

Developing Product Lines in Engine Control Systems: Systems Engineering Challenges

Shawn Collins (Rolls-Royce) - shawn.collins@rolls-royce.com

Malvern Atherton (Rolls-Royce) - malvern.j.atherton@rolls-royce.com

Copyright © 2013 by Collins, Atherton. Published and used by INCOSE with permission

Abstract. Systems engineering is critical to the development of successful control systems for gas turbine engines. Rolls-Royce develops a wide range of gas turbine engines for military, commercial aerospace and industrial applications. This paper focuses on the use of systems thinking on a project at the US division in Indianapolis to develop new control systems for engines used on small helicopter and light turboprop applications. A key challenge was to address military and commercial applications with a common system architecture. Military customers focus on capability and system availability whereas commercial customers focus on minimizing operating cost. Other considerations include adaptability for future applications, and export restrictions for commercial applications. The paper discusses how Rolls-Royce has used systems engineering and systems thinking to face these challenges, including the leveraging of global company capability in processes, tools and a global supply chain strategy.