**D-CDF: Adapting ESA’s Concurrent Design Facility for use in the Defence Sector**

*J. White1\*, S. Gerené2*

*1The DIG, The Hague, The Netherlands, \*james@defenceinnovation.eu*

*2RHEA Group, Leiden, The Netherlands*

Defence capability development projects - especially IT projects - have a much higher failure rate than similarly complex projects run in the Space sector. Despite this, there have been relatively few steps taken by Ministries of Defence, large multinational Defence organizations or industry to make fundamental changes to the way projects are executed. As a result, failures continue at an unacceptable rate, wasting both money and time and reducing military effectiveness.

Taking a closer look at how the Space sector delivers complex projects, some stark differences between Space and Defence are immediately evident. Most notable is the way projects are executed in the earliest stages of requirements identification through to high-level design. In Defence, a documentation-heavy, serial process is typically used, which results in delays, increased costs and a lack of stakeholder alignment, all of which put projects at increased risk. In Space, a more modern approach is used called Concurrent Design (CD) in which all key stakeholders are brought together in the earliest stages of a project to rapidly and concurrently iterate through both the requirements and design until an optimal solution is achieved taking into account a variety of constraints such as time, budget and technical feasibility.

The Defence Innovation Greenhouse (The DIG), RHEA Group and the Dutch Ministry of Defence are undertaking a project to begin to adapt the CD approach being used at the European Space Agency to make it more suitable for use in Defence environments in order to both accelerate and de-risk complex Defence projects. Ultimately, we aim to address three domain areas that are of great interest to Defence leaders within the Defence Concurrent Design Facility (D-CDF) initiative.

The first domain area is project high level design. In this area we aim to adapt existing models used in the Space sector to make these models are more appropriate for use in Defence projects. The goal is to reduce the time required for the earliest phases of Defence project execution and significantly improve the quality of requirements that are provided to industry for implementation. We anticipate that benefits similar to those achieved in the Space sector can also be achieved in Defence, saving money, time and - ultimately - lives.

The second domain area is multinational consensus building on key requirements. One of the greatest challenges in Defence is to have nations come to a common understanding of requirements for Defence capabilities before high level design activities begin. We believe that Concurrent Design principles can be adapted to build models and processes that improve our ability to work with multiple national stakeholders to more quickly reach a common (and documented) understanding of key requirements that can then be fed into the next step, which is high level design.

The third domain area is to use adapted CD models and processes for troubleshooting of Defence projects that have become out of tolerance in terms of time, budget, scope or quality. We believe that the root causes of many project failures share similar characteristics. Because of these similarities, we are confident that an engineering approach can be applied to identify and describe these root causes and develop a set of common solutions over time. Ultimately, we believe that the results of work done to support project troubleshooting can be fed back into both of the other models being developed in order to reduce the occurrence of project failures in the first place.

As we are at the earliest stages of development of the D-CDF, these models have not yet been developed. However, we do have a good grasp on the theoretical underpinnings for the overarching D-CDF program and are prepared to share this with the broader community.