Section 4:
DEMONSTRATION OF SAMS-FF

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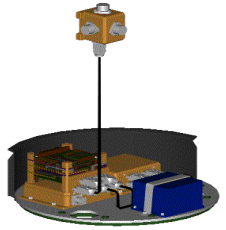
SAMS Free Flyer

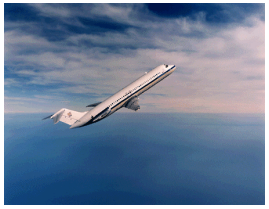
Flexible & Modular System

- **Same basic platform**
- **Easily adapted to experimenter and carrier requirements**
- **Has flown the following configurations**
  - **CDU, TSH, FOG**
  - **TSH & Laptop**
  - **Hermetic CDU & 2 TSHs**
- **Preparing for:**
  - **ISS, Shuttle, Sounding Rocket, KC-135 missions**
  - **Support Ground Characterization before flight**
  - **Evaluate Ground Facilities**

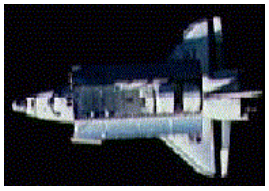
CDU: Control Data Unit
FOG: Fiber Optic Gyroscope
TSH: Triaxial Sensor Head

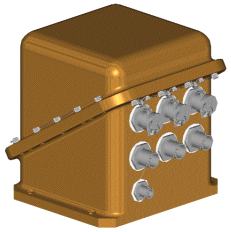


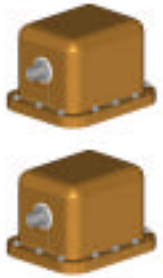
Basic System, in a Sounding Rocket



Compact System, with any Computer







Hermetically Sealed for Outdoor Operation

Demonstration of SAMS-FF

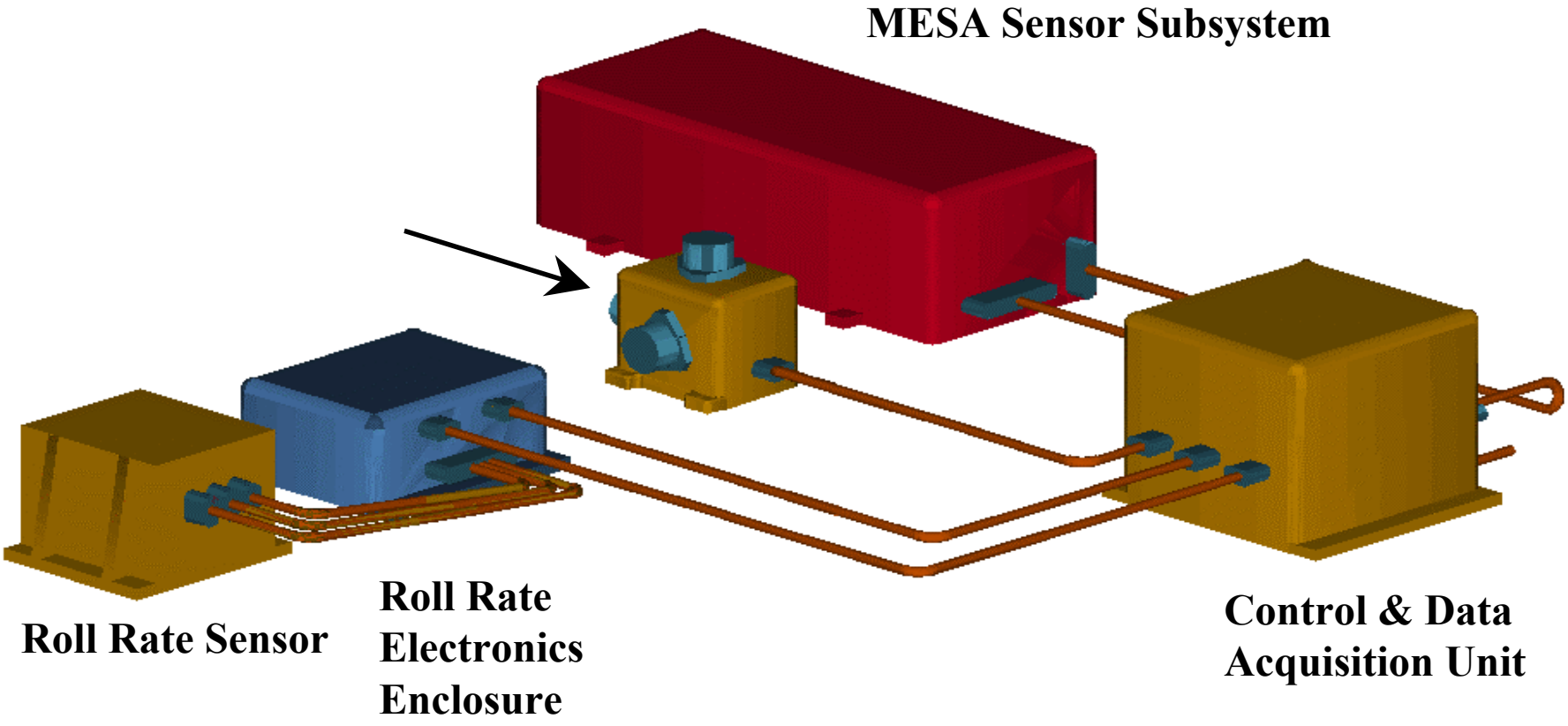
SAMS-FF is a complementary system to SAMS-II, which can support a variety of payloads on the KC-135, Sounding Rockets, STS and ISS.

It was developed in a modular, flexible package to fly on any spacecraft.

Complete Service Package from hardware through integration to data analysis.

SAMS-FF TSH

Flight System on STS-95 in support of the Hubble Space Telescope

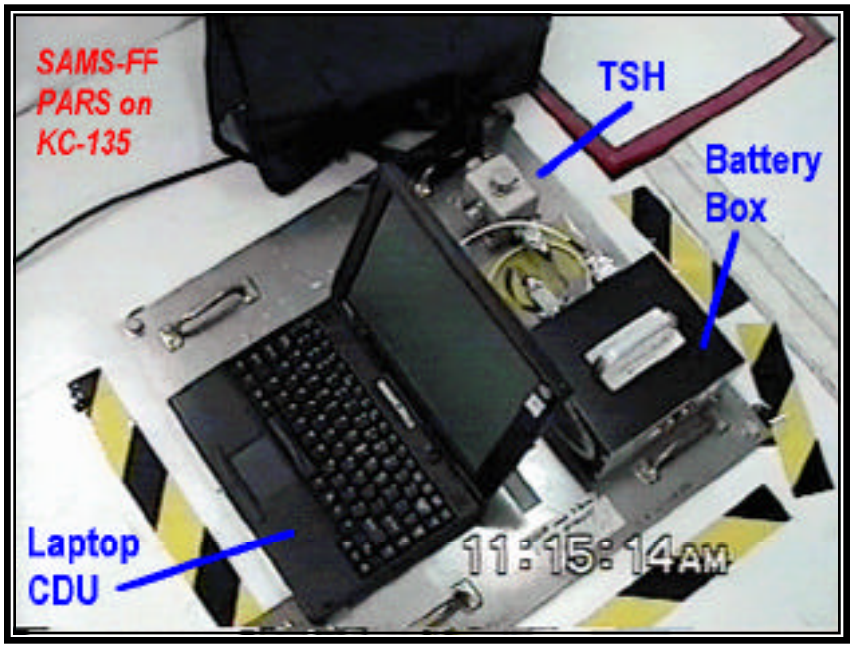

MESA Sensor Subsystem
Roll Rate Sensor
Roll Rate Electronics Enclosure
Control & Data Acquisition Unit

Sensor Specifications

Sensor	*TSH*	*MSS*	*Roll Rate*
Measured Quantity	Higher Freq. Acceleration	Low Frequency Acceleration	Roll Rate Velocity
Dimensions (L x W x H)	2.9" x 2.9" x 2.8"	11.3" x 4.8" x 3.4"	3.8" x 4.4" x 3.0" Gyro 4.8" x 5.0" x 2.2" Intf.
Weight (lbs.)	~1.1	7	3.75
Power (W)	1.6	16	3.6 nom. (temp dep)
Interface	RS422	PC/104 MIU & RS232	RS232
Bandwidth	dc to 200 Hz Selectable	dc to 2 Hz	10 Hz Sampling
Maximum Scale	1.25g	15 mg	190°/sec
Resolution	0.1 ug (sensor spec)	4 ng (1 sec. Period)	0.1 arc-sec (LSB)

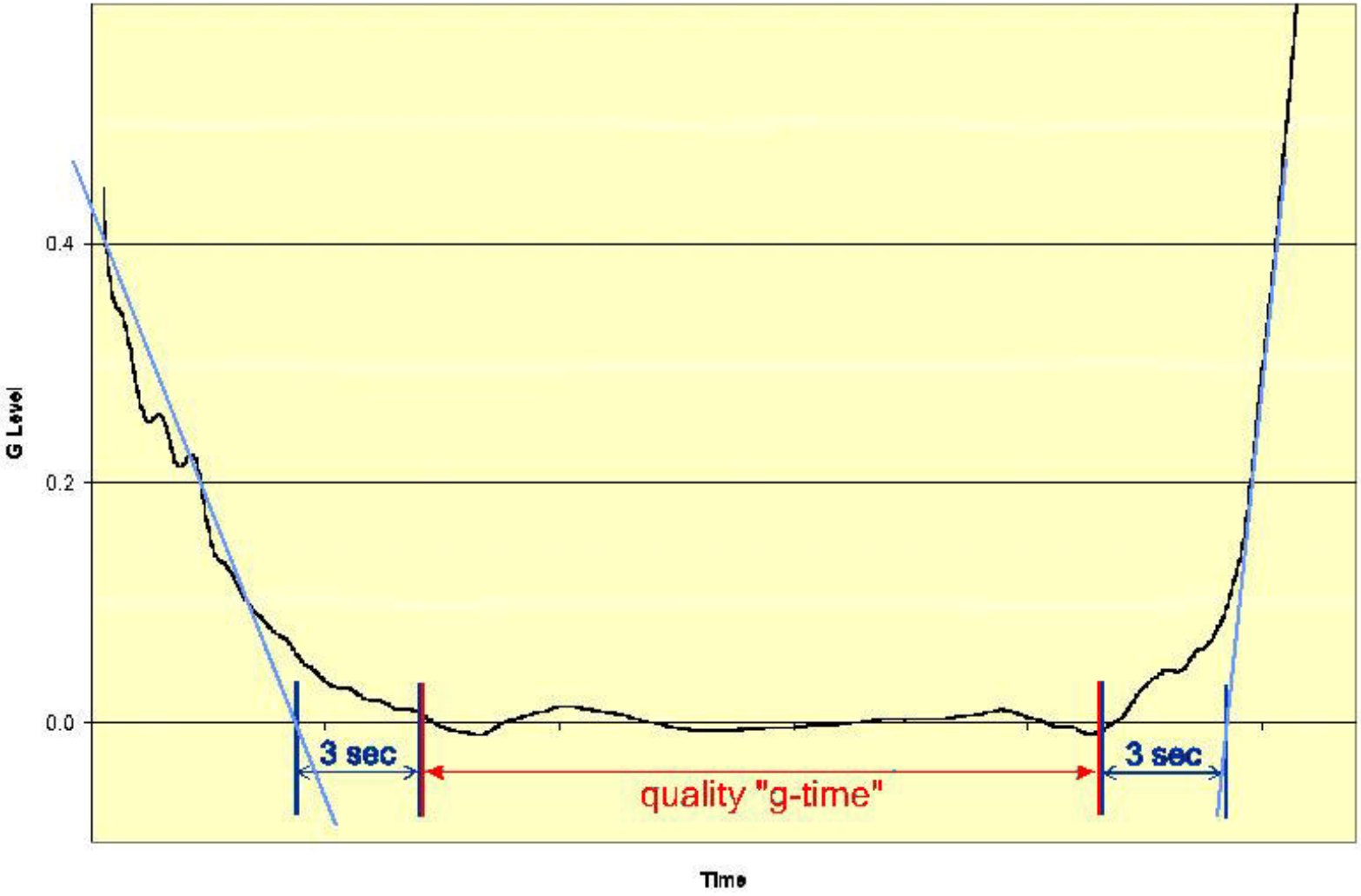
SAMS-FF supports many KC-135 experimenters by providing acceleration data

- Small size and easily modified system have supported wide variety of payloads
- Serves as introduction to acceleration measurements for space payloads
- PARS System
  - Basic system to support payloads
  - Rates the acceleration environment of each parabola, duration and acceleration level data available immediately after each parabola
  - After flight, ratings of each parabola are available to all experimenters
  - Reduces amount of processing required to view data



SAMS-FF PARS

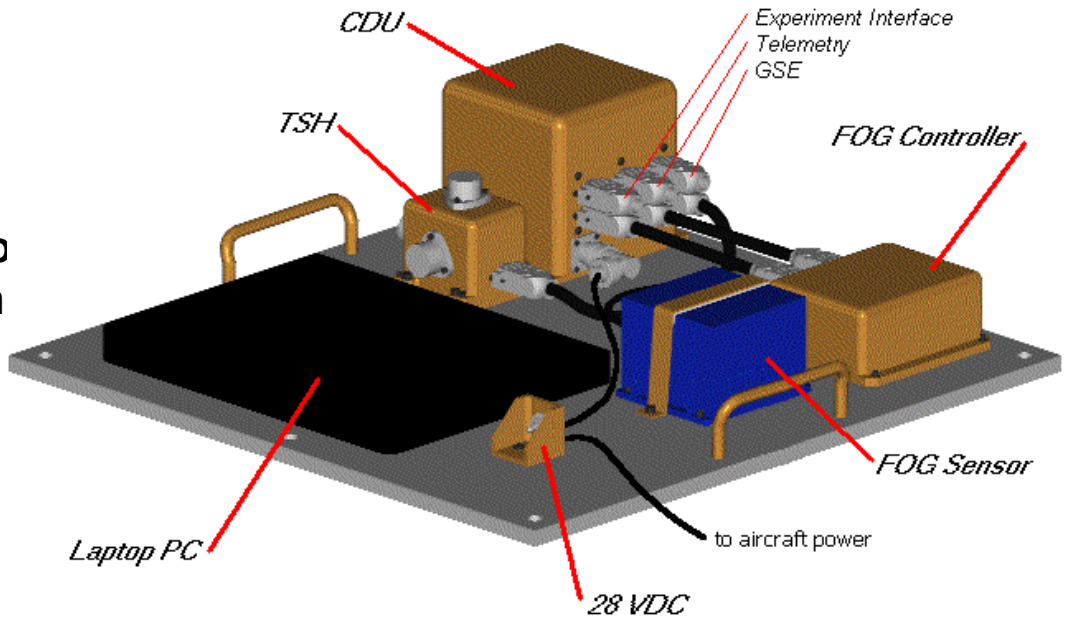
Typical Parabola Data



Terrier-Orion Sounding Rocket System Flown on KC-135

- **Tested successfully on KC-135 in 7/99**
- **Expanded support on the KC-135**
- **Additional TSHs and the FOG added**
- **Add interfaces to synchronize data collection to payload operation**
- **Example of expanded system fo more complete characterization for multiple payloads**

SAMS-FF KC-135 Terrier-Orion System Checkout Configuration



SUPPORT THAT SAMS-FF PRESENTLY PROVIDES

-Ground Testing of Payloads (ERE, PCS)
-Rating of KC-135 Parabolas (PARS)
-Loan Triaxial Sensor Heads (TSH) to experiments (uGSEG)
-Loan Control and Data Storage Units (CDU) and TSH for KC-135 (SAL)
-Provide CDU and TSH as subpayload support Sounding Rockets (SAL-6)
-Provide TSH for subpayload support on the Shuttle (CM-2)
-Provide TSH for subpayload support on ISS (FCF)
-Support experiments (MGM, VCD, PIMS) in SPACEHAB (STS-107)
-Support experiments in the Shuttle Cargo Bay (HST/STS-95)

SAL: Spread across Liquid
ERE: Extensional Rheology Experiment
PARS: Parabolic Aircraft Reading Systems
PCS: Physics of Colloids in Space
FCF: Fluids and Combustion Facility
MGM: Mechanics of Granular Material
VCD: Vapor Collection Distillation

CONCLUSION:

- **SAMS-FF Project has existing hardware and/or expertise to support all elements (ground, KC- 135, sounding rocket, Shuttle and ISS) of the Microgravity Program.**
- **Basic KC-135 and ground support is usually provided at no cost.**
- **Contact Tom Kacpura with technical questions and Ron Sicker with programatic questions.**