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SAND2016-2635PE

USER INTERFACE STORYBOARDS

Builds Event Storyboards

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Brief Description (partial)

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This use case describes how the Analyst builds a new event hypothesis missed by prior processing. The Analyst builds event hypotheses using the following methods: manual signal association, invoking waveform correlation algorithms, invoking signal association algorithms, and specifying an event time and location to build a virtual event hypothesis.

Overview

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- One of the Analyst goals is to tie up all known data, including building events that the system missed. The Analyst doesn't really select to "build an event" like they would select to refine an event or scan. Building an event is something that they do when they notice that the system has missed an event.
- The Analyst accesses the displays represented by these storyboards by opening the Analyst workspace (Analyzes Event UC) and selecting data for analysis (Selects Data for Analysis UC). During the process of scanning waveforms and unassociated detections (Scans Waveforms and Unassociated Detections UC) and/or refining an event (Refines Event UC), the Analyst can also elect to build an event.

Key Concepts

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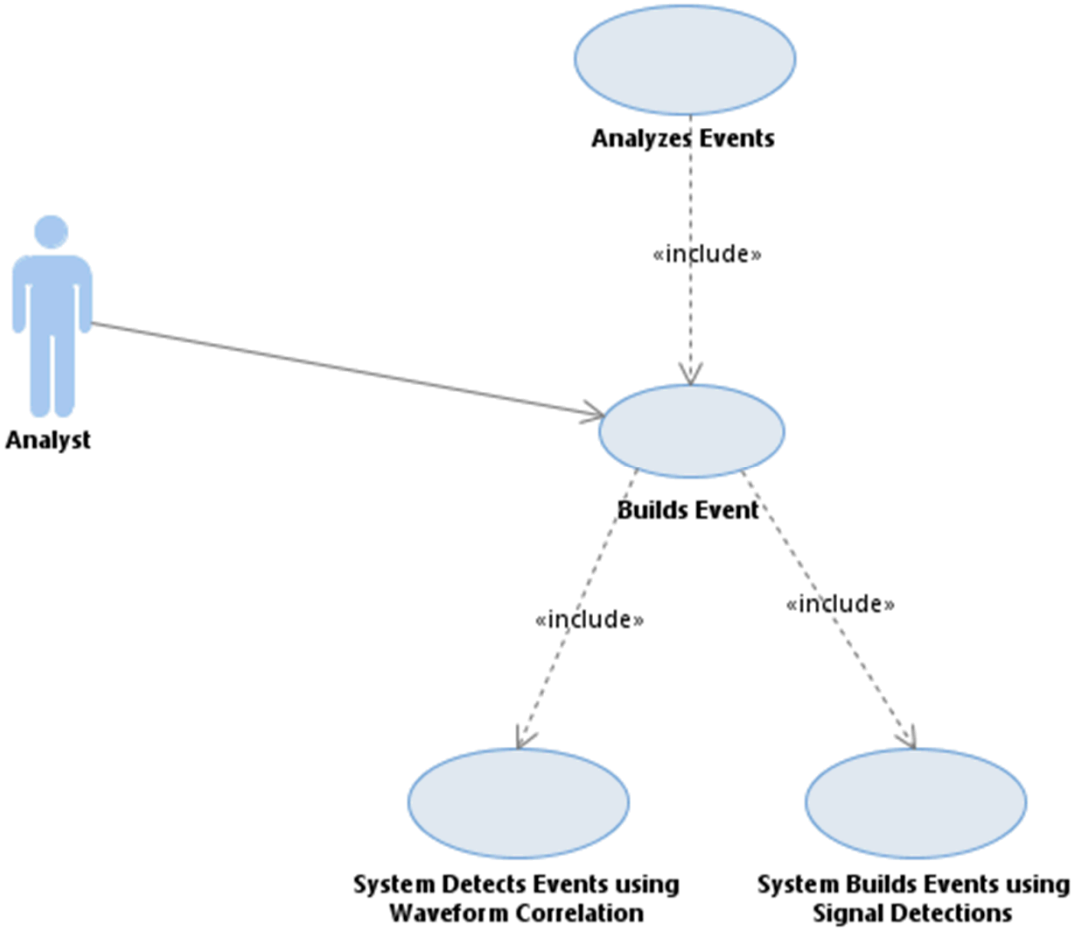
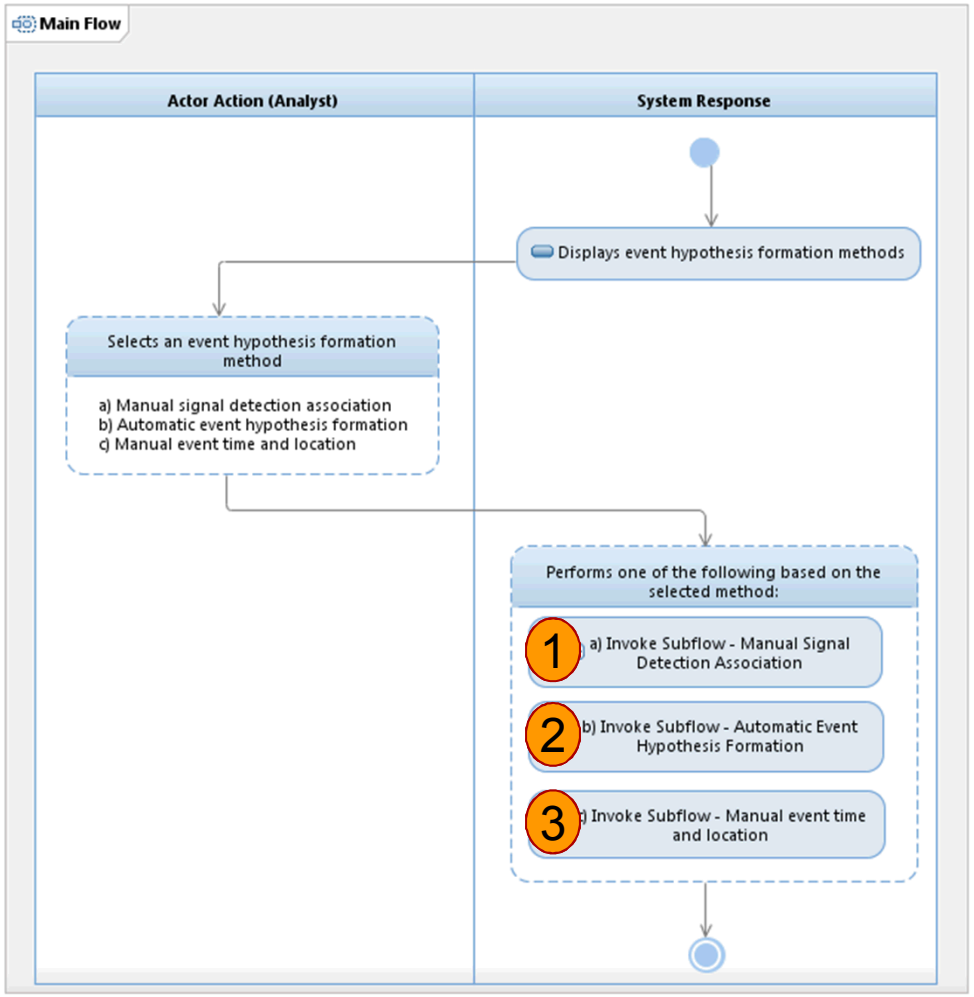
The Analyst can build events in 4 different ways:

1) The Analyst can manually group existing, unassociated signal detections to indicate that they belong in the same event; the system then creates an event (including location) using only those associated signal detections.
2) The Analyst can select existing, unassociated signal detections and request that the system attempt to build event(s) using those signal detections. The Analyst can modify the parameters used by the algorithms that build the event(s).
3) The Analyst can select channels and request that the system attempt to build event(s) using waveform correlation. The Analyst can modify the parameters used by the algorithms that build the event(s).
4) The Analyst can manually enter an event time and location.

Builds Event: Use Case

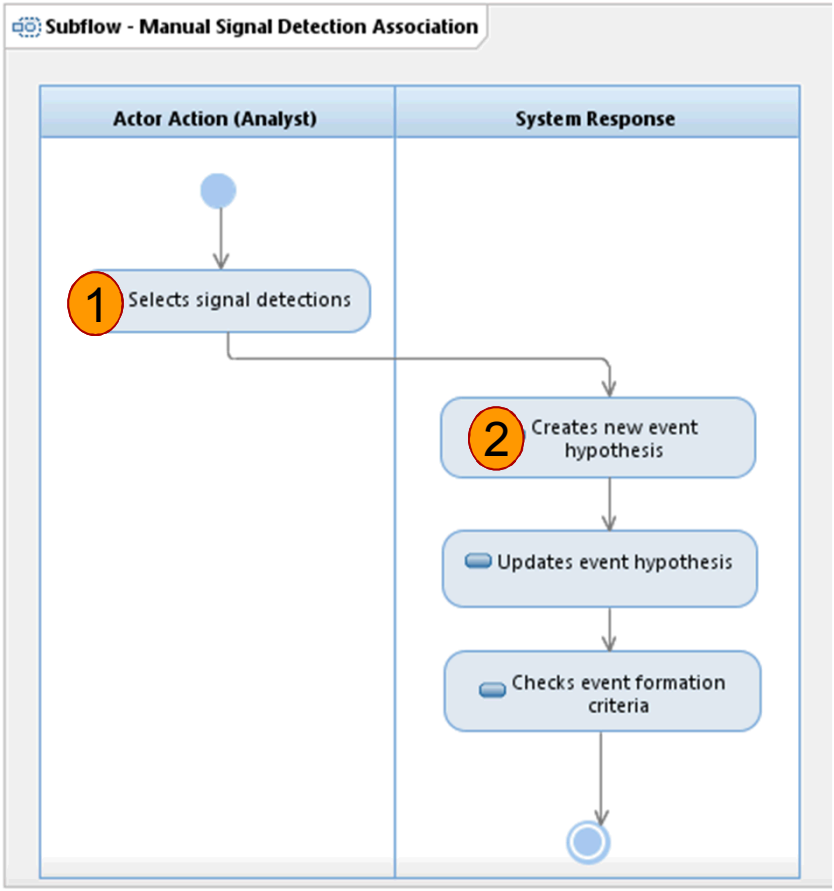


Main Flow



1) Manual signal detection association
2) Automatic event hypothesis formation
   a) Automatic signal detection association
   b) Automatic waveform correlation
3) Manual event time and location

Subflow: Manual Signal Detection Association



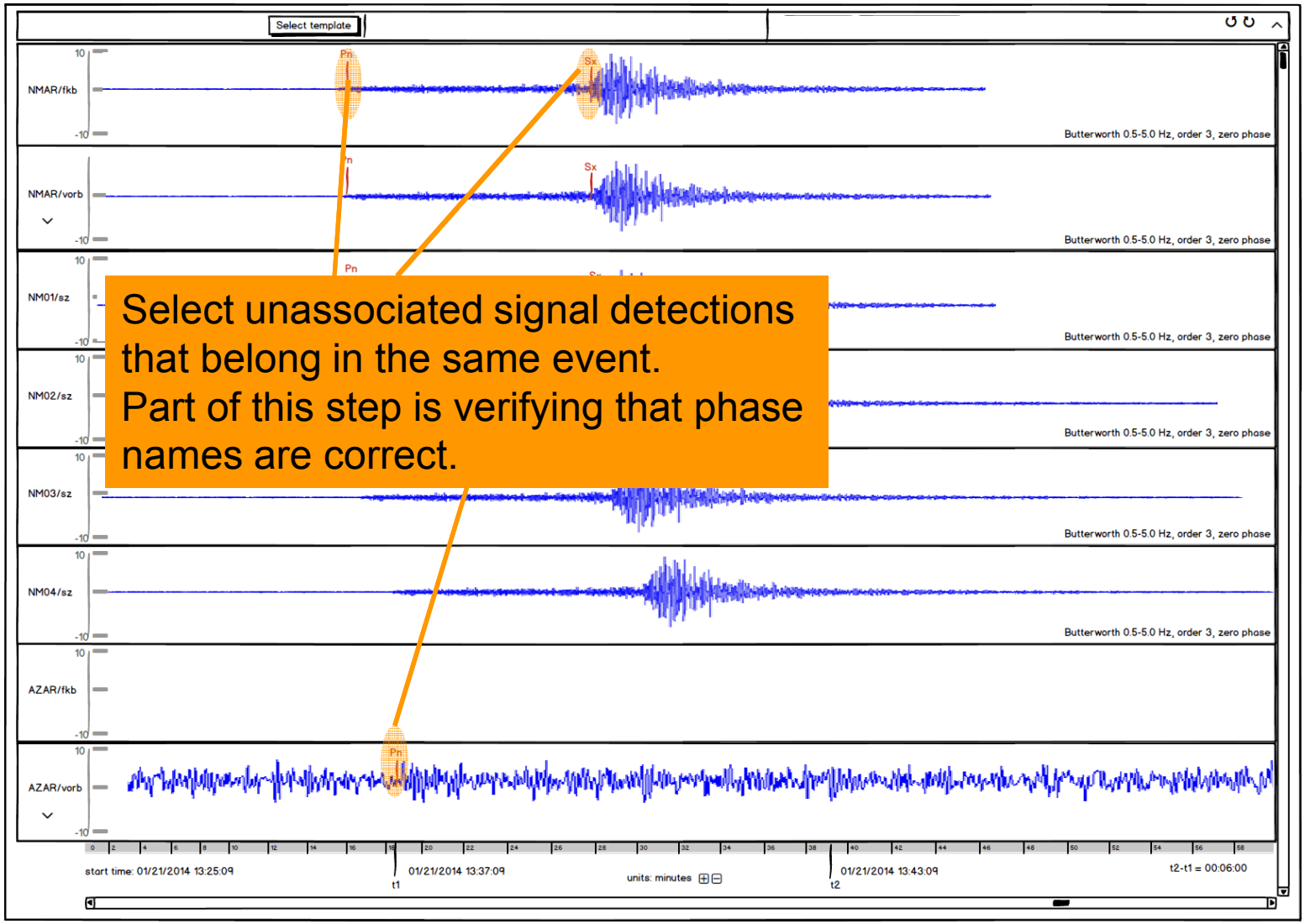
1) The Analyst selects unassociated detections to indicate that they belong in the same event.

   The Analyst is responsible for assigning phase names to unassociated detections.

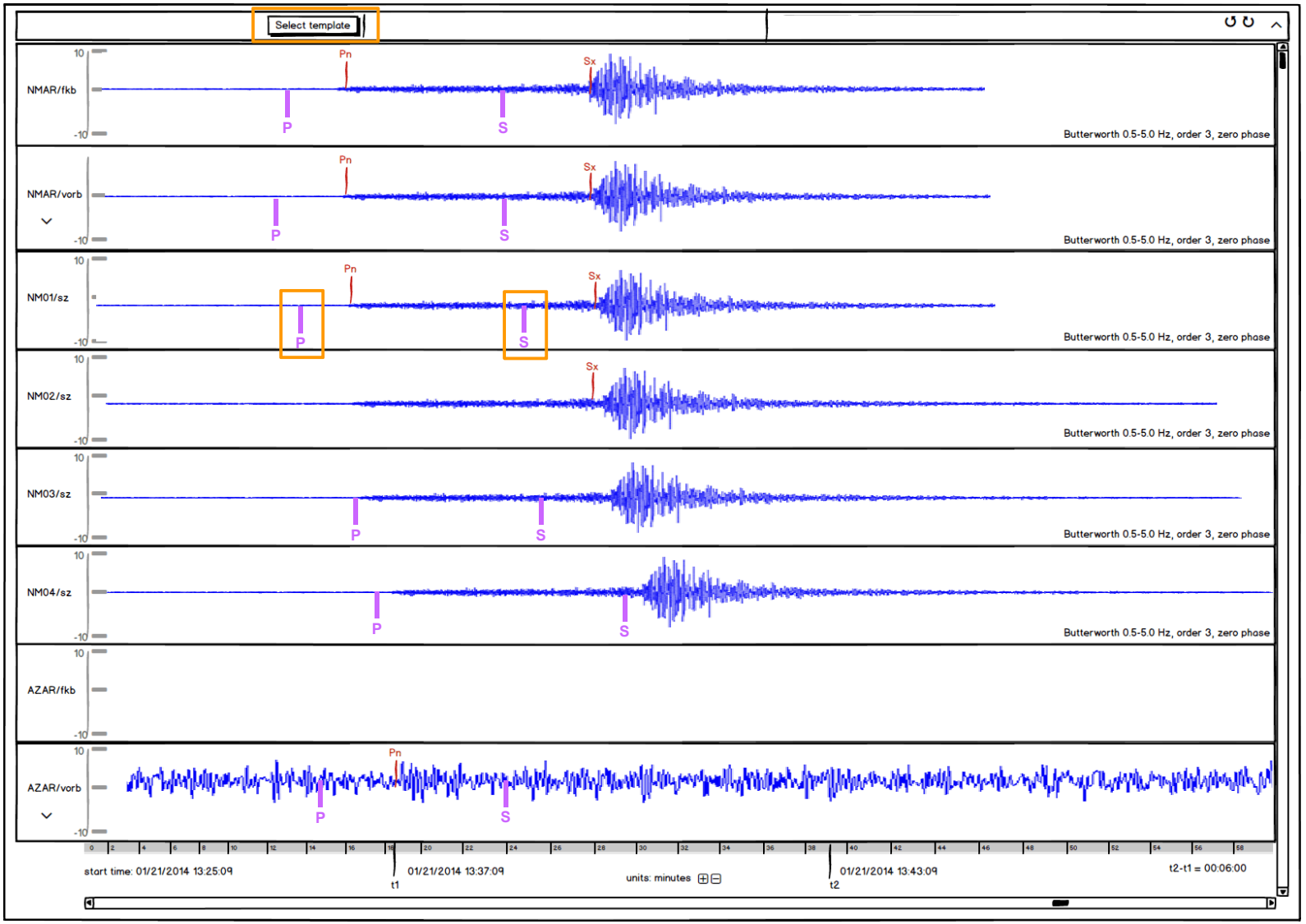
2) The system builds an event using only these detections.

This new event will go on the event list.

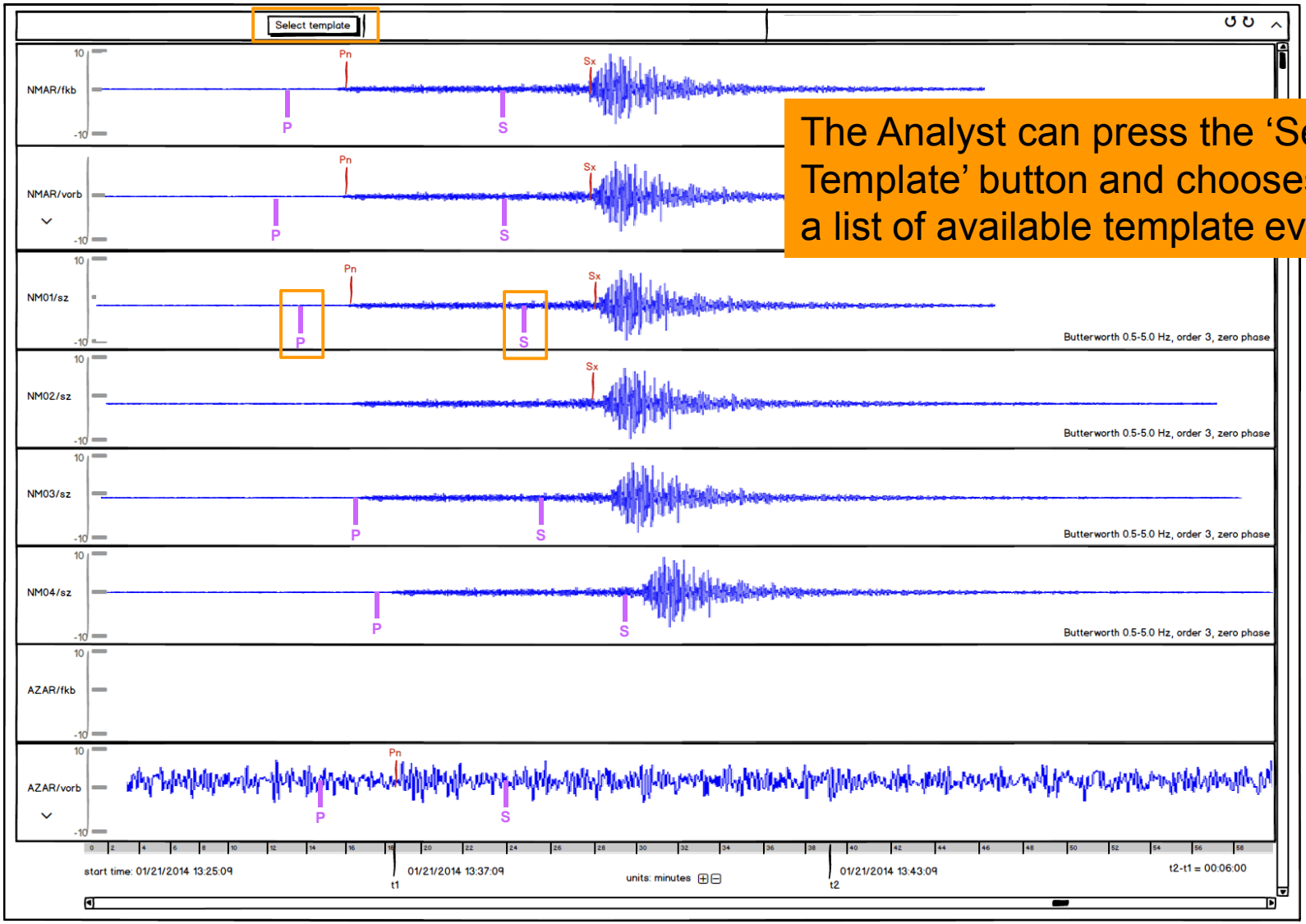
Selects Signal Detections



Selects Signal Detections: Template

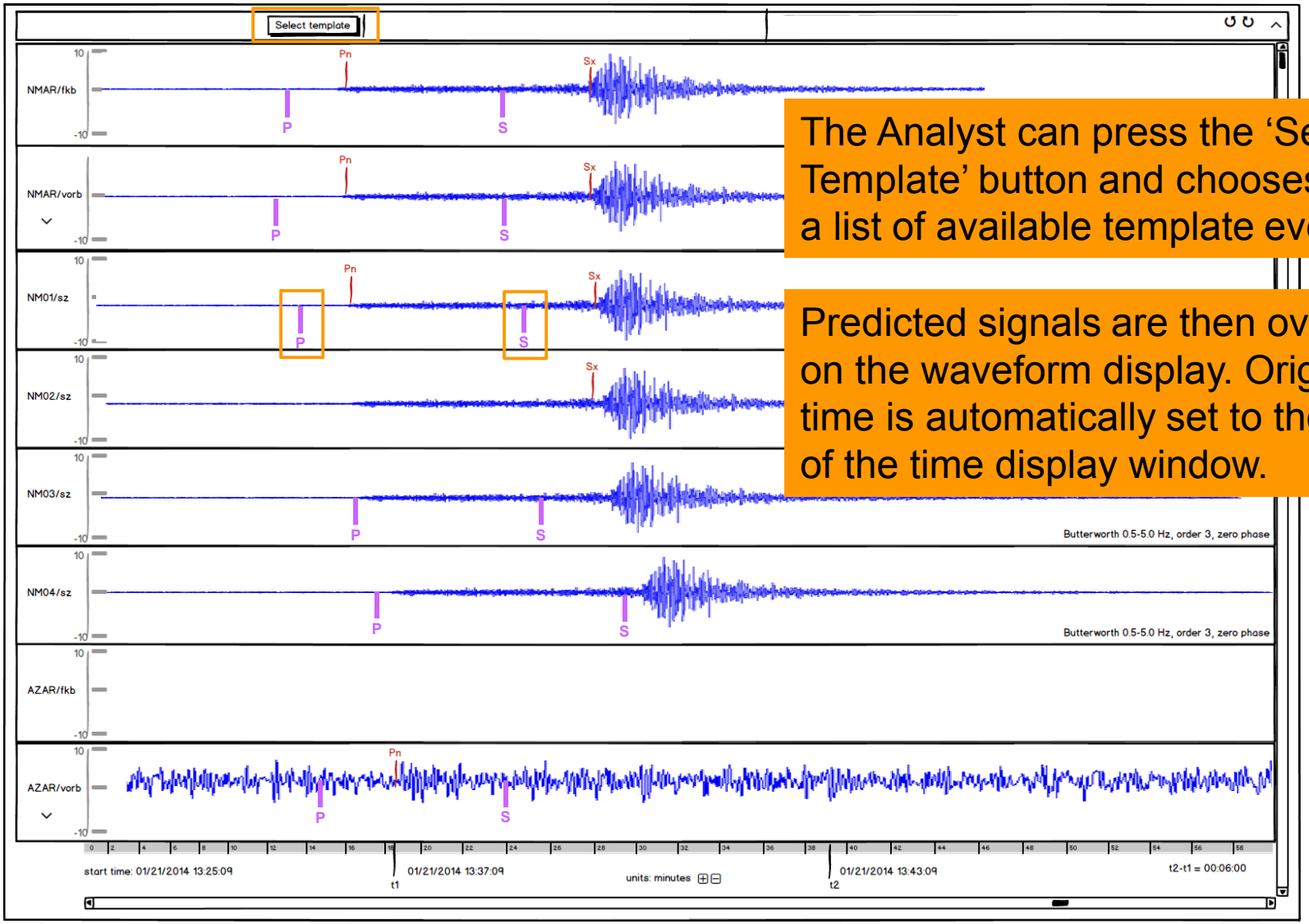


Selects Signal Detections: Template



The Analyst can press the ‘Select Template’ button and chooses from a list of available template events.

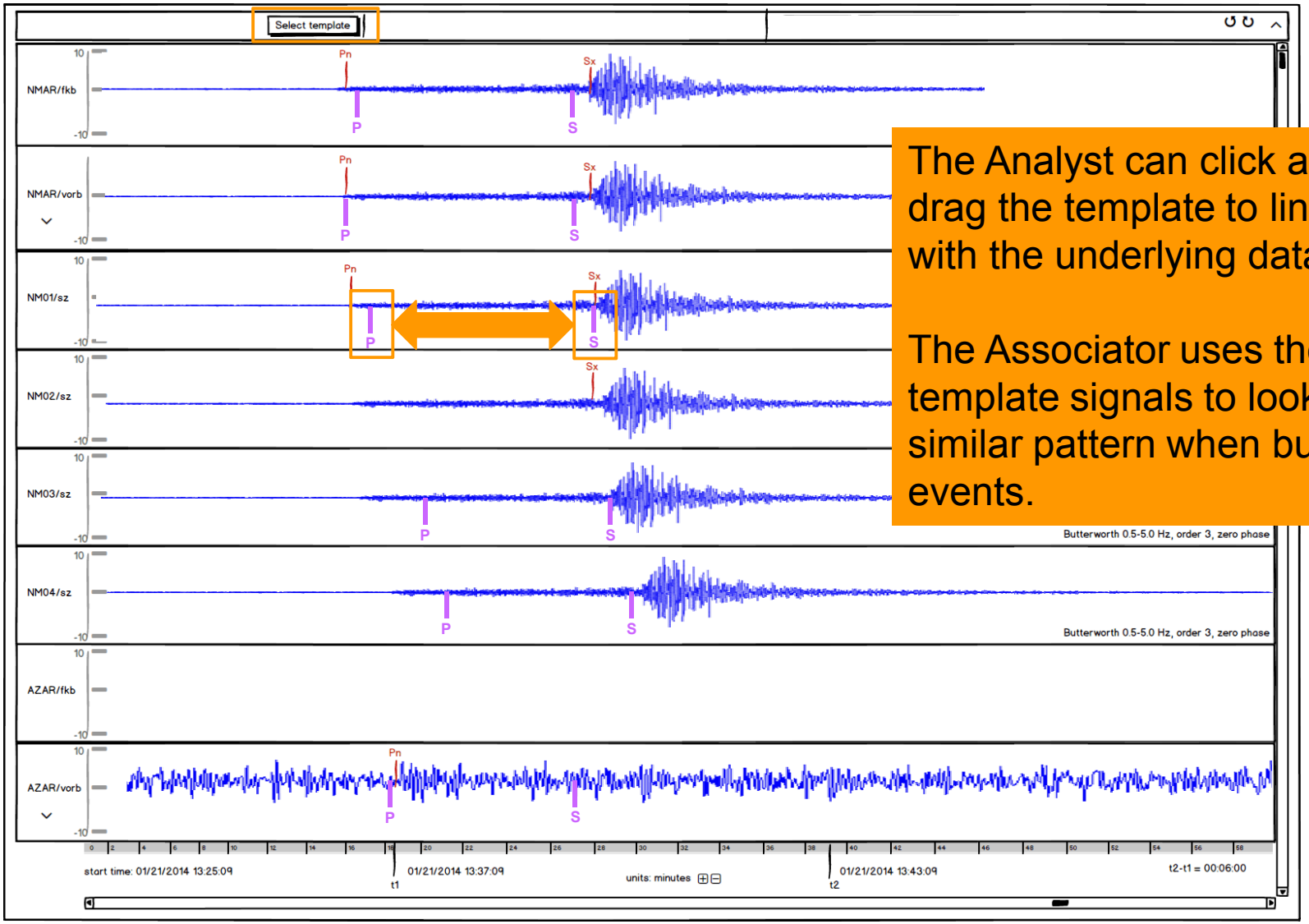
Selects Signal Detections: Template



The Analyst can press the ‘Select Template’ button and chooses from a list of available template events.

Predicted signals are then overlaid on the waveform display. Origin time is automatically set to the start of the time display window.

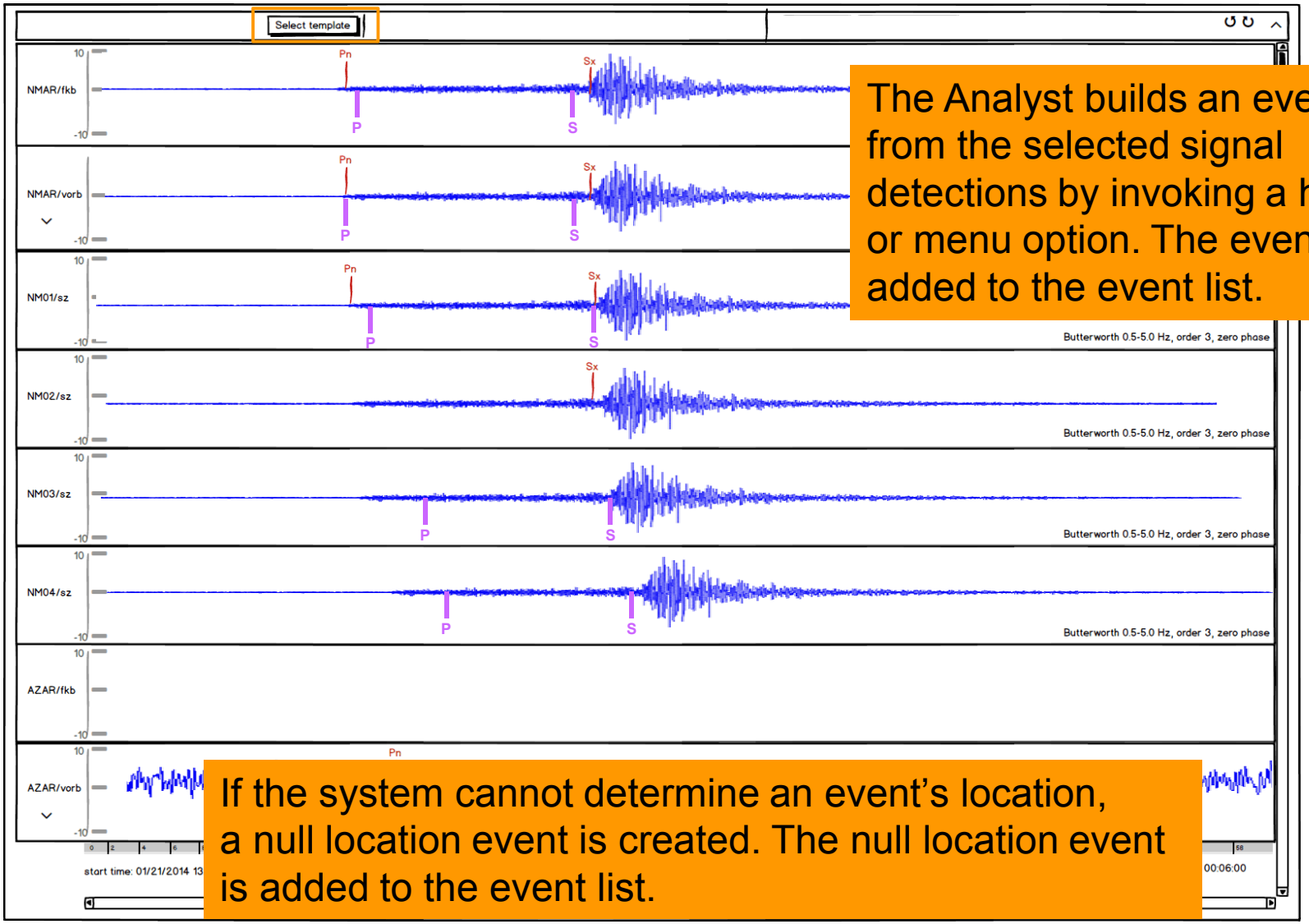
Selects Signal Detections: Template



The Analyst can click and drag the template to line it up with the underlying data.

The Associator uses the template signals to look for a similar pattern when building events.

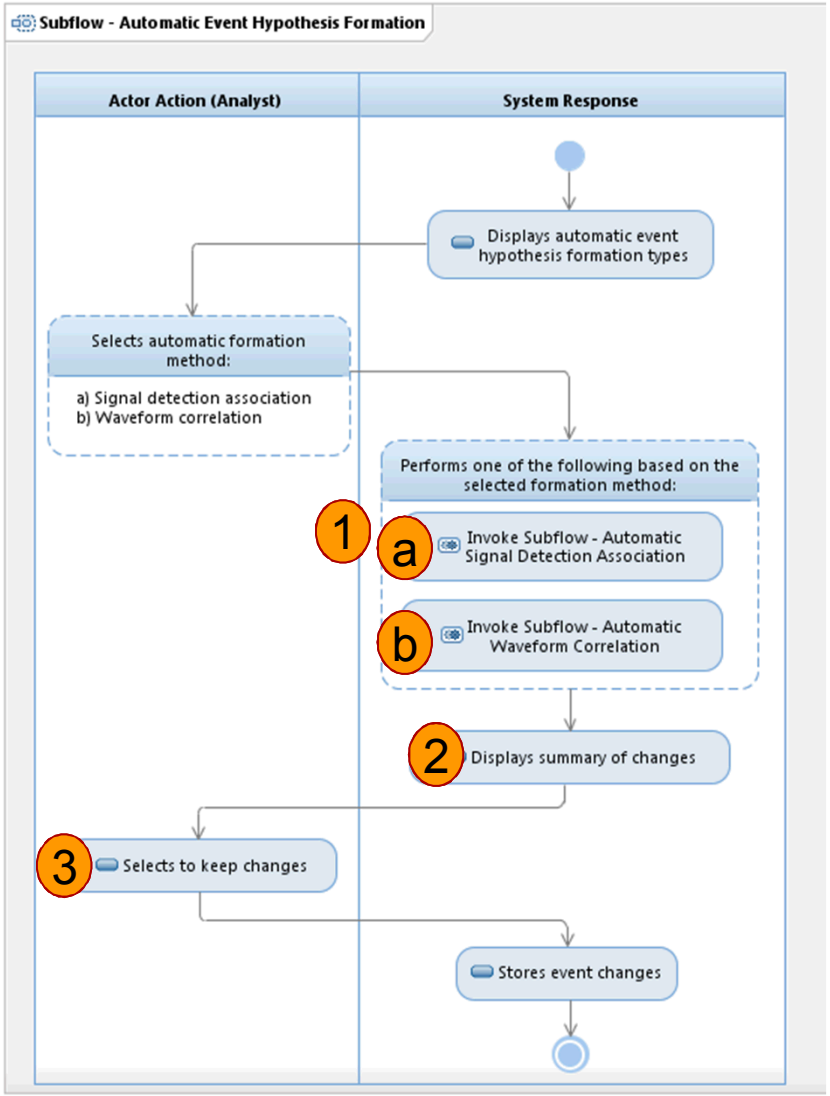
Builds Event with Selected Detections



The Analyst builds an event from the selected signal detections by invoking a hotkey or menu option. The event is added to the event list.

If the system cannot determine an event's location, a null location event is created. The null location event is added to the event list.

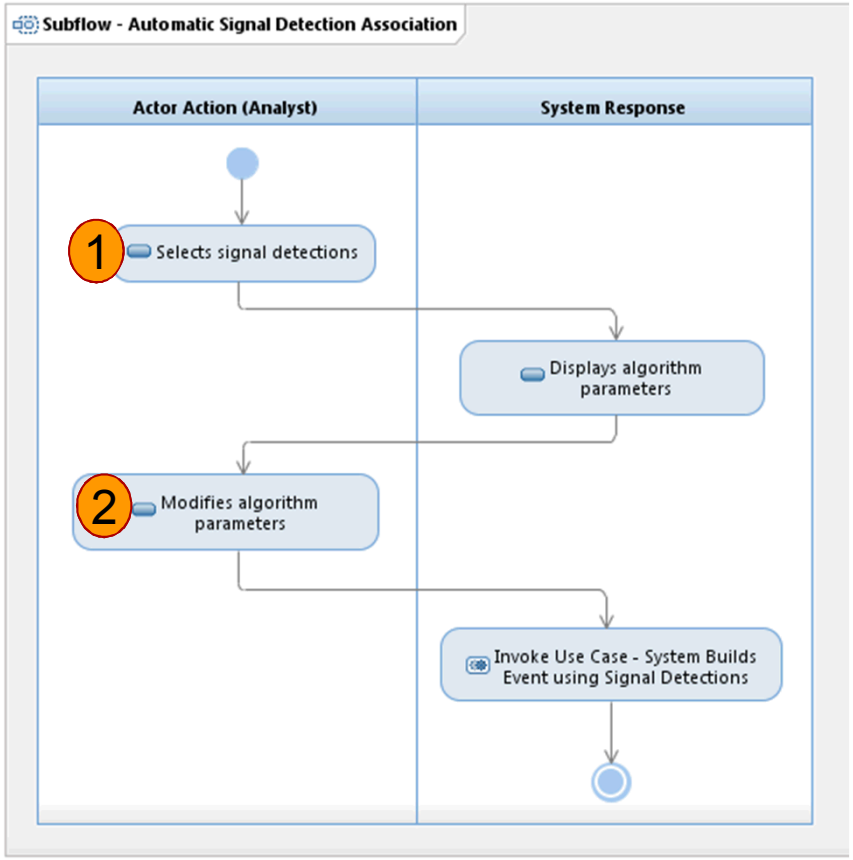
Subflow: Automatic Event Hypothesis Formation



1) Automatic event hypothesis formation
   a) Automatic signal detection association
   b) Automatic waveform correlation

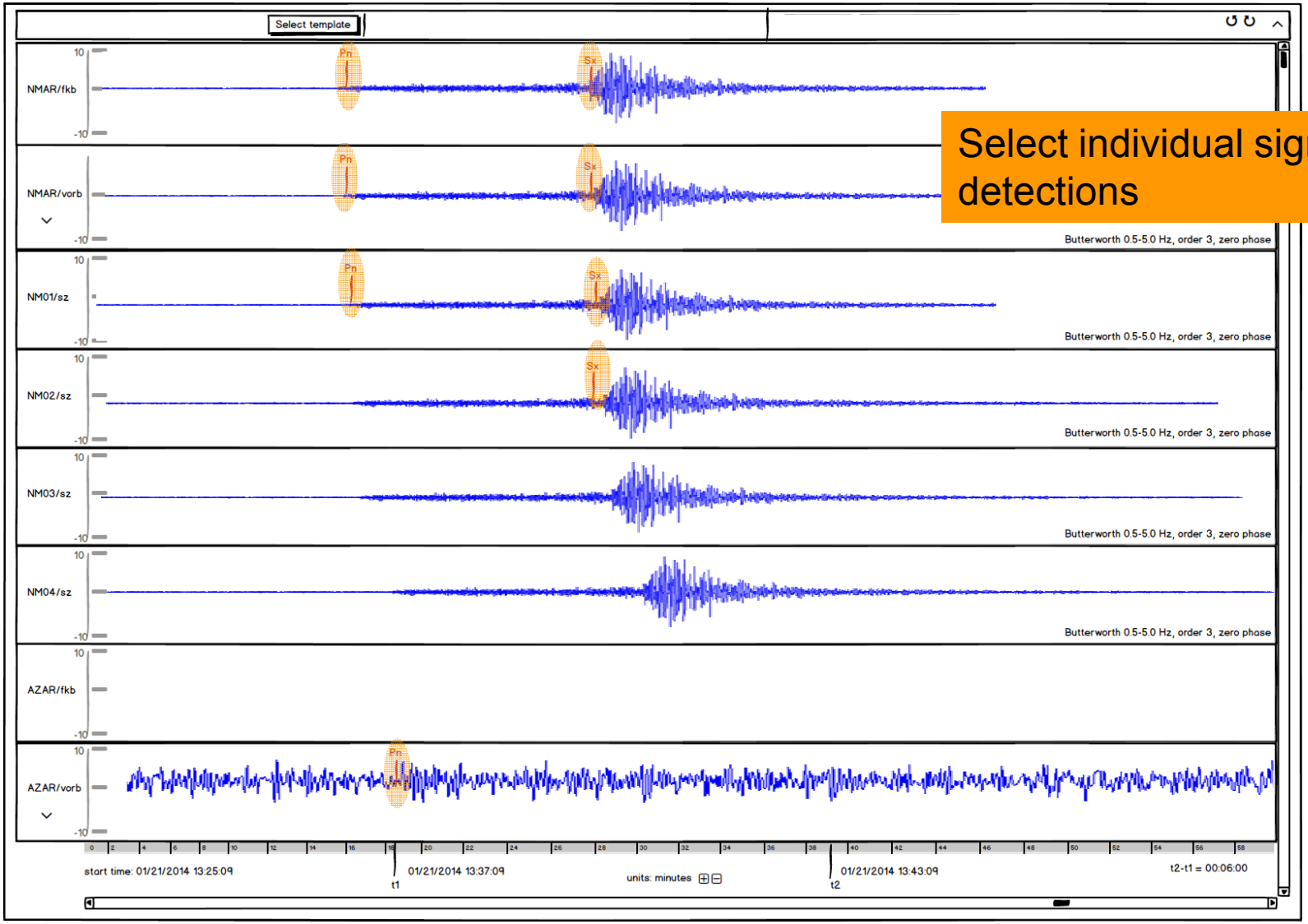
   The system is responsible for assigning phase names to unassociated detections.
2) Displays summary of changes
3) Selects to keep changes

1a) Automatic Signal Detection Association



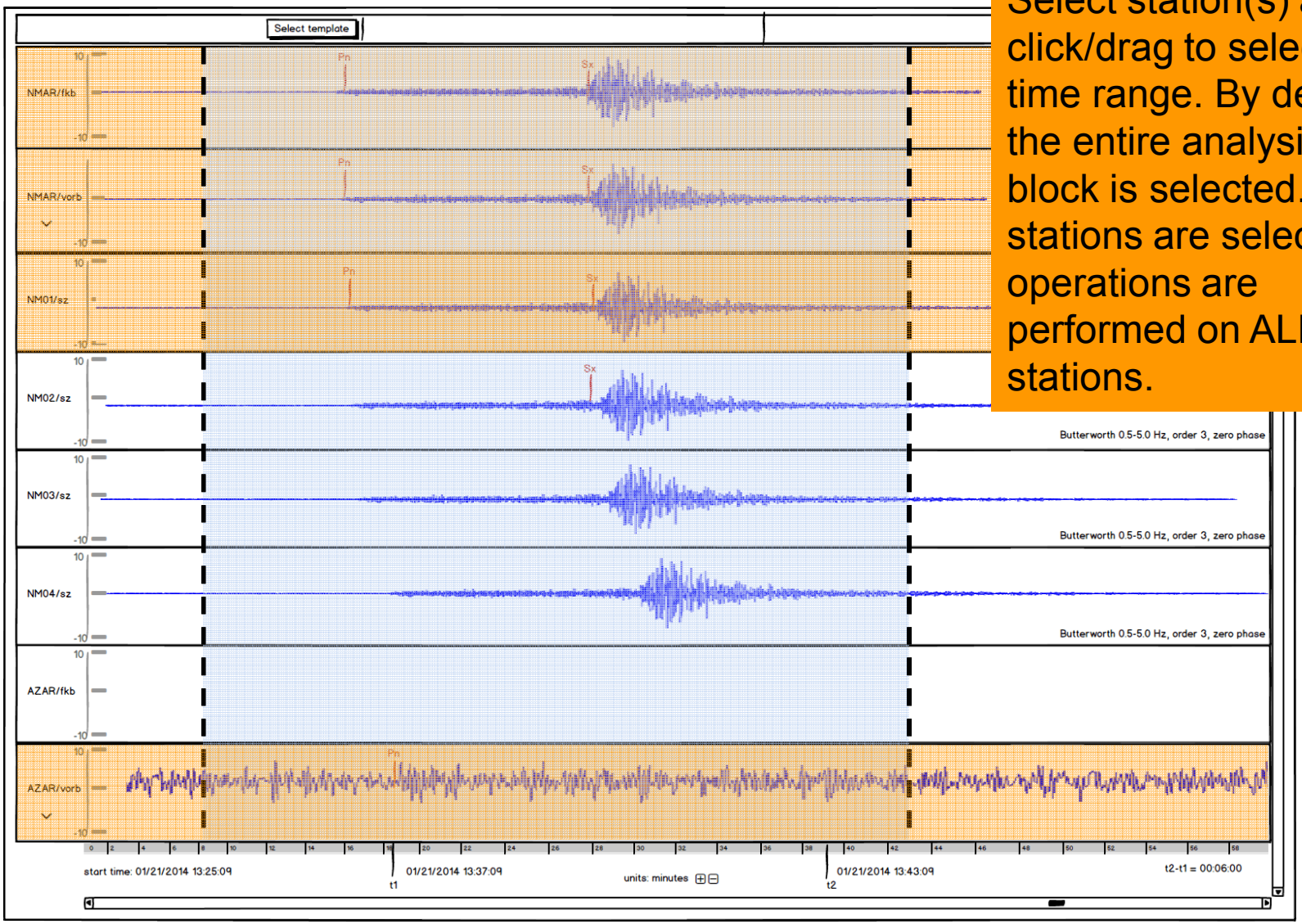
1) Select signal detections
2) Modify parameters to automatic processing

Selects Signal Detections: Individually



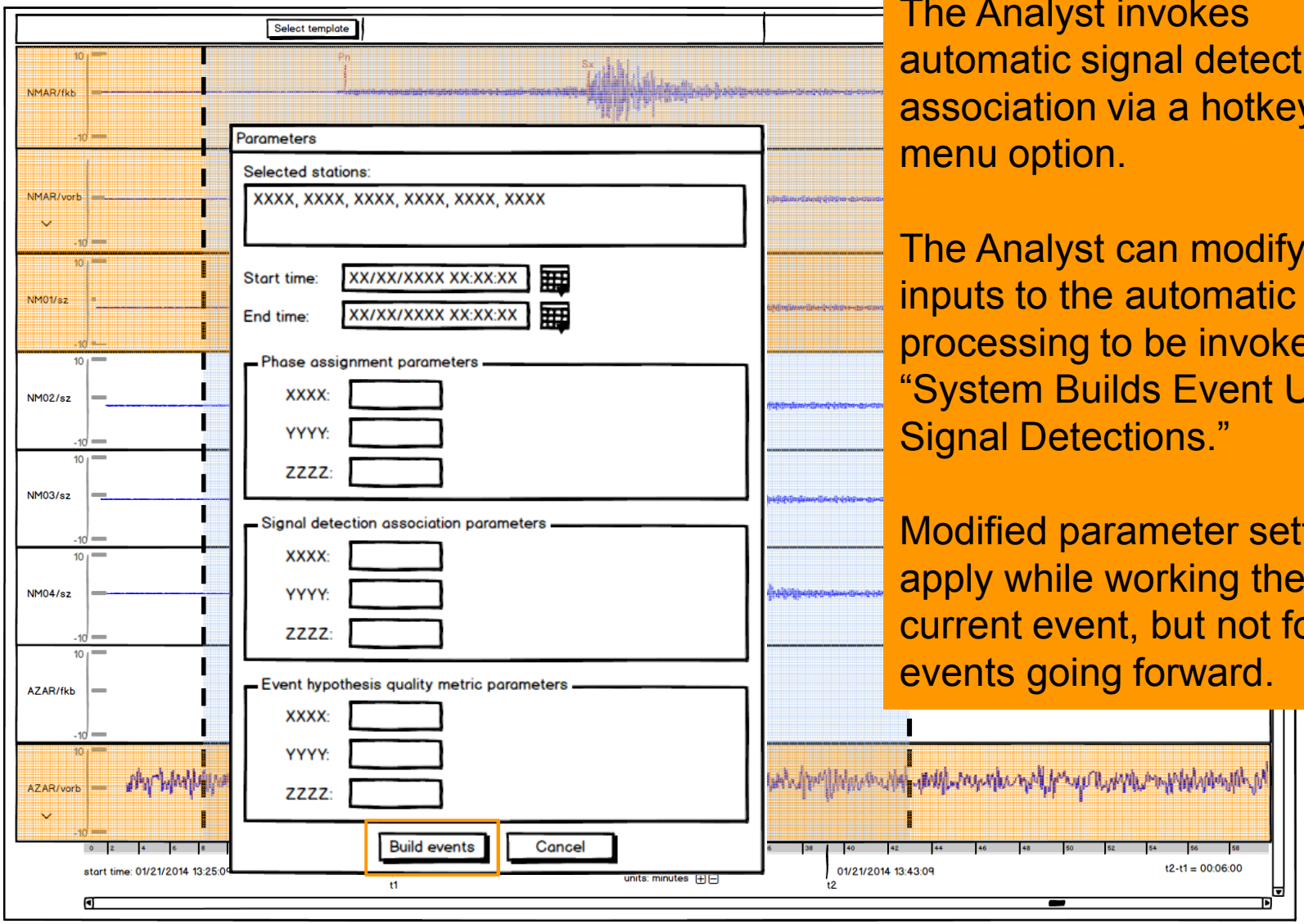
Select individual signal detections

Selects Signal Detections: Station and Time



Select station(s) and click/drag to select a time range. By default, the entire analysis time block is selected. If no stations are selected, operations are performed on ALL stations.

Modifies Algorithm Parameters

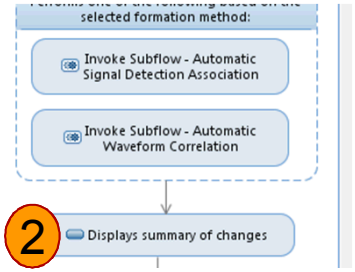


The Analyst invokes automatic signal detection association via a hotkey or menu option.

The Analyst can modify the inputs to the automatic processing to be invoked for "System Builds Event Using Signal Detections."

Modified parameter settings apply while working the current event, but not for all events going forward.

2) Display Summary of changes



The Analyst can view the event hypothesis built by the System in a summary window.

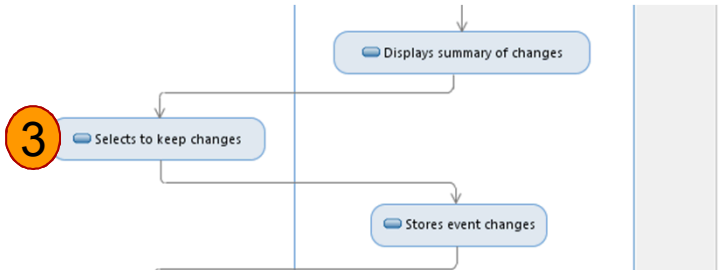
Event Hypotheses built by the System

	Event ID	Lat (deg)	Lon (deg)	Depth (km)	Time	Mag	Region	EQM
⊖	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##
	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##
	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##
	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##
⊕	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##
	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##
	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##

Add to event list

Information about previous versions of the event built by the System, if available, can be viewed by expanding the event row.

3) Selects to keep changes



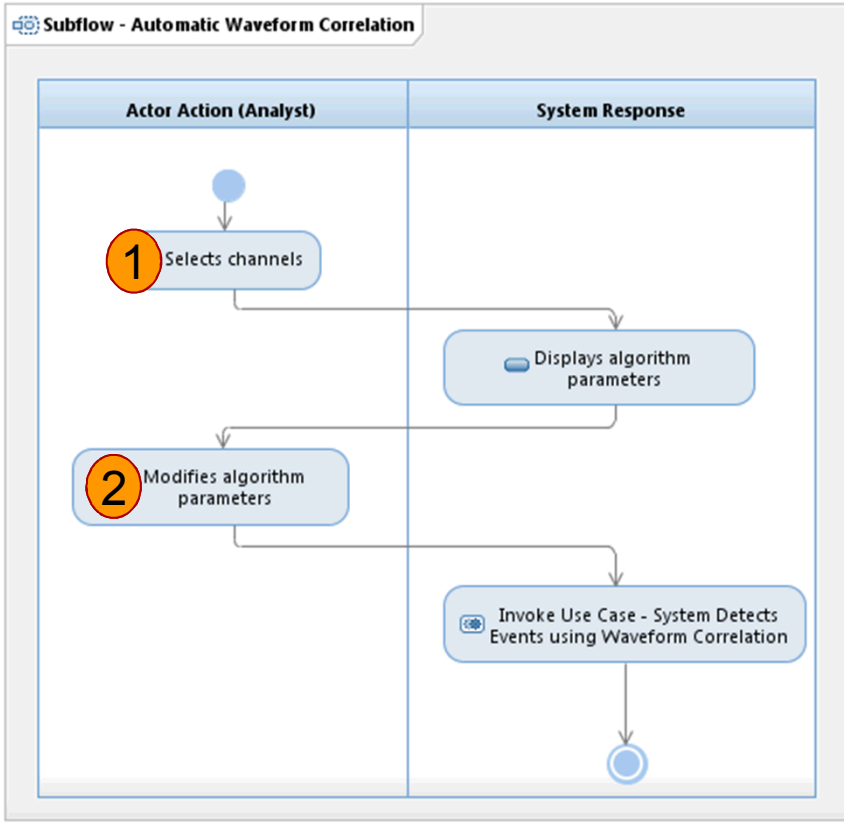
The Analyst can select one or more event hypotheses built by the System and add them to the event list. Accepting an event hypothesis that maps to an existing event creates a new version and maintains the history.

Event Hypotheses built by the System

	Event ID	Lat (deg)	Lon (deg)	Depth (km)	Time	Mag	Region	EQM
⊖	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##
	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##
	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##
	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##
⊕	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##
	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##
	####	####	####	####	##/##/#### ##:##:##.###	####	XXXX	#.##

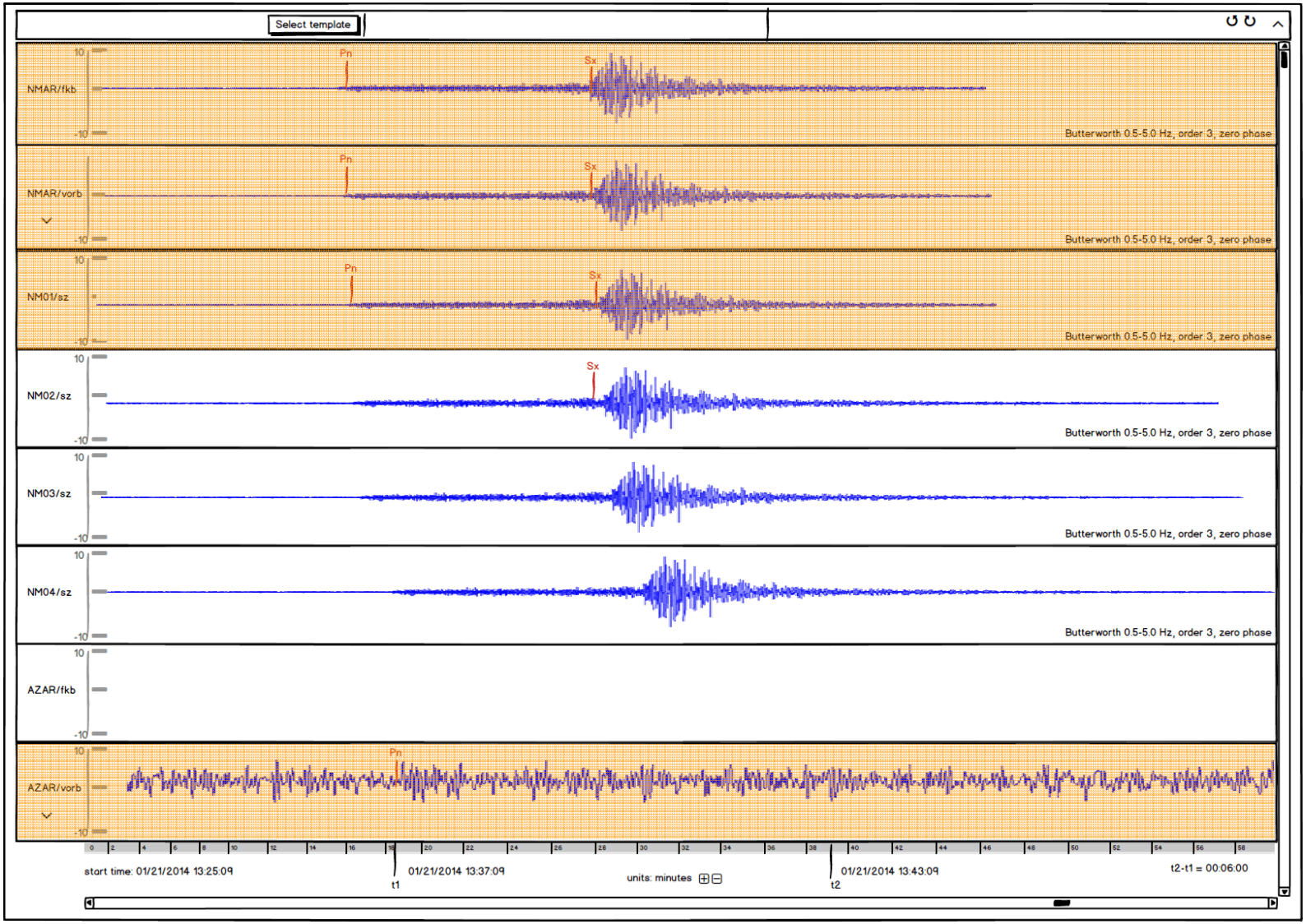
Add to event list

1b) Automatic Waveform Correlation

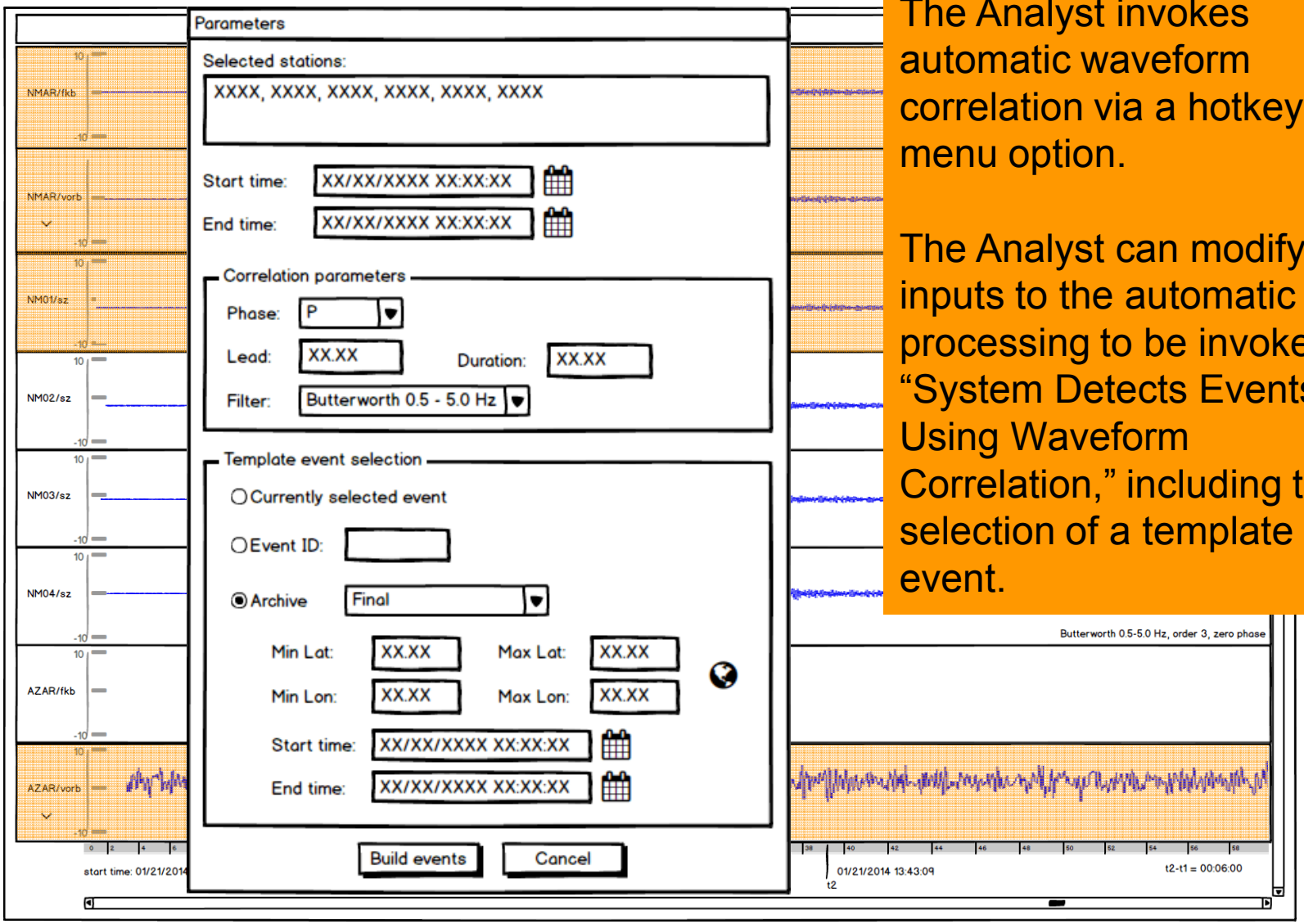


1) Select channels
2) Modify parameters to automatic processing

Select Channels



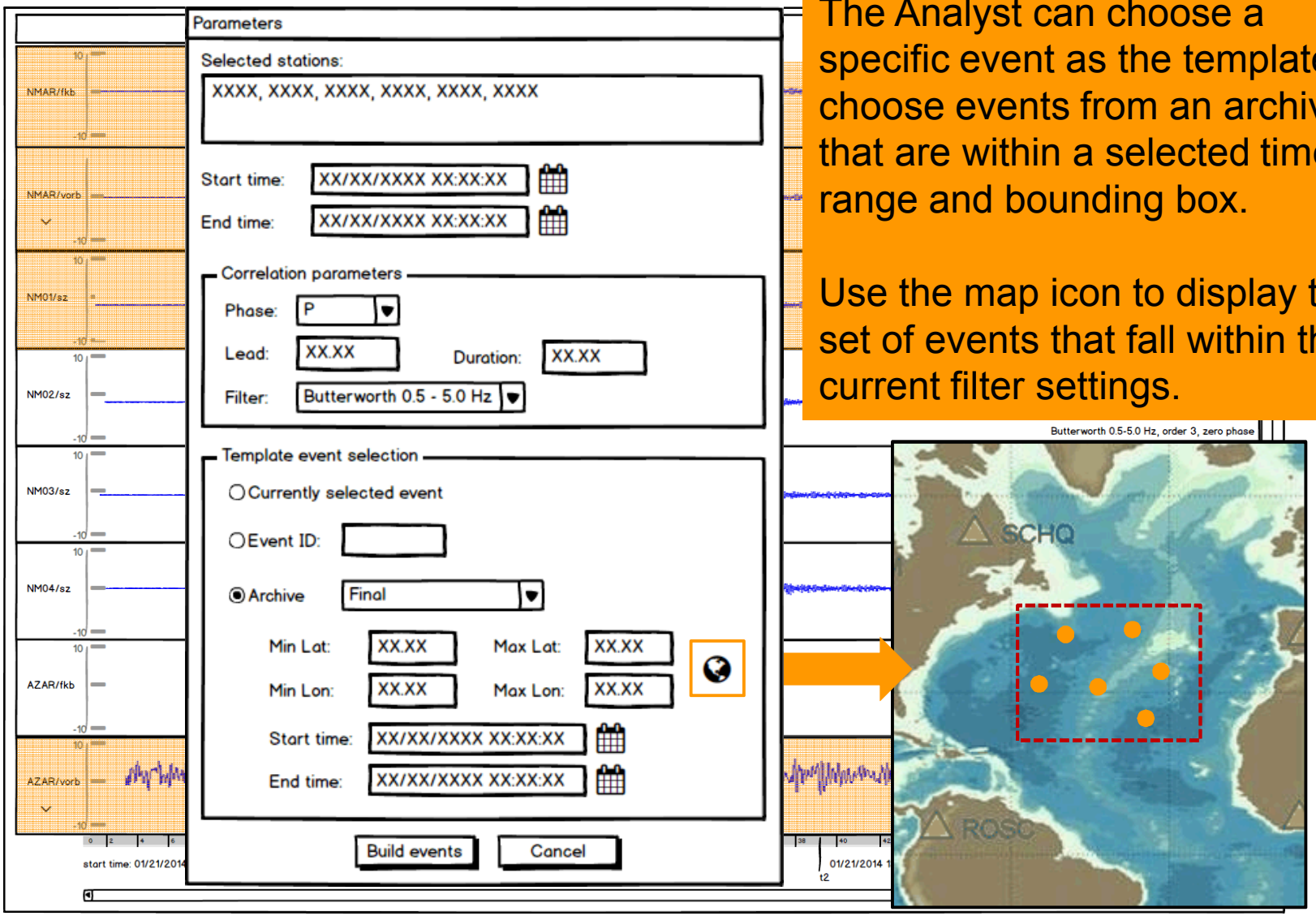
Modifies algorithm parameters



The Analyst invokes automatic waveform correlation via a hotkey or menu option.

The Analyst can modify the inputs to the automatic processing to be invoked for "System Detects Events Using Waveform Correlation," including the selection of a template event.

Modifies algorithm parameters



The Analyst can choose a specific event as the template, or choose events from an archive that are within a selected time range and bounding box.

Use the map icon to display the set of events that fall within the current filter settings.

2) Display Summary of changes and 3) Selects to keep changes

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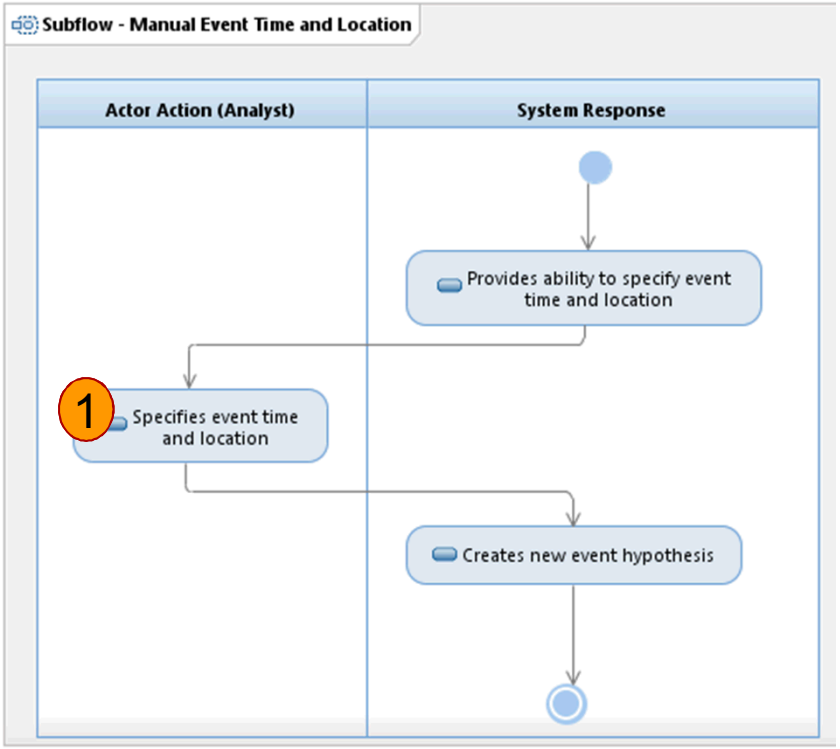
The Analyst can view the event hypotheses built by the System, compare them with the existing event hypotheses, and choose which events to add to the event list.

Event Hypotheses built by the System

Subflow: Manual Event Time and Location

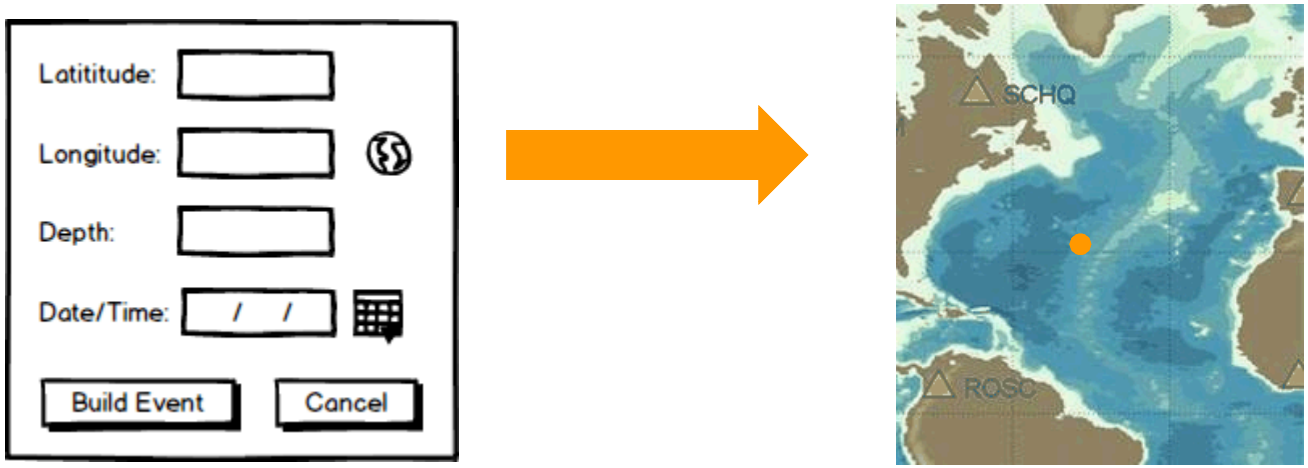


1) Specify event time and location

This event may or may not have signal detections associated with it.

Specifies Event Time and Location

- Analyst selects to build event and inputs a time and location



The new event is added to the event list.