AVIRIS Instrument Computer Changes in Hardware and Software for Data Acquisition

"Too clever is dumb" – German Proverb
Spectrometer (x4) → 8085 controller → Memory Buffer → Metrum VLDS Tape Drive

"The mistakes are all there, waiting to be made" – Tartakower

ER-2 Nav Data, 1Hz

1 Hz, 9600 Baud Serial

1988–98
ER-2 Nav Data, 1Hz

High Alt. Uses ER-2 data
Low Alt. uses CM-2 data

1998 – 1999

1 Hz, 9600 Baud Serial

SBS-OR CC-5
PentiumII 64MB
Lynx RTOS

Flashdisk

10 Hz,
37Kbaud
Serial

Boeing CM-2
Integrated
GPS-INS

"Do, or do not. There is no 'Try'." — Yoda
"If you are going through hell, keep going"

- Winston Churchill
Points to Ponder

• You need an RTOS to implement a complex Real Time System.

• Don’t write Assembly language unless you MUST. Be able to say "Let’s change Hardware". A good RTOS lets you write portable code.

• The difference between Hardware and Software:
  – Hardware is what breaks when you #%*! with it long enough, Software is what works when you #%*! with it long enough.
Sources

- Operating Software – lynuxworks.com, Lynx RTOS
  - Excellent Support at a reasonable price. POSIX standard.
- DSP – bittware.com, dual Analog Devices "SHARC"
  - Outstanding support and assistance, "works as advertised"
  - New "Hammerhead" board offers 2.4 Gflops.
- Integrated GPS/INS – systron.com (was Boeing) "CM–2"
  - Outstanding reliability "A brick that knows where it is"
  - Systron bought the Migits product from Boeing in December
- CPCI Computer – sbs.com SBS/OR "CC–7"
  - Excellent Support and reliability.
- Digital IO – alphitech.com Intelligent Digital IO board
  - On board TMS320 to handle mechanisms control
Additional Information

- The CM–2 gps/inertial nav system is still available but going fast at about $22k/each. There is a CM–3 with 12 channel GPS coming.

- Initializing a CM–2 can be annoyingly difficult if you only know what is in the manual. I will make myself available for off–line discussions for anyone interested in how to make it work.

- Using a DSP for IO is the closest thing to magic that you can use. This programming can also be explained IFF you are interested.