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Falcon 20: Cayenne instrumentation changes since Darwin

HAIC/HIWC A/C Science Team Meeting

Content

- **μ -phys payload: baseline & alternative configurations**
- **Background humidity improvements**
- **Aerosol measurements on F20**

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μ-phys payload: baseline & alternative configurations

Baseline configuration:

- Remote sensing

RASTA

- In-situ microphysics : baseline configuration

CDP

2D-S

PIP

IKP-2

ROBUST

SEA LWC 0.5mm

RICE

- Set of 5 field mill sensors
- Licor 840 & WVSS-2 humidity sensors
- LS detector
- GO-PRO camera for flight deck recognition. How to bring time stamp to GO-PRO, acquisition protocole? (Tom Ratvasky).
- **Spare probes: 2D-S (NASA), PIP (IRT at NASA), CDP-2 (SAFIRE, AIRBUS, NASA), ROBUST sensors,**

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μ-phys payload: baseline & alternative configurations

Alternative configurations:

CPI-1 / HSI (HSI taken into consideration for Convair)

-> **IKP to be dismantled (limited electrical power):** *Only if ROBUST stays*

CPSPD

-> **CDP-ROBUST dismantled:** *Only possible if IKP stays*

ICD / LWC

-> **ROBUST probe temporarily replaced by:** *Only if IKP stays*

CPC 3010 & UHSAS (0.06-1μm) or PCASP-100 (0.1-3μm)

-> **PIP dismantled for clear sky calibration flight**

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Background humidity measurements

Background humidity improvements:

-> for subtraction of water vapour from IKP raw data

-> optimize inlets for Licor & WVSS:

- Use inlet prepared for G-2 now for Licor on F20;
- Inlet is reverse flow equipped with cone to deflect hydrometeors away from inner tube of Licor air inlet;
- Bottom rear fuselage – rain protected...; allow for zero air from Drierite canister to purge/dry inlet lines (valves+plumbing)
- Use WVSS downstream simpler backward facing tube on top fuselage



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F20 Instrumentation

- ▶ Background humidity meas. : new inlet installation under finalization
- ▶ Lightning strike detection: installation on the fuselage roof aperture



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Aerosol measurements

Aerosol measurement

- ▶ UHSAS probe (0.06-1 μm) / PCASP (0.1-3 μm)
 - SAFIRE probe already installed on F-20
 - Use whatever PC for acquisition
- ▶ TSI CN 3010 (> 0.01 μm)
 - CNRS: new rack installation on F-20
 - Requires simple inlet and pump (MD1 – LaMP)



High Altitude Ice Crystals (HAIC, 314314)

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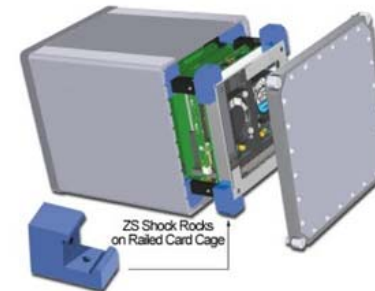


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PLANET

PLANET

Improvement Hardware: Darwin 2014 & Cayenne 2015 (smaller, lighter, less power)



on-board communication protocol: from Iridium SBD protocol (messages and files <1Kb) to Iridium Rudics (IP tunneling = buffering) to allow images file transfer <50 Kb

On-site (Cayenne) communication protocol: buy the satellite terminal for Cayenne and make all connection between the satellite terminal and the local server

Real time transfer to upload any kind of file to the onboard/ground PLANET server

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PLANET

Improvements of PLANET system:

web user interface: messages, tracking of F20 aircraft, geomarkers, in situ measurement monitoring, weather products

The screenshot displays the PLANET web user interface in a browser window. The address bar shows the URL `planet.atmosphere.aero:8080/haic/`. The interface includes several key components:

- PLANET Service info:** A section on the left with a blue 'i' icon and a list of system messages.
- Real time Tracking and weather:** A small map and a data plot showing red and green lines, with a link for "Access to active usage".
- Real time TWC monitoring:** A data plot showing green and red lines.
- Zone definition:** A gear icon and a link.
- Main Map:** A large map of the South Pacific region with a grid. It features a toolbar with icons for globe, mountain, moon, and weather. A vertical toolbar on the right includes icons for SWx, RAD, SAT, and a weather icon. A bottom toolbar includes icons for an airplane, a target, a grid, a compass, a location pin, a lock, and a refresh icon.