

EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Sensors and Technology (3)

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SPATIAL HETERODYNE OBSERVATION OF WATER (SHOW) CAPABILITY DEMONSTRATION

Abstract

The Canadian SHOW instrument is designed to measure high spatial resolution vertical profile of water vapor, a significant greenhouse gas component leading to global warming aspects of climate change. Dynamics of water vapor exchange between upper troposphere and lower stratosphere are not well understood and improving the climate change models will require higher spatial resolution atmospheric water vapor measurements than currently available in the upper-troposphere and lower-stratosphere region. In addition, the aging of existing lower resolution space infrastructure will lead to significant gaps as repeatedly identified by international Earth Observation organizations.

A successful technology demonstration of the Canadian SHOW instrument, based on a monolithic spatial heterodyne spectrometer, was completed on a stratospheric balloon (September 2014). This was the first demonstration of this method for the measurement of water vapor. This activity appropriately demonstrated the technology and enabled the development of data processing algorithms. Such a capability demonstration also provides useful insight into the instrument concept and operations enabling early risk reduction and mitigation towards a future space mission.

The paper will describe the SHOW instrument, the stratospheric balloon campaign, and a summary of the resulting data products and an overview of the upcoming airborne campaign as a precursor of a future space mission.