

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

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Date of Thesis Defense: September 21, 2017

Name of Reviewer:

<p>I confirm the absence of any conflict of interest</p> <p>(Alternatively, Reviewer can formulate a possible conflict)</p>	<p>Signature:</p>  <p>Date: 05-09-2017</p>
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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 tackles a new topic which is the emergence of federated satellite systems. The mathematically formalized notion of synergy introduced is novel by itself, and also novel in its application to space systems. The validation case study with NY Taxi vs Ride Sharing Services is designed to instill confidence in the approach, which it does.

I agree that this is a doctoral thesis that is worthy of its name and I have no doubt that this would be accepted as a strong doctoral thesis at MIT.

I could imagine several interesting extensions of the research presented here:

- a) Forced federations: it occurs sometimes that different systems are forced into a federation by a higher power stakeholder. NPOESS is an example. This can lead to a negative outcome where negative synergy occurs and the federation can disintegrate. The thesis research can be extended to these negative cases.
- b) Potential for parasitism: this is related to the above comment, but refers to the case where there is a "host" and one or several parasites in the federation with unequal or even inverse polarity of net benefit from collaboration.

Provisional Recommendation

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