

Table 6.5
NSF/NCAR C-130Q Hercules (N130AR)
Aircraft Instrumentation Specifications
Special Request Sensors

Variable Measured	Instrument Type	Manufacturer & Model No.	Range	Accuracy	Resolution
GPS Dropsondes (AVAPS)	Thermodynamic & Wind Profiler	NCAR	P: 1080-100mb T: -90 to +60 C RH: 0 to 100% WS: 0 to 200m/s	+/-1.0 mb +/-0.2C +/-5% +/-0.5m/s	0.1 mb 0.1C 1.0% 0.1m/s
<p>OPS Characteristics: The dropsonde incorporates a new pressure, temperature, humidity sensor module (RSS903) and a new GPS receiver module (GPS111), both designed by Vaisala, Inc, for their RS90 radiosonde. The winds are derived using the GPS receiver in the dropsonde that tracks the relative Doppler frequency from the RF carrier of the GPS satellite signals containing the satellite and dropsonde motion. These Doppler frequencies are digitized and sent back to the aircraft data system as a 1200 baud Frequency Shift Key modulation on the 400 MHz sonde telemetry transmitter. The transmitter can be set anywhere in the 400-406 MHz meteorological band in 20 kHz steps, creating about 300 separate channels. After launch, the system processes PTH and GPS data from up to four dropsondes simultaneously. Both PTH and wind data are available every 0.5 s, although the measurements are not made at precisely the same times. The system pairs the PTH and wind data that are most closely matched in time. A unique square-cone parachute is used to reduce initial shock load and reduce or eliminate any pendulum motion of the sonde. Sonde descent time from 12km is approximately 12 minutes.</p>					
Counterflow Virtual Impactor (CVI)	Total Liquid Water Cloud Droplet Residue	NCAR	0.001 to 2 g/m3	15%	0.001 g/m3
<p>OPS Characteristics: The NCAR counterflow virtual impactor (CVI) is an airborne instrument that can be used for studies of aerosol/cloud interactions, cloud physics, and climate. At the CVI inlet tip, cloud droplets or ice crystals larger than a minimum aerodynamic diameter are separated from interstitial aerosol and impacted into dry nitrogen gas. This separation is possible via a counterflow stream of nitrogen out the CVI tip, which assures that only larger particles (cloud droplets or ice crystals) are sampled. The water vapor and non-volatile residual nuclei remaining after droplet evaporation are sampled downstream of the inlet with selected instruments. The standard RAF-supplied instruments include a TDL hygrometer to measure total condensed water content and a condensation nucleus counter to measure residual particle number. An optical particle counter and impactor for electron microscope grids are available upon request. Up to four user-supplied instruments can also be accommodated. Limitations include loss of volatile components from residual nuclei and enhanced particle concentrations due to breakup of large ice crystals and or drizzle drops inside the sampling inlet.</p>					
Cloud Particle Imager (CPI)	3-D Imagry	SPEC, Inc			
Wyoming Cloud Radar	mm Radar	Univ. of Wyoming			
Digital Video	Camera & Digital Recording	Point Grey Research			704 X 480
<p>OPS Characteristics: Forward-facing digital camera images are acquired once per second and stored as JPEG files with UTC time in the file name. They are archived at full resolution for applications requiring the highest quality images. In addition, each image is then annotated with a variety of flight and instrument data and all images from a flight are compiled into an MPEG-4 movie. This reduced-resolution, more compressed movie is ideal for quickly scanning through the images in search of particular events. The movies can be played by "Quicktime 6.5" or later, "Xine", or "RealPlayer 10.5" or later.</p>					
AXBT Probe Deployment Chute	Mechanical Dispenser	NCAR			
<p>OPS Characteristics: The C-130 can be equipped with an in-house mechanical chute capable of deploying payloads up to 13 cm in diameter. This unit is suitable for marine AXBT type probes or other similar devices. Note that the RAF does not have any of the equipment necessary for tracking or recording the data from such devices. The antenna, receiver, data recorder and probes all need to be supplied by the User. A system for storing the probes onboard prior to deployment is available and can handle up to 24 units.</p>					
