



SEAS DTC

Systems Engineering for Autonomous Systems
Defence Technology Centre

Welcome to the DTC's Fourth Annual Conference





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Plenary Session 1

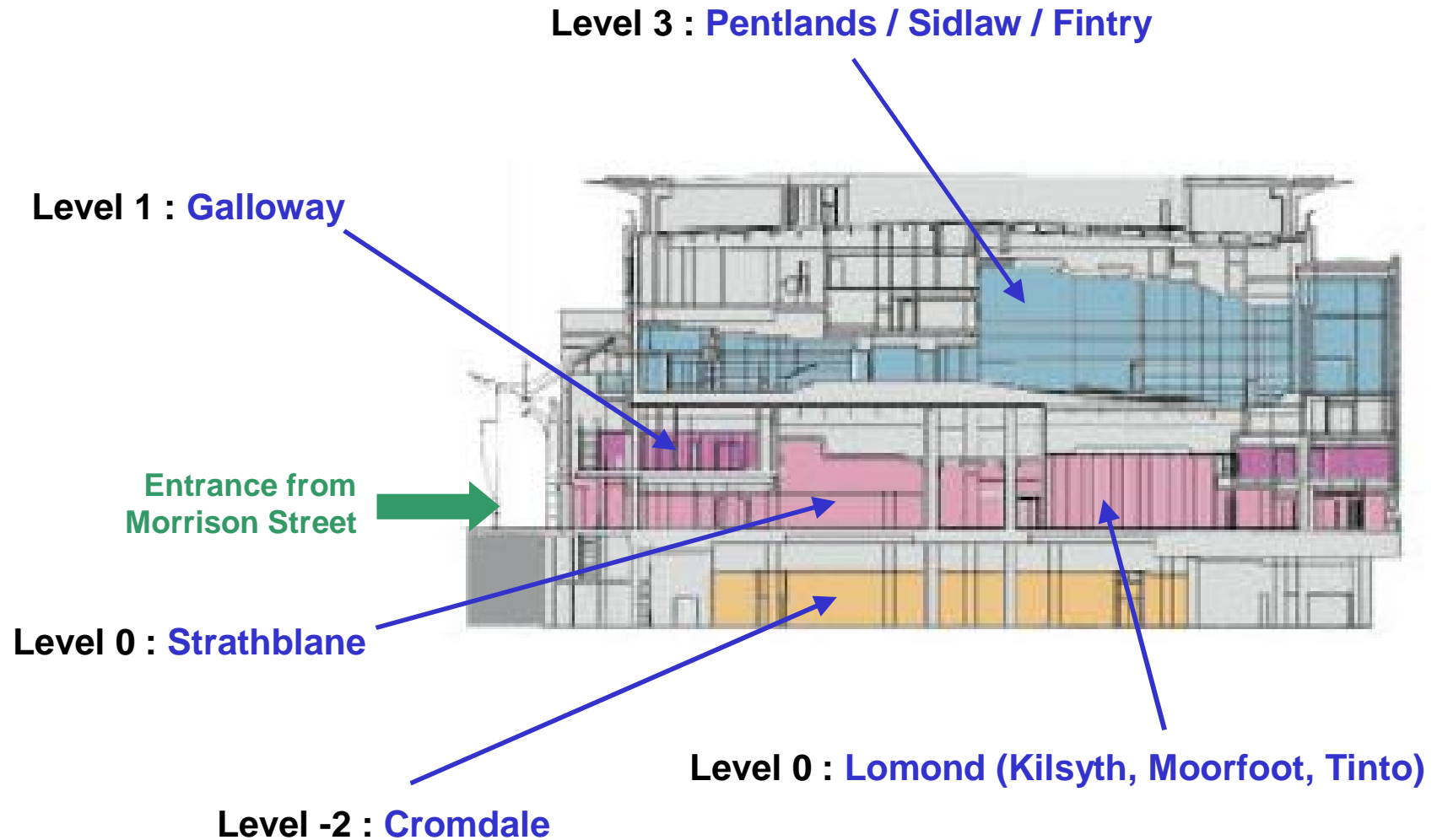
SEAS DTC Introduction

The Conference : *What's Happening Where*

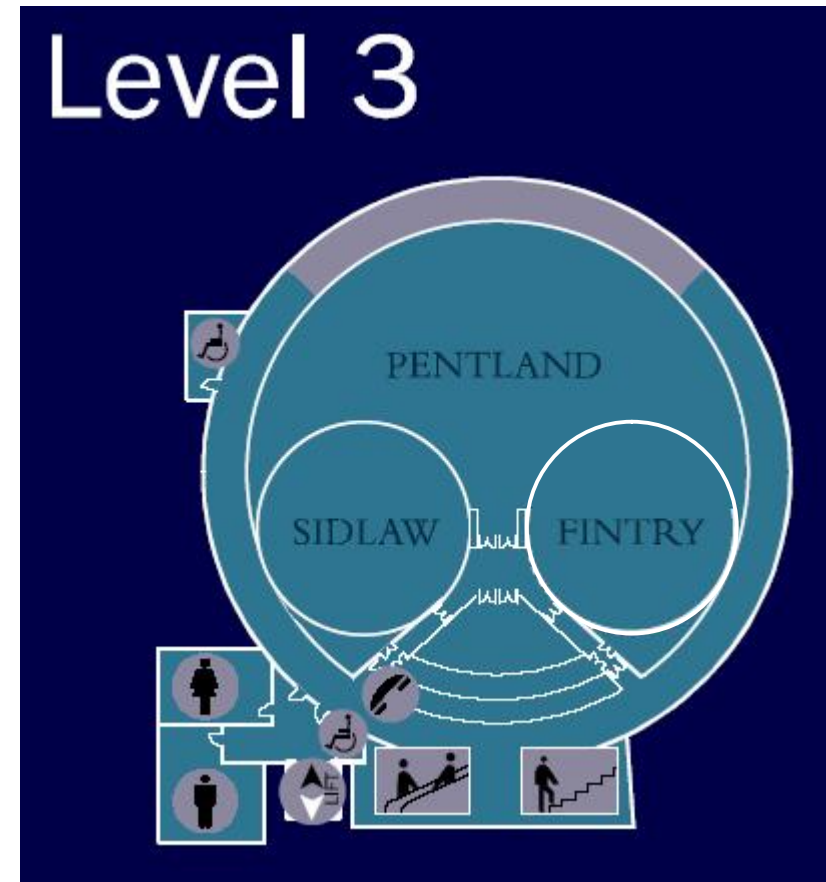
Tim Doggart – SEAS DTC Programme Manager



EICC Layout



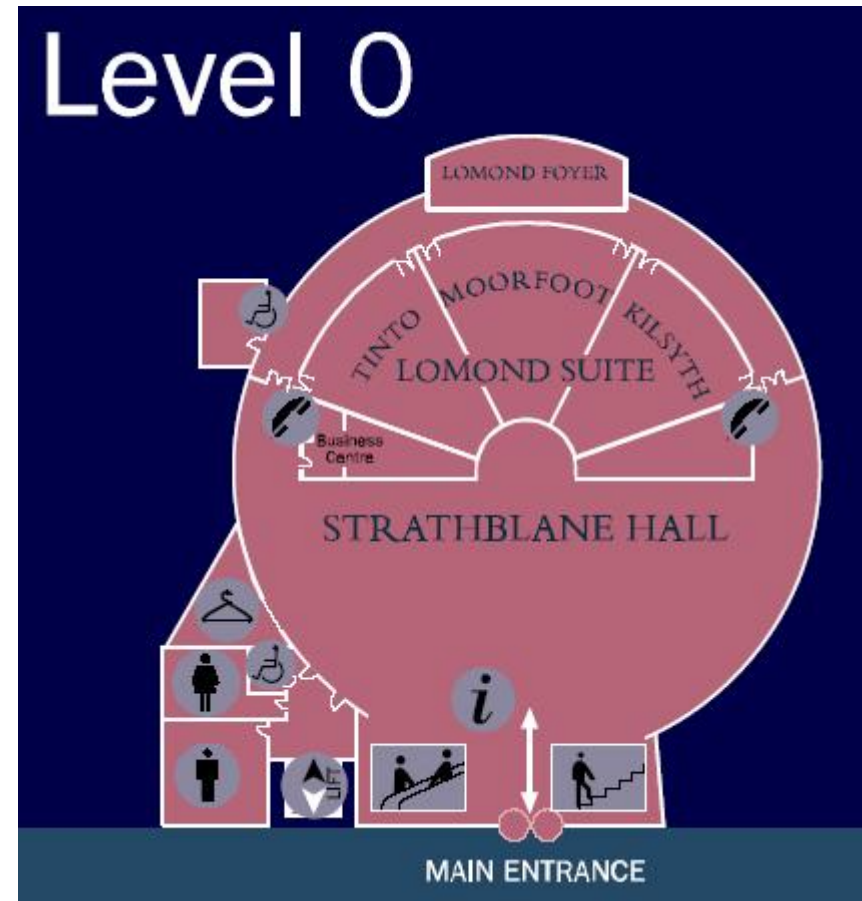
- **Joint Opening Welcome Session**
- **SEAS DTC Plenary Sessions (*Pentland*) :**
 - **1 : Introduction (now)**
 - **2 : Integrated Demonstrations (today)**
 - **3 : DTC Programme : Lessons Learned and Future (tomorrow)**
- **EMRS DTC Papers (*Sidlaw and Fintry*) :**
 - **RF Systems, Embedded Processing, Devices and Materials**
Sidlaw
 - **EO Systems, Embedded Processing, Devices and Materials**
Fintry



- **SEAS DTC Theme Sessions (*Lomond*) :**
 - 3 parallel streams in 3 Lomond rooms
 - 2 sessions today, 3 tomorrow

	Kilsyth	Moorfoot	Tinto
Day 1	Communications & Control	Systems Engineering Research	Propulsion, Power Generation & Energy Management
Day 2	Sensor Exploitation	MoD Technology Management Workshop / Mission Planning & Decision Making	Algorithms & Architectures

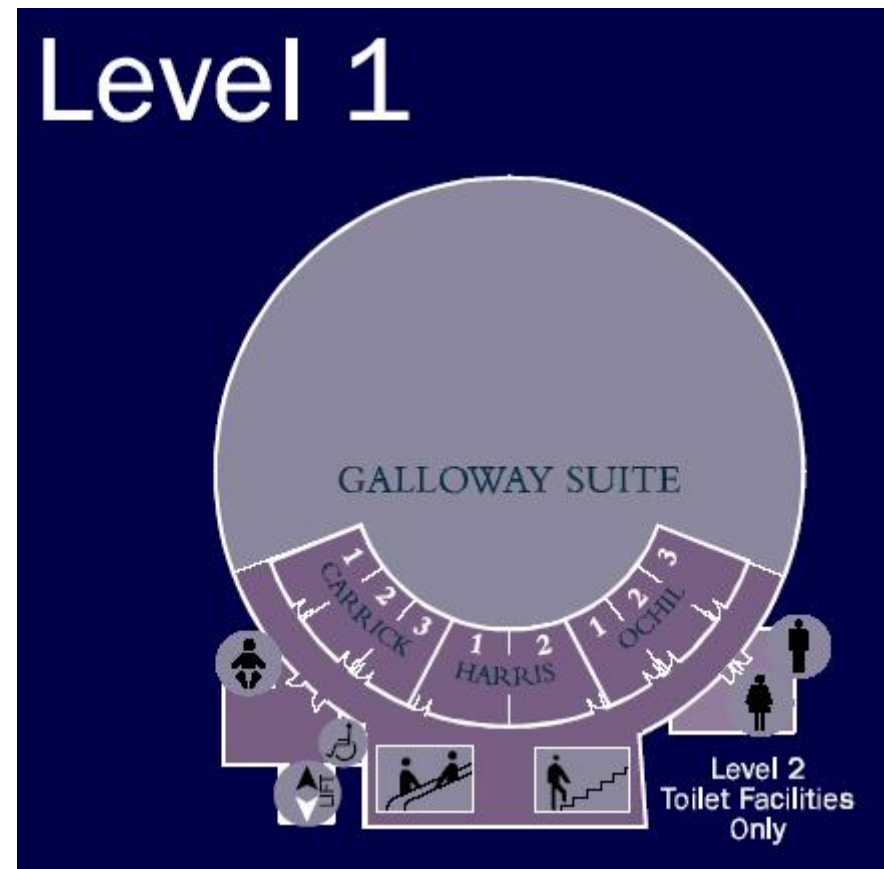
- **SEAS DTC Demonstrations (*Strathblane*) :**
 - Tomorrow afternoon as fourth plenary session



- **Joint Exhibition :**
 - Approximately 30 exhibitors
 - Throughout conference
- **Posters :**
 - Throughout conference (EMRS and SEAS)
 - Opportunity to speak to researchers by posters – at start of Networking reception at the end of Day 1
- **Lunch / Refreshments**
- **Networking Reception**
 - end of Day 1



- **MoD Presentations on Centre for Defence Enterprise**
(Galloway – Carrick Room)
- **Presentation on UK Aerospace and Defence Knowledge Transfer Network**
(Galloway – Harris Room)
 - Repeated session, run once today, twice tomorrow :
 - **Day 1 : 13:30**
 - **Day 2 : 09:00 and 13:30**
- **MoD Technology Management Workshop**
(Galloway – Ochil Room – Day 1)
 - Repeated session, run twice today:
 - **Day 1 : 11:00 and 13:30**
 - **Day 2 : 08:45 (in Moorfoot)**



DTC Strategy and Progress

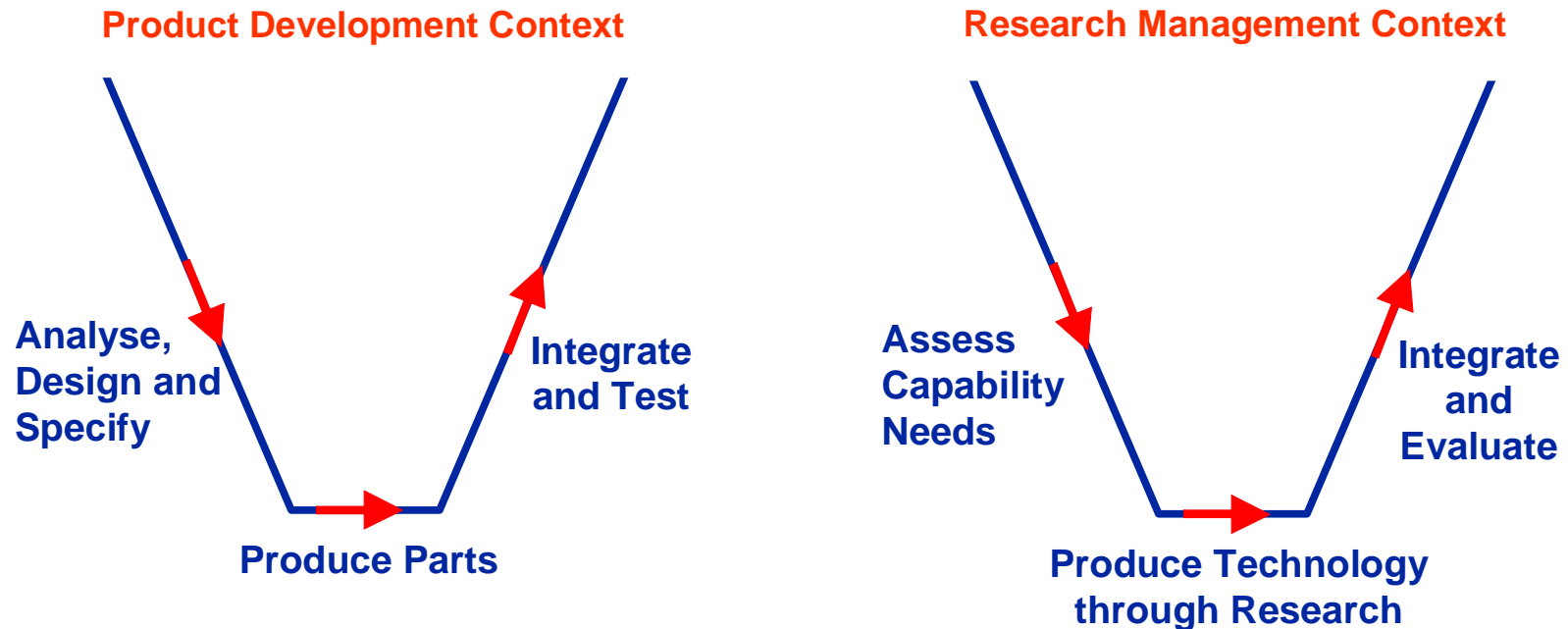
Bill Bardo – DTC Technical Director

(Systems Engineering for) Autonomous Systems

- **Autonomous systems are already in use, but realising the full potential benefits of autonomy requires removal of barriers. SEAS DTC's role is to :**
 - Identify and remove the barriers
 - Provide options to MoD
 - Explore the benefits
- **Barrier areas being addressed by the DTC's research strategy :**
 - **Domain specific technologies, for example :**
 - electromagnetic communication underwater and through the sea surface
 - covert ground wave communication
 - power requirements of locomotion over different types of terrain
 - **Other influences, for example :**
 - legal
 - cultural
 - trust
 - certification

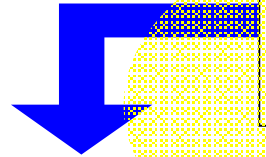
Systems Engineering (for Autonomous Systems)

- A system is a set of interacting component (sub-systems) parts with new (emergent) properties
- The creative task of the systems engineer is to choose the component parts and the interactions between them to produce the desired properties of the whole system and to suppress the undesirable (for the present purpose) properties



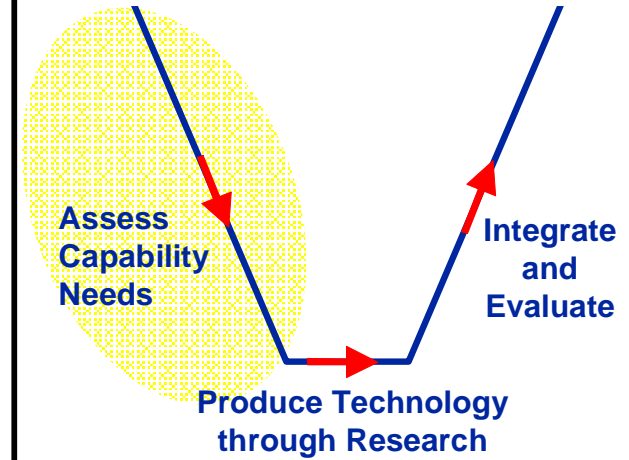
Assessing Needs

Top-down
steer / pull
from
capability
needs



Vignettes and
associated
challenges

Functionality Needs



Experimentation /
evaluation /
demonstration

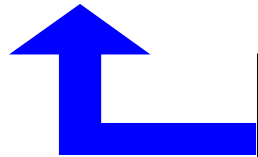
Integration
threads / system
concepts



**Military
Exploitation**

Functionality Generated

Bottom-up
innovation
push



Research work /
technology
building blocks

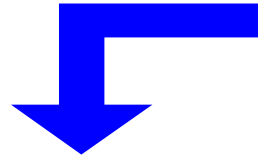
Assessing Needs - Progress

What has the DTC achieved to date in this area ?

- **Defined and refined a set of vignettes as settings to test and challenge the DTC work**
- **Defined and refined associated capability challenges**
- **Worked with and advised stakeholders, for example in :**
 - **Dstl Requirements Group**
 - **MoD Defence Equipment & Support's Autonomy Focus Group**
 - **Supporting the MoD's Unmanned Air Systems Capability Investigation**

Delivering Technology and Functionality

Top-down
steer / pull
from
capability
needs



Vignettes and
associated
challenges

Functionality Needs

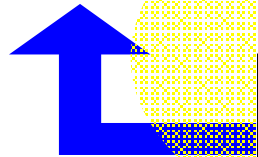
Experimentation /
evaluation /
demonstration

Integration
threads / system
concepts



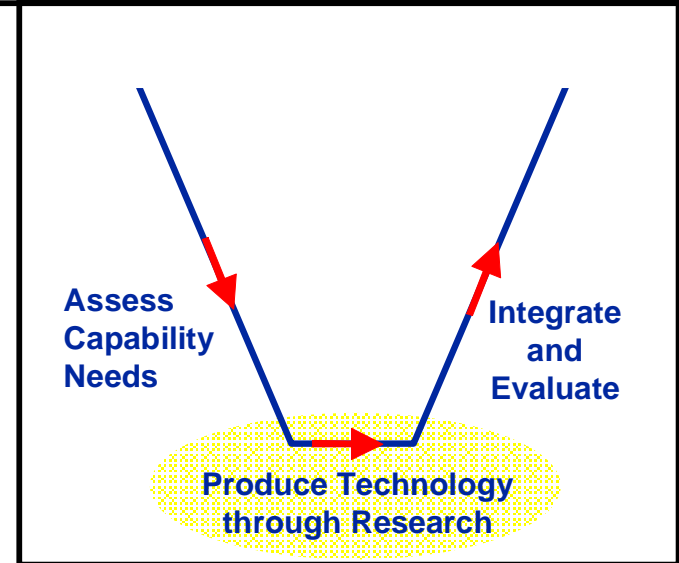
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Delivering Technology and Functionality - Progress

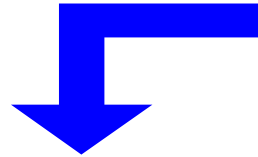
What has the DTC achieved to date in this area ?

- **Delivery of promising and demonstrable technology outcomes within six research themes, including systems assessment methodologies supporting technology deployment**
- **Establishing links between technology outcomes within and across themes**
- **Many examples of external recognition of DTC work and technology advances**
- **Valuable functionality emerging, sometimes with different useful functionality from the same research project**

**Detail in parallel
theme sessions in
Lomond suite**

Integration and Evaluation

Top-down
steer / pull
from
capability
needs

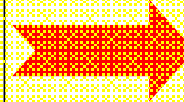


Vignettes and
associated
challenges

Functionality Needs

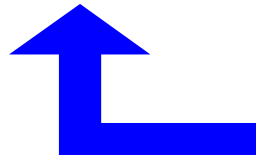
Experimentation /
evaluation /
demonstration

Integration
threads / system
concepts

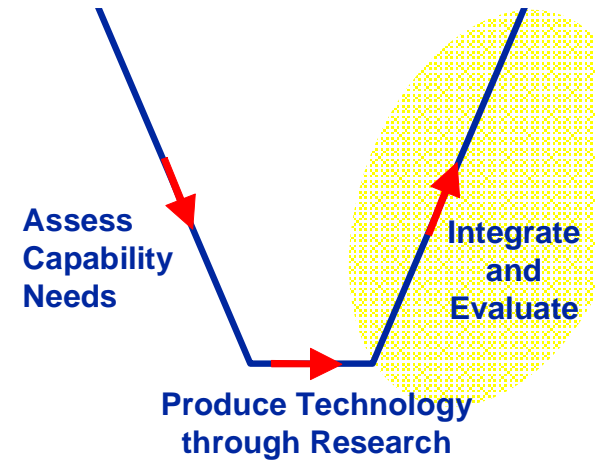


Functionality Generated

Bottom-up
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Research work /
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**Military
Exploitation**

Integration and Evaluation - Progress

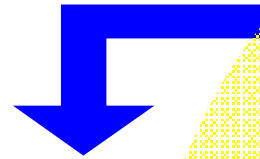
What has the DTC achieved to date in this area ?

- **Point technology demonstrations giving confidence in research outcomes**
- **Identification and development of 'mini-threads' as intermediate building blocks**
- **Identification of a key set of systems-level demonstrators for next 18 month's work**

**Detail in plenary 2
later today;
demonstrations in
plenary 4 tomorrow**

Managing the Overall Process

Top-down
steer / pull
from
capability
needs

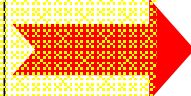


Vignettes and
associated
challenges

Functionality Needs

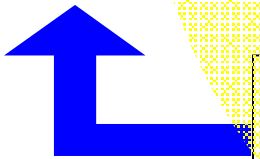
*Experimentation /
evaluation /
demonstration*

Integration
threads / system
concepts



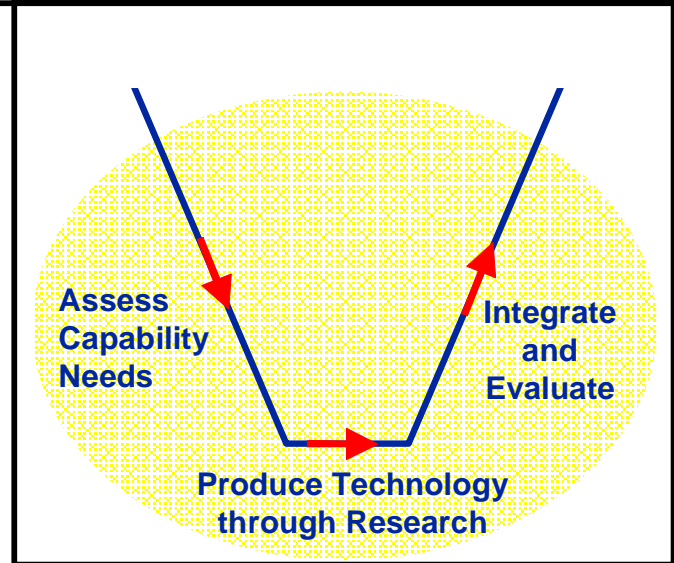
**Military
Exploitation**

Bottom-up
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Functionality Generated

Research work /
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Managing the Overall Process - Progress

What has the DTC achieved to date in this area ?

- **Exploring how toolsets such as UML modelling tools can support the DTC's process**
- **Identification and reporting on lessons learned from DTC operation to date**
- **Building a research community, aligning efforts towards common aims, and working together on topics of special interest**
- **Operating a set of DTC metrics**
- **Setting targets for overall expected outcomes of current DTC contract**

**More detail in plenary
3 tomorrow**

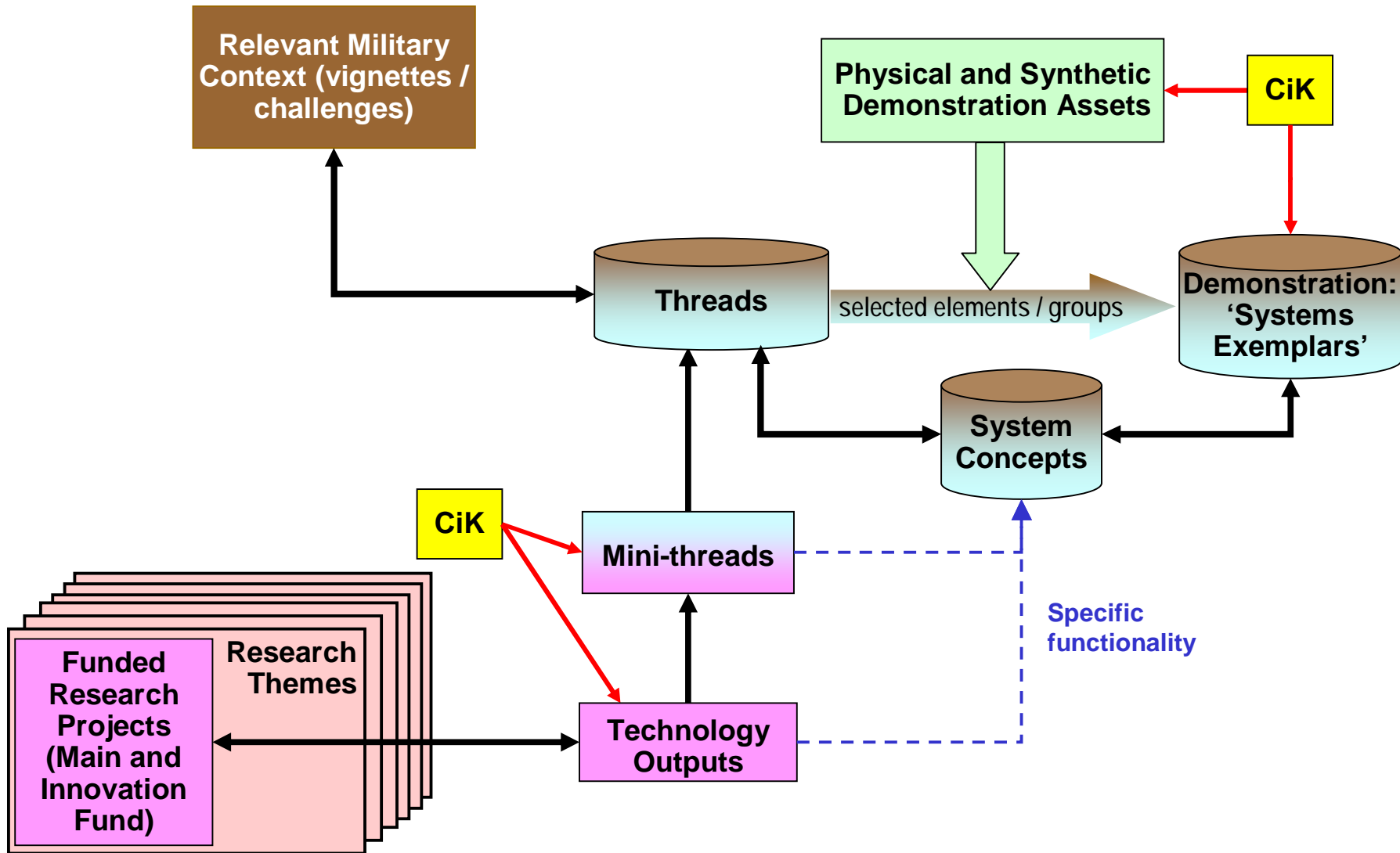
Scope of SEAS DTC / Getting Involved

Tim Doggart – DTC Programme Manager

A Few Facts and Figures about the SEAS DTC

- **The DTC deploys £5M of MoD funding annually in its research programme, on both larger projects and smaller scale investigations under our 'Innovation Fund'**
- **This is matched by Contributions in Kind from the DTC Consortium members**
- **The present DTC contract allows for 6 years of operation (up to January 2011)**
- **Intellectual property is owned by the organisation generating it, but MoD and other consortium members have user rights**
- **The DTC presently has :**
 - **around 200 people from more than 30 different organisations directly working in the DTC**
 - **a network of contacts of around 1000 further people in more than 100 other organisations**

DTC Concepts



Getting Involved in the DTC

- **Talk to the researchers**
- **Visit the website : www.seasdtc.com**
- **Join our contacts list to keep in touch**
- **Respond to periodic calls for proposals**
- **Submit Innovation Fund proposals**
- **Call or e-mail the DTC Office – contact details on website**



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