Intelligent Plant's
Sequence of Events Explorer

User Manual
September 2022

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Revision History:

Date	Version	Description	Created by (Initials)	Reviewed by
01/06/2022	0.1	Draft	SK	VV
01/09/2022	1.0	Initial Manual	VV	
05/12/2022	1.1	Amended incorrect footer	PG	

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1 Introduction

The Sequence of Events Explorer displays to the control room Operator a live view of filtered or unfiltered data sets. When receiving live updates, the application display mimics the functionality of the physical alarm and event printers that existed to record events until the 1990s. The data extracts are created through intuitive and powerful query-building interface elements. The Sequence of Events Explorer allows the Operator to locate specific records from verbose alarm and event databases, with the option to save a complex query for later use or send it to colleagues for analysing.

2 Overview

2.1 Asset and Time Range

The Asset and Time Range panel is used to select the desired asset and time period. The Sequence of Events output will only contain events from the selected asset within this time period.

Select an Asset and Time Range

Select Asset:
Choose an asset

Start time:	End time:
*	*

2.2 Search

The Search panel is used to add and remove filters to the search. Any active filters are also listed in this panel and can be adjusted using the options available. There is also the option to save the current search or open searches that were saved previously. Live updates can also be turned on/off by using the Live Updates switch.

Q Search

▼ Add Filter	⊸ᐅ Add AND Operator	⊸ᐅ Add OR Operator	⊸ᐅ Add NOT Operator

AND | ⠿ | Tag ▾ | equal to ▾ | Enter a value | 🗑

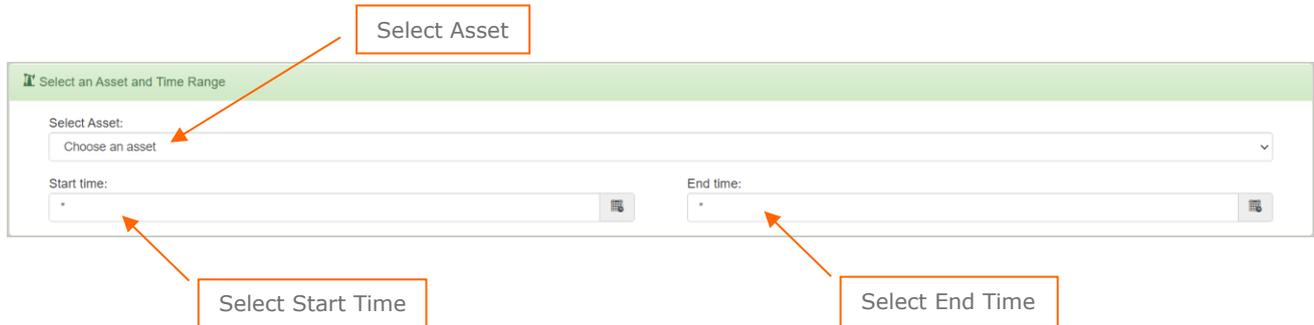| Q Search	🖺 Save Search	🗁 Open Search	⚲ Permanent Link	Live Updates ⬤ ♥

2.3 Sequence of Events

The Sequence of Events panel displays the output of the search. The fields displayed in the output can be adjusted. It is also possible to refine the search by choosing to exclude elements of the output. The output for the whole time period can be exported to Excel.

⊞ Sequence of Events   **⊡ Fields**   **⬇ Export**

#	Time Stamp ⇕	Tag ⇕	Tag Description ⇕	Alarm Identifier ⇕	Event Type ⇕	Priority ⇕	Unit ⇕
1	03/08/2021 00:57:11	38XA3388		OFFNORM	ALM	Alert	Red Unit
2	03/08/2021 00:51:25	21PDAH1113		OFFNORM	ALM	Alert	Red Unit
3	03/08/2021 00:50:55	HV46688		ALM	EVT	Alert	Red Unit
4	03/08/2021 00:50:41	HV46688		ALM	EVT	Alert	Red Unit
5	03/08/2021 00:50:37	21PDAH1113		OFFNORM	RTN	Alert	Red Unit
6	03/08/2021 00:46:42	21PDAH1113		OFFNORM	ALM	Alert	Red Unit
7	03/08/2021 00:45:57	HV46688		ALM	EVT	Alert	Red Unit
8	03/08/2021 00:45:41	21PDAH1113		OFFNORM	RTN	Alert	Red Unit
9	03/08/2021 00:45:03	PI33567	Comp A 1st Stage Knockout	LO	RTN	Warning	Gas
10	03/08/2021 00:44:41	HV46688		ALM	EVT	Alert	Red Unit
11	03/08/2021 00:41:58	HV36612		ALM	EVT	Alert	Red Unit
12	03/08/2021 00:41:46	21PDAH1113		OFFNORM	ALM	Alert	Red Unit
13	03/08/2021 00:41:11	HV46688		ALM	EVT	Alert	Red Unit

3 Detailed Descriptions

3.1 Asset and Time Range

The Asset and Time Range panel is used to select a time period and asset.
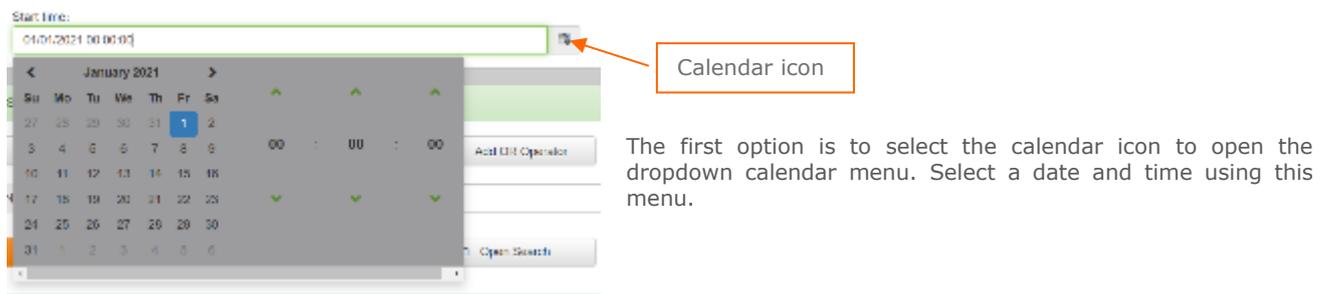

Select Asset

Select Start Time

Select End Time

3.1.1 Select Asset

Click the drop-down to see which assets are available, and select the desired one.

3.1.2 Select Start/End Time

There are two options for setting the start/end time of the Time Range.

Calendar icon

The first option is to select the calendar icon to open the dropdown calendar menu. Select a date and time using this menu.
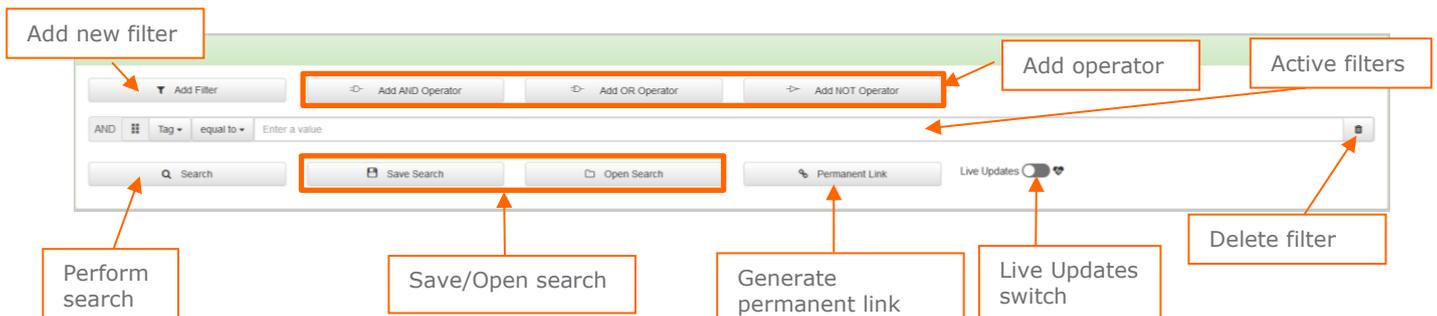
Alternatively, an asterisk (*) represents the current time and date. Using an asterisk, the start/end time can be set a certain number of days before the present. In the example below the start time is set to 30 days before the present.
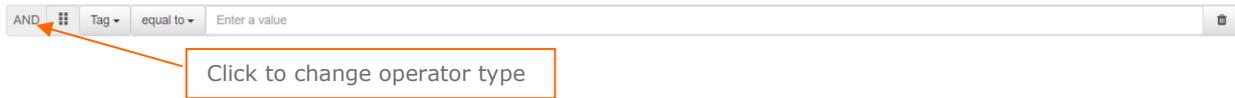

3.2 Search

The Search panel is used to add and remove filters to the search. There are a number of different operator and filter options which can be used to refine the search as desired. Additionally, this panel includes the option to save the current search and also open previously saved searches. A permanent link can also be generated, when this link is accessed, it opens Sequence of Events Explorer with the same search parameters and outputted fields as when the link was generated. Live updates are turned on/off by using the Live Updates switch.

Add new filter

Add operator

Active filters

Perform search

Save/Open search

Generate permanent link

Live Updates switch

Delete filter

3.2.1 Operators

There are three types of operators: AND, OR and NOT, these each follow their usual logical behaviours. Once an operator has been added, the operator's type can be changed by clicking on it.

Click to change operator type

Operators can be nested, by dragging and dropping, to produce more precise searches. See below for an example.
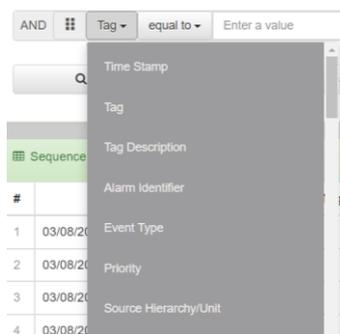
Click and hold to drag and drop

Operators can also be collapsed or expanded by clicking the plus\minus. When collapsed, the content of the operator is written in word form. This is shown below.
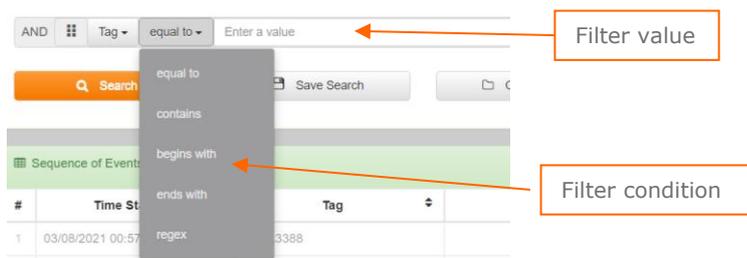
Click to collapse

Click to expand

3.2.2 Filters

A filter is made up of three components: event field, filter condition and value. When a search is performed, each event is filtered according to whether its field value matches that of the filter.
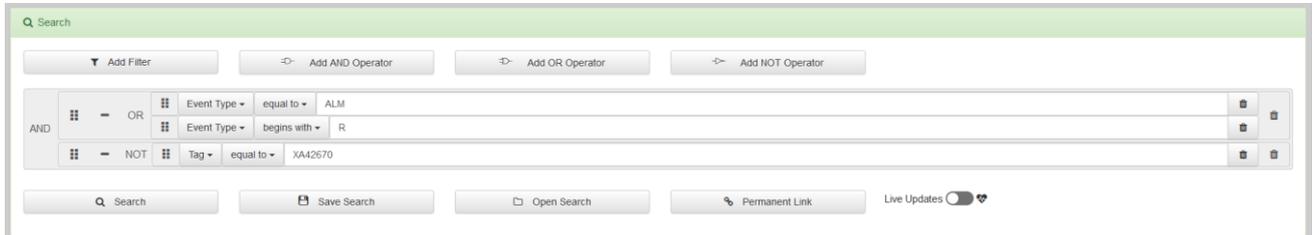
To select a field for the filter, open the drop-down menu and choose the desired one.

The filter condition determines how an event's field must match the filter value to meet the search requirement (e.g., equal to, contains, begins with), the condition is selected from its drop-down menu. The desired filter value can be entered into the value entry space.

Filter value

Filter condition

3.2.3   Example Search

The example below shows a search that filters for events with an Event type equal to "ALM" or beginning with "R", excluding events with the field Tag equal to "XA42670". This is done by filtering for the Event Type in an OR operator and for the Tag in a NOT operator, with each filter entered with the relevant filter conditions and values. The OR and NOT operators are nested within an AND operator, meaning an event only matches the search if the requirements of both operators are met.

3.2.4   Save Search

Clicking the Save Search button will open a dialogue box where the current search can be saved under a desired name.
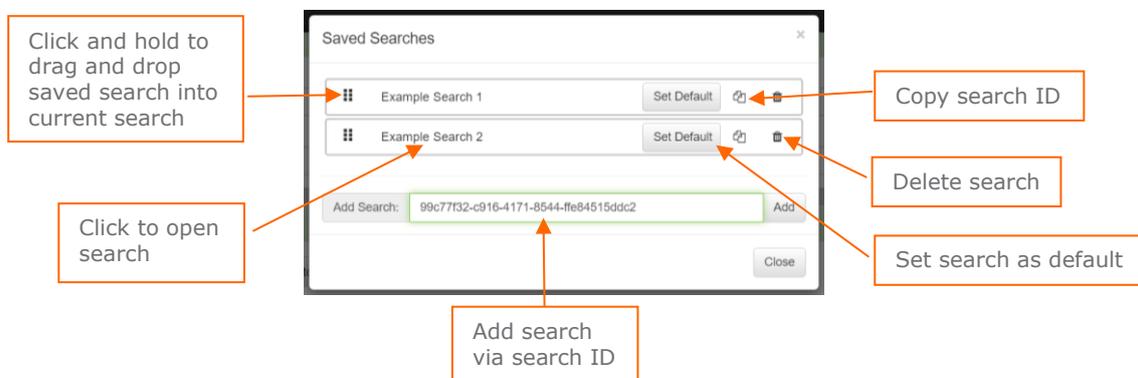

All saved searches can be opened using the Open Search button.

3.2.5   Open Search

Clicking the Open Search button will open a dialogue box which includes a list of all the currently saved searches. For each saved search there is the option to: open the search by clicking it, set it as default, copy the search ID or delete the saved search. Additionally, a saved search can be added to the current search by dragging and dropping it from the list.
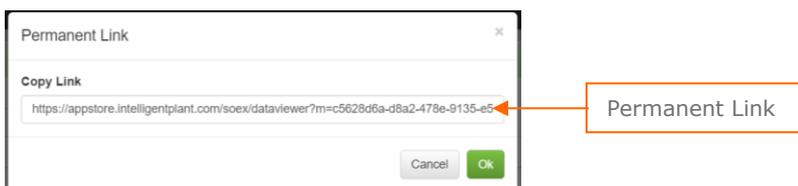
A search can be added to the list of saved searches by entering its search ID into the Add Search bar.

Setting a search as default causes the search to return to that state whenever the app resets.

3.2.6   Permanent Link

Clicking the Permanent Link button will open a dialogue box containing a generated link. When this link is accessed, it opens Sequence of Events Explorer with the same search parameters and outputted fields as when the link was generated. This is useful for sharing a search with others.

3.2.7   Performing a Search and Live Updates

Once all filters have been selected the search can be performed by clicking the Search button. When the search is performed the output is provided in the Sequence of Events panel.

Live updates can be switched on by clicking the Live Updates switch. When the switch is on, the Sequence of Events panel is updated every 5 seconds. The heart icon will flash orange when the Sequence of Events table is being updated.

Live Updates 🔘 💔   Live Updates 🔘 💔

To turn off live updates, click the switch again.

Scrolling down causes the live updates switch to turn off automatically. Once the user has scrolled back to the top, live updates will turn on again automatically after 2 minutes.
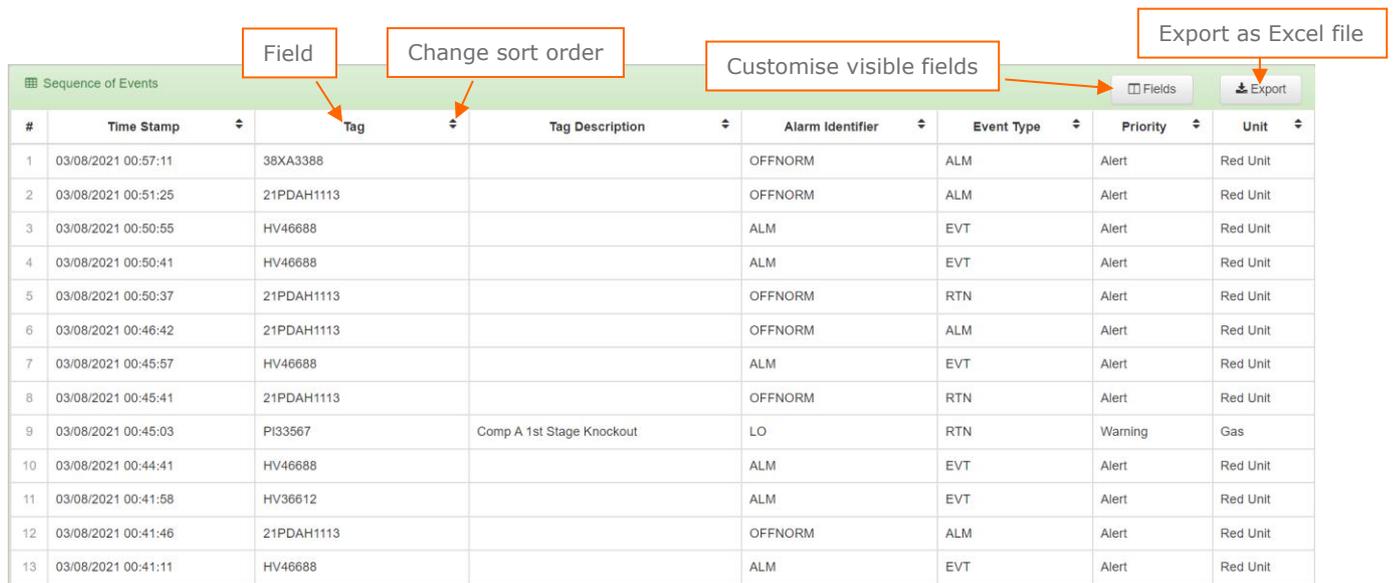
3.3 Sequence of Events

The Sequence of Events panel displays the output of the search. Every event which matches the search criteria in the selected time period is shown.

Each column in the table of events represents a field, these columns can be customised and reordered as desired. By default, the events are sorted in chronological order. However, events can also be ordered alphabetically in a chosen field.

The output for the entire time period can be exported to an Excel file.

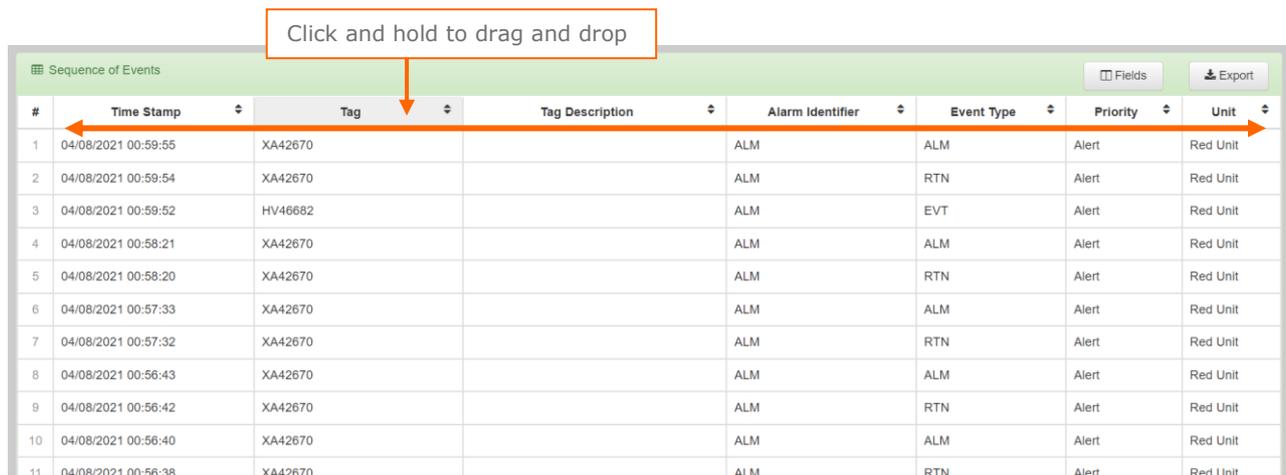The search parameters can also be refined from this panel.

Field   Change sort order   Customise visible fields   Export as Excel file

Sequence of Events

#	Time Stamp	Tag	Tag Description	Alarm Identifier	Event Type	Priority	Unit
1	03/08/2021 00:57:11	38XA3388		OFFNORM	ALM	Alert	Red Unit
2	03/08/2021 00:51:25	21PDAH1113		OFFNORM	ALM	Alert	Red Unit
3	03/08/2021 00:50:55	HV46688		ALM	EVT	Alert	Red Unit
4	03/08/2021 00:50:41	HV46688		ALM	EVT	Alert	Red Unit
5	03/08/2021 00:50:37	21PDAH1113		OFFNORM	RTN	Alert	Red Unit
6	03/08/2021 00:46:42	21PDAH1113		OFFNORM	ALM	Alert	Red Unit
7	03/08/2021 00:45:57	HV46688		ALM	EVT	Alert	Red Unit
8	03/08/2021 00:45:41	21PDAH1113		OFFNORM	RTN	Alert	Red Unit
9	03/08/2021 00:45:03	PI33567	Comp A 1st Stage Knockout	LO	RTN	Warning	Gas
10	03/08/2021 00:44:41	HV46688		ALM	EVT	Alert	Red Unit
11	03/08/2021 00:41:58	HV36612		ALM	EVT	Alert	Red Unit
12	03/08/2021 00:41:46	21PDAH1113		OFFNORM	ALM	Alert	Red Unit
13	03/08/2021 00:41:11	HV46688		ALM	EVT	Alert	Red Unit

3.3.1 Customising Fields

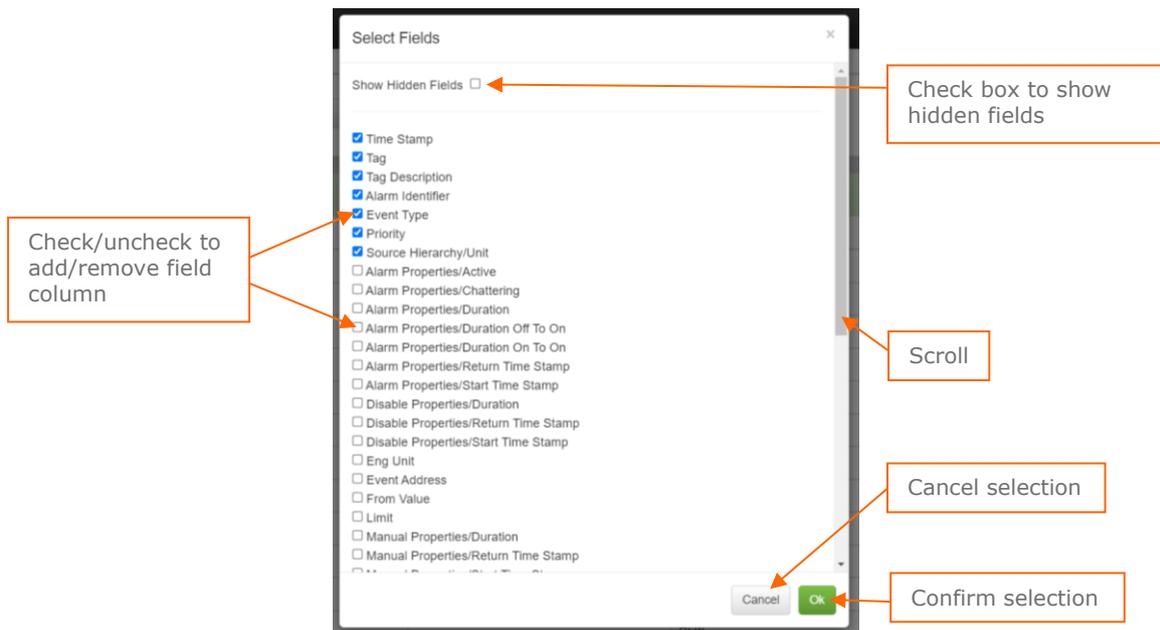The columns for each event field displayed in the Sequence of Events output can be reordered by dragging and dropping them as required.

Click and hold to drag and drop

Sequence of Events

#	Time Stamp	Tag	Tag Description	Alarm Identifier	Event Type	Priority	Unit
1	04/08/2021 00:59:55	XA42670		ALM	ALM	Alert	Red Unit
2	04/08/2021 00:59:54	XA42670		ALM	RTN	Alert	Red Unit
3	04/08/2021 00:59:52	HV46682		ALM	EVT	Alert	Red Unit
4	04/08/2021 00:58:21	XA42670		ALM	ALM	Alert	Red Unit
5	04/08/2021 00:58:20	XA42670		ALM	RTN	Alert	Red Unit
6	04/08/2021 00:57:33	XA42670		ALM	ALM	Alert	Red Unit
7	04/08/2021 00:57:32	XA42670		ALM	RTN	Alert	Red Unit
8	04/08/2021 00:56:43	XA42670		ALM	ALM	Alert	Red Unit
9	04/08/2021 00:56:42	XA42670		ALM	RTN	Alert	Red Unit
10	04/08/2021 00:56:40	XA42670		ALM	ALM	Alert	Red Unit
11	04/08/2021 00:56:38	XA42670		ALM	RTN	Alert	Red Unit

Clicking the Fields button opens a dialogue box listing the possible event fields which can be displayed. By checking/unchecking the box for a field, it is added/removed as a column in the Sequence of Events table. There is also an option to Show Hidden Fields, this adds more advanced field options to the list.

3.3.2 Export to Excel

By clicking the Export button, the Sequence of Events table is exported as an Excel document.
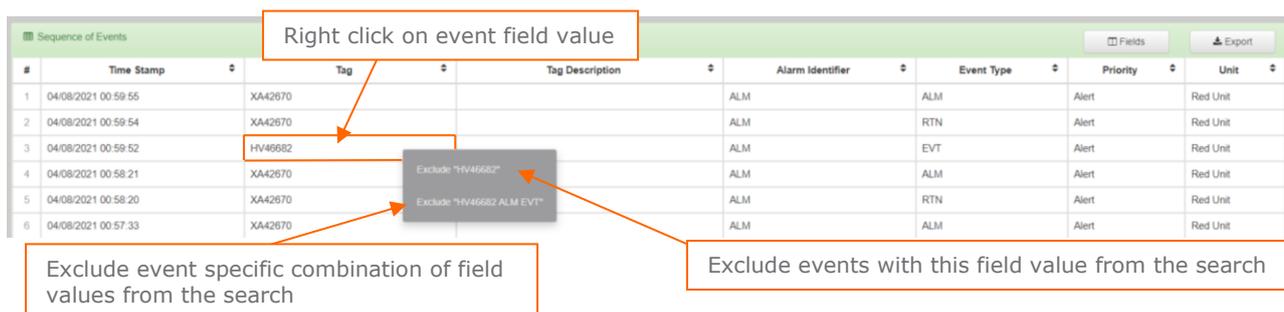

Whilst the export is in progress an additional panel will be displayed with a Stop button. Pressing this button will stop the export at the next step, the provided file will contain all events processed up until this step.

The exported file will appear in downloads.

3.3.3 Refining the Search

It is possible to refine the search from the Sequence of Events panel. Right-clicking on a field value of an event will provide the option to exclude events with this field value from the search output. The option to exclude a combination of field values, relevant to this event, will also be provided. Doing so will add a NOT operator with the appropriate filter to the search panel.

If, in the above example, the option "Exclude "HV46682"" was selected then a NOT operator with the appropriate filter would be added to the search as follows.

NOT operator added to search

3.3.4　Open Bad Actor Detail in Alarm Analysis

For every alarm record (with Event Type "ALM") on right-click there is also an additional option – "Open Bad Actor Detail in Alarm Analysis". Selecting this shows in a new tab all the alarm-specific charts and KPIs required for resolving the alarm – including any associated Alarm Response Manual records.