

Web-Based Electronic Logbook

2008.10.22

Outline

- Introduction to electronic logbook
- Features
- Electronic logbook at DIII-D
- Benefits and advantages
- Structure and communication overview
- Security
- Future Work

Electronic logbook stores critical information

- The electronic logbook is used to record comments and summaries about shots and experiments during operations. These entries are stored in D3DRDB.
- The main electronic logbook application has been entry_display, an IDL application released in the mid 1990's.
- The electronic logbook idea, database schema, entry_display and the web-based logbook all came from MIT. Currently they are using the web version which has been used more extensively, both locally and remotely since its release in 2004.

Logbook website includes all features of entry_display

- Viewing the latest entries

Logbook - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <https://diii-d.gat.com/DIII-D/apps/logbook/index.php>

DIII-D NATIONAL FUSION FACILITY SAN DIEGO

DIII-D Electronic Logbook This website points to the active database. All D3DRDB.

D3DRDB kimmy Logout Selection Options Display Options Make Entry Show C

SELECT ISNUMERIC(SHOT) AS NE,* FROM ENTRIES WHERE (RUN = "20080513") AND VOIDED IS NULL
SHOT ASC, ENTERED ASC

133142	nagy	CHIEF_OPERATOR	May 13 2008 07:36AM
Int Cal Test Shot---Bad			
133143	johnsonb	PCS	May 13 2008 07:53AM
PCS CHANGES: weland: change parameter data: ECCDModulation Params/ntm/NTM Control weland: set vertices: Primary/NTM Control periodic action: Beam Settings/ShotStart/System			
133143	nagy	CHIEF_OPERATOR	May 13 2008 07:54AM
Int Cal Test Shot---Good Int shot, no gas, will repeat with gas			
133144	johnsonb	PCS	May 13 2008 08:05AM
PCS CHANGES: periodic action: Beam Settings/ShotStart/System hyatt: load defaults for category: Data Acquisition hyatt: load defaults for category: System hyatt: load defaults for category: CER hyatt: load defaults for category: Mode hyatt: load defaults for phase: Shape Startup/BreakDown/Shape hyatt: load defaults for phase: Voltage Feedback/BreakDown/F Power Supplies hyatt: restore all categories from hyatt_Simple_INTCAL			

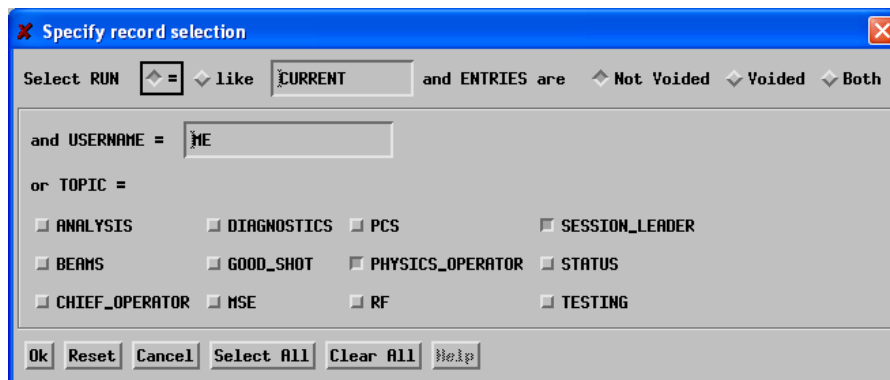
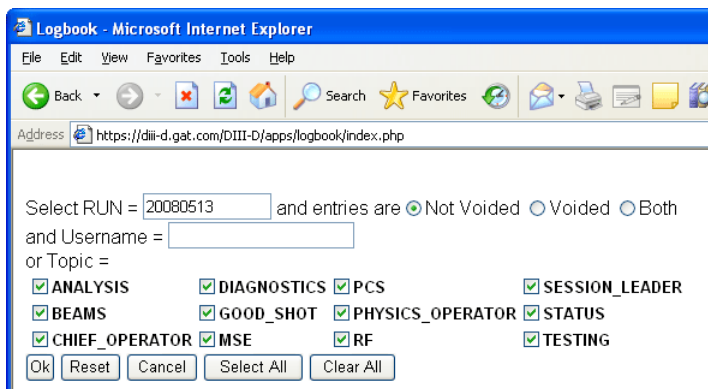
entry_display - Electronic Logbook - on eos.gat.com

File Query Entry Options Num = 30 Help

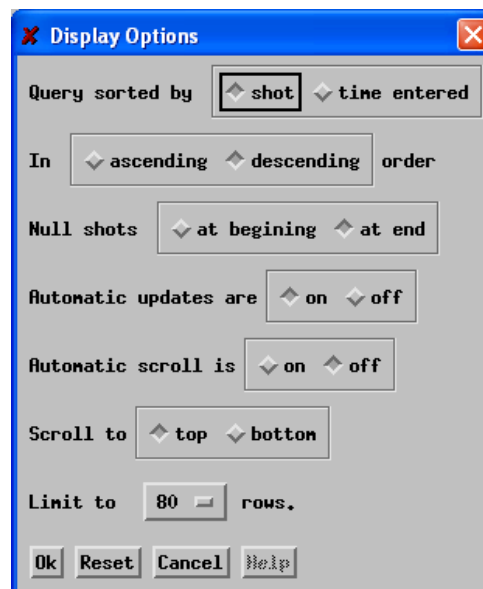
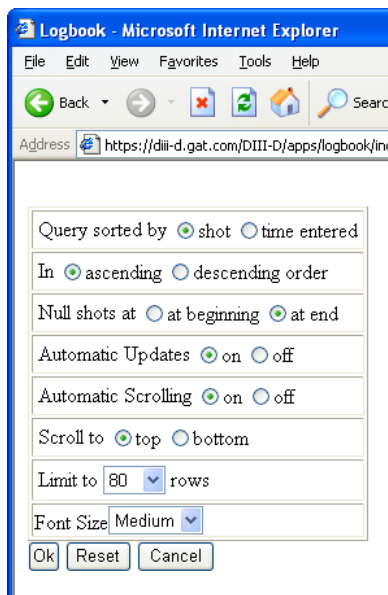
134597	johnsonb	PCS	Aug 13 2008 2:45:30 PM
PCS CHANGES: periodic action: Beam Settings/ShotStart/System			
134597	petrie	SESSION_LEADER	Aug 13 2008 2:46:53 PM
repeat.....result: good shot (#18) ----end of experiment			
134597	Jackson	PHYSICS_OPERATOR	Aug 13 2008 2:47:40 PM
Last shot (#18) RESULT: OK			
134597	west	DIAGNOSTICS	Aug 13 2008 2:50:08 PM
DiMES TV on 430.5 nm CD, extennt of CD emission dring the puff is observable. There is a narrow band very near the edge of the shelf where CD from the puff is visible above the natural level.			
134597	groth	DIAGNOSTICS	Aug 13 2008 2:55:49 PM
Divertor Tangential TV Filter Settings			
Upper Divertor Filter Attenuation Int. Time Tape/H0/MDSPlus			
Standard	225par	CIII (465.0 nm)	20x 17 ms no/HU3/yes
Standard	225perp	CII (515.0 nm)	2x 17 ms no/HU6/yes

Max entries selected - To select more use Options->Display Options ☐ Automatic Updates

- Customizing query options



- Customizing display options



- Making a new entry

https://diii-d.gat.com - New Entry - Microsoft Internet Explorer

New entry by: kimny ☐ Clear Text After Entry

Run: T C P N I D X

Shot: T C P N I D X

Topic: ---- Select Topic ----

Load Template: ---- Select Template ----

Template Name: ---- Global Templates ----

---- User Templates (kimny) ----

---- Select Template ----

Done

Make logbook entry

File Run Shot Topic Options

Run Date Shot

User kimny Topic

Run: T C P N I D X Shot: T C P N I D X

- Executing a custom SQL Query

The screenshot displays the DIII-D Electronic Logbook interface within a Microsoft Internet Explorer browser window. The browser's address bar shows the URL: `https://diii-d.gat.com/DIII-D/apps/logbook/index.php`.

The main page features the DIII-D National Fusion Facility logo and a header with the text: "DIII-D Electronic Logbook This website points to the active database. All changes will update to D3DRDB." Below this, there are buttons for "D3DRDB", "kimmy", "Logout", "Selection Options", "Display Options", "Make Entry", "Show Current Run", and "Do Query". A "Cancel Custom Query" button is also present.

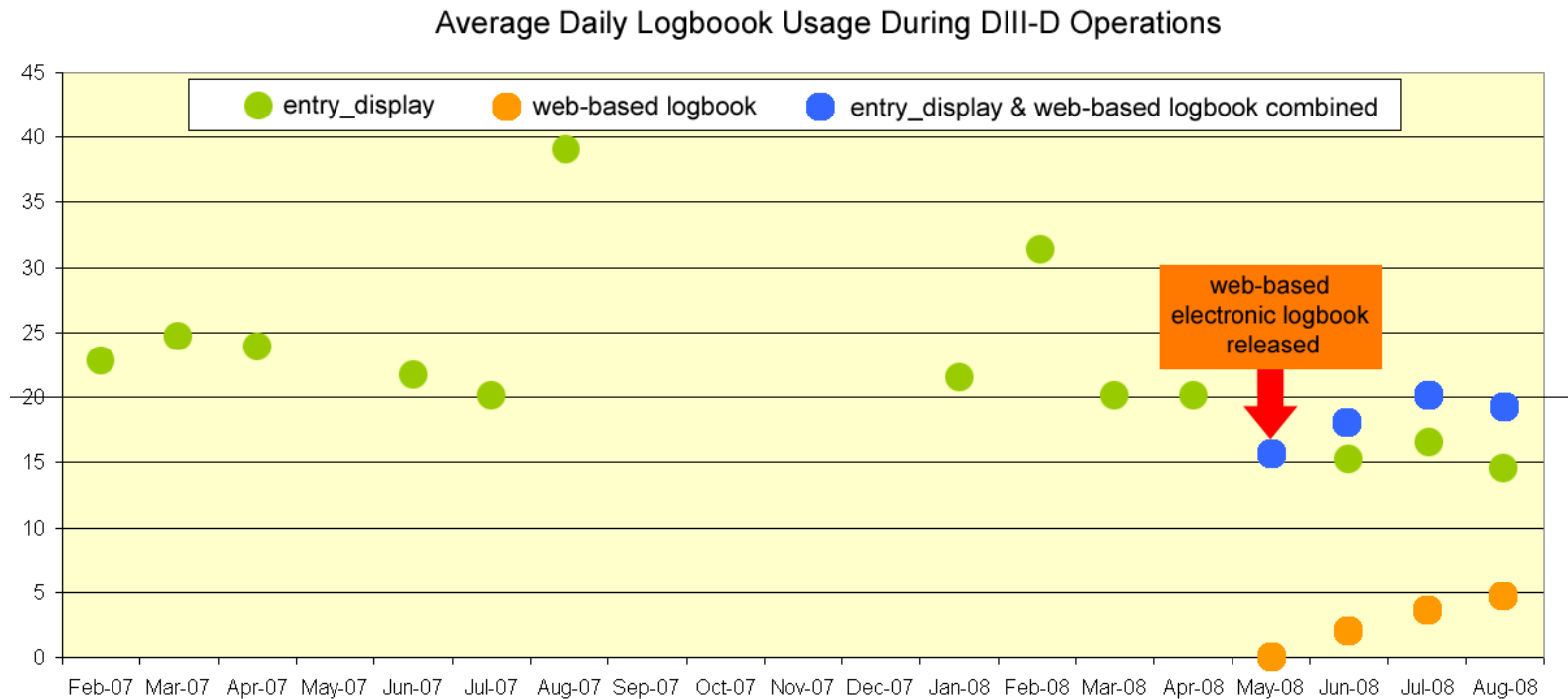
A custom SQL query is entered in the "Custom query:" field: `SELECT * FROM ENTRIES WHERE RUN LIKE '200805%' AND VOIDED IS NULL ORDER BY RUN ASC, SHOT ASC, ENTERED ASC`.

Below the query field, there are input fields for various fields: RUN, SHOT, USERNAME, ENTERED, VOIDED, and TOPIC. Each field has a radio button for "like" and a text input box. There are also "and" and "or" buttons between the fields. A "Show voided" checkbox and a "Do Query" button are at the bottom right of the query section.

A "Custom SQL Query" dialog box is open in the foreground, prompting the user to "Enter an sql predicate into this dialog to select the records to display." It lists available fields (shot, run, topic, username, entered and text) and operators (and, or, not, between, containing, like, <, >, =, <>). It also states "AUTOMATIC UPDATES ARE DISABLED". The dialog has buttons for "Ok", "Apply", "Cancel", "Show Query", and "Help". At the bottom, there are checkboxes for "Include selection options", "Voided", "Run", "User", and "Topic".

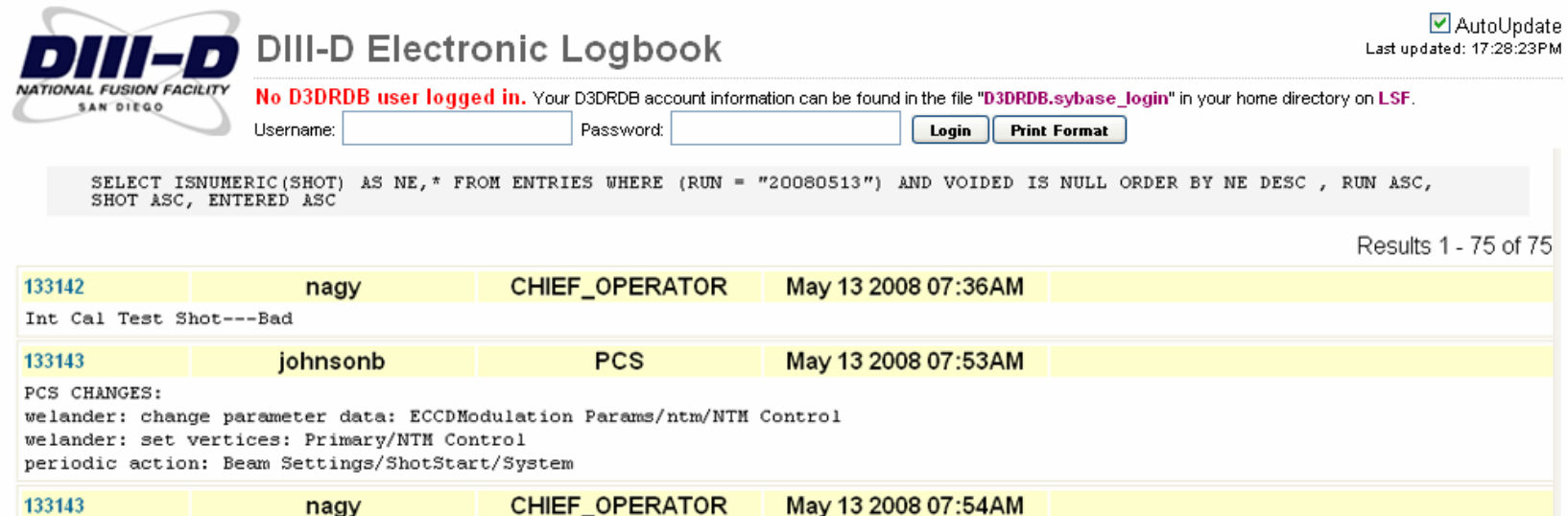
The background page shows a table of logbook entries. The first entry is dated "3:20PM" and the second is dated "2:01PM". A date separator "May 02 2008 05:10PM" is visible. Below the date, there is a summary of the day's activities, including a "Pit Closed: Beams Ready: PS Test Shot:" and "Experiment Supported: Startup Session Leader:".

DIII-D logbook website usages is expected to grow over time



- <diii-d.gat.com>
 - Red Hat release 5.2
 - Apache 2.2.3
 - PHP 5.1.6

The web interface allows easy access and navigation



The image shows a screenshot of the DIII-D Electronic Logbook web interface. At the top left is the DIII-D logo with the text 'NATIONAL FUSION FACILITY SAN DIEGO'. To its right is the title 'DIII-D Electronic Logbook'. In the top right corner, there is a checkbox for 'AutoUpdate' which is checked, and the text 'Last updated: 17:28:23PM'. Below the title, a red message states: 'No D3DRDB user logged in. Your D3DRDB account information can be found in the file "D3DRDB.sybase_login" in your home directory on LSF.' Below this message are input fields for 'Username:' and 'Password:', followed by 'Login' and 'Print Format' buttons. A SQL query is displayed in a grey box: 'SELECT ISNUMERIC(SHOT) AS NE,* FROM ENTRIES WHERE (RUN = "20080513") AND VOIDED IS NULL ORDER BY NE DESC , RUN ASC, SHOT ASC, ENTERED ASC'. To the right of the query, it says 'Results 1 - 75 of 75'. Below the query is a table with three columns: ID, Username, and Role/Time. The first row shows ID '133142', Username 'nagy', and Role/Time 'CHIEF_OPERATOR May 13 2008 07:36AM'. Below this row is the text 'Int Cal Test Shot---Bad'. The second row shows ID '133143', Username 'johnsonb', and Role/Time 'PCS May 13 2008 07:53AM'. Below this row is the text 'PCS CHANGES: welander: change parameter data: ECCDModulation Params/ntm/NTM Control welander: set vertices: Primary/NTM Control periodic action: Beam Settings/ShotStart/System'. The third row shows ID '133143', Username 'nagy', and Role/Time 'CHIEF_OPERATOR May 13 2008 07:54AM'.

DIII-D NATIONAL FUSION FACILITY SAN DIEGO

DIII-D Electronic Logbook

☒ AutoUpdate
Last updated: 17:28:23PM

No D3DRDB user logged in. Your D3DRDB account information can be found in the file "D3DRDB.sybase_login" in your home directory on LSF.

Username: Password:

SELECT ISNUMERIC(SHOT) AS NE,* FROM ENTRIES WHERE (RUN = "20080513") AND VOIDED IS NULL ORDER BY NE DESC , RUN ASC, SHOT ASC, ENTERED ASC

Results 1 - 75 of 75

133142	nagy	CHIEF_OPERATOR	May 13 2008 07:36AM
Int Cal Test Shot---Bad			
133143	johnsonb	PCS	May 13 2008 07:53AM
PCS CHANGES: welander: change parameter data: ECCDModulation Params/ntm/NTM Control welander: set vertices: Primary/NTM Control periodic action: Beam Settings/ShotStart/System			
133143	nagy	CHIEF_OPERATOR	May 13 2008 07:54AM

- Anyone with a DIII-D web access account can view the latest entries of the electronic logbook from anywhere.

The web version has much more capabilities than were present in the IDL version

Logbook - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites

Address Summary Information on DIII-D Physics Experiments: Shot #134577

Previous Shot Next Shot

Click on any label for help on that quantity.

SHOT	134577
TIME_OF_SHOT	2008-08-13 09:00:58.000
PULSE_LENGTH	6.4961
TOPOLOGY	SNT
A	0.56954
R	1.78123
RSURF	1.69391
DELTA_U	0.72568
DELTA_L	0.379981
KAPPA	1.83191
ZMAXIS	-0.0244206
T_EFIT	2.245
BETANMAX	2.29006
T_BETANMAX	4.045
POH	1014030
PRAD	3168280
PBEAM	9182950
T_PBEAM	1.8105
BTORMAX	2.05789
BTOR	2.05789
BTORSIGN	1

Options | Display Options | Make Entry

HERE (RUN = "20080513") AND VOID

ments: Shot #134573

Shot 134573	PCS CHANGES:
	periodic action: Beam Settings/ShotStart/System
	degrassi: load defaults for category: Data Acquisition
	degrassi: load defaults for category: System
	degrassi: load defaults for category: CER
	degrassi: load defaults for category: Mode
	degrassi: load defaults for phase: Shape Startup/BreakDown/Shape
	degrassi: load defaults for phase: Voltage Feedback/BreakDown/F Power Supplies
johnsonb	degrassi: set vertices: LOB2_OnOff/ShotStart/Gas
	degrassi: restore all categories from hyatt_Simple_INTCAL
	degrassi: set vertices: LOB1P/ShotStart/Gas
	degrassi: set vertices: LOB1_OnOff/ShotStart/Gas

Shot 134573	Int cal shot with 13CH4 injection; plenty of 13CH4 indicated on RGA scan (#16, #17 on scan; 0850 scan)
CHIEF_OPERATOR	
leer	

PCS CHANGES:

periodic action:

hyatt: load defa

hyatt: load defa

hyatt: load defa

hyatt: load defa

hyatt: load defa

hyatt: load defa

hyatt: restore all categories from hyatt_Simple_INTCAL

- Users can navigate from the logbook entries to more details on shot and run information including mini-proposals, schedule, data documentation, or any other information already on a different website or stored in the database.

The logbook keeps constant communication with other sources to deliver the most updated results

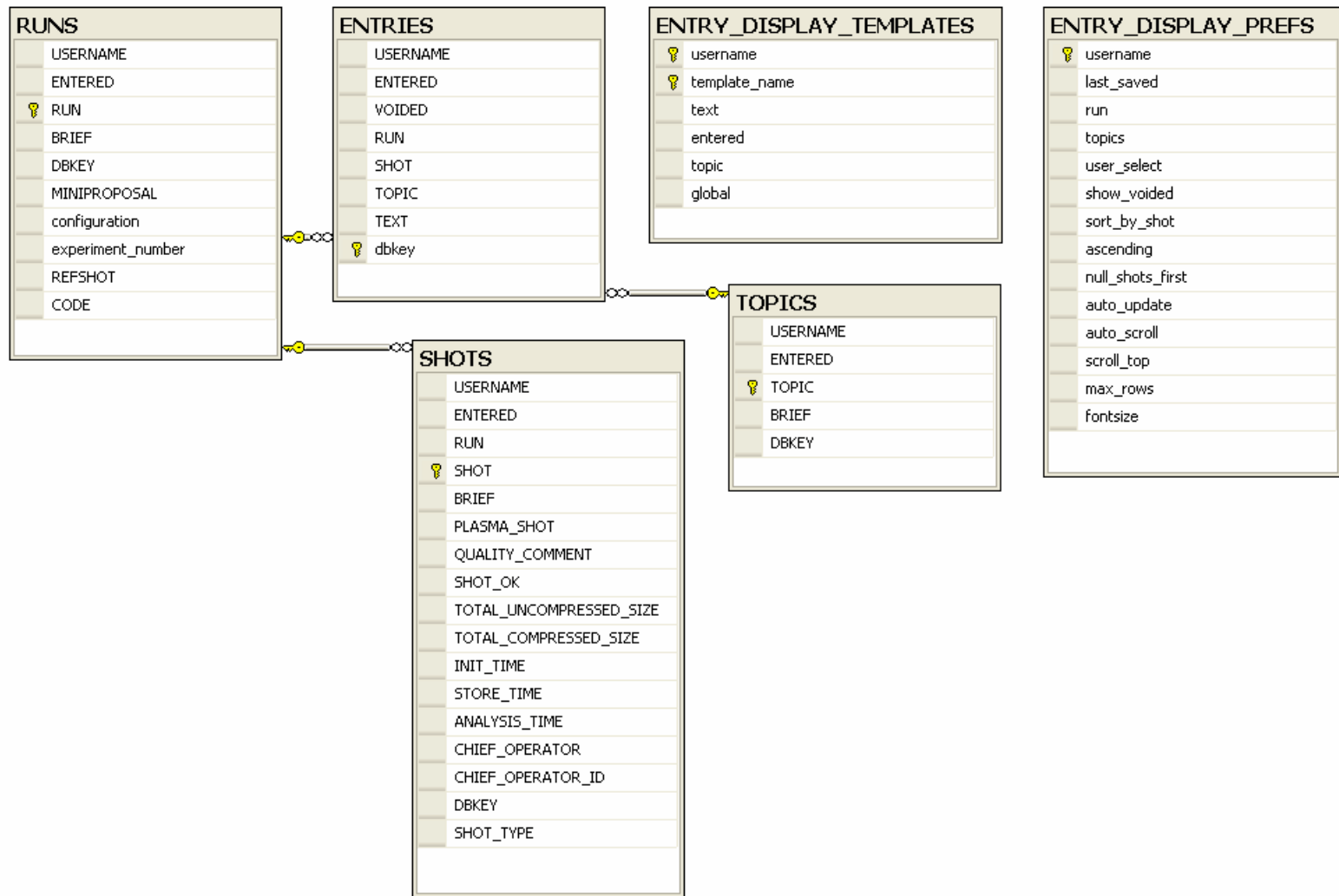
- **Automatic update**

- The website includes a listener which triggers the website to refresh whenever there is a new update.

- **Centralized data**

- The website communicates with the database to gather the requested information, organize the result and then display it.

- **Index.php**
 - Main page where data is parsed & displayed
- **logbook_dbconnect.php**
 - Handles connections to the database
 - Defines default DB user
- **MdsPlus.jar**
 - Start the MDSplus event listener for DB updates
- **CSS (Cascading Style Sheets) & image files**



Client-side: website triggers a listener to connect to the MDSplus event server to provide the latest information

- Every update made on the logbook website or on entry_display sets a new event on the MDSplus event server.
 - New entries
 - Updated entries
 - Deleted entries

```
$handle=mdsplus_connect($event_server);  
mdsplus_value($handle,'setevent("LOGBOOK_ENTRY")');  
mdsplus_disconnect($handle);
```

MDSplus PHP extension is available at www.mdsplus.org

- The event listener notifies the web page to reload when a new event is set.

- The event listener notifies the web page to reload when a new event is set.

```
<object classid="java:MdsPlus/MdsPlusEventMonitor"
archive="MdsPlus.jar" type="application/x-java-applet;version=1.4"
    eventName="LOGBOOK_ENTRY" mayscript="mayscript">
    <param name="eventName" value="LOGBOOK_ENTRY" />
    <param name="jscript"
value="top.updater.update(MdsEventDataString,MdsEventData)" />
    <param name="mayscript" value="true" />
</object>
```

Server-side: PHP communicates with the database in order to organize the requested content

- PHP includes a built-in set of functions for accessing MS SQL Server database.

[mssql_bind](#) — Adds a parameter to a stored procedure or a remote stored procedure
[mssql_close](#) — Close MS SQL Server connection
[mssql_connect](#) — Open MS SQL server connection
[mssql_data_seek](#) — Moves internal row pointer
[mssql_execute](#) — Executes a stored procedure on a MS SQL server database
[mssql_fetch_array](#) — Fetch a result row as an associative array, a numeric array, or both
[mssql_fetch_assoc](#) — Returns an associative array of the current row in the result
[mssql_fetch_batch](#) — Returns the next batch of records
[mssql_fetch_field](#) — Get field information
[mssql_fetch_object](#) — Fetch row as object
[mssql_fetch_row](#) — Get row as enumerated array
[mssql_field_length](#) — Get the length of a field
[mssql_field_name](#) — Get the name of a field
[mssql_field_seek](#) — Seeks to the specified field offset
[mssql_field_type](#) — Gets the type of a field
[mssql_free_result](#) — Free result memory

[mssql_free_statement](#) — Free statement memory
[mssql_get_last_message](#) — Returns the last message from the server
[mssql_guid_string](#) — Converts a 16 byte binary GUID to a string
[mssql_init](#) — Initializes a stored procedure or a remote stored procedure
[mssql_min_error_severity](#) — Sets the minimum error severity
[mssql_min_message_severity](#) — Sets the minimum message severity
[mssql_next_result](#) — Move the internal result pointer to the next result
[mssql_num_fields](#) — Gets the number of fields in result
[mssql_num_rows](#) — Gets the number of rows in result
[mssql_pconnect](#) — Open persistent MS SQL connection
[mssql_query](#) — Send MS SQL query
[mssql_result](#) — Get result data
[mssql_rows_affected](#) — Returns the number of records affected by the query
[mssql_select_db](#) — Select MS SQL database

- Using this extension, connecting to the database and executing queries are as simple as...

```
$c= mssql_connect('D3DRDB.gat.com:8001',$usr,$pw);  
mssql_select_db('[D3DRDB]');  
$r=mssql_query("select max(run) as mrun from RUNS");  
$maxrun=$r['mrun'];  
mssql_close($c);
```

- Using the appropriate queries or by executing stored procedures on the database, PHP can gather data from multiple tables into one variable.

Logbook website provides multiple layer of protection to provide a secure working environment.

- **Access to the website - Apache authentication**
 - <diii-d.gat.com> is SSL enabled, providing a secure communication on the Internet.
 - Once authenticated, the website logs into the database using a generic database account with very limited access.
 - Users can view the latest entries from that day. They will not be able to make any updates.
- **Updates to the database - D3DRDB authorization**
 - Making updates or entering new entries require more permissions than the generic DB account.
 - Each users has to login a 2nd time, with their own D3DRDB database accounts.
 - If they have the correct permission settings on the database, they will be able to make updates.

- Input validation to avoid SQL injection.

Username: `a'; DROP TABLE entries; SELECT * FROM runs WHERE username = 'a`

```
<input type="text" name="usr">
```

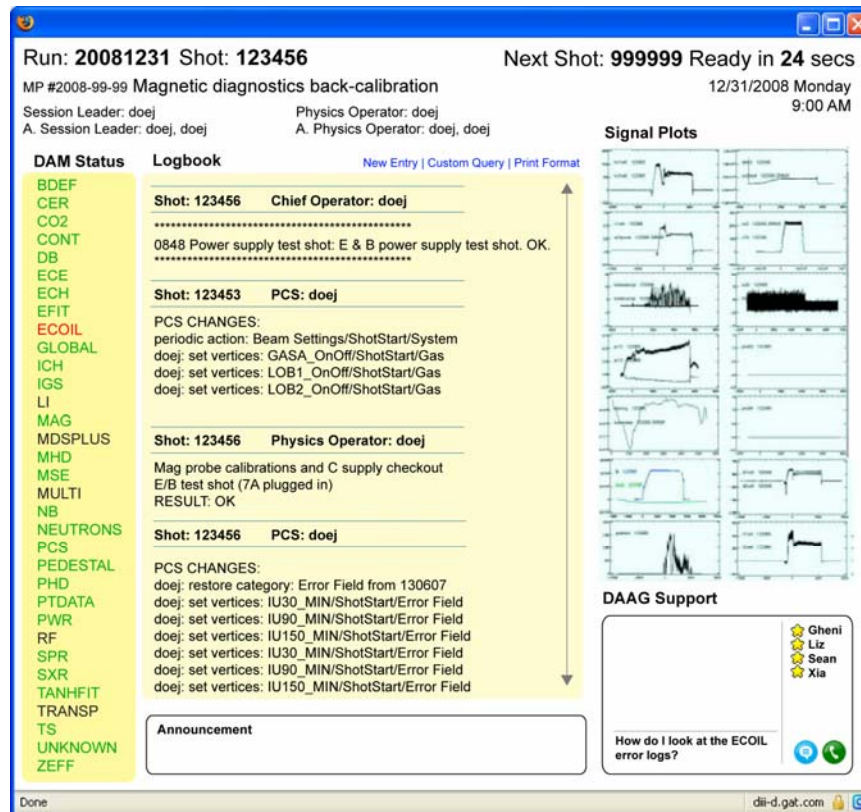
```
1  $c=mssql_connect('D3DRDB.gat.com:8001',$usr,$pw);
2  mssql_select_db('[d3drdb]');
3  $i_usr=$_POST('usr');
4  $r=mssql_query("SELECT * FROM entries WHERE username='" + $i_usr + "';");

    SELECT * FROM entries WHERE username = 'a';
    DROP TABLE entries;
    SELECT * FROM runs WHERE username = 'a';
```

- Tighten user permission on the database-end.

Logbook has the potential to become faster, more efficient and provide more useful data.

- state.html, state.js
 - Displays tokamak states: 'Starting', 'Standby', 'Cooldown', 'Test', 'Recool', 'Init', 'Check', 'Pulse', 'Abort', 'Unknown'
 - Displays countdown times for each shot.
 - Needs proper MDSplus events to be set
- MIT is currently working towards replacing the java applet which drives the updates with javascript Ajax-like scripting to eliminate the need to utilize additional ports on the web server.
 - Port 8001: MDSplus event listener, MSSQL connections
 - Port 80: http
 - Port 443: https



- **New DIII-D Operations Web Portal** - A way for session leaders or others to access a variety of information from one place