

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 16th, 2011

Study Team Membership Changes

Effectivity Date: March 16th, 2011

Discontinue:

Jean-Sebastien Ardaens
German Space Operation Center (GSOC), German Aerospace Center (DLR)
Email: jean-sebastien.ardaens@dlr.de

M.H. Entezari
IROST
entezari@irost.org

Marco Esposito
Cosine Research BV
Niels Bohrweg 11 - NL-2333 CA Leiden, The Netherlands
Ph: +31 71-524 18 42
Fax: +31 71 528 49 63
Email: m.esposito@cosine.nl

Scott Moon
Cosine Research BV
Niels Bohrweg 11, 2333 CA Leiden, The Netherlands
Email: S.Moon@cosine.nl

Alex Wishart
Astrium Ltd
Gunnels Wood Rd, Stevenage,
SG1 2AS, England
Tel: +44 1438 77 4475
Email: alex.wishart@astrium.eads.net

Add:

Stefan Busch
Department of Computer Science
Julius Maximilians Universität Würzburg
Am Hubland

D-97074 Würzburg - Germany
Ph.: +49-931-31-86719
Fax.: +49-931-31-86679
Email: busch@informatik.uni-wuerzburg.de

Thomas Grelier

Centre National d'Etudes Spatiales (CNES)
18 Avenue Edouard Belin
31401 Toulouse Cédex 9, France
Ph: +33 (0)5 61 27 30 93
Email: thomas.grelier@cnes.fr

Jian Guo

Department of Earth Observation and Space Systems
Delft University of Technology
Kluyverweg 1, 2629 HS Delft, The Netherlands
E-mail: j.guo@tudelft.nl

Vaios Lappas

Surrey Space Centre
University of Surrey
Guildford, Surrey, GU2 7XH
Ph.: 44 1483 683412
Email: V.Lappas@surrey.ac.uk

Franz-Heinrich Massmann

Deputy Operations Mission Manager
Gravity Recovery and Climate Experiment (GRACE)
GFZ German Research Centre for Geosciences
Department 1: Geodesy and Remote Sensing, Section 1.2
Tel./Fax: (+49) 8153-28-1206/1735
Email: fhm@gfz-potsdam.de

Phil L. Palmer

Surrey Space Centre
University of Surrey
Guildford, Surrey, GU2 7XH
Ph.: +44 1483 686024
Email: P.Palmer@surrey.ac.uk

Klaus Schilling

Julius-Maximilians Universität Würzburg
Am Hubland
D-97074 Würzburg - Germany
Phl.: +49-931-31-86647
Fax +49-931-31-86679
Email: schi@informatik.uni-wuerzburg.de

Marco Schmidt

Department of Computer Science
Julius-Maximilians Universität Würzburg
Am Hubland
D-97074 Würzburg - Germany
Ph.: +49-931-31-86759
Fax.: +49-931-31-86679
Email: schmidt.marco@informatik.uni-wuerzburg.de