

LTES - Problem Report #31

Telemetry dropout following velocity change command

06/22/2020 11:38 AM - Igor Lazbin

Status:	New	Start date:	06/04/2020
Priority:	Normal	Due date:	06/30/2020
Assignee:		% Done:	0%
Category:		Estimated time:	0.00 hour
Target version:		Spent time:	0.00 hour
Description			
While attempting to change servo velocity from .333 mm/sec to .2806mm/sec, a loss of telemetry was observed. This was later reproduced on the EM control board.			

History

#1 - 06/22/2020 11:46 AM - Igor Lazbin

Cause

While trying to reproduce this scenario in simulation, I noticed that the triangular ramp responsible for generating periodic telemetry stopped updating and was basically dithering in one spot. This would cause the described behavior; this also means that no part of the instrument was stressed. Rather, the mirror stopped scanning and telemetry flow stopped.

Upon further inspection of the model, it became apparent that the issue has to do with the parameter update logic. Normally, parameters are updated at the end of the turn-around period. However, for the ramp to remain continuous, the parameters governing its generation need to be updated near the zero position. Such is the case with the parameter governing scan periods. However, the velocity parameter is updated at the end of the turn-around and causes this issue.

The long-term fix

Long term solution to this issue is to change the logic for updating the scan velocity parameter to be near (or at) the center of scan; basically use the same logic as that used for the scan period parameter change. This is a simple logic change that can be folded into the next software release.

Workaround

Fortunately, there is a simple workaround that will allow scan speeds to be changed without having to perform a new software load. The principal behind the workaround is to make sure the scan velocity parameter is updated nearer the center of scan. The sequence to change the speed to 0.2806mm/sec should be as follows:

Parameter change	TLM_THRESHOLD (parameter 5) to 5000 (default is 9000)
Parameter update	
Wait 2 sec (or longer)	
Parameter change	SCAN_VELOCITY (parameter 4) to 2806 (default is 3330)
Parameter Update	
Wait 2 sec (or longer)	
Parameter change	TLM_THRESHOLD (parameter 5) to 9000
Parameter update	

I have simulated this sequence and it should result in the desired scan velocity change. I recommend doing this in open loop mode, then transition to closed loop once everything is verified to behave nominally.