

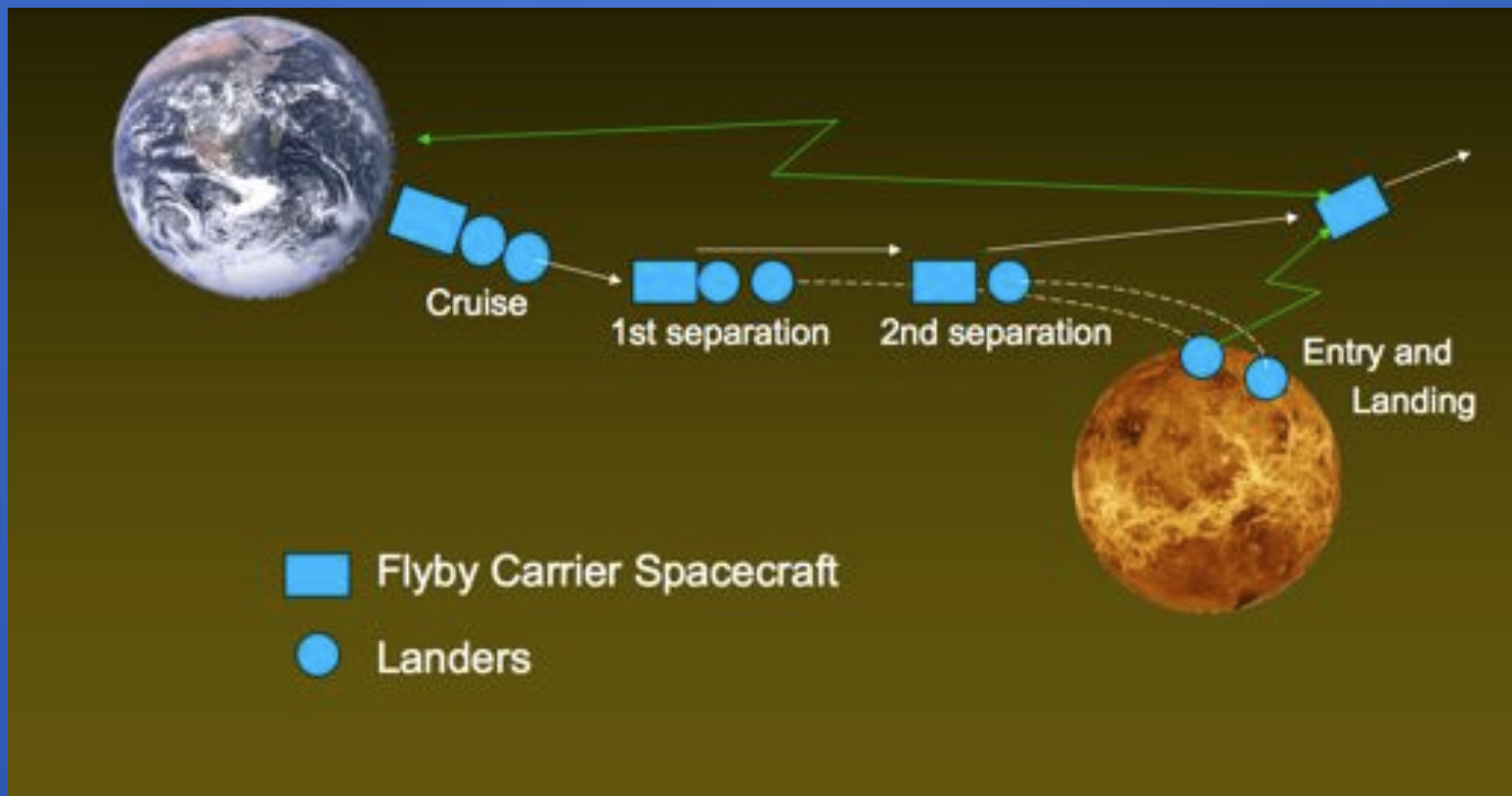


# Missions Possible

Inner Planet Panel

# Plan of VISE

- Venus has a highly corrosive supercritical CO<sub>2</sub> atmosphere, with pressures and temperatures reaching ~90bar and ~460C.
- Because of this extreme environment, the Venus In-Situ Explorer would be able to take measurements at the surface of Venus, but only for ~5 hours.
- It is estimated that there will be 1 hour of decent time for the explorer to take measurements involving the evolution of the atmosphere, interactions of the surface and atmosphere, and atmospheric dynamics.
- During the 5 hours the explorer will be able to survive the extreme conditions of Venus, it will take measurements to understand the physics and chemistry of Venus's crust.



## 5 Hour Near-surface Lifetime

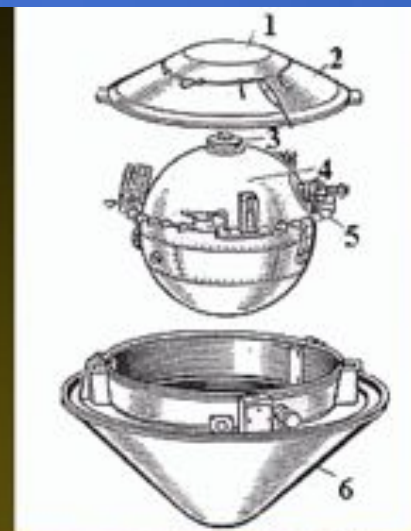


# New Technologies for VISE Survival

- High temperature electronics and cooling
- A pressure vessel design with phase change material, constant conductance heat pipes, and multi-layer insulation.
- A specially designed stirling radioisotopic generator power system that could provide both electric power and active cooling to the spacecraft.



- **Pioneer-Venus Heritage**
  - Same pressure vessel dimensions
  - Flight qualified TPS
  - Eliminate heat shield and back shell development costs
  - Only minor modifications required
- **Venera Configuration Adaptation**
  - Aerodynamic braking plate deployed at 22 km altitude
- **Mission-Specific Designs**
  - 4 Lander legs to provide landing stability, instrument positioning
  - Passively deployable braking plate and legs
  - Increased surface lifetime



# Lunar Science and Lunar Laser Ranging

- Lunar Laser Ranging studies the Moon's internal structure and properties by tracking the variations in the orientation and tidal distortion of the Moon as a function of time.
- Future missions to the Moon's surface should include new laser ranging instrumentation capable of improved range accuracy. May be able to better understand gravity and the inertia of the moon if we knew more about the moon's core and whether a solid inner core might exist within the fluid outer core.

- <http://www.planetaryprobe.eu/IPPW7/proceedings/IPPW7%20Proceedings/Presentations/Session2/pr385.pdf>
- <http://trs-new.jpl.nasa.gov/dspace/bitstream/2014/38734/1/06-0092.pdf>