**ABSEMS: An *Agile*-Based Systems Engineering Methodology Software. A specific tool for managing the mission requirements using *Agile* methodologies in a Concurrent Design Facility.**

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1. **Introduction**

Design techniques and management processes are strongly conditioned by the evolution of most of the engineering-related industries. While Concurrent Engineering (CE) has been implemented in several institutions (NASA [1][2], ESA [3]…) of the space sector, different work methodologies have emerged in the other fields, as the *Agile* Methodologies in the software sector [4]. Within *Agile* methodologies, a work framework to face the evolution of the traditional sequential approach has been defined. Although its implementation is not a simple process [5], the improvements that these methodologies bring to the projects have been evidenced by their use in the industry. Both concepts, CE and *Agile*, have several similarities in their main properties: They are both based in the need of a continuous flow of information, and they are applied within a framework of requirements characterized by rapid changes with reduced deadlines.

Nevertheless, there are some particularities of *Agile* methodologies that may contribute to CE methods with several benefits. In particular, SCRUM methodology is a project management framework that is applicable to any project with aggressive deadlines, complex requirements and a certain degree of uniqueness [6]. SCRUM is based in the prioritization of requirements, focusing the effort in those requirements that affects directly to the customer needs [6].

A new management tool has been developed to combine SCRUM methodology and the Concurrent Engineering method, within a Concurrent Design Facility (CDF). The main concept of the proposed CE *Agile*-based methodology is the task prioritization based on the different mission requirements. The software classifies the project according to ECSS standards and depending on the status of the preliminary design [7][8]: MRR (Phase 0), SRR (Phase 0/A) and Pre-Design (Phase A/B). It manages the creation and definition of the mission requirements and subsystems using the main properties of the SCRUM approach, but according to the basis of CE.

1. **References**

[1] Karpati, G., Martin, J., Steiner, M., and Reinhardt, K.: The integrated mission design centre (IMDC) at nasa goddard space flight center, 2003 IEEE Aerospace Conference Proceedings, pp. 8\_3657-8\_3667, 2003.

[2] Smith, J.L.: Concurrent engineering in the jet propulsion laboratory project design centre, SAE Technical Paper 981869, 1998, <https://doi.org/10.4271/981869>.

[3] Bandecchi, M., Melton, B., Gardini, B., and Ongaro, F.: The ESA/ESTEC concurrent design facility, Proceedings of EUSEC, 9, 2000.

[4] Manifesto, A.: Agile manifesto, available in <http://www.agilemanifesto.org>.

[5] Livermore, J. A.: Factors that impact implementing an agile software development methodology, Proceedings 2007 IEEE SoutheastCon, pp. 82-86, 2007.

[6] Schwaber, K., and Beedle, M.: Agile software development with Scrum (Vol. 1); Upper Saddle River Prentice Hall, 2002.

[7] ESA/ESTEC Requirements and Standards Division, Noordwijk, The Netherlands, ECSS-M-ST-10C Space project management. Project planning and implementation, 2017.

[8] ESA/ESTEC Requirements and Standards Division, Noordwijk, The Netherlands, ECSS-M-ST-10-01C Space project management. Organization and conduct of reviews, 2017.