

Planetary Exploration with Robotic Missions

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The general strategy for planetary exploration starts with robotic fly-by missions, proceeds with orbiters, landers, mobile elements and sample return to finally human exploration. Except for the Moon, only Mars appears to be accessible to humans on even a decade long-term perspective. Thus, robotic exploration is still the name of the game. All planets and many satellite systems as well as classes of small bodies have been explored robotically, at least by fly-by missions. Recent major steps include the fly-by of New Horizons at Pluto, the orbiting and landing of Rosetta/Philae on comet 67P/Churyumov-Gersimenko, the roving of Curiosity on Mars, and sample return from Itokawa by Hayabusa. The immediate future is expected to bring the landing of a geoscience observatory on Mars (InSight), a rover for the search of life on the planet and sample return from that planet.

Planetary Exploration missions typically have similar payloads that include cameras, altimeters, spectrometers, magnetometers and *in-situ* instruments such as seismometers and heat flow probes. They use the communication devices for radio measurements to constrain atmospheric and interior structures.