

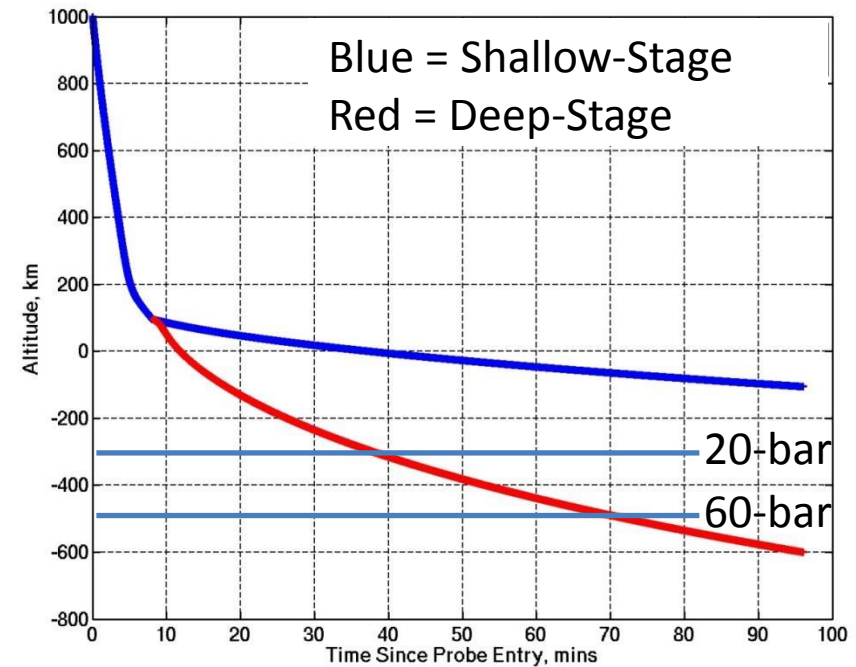
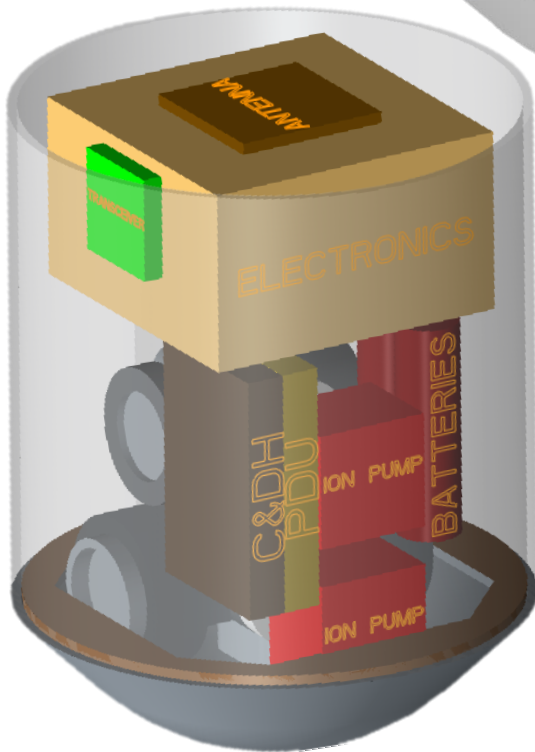
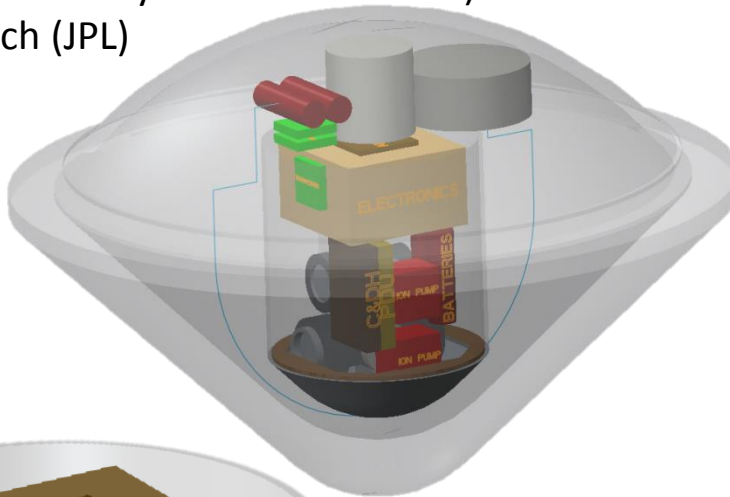
# Two-Stage Saturn Probe to Explore 60+ Bar Atmosphere

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## Summary:

1. Starting Point = 2010 Decadal Survey Mission Study Design:
  - 216.4 kg Probe Mass delivered to Saturn
  - 70-min Comm. Window for Probe → CRSC
2. Two-Stage Mechanical Design and Descent Trajectory Analysis:
  - Shallow-Stage stays above 1.7 bar in 70 min.
  - Deep-Stage (Mass Spec and ASI) reaches 63-bar in 70 minutes
3. Link Analysis:
  - 20 kbps downlink for Deep-Stage → Shallow-Stage → CRSC
4. Cost Analysis: Two-Stage Probe Cost = \$137.3M
  - Increases total mission cost by 2.5% relative to Single-Stage