JTLS-2019-14545 Airspace Representation

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1.0 Summary of Model Change Request

Enable the use of airspaces defined in an Airspace Control Order (ACO) to be referenced and used by players when building JTLS air missions.

2.0 Design Summary

The design is broken up into two primary tasks required for full implementation of this Engineering Change Proposal.These are:

- Translate a real-world Airspace Control Order (ACO) and develop an order to create Airspace Control Mean (ACM) areas within the model. The ACO has a unique identifier for each ACM, which is known as an ACM Identifier (ACMID). ACMIDs are not just used by air missions, they are used by air defense sites, naval units, and land combat units. This ECP concentrates on how an air mission will use this information.

- After the ACMIDs are created and exist in the model, alter the various JTLS-GO Air Mission Orders to accept tasks that refer to the ACMID instead of using latitude and longitude information. This task is much more difficult because it needs to consider the following types of issues:

    a. Which order and which fields within the orders will be changed to use the newly recognized ACMIDs.

    b. When will the ACMIDs expire and how to handle overlaps between Air Tasking Order (ATO) days with the same ACMID name but different locations.

    c. How to show the planned route as part of the order building process.

    d. How to handle air routes in which the air mission is told to follow only a portion of an ACMID route.

3.0 Detailed Design

3.1 Translating An Airspace Control Order Into The JTLS-GO Manage ACMID Order

The purpose of this section is to describe how an ACO will be parsed and translated into an order called the MANAGE ACMID Order.

3.1.1 Description Of ACO Message

Table 1 shows a typical ACO following the Allied Data Publication 3 (ADatP3) format used by the North Atlantic Treaty Organization's (NATO's) Integrated Command and Control (ICC) system. The ADatP3 version of the ACO matches closely to the US Military Standard (MilStd) 6040 generated by the Theater Battle Management Core System (TBMCS). The fields highlighted in "Green" are used by the parser and are needed to properly create the ACO Orders within the model. Differences between the ADatP3 version of the ACO and the MilStd 6040 are noted where necessary.

Table 1. Sample ACO

LINE	EXPLANATION
1	EXER/RAVEN SCOUT 90//
	This record is optional, but for the ACOs produced for JTLS-GO, the record is expected, indicating that the ACO is created for an exercise. The contents of the record are not needed for this ECP
2	OPER/DENY FLIGHT//
	This record is conditional and is usually not included in JTLS-GO ACOs. The contents of the record are not needed for this ECP
3	MSGID/ACO/AADC/014//
	This record is mandatory and the Parser uses the second field of the MSGID record to ensure it is parsing an ACO. The remainder of the record is not needed for this ECP.
4	REF/A/MSGID:ACMREQ/ABCCC/23JAN1990//
	This record is optional. The contents of the record are not needed for this ECP.
5	POC/F. BURNS/MAJ/4077 MASH/LOC:CAMP SWAMPY/TEL:804-555-4142//
	This record is mandatory in the ADatP3 version of the ACO message. It does not exist in the MilStd 6040 version of the message. This is not a problem because the contents of the record are not needed for this ECP.
6	ACMSTAT Record
	NATO considers this record restricted data and it is not included in this description. This is not a problem because the contents of the record are not needed for this ECP.
7	What this design document is calling Record 7 is in fact a repeatable set of possibly 9 records, one set for each Airspace Control Mean being specified by an Airspace Control Mean Identifier (ACMID). This repeatable set is defined in this table as lines 7A through 7I

Table 1. Sample ACO

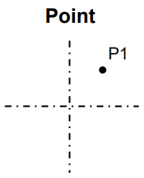
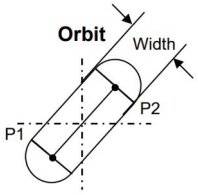
LINE	EXPLANATION
7A	ACMID/ACM:ATC/NAME:BBR22/ORBIT/USE:CLSB//
	This is the record that identifies a named Airspace Control Mean (ACM). It is the first record in a group of records used to define an ACM area. • ACMID is the record identifier • ACM field is not used by JTLS-GO • NAME field will become the name of the ACMID object being created in JTLS-GO. The user will be able to select the ACMID by name from the WHIP filter panel to display the area on the WHIP. This is the name the user will use when creating an order for an Air Mission to use the ACMID. Naming considerations are described in more detail in Section 3.1.2. • The fourth field describes the shape of the ACMID. Based on the shape, the next record is different and describes the data required to define the shape. • The fifth field describes how to ACMID is to be used. This information is important and the level to which this ECP uses this information is a major design consideration. Options are discussed in Section 3.1.3.
7B	GEODATUM/WGS//
	In the ADatP3 version of the ACO, each ACMID group has a mandatory Geodedic Datum specified. In the MilStd 6040 version, there is one GEODATUM record for the entire message. This difference does not matter, since the ATO-T will not use this information, but it should be noted that all JTLS-GO related location data assumes that World Geodedic System 1984 (WGS84) is being used.
7C	The next record is used to identified the shape of the ACMID and varies based on the shape specified in Record 7A. The options for this record are described in the following rows. There are two aspects to the shape that will be discussed later in this design: • The display of the shape on the WHIP - this is discussed and shown in Table 9. • Which mission and which mission options will be allowed to access the various shapes. This is discussed in Section 3.3.
7C1	 APOINT - This is a single point and presumably will be used to indicate the point at which an air mission should orbit.
	APOINT/LATM:2037N05943E//
7C2	 AORBIT - JTLS-GO will use this shape for two point orbits. JTLS-GO currently does not support racetrack orbits and will not as a result of this ECP. Providing this new capability is beyond the scope of the ECP. Thus only the two points of the definition record will be used for the definition of the ACMID. The width of the racetrack and the direction of orbit fields will be ignored.
	AORBIT/LATM:2034N09456E/LATM:2045N09470E/235KM/R//

Table 1. Sample ACO

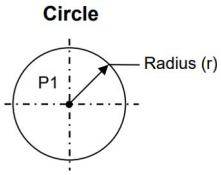
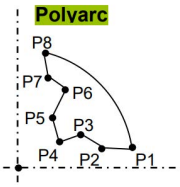
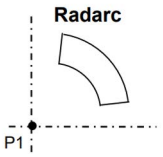
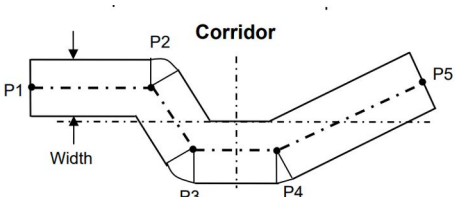
LINE	EXPLANATION
7C3	 CIRCLE - JTLS-GO will use this shape for a single point orbit. Although the radius will be used and passed when defining the ACMD, it will not be used when an air mission accesses the ACMID during flight operations. The radius will be used by other orders such as the definition of a Directed Search Area (DSA)
	CIRCLE/LATM:2037N05943E/200KM//
7C4	 POLYARC - The most complicated of all the ACMID shapes. The second field of the record is a reference point used to compute the first point and the last point of the polyarc area. The third field (330T) gives the bearing to the first point and the fourth field (330NM) is the distance that first point is from the reference point. The last point of the area is defined by obtaining the bearing from the fifth field (160T) and the distance is the same as the first point from the reference point. From there the record can have as many points as desired which define the second point up to the penultimate point of the area. Note that the example record does not match the picture of a polyarc. Representing a Polyarc within the model will be simplified due to time and cost constraints. The simplification is described in Table 9.
	POLYARC/LATM:1510N05901E/330T/330NM/160T/LATM:2036N05942E/LATM:1550N05948E /LATM:1555N05913E//
7C5	 RADARC - Similar to the POLYARC, the RADARC defines an area between two arcs of concentric circles. The second field of the record defines the center the circles. Fields three and four define the bearing range for the arcs. Finally field five represents the radius of the inner circle while field six represents the radius of the outer circle. Representing a Radarc within the model will be simplified due to time and cost constraints. The simplification is described in Table 9.
	RADARC/1510N05901E/170T/050T/150KM/350KM//
7C6	 CORRIDOR - Corridors have a width, but in the same consistent manner as tracks, that width will be ignored. The location of the path will follow the list of locations in the record. Note that all locations may not be in the format of latitude and longitude. They may be references to APOINT ACMID records. This is particularly difficult. The design calls for the parser to convert references to APOINT ACMIDs into locations before sending the ACMID creation information to the model. The model will not represent the track points as references to other ACMID records.
	CORRIDOR/5NM/SNWP:KU33/SNWP:KX22/SNWP:PP19/LATM:2236N06023E/SNWP:XC23 //

Table 1. Sample ACO

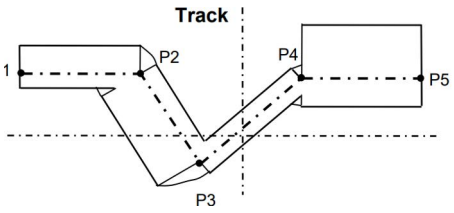
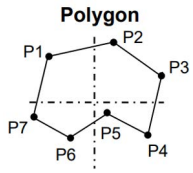
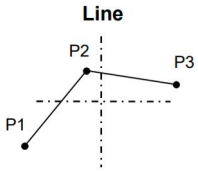
LINE	EXPLANATION
7C7	 1TRACK -Although a track defines various covered widths along the entire path, the concept of a Track ACMID will consist of only the points and the altitude along the path that will be allowed.
	1TRACK /LEG/LEG-BEGIN /LEG-END /LEG-WIDTH /MINALT-MAXALT / 01/152345N0505657E/192646N0531226E/30.5NML-60.9NMR/050AMSL-100AMSL / 02/192646N0531226E/231031N0545323E/60.5NML-60.5NMR/080AMSL-120AMSL / 03/231031N0505323E/280628N0562901E/60NML-80NMR /100AMSL-150AMSL //
7C8	 POLYGON - This ACMID shape will be used to define air mission patrol areas. The concept of traveling on the outer boundaries of the shape will not be considered.
	POLYGON/LATM:2037N05943E/LATM:2044N05953E/LATM:2048N05982E/LATM:2137N07943E /LATM:2037N05943E//
7C9	 GEOLINE - This record creates an ACMID that is simply a series of location points.
	GEOLINE/LATM:1510N05901E/LATM:2036N05942E/LATM:2100N05840E//
7D	EFFLEVEL/FLFL:FL100-FL230//
	This record indicates the flight level at which the mission should fly while in the ACMID region. There are four variations to how flight level is defined, but in each case the result is that the parser will create one elevation at which missions should flying while moving within the ACMID. These four cases are:
	• BRRA:GL-100AGL - Base Reference Point to Relative Altitude - Travel at the specified Relative Altitude or in this example, 10000 Feet
	• BRFL:MSL-FL230 - Base Reference Point to Flight Level - Travel at the specified Flight Level or in this example 23,000 Feet

Table 1. Sample ACO

LINE	EXPLANATION
7D Con't	• RARA:100AGL-020AGL - Relative Altitude to Relative Altitude - Travel in the middle of the specified range. The lower allowable is 10,000 Feet and the upper allowable altitude is 2 thousand feet above that. The mission will fly at 11,000 feet.
	• FLFL:FL100-FL230 - Flight Level to Flight Level - Travel in the middle of the specified range. In the example, the mission will fly at 16,500 Feet.
7E	APERIOD/DISCRETE/270001ZNOV/271200ZNOV//
	As with many other records within the ACMID definition, there are numerous options that need to be considered. • The DISCRETE method is straightforward. The start time and end time of the period is specified. This straightforward method may be complicated by listing several periods. For example the following indicates that there is a two hour break in the period in which the ACMID is active: APERIOD/DISCRETE/270001ZNOV/271200ZNOV// APERIOD/DISCRETE/271400ZNOV/281000ZNOV// • A period may defined using the INTERVAL method. Based on the documented example, it is not clear that even users understand how the methodology works. With an INTERVAL specified period, Field 3 is the start time and Field 4 is the duration. In the provided example, this time duration of Until Further Notice (UFN) indicates that ACMID active status should never end based on this message, which would make it impossible to repeat. Field 5 defines the repetitive time interval and the duration over which the repetitive activation should continue. The duration of Until Further Notice (UFN) indicates there is also has no stop time. APERIOD/INTERVAL/141530ZFEB/UFN/WEEKLY/UFN// Ignoring the confusing example provided in the official documentation, the question becomes should JTLS-GO activate and deactivate ACMIDs throughout an ATO period. Doing so opens up a "large can of worms" and problems that will be difficult to fix. For example, what should happen to a mission that was told to patrol in a polygon that had the multiple DISCRETE APERIOD records? • At 1200Z on 27 November should the mission's patrol be canceled? • Where should it go until 1400Z on 27 November? For this reason and numerous other examples that we can provide, the Design Team has decided that an ACMID will not expire. It will be updated each time an ACO is processed.
7F	CNTRLPT/CP/APPLE/LATM:2037N05943E/BRRA:MSL-210AMSL//
	The Control Point record is optional, If specified the air mission will be told to move to this point and then proceed to the ACMID area provided for its main task.
7G	CONTAUTH/STUCKO 15/275.3MHZ/122.5MHZ//
	The Controlling Authority record will not be used
7H	GENTEXT/PURPOSE OF ACM/HERE YOU MAY ADD ANY COMMENTS IN FREE TEXT OF AN UNLIMITED NUMBER OF CHARACTERS THAT IS REQUIRED BY THE MESSAGE//
	The first general text record is used to indicate the purpose of the requested ACM. It will not be used.

Table 1. Sample ACO

LINE	EXPLANATION
7I	GENTEXT/DETAILED INSTRUCTIONS/HERE YOU MAY ADD ANY COMMENTS IN FREE TEXT OF AN UNLIMITED NUMBER OF CHARACTERS THAT IS REQUIRED BY THE MESSAGE//
	The second general text record contains detailed instructions for the ACM. It will not be used.
8	DECL/DERI:OPLAN 55-01/-/DOWNGRADE TO UNCLASSIFIED/30MAY2005//
	The declassification instructions will not be used.

3.1.2 Naming ACMID Objects

Although Table 1 indicated that the ACMID Name that is specified in Record 7A will be used to name the ACMID, it is not quite that straightforward. There are several design details that need to be considered. Within an exercise, as within the real-world, ACOs can be published at any time. Normally with both ICC and TBMCS, an ACO is published at the same time that an ATO is published. The biggest problem is that for each ATO, the missions may refer to ACMIDs and it is possible that the definition of the ACMIDs may change from day-to-day without the name changing.

It is unclear whether this change capability is operationally used. Over the years, we have had a few circumstances in which a specifically named ACMIDs was changed with each ATO, but the majority of time the ACO does not change throughout the entire exercise. The Design Team struggled with how to handle this situation. We considered the options outlined in Table 2 and decided on the first option which is to have one ACMID in the game and alter it as needed after processing every ATO.

Table 2. ACMID Across Different ATOs

OPTION	PROS	CONS
One ACMID - With each new ACO, the ATOT will submit an order to either create the ACMID or update it with new data.	• There will be no need to clean up ACMIDs. They will exist throughout the game. • Users cannot display the wrong ACMID for a given day.	If there is a change on Day 2, it is possible that a Day 1 mission will be accessing the Day 2 version of the ACMID. The question is could this ever happen during real-world operations.

Table 2. ACMID Across Different ATOs

OPTION	PROS	CONS
One ACMID for each ATO Period.	Each ATO mission would be accessing the correct ACMID.	• The number of ACMIDs, most of which would be identical, would grow throughout the exercise. • Methods to clear or reduce this number would need to be developed to make the capability useful without being a burden.

Given this decision, the naming if ACMIDs is straightforward. The name as presented in Record 7A of Table 1 will be used as the ACMID name,

3.1.3 Implementation Options For ACMID Use

Record 7A in Table 1 has a field marked “USE”. In the past this has been an important field because we create slides based on the Use attribute of the ACMID. All ACMIDs with a “Use” of CAP were placed in the same slide, all ACMIDs with a “Use” of AR were placed in the same slide etc. The Design Team believes that this continued sorting function, not for slides, but for selecting ACMIDs for display on the map will be useful. This is discussed on Section 3.3.

Besides this sorting capability for display purposes, the Design Team has decided this field will be used for other purposes within the model and the interface. In a typical ACO there can be several hundred ACMIDs. As will be seen in Section 3.3, several existing order panels will be altered to allow the user to select an ACMID vice inputting location information. For example, when selecting the orbit location for an air mission, the user will have a new option to orbit within an ACMID. As much as possible, the desire is to limit the list of ACMIDs from which the user can select.

For this reason, the team has decided to limit the ACMIDs that will be in the order field drop down lists. Table 3 outlines all of the possible values that can be entered for the ACMID attribute “Use” and presents the proposed fields for which the ACMID will be legal. If for some reason this list is not accurate, it can easily be changed during game execution. The identification of allowable “Use” ACMIDs is in a data file and the JXSR and WHIP simply needs to be restarted for the new data files to take effect.

Table 3. Legal ACMID Use Values

Allowable Fields	Use	Meaning
Will be selectable from: • ACMID Route Point	EG	Entry / Exit Gate
	HG	Handover Gate
	MG	Marshalling Gate
Will be selectable from: • ACMID Route Point Landing Location	FARP	Forward Arm And Refuel Point
Will be selectable from: • ACMID Route Point Landing Location • ACMID Alert Location	FOL	Forward Operating Location
Will be selectable from: • ACMID Ingress Route • ACMID Egress Route	TC	Transit Corridor
	TR	Transit Route
	AIRCOR	Air Corridor
	APPCOR	Approach Corridor
	AIRRTE	Air Route
	NAVRTE	Area Navigation Route
	ATSRTE	ATS Route
	CDR	Conditional Route
	MRR	Minimum Risk Route
	SAAFR	Standard Use Army Aircraft Flight Route
	SL	Safe Lane
	ARWY	Airway
	ADVRTE	Advisory Route
	SC	Special Corridor
	TMMR	Temporary Minimum Risk Route
Will be selectable from: • ACMID Orbit Fields • ACMID Polygon Area Fields	TA	Training Area
	WARN	Warning Area
	BDZ	Base Defense Zone
	BZ	Buffer Zone

Table 3. Legal ACMID Use Values

ALLOWABLE FIELDS	USE	MEANING
(Con't) Will be selectable from: • ACMID Orbit Fields • ACMID Polygon Area Fields	DA	Danger Area
	ALERTA	Alert Area
	CTA	Control Area
	CONTZN	Control Zone
Will be selectable from: • ACMID Orbit Fields	UAV	Unmanned Aerial Vehicle
	ACP	Air Control Point
Will be selectable from • ACMID Orbit Field On DCA Mission Only	CAP	Combat Air Patrol
Will be selectable from • ACMID Orbit Field On OAS Mission Only	CAS	Close Air Support Holding Area
Will be selectable from • ACMID Orbit Field On EC Mission Only	EC	Electronic Combat
	SEMA	Special Electronic Mission Area
Will be selectable from • ACMID Orbit Field On Air Refuel Mission Only	AAR	Air-to-Air Refueling
Will be selectable from • ACMID Orbit Field On AWACS Mission Only	ABC	Airborne Command Control
	AEW	Airborne Early Warning
Will be selectable from • ACMID Orbit Field On RECCE Mission Only	RECCE	Reconnaissance Area
	SARDOT	Search And Rescue Point
Will be selectable from: • Mobility Mission Orders	DZ	Drop Zone
	LZ	Landing Zone
	PZ	Pickup Zone
Will be selectable from • ACMID OPAREA Polygon Only	CLSA	Class-A Airspace
	CLSB	Class-B Airspace
	CLSC	Class C-Airspace
	CLSD	Class-D Airspace
	CLSE	Class-E Airspace
	CLSF	Class-F Airspace
	CLDG	Class-G Airspace

Table 3. Legal ACMID Use Values

ALLOWABLE FIELDS	USE	MEANING
(Con't) Will be selectable from • ACMID OPAREA Polygon Only	MFEZ	Maritime Fighter Engagement Zone
	LFEZ	Land Fighter Engagement Zone
	FFA	Free Fire Area
	HIMEZ	High Altitude Missile Engagement Zone
	JEZ	Joint Engagement Zone
	JOA	Joint Operations Area
	LOMEZ	Low Altitude Engagement Zone
	ACA	Airspace Coordination Area
	ASCA	Airspace Control Area
	ACSS	Airspace Control Subarea / Sector
	MMEZ	Maritime Missile Engagement Zone
	ADAA	Air Defense Action Area
	ADIZ	Air Defense Identification Zone
	ADZ	Amphibious Defense Zone
	LMEZ	Land Missile Engagement Zone
	NFA	No Fire Area
	NOFLY	No Fly Zone
	MOA	Military Operations Area
	PROHIB	Prohibited Area
	RA	Restricted Area
	RFA	Restricted Fire Area
	ROA	Restricted Operations Area
	SHORAD	Short Range Air Defense Engagement Zone
	WFZ	Weapons Free Zone
Will be viewable, but not selectable from any fields.	CL	Coordination Level
	TCA	Terminal Control Area
	TL	Traverse Level
	TRSA	Terminal Radar Service Area

Table 3. Legal ACMID Use Values

ALLOWABLE FIELDS	USE	MEANING
(Con't) Will be viewable, but not selectable from any fields.	BNDRY	Boundary
	BULL	Bullseye
	CADA	Coordinated Air Defense Area
	CCZONE	Carrier Control Zone
	CFL	Coordinated Fire Line
	COZ	Crossover Zone
	CP	Contact Point
	DBSL	Deep Battle Synchronization Line
	FENA	Forward Edge Of Battle Area
	FIR	Flight Information Region
	FIRUB	Fire Umbrella
	FLOT	Forward Line of Own Troops
	FRAD	Falcon Radials
	FSCL	Fire Support Coordination Line
	FACA	Force Air Coordination Area
	HDACZ	High Density Air Control Zone
	IFFOFF	IFF Switch Off Line
	IFFON	IFF Switch On Line
	ISP	Identification Safety Point
	ISR	Identification Safety Range
	ALTRV	Altitude Reservation
	AOA	Amphibious Objective Area
	CBA	Cross Border Area
	RCA	Reduced Coordination
	TSA	Temporary Segregated Area
	MISARC	Missile Arc
	PIRAZ	Positive Identification Radar Advisory Zone

Table 3. Legal ACMID Use Values

ALLOWABLE FIELDS	USE	MEANING
(Con't) Will be viewable, but not selectable from any fields.	RFL	Restricted Fire Line
	RTF	Return To Force
	SAFE	Safe Area For Evasion
	SAFES	Safety Sector
	SCZ	Ship Control Zone
	SOF	Special Operations Forces
	SSMS	Surface-to-Surface Missile System

3.1.4 Description of the MANAGE ACMID Order

The MANAGE ACMID Order needs to follow the basic design characteristics of a Manage Order. This means that the order will have the following capabilities:

- Create new ACMID
- Alter existing ACMID Object
- Delete existing ACMID Object

Normally, the Manage Order has a list or describe capability. Since ACMIDs will be viewable WHIP objects, the Design Team felt there was no benefit to this option. The Manage ACMID Order will not have a describe or list option.

The following sections describe each of these capabilities. Mandatory fields and options are written in a bold font, and the optional fields are displayed in a normal font, just as they are on the WHIP. The color coding scheme, shown in Table 4, is used within each of the other Order tables presented in this section:

Table 4. Order Table Color Coding Scheme

EXPLANATION
The cell contents represent an Order Field
The cell contents represents an Order Group
The cell contents represents an Order Group Option

The Manage ACMID Order will have the basic fields shown in Table 5.

Table 5. Basic Fields For Manage ACMID Order Panel

FIELD OR GROUP	OPTION	GROUP FIELD
Reference	Text field used to name the order. the existence of a Reference Field indicates that the order will be saved and will be accessible from the Order Group Editor.	
Visible To Sides	Utility to list the sides to which this ACMID will be visible.	
Manage Function Group	Create	See Section 3.1.4.1
	Alter	See Section 3.1.4.2
	Delete	See Section 3.1.4.3

3.1.4.1 Create New ACMID

Table 6 summarizes the fields associated with the Create Group Option for the Manage ACMID Order.

Table 6. Create New ACMID Order Panel Fields

FIELD OR GROUP	OPTION	GROUP FIELD
New ACMID Name:	The specification allows for up to 30 characters, but the word NAME: takes up five characters. The standard naming size for object in JTLS-GO is 25 characters. This field will be limited to 25 characters.	
Color	The color of this ACMID. Areas will be filled with a transparent color. The default color will be specified in new ATO-T table. The selectable colors will be the same as the selectable colors for the current Manage OPAREA Order.	
Shape Group	Point Option	**Location Field**
	Orbit	**Orbit Start Location Field**
		Orbit End Location Field
	Circle	**Location Field**
		Circle Radius
	Track	**Location Leave Altitude Utility**
	Corridor	**ACMID Feasible Location Utility**
	Polygon	**Polygon Field**
	Line	**Location Utility**

Table 6. Create New ACMID Order Panel Fields

FIELD OR GROUP	OPTION	GROUP FIELD
Shape Group (Con't)	Polyarc	**Reference Point Location**
		Initial Arc Bearing
		Arc Distance From Reference
		Location Utility
		Final Arc Bearing
	Radarc	**Reference Point Location**
		Initial Arc Bearing
		Final Arc Bearing
		Arc Distance From Reference
		Inner Arc Distance From Reference
ACMID Default Altitude	The "Track" Shape has associated altitudes, but none of the other ACMID shapes have detailed altitude information. Unless told otherwise, the mission will fly at this altitude when in the ACMID task location.	
Starting Control Point	Optional Field: Before entering the ACMID, the mission will fly to this control point.	
Control Point Leave Altitude	Optional Field: The mission will fly at this altitude on its way to the ACMID area. Once in the area, it will switch to the ACMID Default Altitude.	

3.1.4.2 Alter Existing ACMID

Table 7 summarizes the fields associated with the Create Group Option for the Manage ACMID Order. Altering specific Shape information will not be supported. When altering the shape either the type or specific attribute of the shape, the entire list of shape attributes must be re-entered. At first thought this may see to be burdensome, but the reader should remember that management of the ACMID objects will be automatic based on the translation of the ACO. Attempting to edit individual characteristics of an ACMID is beyond the scope of this ECP.

Table 7. Alter ACMID Order Panel Fields

FIELD OR GROUP	OPTION	GROUP FIELD
ACMID Name:	A drop-down list of all existing ACMID objects known to the WHIP	
Color	A optional field indicating the new color that should be used for the ACMID. All users will see the ACMID with this color. The design does not call for WHIP specific colors for the ACMID objects.	

Table 7. Alter ACMID Order Panel Fields

FIELD OR GROUP	OPTION	GROUP FIELD
Shape Group	Point Option	**Location Field**
	Orbit	**Orbit Start Location Field**
		Orbit End Location Field
	Circle	**Location Field**
		Circle Radius
	Polyarc	**Reference Point Location**
		Initial Arc Bearing
		Arc Distance From Reference
		Location Utility
		Final Arc Bearing
	Radarc	**Reference Point Location**
		Initial Arc Bearing
		Final Arc Bearing
		Arc Distance From Reference
		Inner Arc Distance From Reference
	Track	**Location Leave Altitude Utility**
	Corridor	**ACMID Feasible Location Utility**
	Polygon	**Polygon Field**
	Line	**Location Utility**
ACMID Default Altitude	The “Track” Shape has associated altitudes, but none of the other ACMID shapes have detailed altitude information. Unless told otherwise, the mission will fly at this altitude when in the ACMID task location.	
Starting Control Point	Optional Field: Before entering the ACMID, the mission will fly to this control point.	
Control Point Leave Altitude	Optional Field: The mission will fly at this altitude on its way to the ACMID area. Once in the area, it will switch to the ACMID Default Altitude.	

3.1.4.3 Delete Existing ACMID

When deleting an ACMID, the order panel is straight forward. The user simply needs to select the ACMID from the drop-down list as shown in Table 8.

Table 8. Delete ACMID Order Panel Field

Field or Group	Option	Group Field
ACMID Name:	A drop-down list of all existing ACMID objects known to the WHIP	

3.2 Air Tasking Order Translator (ATOT) Changes

Figure 1 depicts the current ATO translation process.

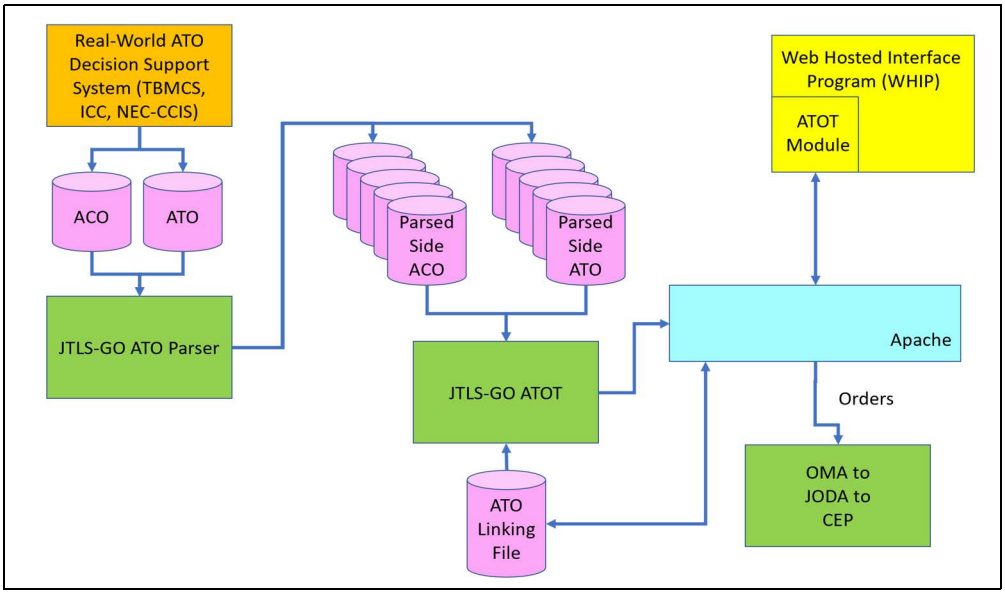


Figure 1. Basic ATO Translation Process

Currently, the ATOT parser reads the ACO and places the contents of the message in a common formatted EXtended Markup Language (XML) file. Thus an ACO that comes from the Theater Battle Management Core System (TBMCS), the Integrated Command and Control (ICC) system, or the Northern European Command - Command, Control Information System (NEC-CCIS) are each parsed into the common format.

To implement this ECP, minor changes will be required for the parser, two new interface panel will be required by the ATOT Module, and some significant changes will need to be made to the ATOT service itself.

3.2.1 ATO Parser Changes

Very few changes will be required of the ATO Parser. All of the data labeled in "Green" within Table 1 needs to be in the parsed ATO file. Currently some of the data associated with the less common shapes, POLYARC and RADARC are not being saved. The intent of this ECP is to implement all of the allowable ACO shapes defined in the specification.

3.2.2 WHIP ATO Module

The WHIP ATO Module is the user interface for the ATOT. The user handles numerous tasks from the module, such as linking:

- Linking ICAO codes referenced in the ATO message with the JTLS-GO airbase or naval unit.
- Linking JTLS-GO Squadrons to Task Units referenced in the ATO
- Linking JTLS-GO Weapon Loads to weapon loads referenced in the ATO, and
- Setting some data needed by the ATOT to accomplish its job such as indicating how to convert fuel specified in the ATO with fuel as built in the JTLS-GO database.

The WHIP ATO Module will need to be changed as follows

- A new interface table needs to be added in which the user can specify the default color for each of the allowable ACO shapes. As shown in Table 6 and Table 7, the Manage ACMID order specifies the color that should be used to display the shape on the WHIP. This new module table is where the ATOT user identifies the color of the ACMID shape. The Manage ACMID orders created by the ATOT service will specify the color as indicated by this new ATOT Module table. This color is the default color for the ACMID. After creation, a user can change the color of any specific ACMID.
- The ATOT Module will also need a summary page of the ACMIDs that were created. This page will be similar in format to the Air Mission summary page currently viewable based on the translation of the ATO parsed file. Note that the ATOT user will be able to translate an ACO, if desired, independently. No ATO will be required to translate an ACO.

3.2.3 Summary Of Changes For ATOT Service

The ATOT will need to be improved to handle two new tasks:

- The ATOT will read the common formatted XML file for the ACO and submit Manage ACMID orders. The Manage ACMID order will not care whether the ATOT is sending an order to Create a new ACMID or to Update and existing ACMID. The order will be the same, and the

model will determine whether the order was intended to be a create or an alter order. These orders will end up in their own Order Group designed to be submitted prior to any of the Air Mission Order Groups currently created by the ATOT.

- The ATOT will also need to change each of the Air Mission Orders that it creates. Currently all Air Mission that refer to ACMID are sent to the Combat Events Program (CEP) by replacing the ACMID reference to the latitude and longitude associated with the ACMID. For example, an Air Mission told to orbit at an ACMID named "Exxon High", is sent to the CEP as an Air Mission told to orbit at the latitude and longitude associated with "Exxon High".

  The ATOT service will no longer do this conversion. Instead, the ATOT will submit an order in which the Air Mission is told to orbit at "Exxon High", and the model will know what that means and will send the mission to the appropriate location. Not all, but a large majority of the air mission specified in an ATO reference an ACMID; thus, the ATOT Service must be able to generate order that use the ACMID references and not the locations associated with the referenced ACMIDs.

  Table 11 is the most important table within this design since it specifies all of the JTLS-GO orders that will be changed to recognize ACMIDs. The ATOT service will need to be able to create the Air Mission Orders referenced in Table 11.

Besides the addition of above two tasks, the are two current ATOT services tasks which will be deleted and removed from the service capability. These are:

- Slide Generation Capability - As discussed in Section 3.3, all ACMIDs, whether referenced within the ATO or not, will be sent to the model and will be displayable and filterable objects. There is no longer any need to represent them as slides. This has the added benefit of reducing the overhead of numerous slides which could cause the WHIP to slow down.

- Automatic Directed Search Area (DSA) Generation Capability. This capability was built since some ACMIDs could appropriately be used as DSAs. The issue with the current capability is that not all ACMIDs are suitable as a DSA and the non-useful DSA are still created by the service. Having a large number of unneeded, undesired, and inappropriate DSAs in the model takes up processing power, each time a Reconnaissance air mission moves. The Manage DSA Order is listed in Table 11 meaning that the user will now be able to easily create an ACMID DSA area by simply selecting the new DSA ACMID option. The Design Team feels this meets the original intent of the automatic DSA capability.

3.3 Web Hosted Interface Program Changes

3.3.1 Displaying Of ACMID

As noted in Table 1, not all ACMID data fields will be used for this design. An ultimate goal of the capability may eventually be able to do so, but some simplifying assumption had to be made based on time and available funding. Table 9 summarizes how each of the ACMID shapes will look on the WHIP.

Table 9. WHIP Display Of ACMID

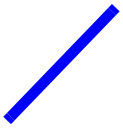
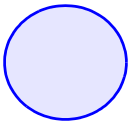
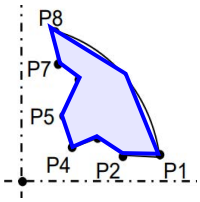
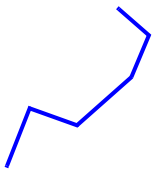
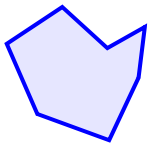
SHAPE	PLANNED DISPLAY
POINT	 A reasonably size filled circle will be displayed. The circle will be centered on the specified latitude and longitude.
ORBIT	 As mentioned above, an orbit ACMID has a width designed to specify the width of the racetrack path on which the mission should fly. In addition, the ACMID also indicates whether the mission should fly the racetrack clockwise or counter-clockwise. The orbit racetrack ECP already exists, but is beyond the scope of this design. An air mission told to orbit at an "Orbit" ACMID, will fly back and forth between the two specified points. For this reason the display will be a fairly wide line connecting the two points.
CIRCLE	 Although the radius will not play a role in Circle ACMID, it is expected that users will need the ACMIDs radius to properly show their coverage area. The area covered by the ACMID will be transparent.
POLYARC	 As shown in Table 1, the "Polyarc" shape starts out with a portion of an arc from a reference point and completes the closure of the arc with polygonal points. Drawing the arc portion properly will take some effort and this ECP has already gotten larger than originally planned. For this reason, as an initial implementation shortcut the arc portion the polygon will consist of two segments. • The first segment from the starting point of the arc and connecting with the midpoint of the arc. • The second segment connecting the midpoint of the arc, to the end point of the arc.
TRACK CORRIDOR LINE	 Although all three of these shapes are different, as shown in Table 1, an Air Mission following the ACMID will be traveling along a line defined by the points. Showing a more detailed shape will mislead the end user. After the initial implementation, if this decision needs to be revisited, the Design Team is ready to consider the improvement.

Table 9. WHIP Display Of ACMID

SHAPE	PLANNED DISPLAY
RADARC	 Although there is no easy way o display a “Radarc” shape, the Design Team could not establish an easy approximation for the shape. The plan is to take the time to implement the “Radarc” shape as intended in the ACO.
POLYGON	 the ACMID specified polygon will be shown as provided in the ACO. The fill for the polygon will be transparent.

3.3.2 Filtering ACMID

As mentioned, the generation of WHIP slides from the ACO will be discontinued and removed from the code. Instead, each of the ACMID objects will be displayable objects and can be filtered on and off by individual WHIP players. This will be accomplished using a slightly redesigned WHIP Filter Control panel. Figure 2 shows the current Filter Control Panel. Note there are three symbols: a generic Areas button, a DSA (Directed Search Area) button, and a Contamination Area button.

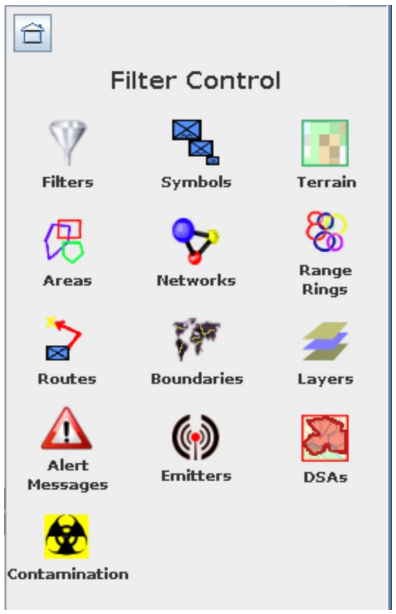


Figure 2. Current WHIP Filter Control Panel

DSAs and Contamination area are areas, and for consistency the Design Team feels filtering of these areas belong under the generic Areas button. Figure 3 shows the current Area Filter panel with four tabs. As a result of this design, this Area Filter panel will have three new tabs added.

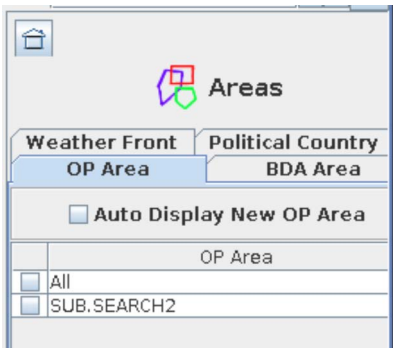


Figure 3. Current Area Filter Panel

These three new tabs are:

- The DSA button from the main Filter Control panel will be removed and become a tab on the generic filter panel. The format of the DSA tab will not change, it will simply be moved from the main Filter Control panel under the Area Filter Control button and be place on its own tab. Figure 4 shows th current DSA filter panel. This same filter panel will be moved a new tab on the Areas filter panel.

Figure 4. Current DSA Control Panel Scheduled To Be A Tab

- The Contamination button will also be removed from the main Filter Control Panel, and become a tab on the generic Areas filter panel. The format of the Contamination filter panel will not change; it is simply being moved to a tab. The current Contamination filter panel is shown in Figure 5.

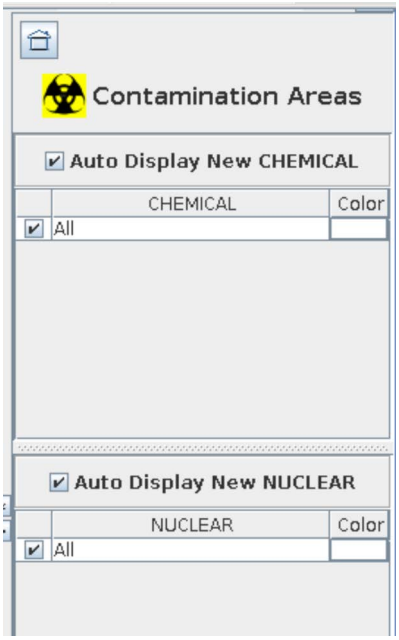


Figure 5. Current Contamination Area Filter Panel

- The third new tab, will be the filtering tab for ACMIDs. There can be tens, if not hundreds of ACMIDs, specified in the ACO. This means that the ACMIDs need to be organized in some manner for users to easily find the specific ACMID that should be displayed. The design calls for creating filter folder based on the specified Use for the ACMID.

  The user will be able to click all ACMIDs for a given Use on and off, but selecting or deselecting the complete file folder. If the folder is open, the user will be able to turn on an off individual ACMIDs. Although the conceptual version of the filter panel, shown in Figure 6, depicts the use of a “Y” or “N” flag, the Design Team feels that a radio button check box is more appropriate and will be implemented

  Note that the filter menu will change as new ACOs are processed. Only the Use Types currently held within the model, will exist in the filter panel. This will keep the size of the filer panel to only the size absolutely needed. The process of creating new filter panels based on the existing ACMIDs will work in a similar manner to the current Target filters. Currently, if a new type of target is created, the model writes out a new filter file. Similarly, when a create or alter ACMID order is received, the model will determine if a new ACMID filter menu is required. If so, it will be written out and delivered to the appropriate WHIPs.

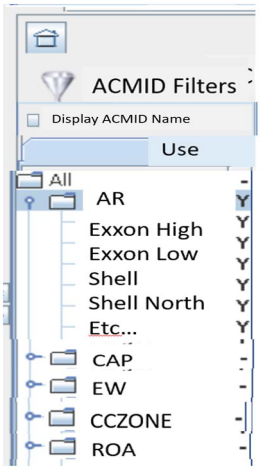


Figure 6. Conceptual ACMID Filter Panel

Finally note that the user can decide whether to display the ACMID names next to the area on the map display by selecting the “Display ACMID Name” radio button at the top of the filter panel.

3.3.3 Searching For ACMID Objects

As shown in Figure 7, a WHIP user can search for three types of objects:

- Model represented objects for which specific icons are displayed on the map. These are objects such as, Units, Targets, Air Missions, Convoys, Missiles, Formations, and Emitters. The user can limit the search by clicking the “Unit/Target” radio button. All such objects that meet the search string entered in the “Find” text box, are marked with a “Red X” on the map.

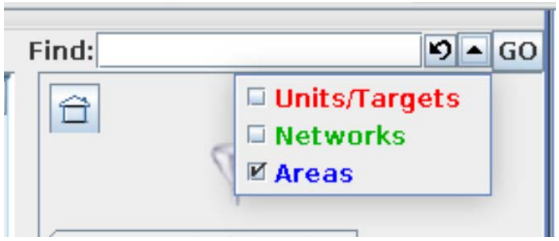


Figure 7. WHIP Search Option Menu

- Similarly, if the user clicks the “Network” search option, the WHIP places a “Green X” at all network object nodes and arcs that match the search string entered in the “Find” text box.

- Finally, the same is true for Areas. If checked, the WHIP will search through areas, such as DSAs, and OPAREAs. A “Blue X” is placed on all areas that match the search string entered in the “Find” text box. ACMIDs will be included in the Area Search.

3.3.4 Information Management Terminal (IMT) Changes

ACMIDs have such a wide variety of data based on its shape, the object does not lend itself to being listed within an IMT. The only way to view ACMIDs will be to select them and display them on the WHIP map. On the other hand, some IMT columns may display the names of existing ACMIDs. The most important being the Associated Object for a task. For example. assume an Air Mission has been told to orbit at ACMID Exxon High. Exxon High will be the Associated Object displayed on the Air Mission’s Orbit task. The latitude and longitude associated with the task will be based on the location of the ACMID.

3.3.5 Order Graphics

This design has a large impact on the newly implemented Order Graphics capability. The order graphics capability draws or connects information from one field in the order panel to another field in the order panel. This capability allows the WHIP user to visualize the planned path for an Air Mission before the order is entered into the model. When an order field references an ACMID, the WHIP needs to draw the ACMID and properly link the field to other order fields as directed by the order XML file.

3.4 JTLS-GO Order Scheduled To Use ACMID Field Options

Numerous orders can be changed to use the new ACMID capability. Although ACMIDs are associated with an Airspace Control Order, they do not simply apply to Air Missions. ACMIDs can represent ROE areas, which within JTLS-GO are represented by an OPAREA. This means that Air Mission Orders are not the only orders that can be changed to recognize ACMIDs. The list is extensive, but each feasible order does not need to be implemented immediately as part of this ECP.

Table 11 list all of the orders that the Design Team feels can feasibly use ACMID named location in addition to specifically entering latitude and longitude locations. The table is color-coded as specified in Table 10

Table 10. Order Implementation Color Coding Scheme

EXPLANATION
Order / Fields that need to be implemented to fulfill basic ECP Requirements. These are basically the orders created by the ATOT service.

Table 10. Order Implementation Color Coding Scheme

EXPLANATION
Order / Fields that should be given priority for implementing given available implementation time. These orders will have their format changed, but the ATOT is not responsible for generating any of these orders. The idea is that the user, through conducting their normal Interface Controller tasks, will be able to created these orders and reference the ACMID instead of entering imprecise location information.
Order / Fields that could use the new ACMID named objects, but are considered a lower priority from the standpoint of common order usage or ACMID specification. Other than identifying the fields that could reference an ACMID, no further explanation of the proposed implementation strategy is discussed in the design. The design will be updated if any of these orders are changed for this initial ECP delivery.

Table 11. Existing JTLS-GO Order That Can Used Named ACMID Fields

ORDER	FIELD
Offensive Air Support	• Orbit Location: See Section 3.4.1 • Ingress Route: See Section 3.4.2 • Egress Route: See Section 3.4.3 • Attack Location: See Section 3.4.4
Defensive Counter Air Reconnaissance Electronic Combat Suppression of Enemy Air Defense (SEAD) Airborne Warning and Control System (AWACS) Patrol Mission Refuel Mission Mine-clearing Mission	• Orbit Location: See Section 3.4.1 • Ingress Route: See Section 3.4.2 • Egress Route: See Section 3.4.3
Manage Attack Package	• Orbit Location: See Section 3.4.1 • Ingress Route: See Section 3.4.2 • Egress Route: See Section 3.4.3 • Rendezvous Point - See Section 3.4.5
Attack Package Mission	• Attack Location: See Section 3.4.4 • Ingress Route: See Section 3.4.2 • Egress Route: See Section 3.4.3
Transfer Mission	• Ingress Route: See Section 3.4.2

Table 11. Existing JTLS-GO Order That Can Used Named ACMID Fields

ORDER	FIELD
Mine-laying Mission	• Mine Location: Section 3.4.11 • Ingress Route: See Section 3.4.2 • Egress Route: See Section Section 3.4.3
Manage Air Mission Tasks	• Orbit Location: See Section 3.4.1 • Mine Location: Section 3.4.11 • Ingress Route: See Section 3.4.2 • Egress Route: See Section Section 3.4.3 • Attack Location: See Section 3.4.4 • Unit Pickup Location: See Section 3.4.6 • Unit Drop-off Location: See Section 3.4.6 • Transit Route While Lifting Unit: See Section 3.4.7 • Supply Transport Instructions: See Section 3.4.8 • HRU Transport Instructions: See Section 3.4.8 • Mine Location: Section 3.4.11 • New Mission Route: Section 3.4.7
Mobility Mission	• Unit Pickup Location: See Section 3.4.6 • Unit Drop-off Location: See Section 3.4.6 • Transit Route While Lifting Unit: See Section 3.4.7 • Supply Transport Instructions: See Section 3.4.8 • HRU Transport Instructions: See Section 3.4.8
Manage DSA	• Create ACMID DSA - See Section 3.4.9
Manage OPAREA	• Create ACMID OPAREA - See Section 3.4.10
Manage BDA Area	• Create ACMID BDA - See Section 3.4.10
Area Report	• ACMID Report Area - See Section 3.4.10
Naval Patrol	• Ingress Route - See Section 3.4.2 • ACMID Patrol Area - See Section 3.4.10
Fire Missile	• Impact Location: See Section 3.4.11 • Missile Orbit Holding Location: See Section 3.4.11 • Missile Route: See Section 3.4.7
Redirect Cruise Missile	• Impact Location: See Section 3.4.11 • Missile Route: See Section 3.4.7
Defend	• Withdraw Route

Table 11. Existing JTLS-GO Order That Can Used Named ACMID Fields

ORDER	FIELD
Ground Move Order **Naval Move Order**	• Move Location • Move Route
Withdraw	• Withdraw Location • Withdraw Route
Attack **Mine** **Clear Mine** **Repair Target** **Destroy Target** **Bridge Operations** **Amphibious Pickup** **Amphibious Assault** **Sea-lift Load** **Cache Supplies**	• Route To Task • Task Location • Egress Route
Direct Support	• Egress Route
Fire Artillery	• Fire Location
Attach **HRU Attach** **HRU Coalition Support** **Enter Port**	• Ingress Route
Detach **Tunnel Sheltering** **Replenish Unit** **Directed Resupply**	• Ingress Route • Egress Route
Manage Land Unit Task **Manage HRU Task** **Manage Naval Task** **Manage Formation Task** **Manage Supply Run Task**	• New Task Location
HRU Ambush **HRU Move**	• Ingress Route • Task Location • Withdraw Route

Table 11. Existing JTLS-GO Order That Can Used Named ACMID Fields

ORDER	FIELD
HRU Raid **HRU Overwatch**	• Ingress Route • Withdraw Route
HRU Lay Mines **HRU Clear Mines** **HRU Civil Military Operations** **HRU Traffic Control** **Naval Mine**	• Ingress Route • Task Location
HRU Patrol	• Ingress Route • ACMID Patrol Area • Withdraw Route
ADA Report	• ACMID Report Area
Sweep Mine	• ACMID Sweep Area
Transport Unit	• Route To Pickup • Pickup Location • Route To Destination • Destination Location

3.4.1 Air Mission Orbit At ACMID

The following missions within JTLS-GO are considered orbiting missions, and as such will be able to accept orders to orbit following an ACMID:

- Offensive Air Support
- Defensive Counter Air
- Reconnaissance
- Electronic Combat
- Suppression of Enemy Air Defense (SEAD)
- Airborne Warning and Control System (AWACS)
- Patrol Mission
- Mine Clearing Mission

- Refuel Mission
- Attack Air Mission Package on Airborne Alert

Each of these orders will have a new option called an ACMID Orbit Area. How the mission orbits in the specified ACMID depends on the shape of the ACMID. Table 12 explains how each ACMID shape will be interpreted and used. Note that Refuel Missions and On Call Airborne Alert missions will only accept a single point; therefore the interpretation of the ACMID for these two orders will be different as shown in Table 12.

Table 12. ACMID Shape Orbit Results

SHAPE	ORBITING MISSION	REFUEL / AIRBORNE ALERT PACKAGE
POINT	The mission will orbit at the specified point.	
ORBIT	The ACMID has two points. The mission will travel back and forth between the two points for its entire orbit time.	The mission will orbit at the midpoint between the two specified points.
CIRCLE	The mission will orbit at the specified center point of the circle.	
POLYARC	As discussed in Table 9, the POLYARC shape will be simplified. The result is a closed polygon. The mission will orbit within the simplified polygon.	The mission will orbit at the centroid of the simplified polygon.
RADARC	 As mentioned in Table 9, the RADARC will be properly displayed on the WHIP, but the mission will orbit at a single point that is half way between the inner circle, outer circle, and the two bearing lines, as shown by the “Red” dot.	
TRACK CORRIDOR LINE	Each of these shape types involve several points. The mission will travel along the specified path from point to point. When the mission gets to the last point of the specified route, it will travel through the points in reverse	If the route has an odd number of points, the mission will orbit at the middle point. For example, of a route with 5 points, the mission will orbit at point number 3. If the route has an even number of points, the mission will orbit at the midway point between the two entered points. For example, for a route with six points: 1, 2, 3, 4, 5, and 6, the mission will orbit at the midpoint between points 3 and 4.
POLYGON	The mission will orbit within the specified polygon.	The mission will orbit at the centroid of the specified polygon.

3.4.2 Air Mission Ingress Route

Currently a user specified an Ingress Route for an Air Mission by specifying an Air Route Utility. The user will now have a choice between entering an Air Route Utility or an ACMID Route. If the ACMID route option is specified, the following entry fields will be displayed on the order panel:

- ACMID Name - Only Tracks, Corridors, and Line ACMIDs will be accepted in this field
- An indicator whether the route should follow the route in the ACO or automatically reverse the route as specified in the ACO. This will be a mandatory field that will be initialized to "No".
- A Get On Location for the route. - An optional field. If not specified, the model will assume that the "Get On" point is the first point in the route. If the "Reverse Indicator" is set, then an empty "Get On" location will be assumed to be the last point in the ACMID route definition.

  Note within an ICC generated ATO, it is not unusual for the ATO to specify that mission should get on at Point 3 and get off at Point 13. Although the ATO lists points by numbers the feeling was that if a user wants to use an ACMID for a hand-created air mission, they will not want to count ACMID points to determine where to get on and get off the route. Instead, it will be easier for a user to simply click near the ACMID route point indicating where to get on. The model will determine which ACMID point is closest to the entered value.

  The reader needs to remember that the ATO-Translator is entering this data the majority of the time, and the ATO-T is responsible for creating the order as needed. This does not require any additional work on the part of a WHIP user unless there is a need to manually re-create or alter an ATO specified air mission.

- A Get Off Location for the route. - An optional field. If not specified, the model will assume that the get off location is the last point in the route. Obviously if the route is to be reversed, the Get Off Location will be assumed to be the first point in the route. As with the "Get On" location, the model will determine the route's Get Off point by selecting the closest ACMID point to the entered value.

3.4.3 Air Mission Egress Route

Currently the Air Mission Egress Route specification has two options, reverse the Ingress Route or specify a new route. The Air Mission Egress Route specification will now have three options as described in Table 13.

Table 13. Air Mission Egress Route Options And Modeled Result Summary

EGRESS ROUTE OPTION	RESULT
Specified Route	The user enters an Air Route Utility and the mission will follow the points as entered. This is as it currently functions. There will be no changes.
Reverse Ingress Route	If the Ingress Route was a Utility Route, the model will reverse that specified route exactly as it does now. If the Ingress Route was an ACMID Route, then the Egress Route that will be followed take the ACMID Ingress route and alters it as follows: • Switches the Reverse Route flag. If it was not set, the Egress Route will set it. Likewise, if the was set, the Egress Route will unset it, • The Get Off Point will become the Get On Point • The Get On Point will become the Get Off Point
ACMID Route	The order will require the same data specified for an ACMID Ingress Route: • ACMID Name - Only Tracks, Corridors, and Lines will be allowed. • The Reverse Flag - an optional entry. If not specified, the model will assume that the Reverse Flag is “No”. • The Get On Location - an optional entry. If not specified, it will be assumed to be the first point on the route. • The Get Off Location - an optional entry. If not specified, it will be the last point of the route.

3.4.4 Air Mission Attack Location

Currently an Offensive Air Support (OAS) mission can be told to attack a Unit, a Target, an HRU, a Joint Desired Point of Impact (JDPI), or a location. Although a low priority, a sixth option will be added to the list. this new option will be labeled ACMID location and the user will be allowed to enter any existing ACMID. Table 14 explains how the various ACMID shapes will be used by the model when an order to attack the ACMID is entered.

Table 14. ACMID Shape Attack Location Results

SHAPE	ORBITING MISSION
• POINT	The mission will attack any object with the effects radius of the selected point. This option will work exactly as the current Attack Location option works.
• ORBIT	This type of ACMID will not be allowed within the field.

Table 14. ACMID Shape Attack Location Results

SHAPE	ORBITING MISSION
• CIRCLE	The mission will attack any object with the specified circle. It can be considered a "Kill Circle" and any object within the polygon be considered as a possible AttackObject subject to the Rules of Engagement (ROE) and the prioritized allowable asset hit preferences list.
• POLYARC	As discussed in Table 9, the POLYARC shape will be simplified. The result is a closed polygon.The simplified polygon will serve as a "Kill Box" and any object within the polygon be considered as a possible AttackObject subject to the Rules of Engagement (ROE) and the prioritized allowable asset hit preferences list.
• RADARC	As mentioned in Table 9, the RADARC will be properly displayed on the WHIP, but due to funding limitations, this object shape will be not be allowed within the field.
• TRACK • CORRIDOR • LINE	Each of these shape types will be not be allowed within the field.
• POLYGON	The polygon will serve as a "Kill Box" and any object within the polygon be considered as a possible AttackObject subject to the Rules of Engagement (ROE) and the prioritized allowable asset hit preferences list.

3.4.5 Air Mission Package Rendezvous Point

While reviewing available ACOs in preparation for this design, Rendezvous Points were observed; therefore, the option to select an ACMID Rendezvous point will be allowed. Only Point and Circle shape ACMIDs will be allowable in this field.

3.4.6 Unit Pickup / Drop-off Location

While reviewing available ACOs in preparation for this design, pickup points and drop points were observed; therefore, the option to select an ACMID point to specify the pickup location or drop-off location for a unit will be allowed. Mobility Mission, Amphibious Operations, and Transport Unit Orders have referenced to a unit's specified pickup and/or drop-off location. Each of these orders will have an ACMID option capability. Only Point and Circle shape ACMIDs will be allowable in these fields.

3.4.7 Mobility Mission Unit Transit Route and Missile Route

Similar to Ingress and Egress routes, an ACMID Transit Route option will be added to the Mobility Mission Order. The ACMID option will allow a Line, Corridor, or Transit ACMID along with a route enter location and a route exit location.

3.4.8 Mobility Mission Supply And HRU Instructions

The Mobility Mission Supply Instruction Utility and HRU Instruction Utility are already fairly complicated Utility panels, but it does include points and stop locations. An ACMID Point option will be added to each of the Utility panels. The most likely use case for this capability is the placement of a forward Supply Cache or an HRU at a Landing Zone or Drop Zone. Only Point and Circle ACMIDs will be allowed in this field.

3.4.9 Create ACMID DSA

As mentioned above, the current ACO translation process has an option to automatically create a Directed Search Area (DSA) for each of the specified ACMIDs. The JTLS-GO Design Team was told to implement this capability, even though the majority of the ACMIDs were unsuitable or were never intended to be used to specified an intelligence collection region. This existing capability will be removed from JTLS-GO, Instead, the Manage DSA order will have a new added DSA Option called an ACMID DSA area.

The user can then choose which ACMIDs should become an intelligence collection area or DSA. This will be a more useful capability and will result in a more efficient specification of exercise audience expected collection areas The field can be filed with any one of the area shapes: POLYARC, POLYGON, RADARC, or CIRCLE.

3.4.10 Create ACMID OPAREA, BDA Area, Controller Intel Area Report

Besides the Manage DSA Order, there are three additional orders within JTLS-GO that create or represent the different areas. These orders include:

- Manage OPAREA - The definition and management of a special polygonal Rules Of Engagement (ROE) Area known as an Operations Area (APAREA). This order will allow for the definition of an OPAREA by specifying an existing ACMID.

- Manage BDA - The definition and management for a special polygonal area in which the model should maintain internal Battle Damage Assessment (BDA) statistics. This order will allow for the definition of an OPAREA by specifying an existing ACMID.

- Controller Area Report - the definition of a polygonal area for which magically generated intelligence information is collected and passed to a specified Force Side. This order will allow for the definition of a Area by specifying an existing ACMID.

3.4.11 Various Individual Location Fields

Finally, after reviewing the various ACMID Use possibilities, the Design Team identified several individual location fields which could logically be considered as an ACMID. These fields include:

- Mine-laying - The location at which a minefield should be placed. This field exists in the Mine-laying Mission order, the Mine Order that can be submitted to an aggregate-level Ground Unit, a Naval Unit, or a High Resolution Unit (HRU).
- Missile Impact - The desired impact location of a missile. This field exists in the Fire Missile Order.
- Missile Holding - The orbit point for a missile when a coordinated missile strike is desired. This field exists in the Fire Missile Order.

4.0 Data Changes

No data changes are required for this ECP

5.0 Order Changes

This ECP requires significant order changes.

- Section 3.1.4 described the new Manage ACMID Order
- Table 11 describes the changes that will be made to the existing order panels. Any order highlighted in “Green” will be implemented. Those orders highlighted in “Yellow” may be implemented based on available funds and the orders highlighted in “Orange” are being considered for future implementation.

6.0 JODA Changes

The concept is that the ACO should be used to create “objects” known to the model and to Air Mission orders in a way that allows the ability to reference these objects. For example, order an Air Mission to orbit at “Exxon High”, instead of clicking on a slide that shows the user where “Exxon High” is located and then passing that information to the model as a latitude/longitude air.

The following sections describe the JDSP protocol changes will be made.

6.1 ACMID SHAPE

An ACMID Shape will be represented as a enumeration of the types of shapes that can be assigned to an Airspace Control Mean Object. The shape enumerations are listed in Table 15.

Table 15. ACMID Shape Enumeration

SHAPE	ENUMERATION
INVALID	0
CIRCLE	1
CORRIDOR	2
LINE	3
ORBIT	4
POINT	5
POLYARC	6
POLYGON	7
RADARC	8
TRACK	9

6.2 Airspace Control Mean (ACM) Object

The name of the new JODA Object will be an AIR_CONTROL_MEAN and it will have the attributes listed in Table 16. Each attribute is a Common Knowledge attribute and all scenario sides that belong to a given Air Tasking Order and Airspace Control Order will have access to the full object information.

Table 16. New Airspace Control Mean JODA Object

ATTRIBUTE NAME	ATTRIBUTE TYPE	DESCRIPTION
acmid_name	STRING	MAX
acmid_jedi	JEDI	The reference number for the ACMID
acmid_use	STRING	The Airspace Control Order (ACO) documentation lists 111 different Use types of an Airspace Control Means (ACMs). The different Use Types will not be held as an enumerated value; instead, an ACM JODA object will have a common knowledge attribute listing the MAX ATO MISSION LENGTH string that represents the planned use for the ACM.
acmid_shape	ACO_SHAPE	Enumeration indicating the type of shape the object is. This shape will define the meaning of may of the remaining attributes.

Table 16. New Airspace Control Mean JODA Object

ATTRIBUTE NAME	ATTRIBUTE TYPE	DESCRIPTION
acmid_location	LOCATION	This will be the location for: • A Point Shape • Center of a Circle Shape • Reference point for a RADARC Shape • Not Used by any other shape
acmid_pt_array		This will be an array for of points for the following Shapes: • Corridor • Line • Track • Orbit • PolyArc • Polygon • Not Used by any other shape
acmid_inner_radius	REAL_32	This will represent the radius of: • Circle • Inner circle for a RADARC Shape • Not used by any other shape
acmid_outer_radius	REAL_32	This will represent the: • Outer radius of a RADARC shape • Not used by any other shape.
acmid_start_bearing	REAL_32	This will represent the: • Starting bearing for a RADARC shape • Not used by any other shapes
acmid_end_bearing	REAL_32	This will represent the: • Ending bearing for a RADARC shape • Not used by any other shapes
acmid_color	GRAPHIC_COLOR	The color that should be used to display the ACMID on the WHIP.

The Airspace Control Order documentation lists 111 different Use types of an Airspace Control Mean. The different Use Types will not be held as an enumerated value; instead, an ACM JODA object will have a common knowledge attribute listing the maximum six character string that

represents the planned use for the ACM. Table 3 provided a list of the legal 111 different Use types.

7.0 Test Plan

TBD