

# SEM File Uploader User Guide

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## Introduction

This user guide contains standard operational procedures for the Scanning Electron Microscope Image Uploader (SEM Uploader). The description technician performs maintenance and an introduction of the SEM for scientists. Information on the SEM itself is presented in the *SEM User Guide* provided by Hitachi (in digital form on the SEM PC and as hardcopy next to it). The SEM Uploader software is an in-house development that makes it possible to upload the images and metadata from the SEM to the IODP LIMS database. SEM Uploader works in combination with MegaUploadTron5001 (MUT).

## Method Overview

The workflow for working with the SEM is as follows:

- Take pictures on the Scanning Electron Microscope
- Save the pictures and the associated metadata on the PC that runs the SEM software
- Transfer pictures and metadata to the IODP LIMS database

## Software required

- SEM Up: the software that will prepare the original SEM pictures and metadata file for the MUT uploader. It will create a MUT uploader file that is formatted in a way MUT can read. SEM Up will extract some of the metadata to this MUT uploader file in order to display this metadata in the LIMS search.
- MUT: MegaUploadTron5001 (MUT, *Figure 1*) is the software that will upload the SEM pictures and metadata file to the LIMS database. The program needs to be installed on the PC and up and running for successful uploading.

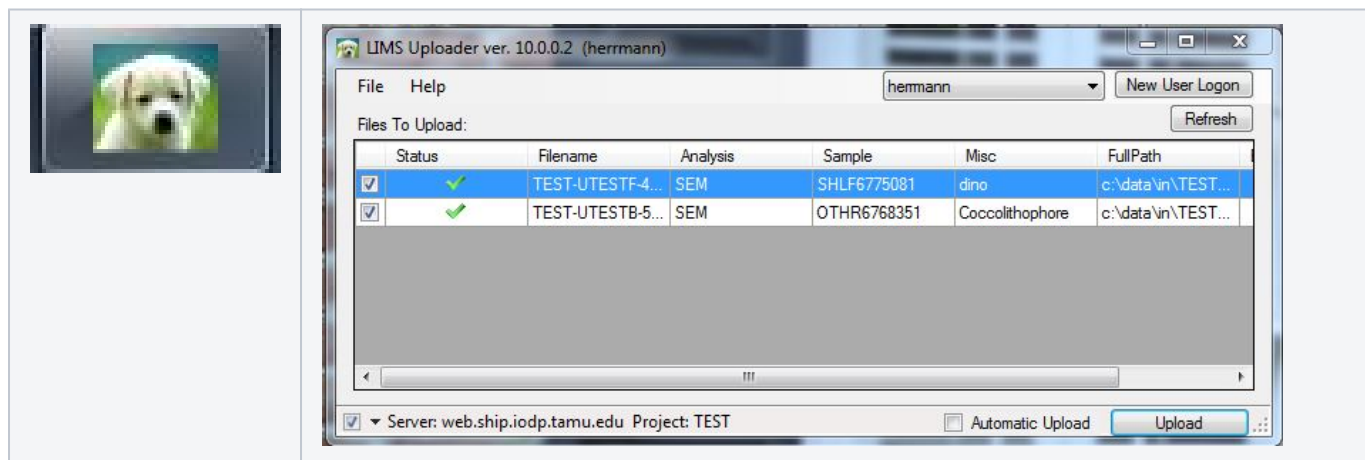


Figure 1. MegaUpodaTron5001 (MUT) icon and user interface

# Admin and developer support

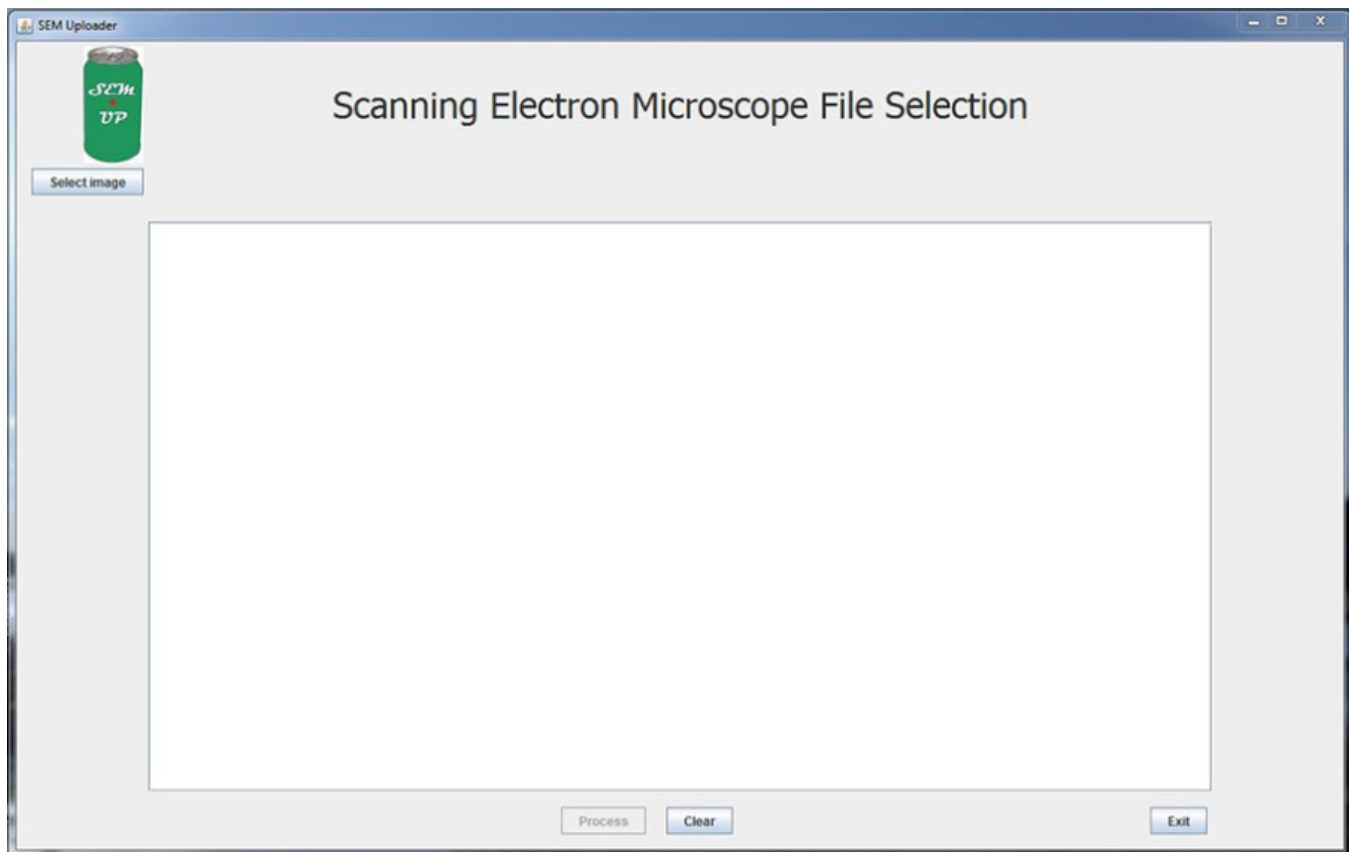
## Setting up expedition-specific categories

The General subcategories in SEM Up represent main value lists in DESClogik. If any of the components has a sub value list that is specific to the expedition created, this must be communicated to the developers. The developers will then associate this expedition-specific value list/subcategory with the appropriate subcategory in the SEM Uploader.

## Upload

After capturing the images on the SEM and saving them on the PC (please following image naming convention at the end of this document) the user is ready to upload the pictures to LIMS. These are the steps for preparing the files for upload and initializing the upload:

- Open MegaUpoldaTron5001 (MUT) and login to the current expedition or project. If more information is needed, refer to the MUT manual.
- Check if the correct uploader directory is set (go to File, Set Upload Directories). By default, files to be uploaded by MUT are saved to C:\DATA\in.
- Open the SEM Uploader.



1. Select an image from the SEM directory. Click **Process**. OR click **Exit** if you decide to upload later. **CLEAR** will clear out the image from the selection. The user can select another image right away if the one chosen is not the one that they wanted to upload.

If the user selected a file that is not one of the image types that the SEM produces (JPG, PNG, or TIF) the following error message will appear (Figure 2):



Figure 2. SEM Uploader message if a NON-image file (JPG, PNG, or TIF) is selected.

If the user selected a file that has no metadata .txt file the following error message will appear (Figure 3):

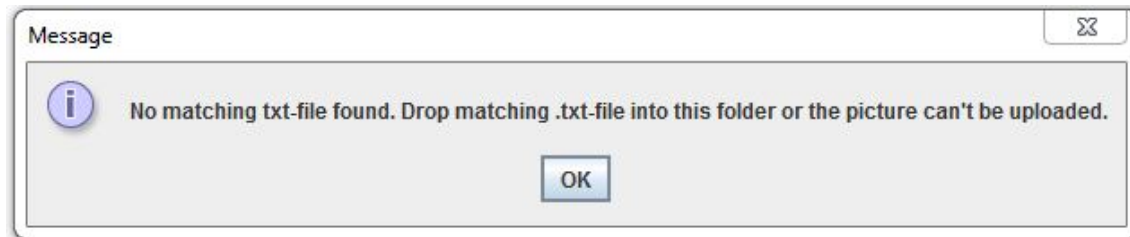


Figure 3. SEM Uploader message if an image file without metadata file is picked.

2. The second window of the SEM uploader will show the image file and metadata text file path on the PC, as well as some of the metadata that was retrieved from it (instrument, condition, working distance, date taken, magnification, filament current). It is designed to associate the sample with the image. There are two ways of assigning the sample – **Hierarchy** search or **Text ID** search (Figure 4).

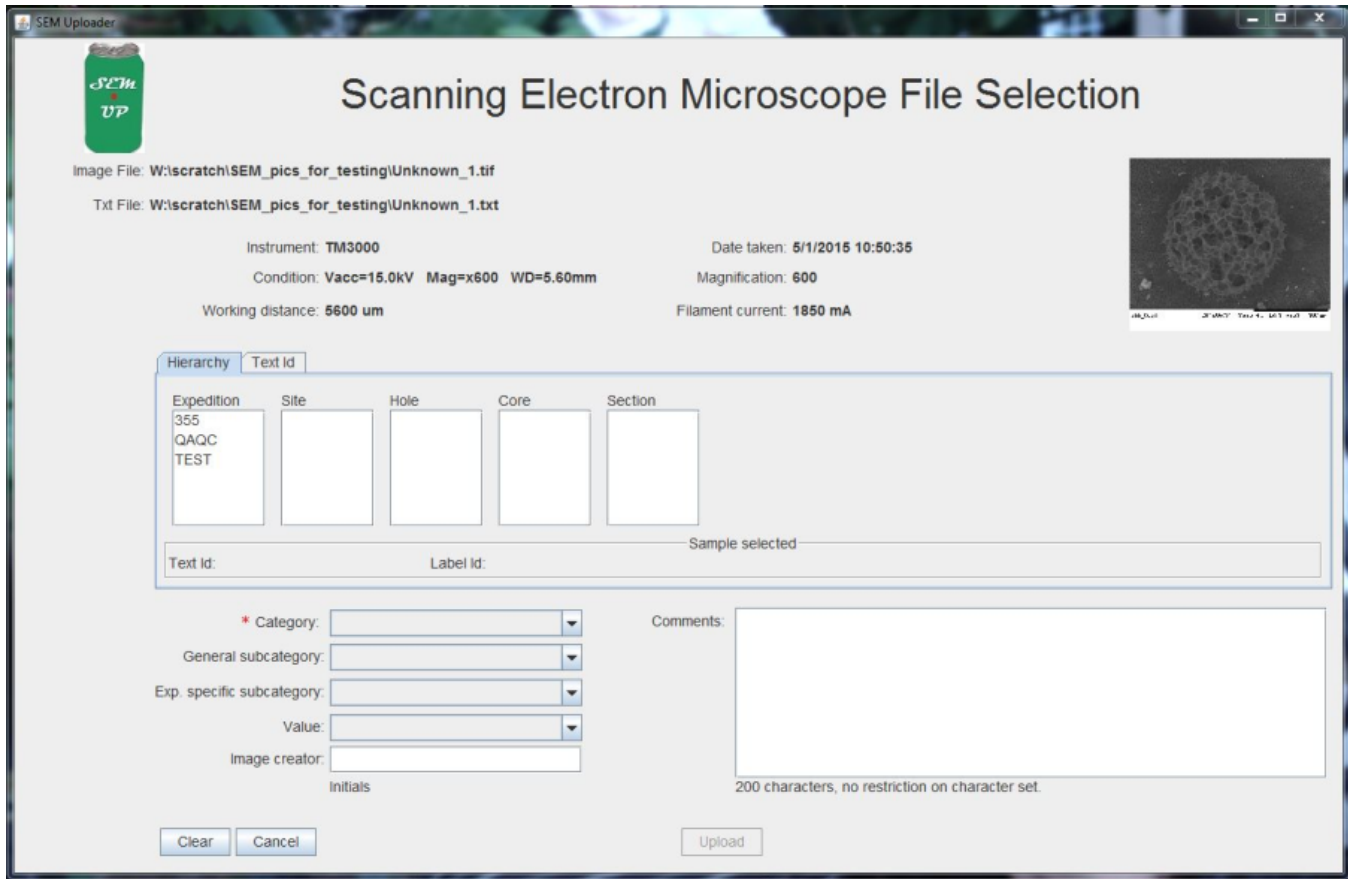


Figure 4. The SEM Uploader window is the place to assign the sample to the picture as well as additional information about the specimen seen in the image.

3. In **Hierarchy** search, the user clicks through Expedition/Site/Hole/Core/Section/Section Half down to the sample that the SEM picture was taken from. The sample will be validated automatically with Text ID and Sample ID. In the **Text Id** search, the user enters the known Text ID into the blank field and clicks **Validate Text Id**. If the user picks an invalid Text ID, the SEM Uploader will tell the user (Figure 5).



Figure 5. Text Id search validation of an invalid Text Id will notify the user of the mistake.

4. The user now needs to pick a **Category** from the drop-down list. The red asterisk next to the category field indicates that this field is mandatory information. The rest of the information is not. The user can pick a **general subcategory**. If the expedition has an **expedition specific subcategory** associated with it this field will auto populate. If there is no expedition specific subcategory, the field will be greyed out. The user will then be able to select a **value** from the drop-down list. However, if the desired value is not in the list, it can't be added by the user. The user will need to ask the description technician to add it to the drop-down list.

Here are examples for adding descriptive metadata to the SEM image:

CATEGORY	FOSSIL	LITHOLOGY	COMPOSITION
GENERAL SUBCATEGORY	calcareous nannofossil	sediment	-
EXP. SPECIFIC SUBCATEGORY	calc_nanno_333	sediment_345	-

VALUE	Emiliana huxleyi (Lohmann, 1902)	clay [Leg210]	olivine
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As you can see, some categories have no additional general subcategory. The field will be greyed out in this case. In the case presented, category composition has neither a general subcategory nor an expedition specific subcategory. The value drop-down list will simply have all entries from the category list composition listed.

1. The user has the option to enter initials in the **Image creator** field.
2. The user has the option to add **comments** as well. The comment field allows up to 200 characters without restrictions on special characters.
3. The **Upload** button is activated once the user has filled out the sample selection and picked a category. **Clear** will clear the sample selection as well as the selection of descriptive parameters. **Cancel** will navigate the user back to the first file selection window where the image was chosen.
4. MUT should display the ".SEM" uploader file in the user interface after the user clicks upload. If the directories are set correctly and MUT is working correctly the files should be uploaded to LIMS right away.

## Download

The SEM report can be found as part of the image reports in the LORE interface:

On shore/WWW: <http://iodp.tamu.edu/LORE/>  
 On the JR: <http://web.ship.iodp.tamu.edu/LORE/>

To select an SEM image the user must click on 'Images' under 'Select report' and then select the Scanning Electron Microscope (SEM) option. Users can decide to use the standard report or an expanded report. The standard report is commonly used for viewing and downloading data, whereas the expanded report is used for data review to see all information captured. Whether the user chooses to use the standard or the expanded report, the same search functions are available. The user can search by:

- Hierarchy search (default)
- Splice Search
- Text ID search

To use the hierarchy search, click the "Select by Hierarchy" tab on any sample module. The hierarchy search allows the user to progress through the sample hierarchy tree (expedition, site, hole, core, section, section half, etc.) to focus the search to the desired level. A hierarchy search can be combined with a parameter search (such as sample type) to narrow results by browsing down the hierarchy (at least to the Hole level) and then adding specific search parameters. This can be done in any order. Combining searches may result in a too-narrow query that may return no samples. Each sample has a unique **Text Id** that can be found on the sample label in both barcode and human-readable format. The Text Id for each sample can also be found in LIME. Specific samples (and their children) can be found using a TEXT\_ID search. Text Id's can also be found in the Sample search in LORE/LIMS and SampleMaster. To search for samples by Text Id, click the "Text ID Search" tab on any sample module. Enter one Text Id manually or paste from a list into the entry field. Once the Text Id is entered, click "View data" – all the available SEM images for that sample will be listed.

A **Text Id search** can be combined with a parameter search (such as sample type) to narrow and then adding specific search parameters. This can be done in any order. Combining searches may result in a too-narrow query that may return no samples.

## Tips

- Upload is independent of the capture process so multiple images can be taken and only the ones desired can be uploaded,
- Comments can be seen in reports and their use is encouraged.

## Naming and Saving Conventions

Naming convention for SEM files:

1. EXP number
2. Site
3. Hole
4. Core
5. Section
6. Sample
7. Taxa/specimen/piece
8. No. 1, 2, 3...

E.g.

349\_U1431A\_1H\_1\_10-11cm\_Emiliana\_huxleyi\_1,  
 349\_U1431A\_1H\_1\_10-11cm\_Emiliana\_huxleyi\_2,  
 349\_U1431A\_1H\_1\_10-11cm\_Emiliana\_huxleyi\_3, ...

Storage convention for SEM files on the local PC:

1. SEM

2. Site
3. Hole
4. Sample

E.g.  
 Folder SEM  
 Folder 1431  
 Folder 1341A  
 Folder U1341A\_1\_H\_1\_1-11cm (all files for this SEM sample)

NOTE: All files need to be moved to USERVOL and DATA1 by the end of the expedition.

## LIMS Integration

Analysis	Component	Definition
Scanning Electron Microscope (SEM)	Exp	expedition number
	Site	site number
	Hole	hole number
	Core	core number
	Type	type indicates the coring tool used to recover the core (typical types are F, H, R, X).
	Sect	section number
	A/W	archive (A) or working (W) section half.
	Top offset on section (cm)	position of the SEM sample measured relative to the top of the section or section half.
	Bottom offset on section (cm)	position of the SEM sample measured relative to the top of the section or section half.
	Top depth CSF-A (m)	location of the SEM sample expressed relative to the top of the hole.
	Bottom depth CSF-A (m)	location of the SEM sample expressed relative to the top of the hole.
	Top depth [CSF-B] (m)	location of the SEM sample relative to the top of a hole. The location is presented in a scale selected by the science party or the report user.
	Bottom depth [CSF-B] (m)	location of the SEM sample relative to the top of a hole. The location is presented in a scale selected by the science party or the report user.
	Image link	link to URL of JPG, PNG, or TIF version of SEM image.
	Image filename	filename of SEM image provided for identification purposes.
	Image Metadata	link to URL of TXT metadata file of image.
	Category	Category of the specimen pictured in the image.
	Observable	Specific category describing the pictured specimen
	Magnification	user setting on the SEM when the picture was taken.
	Timestamp (UTC)	point in time at which the SEM picture was uploaded.
	Instrument	SEM Scanning Electron Microscope (currently Hitachi TM3000).
	Text ID	automatically generated unique database identifier for a sample, visible on printed labels.
	Test No	unique number associated with the instrument measurement steps that produced these data.
	Comments	uploader's notes about the sample or image or specimen on the image.

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