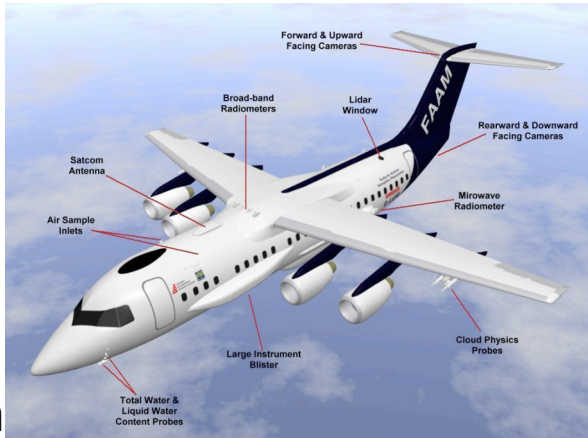


## BAe-146 FAAM Aircraft



Gen

Very likely both aircraft are to be based at Arica. The UK recce is early April, both Arica and Iquique will be visited.

Arrival now confirmed:

Departure date:

Total of 120 flight hours including transit

20 potential flight days

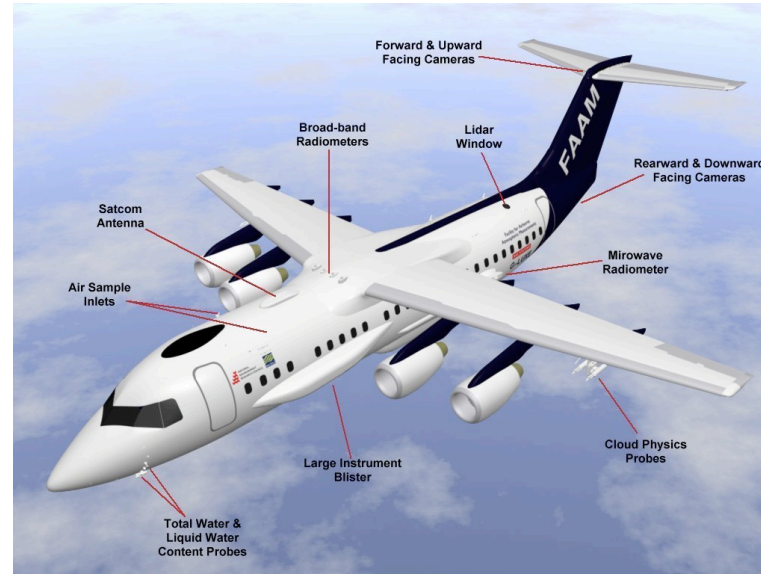
12-13 flights ~ 5 - 5.5 hrs duration

Day and night flights possible

Min altitude: 50 ft

Maximum altitude: 35,000 ft

## BAe-146 FAAM Aircraft



### Information:

Test flying UK: 17<sup>th</sup> and 20<sup>th</sup> Oct 2008

Prep and transit 21<sup>st</sup> to 24<sup>th</sup> Oct inclusive

Set up in Chile: Oct 25<sup>th</sup>

Operation: Sunday 26<sup>th</sup> Oct – Friday 14<sup>th</sup> Oct inclusive

Pack Up: 15<sup>th</sup> Oct

Total of 120 flight hours including transit

15 potential flight days      **10 flights** ~ 5 - 5.5 hrs duration

**Day and night flights possible**

Min altitude: 50 ft

Maximum altitude: 35,000 ft

At present 4 pilots so crew duty is not a problem (this may change if no NERC funding)

However, technical staff duty may provide some limitations (not clear at this stage)



# Crew duty

A single day off will include 2 local nights, and cover at least 34 hours. Additionally:

- a. Crewmembers will not be on duty more than 7 consecutive days between days off.
- b. Crewmembers will have 2 consecutive days off in any consecutive 14 days following the previous 2 days off.
- c. Crewmembers will have a minimum of 7 days off in any consecutive 4 weeks.
- d. Crewmembers will have an average of at least 8 days off in each consecutive 4-week period, averaged over 3 such periods.

## MAXIMUM FLIGHT DUTY PERIODS (Applies to FAAM science staff also)

LOCAL TIME OF START	NUMBER OF FLIGHTS				
	1	2	3	4	5
0600 -0659	13	12 $\frac{1}{4}$	11 $\frac{1}{2}$	10 $\frac{3}{4}$	10
0700 -1259	14	13 $\frac{1}{4}$	12 $\frac{1}{2}$	11 $\frac{3}{4}$	11
1300 -1759	13	12 $\frac{1}{4}$	11 $\frac{1}{2}$	10 $\frac{3}{4}$	10
1800 -2159	12	11 $\frac{1}{4}$	10 $\frac{1}{2}$	9 $\frac{3}{4}$	9
2200 -0559	11	10 $\frac{1}{4}$	9 $\frac{1}{2}$	9	9

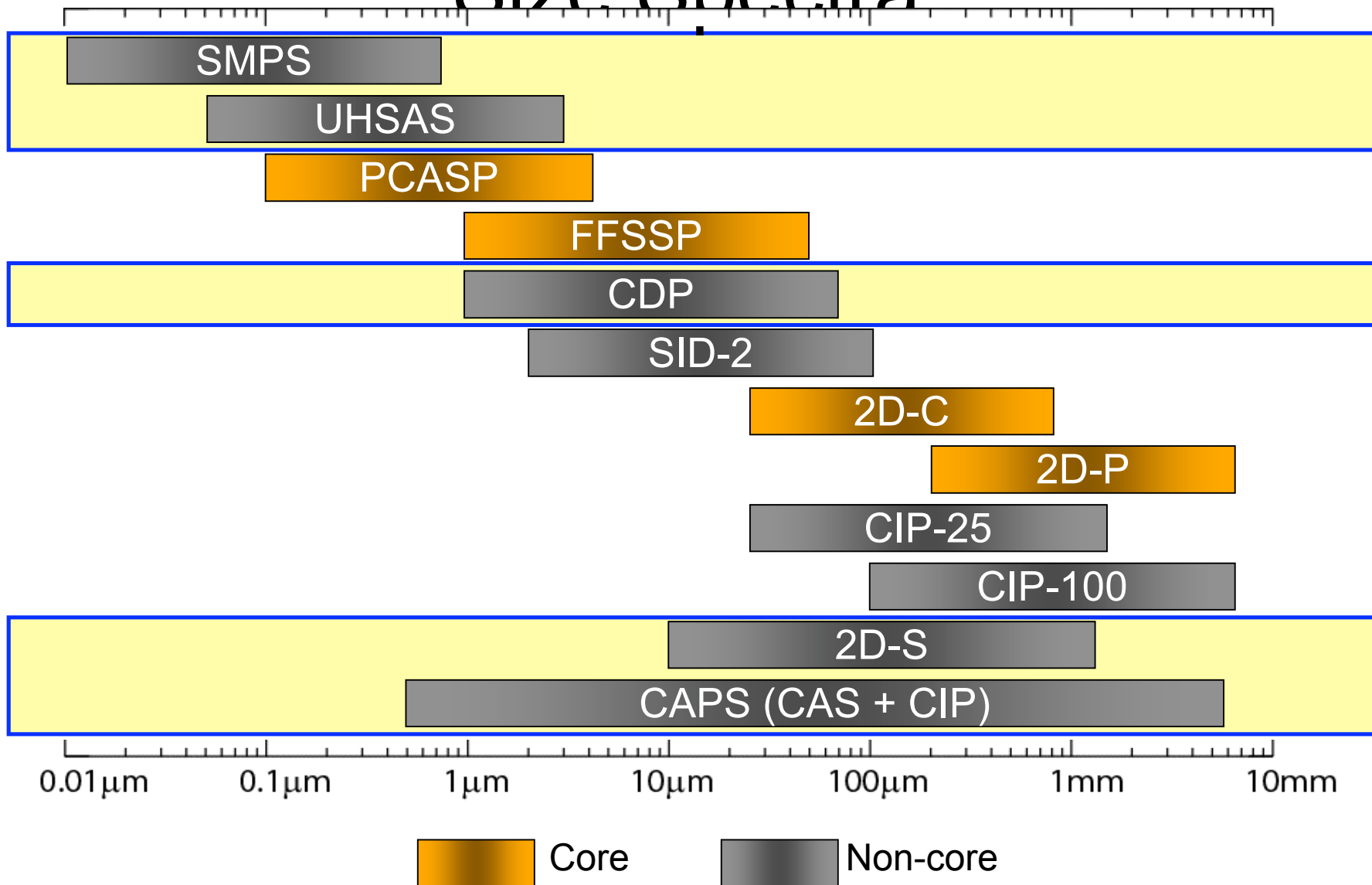
# Instrumentation

During VOCALS the BAe-146 will be in its **radiation** and **cloud/aerosol physics** mode.

In addition to this instrumentation (see next slides) the aircraft will be fitted with

- **Core chemistry:** CO, O<sub>3</sub>, NO<sub>x</sub>
- **Thermodynamics:** Temperature, Humidity, Pressure.....
- **Dynamics:** Turbulence probe
- **Sondes**
- **Video Cameras:** Upward, Downward, Forward, Rear

# Aerosol and Cloud Measurements: Size Spectra



# Aerosol and Cloud Measurements: Bulk

**LWC:** Johnson Williams, Nevzerov LWC, Nevzerov TWC

**Total Water Content:** Liquid + Ice + Vapour (Lynman- $\alpha$  absorption hygrometer)

**CCN:** Dual channel continuous flow

**Condensation Particle Counter:** TSI-3025A Aerosol concentration  $> 3$  nm

**Aerosol Mass Spectrometer:** Mass of non-refractory components of aerosol particles as a function of size (50 – 500 nm)

**Single Particle Soot Photometer (SP2):** Black carbon mass (single particle basis)

**Filters:** Sub and Supermicron

**CVI:** Counter Flow Virtual Impactor (Residual particle & vapour from cloud drops)

**Nephelometer:** Aerosol scattering (dry) at  $\lambda = 450, 550, 700$  nm

**Wet Nephelometer:** Aerosol scattering  $f(\text{RH})$  at  $\lambda = 450, 550, 700$  nm

**PSAP:** Aerosol absorption at  $\lambda = 567$  nm

# Radiation Instrumentation

- Microwave Radiometer (MARSS):** Upward and downward pointing (+40 to -40 deg)  
5 channels 89-183 GHz  
Derive LWP, T + q structure
- Shortwave Spectrometer (SWS):** Pointable high resolution spectrometer measuring  
radiance across spectral range 0.3 – 1.7  $\mu\text{m}$   
MODIS type retrievals of cloud properties
- Spectral Hemispheric Irradiance Measurement (SHIM):** As SWS but  
hemispherically  
integrating. Mounted on top and bottom of aircraft.  
Derive cloud optical depth
- Broad Band Radiometers:** Derive cloud optical depth
- Heiman Radiometer:** Sea surface temperature
- Airborne Research Interferometer Evaluation System (ARIES):** Interferometer  
producing high resolution spectra 18 – 3.3  $\mu\text{m}$ . Retrieve profiles of gases ( $\text{CO}_2$ ,  $\text{H}_2\text{O}$ ,  
 $\text{O}_3$  etc) and sea surface temperature. Cloud info incl cloud top temp.....
- LIDAR:** backscatter lidar possible – due for installation October 2008.

## NERC Do-228 Airborne Research and Survey Facility (ARSF)



**Contingent on NERC award**

**Dates available:** As yet unconfirmed but will at least match those of the FAAM aircraft

**Flight Hours available:** 50 hours (approximately 10 x 5 hours)

**Flight performance:** At FL150 it has a maximum range of 1610 NM (185 kts) and a maximum speed of 236 kts. So can match BAe-146 science speed/duration

**Crew:** 2 and a single scientist

Crew duty information not available at present



## NERC Do-228 Airborne Research and Survey Facility (ARSF)



**LIDAR:** A Leosphere (ALS300) aerosol backscatter lidar will be installed on the Do-228

**ASP:** accumulation mode Optical Aerosol Sizing Probe ( $0.1 < D_p < 10 \mu\text{m}$ , 40 channels)

### **Hyperspectral Imaging:**

The Eagle and Hawk hyperspectral sensors are the most They are pushbroom systems Eagle has a 1000 pixel swath width, covering the visible and near infra-red spectrum 400 - 970nm. Spectral resolution of the sensor is 2.9nm

The AISA Hawk has a wavelength range (970 - 2450nm); it has 320 pixels, 244 spectral pixels and a spectral resolution of 8nm

**AIMMS:** Turbulence sensor