



Linear Mode Photon Counting HgCdTe Avalanche Photodiode Arrays for Multi-beam Laser Altimeters

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Target: Surface and atmosphere of Mars and Titan; Surfaces and shapes of airless bodies; Remote sensing from orbit or during flyby

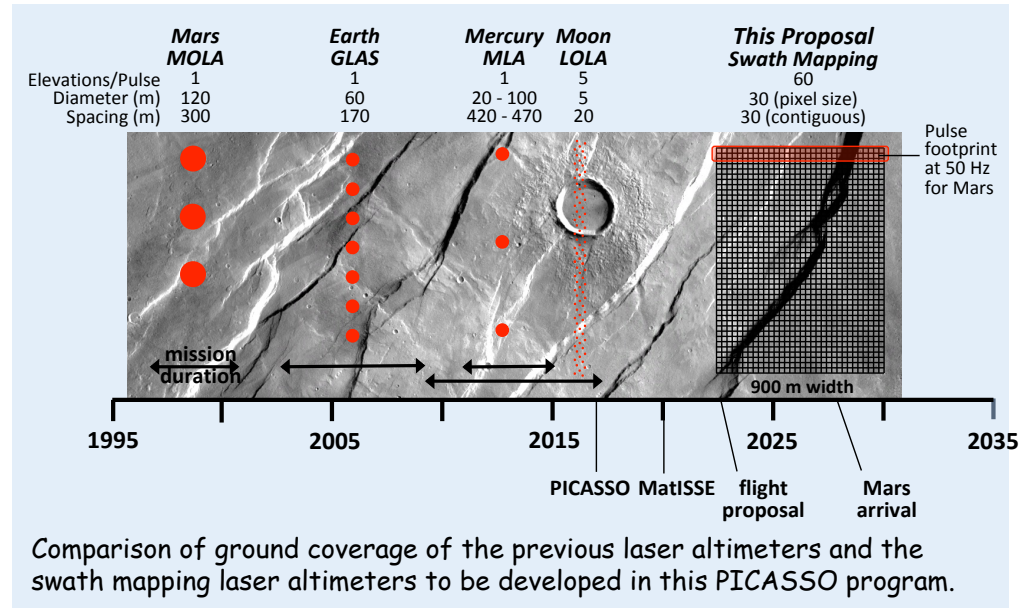
Science:

- Mars polar topography map at 30 m spatial resolution and wall-to-wall ground coverage to capture detailed geological features and monitor seasonal variation.
- Atmosphere backscatter profiles of clouds, dusts, and aerosols, daytime and nighttime.
- Diurnal cycle of surface frost in polar region of Mars and volatiles on airless bodies

Objectives:

- Developing a quantum limited (single photon) and linear response laser altimeter receivers from visible to mid infrared wavelengths
- Mapping surface topography at finer resolution and wider coverage from current 5-10 sparsely distributed beams to 60 contiguous pixel swath at better than 0.5 m ranging precision.
- Simultaneous measurements of atmosphere backscatter profiles and surface reflectance at the laser wavelength daytime and nighttime.

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Key Milestones:

- Science measurement requirements 3 months
- DRS in contract with GSFC 6 months
- Swath mapping signal simulation 12 months
- DRS detector design finalization 18 months
- Laser transmitter design 20 months
- DRS detector delivery 30 months
- Detector evaluation at GSFC 34 months
- Signal processing algorithm testing 35 months
- Final report 36 months

TRL 2 to 4