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THE IMPORTANCE OF EXPORT COMPLIANCE REGARDING NUCLEAR ENERGY SYSTEMS
AND ITS USE IN THE SPACE INDUSTRY

Abstract

Nuclear technology has always been a controversial topic in politics and the domain of export control. Moreover, the approach on building nuclear reactors to the creation of nuclear weapons often varies from country to country.

In space, radioisotope thermoelectric generators (RTGs) have been used since 1961, with some countries relying on fission nuclear reactors as well to fill high-demand energy needs of space technology, and new options are soon to be reached by the most developed countries in this sector. Currently, plutonium-238 and americium-241 are the first choices for fuel on space missions, as they have preferable characteristics in terms of energy output, reliability and cost effectiveness compared to other non-nuclear alternatives. On an international level, cooperation between states in this field is conducted under UNOOSA and COP-UOS, which have produced the NPS principles, guidelines about the correct - and sometimes, necessary - use of nuclear technology for space exploration, space access and the development of ever improving thrusting technologies. In this context, key players in the fields of nuclear fuel extraction and export control regulations will play a crucial role in giving a country and its industry stakeholders the elements to have a part in what seems to be the most viable and economically sustainable solution for longer lasting missions in space with cost efficient and lighter rovers and rockets.

Furthermore, the increasing number of experiments and research on nuclear electric propulsion (NEP) seems to have gained the interest of both space agencies and companies, which have been testing, in the last years, new thrusting technologies that are much safer and weight efficient than chemical and other non-nuclear alternatives. In terms of staying compliant with applicable export control regulations and the IAEA provisions, when exporting nuclear materials or technologies, the main concern is that a correct end-use and end-user are provided. The ever growing need of such energy sources for a country to sustain the costs of space exploration and the evolution of these technologies call for a set of regulations that can guarantee equity of access and of import/export, in order to avoid circumstances where a country can be cut off the market - and thus, left many steps behind in the space race - while still protecting the security of humankind by avoiding to leave this type of resources in the hands of terrorist groups or other potentially dangerous parties and international actors.