

SPACE SYSTEMS SYMPOSIUM (D1)
Lessons Learned in Space Systems (5)

Author: Dr. Robert Axmann

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, robert.axmann@dlr.de

Mr. Julian Gude

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, julian.gude@dlr.de

Mr. Peter Muehlbauer

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, peter.muehlbauer@dlr.de

TET-1 SATELLITE OPERATIONS LESSONS LEARNED: PREPARATION OF MISSION, LEOP AND
ROUTINE OPERATIONS OF 11 DIFFERENT EXPERIMENTS

Abstract

TET-1 is a small experimental satellite with 11 different space experiments on-board. Build by German space industry its a satellite dedicated to verification of newly developed space hard- and software. The German Space Operations Center (GSOC) as part of the German Space agency (DLR) is responsible for satellite operations.

Development of space and ground segment started back in 2006, with a scheduled launch in the second quarter of 2011. Keeping this in mind we perform a survey of mission preparation activities focusing on first the reuse of existing GSOC mission infrastructure and second the specific adaptations necessary for TET-1. Lessons learned are compiled with respect to applicability for other missions, especially with respect to flight procedure development and satellite commanding.

Operations team training started in 2010 with different training and simulation sessions. Engineering models and the flight model itself have been used, no dedicated software simulator has been available. Advantages and disadvantages of this approach are discussed.

After a concise conclusion of preparation of LEOP and commissioning sequences that are commanded from ground control center a short introduction to the activation sequence of the satellite is given. This sequence is a set of predefined commands executed after spacecraft activation at separation. We will go on with LEOP and commissioning results in comparison with planned activities. Discussion is extended to our planned routine operations concept for 11 different payloads and the results of the first operational months in space.

We conclude with a collection of space segment design decisions with the biggest (positive as well as negative) impact on ground segment design and subsequent operations.