

# Operation Related Topics: Remote KSTAR Experiments

by  
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US-KSTAR Workshop  
San Diego, CA

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# Overview of Talk

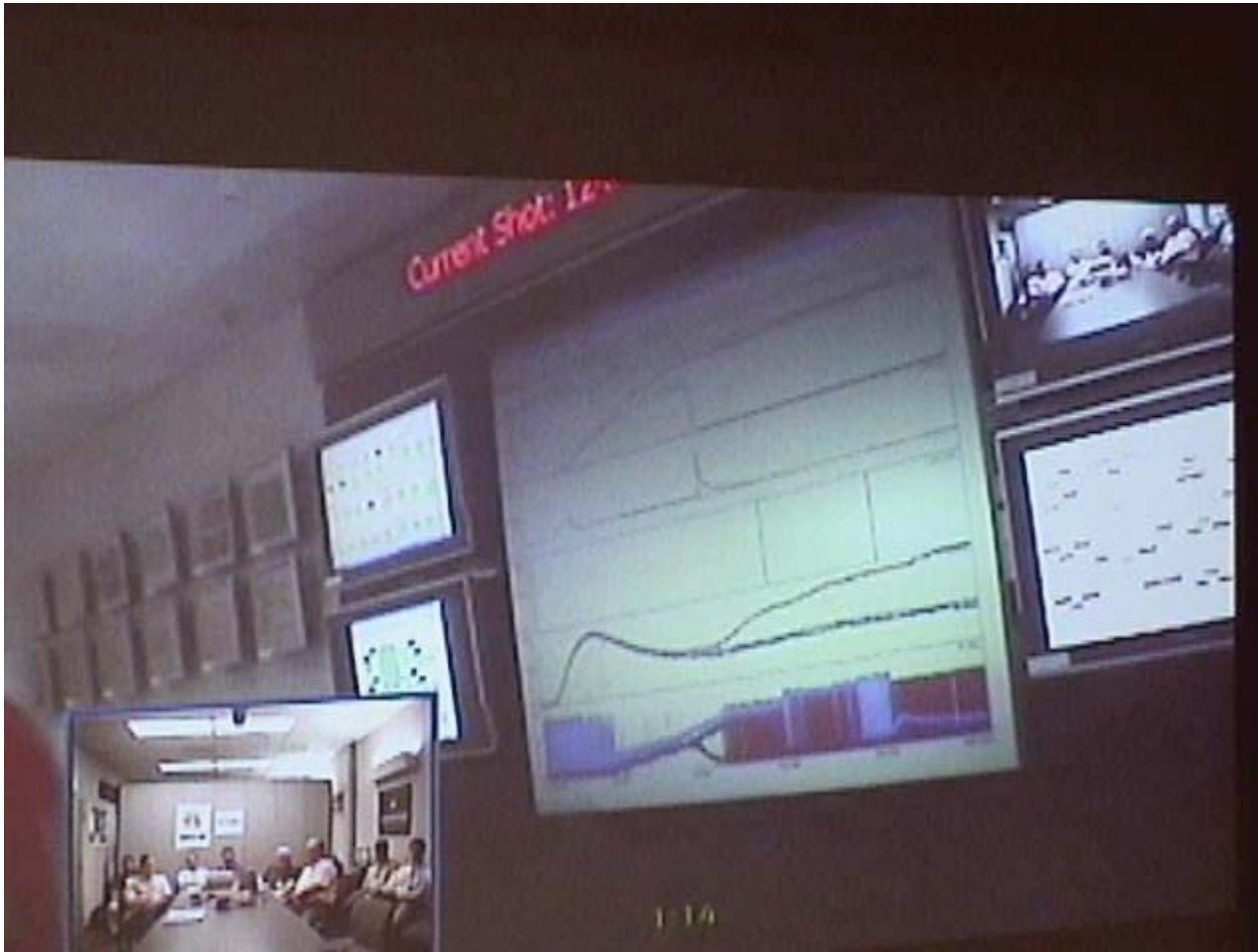
- **Lessons learned from recent remote support of EAST operations**
  - Network connectivity an issue
  - Common storage solutions leverage existing tools
- **Present status of tools to support remote KSTAR operations**
  - Communication via H.323 and Access Grid
  - Initial EFITViewer and ReviewPlus deployment
- **Improvements planned before KSTAR resumes operation**
  - MDSplus storage, EFITViewer, and ReviewPlus
  - Electronic Logbook
  - Webportal

# Substantial Recent Experience from Remote East Ops



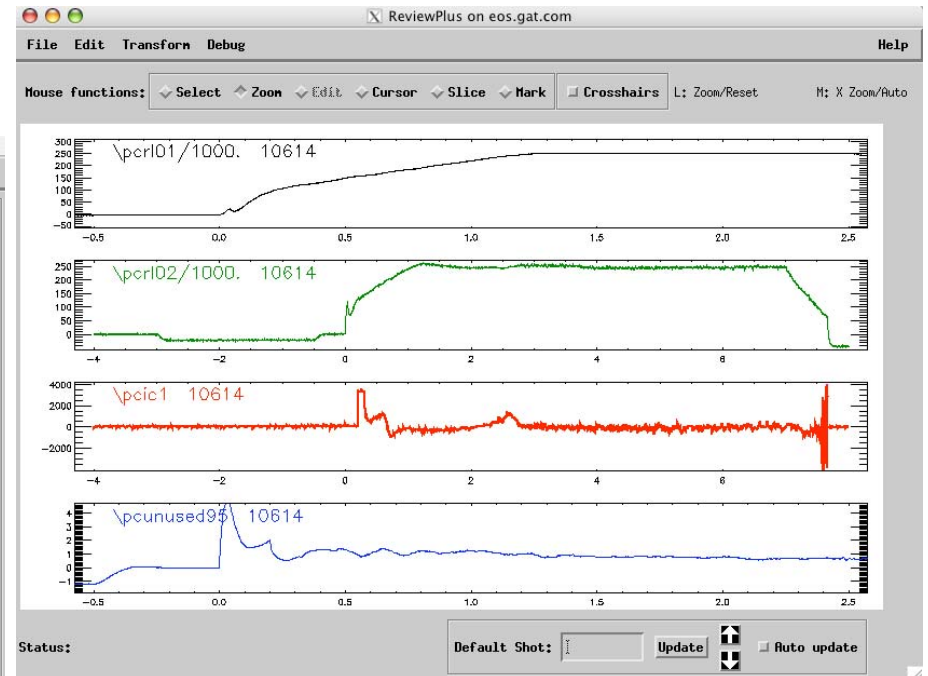
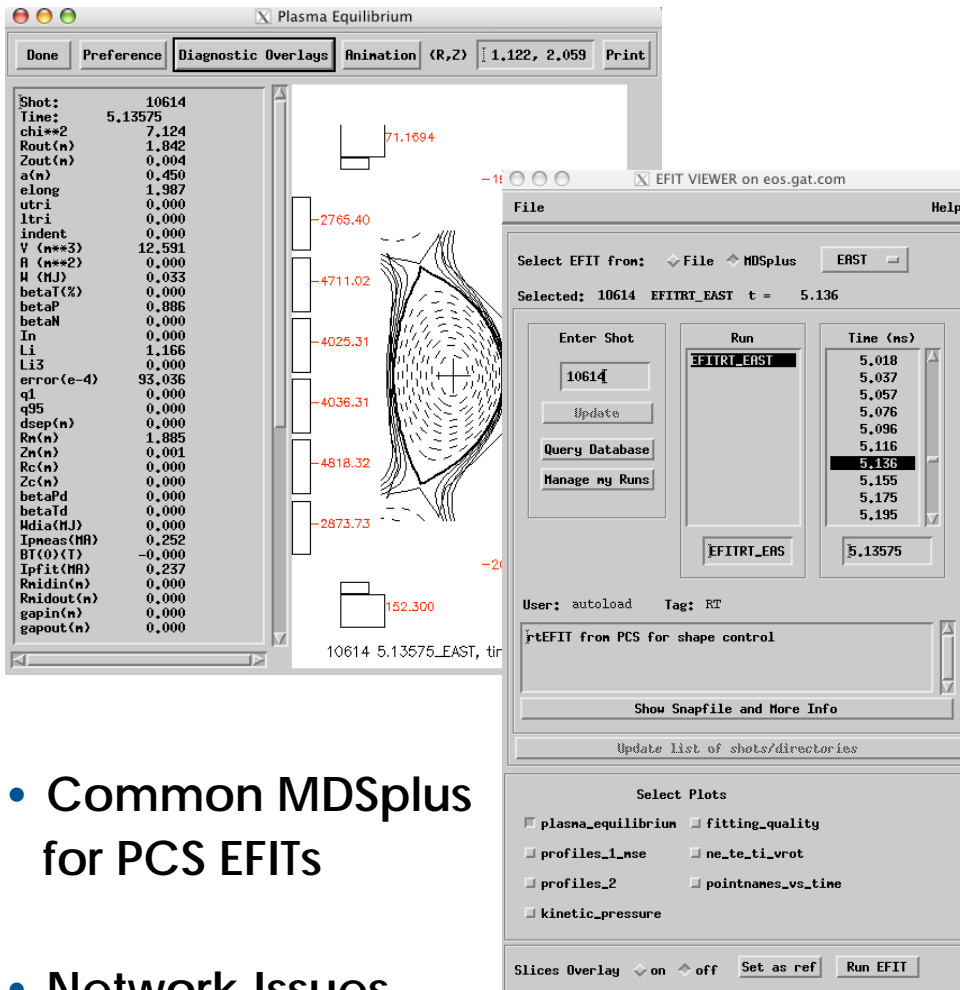
- Communication
- Data Availability
- Tools
- Remote PCS
- Network
- Large EAST/GA Team

# Communication to EAST Worked Well



- H.323 recently
- Access Grid
  - Previously
- Skype IM & Phone
- All helpful
  - More cameras

# EAST Data Availability and Tools



- Common MDSplus for PCS EFITs
- Network Issues

- ReviewPlus
- EFITViewer
  - Not offline EFIT: storage

# Network Throughput Slow for Remote EAST Operations

- Transfer rates around 24 KB/s to 32 KB/s
  - Too slow to grab individual signals as needed by multiple people
  - Necessitated one data copy to GA allowing local access

- EAST shot file moved to GA ~14 MB
  - ~ 6 to 9 minutes to complete



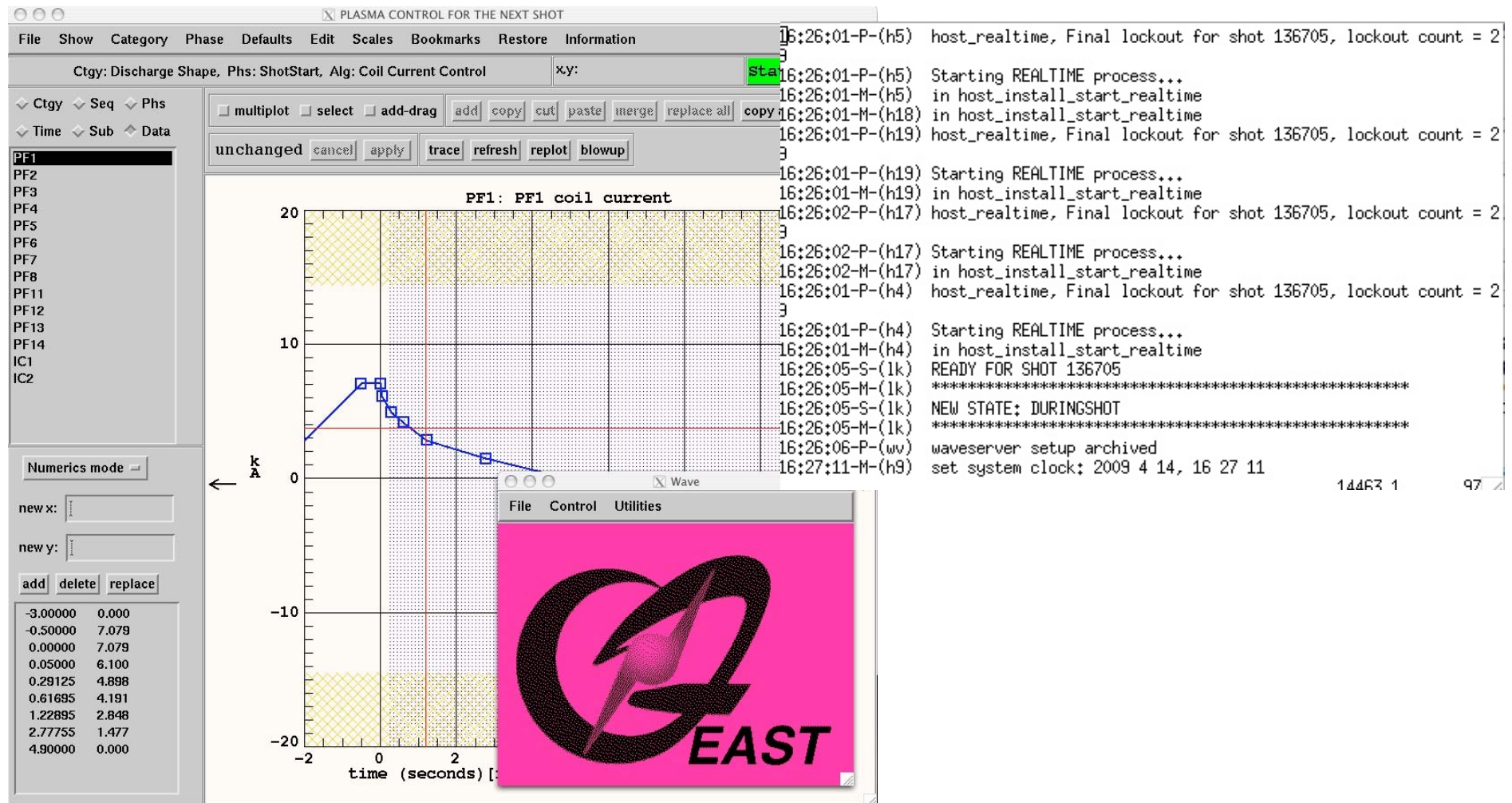
EAST Next Shot	10644
THOR MDS Shot	10641
EAST Time	04/15/09 07:10:52 AM
San Diego Time	04/14/09 04:10:52 PM
Status	Transfer in progress... 24

- Have begun examination of where the slowdown is occurring
  - PerfSONAR Nodes for diagnostics with ESnet help
- Typically have not replicated MDSplus data
  - Need closer examination related to updating, etc.

# Remote PCS: Local GUI and Remote Commands

- **Direct connection of PCS client GUI to EAST PCS Server**
  - Local copy of PCS GUI: fast
  - Connected directly to EAST PCS server
- **SSH tunnels utilized for remote GUI**
  - GA to EAST via EAST portal computer then to EAST PCS
  - TCP/IP socket communication: GUI at GA and PCS at EAST
- **Plasma control shot parameters updated remotely**
  - Utilized PCS user access control
  - Controls which users can connect and update parameters
  - Managed by the EAST PCS server processes

# Remote PCs: Local GUI and Remote Commands

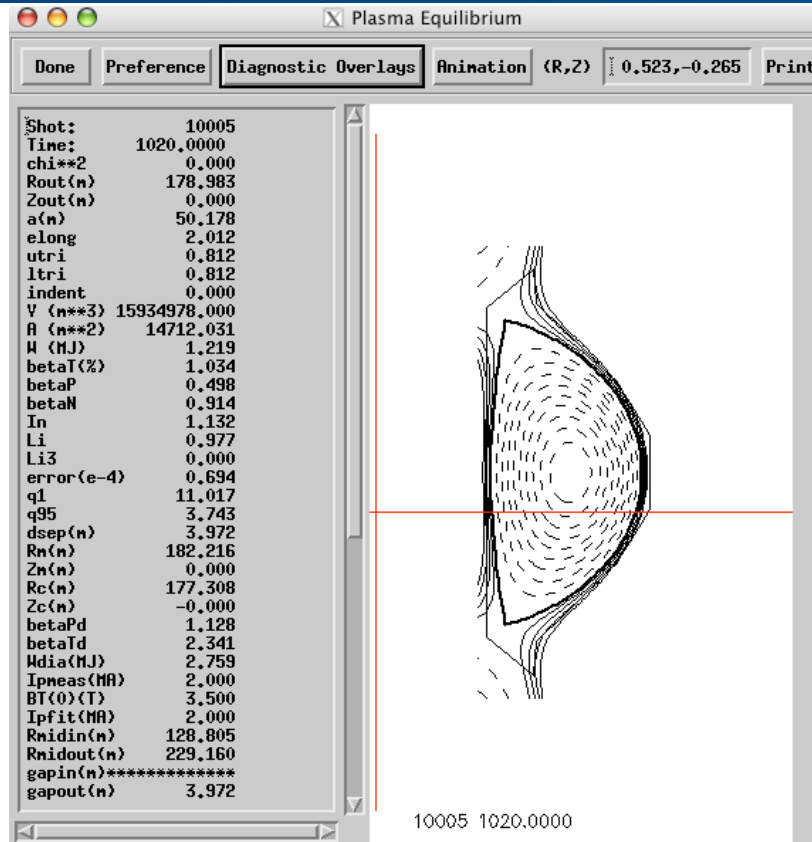
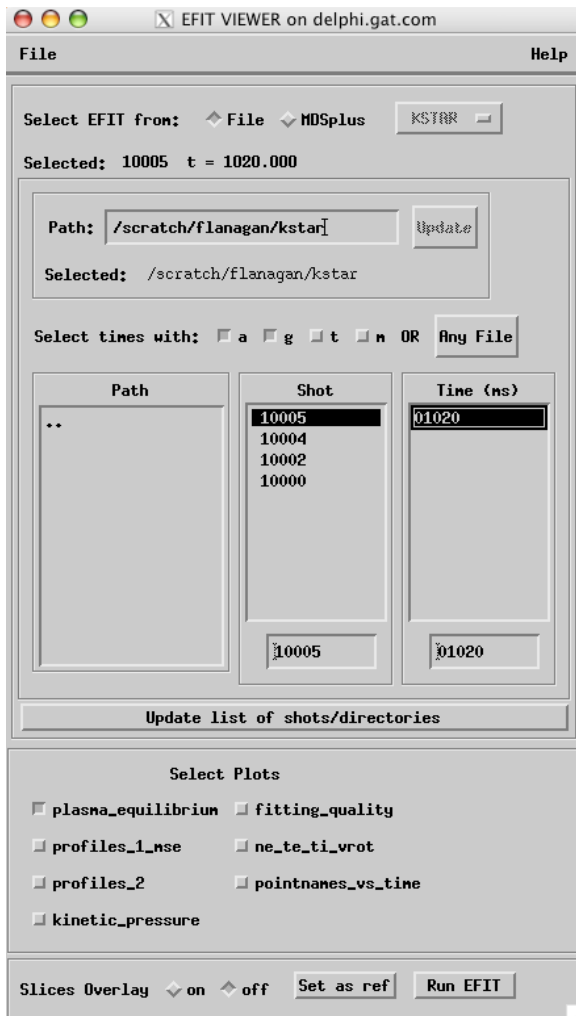


# Today: Communication to KSTAR



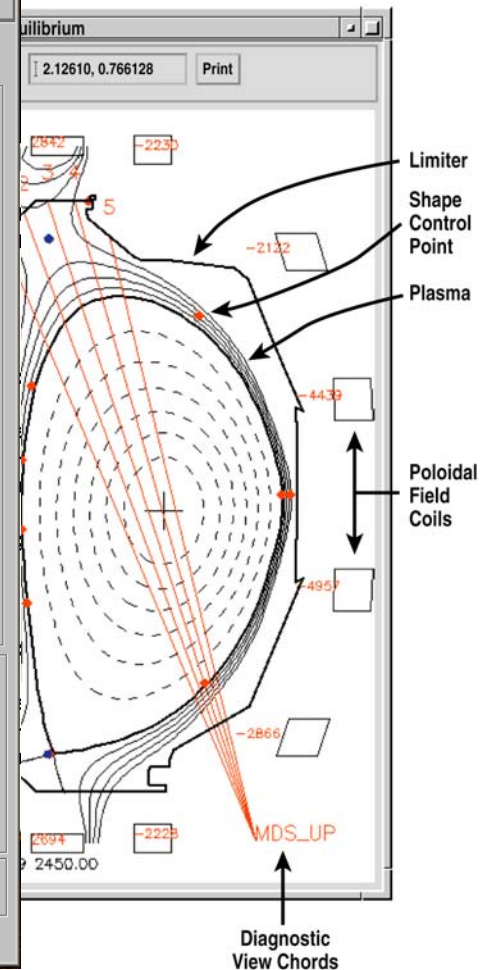
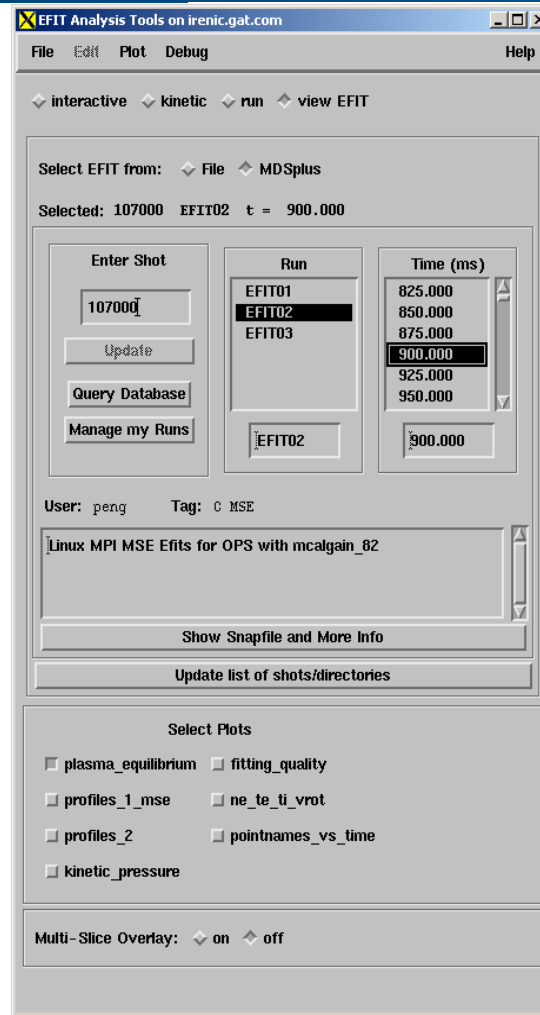
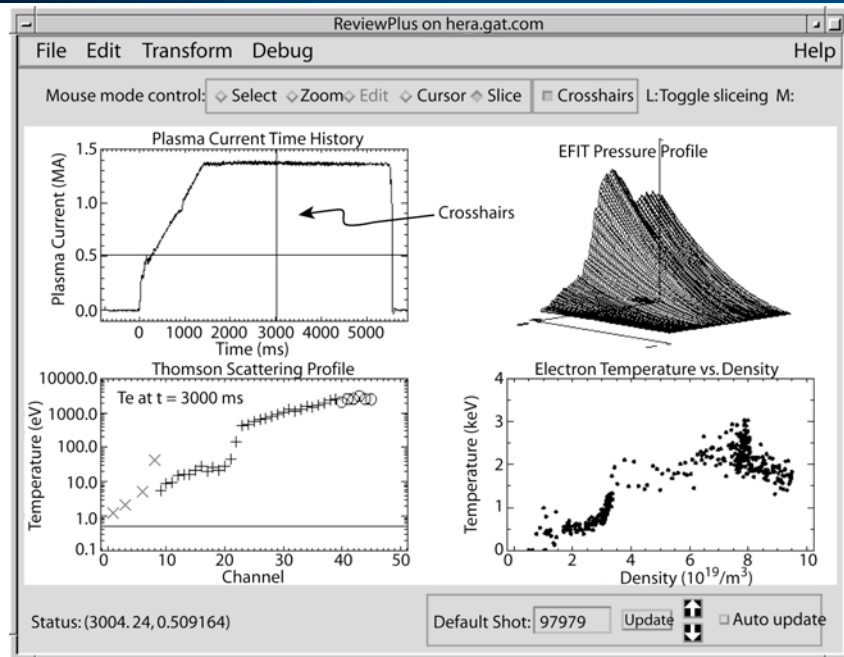
- H.323
- Access Grid

# Today: KSTAR ReviewPlus and EFITViewer Initial Install



- EFITViewer reading from files
- ReviewPlus from MDSplus but units issue

# Future: KSTAR-MDSplus Data Storage along with Full EFITViewer & ReviewPlus Functionality



- Unified MDSplus format for EFIT
- Unit data storage in MDSplus
- Relational DB for Run Management

# Future: KSTAR Electronic Logbook

## Summary Information on DIII-D Physics Experiments

Experimental Summary (20060901)

### Test of high k turbulence models

Run: 20060901      Shot Range: 126406 - 126414

Session Leader: [rhodes](#)   Assistant Session Leaders: [doylej](#) [peebles](#)

Physics Operator: [evans](#)   Assistant Physics Operator: [lahaye](#)

Miniproposal: 2006-22-05

[Electronic Logbook Entries Found: 29](#)

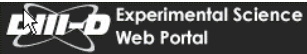
[\(click here for executive view\)](#)

ELECTRONIC LOGBOOK ENTRIES: [\(click here to hide entries\)](#)

Shot <a href="#">126415</a>	Move floating beam blip to 4.2 s, from 2.8 (also move CER timing for this blip).
BEMIS	
doylej	
Shot <a href="#">126414</a>	B field still droops at start.
SESSION_LEADER	
rhodes	
Shot <a href="#">126414</a>	B field still droops at start. Reversed time of 210 RT and first set of 30LT/330LT mix. Still get dithers.
SESSION_LEADER	
rhodes	
Shot <a href="#">126414</a>	Swapped beams in first two blips, i.e. 210Rt now second blip, first is alternatinng 30LT/330LT
BEMIS	
doylej	
Shot <a href="#">126413</a>	CER data integration time set as 0.5 ms, from 10 ms previously!
DIAGNOSTICS	
doylej	

- Collaborative notes
  - Real-time
  - Distributed Collaboration
- Driven from Relational DB
  - Same for Run Management
- IDL and Web interface

# Future: KSTAR WebPortal for Operations



[calendar](#) | [clock](#) | [video](#) | [status](#) | [dam](#) | [run](#) | [logbook](#) | [plots](#) | [bookmark](#) | [efit](#)

Machine hall open for the next 15 minutes for diagnosticians who need access. - mckee (2009-03-10 18:32)

[Applications](#) | [Help](#)

### Experimental Schedule

Previous Next

March 2009						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	Fri 2009/03/13 [2009-01-02] MGI radiation asymmetry in ECH plasmas - Hollmann	
29	30	31				

■ Ops Day (Roll over a date to view detail or click to view previous summaries or upcoming daily schedules)

### Current Exp Summary

**Latest shot: 136181**  
 Time of Shot: 2009-03-13 16:52:51  
 2009-01-02: MGI radiation asymmetry [PDF](#) | [Info](#)  
 Run: 20090313  
 Session Leader: jamesan  
 Assistant Session Leader: hollmann  
 Physics Operator: lahaye

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**DAM: 136181**  
[Customize DAM Fields](#)

<b>BCI</b> Posts: 3 Errors: 0	<b>BDEF</b> Posts: 3 Errors: 0	<b>BOL</b> Posts: 0 Errors: 0	<b>CER</b> Posts: 8 Errors: 0	<b>CO2</b> Posts: 1 Errors: 0	<b>CONT</b> Posts: 0 Errors: 0	<b>DB</b> Posts: 4 Errors: 0
<b>ECE</b> Posts: 6 Errors: 0	<b>ECH</b> Posts: 2 Errors: 0	<b>EFIT</b> Posts: 13 Errors: 0	<b>FCOIL</b> Posts: 0 Errors: 0	<b>GLOBAL</b> Posts: 0 Errors: 0	<b>ICH</b> Posts: 1 Errors: 0	<b>IGS</b> Posts: 5 Errors: 0

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### Electronic Logbook

[Customize Logbook Selection](#)

\*Please note this window should stay in the 2nd column for viewing

**136181** SESSION\_LEADER **jamesan** Mar 13, 2009 17:00:11  
 Good Xe MGI shot. RE signals on plastic scintillator and sxx.

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**136180** SESSION\_LEADER **jamesan** Mar 13, 2009 16:13:51  
 Good Ne MGI shot, L-mode. Repeat for next shot.

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**136179** SESSION\_LEADER **jamesan** Mar 13, 2009 16:01:36  
 Malfunctioning lemo T discovered in annex which was intermittently shorting and

### Status Information

Shot Type	PLASMA SHOT
Next Shot	136182
BT Request	2.100000
IP Request	1.400000
Shot Status	Resuming Shot
Time to D3D	0:18
Availability	

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05:35pm

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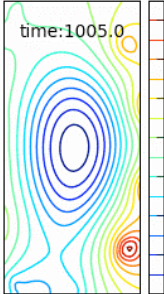
### Bookmarks

[Add a new bookmark](#)

- [DIII-D](#)
- [LeadList](#)
- [Logbook](#)

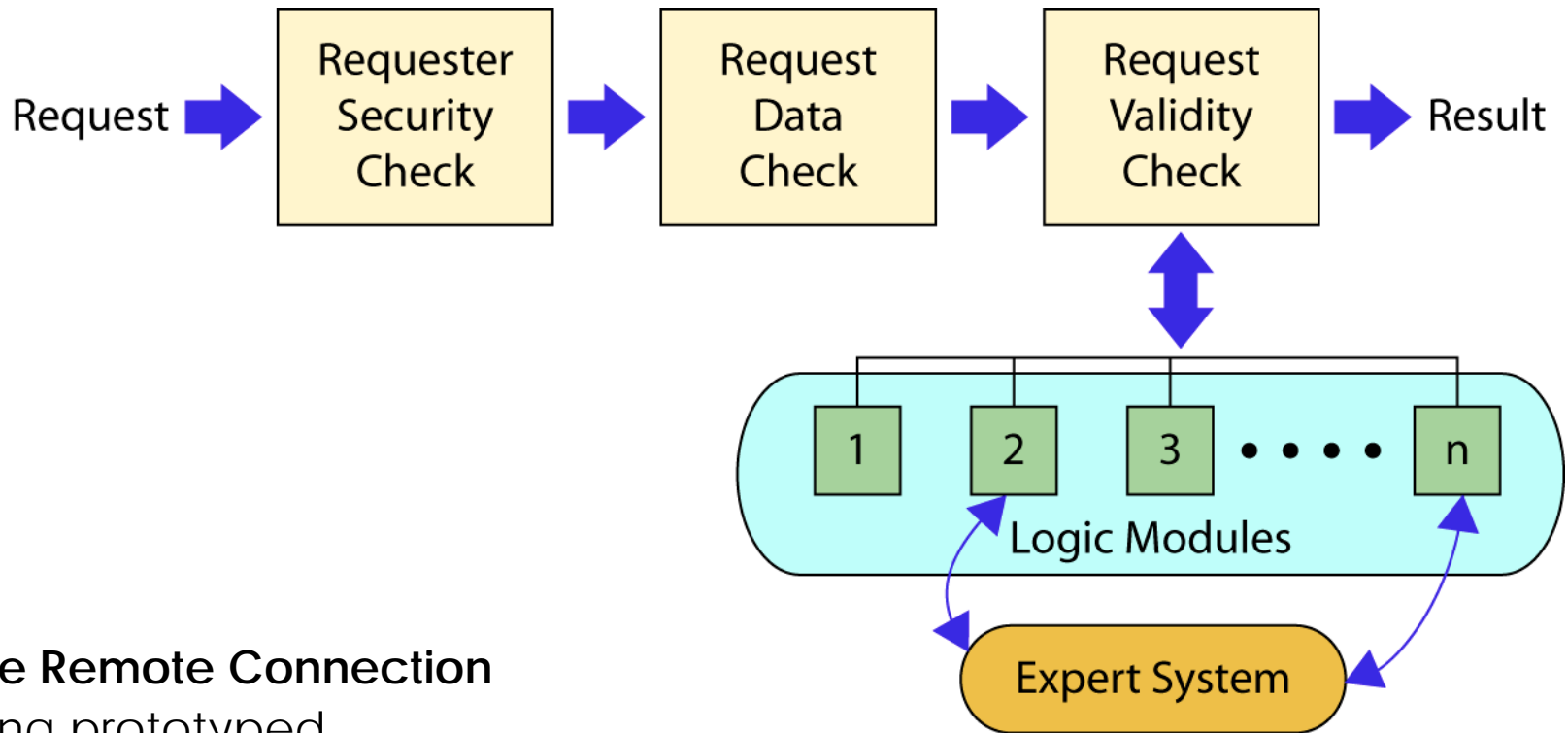
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136174



- For Operations
  - Real-time
  - Enable Collaboration
  
- Needs new hardware
  - Linux & Apache
  
- IDL and Web interface

# KSTAR: Gatekeeper for PCS Security



- **Secure Remote Connection**
  - Being prototyped
- **Authentication and Authorization**
  - Who you are and what you are allowed to do

# Concluding Comments

- **Common MDSplus storage allows leveraging many tools**
  - EFITViewer as one prime example
- **Relational Database installation critical for rapid searching**
  - Facilitates EFIT-picker in EFITViewer
  - Allows deployment of Electronic Logbook
- **Webportal will be useful for monitoring remote operations**
  - Proven solution at DIII-D
- **Worthwhile checking network throughput early**
  - Possibly install PerfSONAR nodes as well