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A 2023 overview of French in-space chemical propulsion activities supported by CNES

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Abstract

This paper presents an overview of the ongoing research activities carried out on in-space chemical propulsion in France, with the strong support of the French Space Agency CNES. To cope with REACH legislation (Registration, Evaluation, Authorisation and Restriction of Chemicals) the technical roadmap includes mainly activities on green propulsion technologies, that have been investigated by propulsion industry and research centers for more than two decades. A state of the art of the current world-wide, green, in-space propulsion solutions is presented. Advantages and drawbacks of the proposed solutions are highlighted and a brief performance comparison is reported. The CNES supported research activities in the field of green propulsion are presented; in particular, those that have as their main goal the replacement of hydrazine. In addition, the strong research effort put on the search of novel, cheaper and more performing propellants and associated technologies is highlighted. This would, eventually, lead to new chemical propulsion system solutions expanding applications and reducing overall mission cost.