Skoltech
Skolkovo Institute of Science and Technology

Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Ignasi Lluch I Cruz

PhD Program: Engineering Systems

Title of Thesis: A Framework for Architecting Federations of Engineering Systems

Supervisor: Professor Alessandro Golkar

Chair of PhD Defense Jury: Professor Clement Fortin ***Email:*** ***c.fortin@skoltech.ru***

Date of Thesis Defense: September 21, 2017

Name of Reviewer:

I confirm the absence of any conflict of interest (Alternatively, Reviewer can formulate a possible conflict)	**Signature:**  **Date: 28-08-2017**

The purpose of this report is to obtain an independent review from the members of PhD defense Jury before the thesis defense. The members of PhD defense Jury are asked to forward a completed copy of this report to the Chair of the Jury at least 30 days prior the thesis defense. The Reviewers are asked to bring a copy of the completed report to the thesis defense and to discuss the contents of each report with each other before the thesis defense.

If the reviewers have any queries about the thesis which they wish to raise in advance, please contact the Chair of the Jury.

Reviewer's Report

Reviewers report should contain the following items:

- Brief evaluation of the thesis quality and overall structure of the dissertation.
- The relevancy of the topic of dissertation work to its actual content
- The relevancy of the methods used in the dissertation
- The scientific significance of the results obtained and their compliance with the international level and current state of the art

- The relevance of the obtained results to applications (if applicable)
- The quality of publications
- The summary of issues to be addressed before/during the thesis defense

This thesis is a theoretical work defining and describing a new concept in Engineering, which is Federation of Systems. This is a novel approach, that will be very important in the future of the Information Society.

The Thesis contains clear definitions and taxonomy of Federations of Systems and very elegantly explains clear differences to other taxonomies. The Thesis also compares the advantages and disadvantages of several examples of Federations of Systems vs. conventional approaches (e.g., Federated Satellite Systems vs. Satellite clusters or swarms, new Rural Community Wireless network possibilities and Federated Ride Sourcing Car Service Systems (e.g. UBER) vs. conventional taxi systems). These are some main examples of these newly emerging economies using federated systems. The results clearly demonstrate many advantages of the newly emerging vs. conventional concepts.

The main topic of the work is new and urgently needed. Federated Systems are only possible since a few years and clear definitions were missing so far. Therefore this is a very timely work, that can be used as an overview and even as a manual.

Parts of the Thesis work were also published and presented at International Conferences (e.g., the World Conference "International Astronautical Conference" on Astronautics in 2015) and attracted much attention. As to my information, the new concepts from this work are now taken up by the Space Industry and plans for a commercialisation exist. The current thesis is a solid basis for this.

The literature overview is up to date and the whole thesis is written in a clearly organized and understandable way.

In summary, I consider this a very useful and excellent thesis work.

Provisional Recommendation

X *I recommend that the candidate should defend the thesis by means of a formal thesis defense*

☐ *I recommend that the candidate should defend the thesis by means of a formal thesis defense only after appropriate changes would be introduced in candidate's thesis according to the recommendations of the present report*

☐ *The thesis is not acceptable and I recommend that the candidate be exempt from the formal thesis defense*