

Technology Opportunity

Microresonant Igniter

The Combustion Branch of the NASA Glenn Research Center is interested in partnering opportunities for the development of microcombustion systems. Formal partnering arrangements would be made through Space Act agreements.

Potential Commercial Uses

Microresonant igniters are considered to be highly reliable and could be part of a lightweight ignition system requiring multiple ignition sources. They have no moving parts and require no electrical excitation. Thus, they would be especially appropriate in systems where electromagnetic interference (EMI) is an issue. Microresonant igniters would also be a candidate for a micropropulsion device ignition system. Their use is restricted to relatively low molecular weight working fluids (i.e., hydrogen or methane).

Benefits

- No EMI
- Lightweight
- High reliability
- Low cost

The Technology

In a resonant ignition system, the flow from a sonic orifice is directed into a tube (fig. 1). The flow creates a pattern of strong acoustic waves in the tube, which results in a significant temperature rise in the working fluid. If the heat loss from the tube is minimized, this temperature rise is sufficient to initiate combustion for some propellant combinations. The goal of current research is to demonstrate ignition in a $\sim 1 \text{ cm}^2$ footprint device with a geometry that can be reproduced

photolithographically. Both computational and experimental approaches are being pursued to optimize the resonator geometry.

Options for Commercialization

There are currently no patent applications or existing licenses for this technology.

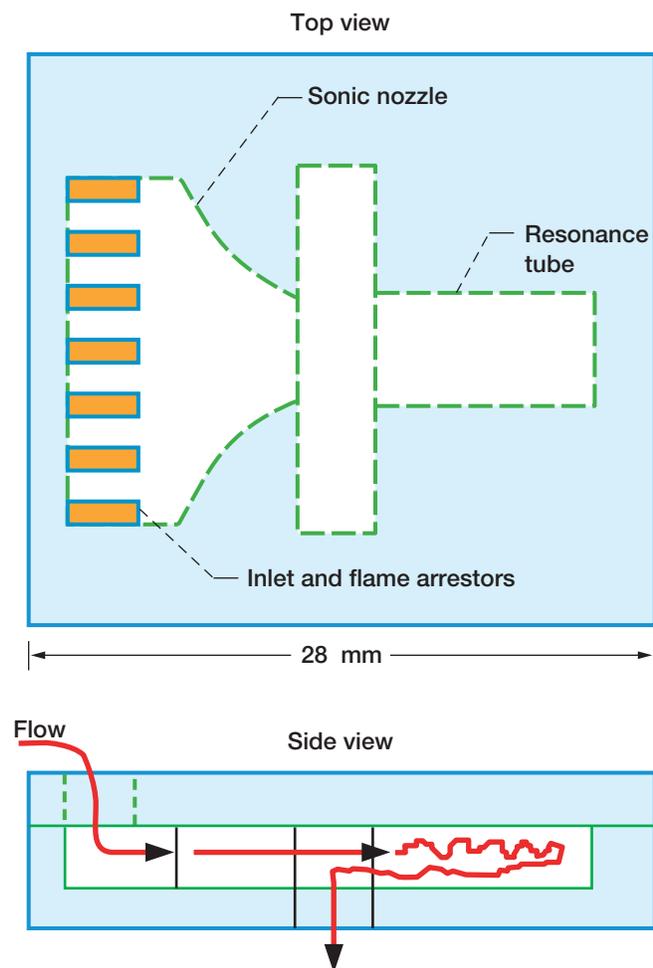


Figure 1.—Microresonant igniter.



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