

## Space communications and cyber security: Threats, risks and solutions

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### Abstract

Space communication is becoming a vital part of national and international infrastructures. Countries are increasingly dependent on global satellite capabilities for national and international infrastructures, which include systems governing the navigation of aircraft and ships, military decision-support systems, financial transactions, and communications through the internet. Cyber security threats to space communications are a relatively new phenomenon, with increasing connections to the forefront of concern for the critical systems due to the vulnerabilities that such threats may exploit and negatively impact. In fact, such vulnerabilities may affect military command systems, launch systems, communications, telemetry, tracking & command, and mission completion. More importantly, space infrastructures are often used as backup solutions to traditional communication mechanism: consequently, they are not secured by design. This talk addresses these new interfaces between space communications and the cyberspace. It provides examples of malicious, both kinetic and cyber-enabled, events that interleave with cybersecurity risks. New challenges regarding the nature of spatial data, including the need for computational efficiency, survivability, and fault-tolerance are emphasized. The impediment of emerging technologies such as artificial intelligence (AI) and the internet of things (IoT) are considered as a force multiplier for the cyber risks that stem from space communications. Moreover, since space infrastructures are commonly used for intelligence and reconnaissance purposes, specific security requirements and solutions. The talk concludes by prospecting the establishment of a framework to implement efficient and effective remedies to the cyber threats connected to space communications.



### Biography:

Mohamed Hamdi (PhD, habilitation) is the Founding Director of Elgazala Innovation Center where he leads the supervision of innovative startup projects. He co-authored more than 150 scientific publications published in international journals and conferences. He was the Chair of the Cloud Security Industry

Forum in the IEEE ICC'12 conference (Ottawa, Canada), and has also Chaired and Co-chaired for international conferences and special issues in international conferences including the Trust, Security, and Privacy symposium in the IEEE IWCMC 2012 conference and for the special issue on Web Services in Multimedia Communication for the Journal on Advances in Multimedia

### Speaker Publications:

- 1.M. Hamdi, "Security Engineering Techniques and Solutions for Information Systems: Management and Implementation,"
- 2.M. Hamdi IGI Global, Nov. 2010 ISBN13: 9781615208036, ISBN10: 1615208038.
- 3.M. Hamdi, A. Meddeb, N. Boudriga, "Multi-layer Statistical Intrusion Detection in Wireless Networks," EURASIP Journal on Advances in Signal Processing, Volume 2009, No. 3, pp. 46-58, Article ID 368589, 2009.
- 4.M. Hamdi, N. Boudriga, M. S. Obaidat, " Bandwidth-Effective Design of a Satellite-Based Hybrid Wireless Sensor Network for Mobile Target Detection and Tracking," IEEE Systems Journal, Vol. 2, No. 1, pp. 74-82, 2008.
- 5.M. Hamdi, N. Boudriga, M. S. Obaidat, "WHOMoVeS: An Optimized Sensor Network for Military Vehicle Tracking," International Journal of Communication Systems, Vol. 21, pp. 277-300, 2007.

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