Multimission Ground Systems and Services

RAVEN User's Guide

User's Guide

Table of Figures:

1. Document Overview

Identification

Property	Value
Element	MPSA
Program Set	SEQ Subsystem
Version	34.6.0

1.1 Purpose

This user guide is a technical communication document intended to give assistance to people using RAVEN.

1.2 References

Table 1: Applicable JPL Rules documents

Title	DocID
Software Development	*57653*

Table 2: Applicable MGSS Documents

Title	DocID
PEF SIS: Predicted Events File	*000262 Rev N*
RAVEN Software Design Document (SDD)	*001519 Rev C*
RAVEN Software Requirements (SRD)	*001498 Rev E*

2. General Information

2.1 License Agreement

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2.2 Organization of the Document

This document provides the prerequisites to run RAVEN, a system overview to get acquainted with the User Interface, installation and configuration of the system and a system guide that explains the “How To” for the provided features.

2.3 Abbreviations

MGSS	Multi-mission Ground Systems and Services
RAVEN	Resource and Activity Visualization Engine
JPL	Jet Propulsion Laboratory
MPS	Mission Planning and Sequencing
MPSA	Mission Planning, Sequencing and Analysis
CAM	Common Access Manager
TMS	Timeline Management System
ES5	EcmaScript 5
GDS	Ground Data Systems
DOM	Data Object Management
MCWS	Mission Control Web Services
TOL	Time Ordered List
PEF	Predicted Events File
EVR	Event Record
EHA	Engineering Housekeeping Accountability

3. System Summary

Prerequisites

- A computer to be used as the server with Linux RedHat 7.3 is supported by MGSS.
- Access to MPSServer and/or MCWS to access the data stores.
- If authentication is required, CAM must be provided as part of the artifacts to install.
- A Web Browser that supports ES5 and above. Supported browsers are:

	Chrome	60.x +
	Firefox	55.x +

4. System Overview

RAVEN is a web -based application included in the SEQ subsystem of the Advanced Multimission Operations System (AMMOS) and managed by the Multimission Ground System and Services (MGSS). It allows users to view science planning, spacecraft activities, resource usage and predicted data, or any time -based data, displayed in a timeline format via web browser. Subsequently, it can be viewed simultaneously by distributed users/teams for collaboration when creating, updating and validating activity plans and command sequences.

4.1 Application Layout

RAVEN is a single page web application with different sections and controls that group functionality. The application layout is composed by a Data View Selection Panel, controlling the data visualization in the Chart Area. The Data Explorer, which is the interface to select the data available to chart. The Chart Area, being the main panel holding the graphs. And the Details Panels, used when there is a need for looking at the data points. All these sections are explored in detail in this document.

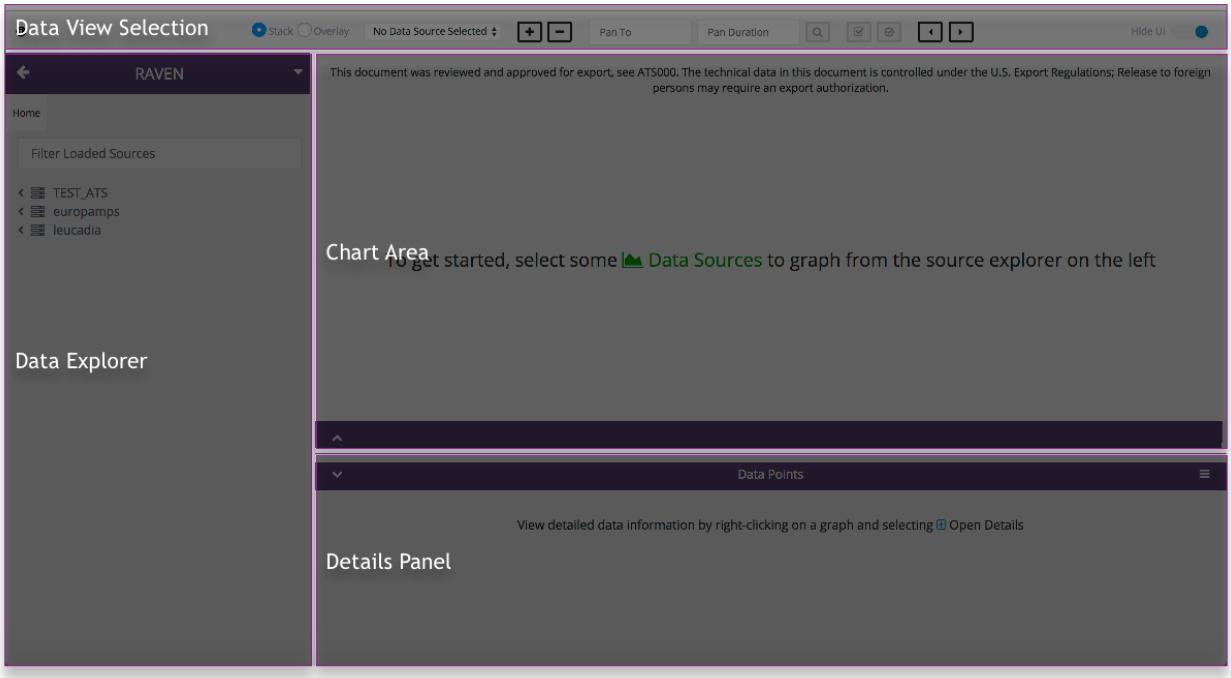


Figure 1. RAVEN Layout

4.2 Data Explorer Area

An area of the screen that hosts data sources to choose from and allow the user to navigate and select individual data sets for display.

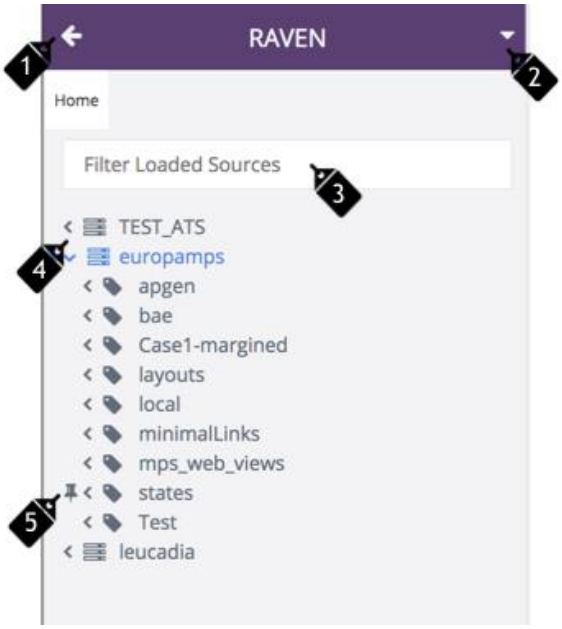


Figure 2. Source Explorer

Legend

1. Hide Data Explorer panel.
2. Managerial Menu.
3. Filter Loaded Sources Input.
4. Available Collections Tree.
5. Data Pin.

How To: Hide the Data Explorer panel

1. Click on the (left arrow) icon.
2. This will shrink the Data Explorer and expand the Chart Area and the Details Panel.
3. To restore the Data Explorerclick on the (hamburger) icon.
4. It will expand the Data Explorer back to its original size.

Iconography:

	Represents an Alias in the filesystem ...
	Pinning *(See section 6.1 Data Pinning)* ...

NOTE: What is an Alias?

An alias is the name that is set in the configuration file to identify the collection in the data store. *(See "5.4 RAVEN Specific Configuration ")*

4.3 Managerial Menu:

This menu displays the different options for actions that apply to all instances of the same element.

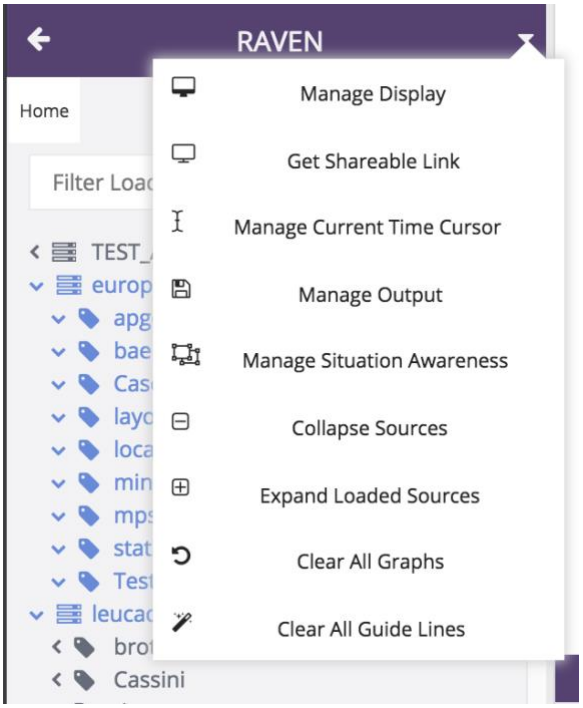


Figure 3. Managerial Menu

What are these?

Manage Display: save/manage/apply Explorer State/layout

Get Shareable Link: Generate and save a unique URL that will bring up the RAVEN Chart Area and Detail Panel.

Manage Current Time Cursor: Define the properties of the current time cursor

Export Data: Export data based on the user's selected timeline and data in view and output the data in the chosen data format (CSV or JSON).

Manage Situation Awareness: Turn on/off time cursor, centering the timeline on the time and centering the timeline on the time cursor.

Collapse Sources: Collapse all sources in the explorer area.

Expand Loaded Sources: Expand the explorer tree from the root to the loaded data.

Clear All Graphs: Remove all graphs displayed in the chart area.

4.4 Chart Area

The container for drawing a chart. There will be two areas: main, which is the predefined panel to display data, and sticky, which is used to move lanes that the user want to always see regardless of scrolling in the main area. The user may move the graphs (in rows) between these two areas.

When RAVEN is first loaded, it will display a message indicating the user how to get started.

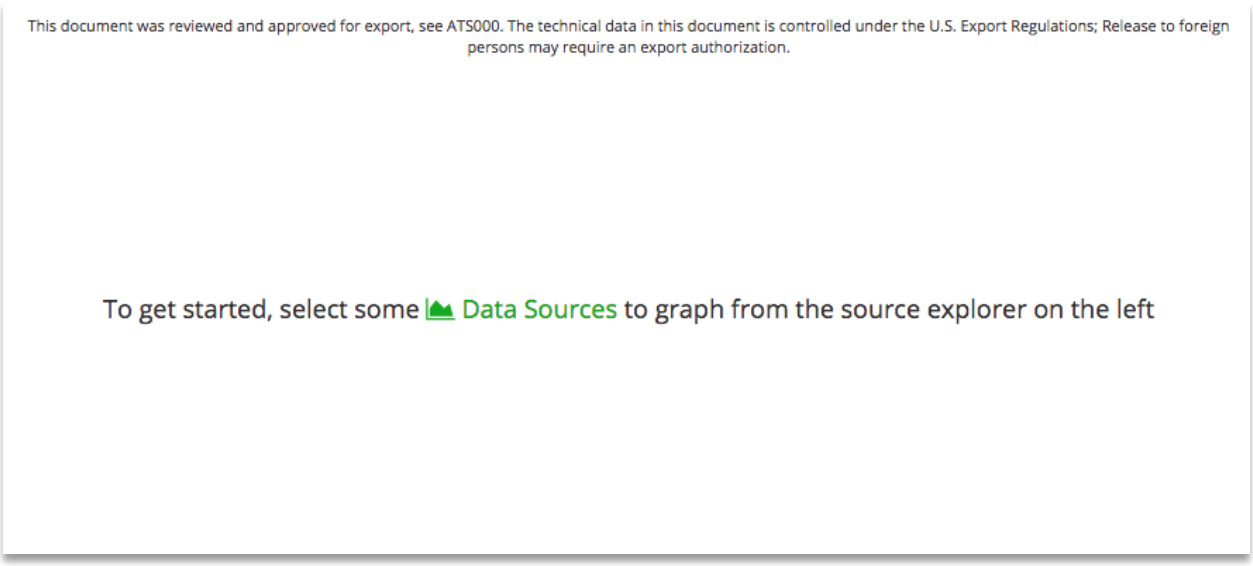


Figure 4. Chart Area Initial Message

This is the main panel that will host the visualization of the different components, like activities and resources (*explained later in this document*).

4.5 Detail Panel

The Detail Panel shows additional details of items (resources, activities, etc.) that are selected in the Chart Area.

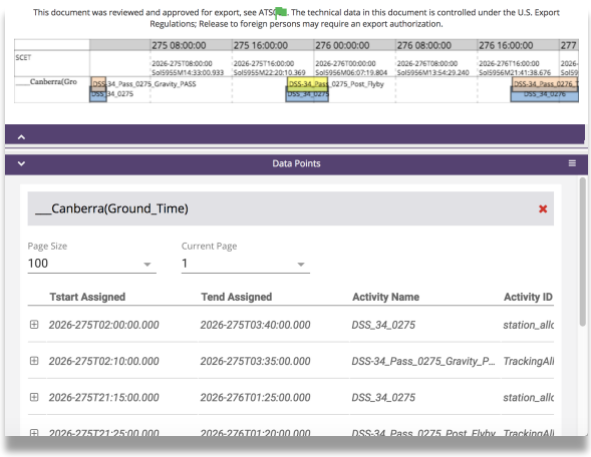


Figure 5. RAVEN Details Panel

How To: View data in the detail panel

1. Identify the Band in the Chart Area of interest. A band is a horizontal section that follows the timeline that charts data points from a data source.
2. Right-click on the band to show the context menu.
3. Select Open Details:

4. The detailed information of the data points will be shown on the Detail Panel.

4.6 Data View Selection

On the top of the RAVEN display, there are several fields or buttons that provide mechanisms to manage the data in view.

Figure 6. Data View Selection Panel

Legend

1. Copyright Information.
2. Display chart preference: Overlay or stack.
3. Band focus selector.
4. Zoom controls for time.
5. Panning controls
6. Annotations indicator.
7. Show/Hide Chart Area surrounding

5. Getting Started

5.1 Installation

RAVEN is packaged in a tar.gz file. The user needs to determine the directory that will contain the RAVEN software and its related files. We will refer to this directory as {mps_home}. Please review the following deployment configurations and pick the one that best fits your needs.

How To: Install in Linux RedHat

1. Pick your deployment strategy.
2. Extract the contents of the RAVEN package:
   `tar -xvfz <filename.tar.gz>`
3. Set the raven location in {mps_home}/mps.config:
   `raven.dir={location of RAVEN in your filesystem}`
4. Create a configuration folder that contains data_sources.properties based on the deployment configuration selected.
5. Set the service configuration for the data sources in {mps_home}/mps.config:
   `service.config.dir={configuration}/data_sources.properties`
6. In your terminal, run the startup script:
   `./bin/startup_mps_server.sh`
7. Go to:
   `https://localhost:8443/mpsserver/raven`
8. Proceed to the Configuration section in this document to learn more about data sources and authentication features.

RAVEN deployment configurations:

- *Local*. Installing and using RAVEN within a mission's GDS at a single site.

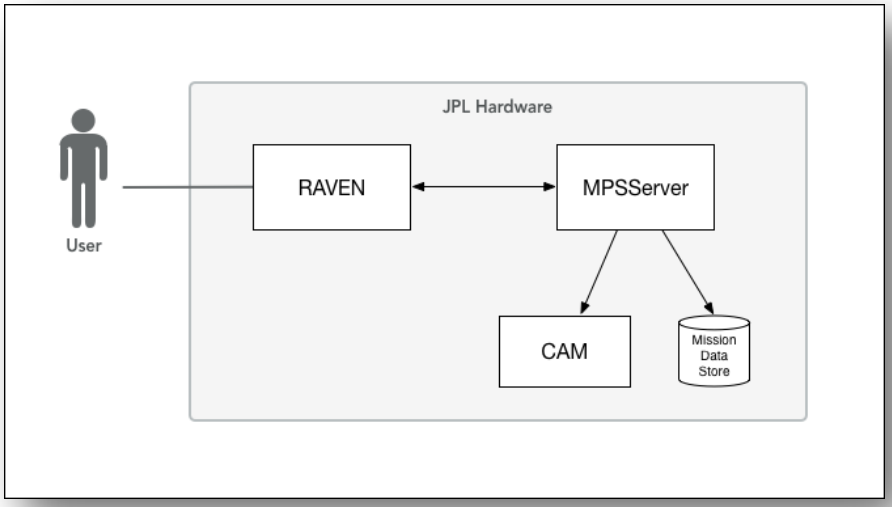


Figure 7. RAVEN Local Deployment

- *Personal*. Installing and using RAVEN on a personal work computer (JPL provided). Both RAVEN and MPSServer will be installed and configured on a single computer.

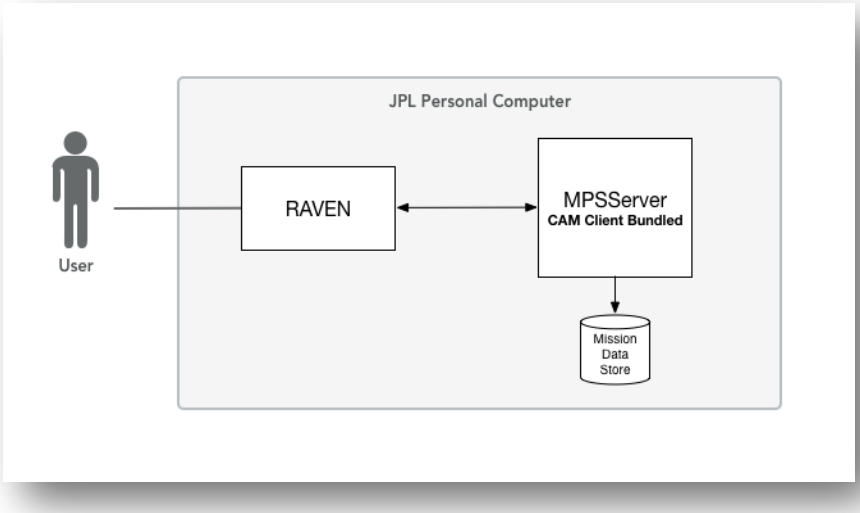


Figure 8. RAVEN Personal Deployment

- *Distributed*. Installing and using RAVEN with a mission's GDS that is shared across multiple sites. The mission decides if RAVEN and MPSServer should be installed locally or at the partner site.

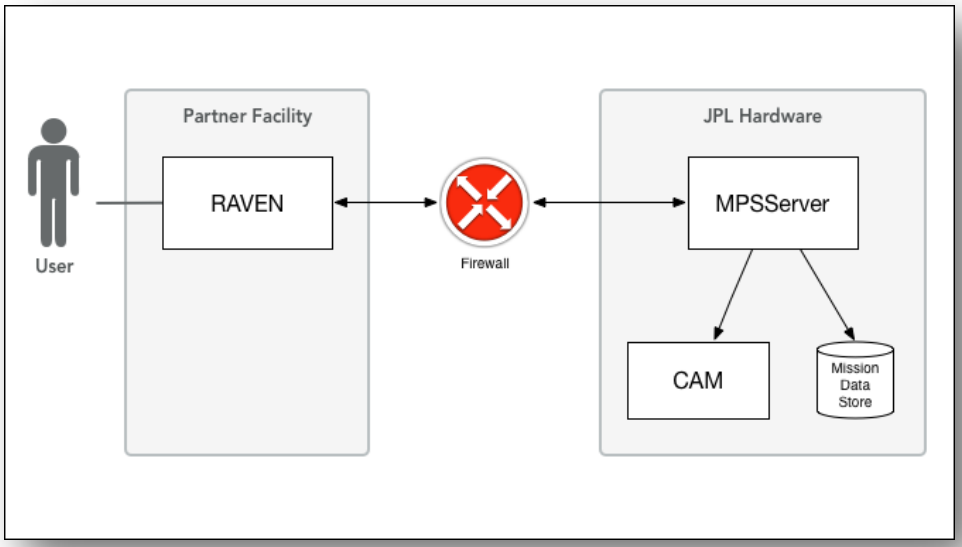


Figure 9. RAVEN Distributed Deployment

Once you have identified the deployment strategy that best fits your needs, create the necessary folders in the servers and proceed to the configuration section below.

5.2 Configuration

RAVEN can get data in different ways. This is configured by setting the **service.config.dir** attribute in the configuration file to point to the folder in the filesystem containing the connection properties for the desired external data services. This file is named **data_sources.properties**. (*Please see MPSServer Product Guide to get more information).*

5.3 Authentication

RAVEN uses Common Access Manager (CAM). If it is enabled in the MPSServer configuration, an **"Authentication Required"** pop-up will appear requiring the username and password.

How To: Enable/Disable Authentication

1. Edit {mps_home}/mps.config file.
2. Set cam.authentication.required=true
3. To apply changes, restart the server by executing: ./{mps_home}/stop_mps_server.sh and then ./{mps_home}/start_mps_server.sh

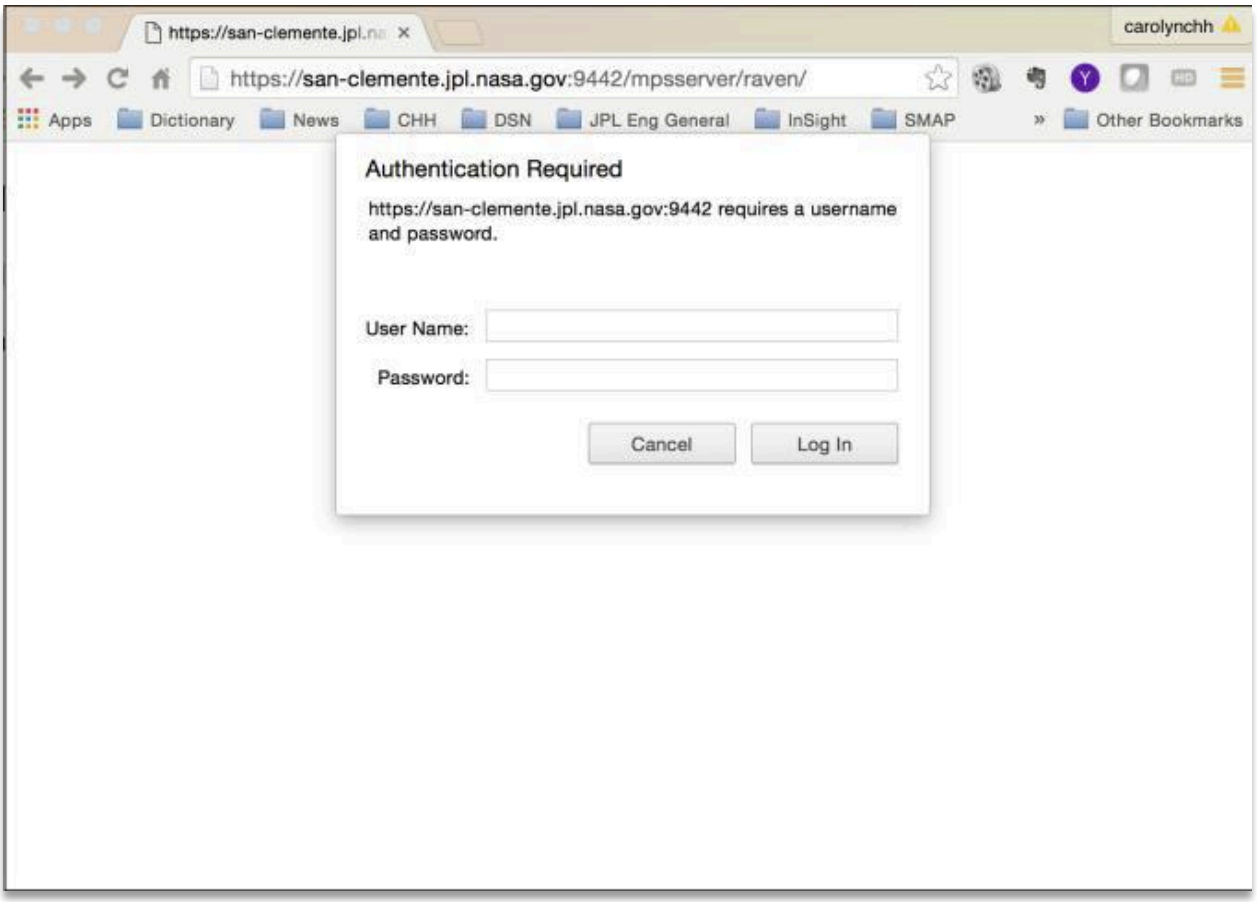


Figure 10. SSO Authentication Prompt

5.4 RAVEN Specific Configuration

RAVEN supports custom configuration for project settings through a **config.*.js** file. This file is in the directory where RAVEN is installed. It contains information that defines variables for the operation of the RAVEN. Some of the variables are URL's or directory paths and others are values. For variables that are URL's or directory paths there are no defaults, but for variables that are values there are defaults.

config.{user_given_name}.js example:

```
'use strict';

(function (exports) {
   let rootUrl = window.location.protocol + '//' + window.location.host;
   if (/\/$/.test(rootUrl)) {
      rootUrl = rootUrl.substring(0, rootUrl.length - 1);
   }

   const ravenConfig = {
      rootUrl: 'https://san-clemente.jpl.nasa.gov:9003',
      ajaxTimeout: 40000,
      layout_mongodb_alias_name: 'TEST_ATS'
      layout_mongodb_db_name: 'LAYOUTS',
      filterSourcesTimeout: 500,
      localStorageKey: 'raven_local_storage',
      maxGraphDataPointsPerPage: 25,
      minBottomPanelHeight: 300,
      minLeftNavWidth: 300,
      minTime: '1950-001T00:00:00.000',
      maxTime: '2029-001T00:00:00.000',
      includeCurrentViewWindowInNewPlot: 10,
      disableBrowseProcess: true,
      zoomDelta: 10,
      …

      exports.ravenConfig = ravenConfig;
   })(typeof exports!=='undefined'&&exports!==null ? exports : window);
```

***How To**: Set properties for LAYOUTS*

```
… {
    //LAYOUTS
    //define the following if layouts should be allowed
    //WARNING: the alias & db name MUST also be defined in the
      MPSServer/MongoDB configuration
    layoutsUrl: '/mpsserver/mongo/TEST_ATS/LAYOUTS',
…
}
```

***How To**: Set properties for STATES*

```
… {
    //STATES
    //define the following if states should be allowed
    //WARNING: the alias & db name MUST also be defined in the
      MPSServer/MongoDB configuration
    statesUrl: '/mpsserver/mongo/TEST_ATS/STATES',
…
}
```

***How To**: Set properties for Shared URLs*

```
… {
    //Shared URL
    //define where shared URLs should be saved
    minimalLayoutLinksUrl: '/mpsserver/mongo/TEST_ATS/LINKS',
…
}
```

***How To**: Set properties for Filters*

```
… {
    //Pre-defined filters
    //evrFilter: ['TWTA.*', 'SDST_TLM_MODE', 'SDST_RNG_MOD_IND',
      'SDST_RANGING'],
    // commandFilter: [ 'FILE_DELETE', 'FILE_DIR_DUMPALL',
      'SDST_UPLINK_RATE', 'SRU_CATALOG_DUMP', 'SRU_PJ_PARAM_SET',
      'SRU_STAR_DMP_ENA', 'VM_GV_SET_UINT', 'VM_LOAD' ],
    // sequenceFilter: [ 'auto_rexmit', 'comm_begin', 'comm_end', 'ddor',
      'fsw_diag_daily', 'fsw_diag_monthly', 'fsw_diag_weekly', 'kats',
      'playback', 'repoint' ],
…
}
```

How To: Set properties other properties

```
… {
   // MongoDB alias name to use with the URL
   // default_mongodb_alias_name: '',
   //specifies the url for pef data to be shown in the pef query view of
     the raven when it starts
   default_pef_query: 'url',
   default_pef_query: 'https://
pismo.jpl.nasa.gov:8443/mpsserver/mongo/leucadia/testpef/sol00983/pefReco
rd',
   default_pef_query: '',
   // shorten the acrivity labels when space is limited (default: false)
   // useShortenLabel: ,
   //specifies what to use for labels ("Activity Type" or "Activity
     Name") (default: "Activity Type")
   activityLabel: 'Activity Name',

   //specifies if MongoDB collection name is included as part of the row
     title (default: true)
   includeCollectionNameInRowTitle: ,

   // default rgb for line plot
   defaultLineColor: [0,0,0],
   leftDivWidth: ,
   leftDivFontSize: '',

   //Current time indicator
   currentTimeDelta: 0,
   auto_page: false,
   displayCurrentTimeCursor: false,
   clockRate: 1,
   clockUpdateIntervalSecs: 2,
   landing_time: false,
   itarMessage: 'This document was reviewed and approved for export, see
                 ATS000.\nThe technical data in this document is
                 controlled under the U.S. Export Regulations;\nRelease
                 to foreign persons may require an export
                 authorization.',
   // for Julian
   use_julian_date: false
   excludeActivityTypes: []
   …
}
```

6. Using the System

After installing RAVEN and its dependencies it is important to understand the configuration. Once that has been done and sources are ready to be loaded; the fun starts.

There are many features in RAVEN, but it is important to understand that there is no business logic and/or processing of data in RAVEN. Its main function is to display data sources in a way that is friendly to the user.

***How To**: Start RAVEN with a specific layout*

RAVEN is a RESTful application. This means that there is no state, only a representation of resources.

You can pass a query parameter to the URL with the name of the layout:

```
https://{hostname}:{port}/mpsserver/raven?layout={name of layout}
```

Context Menus

Activity Row

It displays spacecraft activities in a row associated to a timeline. Right-click on the activity row to bring the context menu. The context menu for activity rows has the following choices:

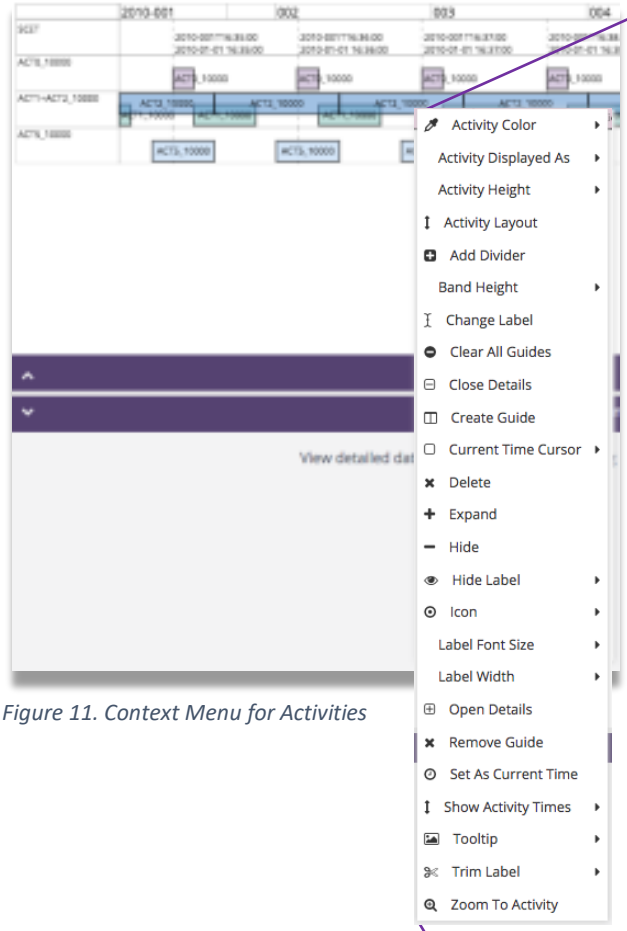


Figure 11. Context Menu for Activities

Add Divider	Add a narrow divider
Clear All Guides	Remove the vertical guides
Create Guide	Create a vertical guide where the mouse is pointing.
Current Time Cursor	Enable or disable the current time cursor on the time pointed by mouse.
Decrease Activity Height	Decrease height of the activities in the row
Decrease Activity Band	Decrease the height of the row
Decrease Label Width	Decrease the width of the row label
Delete	Delete the row
Hide Label	Hide the labels of the activities in the plotting
Icon	Display symbols over the activity rectangles (used for very short duration activities)
Increase Activity Height	Increase height of the activities in the row
Increase Activity Band	Increase the height of the row
Increase Label Width	Increase the width of the row label
Open Details	Open the detail panel (Data Points area)
Remove Guide	Remove the vertical guides
Set As Current Time	Set the pointed time to current time. A red bar will be displayed to indicate the current time.
Trim Label	Shorten the activity label to fit in the activity rectangle (removes label if it doesn't fit)
Zoom to	Zooms to a previously selected activity

Numeric Resource Rows

It displays numeric data from spacecraft resources in a row as line graphs associated to a timeline. Right-click on the activity row to bring the context menu. The context menu for resources rows has the following choices:

Add Divider	Add a narrow divider
Clear All Guides	Remove the vertical guides
Create Guide	Create a vertical guide where the mouse is pointing
Current Time Cursor	Enable or disable the current time cursor on the time pointed by mouse
Decrease Band Height	Decrease the height of the row
Decrease Label Width	Decrease the width of the row label
Delete	Delete the row
Dynamic Y-axis Scale	The Y-axis range adjusts dynamically based on all the data in view
Fill	On/OFF. Fill the portions of the graph
Fill Color	Select the fill color of the graph
Hide Label	Hide the labels of the activities in the plotting
Increase Band Height	Increase height of the row
Increase Label Width	Increase the width of the row label
Interpolation	Constant/Linear/None – The type of interpolation to use. (Note: None is used with the icon menu item and it places symbols at the points)
Line Color	Select the color of the graph
Open Details	Open the detail panel (Data Points area)
Remove Guide	Remove the vertical guides
Set As Current Time	Set the pointed time to current time.
Static Y-axis Scale	The Y-axis range is based on the value range of all data in the full time range.

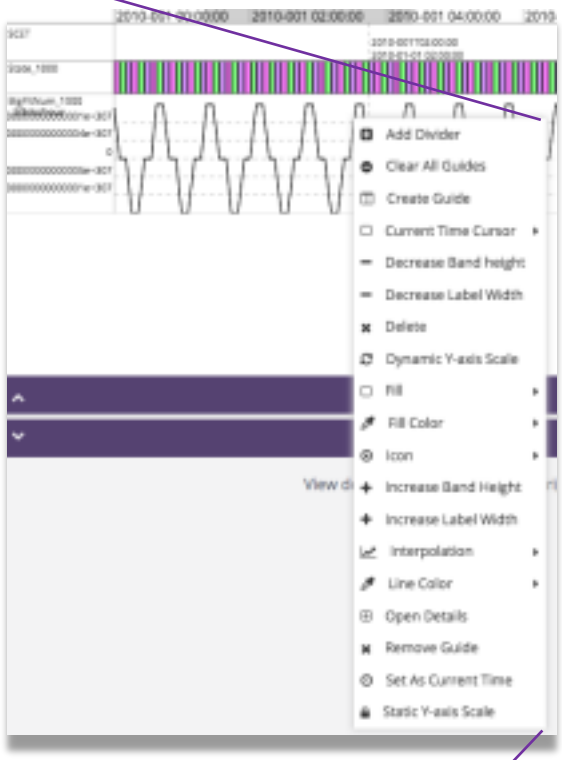


Figure 12. Context Menu for Numeric Resources

State Resource Rows

It displays state data from spacecraft resources in a row associated to a timeline as bar graphs. Right-click on the activity row to bring the context menu. The context menu for state resources rows has the following choices:

Add Divider	Add a narrow divider
Clear All Guides	Remove the vertical guides
Create Guide	Create a vertical guide where the mouse is pointing
Current Time Cursor	Enable or disable the current time cursor on the time pointed by mouse
Decrease Band Height	Decrease the height of the row
Decrease Label Width	Decrease the width of the row label
Delete	Delete the row
Icon	Display symbols instead of graph
Increase Band Height	Increase height of the row
Increase Label Width	Increase the width of the row label
Open Details	Open the detail panel (Data Points area)
Remove Guide	Remove the vertical guides
Set As Current Time	Set the pointed time to current time.
Show State as Resource	Convert the bar chart (w/ state name) into numeric chart based on the state names. * RAVEN also allows the user to revert the chart (by 'Show Resource as State')

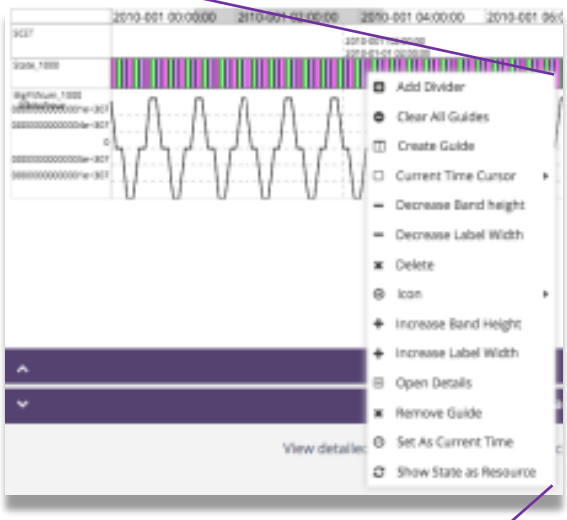
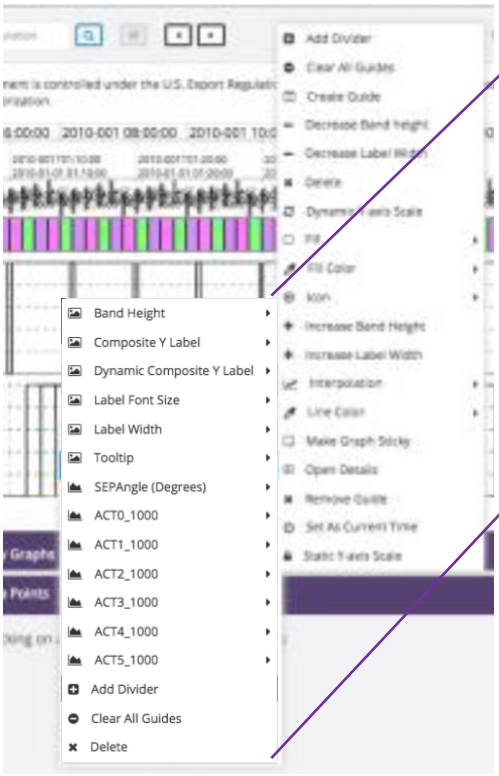


Figure 13. Context Menu for State Resources

Overlay Rows

It groups more than one band type in a row. For overlaid rows, the Context Menu contains the items for the numeric resources.



Composite Y-Label	Combined/Not Combined Y-labels
Add Divider	Add a narrow divider
Clear All Guides	Remove the vertical guides
Band Height	Increase/Decrease the height of the row
Label Width	Increase/Decrease the width of the row label
Delete	Delete the row

* NOTE: You can access the options for the overlaid graphs in this context menu.

Figure 14. Context Menu for Overlaid Graphs

Details Panel

The data in the Details Panel reflects the data on the Chart Area. This allows the user to view the detail data points of the selected activities or resources.

Open Details

> ***How To**: View the Details*
>
> 1. Point the mouse to the row to display data from.
> 2. Right-click to show the context menu.
> 3. Select Open Details.
> 4. The detail information of the data points will be shown on the Details Panel on the bottom.

All data details are organized in pages. The user may choose the page size, select the page to view, and scroll up and down to view data points in a page. To close the details for a selected data source, click on the red X on the right top corner in the detail data display.

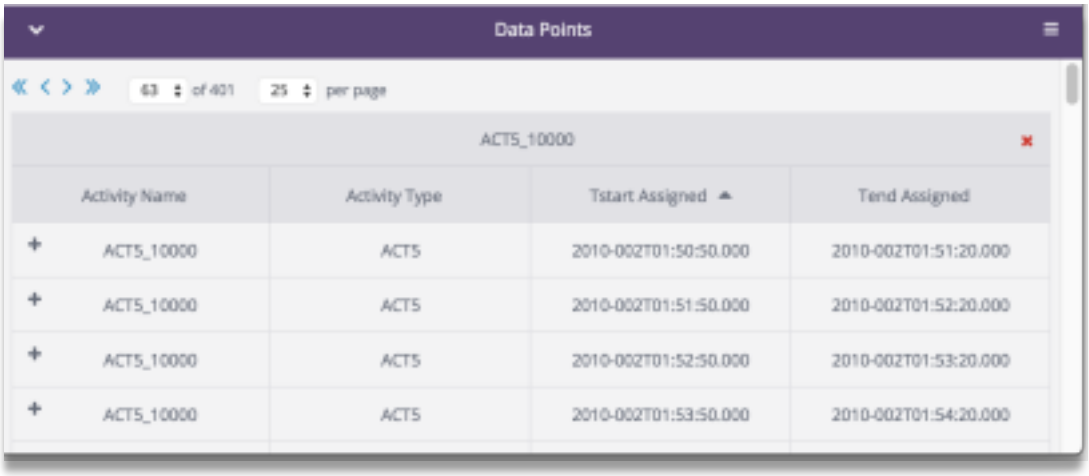


Figure 15. Details Panel Example

Switch Details of two Data Sources

Multiple data sources, activities or resources, may have their own details opened and can be switched around by clicking on the menu button which is located on the right end of the Detail Points ribbon. To locate a specific data point in the detail panel, click on the data point on the display, then RAVEN will pin point its details in the detail panel with highlight (yellow).

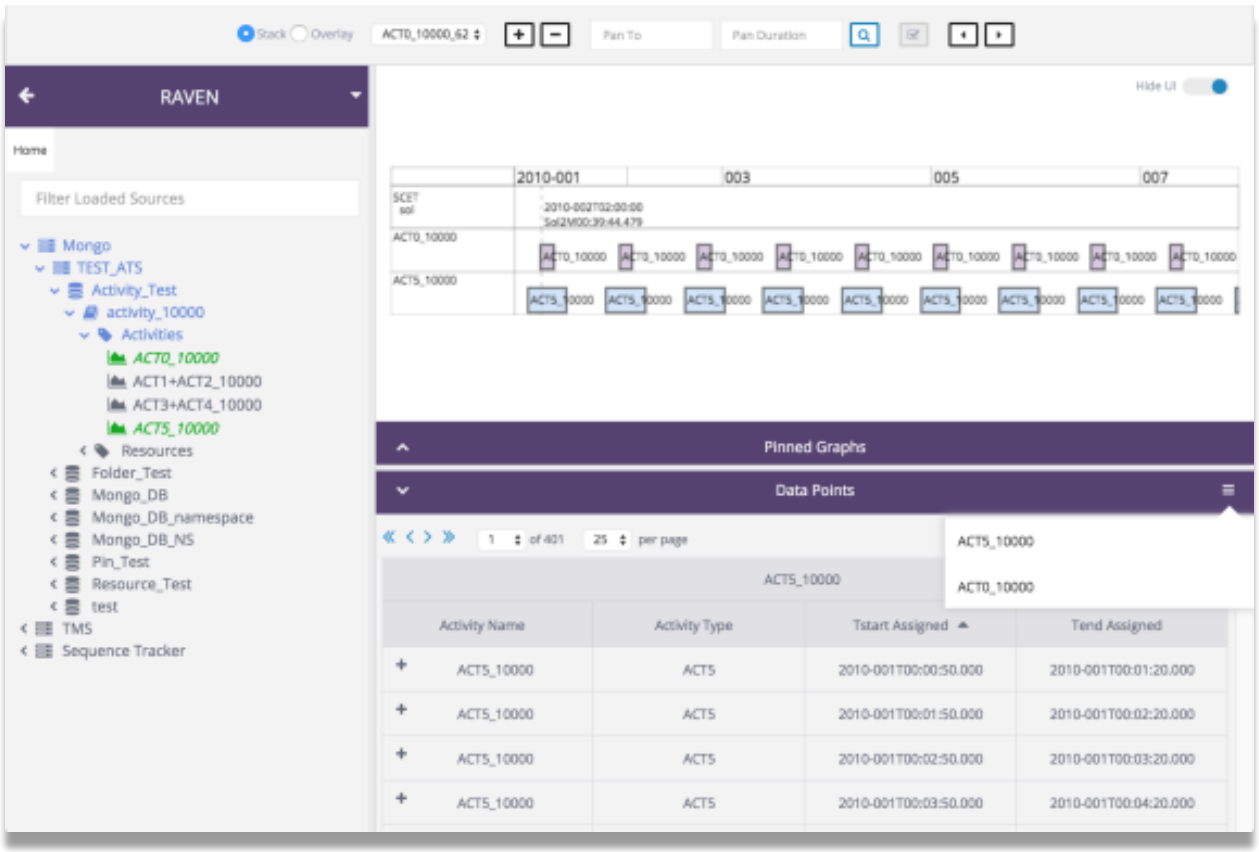


Figure 16. Switch Details of Two Data Sources

Managing the Explorer State and Layout

The Manage Display feature allows the user to manage Explorer States and Layouts in RAVEN.

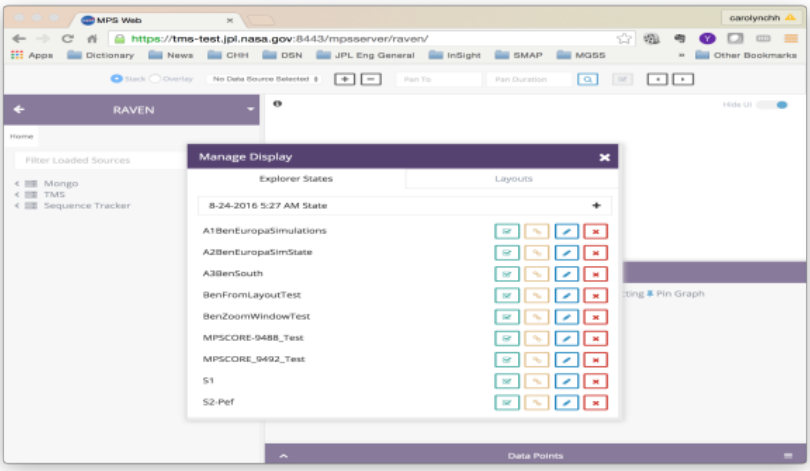
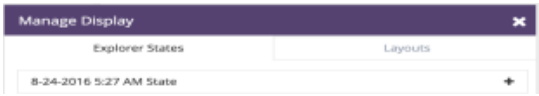


Figure 17. Manage Display Dialog

Explorer State

The user may save the current explorer state, apply previously saved explore state, or delete existing explorer states.

> ***How To**: Save the Current State*
>
> 1. Set the RAVEN chart as preferred.
> 2. Make sure you are in the Explorer States Tab.
> 3. Click on the + icon to add the state.
>
> 
>
>
> 4. It will show up in the list of available states.

To apply the state, simply bring up the dialog window and click on the apply button of the state: Apply: 

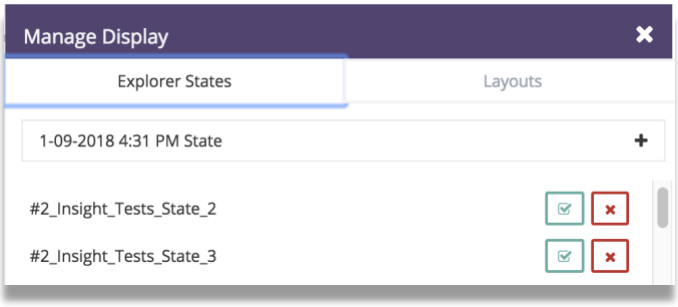


Figure 18. Apply Explorer State

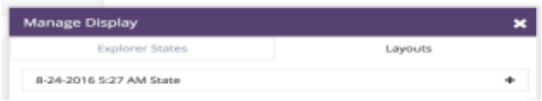
To delete, click on the  icon button.

Layout

The **Save Layout** button allows the user to save and name the current layout where “layout” is how you have the rows set up.

How To: Save the Layout

1. Set the RAVEN chart as preferred.
2. Make sure you are in the Layouts Tab of the dialog.
3. Enter the name.
4. Click on the + icon to add the layout.



5. It will show up in the list of available layouts.

To apply the layout, simply bring up the dialog window and click on the apply button of the layout:

Apply:

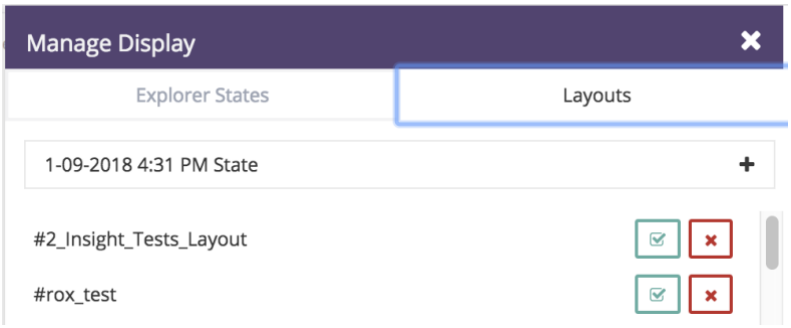
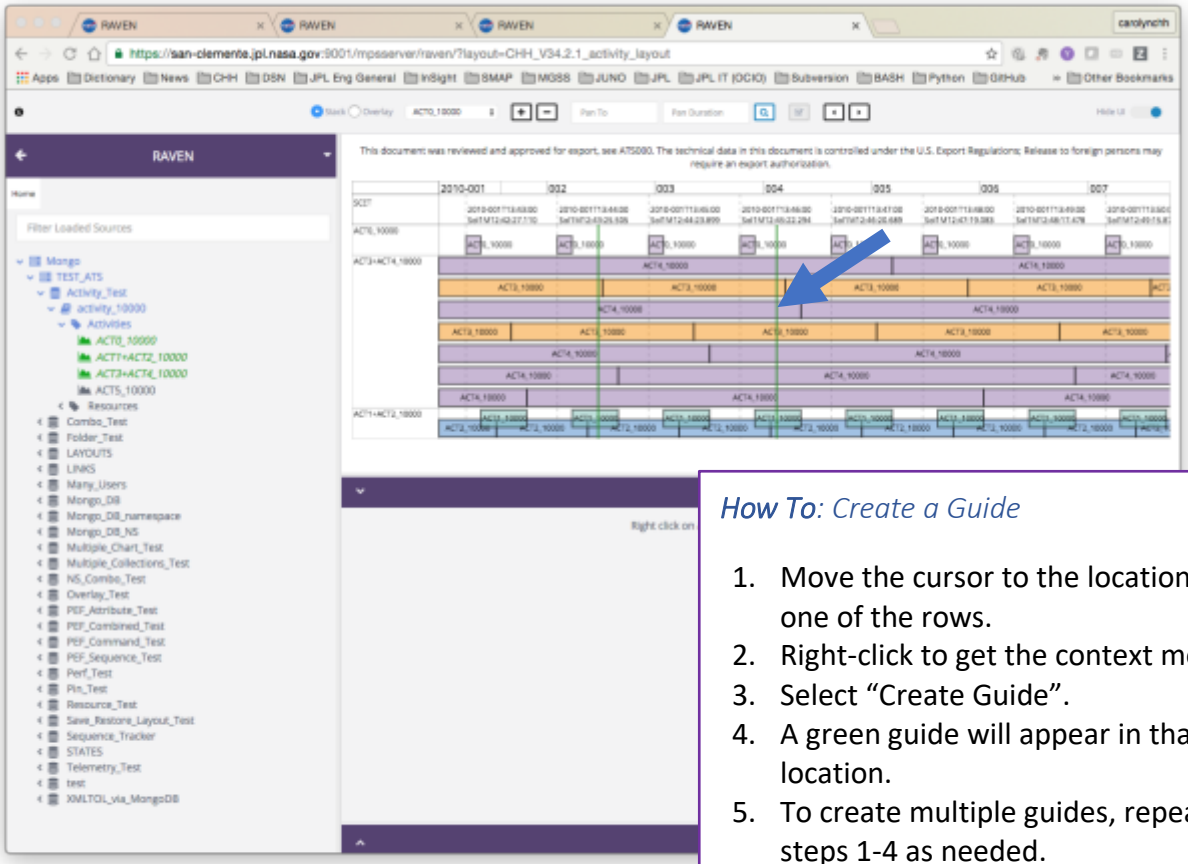


Figure 19. Apply Layout

To delete, click on the icon button.

Guides

Guides are vertical bars that span across rows.



How To: Create a Guide

1. Move the cursor to the location on one of the rows.
2. Right-click to get the context menu.
3. Select “Create Guide”.
4. A green guide will appear in that location.
5. To create multiple guides, repeat steps 1-4 as needed.

6.1 Data Pinning

If you want to pin a certain subtree of the data that is of special interest or require quick and easy access; Data Pinning will make this easy. When a subtree is pinned a tab is created on top of the Data Explorer. Multiple subtrees can be pinned.

How To: Pin a Subtree

1. Show the Data Explorer
2. Hover the mouse over the item to pin.
3. A pin icon will appear: and click on it
4. You will see a tab being added on the Source Explorer.
5. Click on the tab and it will display the subtree pinned.

6.2 Data Filtering

A filter field is located right above the Data Explorer area. The user can enter a search string in the filter to search for specific nodes containing the given string. RAVEN will then display the found nodes and all nodes above them from the root. RAVEN applies the same filter to all tabs and will display the qualified nodes per the pinned subtree.

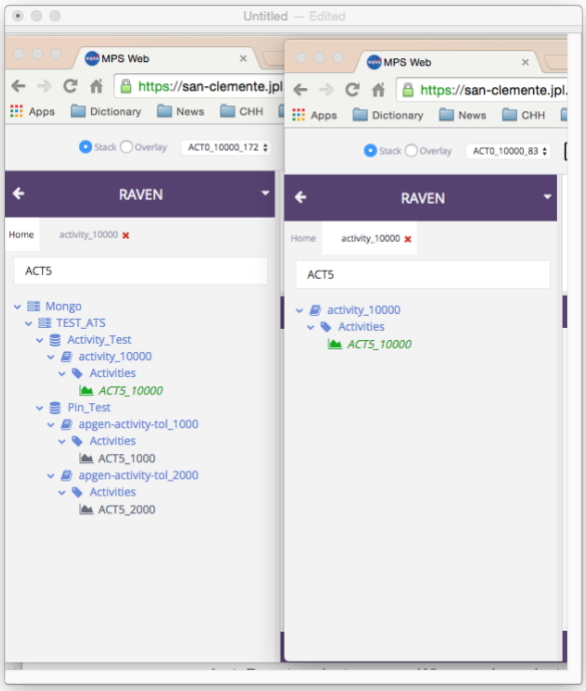


Figure 20. Data Filtering

6.3 Activity Expansion

RAVEN can show expansion of an activity to its children or recursively show all of its descendants.

***How To**: Show/Hide Activities Expansion*

1. Click an activity in the chart.
2. Right-click to on it to get the context menu.
3. Select Expand and pick the desired option:
    - All Displayed Activities Fully
    - All of Selected Type Fully
    - Selected Fully
    - Selected Next Level

Figure 21. Expanding Activity to Next Level

6.4 Sequence Tracker Data

When **Sequence Tracker data** is selected, the Explorer Panel allows the user to select what data generated by the connected Sequence Tracker should be displayed. Sequence Tracker contains two types of filtering: 1) Sequence Events and 2) Metadata & Sequence Filters.

6.5 Sequence Events

RAVEN will list all the sequence events for display. The user can select the events that are of interest to be displayed. Unlike other RAVEN data sources, Sequence Tracker data are all bundled and shown in a single row in the chart area.

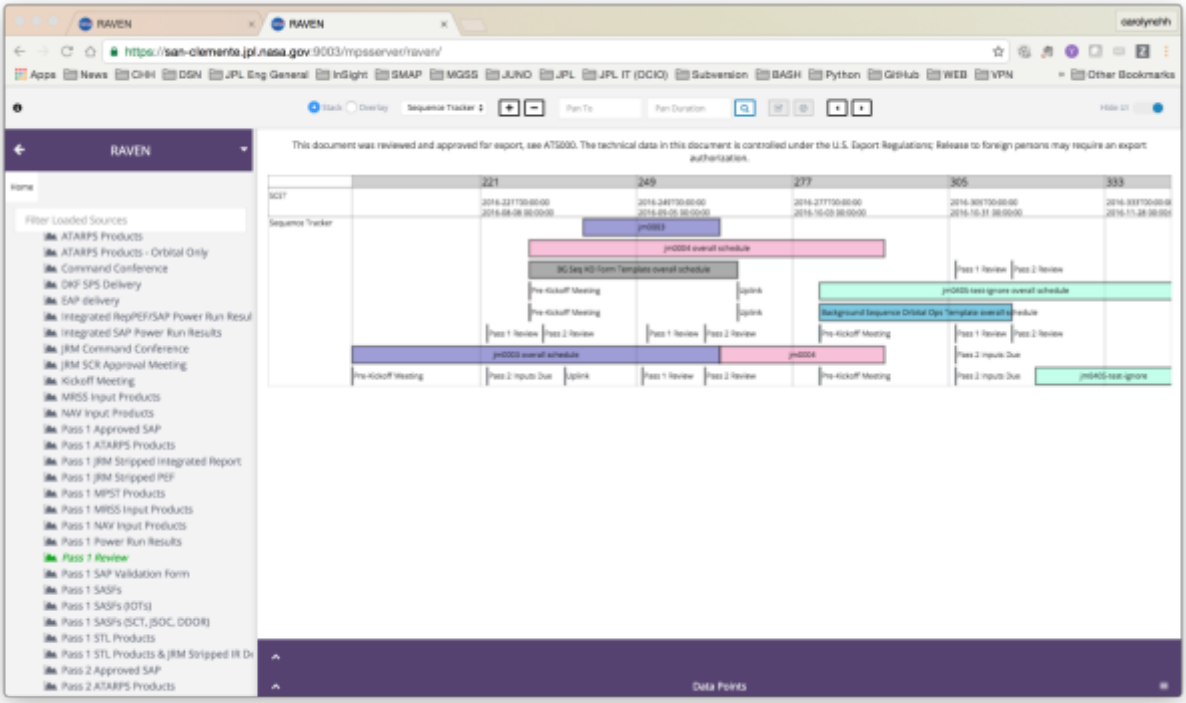


Figure 22. Sequence Events

6.6 Sequence Filters

Sequence Filters allows the user to specify the sequence title or the sequence type of the interested sequences.

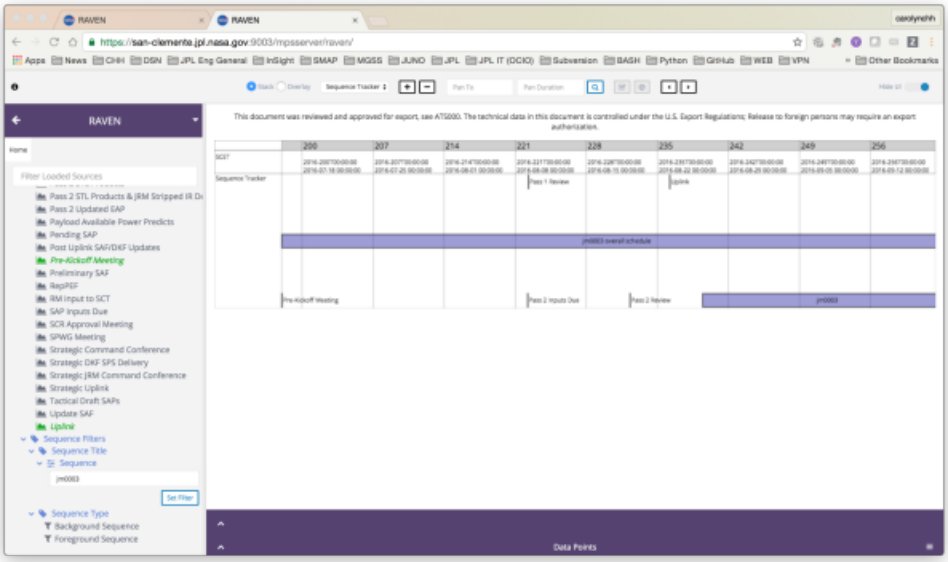


Figure 23. Sequence Filters

Metadata Filters lists all the metadata associated with different categories of sequence events, such as ‘collection’ and ‘meeting’. The user can choose what metadata of interest to be shown in the detail data points.

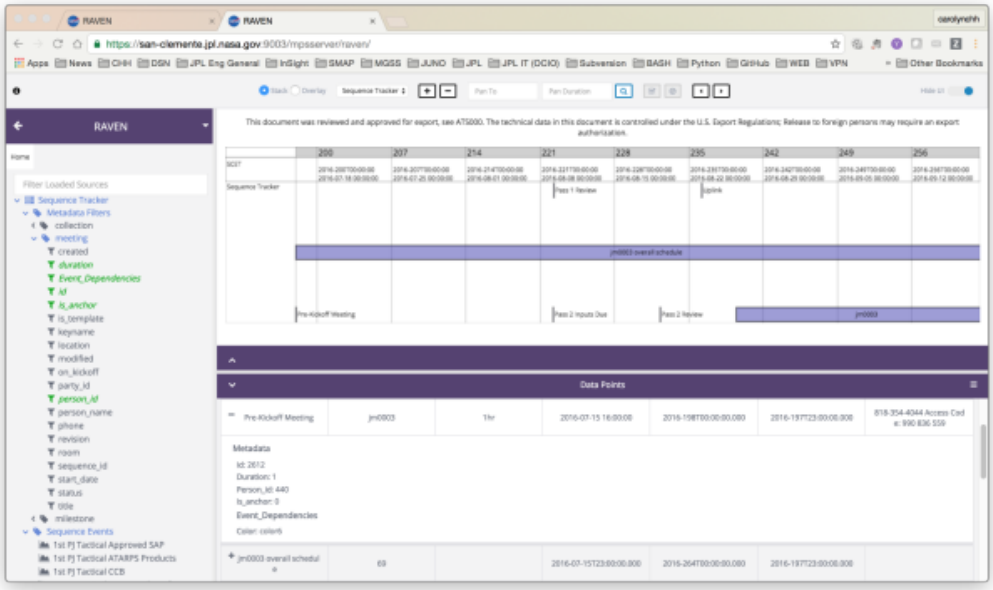


Figure 24. Metadata Filters

6.7 Sharing

Sharable Link

The shareable link is an easy way to generate and save a unique URL that will bring up the RAVEN Chart Area and Detail Panel but not the Data Explorer.

***How To**: Generate a Shareable Link*

1. Click in the Managerial Menu icon
2. Select “Get Shareable Link”.
3. You can now distribute that link to others.

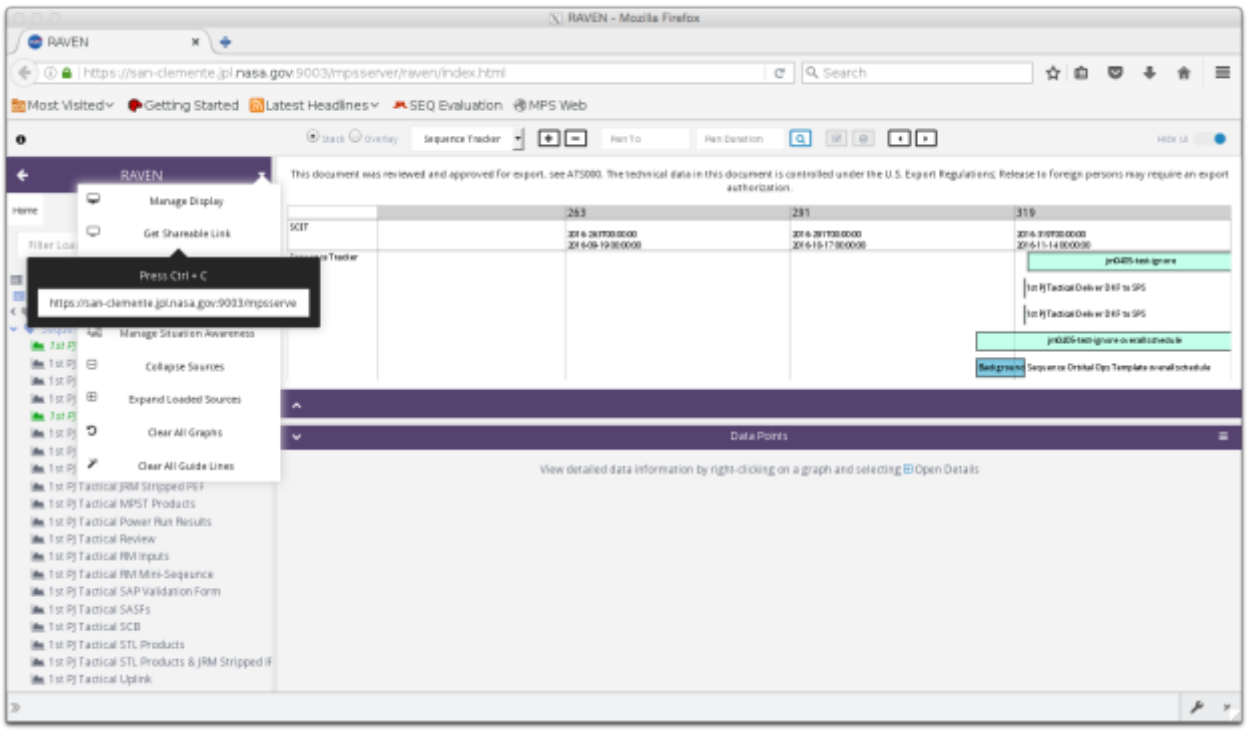
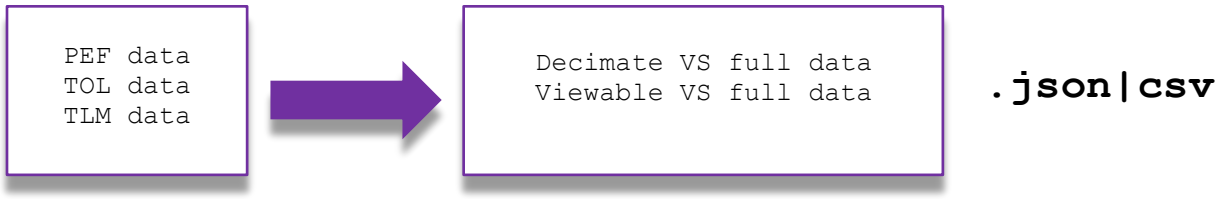


Figure 25. Shareable Link

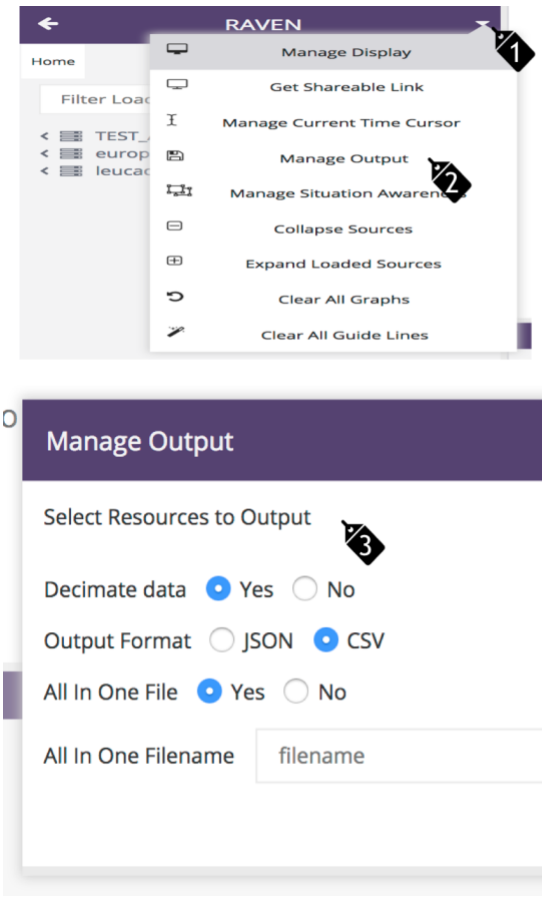
6.8 Export Data

RAVEN can export the selected data (sources/filtering/timelines/display) into the a JSON or CSV format*.



* It will take the relevant data points and index them to make it more efficient to load.

Figure 26. Data exported to output options and format (JSON versus CSV)



How To: Export Data

1. Open the Managerial Menu
2. Select 'Manage Output'
3. Select the data and the output format to export.
4. Click on 'Output Files' to perform the export task.

Figure 27. Export Data Workflow

6.9 Programmatic Interface

The Programmatic Interface allows the user to specify, in a JSON file, the timeline data: resources and activities, to be displayed in RAVEN. Once the JSON file is imported into the tool, the timelines can be rendered in the browser by using the query parameter '?**mm**=filename'.

How To: Import a file for Programmatic Interface

1. Create a JSON file based on the schema provided below.
2. Use endpoint to import:
   `{hostname}/mpsserver/api/v2/fs/{path}`
3. Display it in RAVEN:
   `{hostname}/mpsserver/raven?mm={name}`

Schema: JSON file for Programmatic Interface

```
{
   "$schema": "http://json-schema.org/draft-04/schema#",
   "definitions": {
      "graphSettings": {
         "type": "object",
         "properties": {
            "iconEnabled": {
               "type":"boolean"},
               "trimLabel": {"type":"boolean"},
               "compositeYLabel": {"type":"boolean"},
               "lineColorCustom": {"type":"string"},
               "fillColorCustom": {"type":"string"},
               "fill": {"type":"Boolean"},
               "height": {"type","integer"},
               "interpolation": {"type":"string"},
               "overlayBand": {"type":"string"},
               "statePlotType": {"type":"integer"}
            }
         }
      "displayItem": {
         "type": "object",
         "properties": {
            "name": {"type":"string"},
            "label": {"type":"string"},
            "url": {"type":"string"},
            "graphSettings": {"$ref":"#/definitions/graphSettings"}
         },
         "required":["name", "label", "url"]
      }
   },
   "title": "displayContent schema",
   "type": "object",
   "properties": {
      "name": {"type": "string"},
      viewTemplate:{
         viewStart: {"type":"string"},
         viewEnd: {"type","string"},
         charts: {
            "center": [{"$ref":"#/definitions/displayItem"}],
            "south":[{"$ref":"#/definitions/displayItem"}],
         },
      }
      guides: [{
         "type":"string",
         "description":"time of guide"
      }],
      "bandLabelWidth": {
         "description": "width of resource label",
         "type": "integer",
      },
   },
   "required":["viewTemplate"]
}
```

6.10 Annotations

An annotation in RAVEN is a marker to data in time that the user considers relevant. It consists of a label, a string and color. One or more annotations can be created for each row in the chart.

How To: Enable Annotations

1. In the "Data View Selection" area locate an icon like this: 
2. It shows the annotations enabled when green and disabled when gray: 

NOTE: It also shows the number of annotations in the pink circle.

How To: Create an Annotation

3. Make sure at least a band exists in the Chart Area.
4. Look for the edit (pencil) icon:  in the Data View Selection Area
5. Click the edit icon to bring up the Annotation Data window.
6. Enter the data: Label, Type, Time, Text, Color).
7. Click the Add button.

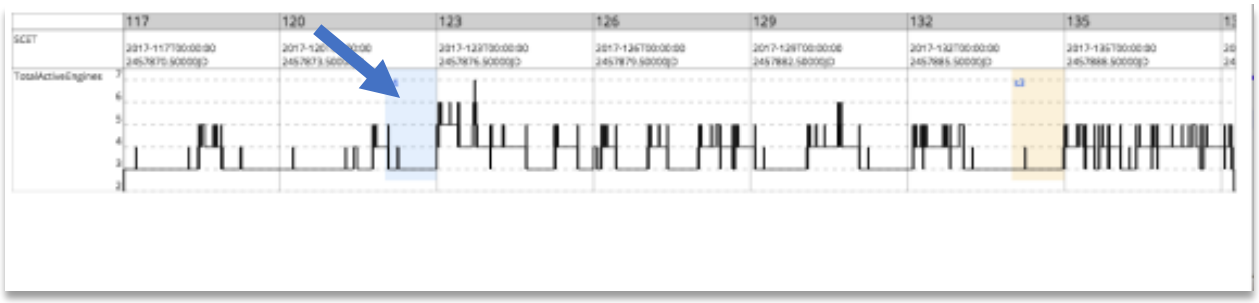
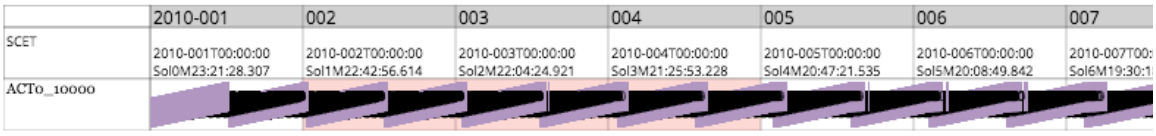


Figure 28. Annotations displayed in Band (Blue and Yellow)

How To: Read an Annotation

1. Make sure the Annotations Flag is enabled in the Data View Selection Area:

   Disabled:  →Enabled: 
2. The number icon shows the number of annotations added.
3. The section in the band will be brushed with the color selected:



6.11 Situation Awareness

When Situation Awareness mode is turned on, the current time cursor is displayed. The duration for a page is configurable via the “Manage Situation Awareness” option, accessible through the managerial menu. The time period of data from each PEF to use is specified in a CSV file stored in the Data Store configured in the situational_awareness.properties file used by MPSServer. As new PEF files are generated, the CSV should be updated with the new entries.

Enabling/Disabling Situation Awareness

By default, the Situation Awareness feature is disabled. You need to turn it on to start using it. Without the Situation Awareness feature enabled, the user will see all the PEF files of the group in the explorer data with their original data.

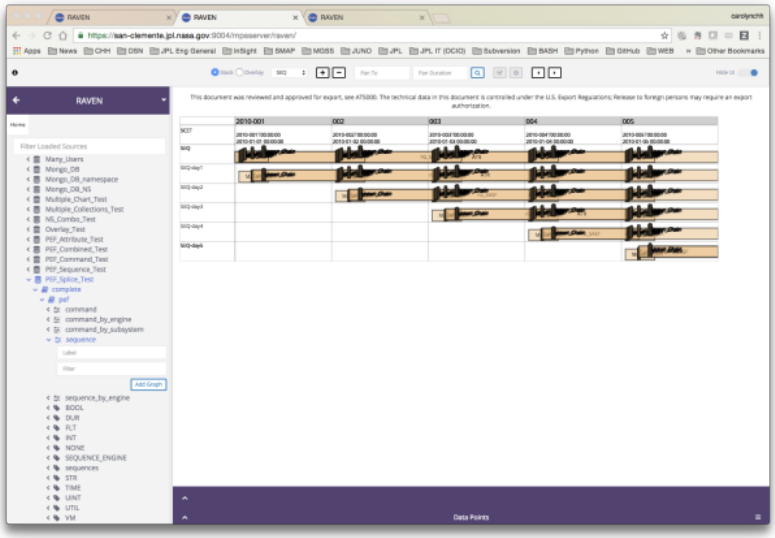


Figure 29. PEF Display - Situation Awareness disabled

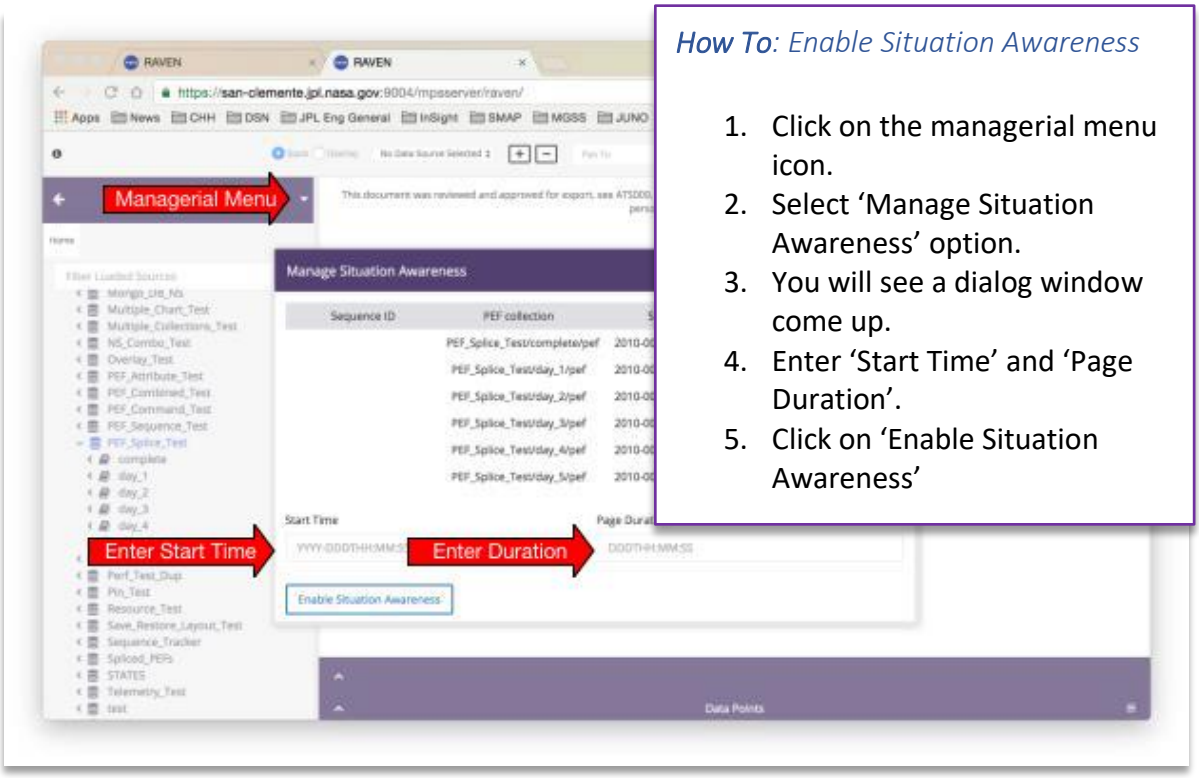


Figure 30. Enable Situation Awareness

Once the 'Situation Awareness' is enabled, the user will see all the PEFs of the group in the explorer area, and all their data will now be spliced according to the Situation Awareness Specification file. The user should only select data for display from ONE AND ONLY ONE of the group of PEFs as if they are all from a single PEF, a spliced one transitioning from one PEF file to the next.

6.12 PEF Stitching

RAVEN provides an option for users to view data from multiple PEF files with seamless transitions from one to the other. A PEF is a Predicted Events File. Its purpose is to give complete information to the external user as to what predicted events are to take place during sequence execution.

***Example**: CSV File for PEF Stitching*

```
sequenceID,pefCollection,pefStartTime,pefEndTime
day_1,PEF_Splice_Test/day_1/pef,2010-001T04:20:00.000,2010-002T04:20:00.000
day_2,PEF_Splice_Test/day_2/pef,2010-002T04:20:00.000,2010-003T04:20:00.000
…
day_n,PEF_Splice_Test/day_n/pef,2010-003T04:20:00.000,2010-004T04:20:00.000
```

***How To**: Setup PEF Stitching for Situation Awareness*

1. Configure the data_sources.properties file to add the MongoDB reference.
2. Ingest the pef_list.csv file to the data store.
   Example:

```
sequenceID,pefCollection,pefStartTime,pefEndTime
day_1,PEF_Splice_Test/day_1/pef,2010-001T04:20:00.000,2010-
002T04:20:00.000
day_2,PEF_Splice_Test/day_2/pef,2010-002T04:20:00.000,2010-
003T04:20:00.000
…
day_n,PEF_Splice_Test/day_n/pef,2010-003T04:20:00.000,2010-
004T04:20:00.000
```

3. Enable Situation Awareness from the managerial menu.

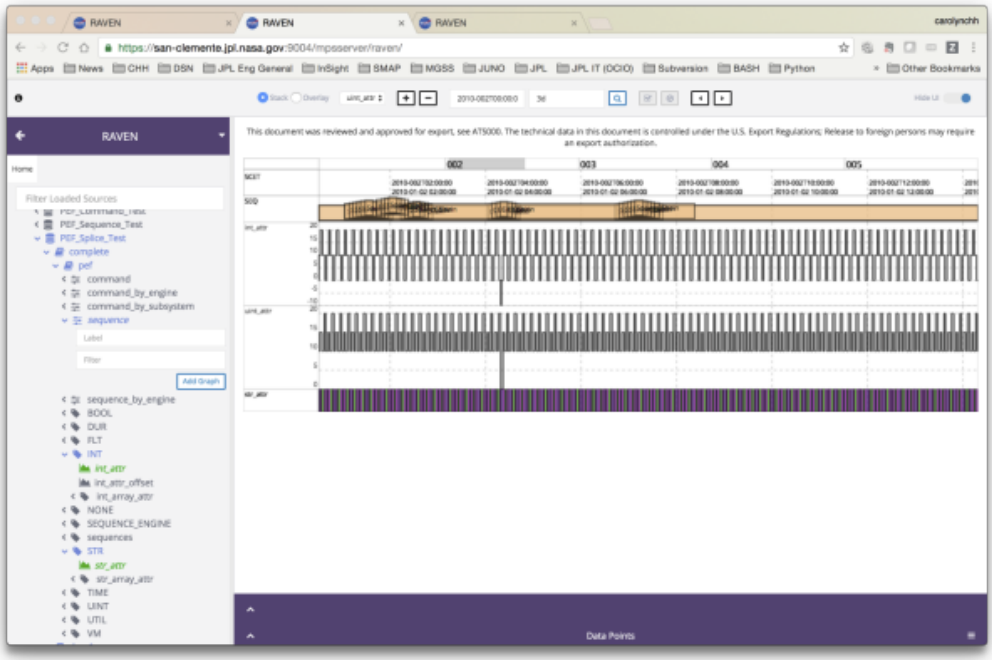


Figure 31. PEF display with Situation Awareness enabled