Australian Government
Department of Defence
Science and Technology

Aerospace Division Strategic Plan 2016-2021

DST GROUP

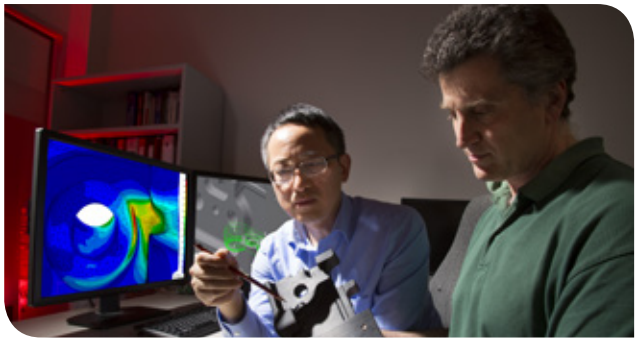
Science and Technology for Safeguarding Australia

Aerospace Division Mission

Lead and conduct aerospace research for Australia's defence and national security, providing expert science and technology advice and innovative solutions.

Aerospace Division Vision

Transforming Australia's air power through world-leading science and technology.



Message from the Chief of Aerospace Division

The Aerospace Division is part of the Australian Defence Science and Technology (DST) Group. It is responsible for innovative and effective application of science and technology in the Australian military aerospace domain.

The DST Group Aerospace Division provides value to Australian Defence by:

- providing relevant S&T advice regarding operations, acquisition and sustainment of ADF aircraft especially safety, airworthiness, training and effectiveness;
- conducting relevant research about future capabilities in selected areas of high value, such as the use of simulation technology, aircraft health systems, hypersonic flight technology, and autonomous systems; and
- providing economic benefits through major savings in acquisition and sustainment and the commercial exploitation of its science and technology products (e.g. airframe and engine life extension advice based on experience, modelling, testing and analysis).

The Aerospace Division is able to carry out this mission because:

- it has deep expertise and extensive facilities in a range of relevant aero-science capabilities;
- it has extensive knowledge of and experience with Australian defence aircraft operations and capabilities; and
- it has access to related technology in other DST Group Divisions, universities and industries, and privileged access to information and technology from overseas partners.

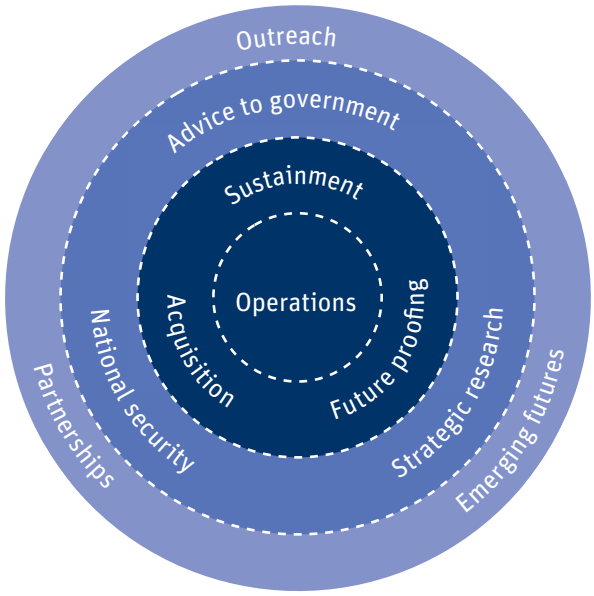
There have been many changes for DST Group in the last few years, including the implementation of the DST Strategic Plan 2013-2018 and the more recent First Principles Review of Defence. To respond to these changes, we need to ensure that we take every opportunity to improve the way we plan and undertake our research program so that we realise our vision to transform Australia's Air Power.

This Strategic Plan articulates the strategic drivers and challenges for Aerospace Division and our roles and sets directions for where we need to evolve over the next five years. An Annual Implementation Plan will be developed to ensure this Strategic Plan is enacted.

Dr Ken Anderson
Chief, Aerospace Division

Our Roles

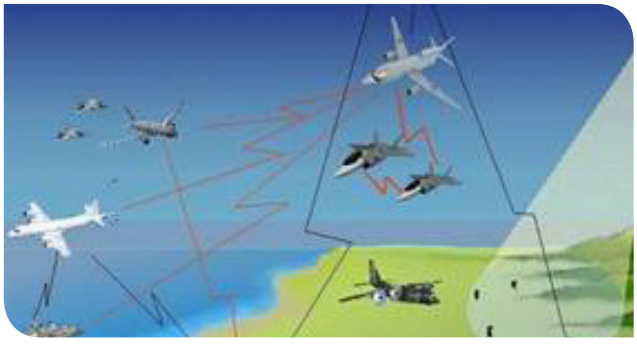
In Aerospace Division, our role is to lead, undertake and support research in the Aerospace domain to support Australian defence and national security.



Aerospace Division undertakes research and provides advice in aerospace science and technology to contribute to the following DST Group roles:

Operations

We provide immediate advice on airworthiness, aircraft performance and survivability, safety and accident investigations, aircrew human factors, training and aircraft technical intelligence to support current ADF air operations.



Acquisition

We conduct technical risk assessments and provide mitigation advice for major air acquisition projects (such as F-35), and co-development programs, such as EA-18G Growler, including the provision of specialist staff to overseas project teams.

Sustainment

We advise on airworthiness, sustainment and performance of all in-service aircraft, including life assessment and life extension programs, signature management and repair technology.

Future Proofing, Strategic Research and Emerging Futures

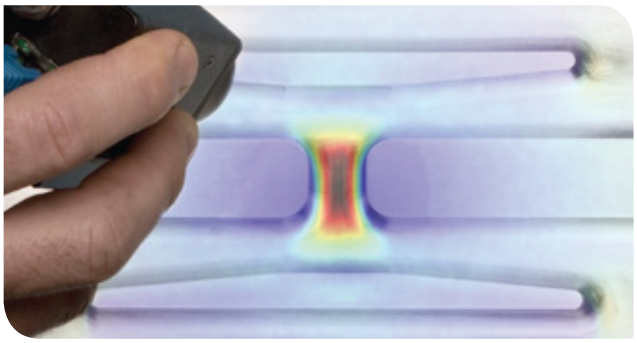
We conduct research in technologies such as hypersonics, autonomy, signatures and smart materials which have potential to transform the way Aerospace defence is delivered in the future.

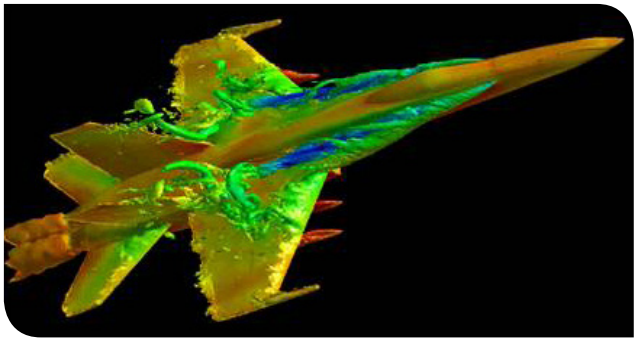
Advice to Government and National Security

We conduct investigations and provide advice to government agencies such as the Australian Transport Safety Board and the Australian Federal Police in areas where we have specialist capabilities.

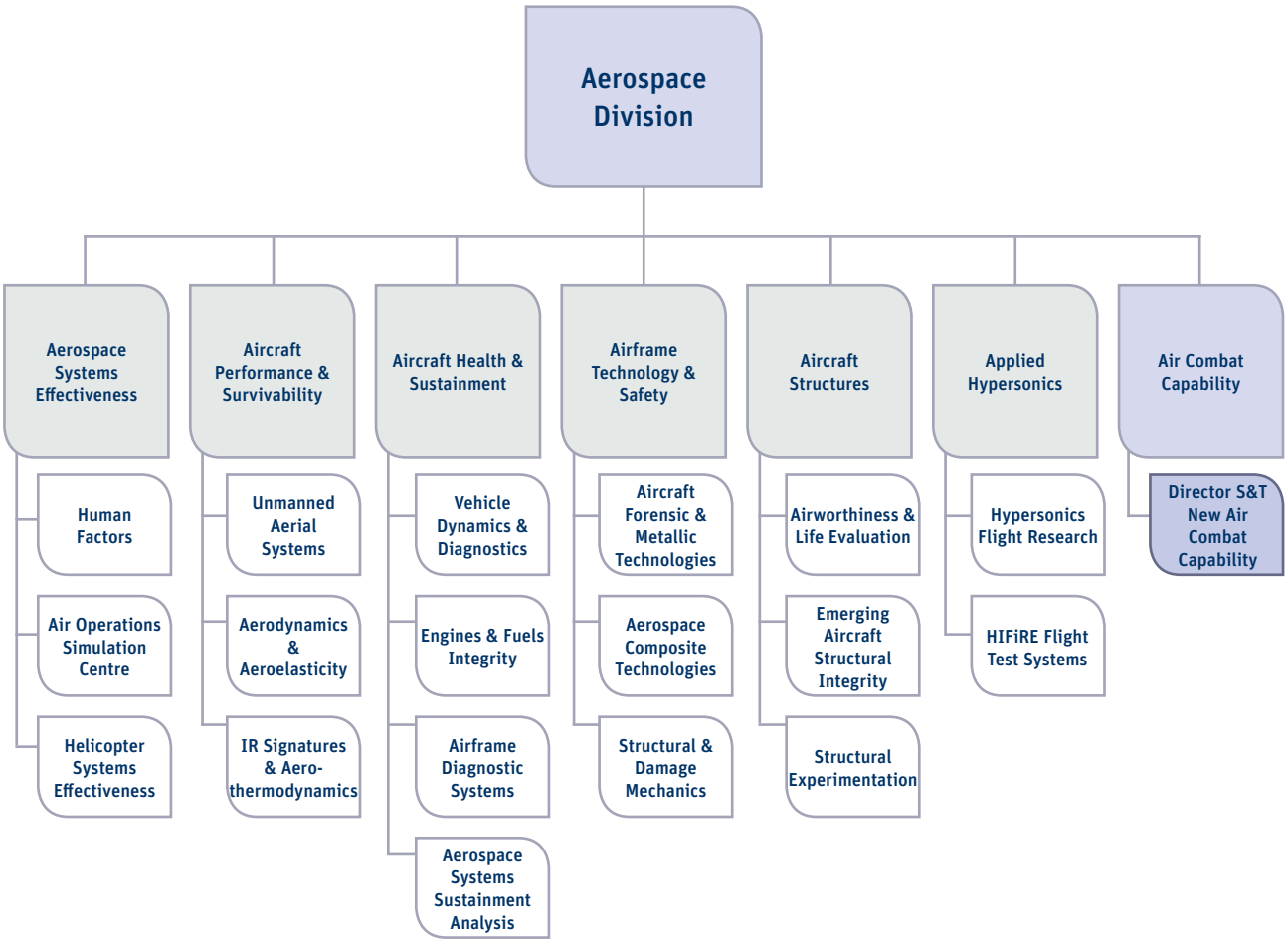
Parnerships and Outreach

We engage and collaborate strategically to achieve mutual benefits with academia, industry, publicly funded research agencies and our Defence science peers in other nations.





We fulfil these roles through our six major science and technology capabilities described at the end of this document.

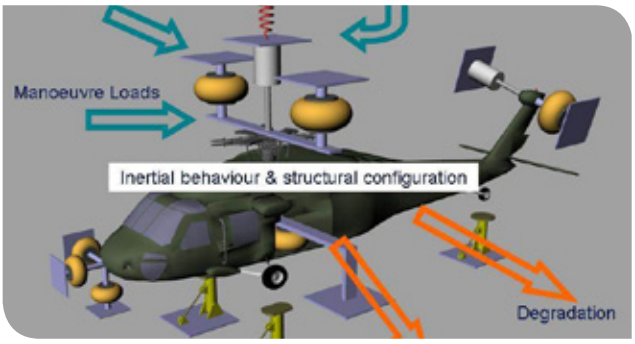


Our Value

We add value to Australia's Defence and National Security by providing specialist scientific advice and innovative technology solutions that serve to reduce and mitigate strategic and operational risks, to create and maintain a capability edge and to provide substantial economic benefits.

Our capacity to deliver value is built on our:

- Deep knowledge of and responsiveness to the Australian defence aerospace domain through the expertise and experience of our staff;
- Unique world class sovereign capabilities such as aircraft structures laboratories, aircraft forensics laboratories, wind tunnels, flexible simulation facilities, hypersonics experimentation capabilities, and low observable research facilities;
- Proven record of linking research, innovation, applications and end users, such as in the development of techniques for aircraft repairs by composite patches and supersonic particle deposition;
- Active collaboration nationally through activities with industry, universities and publicly funded research agencies, through the DST Group Strategic Industry and University Alliances, the Defence Materials Technology Centre and the Defence Science Institute, and collaboration internationally through The Technical Cooperation Program and other international bodies;
- Ability to integrate information to provide relevant, coherent expert advice on the Defence aerospace domain, such as aircraft accident and incident forensic investigations, airworthiness and structural integrity, and whole of life cost of ownership;
- Ability to maintain commercially unviable technologies that are critical to Defence, such as wind tunnels and aircraft structures laboratories; and
- Ability to foster a national aerospace science and technology base through strategic alliances and by supporting national and local Science Technology Engineering and Mathematics (STEM) initiatives.



Australia's Defence Aerospace Landscape

The Australian Government emphasises the importance to the nation of innovation and agility. The Defence White Paper recognises the need to foster and leverage innovation to support a force structure that is able to take advantage of technological advances.

The Defence Corporate Plan 2015-2016, in responding to the First Principles Review of Defence, includes goals of developing a single end-to-end capability development function, including more contestability, and enhanced partnering with industry. These are goals that Aerospace Division can contribute to through our own research, and our research partnerships.

In recent years, the Australian Government has made substantial investment in ADF aviation capabilities and all Army, Navy and Air Force fleets are being modernised and transformed. Several new capabilities, such as AEW&C and Unmanned Aerial Systems, have been or are being acquired.

RAAF Plan Jericho will be a key driver of change in the nature of the science and technology required by RAAF as it transitions to a more networked Air Force. Aerospace Division will play a critical role in ensuring the Air Force achieves its transformation through science and technology engagement with the Jericho Program of Work, which will support the Plan Jericho themes of:

- harnessing the combat potential of a fully integrated force;
- developing an innovative and empowered workforce; and
- changing the way we acquire and sustain capability.

Navy's Plan Pelorus seeks a more agile and capable task-group oriented Navy, and Army's Modernisation Plan emphasises integration, responsiveness and operating in complex environments. Army and Navy aviation is being transformed with the introduction into service of new generation helicopters incorporating increased sensing, networking and firepower capabilities and new materials, with the inclusion of Unmanned Aerial Systems capabilities, and with the development of an ADF amphibious capability.

Our Defence stakeholders continue to emphasise the need for research to support:

- the safety of flying operations as a prime concern;
- investigating new and future capabilities with an emphasis on reducing the effects on the operator of the increasing complexity of systems and operations;
- integrating the future joint force;

- reducing cost of ownership of capabilities;
- ensuring airworthiness; and
- an increasing need to investigate emerging, potentially game-changing science and technology developments.

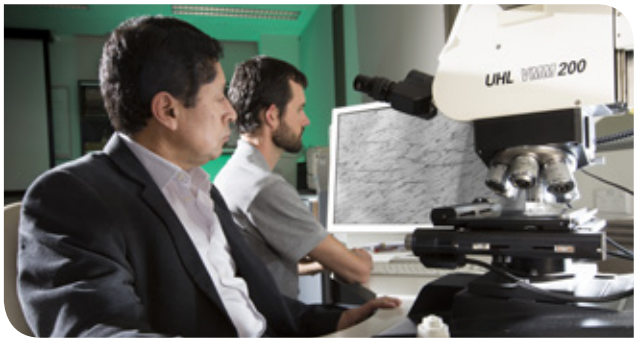
Areas for Aerospace Advice, Analysis and Research

To enable transformation of Australia's air power, Aerospace Division investigates and develops emerging technologies that have the potential to have high impact on aerospace operational capability, for example:

- unmanned aerial vehicles, including advances in endurance, flight control and the development of new operational concepts;
- high speed flight, particularly speeds above Mach 5;
- human-aircraft interfaces and human-autonomy teaming;
- advanced prognostic and health management systems; and
- advanced aerospace materials.

To meet the needs of an integrated, networked aerospace force, Aerospace Division will enhance ADF aerospace capabilities, especially through the development of innovative techniques to improve:

- aircraft performance in complex battle environments;
- the assessment of effectiveness of the whole of the air system;
- aircrew team training;
- survivability of ADF aircraft in Defence operational environments; and
- the safe carriage and release of air delivered weapons.



To ensure ADF aerospace platforms meet the needs of the future force, Aerospace Division has an enduring interest in fundamental aerospace technologies that support:

- safety of flight and accident investigation;
- reliability, availability and airworthiness of ADF aircraft;
- the whole of life cost of ownership and operation of ADF aircraft; and
- repair and maintenance of aerospace systems.

Our People

Aerospace Division's greatest asset and resource is the knowledge, skills and aptitude of our people. Our scientists, engineers and technicians have extensive experience and expertise in aviation-related technologies in the Australian Defence environment.

We will invest in ensuring our people are well suited to their roles, and are developed to reach their full potential. The Division gives priority to the education, training and professional development of our people, and will ensure fairness and appropriateness of any opportunities.

We expect our people to be professionally adept and have a high awareness of the aerospace domain. Training opportunities will include scientific and technical conferences, mechanisms to enhance aerospace domain awareness and professional development and upskilling.

We expect everyone to strive for excellence in our scientific and professional work, in our supervision, management and leadership. We expect supervisors and managers to generate the environment to facilitate this, and maintain high professional standards. We celebrate achievements.

To provide improved engagement on staff career development aspirations, and to identify the best people for available opportunities, Aerospace Division is establishing structured annual staff career development discussions between Group Leaders and their staff, which are shared with the Chief, Research Leaders and Air Combat Capability Program Leader.

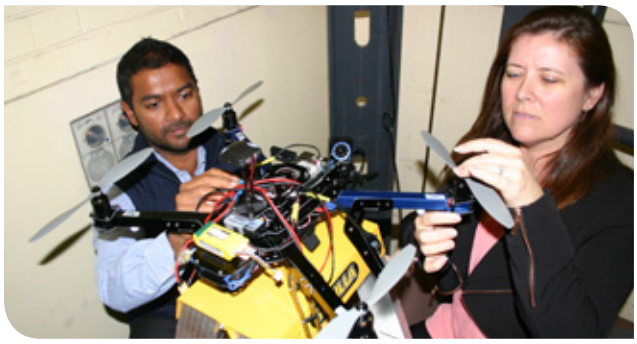
We encourage and support career development opportunities including rotational positions such as Air Force Scientific Adviser and Counsellors for Defence Science and Technology, as well as DST Group International Fellowships, undertaking Masters or PhDs, SRI Fellowships and other secondments.

These Divisional expectations have links with, and are supported by, the DST Group Strategic Initiatives D1 (Science and Technology Excellence), O1 (Leadership, accountability and performance management) and O2 (Talent, diversity and career development pipeline).

Aerospace Division is committed to continual improvement, and will use the feedback from the DST Group Insights Surveys, amongst other mechanisms, to develop action plans to enhance the Division as a great place to work.

The continued success of Aerospace Division is dependent on a healthy culture that is inclusive, respectful and supportive. Aerospace Staff are expected to:

- uphold the DST Group Values;
- seek quality outcomes for Defence;
- encourage innovative thinking;
- collaborate rather than compete;
- respect diversity;
- respect the work and well-being of others; and
- celebrate achievements.



Broad Directions over the Next Five Years

Aerospace Division is committed to improving its ability to:

- Transform Australia's Air Power;
- Deliver high impact outcomes for Defence; and
- Sustain relevant science and technology capabilities.

1. Transforming Australia's Air Power

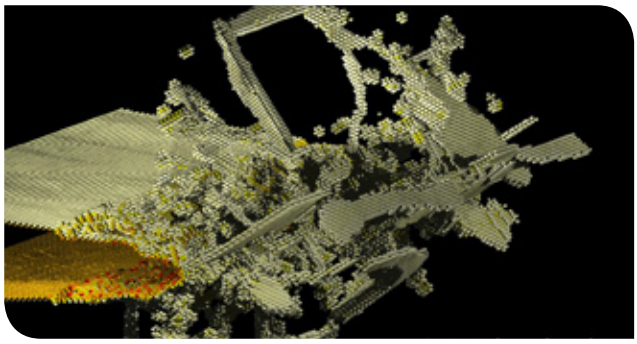
Aerospace Division will:

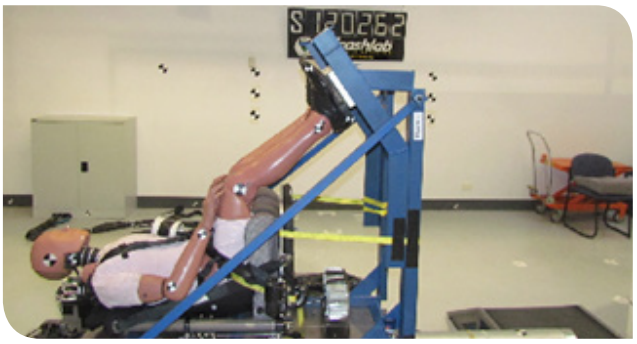
- Be a key partner in the transformational RAAF Plan Jericho by:
  - providing leadership of the DST Group program for engagement with RAAF Plan Jericho; and
  - growing S&T capabilities that support the vision of RAAF Plan Jericho particularly in the fields of collective training, live, virtual and constructive simulation, and integrated logistics into the battlespace.
- Grow capabilities that support Aerospace Autonomous Systems and develop a program that influences Defence adoption of innovative autonomous systems. This includes:
  - aspects of platforms, materials, command and control, human factors and simulation.
- Invest in capabilities that will enable the integration of a high speed aerospace capability into the ADF Force Structure by:
  - demonstrating the potential of integrating a high speed capability into the ADF force structure; and
  - sustainably investing in the future of the DST Group hypersonics technology program after HIFiRE.
- Work with other DST divisions, Australian universities and our international Defence science peers to establish a relevant, effective Aerospace Division space research program.
- Grow science and technology capability to provide affordable Low Observable sustainment capability and advice for the Future Force, and provide leadership of the DST Group Low Observable program.

2. Delivering high impact outcomes for Defence

Aerospace Division will:

- Lead the DST Group Aerospace science and technology domain.
- Evolve science and technology capabilities and programs that support ADF aircraft maintenance and sustainment models; including:
  - working with Capability Acquisition and Sustainment Group, Air Force, Army and Navy to establish the appropriate science and technology capabilities and programs to support, airworthiness, the safe operation and cost-effective sustainment of the new generation of aircraft.
- Continue to develop innovative technologies to improve sustainment, affordability and availability of legacy systems by:
  - improve model-based structural and material analysis;
  - improve condition- based maintenance technologies and models, including diagnostic and prognostic systems; and
  - increase additive manufacturing and repair assurance for the development of rapid, low-cost, low-volume components.
- Improve cost capability modelling to feed into intelligent life cycle decisions and have an enhanced focus on contestability in Defence.
- Develop improved high fidelity infra-red signature models for mission data of 5th generation aircraft.
- Commit to providing science and technology support to the strategic partnership between RAAF and USAF for the integration and clearance of weapons from the Joint Strike Fighter.
- Continue to deliver rapid, high quality operational support via the aircraft forensics engineering team and utilise skill sets across the Division and the rest of DST Group to support ADF aviation accident and incident investigations.





3. Sustaining relevant science and technology capabilities

Aerospace Division will:

- Be well networked and collaborate internally within the division and with all other DST Group divisions to achieve our mission and vision.
- Gain significant leverage through well-chosen external partnerships with national and international scientific agencies, including:
  - maximising the use and benefits of the DST Group Strategic Alliances with Universities and Industry partners; and
  - increasing leverage and collaboration with external partners, in particular in areas aligned with the guidance in the DST Group Strategic Plan, to:
    - develop a sustainable national capability in critical technology areas supporting the Aerospace domain, for example in autonomy and team training; and
    - offset APS workforce reductions.
- Develop infrastructure and workforce plans to ensure sustainable delivery of the Divisional program, including:
  - prioritising recruitment into areas that provide high client impact, and support the goals of the DST Group Strategic Plan 2013-18; and
  - undertaking annual Staff Career Development discussions between staff and Group Leaders to improve workforce management.
- Institutionalise agile management processes to enable our work programs to be delivered successfully with accountable and trusted leadership; in order to:
  - develop and implement a quality management system (QMS) to ensure we deliver our value proposition effectively and efficiently with appropriate contestability. This system will be compliant with the ISO 9001:2015 international standard of best practice with full commitment and engagement by our Divisional leadership;

- embrace the quality management principles of Customer Focus, Leadership, Engagement of People, Process Approach, Improvement, Evidence-based Decision Making, and Relationship Management. We will strive to employ these practices in all our work;
- commit to address issues raised through the DST Group Insights Surveys by development, implementation, and review of our AD Insights Action Plan; and
- act and respond on issues and risks determined from benchmarking or other internal and external reviews.

• Consider pathways for transitioning research early, utilising for example Industry Alliances and Technology Pitches.

The Major Science and Technology Capabilities in Aerospace Division

• Aerospace Systems Effectiveness

• Aircraft Health and Sustainment

• Aircraft Performance and Survivability

• Aircraft Structures

• Airframe Technology and Safety

• Applied Hypersonics

Aerospace Systems Effectiveness

Purpose

The Aerospace Systems Effectiveness MSTC supports Defence outcomes in capability, efficiency and safety by providing advice and solutions where humans and air platforms or systems interact.

Science and Technology Capabilities

- Human Factors.
- Air Operation Simulation Centre (AOSC).
- Helicopter Systems Effectiveness.

Key Drivers & Challenges

- Increasing access to and reliance on networked platforms and information systems are placing new demands on military operators. The ADF will require increasing science and technology support to ensure that individuals and teams perform safely and effectively in the complex physical and information environments characterising modern military operations. Science and technology aimed at enhancing coordination within and between teams and enabling operators to gain and maintain situation awareness and make effective decisions in the face of large volumes of information will be required to fulfil the objectives of RAAF Plan Jericho and the future needs of Army and Navy aircrew.
- The imperative for effective use of simulation as part of aerospace team training and tactical development is increasing as operations become more reliant on teams of teams, and some advanced capabilities cannot be utilised in non-operational environments.
- Prioritising work programs when demand outstrips supply remains a challenge. This will be undertaken by the ASE Executive Team.
- Recruitment will be undertaken in priority areas that support the goals of the DST Group Strategic Plan 2013-2018 and RAAF Plan Jericho.

Directions for Aerospace Systems Effectiveness Branch

Increasing emphasis will be placed on:

- Research supporting autonomy, including human-autonomy teaming, situational awareness and decision making, simulation and white forces;
- Supporting design, selection, training and effectiveness of highly networked and situationally aware aerospace teams;
- Training research will move from individual to collective; and
- Opportunities for increased external partnering and leverage through more strategic engagements with industry, academia and publicly funded research agencies.

Continuing emphasis will be placed on:

- Understanding rotary wing systems, more particularly in challenging operational environments;
- Capabilities that support aviation safety and accident investigations; and
- A balance of short- and long-term goals for the research program.

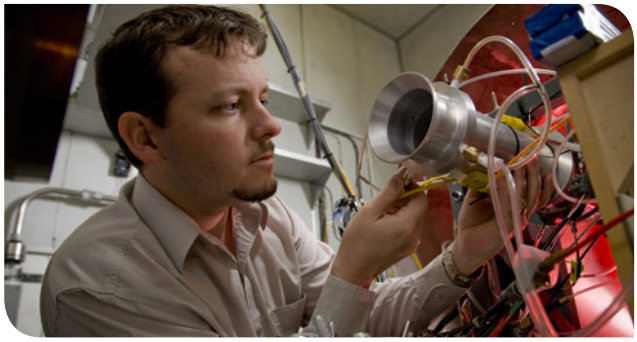
Aircraft Health and Sustainment

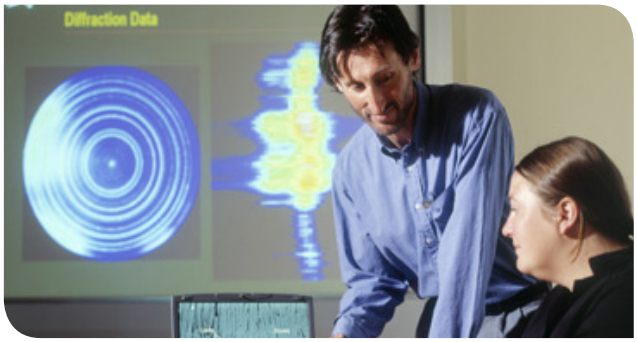
Purpose

Enable safe, supportable and affordable operation of ADF aircraft fleets over their life-cycle through a focus on asset and health management technologies.

Science and Technology Capabilities

- Aerospace Systems Sustainment Analysis.
- Vehicle Dynamics and Diagnostics.
- Engines and Fuels Integrity.
- Airframe Diagnostic Systems.



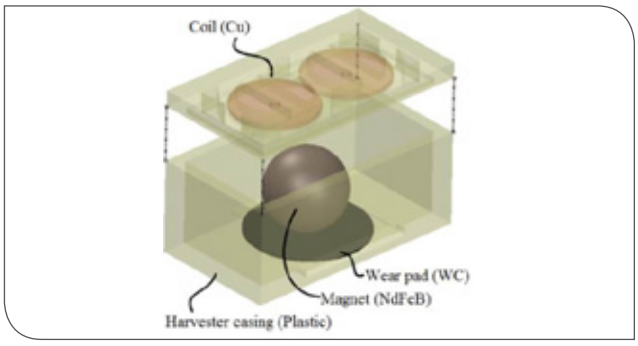


Key Drivers & Challenges

- The costs and complexities of new aircraft systems have made integrity management and maintenance more challenging while significantly driving up sustainment costs. New operational and sustainment paradigms have seen Defence move towards global logistics, virtual fleets and performance-based management of assets. Innovative technological solutions and cost-effective sustainment approaches are needed to ensure that required aircraft sortie generation rates are met and sustained during air operations, while maintaining system integrity and delivering on airworthiness goals.
- A capability to provide independent technical advice and support for ADF Propulsion Systems Integrity programs is required to be established and maintained (Defence Airworthiness Policy DEFLOGMAN, Part2,Vol 10).
- Ensure the challenges of restricted access to information and technical data under current Total Logistic Support (TLS) contracts are met.

Directions for Aircraft Health and Sustainment Branch

- Growing capability to analyse aerospace sustainment systems to shape future ADF sustainment strategies and planning. This includes asset management, performance-based logistics, supportability modelling and cost of ownership analysis;
- Providing enhanced focus on the integration of health management and autonomic sustainment systems with sensing and condition assessment technologies;
- Developing new air vehicle health management technologies for transition into systems under development and those in current service by utilising strong partnerships with Defence and Original Equipment Manufacturers (OEMs);
- Maintaining a core capability to provide deep technical advice on the integrity management of ADF aircraft propulsion systems (engines, drive trains and fuel) and future proofing the capability through research into: High-Frequency High-Cycle Fatigue, Ultra-High Temperature Materials, Thermal Stability of Fuels, and Probabilistic Decision Making for airworthiness advice;
- Maintaining a core capability and developing advanced techniques in experimental mechanics to enable effective and efficient stress measurement capabilities for application to ADF ASI management;



- Maintaining a core capability that enables a deep understanding of current and future NDI technologies to future proof the capability and to allow timely expert technical advice to the ADF on the application of NDI, especially thermographic methods, in new and innovative ways;
- Undertaking Strategic Research Initiatives: in Signatures, Materials and Energy in the areas of Guided Wave Acoustic Fingerprinting, Optical Fibre Systems, and Energy Harvesting for Structural Diagnostics; in new retro-reflective coatings for infra-red; and in Hypersonics in the area of Ultra-High Temperature Materials;
- Building key partnerships and activities with relevant OEMs. Focus on and enhance international programs including The Technical Cooperation Program (Aerospace and Materials Panels); and
- Focusing Aircraft Health and Sustainment capability development and future proofing on a few key air vehicles: F-35, SH-60R, C-17 and Triton.

Aircraft Performance and Survivability

Purpose

The Aircraft Performance and Survivability MSTC contributes to Defence capability and operational effectiveness by providing expert, timely advice and innovative solutions that directly impact system-level performance and survivability.

Science and Technology Capabilities

- Aerodynamics and Aero-elasticity, including flight dynamics modelling and stores carriage and release.
- Infra-red Signatures and Aerothermodynamics.
- Unmanned Aerial Systems.

Key Drivers & Challenges

- Plan Jericho aims to transform the RAAF and ADF into an integrated fifth generation force. Exploitation of the situational awareness available to fifth generation aircraft will be reliant, in part, on the accuracy of the signature and performance data in the aircraft's intelligence mission database (IMD). This is driving the increasing need for data on a range of platforms.

- Air operations in contested airspace require an understanding of full-spectrum signatures to inform future countermeasure development and aircraft signature management.
- The rapid integration of new technologies on military aircraft can have an unintended impact on the thermal, structural and flight performance of the aircraft.
- The ADF and its coalition partners will increasingly rely on autonomous aerial systems to support military operations in contested and complex environments.
- Energy scarcity and demands for higher energy densities are leading to the emergence of new energy and thermal management technologies.
- Major Defence acquisition programs, including AIR6000 (JSF), AIR9000 (Helicopters) and SEA1000 (Future Submarine) are key strategic drivers for the MSTC.

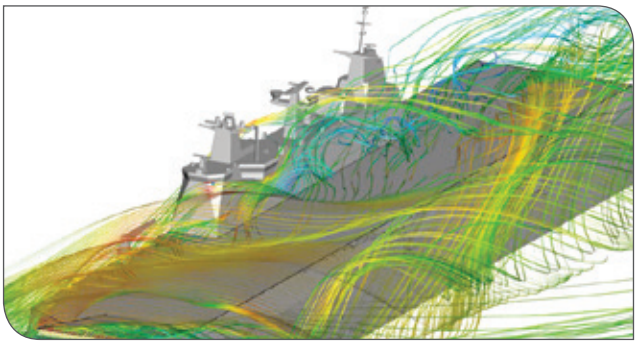
Directions for APS Branch

Increasing emphasis will be placed on:

- Developing technologies for the operation of autonomous systems in complex and contested environments;
- Under the Aircraft-Stores Compatibility Project Arrangement between the RAAF and the USAF, aligning the MSTC stores clearance methodology with that of the USAF;
- Leading the development of common modelling and simulation tools and provide relevant products to the Intelligence Community. Strengthen collaborative programs; and
- Opportunities for increased external partnering and leverage through more strategic engagements with industry, academia and publicly funded research agencies.

Continuing emphasis will be placed on:

- Extending the signature modelling capability to provide datasets in supporting mission data requirements and the continually evolving threat environment; developing innovative signature management strategies;



- Further developing the computational and experimental thermofluid-structure interaction capability;
- Improving capabilities that support aviation safety and accident investigations; and
- Reducing workforce effort on non-core and administrative tasks by transitioning work/ technology development to external partners, burden sharing with collaborators and making more effective use of contract mechanisms to access short term capability.

Aircraft Structures

Purpose

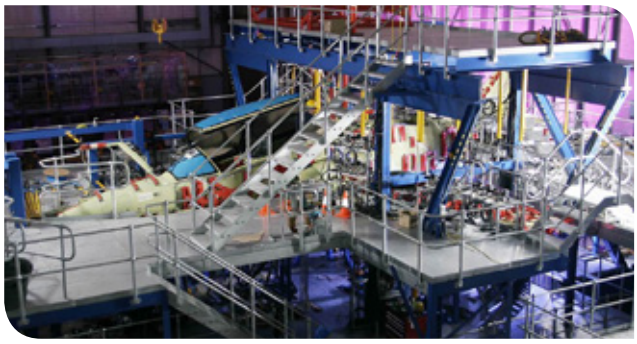
The Aircraft Structures MSTC provides expertise, advice and solutions in the aircraft structural integrity (ASI) area through innovations and targeted research, so that Defence can fully exploit the safety, durability and cost effectiveness of their current and future fleets of both fixed and rotary wing aircraft.

Science and Technology Capabilities

- Airworthiness and Life Evaluation.
- Structural Experimentation.
- Emerging Aircraft Structural Integrity.

Key Drivers & Challenges

- DST Group's responsibility to provide ASI advice and to sustain this core capability is a mandatory requirement of the Defence Manual, DEFLOGMAN Part 2 Vol 10 Chap 18.
- Defence, as an employer, has the unequivocal and lawful duty to ensure workplace safety which extends to ADF's air platforms. As a result, present and past S&T Strategy Guidance released by the Air Force have had "flight safety" as their Number 1 Priority.



- Increasing pressures to operate aircraft beyond their original design lives.
- Introduction of new materials (composites, new alloys) and technologies (additive manufacturing, new surface treatments).
- There is an increasing scope and trend towards industry support and sustainment of ASI for the ADF fleets. Strategic engagement and partnership with and transition of R&D capabilities to industry are imperative.
- Managing extensive infrastructure that is expensive to maintain and update. Increasing reliance on intermittent client funding to support critical infrastructure costs that are not captured in current business processes.
- Reliance on year-to-year client funding to sustain a number of long-term technical staff on contract.

Directions for Aircraft Structures Branch

Increasing emphasis will be placed on:

- Capabilities in composite structural life assessment, complementing and leveraging the composites technologies capability in the ATS MSTC;
- Capabilities in probabilistic and advanced structural life assessment, complementing and leveraging related technologies in the ATS and AHS MSTCs;
- Applied research in ASI technologies; and
- External engagements, including strategic alliances with industry and universities, collaborations with OEMs, Project Offices, and other contributors.

Continuing emphasis will be placed on:

- Innovative testing capabilities, including high-speed structural testing capabilities and full-field methods and other data mapping capabilities; and
- Reducing the level of standard engineering analysis: work will be transitioned to industry at the earliest possible stage once developed methodologies have been codified or standardised.

Airframe Technology and Safety

Purpose

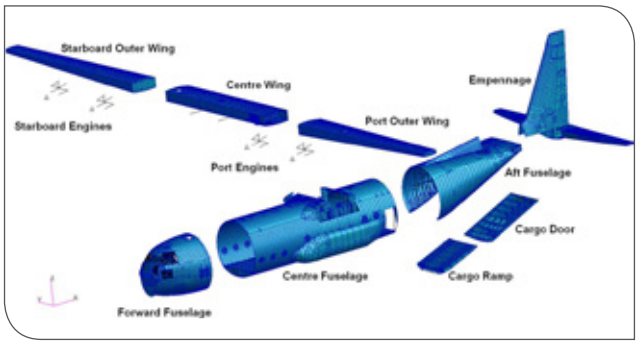
The Airframe Technology and Safety MSTC sustains and develops capabilities to investigate urgent subsystem failures and provides scientific leadership for investigations into ADF aircraft accidents and incidents. The MSTC provides innovative advice and solutions for assessing and improving multifunction performance and integrity of airframes, by undertaking research in advanced composites technology, advanced metallic technology and computational modelling of structural performance and structural lifing. These impact positively on safety, operational availability and sustainment costs for ADF platforms.

Science and Technology Capabilities

- Aircraft Forensic and Metallic Technologies.
- Structural and Damage Mechanics.
- Aerospace Composite Technologies.

Key Drivers & Challenges

- Present and past Science and Technology Strategy Guidance of the Air Force assigns highest priority to “flight safety”.
- Balancing recruitment priorities to meet the needs identified in the DST Group Strategic Plan 2013-2018, and to sustain core capabilities.
- Major Defence acquisition programs, including AIR6000 (JSF).
- Introduction of new materials and technologies are strategic drivers for this MSTC.
- Extensive infrastructure (for aircraft forensic engineering, composites and computational modelling) that is expensive to maintain and update is an on-going challenge.
- Reliance on ad-hoc client funding to provide for shortfalls.



Directions for Airframe Technology and Safety Branch

Increasing emphasis will be placed on:

- Meta-nano and Low-observable materials, additive manufacturing, ultra-high temperature materials, multiscale and adaptive structural modelling, enhanced deterministic and probabilistic life estimation of composite and metallic components, and innovative life extension and repair techniques;
- External partnering and leverage through more strategic engagements with industry (including manufacturers), academia and publicly funded research agencies. Focus on and enhance The Technical Cooperation Program (TTCP) collaborative activities in Aerospace Systems and Materials (AER and MAT) Groups; and
- Strategic Research Initiatives in Signatures, Materials and Energy.

Continuing emphasis will be placed on:

- Core capability to provide deep technical advice that supports aviation safety and accident investigations;
- Core capability to provide deep technical advice on technologies for assessing and improving multifunction performance and integrity of airframes, including advanced composites technology, advanced metallic technology including residual stress assessment and computational modelling of structural performance and structural lifing; and
- Reducing the level of S&T staff effort on infrastructure management, via targeted contracting and divesting as appropriate.

Applied Hypersonics

Purpose

The Applied Hypersonics MSTC is actively engaged in technology development for high-speed propulsion used in air vehicles travelling at speeds in excess of Mach 5. The Branch carries out hypersonic research and flight testing and it provides expert advice to Defence on emerging hypersonic systems.

Science and Technology Capabilities

- Hypersonics Flight Research.
- HIFiRE Flight Test Systems.

Key Drivers & Challenges

- Hypersonic systems have the potential to offer "transformational" strategic advantages to Defence.
- Other nations actively pursue programs with the aim to transition hypersonic systems into mainstream service.
- ADF must develop an understanding of emerging science and technology threats and opportunities in this space.
- ADF requires a partner that provides essential information for transitioning hypersonic technology into service for Australia and allied nations.
- The Defence requirement for expert advice on hypersonic systems will increase significantly over the coming years.
- Opportunity exists to leverage a close relationship with the US in joint hypersonic development programs.

Directions for Applied Hypersonics Branch

Increasing emphasis will be placed on:

- Collaboration with national and international partners with a focus on technology maturation;
- Preparation for potential full scale engineering developments of advanced hypersonics systems; and
- Providing expert advice to Defence on emerging hypersonic systems;

Continuing emphasis will be placed on:

- Remaining at the forefront of applied hypersonics flight research;
- Increasing the Technology Readiness Level (TRL) of critical hypersonic system technologies using experimentation, computational science and flight testing; and
- Integrate critical technologies into hypersonic flight test vehicles and complete a series of long-range flight test demonstrations.

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