

# IAA Study Group Status Report

## Responsible Commission:

## Study Number and Title: 4.17 Space Systems for Biomedical Research

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

Space environment is characterized by extraordinary conditions that can support and improve biomedical research on human diseases. The results obtained by several researches suggest that space environment exposure including microgravity and ionizing radiation can cause biological changes in cell structures, functions and in human health not always reproducible at ground.

For example results of studies performed on tissue culture for organ regeneration demonstrated the advantages of growing tissues in microgravity; preliminary on-orbit tests showed that the space environment is a fundamental tool to find new treatments for cancer cure.

The high costs related to space missions and the great amounts of data needed to validate results in biomedical research are some of the factors that constrained the space biomedicine.

Another main constraint is the possibility to have access to space. Recently, only the International Space Station is giving the possibility to support biomedical research in space, but launch and room availability inside the ISS are not sufficient for the amount of experiments that the biomedical community can perform.

The goals of this study is to find new space systems to improve biomedical research in space solving several issues such as high costs, samples analysis on board, payload recovering and also ethical issues and safety issues.

A possible way to improve the biomedical research in space could be the use of cheap and autonomous space systems (e.g. CubeSats). At the same time, several technical issues to use this kind of system need to be solved (e.g. thermal environment, reentry, on board sample analysis)

The main goals of this working group are:

1. Study possible technical solutions to design ad hoc platform for biomedical research in space,
2. Study new technologies and materials to improve samples return on ground,
3. Find new solution to improve launch capability or space biomedical payloads,
4. Design specific standards for biomedical research in space

In order to achieve these goals, members of the team have been selected from biomedical and aerospace engineer areas.

## Progress in past six months:

Chapter 4 has been approved.

Chapter 5 is under revision.

Listed new possible study group members.  
New Possible study group members have been contacted.  
An annual meeting at 3<sup>rd</sup> IAA Latin American CubeSat Workshop has been conducted with few new people interested in the initiative.

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

Yes.

**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.)

**Name of person providing Study Group Status** (Study Group Chair or Co-Chair):  
Chantal Cappelletti (Filippo Graziani)

**Status Report Date:**

01 March 2018

### **Study Team Membership Changes**

Effectivity Date: 08 March 2015

#### **Discontinue:**

Name

Current email address

#### **Add:**