

AquaWatchAUK (Australia/United Kingdom)

Empowering decision making using an integrated ground-to-space monitoring system for better water quality data



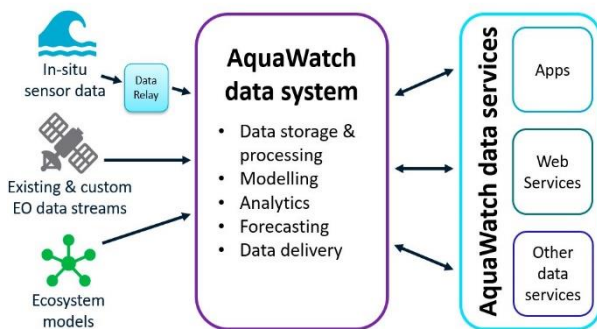
Water quality is a global issue

We all rely on freshwater and coastal ecosystems, not only for our own wellbeing, but to support a healthy environment and prosperous economies. But these critical ecosystems are rapidly degrading due to human impacts and increased frequency of extreme weather events. Comprehensive monitoring is essential for effective management action.

AquaWatch-AUK expertise

Australia and the UK have partnered to form AquaWatch-AUK, which builds upon CSIRO's AquaWatch program for the UK, with the potential to be expanded to integrate other nations and data supply service.

With support from the UK Space Agency and the Australian Space Agency, CSIRO are collaborating with the UK's RAL Space, Surrey Satellite Technology Ltd (SSTL), Assimila, Cefas, Pixalytics, and Australia's SmartSat CRC to deliver AquaWatch-AUK. This collaborative approach progresses space technology innovations to deliver 'decision-ready' water quality data from national to international scales.



Space technology and near-real time monitoring

Benefiting from the world class expertise of both countries, through the support of the UK-AU Spacebridge, AquaWatch-AUK will provide an inland to coast monitoring and forecasting system by integrating satellite Earth observation data with in-situ water sensor measurements, processed using modelling and powerful cloud-based data analytics software for decision making.

The space segment of AquaWatch is envisaged as a 'virtual constellation' of existing and planned Earth observing satellites, supplemented by bespoke satellites to fill critical information gaps in water quality and aquatic ecosystem monitoring.

Data derived from our space applications will provide alerts for water quality risks and support proactive actions

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from water management and the community through co-designed products and services. The development of these water quality products will provide benefits to key stakeholders, industries and communities through economic savings, improved environmental outcomes and the harmonisation of water data to end users for easier access and understanding.

CyanoSense – hyperspectral imager

The CyanoSense program, led by CSIRO, is developing bespoke hyperspectral imaging payloads to detect and monitor potentially harmful algal blooms in coastal and inland waterbodies from space. Through the development of novel manufacturing techniques these payloads integrate a custom optical system, a high-performance compute module for on-board data processing, and a low-power supervisor with versatile electrical interfaces to enhance adaptability, allowing seamless integration with a wide range of spacecraft platforms, ensuring broad compatibility and operational flexibility.

AquaSat-1

The AquaSat-1 mission concept, jointly developed by CSIRO and NASA's Jet Propulsion Laboratory (JPL), is designed to provide space-based observations that can be used to provide actionable information on water quality and aquatic ecosystems for societal benefit. AquaSat-1 is proposed as the first Earth observing mission to demonstrate the challenging combination of high spatial resolution, high temporal resolution, high spectral resolution, and high sensitivity required for space-based aquatic measurements.

Aquasat-1 design focusses on three application objectives: potentially harmful algal blooms, invasive aquatic vegetation, and live coral cover. We are now exploring opportunities for a path to flight for AquaSat-1, which includes assessing the potential of UK-developed satellite platform for this mission as part of AquaWatch-AUK.

Next steps

The AquaWatch system, is scalable and this modular concept enables multiple international partners to co-invest to benefit their own national priorities.

We want to connect with partners who can support the development, including satellite design, construction and data processing, managing and implementing sensor networks, sensor manufacturing and data services, Earth observation and predictive modelling for real-time applications.

AquaWatch Australia

Email: aquawatch@csiro.au

<https://research.csiro.au/aquawatch/>