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Author: Mr. Andrés Manjón
Instituto Nacional de Tecnica Aeroespacial (INTA), Spain

Ms. Miriam Pajas
Instituto Nacional de Tecnica Aeroespacial (INTA), Spain
Ms. Paloma Gallego
Instituto Nacional de Tecnica Aeroespacial (INTA), Spain
Mrs. Irene Catalán Fernández
Instituto Nacional de Tecnica Aeroespacial (INTA), Spain
Mr. Alberto Rodríguez
Instituto Nacional de Tecnica Aeroespacial (INTA), Spain
Mr. Álvaro de Pedraza
Instituto Nacional de Tecnica Aeroespacial (INTA), Spain
Mrs. Mª Ángeles Alcacera
Instituto Nacional de Tecnica Aeroespacial (INTA), Spain
Mr. Francisco Donaire
Instituto Nacional de Tecnica Aeroespacial (INTA), Spain
Mr. Diego Laguna
Instituto Nacional de Tecnica Aeroespacial (INTA), Spain
Mr. Carlos Fernández-Muñoz
Instituto Nacional de Tecnica Aeroespacial (INTA), Spain
Mr. Ángel Carretero
Instituto Nacional de Tecnica Aeroespacial (INTA), Spain
Mrs. Ana Balado
Instituto Nacional de Tecnica Aeroespacial (INTA), Spain
Mr. MIGUEL MAS
INTA - Centro de Astrobiologia, Spain

FOCAL PLANE ASSEMBLY FOR PLATO 2.0 CAMERAS: VIBRATION TEST RESULTS COMPARISON IN SERIALLY PRODUCED FLIGHT MODELS

Abstract

PLATO, the PLAnetary Transits and Oscillations of stars mission, is an ESA mission dedicated to finding and studying extrasolar planetary systems, with a special emphasis on rocky planets around Sun-like stars and their habitable zone, planned to be launched in 2026. The payload is composed of 26 cameras in the same instrument bench in order to cover a large field of view with the highest possible photon statistics. Each PLATO camera consists of a telescope optical unit, a focal plane assembly (FPA) containing four high-dimension CCDs, and a front-end electronics box. The number of cameras being manufactured, integrated, and tested at the same time makes this mission the first space assembly-line production.

PLATO FPA flight models (FM) have been serially produced and tested, which provides a unique opportunity to analyze the repeatability of the different units in many different aspects. It also allows the validation of the numerous manufacturing, integration and validation processes needed to achieve a high level of similarity between FM units, making them interchangeable.

This paper describes the vibration acceptance tests performed on the 15 FPA FM units tested at INTA premises, their test set-up, instrumentation and mechanical load levels performed, mainly focusing on the obtained results, comparing them and analyzing the repeatability in terms of main eigenmodes of the different as-built FM units.

The obtained results demonstrate that a high-level repeatability has been achieved in serially produced PLATO FPAs, allowing to interchange the units, if needed. This is the outcome of very solid and high-consolidated MAIT procedures.