## SLIM (Smart Lander for Investigating Moon) project for pin-point landing demonstration

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"SLIM" is a project in ISAS/JAXA to demonstrate "pin-point" landing on the lunar surface with small spacecraft. Recently, capability to "land anywhere you want" is expected from several viewpoints, such as science or resource exploration. "Pin-point" landing is a key technology for this capability, however, conventional ground-based navigation is not accurate enough. SLIM lander is designed to achieve precise landing whose error ellipse has a radius of 100m, although past lunar landers' error ellipse radius was more than a few km. Image-based onboard navigation system, and autonomous guidance, navigation and control are the breakthrough technology for this next-generation landing accuracy.

Another unique aspect of SLIM lander is its light weight: 200kg in dry mass and 700kg in wet mass. Several new technologies are developed to realize such a light-weight spacecraft,

and they will be useful for future frequent interplanetary missions.

Although the SLIM's main mission is technological demonstration described above, additional small scientific payloads, Multi-Band Camera, is also employed. Multi-Band Camera is designed to investigate an olivine bearing lithology for understanding their origin and investigating the composition of the lunar unsampled mantle or deep crustal material. SHIOLI crater (13.3degS, 25.2degE) was selected as a target landing point to derive this detailed mineralogy of the olivine-rich exposure. "Two step landing scheme" is another unique landing technology of SLIM to achieve safe landing on a slope, and this target landing point bit close to a crater is a typical example requiring such ability. Image based obstacle avoidance onboard will also take an important role at the final landing stage.

SLIM is scheduled to be launched in Japanese fiscal year 2021, and at this moment, the development is at the end of so-called Phase-C. In the coming joint meeting, development status will be also introduced, including several engineering models test.

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