

## Recent progress in the International Laser Ranging Service

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The International Laser Ranging Service (ILRS) provides Satellite Laser Ranging (SLR) and Lunar Laser Ranging (LLR) observations and data products with a focus on Earth and Lunar science and engineering applications. The basic observables are the precise two-way time-of-flight of ultra-short laser pulses from ground stations to retroreflector arrays on satellites and the Moon and the one-way time-of-flight measurements to space-borne receivers (transponders). SLR is one of the four space geodetic techniques (along with VLBI, GNSS, and DORIS). The International Terrestrial Reference Frame (ITRF) development, maintained by IERS, is based on these geodetic observations. Fundamental data products include accurate satellite ephemerides, Earth orientation parameters, three dimensional coordinates and velocities of the ILRS tracking stations, time-varying geocenter coordinates, static and time-varying coefficients of the Earth's gravity field, fundamental physical constants, lunar ephemerides and librations, and lunar orientation parameters. The ILRS continues to expand spatial and temporal coverage of SLR observations. New stations with new technologies are being deployed; existing stations are being upgraded. Some of these stations are multi-technique Core Sites. New satellites are expanding applications and strengthening the ILRS contribution to the reference frame. New analysis, modeling, and data processing techniques are improving data products. New campaigns are expanding our applications into relativity and the study of non-gravitational forces. New activities are underway on Lunar Laser Ranging, Time Transfer, and Space Debris Tracking, helping to expand laser ranging applications. This talk will give an update on the current ILRS activities and their impact on ILRS data products.