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Incorporating LARES-2 SLR Data in ILRS Products for ITRF Development

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Geodetic network infrastructure has evolved with increasing pace the past decade with remarkable additions of modern hardware, replacing aging, '80s vintage equipment throughout the globe. SLR needs however more than updating the network to deliver the accuracy required today. New and improved design "targets" must also be used that support the required "1-mm accuracy". LAGEOS was conceived and built in the early '70s with a ~5 mm accuracy in mind [Pearlman et al., 2019]. This limitation forced analysts to develop approaches of data analysis to ensure that even with such data one can reach the required 1-mm accuracy [Luceri et al., 2019]. Along with the network updates a parallel effort was thus initiated to modernize the space segment as well. Initially with the design and launch of LARES in 2012 [Pavlis et al., 2015] and following that, the design of LARES-2 [Ciufolini et al., 2017, Paolozzi et al., 2019], which was successfully launched on July 13, 2022 [<https://www.nature.com/articles/d41586-022-02034-x>]. The new mm-accurate target was quickly acquired first by the Italian station at Matera, only three days after launch and although very early in the mission, the data were of remarkably high quality and insignificant bias. This prompted a quick evaluation and a test inclusion of this target in the limited list of SLR targets supporting the ITRF development. With an orbit nearly identical to LAGEOS (with supplementary inclination), taking full advantage of all the appropriate models designed and applied to LAGEOS, we achieved 7-day orbital fits of 3-5 mm even without a tuned target signature correction. Using the approach described in [Kuzmicz-Cieslak, M. et al., 2022] and along with data from the other geodetic spheres, we have generated preliminary combination products for the development of the ITRF. We will present an overview of this initial analysis of LARES-2 data focusing on comparing these results to contemporaneously taken data from the standard four geodetic spheres only, (LAGEOS 1 & 2 and Etalon 1 & 2).

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