

Capability Demonstrator: I-In-The-Sky

Mission Goal: Develop and harness satellite-based information capabilities to enhance Australia's disaster resilience.

Natural disasters have been part of the fabric of Australia's existence, with bushfires, floods, and droughts occurring with increasing frequency and severity. Such events can significantly impact national security, economic health and societal wellbeing and there is a strong national focus on improving disaster resilience. The information age provides us with powerful tools to improve disaster resilience through the ability to collect, exploit and disseminate actionable information to a broad community of end users. This includes emerging space technology to augment emergency management contributing significantly to improving resilience.



Prevent, Prepare, Respond and Recover

Disasters can be segmented in phases covering prevent, prepare, respond, and recover where space technology can contribute to all four. Using bushfires as an example, earth observation and in-situ satellite communication connected sensors can contribute to managing forest fuel loads and the early detection of outbreaks. Additionally satellite communications can support situational awareness and command and control in the respond phase, and both space technologies provide interim capability while ground infrastructure is under recovery.

The goal is to support Australia's efforts to be more resilient to disaster situations by developing capabilities and providing technologies for emergency management in the digital age.

The I (intelligence)-in-the Sky capability demonstrator seeks to develop an indicative architecture of an end-to-end, all source information broadcast system that will service the needs of planners, emergency services and the public now and into the future.

The approach is to start with simple use cases, develop concepts in partnership with end-users and demonstrate practical and implementable capabilities.

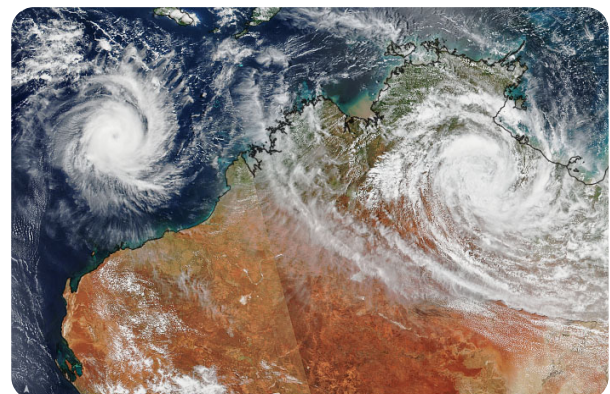
SmartSat is working closely with the end-users including emergency management services to ensure research outcomes from the I-In-the-Sky mission are aligned with the needs of the sector.

Priority research areas for I-In-the-Sky include:

- Robust Position, Navigation and Timing, including enabling future autonomous ground-based emergency vehicles.
- Dedicated Earth Observation sensing capabilities, data processing, fusion and modeling utilising satellite, UAV, HAPS, and in-situ networks.
- Advanced connectivity and distress-related communications.

Impacts

The I-in-the-Sky capability demonstrator is developing new concepts, techniques, technologies and system elements to support emergency management agencies and Australian communities. It aims to provide evidence-based advice for decision makers on the use of space technology to enhance Australia's disaster resilience.



PROBLEM DEFINITION:

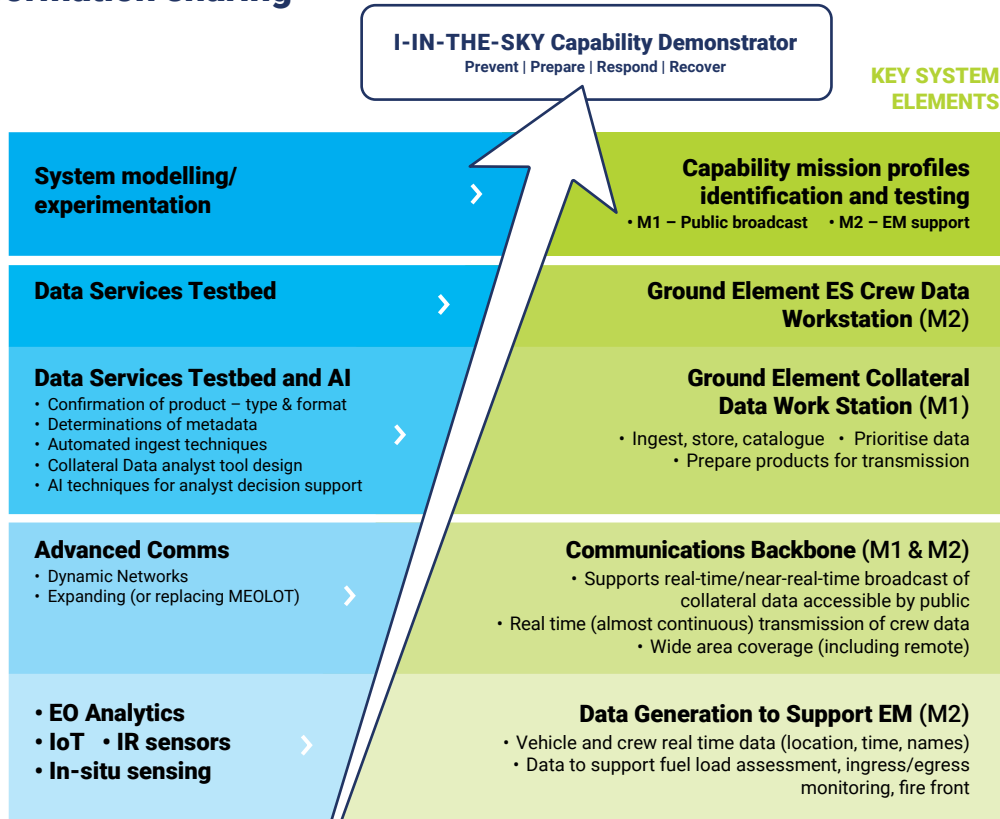
Effective Emergency management pivots around providing relevant and timely information to emergency management personnel and the public. How can emerging space technologies help achieve this?

Satellite Technologies can support pervasive emergency situational awareness & information sharing

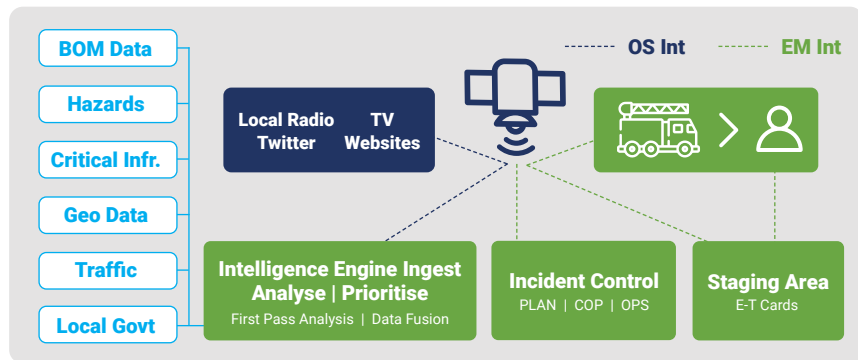
Satellite technology can enhance emergency management across the Prevent, Prepare, Respond and Recover phases.

TECHNOLOGY CONTRIBUTIONS

-  Space Segment
-  Ground Segment Sat Comms
-  Ground Segment Terrestrial Comms
-  Data Analytics & Management System
-  End User Terminals



Concept: Resilient, timely, all-source information fusion and broadcast system for EM planners, incident controllers and the public. Ingests, prioritises and broadcasts intelligence information including; weather information, road status, traffic alerts, emergency shelters locations, flood areas, fire fronts, location of responders and their assets, all enhanced by drawing on the rich data in existing data stores and producing customised value-added information products to incident controllers and front line responders where and when needed.



Systems Analysis: Provides the pathway from User Requirements to System Design.

To provide maximum research impact, SmartSat has established **three Capability Demonstrator missions**. This goal-orientated research and innovation aims to meet some of Australia’s major challenges including water and land management (**Aquawatch Australia**), defence and national security (**Indo-Pacific Connector**), and response to increasing frequency of natural disasters (**I-in-the-Sky**). Research outputs from these CDs may be translated for operational adoption by end-users as fully fledged missions.

For further information, please contact:
info@smartsatcrc.com
 Level 3, McEwin Building, Lot Fourteen
 North Terrace, Adelaide SA 5000



Australian Government
 Department of Industry, Science,
 Energy and Resources

AusIndustry
 Cooperative Research
 Centres Program