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Sandia National Laboratories

Technical Meeting on SHI Software Engineering at the IDC

Refines Event Storyboards

17-19 June 2015

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Overview

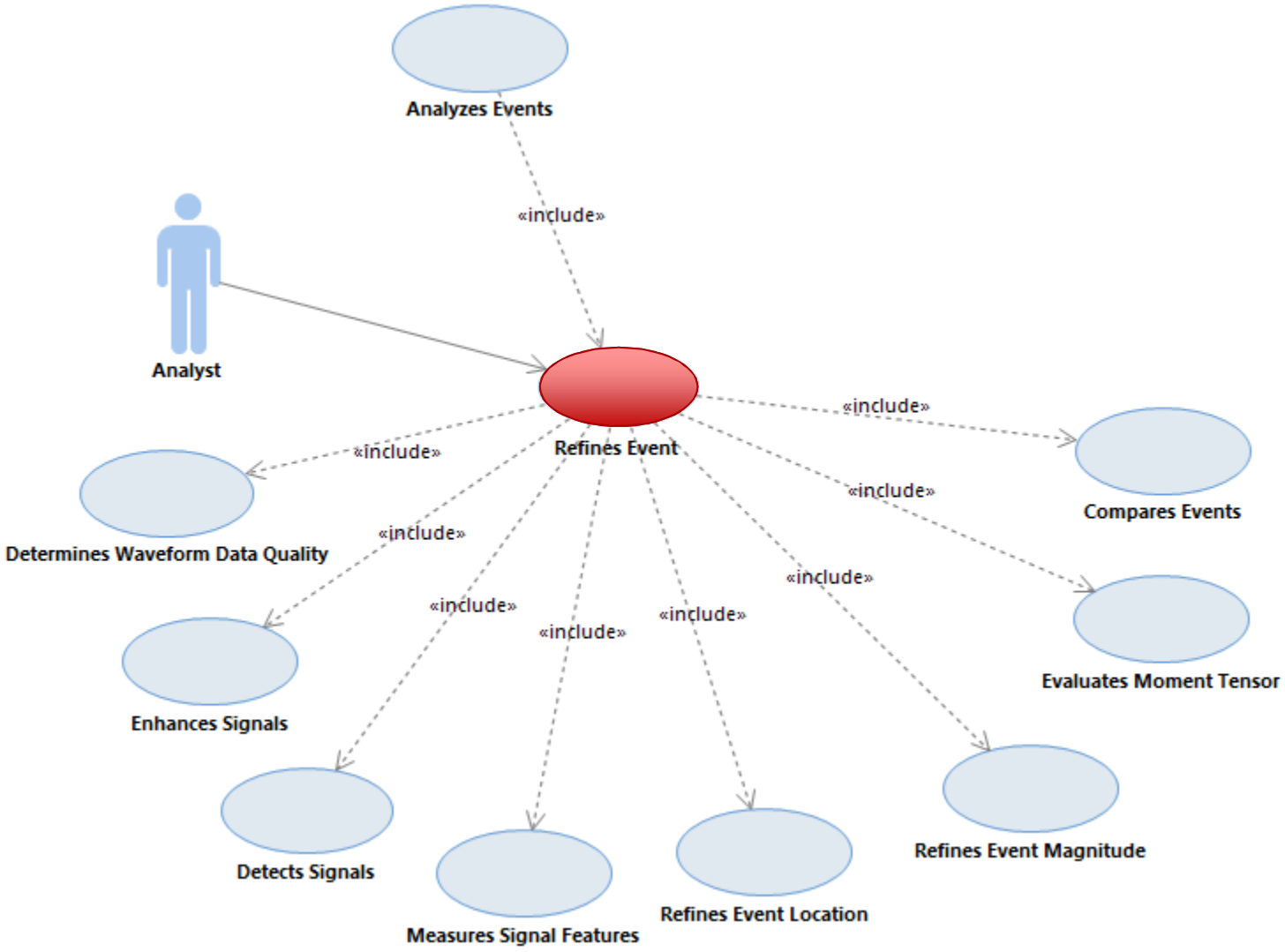
- The Analyst accesses the interfaces represented by these storyboards by opening the Analyst workspace (Analyzes Events UC), selecting data for analysis (Selects Data for Analysis UC), and selecting an event to refine (Refines Event UC, these storyboards)
- These storyboards represent the primary Analyst interface where Analysts can refine events

Key concepts

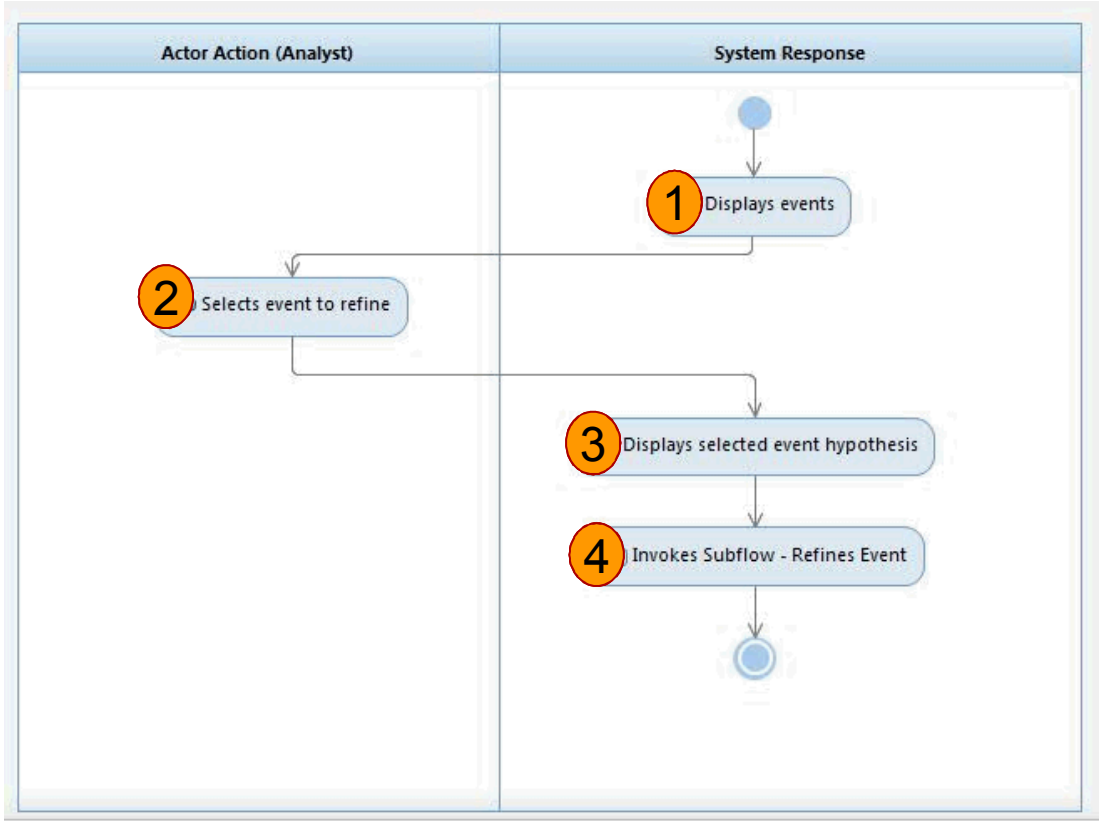
- Tabs are used to represent UI elements that can be:
  - Docked/Undocked
  - Positioned where desired

  - This supports a range of Analyst environments – from a laptop to working with multiple monitors
- The menu items shown are for items that are only available via a menu. Other menu items will exist, but may not be shown on storyboards
- Hot keys are not shown

Refines Event: Use Case



Refines Event: Use Case - Main Flow



1) Displays event list
2) Selects event to refine
3) Displays preferred event hypothesis for selected event
4) Refines selected event

System Action: Displays events

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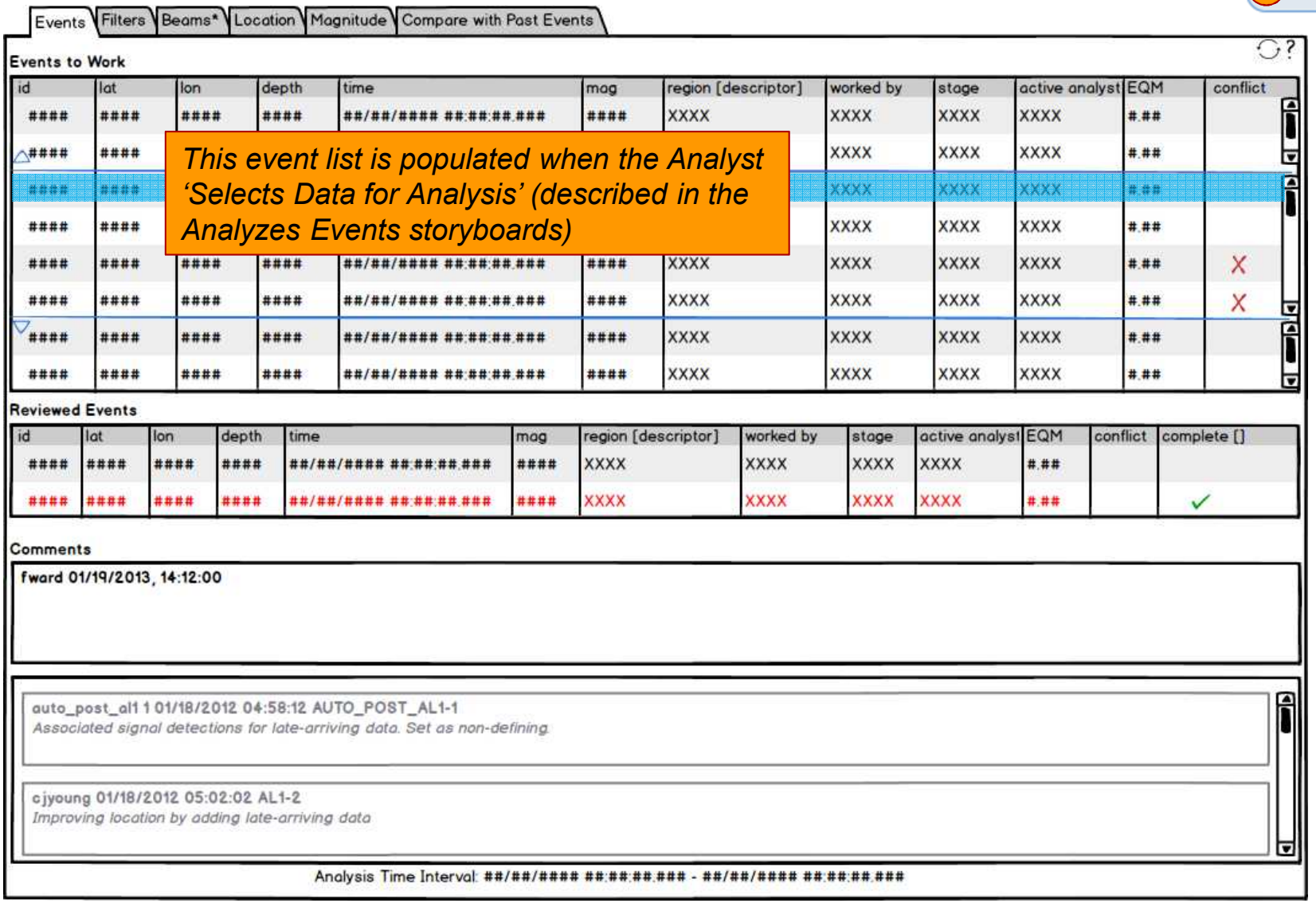
1 Displays events



System Action: Displays events

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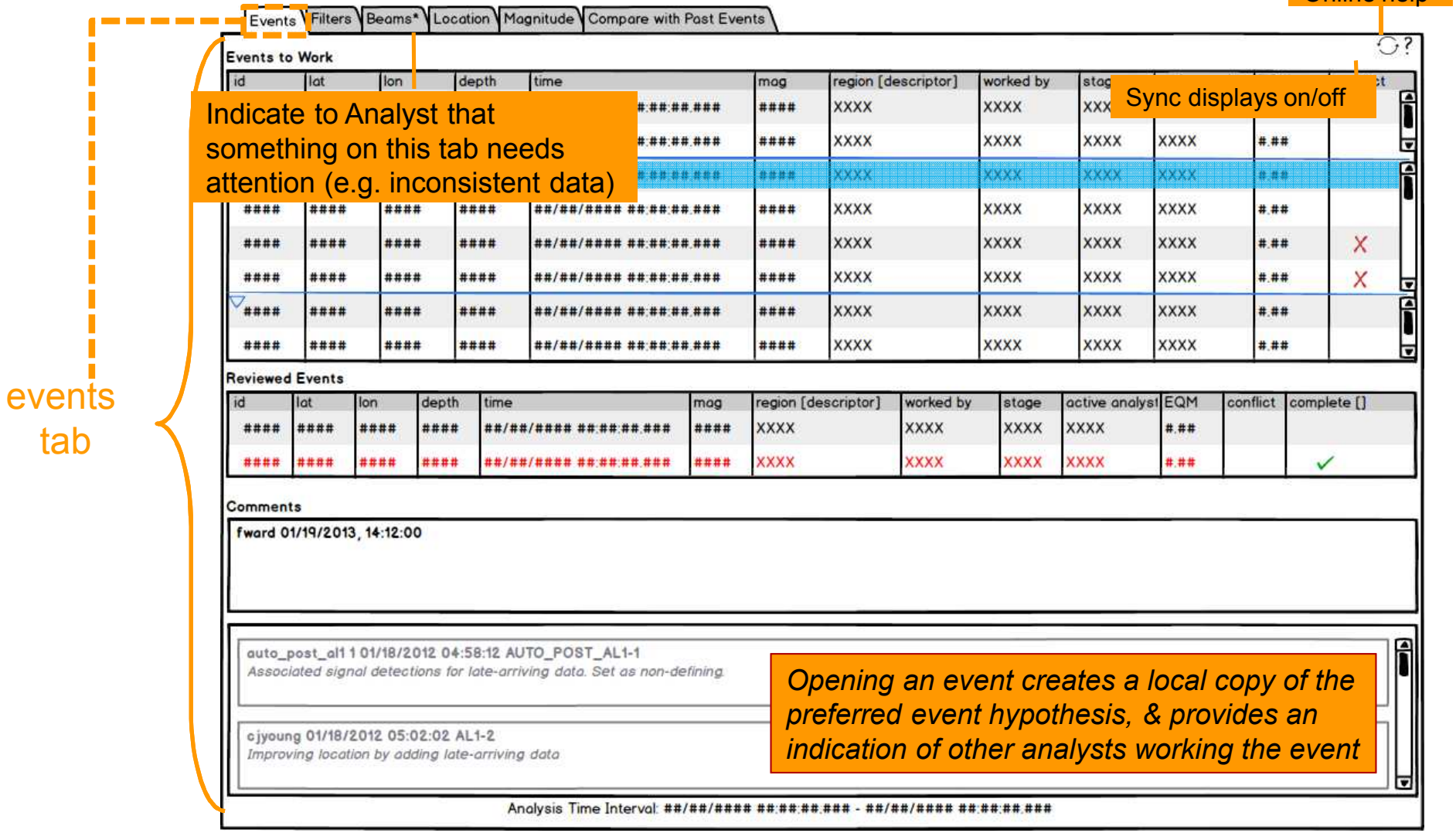
1 Displays events

Online help



System Action: Displays selected event hypothesis (preferred hypothesis for selected event)

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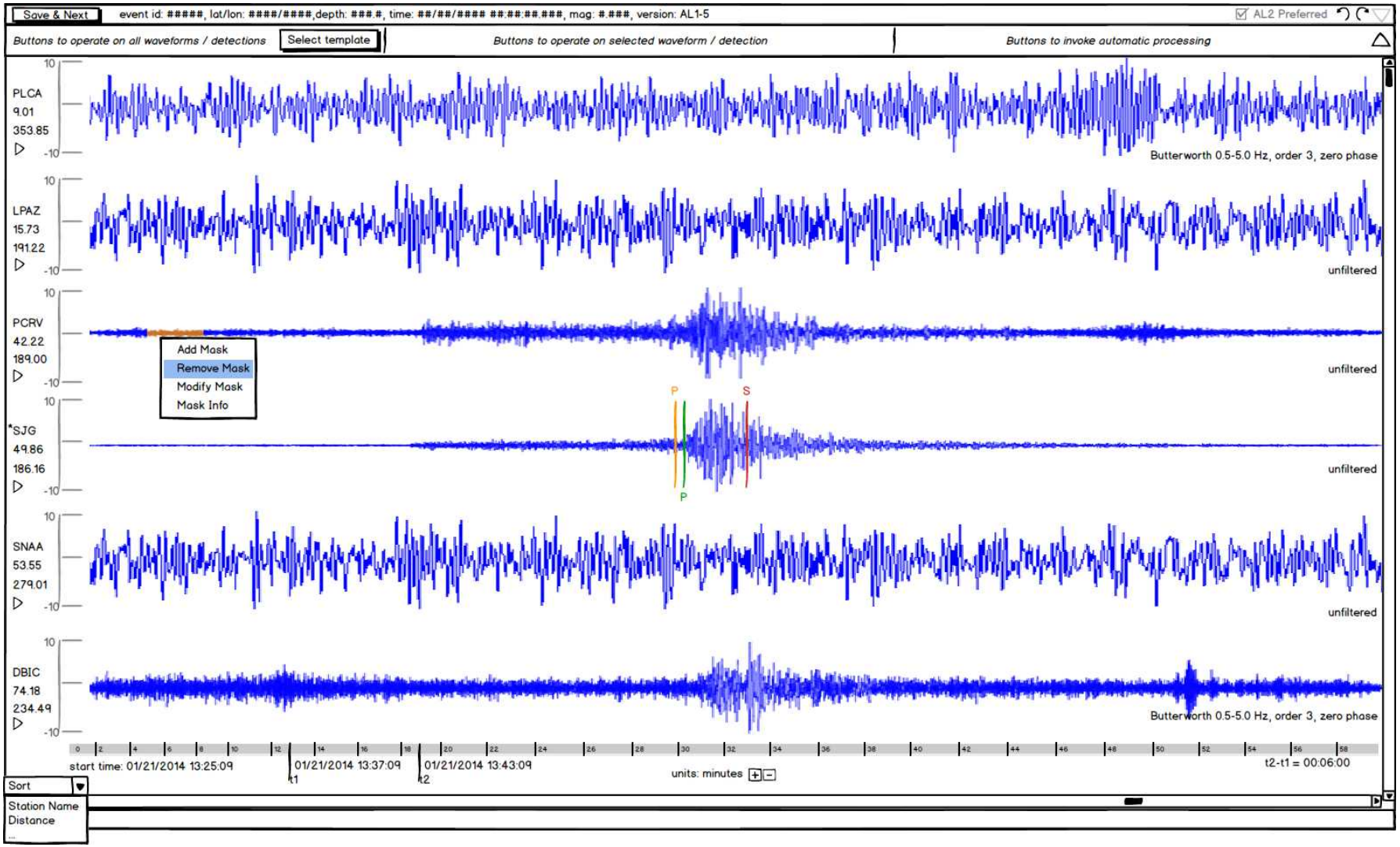
3 Displays selected event hypothesis



System Action: Displays selected event hypothesis (preferred hypothesis for selected event)

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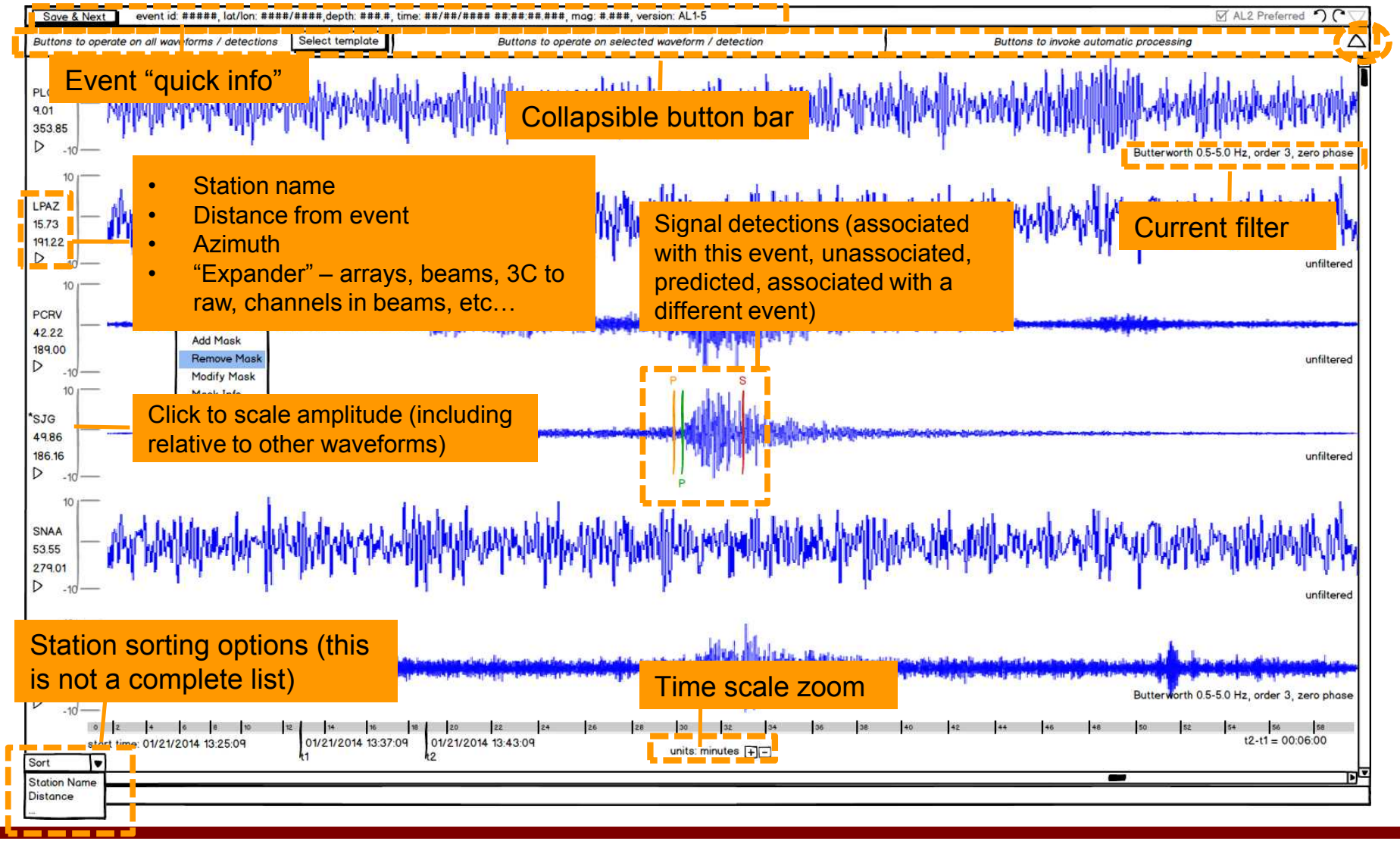
3 Displays selected event hypothesis



System Action: Displays selected event hypothesis (preferred hypothesis for selected event)

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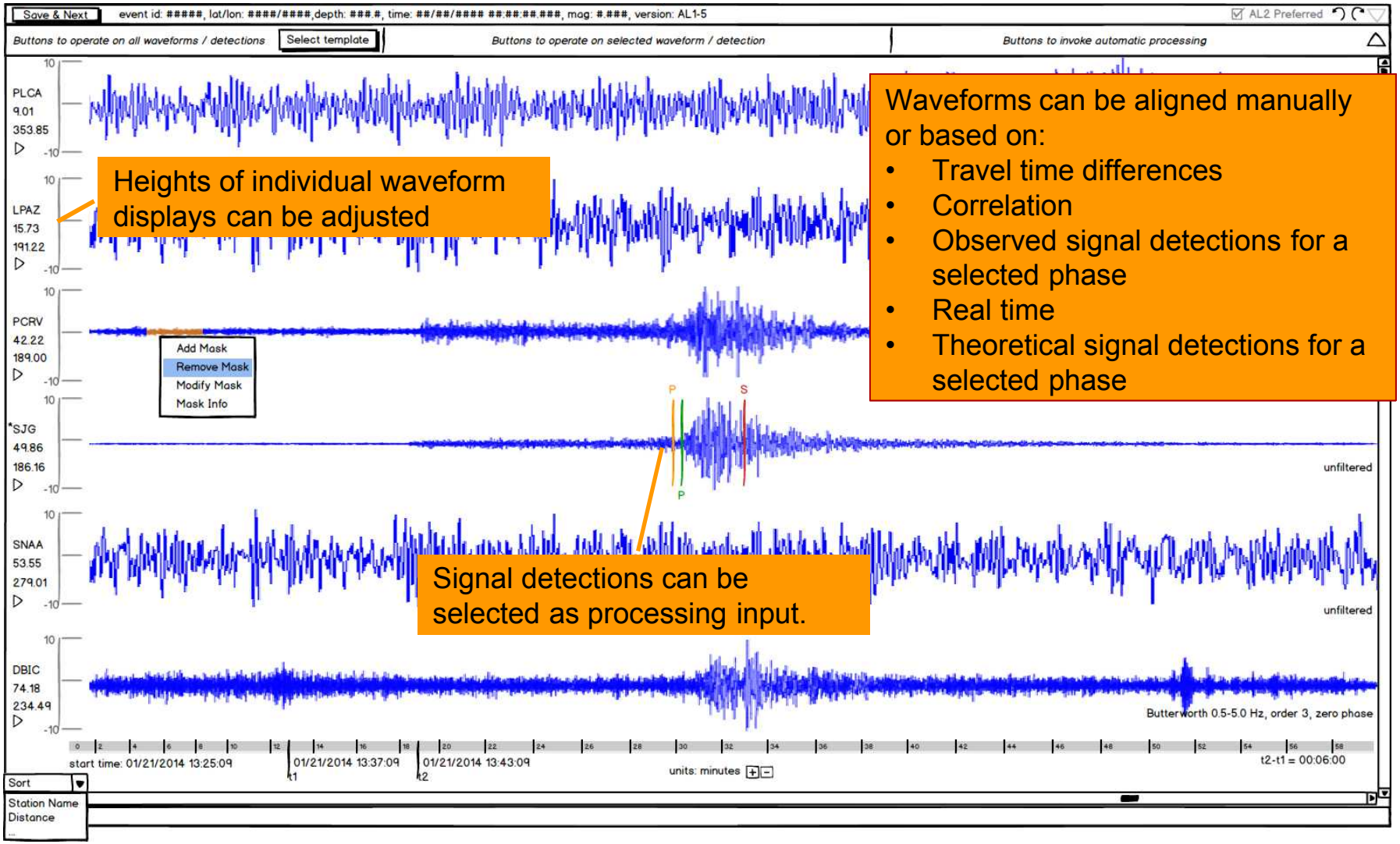
3 Displays selected event hypothesis



System Action: Displays selected event hypothesis (preferred hypothesis for selected event)

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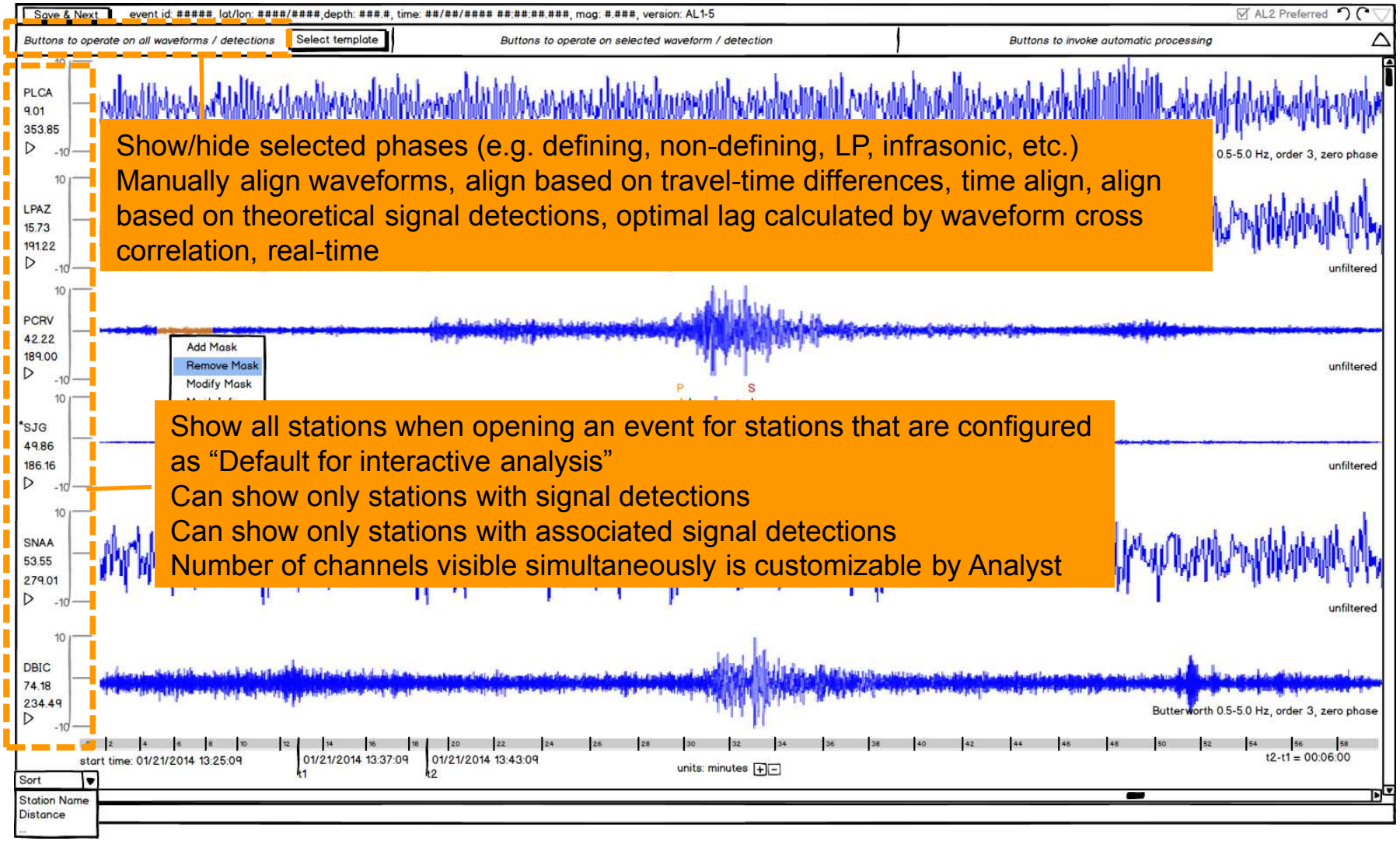
3 Displays selected event hypothesis



System Action: Displays selected event hypothesis (preferred hypothesis for selected event)

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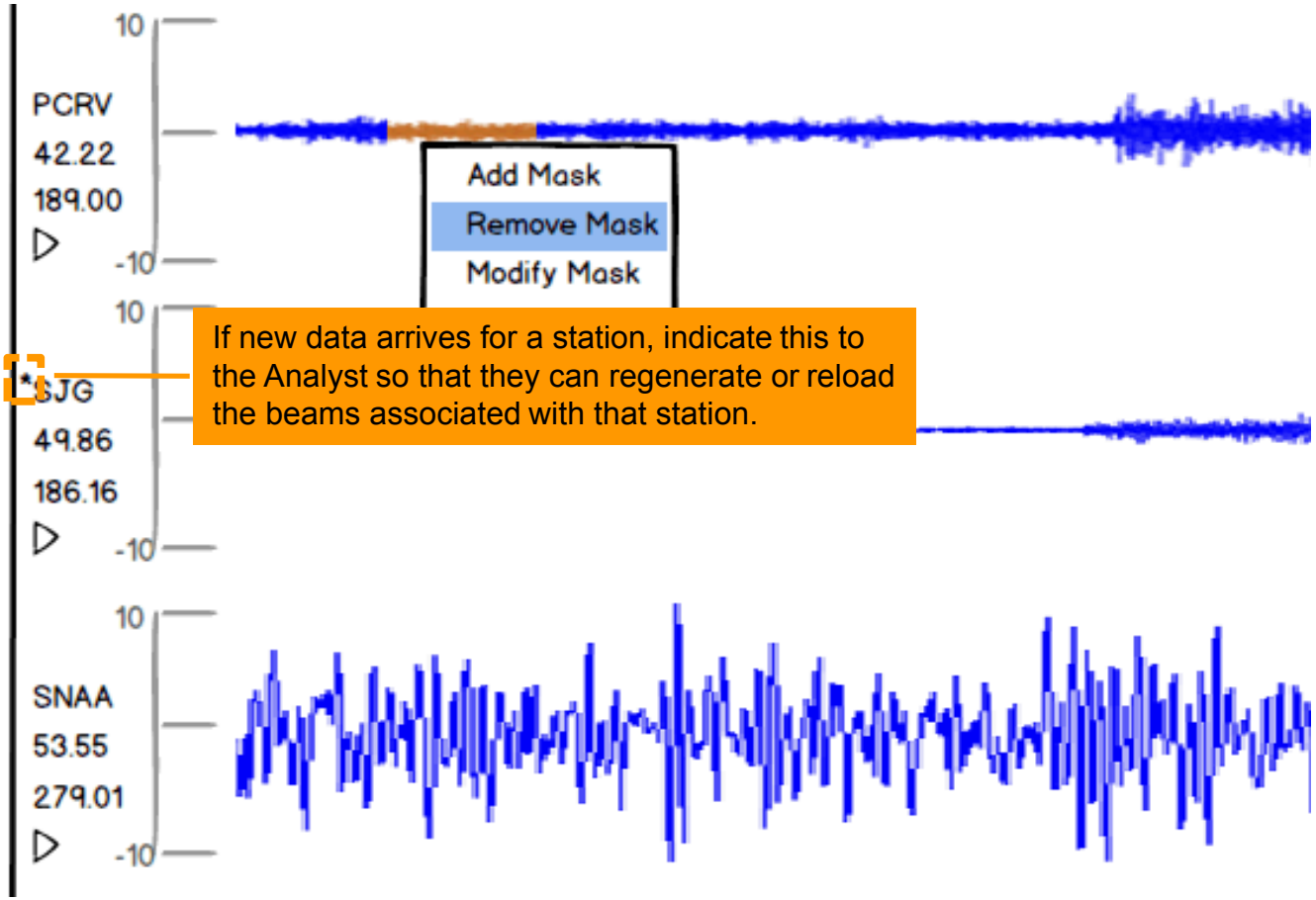
3 Displays selected event hypothesis



If new data arrives for a station, indicate this to the Analyst so that they can regenerate or reload the beams associated with that station.

User Action: Selects one of the following actions

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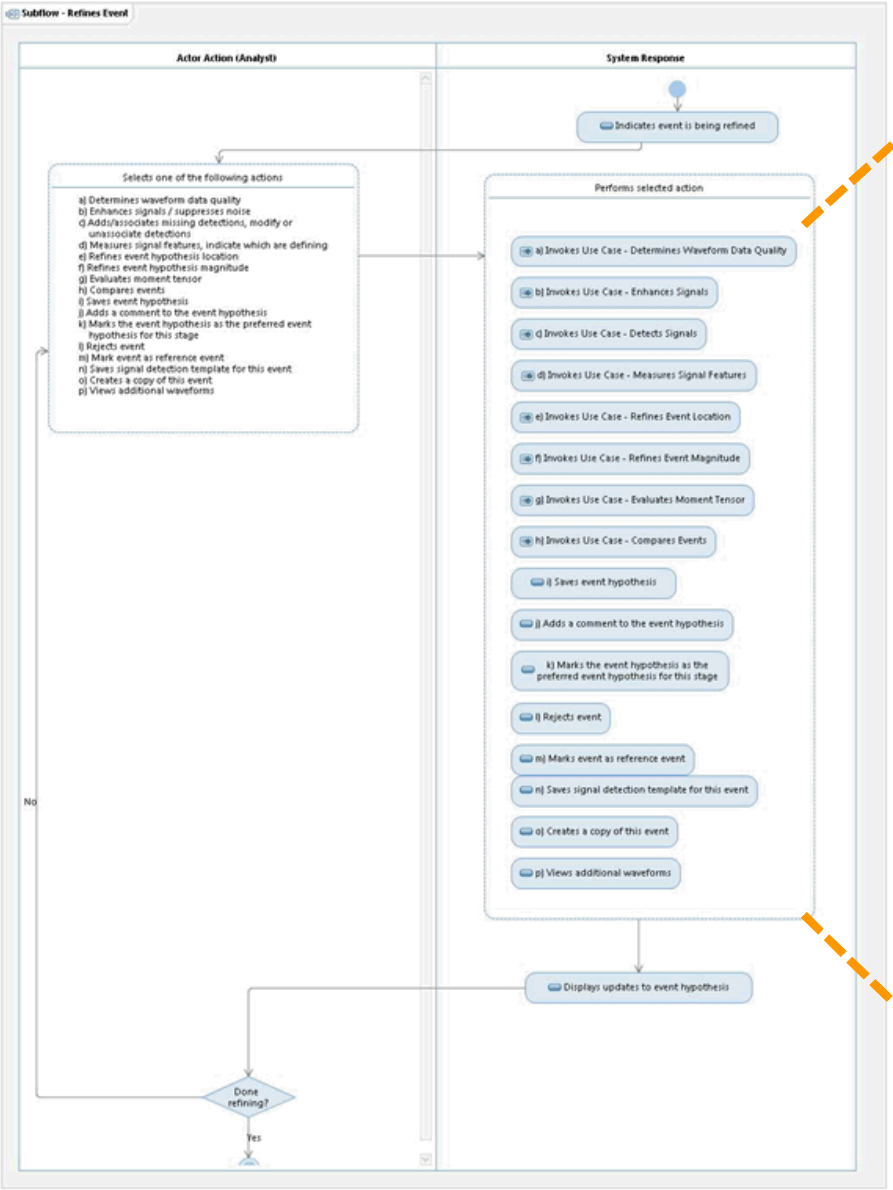

4 Invokes Subflow - Refines Event

a) Determines Waveform Data Quality
b) Enhances Signals
c) Detects Signals
d) Measures Signal Features
e) Refines Event Location
f) Refines Event Magnitude
g) Evaluates Moment Tensor
h) Compares Events
i) Provides Analyst Feedback
j) Saves event hypothesis
k) Adds a comment to the event hypothesis
l) Marks the event hypothesis as the preferred event hypothesis for this stage
m) Rejects event
n) Marks event as reference event
o) Saves signal detection template for this event
p) Creates a copy of this event
q) Views additional waveforms

User Action: Determines Waveform Data Quality UC

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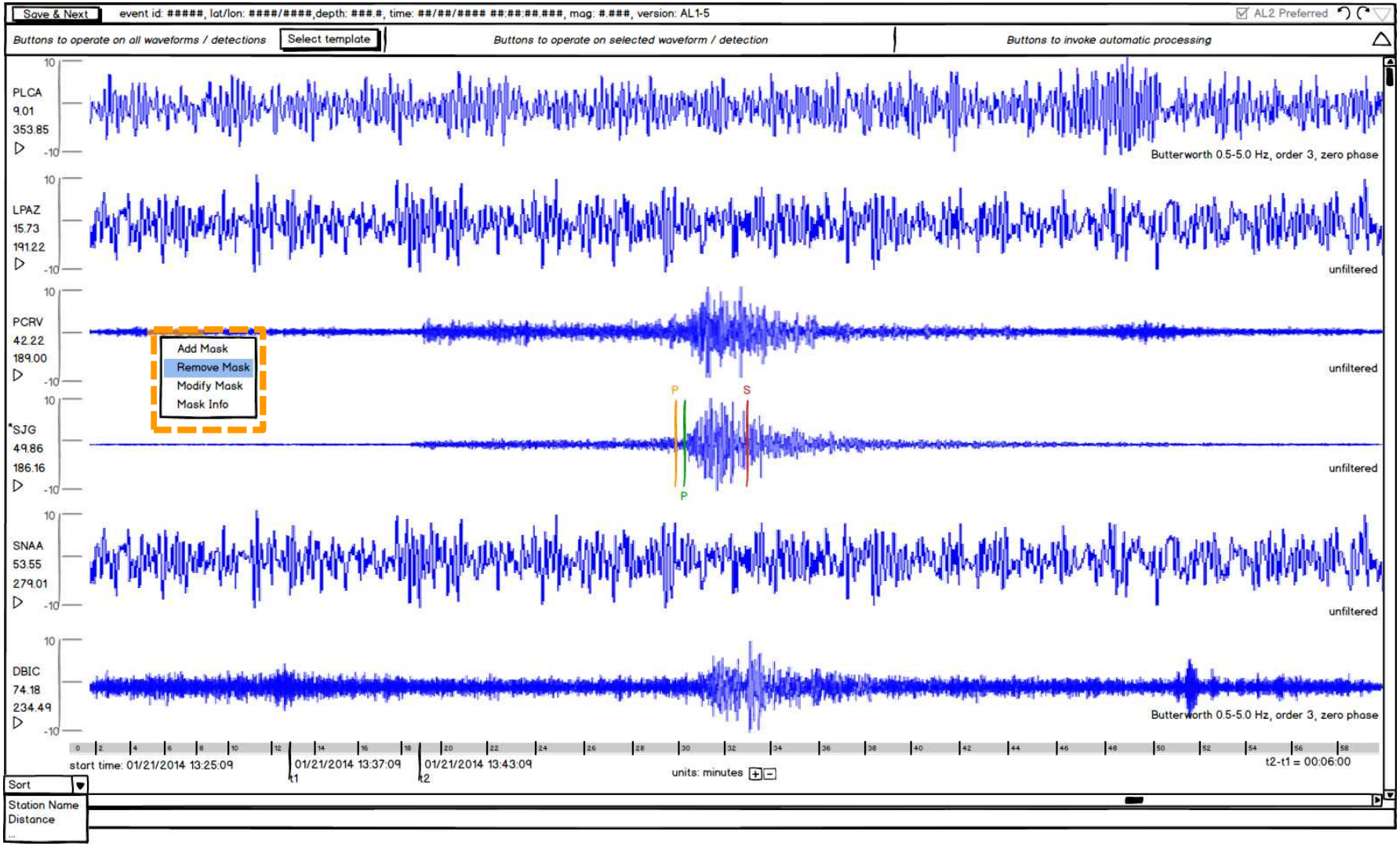
4a Invokes Use Case - Determines Waveform Data Quality



User Action: Enhances Signals UC

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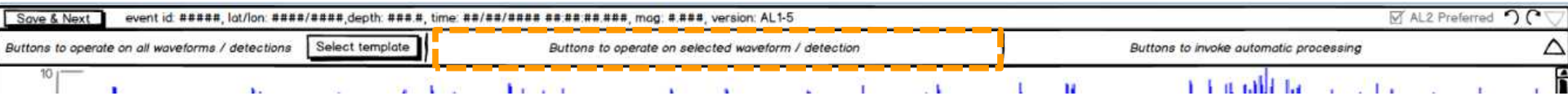
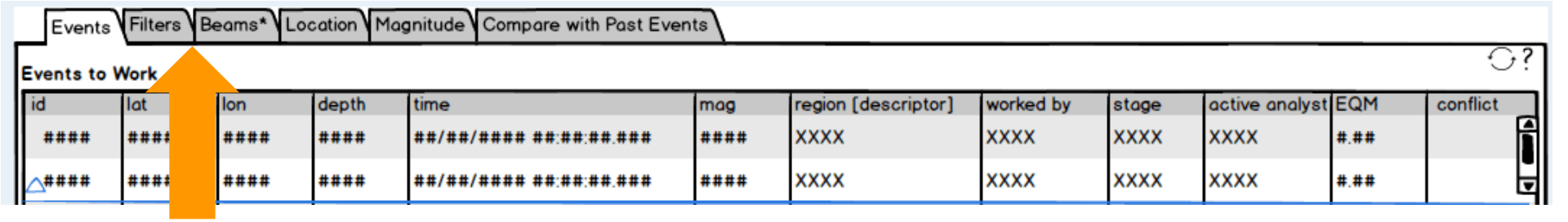
4b Invokes Use Case - Enhances Signals





User Action: Detects Signals UC

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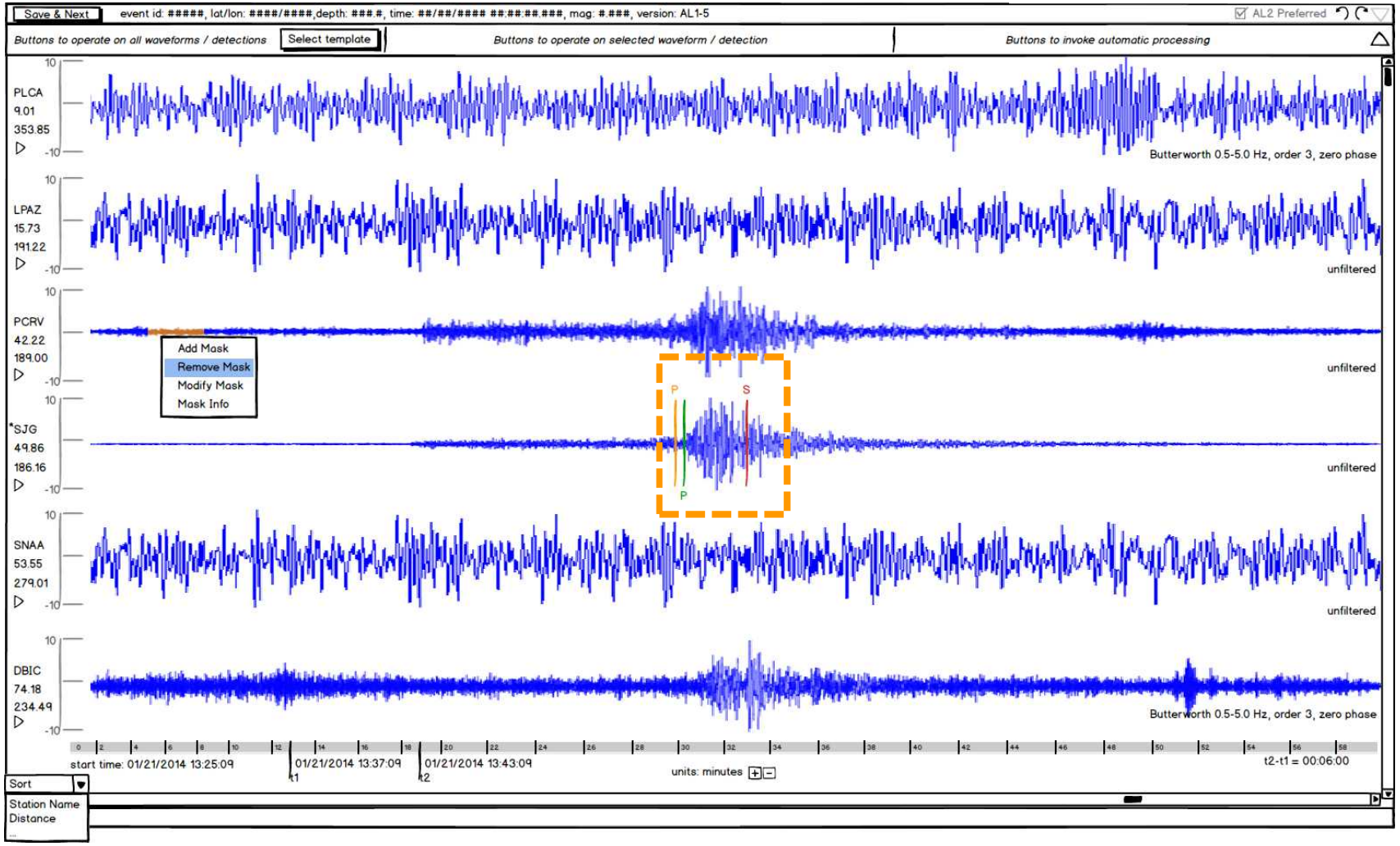
4c Invokes Use Case - Detects Signals

4d Invokes Use Case - Measures Signal Features



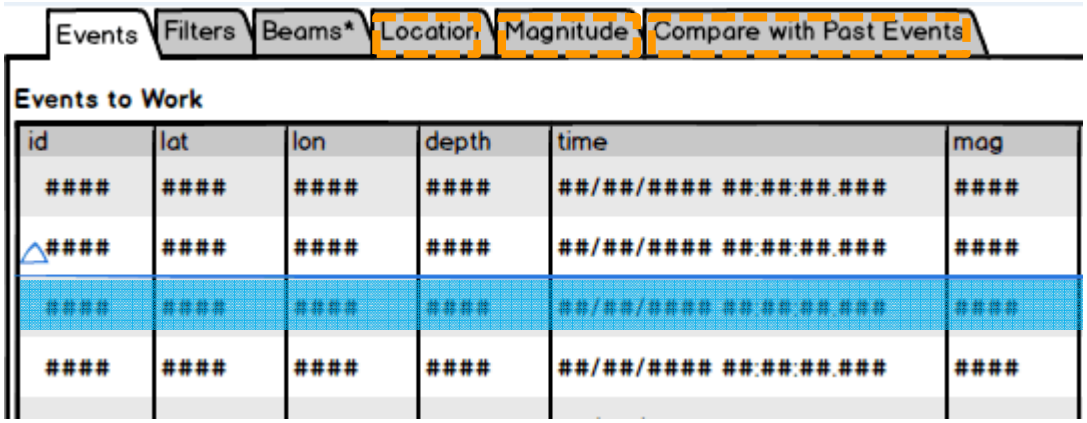
User Actions

- Refines Event Location UC
- Refines Event Magnitude UC
- Compares Events UC

4e Invokes Use Case - Refines Event Location

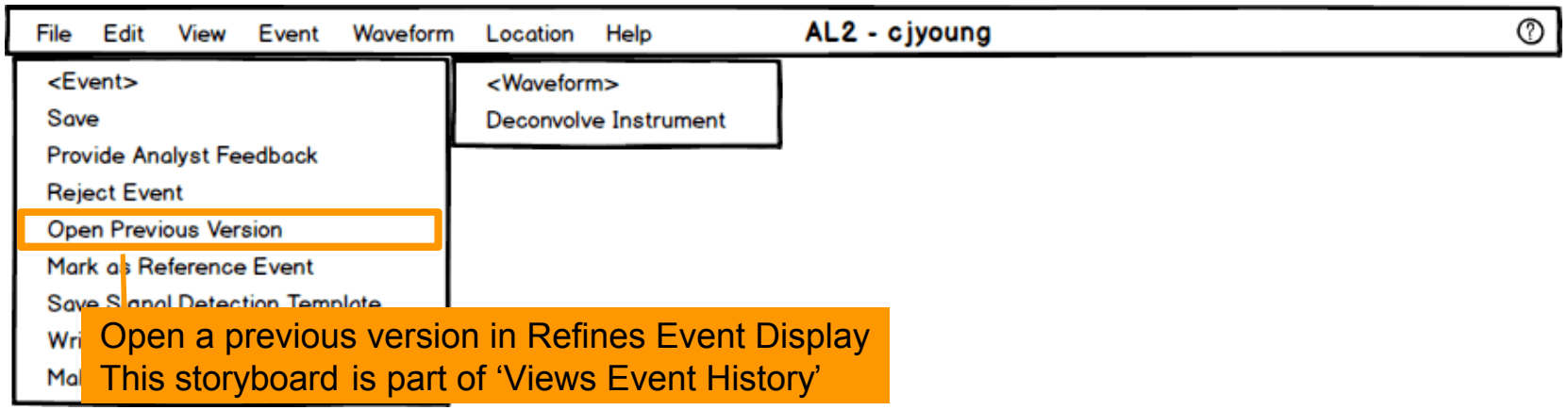
4f Invokes Use Case - Refines Event Magnitude

4h Invokes Use Case - Compares Events



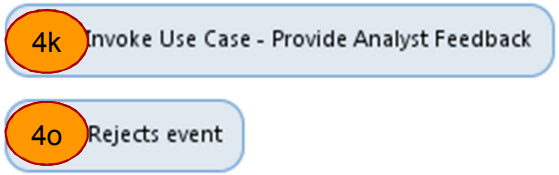
User Actions

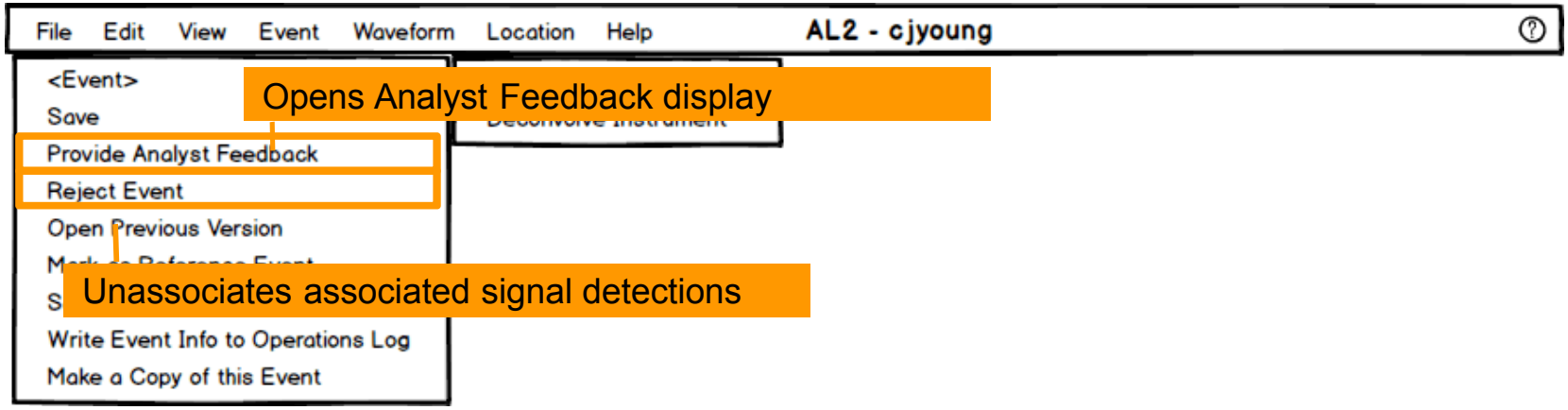
- Open Previous Version



User Actions

- Provides Analyst Feedback UC
- Rejects event





User Actions

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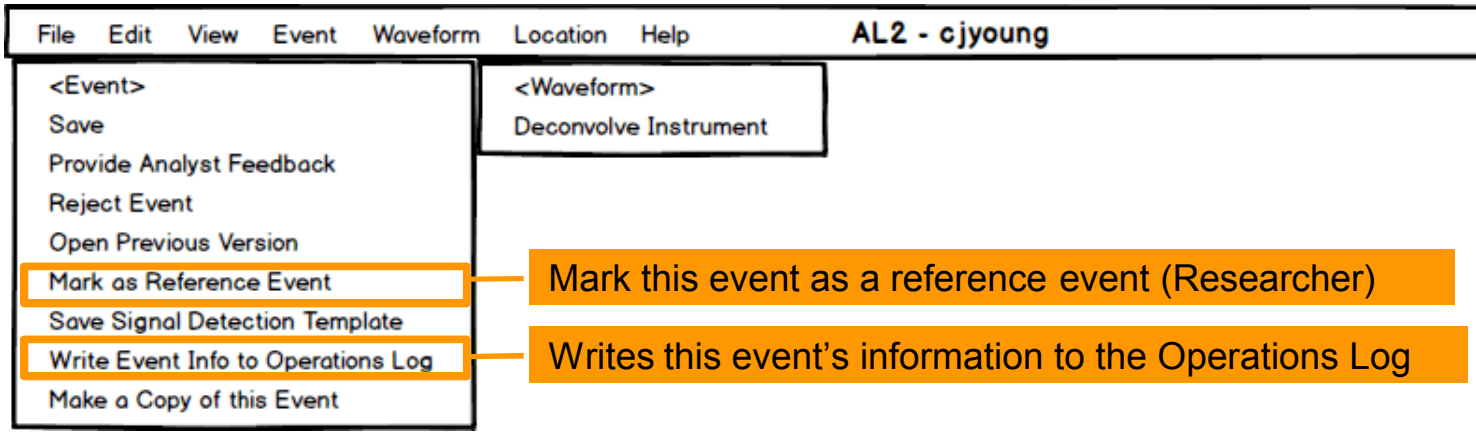
4p Marks event as reference event



A "reference event" is an event that has been categorized as a certain type of an event.
Part of marking an event as a reference event will include indicating 1 or more categories of reference event.

User Actions

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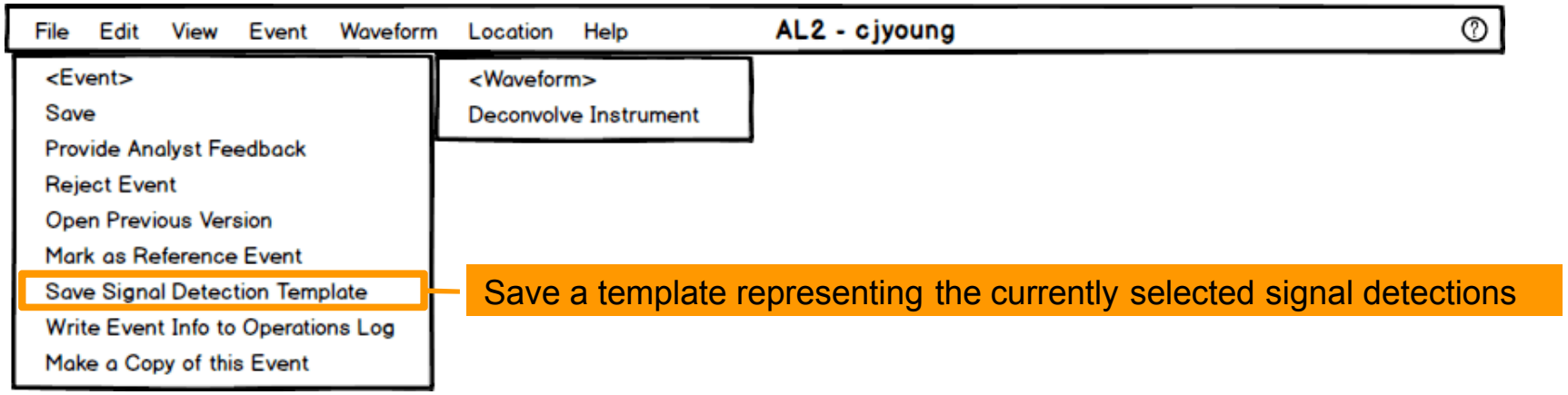
4q Saves signal detection template for this event



User Action: Saves event hypothesis

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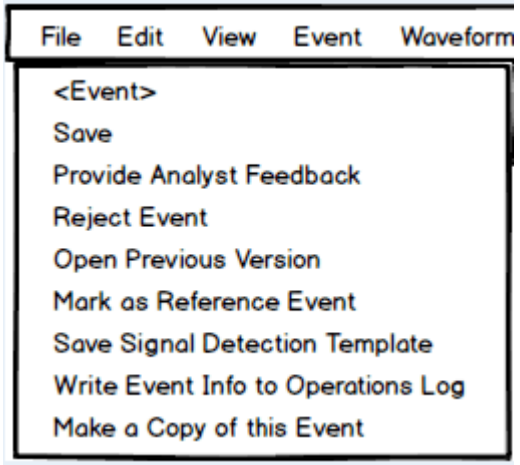
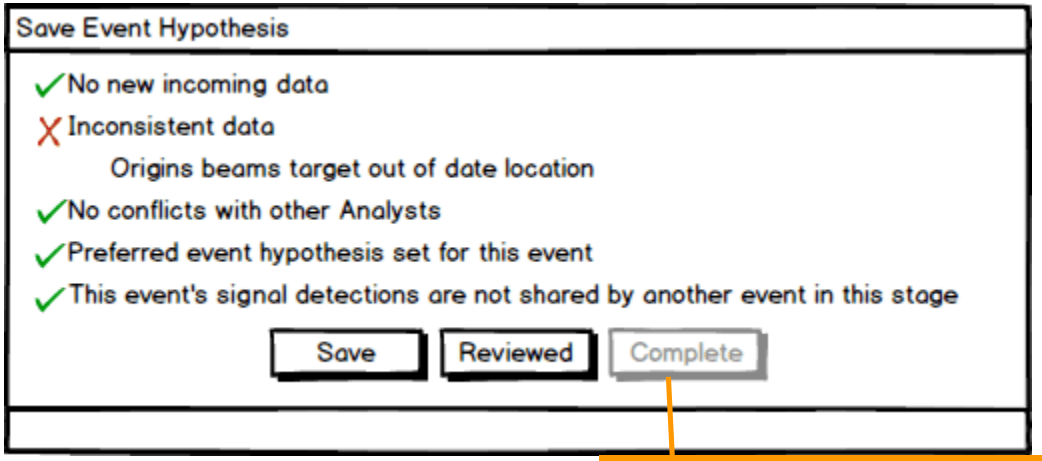
4I Saves event hypothesis

- Saves the current event hypothesis and all related information, including new derived waveforms that contain associated signal detections
- Saves a new version and starts a new session (clear session stack, create a new working copy/version of the event hypothesis). Until the Analyst reviews the event, it stays in the “Events to Work” list
- This is how the user saves the current event hypothesis (not the unassociated detections)

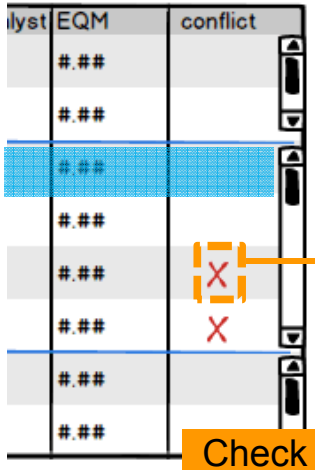


User Action: Saves event hypothesis

This display represents a status check of the data
This display could be modified to have error information only

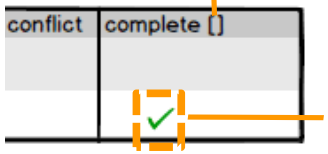


Becomes enabled when there are no conflicts *(Conflict could be more than one event the same time and space, events that share a signal detection)*



When checked, indicates a conflict exists between the checked event and another event

Check all complete checkboxes



When checked, indicates the Analyst considers this event to be done (no need to rework, automatic post processing can be run, no conflicts allowed)
This will update the number of events completed count shown in the workflow.

User Action: Adds a comment to the event hypothesis

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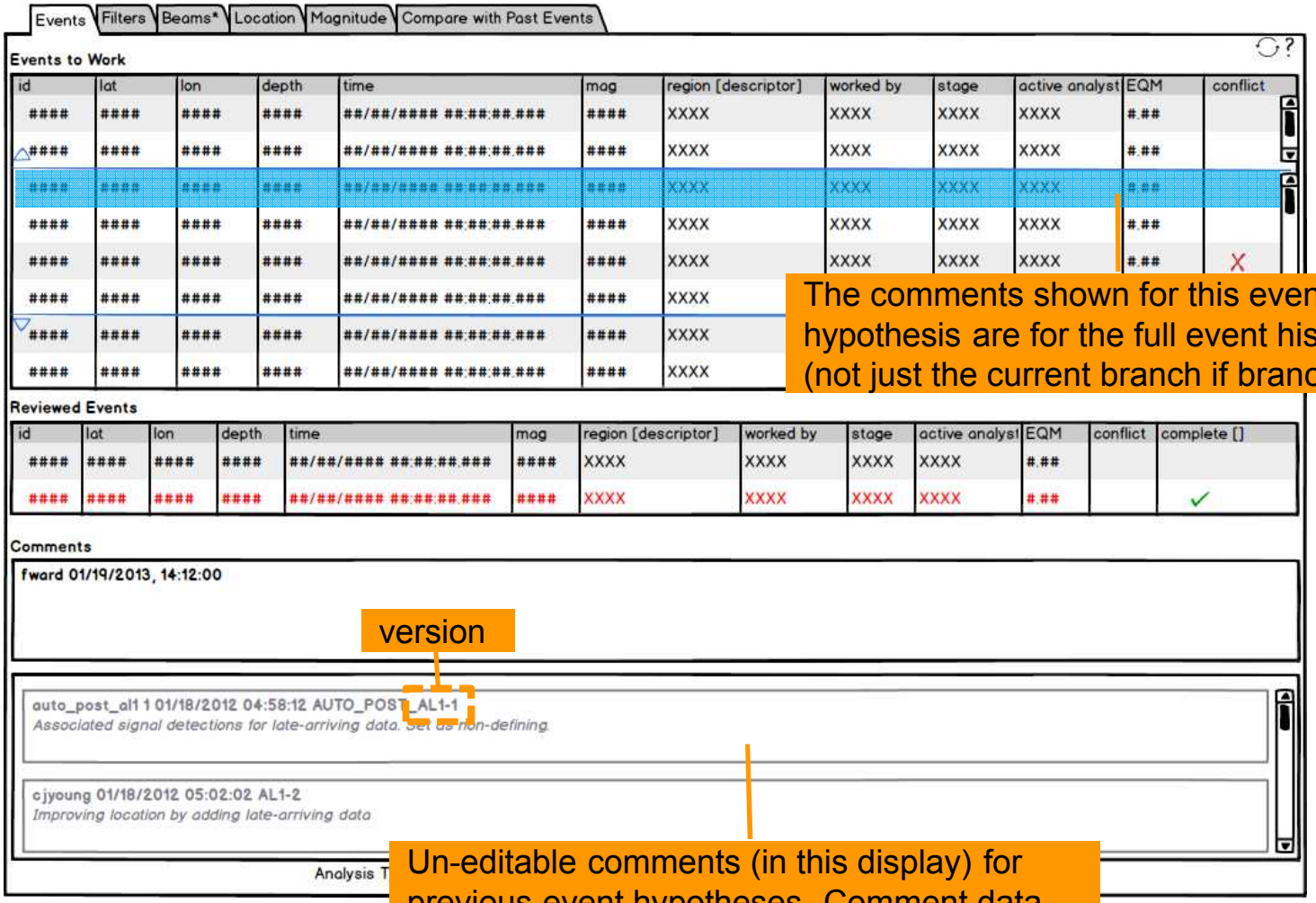
4m Adds a comment to the event hypothesis



User Action: Marks the event hypothesis as the preferred event hypothesis for this stage

4n n) Marks the event hypothesis as the preferred event hypothesis for this stage

- There should be at least one and only one preferred event hypothesis for an event per processing stage.
- This check box is selected by default when the Analyst opens the current preferred event hypothesis.
- If the preferred event hypothesis check box is checked when the event hypothesis is saved, the saved event hypothesis is the preferred for the event for the current processing stage.
- The Analyst can open a previous event hypothesis version (e.g. through Open Previous Version menu) and mark that event hypothesis as preferred. ☐ AL2 Preferred
- If the Analyst deselects the check box and saves, the currently preferred event hypothesis will not change. This is to ensure that there is always a preferred event hypothesis.

User Action: Creates a copy of this event

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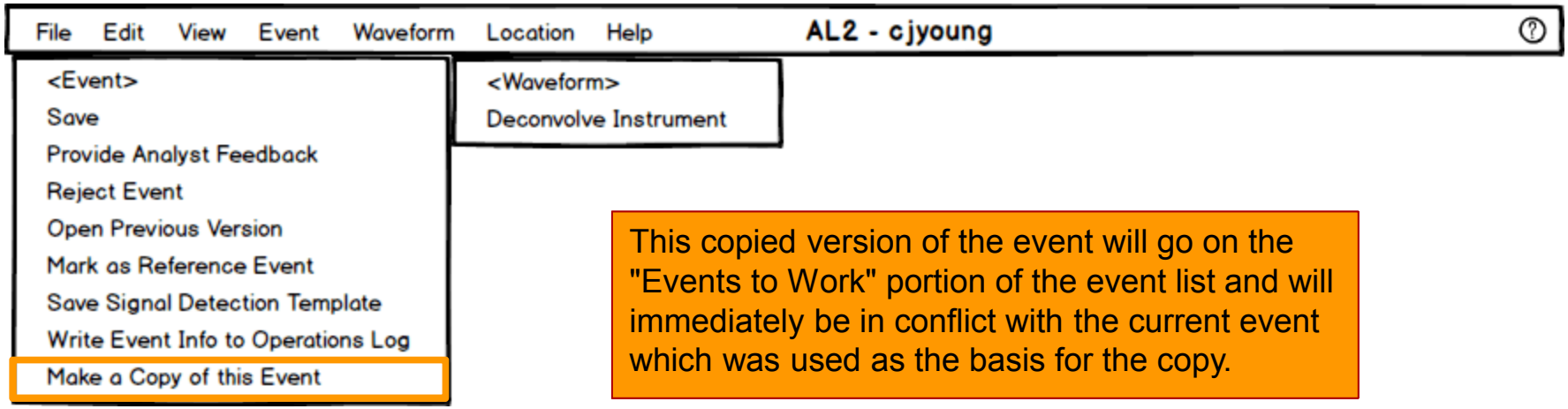
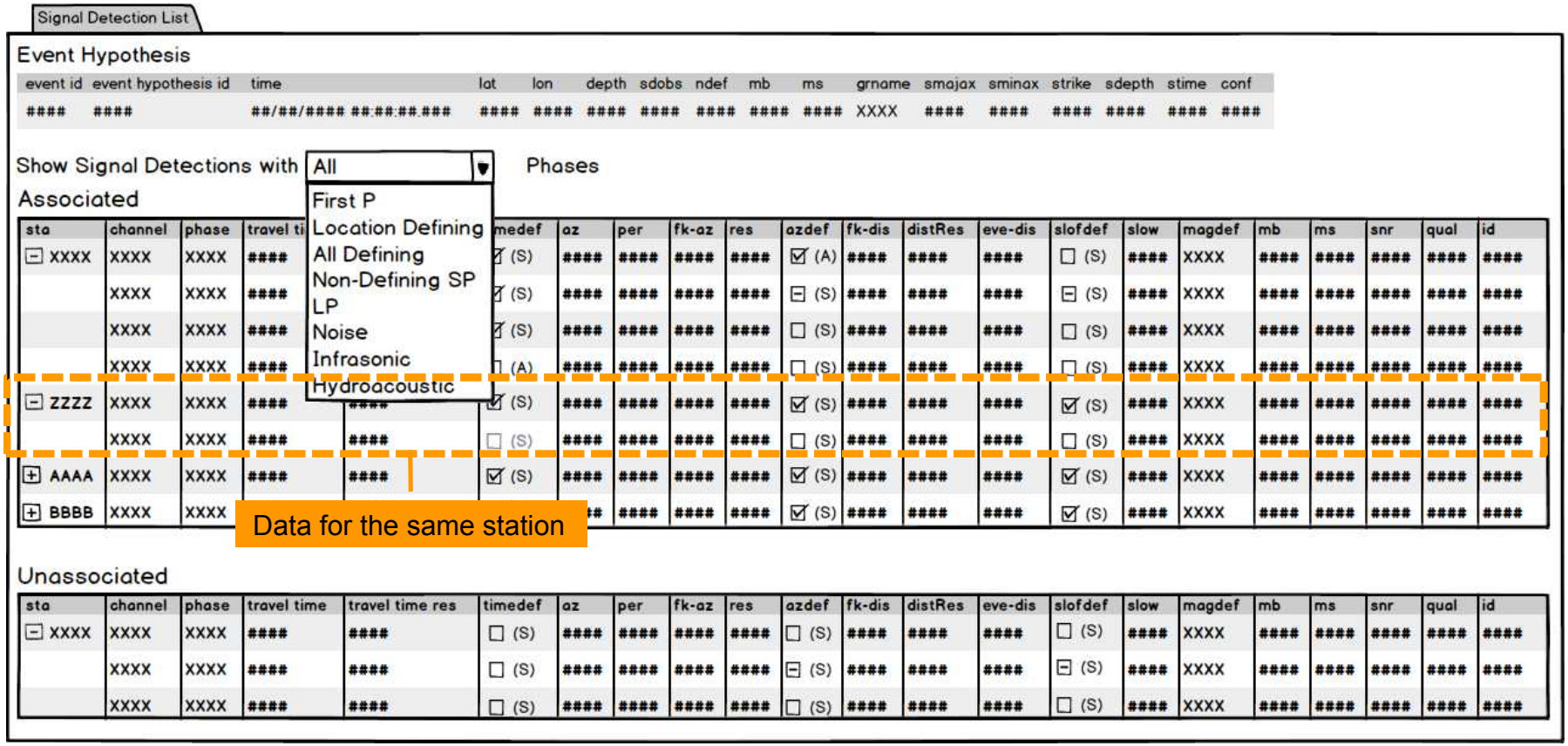
4r Creates a copy of this event



This copied version of the event will go on the "Events to Work" portion of the event list and will immediately be in conflict with the current event which was used as the basis for the copy.

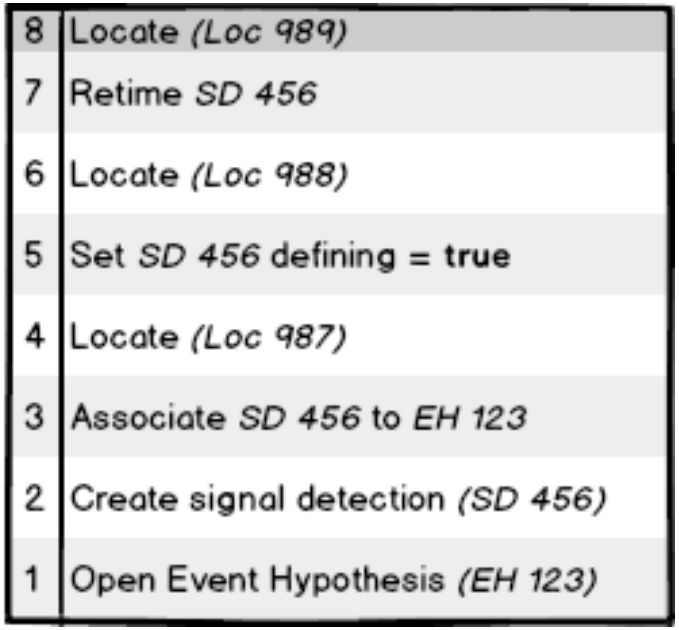
Signal Detection List

- This list is synced with displays related to refining an event
- Portions of this list will be available elsewhere (e.g. portions related to location will be in the Refines Event Location tab)



Session stack

- User can select to move to a given state (as opposed to manually stepping forward / backward through stack)
- Stack clears when event hypothesis is saved



Notes

- Please see the Analyzes Event UIS for more information about how the system supports more than one Analyst analyzing an event at the same time.
- For associated signal detections, derived waveforms are saved with the current event hypothesis. For unassociated signal detections, derived waveforms can be saved at any time.

Open Issues

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- These storyboards do not currently address the display of hydroacoustic and infrasound data.