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LEGAL CHALLENGES OF SPACE 4.0: THE FRAMEWORK CONDITIONS OF LEGAL CERTAINTY
AMONG STATES, INTERNATIONAL ORGANISATIONS AND PRIVATE ACTORS IN THE
CHANGING LANDSCAPE OF SPACE ACTIVITIES

Abstract

After more than 60 years of space activities, ongoing scientific and technological progress alongside increased international cooperation, Space 4.0 is entering this field, leaving its hallmark on what appears a new era of space activities. The space community is rapidly changing and the world continues to face a growing need for dedicated space applications. This is particularly visible in continents such as Africa and South America, with growing interest in space and leads to an increasing participation of various new actors in space activities. Governmental and private actors as well as international organisations are eager to fill these gaps in securing the global society's needs.

ESA's efforts in this regard are reflected in the Space 4.0 concept, introduced at ESA's Ministerial Council in December 2016 by the ESA Director General. This new conception – building on Industry 4.0 - is designed to host a new era of space activities, setting out to tackle global challenges using the advantages deriving from space and technological progress. These challenges range from climate change to shortage of resources, health, demographic development, digital divide and more. ESA is also highly active within UNISPACE and its objectives: space accessibility, economy, security and diplomacy to contribute to Space 2030 and the UN Sustainable Development Goals.

Capacity building reflects the core objective of all international Space 4.0 efforts.

This rapid changes and growth are meeting certain needs by bringing space closer to society and inspiring new generations. However, as these developments are taking place in a highly complex net of legal, regulatory and political considerations, they are themselves raising challenges.

This paper focuses on the legal challenges raised by the new era Space 4.0 and outlines the framework conditions for legal certainty in this rapidly changing environment. It elaborates on the content of Space 4.0 and its implementation, the legal framework for space activities, and how this is currently challenged by two characteristics of the Space 4.0 development, commercialisation of space activities, along with increasing cyber-security concerns in the context of digital divide and big data. The paper will further demonstrate that, given the ultra-hazardous nature of outer space and the growing dependence of society on space, the familiar security concepts might extend beyond cyber security to cyber resilience.