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Author: Mr. Walter Calles
Instituto Politécnico Nacional, Mexico

Mr. Juan Carlos Mariscal
Space Generation Advisory Council (SGAC), Mexico
Mr. Juan Hernández
IPN, Mexico

IS IT POSSIBLE TO BE SPACE AGILE? A NEW APPROACH FOR SPACE MISSION DESIGN AND IMPLEMENTATION THROUGH AN HYBRID AGILE METHODOLOGY

Abstract

The concept of Agile Methodologies is not as new as we may think it is. During the mid-60's, NASA engineers applied innovative working methodologies that helped them deliver as fast as possible both software and hardware solutions that, eventually, put the first man on the moon just before the end of the decade. Even if they were not aware of what agile means nowadays, the early understanding of the principles of it was necessary to succeed; and they did it. Now, with the new revolution that we are living in science and industry, the transition from classic Waterfall Methodology approach to continuous delivery, DevOps and Agile has been adopted by multiple companies all around the world. And the Aerospace industry is well aware of that. But what about the academic and research community? Are they aware of the benefits that Agile Methodologies provide? The purpose of this paper, is to present a general review of past and current aerospace research projects in Mexico, determining the project management and systems Engineering approaches they've taken and to put in perspective the success rate of each one of them. Also, an analysis of the main causes of delay in deliveries, integrations and testing for both hardware and software, and look for patterns that can give a clear idea of their weak points and opportunity areas. With this information, we make a quick review of the main differences between Traditional and Agile Methodologies, the key roles of both, pros and cons. The initial part of this research, presents a Scrum-based Agile Methodology specially thought for small to medium Space Missions Design and Implementation, with an early Proof of Concept application for a Mars Analogue Simulation research project. The outcome from this first implementation delivers critical information, used to refine and improve this methodology for a further version, which can be applied for multiple projects within Space Systems Engineering.