

THE AUSTRALIAN SPACE RESEARCH PROGRAM: PLATFORM TECHNOLOGIES FOR SPACE, ATMOSPHERE AND CLIMATE PROJECT

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Recently, the Australian Government established the Australian Space Research Program and supported the Platform Technologies for Space, Atmosphere and Climate project. The aims of this research are to investigate advanced platform technologies for space-related research, including in-space tracking and navigation, precise satellite positioning, space weather, atmospheric modelling and climate monitoring. New algorithms and enhanced atmospheric models will be developed in the context of new generation navigation and geo-environmental satellite programs to enhance Australia's capability in space research and meteorological applications. It is anticipated that this will lead to a significant global competitive advantage for Australian companies involved in the use of advanced space technologies for positioning, tracking and environmental monitoring.

The insufficient density of ground-based meteorological observation stations (especially in the Southern Hemisphere) and the lack of accurate data over the world oceans and polar regions significantly limit the accuracy and reliability of the current climate models. As such it is important to develop and evaluate new observational techniques to gain an improved understanding of climate change in the Asia Oceania region. Satellite-based remote sensing provides powerful means of precise measurement of characteristics of the Earth environment on a global scale.

An emerging approach to atmospheric satellite remote sensing, the Global Navigation Satellite Systems (GNSS) Radio Occultation (RO), has proven to be an important and robust atmospheric sounding technique of retrieving high accuracy and high vertical resolution data, with an un-biased global coverage, availability over difficult-to-access areas and all-weather operation capability. The GNSS RO data can be used to improve the absolute accuracy of temperature analyses based on other space-based observations and to improve models of the troposphere, stratosphere and ionosphere.

Under this project, advanced algorithms and optimised methodologies will be developed in order to improve the use of and accuracy of GNSS RO data from Constellation Observing System for Meteorology, Ionosphere and Climate (COSMIC) mission and consequently to improve analysis of key atmospheric characteristics such as temperature and moisture. These algorithms and methodologies will be developed with a view to be also implemented for data retrieval from planned new satellite missions across the globe (e.g. KOMPSAT-5 from Korea, COSMIC-II from Taiwan/USA, radio occultation sounder for atmosphere from Italy and others) and possible future Australian satellites.

To summaries, a suite of satellite-based technology platforms will be developed for the purposes of space tracking, precise positioning, space, atmosphere and climate related research which will be an important step forward in advancement of our understanding of the global climate change as well as the regional tropical climatic hazards in Asia Oceania.

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