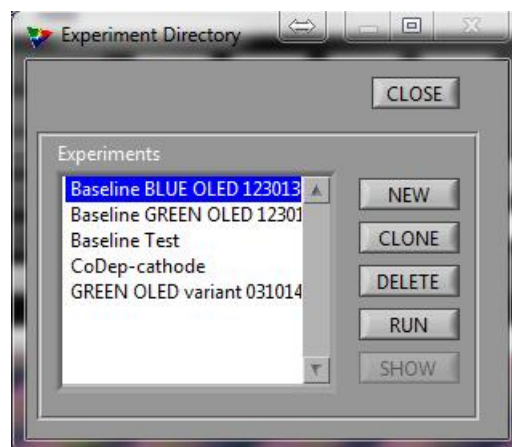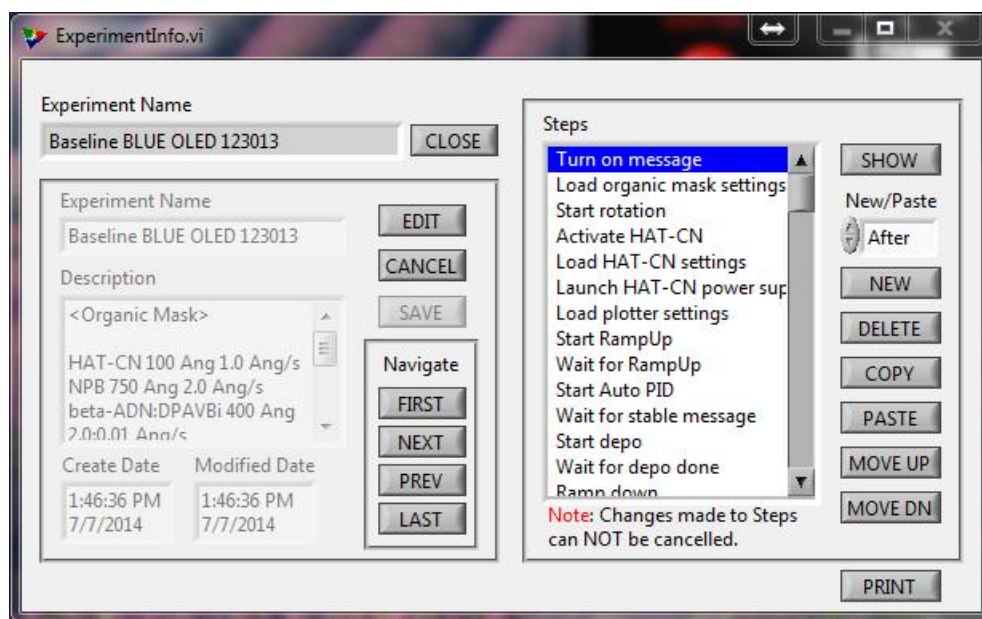# Experiments

Experiment Directory

Pressing the Experiment button on the Main Panel launches the Experiment Directory dialog box. The Experiments list-box displays the list of experiments that have been created. Pressing the NEW button launches the Experiment Info dialog and creates a new experiment that is blank. Pressing the CLONE button creates and exact copy of the selected experiment and adds it to the list. The DELETE button deletes the selected experiment and removes it from the list. The RUN button launches the Experiment Control dialog box which is used to sequence through a series of program steps to accomplish an experiment. The SHOW button launches the Experiment Info dialog box and presents the details of the selected experiment.

Experiment Info

The Experiment Info dialog box displays the information about the experiment on the left hand portion of the screen. The left hand portion of this dialog box starts in read-only mode, except when launched as a NEW experiment. The user can use the Navigate buttons to move through the experiment list t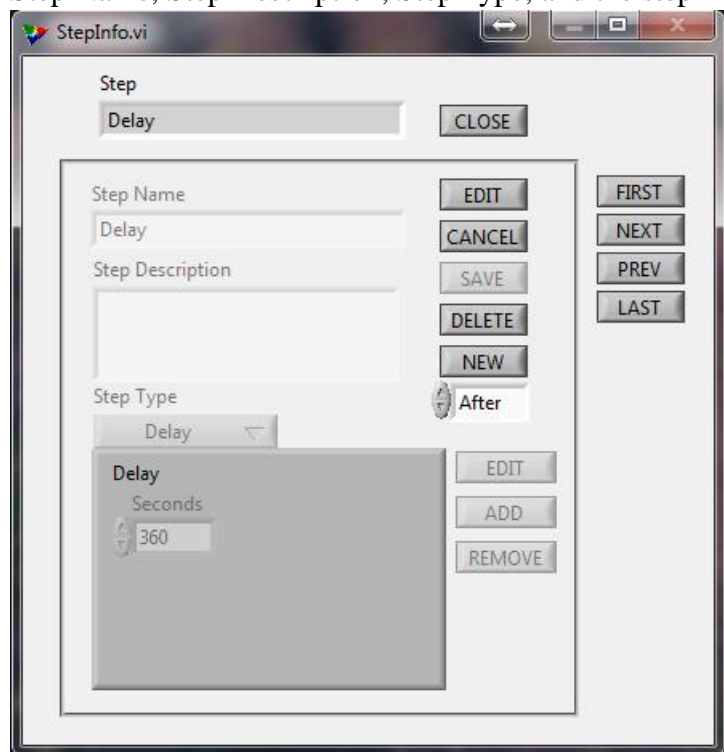o view details of any experiment. The Navigate button move through the experiments in numerically-valued alphabetic order. This means that upper and lower case characters have different values and may display in the list in a manner differently than expected. Pressing the FIRST button displays the information for the first experiment. Pressing NEXT moves to the next experiment in the list. Pressing PREV moves to the previous experiment in the list. Pressing LAST moves to the last experiment in the list.

The right hand side of the screen displays the steps that compose the experiment. This side of the screen is always in edit mode. Care must be taken to avoid inadvertent changes in an experiment. Pressing the SHOW button launches the Step Info dialog box to show the details of the step. Then New/Paste select-box is used to set the insertion point for a new or paste operation. The choices are After, Before, First, or Last. For After and Before, the insertion point is relative to the selected step in the Steps list-box. The First and Last selections are absolute, meaning the operation is performed at the

beginning or end of the list. The NEW button creates a blank step and launches the Step Info dialog box. The DELETE and COPY button will work with multiple selections in the Steps list-box. Multiple selections are made using mouse selection holding the CTRL or SHIFT keys on the keyboard. Pressing the DELETE button deletes the selected step(s). Pressing the COPY button copies the selected step(s) to a paste buffer. Pressing the PASTE button will paste the contents of the paste buffer to the position specified by the New/Paste select-box. The MOVE UP and MOVE DOWN button move the selected step up or down one position in the list until it gets to the top or bottom of the list. The Print button creates a text file (.txt) of the details of the experiment in the c:\Trovato\Print folder of the hard drive.

Step Info

The Step Info dialog box displays the details of a step of an experiment. Except when launched as a new step this dialog is launched in read-only mode. Pressing the EDIT button near the top of the dialog box puts the dialog box in edit-mode. Then the Step Name, Step Description, Step Type, and the step items can be edited. Pressing the CANCEL button puts the dialog box back into read-only mode and restores the original data. Pressing the SAVE button while in edit-mode will save the step info and put the dialog box into read-only mode. Pressing DELETE will delete the step being displayed and show the next step in the experiment. If the deleted step is the last step in the experiment the previous step is shown. Pressing the NEW button creates a new step. The position of the step within the experiment is determined by the select box located directly below the NEW button. The choices for the insertion point are After, Before, First, or Last. For After and Before, the insertion point is relative to the current step. The First and Last selections are absolute, meaning the operation is performed at the beginning or end of the experiment. The FIRST, NEXT, PREV, and LAST buttons are navigation buttons. They allow the user to move back and forth through an experiment without leaving the screen.   The Step Type menu button selects the type of action the step will perform. There are several step types: Delay, Load Settings, Set Event(s), Monitor Event(s), Operator Message, and Activate Material.

Step Type – Delay
The Delay step will pause the execution of an experiment for the number of seconds shown in the Seconds control. This Step Type is used to help synchronize steps that take a different amount of time. Such as a co-deposition process where two materials have different per-conditioning times. The material that takes the longest is started first and the Delay is added to start the second material so that they arrive at the desired rates at approximately the same time, thus saving material.

Step Type – Load Settings

The Load Settings step will load a set of named settings into a function panel such as the Power Supply Control, Fixture Control, or Plotter windows. Please note that since the Trovato experiment control design is material centric, the Material Settings are used with the Power Supply Control window. Also note that before a setting can be properly loaded a step to Activate Material must have been performed previously in the same experiment.

Step Type – Set Event(s)

The Set Event(s) step will request one or more events to be executed in the function panels. The Set Event step is like being an automatic button pusher. It is used to push buttons as you would during a manual experiment. When this Step Type is selected additional buttons appear to facilitate building the list of events to set. The EDIT button launches a dialog box for editing the selected event in the list. The ADD button launches a dialog box for adding an event to the end of the list. The REMOVE button removes the selected event in the list. At execution time the events are set in the order presented in the list from top to bottom. The MOVE UP and MOVE DN buttons move the selected item in the list up or down so that the order of events can be set as desired. Below is a table with the list of Functions and the Events that bay be set.

Function	Event Name	Description
Material (Power Supply Control)	Launch	This event causes the Power Supply Control window associated with the specified material to be launched using the settings that were selected on the Main Panel. Note: The material must have already been activated using the Activate Material Step. Also, a material must be launched in order for any of the following material events to execute properly.
	PwrRampStart	This event starts the power ramp up sequence for the material.
	RateAuto	This event starts the automatic rate control (PID) loop for the material.
	DepostitionStart	This event starts the deposition sequence for the material.
	StopRateAuto	This event stops the automatic rate control (PID) loop for the material.
	RampDown	This event starts the power ramp down sequence for the material.
	Close	This event closes the Power Supply Control window associated with the material.
FixtureControl	Rot/ShiftStart	This event initiates the execution of the rotate or shift command as specified in the MASK and SHIFT controls on the Fixture Control window.
	RotateStop	This event stops the Rotate command in the Fixture Control window.
MainPanel	StartLogging	This event starts the Logging process in the Main Panel.
	StopLogging	This event stops the Logging process in the Main Panel.

Step Type – Monitor Event(s)

The Monitor Event(s) step will pause execution of more steps until all of the Events in the list are logically TRUE. The step type is used in to wait until indicators indicate a certain state, like an operator waiting for the Done light before proceding to the next step. When this Step Type is selected additional buttons appear to facilitate building the list of events to set. The EDIT button launches a dialog box for editing the selected event in the list. The ADD button launches a dialog box for adding an event to the end of the list. The REMOVE button removes the selected event in the list. Following is a table with the list of Functions and the Events that may be set.

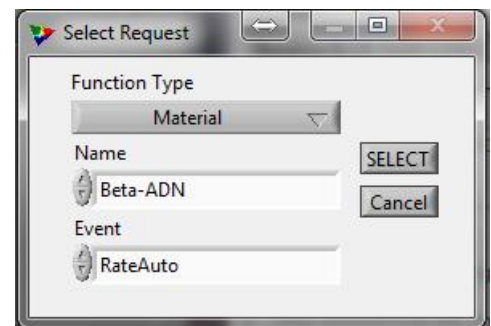| Function	Event Name	Description
Material (Power Supply Control)	PwrRampDone	This event indicates that the power ramp up sequence for the material is complete.
	RateStable	This event indicates that the stability criteria for the material has been met.
	DepositionDone	This event indicates that the Target Thickness for the material has been exceeded.
	RampDownDone	This event indicates that the power ramp down sequence for the material is complete.
FixtureControl	Rot/ShiftDone	This event indicates that the Shift cycle for Fixture Control has completed.
	Rotating	This event indicates that the fixture is rotating.
	UpToSpeed	This event indicates that the fixture has reached 90% of its programmed speed.

Step Type – Operator Message

This step will display a message box on the screen in the Experiment control window that must be acknowledged by the operator before the expreiment can proceed. This type of step is useful for directing the operator to perform a manual operation.

Step Type – Activate Material

This step activates a material in the main panel. This step is often followed by the Load Settings and Launch step for a material. This sequence of steps launches a power supply for the desired material with the desired settings.

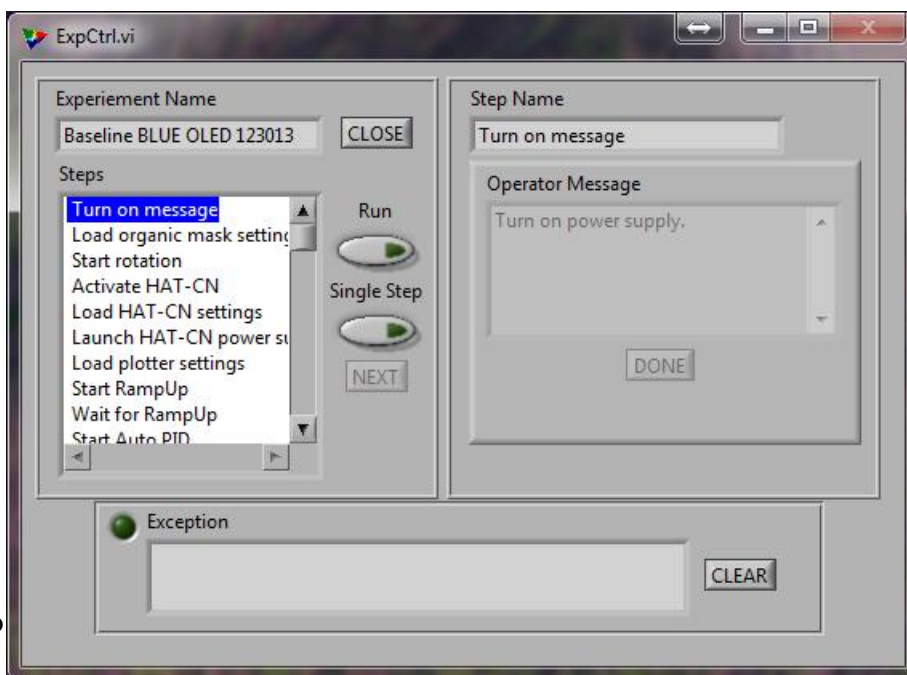### Select *Event* (Monitor or Request) Dialog

When adding or editing Set Event or Monitor Event step types, the Select Monitor or Select Request dialog will be presented. They operate in the same manner. The Function Type menu bar button selects the function type. The Name selector box selects the desired function name. The Event selector box selects the desired event. Pressing the SELECT button saves the event selection and closes the dialog box. Pressing the Cancel button cancels the event selection and closes the dialog box.

Experiment Control (ExpCtrl.vi)

Pressing the RUN button in the Experiment Directory dialog launches the Experiment Control dialog box. The Experiment Name control displays the name of the selected experiment. The steps of the experiment are shown in the Steps list-box. The details of the selected step are displayed in the right hand panel of the screen.

The Run, Single Step, and NEXT buttons control experiment execution. An experiment can be started on any step in the list. An experiment is started by pressing the Run button. The experiment can be stopped at any time by pressing the Run button again. The machine will stay in the state it is in at that time. This allows an operator to stop an experiment and make changes to setting and then restart the experiment. Also, steps may be skipped or repeated, by stopping the experiment selecting a new step and pressing the Run button to start it again in a new spot. The Single Step button must be set before an experiment is started. When this button is on, the experiment will only execute one step at a time. When the step is complete, the NEXT button will be enabled. The operator must press the NEXT button to start the next step. This mode is useful in the walking through a newly developed experiment to verify the steps are in the order intended.

The bottom frame of the dialog box is the Exception area. Generally, exceptions occur when the steps of an experiment try to perform set an event that inappropriate for the state of the system. An example would be an AutoRateStart event being set while the Power Ramp Up sequence is active for a material. This would Exception LED to turn from dark green to bright red. And text explaining the exception would appear in the Exception text control box. The active experiment would be halted with the next step in the Steps list-box being selected.