INS Data Collection System

For the
Quarterly Review of the NASA/FAA Joint University Program for Air Transportation Research
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Project Sponsor: Joint University Program

Purpose

- Application of integrated GPS/INS to high dynamic vehicles
- Software development and modification are the primary focus at this time
- Initial hardware has been installed

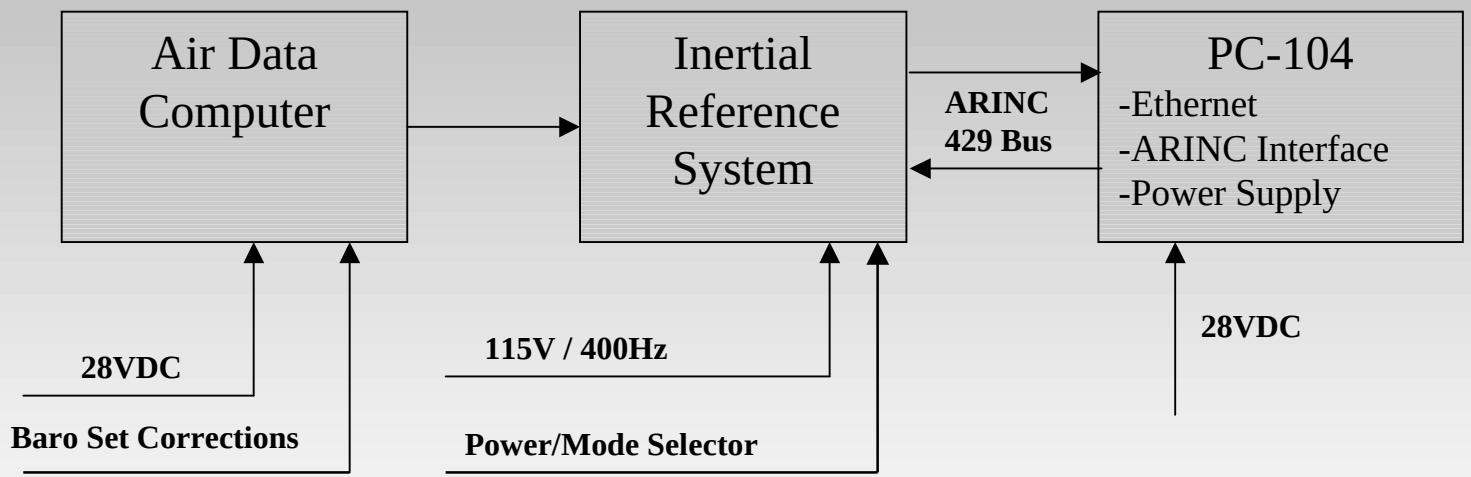
Flight Test Vehicle

- **L - 29 Delphin**
- High Altitude 11 Km
- High Speed 354 knot
- Fully Aerobatic

Flight Specs Taken From http://aeroweb.brooklyn.cuny.edu/specs/aero/l-29.htm

Delphin Cockpit

Data Collection System Block Diagram



Data Collection

- INS data will be collected on the PC-104 computer through the ARINC card
- Time tagging will be accomplished using the CPU clock
- GPS data collection software will be added later

Software Development

- ARINC card has four channels with both high and low speed capability
- Initialization data is transmitted in 2 to 4 bursts on the low speed bus
- INS data is received on the high speed bus

Software Development (continued)

- Labels can be used to mask unwanted outputs
- Software can utilize three high speed buses on INS unit to receive data.
- Up to three programs can run simultaneously collecting data from INS unit

Current Software

- Allows INS data collection
- Eventually allow INS-GPS data collection followed by INS-INS-GPS collection
- Data collected from multiple inputs will have a synchronous time tag to allow for comparison

Software Modules

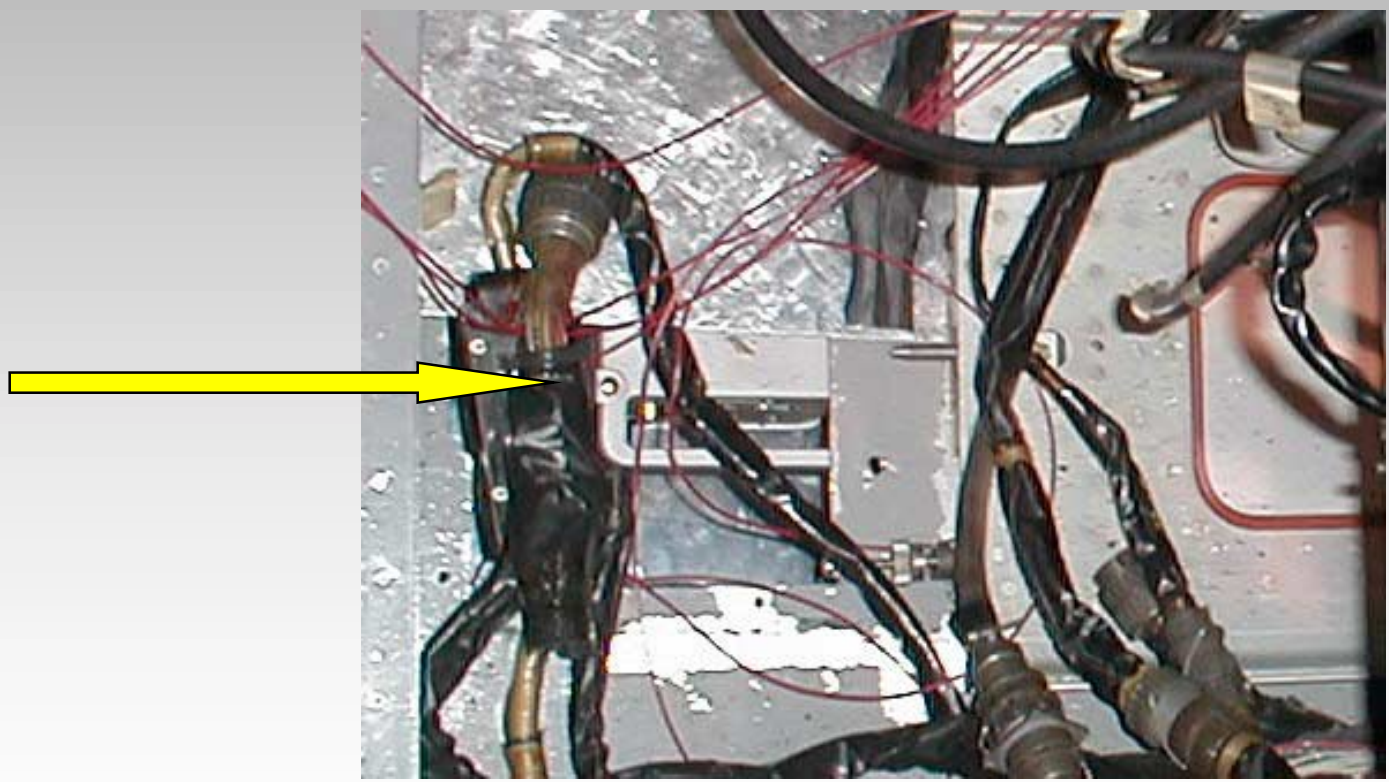
- Software written in modular format
- Modules initialize hardware and software
  - »Initialize ARINC Card
  - »Initialize INS Unit
  - »Initialize CEI-400
  - »Initialize Time Stamp Code
  - »Collect data from INS unit
  - »Call all functions from main

Hardware Configuration

- Encoding altimeter will be replaced with a variable potentiometer
- Control Display Unit (CDU) will be replaced with a single pole single throw switch

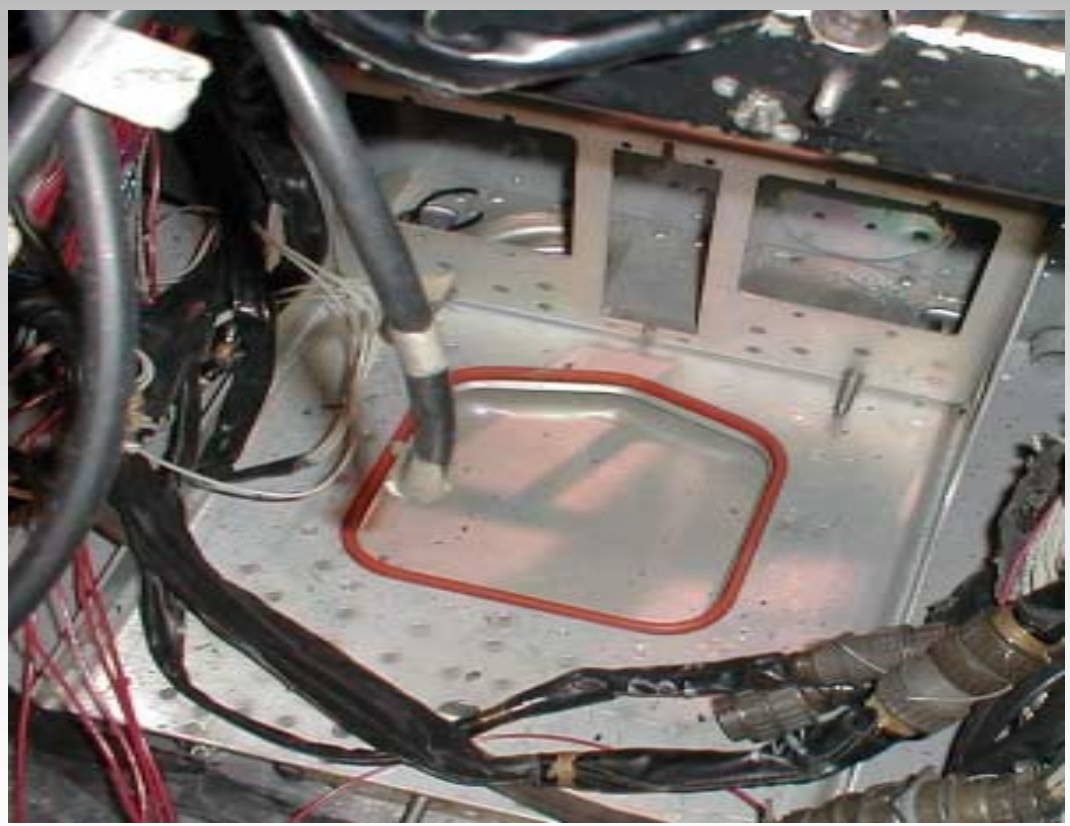
PC-104

- PC-104 handle(seen in center of picture)



Mounting Rack

- Mounting rack for INS unit**.**



Conclusions

- Software will change to meet goals of project
- Additional hardware will be integrated into the system sparking the evolution of the software

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