LETTER OF SUPPORT - IMPACT AWARD STATEMENT

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	TEC-SES
Document Type	LE - Letter
Reference	
Issue/Revision	1 . 0
Date of Issue	28/04/2025
Status	N/A

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Dear Application Review Committee,

It is my great pleasure to express my strong support for Edd Salkield from the Systems Security Lab (SSL), Department of Computer Science in applying for the MPLS Award for Policy Impact. Edd's paper was of critical importance to us since it revealed and demonstrated a significant vulnerability in an entire class of adaptive satellite communication protocols, and has directly lead to impact within the European Space Agency (ESA) as well as the *Consultative Committee for Space Data Systems* (CCSDS), the inter-governmental standards body for space data and information systems.

My name is Antonios Atlasis and I am the Head of the System Security Section and the Directorate of Technology, Engineering and Quality of the European Space Agency. My team is providing support to several space projects and missions of the European Space Agency, while also driving the Research and Development of Technologies related to security. I am also a member of the CCSDS security working group, which defines the security standards used in ESA but also intergovernmental space missions.

In February 2024, we were made aware of the vulnerability Edd discovered in adaptive satellite communication protocols; this was submitted to us as a paper to *Security for Space* Systems *2024,* which we organised. The vulnerability revealed that all adaptive satellite protocols currently implemented according to the CCSDS standard are highly vulnerable to jamming and hijacking attacks, which they were previously considered secure against. This work is especially impactful for us, since ESA missions rely on the CCSDS standards to define how our missions operate and provide interoperability, and adaptive protocols are a key technology driving our development of the latest generation of high data-rate satellite communications.

This work impacted ESA in a number of ways: first, it has directly lead to improvements of multiple CCSDS standards. As mentioned, I sit on the CCSDS security working group, and was pleased to sponsor Edd in November 2024 to present his findings at the Fall meetings. Due to the wide-reaching ramifications of this work, a large group consisting of three sub-committees were assembled to discuss his findings. Several immediate actions were taken, including the following:

> *Considering the security threats to ACM exemplified in this presentation, it is necessary to update the security annexes of the CCSDS Blue Books that cover ACM systems, namely:*
>
> ● *131.3-B-2: CCSDS Space Link Protocols over ETSI DVB-S2 Standard*
>
> ● *131.2-B-2: Flexible Advanced Coding and Modulation Scheme for High Rate Telemetry Applications*
>
> *to include all the attack scenarios listed in the presentation.*

These improvements will be incorporated within the next published versions of these standards, to the benefit of all major space agencies.

Second, this has triggered further research on ESA projects addressing the protection of adaptive satellite communications systems. We invited Edd to provide input into the development of our new cybersecurity test satellite *CyberCube*, which is set for launch in 2026, to have a communication payload specifically designed for adaptive protocol security. Furthermore, a previous ESA Final Report on adaptive protocols incorrectly concluded that there are no security implications to these protocols; this attitude within the organisation has now changed due to Edd's work.

In early 2025, we awarded an ESA Tender entitled "*Security Assessment of Smart RF Interference techniques against space data link protocols and proposed countermeasures"* to Edd at the Systems Security Lab, with a total value of 100,000 EUR. This has been assigned so that the security of satellite missions conducted by ESA can be assessed in light of Edd's research, which has been identified as a very high priority within the space agency.

Best wishes,

Antonios Atlasis

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