The reference frame employed for SLR data analysis has been defined by the LAGEOS satellites. The eight NASA systems exert a strong influence on the scale of the frame. These stations have been built to a similar design and possess properties which are not replicated in other SLR systems. Systematic features in the ILRS network’s range measurements to the geodetic satellites LAGEOS 1 and 2, Etalon 1 and 2, Ajisai, Starlette, Stella and LARES are routinely assessed in the data analysis conducted at Hitotsubashi University. We present a summary of recent results for the NASA network and note a strong signal in the ranges to those targets which are sensitive to the satellite center-of-mass (CoM) offset model. The implied refinements to the LAGEOS CoM correction would lead to a significant change in the scale of the SLR reference system.