

IAF SPACE PROPULSION SYMPOSIUM (C4)
Electric Propulsion (4)

Author: Mr. Ulrich Gotzig
ArianeGroup, Germany

Prof. Hans Leiter
Airbus Defence and Space, Germany

Dr. Philipp Bauer
ArianeGroup, Germany

Mr. Marcel Berger
ArianeGroup, Germany

Mr. Jan-Patrick Porst
ArianeGroup, Germany

Mr. Michael Rath
ArianeGroup, Germany

THE ARIANEGROUP ELECTRIC PROPULSION PRODUCT FAMILY

Abstract

ArianeGroup is the European leading company for chemical propulsion systems and components with a large product portfolio. As the market is changing with an increasing demand for electric propulsion, ArianeGroup is extending its product portfolio with contemporary electric propulsion thrusters and systems.

The ArianeGroup electric propulsion portfolio bases on the radio-frequency ion thruster technology "RIT". In this type of gridded ion thrusters the propellant is ionized in alternating electromagnetic field and accelerated in electrostatic fields. The flight proven RIT concept provides inherent high voltage insulation, perfect thrust control, very low thrust noise and broad scalability. The scalability is key for a family of systems covering the thrust range from N up to 0,25 Newton.

Also in the field of electric propulsion a bi-furcation of the market is recognized: the classic market for telecommunication satellites still requests high performance systems whereas a new and rapidly growing market summarized also as "New Space", requests for innovative low cost solutions. Especially the idea of large constellations is driver for this segment.

ArianeGroup is engaged in both markets: The RIT 2X system is designed for the need of telecommunication satellites. Furthermore it represents an attractive solution for scientific probes. In contrast, "Arclight" is a new system concept for large scale constellations and super-constellations

RIT 2X key feature is its triple mode capability covering north-south-station keeping, orbit raising and highest specific impulse for science missions.

Arclight is designed for a system power up to 450W. It will be operated at one level of thrust only, which can be adapted to specific mission needs in the range of 8-15 mN. Its specific impulse above 2400s is two times higher than the isp of competing systems. The system's thruster control unit manages all typical tasks of classic EP systems. Moreover the high pressure propellant management is included, too.

RIT-X is the smallest ArianeGroup EP engine. Its development was motivated by the needs of the European Space Agency ESA's scientific missions in the low thrust regime. Namely, high precision formation flying and in-situ compensation of atmospheric drag or solar wind are requesting thrust control better than 0.1 N is proven.

The proposed paper will provide an introduction into the radio frequency ion thruster technology. The RIT thruster and system family will be presented together with most recent results from the running qualification programs. A chapter on contemporary production of EP thrusters and systems will complete the paper.