



Introduction to Space Nuclear Power and Propulsion Systems

2120 € HT

But

To provide the basics of space applications of nuclear energy for electrical power generation and for propulsion by answering the following questions: what are the different types of space nuclear systems, what are their principles, what is their potential performance, what application needs do they meet and what opportunities do they open up, what is their state of the art, what are their major design issues and associated technological challenges, and how is their safe use ensured?

Esprit Général

The course focuses on providing background information and basic concepts useful for understanding the potential merits of these nuclear systems compared to existing technologies, given evolving space needs. Basic concepts useful for understanding their major design and technological issues as well as their operating constraints are also introduced.

The "flagship applications" that motivate the use or development of these systems are illustrated and justified.

Prérequis

Niveau du stage : Base

This course is aimed at engineers or senior technicians with good basic scientific knowledge, without necessarily being specialized in space or nuclear energy

Durée et emploi du temps

This course lasts 3 days (3 x 7 hours) and consists of a series of presentations lasting one and a half to three hours incl. Q&A.



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Catalogue Complet
des formations



Date
PARIS

Programmé

5 au 7 Octobre 2027

* Conditions Générales



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Sommaire

- Space Nuclear Power Systems

- Electricity generation in space: needs and their current evolution, associated constraints, non-nuclear and nuclear technologies and their respective merits.

- Space Radioisotope Power Systems

- Radioisotope Thermoelectric Generators (RTGs): historical role; principle and state of the art design, technologies and performances; basic notions of radioisotopes, radioisotope choice criteria and production process; nuclear safety implications of the use of radioisotopes, safety requirements, design features and qualification testing, transport and integration; limits of the use of RTGs; Radioisotope Heating Units (RHUs)

- Advanced Radioisotope Power Systems; current developments

- Space Nuclear Fission Power Systems (SNFPSs)

- Basic notions of nuclear physics, nuclear fission reactor physics, terrestrial nuclear fission power plant design, operation and nuclear safety (all notions also useful for space nuclear propulsion systems)

- Specificities of SNFPSs; state of the art: historic and recent developments and lessons learned

- Aspects relating to the safety of the use of SNFPSs

- Design choices and associated rationale, technological options, performance, and aspects relating to their safety of use

- Space Nuclear Propulsion Systems

- Basic notions of in-space propulsion: current technologies - Chemical (Thermal) and Solar Electric Propulsion-, their respective fields of application and physical limits of their performances put into perspective with the evolution of in-space propulsion needs.

- Nuclear Thermal Propulsion (NTP) and Nuclear Electric Propulsion (NEP): respective principles, potential merits over current technologies, opportunities they open, and "flagship applications"

- Nuclear Electric Propulsion Systems: design specificities of space nuclear power systems for use in NEP systems; current developments

- Nuclear Thermal Propulsion Engines

- State of the art: historic and recent developments and lessons learned

- Design options and associated rationale, technological options and associated challenges, development and qualification testing challenges; current developments, nuclear safety aspects specific to NTP.

Pour faire une demande

Bulletin d'inscription

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