

Venus Mobile Explorer: Balloon Concept

Tibor Balint

NASA JPL

Richard Brill

San Jose State University, NASA Ames

Ed Chester

CTAE

Brandy Holmes

University of Idaho

Qamar A. Shams

NASA Langley

Greg Thanavaro

Boston University, Georgia Institute of Technology

IPPW 6 Short Course

6-22-08

Mission Profile

- Descent
- Deployment from 70 - 50 km, recovers to cruise altitude, 60 - 65 km

Balloon Specs

- Super-pressure balloon, Helium
- Teflon coated, acid resistant
- Shape (TBD by trades, spherical vs. egg-shaped)
- Supports payload gondola

Payload/Instruments

- Imaging: IR (high res) + multispectral imager
- Chemical composition: Nephelometer + GCMS
- Meteorology: meteorology package (T, p, wind)
- Doppler: Ultra stable oscillator
- Sensors: Accelerometers + Gyros
- Drop Sondes: p, T, possible descent imager
- Lightning: Infrasonic microphone + electric field detector

Communications

- Telecom trades TBD
- Notionally:
 - X-band**
 - Low rate to Earth via DSN (unidirectional HGA)
 - +
 - High rate relay via orbiter (omnidirectional MGA/LGA)

Power

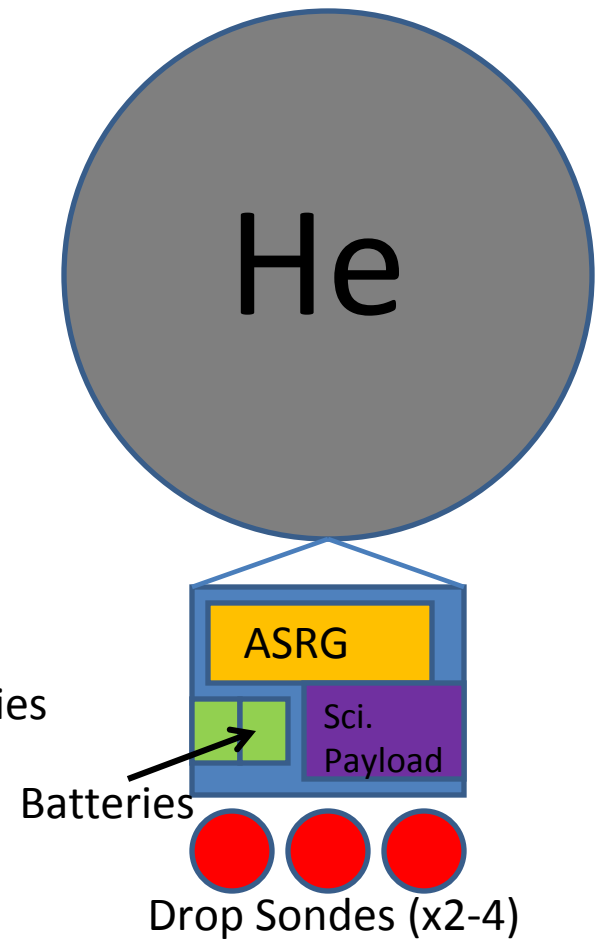
- Gondola:** Stirling Engine (21 kg, 140 W) + Secondary Batteries
- Drop Sondes:** Primary Batteries

Operationally:

High power modes: (e.g. telecom) draw power from RPS + batteries

Low power modes: recharge batteries from RPS

Concern: ASRG heat waste rejection during cruise to Venus and entry



Power Breakdown of Balloon Concept

	Power Avail., Watt
Power	
Stirling Engine	140
Secondary Batteries	TBD
<hr/>	
	Power Req., Watt
Science Payload	
Imaging	
IR	10
Multispectral	15
Chemical Composition	
Nephelometer	40
GCMS	30
Meteorology package	4
Doppler	
Ultrastable oscillator	10
Sensors	
Accelerometers & Gyros	1.7
Drop Sondes (primary battery powered)	0
Lightning	
Infrasonic Microphone	1
Electric Field Detector	1
Communications	
Omnidirectional, Medium/Low Gain X-band Antenna	30
Directional, High Gain Antenna	60
	202.7