JTLS-2018-13796 Specific Selection for Range Rings

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1.0 Summary of Model Change Request

If an aircraft, ship, or ground unit has different sensors, combat systems, or weapons on board, then JTLS-GO currently only displays range rings for the one with the largest range. This design proposes to add a capability which gives the user the ability to display a specific range ring for a selected source. When using the context sensitive menu (right-click), the user will be able to select the specific source (sensor, combat system, weapon) to display on the map portion of the WHIP.

2.0 Design Summary

The JTLS-GO user currently has the ability to display "on-demand" range rings for objects by using the context sensitive menu (right-clicking on the object). There are no specific options for these on-demand range rings, the WHIP always displays the ring with the largest range for that object. This design proposes to improve on the existing range rings by allowing the user to select the specific type of object for which a range ring will be displayed.

For example, if an air mission has 3 on-board sensors called A, B, and C. Sensor A has a range of 10 KM, sensor B has a range of 50 KM, and sensor C has a range of 25 KM. Using the current system, the on-demand range rings will always display a 50 KM range ring for sensors on this air mission. This design proposes to allow the user to select which sensor (A, B, or C) will be displayed when a range ring is requested.

3.0 Detailed Design

Range rings for objects may be displayed in JTLS-GO for several different types of objects. However, in some cases, the individual object may be comprised of multiple entities, each of which has a different range of effectiveness. For these objects, displaying the range ring will only display the largest possible range of the associated entities.

This design proposes to change the method and result by which range rings are displayed for objects which hold multiple entities (sensors, combat systems, or weapons). JTLS will add the capability to pick which entity will be displayed. The user will gain the option to display one or more range rings for an object. Note that these specific range rings will be available for combat systems with Indirect and Long-Indirect attrition types. Individual systems with direct-type attrition shall not be displayed as part of this design.

3.1 Current Capabilities

Currently, the range rings for different types of entities can be displayed on the WHIP. For some objects, the entity-specific ranges are already implemented. For example, Figure 1 shows the range rings by altitude zone for a Surface to Air / Anti-Aircraft Artillery (SAM/AAA) target.
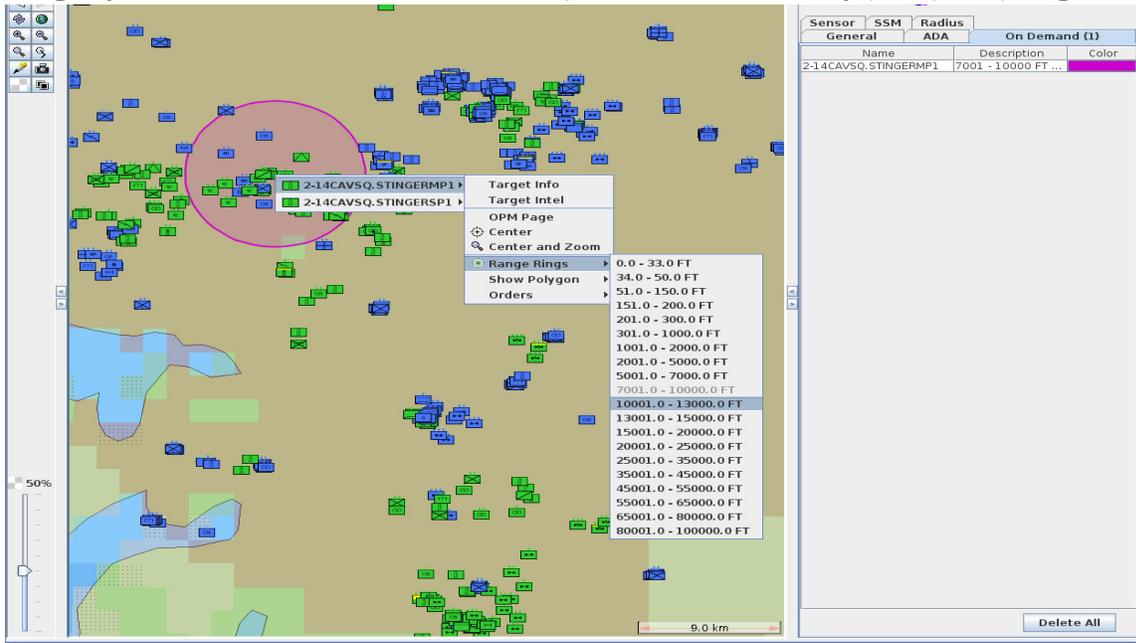

Figure 1. Range Rings by Altitude Zone for SAM/AAA Targets

For units, the user is currently only allowed to view the range for the largest reaching system, for both direct fire and indirect fire. The current options for unit range rings are shown in Figure 2.

Figure 2. Range Ring Options for Direct and Indirect Fire in Units

In the case of Air Missions, the weapon and sensor ranges for the mission are only displayed for the largest available ranges. This is shown in .Figure 3

Figure 3. Weapon and Sensor Range Ring Options for Air Missions

3.2 Proposed Changes

This design proposes to improve on the options available to the user for displaying range rings. Specifically, for Units, the user will be able to show the range of each individual combat system type that is part of a unit or HRU. This feature will be limited to only those combat systems which have an Indirect or Long-Indirect attrition type. No display of range rings for combat systems with direct attrition will be supported. Similarly, for air missions, the user will gain the ability to display range rings for every type of weapon and sensor which are loaded onto an air mission.

Table 1 lists the types of range rings, both available now and proposed here.

Table 1. Range Ring Options in JTLS

OBJECT TYPE	TYPE OF RANGE RING	STATUS
Surface-to-Surface Missile (SSM) Target	By Each Targetable Weapon	Existing
SAM/AAA Target	By Each Altitude Zone	Existing
Sensor Target	By Sensor Type Subcategory	Existing
Unit: All Aggregate Types	Unit Radius	Existing
High Resolution Unit (HRU)	Unit Radius	Existing
Unit: Ground, Forward Arm and Refuel Point (FARP), Naval	Mandatory Transfer Distance	Existing
Unit: Ground, FARP, Naval	Max Direct Fire	Existing
Unit: Ground, FARP, Naval	Max Indirect Fire	Existing

Table 1. Range Ring Options in JTLS

OBJECT TYPE	TYPE OF RANGE RING	STATUS
Air Mission	Max Surface Weapon Range	Existing
Air Mission	Max Air Weapon Range	Existing
Air Mission	Max Surface Sensor Range	Existing
Air Mission	Max Air Sensor Range	Existing
Air Mission	By Targetable Weapons in Load	Proposed
Air Mission	By Sensors in Load	Proposed
Unit: All Aggregate Types	By Indirect and Long-Indirect Combat System Range	Proposed
High Resolution Unit	By Combat System Range that has a CS EXPLICIT HRU WEAPON.	Proposed

A new object class, called a RANGE_ITEM, is required in both the model and in the JODA data server to implement this design. When a Unit, HRU, or Air Mission is instantiated in the model, the associated ranges items are created and published on the JODA. Note that the range items are linked to individual units, HRU, and air missions.

When a new HRU is created, or when a Unit undergoes a detach or an attach, then the range items for these objects are updated to reflect any associated changes in the combat systems. For example, if a unit with two different combat systems: C and D, is attached to a unit with three combat systems A, B, and C, then the combined unit now has four combat systems. The range items for the combined unit will be updated at the time of the attachment.

If the controller changes the range of a sensor type, or combat system, then the values held in the associated range items are modified in the model and updated on the JODA. This means that every range item in the game will always have the current value for the range of its entity.

4.0 Data Changes

No data changes are required to implement this design.

5.0 Order Changes

No order changes are required to implement this design.

6.0 JODA Changes

To implement this design, changes will be made to the CEP and to the JDS Protocol to store the data which holds the ranges of the individual entities. These data will be held in a new JODA object class called RANGE_ITEM. Every RANGE_ITEM will have a name, a reference to the owning object, and the actual range, measured in Kilometers.

7.0 Test Plan

This test plan will confirm that the desired range rings may be displayed for specific combat systems in Units and HRUs, and for weapons and sensors loaded on Air Missions. These tests will also demonstrate that these ranges rings will reflect the new range values when changes are made using Controller orders. When HRUs are created, or when Units are detached or attached, then the resulting range rings will reflect the current combat system makeup of the units.

7.1 Display Unit CS-Specific Range Rings

Purpose: The purpose of this test is to ensure that Units can display their individual Combat System Range Rings

Step 1: Select a Ground unit from the same side as the WHIP that has Combat Systems that are non-attritors, Direct Fire attritors, Indirect Fire attritors and Long-Indirect Fire attritors.

Step 2: Bring up the context sensitive menu item and review what is available under Range Rings.

Expected Results: You should see an entry for Max Direct Fire systems, Max Indirect File, Unit Radius, and each of the available Indirect Fire Combat Systems and Long-Indirect Fire Combat Systems.

Step 3: Select one or more of the options and check the displayed range against the information held in the OPM.

Expected Results: The range rings should be displayed properly.

Step 4: Select a Naval unit from the same side as the WHIP that has Combat Systems that are non-attritors, Direct Fire attritors, Indirect Fire attritors and Long-Indirect Fire attritors.

Step 5: Bring up the context sensitive menu item and review what is available under Range Rings.

Expected Results: You should see an entry for Max Direct Fire systems, Max Indirect File, Unit Radius, and each of the available Indirect Fire Combat Systems and Long-Indirect Fire Combat Systems.

Step 6: Select one or more of the options and check the displayed range against the information held in the OPM.

Expected Results: The range rings should be displayed properly.

Step 7: Select a Ground unit from an opposing side to the user WHIP that has Combat Systems that are non-attritors, Direct Fire attritors, Indirect Fire attritors and Long-Indirect Fire attritors.

Step 8: Bring up the context sensitive menu item and review what is available under Range Rings.

Expected Results: There should be no range ring information available from the context sensitive menu.

Step 9: Select a Ground unit on a Controller WHIP that has Combat Systems that are non-attritors, Direct Fire attritors, Indirect Fire attritors and Long-Indirect Fire attritors.

Step 10:Bring up the context sensitive menu item and review what is available under Range Rings.

Expected Results: You should see an entry for Max Direct Fire systems, Max Indirect File, Unit Radius, and each of the available Indirect Fire Combat Systems and Long-Indirect Fire Combat Systems.

Step 11:Select one or more of the options and check the displayed range against the information held in the OPM.

Expected Results: The range rings should be displayed properly.

Step 12:Select a Ground unit on a Controller WHIP that has only non-attritor and Direct Fire attritor Combat Systems.

Step 13:Bring up the context sensitive menu item and review what is available under Range Rings.

Expected Results: You should see an entry for Max Direct Fire systems, Max Indirect Fire, Unit Radius, and no specific Combat System entries. Note the Max Indirect Fire option should have a radius of zero, and no circle should be displayed.

Step 14: Select one or more of the options and check the displayed range against the information held in the OPM.

Expected Results: The range rings should be displayed properly.

7.2 Display HRU CS-Specific Range Rings

Purpose: The purpose of this test is to ensure that HRUs can display their individual Combat System Range Rings

Step 1: Select an HRU from the same side as the WHIP that has several Combat Systems with CS HIGHRES EXPLICIT TW,

Step 2: Bring up the context sensitive menu item and review what is available under Range Rings.

Expected Results: You should see an entry for Unit Radius, and each of the available Combat Systems that have a CS HIGHRES EXPLICIT TW specified.

Step 3: Select one or more of the options and check the displayed range against the information held in the OPM.

Expected Results: The range rings should be displayed properly.

Step 4: Select an HRU from an opposing side to the user WHIP that has several Combat Systems with CS HIGHRES EXPLICIT TW,

Step 5: Bring up the context sensitive menu item and review what is available under Range Rings.

Expected Results: There should be no range ring information available from the context sensitive menu.

Step 6: Select an HRU on a Controller WHIP that has Combat Systems with CS HIGHRES EXPLICIT TW,

Step 7: Bring up the context sensitive menu item and review what is available under Range Rings.

Expected Results: You should see an entry for Unit Radius, and each of the Combat Systems with CS HIGHRES EXPLICIT TW,

Step 8: Select one or more of the options and check the displayed range against the information held in the OPM.

Expected Results: The range rings should be displayed properly.

Step 9: Select an HRU on a Controller WHIP that has no Combat Systems with a CS HIGHRES EXPLICIT TW specified,

Step 10:Bring up the context sensitive menu item and review what is available under Range Rings.

Expected Results: You should see an Unit Radius, and no specific Combat System entries.

7.3 Display Sensor-specific range rings for sensors on an Air Mission

Purpose: The purpose of this test is to ensure that specific Air Mission Sensor Range Rings can be displayed on the WHIP.

Step 1: Create an Air Mission and specify the exact load that it should carry. The load should have two Air Search Sensors, three Ground Search Sensors and no weapons.

Step 2: Fly the Air Mission.

Step 3: Bring up the context sensitive menu and review what is available under Range Rings.

Expected Results: You should see the Max Air Search, Max Surface Search and the five various sensors that were placed on the mission.

Step 4: Select one or more of the options and check the displayed range against the information held in the OPM.

Expected Results: The range rings should be displayed properly.

Step 5:

7.4 Display Weapon-specific range rings for targetable weapons on an Air Mission

7.5 Attach two units which have different compositions of combat systems, displaty the CS-specific range rings for the combined unit. The list of available systems should include all types from both original units

7.6 Detach a unit, then display the CS-specific range rings for the detachment. The list of available systems should only be for those systems found in the detachment.

7.7 Display the range ring for a specific sensor on an Air Mission. Use the SET.SENSOR.PARAMETER order to change the range for this sensor. Re-display the range ring for this sensor. The size of the range ring should change to reflect the new value of the range for this sensor.

7.8 Display the range ring for a specific weapon on an Air Mission. Use the SET.TARGETABLE.WEAPON.PARAMETER order to change the range for this weapon. Re-display the range ring for this weapon. The size of the range ring should change to reflect the new value of the range for this weapon.

7.9 Display the range ring for a specific combat system in a unit. Select one with an attrition type of long or indirect. Use the SET.COMBAT.SYSTEM.PARAMETER order to change the effective range of this combat system. Re-display the range ring for this system. The size of the range ring should change to reflect the new ralue for the effective range of this system.

7.10 Repeat number 9, using a combat system in an HRU instead of an aggregate unit.