

Meteorological Measurement System

MMS

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Data Collection/Creation Process

Basic Equation: **$V_{\text{air}} = V_{\text{aircraft}} + V_{\text{wind}}$**

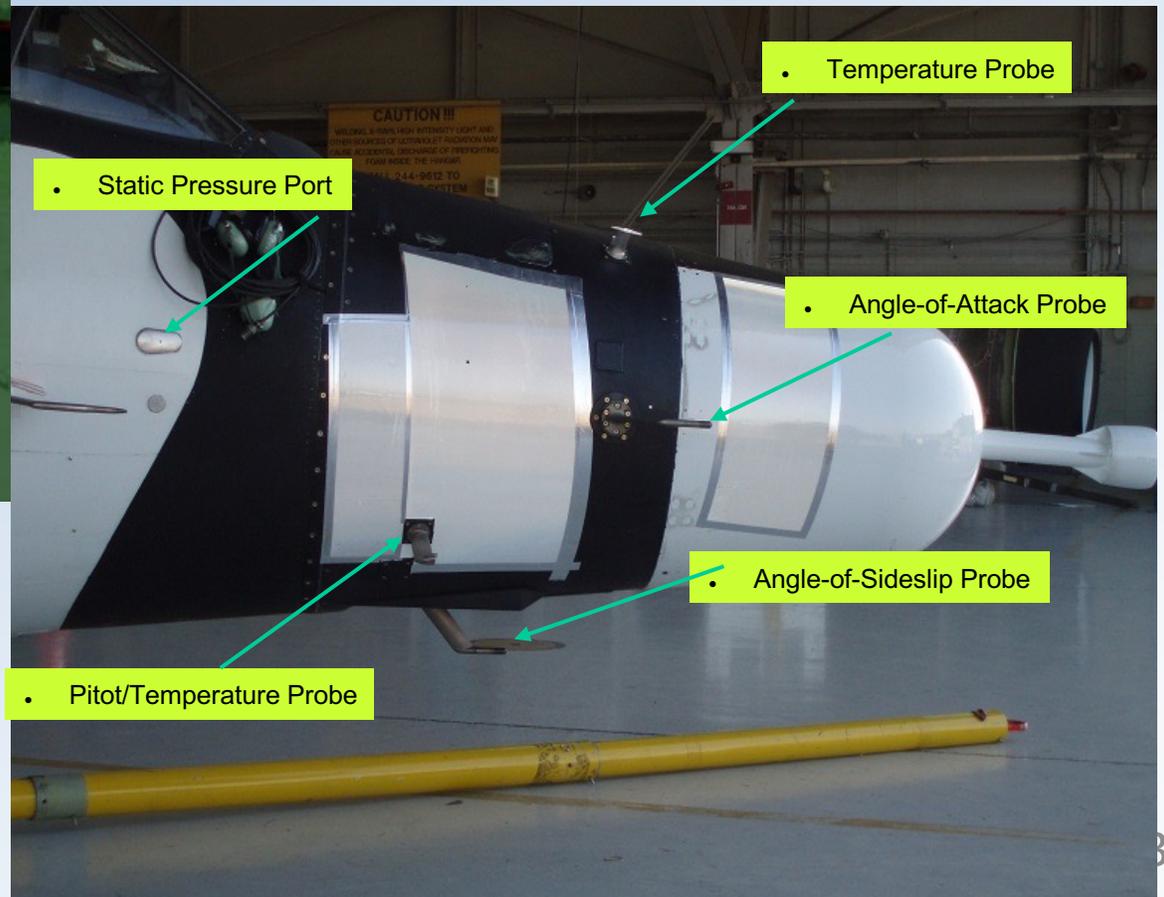
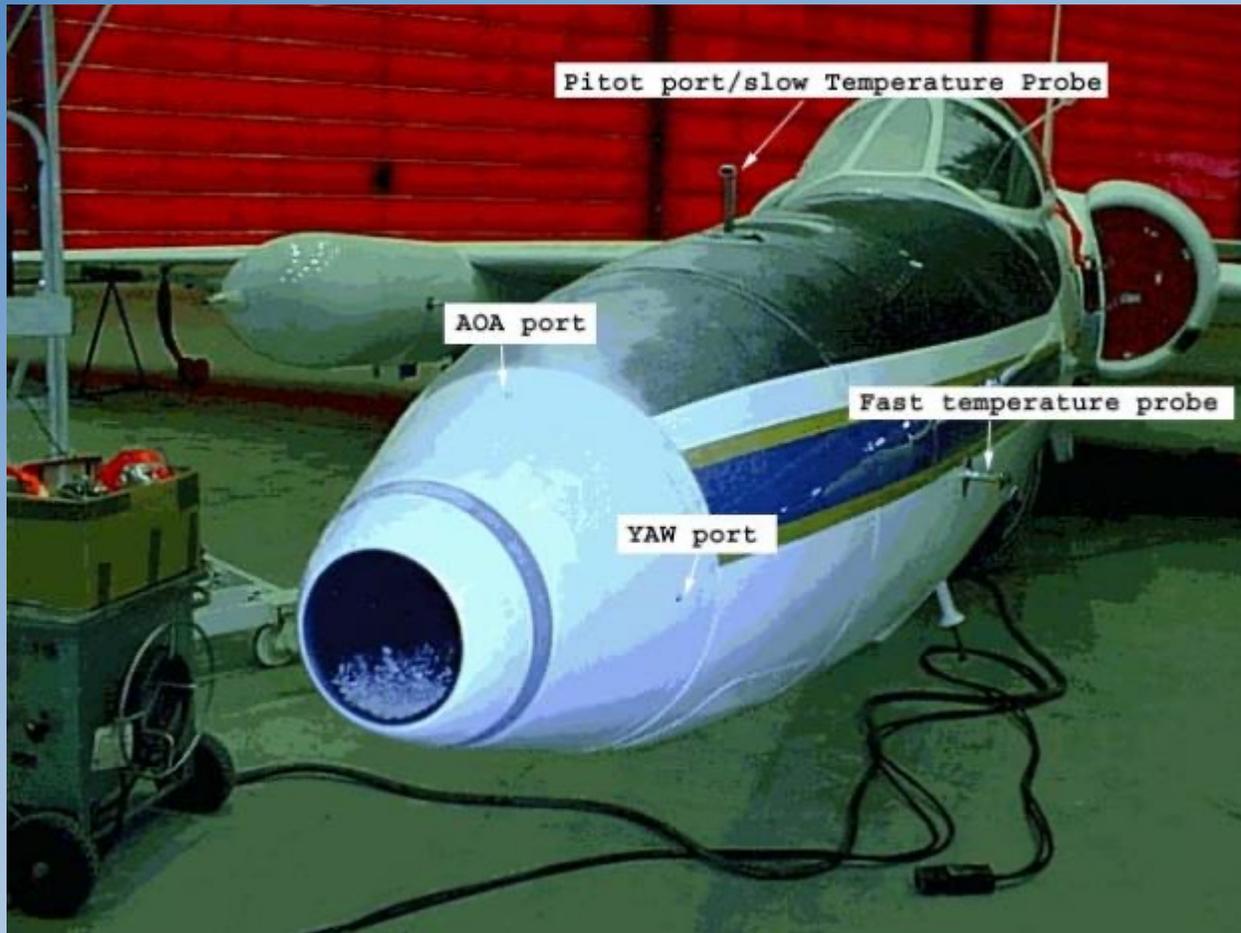
V_{air} = F(many pressures, temperature), ~200m/s

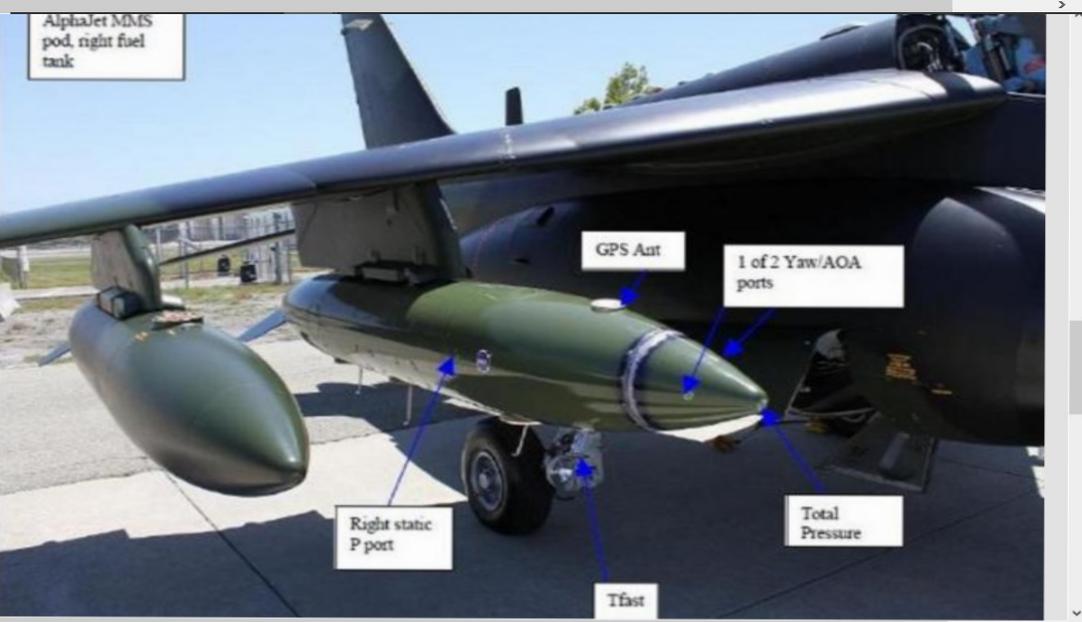
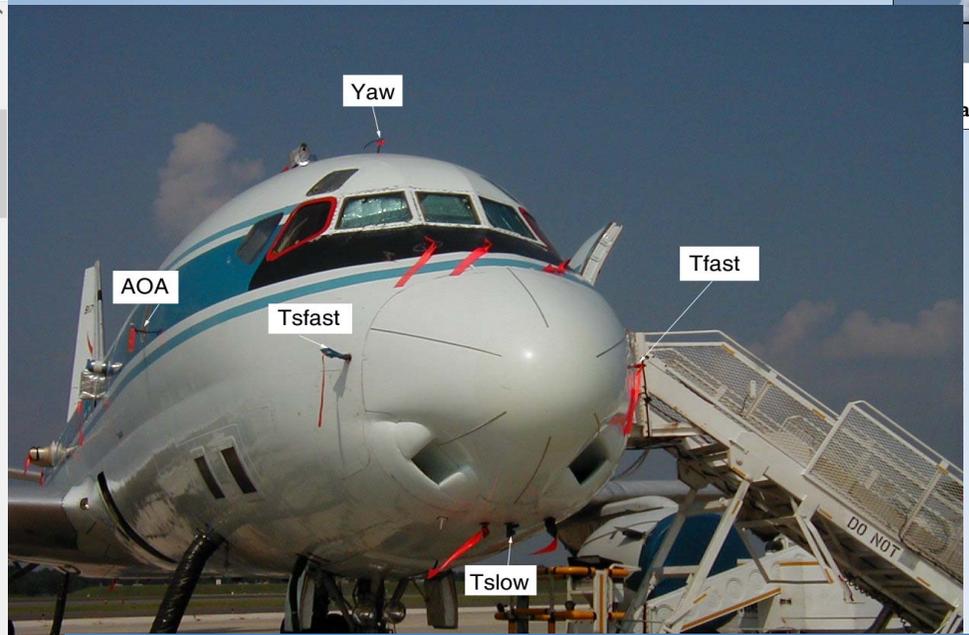
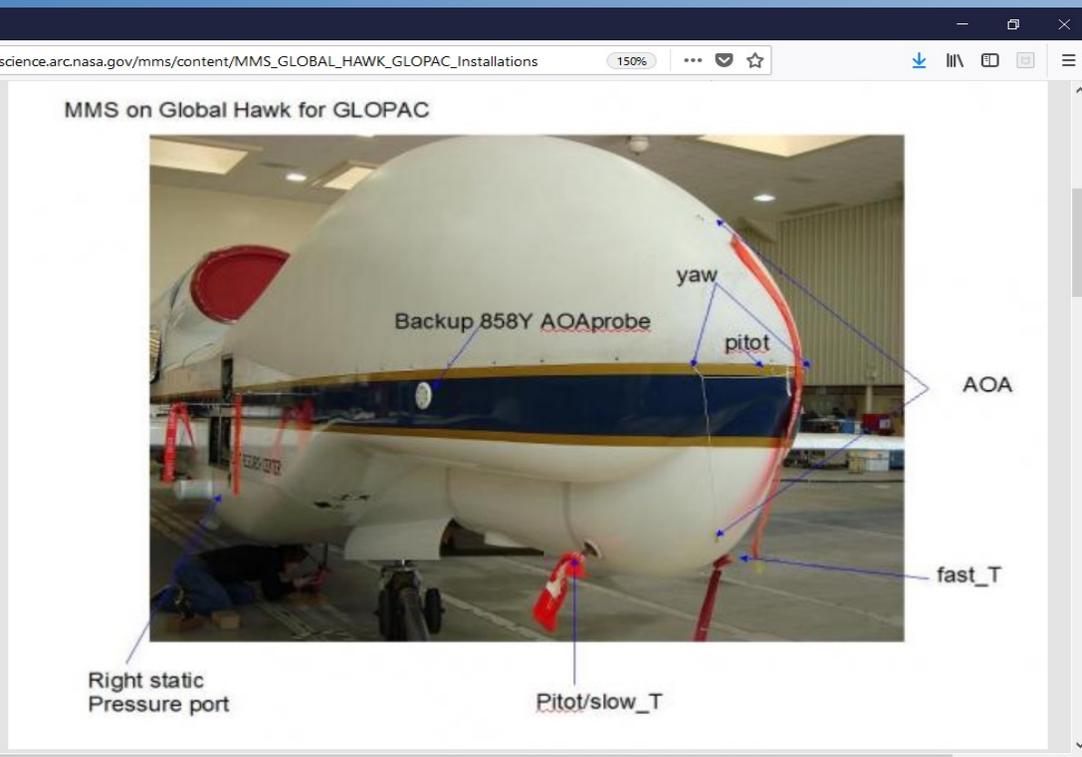
V_{aircraft} = GPS corrected ground velocities, ~200m/s

V_{wind} = 0 - 50 m/s

Sample over 45 parameters at various rate (300, 100, 20, 1 Hz)

<https://airbornescience.nasa.gov/mms>





File Structure & Content

- Text ICARTT format files:
 - DCOTSS-MMS-20HZ_ER2_YYYYMMDD_Rx.ict (~100 MB)
 - DCOTSS-MMS-1HZ_ER2_YYYYMMDD_Rx.ict (~ 5 MB)
- Primary Products: in situ Meteorological Data (Pstatic, Tstatic, 3D Winds)
- Secondary Products: turbulence dissipation rate index, potential temperature, Reynold Number, aircraft positions.

File Structure & Content

- Ancillary Data (for long-term archival, potential to re-calculate primary variables, and diagnostic by other payloads such as isokinetic flow determination):
 - platform velocities, attitudes, compressible-dynamic-pressure, sideslip angle, angle-of-attack, vertical acceleration, differential pressures of sideslip and angle-of-attack

Data Limitations & Considerations

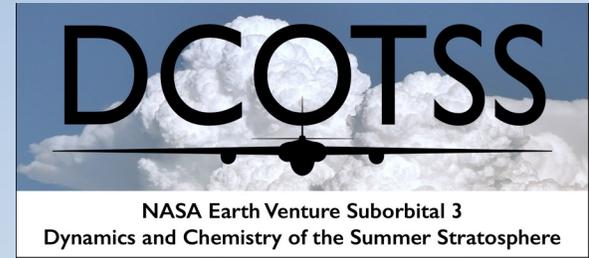
Data at 1 Hz & 20 Hz (Vertical wind zero

averaged) variable	typical value	precision	accuracy
pressure	60 mb	± 0.003 mb	± 0.3 mb
temperature	180 K	± 0.05 K	± 0.3 K
horizontal wind	30 m s^{-1}	$\pm 0.01 \text{ m s}^{-1}$	$\pm 0.5 \text{ m s}^{-1}$
vertical wind	$<1 \text{ m s}^{-1}$	$\pm 0.05 \text{ m s}^{-1}$	$\pm 0.1 \text{ m s}^{-1}$

Tentative Archival Timeline

- Field preliminary data are typically available within hours post-flight
- Post campaign calibrated data are archived within 6-month
- Current schedule is to archive 2021 by February 2022

Upcoming Conference Presentations



- Plan to present MMS-ER2 and MMS-WB57 intercomparison in ACCLIP Jan 2022 Science Team Meeting