

IAA Study Group Status Report

Responsible Commission: 4 - Space System Operation & Utilization

Study Number and Title: 4.10 (TBC)

Distributed Space Missions for Earth System Monitoring

Short Study Description (repeat from Study Group Proposal):

It is worldwide agreed that upcoming space systems will strongly make use of collaborating platforms to replace current monolithic systems and to implement missions otherwise impossible (e.g. those requiring very large sensor apertures). Such evolution calls for a revolutionary change of mentality in design, realization, and operation at different levels. At payload level, one has to assess the capability to integrate the mission payload using different elementary payloads on board different satellites. In addition, new concepts (e.g. modularity, autonomy, standardization, plug & play components) must be explored to attain an efficient bus implementation and new subsystems (e.g. relative trajectory design, relative navigation and control, satellite interlink) are to be implemented to enable required new functions. The approach to distributed space missions is thus inherently multidisciplinary. Nevertheless, research has produced thorough studies on selected topics, but not always accounting for all the needs.

The study group will focus on distributed space missions with application to Earth observation in order to: (1) produce a comprehensive picture of the state of the art considering current research and mission programs; (2) identify applications which could benefit from this approach; (3) analyze most significant and innovative aspects, e.g. distributed payloads and their operation, spacecraft buses able to support such missions, launcher availability and/or required developments, relative orbit design, relative navigation and control (and required sensors/actuators), inter-satellite data link (telemetry & command, payload data). Finally, critical issues will be identified and recommendations proposed. In particular, prospect and opportunities of fully-fledged autonomous formations integrating a large number of platforms as follow-on of scheduled or studied formations based on two or a few spacecrafts will be addressed.

Progress in past six months:

Membership has been improved to cover most of the subjects under study.

Study content has been detailed and agreed and a first level outline has been implemented. Groups of authors and contact authors have been identified for most chapters.

Work started for first chapters whose outputs are needed for remaining study parts. Preliminary outputs are expected in May to be finalized by October (IAC in Prague). Overall study is due for May 2011.

Website Study Information up to date? (Study Group Membership, Study Plan and Schedule):

At the moment the study group is listed in the "Waiting Status" section.

Issues requiring resolution? (recommend approach):

At the moment authorship definition for the part on distributed electro-optical sensor is critical. If the problem is not solved by summer, such part will be canceled and the study will only focus on radar missions.

Product Deliveries on Schedule? (If modified explain rationale):

Yes

Study Team Member Changes? (List any Study Team Members that you wish to discontinue, and provide names plus contact coordinates of any Members you wish to add on the second page of this Study Update form.) Note: Complete contact information including email, tel. and fax must be provided for all additions. Only Members with complete contact information will be listed and receive formal appointment letters from the IAA Secretariat.)

Name of person providing Study Group Status (Study Group Chair or Co-Chair):

Marco D'Errico (Chair)

Status Report Date: March 11th, 2010

Study Team Membership Changes

Effectivity Date: March 11th, 2010

Discontinue: None

Complete member list in the following (some data will be provided shortly: currently we are working with email only)

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