SPACE SYSTEMS SYMPOSIUM (D1)
System Engineering Tools, Processes and Training (2) (6)

Author: Dr. Pavel Paces
Czech Technical University In Prague (CTU), Czech Republic, pacesp@feld.cvut.cz

Mr. Juan Cabrera
Venezuela, johancabrerag@gmail.com
Mr. Simon Fellowes
Surrey Satellite Technology Ltd (SSTL), United Kingdom, S.Fellowes@sstl.co.uk

A COMPLETE PERFORMANCE TESTS OF AN ANALOGUE SUN SENSOR WITH IMPROVED LINEARITY, VARIABLE SLIT AND SHUTTER DISTANCE

Abstract

This work summarizes lessons learned which were gained after performing measurement of a complete set of characteristics with an analogue sun sensor whose design allows to change width of its slit and the height of the slit over the sensing element. The width of the sensor slit and the slit distance from the sensing element has been changed and the sensing element performance was recorded. The article introduces a method of testing and equipment used to determine an optimal arrangement of the sun sensor, including sun light simulator. While the analogue sun sensor has non-linear characteristics, a method which improves sensor linearity is introduced. This method introduces different shapes of the sensing elements to cope with changing response of the solar cell modules. There were multiple shapes tested including sinusoidal and exponential shapes that were compared with commonly used linear arrangement. The article summarizes recommendations for the sensing element optimal shape together with general advices about shutter which were derived from the measurement results. The optimal sun-sensor design is now being considered for a cube sat mission and also for a small satellite platform used mainly for education purposes.