

**Professor Robert Clark**  
**Chief Defence Scientist &**  
**Chief Executive Officer**

**Defence Science & Technology Organisation**  
**Department of Defence**  
**Australia**

**10<sup>th</sup> Annual SET Conference**

**21 April 2009**

**The Australian Perspective**

**Unclassified**

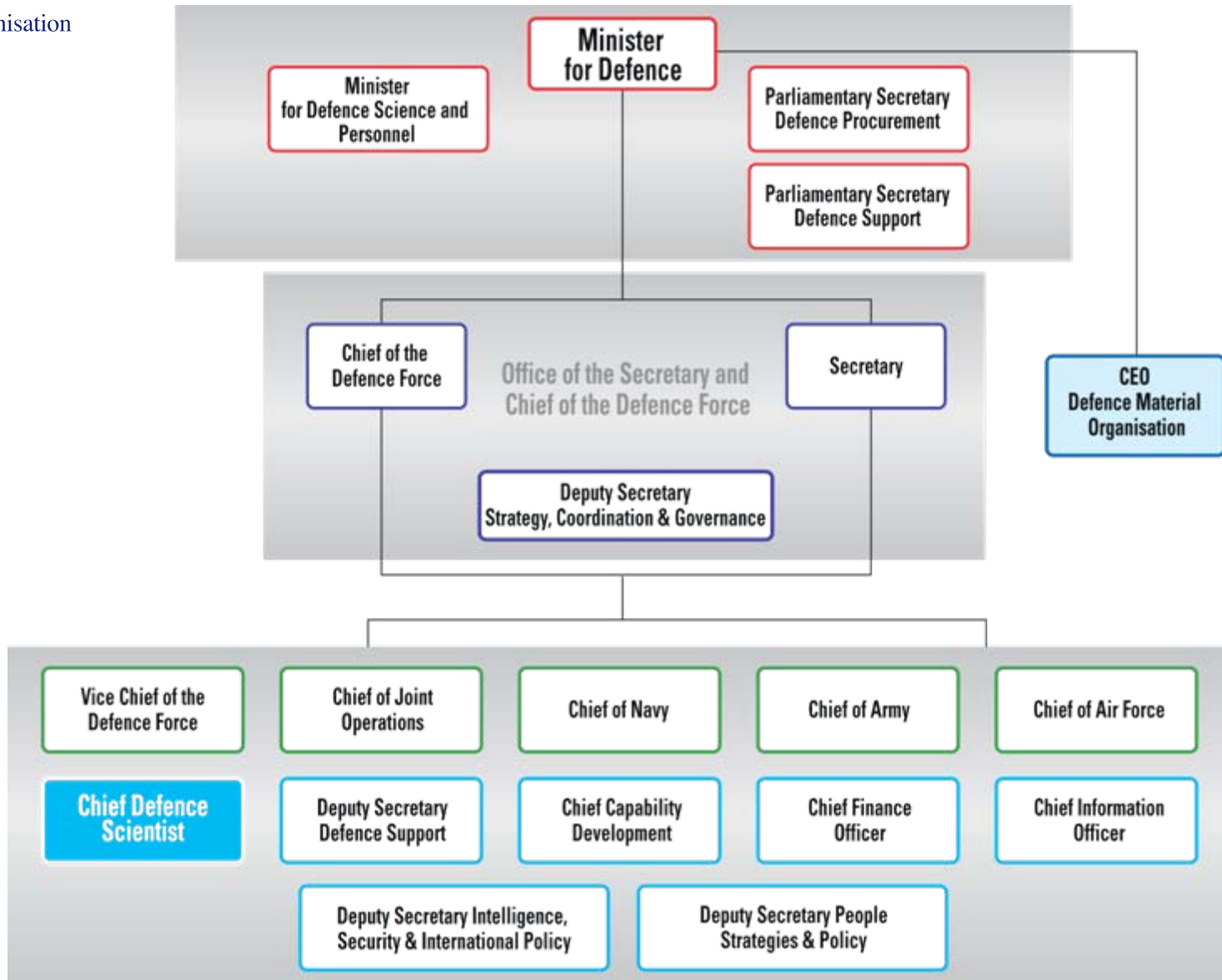


# DSTO at a Glance

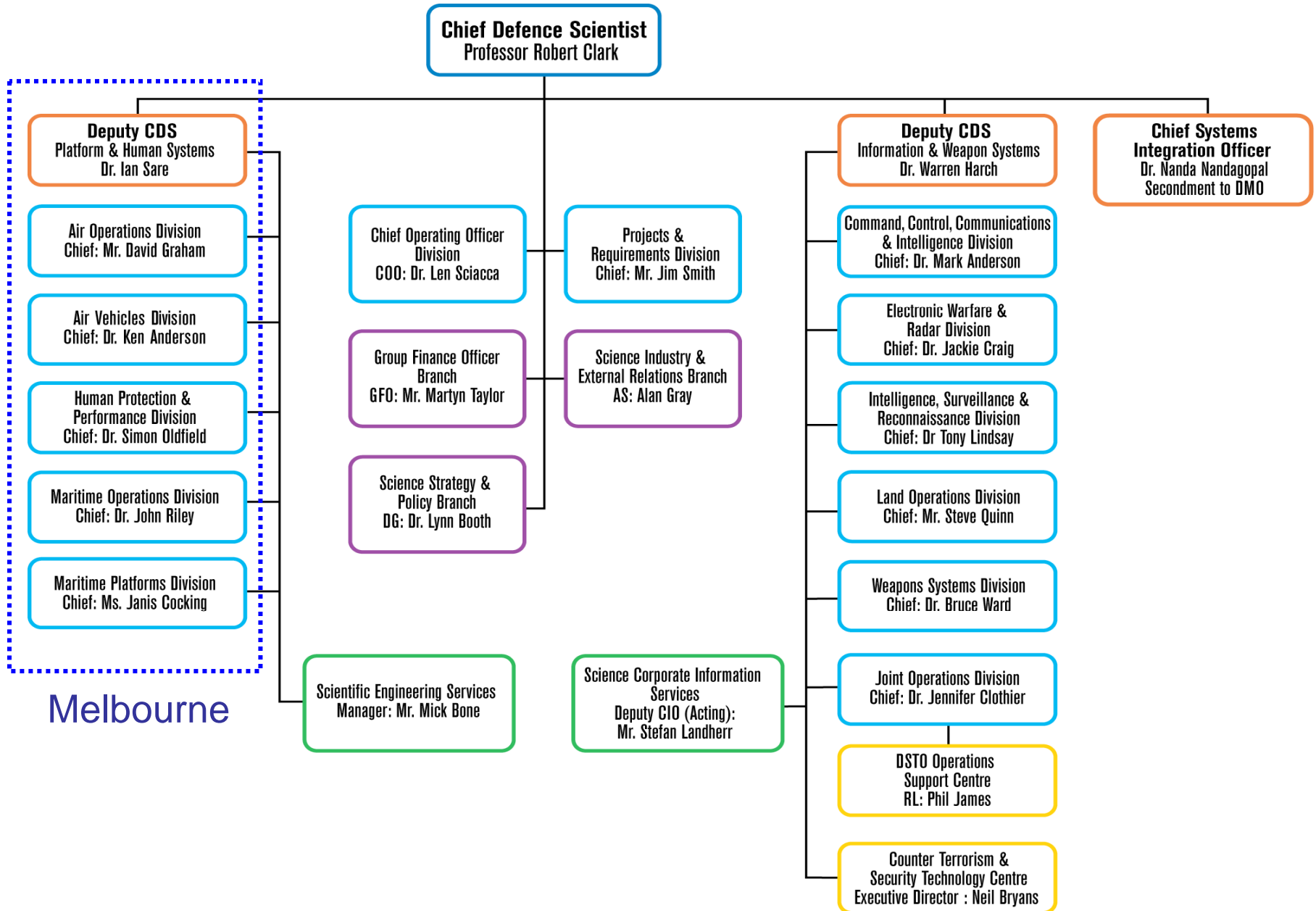




# DSTO in Defence



# DSTO Structure



# DSTO Structure

**Chief Defence Scientist**  
Professor Robert Clark

**Deputy CDS**  
Platform & Human Systems  
Dr. Ian Sare

**Air Operations Division**  
Chief: Mr. David Graham

**Air Vehicles Division**  
Chief: Dr. Ken Anderson

**Human Protection & Performance Division**  
Chief: Dr. Simon Oldfield

**Maritime Operations Division**  
Chief: Dr. John Riley

**Maritime Platforms Division**  
Chief: Ms. Janis Cocking

**Scientific Engineering Services**  
Manager: Mr. Mick Bone

**Chief Operating Officer Division**  
COO: Dr. Len Sciacca

**Group Finance Officer Branch**  
GFO: Mr. Martyn Taylor

**Science Strategy & Policy Branch**  
DG: Dr. Lynn Booth

**Projects & Requirements Division**  
Chief: Mr. Jim Smith

**Science Industry & External Relations Branch**  
AS: Alan Gray

**Science Corporate Information Services**  
Deputy CIO (Acting):  
Mr. Stefan Landherr

Canberra

**Deputy CDS**  
Information & Weapon Systems  
Dr. Warren Harch

**Command, Control, Communications & Intelligence Division**  
Chief: Dr. Mark Anderson

**Electronic Warfare & Radar Division**  
Chief: Dr. Jackie Craig

**Intelligence, Surveillance & Reconnaissance Division**  
Chief: Dr. Tony Lindsay

**Land Operations Division**  
Chief: Mr. Steve Quinn

**Weapons Systems Division**  
Chief: Dr. Bruce Ward

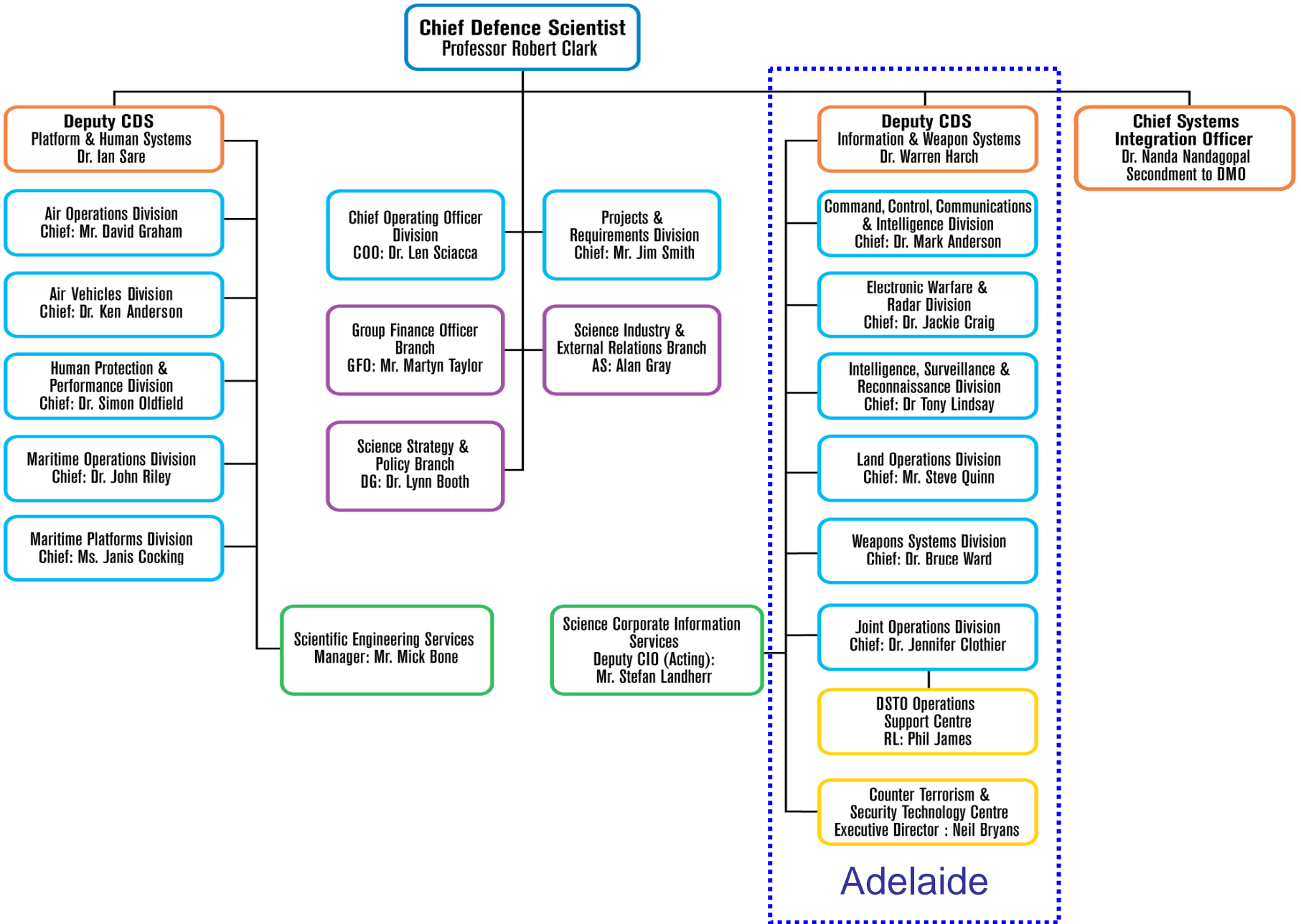
**Joint Operations Division**  
Chief: Dr. Jennifer Clothier

**DSTO Operations Support Centre**  
RL: Phil James

**Counter Terrorism & Security Technology Centre**  
Executive Director : Neil Bryans

**Chief Systems Integration Officer**  
Dr. Nanda Nandagopal  
Secondment to DMO

# DSTO Structure





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# DSTO Major Facilities



Adelaide



Melbourne



# Selected DSTO Achievements /1

- JORN Phase 5 Enhancement Program
- F/A-18 Hornet Structural Testing







# Selected DSTO Achievements /2

- “Shapes Vector”  
Network Security



- Nulka





# DSTO Role

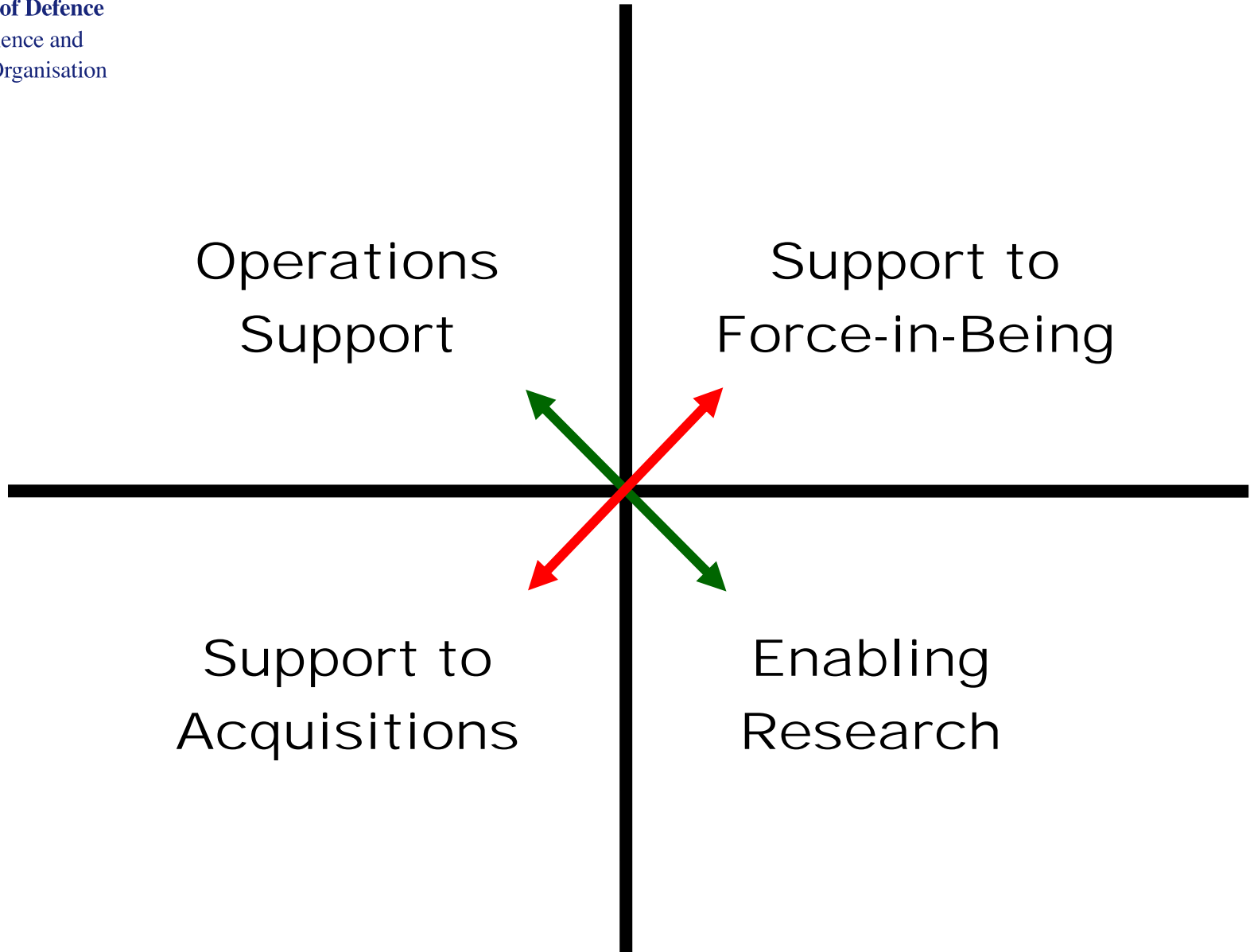
- Enhance Australian Defence and national security **operations**
- Support the **sustainment** of in-service capabilities
- Deliver key advice and technology solutions for **future capability**
- Build Defence capacity through partnerships with **industry**





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# DSTO Focus





# I: Support to Operations /1

- Deployed Operations Analysts (OA)
  - DSTO responsible for raising, training and deploying two-person OA teams on ADF operations
  - > 60 personnel deployed to 7 countries since 2005
  - Currently maintain 4 teams around the globe
- Operational Reachback Program
  - Link between deployed analysts and broader defence science community
  - Set of dedicated and committed staff available to respond to requests for science and technology assistance





# I: Support to Operations /2

## Headquarters Joint Operations Command (HQJOC)



## Joint Task Force Headquarters



## Fighting Elements



## DSTO Contributions



Battlelabs



Deployed scientists



Technology insertion



## II: Operational Support for ADF Platforms

- Maximising operational effectiveness
- Support to capability enhancements
- Position for the future



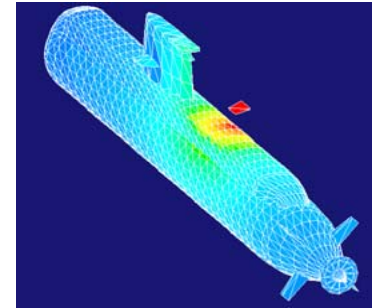


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## II: Shock Trial of HMAS Rankin

**Outcomes:** Validated static & dynamic structural performance

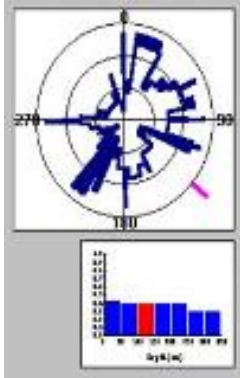
R&D advice to support safety, reliability & functionality





# II: Signature Management

## Threat Analyses



## Measurement

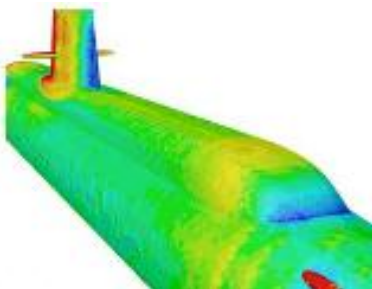


## Analysis

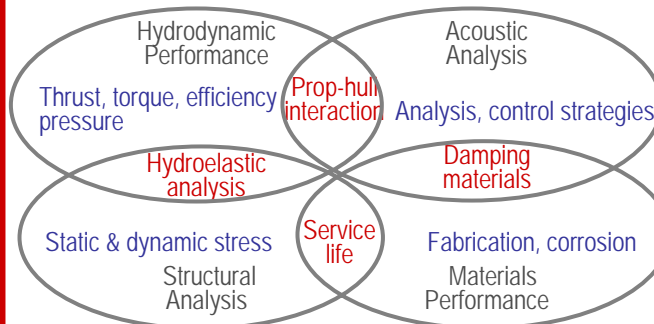


Provides essential information for complete signature awareness and management

## Modelling



## Propeller design



## Control







## II: Support of F/A-18 Structure

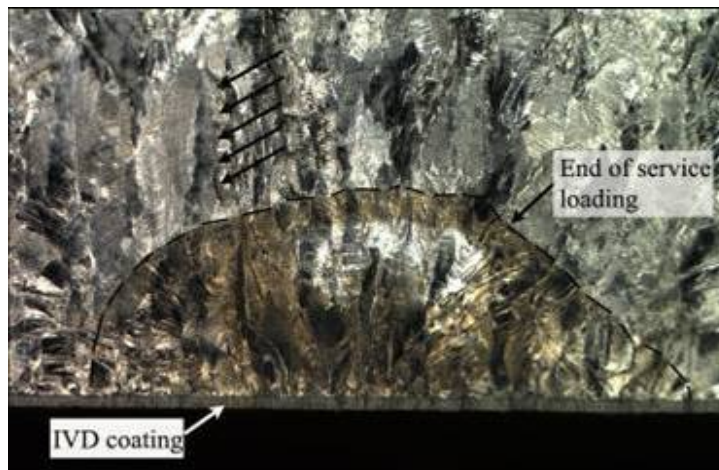
### Flaw Identification through Application of Loads

- Risk Mitigation program supporting RAAF fleet late in life.
- Damage enhancement testing, and teardown, of retired centre barrels.
- Assesses potential for wide spread fatigue damage and environmental degradation.
- Build confidence by comparing FINAL locations to known Damage Item Locations (DILs).
- Re-Assess safe life limits at DILs

- Improve fatigue crack growth modelling
- Combined with fleet management

#### Outcomes:

- Improved operational flexibility
- Improved availability
- Large cost savings - less centre barrels replaced



Fracture surface of bulkhead



FINAL Test  
Centre Barrel in test rig



## III: Support to Acquisitions

SEA 1000  
Future  
Submarine

SEA 4000  
Air Warfare  
Destroyer

AIR 6000  
New Air  
Combat  
Capability

LAND 400  
Combat  
Vehicles



## IV: Enabling Research

- Cyber
- Electronic Warfare
- OTHR
- Hypersonics
- CIED – Force Protection
- Signature, Power and Energy
- USW
- UAS
- Systems Integration





# Collaborating to Innovate

- **Rapid Prototyping, Development and Evaluation Program (RPDE)** – collaborating with Australian Industry.
- **Defence Future Capability Technology Centre (DFCTC)** – linking government, research agencies and industry to develop Defence capability.
- **Centres of Expertise (CofE)** – helping universities to focus on research and technology areas of interest to Defence.
- **Capability Technology Demonstrator Program (CTD)** – helping industry to develop new technology with strong military potential.





# Capability Technology Demonstrator Program

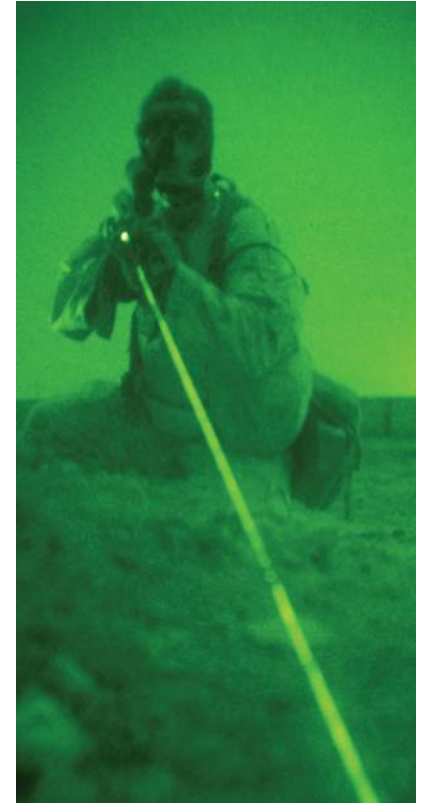
- Demonstrating military potential of technology.
- \$210 M invested since 1998.
- Average CTD – 3 years, \$2.5 M.
- Now CTD Extension Program with 5 successful demonstrators fast-tracked.
- US – JCTDs





# RPDE

- Rapid Prototyping, Development and Evaluation Program (RPDE) – collaboration with industry.
- Seeks to accelerate the introduction of network centric solutions into the ADF.
- Harnesses expertise of 141 industry participants to respond rapidly to problems.
- DSTO involved in 75% of RPDE tasks.
- Joint effort progresses ideas quickly to a stage where acquisition can start.





# Defence Future Capability Technology Centres

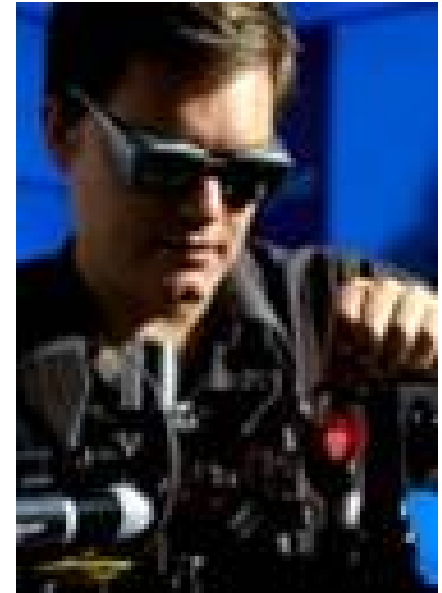
- DFCTC program – a new initiative between Government, research agencies and industry to develop future Defence capability.
- Defence Materials Technology Centre first under this program.
- DMTC - 14 participants, \$85 M invested.
- DMTC is test-bed for new high-tech materials for use in next generation Defence platforms.





# Centres of Expertise

- DSTO Centres of Expertise in 7 universities.
- Focus on specific research and technology areas
  - energetic materials
  - systems integration
  - autonomous vehicle systems
  - photonics
  - helicopter structures and diagnostics
  - aerodynamic loading
  - structural mechanics.
- Some COEs (photonics, AVS) already making significant advances.

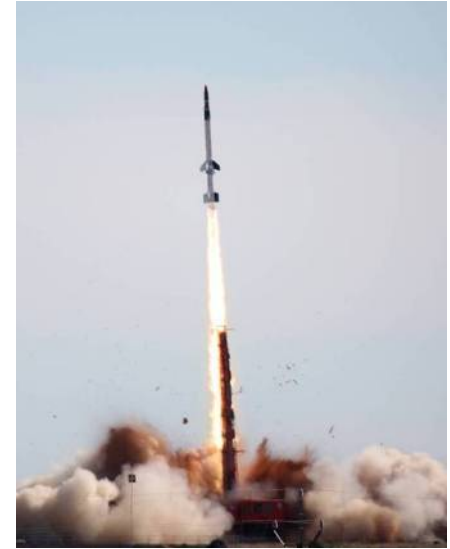






# International Collaboration

- DSTO participates in the following multilateral agreements
  - American, British, Canadian, Australian and New Zealand Multilateral Master Information Exchange MOU (ABCANZ)
  - The Technical Cooperation Program (TTCP)
- DSTO participates in several bilateral agreements





# Industry Collaboration

- DSTO and industry have common goal – to enhance Defence capability.
- DSTO enables industry to better support Defence.
- Striving for closer engagement with industry (Industry Days).
- Flexible IP policy – not implacably wedded to royalty collection but to capability innovation.





# DSTO Support to National Security

- Threat anticipation
- Public safety and border security
- Crisis management & command systems
- Critical infrastructure protection, including information infrastructure
- Chemical, biological, radiological and nuclear defence
- Explosives and improvised explosive devices
- Intelligence support tools
- Exercise command and control and operations research





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# DSTO Advisory Board

- Strong team of experts will advise on strategic directions and S&T delivery to Defence.
- A change to welcome fresh ideas and perspectives from industry and the science/innovation community.





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# Questions