60th IISL COLLOQUIUM ON THE LAW OF OUTER SPACE (E7)
Current Developments in Space Law (5)

Author: Ms. Reina Buenconsejo
Science and Technology Policy Institute, United States

Dr. Bhavya Lal
IDA Science and Technology Policy Institute, United States
Ms. Alyssa Picard
Science and Technology Policy Institute, United States

THE FUTURE OF THE SPACE NUCLEAR POWER ENTERPRISE

Abstract

Space nuclear power and in particular radioisotope power systems (RPSs) serve a niche class of deep space missions: those that travel to areas where solar flux is too low or environmental conditions are too harsh for solar power to provide sufficient power levels. When certain missions do not have a nuclear power option available, science objectives get re-scoped, transmission of data back to earth is often slower, and the overall return on investment may be compromised. Yet in the past 15 years, the United States has launched historically fewer RPSs. This may be because the expensive and timely plutonium-238 (Pu-238) production process disincentivize mission architects from using RPSs for their missions.

In order to better understand these processes, this paper traces the evolution of the legal, regulatory, policy frameworks that drives RPS production and certification via literature review and expert interviews. Documents to be reviewed include the Presidential Directive/National Security Council Memorandum 25, the Atomic Energy Act, memoranda of understanding between the U.S. Department of Energy and the National Aeronautics and Space Administration (NASA), National Space Policy, among others. To the extent possible, we will consider the original intent of the document, the effect of the document on the system initially, and its current impact on the system. With an historic context of regulatory and policy documents, we will examine how this present framework affects the cost, timeliness, and quality of processes to produce Pu-238 and the final RPS. We then will assess the root drivers of the high cost RPS systems to determine potential ways forward: what laws, regulations, and policy pieces need to be changed in order to improve the system and is it feasible to make these changes?

Finally, parallels will be drawn between space nuclear power and areas where the nuclear regime in the United States has been privatized. For example, we make comparisons with the nuclear navy, medical isotopes, and tritium production to explore where there may be lessons learned for space nuclear production.