Table 6.2
NSF/NCAR C-130Q Hercules (N130AR)
Aircraft Instrumentation Specifications
Radiometric Sensors

Variable Measured	Instrument Type	Manufacturer & Model No.	Range	Accuracy	Resolution
Radiometric Surface Temperature (RSTB, RSTB1)	**Bolometric Radiometer (9.5 to 11.5 uM)**	**Heimann Infrared KT19.85**	**-50 to +50 C**	**+-0.5 C**	**0.005 C**
Radiometric Sky Temperature (RSTT)	**Bolometric Radiometer (9.5 to 11.5 uM)**	**Heimann Infrared KT19.85**	**-50 to +50 C**	**+-0.5 C**	**0.005 C**
OPS Characteristics: This unit provides a remote radiometric measurement of surface temperature by comparing incoming radiation in a particular wavelength band against an internal reference. In normal operation one can expect a fairly noisey signal over an unobstructed ground surface. The signal over unobstructed water will be much more stable due to the uniformity of that medium. Because the unit samples the temperature of whatever falls within its field of view, the presence of clouds or other optically opaque materials can result in rapid and extreme fluctuations in the system output. During passage through a dense cloud, the value of RSTB should fall very close to the in situ ambient temperature. Because the instrument is hard mounted to the aircraft frame, the field of view will vary sharply with changes in aircraft attitude. No attempt is made to adjust the data for these changes. Similarly, the output of the instrument is affected by the optical depth within the field of view. The larger the distance (altitude) between the aircraft and the target surface, the greater the error in the measurement.					
Infrared Radiation (IRT, IRB)	**Pyrgeometer 3.5 to 50 uM**	**Epply PIR (NCAR modified)**	**0 to 600 W/M2**	**----**	**0.40 W/M2**
OPS Characteristics: The most significant sources of IR are the earth's surface and clouds. With this in mind IRBC will always be greater than or equal to IRTC. An unobstructed view of the earth's surface should give IRBC values on the order of 400 to 500 W/m2 and will show a gradual decrease with increasing altitude. IRTC measurements in clear skies will also exhibit this altitude dependence as well as a marked correlation with regional humidity values. In the presence of, or during the penetration of cloud formations, these responses will change dramatically. Within a good solid cloud formation, IRTC and IRBC values should be roughly equal (within system accuracies). It is important to monitor these instruments through their "corrected" outputs because of the substantial adjustments required to account for IR emissions by the various components of the instrument itself. The related parameters (DTT,STT,DTB,STB) represent the component dome and sink temperatures for each sensor. These temperatures should roughly track ambient temperature and matched dome and sink temps should remain quite close for the instrument to perform correctly.					
Ultraviolet Radiation (UVT, UVB)	**Photometer 0.295 to 0.385 uM**	**Eppley TUVR (NCAR modified)**	**0 to 200 W/M2**	**----**	**0.12 W/M2**
OPS Characteristics: The sole source of UV radiation is the sun so UVT will always be substantially greater than UVB. Under clear skies typical values for UVT and UVB will be on the order of 30 - 60 and 5 - 15 W/M2, respectively. However, clouds are efficient reflectors of UV radiation and will influence specific measurements. With clouds aloft, UVT and UVB values will be 15 -30 and 2 - 10 W/M2, respectively. With a solid cloud deck in close proximity below the aircraft, UVB values will increase sharply and can be expected in the 20 - 40 W/M2 range. It is important to note that the ratios between UV and SW irradiances should remain fairly constant under most conditions (ie UVT/SWT ; UVB/SWB). A good ballpark number for this ratio is 0.05. Sun angles will be important in these measurements as will aircraft orientation. Atypical fluctuations should first be examined in terms of aircraft attitude before other actions are taken.					
Visible Radiation (SWT, SWB)	**Pyranometer 0.285 to 2.8 uM**	**Eppley PSP (NCAR modified)**	**0 to 1500 W/M2**	**----**	**0.12 W/M2**
OPS Characteristics: The SW instruments cover most of the visible wave bands. The primary source of the SW radiation is the sun and the basic operation follows the previous discussion of the UV radiometers. The OPS range is much larger, however, with typical values running as high as 1400 W/M2 under clear and sunny skies.					