

IAF SPACE POWER SYMPOSIUM (C3)
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A UK ROADMAP FOR THE DEVELOPMENT OF NUCLEAR POWER IN SPACE

Abstract

With the cost of launch decreasing significantly over the past decade, the potential to explore and commercialise low earth orbit, cis-lunar space and beyond is becoming ever more viable. NASA's Artemis Plan and Accords sets out a vision of lunar exploration within the decade as part of an international collaboration with EU, UK and other partners. Unlike the Apollo missions this will not be to just visit but to work towards a sustainable presence on the lunar surface.

Critical to achieving this, will be a goal of developing an uninterruptable, high specific power (kW/kg), surface power supply capable of delivering 10's-100's kW to surface habitats and experiments. Due to its extremely high specific power and being unsusceptible to the challenges of solar night, position on lunar surface etc., compact nuclear fission is deemed to be an ideal power source for this type of application when developed.

The UK has a heritage in innovation and development of compact nuclear power technologies and several UK organisations are working independently and as collaborations to develop a range of nuclear fuels, technologies and products. It has potential to become one of the world leaders in the supply of nuclear technologies for space.

In this paper we present the lunar surface use case and propose a roadmap for UK industry and academia, working in partnership, to create the lunar surface power technologies needed to support this in time for Artemis in addition to commercial lunar ambitions. It will set out the current UK landscape including current and proposed programmes and facilities, identify gaps, potential international collaborations on a realistic timeline.