**The challenges of designing space systems in the context of System-of-Systems Application**

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1. **Introduction**

In the context of New Space or Space 4.0, there is a potential shift of paradigm towards a system-of-systems (SoS) approach instead of traditional space systems. Growth in the commercialisation of space outside the traditional applications can bring new opportunities in the design of space systems but this also come with challenges as highlighted in Jamshidi’s book [1]. The benefits of system-of-systems for space applications is outside the scope of this paper as well as the design of such SoS. However, this paper will focus on the challenges associated with the design of space systems that are intended to be integrated within a larger SoS.

1. **Relevance of the research with respect to the conference Thematic Areas**

The paper will discuss the current state of the research undertaken at University College London (UCL) and will present progress made towards a methodology. The purpose of this paper is to contribute to the Thematic Area of Processes & Methodology as well as engaging with the community.

In the recent years, many processes and methods have been studied to address the lack of system-level maturity [2], [3] and [4]. The need for an assessment framework has been recognised [5]. Recently, the idea of Concept Maturity Levels (CML) has been introduced [6]. Similarly, this paper recognised the need for a System Maturity Levels and aims to contribute towards the definition of it.

1. **Discussion**
   1. **System attributes**

The first aim of this paper is to establish a list of attributes that can form the basis of the metrics for the system maturity assessment process. Similar to the well-established attributes for Technology Readiness Levels (TRL), there is a need for specific system attributes. These attributes are tailored for expressing the adequacy of a system to be integrated into a system-of-systems. Some of these attributes are technology lifecycle, integration readiness, TRL, concept maturity, technical risks, cost estimation & risks, project organisation, acquisition, mission development, design maturity… The paper discusses the importance of these attributes in details.

* 1. **System maturity assessment**

This paper will reflect on the system maturity assessment method for systems that are intended to be used within the context of a system-of-systems. The relationship between system attributes and assessment method will be discussed.

* 1. **Systems design process**

This paper will then reflect on the adequacy of the current traditional design process, followed by many actors in the space industry, being agencies, private companies or other institutional entities. The need for tailoring the concurrent design process to integrate the specificities of designing for SoS will be discussed in the paper.

1. **References**

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