

MicroMAPS CO Measurements over North America and Europe during Summer-Fall 2004

V. Connors¹, P. Hopkins², H. Reichle³, W. Morrow⁴, W. McMillan⁵, and M Sandy⁶

1 NASA Langley Research Center, Hampton, VA

2 University of Virginia, Charlottesville, VA

3 NASA Retired, Moon, VA

4 Resonance LTD, Barrie, Ontario, Canada

5 University of Maryland- Baltimore County, MD

6 Virginia Space Grant Consortium, Hampton, VA

The MicroMAPS instrument is a nadir-viewing, gas filter-correlated radiometer which operating in the 4.67 micrometer fundamental band of carbon monoxide. Originally designed and built for a space mission, this CO remote sensor is being flown in support of satellite validation and science instrument demonstrations for potential UAV applications. The MicroMAPS instrument system, as flown on Proteus, was designed by a senior student design project in the Aerospace Engineering Department, Virginia Tech, in Blacksburg, VA. and then revised by Systems Engineers at NASA Langley. The final instrument system was integrated and tested at NASA LaRC, in partnership with Scaled Composites and Virginia Space Grant Consortium (VSGC). VSGC supervised the fabrication of the nacelle that houses the instrument system on the right rear tail boom of Proteus. Full system integration and flight testing was performed at Scaled Composites, in Mojave, in June 2004. Its successful performance enabled participation in four international science missions on Proteus: in 2004, INTEX -NA over eastern North America in July, ADRIEX over the Mediterranean region and EAQUATE over the United Kingdom region in September, and TWP-ICE over Darwin, Australia and the surrounding oceans in Jan-Feb 2006. These flights resulted in nearly 300 hours of data.

In parallel with the engineering developments, theoretical radiative transfer models were developed specifically for the MicroMAPS instrument system at the University of Virginia, Mechanical Engineering Department by a combined undergraduate and graduate student team. With technical support from Resonance Ltd. in June 2005, the MicroMAPS instrument was calibrated for the conditions under which the Summer-Fall 2004 flights occurred. The analyses of the calibration data, combined with the theoretical radiative transfer models, provide the first data reduction for the science flights reported here. These early results and comparisons with profile data from the NASA DC-8, the coincident AIRS CO retrievals, and selected CO measurements from the MOZAIC program will be presented.