Summary JTLS-GO 6.0 For Polaris Gram 20

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1.0 Introduction

From 19 October to 19 November 2020, ROLANDS & ASSOCIATES Corporation (R&A) supported the Norwegian Joint Headquarters (NJHQ) for the preparation and execution of the annual NJHQ command post exercise. This year the exercise was identified as Polaris Gram 20. The exercise was supported by the new Joint Theater Level Simulation - Global Operations (JTLS-GO) Version 6.0. Due to the cancellation of other exercises because of the worldwide Corona virus pandemic, Polaris Gram was the first JTLS-GO 6.0 exercise.

The purpose of this paper is to summarize the results of this first use case for JTLS-GO 6.0. R&A engineers spent over an hour discussing JTLS-GO 6.0 from the user perspective and our engineers also have a list of their own observations accumulated during the week-long exercise. **Section 2.0** discusses the NJHQ user observation. **Section 3.0** provides the R&A conclusions concerning Exercise Polaris Gram 20.

2.0 User Evaluation Topics

Each military functional area prepared a summary of their model issues. This section maintained that organization and summarizes the R&A response and way forward addressing each of the user observations.

2.1 General Observations

The following sections describe the general observations identified during the user discussion session.

2.1.1 Limit Order Panel Weapon Selection

User Observation: Users mentioned that the order panels for weapon selection were difficult to use because the weapon lists contained all database represented weapon types. Only the weapons available in the unit's inventory should be in the list and not all the weapons in the world.

R&A Comments: First and most importantly, this exact issue has been identified and funded by the JTLS-GO NATO consortium. Engineering Change Proposal (ECP) JTLS-2011-10943, Improve Field Restriction Definition will be a part of JTLS-GO Version 6.1 with a planned delivery date of 30 September 2021. This ECP is still in the design phase, but it will definitely address the all important weapon selection order panel issue.

It should be noted, that the current design does not want to limit the list to the unit's current weapon inventory, because it may be possible that the Operational Plan being simulated calls for future additional weapon availability. The lists will be limited, in some manner, to only reasonable weapons based on the unit's weapon systems and not weapon inventory. Once an approve design has been completed, it will be available for review on the R&A web site.

2.1.2 OPFOR Lethality Data Too Low

User Observation: As a general observation, the NJHQ users felt that the delivered Opposing force data delivered with the JTLS-GO 6.0 Repository was too low. The primary opposing force of interest to the NJHQ had data that may have been indicative of capabilities ten or fifteen years ago, but all recent observations imply the opposing force is much more capability and lethal than represented by the Probability of Hit (pH) and Probability of Kill (pK) data in the repository.

R&A Comments: The R&A database team will take an in depth review of this data, but since there is an abundance of lethality data in the repository this will be a large and time consuming undertaking. It would help if NJHQ would provide a list of specific weapon systems to help focus the database team's review.

In addition, R&A will attempt to expand the document that describes the repository database, *JTLS-GO Repository Description*, to include some summary run information to help the end user decide if the delivered data meets their lethality expectations.

2.1.3 Implement Communication Infrastructure Representation

User Observation: The NJHQ staff responsible for the national communication infrastructure was impressed with the possibilities of using JTLS-GO to represent their national communications network. There are two important aspects that need to be properly represented to fulfill their specific needs:

- Representation of satellite communications. The exercise widely used the JTLS-GO satellite intelligence collection capability, but as the enemy attacked satellite communication centers, the effects of those attacks had to be manually adjudicated and implemented through controller orders.

- Although redundant communication paths from intelligence collection assets to central fusion centers are available within Norway, there is a significant difference in the information delivery times between these capabilities. There is currently no way to automatically represent this process or even view the status of these communication alternatives.

  Attacking these communication paths is expected to be a central focus to an opposing force's attack plan; therefore, it is extremely important to represent communication networks within JTLS-GO. The IADS network is adequately represented, but the addition of the Link-16 network, OTH-Gold data network, and the civilian shipping Automatic Identification System (AIS) network all need to be represented within JTLS-GO.

R&A Comments: R&A has submitted this requirement as ECP JTLS-2020-15038. It is available to be viewed on the R&A web site. In addition, NJHQ has offered to submit an unclassified complete description of the types of networks that need to be represented as part of this ECP. This would be a large undertaking and would require independent funding to fulfill this capability.

2.2 Naval Function Observations

The following sections describe the naval observations identified during the user discussion session.

2.2.1 Naval Move Task End Time Useful

User Observation: The JTLS-GO new capability that lists the expected end time for a naval move was extremely useful. The observations was to include this capability for all tasks.

R&A Comments: R&A has plans to expand the capability to list the expected end time for every type of task, for all object, not just naval object tasks. The importance of accomplishing this in a slow and deliberate manner was proven during this exercise because an error was discovered during game play. If the user changes the speed of a naval unit during an active move task, the task's end time is not being updated. This is an error and will be corrected in the next maintenance release of JTLS-GO 6.0

The R&A goal is to have all task end times properly shown on the Information Management Terminal (IMT) for the release of JTLS-GO 6.1. This is ECP JTLS-2016-12599, Move Task End Time.

2.2.2 Naval Task Dependencies

User Observation: The coordination of sequential tasks that need to be coordinated between several objects was difficult. The following two examples were provided:

- Move vessel X to position A, then resupply from unit Y, when the resupply is finished move vessel X to position B.
- Move an HRU to a moving ship so it could go into coalition support was difficult to coordinate.

R&A Comments: First addressing the two specific examples:

- JTLS-GO 6.0 attempted to solve the first problem, but making the resupplying ship "intercept" the vessel it should resupply. Continuing with the terminology of the example, Vessel X can be given a move order to position A and position B. Vessel Y can be given a Replenish Unit order. Vessel Y will intercept Vessel X and when it gets close enough, the supplies are transferred and Vessel X will continue with its assigned tasks.

  If this is not the logic the user saw, R&A would like to know so we can retest to ensure this "intercept" logic is working properly.

- R&A believes that the second example occurred because of a lifeboat rescue mission in which a ship sunk, lifeboats were deployed, and some other ship was sent to rescue the survivors. The HRU should not move to the ship; instead, the user needed to use one WHIP to send the rescue vessel to the area in which the lifeboats were deployed. When the ship was close enough, the user needed to use a different side's WHIP to tell the lifeboats to go into Coalition Support to embarked on the rescue ship.

  R&A believes that this entire situation may have been easier if Super WHIPs were given to for players. A Super WHIP is one WHIP that can be used to give orders to several different sides. Since this was a first use exercise, the R&A engineers decided against using this new capability and stay with the single-side WHIPs. In retrospect, since the model performed exceptionally well, the Super WHIP concept could have been used.

R&A would appreciate if NJHQ creates and uses some Super WHIPs during their war gaming analysis efforts to determine whether the concept fully addresses this user issue.

2.2.3 Transferring IMT Screens To Excel

User Observation: IMT screens could not be copied into Excel because the format for numbers was wrong for Norway processing.

R&A Comments: During JTLS-GO training, R&A teaches and suggests that users copy IMT screens to Excel and then use the Excel features to add numbers to meet their needs. This was not possible because JTLS-GO only supports the English method of dealing with floating point numbers in which a decimal point separates the whole value of the number from the decimal value of a number, for example, 12345.67

The Excel available to users were setup using Norwegian number representation, in which a comma is used to separate the whole value of the number from the decimal value of a number, for example, 12345,67. Furthermore, Norway uses the period (.) as English would use the comma for large numbers, such as 12.345,67. It is currently not possible to setup JTLS to display numeric data using the various methods used worldwide.

ECP JTLS-2020-15039, Different Formats For Numbers has been submitted on behalf of NJHQ to address this issue.

2.2.4 Limit Orders In Order Group Editor

User Observation: Users had the following two suggestions:

- The Reference Field should never be mandatory. If not filled in the system should simply assign a default reference name.

- If the user does not enter the Reference Field, then the order should not be saved as part of the Order Group Editor.

R&A Comments: R&A fully udnerstand the concept and ECP JTLS-2020-15040, Limit Orders In Order Group Editor has been submitted on behalf of NJHQ to address this issue.

2.2.5 Order Group Editor Filtering

User Observation: Users suggested that the Order Group Editor be given some filtering capability such as being able to filer based on the time the order was created or entered, and the unit to which the order is directed.

R&A Comments: R&A believes that a slightly different interface may solve the issues observed by the users. JTLS-2020-15041, Order Group Editor Filtering, has been submitted on behalf of NJHQ to address this issue.

2.2.6 Indicate Object Or Sensor That Accomplished The Detection

User Observation: Users requested that the WHIP indicate the object and/or sensor that accomplished a detection.

R&A Comments: This is not the first time that users have made this request. ECP JTLS-2009-10268, Last Detecting Object Information already exists in the improvement list and simply needs to be prioritized and funded for implementation.

2.2.7 Zoom Loses Object Visibility

User Observation: Users indicated that when they would use the Zoom In and Zoom Out WHIP functions, they would lose unit visibility.

R&A Comments: Throughout all of our testing, we have never experienced this phenomenon. This does not mean that it did not happen. If true it is definitely a Software Trouble Report (STR) and will be fixed. R&A does believe that this was experienced because of either machine processing overload or communications delay. R&A engineers experienced similar communication delays especially when there were too many processing running on the client machines.

The issue has been logged in our issue tracker to keep an active watch for similar behavior.

2.2.8 Improve Naval Move

User Observation: Users continued to have issues with Naval Moves. The following two suggestions were provided:

- Naval Units should be able to find their way around land masses and not run into route problems due to encountered land.
- Google Map like options should be offered to the user, where several routes are made available, displayed, and from which the user can select the desired route.

R&A Comments: Taking each comment individually:

- Norway's complicated coastline is definitely a challenge for the automatic route optimization logic used within JTLS-GO. R&A engineers believe that a more detailed sea-lane network around the Norwegian coast may help this problem. In addition, it is

possible that adjustments to the optimization parameters that provide the guidance concerning the region over which an optimal path should be located may help with this issue.

This is not to say that some more improvements can't be made to the naval route optimization logic, but before undertaking a review of this possibility, some further testing is warranted. Either R&A can conduct this testing or NJHQ can look into this testing by altering the optimization parameters, END OVERLAP and HALF WIDTH FACTOR. R&A will be happy to get into a technical discussion on how to proceed in addressing this issue further.

- Although Google Map option are now common experiences for user in the real world, it would be extremely difficult if not impossible to reasonable implement this capability in JTLS-GO.

First and foremost, an order from a user cannot stop game play while awaiting for decisions from a user. Only the model has all of the data needed to compute alternative paths, which includes sea-lanes, water depth, terrain impediments, national boundaries, and barriers. This means that the user would submit an order to move from Point A to Point B. The model would need to somehow send route optimization alternatives to the WHIP from which the user could select an option.

The model cannot wait for the users response. This would be equivalent to saying that the entire city would stop moving while a Google Map user selects a route from route options provided on the navigational system. Even if we could build a procedure to let the model continue moving forward, the fact that the route was available when presented to a user and would still be available after the route option is selected, could not be guaranteed.

R&A has not done anything with this user comment. Still NJHQ can submit an ECP on their own for this capability, but implementation would require that the WHIP would need all of the route optimization data internally so the options could be computed on the local client machine. This would require a significant change to the WHIP which would be a costly undertaking.

2.2.9 Formation Filtering

User Observation: Users complained because the filters could be set in such a way that not all ships that belonged to a given formation were displayed on the WHIP. The NJHQ Naval Cell considered this an error.

R&A Comments: R&A does not consider this an error. It would be an error if the filters were set in such a way that a ship should have been displayed and it was not. Without seeing the situation for ourselves, we cannot confirm this to be true. We have not had and filtering errors reported by any other users. Investigation has always shown that the filers were set in such a way that the object should not have been displayed.

That being said, R&A engineers understand the desire to be able to display all ships within a formation in a manner similar to the Command Hierarchy filtering for units. Within JTLS-GO units in a formation are not necessarily within the same command hierarchy; therefore, the Command Hierarchy filtering is not applicable to this situation. A new filtering panel would

need to be created. ECP JTLS-2020-15042, Formation Object Filtering, has been submitted on behalf of NJHQ to address this issue.

As a side note, R&A engineers feel WHIP filtering is currently robust and adding more options may make it difficult to use. This may be why the user thought something should be displayed and it wasn't. Before funding this ECP, the difficulty of filtering should be considered.

2.2.10 Naval Shadow Does Not Work

User Observation: Users complained that the naval show capability does not work.

R&A Comments: R&A was surprised by this comment, because Naval Shadow has just completed a full testing cycle. R&A project management will test this capability to determine if a problem can be found. Any problems encountered will be considered an STR and fixed for a future release.

2.2.11 Naval Unit Arrival Time Does Not Work

User Observation: Users complained that the naval arrival time moves were not working.

R&A Comments: R&A will send this issue to the independent test team for thorough testings. Any problems encountered will be considered an STR and fixed for a future release.

2.3 Logistics Function Observations

The following sections describe the logistics observations identified during the user discussion session.

2.3.1 Logistics Hierarchy Difficulties

User Observation: Users complained it was difficult to build a reasonable Logistics Hierarchy with needed trucks, tankers and crew.

R&A Comments: First NJHQ database builders should realize that Crew systems are not needed for the Trucks and Tankers assigned to Support Units. This was done in an attempt to make building the Logistics Hierarchy easier for the database builder. Even with that simplification, given that each Supply Category can have its own Logistics Hierarchy, building a proper hierarchy that represent the real operations can be a difficult undertaking.

There are Scenario Verification Program (SVP) checks that indicate if a Support Unit does not have Trucks and Tankers. R&A engineers are fairly certain that all of these warnings were removed prior to game execution, but the check only asks where some trucks and tankers are available, the check has no way of knowing if the assigned assets are enough.

To solve this issue, R&A believes that a DDS Report can be produced to summarize the Logistics Hierarchy along with the truck and tanker assets available at each unit. This report could then be given to the exercise proponent for validation and correction prior to game

execution, ECP JTLS-2020-15043, DDS Logistics Hierarchy Report, has been submitted on behalf of NJHQ to address this issue.

2.3.2 Targetable Weapon Units Of Measures

User Observation: Users believe that more user friendly users of measures are needed to view supply levels.

R&A Comments: The available list of Units of Measure (UOMs) is a database parameter and anything that is desired can be added to the database. R&A does not believe that this is an issue.

On the other hand, R&A engineers had their own issues when reviewing and determining exact weapon levels during execution. We noted several related issues which we believe should be fixed. These issues are:

- Holding Class V ammunition supplies in tons at a unit and using UOMs to display the number of weapons at a unit is not accurate. Due to round-off errors, fractional weapon counts are needed to ensure the available supplies represent the desired number of weapons. It is R&A's feeling that the current UOM for each type of Targetable Weapon is becoming an unusable solution to the weapon count problem especially since more and more weapon types are considered important and must be tracked individually.

- Assigning weapons to a unit based on a prototype is not working. as needed To fix this problem, each airbase must be given its own prototype with the desired number of weapons or Controller Orders must be entered at game start to set the desired weapons at each airbase. Airbases are not the only issue, naval units and some ground units have similar requirements.

R&A believes that weapons should not be placed in a prototype's supply table; instead, either the prototype or a unit should have a new table that lists the exact weapon counts that should be available at the unit. Weapon supplies should still be tracked for resupply purposes, but the model and all user interface interaction should be presented at weapon counts. This is a major ECP, but should be given some priority. ECP JTLS-2020-15044, Specifically Track Weapons By Count Not Supplies, has been submitted on behalf of NJHQ.

2.3.3 Air Domain Class V Reporting

User Observation: The Logistics Cell had a difficult time tracking the weapons assigned to a specific airbase. The existing Logistics Reports did not meet their needs. The existing reports either work from unit command hierarchy or logistics hierarchy. An airbase and the missions flying from squadrons assigned to the airbase may not follow either of those paths.

R&A Comments: R&A completely understands and supports the request for an airbase weapon and fuel report. NJHQ should review an existing ECP JTLS-2006-1833, Airbase Periodic Report, on our web site to determine if it meets the Logistics Cells objectives. If not, we can add additional requirements as needed.

2.4 Land Function Observations

The following sections describe the Land Cell observations identified during the user discussion session.

2.4.1 HRU Fighting An Detection Difficult

User Observation: HRU versus HRU fighting was a challenge to manage as was having Aggregate Resolution Units (ARUs) to detect HRUs.

R&A Comments: HRU management is designed to be handled by the model. The user can give orders to HRUs to accomplish tasks, but the fighting and detection is handled automatically using the internal JTLS-GO rules. HRUs used for combat situations are usually employed in a covert manner, which means they must first be detected, Once detected the interaction between the detector and the detectee is handled internally due to the speed needed to initiate and respond to combat. This is similar to air missions and air-to-air combat.

Users need to remember that covert HRUs are not easy to detect. The Controller display may show an enemy HRU is in the area, but in the real-world operating covertly mean that the assets may be "hiding" in plain site. It takes time to identify and detect these covert assets. Consider how long it would take to identify an active enemy operating cell within the Bodo area. The enemy asset may never be found until the covertly operating assets takes a direct action against military assets.

Still R&A plans on doing the following to investigate this observation in more detail:

- Review the Analyst Guide to ensure that the description of the HRU detection algorithm is accurately described. This includes the HRU versus HRU detection and the ARU Special Operation Force (SOF) Alert capability.
- Thoroughly test the HRU to HRU detection algorithm to make sure that it properly responds to changes in the supporting data.
- Thoroughly test the SOF Alert capability to ensure that when in SOF Alert an ARU can initiate an attack on a detected covert operating HRU.

2.4.2 Stealth Land Units

User Observation: Users feel that they need to have an ARU covert or stealth mode. This is needed to properly represent units to hide in a forested area and attack the enemy as they happen by. The issue is that HRU combat is over too quickly and that is why the user feels that the HRU structure is inadequate for their needs.

R&A Comments: R&A believes that this comment is closely related to the perception that HRU detection and combat is difficult to manage. HRUs are designed to represent small groups of combat assets that operate covertly or in hiding. Using them to sit in hiding and attack other assets as they pass by is exactly how the HRU Ambush task is designed to operate. The perception that this does not meet direct needs of NJHQ may be due to database and task specification settings.

Before developing an ECP which would be extremely difficult to implement and would alter some of the basis JTLS-GO modeling assumptions, NJHQ should spend some time playing with the following HRU setup:

- Create a significantly sized HRU. Generally the documentation indicates that users should limit HRUs to around 20 people, but that is only a suggestion and not a hard and fast rule. Still R&A engineers believe that creating large HRUs with 50 or 60 personnel may lead to some model inconsistencies, but it is worth testing to determine if the larger HRUs will solve the problems encountered during Polaris Gram.

- When creating these larger HRUs ensure that the HRU's Highres Unit Prototype (HUP) has an appropriately assigned HUP MEAN TIME TO DETECT and HUP TIME TO LOSE CONTACT. Setting these parameters properly will alter how easily it will be to detect the covert HRU and once detected, how long continued detection will continue even if contact is broken.

- When giving a larger HRU an Ambush task, assign the HRU a "Stand and Fight Time" of 30 to 60 minutes. This is specified on the Ambush Order. One of the comments from the users was that the HRU fight is over too quickly. The "Stand and Fight" time, as specified on the Ambush Order, should extend this fight.

- Ensure this setup is tested for both HRU versus HRU combat and HRU versus ARU combat.

R&A will conduct similar tests. Before moving any further on this comment, R&A will wait for some feedback from NJHQ concerning the results and analysis of this option.

2.4.3 Provide Expect Arrival Time For Current Move

User Observation: Users requested that the expected travel time information that currently exists on the Ground Route Report be included in the unit's movement report.

R&A Comments: R&A will review these two reports to determine if there should be some shared information provided to the user. More importantly, R&A believes that our ongoing effort to provide an estimate task completion time on every task will solve the problem and possibly eliminate the need of separate reports all together. ECP JTLS-2016-12599, Move Task End Time, has already been funded and is planned for delivery as part of JTLS-GO 6.1.

2.4.4 Scale Lanchester Battle Interval By Size Of Unit

User Observation: Since NJHQ plays with tiny units, there are battles that maybe over in 30 minutes or less, Reduce the Lanchester assessment step based on the size of the unit.

R&A Comments: This issue is related to the other HRU comments. JTLS-GO is designed to represent the differences between ARUs and HRUs. When building a database, ARUs on all combat sides should be built at the same level. The following inconsistencies will have a direct impact on the JTLS-GO modeling assumptions:

- Having once side represented at the Company-level and an opposing side represented at a Platoon-level will lead to model inconsistencies.

- Having a mixture of Company-level ARUs and Platoon-level or even Squad-level ARUs on the same side, will also lead to model inconsistencies.

If the database is built with like-sized units, then there would be no need to automatically change the Lanchester Battle Time based on the type of units participating in the battle. If R&A were to implement this concept, there are numerous design decisions that would need to be considered, especially if a single battle included Squad-sized units, Platoon-sized units, and Company-sized units. What would be done if a single battle included:

- Five Platoon-sized versus five Platoon-sized units, or

- One Company-sized unit version another Company-sized unit, or

- One Company sized unit versus five Platoon sized units.

Before submitting an ECP to support this issue, R&A feels NJHQ should spend some time and change the Combat Assessment Time for everyone from 30 minutes down to 15 or 20 minutes. Reducing it much more than that, will start to affect the assumptions of a Lanchestrian Battle. The Combat Assess Period can be changed as the game is running, from the SET MODEL EVENT TIME Order panel available to a Controller.

R&A suggests that NJHQ conduct a simple Assess Combat Period comparison test. Select a single exercise day, during which there was significant Lanchestrian Combat, and replay the day using Assessment Periods of 30 Minutes, 20 Minutes, and 10 Minutes. Compare the time needed to execute the single day and the results to determine whether it is worth the time slowdown for the shorter assessment periods.

Finally, NJHQ needs to review their creation of "tiny" ARUs, and consider the exact issues with representing these units as HRUs. With changes to HRU "Stand and Fight" times, it is possible that the already shorter HRU Assess Combat Periods will solve the perceived issues experienced by the Land Cell.

2.4.5 HRU Specifically Attack Other HRUs

User Observation: Allow an HRU Direct Action task to specify another HRU.

R&A Comments: R&A engineers were surprised that this was not already a capability. The model definitely assumes that combat HRUs will be operating covertly and if an HRU is covert, until detected, there is no way to directly attack it. This mindset does not account for the following situations:

- The desire to attack a non-covert HRU, such as a Non-Government Organization (NGO) group of aid or health care workers, displaced personnel, or distinguished Very Important People (VIP) traveling through an area.

- Covert HRUs that have been detected and given a long HUP MEAN TIME TO LOSE remain detected for a significant amount of time.

ECP JTLS-2020-15045, HRU Direct Action Tasks Against Another HRU, has been submitted on behalf of NJHQ.

2.4.6 Turn Off Reports For Civilian Units

User Observation: HRU reports included information concerning Civilian side units. The user would like to either turn this off or sort in some way that this information is not reported.

R&A Comments: Unfortunately this issue was caused by a Catch-22 that exists within JTLS-GO. Every Information Intelligence Prototype (IIP), has a database parameter that indicates the relationship level that should be used in reports. Detection assets will collect on every object, but only report the object if it meets the reporting relationship value. This is the database parameter, IIP RECCE REPORT LEVEL.

- If set to Suspect then only Suspect and Enemy relationship side objects are reported.
- If set to Neutral, then Neutral, Suspect, and Enemy relationship side objects are reported.

The Catch-22 occurs because the desire was to report on Civilian Naval Vessels detected via Satellite. For this reason, the IIP RECCE REPORT LEVEL was set to Neutral. This caused Civilian side objects to appear in the HRU reports.

This problem can be solved by building the database so the Satellites belong there own Faction with their own unique IIP. The Satellite faction can use IIP A, which has the IIP RECCE REPORT LEVEL set to Neutral and the faction used by land units can use IIP B, which has the IIP RECCE REPORT LEVEL set to Suspect. If this solution does not meet the NJHQ needs, let R&A know and an ECP will be submitted on their behalf.

2.4.7 HRUs Report When OPFOR Moves

User Observation: The Land Cell requested that HRUs report whenever an OPFOR Unit Moves.

R&A Comments: This comments was not well discussed during the user meeting held at the end of Polaris Gram 20. It has all the indications that the comment is a user suggested solution to a problem. R&A would much more prefer to understand the problem.

Currently an HRU will report the arrival and departure of every land-based object from its collection area. It does not report an object that moves from one location to another location within its detection area. This is easy to correct, but R&A would prefer to understand why this information is needed. One reason for needing this capability, may be so the user can direct their HRU to "follow" the other HRU.

If this is the reason for needed the movement information, then the capability would be better served by implementing a new HRU task, maybe called "Pursue" which would automatically follow an enemy HRU attempting to break contact. Before submitting any ECP concerning this issue, R&A would prefer more information why the Land Cell wants this capability.

2.4.8 Get HRU Style Reports From ARUs

User Observation: The Land Cell requested that ARUs also create period reports indicating what has been observed.

R&A Comments: This capability already exists in JTLS-GO, but by default it has been turned off because of the number of messages generated by the system. To turn on this flag and obtain these reports, use the Set Debug Report Flag Order and set the Unit TACREP Flag to Yes. Once done, each Tactical Intel Report time, as specified by the unit prototype TUP ORGANIC REPORT TIME or SUP ORGANIC REPORT TIME database parameter, it will generate a report identical to HRU report.

Once NJHQ views these messages, R&A will be interested in obtaining suggestions concerning how to limit the generated messages. Specifically, we have already discussed not sending a "No Information To Report" message and limiting the messages to only positive information messages.

2.4.9 Include Detecting Aircraft To HRU and ARU Tactical Intel Reports

User Observation: The users would like HRU intelligence reports, and by definition the equivalent ARU tactical intelligence reports, to list observed aircraft. The desire would also be to allow Urgent Reports generated based on these observations.

R&A Comments: This will require the implementation of an ECP. ECP JTLS-2020-15046, HRU and ARU Tactical Lookouts Report Aircraft, has been submitted on behalf of NJHQ.

2.5 Air Function Observations

The following sections describe the Air Cell observations identified during the user discussion session.

2.5.1 Air Drop Mission Did Not Follow Egress Path

User Observation: The Air Cell reported that an Air Drop mission did not follow the Egress path on its return.

R&A Comments: If this is true, it is definitely an STR and will be addressed. R&A has sent this issue to our independent test team. We do know that an Air Drop mission was canceled during its load procedure because it was taking too long. If the mission is canceled during the Load procedure, R&A engineers believe that only points closes to the mission's home base should be maintained in the Egress route. The model should automatically remove Egress route tasks that will take the mission further away from its home base.

This means that the R&A test team will review the situations outlined in **Table 1** and implement corrections as necessary.

Table 1. Air Drop Test Plan

SITUATION	RESULTS CANCEL TASK	RESULTS CANCEL MISSION
Create an Air Drop Mobility Mission with a several point Egress Path. The path should have multiple points that has several points between the drop location and the pickup location, and between the pickup location and the mission's home base. Let the mission fly normally to ensure that the Egress Path is properly working. This is considered a baseline case.		
Mission with Egress Path specified, on the way to the Load Unit location	Cancel Load Unit Task	Cancel mission
Mission with Egress Path specified, actively loading Unit.	Cancel ongoing Load Unit Task	Cancel mission
Mission with Egress Path specified, on the way to the Drop Unit location	Cancel Offload Unit Task	Cancel mission
Mission with Egress Path specified, actively air dropping the unit.	R&A engineers do not believe this is a possible test, because an Air Drop of a unit is an instantaneous event. The test team should verify that this is true.	
Mission with Egress Path specified, actively offloading a unit on eh ground.	Cancel Offload Unit Task	Cancel mission
Mission with Egress Path specified, on the way home, following the Egress Path	Cancel the current move task.	Cancel mission

2.5.2 Add NEC-CCIS Mission Types To ATO-T

User Observation: Several Northern European Command - Command Control Information System (NEC-CCIS) Mission Types were used in the Air Tasking Order (ATO) and were not recognized by the JTLS-GO ATO-Translator (ATO-T).

R&A Comments: The four Mission Types encountered (ISR, GISR, TPT, and GTPT) during Polaris Gram 20 have been added to the JTLS-GO ATO Mission Type list. The question is what other Mission Types exist within NEC-CCIS. R&A requests that NJHQ provide a full list to ensure a similar problem is not encountered during the next exercise with other unexpected Mission Types.

AS a side, not R&A engineers supporting Polaris Gram 20 were surprised that new Mission Types could not be added to the system during game execution. R&A will also be investigating this issue,

2.5.3 Transfer Aircraft Squadrons Left Behind

User Observation: The Air Cell would like the model to allow transferring aircraft without leaving a detachment squadron without any aircraft.

R&A Comments: First R&A engineers believe that the model will do this if a mission is ordered to return to its home squadron and not its home base. The problem is that the ATO-T is sending the orders with the return base name and not the home squadron name. This issue has been placed on the R&A Issue Tracker. It is not considered an ECP that will need funding. The issue will addressed under Operations and Maintenance (O&M) funding from the JTLS-GO user group maintenance funds.

This issue has a large impact on how the JTLS-GO Transaction Operational Interface (JTOI) operates. If CWIX is attending in June 2021, this issue should become a significant test in the NJHQ Test Plan for JTLS-GO.

2.5.4 Aborting Missions Does Not Find Closest Egress Point

User Observation: The Air Cell indicated that when they abort an air mission, it does not following the Egress Path home.

R&A Comments: This issue is similar to the **Section 2.5.1, "Air Drop Mission Did Not Follow Egress Path," on page 13**. The original JTLS-GO design is that the mission should select the Egress Path Point that is closest to the mission and closer to the mission's home base. All Egress points before that point should be deleted. It is possible that this logic did not get properly transferred to the model when we moved to the Air Mission Task concept. This will be thoroughly tested and STRs submitted to correct any problems encountered.

2.5.5 Transfer Missions Following Air Routes

User Observation: The Air Cell indicated that Transfer Missions were following Air Routes.

R&A Comments: The model has data that controls which Mission Types should consider using Air Corridors. This data exists in the Air Control Prototype - Mission Type Table and is called the ACP MT DEFAULT OPTIMIZATION. This database parameter can be set to OPTIMIZE or FLIGHT.PATH. If set to FLIGHT.PATH, the mission will attempt to use Air Corridors to determine its flight path. To alter this, the user has several choices:

- The database can be changed to use indicate that Transfer Mission should not use the FLIGHT PATH option.
- Using the Controller Set Air Control Prototype Order, the database parameter can be changed during game play.
- It is possible to change the value for a specific mission using the Change Mission Parameter Order. This means the user can override the default parameter for a specific mission.

2.5.6 Mobility Missions Challenging

User Observation: The Air Cell indicates that setting up Mobility Missions is challenging.

R&A Comments: R&A engineers believe that the major issue was the time to load these missions and was directly related to the database issue in which the number of simultaneous loading facilities at each airbase was not properly represented in the database. Before looking into this issue any further, R&A requests that the NJHQ add an appropriate number of loading facilities. This data is located in the database parameters TUP NUMBER LOADING FACILITIES and SUP NUMBER LOADING FACILITIES.

NJHQ should realize that although these database parameters can be changed during game play, they do not take effect on existing units and would only apply to new units created during game play. This data needs to be reviewed as part of the database building process.

If R&A has interpreted this problem incorrectly and there is some other burden that is making Mobility Missions difficult to use, NJHQ should submit more detail for evaluation.

2.6 Sensor / Reports / C4IS Observations

2.6.1 Fill OTH-Gold Source Field

User Observation: The OTH-Gold message format includes a "Source Field" that indicates the asset that collected the information. The Intel Cell would like this field filled and managed by JTLS-GO.

R&A Comments: ECP, JTLS-2020-15047, Fill OTH-Gold Source Field, has been submitted on behalf of NJHQ.

2.6.2 More Control Over Satellites

User Observation: The Intelligence Cell noted that there was very little control over Satellites. Once entered into the game, it was not possible to change sensors, turn the sensors on and off, or update the frequency with which they report.

R&A Comments: The majority of the Cell's observation is correct. JTLS-GO Version 6.1 includes ECP JTLS-2020-14973, Multiple Sensors On Satellite. The design for this ECP will expanded to allow the controller to turn on and turn off Satellite sensors and to add and delete sensors from the satellite platform.

The only portion of the Cell observations that already exists in JTLS-GO is the comment that there is no capability to manage the frequency with which reports are generated. The database parameter, which will be renamed as part of JTLS-GO 6.1, that manages the satellite report frequency is the IIP.MARITIME.INTEL.REPORT.PERIOD parameter. This one parameter is used by all satellites owned by a Faction that uses the specific IIP. The parameter can b change during game play and takes effect after the next report period.

If the current report frequency report capability does not meet the Cell's needs, R&A and review the current JTLS 6.1 Satellite ECP to determine if a more robust method can be implemented under the existing ECP.

2.6.3 Represent Concept Of Unknown Units

User Observation: The Intelligence Cell indicates that satellite detections, which can only detect the existence of objects are providing this information but the detected objects are given a correct Force Side. This is more information than wold be available from some satellites.

R&A Comments: The observation is completely correct. Currently the concept of "Unknown" is only applied to Air Missions and it should be noted that usually databases, including the database used for Polaris Gram 20, are not setup to use the "Unknown" Force Side. ECP JTLS-0148, Unknown Sides, has been on the ECP list for almost twenty years and has never been picked up. This would be a significant ECP that would require significant funding to implement.

2.6.4 Area Filters In JOI

User Observation: Users indicated that it would be useful if the JTLS-GO Operational Interface (JOI) would have an area filtering capability. In other words, only report tracks that fall within a polygonal area.

R&A Comments: ECP, JTLS-2009-10336, JOI Area Filter, already exists and would need to be funded for implementation.

2.6.5 Limit Urgent Report Contents

User Observation: HRUs and ARUs have the ability to send out an "Urgent" report if the asset detects an object that exists on the user provided Essential Elements of Information (EEI) list. The issue is that the urgent reports includes everything that the HRU detected since the last report, both urgent and non-urgent information.

R&A Comments: This comment is true, but the model was designed to operate in this manner. HRUs have a probability of being detected each time a report is sent. Even though the covert HRU reports, JTLS-GO assumes that a burst radio transmission passes this information back to the parent unit, the database indicates how likely the burg.st transmission could be detected and localized by the enemy giving away the location of the covert HRU.

For this reason, the urgent message goes out with all information and then the next report time is adjust to occur from that point forward. Remember the information provided in **Section 2.4.6, "Turn Off Reports For Civilian Units," on page 12** which addresses the fact that even Blue units are being reported. Setting the IIP RECCE REPORT LEVEL properly should stop this from happening.

If it does already put the urgent information at the top of the message, R&A engineers will treat the situation as an STR and alter the logic to do so.

If this solution is not satisfactory to the NJHQ, please submit the desired solution and an ECP will be submitted on behalf of NJHQ.

2.6.6 Represent Raising / Lowering Sensors Into Mountain Shelter

User Observation: Users indicated that they need to be able to represent the raising and lowering of sensors into a mountain shelter.

R&A Comments: R&A engineers believe this can already be represented within JTLS-GO using the equipment shelter concept. We will send this to our independent test team to ensure that it is working as expected. Basically, if a sensor is turned off, it should enter a co-located equipment shelter that can represent a mountain shelter. When turned on it should come out of the shelter.

While in the shelter it cannot be detected by overhead assets and it will be more difficult to damage because the mountain shelter must be damaged first and then the individual contests of the shelter are considered for damage.

The important fact that needs to be investigated is whether the sensor must be owned by a unit or can simply be associated with a unit. If the model does not work as described, R&A engineers believe this represents an STR and the issue will be fixed and properly documented.

2.6.7 Change Manner To Track Dead Units

User Observation: User thought that removing dead units from the command hierarchy caused issues with getting summary reports, such as summary Logistics Reports and even summary Combat System Command Hierarchy Reports. The user loses the combat systems that were killed from these unit and subordinate types reports because dead units are removed from the command hierarchy.

R&A Comments: R&A admits that our engineers do not remember why in 1983, the decision was made to remove dead units from the Command Hierarchy. Units that have not arrived in the theater or have left the theater are in the Command Hierarchy; therefore, there is no known reason to remove the dead units from the Command Hierarchy.

ECP JTLS-2020-15049, Leave Dead Units In Command Hierarchy, has been submitted on behalf of NJHQ.

2.6.8 Reporting Requirements

User Observation: The Intelligence Cell users listed several reports that they would like to see. These reports are:

- Extract spot reports from units larger than HRUs

- Only reports changes since the last report.

- Reports contain information on sides for which the user is not interested, such as Civilians.

- Ask for a report for a specific area that would list the units seen in the area and the names of the objects that detected the units in the area.

- Have units report when aircraft fly overhead.

R&A Comments: R&A has the following comments concerning each request:

- As mentioned in **Section 2.4.8, "Get HRU Style Reports From ARUs," on page 13**, ARUs have the ability to provide Spot Reports

- Spot reports should only be providing new information. If that is not true, this would be considered an STR and will be fixed.

- Limiting the sides of units that are contained in all intelligence reports was discussed in **Section 2.4.6, "Turn Off Reports For Civilian Units," on page 12**.

- There are several ways in which a detection area report could be generated. It would be tracked within the model or R&A engineers could create an After Action Review (AAR) in game report. Without some detailed design work, it is unclear which method would be best, but the general feeling is that this type of report would be more suitable for the AR database query reports, which in JTLS 6.1 will be available from ever user's Web Host Interface Program (WHIP).

  ECP JTLS-2020-15050, Provide Area Detection Summary Report, has been submitted on behalf of NJHQ.

- **Section 2.4.9, "Include Detecting Aircraft To HRU and ARU Tactical Intel Reports," on page 13**, resulting in our submission of an ECP for this capability.

2.7 Civilian Function Observations

2.7.1 Single Location Naval Moves Do Not Use Sea-lanes

User Observation: The Civilian Cell believes that the civilian ships were not using sea-lanes.

R&A Comments: The R&A independent test team will retest this function, but the current feeling is that this is working just fine. It is possible that the area search parameters were set too small and this is why a sea-lane route was not found. NJHQ could do some of their own testing and play around with the END OVER LAP, HALF WIDTH, MIN END OVER LAP and MIN HALF WIDTH database parameters if it provides a better possibility of finding sea-lanes.

Without a specific example, such as a ship moving from location X to location Y did not use sea-lanes, there is little we can do to explain why a sea-lane route was not found.

2.7.2 Some Java Errors Appeared In The Message Browser

User Observation: The Civilian cell indicated that they had a few messages that caused a Java Exception in the Message Browser.

R&A Comments: There is little we can do about this issue without looking at the specific message involved. In the future, WHIP training should include what to do about these type of Java Exceptions. Basically, the message number should have been sent through Chat to Technical Control so the exact problem could be properly evaluated and documented.

2.7.3 Ships That Run Out Of Fuel Do Not Restart Automatically

User Observation: The Civilian Cell indicated that if a ship runs out of fuel, and fuel is magically provided for the ship, then it does not automatically restart.

R&A Comments: There are three ways to provide fuel to a ship. These are:

- Provide fuel by sending a taker to refuel the ship using the Replenish Unit Order. When the fuel arrives, the ship should automatically start to move again.

- Magically provide fuel using the Login Build Order. When the fuel arrives, the ship should automatically start to move again.

- Magically provide fuel using the Set Individual Unit Parameter Order and set the On Hand for fuel to a value greater than zero. The model is designed not to automatically restart a unit under this circumstance. This capability is needed to correct problems without resulting in any ancillary actions. The Set Individual Unit Parameter Order is usually reserved for Technical Control to solve non-resupply issues.

The R&A Independent Test Team will rerun tests to ensure that model works as described and expected.

3.0 R&A Conclusions

R&A keeps a log during an exercise to note all issues that we uncover during execution. The following is a list of the issues that we have found during the exercise. If the item does not list a ECP number, R&A considers the issue an STR and will fix the issues as time permits. No additional funding is required to correct STR issues,

- The Automatic Supply Calculation Tool does not give artillery to units. This is ECP JTLS-0293, Supply Calculation Excess Indirect Fire Ammunition. R&A is considering raising the priority of this ECP.

- R&A had several questions concerning the difference between two or three different versions of a given Targetable Weapon. It would help if the Targetable Weapon table had a comment field, so the JTLS-GO database team could provide some clarifying information. ECP JTLS-2020-15051, Add Comment Field To Targetable Weapon Table has been submitted.

- The ATO-T was not getting the ATO name from the proper place in a NEC-CCIS generated ATO. This is an STR and will be fixed.

- Although not mentioned by the Air Cell during the user discussion, during the exercise the Air Cell did complain that the Mission Report indicates when a intercept is stopped, but does not indicate when the intercept starts. This is considered an STR and will be fixed.

- We have never tested or used the ATO-T from a Super WHIP when the ATO contains several missions from several sides. R&A translated the coalition ATO by running the ATO-T from each side's WHIP. Translating from a Super WHIP needs to be either implemented or fully tested before approving it for use in an exercise.

- Although not mentioned by the Navy cell during the user discussion, during the exercise there was a complaint that the Naval Shadow order did not have an option to alter the speed with which the naval vessel should use to get into the proper shadow position. This is extremely important for submarines. Currently the naval vessel speeds up to their normal cruise speed to get into position. This makes the shadowing submarine too vulnerable to detection.

- The OPM page for the types of objects in a Target Type Group is difficult to use. The data presented in the table needs to be sorted in some manner.

- The user caused a crash by placing an Alert Task prior to a mission going through its begin task. This needs to be fixed. The reason this happened is that the user was trying to make a mission start earlier than originally planned. Not only does the logic error that caused the crash to occur, but an easier way to alter the start time of a mission needs to be provided to the user.

- The ATO Parser provides a list of errors and warnings uncovered during the parser function. This list is very difficult to read and needs to be improved.

- Satellite IMT screen needs to list the sensor that is on the satellite.

- When restarting a Total Recall Interactive Post Processor (TRIPP), the R&A engineers believe that the tool does not come up in an efficient manner. It starts at the last point in time used by the TRIPP and then automatically throw the download away and goes back to get a download for time zero. This takes processing which is not needed.

- A Land Cell user had some difficulty with the speed at which an HRU could travel. The problem identified could have been caught as part of the SVP checks. If an HRU speed capability is less than its database parameter HUP ORGANIC SPEED, then a warning should be generated.

- When generating a time based TRIPP report the last partial period is not listed. For example, if an Aircraft Kill report is request at 2300Z for every day since the start of the exercise, the report does not include the aircraft kills from 0000Z to 2300Z on the current day.

- The Naval Unit OPM page is poorly formatted.

- Runway Cuts cannot be viewed from the Controller WHIP.

Finally although we had a few crashes, the majority of the problems were found in the shadow game and did not affect model availability. R&A computed that 98.95% model availability.

If there are any questions concerning this report, please contact Ellen Roland at ellen.rolands@rolands.com