

IISL COLLOQUIUM ON THE LAW OF OUTER SPACE (E7)  
Key Governance Issues in the New Space Age (4)

Author: Dr. Anne-Sophie Martin  
Sapienza University of Rome, Italy, martin.annesophie@yahoo.fr

Prof. Steven Freeland  
Western Sydney University, Australia, s.freeland@westernsydney.edu.au

ENCODING AND SECURING SPACE ACTIVITIES: LEGAL CHALLENGES ARISING FROM  
'QUANTUM TECHNOLOGY FOR SPACE'

**Abstract**

Quantum Technologies (QT), and their use in space applications, are potentially transformative innovations with fundamental implications for society and the global economy. A new era of QT is emerging in the space domain, with a range of space missions now already carrying quantum cryptography payloads, such as China's Micius satellite in 2016 and the 2019 SpooQy-1 mission by the National University of Singapore. Many other projects are exploring on a national and regional basis the potential of space-based QT for distributing keys in the field of cryptography, including the European IRIS2 telecommunications programme. Both the quantum and space domains have evolved as strategically important technology sectors that address some of the major challenges of the modern digital era, and now they are being used inter-operatively.

This paper will analyse the intersections between these two sectors. We will highlight legal and regulatory issues to be considered at this relatively early stage of 'quantum technology for space', in particular cybersecurity, data transfer protection and liability. As quantum cryptography becomes increasingly important, it is necessary to assess the extent to which those quantum systems utilised in space missions will comply with applicable cybersecurity regulations, current encryption standards, as well as data transfer and protection regulations. We will also examine the legal consequences of any data loss resulting from an error within the QT framework, focusing on potential liability and responsibility concerns and the applicability of the UN Space Treaties.