

## IAA Study Group Status Report

### Responsible Commission: 4 - Space System Operation & Utilization

**Study Number and Title:** 4.10 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:**

Authorship & outline completed and agreed.

Contact with potential publisher on-going.

Work is proceeding, some chapters completed.

With respect to initial deadline (May 2011), end of work is expected in December 2011.

**Website Study modifications:** (Study Group Membership, Study Plan and Schedule, please list the corrections to be done or the documents to be uploaded)

Schedule: end expected in December 2011

**Issues requiring resolution?** (recommend approach):

None

**Product Deliveries on Schedule?** (If modified explain rationale):  
The study has a few month delay. Work planned to finish by end of 2011.

**Study Team Member Changes?**  
Discontinue: 5 - Add: 8

**Name of person providing Study Group Status** (Study Group Chair or Co-Chair):  
**Marco D'Errico (chair)**

**Status Report Date:** March 16<sup>th</sup>, 2011

### Study Team Membership Changes

Effectivity Date: March 16th, 2011

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