

ABSTRACT AND BIOGRAPHY

Developing Requirements for Constellation's Next Generation Space Suit

A major challenge identified by the Government Accountability Organization and NASA's Inspector General is a project's inability to fully define project requirements prior to entering into contractual arrangements that place projects at risk of significant cost overruns, schedule delays, and performance shortfalls.

In the Spring of 2007, Constellation Space Suit Element was tasked to produce their level 4 Element Requirements Document (ERD) and baseline it within a three month period. Aware of the consequences of developing a poor set of requirements, NASA's Space Suit Project management put in place a carefully thought out process that would allow the project team to develop a high quality set of requirements within the tight schedule constraints.

This process included the training of the entire team in how to develop defect free requirements and implemented a continuous requirement validation process that would incrementally remove requirement defects before the requirements were included in the official set of Suit requirements.

The result of this approach was an order of magnitude reduction of review comments (RIDs) against the ERD compared to the number of RIDs against the parent level 3 System Requirements Document. Both NASA management and potential bidders for the development of the suit expressed praise to the Suit Element requirement development team for the high quality of the requirements in the ERD.

Because of the success in using this process, the Suit Project integrated it into their continuous requirement validation process to ensure a high quality, correct, consistent, and complete requirement set as it matures.

Louis Wheatcraft
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Lou Wheatcraft is a senior consultant/instructor for Compliance Automation, who has over 40 years experience in the aerospace industry, including 22 years in the United States Air Force. Lou has taught over 120 seminars in requirement development and management for NASA's APPEL Program and industry over the past nine years. He has worked with, and provided intact team training and consultation to multiple NASA project teams at many of the NASA Centers.

Lou has had articles published in the International Council of Systems Engineering (INCOSE) INSIGHT magazine and in DoD's magazine, CrossTalk. Lou has made presentations at NASA's PM Challenge, INCOSE's International Symposium, and at the local Project Management Institute (PMI) Chapter Meetings.

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Lou has a BS degree in Electrical Engineering, an MA degree in Computer Information Systems, an MS degree in Environmental Management, and has completed the course work for an MS degree in Studies of the Future.

Lou is a member of INCOSE, co-chair of the INCOSE Requirements Working Group, a member of PMI, the Software Engineering Institute, the World Futures Society, and the National Honor Society of Pi Alpha Alpha. Lou is the recipient of NASA's Silver Snoopy Award and Public Service Medal and was nominated for the Rotary Stellar Award for his significant contributions to the Nation's Space Program.

Terry Hill

Constellation Space Suit System Engineering Project Manager
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Terry Hill is NASA's Johnson Space Center's Engineering Project Manager and deputy CxP EVA Suit Lead for the CxP Suit Element, responsible for the development of the functional, performance, and quality requirements and preliminary design of NASA's next generation space suit system.

Terry has a BS in Aerospace Engineering and a MS in Guidance, Navigation & Control Theory with a minor in Orbital Mechanics and Mathematics from the University of Texas at Austin. He began his career at NASA while working on his masters thesis project in developing banks of simplified Kalman filters integrated into an artificial neural network to obtain an optimal state solution for precision landing on Mars.

While at NASA, Terry has worked on projects and programs spanning verification of ISS navigation software, Shuttle Design Test Objectives (DTO) and back room mission support, X-38 Crew Return Vehicle navigation algorithm development, Space Launch Initiative technology development, Orbital Space Plane project office ISS-Prime integration, STS-107 Return to Flight Tile Repair capability development, to Constellation Program Space Suit System leadership.

In leading the CxP Suit Element engineering team, Terry has facilitated the development of system requirements for space suit development and a clean-sheet design approach that has widely recognized within and outside of NASA.