

EARTH OBSERVATION SYMPOSIUM (B1)  
Interactive Presentations (IP)

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PERFORMANCE OF THE SPACE ORBITING ARGUS 1000 MICRO-SPECTROMETER:  
SIGNAL-TO-NOISE RATIO (SNR) ANALYSIS

**Abstract**

Carbon Dioxide (CO<sub>2</sub>) is one of the most important greenhouse gases after water vapor (H<sub>2</sub>O) which plays significant role in the climate process. Measurements of CO<sub>2</sub> must meet the precision requirement 1% in order to accurately infer the location of CO<sub>2</sub> sources and sinks. GENSPECT, a line-by-line radiative transfer code, was used to investigate the top-of-atmosphere radiance change for 1% CO<sub>2</sub> variation in the atmospheric boundary layer (ABL) near the band 1580 nm. Findings suggest that the required signal-to-noise ratio (SNR) must be 2000:1 for Argus 1000 micro-spectrometer to detect 1% CO<sub>2</sub> change in the ABL. Laboratory experiments shows that Argus 1000, with SNR 1693:1, can detect 1.18% CO<sub>2</sub> change in the ABL.