



Propulsion

Microtube Ignition System

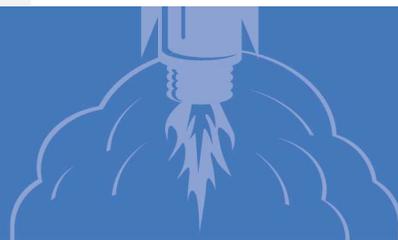
For use in rockets, power generators, and more

Innovators at NASA's Glenn Research Center have developed a microtube ignition system that uses a small catalysis-based torch to reliably generate the energy and high temperature needed to ignite propellant mixtures in a rocket chamber. Conventional spark plug systems require from 50 watts (W) to multiple kilowatts (kW) of power in different applications. The Glenn innovation ignites at less than 25 W. The system operates across a range of atmospheric and altitude conditions with power inputs on the order of 20-30 W, with chamber pressures and mass flow rates typical of comparable ignition systems for a 444.8 Newton (N) engine. Designed for liquid methane and oxygen rockets, the microtube ignition system also operates with gas propellants and can be modified for hydrogen use in commercial combustion devices.

BENEFITS

- **Reliable:** Operates across a range of atmospheric and altitude conditions
- **Efficient:** Requires significantly less power to operate than conventional ignition systems
- **Configurable:** Works as an ignition source for various rocket types as well as a variety of commercial combustion devices

technology solution



NASA Technology Transfer Program

Bringing NASA Technology Down to Earth

THE TECHNOLOGY

Devices that generate both high energy and high temperature are required to reliably ignite the propellant mixtures in a rocket chamber. NASA Glenn's rocket ignition device generates these conditions with a small catalysis-based torch. While space vehicle power supplies are low voltage, a heavy transformer is required to generate the necessary high voltages, which are then prone to ignition failure by insulation breakdown and corona discharge. In order to reduce complexity and utilize the same supply, the staged microtube catalytic ignition system is fed by the same tanks that feed the rocket that it ignites. While this catalytically induced staged igniter was primarily designed for a rocket, the torch can also be configured in various ways for other types of combusting burners and devices.

This is an early-stage technology requiring additional development. Glenn welcomes co-development opportunities.



The microtube ignition system can also be used in gas-fueled cooking appliances (grills, ranges, and ovens)

APPLICATIONS

The technology has several potential applications:

- ➔ Rocket engines
- ➔ Military launch vehicles
- ➔ Commercial launch vehicles
- ➔ Residential and commercial furnaces
- ➔ Power generators
- ➔ Ignition systems
- ➔ Microthrusters
- ➔ Gas-fueled cooking appliances (grills, ranges, and ovens)

PUBLICATIONS

Patent Pending

National Aeronautics and Space Administration

Technology Transfer Office

Glenn Research Center

21000 Brookpark Road
Cleveland, OH 44135
216-433-3484
ttp@grc.nasa.gov

<http://technology.nasa.gov/>

www.nasa.gov

NP-2015-04-1542-HQ

NASA's Technology Transfer Program pursues the widest possible applications of agency technology to benefit US citizens. Through partnerships and licensing agreements with industry, the program ensures that NASA's investments in pioneering research find secondary uses that benefit the economy, create jobs, and improve quality of life.

LEW-18565-1

