IAF SPACE OPERATIONS SYMPOSIUM (B6)
Ground Operations - Systems and Solutions (1)

Author: Dr. Gabriele De Canio
European Space Agency (ESA-ESOC), Germany

Mr. James Eggleston
European Space Agency (ESA/ESOC), Germany
Dr. Evridiki Ntagiou
European Space Agency (ESA-ESOC), Germany
Mr. Martin Unal
European Space Agency (ESA-ESOC), Germany
Mr. Holger Dreihahn
European Space Agency (ESA-ESOC), Germany
Dr. Marcus G F Kirsch
European Space Agency (ESA), Germany
Mr. Jens Lerch
European Space Agency (ESA-ESOC), Germany
Mr. Steve Foley
ESA - European Space Agency, Germany
Ms. Nieves Salor moral
Starion Group, Spain
Mr. Philip Pilgerstorfer
McKinsey & Company, United Kingdom
Mr. Jose Martinez Heras
Solenix GmbH, Germany
Ms. Alisa Krstova
Airbus DS GmbH, Germany
Mr. Sergio Oscar Krikorian Daveloza
Airbus Defence & Space, Germany

ARTIFICIAL INTELLIGENCE-BASED AUTOMATION OF MISSION POST-LAUNCH OPERATIONS PROCESSES

Abstract

ESOC's Artificial Intelligence for Automation (A2I) Roadmap developed with the European industry defined a clear and coherent plan to bring AI to mission operations. Its implementation started in 2021 with the development of two prototypes and continued in 2022 with the operationalisation of multiple platforms and products, now being used on a daily basis by mission operators at ESOC. In 2023, ESOC pioneered the development of four use cases related to mission post-launch operations processes. These relate to satellite health monitoring and control as well as planning and scheduling. The AI applications built from the use cases clearly demonstrate the benefits of bringing AI to aid mission operators, ultimately bringing to more automation, and allowing engineers to spend less time on repetitive tasks in favour of more challenging endeavours, hence supporting ESA Agenda 2025. In this paper we describe the innovative approach adopted to develop, operationalise, test and validate four applications in only 13

months involving more than 50 people between ESA and industry. We highlight the processes that allowed to bring tangible benefits, among which faster delivery of working products, higher adoption by end-users, and trust into AI. Lastly, we discuss the importance of change management and the lessons learned during the execution of this project. Our approach is an important paradigm shift in the conservative domain of mission operations. We hope that our work will be used as the future baseline adopted by national and international agencies as well as the industry when dealing with bringing novel technologies to conservative domains.