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THE ROLE OF UNIVERSITIES IN SPACE TECHNOLOGY DEVELOPMENT AND UTILISATION  
CAPACITY BUILDING: LESSONS FROM JAPAN AND GLOBAL COMPARISON

**Abstract**

Universities of advanced space nations have played a central role in the progressive build-up of technical capabilities for space technology development and utilisation in developing countries. From the University of Rome's cooperation with the University of Nairobi for the development of 1KUNS-PF to the support provided by the Technical University of Berlin to the National Institute of Aeronautics and Space of Indonesia (LAPAN) for LAPAN-TUBSat, numerous countries in Asia, Africa and Latin America have obtained their first satellite thanks to university-led capacity building programs. Japanese universities have in particular been particularly active in this field (e.g. the Kyushu Institute of Technology, Hokkaido University, Tohoku University).

This paper presents the results of a two-year study conducted by researchers of the Science, Technology and Innovation Governance (STIG) program of The University of Tokyo, in collaboration with, and funded by, the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT). The first contribution of this project was to provide a precise mapping of past and current efforts of Japanese university-led space technology development and utilisation capacity building programs, from the perspectives of both donors and recipients. The cases of Japanese universities were then compared with other selected international providers: universities (e.g. University of Rome), university spin-offs (e.g. Surrey Satellite Technology Ltd) and large aerospace corporations (e.g. Airbus). Based on the huge amount of data collected during international field visits, interviews at international conferences and review workshops, this study also proposed thematic analyses of the diplomatic and educational effectiveness of technical capacity building. Finally, the core of the study was a thorough and independent evaluation of the strengths and weaknesses (structural, government-related and programmatic) of Japanese university-led space technology development and utilisation capacity building programs, from which were derived areas of improvement and concrete needs. It concluded with four policy recommendations to the Government of Japan covering the national coordination of capacity building efforts of Japanese universities, the role of university headquarters in projects usually conducted by mostly independent laboratories, as well as different forms of direct governmental support for instance for the establishment of small satellite testing infrastructure, the provision of "space education official development assistance (ODA)" and the continuation of affordable CubeSat deployment opportunities from the Japanese module of the International Space Station.

The paper also includes preliminary considerations on the impact of the COVID-19 pandemic on current capacity building projects.