Electro-Control System of San Juan SLR Station

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Abstract

A new SLR station has been set up in San Juan, Argentina this year, and works well now. Since Feb. 5th, 2006 to the 4th quarter, 2006, a total of 5861 pass (include 1134 Lageos pass) was obtained[1]. Some parts of this station, including servo system, control system, control software, and some observations will be described in this paper.

Telescope Servo System

San Juan SLR station's telescope is a bi-close-loop control system, i.e. position loop and velocity loop. Angle inductosyn and tacho-generator are used for the feedback sensors. When SLR system is tracking, the DAC input is tuned by PC software to drive telescope according to the ephemeris and the telescope position. Then the PID arithmetic theory is used to figure out the PWM voltage, consulting the telescope and theoretical velocity, to drive telescope's moment motor. So using this bi-close-loop control system, the SLR system's tracking can be improved.

The mount is driven by special motion drive IC: LMD18200. Its operating voltage can be up to 55V, and operating current can be up to 3A continuous output.
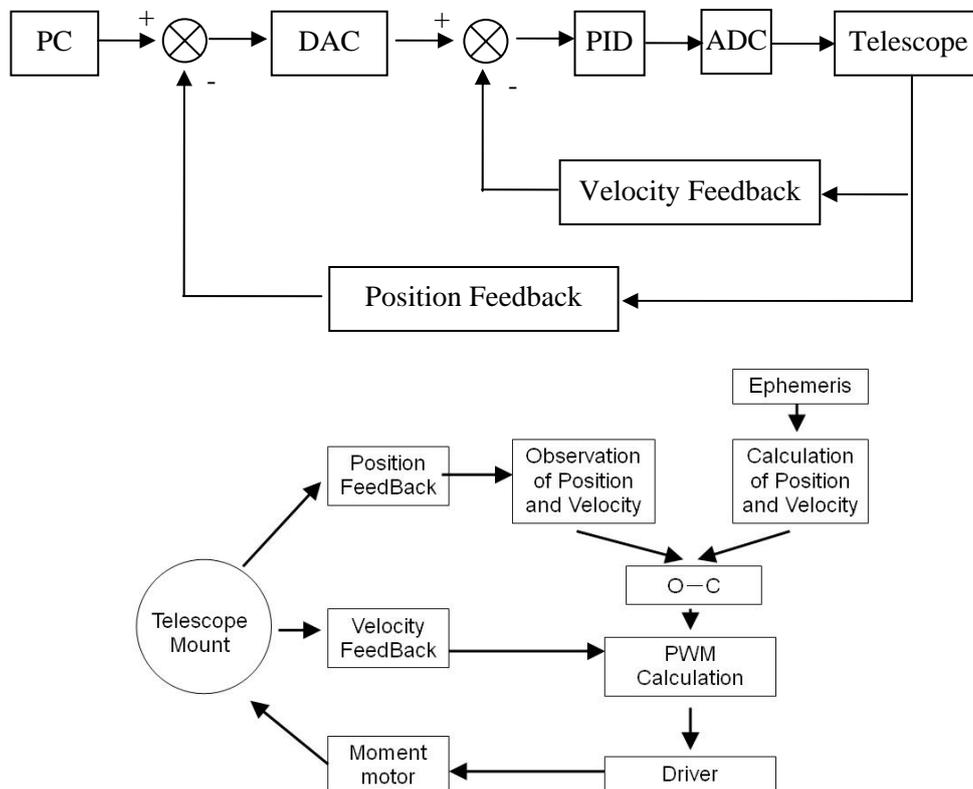

Figure 1: *the principle diagram of servo system*

Control Software

A general computer is needed to run the control software, and Figure 2 is the first picture of San Juan's tracking Lageos. Most control functions are included, such as satellite prediction, data pre-treatment, telescope servo, laser firing, range gate tuning, target measurement, data acquisition, etc.

Figure 2 is the first pass of Lageos in San Juan SLR station on Feb.5th, 2006. In this pass, 1514 samples were achieved between two green lines. The duration is about 15 minutes, and the deviation is very small (white dots).
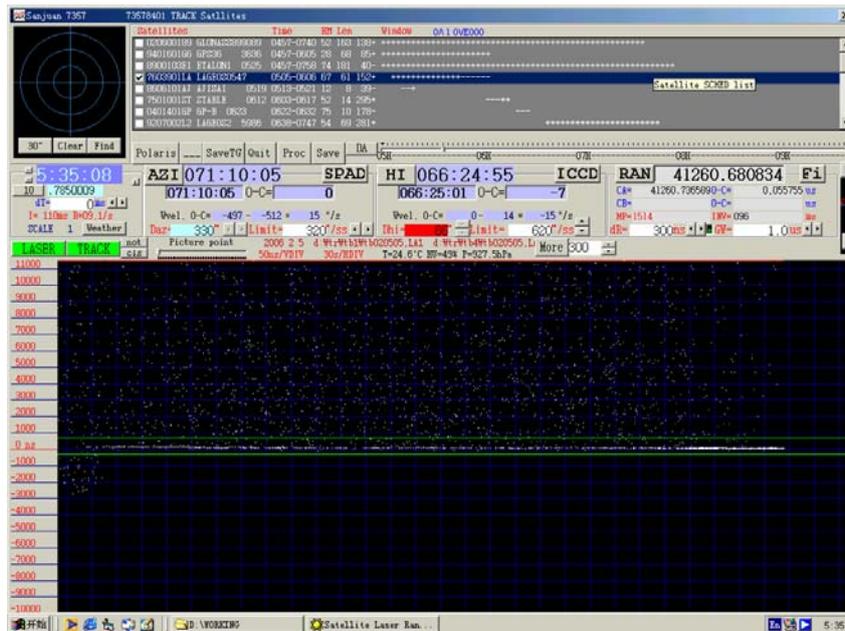

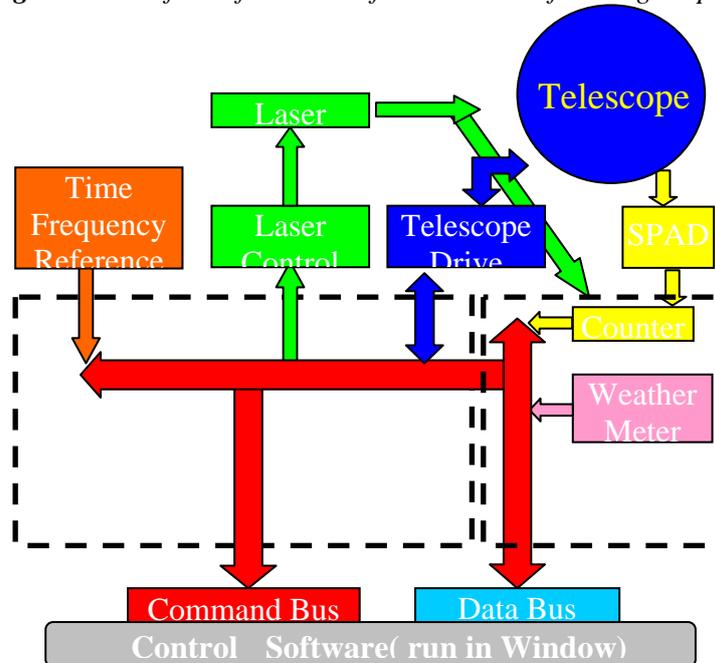*Figure 2:* *Interface of control software and the first Lageos pass*

Figure 3: *The diagram of control system*

Results

The South America is lack of SLR station. The running of productive San Juan station will improve performance of the ILRS network.

Site Information		Data Volume									Data Quality		
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14
Location	Station Number	LEO pass Tot	LAGEOS pass Tot	High pass Tot	Total passes	LEO NP Total	LAGEOS NP Total	High NP Total	Total NP	Minutes of Data	Cal. RMS	Star RMS	LAG RMS
Baseline		1000	400	100	1500								
San_Juan	7406	3846	1134	881	5861	52713	13619	4180	70512	32323	6.5	10.4	12.1

Table 1: *San Juan performance report card[1]*

Reference

[1] SLR Global Performance Report Card July 1, 2005 through June 30, 2006.

[2] Wang Tangqiang, Current Status Of San Juan SLR Station In Argentina, 14th ILRS Workshop Proceedings.

[3] Guo Tangyong, The Performance and Observation of Mobile System TROS-I In China, 14th ILRS Workshop Proceedings.