

Broadening of SLR Network in Chinese Mainland

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Abstract

Chinese mainland should broaden its SLR network ,to determine and check up the orbits of its Compass/Beidou satellites. At least 3 new stations should be located in west China's Urumqi, Xining and Lhasa. Three broadening plans of SLR network can be thought about ,and more mobile systems may be designed .Three methods can be used in overcoming its main difficulty.

1. Brief history of Chinese SLR Network

China began its SLR research in early 1970s.Chinese Academy first got SLR data,in meter accuracy(ZHANG and CHEN). Early 1980s , Chinese SLR network observed LAGEOS Satellite. By the end of 1980s, 7 observatories may be seen in table 1(ZHU,1989).It is a pity that some SLR stations(Zhengzhou, Guangzhou) stop their work. A score later ,at least 3 Chinese SLR stations realize GEO satellite, Khz and daylight SLR tracking.

Table 1
Chinese SLR Observatories in 1988

Name	Long(deg.)	lat(deg.)
Shanghai	121.2	31.1
Xi'an	109.0	34.2
Zhengzhou	113.6	34.7
Beijing	116.3	40.1
Wuhan	114.3	30.5
Changchun	125.4	43.8
Urumqi	87.6	43.8

Table 2
Chinese SLR Observatories in SLRF2005

Name	Long(deg.)	lat(deg.)
Shanghai(7821)	121.2	31.1
Lhasa	91.0	29.6
Kunming	113.6	34.7
Beijing	115.9	39.4
Wuhan(7236)	114.3	30.5
Changchun	125.4	43.8
Urumqi	?	?

2. Current SLR satellites and observatories

Until 2013, China have sent its SLR 4 kinds of spacecrafts, for example Shenzhou4, Hy-2, zy-3, COMPASS satellites. All the LRAS were designed and made by Chinese themselves. The three LEO satellites catch the similar LRA . Table 2 show 7 stations in 2010s. In table2(ZHU(2008),NASA), Zhengzhou ,Guangzhou and Xi'an are replaced by Lhala, Kunming and Changchun. The Beijing observatory in table 1 is not the same as in table2.Fig 1 is the LRA on Compass-G2(YANG and ZHANG,YANG and HONG)

3. China should broaden its SLR Network

Table 1 and 2 show that China's SLR observatory mount almost had stopped its steps for quarter a century. In contributions of space geodesy, geodynamics and orbit determination for Compass satellites. Three plans or steps can be thought.

First, west China's Urumqi and Lhasa should become fixed SLR station. New system installation at Xining may be better.

Then, Zhengzhou, Xi'an and Guangzhou come back to the SLR observatory list .In west China, such as Xinjiang, one new station is less than SLR data necessary.

Third, new mobile SLR instrument may be designed and made out. Perhaps , Beijing had put in use another SLR system, with 1 meter aperture receiving telescope, in its north suburbs (YANG and ZHANG et al.) .

4. Difficulties and countermeasures

Feet are longer than roads methods are more than difficulties. Main difficulty is professional and expense problem. though, near 50 scientists and engineers devoted in SLR event. The more observatories, the more workers and expenses. A long term plan may be helpful ; and great influences from famous scientists and geodesists to the government will win better policy decision .

In addition , younger colleagues can be introduced and encouraged to SLR career.

5. Summary

Till 2020, Compass satellites will become a global navigation satellite system, they need SLR technology.

As above, Beijing and Xinjiang may fulfill two SLR systems, Xining ,Lhasa, Wuhan, Guangzhou , Changchun, Kunming, Xi'an ,Zhengzhou may settle a fixed instruments. 2-3 mobile SLR Systems could be thought out.

Thus, Chinese mainland should use 14-15 fixed or mobile SLR instruments.

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The LRA on Compass-G2

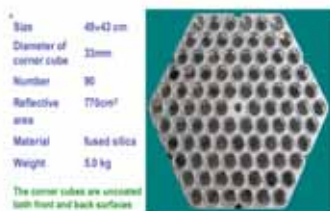


Fig.1
Corner cubes on
Compass-G2 satellite