

Easy Upload of Sensor Information and Data Acquisition Channel Lists To NEEScentral

1. Overview

Typical NEES earthquake engineering experiments often use dense sensor arrays on the order of 400 sensors to help characterize performance and behavior of the test specimen. Detailed metadata about each sensor such as the exact 3-D location and orientation of the sensor relative to the specimen is necessary in order to understand the data from the experiment. The NEES data model attempts to capture as much of this pertinent metadata about the sensor locations, as well as information about the associated data acquisition (DAQ) channels that the sensors are hooked up to during an experiment in order to easily associate the sensors with the actual data files outputted from the DAQ system. The NEEScentral user interface allows a user to upload data and metadata for each sensor and each DAQ channel individually. This can be a time consuming task for experiments with 400 sensors and DAQ channels. Therefore, NEESit is developing mechanisms for bulk upload of data and metadata in order to simplify the upload process for the user. This document describes methods to easily upload many sensor locations and DAQ channels at one time using an Excel spreadsheet template provided by NEESit.

2. Sensor Locations

The first step in providing detailed metadata about sensors involves describing critical metadata such as sensor label, type, location, orientation, etc. The following section navigates a user through the NEEScentral hierarchy to the level where bulk upload of their sensor location metadata can be accomplished using the provided Excel spreadsheet. Once the user submits a filled in spreadsheet template the metadata it contains is automatically ingested into the NEEScentral database.

1. Log in to NEEScentral.
2. Click on *My Projects* in the main navigation bar.
3. Click on the project you are interested in.
4. Click on *Experiments* in the project navigation bar.
5. Click on the experiment you are interested in.
6. Click on *Setup* in the experiment navigation bar.
7. Click on *Sensor Location Plans*.
8. Click on the sensor location plan for which you would like to upload sensor locations and click the *Edit Location Plan* button. If you do not already have a sensor location plan, create and save a new plan.
9. Scroll down to the bottom of the page and click the *Upload Sensor Locations* button.
10. Click on the *SensorLocation.xls* link to download an Excel spreadsheet.
11. Fill in the Excel spreadsheet according to the following instructions:
 - **Label:** Enter a name to reference the location being defined.
 - **SensorType:** Enter one of the following: Accelerometer, Conductivity Sensor, Depth Gage, Displacement Sensor, Inclinator, Load Cell, Position Sensor, Pressure Sensor, Profile Sensor, Strain Gage, Temperature Sensor, Turbidity Sensor, Velocimeter, or Wave Gage.
 - **Comment:** Enter any comments you have about this location.
 - **X, Y, and Z:** Enter the coordinates describing the sensor's location in terms of the coordinate system used by the coordinate space in which the location is being defined. For example, *X* represents *x* (Cartesian) or *r* (cylindrical and spherical). Similarly, *Y* represents *y* (Cartesian) or θ (cylindrical and spherical), and *Z* represents *z* (Cartesian and cylindrical) or Φ (spherical).
 - **I, J, and K:** Enter the three Euler angles that describe, according to the x-convention, the rotation of the sensor relative to its standard orientation within the reference coordinate space.
 - **XUnit, YUnit, ZUnit, IUnit, JUnit, and KUnit:** Enter the units associated with *X*, *Y*, *Z*, *I*, *J*, and *K*. Choose from the following: cm, ft, in, km, m, μ m, mi, mm, nm, yd, radians, or degrees.
 - **Coordinate Space:** Enter the name of the reference coordinate space.
12. Save the Excel spreadsheet.

13. Click the *Browse...* button to locate your saved Excel spreadsheet.
14. Click the *Save* button to upload your sensor locations and add them to your sensor location plan.

3. DAQ Channels

Similar to sensor location metadata, additional information that associates each sensor with the data acquisition channel it is hooked up to is necessary in order to associate the sensor with the recorded time history data file. The metadata related to DAQ channels consists of the channel name/number, associated sensor, its location, and additional DAQ information such as range, resolution, and gain. The following section defines a step-by-step approach to easily upload the DAQ channel metadata.

1. Log in to NEEScentral.
2. Click on *My Projects* in the main navigation bar.
3. Click on the project you are interested in.
4. Click on *Experiments* in the project navigation bar.
5. Click on the experiment you are interested in.
6. Click on *Trials* in the experiment navigation bar.
7. Click on the trial you are interested in.
8. Click on *Setup* in the trial navigation bar.
9. Click on *DAQ Configurations*.
10. Click on the DAQ configuration for which you would like to upload a channel list. If you do not already have a DAQ configuration, create and save a new one.
11. Click the *Edit Configuration* button.
12. Scroll down to the bottom of the page and click the *Upload a DAQ Channel List* button.
13. Click on the *DAQChannelList.xls* link to download an Excel spreadsheet.
14. Fill in the Excel spreadsheet according to the following instructions:
 - **ChannelOrder:** Indicate which column of data in the output file is associated with this sensor. The value must be a positive integer. Do not repeat values.
 - **SensorLocationPlan:** Enter the name of the sensor location plan in which your sensor's location is defined.
 - **SensorLocation:** Enter the name of the sensor location as defined in one of your sensor location plans.
 - **Gain:** Enter the amount of gain associated with the channel.
 - **ADCRange:** Enter the ADC range.
 - **ADCResolution:** Enter the ADC resolution.
 - **Excitation:** Enter the amount of excitation.
 - **Description:** Enter a description for this channel.
15. Save the Excel spreadsheet.
16. Click the *Browse...* button to locate your saved Excel spreadsheet.
17. Click the *Save* button to upload your DAQ channels and add them to your DAQ configuration.