Janus: A NASA SIMPLEx mission to explore two NEO Binary Asteroids

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Janus is a NASA SIMPLEx mission currently in Phase B. The SIMPLEx program is designed around the idea of using secondary launch opportunities to explore interplanetary destinations. The Janus mission concept plans to take advantage of the NASA Psyche launch to send two spacecraft to fly by Near Earth Objects of interest. A specific point design has been developed that sends two spacecraft to two binary asteroid systems, (175706) 1996 FG3 and (35107) 1991 VH, both of which have been observed repeatedly with photometry, spectrometry and radar.

The Janus mission sends light-weight, low-cost spacecraft built by Lockheed Martin to encounter these high-science value small body targets. The science instruments are a visible and IR imager, from Malin Space Science Systems. The spacecraft will perform a rigorous remote sensing campaign when the object is a point source, and when resolved. The spacecraft will track the binary asteroid systems through closest approach, allowing for a combination of absolute surface resolution, relative resolution across the target asteroids and phase angle coverage unparalleled in previous asteroid flyby missions.

Janus science will combine flyby observations of the target binary asteroids with ground-based observations, enabling the high resolution imaging and thermal data to be placed into a global context and leveraging all available data to construct an accurate topographical and morphological model of these bodies. Based on these measurements, the formation and evolutionary implications for small rubble pile asteroids will be studied.

The science team members all have experience on asteroid missions or have made extensive ground based observations of NEAs. The industry team has extensive experience in the design, fabrication and operation of interplanetary spacecraft and instrumentation.