PRECISE ORBIT DETERMINATION AND MEASUREMENT BIAS ANALYSIS FOR STARLETTE WITH SATELLITE LASER RANGING OF THE KOREAN SLR STATION "DAEDEOK-73592601".
Y.-R. Kim, E. Park, and H.-C. Lim, Center for Space Situational Awareness, Korea Astronomy and Space Science Institute, 776, Daedeok-Daero, Yuseong-gu, Daejeon, 305-348, South Korea, yrockkim@kasi.re.kr.

Introduction: Korea Astronomy and Space Science Institute (KASI) has developed the first Satellite Laser Ranging (SLR) station of Korea, "DAEDEOK-73592601". The DAEK station has been provided SLR normal point (NP) data to International Laser Ranging Service (ILRS) data centers since August 2013 and became an active station in April 2014. As a new active ILRS stations, quality assessment of SLR NPs from DAEK station are required.

Precise Orbit Determination: In this study, precise orbit determination (POD) for Starlette is performed for quality assessment of DAEK SLR NPs. The NASA/GSFC GEODYN II software is used for POD and a weekly-based POD strategy is applied to process SLR NPs from January, 2013 to July, 2014 from 27 ILRS global stations. Golosiiv, Simeiz, Riga, Svetloe, Badary, McDonald, Yarragadee, Greenbelt, Monument Peak, Tahiti, Changchun, Beijing, Daedeok, San Juan, Hartebeesthoek, Zimmerwald, Kunming, Shanghai, San Fern, Mount Stromlo, Simosato, Graz, Herstmonceux, Potsdam, Grasse, Matera, and Wettzell are included in SLR data processing. For air drag coefficients and empirical acceleration parameters estimation, 8h-based strategy is applied. The center of mass for Starlette is used as a value of 78 mm. For measurement bias estimation, quick orbital analysis by pass-by-pass is performed.

Results: The mean root mean square (RMS) value of post-fit residuals of Starlette is 9.6 mm. The precision of post-fit residuals in this study is better than those of previous studies [1, 2, 3, 4].
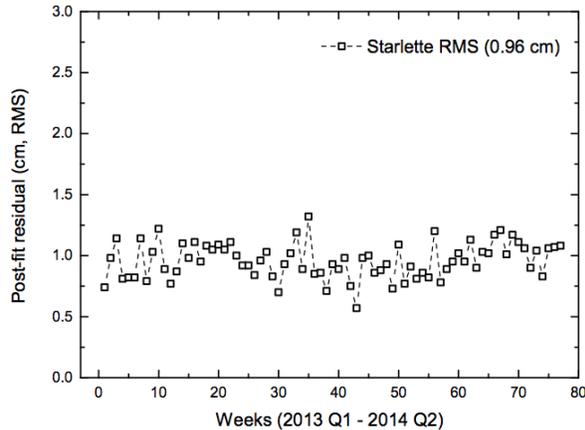
Figure 1. The mean of Post-fit Residuals for Starlette POD

The results of measurement bias analysis are presented by range bias of each pass. The mean value of range bias from DAEK station is -12.5 mm.
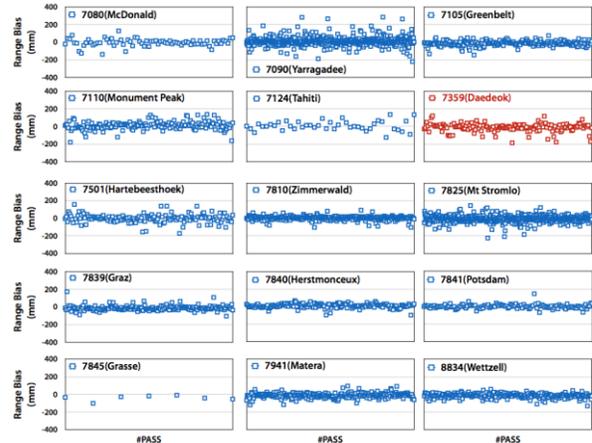
Figure 2. Measurement Bias Analysis for ILRS Stations

Summary and Conclusions: We performed POD and measurement bias analysis for Starlette with SLR including DAEK station. We obtained the mean post-fit residuals under 1 cm and calculated the mean range bias of DAEK stations about -10 mm.

References:
[1] Lejba P., Schillak S., and Wnuk E. (2007) *Adv. Space Res., 40,* 143–149.
[2] Lejba P. and Schillak S. (2011) *Adv. Space Res., 47,* 654-662.
[3] Jeon H. S. et al. (2011) *Astrophys. Space Sci., 332,* 341–351.
[4] Rutkowska M. and Jagoda M. (2012) *Acta Geophysica, 60,* 1213-1223.