



Australian Government
Department of Defence

DEFENCE ISR ROADMAP - 2007-2017



See beyond your horizon





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Forward

Australian Defence personnel have consistently demonstrated an innate understanding of Intelligence, Surveillance and Reconnaissance (ISR) and the value it brings to the successful conduct of operations. This understanding has shown itself in the innovative techniques our people have applied to seeing beyond their horizon. From the box periscopes peering over the trenches at Gallipoli, to the rapid deployment of radar technology along our coastline during World War II, and now the wide application of space-based and aerial reconnaissance systems, all show that our doctrine and procedures are based on knowing as much as we can about our environment, who is operating in it, and what our courses of action could be.

The future Defence ISR system must be constructed to support the modern commander at all levels. The changed shape of the modern battlefield means that key events can happen any where at any time. Local commanders and their superiors must have ready access to the common information that will help them make the right decisions.

The development of Defence ISR will not be a low-risk endeavour. Planned acquisition of ISR platforms, sensors and supporting systems will be at high financial cost. In my role as Co-ordinating Capability Manager for ISR, my job is to co-ordinate the development of ISR across Defence to make sure it is delivering maximum advantage now and into the future, and obtaining best value for money.

The Defence ISR Roadmap details activities, principles and a phased approach to ensure that we make better use of our existing capabilities, that planned acquisitions enter service as integrated capabilities, and that we will make the right decisions about future capabilities.

Implementation of the Roadmap initiatives is underway. There is much work to be done, and I encourage you all to gain an understanding of the challenges faced and to make your contribution to delivering the vision for Defence ISR.

Steve Merchant, Deputy Secretary Intelligence, Security and International Policy
July 2007

Executive Summary

Defence is making a significant commitment to pursuing the challenging ambition of achieving an integrated Defence ISR capability. The Defence ISR Roadmap 2007-2017 sets a vision for this integrated capability and identifies specific actions that Defence will undertake in order to guide and accelerate the evolution of Defence ISR towards the longer-term vision.

Defence ISR will actively and continuously observe Defence areas of interest to the advantage of decision makers at all levels. Dominant situational awareness will bring agility to the planning and conduct of operations for the protection of Australia's national interests.

The Defence ISR Vision

The Defence ISR Roadmap recognises that there is great opportunity in the immediate term to establish better use of existing ISR capabilities and to lay a foundation for how Defence will utilise these capabilities into the future. The Roadmap also recognises that significant investment in research and development is required to deliver core functions of the future Defence ISR capability.

The Roadmap establishes a phased and principles-based framework for the development of Defence ISR. By applying the principles to capability decisions, judgements can be made about the potential for a given ISR capability proposal to help realise the Defence ISR vision.

The classified ISR Roadmap was published in early 2007 and subsequently an Implementation Plan has been developed to guide and track the Roadmap recommendations.

This unclassified version of the Roadmap is designed to reach the widest possible audience.



Part 1 - Defence ISR

See Beyond Your Horizon

ISR lets you see beyond your horizon. ISR brings together a range of sensing and information gathering activities to give you, and decision makers at all levels, the information needed to make more informed and more timely decisions, which is a big advantage in any mission.

Defence currently has a diverse range of very capable sensors and information gatherers. These capabilities are highly active (some constantly active) delivering valuable information and alerts to discrete areas of the Defence network where our skilled people use that information to build their situational awareness.

But we can do more with what we have. By bringing these capabilities together in an integrated way and by allowing the information gathered to be shared and diversely applied, we can ensure that decision makers at all levels will have access to the information they need to achieve their mission.

The aim of Defence ISR is to put you at the heart of these capabilities, giving you confidence that you will have access to the best possible information available to make your next move to achieve your mission.

Over the next ten years, Defence will introduce a range of new sensor capabilities and platforms capable of producing massive amounts of ISR data. This means the integration challenge is going to get more complex, but the rewards will be immense.

The Defence ISR Roadmap 2007-2017 articulates how Defence will bring these critical capabilities together to deliver maximum advantage as we look to create opportunities by facing the challenges and uncertainties of the future.

ISR - Information in Many Forms

ISR data can take many forms, including electro-optical and infrared images, full-motion video, images from synthetic aperture radar, as well as the sensing and geolocation of electronic and other emissions (known as electronic intelligence, or ELINT, and measurement and signature intelligence, MASINT); the interception of communications (communications intelligence, COMINT); and from human sources (human intelligence, HUMINT).

ISR data and information comes from the intelligence community (including DSD and DIGO), from key platforms

(such as the Air Force AP3-C Orions and Navy ships) and from theatre and tactical sources (such as tactical unmanned aircraft, ASLAVs, and from people on the ground).

ISR is more than just the sum of its platforms and sensors. It is about how we combine these capabilities, and the information they deliver, with the skills of Defence personnel to understand the battlespace to achieve situational awareness.

Defence ISR

“With effective ISR, we can make decisions faster and better than the enemy. But this does not come by being overwhelmed with information.”

LTCEN Ken Gillespie, Vice Chief of the Defence Force

The traditional functions of Intelligence, Surveillance and Reconnaissance are information collection and exploitation activities that support operational objectives. While these traditional concepts remain valid, Defence ISR extends the concept to include the integration of these functions to achieve the goals of Network Centric Warfare (NCW).

Shared situational awareness is a core premise of NCW. The term ‘Defence ISR’ is used to describe a system of interconnected ISR elements that will seamlessly combine with the command and engagement systems to ensure that information can be readily exchanged in support of shared situational awareness, collaborative planning and cooperative action.

Defence ISR Vision

Defence ISR will actively and continuously observe Defence areas of interest to the advantage of decision makers at all levels. Dominant situational awareness will bring agility to the planning and conduct of operations for the protection of Australia’s national interests.

The Defence ISR Roadmap 2007-2017

The purpose of the ISR Roadmap is to identify specific actions that Defence will undertake in order to guide and accelerate the evolution of Defence ISR towards the longer-term vision.



The Roadmap details initiatives to:

- Accelerate Defence’s near-term application of ISR to better exploit current capabilities and make valuable increases in shared situational awareness.
- Accelerate the provision of ISR-enabled situational awareness to the warfighter at the tactical level.
- Chart the future course for developing Defence ISR by providing principles and attributes of how Defence ISR is to operate as a balanced, networked and deployable capability.



Part 2 - Understanding the Future

Defence ISR Principles

The Defence ISR principles provide a framework for the development of the integrated ISR capability. By applying the principles to current and future capability decisions, judgements can be made about the potential for a given ISR capability proposal to help realise the Defence ISR Vision. The principles are:



Operationally Focused: Defence ISR will be optimised for supporting the conduct of military operations and the decision-making and planning processes that support these operations. Elements of the system will be constantly active, meeting needs for dominant situational awareness.



Integrated: Defence ISR must bridge organisational and technical boundaries to ensure integration between core capabilities to achieve optimal application of ISR resources. Integration must principally occur at the information level so that what data is collected can be rapidly accessed by the systems and people that enable decision superiority.



Interoperable: Australia's ability to maintain dominant situational awareness is dependent on the ability to interoperate with strategic allies and operational partners. Maintaining technical and information interoperability in key areas with the US and regional partners will extend Defence ISR. Maintaining technical and information interoperability with non-Defence agencies will reinforce defence of national interests.

Development Phases

“Transformation is not just about new technologies: it’s about doing things in new ways. The concept of operations must be worked out.”

Mike Pezzullo, Deputy Secretary Strategy, Compliance and Governance

The Roadmap covers the years 2007-2017 and describes the development of the Defence ISR capability in three evolutionary phases: Establish, Ensure and Extend. The evolutionary development of the phases is aligned with the NCW Roadmap concept of developing ‘critical mass’. The phases progress concurrently and represent short- medium- and long-term steps towards realising the ISR Vision, as represented below:

Guiding Principles	Establish 2007-2008	Ensure 2007-2012	Extend 2007-2017	Vision
Operationally Focused	Improved utilisation of existing ISR data at the operational level	Correlated ISR information is available to users at all levels	Interaction with Defence ISR is user-defined at all levels	Defence ISR will actively and continuously observe Defence areas of interest to the advantage of decision makers at all levels. Dominant situational awareness will bring agility to planning and conduct of operations for the protection of Australia’s national interests.
Exercise and trials				
Integrated	Accelerated acquisition of integrating capabilities	Transmission of ISR data between sensors and tactical units	Vertical and horizontal integration in joint and combined operations	
Research and experimentation				
Interoperable	Improved sharing of current ISR pictures	Shared ISR operating picture with allies	Operate interdependently with allies and partners	
Research, experimentation and exercises				

- The Establish phase builds the foundation of Defence ISR at the operational level by making measurable improvements in the exploitation of existing ISR information.
- The Ensure phase is focused on improving tactical users’ access to ISR by investing in techniques and technologies that will develop sophisticated ISR information sharing processes between relevant platforms, tactical units, operational headquarters and strategic agencies.
- The long-term Extend phase will guarantee that the integrated ISR enhancements delivered during the earlier phases of the Roadmap evolve into mature capabilities, incorporating technological advances that occur during the life of the Roadmap.

ISR Science and Technology

“Innovation is the lifeblood of Defence ISR. Through innovation we harness the dynamic nature of ISR evolution: not only in the development of new technology, but in the smart use of available technology and the ability to link the new with the legacy.”

Dr Roger Lough, Chief Defence Scientist

A comprehensive ISR Science and Technology Plan is being developed by DSTO and other key Defence and industry parties to fulfil a core element in the evolving Defence ISR capability. The S&T program will continue throughout the life of the Roadmap, clarifying the capability needs and leading to the discovery of new techniques for integrating ISR systems. DSTO will be the Defence lead for S&T activities and there will be opportunity for industry participation.

The S&T Plan will pursue six broad themes that will guide longer-term research, development and experimentation:

- **Command and Control:** Improved techniques and tools for interaction between commanders and operators of the Defence ISR capability.
- **Dissemination:** Improving the distribution and interrogation of real-time and near-real time ISR information, including through the development of the User Defined Operating Pictures.



- **Fusion:** Enhancing ISR information for improved use in tools and systems of the NCW C2 and Engagement grids by bringing together all information in a single consolidated manner.
- **Analysis and Production:** Developing technologies to increase the reliable automation of analysis and exploitation tasks conducted by users of ISR information.
- **Knowledge Management:** Developing and deploying valid methods and processes for the management of information and knowledge generated from ISR operations.
- **Collection:** Developing and assessing ISR capabilities for collection against emerging or known targets beyond current capabilities.

Exercises, Trials, Experimentation and Concept Development

The successful evolution of Defence ISR will be best achieved by adopting the 'learn by doing' approach of the NCW Roadmap. Improvements are to be practised in joint and combined exercises, trials and experimentation, and the experiences gained used to shape the longer-term phases of the ISR capability.



Experimentation will clarify the capability needs and lead to the discovery of new concepts and techniques for integrated ISR operations. Current operations and the program of combined exercises are revealing that Defence needs new methods of understanding the environment and new concepts for functioning successfully in it. Furthermore, Defence will be participating in major international events with domestic security implications. All these issues will be prominent in the next two years and Defence cannot afford not to act in this period of opportunity.

Workforce – Harness the Future

While technology driven, the achievement of integrated ISR depends on having a skilled workforce that can best apply the technology, interpret what is gathered, and use it to support decision superiority.

“As we strive to go beyond operating jointly to operating in the seamless manner described in Force 2020, the successful evolution of Defence ISR will depend upon a Defence workforce that is dedicated, highly skilled and has a culture that promotes innovation, integration and agility.”

AIRMSHL Geoff Shepherd, Chief of Air Force

Building a knowledgeable workforce who can harness the totality of the Defence ISR capability and apply it as a tool of command will be a key challenge. Each major ISR system will need to have around it a technically proficient workforce which is adept at operating that system and understands how the system contributes to the networked force. The Ensure phase will examine the training needs of the workforce that will be dealing with the new concepts and systems of Defence ISR.





Part 3 - Achieving the Vision

Implementation – Achieving the Vision

The ISR Roadmap has shaped over 50 key tasks that are being implemented in order to move Defence towards its aspiration of integrated ISR. Each task has been assigned to an appropriate Senior Defence Officer who has the responsibility to lead its implementation and to report on its progress. There are tasks that contribute to each of the Establish, Ensure and Extend Phases, and cover topics such as:

- Improving Situational Awareness through initiatives that increase access to and operational use of ISR derived information.
- Improving the exchange of ISR information and widening Defence ISR relationships with Australian Government, coalition, and regional partners.
- Maximising ISR inputs to, and getting maximum return from, Exercises and Trials.



- Activating the ISR S&T Plan and evolving the plan in response to the 'learn-by-doing' discoveries.
- Reviewing the scope, funding and schedule of selected projects to inform any rebalancing of the Defence Capability Plan (DCP).
- Development of policy and concepts to support Defence ISR.
- Sponsorship in 2007 of the project definition study to develop and deliver Integrated ISR.

ISR Governance

The ISR governance arrangements are in place to ensure the coordination of the integration and interoperability required across all aspects of Defence ISR. The governance arrangements will not impede individual Services or agencies from acquiring or developing ISR capability that support their future operational needs, but will ensure that new capabilities adhere to agreed standards and make a contribution towards achieving the ISR Vision. ISR governance will also ensure that the implementation of the vision accords with, and contributes to, the NCW Integration Plan and the NCW Compliance Framework.

Co-ordinating Capability Manager for ISR

“ISR capability crosses so many domains. Defence needs an ISR leader who has the responsibility to co-ordinate these capabilities so that they are ‘born joint’ and built to be used by VCDF in operations.”

LTGEN David Hurley
Chief of the Capability Development Executive

Steve Merchant, Deputy Secretary Intelligence, Security and International Policy, has been appointed the Co-ordinating Capability Manager for ISR (CCM ISR). While the senior Defence committees remain the superior authorities for decisions on capability investment, the appointment of a CCM ISR establishes the top tier for the co-ordination across the Services and Groups



for ISR capability issues. The ISR Council will be the peak body to address ISR capability issues that extend beyond the recognised responsibilities of Service Chiefs and Group Heads as Capability Managers. The Council is supported by a 1 star/band 1 Steering Group and the Office of ISR Co-ordination in the Intelligence, Security and International Policy Group.

Industry Engagement

Defence ISR is considered a critical Defence capability. Applying Defence industry policy, we must seek to generate and sustain an indigenous industry component to the development of Defence ISR. To achieve this, Defence will need to establish a long-term partnership with Australian industry to guarantee that sufficient ISR capability is retained in-country. The nature of this partnership will be radically different to the traditional Defence procurement process, reflecting the whole-of-Defence nature of Defence ISR.

“Professional integration is the key. Industry will be tasked and rewarded for understanding the integration challenge and delivering solutions.”

Dr Stephen Gumley
CEO Defence Materiel Organisation

To ensure that industry can effectively partner with Defence, an integrated Industry Engagement Plan is being developed stating the strategy, goal and activities of the partnership. The Industry Engagement Plan will be closely linked to the ISR S&T Plan.

The key areas of ISR development that provide opportunities for Industry will be:

- Development of Knowledge and Information Management regimes.
- Support for an integrated ground environment including the exploitation and dissemination of ISR information, mission planning and analysis/integration/fusion techniques and technologies.
- ISR systems design, integration and development.
- Design and delivery of ISR training.
- Development of ‘niche’ ISR capabilities.
- Cooperative development of ISR capabilities.





Part 4 - Development Phases

Establish Phase - Improving the Current ISR Capability in 2007-2008

The years 2007-2008 present a great opportunity to undertake a significant commitment in recognising the operational value of pursuing the integrated Defence ISR capability.

The changes to command and control of the ADF must be supported by new techniques that support the conduct of sophisticated joint operations. The establishment of the new Headquarters Joint Operations Command at Bungendore, HQJOC(B), is an important milestone for the development of Defence ISR in the short term.

It is important that HQJOC(B) is built to receive optimised delivery and visualisation of timely and relevant ISR information to benefit operational decision-making processes.

Improving the visibility and operational use of current ISR-fed situational awareness displays within HQJOC will act as a catalyst for the development of doctrine and procedures to enhance the use of ISR information in support of operational planning and command.

The Establish phase builds the foundation of the future Defence ISR capability by improving the use of existing ISR resources. Specifically, the phase will deliver the following enhancements to the Defence ISR capability:

- Measurable improvements in the delivery of raw and aggregated situational awareness feeds from Defence and allied sources to support decision making at HQJOC and key subordinate sites such as the Deployable Joint Force Headquarters, the National Surveillance Centre, and the Eastern Regional Operations Centre.





- Measurable improvements in the exchange of ISR information with allies and partners.
- Increased emphasis on improving the exchange of ISR information and the conduct of ISR operations in support of Whole of Government objectives.
- Co-ordination of joint, inter-agency and combined exercises, trials and experiments that contribute to knowledge and practice of ISR for Defence and security outcomes.

Contributing to Whole of Government

Defence undertakes significant activity in domestic security operations where ISR information is shared; maritime and air surveillance being prime examples. Defence is working to build stronger relationships with other Australian Government Departments and enhance the sharing of ISR information and co-operative planning of ISR operations.



The Ensure Phase 2007-2012

The Ensure phase of the ISR Roadmap contains those activities that are expected to deliver an outcome within five years. It also is a significant period of the DCP during which several major ISR-related capabilities will be delivered.

Together with new platforms such as AEW&C, MUAV, and TUAV, new technologies and techniques to improve the integration of ISR information will be delivered.

The Ensure phase will invest in solutions for tactical users of ISR information that will build and mature sophisticated ISR information sharing processes between platforms, tactical units, operational headquarters and strategic agencies. The goals of the Ensure phase include:

- Measurable improvements at HQJOC in the use of ISR data in support of ADF operations by exploiting new data sources, and by improvements such as the correlated display on Secret systems distilled from Top Secret sources.
- Measurable improvement in the transmission of ISR data to and between ISR assets and ADF tactical units, and through incorporation of legacy systems into real-time dissemination networks.
- Development of policy and procedures to overcome current limitations to the sharing and display of ISR information.
- Increased participation and leadership by Defence in extending ISR interoperability with other Departments, and with allies and regional partners.
- Identification of the skills needed to apply the Defence ISR capability in operational decision-making, and the delivery of an ISR education program.

The Extend Phase 2007-2017

The long-term Extend phase will make sure that the integrated ISR enhancements delivered during the earlier phases evolve into mature capabilities incorporating technological advances that occur along the way.

This phase delivers core functions of the future Defence ISR capability and will require significant investment in research and development. It is necessary to commence these activities now so that the required functionality will be available as the extent and complexity of the ISR capability increase over time.





Conclusion

Defence has set a high ambition in seeking to integrate what is a complex array of ISR capabilities and activities. But only through achieving this ambition can we ensure that Defence ISR can excel in the modern battlefield. By bringing these capabilities together in an integrated way and allowing the information gathered to be shared and applied, we can ensure that decision makers at all levels have access to the information they need to achieve their mission.

With the guidance of the Defence ISR Roadmap 2007-2017, Defence will deliver integrated ISR capabilities that allow us to see beyond our horizons.

Points of Contact

The Office of ISR Coordination in I,S&IP Group provides support to the Roadmap implementation tasks and to all levels of the implementation framework. For questions or comments on the Roadmap or its implementation, please contact:

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