SMARTSAT
COOPERATIVE RESEARCH CENTRE

# Capability Demonstrator: AquaWatch Australia

**Mission Goal:** AquaWatch Australia will safeguard the health, quality and security of freshwater and coastal resources, and grow Australia's high-tech space industry through an integrated ground-to-space water quality monitoring system.

Knowledge of water quality information from inland rivers, reservoirs and coastal zones is a critical requirement for the effective monitoring and management of this essential resource. Access to safe and clean freshwater impacts rural and urban communities, agriculture, livestock and wildlife. Freshwater quality can be adversely affected by natural or man-made low river flows, warm temperatures, toxic algae blooms, hypoxic blackwater from floodplain inundation, bushfires, sediment and nutrients transport. Recent events like the Menindee region fish deaths (>1 million fish died in 2019) led to major environmental, political, economic and community concerns as well as significant economic loss. Similarly, coastal water quality is a key factor for fishing, ecosystem health, aquaculture, recreation, and tourism.

Preventing poor water quality requires improved monitoring, forecasting and management responses. Australia needs a comprehensive and bespoke monitoring capability with in-situ measurement and satellite Earth observation platforms that can be used to provide accurate information to support responsible management.

**The AquaWatch Australia mission is a partnership lead by CSIRO and SmartSat. With a view to help to grow Australia's space and environmental monitoring industry,**

**the proposed mission will bring together key research partners, government and industry into a nationally relevant project with global export opportunities for Australian Industry.**

The AquaWatch Australia mission will cover inland, estuarine and near-coastal water bodies in Australia and globally to facilitate the science and management objectives of:

- Freshwater availability & safe drinking water for communities, a critical global issue.
- Improved management of freshwater and coastal water ecosystems.
- Protection of natural ecosystem functions, & reduced impacts of contaminants.
- Early detection and improved management and mitigation of extreme events such as fish kills, harmful algae blooms, floods and coral bleaching.
- Detection and discrimination of macro and micro-plastics using hyperspectral remote sensing.
- Estimating land to ocean sediment fluxes using multi-sensor data merging.
- Photo-bleaching and microbial degradation of aquatic organic carbon and its influence on optical remote sensing signature.
- ML based remote sensing models to map phytoplankton dynamics in sediment rich river flood discharges.
- Market and non-market value of inland and coastal aquatic water quality.

IN COLLABORATION WITH:

CSIRO

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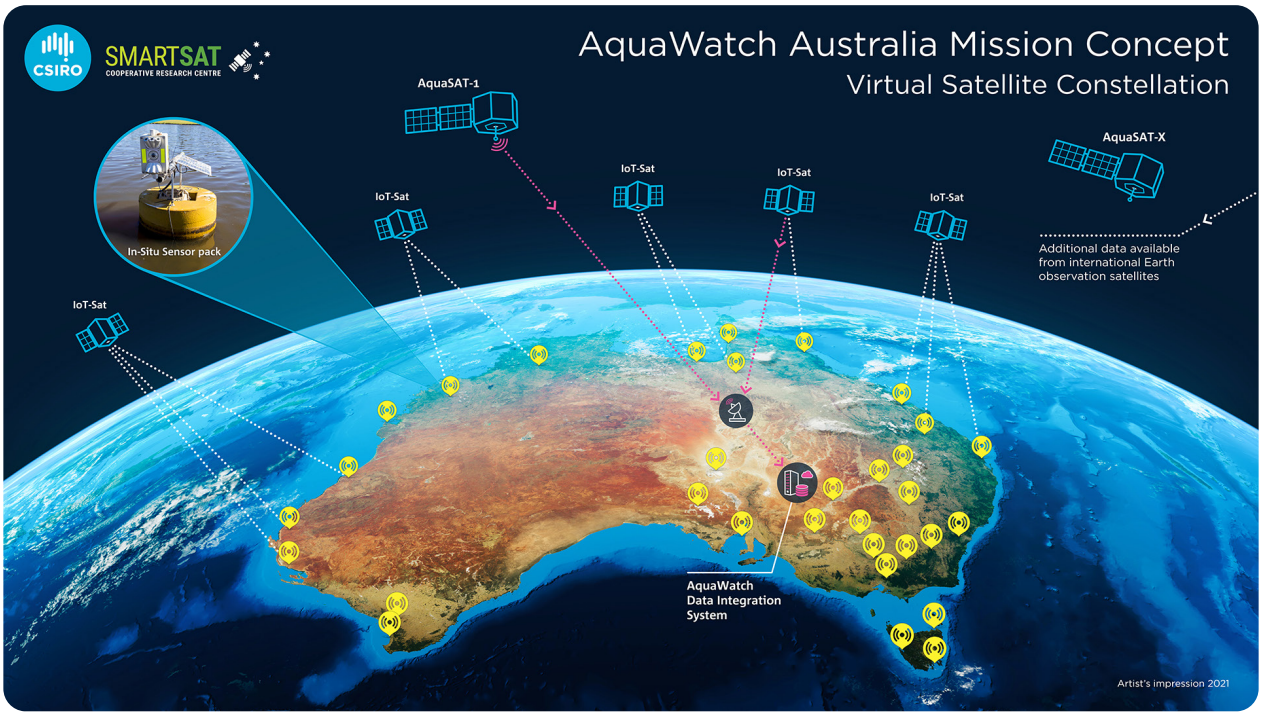
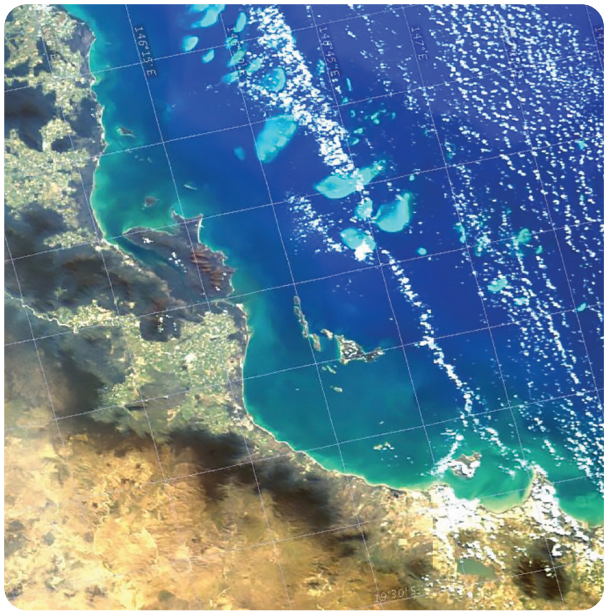



## Impacts

The AquaWatch Australia mission aims to contribute to the development of Australia's space industry through:

- Development of a sovereign mission capability that is also the first dedicated water quality satellite Earth observation mission in the world
- The upskilling of Australians through collaboration with international space agencies
- New space related employment opportunities. This provides enormous opportunities for growth and economic productivity.
- Contribution to the international efforts of aquatic ecosystem monitoring, through collaboration and data provision to ongoing and planned hyperspectral satellite Earth observation missions and research.



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.

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AusIndustry
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