

Preface

This manual represents the flight operations handbook for the “Future Low-Cost Platform” (FLP), a microsatellite platform developed by the Institut für Raumfahrtssysteme, Universität Stuttgart, Germany with the engineering support from Airbus DS GmbH, Friedrichshafen, Germany.

The FLP is a three-axis-stabilized satellite platform for the 100–150 kg class of satellites corresponding to approximately 1 m³ size. The manual was developed in parallel to final assembly and test phase of the first satellite based on this FLP platform—the “Flying Laptop” from the IRS, Stuttgart.

Since the manual serves as handbook for the flight operators during mission control it provides a thorough insight into the performance and architecture of the platform and the operations techniques—information not available for students in classic academic literature. The manual is therefore structured for an efficient training of new spacecraft operators (i.e., students being trained to control the university satellite) and thus it does not follow document content guidelines for Flight Operations Manuals from ESA, NASA, or any other agency standards.

Although the manual focuses on the generic platform to provide a documentation for future FLP-based spacecraft, it quotes for some passages and elements mission specific data, taken from the “Flying Laptop” project for better illustration purposes, such as for topics like

- the interfaces between platform and payloads,
- the thermal control subsystem—which obviously always covers the entire spacecraft,
- the ground infrastructures from Stuttgart and DLR/GSOC being used for this mission and
- a number of limit table values and event tables in the chapters and annexes.

The first FLP-based satellite “Flying Laptop” provides only an attitude control subsystem but does not yet feature propulsion module for orbit control. It also does not yet provide a SpaceWire-based payload control and payload data processing network. Both such elements have been studied by Airbus DS, Friedrichshafen for

- an ESA Phase-A space debris detection mission called “Space-based Space Surveillance” and
- in an R&T study called OBC-SA together with DLR, Fraunhofer FOKUS and other partners.

Some very brief sections on these topics—including the upgraded onboard computer design under test—are included in this manual to demonstrate the potential of the architecture. The corresponding literature and papers are cited in the references. In house Airbus DS this enhanced design with an upgraded onboard computer, SpaceWire payload equipment network and propulsion subsystem is called “FLP Generation 2.”

June 2015

Prof. Dr.-Ing. Jens Eickhoff

Donation for Life

With the royalties of this book the authors sponsor the German and international bone marrow donor's database for the fight against leukemia and other blood cancer variants. Many of these patients can only be saved by a bone marrow transplant and need a compatible donor.

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The FLP Microsatellite Platform

Flight Operations Manual

Eickhoff, J. (Ed.)

2016, XXVI, 680 p. 266 illus., 56 illus. in color.,

Hardcover

ISBN: 978-3-319-23502-8