



Paper based analysis to support TDLIO testing

Shaun Donnelly – ATEQ Consulting

Scope of the Presentation

- Need for IO Management in TDLs
- UK's Approach to IO Management
- Paper Based Testing – Key Components
 - IERs
 - Implementation Data
 - Known Limitations
- Use of Paper Based Testing Outputs

Shaun Donnelly **ATEQ Consulting** **1985-1998 - RAF**


- Software Engineer on the E-3D

1998 – Present

- TDL Consultant
- Specialist in TDL Testing
- Supported many national and international programs
 - Air, Surface and Land Systems
 - C2 and Non C2
- Provides IO and IO Matrix support to the TDL CaT ITS



Why do we need Interoperability Management?



If you implement
using the STANAG,
what can go wrong?

TDL = Just another
radio!

There is a Data
Forwarder so we
can be sure of
seamless comms

He has MIDS, I have
MIDS – we have
Link 16

TDL solutions are often based on “high-level” operational requirements

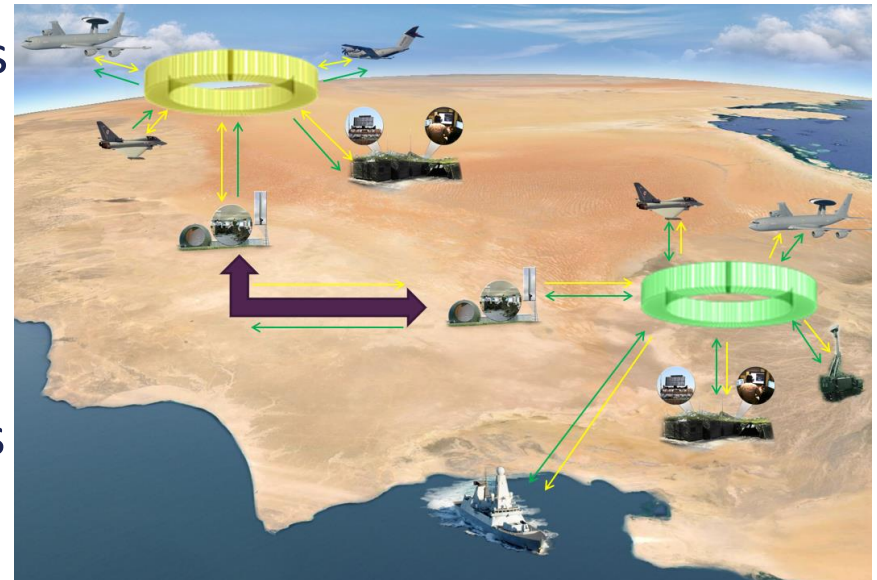
- Integration of TDLs into platforms
 - is complex
 - is often led by industry
 - is often developed from a single platform perspective

TDL Standards

- Have been historically ambiguous
- Are living and (by committee action) evolving documents

Platforms are developed

- To different Standard baselines
- Using different
 - integration approaches
 - Interpretations of the standards



Illustrative Example



STANAG Draft Revise 3 **+DLCPs**
Early NRS
Circa 1995

STANAG Ed 3 **+DLCPs**
Supplier Imp Plan
Circa 2001



STANAG Ed 6 **+DLCPs**
iSMART PRS
Circa 2011



STANAG Ed 1 **+DLCPs**
Supplier Spec
Circa 1998



MIL-STD 6016C **+DLCPs**
iSMART PRS
Circa 2005

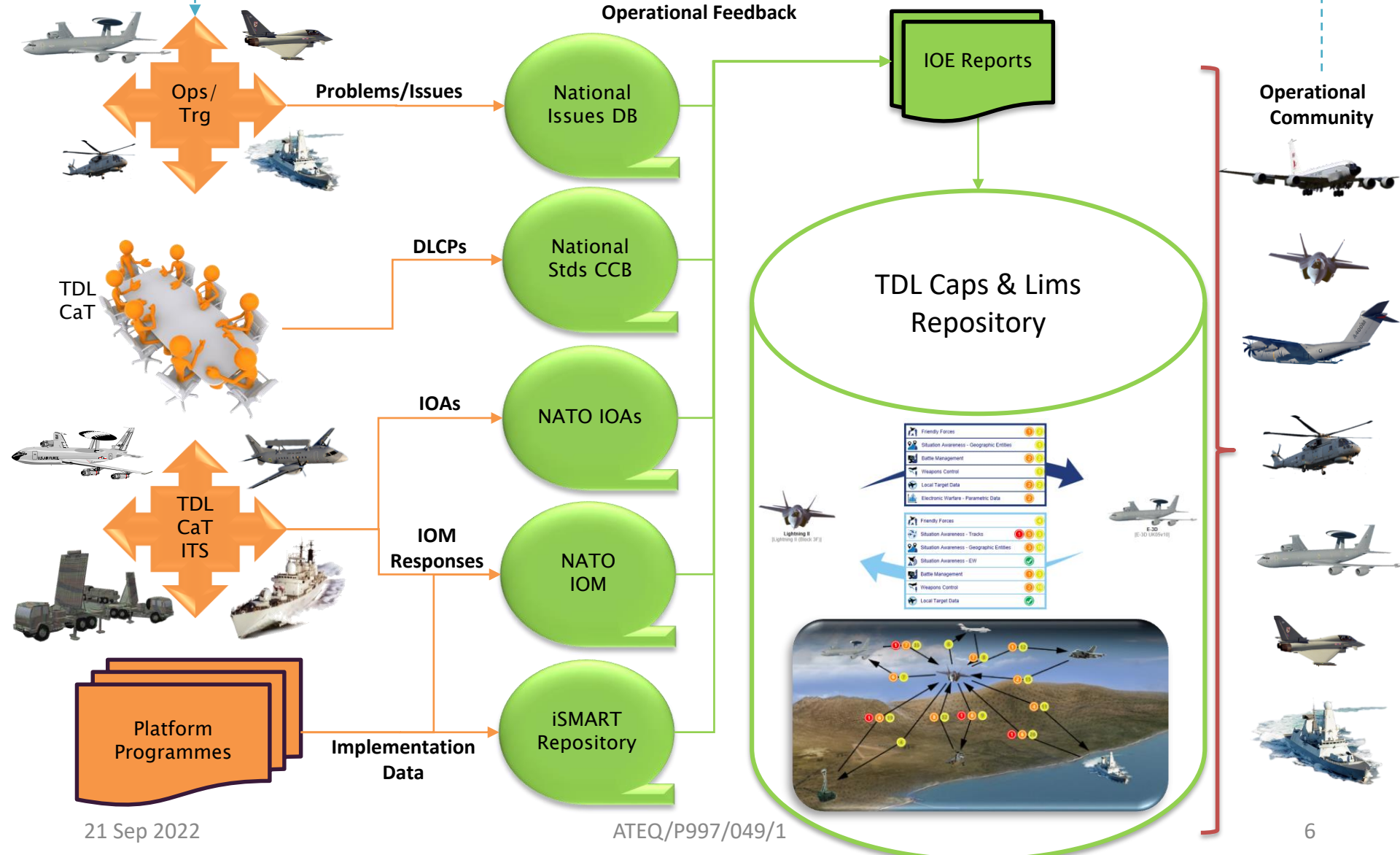
UK Approach to IO Management

Collect

Analyse

Inform

Operational Feedback

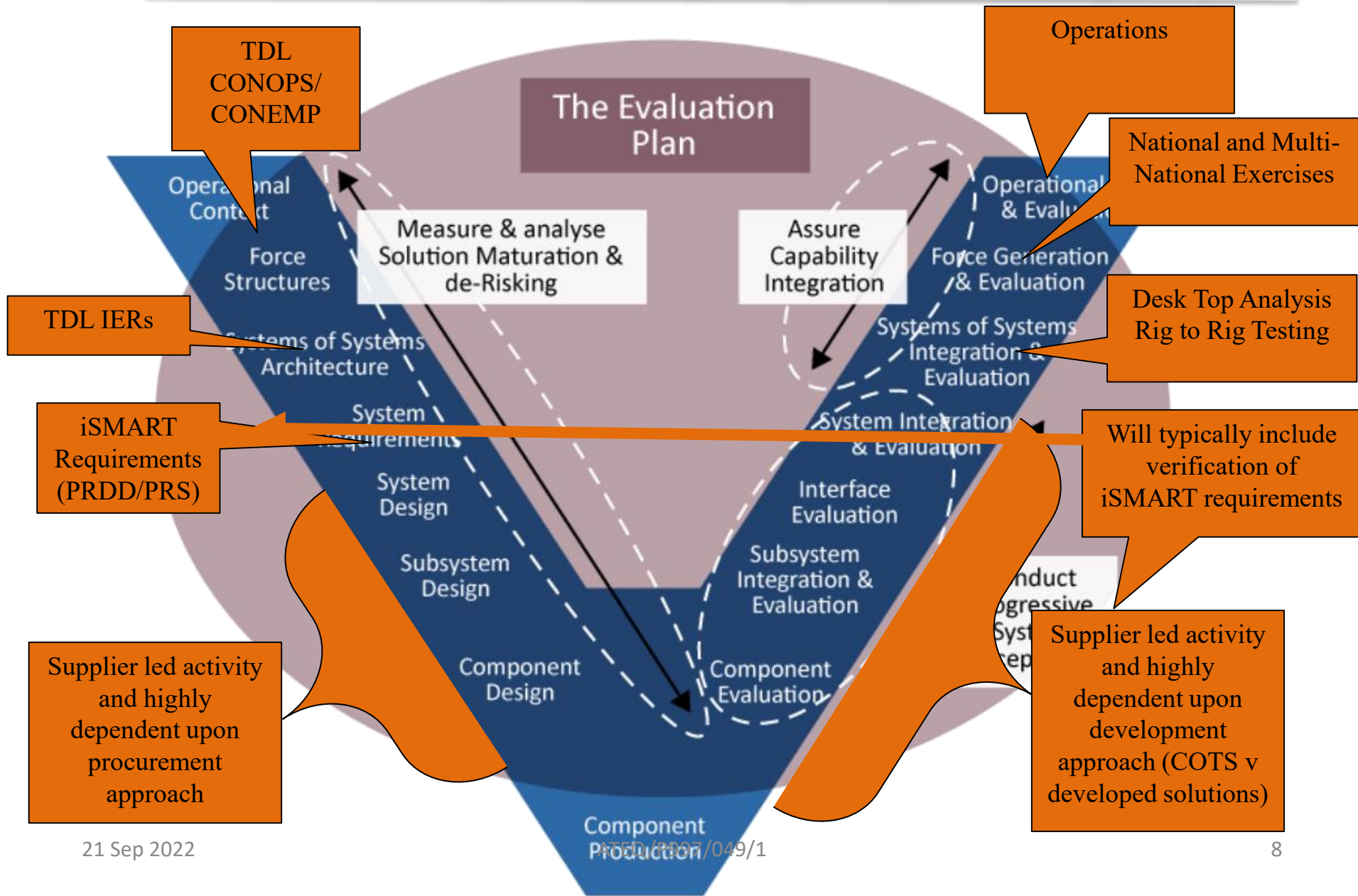


Knowledge in Defence – Best practice guidance for procurement

- Integrated Test, Evaluation and Acceptance
 - Use all phases of testing to gather evidence
 - Use all outputs from testing to inform operational use (Caps & Lims)

TDL Policy (Joint Service Publication 604, Leaflet 2002 (TDL))

- iSMART Process
- IO Testing Requirements
- Risk based approach



TDL Capabilities & Limitations

Inform

Operational
Community



IOE Reports

TDL Caps & Lims
Repository



Operations

National and Multi-National Exercises

Desk Top Analysis
Rig to Rig Testing

Will typically include
verification of
iSMART requirements

Operational & Evaluation

Force Generation & Evaluation

Systems of Systems
Integration & Evaluation

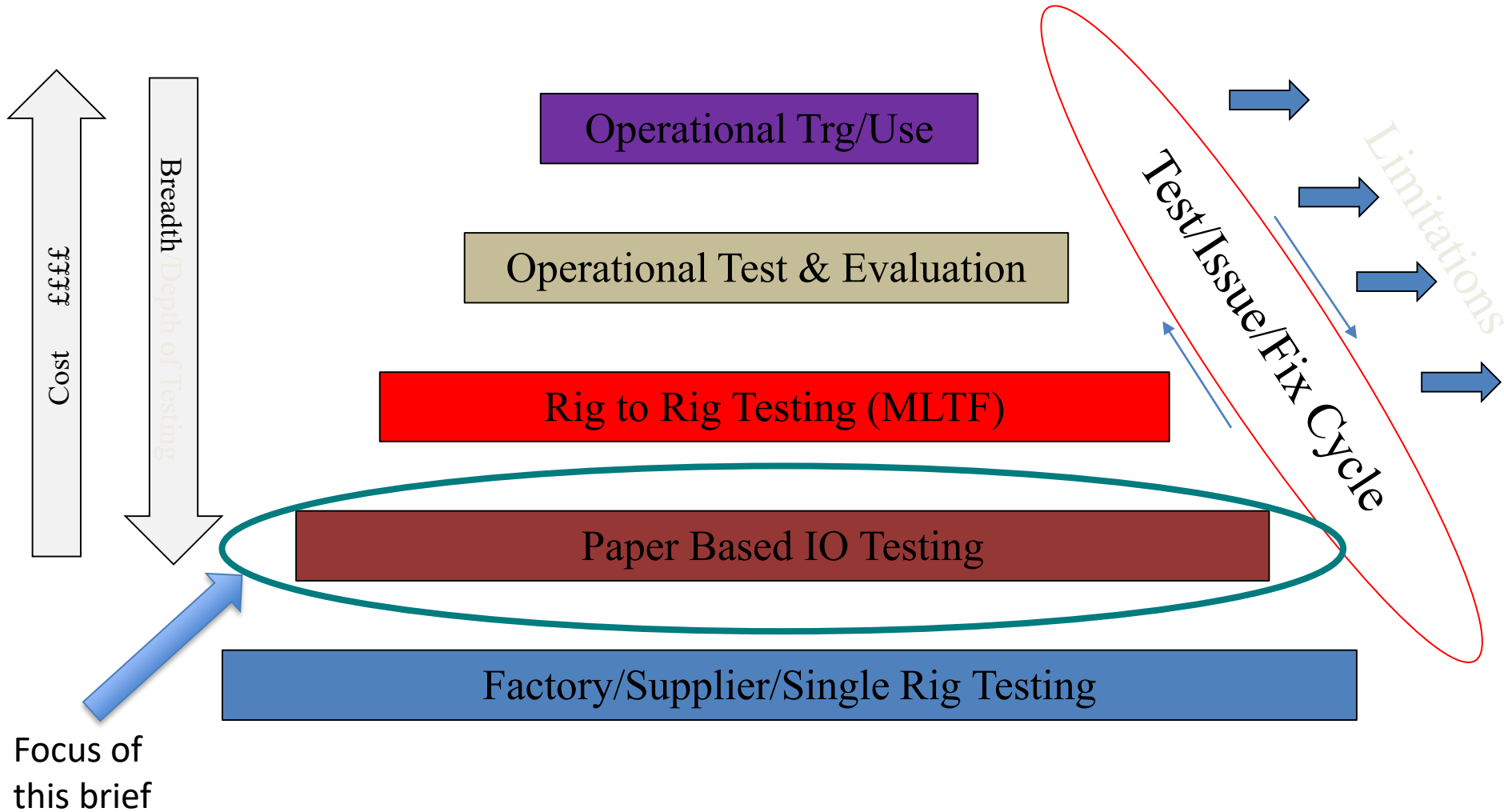
System Integration & Evaluation

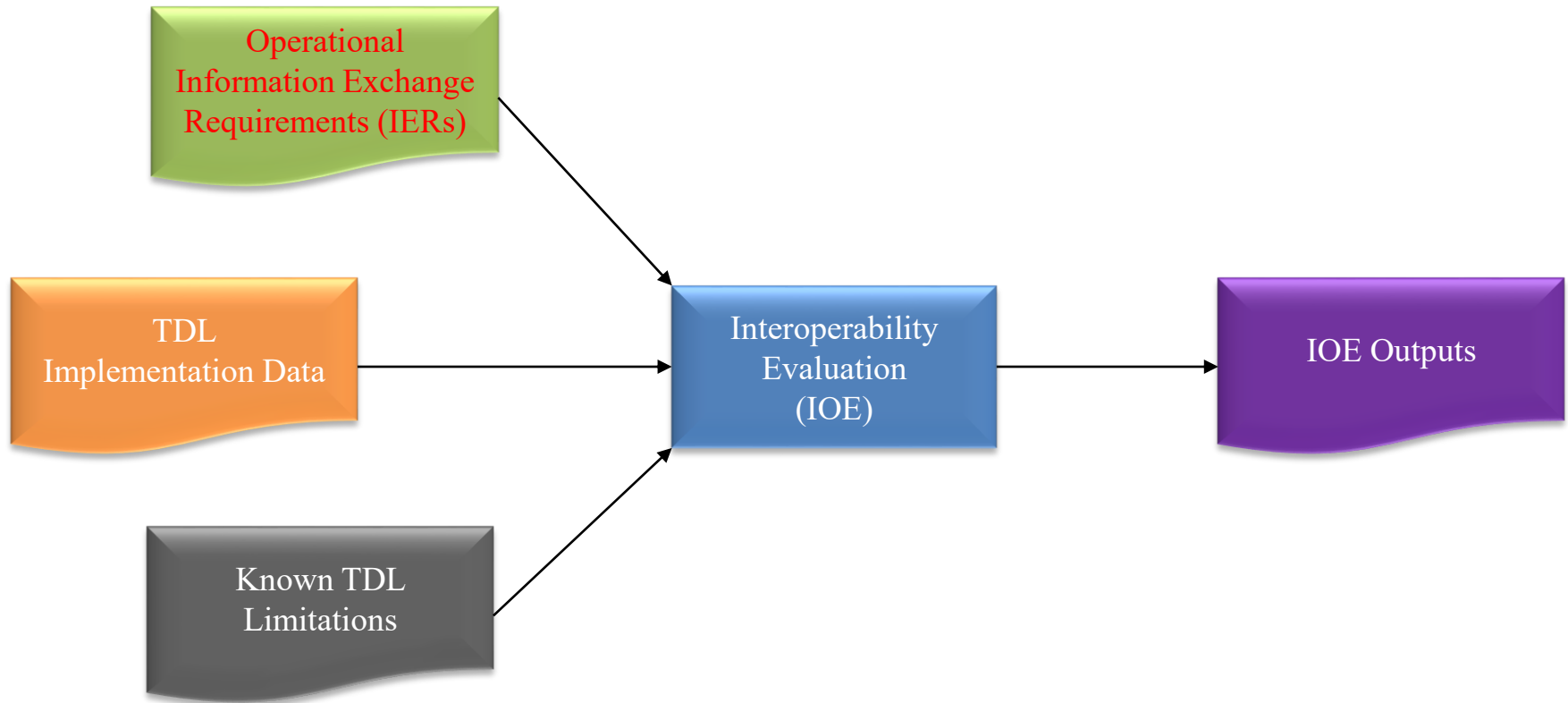
Interface Evaluation

Subsystem Integration & Evaluation

Conduct Progressive

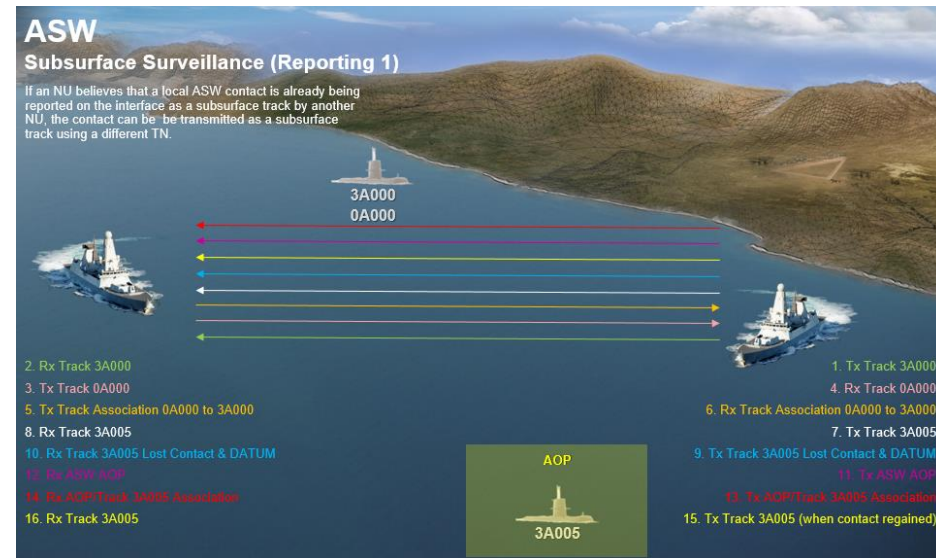
TDL Test Phases



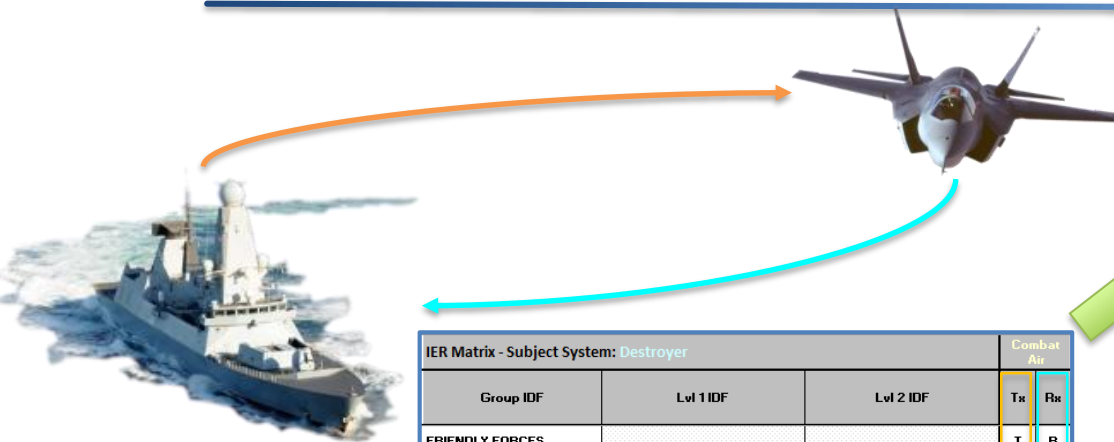


Many TDL programmes lack operational context and requirements

- Scenario/mission/role based Use Cases assist in IER Capture
- IERs need to be operationally focussed
 - TDL message agnostic
 - But mapped to TDL message structures to aid effective and efficient interoperability evaluation



IERs – Scope for IOE



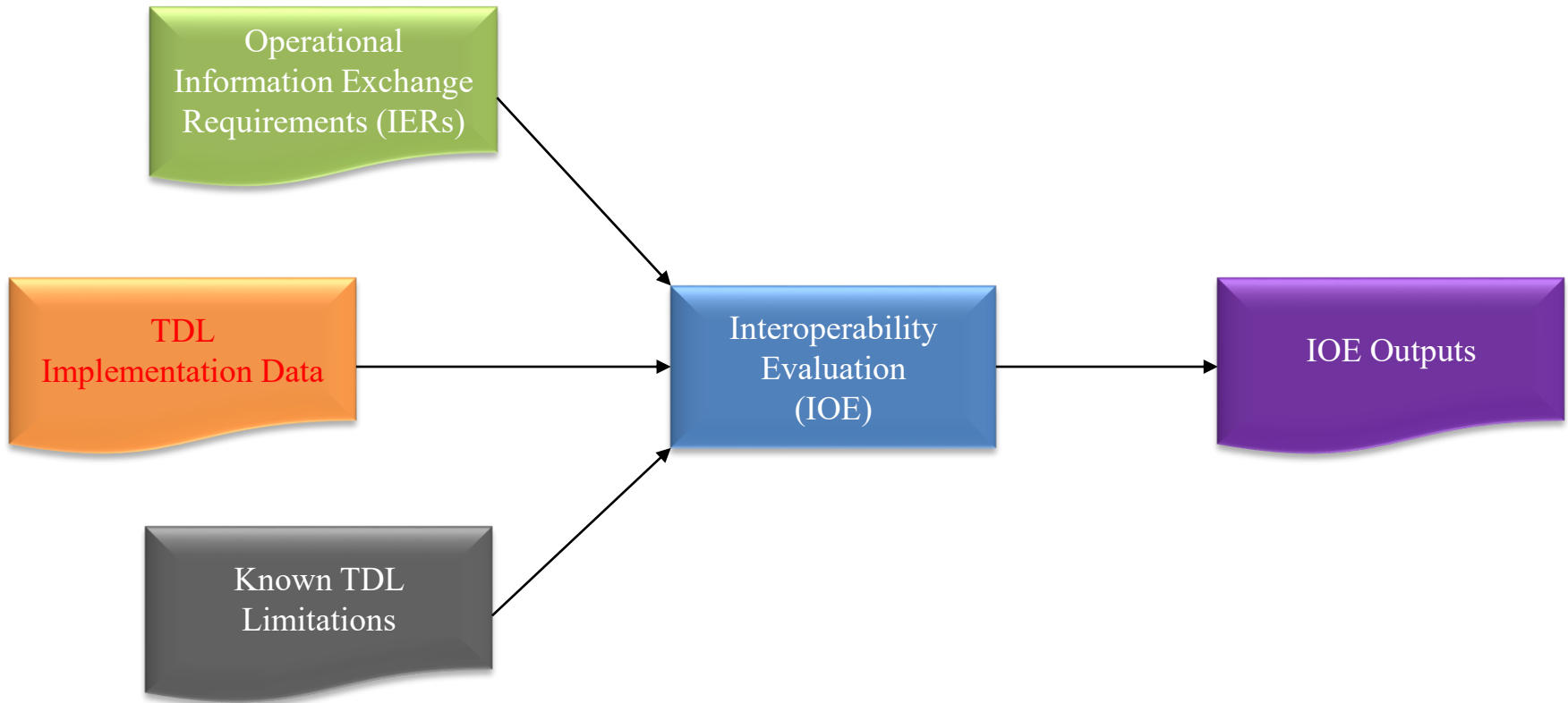
IER Matrix - Subject System: Destroyer			Combat Air	
Group IDF	Lvl 1 IDF	Lvl 2 IDF	Tx	Rx
FRIENDLY FORCES			T	R
SITUATION AWARENESS - TRACKS			T	-
	Threat Warning		T	-
		Threatened Object	T	-
		Threatening Object	T	-
		Threat Type	T	-
		Additional Supporting Data	T	-
	Air Track		T	-
	Air Track - Pseudo Local		-	-
	Surface Track		-	-
	Surface Track - Pseudo Local		-	-
	Land Track		T	-
	Space Track - Basic SA		-	-
	Subsurface Track		-	-
	Track Picture Management		-	-
SITUATION AWARENESS - GEOGRAPHIC ENTITIES			T	R
SITUATION AWARENESS - EW			-	-
BATTLE MANAGEMENT			-	-
WEAPONS CONTROL			-	-
LOCAL TARGET DATA			-	-
ELECTRONIC WARFARE - PARAMETRIC DATA			-	-
BALLISTIC MISSILE DEFENCE			-	-
ANTI SUBMARINE WARFARE			-	-
IMAGERY			-	-

Table 2-1 – IERs – Air Surveillance System and Combat Air

Functional Area	IERs
Friendly Forces	Location and Identification data Basic Status information Text Messages
Situation Awareness – Track Data	Air Tracks (Air Surveillance System to Combat Air) Land Tracks (Air Surveillance System to Combat Air) Threat Warnings (Air Surveillance System to Combat Air)
Situation Awareness – Geographic Entities	Geographic Reference Points, Lines and Areas (Air Surveillance System to Combat Air) Land Objects (Points) (Air Surveillance System to Combat Air) Emergency Points (Air Surveillance System to Combat Air) Data Update Request for Reference Point data (Combat Air to Air Surveillance System)

Table 2-2 – Information Exchanges Discounted from IOE – Air Surveillance System and Combat Air

Functional Area	Discounted IERs
Situation Awareness – Track Data	Surface Tracks Space Tracks Subsurface Tracks Data Update Requests (Air Surveillance System to Combat Air) Force ID Change instructions (Air Surveillance System to Combat Air)
Situation Awareness – Geographic Entities	Data Update Request for Reference Point data (Air Surveillance System to Combat Air) Emergency Points Pointers
Battle Management	No requirement to exchange
Weapons Control	No requirement to exchange
Local Target Data	No requirement to exchange
Situation Awareness - EW	No requirement to exchange
EW – Parametric Data	No requirement to exchange
Ballistic Missile Defence	No requirement to exchange
Anti-Submarine Warfare	No requirement to exchange
Imagery	No requirement to exchange



Often “Project Owned”

- Key issue for central TDL “authority”

Available in several forms

- Full iSMART Products
- Supplier specific documents
- Implementation Plan
 - Excel
 - Tool set “specific”
 - PDF
- IOM Data
- HMI Specifications/Operator Handbooks
 - Data may be passed over the TDL but is it displayed to the operator
 - In a clear and logical manner

D.1.2 C² TRACK TRANSMISSION

D.1.2.1 C² Track Transmission Stimulus

D.1.2.1.1 [Transaction D.1.1](#), C² Preparation for Track Transmission ([Paragraph D.1.1.3.6.1](#)), upon preparation of a track for transmission.

D.1.2.1.2 ~~Periodically as defined Paragraph D.1.2.3.3.12.e, for a Balance repeated transmission. Not Used~~

D.1.2.1.3 [Transaction E.1.3](#), Receipt Number ([Paragraph E.1.3.3.1](#), [Paragraph E.1.3.3.14](#)), on receipt of a data up

D.1.2.1.4 [Transaction P.3.3](#), C² Receipt ([P.3.3.3.5.a](#)), upon automatic acceptance for which R² is held.

Destroyer x				
Overlay IERs from Project		IDF Group	IDF Level 1	IDF Level 2
Demo Project		<All>	<All>	<All>
TDL Element	Transmit	Transmit Issues	Receive	Receive Issues
▲ J2.3 Surface PPLI	T		R	
▲ W J2.3I SURFACE PPLI INITIAL WORD	T		R	
▶ F 1550 001 WORD FORMAT	T		R	
▶ F 270 004 LABEL, J-SERIES	T		R	
▶ F 271 005 SUBLABEL, J-SERIES	T		R	
▶ F 800 001 MESSAGE LENGTH INDICATOR	T		R	
▶ F 385 003 EXERCISE INDICATOR	T		R	
▶ F 756 001 SPARE	T=0		NP	
▶ F 354 002 FORCE TELL INDICATOR	T		R	
▲ F 355 002 EMERGENCY INDICATOR	T=0	⚠	R	
D 0 NO STATEMENT	T	⬆	R	
D 1 EMERGENCY STATUS	NT	⬆	R	
▶ F 893 001 COMMAND AND CONTROL INDICATOR	T		R	
▶ F 1604 001 SIMULATION INDICATOR	T		R	
▶ F 756 002 SPARE	T=0		NP	

Add Platform
Export Platform
Clone Platform
Remove Platform

Main Menu

Record Editing
☒ Enabled
☐ Disabled

TDL: Link 16 Platform: Navy Frigate

Classification NATO UNCLASSIFIED
Releasable to APN(AUS, AUT, CHE, FIN, SWE)
Platform Navy Frigate
Country Partner
Service Navy
SoftwareVersion Combat System 5.1.5
Operational SW? ☐
Terminal MIDS LVT 5- BU1
Terminal SW BC7
Base Spec' Doc' 5516 Edition7/ATDLP-5.16(A)(1)
Entry Type 5 - Full Responses (Planned Implementation)
Point of Contact Lt Cdr Kirk

Operational Role
ARTIFICIAL DATA

The Navy Frigate operates as a warship and is part of a Carrier Strike Group. It is able to provide Air Surveillance and will interact with all Naval and Air Force assets using Link 16 and Link 22 as needed.

Technical Comments
Defines the Link 16 message processing for LOS (MIDS Exchange). For Link 16 over JREAP, a reduced subset of messages will be implemented (largely excluding J12.x series messages).

Mess	Implementation Question	Description	Plat A	Plat A	Plat A	Plat A	Plat B	Plat B	Plat A	Plat A	Plat A	Plat A	Plat A	Plat B
			Responses	Response	Response	Response	Responses	Responses	Response	Responses	Response	Responses	Plat A	Plat B
													Comm	Comm
J0.0	Initial Entry Message	Primarily used for network synchronisation. It is also possible to include a basic set of timeslots that a joining platform can then use to join a network without a previously allocated timeslot load.	T	R	-	-	T	R	-	-	-	-	No Comment	No Comment
J0.1	Test Message	Automatically generated by the Terminal in response to a J0.6 Terminal Interrogation. Used to establish the presence of connectivity between two platforms.	T	R	-	-	T	R	-	-	-	-	No Comment	No Comment
J0.2	Network Time Update Message	Facilitates a change to network time. Supports the promulgation of the change required to network time and the time of execution for the change.	T	R	-	-	T	R	-	-	-	-	No Comment	No Comment
J0.3	Time Slot Assignment Message	Provides the Network Manager with the ability to dynamically assign or deassign Time Slot Assignments being used within the Network.	NT	R	NT	NP	NT	R	NT	NP	-	-	No Comment	No Comment
J0.4	Radio Relay Control Message	Provides the Network Manager with the ability to dynamically assign or deassign Relay Functions being used within the Network in order to ensure effective data propagation within the network.	NT	R	NT	NP	NT	R	NT	NP	-	-	No Comment	No Comment
J0.5	Repromulgation Relay Message	Used to identify particular messages within a specific timeslot that are to be relayed as part of the repromulgation relay function. A unit can either originate repromulgation relay or simply repromulgate messages that were originated by others.	NT	R	-	-	T	R	-	-	-	-	No Comment	No Comment
J0.6	Communications Control Message	See Below	NT	R	NT	NP	T	R	NT	NP	-	-	No Comment	No Comment
J0.6	Action, Communication Control = 0 (Terminal Interrogation)	Request that a remote unit responds with either a J0.1 (Test Message) or J2x (PPLI Message). Used to establish connectivity.	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	No Comment	No Comment
J0.6	Action, Communication Control = 3 (Control Request)	Request from a unit to the Network Manager to request more/less Timeslots be assigned on a specified NPG. Used by systems that can automatically detect over or under utilisation of timeslots.	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	No Comment	No Comment
J0.6	Action, Communication Control = 3 (Control Request)	Allows the appropriate authorised unit to effect a change of CVLL within a remote unit.	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	No Comment	No Comment
J0.7	Time Slot Reallocation Message	Provides the capability for a JU to request a percentage of time slots from a shared Time Slot Reallocation (TSR) pool and disseminate the requests of other JUs.	T	R	-	-	NT	NP	-	-	-	-	No Comment	No Comment

An often overlooked valuable source of information, especially valuable if working with just a message implementation

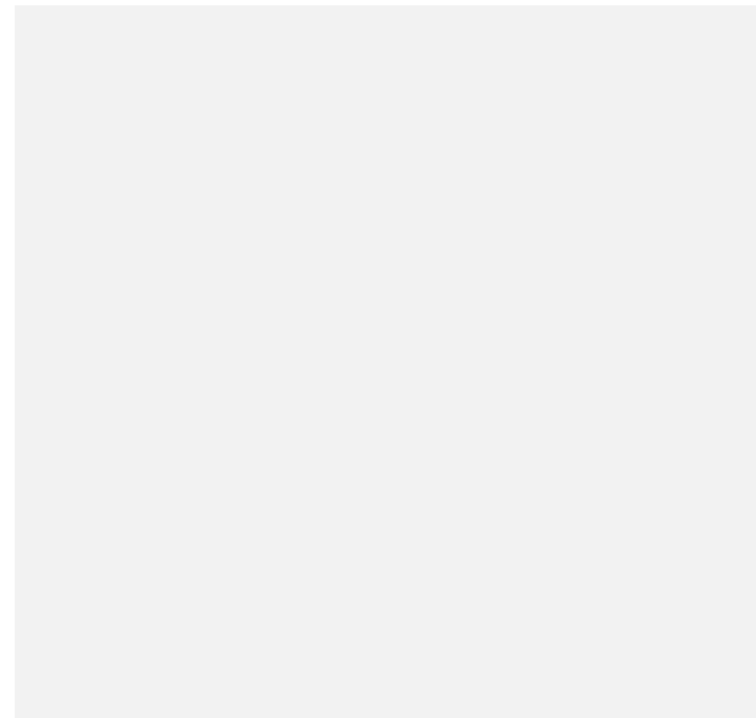
- Describes how the operator interacts with the TDL
 - Can reveal aspects of the implementation not expressed in the message implementation

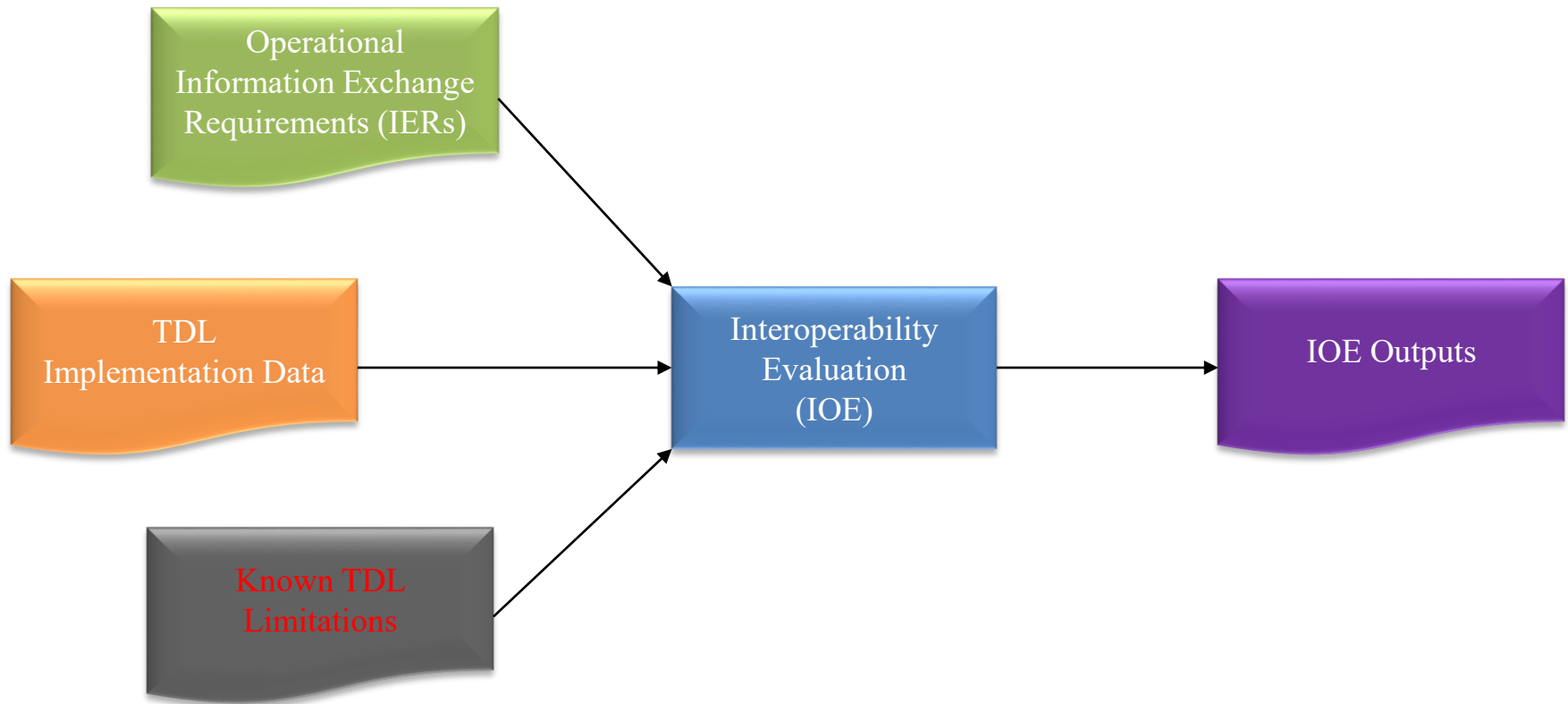
L16 Geographical Pointers are used to highlight a geographic area to Flight Members.

Pointers are created on the Point page using existing Mark Points and the **Pointer** (R5) button.

- The POINTER button is only displayed when a Mark Point is selected for review. When selected, the following occurs:
 - A Pointer is created at the Mark Point's location.
 - The Pointer is transmitted to all flight members.
 - Selects the newly created point as the point being reviewed.

Note: If there are no Flight members in the database the POINTER button isbarriered.





Known TDL Limitations

Edit/Review/Report IOAs normal mode.

54 Country: --All-- Search Titles: Status: Active
 IOA's in list: TDL: --All-- Impact: --All-- Short report Reapply Filters
 IOA No. Platform: --Any-- Full report Reset Filters Main Menu

Classification: NATO UNCLASSIFIED Release To: APN(AUS, AUT, CHE, FIN, SWE)

Title (NU): Reception of PPLI Messages - Continuation Word Sequence

Country: Partner No. 010 Issue No. 6 IOA Status: Active Dated: 12 January 2010
 TDL: Link 16 Msg: J2.2 Function: Friendly Forces Data
 Originator: UK - IOM Custodian Impact: Operator Level B
 Source: PTDLIOT IOI P0687J, P0692J, P0803J & NTDLIOT IOI P1121J

Operational Summary | Operational Details | Technical Details | Further Action | Rationale for selected Status | Validation

"Operational Summary" NATO UNCLASSIFIED

It is possible that certain elements from a platform's PPLI message may not be processed (or the entire message may be completely discarded).

IO Issues Database

NATO TDL Interoperability Issues

Version 10.90 - February 2015

NATO UNCLASSIFIED

IO Issue Analysis Active IO Issues

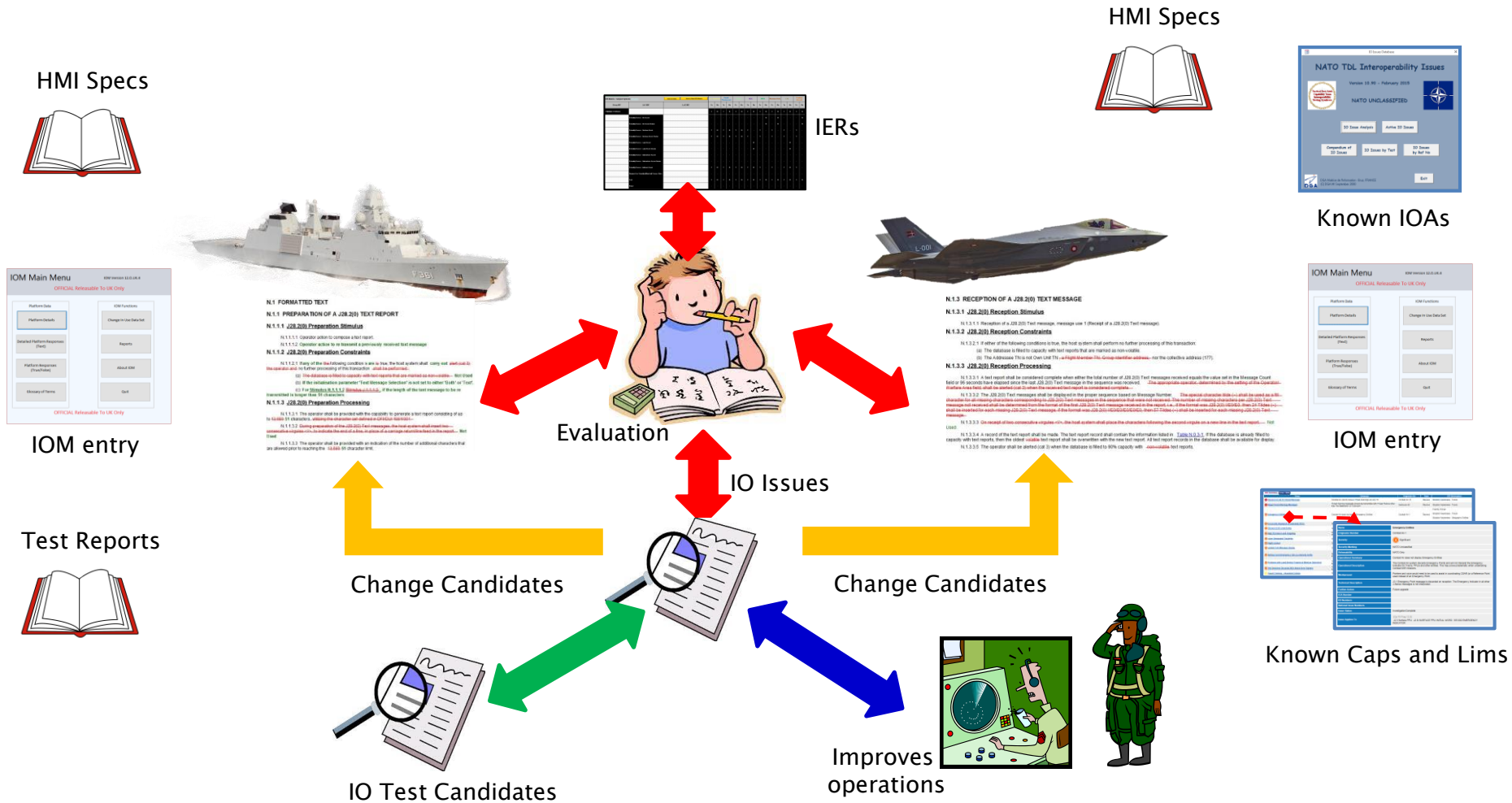
Cumpendium of IO Issues IO Issues by Test IO Issues by Ref No

Exit

DGA Maître de l'Information - Bruz, FRANCE
 (C) DGA MI September 2000

Issue	Summary	Originator No	Type	IER Information
Discard of Link 16 Threat Warnings	Combat Air cannot receive Threat Warnings via Link 16	Combat Air-15	Receive	Situation Awareness - Tracks
Illegal Threat Warning Messages	Threat Warning messages should be transmitted with Threat Posture other than "No Statement" or "Unknown"	Destroyer-36	Receive	Situation Awareness - Tracks
Emergency Entities	Combat Air does not display Emergency Entities	Combat Air-1	Receive	Friendly Forces Situation Awareness - Tracks Situation Awareness - Geographic Entities
Incorrectly Displayed (Forwarded) PPLIs	Com			
Discard of All Lines/Areas	Com			
High Precision Land Targeting	Com			
Laser Designated Targeting	Com			
Flight Control	Com			
Limited Text Message Display	Com			
Setting Force/Emergency Tell on a Remote Entity	Dest			
Problems with Land/Surface Targets as Mission Objectives	The			
The Destroyer Discards BDA Status from Fighters	The			
Transit Training - Simulated Entities	The			

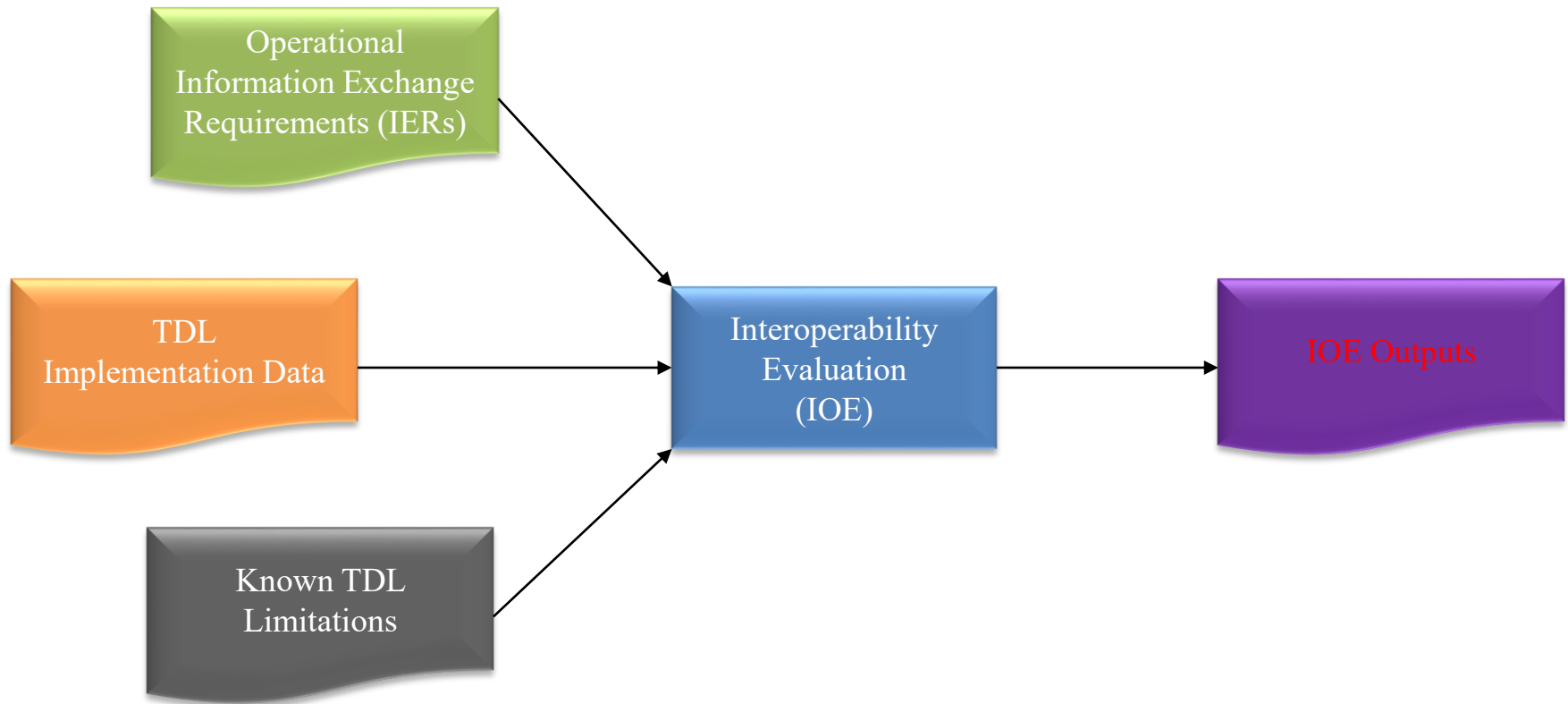
Name	Emergency Entities
Originator Number	Combat Air-1
Severity	Significant
Security Marking	NATO Unclassified
Releasability	NATO Only
Operational Summary	Combat Air does not display Emergency Entities
Operational Description	The Combat Air system discards Emergency Points and will not interpret the Emergency Indicator for Tracks, PPLIs and other entities. This may prove problematic when undertaking Combat SAR missions.
Workaround	Pointers and voice would need to be used to assist in coordinating CSAR (or a Reference Point used instead of an Emergency Point)
Technical Description	J3.1 Emergency Point message is discarded on reception. The Emergency Indicator in all other J-Series messages is not interpreted.
Further Action	Future upgrade
IOA Number	
IOI Numbers	
National Issue Numbers	
Issue Status	InvestigationComplete
Issue Applies To	[Op Fit Prog 12.0] J2.3 Surface PPLI J2.3I SURFACE PPLI INITIAL WORD 355 002 EMERGENCY INDICATOR



Lack of detailed platform information

- Increasingly, platforms are only providing Message Implementation Plans (MIPs)
- A lot can be determined from MIPs, but the nuances in the implementation are not obvious
 - Message NPGs
 - Features such as flight member processing not obvious
 - Have make assumptions based upon the declared underlying Link 16 message standard, e.g. ATDLP-5.16 or MIL STD 6016
- Documentation releasability
 - Platform and National authorities restricting the release of platform TDL documentation
- Quality of Documentation available directly relates to the accuracy of the IOE
 - More assumptions have to made Vs definitive statements

Key Components – IO Management



IOEs reports historically developed from a technical standpoint

- Overly focussed on technically derived issues
 - Little or no operational significance
 - Impacts not well identified
- As a consequence, front line were not benefiting
- IOE Reports:
 - “Bulky”
 - Static
 - Required SME knowledge to interpret
- A more operationally focussed output was needed
 - And more dynamic
















Key Components of IOE Output

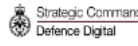
- Detailed Analysis
- Operational View
 - Representation of IERs
 - Capabilities & Limitations
- Identification of priority candidates for physical testing
 - Lack of information at the IOE stage on certain capabilities
 - IO issues raised by the IOE can be validated and assessed
 - Allows precious testing time to be used more efficiently
 - Focus on areas of operational importance
 - More testing on areas that have problems Vs areas that appear sound
 - Don't test areas that will not work



UK TDL Capabilities & Limitations Repository

Platform Focussed Caps & Lims

<p>A400M - Summary A400M IOEs</p> 	<p>Apache Summary Apache IOEs</p> 	<p>Crowsnest Summary IOEs (FOC) IOEs (SRP11.1 - CSG21)</p> 	<p>E-3D Summary E-3D IOEs</p> 	<p>F-15 Summary F-15 IOEs</p> 
<p>F/A-18 Summary F/A-18 C/D IOEs</p> 	<p>LEAPP Summary LEAPP IOEs</p> 	<p>Lightning Summary Lightning IOEs</p> 	<p>Network Management Issues</p> 	<p>Poseidon P-8A Summary P-8A IOEs</p> 
<p>QNLZ Summary QNLZ IOEs</p> 	<p>Sky Sabre Summary Sky Sabre IOEs</p> 	<p>Type 45 Summary IOEs (MML) IOEs (Pw MML)</p> 	<p>Typhoon Summary P3Es IOEs Tranche 1 IOEs</p> 	<p>UCCS Summary UK CSI Summary UCCS/CSI IOEs</p> 




[Home](#)
[UK TDL Caps & Lims Repository](#)
[UK JCM Database](#)
[JDE Reports](#)
[UK Platform - TDL Data Summary](#)
[Link 16](#)
[JREAP - C/Link 11/22/VMF](#)
[ISR Data Links](#)
[Stakeholder Information](#)
[Documents](#)
[Site contents](#)
[Recent](#)
[Recycle Bin](#)

[ISS Home](#)
[ISS Strategy](#)
[UK Link \(LTD\)](#)
[EDIT LINKS](#)

b0210f02-f2c1-e611-bf01-acfdce1bd280

A400M - OFFICIAL

A400M



Operational Description

The A400M, which is a collaborative venture involving the governments and industries of six European countries, will support the deployment of the Joint Rapid Reaction Force and will give the RAF a tactical and strategic-lift aircraft capable of supporting all three services.

Platform Configuration Notes

Platform IBD

01/04/2017

Platform OBD

01/04/2050

TDL Employment

	Link 18	Link 22	JREAP	Link 11A	Link 11B	VMF(Messages)	VMF(Header)	VMF(Bearer)	IDL	Link 1
Employed?	Yes	No	No	No	No	No	No	No	No	No
Baseline Standard	5516 Edition 3	-	-	-	-	-	-	-		
Notes										

TDL Forwarding

	Link 11 - 18	Link 11 - 22	Link 18 - 22	Link 18 MID9 - JREAP
Data Forwarder	No	No	No	No
Concurrent Interface Unit	No	No	No	No
Baseline Standard	-	-	-	-
Notes				

TDL Baseline Details

> [Link16] IDS Issue 3

TerminalType

MIDS LVT 1- BU1

Terminal Notes

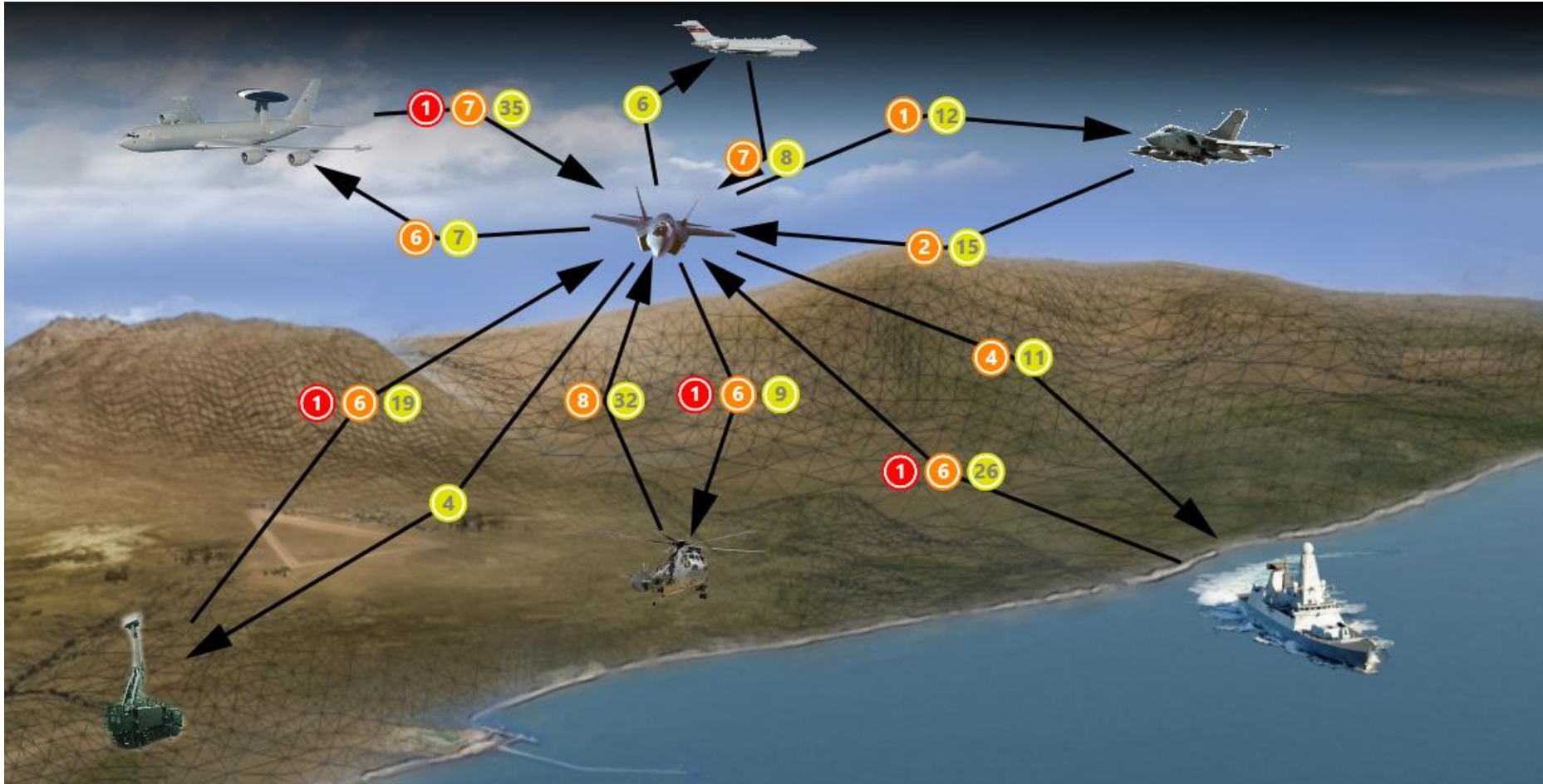
Network Participant Groups (NPGs)

NPG No	1	2	3	4	5	6	7	8	9	10	11	12	13	14
NPG Name	Initial Entry	RTT - A	RTT - B	Network Management	PPLI and Status Group A	PPLI and Status Group B	Surveillance	Mission Management / Weapons Coordination and Management	Control	Electronic Warfare	Image Transfer	Voice Group A	Voice Group B	Network E/W Responses
Transmit	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	No
Receive	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No

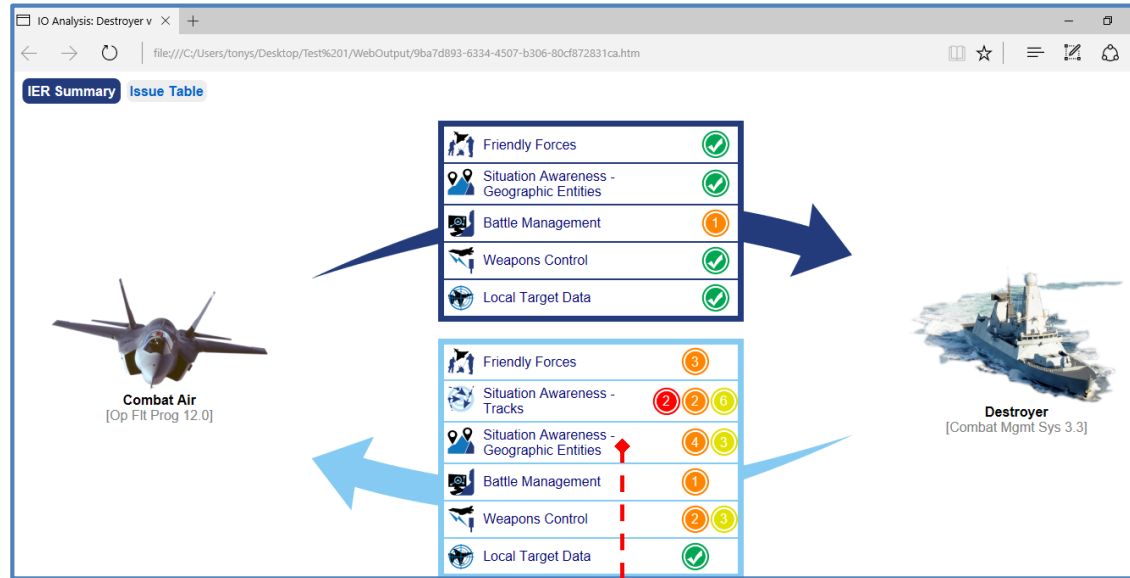
Concurrent Multi-Netting

CMN-2	No
CMN-3	No
CMN-4	No

Outputs – MOD Sharepoint



Outputs – MOD Sharepoint



Situation Awareness - Geographic Entities
Geographic entities that are exchanged to provide additional SA or to report entities for which direct sensor support is not available.

Reference Point - Hazard
A geographic reference point that reports an entity that is a potential Hazard to friendly forces

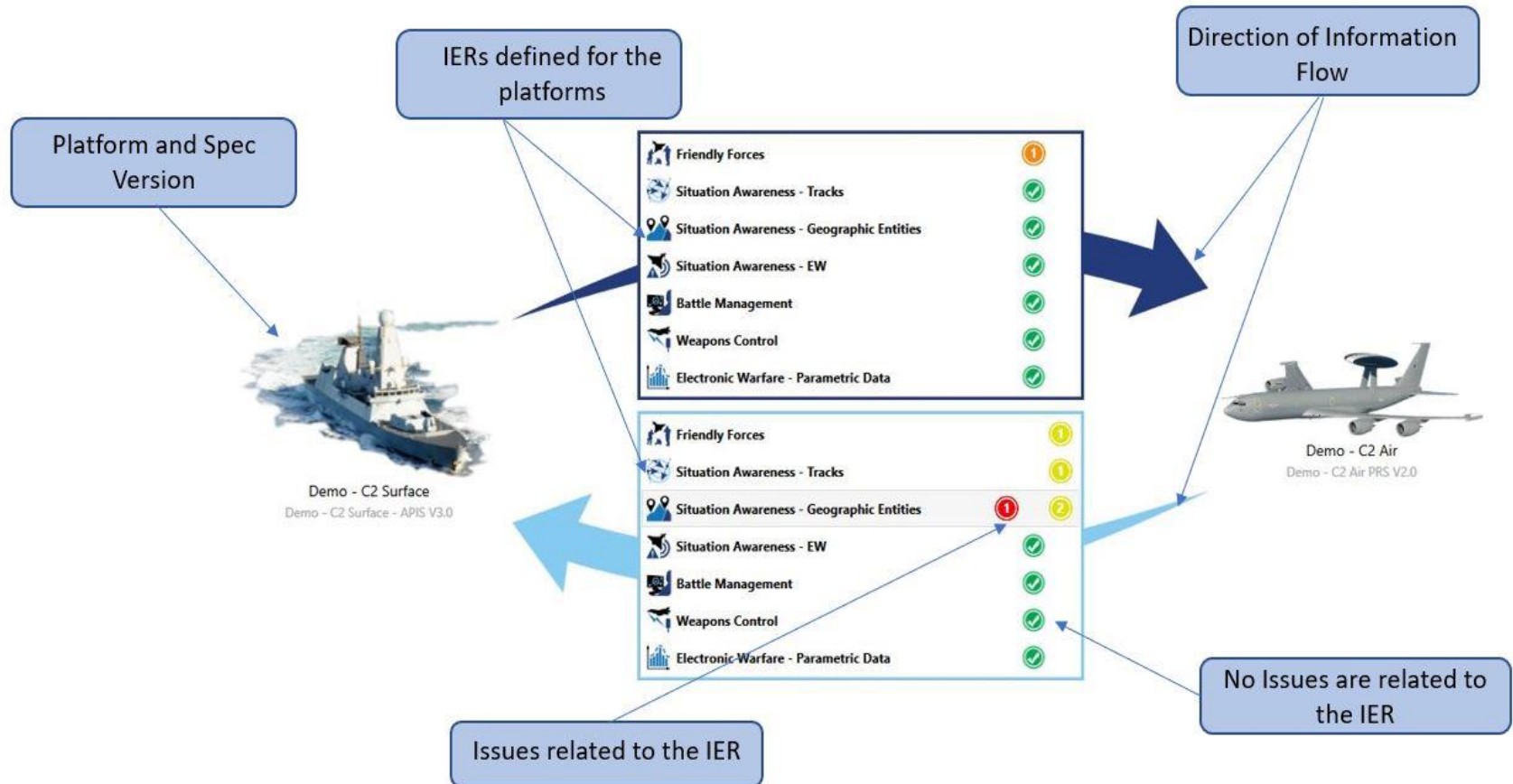
Information Type	Issue	Operational Summary
Hazard Description	Green Checkmark No Known Issues	
Location	Yellow Circle (1) Combat Air Discards All Slaved Reference Points	The Combat Air system discards any Reference Point which is slaved to another track or PPLI

Land Object
A geographic object in the Land domain that has been derived from other than sensors

Information Type	Issue	Operational Summary
Location	Orange Circle (1) High Precision Land Targeting	Combat Air does not interpret Land Objects with High Precision positional information correctly
Identification	Yellow Circle (1) Exercise Objects - Displayed as Real	Combat Air displays all exercise tracks/points as if real
Enhanced Point Characteristics	Orange Circle (1) Setting Force/Emergency Tell on a Remote Entity	Destroyer may not be able to set Force Tell or Emergency Status on a remote entity.
	Yellow Circle (1) Limited Supporting Information - Land Points	Destroyer reports limited information for Land Points.

Geographic Pointer

Outputs – MOD Sharepoint



IER Summary
Issue Table


Name	Missile In Flight/Weapon Released
Originator Number	MRCA L16 PRS V0.3-3
Severity	
Security Marking	NOT SET
Releasability	NOT SET
Operational Summary	MRCA does report Missile In Flight/Weapon Released against a Target.
Operational Description	MRCA is unable to report Missile In Flight/Weapon Released when Engaging/Attacking a Target. A controlling unit would not be made aware of this change of status during prosecution of a Target.
IO Conflicts Addressed	
Workaround	Inform of Missile In Flight/Weapon Release by voice.
Technical Description	Status Information Discrete value 3 cannot be initiated for transmission by the MRCA Main Computer.
Further Action	A fix is being pursued.
IOA Number	
IOI Numbers	
National Issue Numbers	
Issue Status	Investigation Complete
Issue Applies To	MRCA L16 PRS V0.3 J12.6 Target Sorting J12.6I TARGET SORTING INITIAL WORD 704 021 STATUS INFORMATION DISCRETE SWITCH: 5 LAND for 275 004 ENVIRONMENT 3 MISSILE IN FLIGHT/WEAPON RELEASED SWITCH: 3 SURFACE for 275 004 ENVIRONMENT 3 MISSILE IN FLIGHT/WEAPON RELEASED SWITCH: 2 AIR for 275 004 ENVIRONMENT 3 MISSILE IN FLIGHT/WEAPON RELEASED



Home Early Warning
EW L16 APIS V1.0]




Battle Management
The exchange




Engagement Status Report
Allows the status of engagements to be exchanged



Fighter Report - Engagement



Fighter Report - Engagement



Battle Damage Assessment
Allows the results of prosecuted engagements to be exchanged

Operational Summary

Project - Handbook Demo
IER Editor Handbook Demo X








Subject Platform

Demo - C2 Air


Object Platforms




Demo - Non C2 Air
Demo - C2 Surface


Information Definition (IDF)		Demo - Non C2 Air		Demo - C2 Surface	
		T	R	T	R
▶  Friendly Forces		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
▶  Situation Awareness - Tracks		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
▶  Situation Awareness - Geographic Entities		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
▶  Situation Awareness - EW		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
▶  Battle Management		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
▶  Weapons Control		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
▶  Local Target Data		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
▶  Electronic Warfare - Parametric Data		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
▶  Ballistic Missile Defence		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
▶  Anti Submarine Warfare		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
▶  Imagery		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
▶  Network Planning and Management		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Subject Platform




Demo - C2 Air

Object Platforms



Demo - Non C2
Air



Demo - C2 Surface

Information Definition (IDF)		Demo - Non C2 Air		Demo - C2 Surface	
		T	R	T	R
Friendly Forces		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Friendly Forces - Air Asset		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Location		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Identification/Role		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Mission Related Information - Command & Control Assets		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Mission Related Information - Controlled Assets		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Indications		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Friendly Forces Report - Data Handling		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Friendly Forces Report - Simulated Entity		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Friendly Forces - Air Asset Status		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friendly Forces - Surface Asset		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Location		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Identification/Role		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Mission Related Information - Command & Control Assets		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Emergency Indications		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Friendly Forces Report - Data Handling		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Friendly Forces Report - Simulated Entity		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Friendly Forces - Surface Asset Status		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Outputs – MOD Sharepoint

Baseline View | Issues View | IO Summary View

C2 Surface v C2 Air (Handbook Demo)

IDF Group: <All> | Filter Elements: All Elements | Switch Direction

Rename Analysis | IDF Level 1: <All> | IDF Level 2: <All>

TDL Element	Demo - C2 Air Transmit	Transmit Issues	Demo - C2 Surface Receive	Receive Issues
J2.5 Land Point PPLI	NT		R	⬇
J2.6 Land Track PPLI	NT		R	⬇
J3.0 Reference Point	T		R	⬇
J3.1 Emergency Point	T	⚠	R	⬇
J3.2 Air Track	T		R	⬇
J3.3 Surface Track	T		R	⬇
J3.4 Subsurface Track	NT		R	⬇
J3.5 Land Point/Track	T		R	⬇
J3.6 Space Track	NT		NP	
J3.7 Electronic Warfare Product Information	T		R	
J5.4 Acoustic Bearing/Range	NT		R	⬇
J6.0 Track/Point Amplification	T		R	⬇
J7.0 Track Management	T		R	⬇
J7.1 Data Update Request	T		R	
J7.2 Correlation	T		R	
J7.3 Pointer	T		R	
J7.4 Track Identifier	T		NP	
J7.5 IFF/SIF Management	T		R	
J7.6 Filter Management	NT		DM	

No Colour Coding = No IER Defined

IER Defined, Not all IDF's satisfied

IER Defined, all IDF's satisfied

Platform Reception Issue - No Project IER defined - No Interest to this Project

Platform Transmission Issue at the Message Level

Platform Reception Issue, at a level below the message level

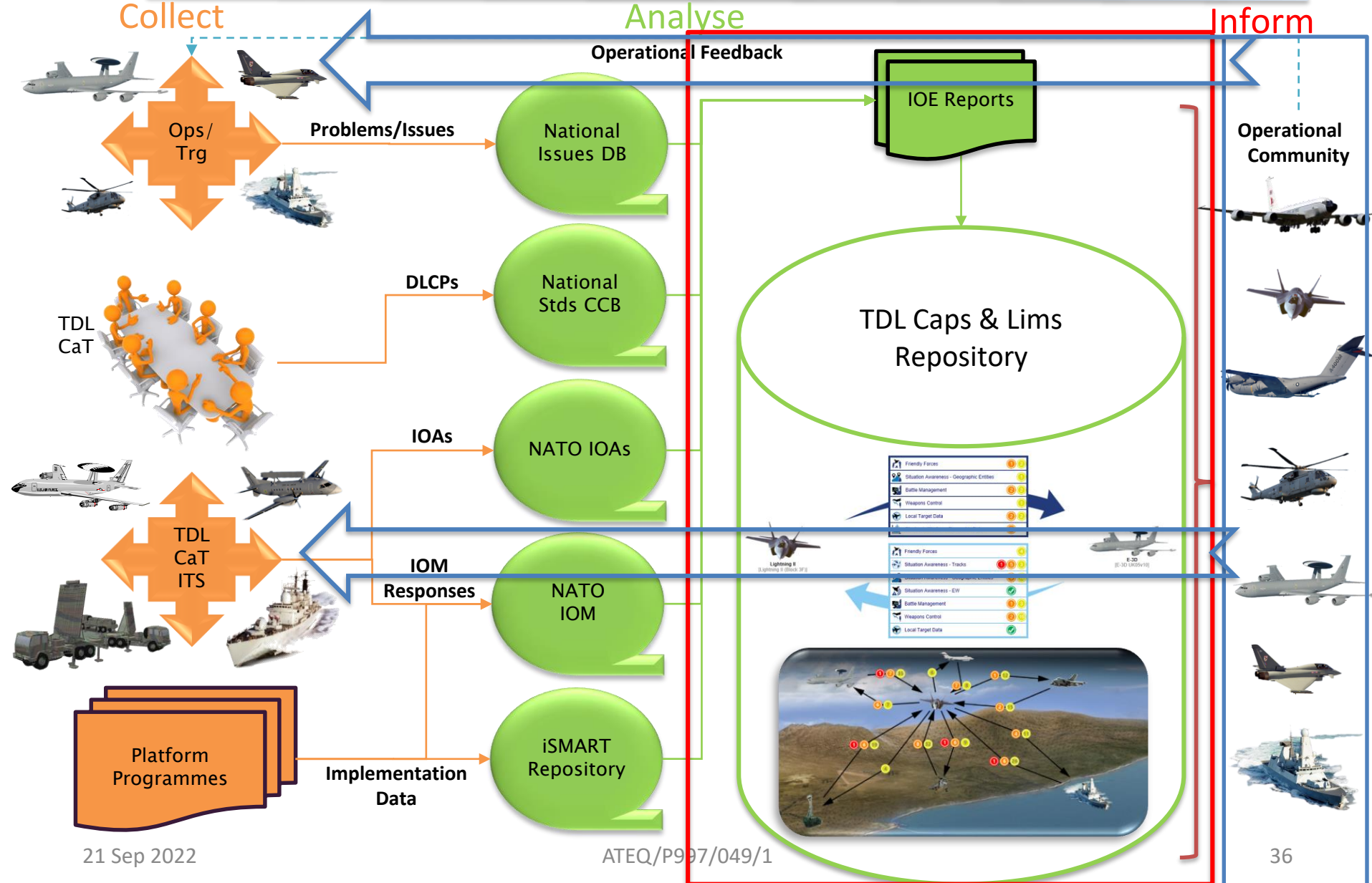
UK Approach to IO Management

Collect

Analyse

Inform

Operational Feedback





Day 1

Lets go!!!
Mission
Assignment
testing!!!

Day 5

Lets go!!!
To the bar





Questions?