Mission

Battle Winning Technology for the Armed Forces to Support Operations Today and in the Future.

Presentation to EMRS and SEAS Conference June 2008

- Current Landscape
  - Where we have come from
  - Why Defence Research is vital
  - How we deliver to the frontline
- Successes in the DTCs
  - How they work
  - Effective delivery
  - Way Ahead

Defence Technology Innovation

- Years of relentless evolution and transformation :
  - PE controllerates, PAOs, CERN
  - R&D establishments, DRA, DERA, QinetiQ, Dstl
  - DCS, SDR, DPA, DLO
  - DIS, DACP, DE&S, DTIC
- SIT - Science Innovation and Technology

Why Invest in Science and Technology?

- To create UK-owned technology to benefit equipment
  - Gives us a battle winning edge (capability)
  - Prevents us relying on foreign sources (sovereignty)
  - Creates opportunities for industry investment (wealth creation)
- To support armed forces in operations today tomorrow and 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 an “insurance policy” and surge capacity for responding quickly to rapid changes in an uncertain world

Impact of Science and Technology On Warfare

Gyro-stabilised gun

Radar

GPS

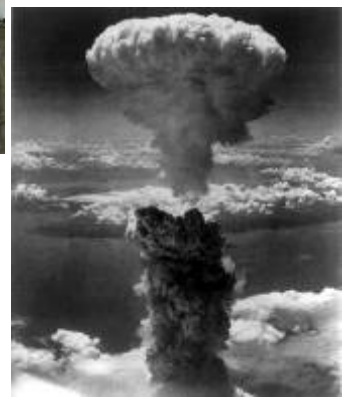
Chobham armour

Stealth, UCAS

Night vision

Sonar

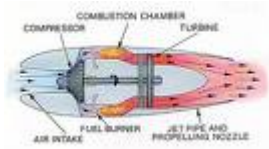
Information Technology



Nuclear Science

Precision guided munitions

Electronic warfare



Gas turbine

Impact of Science and Technology Beyond Defence

Penicillin

Automotive engineering, Production engineering

Motorways

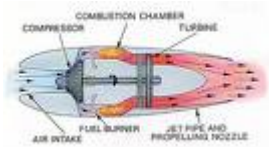
Information Technology, The Internet

Computerised medical imaging

Cellular Telephony

Consumer Electronics

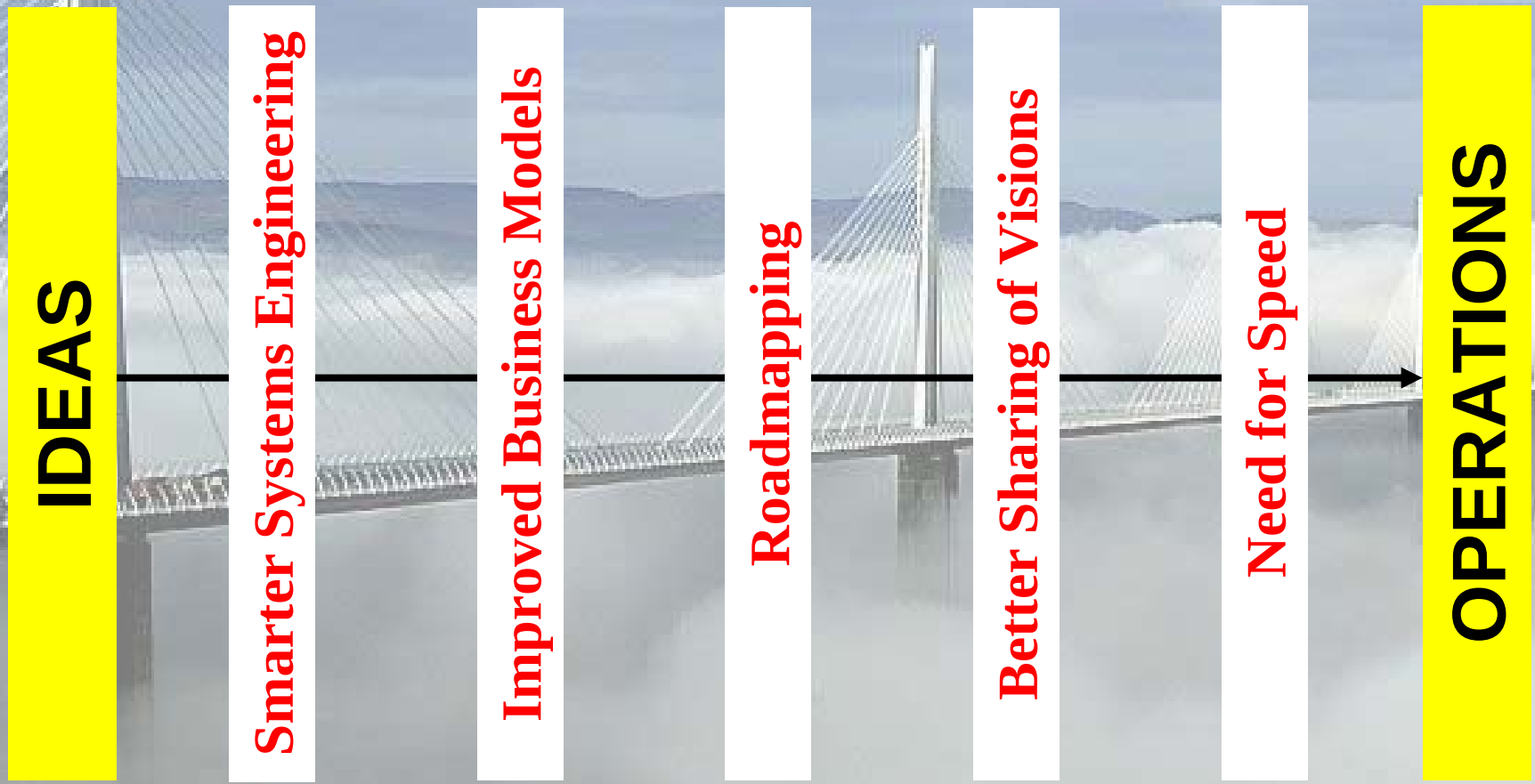
Nuclear science



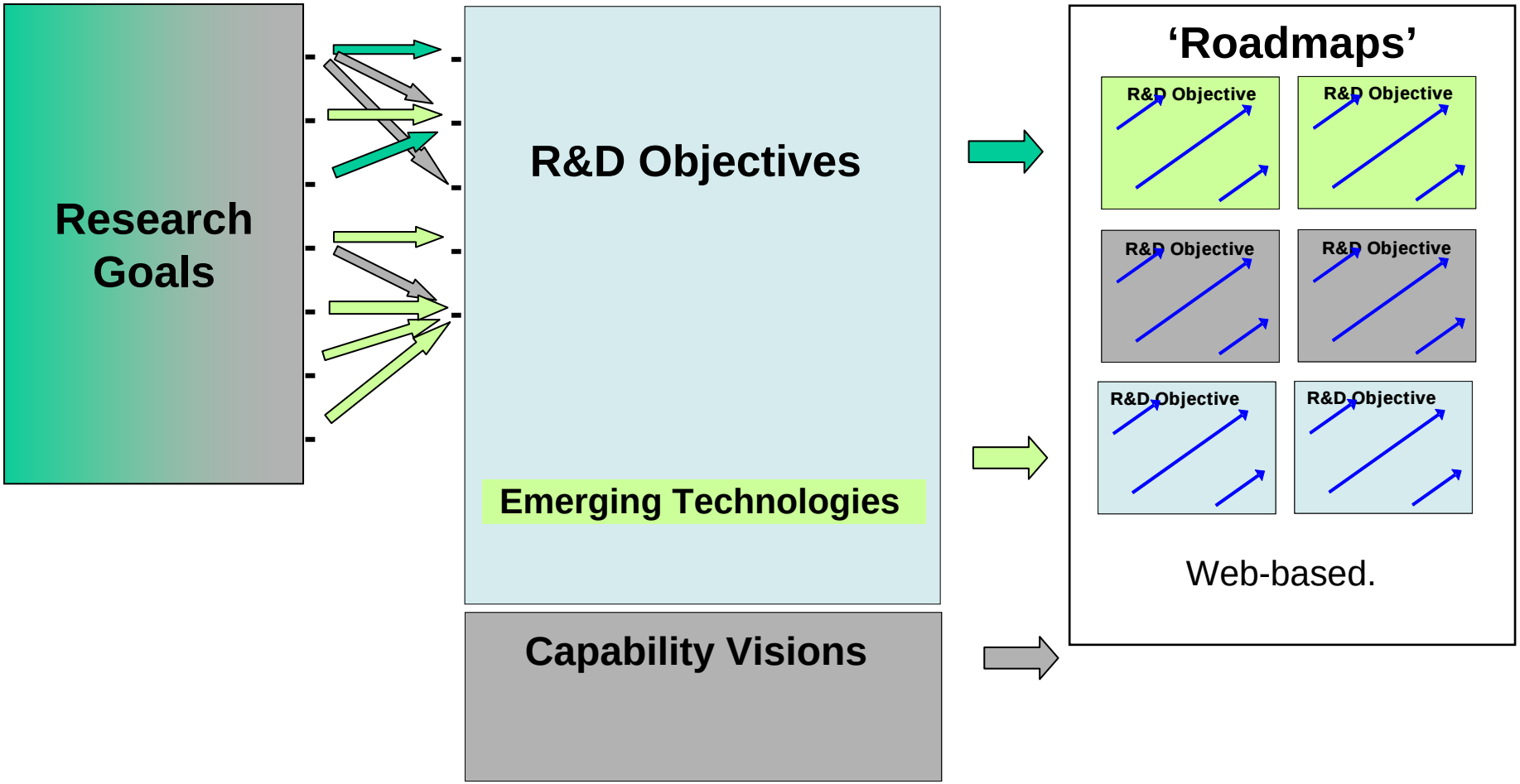
Gas turbine

GPS

INNOVATION BRIDGE



Defence Technology Plan

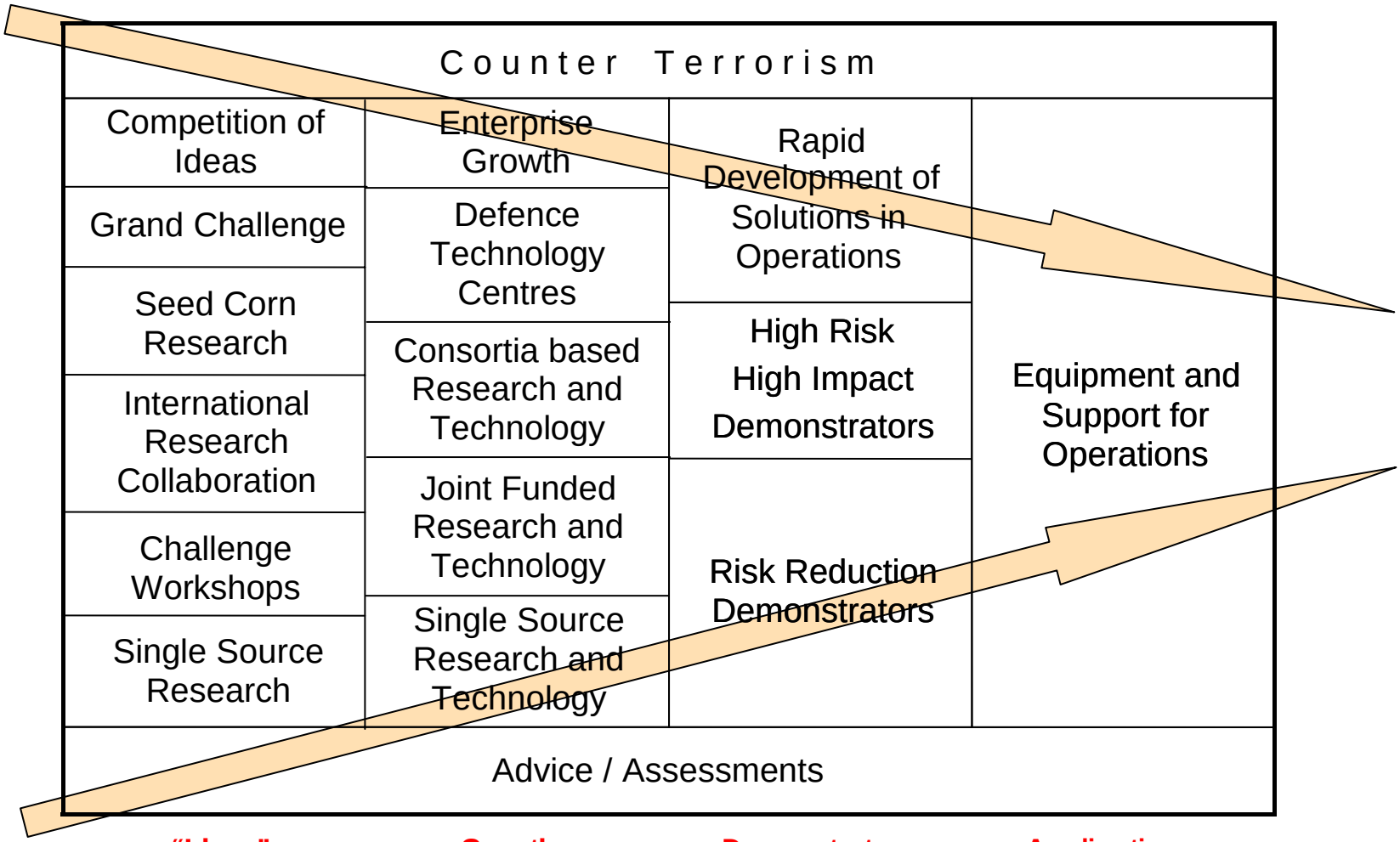


Equipment & Support Supply Chain

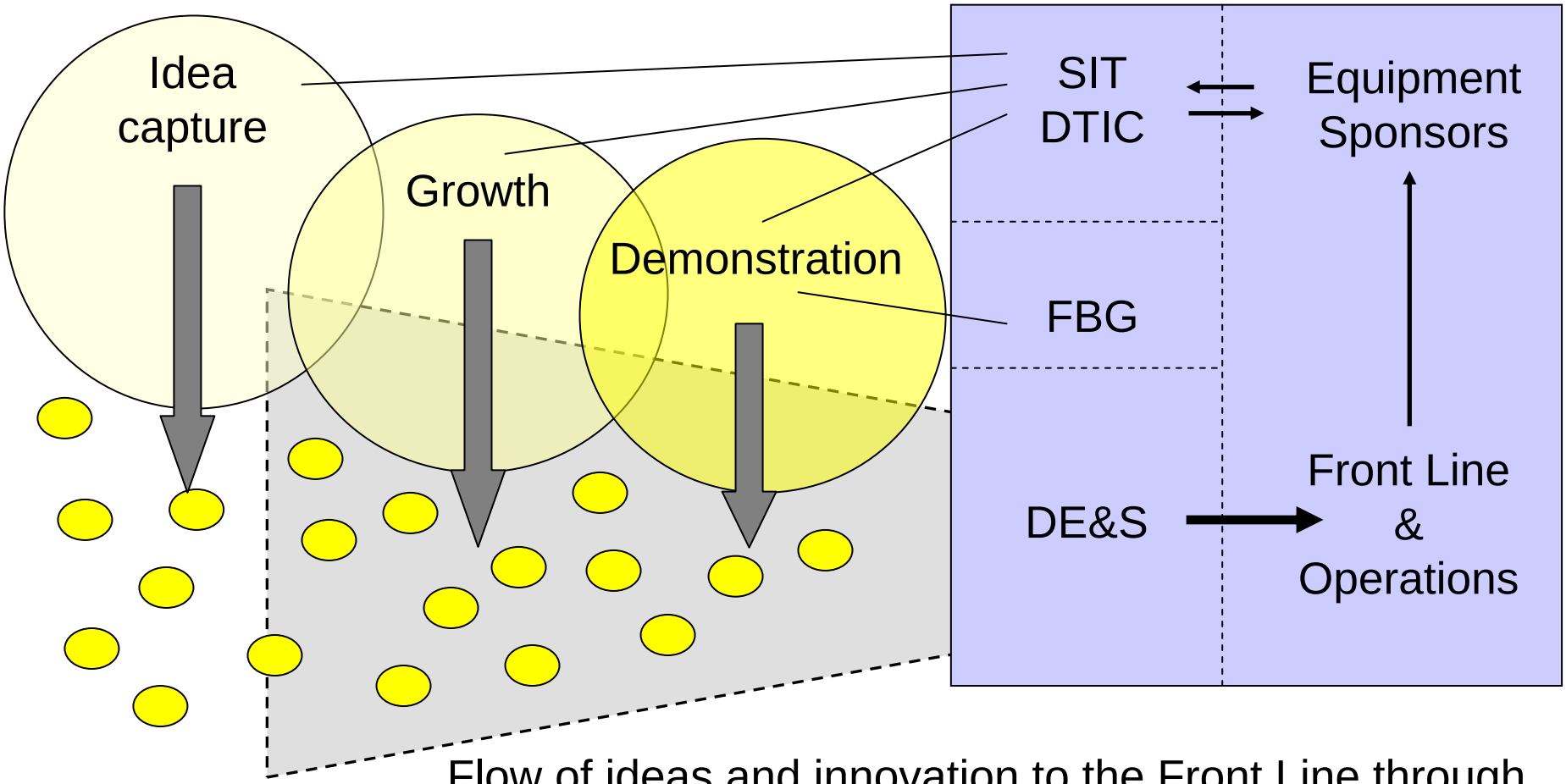
Challenges

- Leading edge technologies into current and future systems
- Support to operational and non-operational decision making
- Capturing ideas from wider UK Plc
- Exploiting opportunities for UK wealth creation and overseas markets
- Development of commercial business models
- Technology capture, growth and development

S&T Operations Delivery Model



Supply Chain Framework



Flow of ideas and innovation to the Front Line through the Supply Chain & Equipment Programme

DTCs How They Work

- Joint Primes/Non Primes
- Joint funding – 50/50
- Competing open calls to get the best ideas
- Contracting with universities and SMEs
- Creating enduring skills and knowledge
- Integrated into the Prime/Tier one supply network

DTCs - EMRS and SEAS

- EMRS
  - Research/demonstrate innovative and cost-effective sensor technologies in any parts of the EM spectrum
    - Detect, identify, locate – accurate and timely
    - Longer range and all weather – with agility
    - Air, land, sea and space
- SEAS
  - Novel technology-based system to support the advancement of autonomous military vehicles.
    - Reduce exposure of UK Forces, reduce workloads
    - Improved performance – size, weight, persistence, agility

SEAS Highlights

- Novel recuperator for UAV gas turbines – 15% fuel efficiency improvement for no weight penalty
- Robust Communication
- Automatic landing for UAVs
- Work on the legal, cultural and trust issues
- Learning from bats – new sonar and radar waveforms
- Developing algorithms to aid decision making and human machine relationship

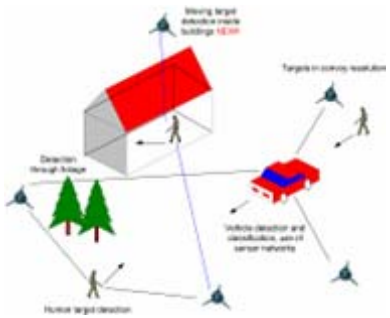
EMRS Highlights

- Detection of targets behind hills, inside buildings or hidden by trees
- Multifunction systems that reduce payload size and mass
- Novel ‘multiple output multiple input’ radars for UAVs, longer range force protection
- IED detection
- All weather senor performance
- Super-resolution video imagery – exploited with Wescam
- Advanced algorithms for tracking moving targets

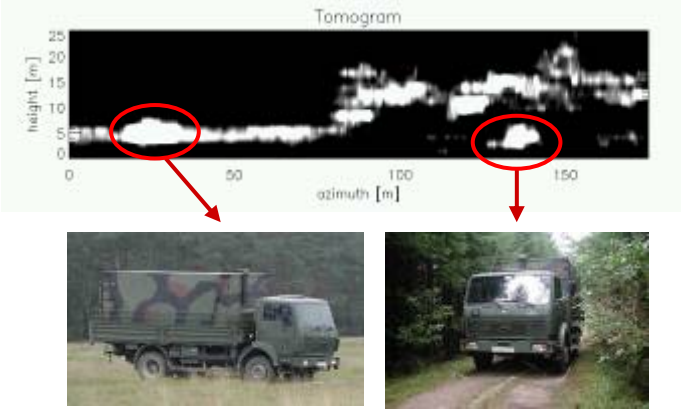
EMRS DTC Highlights

RF-related technologies and electronic device research

- Demonstration of unmanned sensor networks exploiting low-frequency forward scatter radar for the detection of moving targets behind hills and inside buildings. Provides improved situational awareness, with automatic target classification

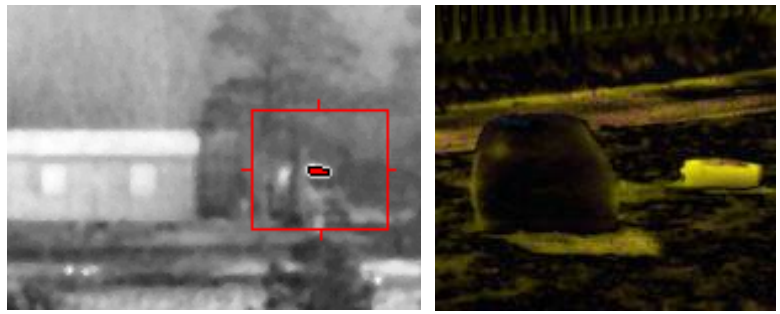


- Demonstration of effectiveness of SAR tomography for locating military targets hidden under the tree canopy

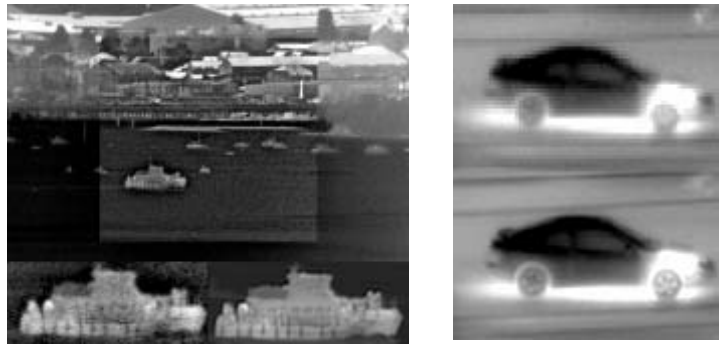


Electro-optic related sensors and their exploitation

- Demonstration of discriminative imaging techniques for the location of military targets hidden behind tree lines and for IED/mine detection using a compact camera system easily exploitable for current military operations



- Technique developed to achieve super-resolution in video imagery - applied to IRST data taken within AWE AIMMS programme and ASRAAM seeker datasets - being exploited through Wescam



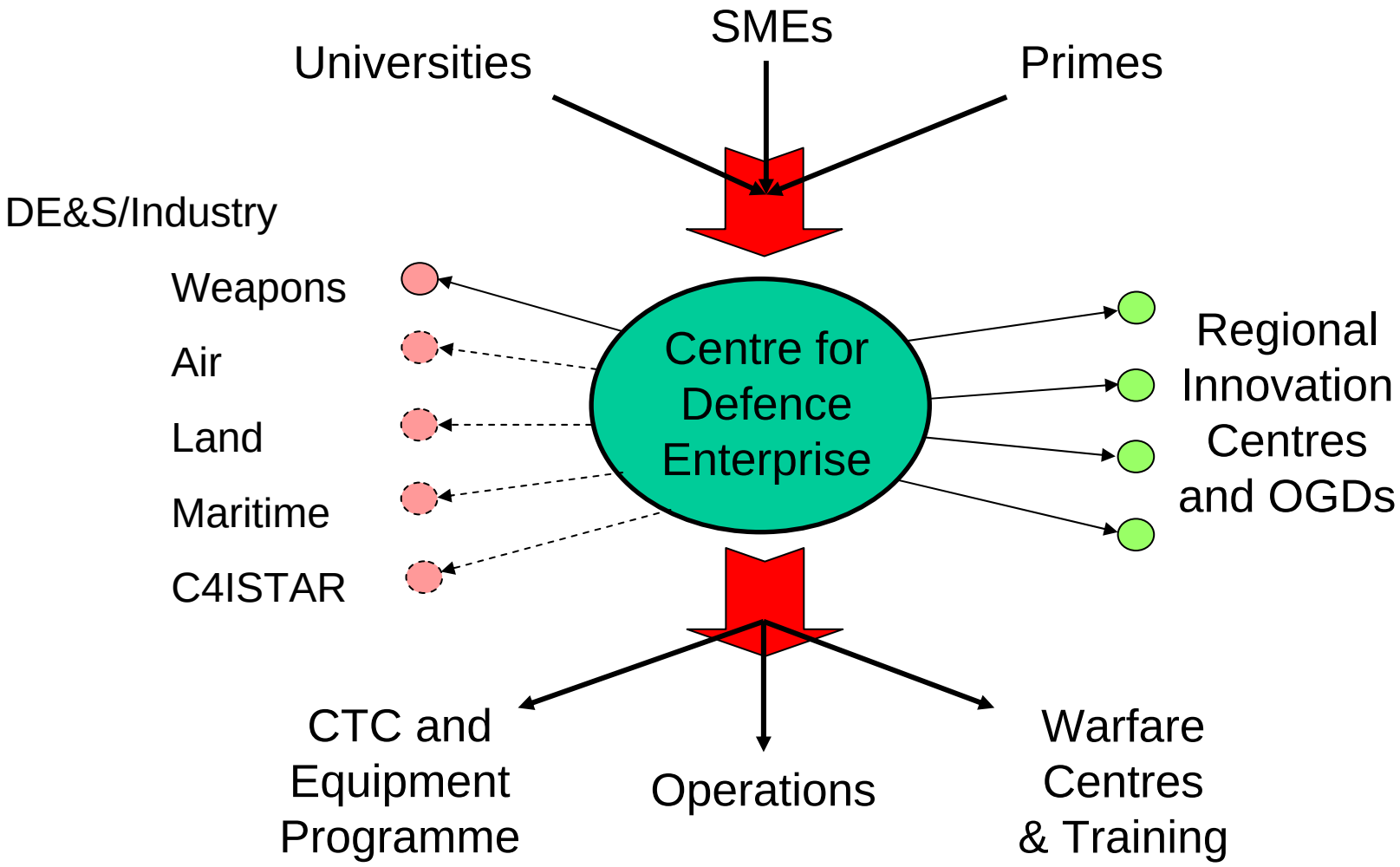
DTCs – Way Ahead

Taking DTC model and expanding

- Increase TRL level
- Developing additional Centres to cover other key areas of the technology/systems map.
- Common Performance Assessment Framework (PAF) across the research programme
- Openness and responsiveness (speed)
- Close relationships with DE&S Clusters and associated supply chains
- We will continue Centres in EMRS and SEAS areas – with expanded agenda and responsibilities.

Centre for Defence Enterprise

"First Point of Contact for all new ideas"



Overall Direction of Travel

- Clear research priorities
- Clear critical technologies
- Open systems and open architectures
- Agile and rapid pull-through
- Growth and continuity of skills and experience
- Non-defence applications and wealth creation
- New business models and IP arrangements
- New sourcing arrangements

"Problems cannot be solved by thinking in the framework in which the problems were created."

Albert Einstein