DEEPWAVE Support
NCAR Gulfstream-V

DEEPWAVE Payload – 1 of 3

- **Rayleigh lidar:** measurements of vertical winds and atmospheric densities from ~30-60 km with ~3-km altitude resolution viewing vertically.
- **Sodium lidar:** The NGV sodium lidar will be employed for measurements of vertical winds and temperatures from ~15-30 and ~84-96 km with ~3- to 4-km vertical resolution.
- **Advanced Mesospheric Temperature Mapper (AMTM):** 2-D imaging system to measure gravity wave intensity and temperature in the infrared OH emission layer (centered around 1.5 μm) in the upper mesosphere (altitude ~87 km)

DEEPWAVE Payload – 2 of 3

- **Microwave Temperature Profiler:** a scanning radiometer that observes emitted radiance (brightness temperature) at 56.363 GHz, 57.612 GHz, 58.363 GHz and produces a vertical curtain of ambient temperatures.
- **Laser Air Motion Sensor:** a lidar system using Doppler shift to calculate three dimensional wind fields in flight.
- **Aerosol and Cloud probes:** sensors to measure aerosol size spectrum and cloud microphysics properties.
- **Digital cameras:** visible images and video during day light conditions.

DEEPWAVE Payload – 3 of 3

- **Dropsonde system:** Soundings of temperature, humidity, and wind from the altitude of the aircraft to the surface.
- State parameters, position, 3D winds, satellite communications, IRC chat with GV, GV position on the ground displays will all be available

Dropsonde Strategy

- Dropsondes will be released primarily over water
- Will not be dropped through airways
- Will be released only over pre-detemined points over land where there is no risk of sondes hitting objects on the ground
- Will not be released over any land of Australia
- Will not be released at any time if ATC requests so.
- RAF will use the same approach used recently to safely perform over land sonde releases (next slide).

Example of Sonde Ops

Pre-determined locations shown with calculated dispersion circles and actual sonde landing locations all within the predicted circles. MPEX project, 2013

Lidar Operations

- Lidars will not be operated underneath airways
- Lidars will be turned off in case another aircraft appears on TCAS above GV and closer than 5 nmi
- Lidars will not be operated on the ground unless NOTAM is obtained
- Ground safety rules will be established for all lidars.

Crew Duty (Single)

- Max flight duration: 10 hours (6 hour duration during single crew DEEPWAVE flight operations
- Max hours in one week: 40
- Typically two consecutive flight nights, then rest night
- One hard down day every 6 work days
- Other limitations also apply, will be carried out by GV Project Manager

NSF/NCAR GV Double Crew Period

- Double crew period is 21 June to 4 July
- Number of consecutive night flights may be increased, subject to crew fatigue assessment
- Flight mission duration may be increased subject to fatigue considerations
- Consideration for science crew fatigue is also important