JTLS-2021-15458 Link 16 J-Message Filters

Eric McDonald, Ellen Roland

1.0 Summary of Model Change Request

The Link 16 Message Service (L16MS) filtering will be expanded to have an additional filter setting. Operators need to configure a L16MS to send only specific J-Messages. These settings will allow track filtering by generic J-Message type.

2.0 Design Summary

A new J-Message filter panel will be added to the L16MS WHIP Module for filtering by J-Message type. This panel will contain a list of supported Link 16 message types. This filter group will operate as a generic filter that may only be overridden by track specific filters in the track summary table. To better describe a generic filter, take for example the OTH-Gold Message Service. In that service there are several generic filters including filtering by side, object class (air, ground, naval, etc.), aircraft class, and more. Those filters are also overridden only by track specific filters in the track summary table.

3.0 Detailed Design

The L16MS supports the independent message types listed in Table 1. Filterable J-Messages. There are other message types produced by the L16MS, but these are considered ancillary to the primary messages and will not be given their own filter setting. If the filterable J-Message is turned off, the associated or ancillary messages will automatically be assumed to be turned off.

Table 1. Filterable J-Messages

FILTERABLE J-MESSAGE	ASSOCIATED MESSAGES
J2.2 (Air PPLI)	J13.2 (Air Platform Status)
J2.3 (Surface PPLI)	J13.3 (Surface Platform Status)
J2.4 (Subsurface PPLI)	J13.4 (Subsurface Platform Status)
J2.5 (Land Point PPLI)	J13.5 (Land Platform Status)
J3.1 (Emergency Point)	None
J3.2 (Air Track)	None
J3.3 (Surface Track)	None

Table 1. Filterable J-Messages

FILTERABLE J-MESSAGE	ASSOCIATED MESSAGES
J3.4 (Subsurface Track)	None
J3.5 (Land Track)	None
J3.6 (Space Track)	J3.0 (Reference Point)
J10.2 (Engagement Status)	None

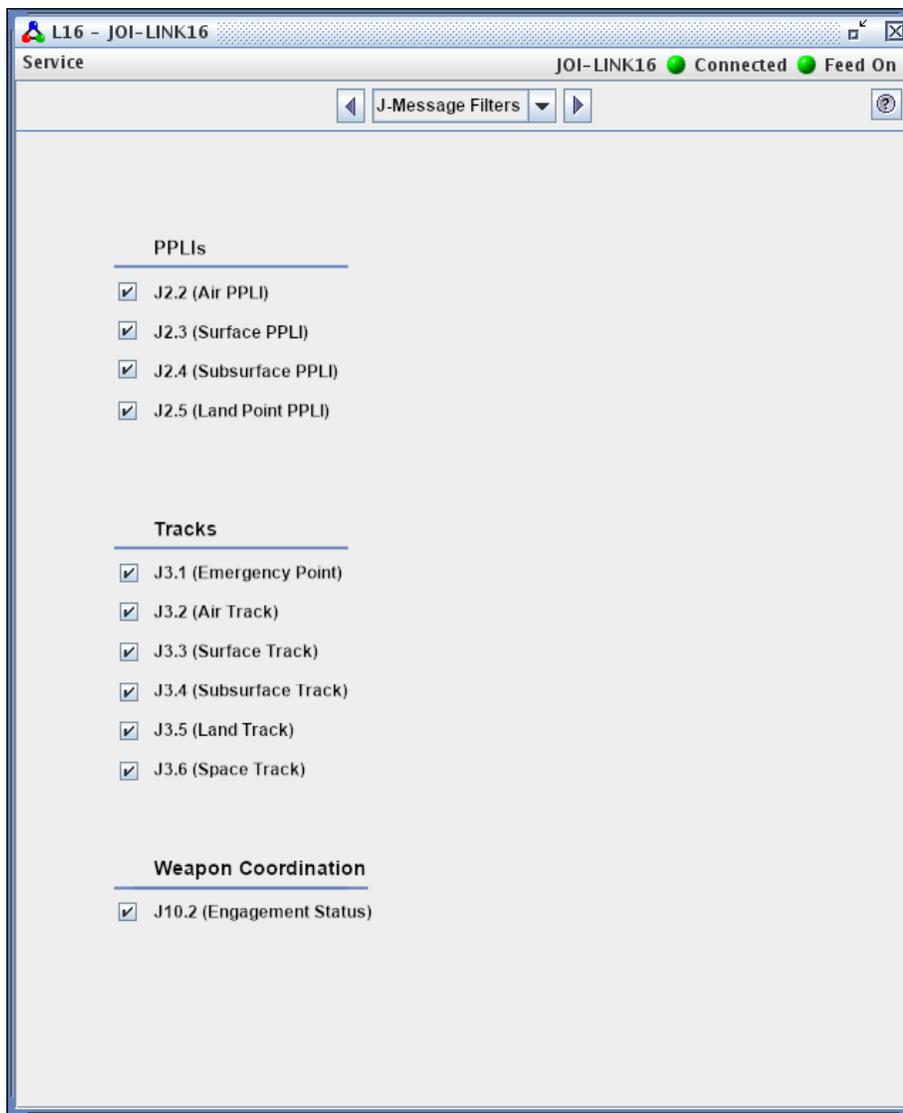A mock-up of the J-Message Filter panel is shown in Figure 1. yh78i

Figure 1. Mock-up Of J-Message Filter Panel

The L16MS will support saving the current service configuration. The J-Message filters will be added to the saved configuration file. This configuration file is automatically loaded on service startup if it exists.

This design has no impact on the model. The model will use its data, settings, and computed detections to properly fill JU Numbers, JU Source Number and JU Track Identifiers. This design simply imposes rules on the JOI to stop generating the specified messages based on the JOI manager's desires. There are two implications behind this situation:

- This Design does not call for filtering off tracks that are held by an object that has been filtered off. For example, assume that the AWACS mission, with a JU number of 44001, holds three Air Tracks, AA001, AA002, and AA003. If the JOI manager, filters off all Air PPLIs or just the PPLI for the AWACS mission, the JOI will not automatically stop sending out the J3.2 messages for AA001, AA002, and AA003. Under this circumstance, it is expected that Link-16 Common Operational Picture (COP) will reject the J3.2 messages with an error code indicating it has no knowledge of the Source JU Number for Tracks AA001, AA002, and AA003

- This design is also closely tied to ECP JTLS-2021-15460 Link 16 Air PPLIs Report Selves as Tracks. In that ECP, the model can be set up to provide data so that an Air PPLI will have a Track number assigned and the Air Mission will send out both a PPLI (J2.2 Message) and a Track (J3.2) message. The manner in which this ECP will handle this new filtering capability is described in detail within ECP JTLS-2021-15460 Link 16 Air PPLIs Report Selves as Tracks

4.0 Data Changes

None

5.0 Order Changes

None

6.0 JODA Changes

None

7.0 Test Plan

These tests can be accomplished either linked to a real-world system that can receive Link-16 messages or linked to the jtlsserver or jtlsclient process and manually view the output from the Link-16 JTLS Operational Interface (JOI). Make sure the following situations exist when accomplishing the test:

- Some of the air mission self reporters have a Send Air Info set so they will report fuel and weapon counts.

- Some of the PPLI Missions are holding tracks

- Some of the PPLI ships are holding tracks.

7.1 Test Basic Filtering

Purpose: The purpose of this test is to ensure that the Link-16 filtering works properly.

Step 1: Change the JOI filters according to the instructions in Table 2.

Table 2. Filter Options

TEST #	FILTER	CHECK LINK-16 NOT SENT
1	Turn off all filters	Everything should be sent.
2	Turn on Air PPLI Filter.	Air PPLI J2.2 messages, should not be sent as well as the J13.2 messages.
3	Turn off Air PPLI Filter	Air PPLI, J2.2 messages, and J13.2 messages should again be sent along with all other Link-16 messages
4	Find a naval unit on the side for which the JOI is running that does not have a source JU number. Give is a source JU number on the appropriate Link-16 network	The naval unit PPLI, J2.3 message, should start to be sent along with all other Link-16 messages.
5	Turn off Surface PPLI messages.	Surface PPLI should not be sent as well as the J13.3 Surface Platform Status messages.
6	Give another ship on the JOI side that has no JU Number, a JU Source Number on the appropriate network.	The newly assigned Naval Unit should not result in a Surface PPLI.
7	Turn on Surface PPLI messages.	All J Messages should be sent, including the ship that received a new JU number from Test #6.
8	Turn off Air Tracks, J3.2 messages.	The Air Tracks should not be sent out.

Table 2. Filter Options

TEST #	FILTER	CHECK LINK-16 NOT SENT
9	Turn off Surface Tracks and Surface PPLI	Only Air PPLIs should be sent out. I
10	Turn on Surface PPLIs	Only Air PPLIs and Surface Tracks should be sent out.

Expected Results: The proper Link-16 messages and their associated messages should be sent or not sent as appropriate.

7.2 Test Individual Track Filter Override

Purpose: The purpose of this test is to ensure that Link-16 track information for an individual object can override the JOI filter.

Step 1: Repeat each test in Test 7.1, but after setting the filters associated with each Sub-Test number, go directly to the individual track page.

Step 2: Find an object off that is currently on and turn it off.

Step 3: Find an object that is currently turn it off, and turn it on.

Expected Results: The results should be the same for each Sub-Test, except the individually altered objects should follow the individual filter settings.

7.3 Test Configuration File Saving

Purpose: The purpose of this test is to ensure that the JOI configuration saves the currently set filter settings.

Step 1: After completing Test 7.2, save the configuration and stop the JOI

Step 2: Restart the JOI and open the saved configuration file.

Expected Results: All filters should revert to the save configuration and the appropriate messages should be sent.