IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Enabling the Future: Developing the Space Workforce (5)

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BEYOND TECHNICAL EXPERTISE: REAL-WORLD EXPERIENCE ADVANCING SPACE WORKFORCE DEVELOPMENT THROUGH VERTICAL LEADERSHIP AND HANDS-ON TRAINING

Abstract

The evolving space industry demands a workforce that is not only technically proficient but also equipped to lead in increasingly complex and uncertain environments. Traditional workforce development programs focus primarily on technical skill acquisition, yet the industry requires a more comprehensive approach that fosters both technical mastery and leadership growth. This paper presents an integrated framework for space workforce development that combines vertical leadership development with immersive, project-based learning.

Vertical leadership development, grounded in neuroscience, adult learning theory, and organizational development, cultivates transformational growth by enhancing the way individuals think, interpret challenges, and engage with complexity. This method has been successfully applied in various industries to produce adaptive, resilient leaders capable of navigating disruption and driving mission success. As a recent example, this paper will highlight curriculum design and delivery for the experiential Satellite Engineering Education and Development (SEED) program. The objective of SEED was to provide young professionals with critical space engineering knowledge through intensive, real-world applications. SEED was developed and implemented for a UAE-based organization, accelerating the integration of multidisciplinary professionals into effective space project teams through a rigorous 10-week curriculum spanning mission design, development, verification, and operations.

This paper highlights lessons learned from SEED and derives practical recommendations for integrating vertical leadership development with structured, hands-on training to create a more effective and adaptive space workforce. By blending technical immersion with leadership growth, organizations can develop space professionals who not only excel in their technical roles but also emerge as strategic leaders prepared to shape the future of the industry. The insights and lessons learned from these approaches offer a scalable model for government, commercial, and academic organizations seeking to cultivate the next generation of space leaders.