



# Supporting Improvements to UK Defence Supply Chain Management

## ISMOR 25

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# The Context

- Supply chain shortcomings in Gulf War(s)
  - Materiel transported into theatre but not used
  - £millions of materiel 'lost'
    - E.g. Body Armour
  - Unnecessary transportation costs
  - Reduction in military effectiveness
- Inability to effectively manage Supply Chain
  - No visibility of arriving transport at logistics nodes
  - ...despite introduction of Consignment Tracking (CT) systems in 1990s



# Why is it so difficult?

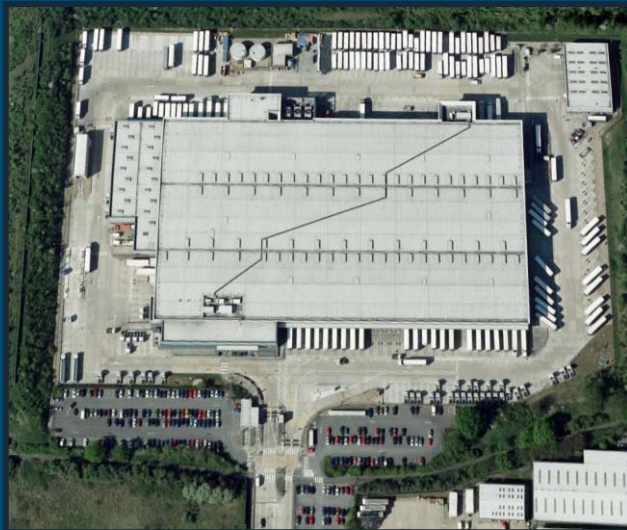
Sainsbury's

TESCO

ASDA  
part of the WAL-MART family



- ~40,000 different items
- Fixed physical/IS infrastructure
- 1.5 million different items
- Often no fixed infrastructure



Tesco Distribution Centre - Southampton



Distribution Centre – Kandahar Airfield

# Transport



At home...

85 Vehicles = 8 km Column Length



...and in theatre



# Supply Chain Management Improvements

- Single Statement of User Need

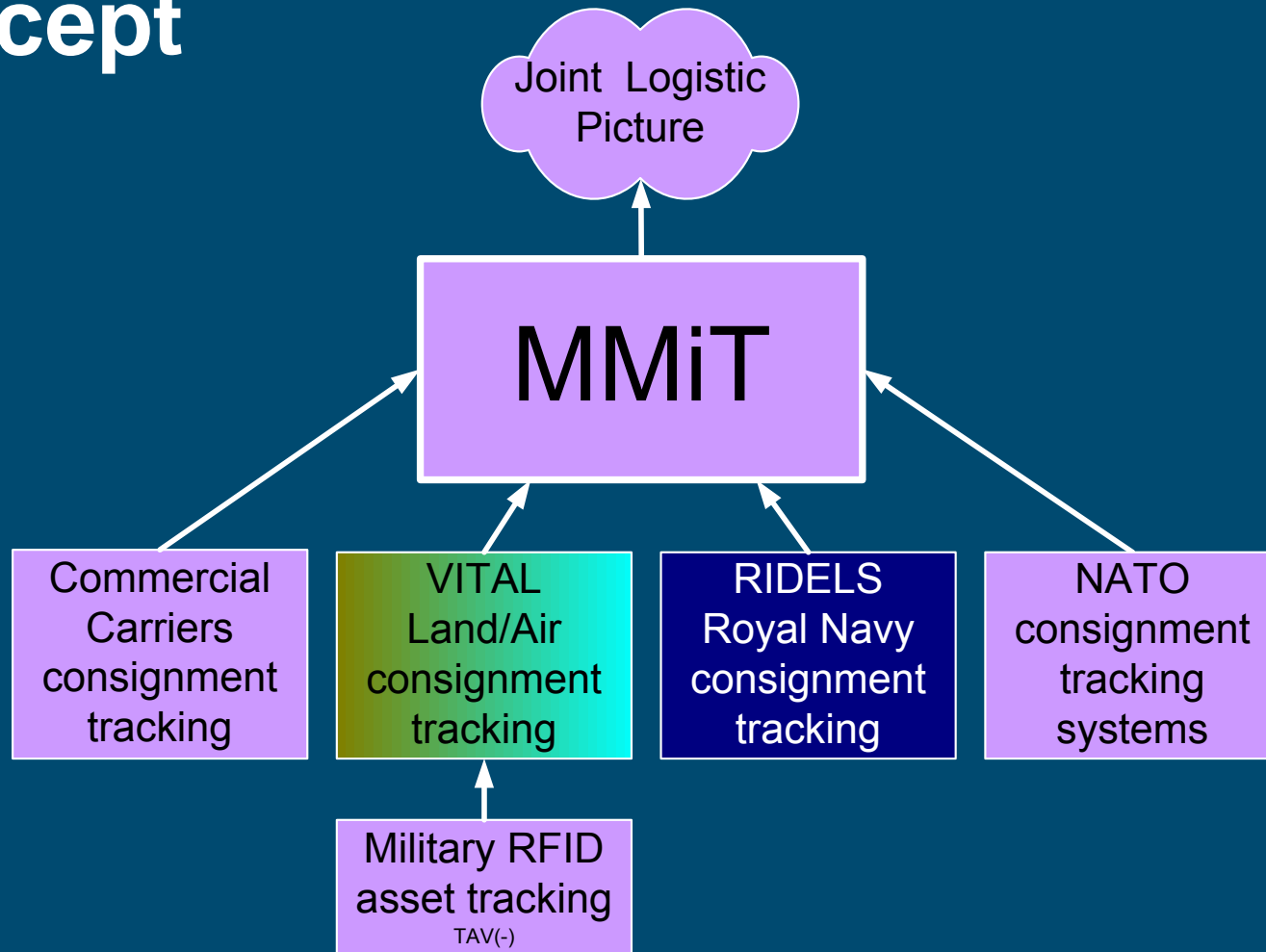
“To monitor and facilitate **the effective control of the end-to-end supply of items** from their initial point of despatch into the Supply Chain (SC) to the receipt by the original demanding unit.”

- Project: Management of Materiel in Transit (MMiT)

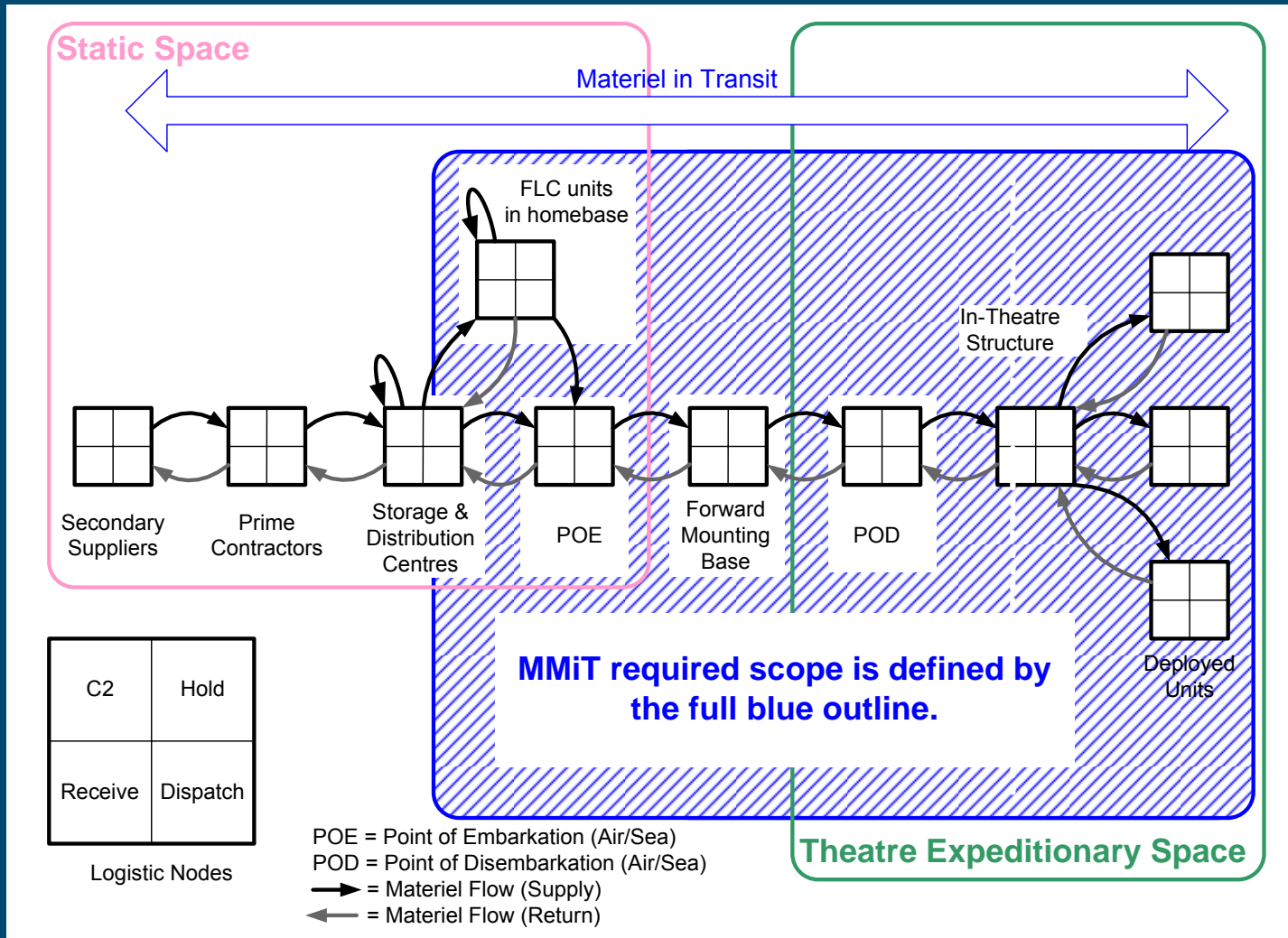
- Aims:

- Use existing consignment tracking data to improve visibility and C2 of materiel moving through the Supply Chain (SC)
- Provide a SC Management capability that is not currently available

# Management of Materiel in Transit Concept



# MMiT Scope



# MMiT Requirements

- Monitor items within the military SC

When will demand #12345, that I made last Thursday, arrive?

Return of Surplus/Unserviceable Materiel (Returns)

- Movement within Military
- Movement by Commerce
- User Requirements

How many consignments need to be processed at my logistics node in the next few days and what are the priorities?

- Track any item moving
- Access characteristics
- Control the flow of materiel

Where is all the “body armour” in the Defence Supply Chain and when will it arrive in theatre?

Items in transit

Number of consignments in transit

?

Defence Support Systems





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# What is Dstl doing?

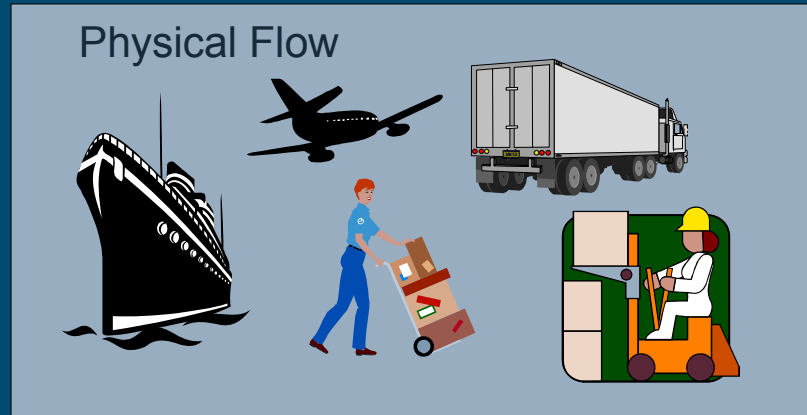
- Understanding the changes to supply chain effectiveness provided by the MMiT capability...
- ...by developing a model of the Defence Supply Chain
  - From UK warehouses and units to battlegroups in theatre
  - Modelling physical, information and command and control components
- Using Siemens Tecnomatix Plant Simulation (object oriented, discrete event simulation tool)



# MMiT Measures of Effectiveness (MOE)

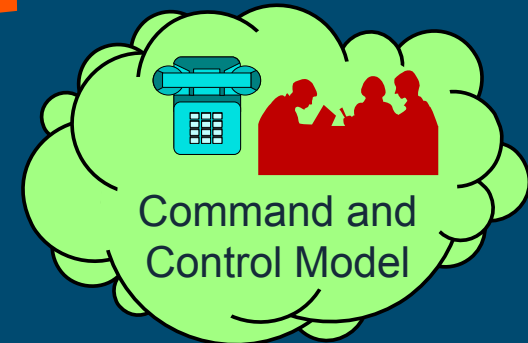
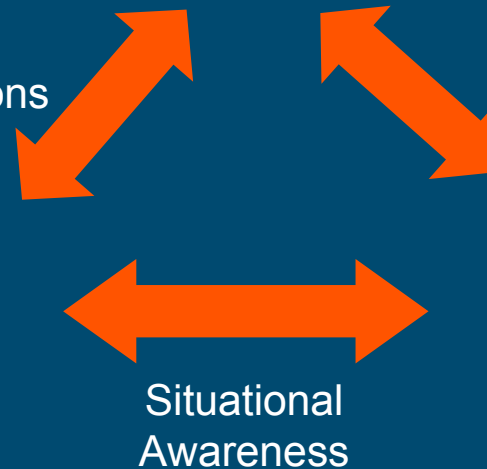
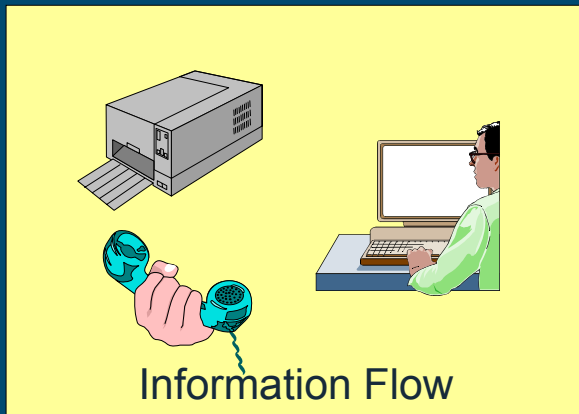
	Description
<b>MOE1</b>	<ul style="list-style-type: none"><li>• <b>Time to Achieve Full Operating Capability</b><ul style="list-style-type: none"><li>– 95% of outload materiel delivered to destination</li></ul></li></ul>
<b>MOE2</b>	<ul style="list-style-type: none"><li>• <b>Average lateness</b><ul style="list-style-type: none"><li>– Measure of how late ordered items are</li></ul></li></ul>
<b>MOE3</b>	<ul style="list-style-type: none"><li>• <b>Supply Chain Certainty</b><ul style="list-style-type: none"><li>– The ability to accurately predict the delivery date of consignments</li></ul></li></ul>

# Components of a Supply Chain Model



Impact of Communications

Behaviours



# The Model – Screenshot

**.Models.Frame**

**Level 1 - Homebase to Theatre**

Unit

DSDA

Transport to APOE

Homebase Distribution Network

Transport to SPOE

APOE

SPOE

List of Items in Transit

\_Theatre

\_Theatre

\_Theatre

RESET

INIT

ENDSIM

Trial=1

OnTimeConsignments=1154

LateConsignments=28

FalseCollects=1

SuccessCollects=14

TotalRedemands=9

AbandonedConsignments=0

ConsignmentsGenerated=4611

ConsignmentsDelivered=1182

ConsignmentsInTransit=3429

NoOfShips=2

NoOfAircraft=67

DemandsProcessed=85

Information Flow Model

Breakdown

DidNotArriveFail=0

NotInConsWaitFail=1

ConWaitCollectSuccess=7

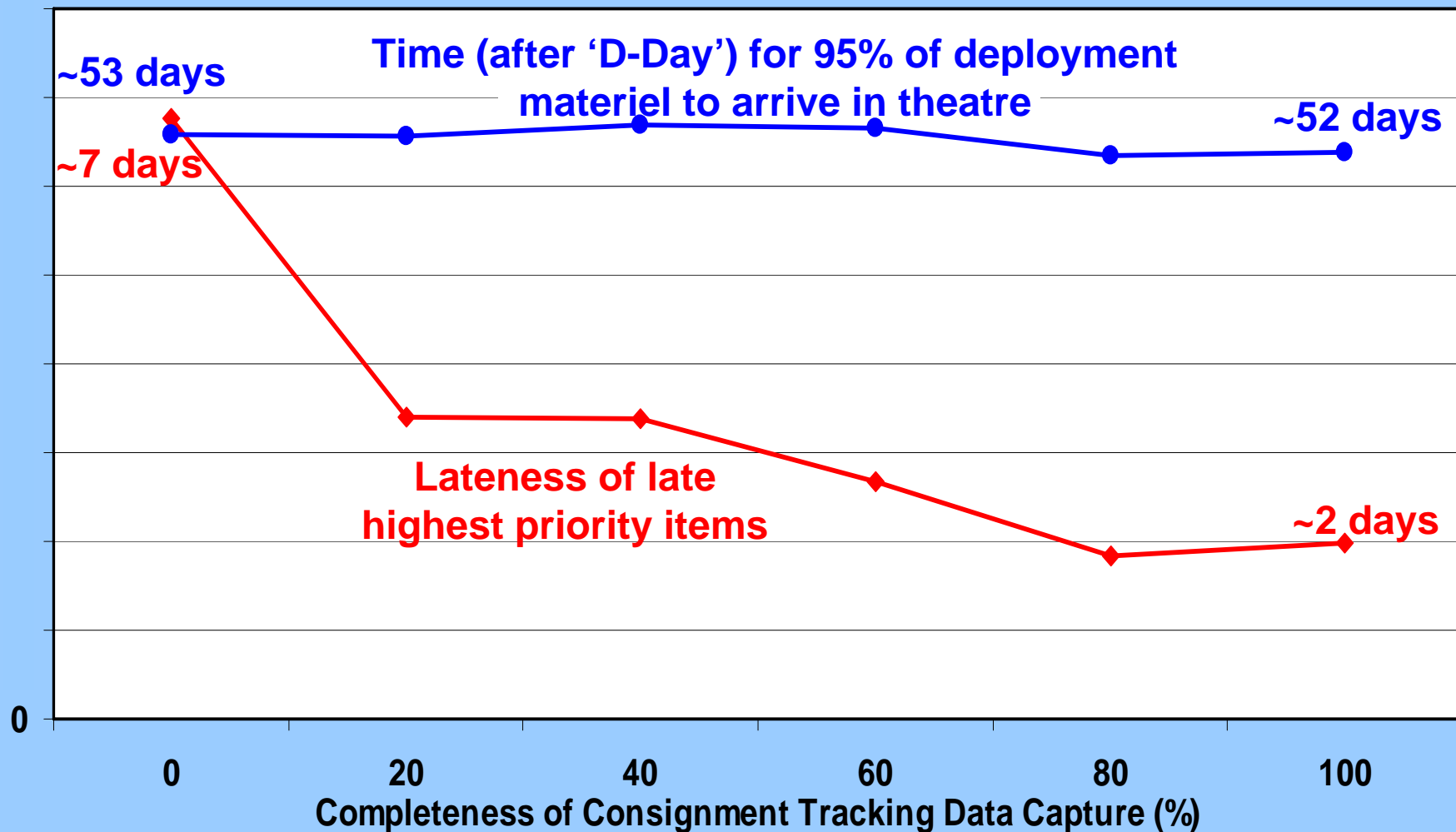
CheckCollectfalse=0



# Command and Control Modelling

- Asset Visibility information informs Command and Control decision making processes at every level of the supply chain
- 20+ modelled C2 processes
- Examples:
  - Resource management and allocation (personnel, transport, etc.)
  - Consignment reprioritisation
  - Collection of demanded items when late or *predicted* late
  - Redemanding items when late or *predicted* late

### Mean Value of Five Runs



# Sample Findings

- Certainty of delivery → improved planning is the largest benefit found
- The supply chain is a complex system and interventions in one area may have (adverse) knock on effects elsewhere. Improved SC situational awareness can facilitate this.
- More benefit is realised when SC is larger and more complex
  - Greater number of opportunities to reassign the larger resource pool (people, MHE, transport)



# Questions



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