

# IAA Study Group Status Report

**Responsible Commission:** Commission IV

**Study Number and Title:** 4.22 Through Optimization of Aerospace Trajectories

**Short Study Description** (repeat from Study Group Proposal):

The analysis and improvement of advanced methods for elaboration of a rigorous approach to the through optimization of branching trajectories of space transportation systems (STS), including injection into an orbit, interplanetary flights, reentry of separated parts and vehicles, emergency trajectories and probability processes.

The methods are supposed to give the possibility of using adjoint variables as sensitivity functions (one of the basic Pontryagin maximum principle properties). Also the possibility to develop methods for global optimization, in particular to estimate the number of local optimal solutions arising in different aerospace problems. These methods may have both analytic and geometric foundations.

Current trends of broad cooperation among specialized scientific institutions as well as geographical expansion of the aerospace corporations have forced development of the new approaches to integrated and multidisciplinary optimization. The new approaches must allow for combining diverse programs intended for detailed single-discipline investigations into a unified framework.

**Progress in past six months:**

A study group leaders meeting was held in Adelaide on September 2017 during 68<sup>th</sup> International Astronautical Congress to discuss the expanded list of SG Members and preliminary schedule of activities.

The key items and SG structure were coordinated via e-mail.

**Website Study Information update:** (please give any update regarding Study Group Membership, documents, Study Plan and Schedule):

Additional Study Team Members not listed at <http://iaaweb.org/content/view/738/970/> were included.

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

None

**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.)

Alexander Golikov  
Alexander Sagalakov  
Bagrat Akobyan  
Stefano Carletta  
Mauro Pontani

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

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**Status Report Date:** 28.02.2018

### **Study Team Membership Changes**

Effectivity Date: 28.02.2018

#### **Discontinue:**

Name

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#### **Add:**

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