

The Huygens Surface Science Package

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SSP Participants



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Cassini/Huygens Scientific Aims

Titan

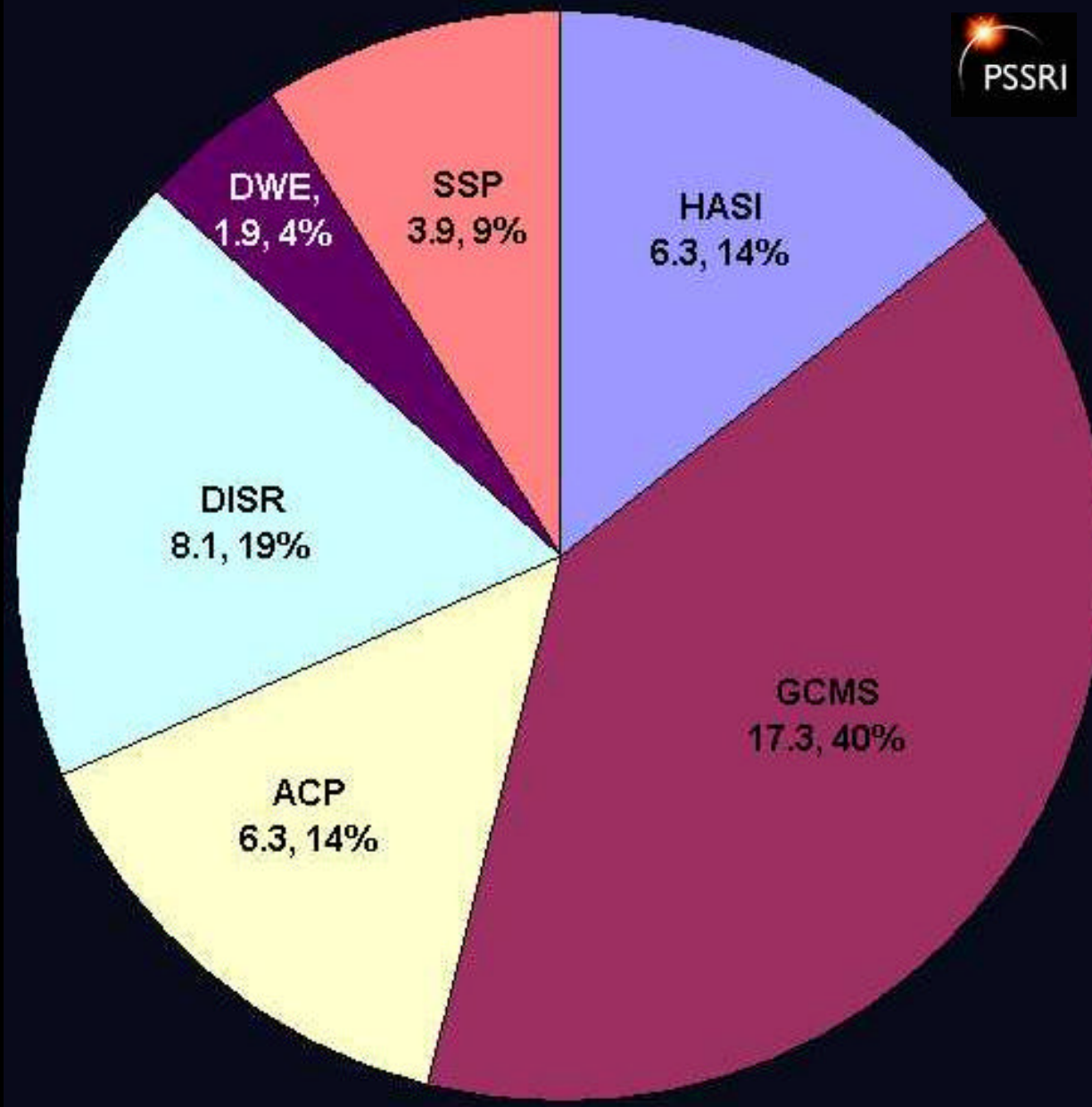
- Atmospheric constituent abundances
- Distribution of trace gases and aerosols
- Winds and temperatures
- Surface state and composition
- Upper atmosphere



Landing Scenarios



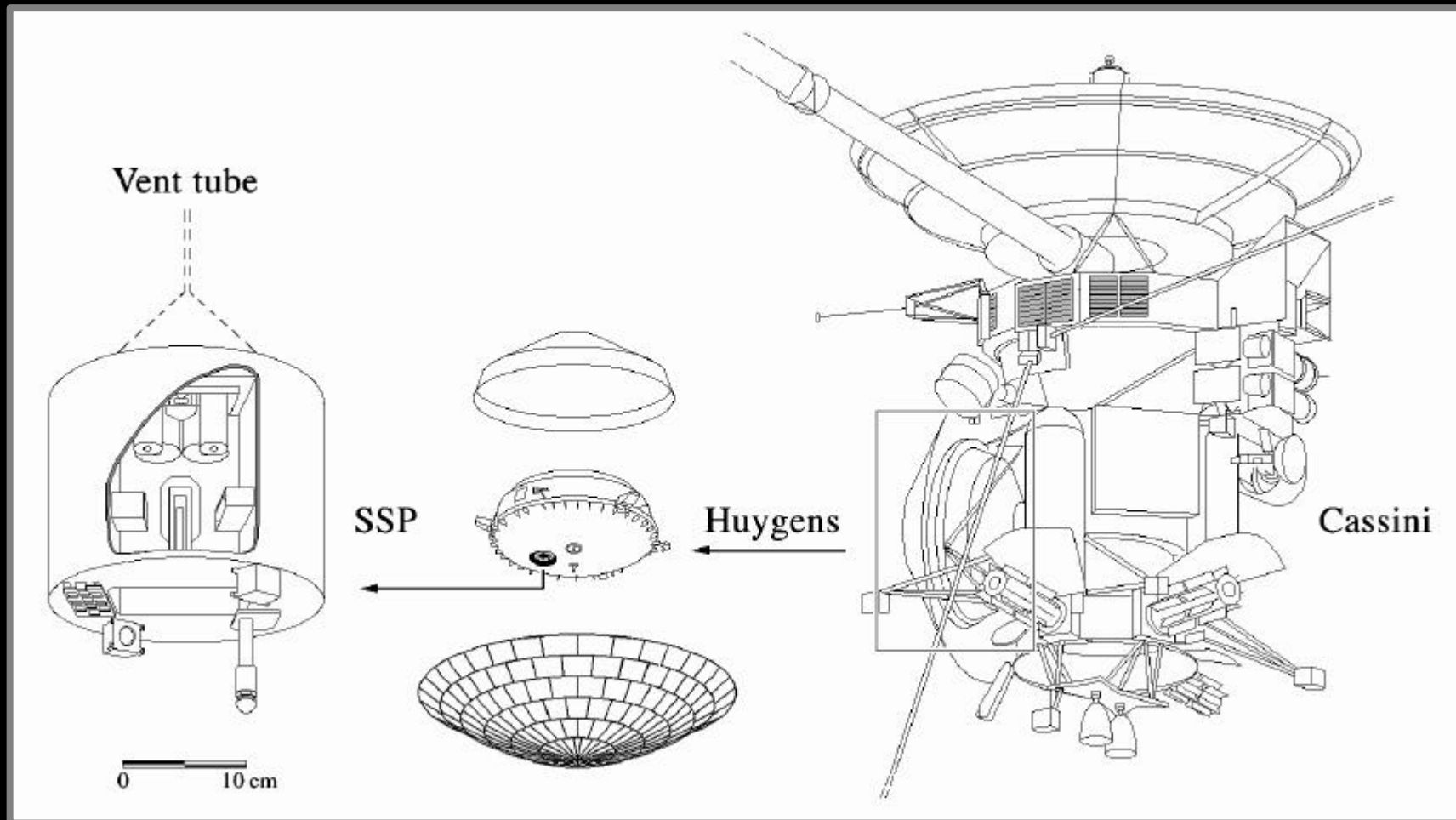
MASS (kg)



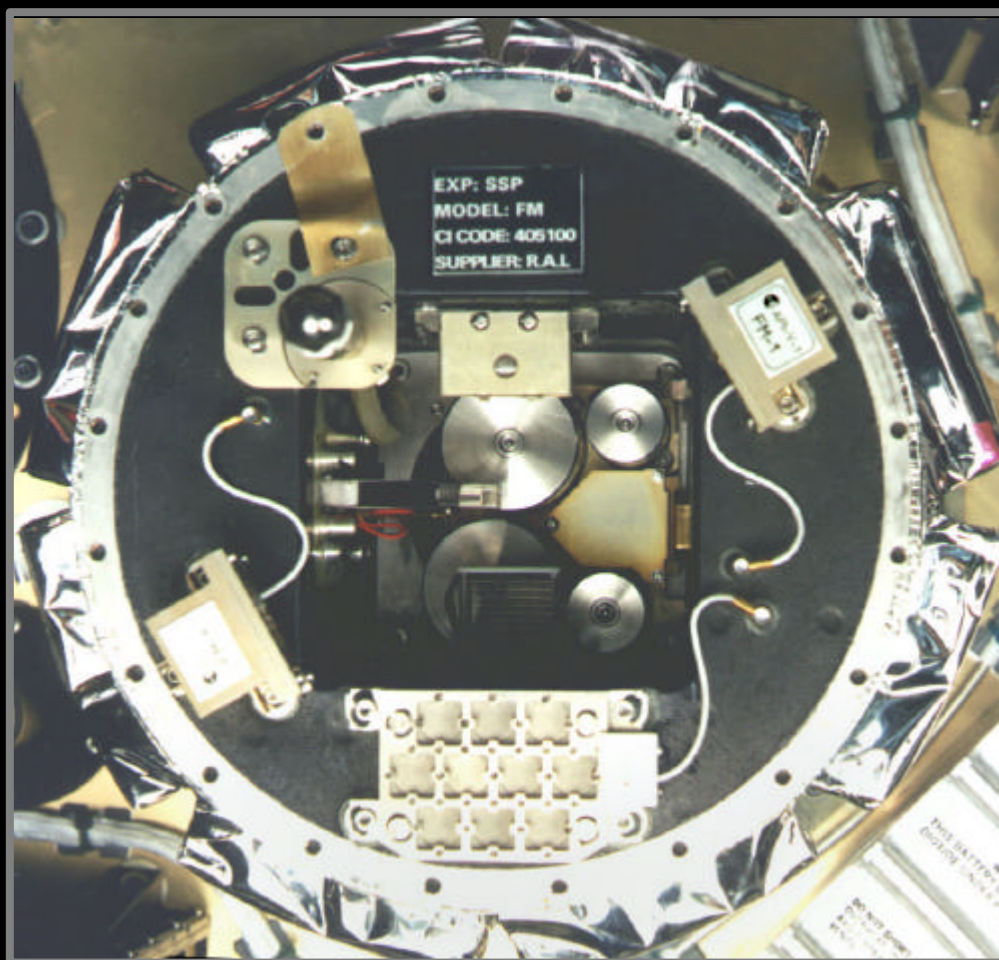
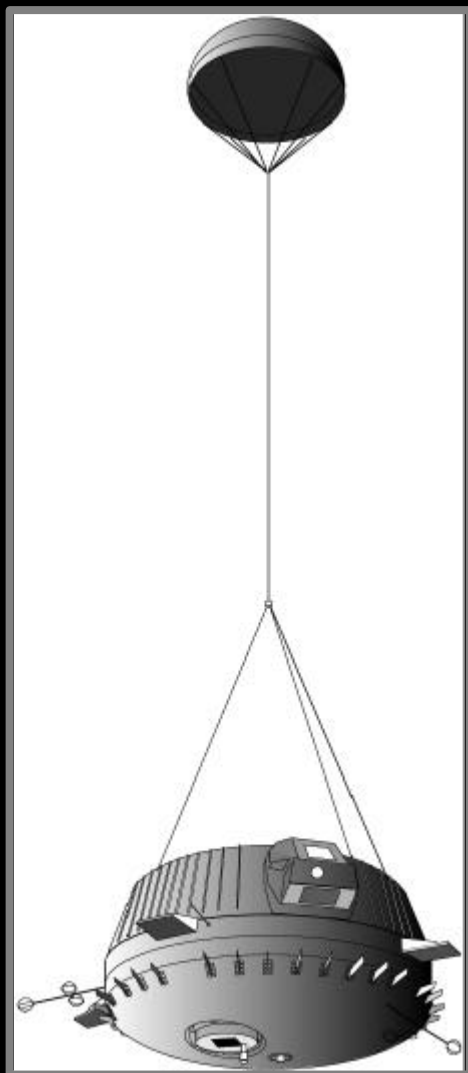
Huygens SSP Summary

- SSP uses 9 sensors to characterise surface (& atmosphere)
- Sensors chosen to function under various surface scenarios (solid or liquid)
- Operation is biased to surface operation but significant atmosphere capability exists
- 7 sensors in dedicated enclosure, 2 on electronics box

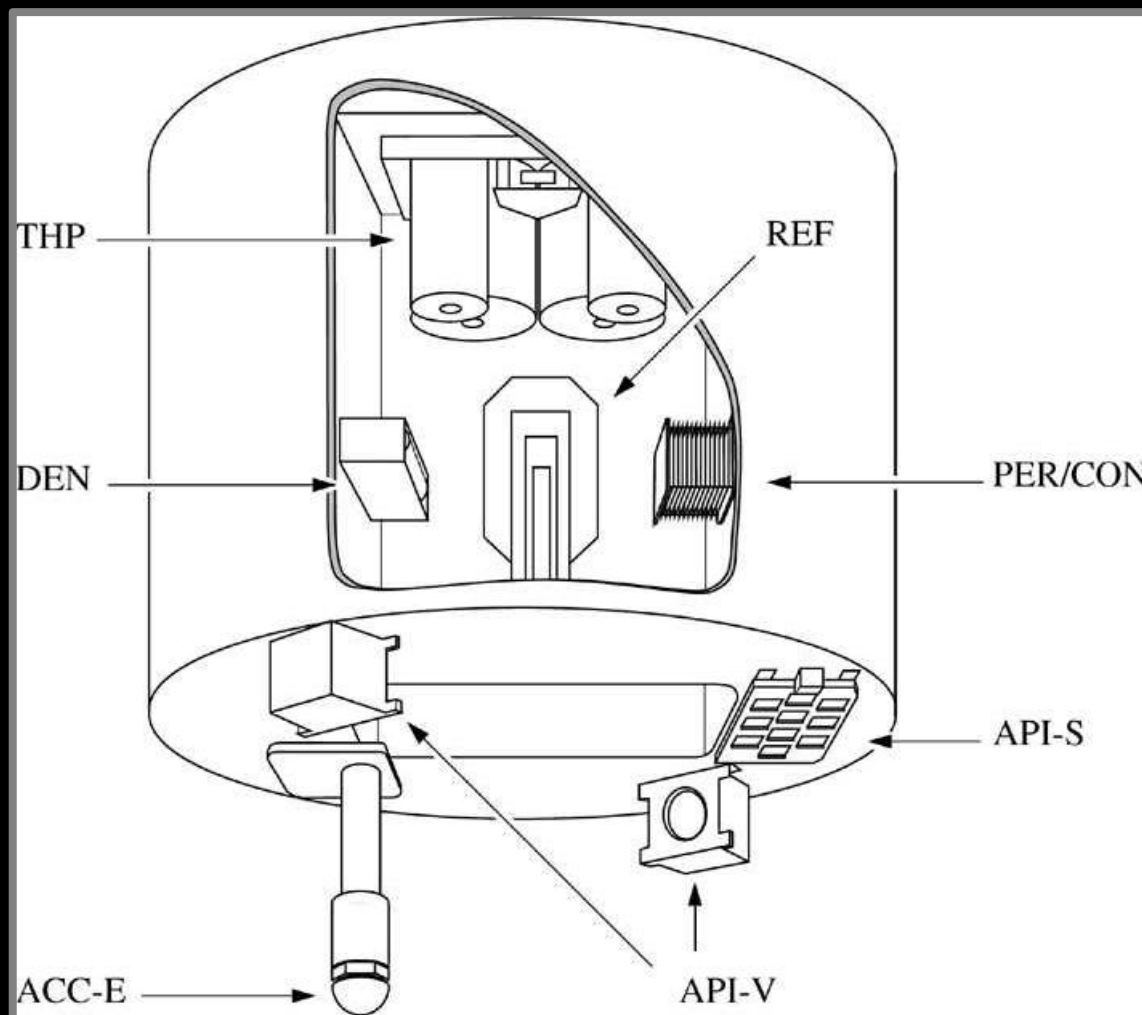
Location and the internal arrangement of SSP in the Huygens Probe



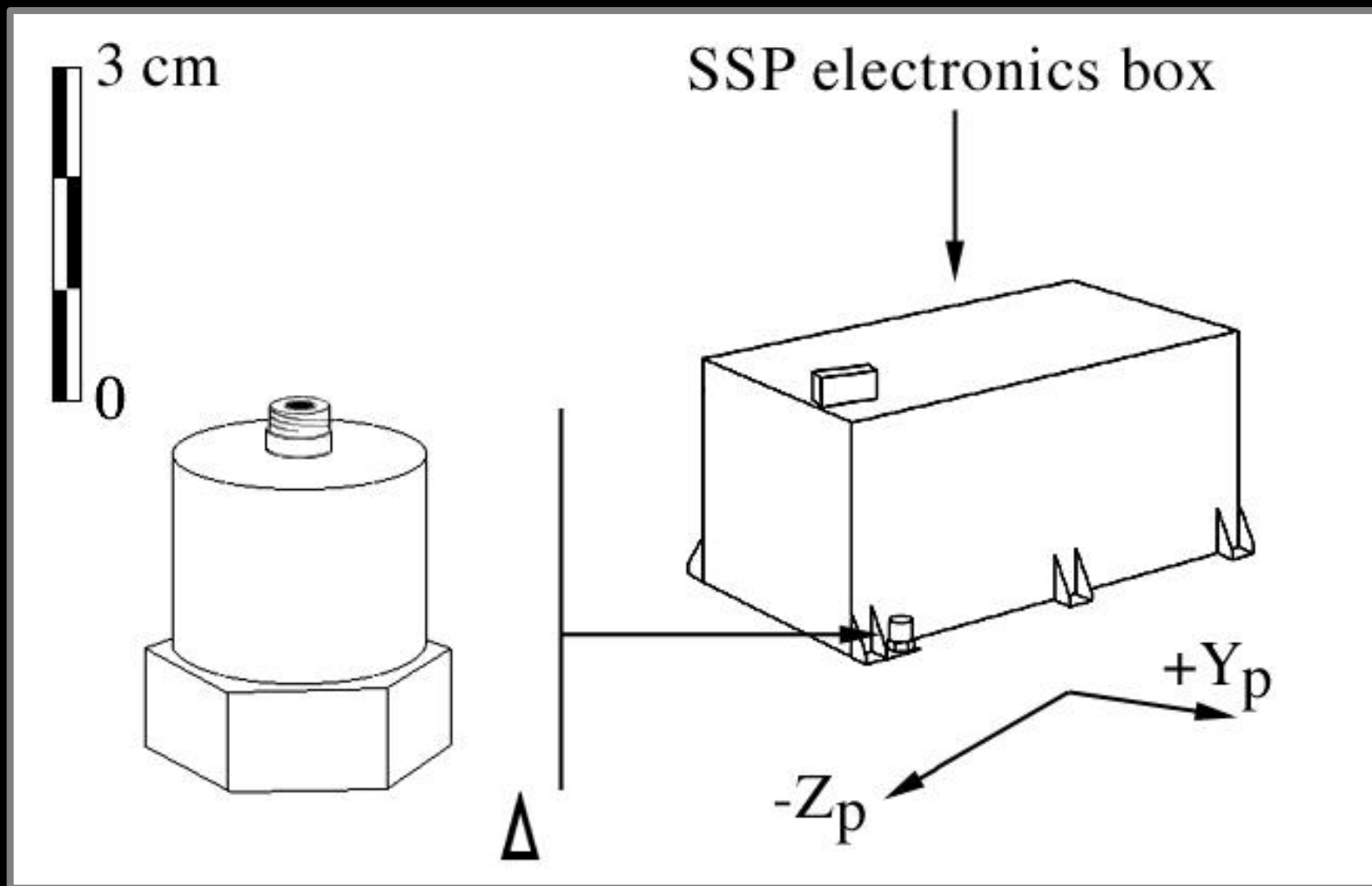
The Surface Science Package



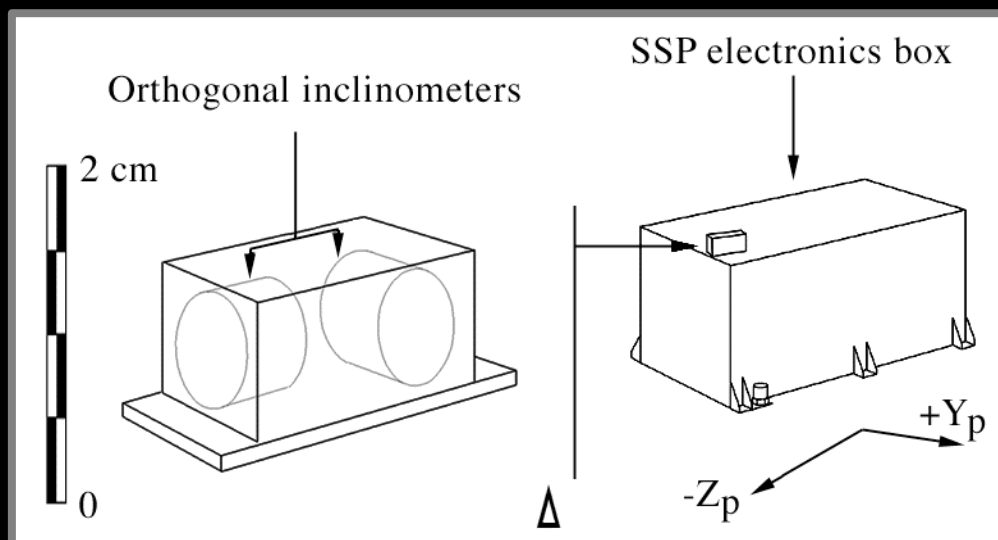
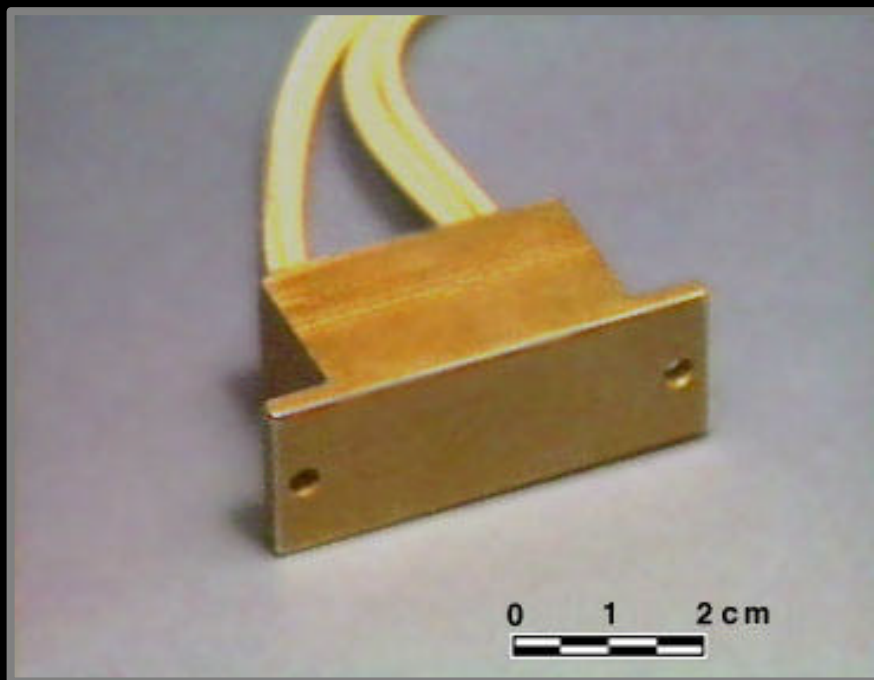
SSP Sensors



ACC-I



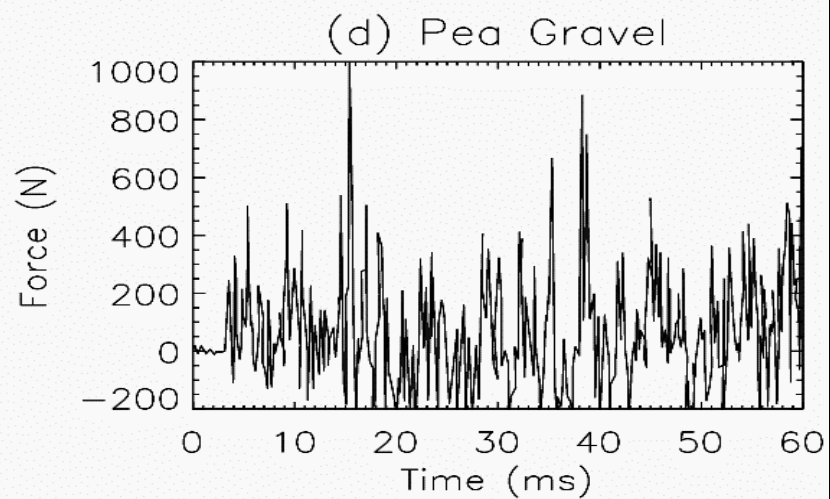
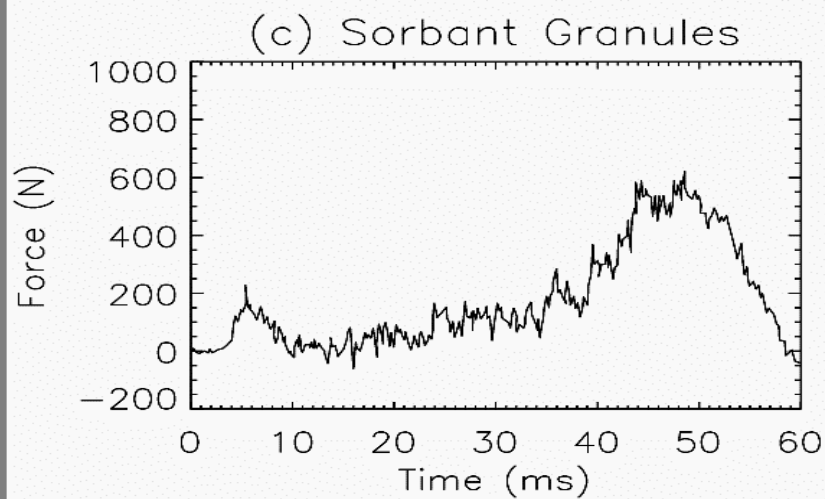
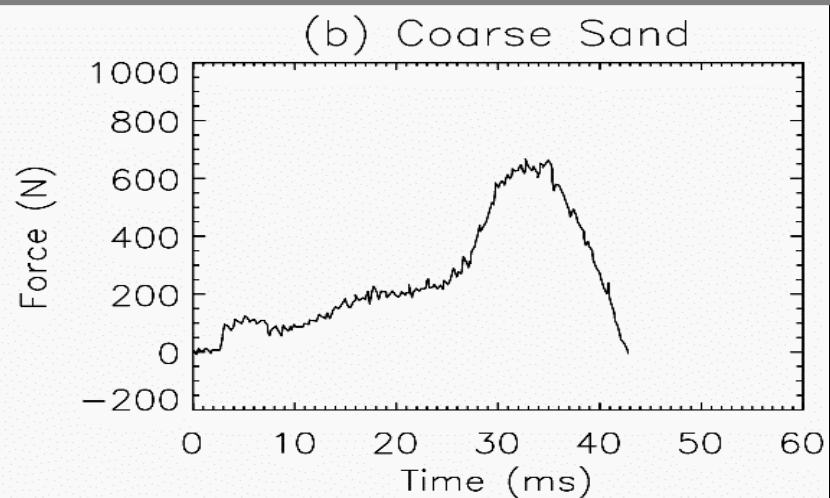
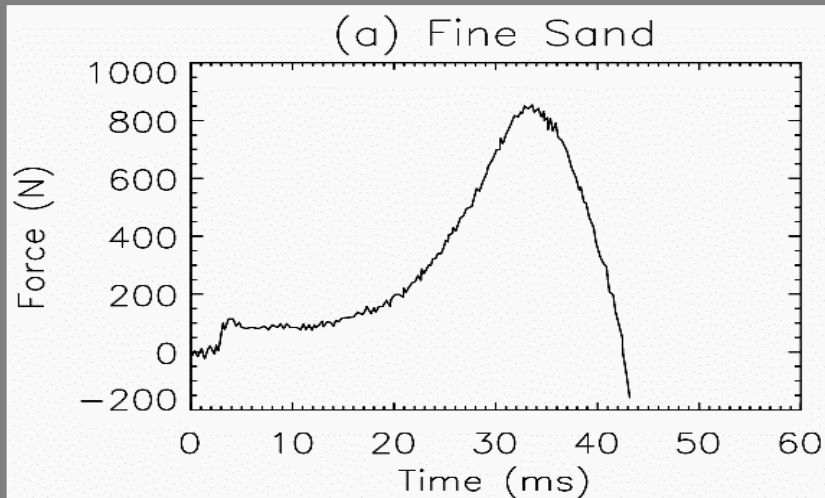
TIL



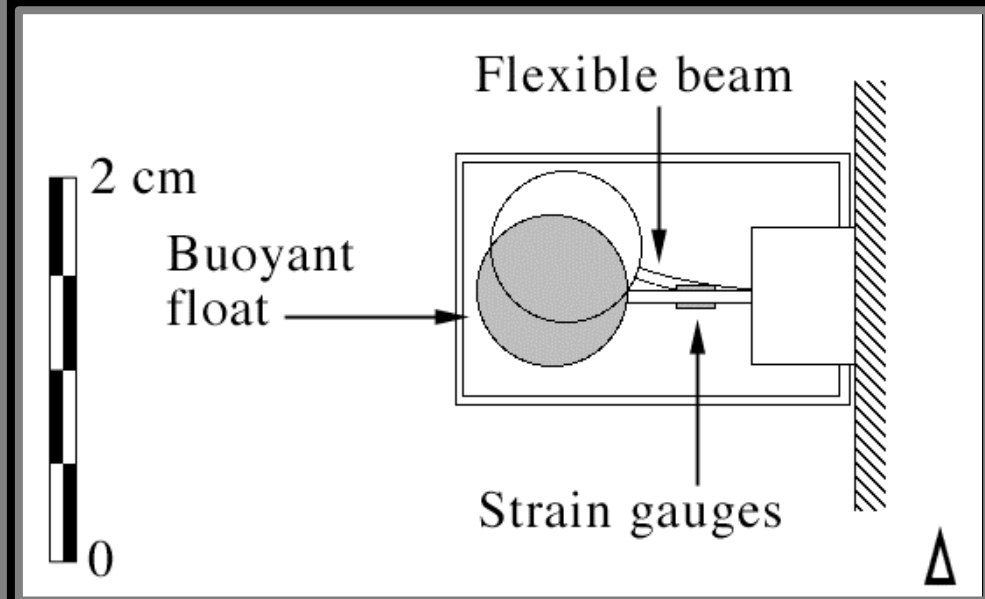
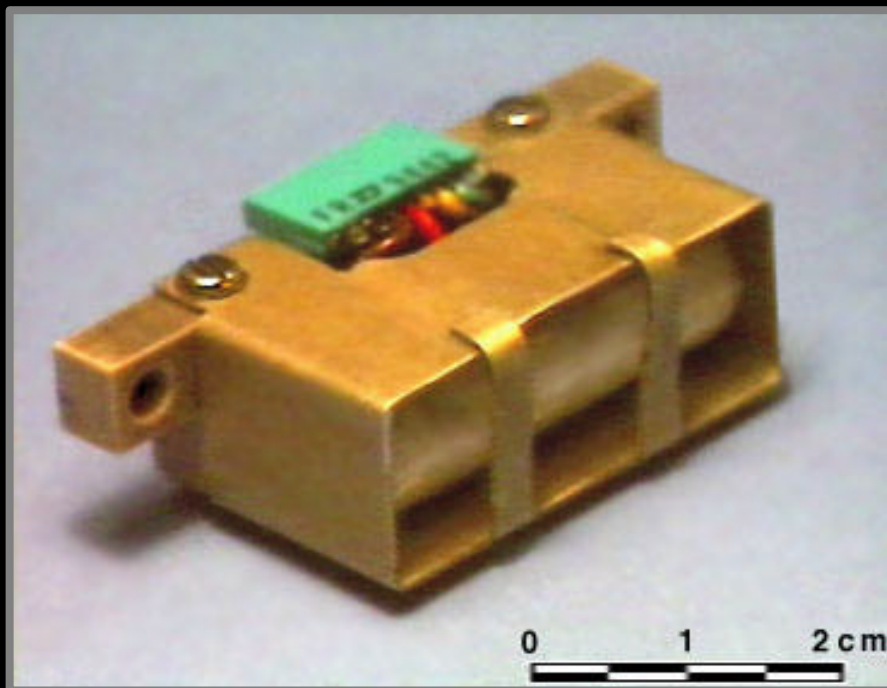
ACC-E



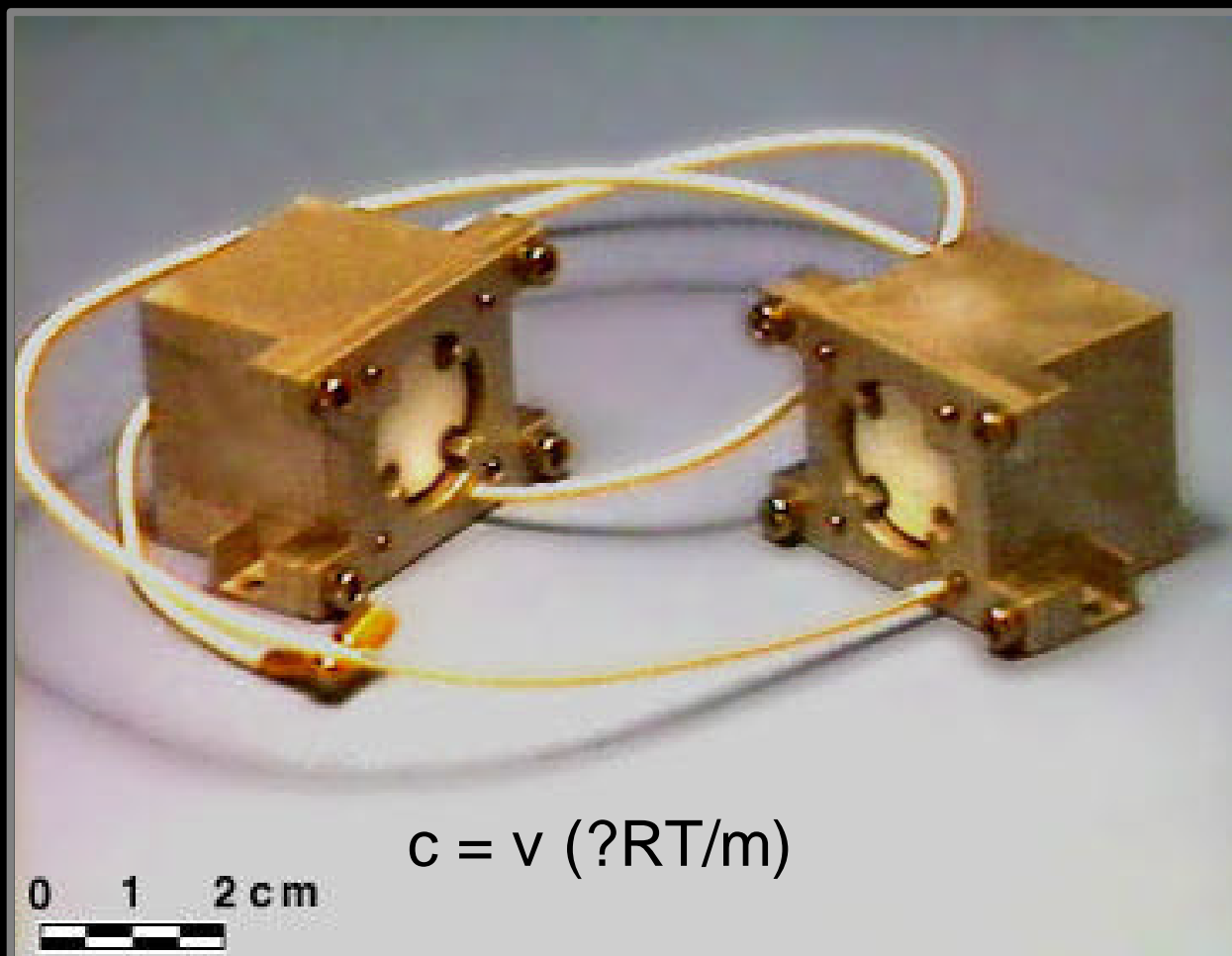
ACC-E



DEN



API-V (ESA ESTEC)



API-S

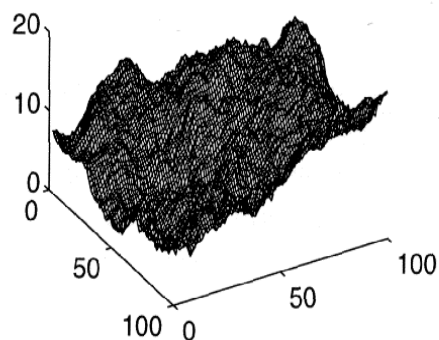


Figure 8.5a :- Surface with a 20 m relief range

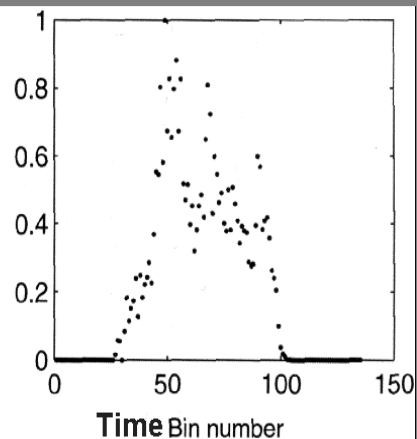


Figure 8.5b :- Binned normalised echo from surface in 8.5a

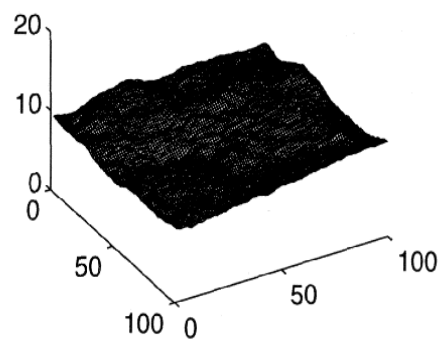


Figure 8.7a :- Surface with a 5 m relief range

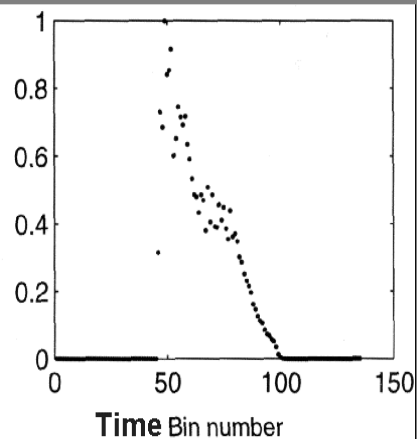
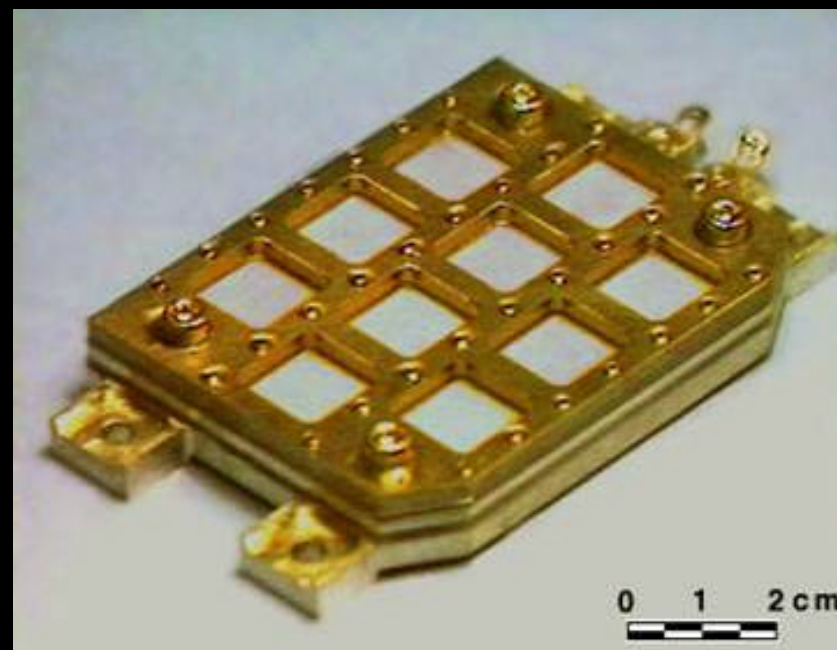
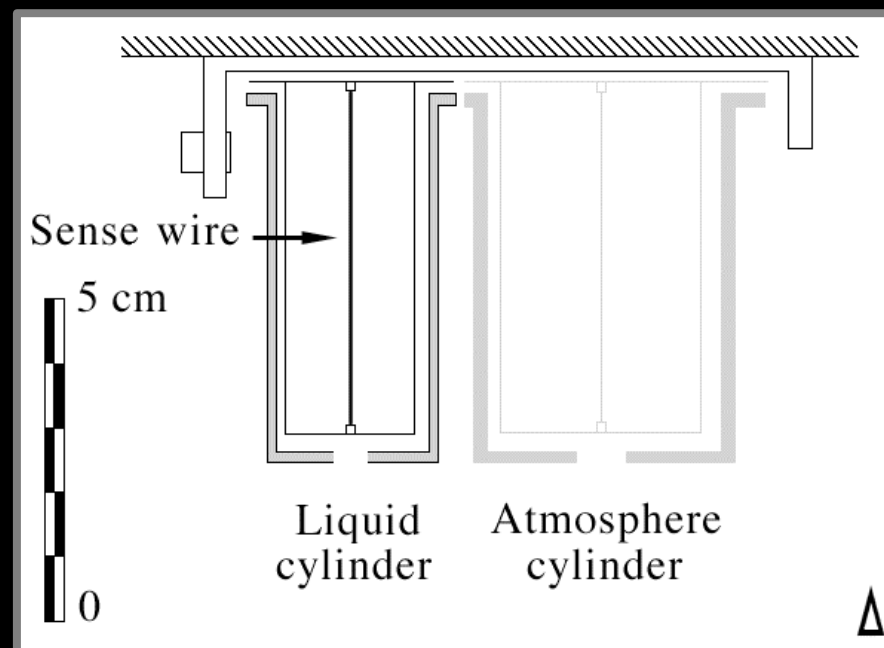
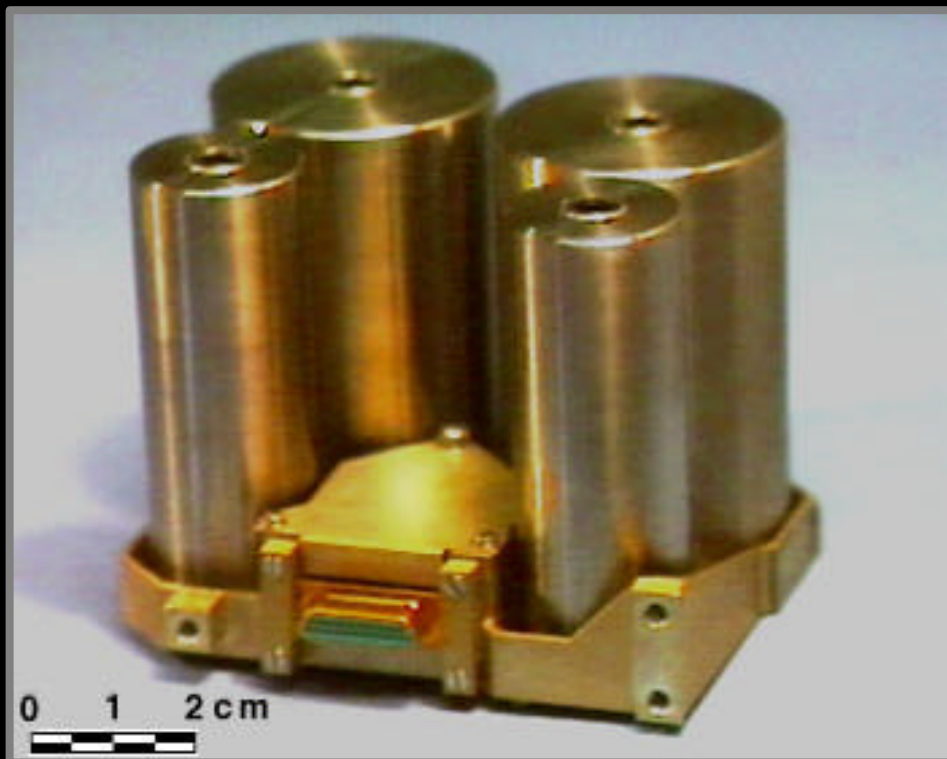


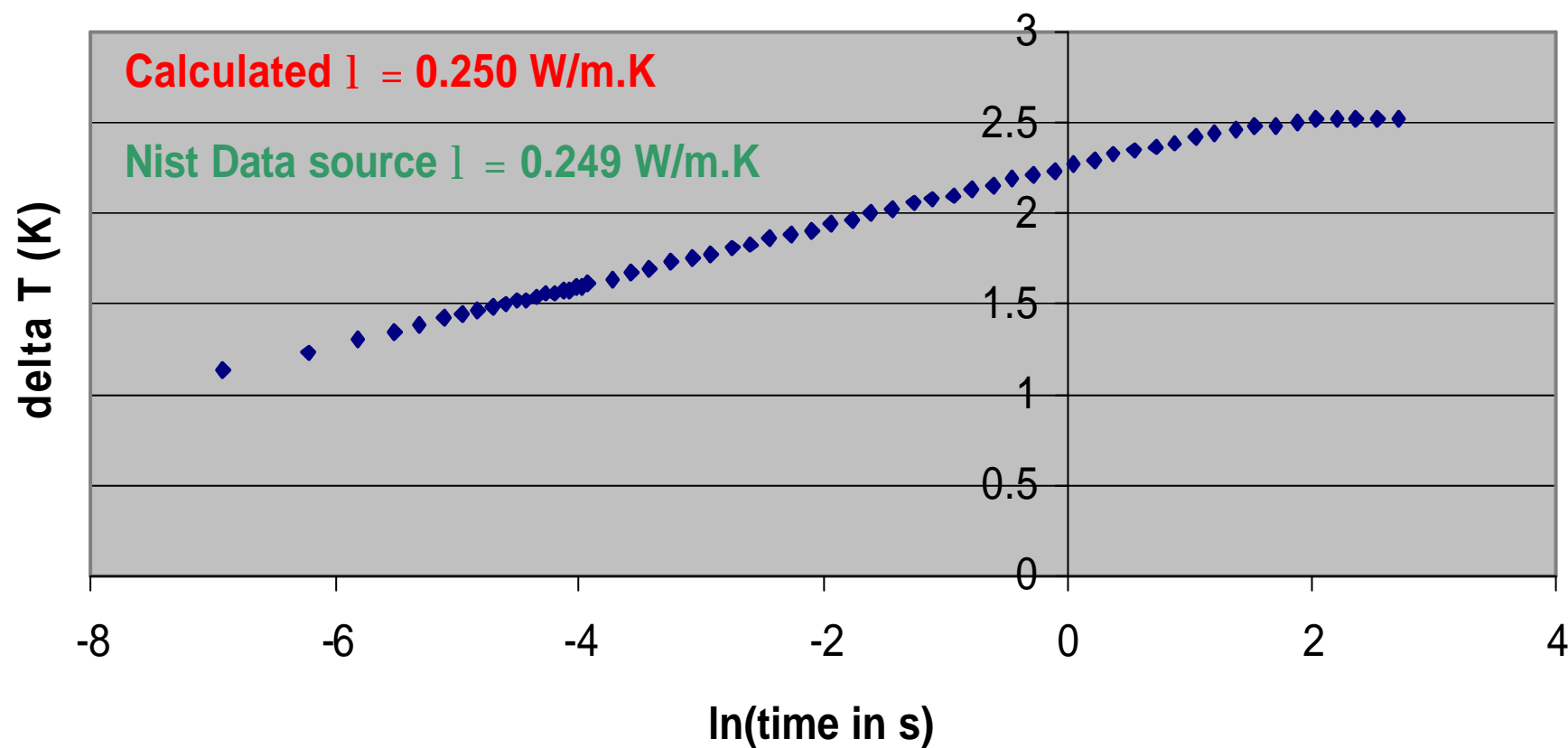
Figure 8.7b :- Binned normalised echo from surface in 8.7a



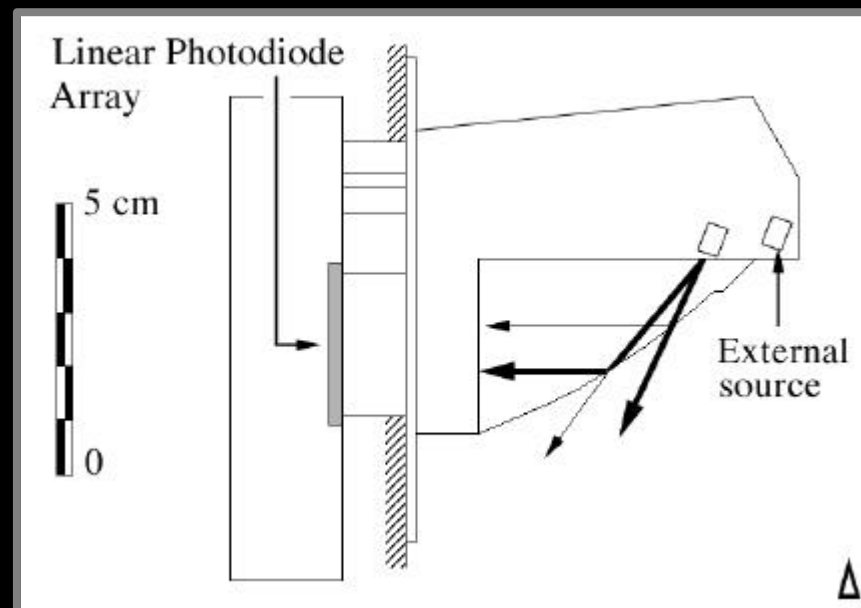
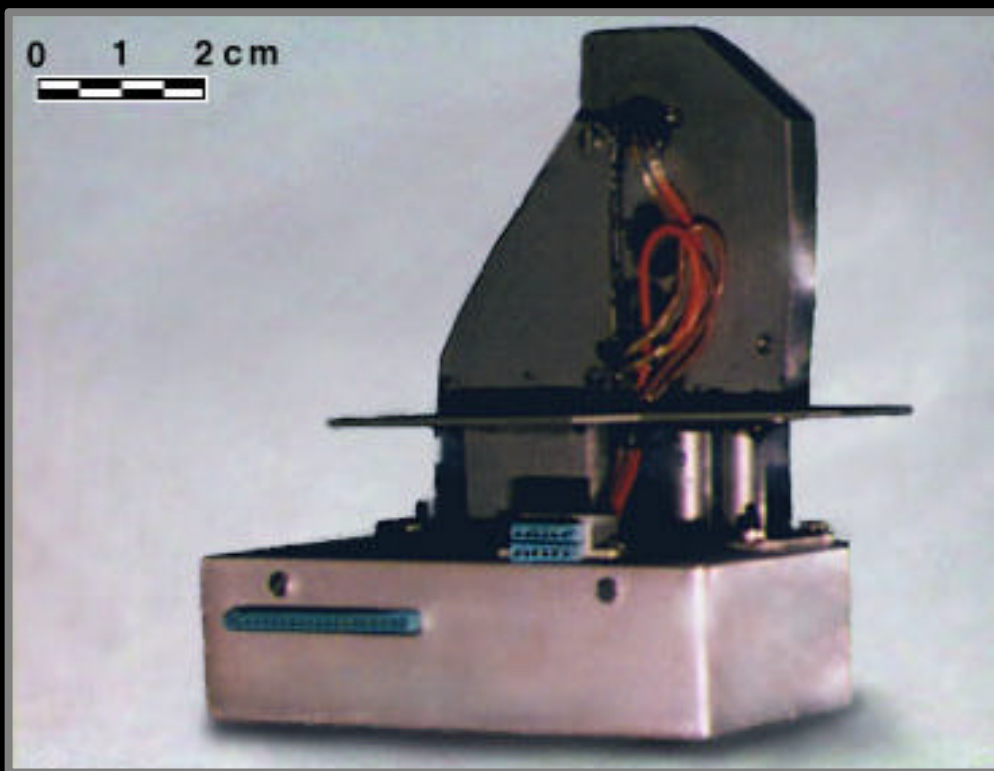
THP (SRC Warsaw)



FM THP (Calibration in Liquid Ethane medium at 99K)

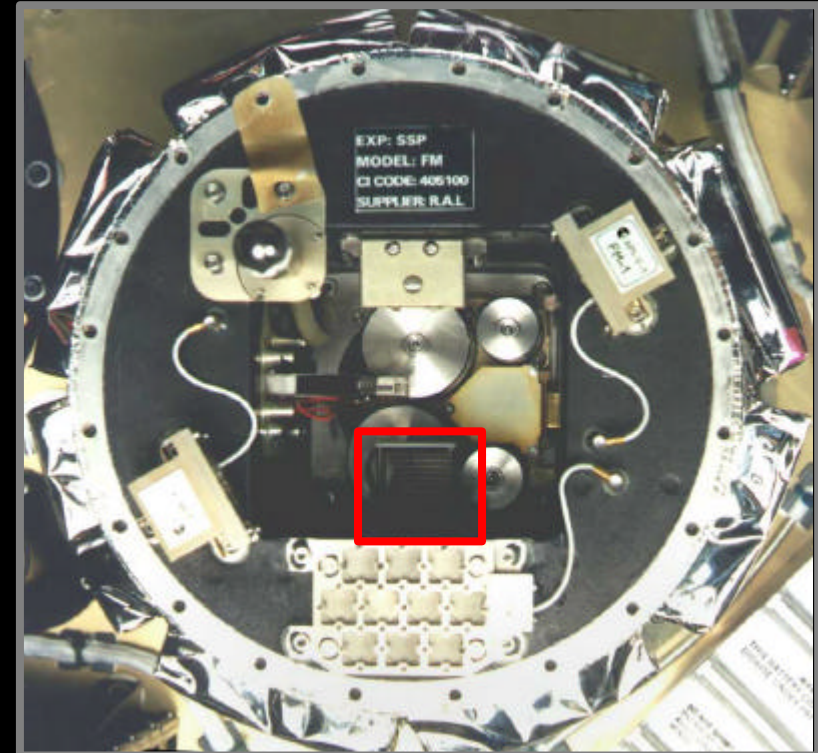
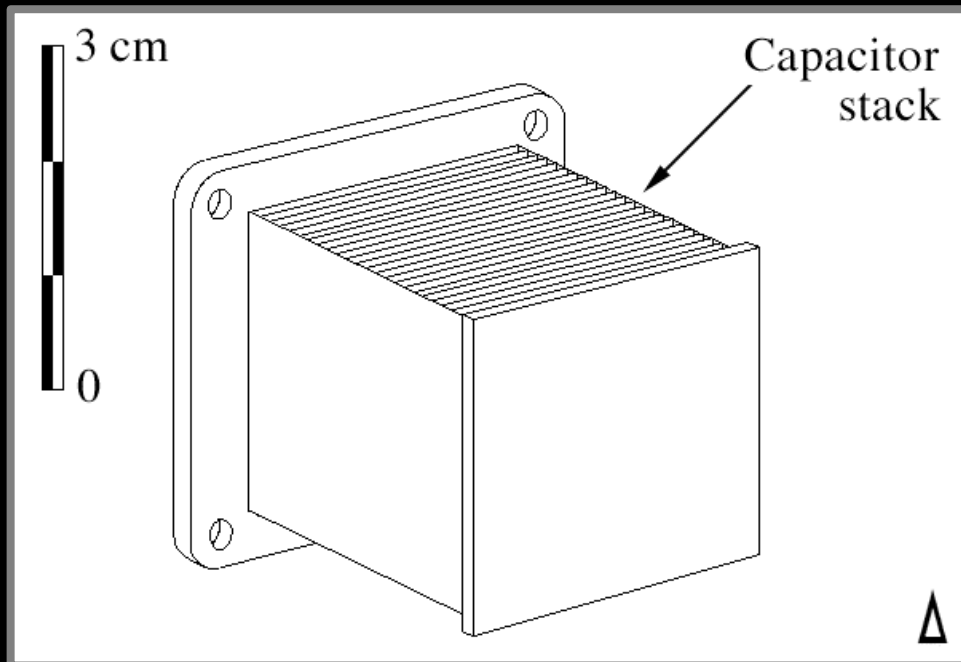


REF (UMIST)

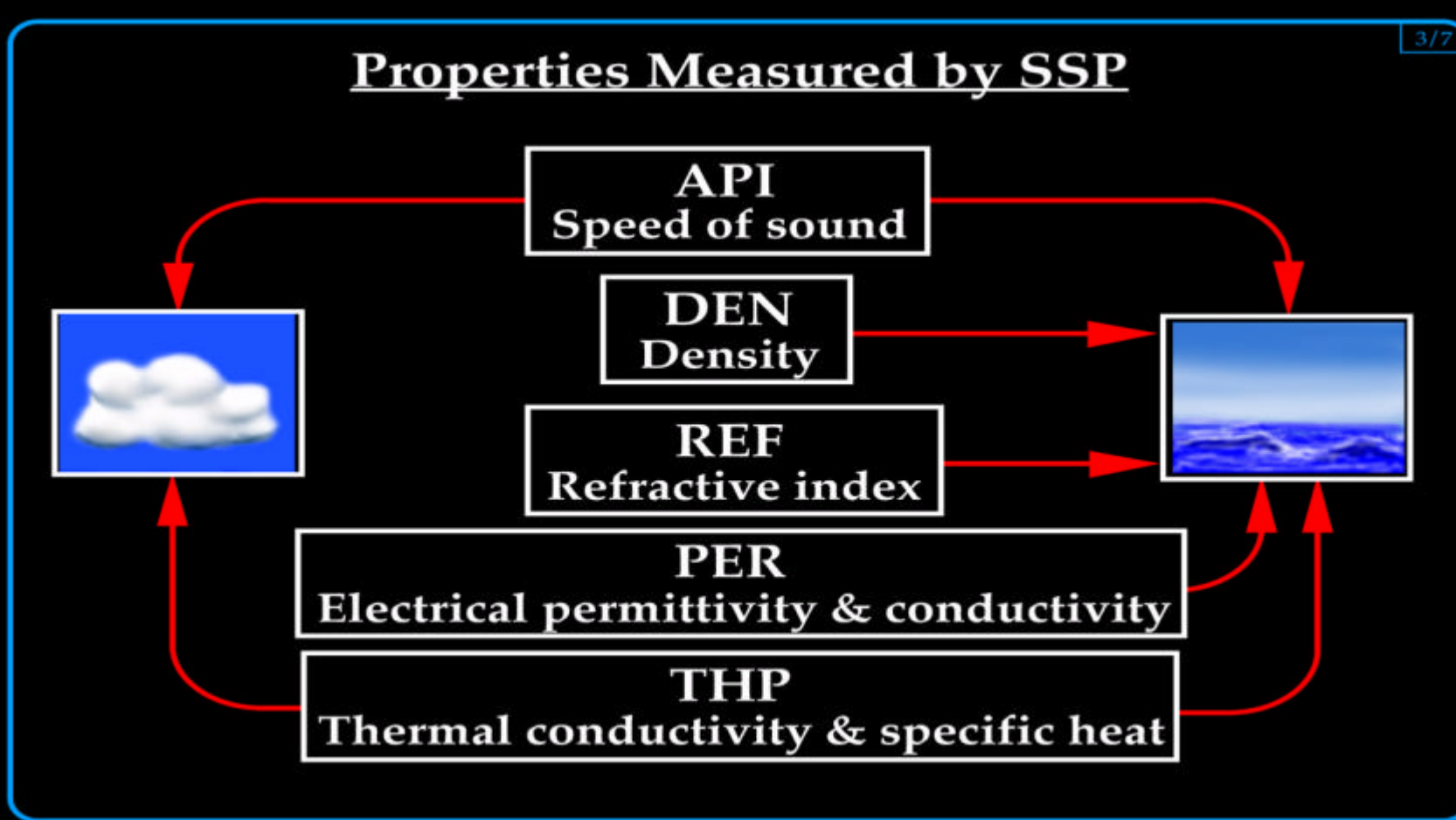



PER

Permittivity and Conductivity Measurements



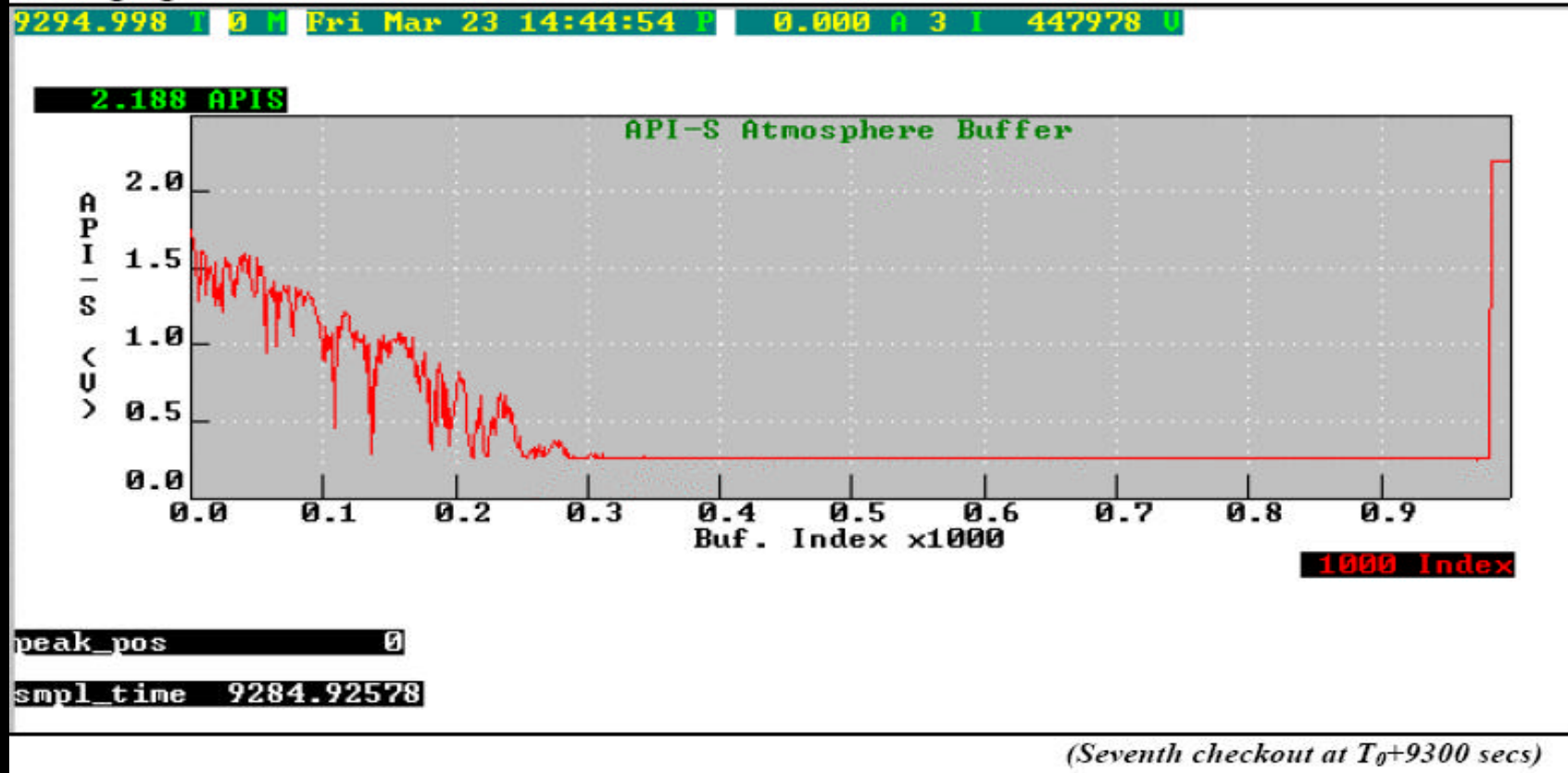
(Selected) Properties Measured by SSP



Sensor	 LIQUID	 MUD	 SOLID	 ATMOSPHERE
ACC-E	x	✓	✓	x
ACC-I	✓	✓	✓	(✓)
API-S	✓	✓	✓	(✓)
API-V	✓	x	x	✓
DEN	✓	x	x	x
PER	✓	(✓)	x	(✓)
REF	✓	x	x	(✓)
THP	✓	(✓)	x	✓
TIL	✓	✓	✓	✓
'Score'	8	4.5	4	4

API-S Check Out Anomaly

Full (uncompressed) APIS output is shown below. From this data, it is possible to exactly measure the ringing duration.



Conclusions

- SSP is a flexible package which can make measurements under various surface scenarios
- SSP also retains a significant atmospheric capability
- In-flight checkout results show SSP is in a healthy state (increased API-S resonance under cruise vacuum condition is under investigation)
- SSP awaits January 14 2005 with great anticipation

