

Current state of the contribution of ESA's Izana-1 station to the ILRS

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ESA's Izana-1 station deployed on Tenerife in 2021 serves as a testbed for new technologies, such as active and passive space debris observations as well as optical communication. It also features a geodetic piggy-back laser and detector package with a novel and efficient design. The station actively contributes to the ILRS and submitted more than 850 SLR passes at 532 and 1064 nm to the European Data Center (EDC) between end of November 2021 and September 2022. Since August 4th, the station is released from quarantine within the ILRS. The calibrations shown an RMS of 23 ps at 532 nm and 29 ps at 1064 nm thus achieving mm precision. The accuracy of the station data is at mm level based on range bias analysis. The impact of the return rate on the measured distance has been characterized for both wavelengths, in order to ensure single-photon level for the regular but also the fully autonomous operation of the station in future.

Currently mostly targets from the ILRS list (LEO to GNSS) are tracked with high productivity in terms of achievable return rates, even at low elevation, also during the day and with short NPT accumulation times given the 0.2 W power of the Passat laser at 1064 nm. Also, cooperative inactive targets such as Envisat, Topex and various rocket bodies have been tracked on a regular basis. Passive observations have been recorded to these and other targets that are used for orbit determination and attitude characterization using the high-resolution camera FLI ML 16070. This is done in preparation for a future extension of the system with more powerful laser establishing tracking of uncooperative targets on a regular and even autonomous basis. This paper will summarize the current status of the Izana-1 station as well as its contribution to the ILRS.