SRM Discrete Samples: Quick Start Guide

V1.1; M Hastedt, 8/15/2011; Approved by D. Houpt 12/2013

Introduction

This guide will help the paleomagnetist quickly begin using the discrete-sample version of the Superconducting Rock Magnetometer (SRM) software and upload their data to the LIMS. For detailed information on the instrument please refer to the 2G Enterprises manuals, available both on the bookshelf in the laboratory in the "Pmag Manual" binder and online.

Procedure

The procedure for measuring discrete samples includes the following steps:

1. Start the software application.
2. Set up the sequence in the software.
3. Measure the samples.
4. Upload data to LIMS.

Step 1: Start the Application

1. Double-click the **Discrete SRM** shortcut on the cyromag computer. If the program does not launch automatically, click the **Run** arrow in the upper left corner to start (*Figure 1*).
2. Enter LIMS credentials into the application login screen (*Figure 2*).
3. Once authenticated, the Communication Status dialog box apprises the user of the status of the SQUIDs and degausser controller (*Figure 3*). If any of the information is blank, notify the paleomagnetics technician.

    X, Y, and Z are the SQUID axes; SQUID responses shown in the example in *Figure 3* are as follows:

    –Filter (F) = 1
    –Range (R) = 1
    –Slew (S) = enabled (E)
    –Loop (L) = closed (C)

    Degausser (D) codes shown in the example are as follows:

    –Status (S) = idle (Z)
    –Ramp Rate (R) = 3
    –Dwell (D) = 1 s
    –Coil (C) = Z
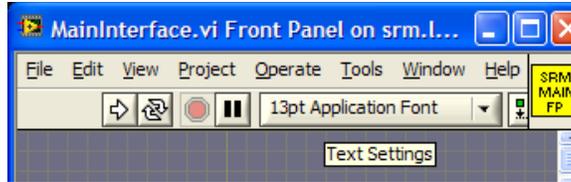   –Amplitude (A) = 50 gauss

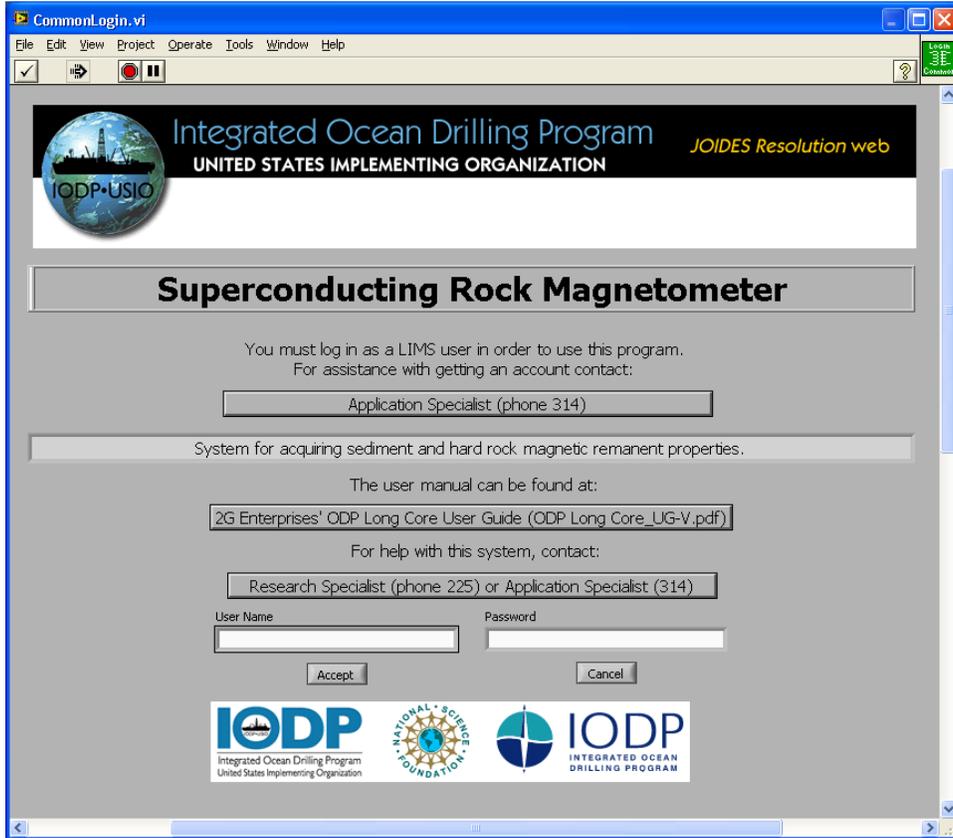Figure 1. Run Application.
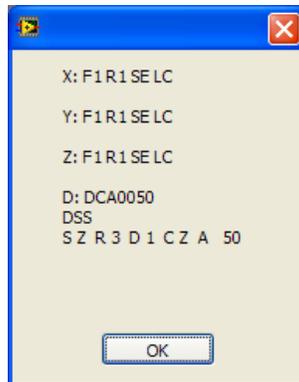

Figure 2. LIMS Login.

Figure 3. Communication Status Report.

Step 2: Set up the Sequence

Main Screen

The *Discrete Samples Main* screen offers the following operations (see *Figure 4*):

| Button/Field	Function	Purpose
Identify Samples	Opens *Discrete Sample Identification* screen	Input information about the sample (Text_ID, name, length, UserID, etc).
Process Sample	Opens *Sample Measurement* screen	Perform the measurement routine specified in *Set Demag Schedule*. **Note**: the last used sequence will load at startup.
View Plots	Opens *View Plots* screen	Examine data after measurement.
Set Demag Schedule	Opens *Processing Sequence Editor* screen	Specify sequential measurement and demag steps for a sample, as well as measurement intervals, averaging, and header/trailer lengths.
Measure Tray	Opens *Tray Data Collection* screen	Demagnetize and/or measure a tray.
Tray Name	Field	File name of the last used tray. This field must be filled in.
Auto Save	Toggle	Automatically save data without going to the *View Plots* screen between runs of a sequence. The switch can be toggled at any time. **NOTE**: v.2 Auto Save is enabled by default for multistep demag sequences.
Comments	Toggle	Enable/disable the three comment dialog boxes when saving each data file.
Exit Program	—	Quit the software (updates the configuration file at exit).
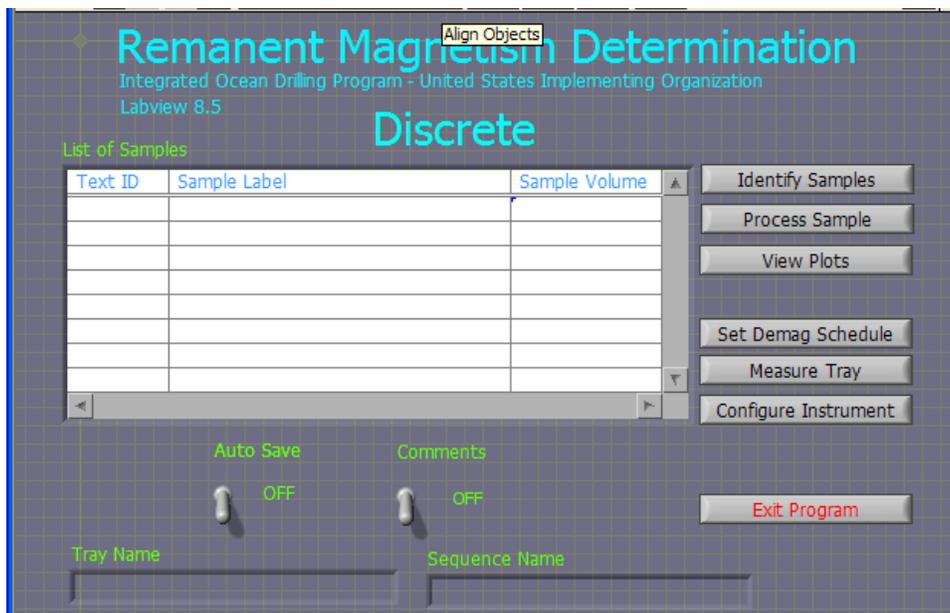
Figure 4. Discrete Samples Main Screen.

Measure the Sample Tray

1. On the *Main* screen, click **Measure Tray** to open the *Tray Data Collection* screen (***Figure 5***).

2. Type the name of the tray to be measured in the *Tray ID* field. Give the tray a time-stamp name such as 2009-12-7_1015 to generate a tray filename of "Discrete_tray_2009-12-7_1015.txt" after the measurement finishes.

3. Click **Cleanse** to degauss the tray (up to 80 mT) before measuring. A dialog box will prompt for the demag level.

4. Enter discrete measurement positions:

   –Click **New** to clear all previous discrete positions.

   –Enter a new discrete position (in cm) in the *Position* field.

   –Click **Add** to append the position to the discrete position measurement list (make sure positions are listed in numerical order).

   –Double-click any entry and click **Delete** to make changes to the list.

   –Click **Measure** to acquire new tray data. If the boat is not moving, click the button twice.

   –Once a tray has been measured, click **Use Tray** and select a tray file from the *Current Tray Files* list to display the X, Y, and Z moment data on the screen.
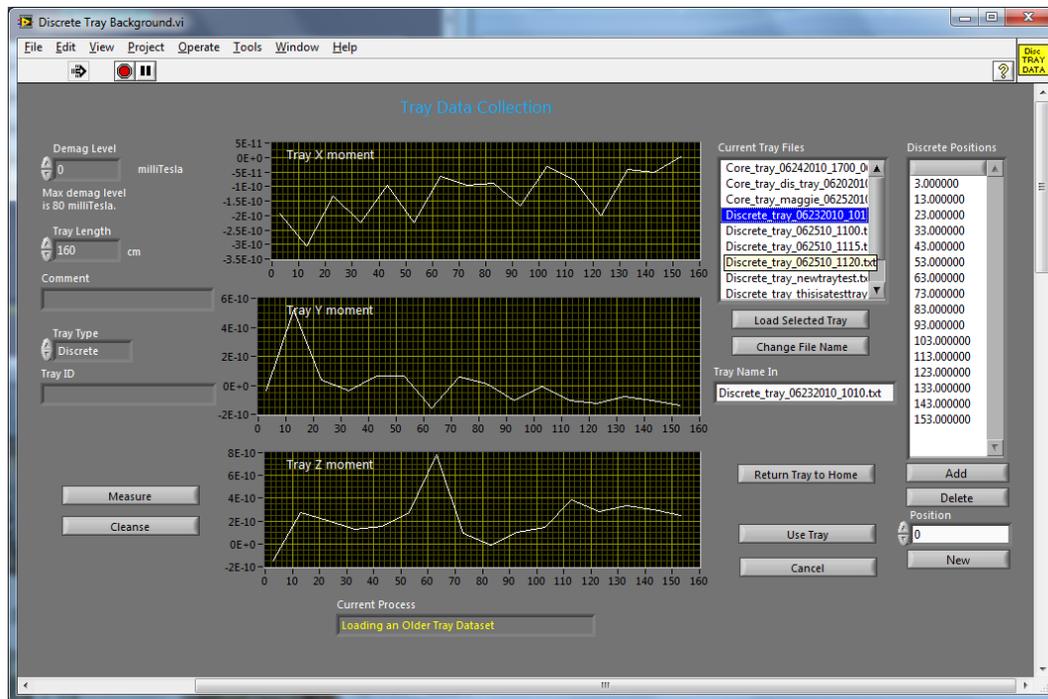

Figure 5. Tray Data Collection Screen.

Set up Measurement Parameters

Configure measurement replicates and degauss sequences using the *Remanent Magnetism Processing Sequence Editor* screen (***Figure 6***). To access this screen, click **Set Demag Schedule** on the *Main* screen. Use the buttons on the measurement parameters screen to use a previous sequence, modify a previous sequence, or build a new measurement sequence including degaussing and measurement steps. Other tips for use on this screen:

–Demag levels must be above 0 and less than or equal to 80 mT.

–To delete a step from a sequence, double-click the step and use the **Delete Selected Item** button.

–Ensure that every sequence has a last step END (automatically added upon **Save Sequence**).

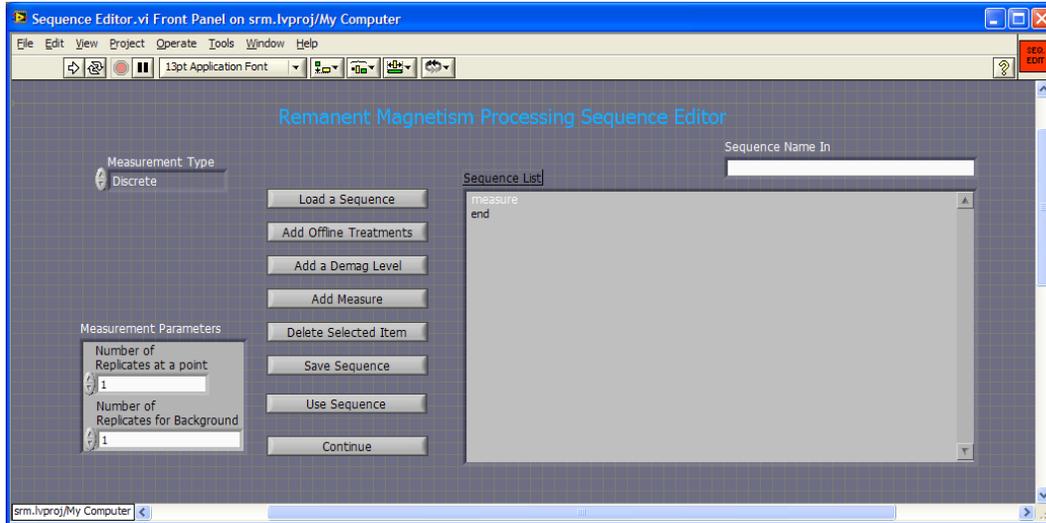–Click **Continue** to return to the previous screen without saving any changes.

Figure 6. Processing Sequence Editor Screen.

Identify Discrete Samples

Click **Identify Samples** on the *Main* screen to launch the *Sample Identification* screen (***Figure 7***).

1. Scan the barcode label to populate the *Text ID* field. If the sample information does not automatically populate, click **Parse Text ID**.

2. Enter the location of the sample boat/tray in cm (inherited from the previously measured/loaded tray) in the *Tray Location* field.

3. Select the appropriate sample orientation from the list (see ***Appendix B***).

4. Change sample dimensions for cube or minicore samples if needed under *Height*, *Width*, and *Length*. Click **Calculate Volume** if dimensions were changed.

5. Click **Add** to add the sample to the discrete sample list (alternatively, double-click the correct location line in the sample table).

6. Continue adding samples in ascending position order, using the same positions measured on the empty tray (see **Measure Tray**). A tray position can be skipped but the point will be measured anyway (but no file will be written).

7. Edit the sample table by double-clicking any sample in the table and entering new information.

8. To change the orientation of every sample in the table, use the **Change Orientation** button.
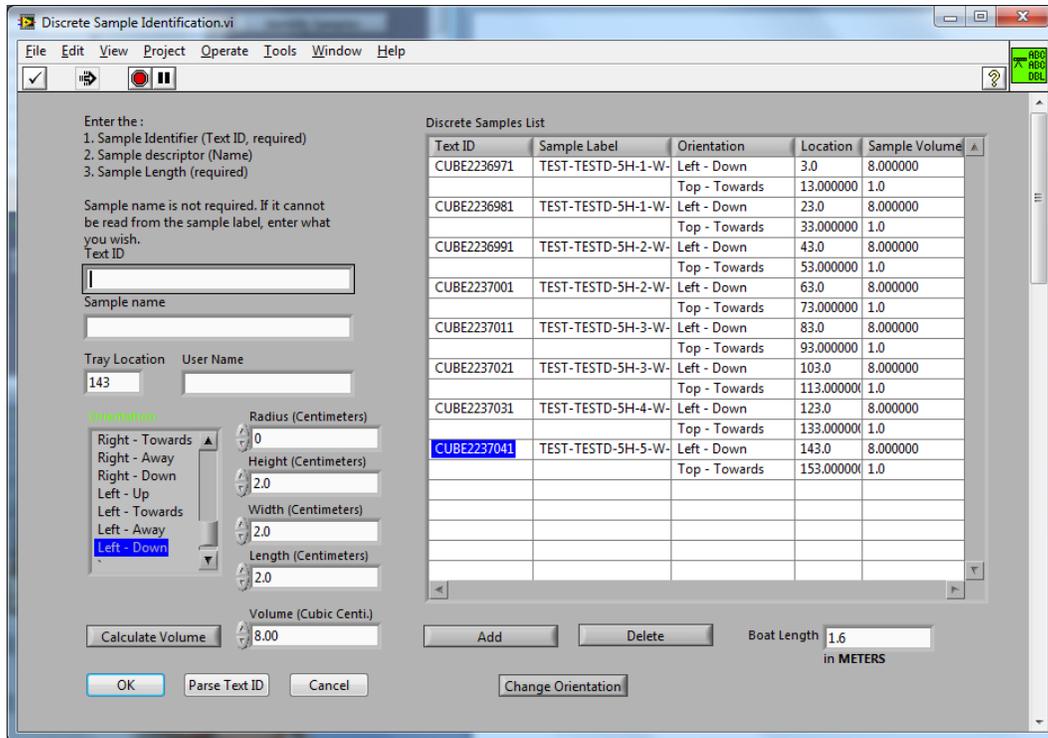
Figure 7. Sample Identification Screen.

Step 3: Measure Samples

1. Select **Process Samples** from the *Main* screen to start measuring samples and open the *Data Collection* screen (*Figure 8*). The plots show real-time acquisition plots for the sequence step in progress.

2. To abort a measurement, click **Abort** once:
   –"Aborting the Data Collection Process" will show in the status bar
   –A dialog box will ask whether to save the file of the sample currently being measured
   –The boat will be retrieved from the magnetometer

3. Double-click **end** in the sequence list to finish aborting the run.

4. Double-click any other step in the sequence list to resume measurements.
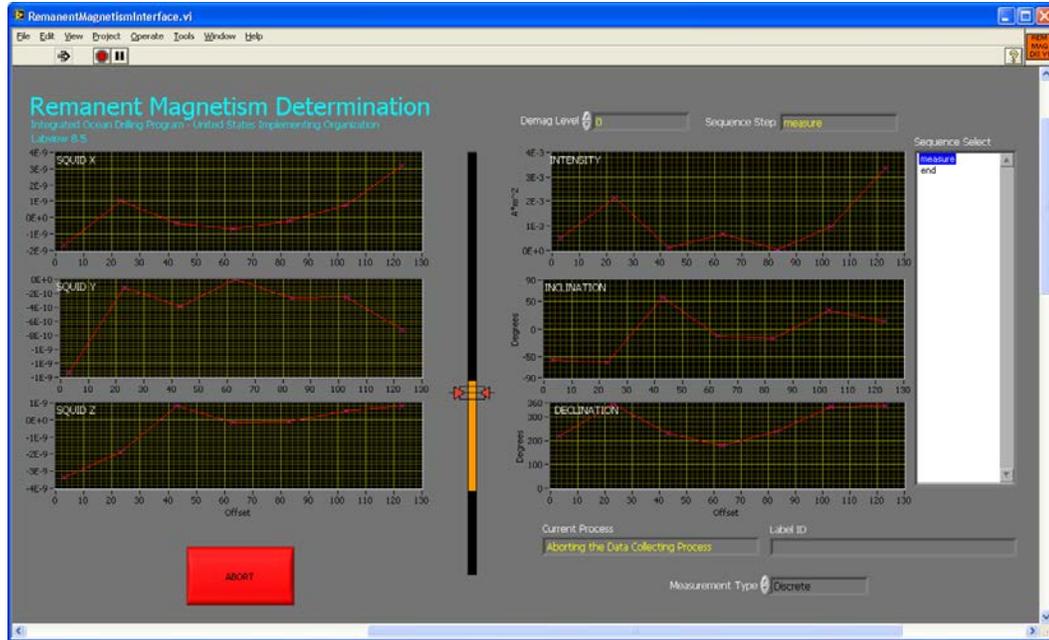
Figure 8. Data Collection Screen.

View Plots

1. Select **View Plots** from the *Main* screen to open the *View Plots* screen (***Figure 9***).

2. Select a *Demag Level* from the list or a *Filter* (All, Raw, Background Only, etc.) from the drop-down list to see sample plots.

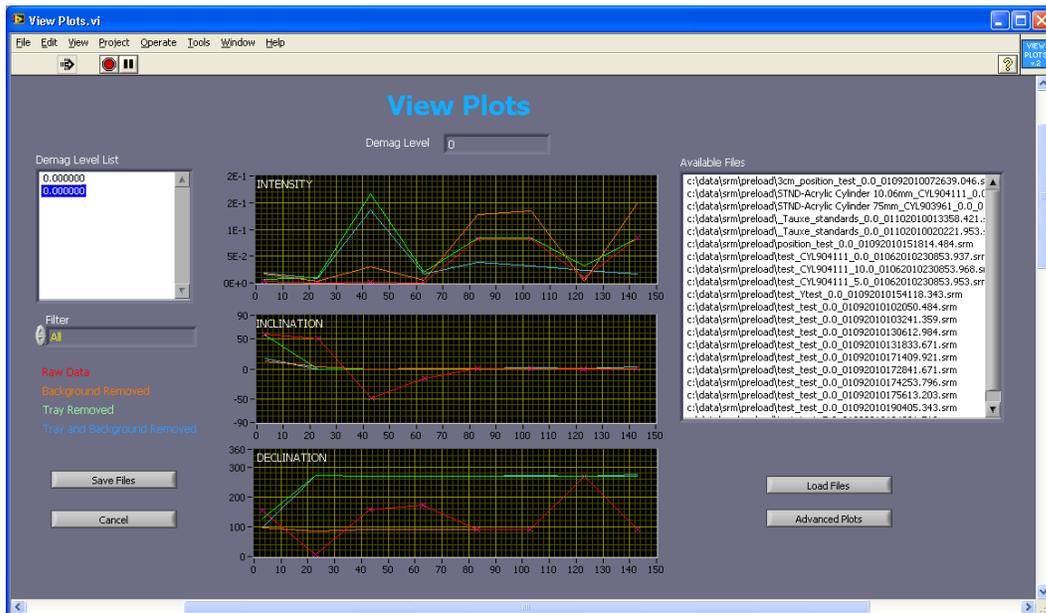3. Click **Save Files** to save the data to the upload directory.

Figure 9. View Plots Screen.

Step 4: Upload Data to LIMS

Please see an application developer if there are any problems uploading files.

1. Double-click the upload icon on the desktop to open the MegaUploadaTron (MUT) uploader screen (*Figure 10*).

2. Manually upload samples by clicking **Upload**; alternatively, **selecting Automatic Upload** will cause the loader will to check *c:\data\srm\in* for new files to upload every few minutes.

3. Close the upload application by clicking the red X in the upper right-hand corner, but be advised that the true application close is on the Windows task bar in the lower right corner of the desktop. Right-click the LIMS loader icon and click Exit to fully close the uploader (*Figure 11*).
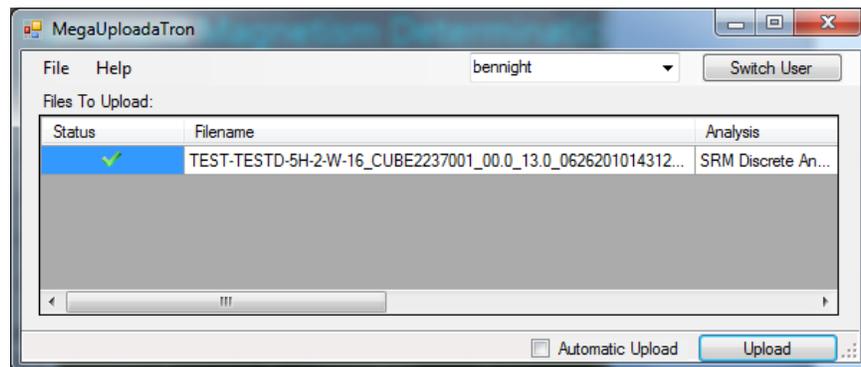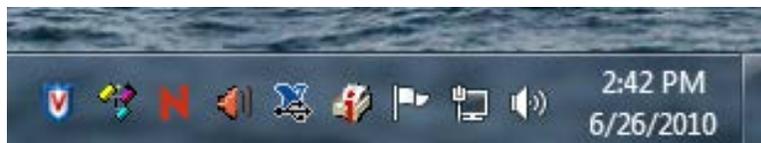

Figure 10. LIMS Uploader Screen.

Figure 11. LIMS Uploader System Tray Icon (second from left).

Verifying Data in LIMS

LIMS Reports

1. Go to *LIMS Reports* at http://webserv.ship.iodp.tamu.edu:8080/UWQ/.

2. Under **Select Report**, choose **Magnetism** > **Magnetic Remanence (SRM discrete)**.

3. Under **Select Sample Range**, specify *Expedition*, *Site*, *Hole*, and *Section* image(s) to retrieve.

4. Click **View data or Download data**.

LIMSpeak

1. Open *LIMSpeak* at http://ship.iodp.tamu.edu/tasapps/limspeak/.

2. Click **Select a hole** to view a drop-down list of available holes, and select a hole.

3. Click **Select a template** to view a drop-down list of available templates, and select **SRM**.

4. Click **Display.**

5. Click on any section in the *Samples* column to zoom in on the SRM plot image.

Web Tabular

1. To obtain detailed information that is not available on the LIMS report use *Web Tabular Report*: http://webserv.ship.iodp.tamu.edu:8080/Lims-client/html/.

2. Under Expedition/Sample, enter the *Expedition*, *Site*, *Hole*, etc.

3. Under Test/Result > *Analysis* select **SRM** from the drop-down list.

4. Select **Show Report** to see data on screen.

Appendix A: File Locations

There are several locations for SRM data on the cryomag computer. All files are ASCII text regardless of file extension. The main directories include the following:

C:\DATA\SRM\IN: This is the SRM data folder that the LIMS uploader watches for transfer to the database. Files you chose to save at the end of a run are copied from the preload folder to this location. SRM discrete sample data will have a .DSC file extension; section data has a .SRM extension.

C:\DATA\SRM\PRELOAD: New with version 2. This folder contains copies of the measurement data files and is used by View Plots to display previously-measured data. Important: ALL data files are written to this location, including those that were cancelled for whatever reason. Clean or reorganize this folder periodically to keep the plot file list manageable or to avoid viewing the bad data files.

C:\DATA\SRM\.CONFIG: Location of the instrument.ini configuration file, last-used sequence, and LIMS webserver location information.

C:\DATA\SRM\.LOGIN: LIMS authentication and uploader configuration information.

C:\DATA\SRM\SAMPLE_DATA: Location of .BKU (backup) files containing only measured moments of each section, used internally by the software. Clean or reorganize this folder periodically to keep the file list manageable.

C:\DATA\SRM\ARCHIVE: The uploader moves files from C:\DATA\SRM\IN to this location after successful upload to the database.

C:\DATA\SRM\ERROR: The uploader moves files here if there are problems that prevent upload to the database. Check the number of files shown in the error window of the uploader to see if there are problem files.

Appendix B: 24 discrete sample positions

The current version of the discrete sample SRM software has the ability to put a discrete sample in 24 different orientations that could be measured and then averaged offline to help minimize vector uncertainty due to boat rotation, to perform double-demags, etc.

Terminology: "arrow face" is the surface of a sample taken from the working half of the core, the one with the up-arrow drawn on it. If you are using an IODP minicube then the assumption is that it has been *pushed into* the section as its up-arrow is printed on the bottom of the cube. "SRM reference direction" is the orientation of the up-arrow on the arrow face with respect to a person standing in front of the cryomag at the loading end, facing to the forward of the ship, e.g., 'toward' means going toward the SRM body and away is its opposite. Left and right are similarly the left or right of the SRM body as you face the bore. The 24 orientations are listed as "arrow face – SRM reference direction" pairs in the orientation list.

Example 1: "Top-Away"—This is the traditional position of a minicore or cube. The arrow face is on the *top* surface of the working half, and the up-arrow points *away* from the SRM body toward the elevator.