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## **Technologies for Titan Exploration**

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Titan has unique features that make it especially suited for robotic exploration. Its extended atmosphere allows spacecraft to aerocapture into desired orbits, allowing much greater mass to be delivered than would be possible with propulsive capture. The thick Titan atmosphere provides relatively benign entry conditions compared to the giant planets, and even Earth. Radiation environment is low around Titan and absent in the environment near the surface. The air density at lower altitudes is high, the air is cold and mostly stable nitrogen and the winds are relatively light and predictable below 10-20 kilometers altitude. The most economical, elegant, and reliable way to navigate this environment is with an aerial platform, either a pressurized light gas balloon or powered airship, or a hot air balloon—a montgolfiere—that uses the varying winds at different altitudes to cruise across the landscape and sample interesting regions. Utilizing waste heat and power from onboard MMRTGs, such aerial vehicles would provide an ideal combination of efficiency and robustness that could enable an exploration mission returning science far in excess of that which could be obtained from an orbiter alone or even a stationary lander or surface rover.