

Xenon

Rare Gas Application: Spacecraft Propulsion



Ion engines are commonly used for electric spacecraft propulsion. Most satellites, such as those for telecommunications, science and exploration, employ this technology for station-keeping, orbit-raising or primary propulsion.

As the world leader in rare gas technology, Air Liquide provides high-purity xenon that is ideally suited to support this electric propulsion technology.

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Xenon in Space

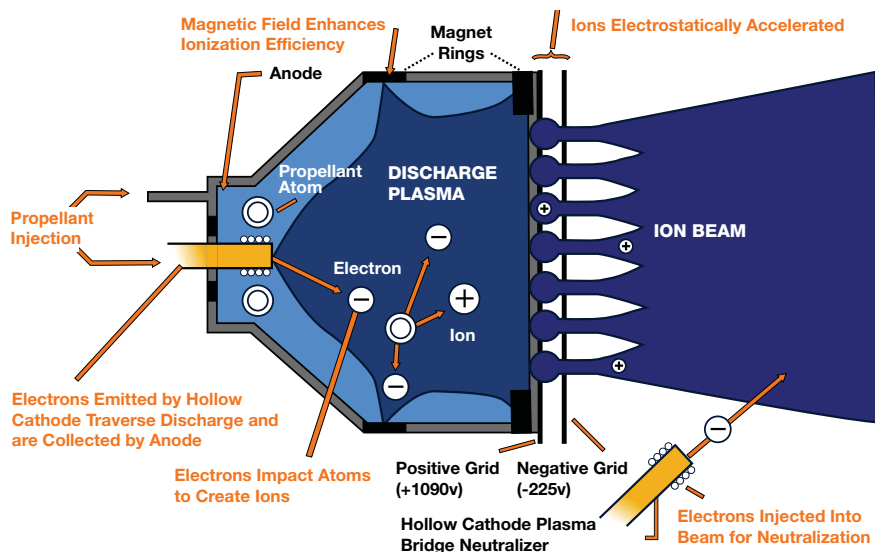
While not nearly as powerful as rocket engines, the efficiency of ion engines used in spacecraft allows for continuous operation over long periods of time. Satellite ion engines function when electrical energy collected by solar panels excites or "ionizes" gas molecules to produce an impulsion plasma. Xenon is ideal for this application because it can be easily ionized, has low heat capacity and a high density. In addition, xenon's high molecular weight improves satellite specific impulse performance (the ratio of engine thrust over weight flow).



NASA Image: Xenon ion test firing at Jet Propulsion Laboratory.



Air Liquide Delaware Research and Technical Center.



NASA Image: How a gridded electrostatic engine works

The Air Liquide Xenon Advantage

- Xenon gas and handling equipment to meet the most demanding applications
- Dedicated Advanced Technologies Division for development of space-related products and services
- Research and technical centers on three continents
- World leadership in the supply of rare gases
- World leadership in supply chain excellence with operations in over 80 countries
- Experience working with leading companies in the aerospace industry
- Xenon purification services are available

World Leader in Rare Gas Technology

Air Liquide offers nearly 50 years of experience working with leading global companies in the aerospace industry. Through our Dedicated Advanced Technologies Division, we have developed innovative ground support equipment that optimizes high-pressure storage, filling, draining and pressure testing where management of xenon's thermodynamic characteristics is paramount.

As the world's premier supplier of rare gases, Air Liquide has the largest sourcing capability as well as efficient supply chain configurations to ensure reliable and timely delivery of gases to meet the most stringent customer needs. Our facilities employ leading-edge technologies and state-of-the-art analytical instruments to guarantee production of gases ranging from "standard" quality to the most ultra-high-purity gases available on planet Earth.



Founded in 1902, Air Liquide is a world leader in industrial and medical specialty gases and related services, providing innovative solutions for the manufacture of everyday products and for the protection of life.

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