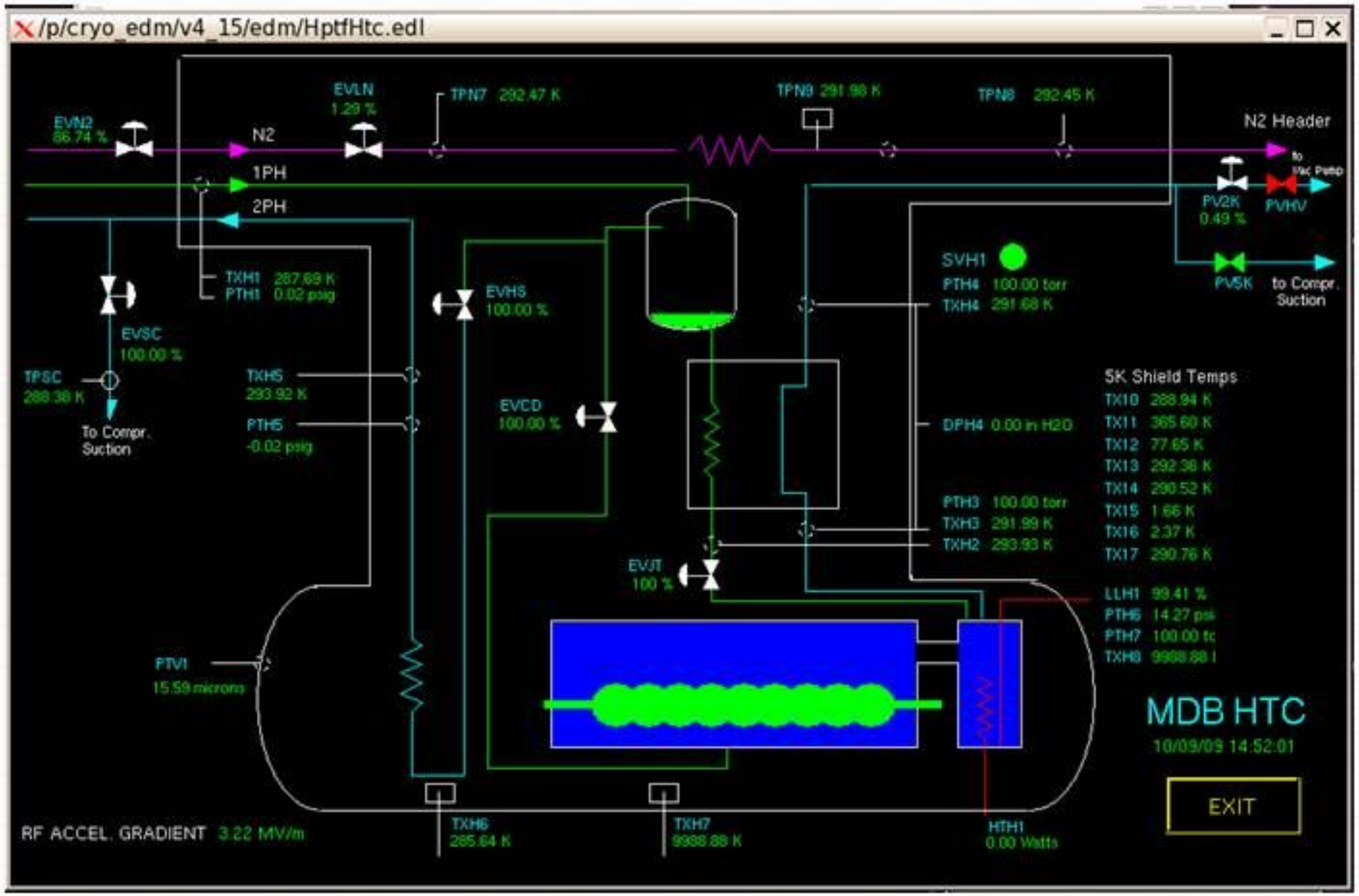
Fermilab Accelerator Operations

ACNET Index Pages

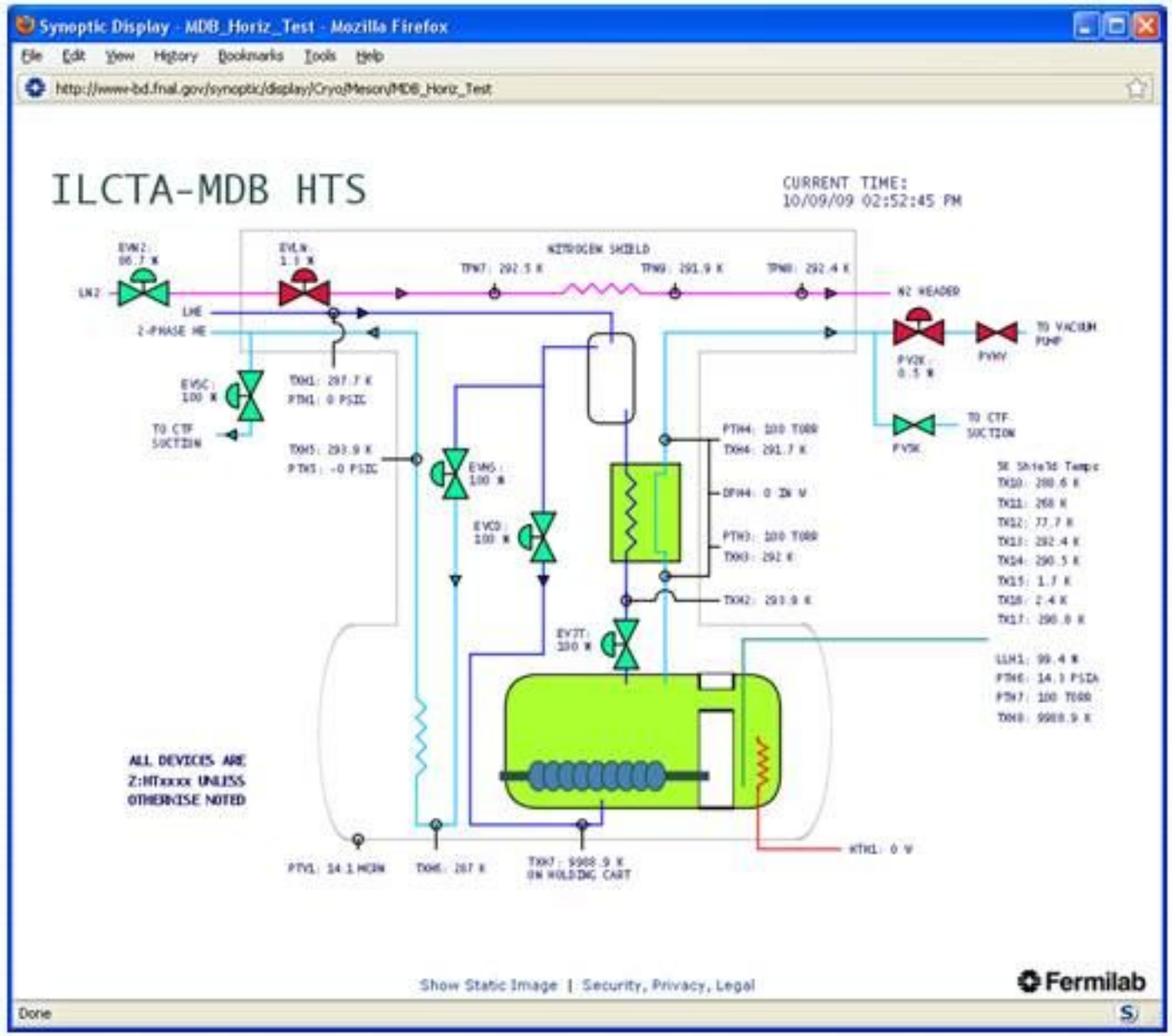
Photoinjector DOOCS DDD



Cryo Display: EDM



Cryo Display: ACNET Synoptic



Integrating EPICS Into Operations

- Simple enough to add an EDM command to one of our Index Pages
- What about all the other supporting data files, configurations, scripts, file permissions,...?
- Hard to enforce environment standards on external developers
- Access Security

Why We Like ACNET

- No CA Gateways (don't need to know network topology)
- Central Device Database is very useful
- Reading/setting parts of an array
- The ability to acquire or trigger the same device at multiple frequencies or events

What We're Learning From Others

- Some People Really Like GUIs instead of text (but some operators at Fermilab really like textual parameter pages). We need to enhance and advertise our GUI builders.
- Longer_Device:Names:helpful (sometimes)
- Intuitive seamless plotting packages
- Support of collaborators contributions

Why *Can't* We Just All Get Along

- If there are two controlling points, who's really in charge?
- Security headaches double
- System Administration/Configuration
- Staffing-limited
- Danger of orphaned or one-expert systems.

Summary

- Most technical hurdles can be overcome
- The "big picture" integration is harder than spanning different network protocols
- Limits on the availability of personnel
- We can learn from each other

THANK YOU!