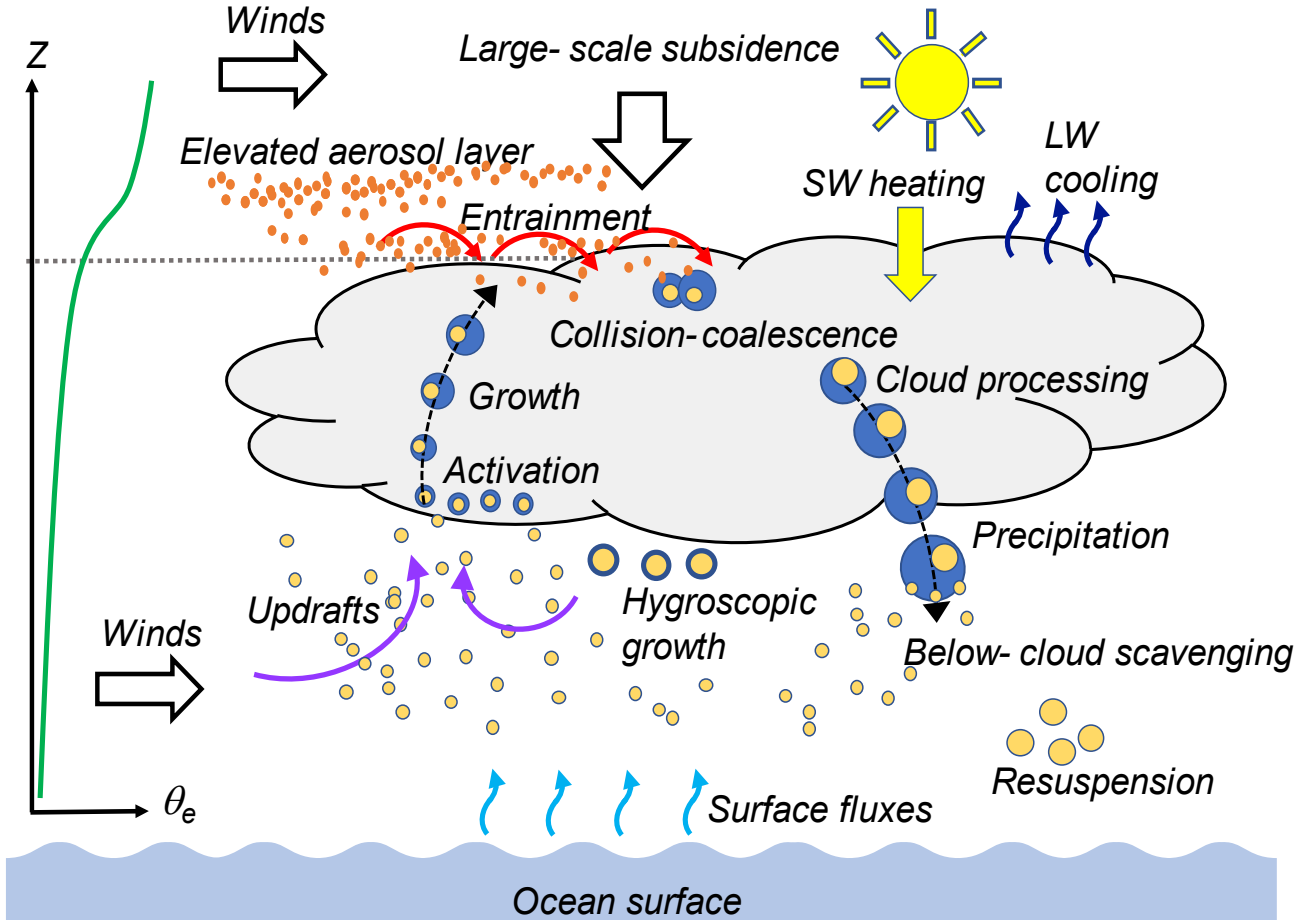
Facility Update

Armin Sorooshian
The University of Arizona

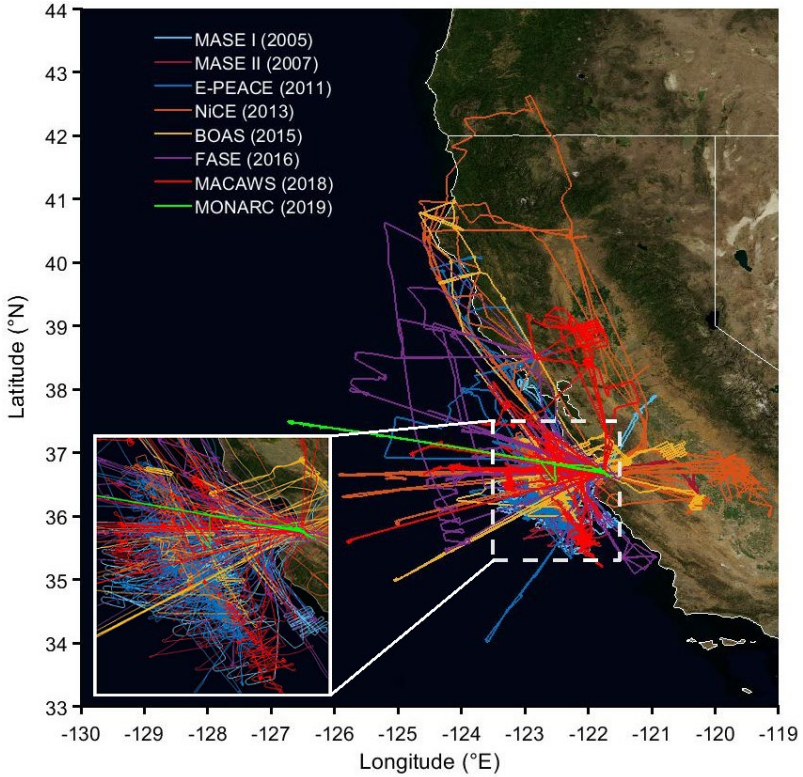
SCOAR Committee Meeting• 4 October 2022

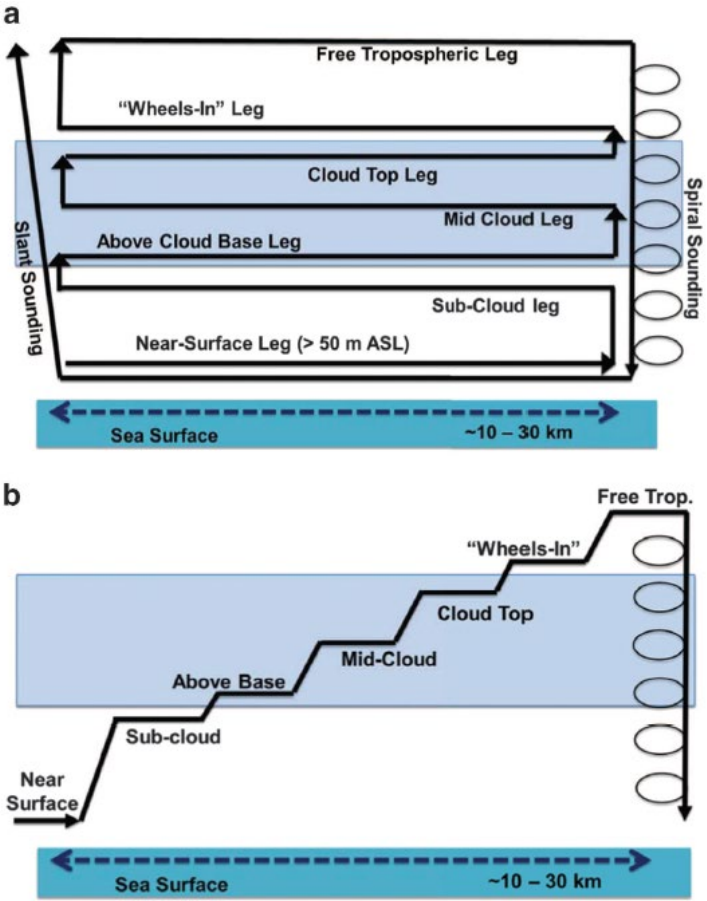
Airborne Research

Center for Interdisciplinary Remotely-Piloted Aircraft Studies Twin Otter



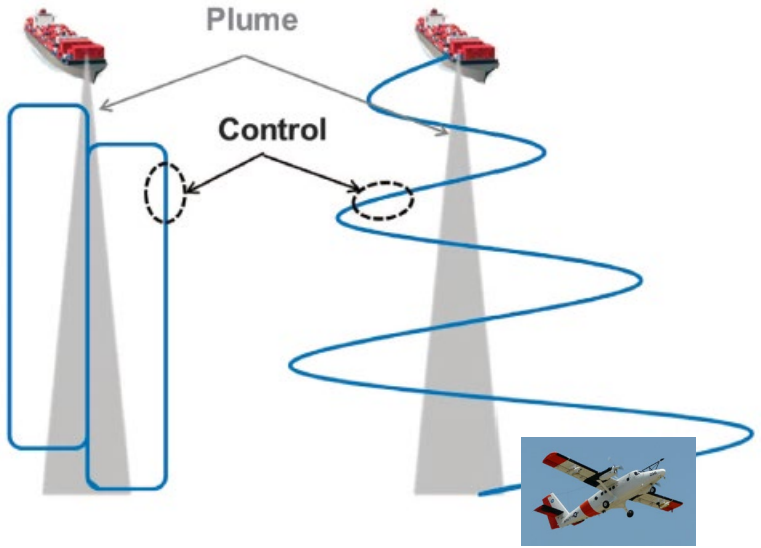
A Multi-Year Dataset of Aerosol-Cloud Interactions





- 144 flights, ~660 flight hours
- Data: Met/Nav/Aerosol/Cloud
- Map excludes the 2021 California Smoke Mission

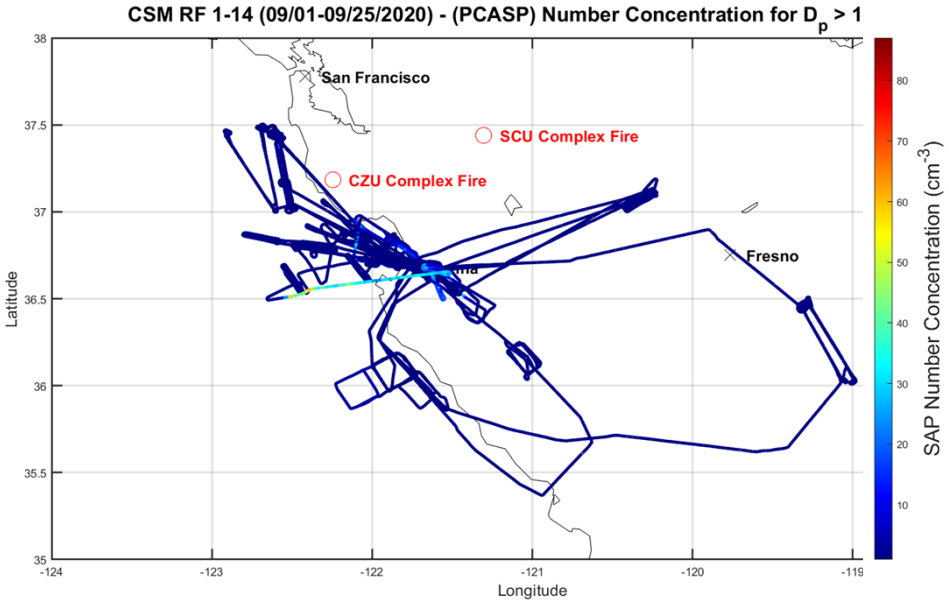
A Multi-Year Dataset of Aerosol-Cloud Interactions

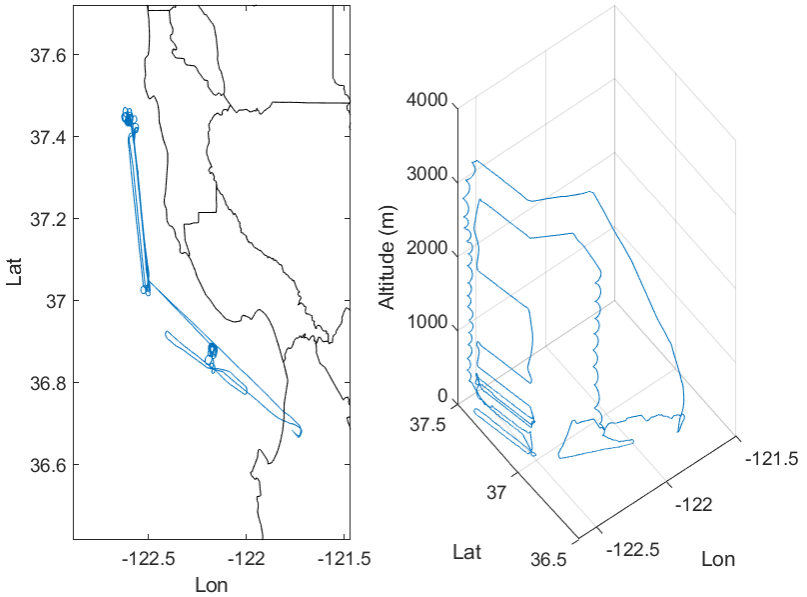


<u>Twomey effect</u>

More aerosol = more but smaller droplets (at fixed liquid water)

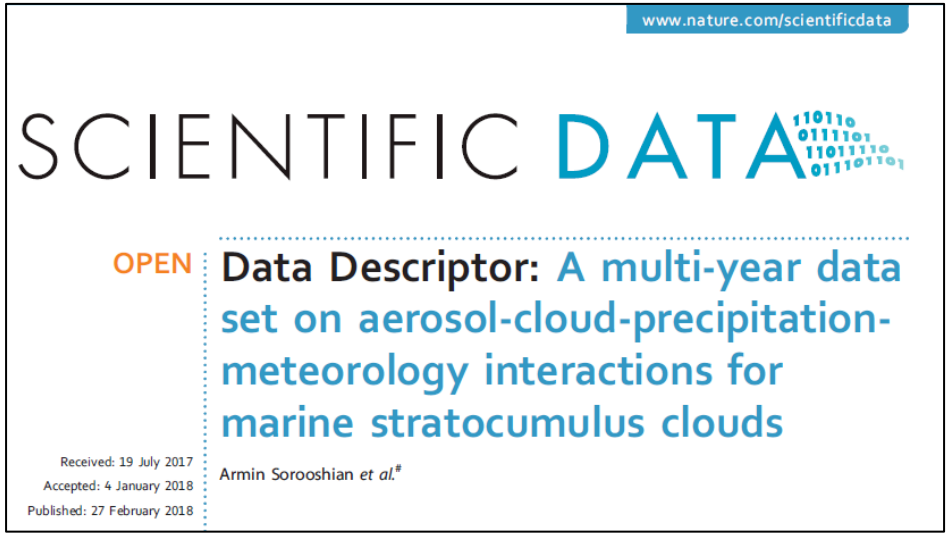
California Smoke Mission (1 Sep – 25 Sep 2020)





- 14 flights characterizing smoke and sea salt during a very busy wildfire season
  - Numerous vertical profiles to intercompare with Navy products

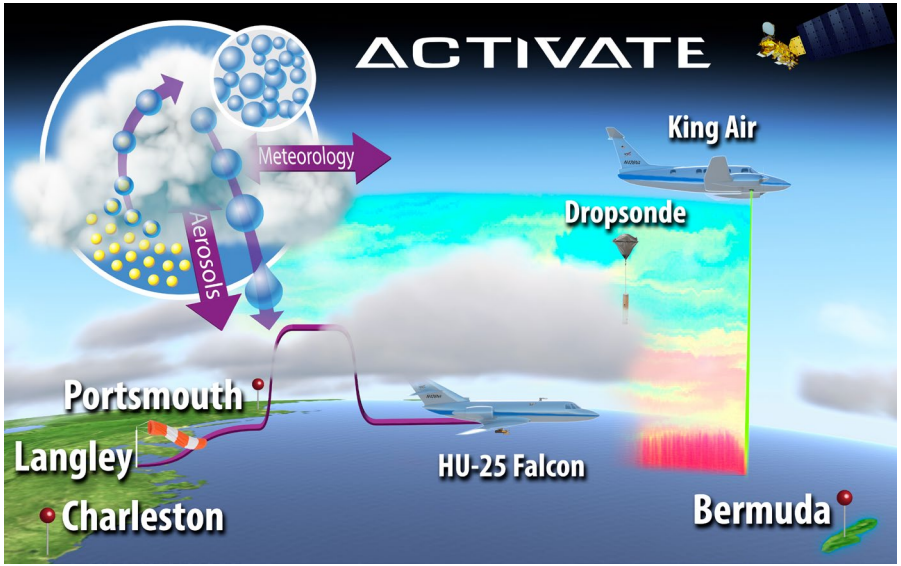
Archival of Twin Otter Data



Sorooshian et al. (2019), *BAMS*

Extensive Outreach via Student Training

Aerosol Cloud meTeorology Interactions oVer the western ATlantic Experiment

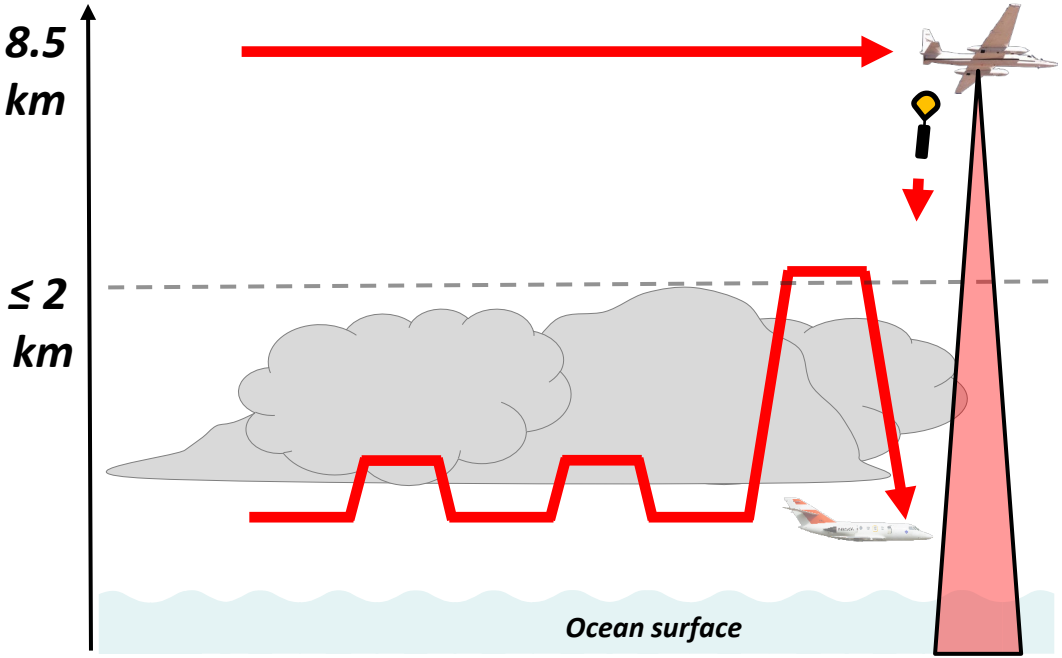


Science: Build an **unprecedented dataset** to better understand aerosol-cloud-meteorology interactions, improve physical parameterizations for Earth system and weather forecasting models, assess remote sensing retrieval algorithms, and guide plans for future satellite missions.

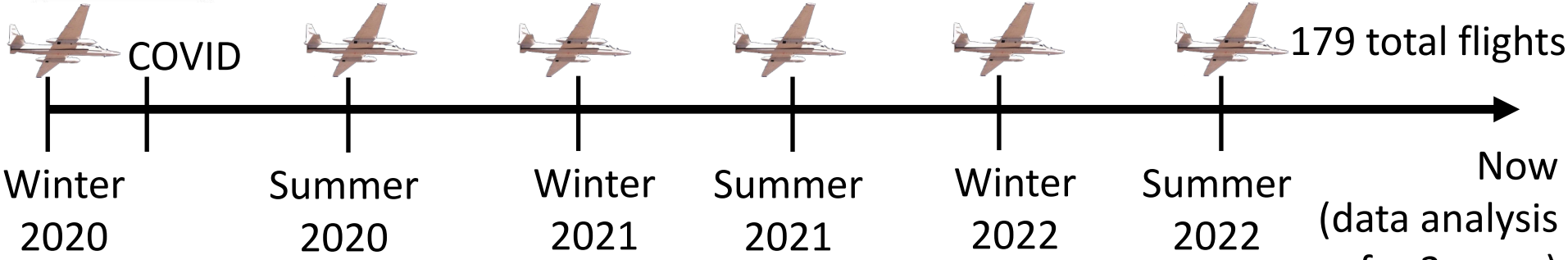
- PI: Armin Sorooshian (U. Arizona)
- NASA Earth Venture Sub-orbital (EVS-3) Mission
- $30 Million between Jan 2019 – Jan 2025
- Partnering Institutions: U. Arizona, NASA LaRC, NASA GISS, NCAR, SSAI, NIA, PNNL, BNL, U. Miami, DLR (Germany)
- Science Team > 130 people and growing

- Airborne element:
  - Platforms: HU-25 Falcon + King Air
  - 150 joint airplane missions (~600 hrs per plane) over western North Atlantic Ocean
  - Based out of NASA LaRC, Hampton, VA
- Approach:
  - Measurements: In situ and remote sensing measurements of aerosol and cloud distributions and properties, atmospheric state
  - Modeling: Particle dispersion, chemical transport, single-column, large-eddy simulation, cloud-resolving, weather forecasting and climate modeling

Flight Concept



Watch the Falcon forward camera video!

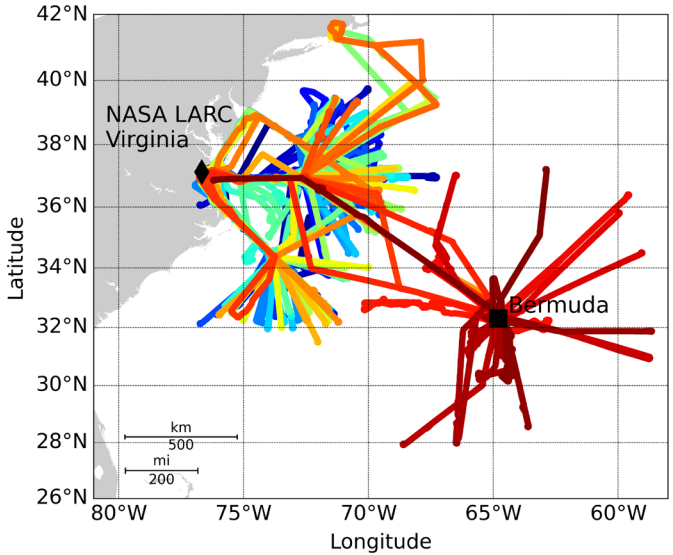


The Washington Post
Democracy Dies in Darkness

Coronavirus | Latest news | U.S. map | World map | FAQ | Vaccine tracker | Coron

Capital Weather Gang

Coronavirus is wreaking havoc on scientific field work

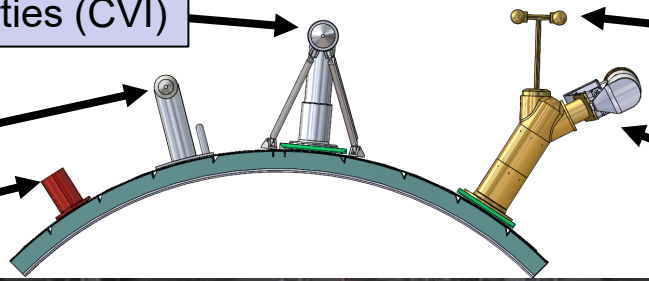


Payload: Falcon External Probes

Cloud Residual Properties (CVI)

Isokinetic Aerosol Inlet

Trace Gases



Cloud Droplet Probe

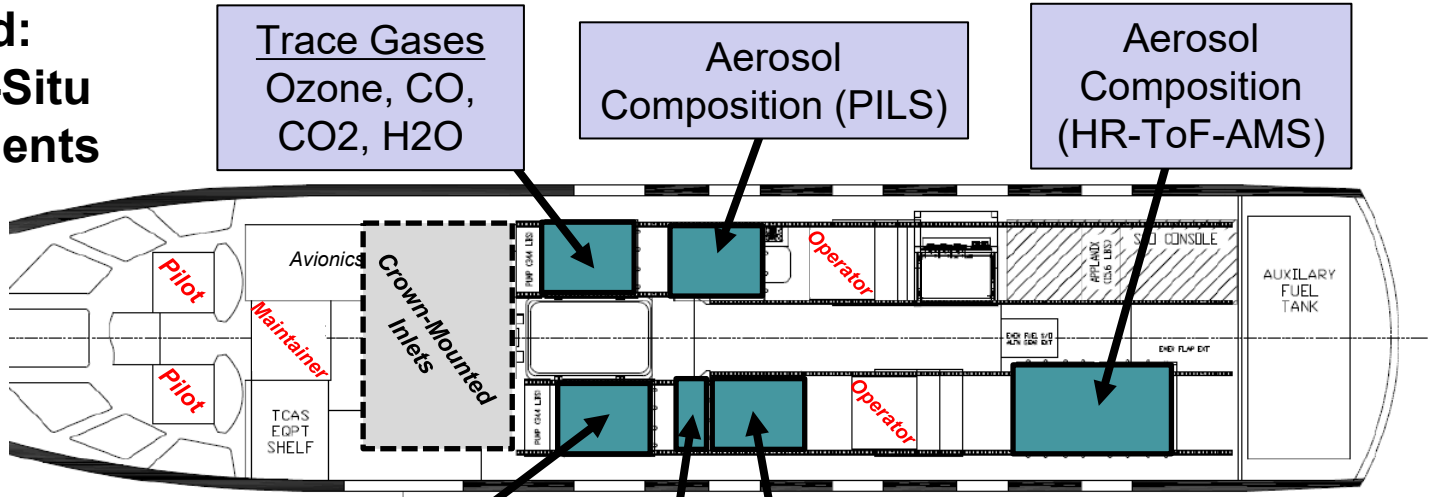
AC3 Cloud Collector

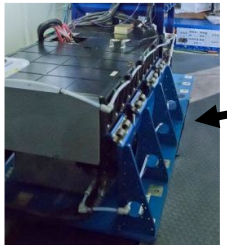
Cloud Aerosol Precipitation Spectrometer (Langley)

Turbulent Air-Motion Measurement

FCDP/2D-S Cloud probe (DLR)

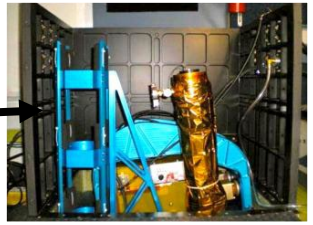
Payload: Falcon In-Situ Measurements

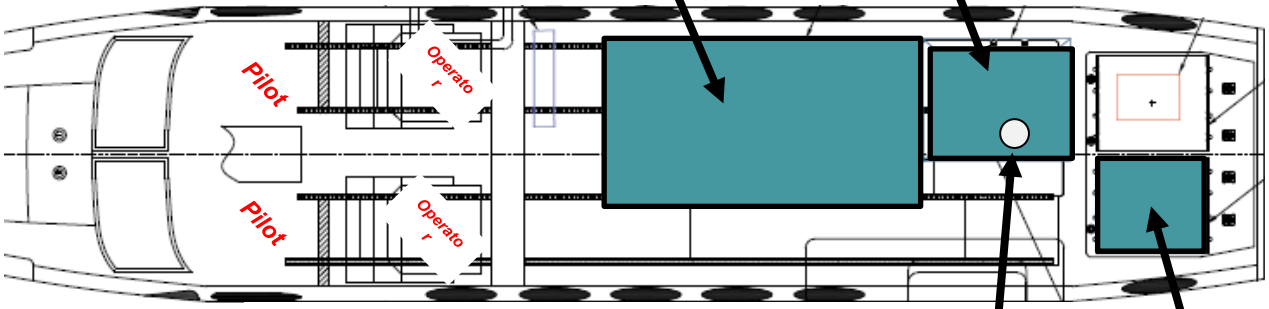




High Spectral Resolution Lidar (HSRL-2)

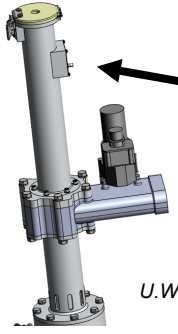
Research Scanning Polarimeter (RSP)





Entry Door

Payload: King Air



U.Wyo B-200 Launcher

Dropsonde Tube Penetration

Dropsonde (AVAPS) and RSP support Electronics