

Aerosol Collector Pyrolyser

Titan Conference

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ACP Science Team

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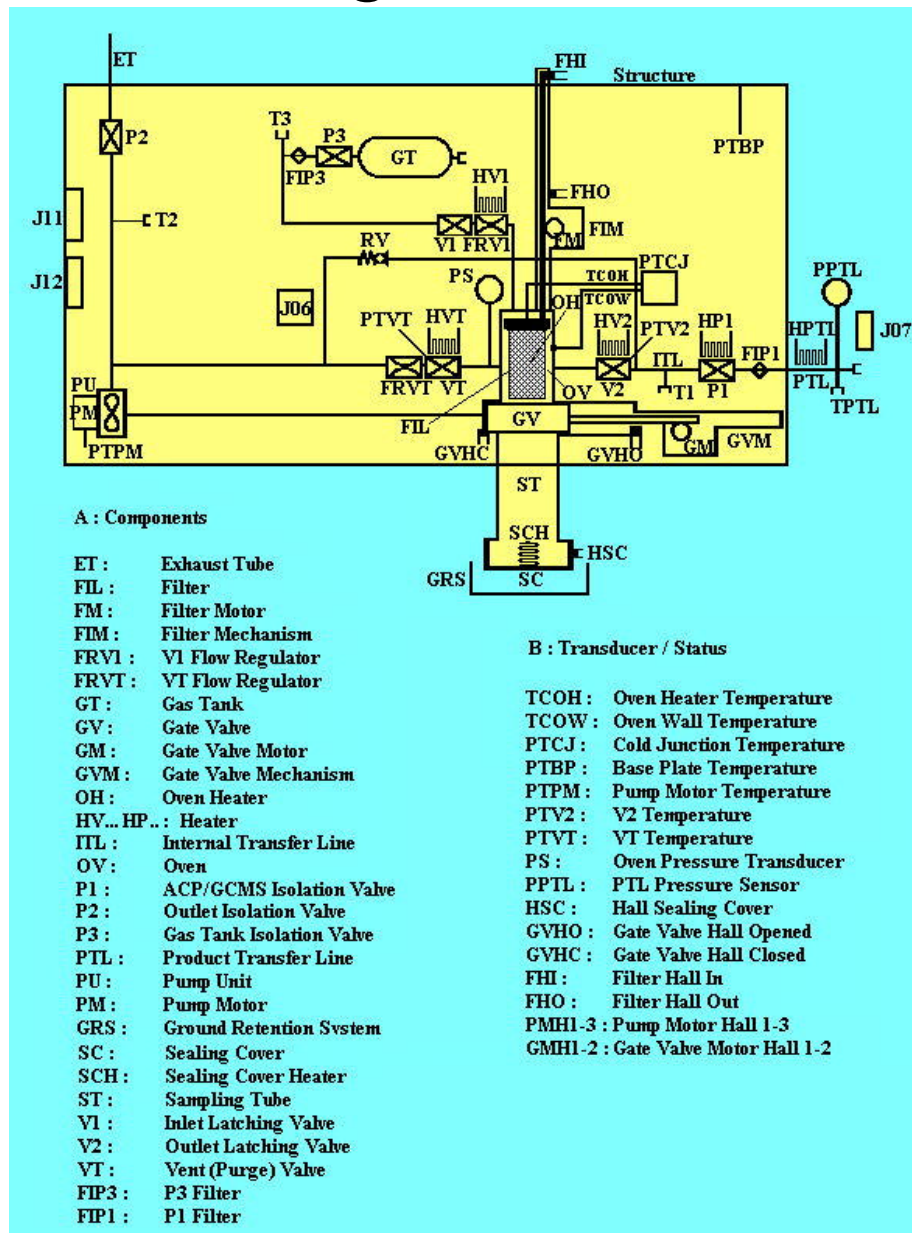
Science Objectives

- determine the chemical makeup of the photochemical aerosol in Titan's low stratosphere
- research for the relative abundances of condensed organics down to the upper troposphere

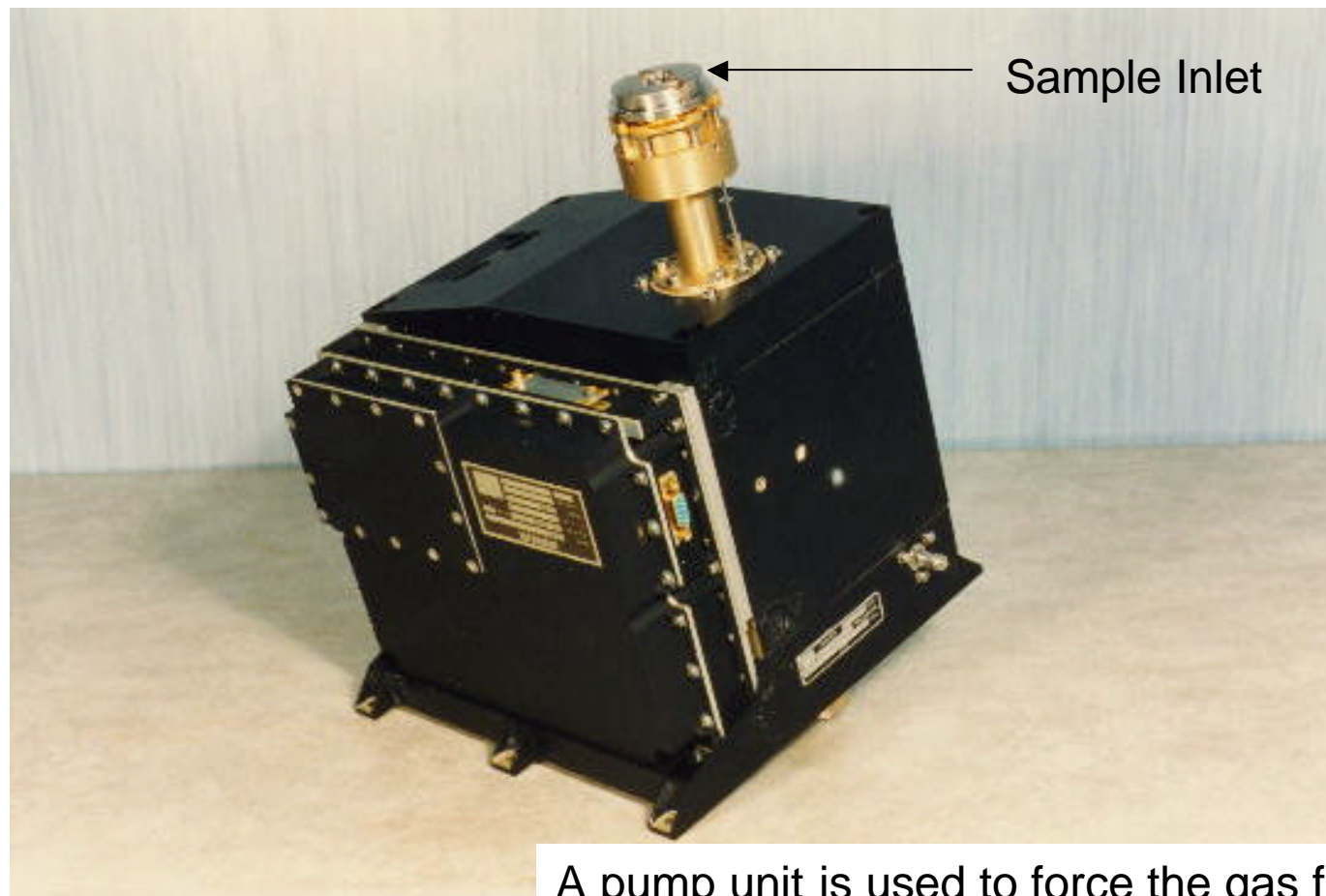
Methodology

- Collect the aerosols and condensates during descent and prepare the collected matter (by evaporation, pyrolysis and gas products transfer) for analysis by the Huygens Gas Chromatograph Mass Spectrometer (GCMS)
- Aerosols will be collected in two regions of the atmosphere : first between 135 and 32 km, and then between 22-16 km

System Diagram of the ACP

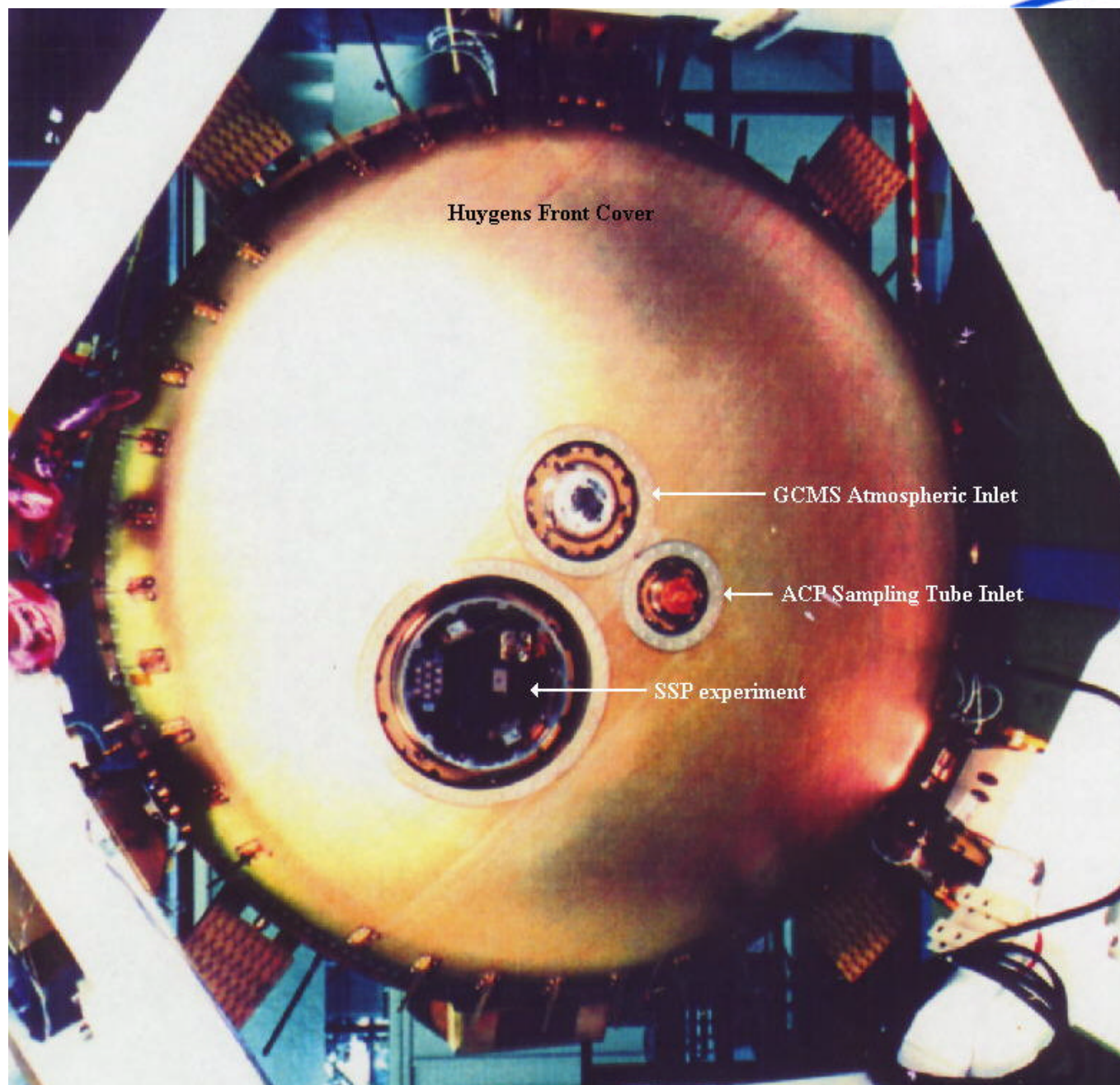


Flight Configuration

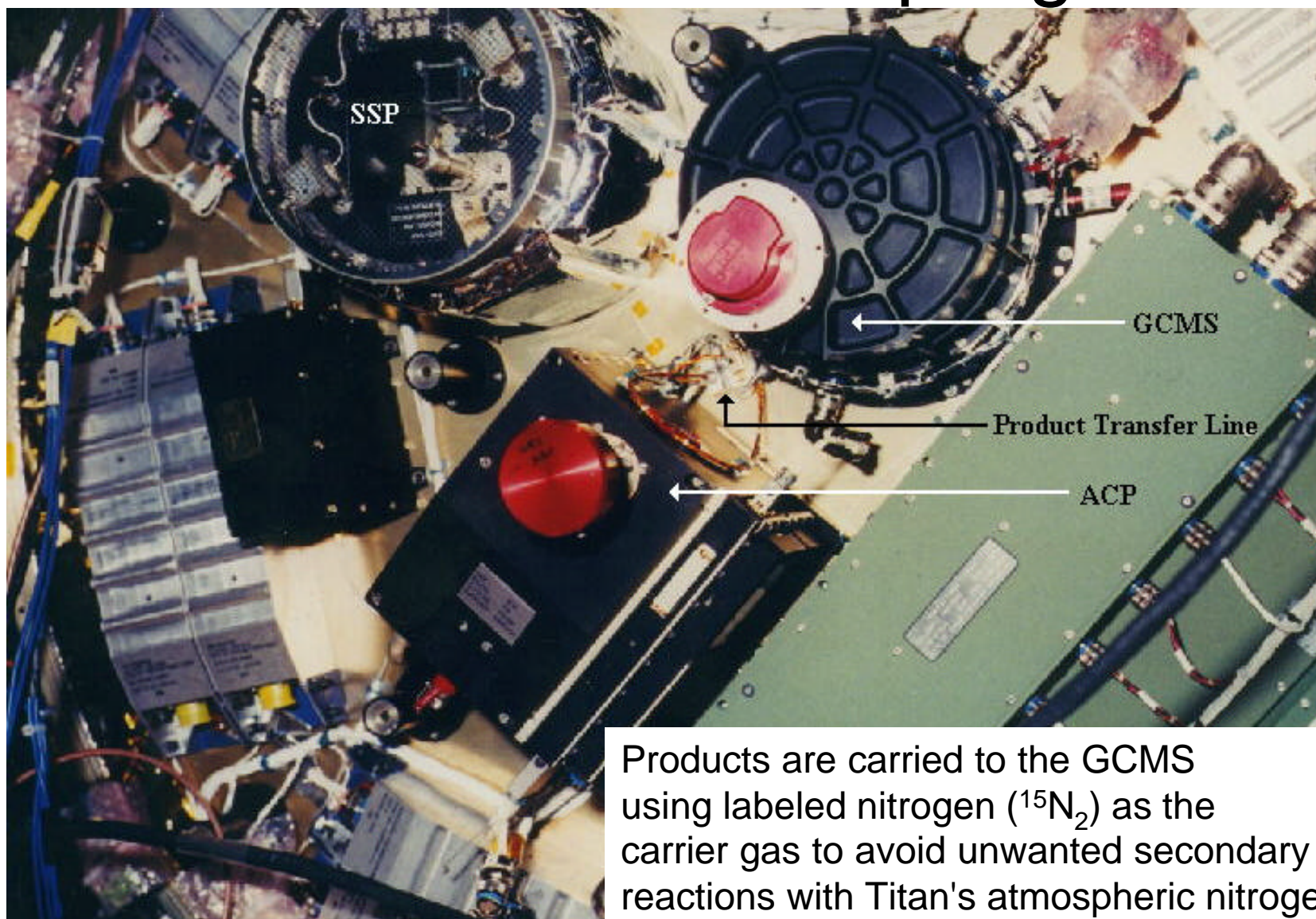


A pump unit is used to force the gas flow through a filter which has a thimble-like shape. In its sampling position, the filter front face extends a few mm beyond the probe fore dome, thus being at a temperature very close to the ambient Titan atmosphere

Location of the ACP on the Huygens Probe

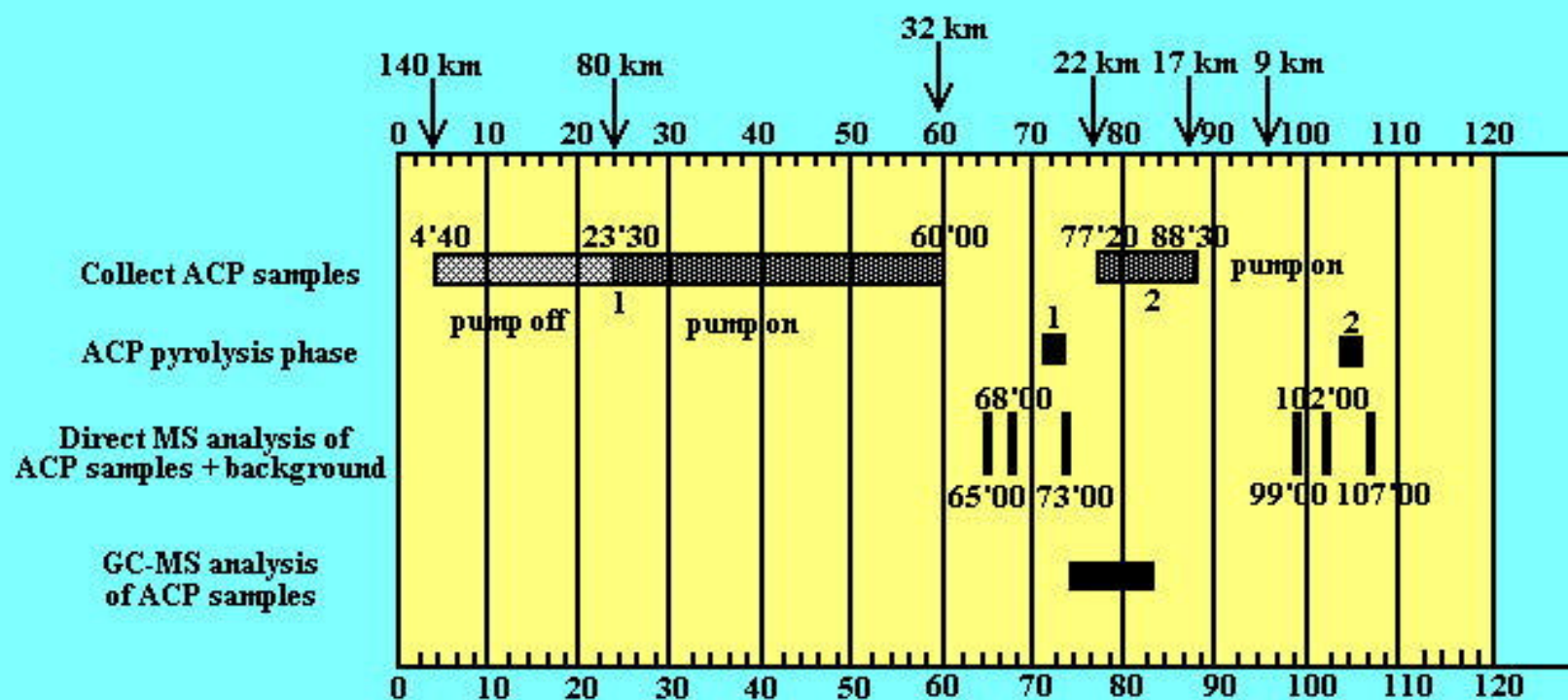


ACP-GCMS Coupling



Products are carried to the GCMS using labeled nitrogen ($^{15}\text{N}_2$) as the carrier gas to avoid unwanted secondary reactions with Titan's atmospheric nitrogen

Descent Sequence



The pyrolysis furnace contains a heating element which can heat the filter and hence the sampled aerosols to 250°C or 650°C