Plans and study of JAXA's next SLR station

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JAXA started developing a new SLR station in 2017 to replace an old resource that was established in 2004 on Tanegashima.
Five new features are planned to be added to this new SLR station; infrared wavelength, high repetition rate, optical fiber transmitter, automatic tracking, and safety system with an infrared thermography.
To ensure the availability of these features, we conducted a demonstration test last year by making a prototype SLR with inexpensive components to measure the range to a ground target. We used both 532 nm and 1064 nm wavelength lasers whose pulse width was 1 ns and the repetition rate was 1kHz. To guide the laser pulse to the transmitter, we used optical fiber instead of the Coude path. For a detector, we chose to use APD in the linear mode with its rising time set in the nano-second order. Consequently, we succeeded in performing laser ranging to the ground target, but its accuracy was limited to about 2 to 10 cm. To increase the precision, we will change APD to SPAD.
Adding to this, we conducted another demonstration test by taking pictures of aircraft using infrared thermography to examine whether this technology suits as a safety system. We also succeeded in identifying the shape and temperature of a plane clearly. In the future, we will add a feature of stopping laser transmission when a system detects aircraft.
The new station is planned to be established in Tsukuba Space Center, and will start its operation in 2021.