



Defence Technology Plan

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Science & Technology Capability

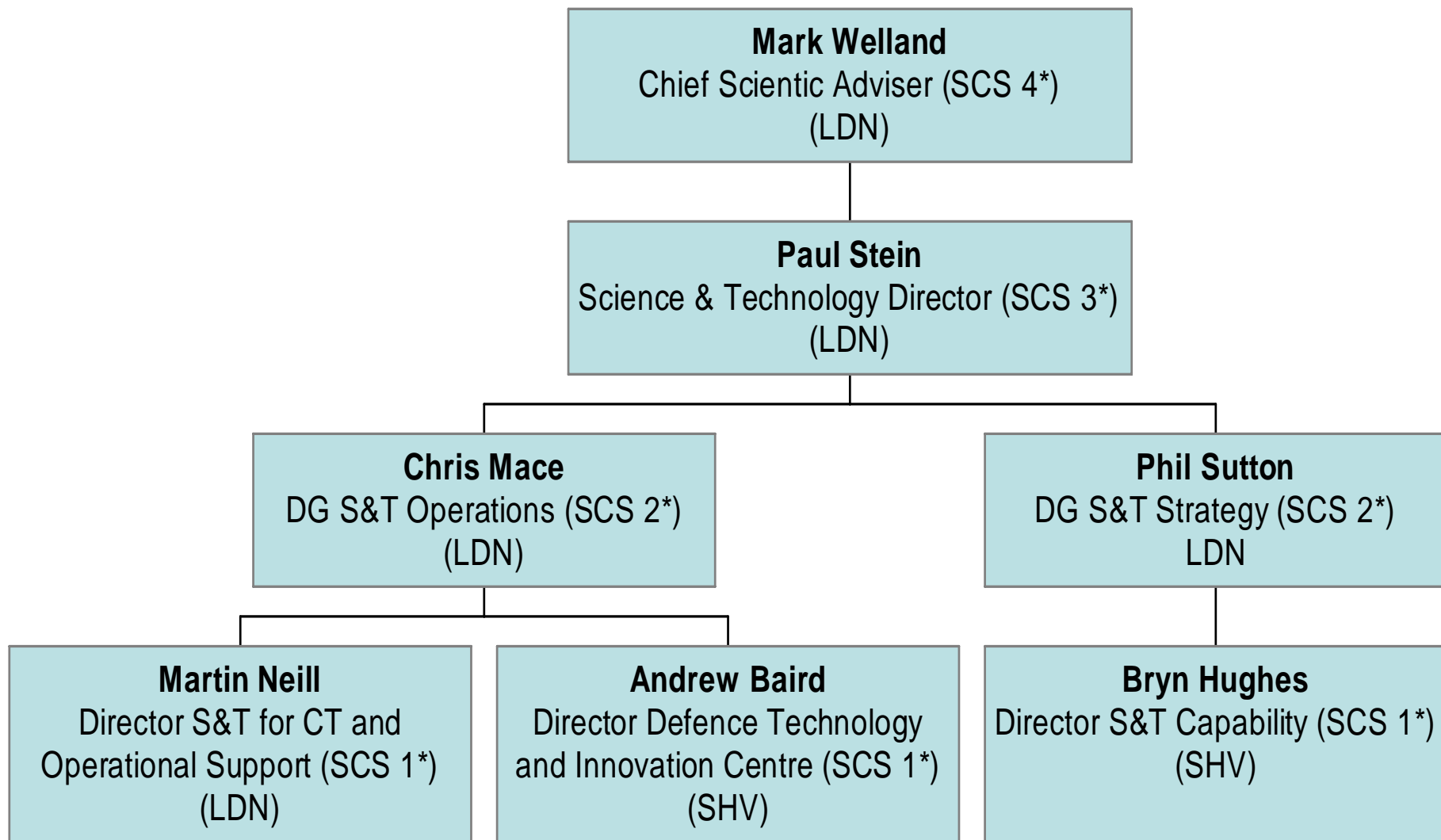


Why Invest in S&T?

- To create UK-owned technology to benefit equipment
- To support the armed forces in operations today, tomorrow and in the future
- To support intelligence assessments, strategic decision making and the evolution of doctrine
- To support equipment acquisition, support and training
- To support technology exchanges with allies
- To provide “insurance policy” and surge capacity for responding quickly to rapid changes in an uncertain world



SIT Organisation Structure





The Challenge for S&T

- develop technical capability in the supplier base which can be drawn upon to deliver military capability to the front line
- improve the pace at which science and technology is developed and brought into service
- identify and develop those technologies with the potential to transform the military business
- coordinate all R&D activities centrally to achieve maximum value for money – need for a coherent overall programme





Defence Technology Plan

- The Defence Technology Plan (DTP)
 - ...will be a plan starting with capability driven research goals and showing how the goals will be met by R&D activity supporting later phases of acquisition
 - ...builds upon the DTS.. and provides clear direction to the R&D community, allowing industry and academia to better direct its investment in Defence technology.

Ministerial statement
made to the House,
Monday Nov 12th 2007.



Defence Technology Plan

- The Defence Technology Plan (DTP)
 - ...a new, dynamic DTP, that will set out how MOD will deliver its research needs....will be published on the internet
 - ...technology road maps within the DTP will set out detailed performance, cost and time parameters for elements of sub-systems research, together with milestones.
 - ...allow greater understanding of priorities

MOD – Innovation Strategy



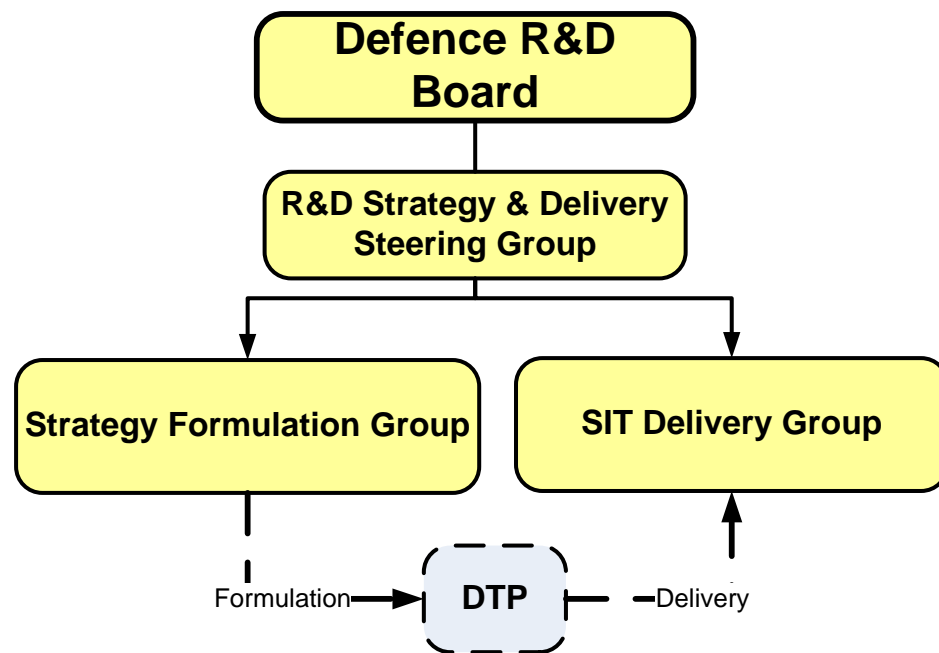
Defence Technology Plan

- One single plan for research covering the whole of MoD
- The means of integrating science and technology into Capability Planning and Equipment Acquisition
- Shared with industry and academia for joint planning
- Initially covering research – but shortly to cover research and development
- Balanced across MoD's needs to meet Departmental objectives



Ownership of DTP

- Developed and maintained by DG S&T Strategy
- Implemented and delivered DG S&T Operations
- Owned and endorsed by Defence R&D Board





DTP – Key Components

DTS Drivers

R&D Objectives

Programmes to address identified technologies

S&T Challenges and Emerging Technologies

Technology push, threats & opportunities

Capability Visions

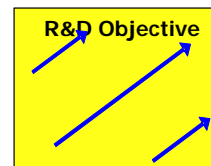
Programmes to address 'Left of arc' Defence Challenges

Research Goals

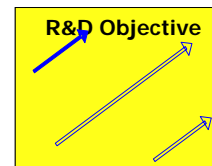
Solution independent, statement of need

'Roadmaps'

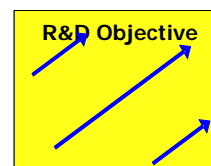
R&D Objective



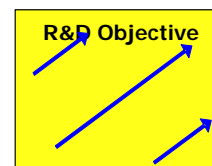
R&D Objective



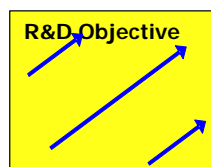
R&D Objective



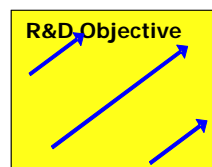
R&D Objective



R&D Objective



R&D Objective



Graphical and text representation of the key R&D steps needed to deliver the programme



DTP Content (1)

- Research & Development Objectives (RDOs) are:
 - Focused research activities to meet the identified needs of the MoD Unified Customer
 - Currently approximately 80 in number
 - Most RDOs meet several Research Goals
 - Developed closely with Stakeholders
 - Provide highly effective research coherence across the programme



DTP Content (2)

- S&T Challenges and Emerging Technologies
 - Stimulate Innovation and Excitement
 - Tackle The High-Risk-High-Return Future Defence Challenges
 - Encourage Defence Community to Accelerate the Adoption of New and Emerging Technologies
 - Leverage Civil Technology Investment
- Provide:
 - Step Change in Current or Planned Capabilities
 - Effectively Counter Future Threats
 - Enable UK to be first to field New, Disruptive, Battle Winning Capabilities



DTP Content (3)

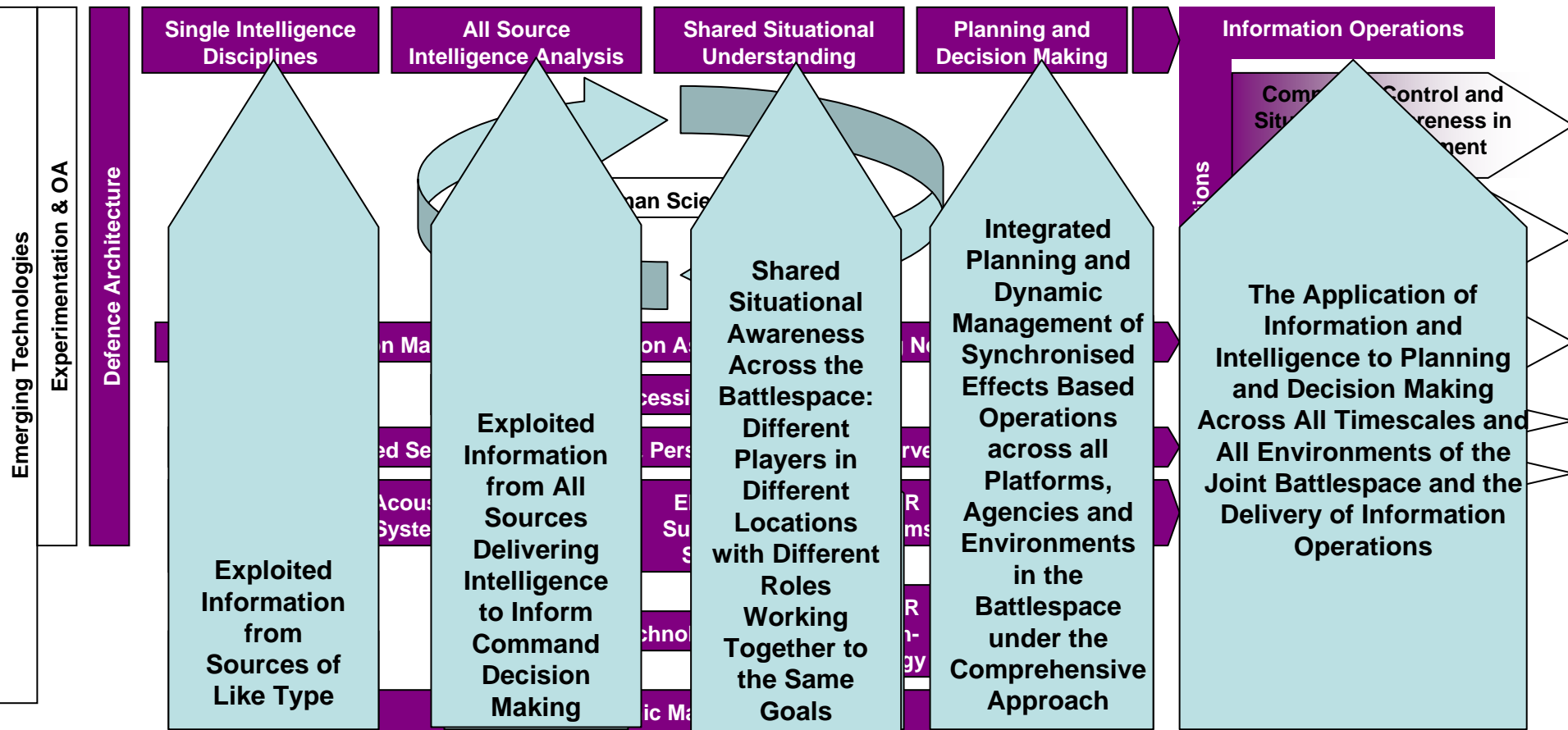
- Capability Visions
 - Stimulate Innovation and Excitement
 - Tackle The High-Risk-High-Return Future Defence Challenges
 - Encourage Suppliers to Seek New and Innovative Applications for Existing Technologies
 - Facilitate MOD Leverage of External Investment
- Provide:
 - New, Disruptive, Battle Winning Capabilities For The Future
 - Radically Enhance Current or Planned Capabilities
 - Effectively Counter Future Threats



Example DTP Domain: Sensors & C4ISTAR

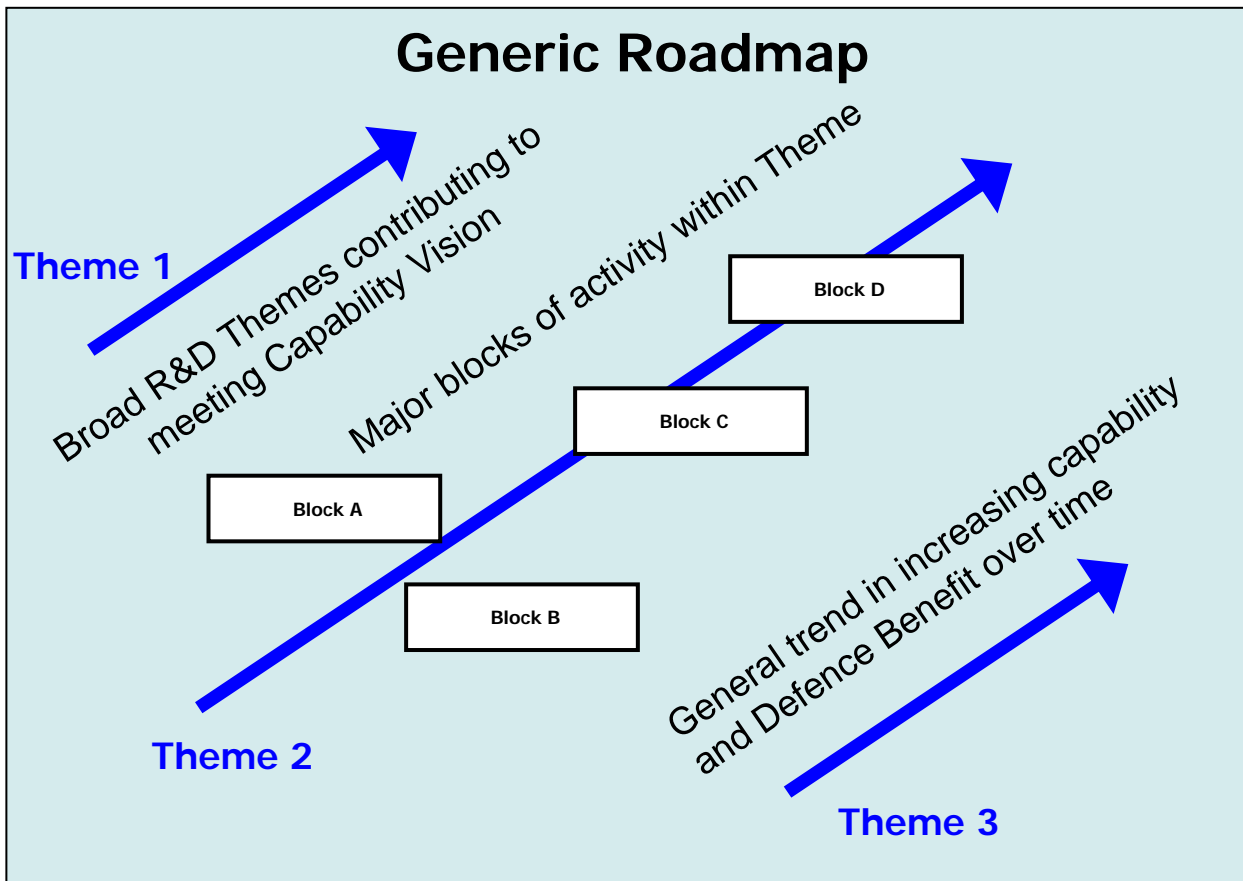
■ Sensors & C4ISTAR R&D Objectives

□ Interfaces to other domains





Generic Roadmaps



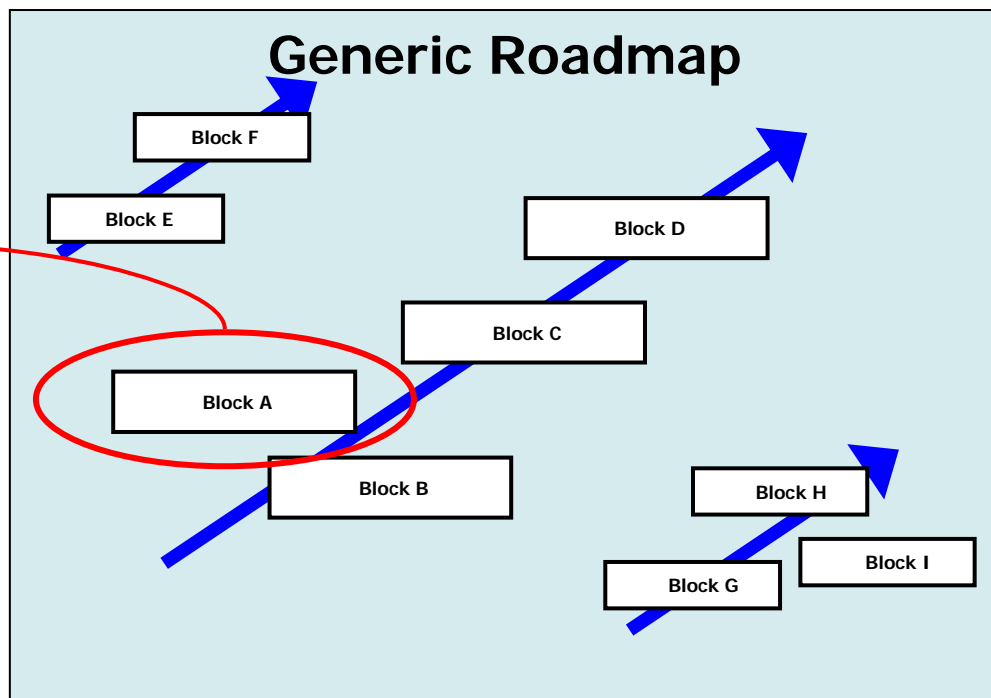


Roadmap Descriptors

Underlying activity detail

- Scope
- Desired Outcome
- Solution Options
- Proposed MOD Action

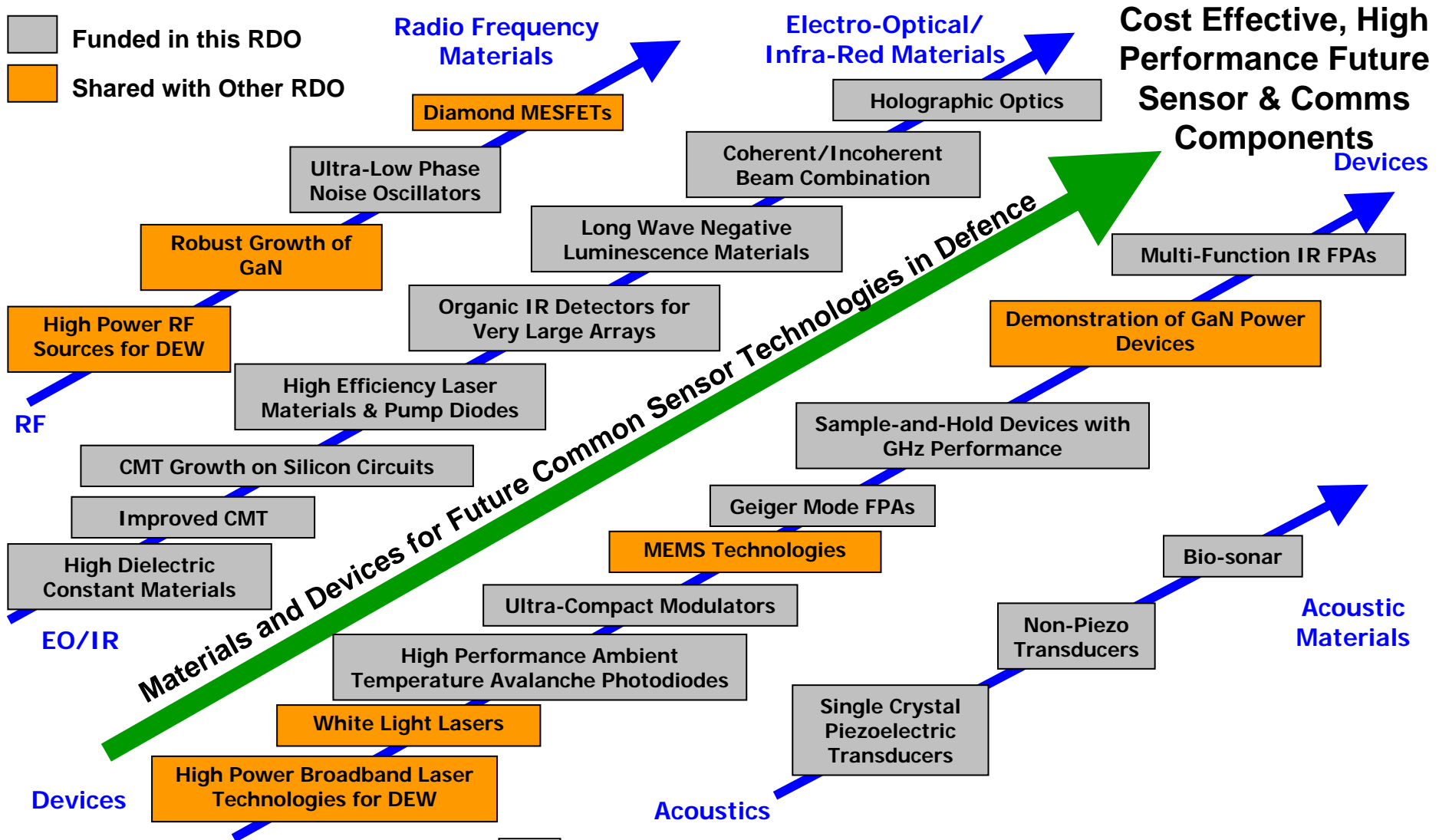
- *In terms of known targets / constraints / issues*
 - *Rather than detail description of delivery mechanism*





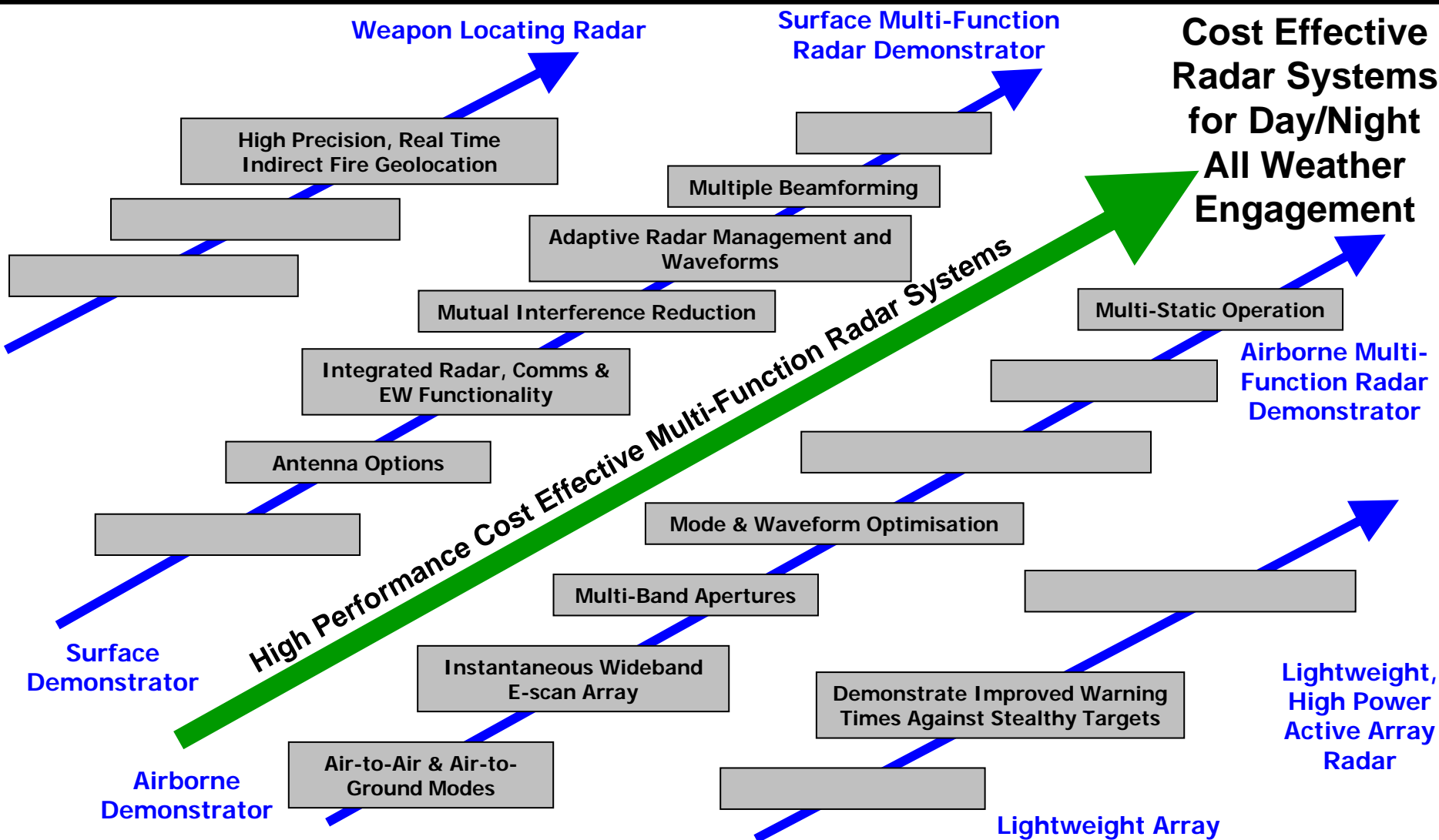
RDO: Sensor Electronic Materials and Devices

- Funded in this RDO
- Shared with Other RDO



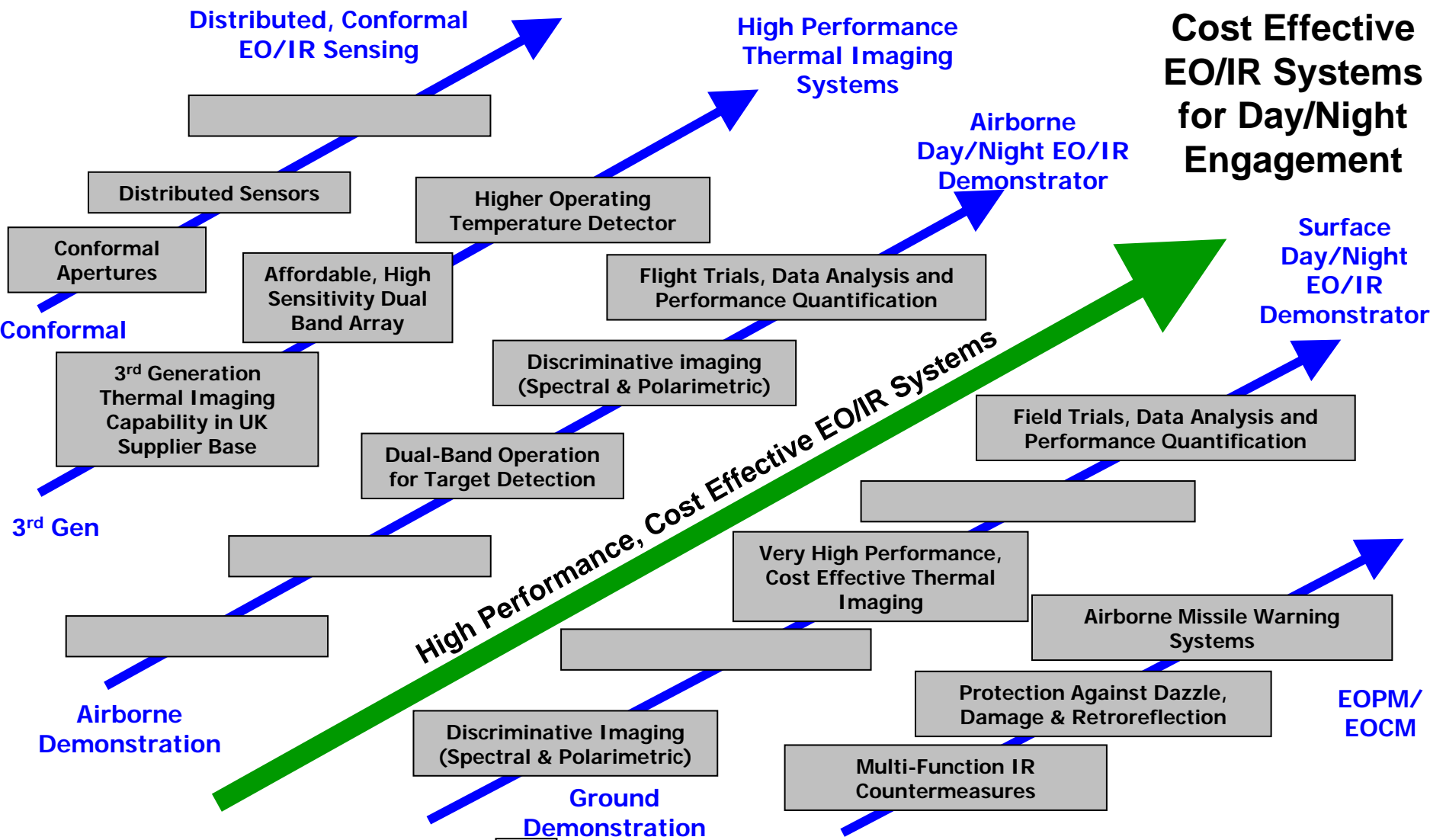


RDO: Radar Systems



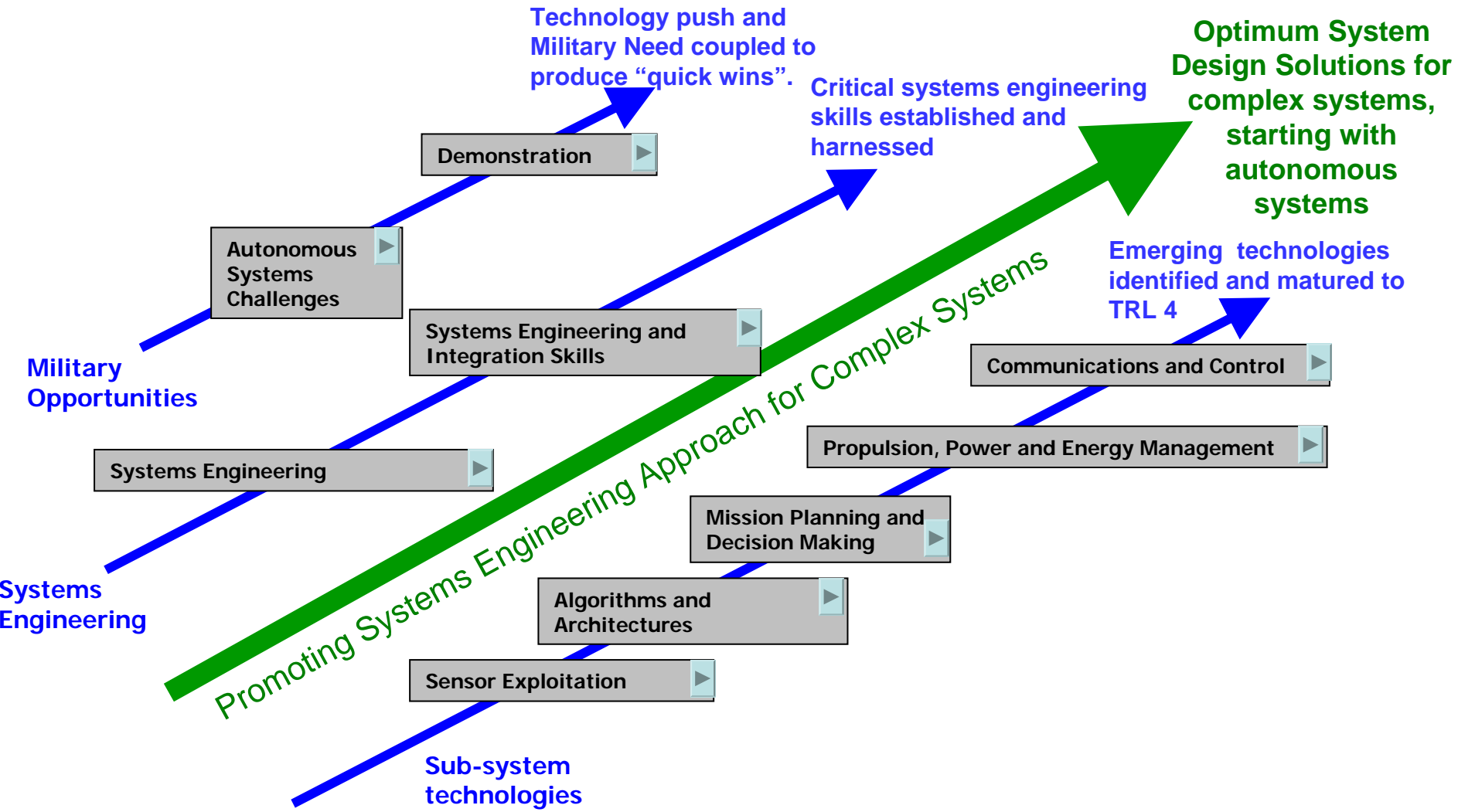


RDO: Electro-Optic/Infra-Red Systems



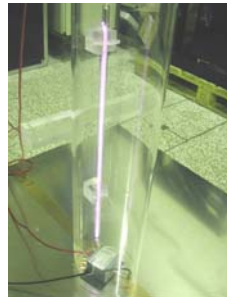
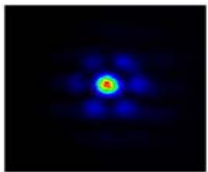
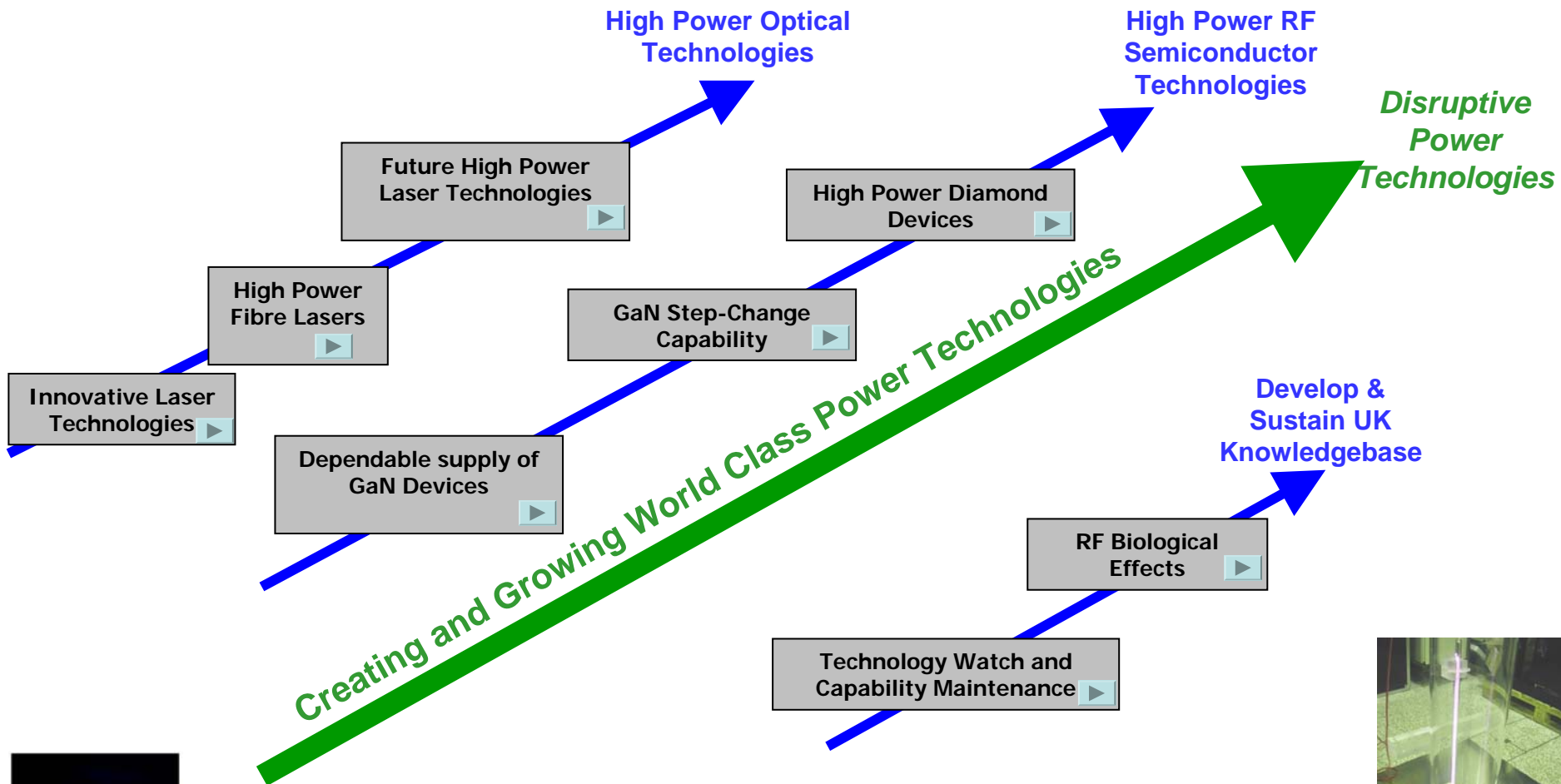


Example DTP Domain: S+T Challenges - Systems Engineering and Unmanned Systems



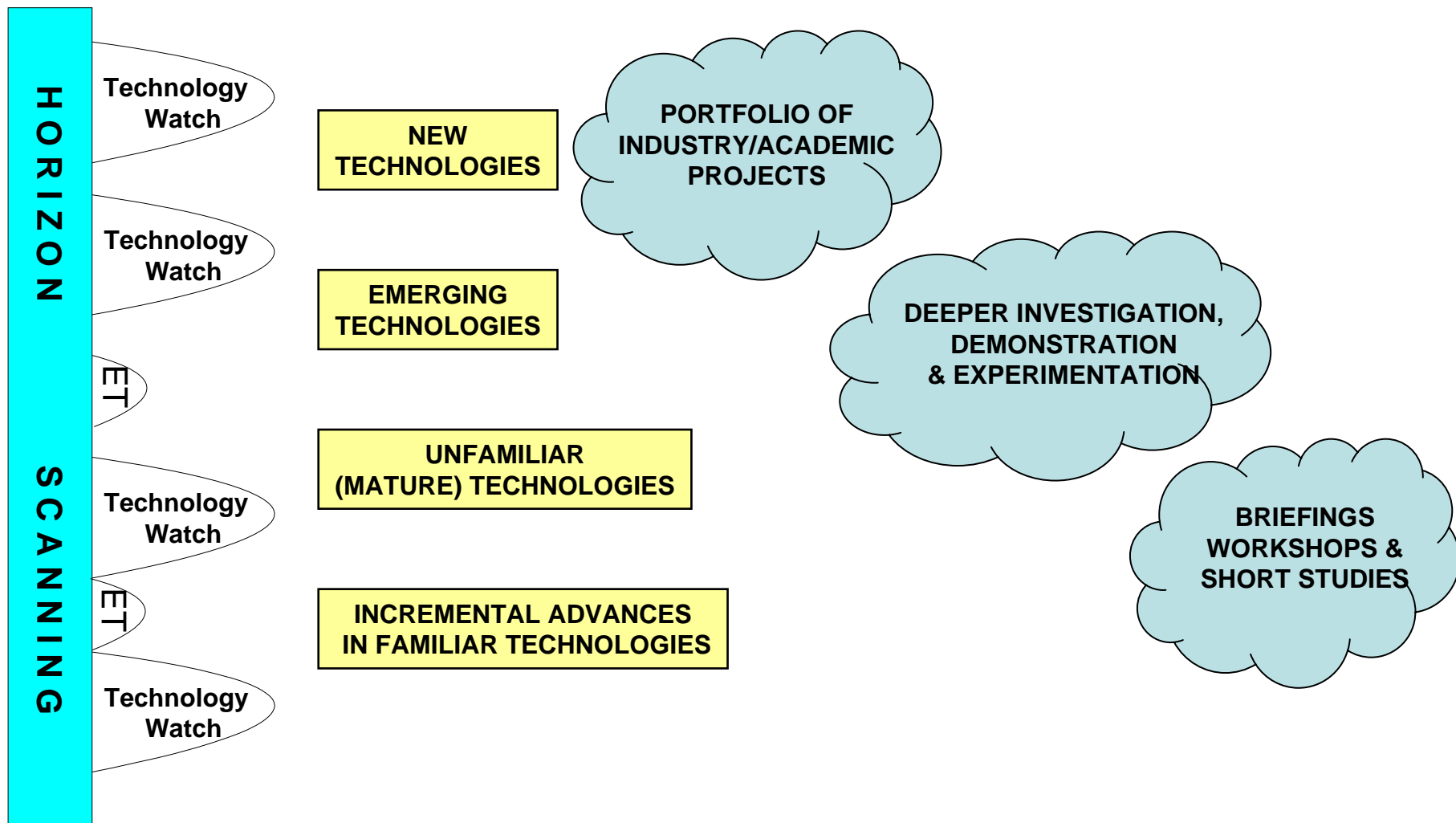


S&T Challenge: Disruptive High Power Technologies





Example DTP Domain: Emerging Technologies



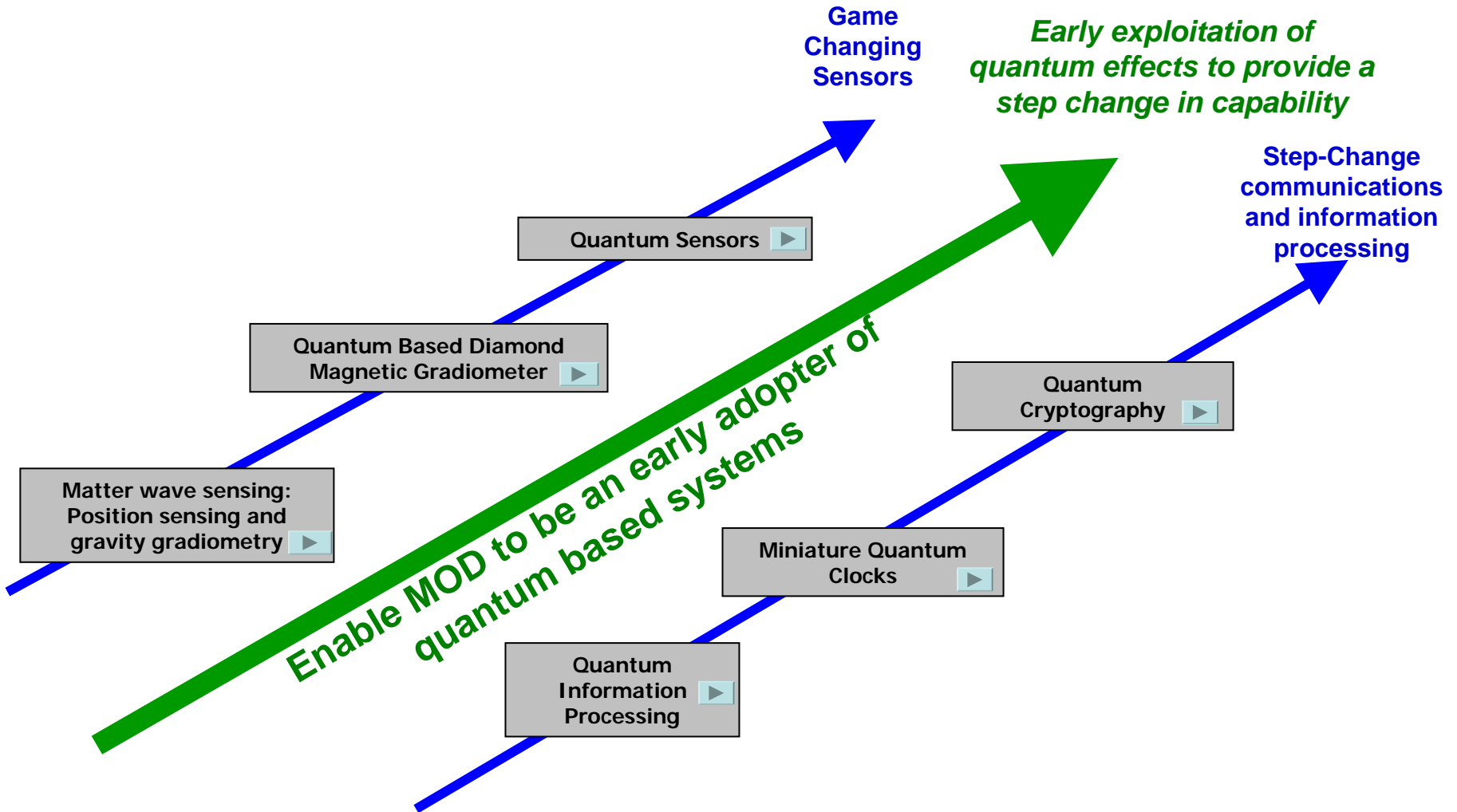


Emerging Technology Themes Strawman for Tranches

- The Technology Themes grouped into tranches, each consisting of 3 - 4 themes
 - Tranche 1:
 - Micro and nano technologies
 - Emerging quantum technologies
 - Advanced electronic and optical materials
 - Tranche 2:
 - Future computing
 - Energy and power
 - Data and information technologies
 - Tranche 3:
 - Autonomy
 - Human focussed
 - Advanced materials
 - Tranche 4:
 - High power technologies
 - Bio inspired technologies
 - Novel sensors and sensor systems
 - Tranche 5
 - Emerging systems technology
 - Communications
 - Emerging biological science



Emerging Technologies: Quantum





Capability Visions

- Studies identified that we needed:

*“to achieve fresh approaches to future capability
the MOD must
articulate our challenges and vision in a way
that leads to innovation”*

- Capability Visions Mechanism Proposed



Purpose of Capability Visions

- Stimulate Innovation and Excitement for Defence S&T Across the Whole UK S&T Community
 - Especially Industry including non-conventional suppliers
- Tackle The High-Risk-High-Return Future Defence Challenges
 - Both Threats and Opportunities
- Encourage Suppliers to Seek New and Innovative Applications for Existing Technologies
- Facilitate MOD Leverage of External Investment
 - Guide Externally Funded Research Investment
 - Promote Collaboration With All Levels of Partners
- Hence Provide:
 - New, Disruptive, Battle Winning Capabilities For The Future
 - Radically Enhance Current or Planned Capabilities
 - Effectively Counter Future Threats



CVs Categories

- **“New Journeys”**
 - MOD faced with a major challenge that will seriously affect defence business
 - Reducing Dependency on Fossil Fuels
- **“New Solutions”**
 - An opportunity or threat exists to employ ‘disruptive’ technologies that offer real potential (or threat) and will challenge how we currently operate.
 - Exploiting Commercial Communication Developments
- **“New Ideas”**
 - A completely new approach to some aspect of defence capability
 - Beyond Armoured Fighting Vehicles.



Current CV Topics

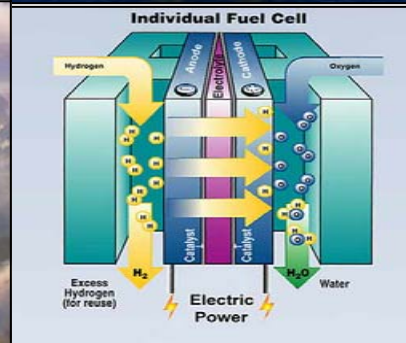
- Reducing the Load on the Dismounted Soldier
- Advanced Biometrics
- Reduced Dependency on Fossil Fuels
- Cyber Warfare Without Software
- Future Protected Vehicle
- Delivering Precise Effects at Distance
- Novel Air Capability
- Self-Sustaining Forces in Theatre
- Beyond Armoured Fight Vehicles
- Protecting Our Deployed Land Bases
- Cyber Forensics
- Exploitation of Commercial Communications

Capability Vision

Reduced Dependency on Fossil Fuels for Future Defence Operations

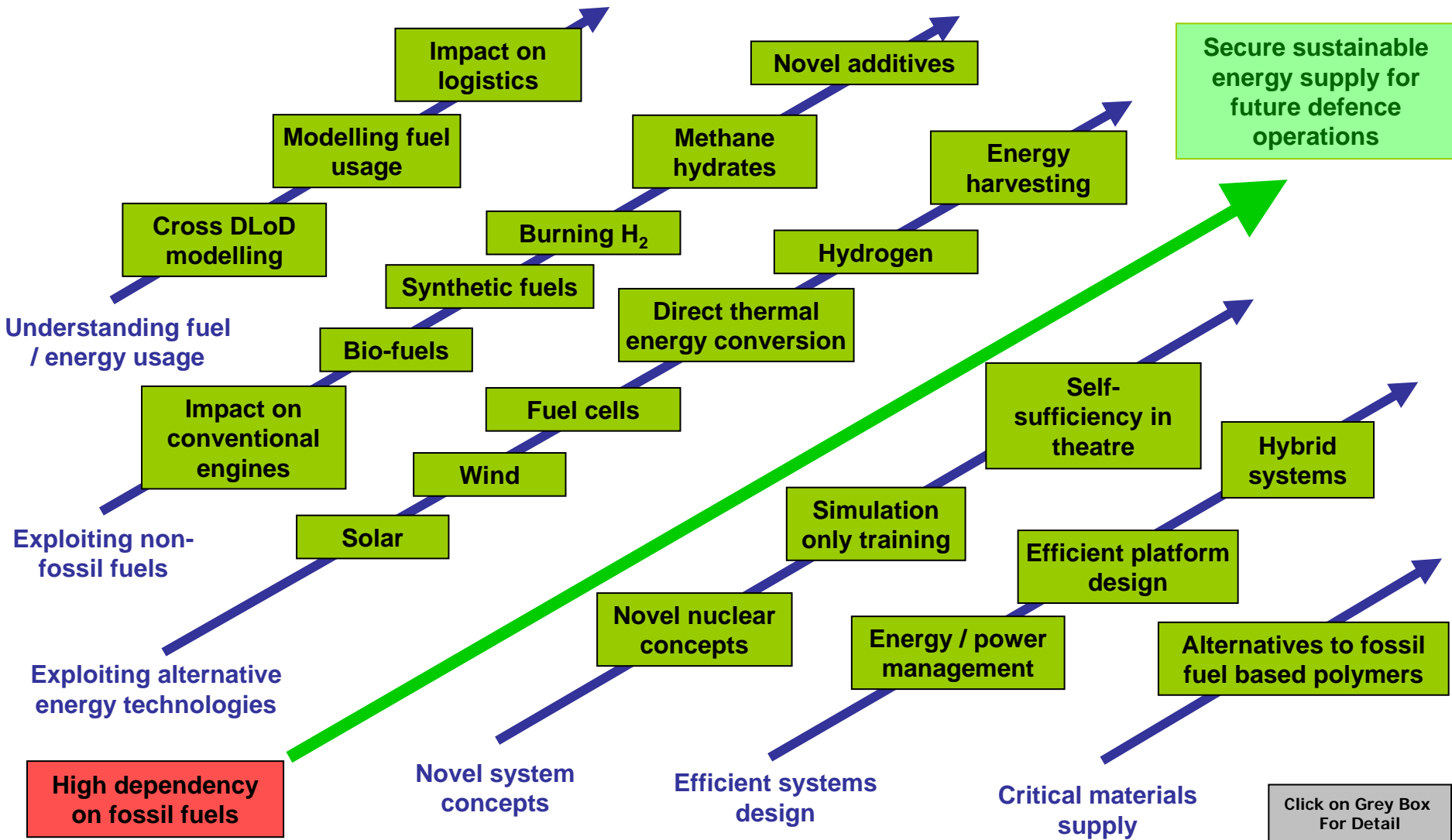
To establish the options for Future Energy supply for future defence forces and operations by investigating the impact and opportunities for exploitation of alternative energy sources and technologies as they develop in the civil market.

Innovation across all Defence Lines of Development will be necessary to achieve the overall objective.





Capability Vision: Reducing Dependence on Fossil Fuels

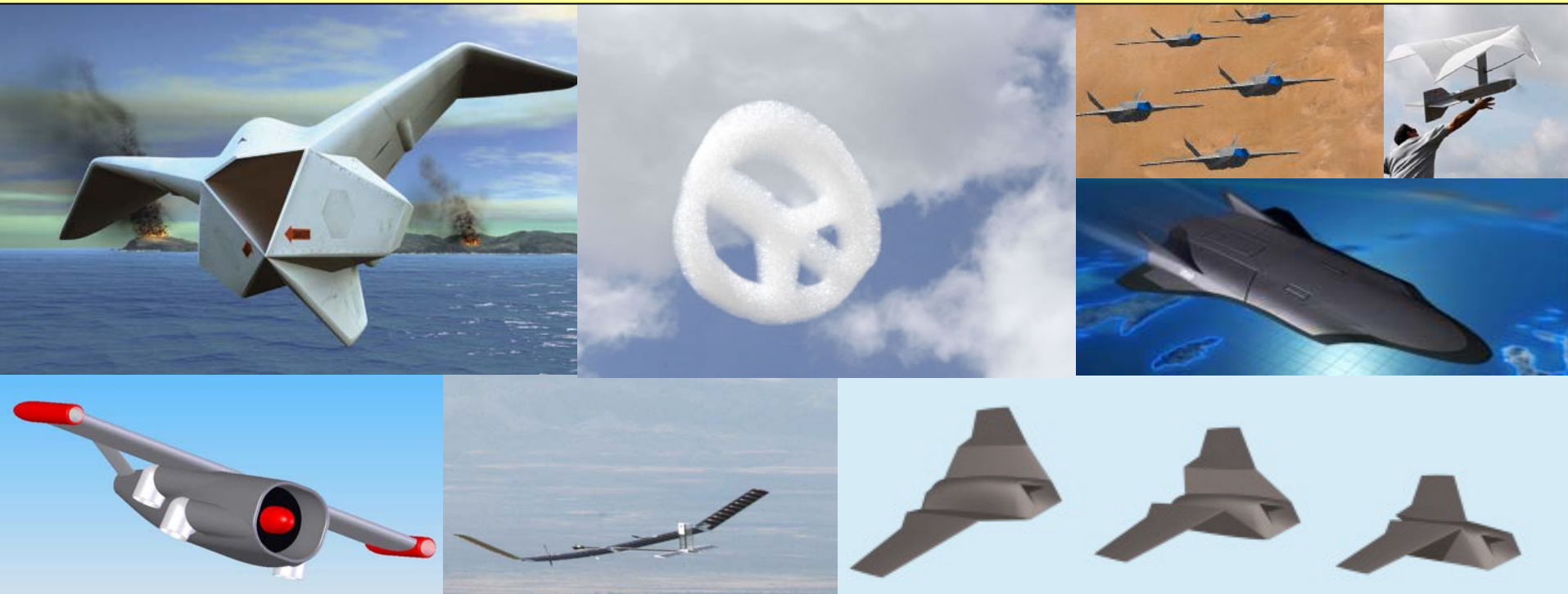


Capability Vision

Novel Air Capability

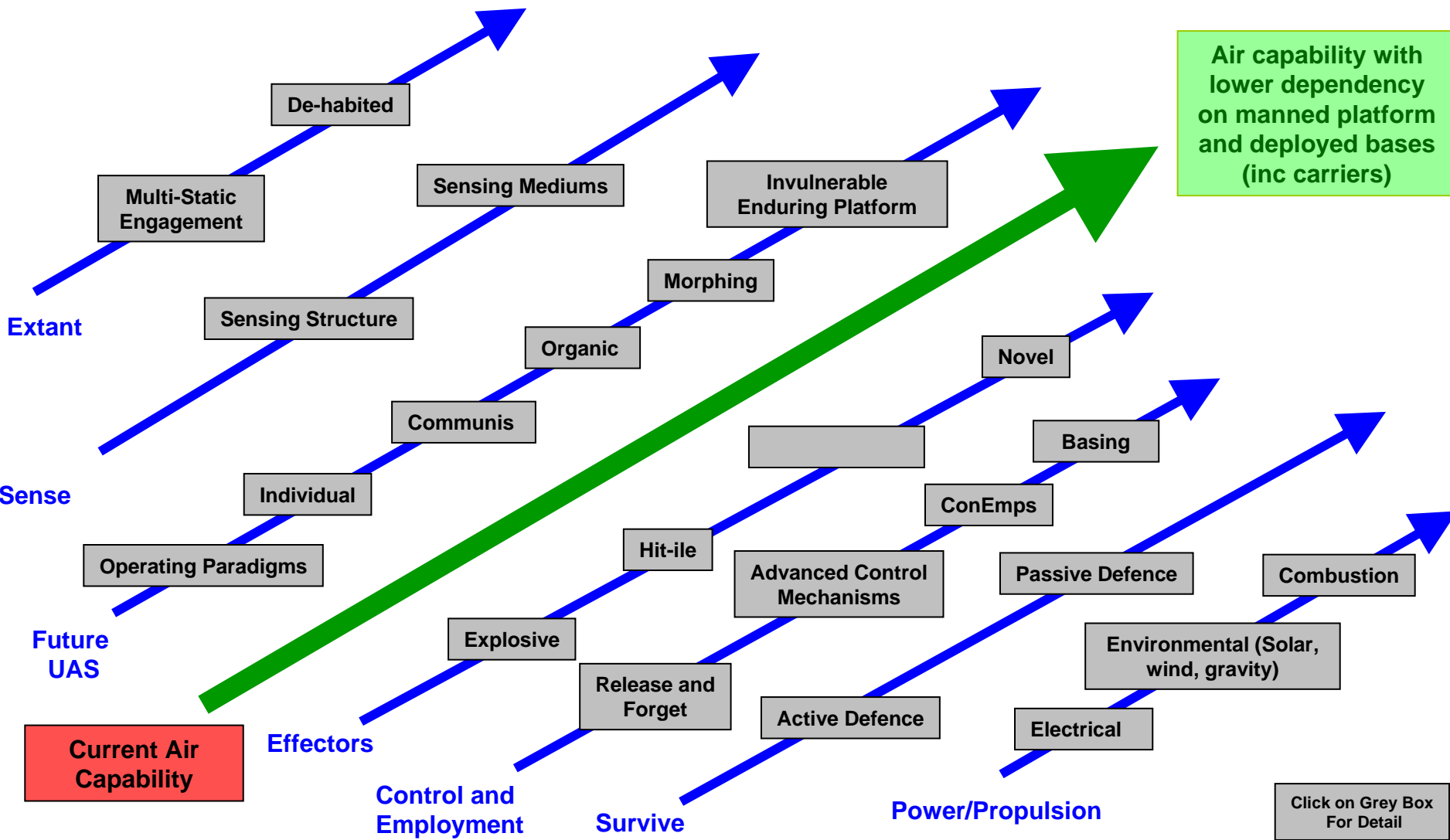
Provide a more cost-effective means of achieving the effects currently conceived as provided by manned aircraft by using new concepts in UAV/UCAV.

The specific effects under consideration are precision ground attack, air superiority over remote hostile territory and projection/support.





Capability Vision Novel Air Capability





DTP on the Web

DTP is web-based and made available in three stages:

- Draft Government version via RLI

December 2007

- Defence Industry version via RLI

April 2008

- Public version via Internet

Late 2008



The screenshot shows the 'Defence Technology Plan' website. At the top, there is a navigation bar with the text 'science | innovation | technology' and the title 'Defence Technology Plan'. A 'Login' link is visible in the top right corner. The main content area is divided into two columns. The left column contains a list of navigation links: 'Introduction', 'R&D Objectives', 'Capability Visions', 'Emerging Technologies', 'Strategic BoI', 'FAQs', 'How to get Involved', 'Acronym Buster', and 'Search Database'. The right column contains the 'R&D Objectives' section, which includes a description of high-level statements, a list of descriptors (Defence Benefit, Capability Target, Research Category, Stakeholders, Budgetary Costs), and a list of activity descriptors (Desired Outcome, Delivery Route, Timescales, Significant Milestones, Exploitation Path). There are three small images on the right side of the page: a rocket launch, a person working at a computer, and a ship at sea. At the bottom, there is a search bar with a 'Search' button and a dropdown menu set to 'All'.



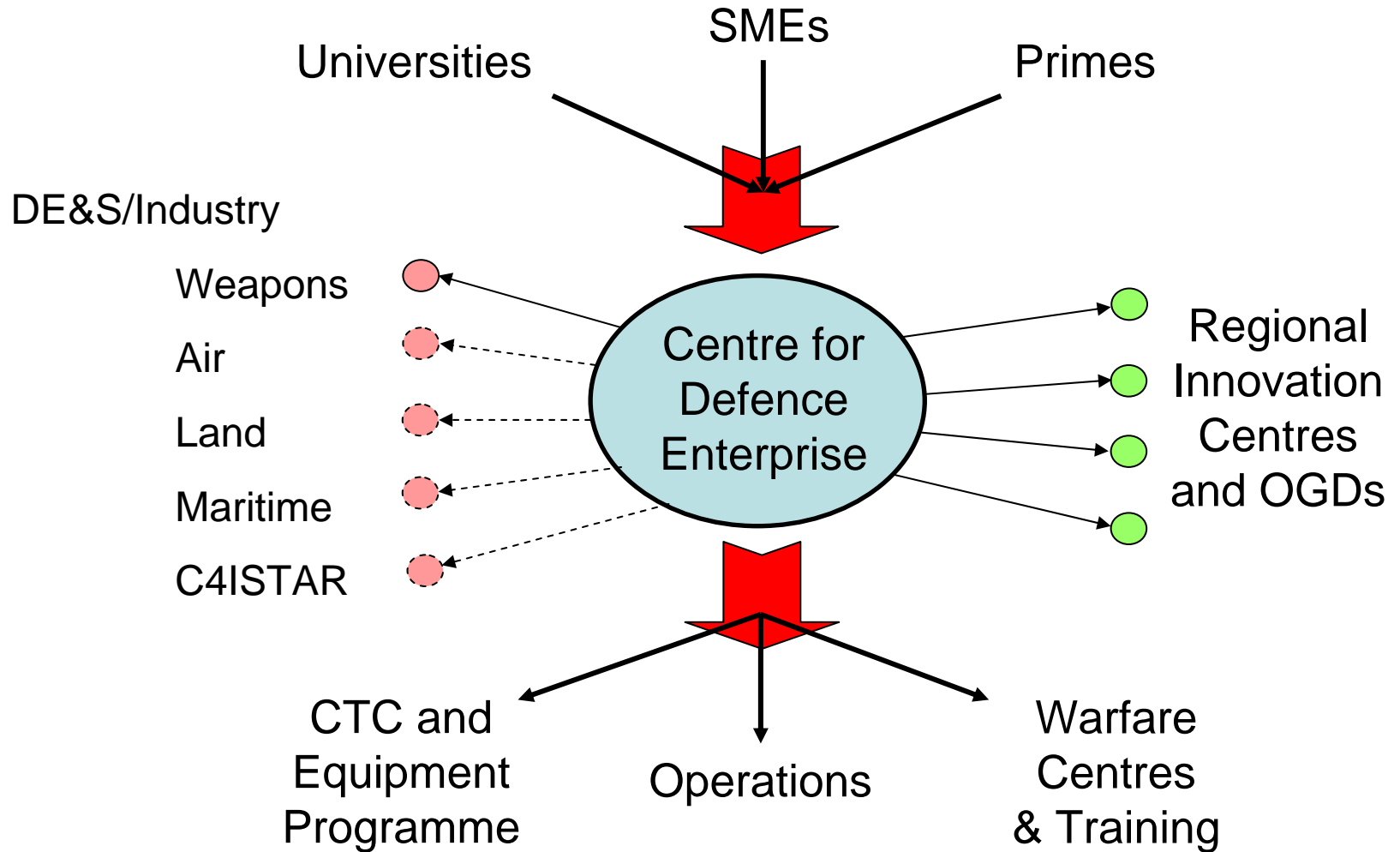
Questions?





Centre for Defence Enterprise

“First Point of Contact for all new ideas”





Enterprise Centre

- Single point gateway for new ideas from universities, SMEs, primes and non-defence industry.
- Fund proof-of-concept, seed-corn and incubation
- Funding up to £2M over 6 months evaluation period. Looking for joint funding with VCs and B-Angels
- Pull-through to incubation demonstration, equipment, support and OGDs/agencies E-submission and assessment process. Decisions/feedback 15 days after monthly cut-off.
- Workshops – 4th Thursday every month to engage universities/SMEs with operations, visions and DTOs