VENUS Team

Pat Beauchamp
JPL/ Team Lead

Darby Dyar
PSI/Mt Holyoke/Science

Gary Hunter
GRC/VEXAG Tech Plan lead

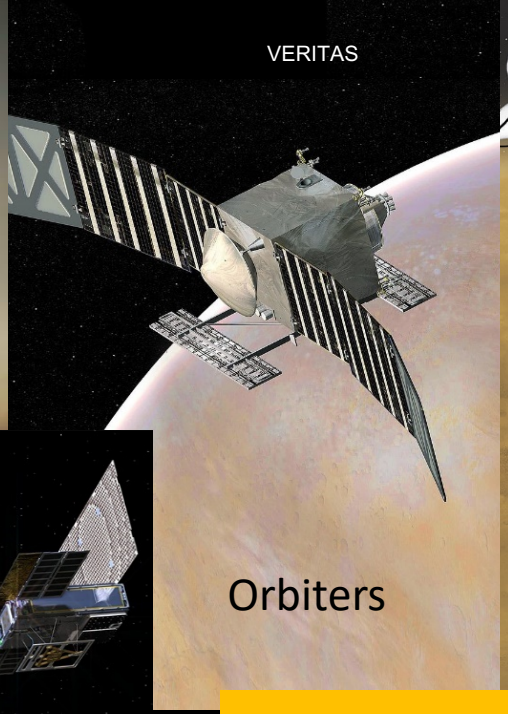
Jim Cutts
JPL/VEXAG Roadmap Lead

Ian Gravseth
Ball Aerospace

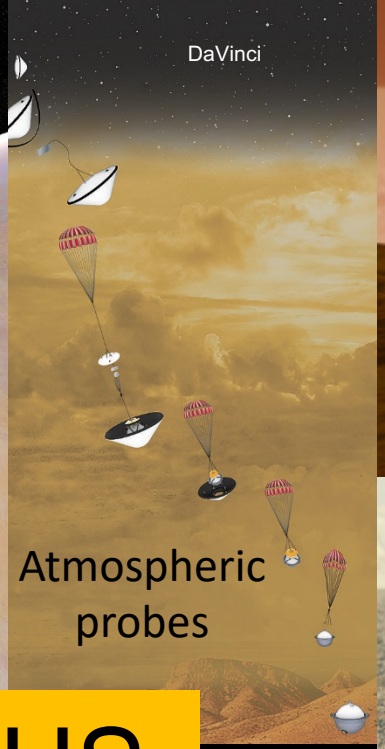
Lorraine Fesq
JPL/System Eng

Rebecca Foust
UIUC and Caltech

Michele Chan
Applied Physics Lab - JHU

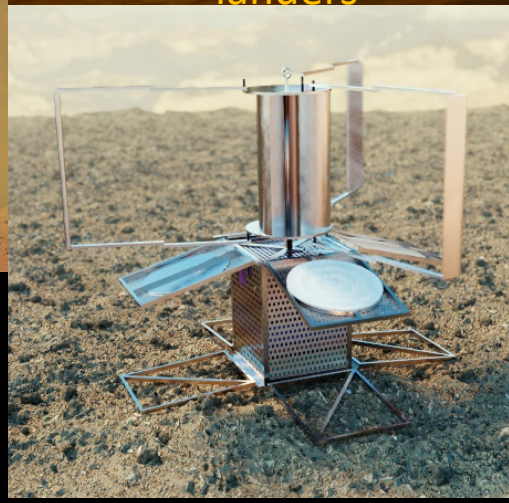


Orbiters



Atmospheric probes

landers



Airplanes

VENUS

Conditions: 93 bars and 740K at surface
½ bar and 30C at 55 km

Science Questions as of 2018:

1. Venus' early evolution (including possible habitability), and the evolutionary paths of Earth-sized terrestrial (exo)planets?
2. Atmospheric dynamics, composition, and climate history on Venus?
3. How physical and chemical processes interact to shape the modern surface of Venus?

Venus Mission Autonomy

Machine-based Situational Awareness, Decision Making, Response to Enable Exploration of a Diverse Planet

- Venus Science Questions → characterize a broad range of time-dependent, and potentially co-dependent, parameters from the surface to orbit.
- DRM - platforms on the surface, in mid-atmosphere, and in orbit as part of a coordinated investigation enabled by autonomous systems
- Widely varying operational conditions from the surface to orbit -> vehicle platforms with varying degrees of autonomous capability and integrated intelligence
- Example: Volcanic eruption causing seismic events and volcanic plumes. Independent of human intervention, the platforms quickly coordinate to observe the event and trace its effect
  - **Networked lander systems detect seismic event**, triangulate location, monitor evolution of local chemical profile while providing information to aerial platforms and orbiter -> examine crustal properties and independently characterize how volcano eruptions shapes local chemistry and dynamics.
  - **Orbital platforms confirm seismic event.** Characterize effect on atmospheric dynamics and physical/chemical processes on a planetary scale. Orbiters guide aerial platform to initial event and identify potentially correlated events away from the initial eruption and then divert/coordinate aerial assets to investigate
  - **Aerial platforms confirm seismic event.** Flight profiles reconfigure to target the volcanic site and a variety of vehicles encompass the site while monitoring the evolving plume. Atmospheric probes/landers are dropped for atmospheric dynamics and composition profiling and to provide visual/chemical observations of event.