

The CLARREO Climate Benchmarking Mission: The Absolute Radiance Interferometer (ARI) is a proven prototype for the Infrared portion of the full observing capability

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The NASA Climate Absolute Radiance and Reflectivity Observatory (CLARREO) will use highly accurate, spectrally resolved infrared emission and reflected solar measurements to quantify global trends in the climate of the Earth (Wielicki *et al.*, BAMS, 2013). This year, the resources for a CLARREO Pathfinder/Tech Demo flight of both IR and reflected solar instruments on the International Space Station (ISS) were included in the 2016 President's recommended budget.

The technical readiness for this ISS mission has been proven by NASA supported instrument developments, including that of the Absolute Radiance Interferometer (ARI), a prototype for the infrared portion of CLARREO. ARI was developed by our group teamed with the Anderson Group at Harvard University and ABB of Quebec, Canada (supported by the NASA Earth Science Technology Office, ESTO).

The ARI instrument measures absolute spectrally resolved infrared radiance (3.7-50 μm) with ultra-high accuracy (< 0.1 K 3-sigma brightness temperature). Resolving spectral lines allows ARI to provide products for climate trending with much higher information content than those from current radiation budget measurements. The key new aspect of the ARI instrument is the On-orbit Verification and Test System (OVTS) for proving its accuracy on-orbit by reference to International Standards (SI).

The ISS provides a platform well suited to unbiased temporal sampling below 52 degrees latitude, and intercalibration of operational sounding instruments that give good polar coverage. Therefore this pathfinder mission will be capable of initiating the CLARREO benchmark record.