AFTERBURNER OPERATING ON CONTINUOUS DETONATIVE COMBUSTION

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Abstract: A continuous-detonation afterburner (CDA) operating on aviation kerosene TS-1 is developed, manufactured, and tested. The test fires of the CDA are performed in combination with the TJ100S-125 small-sized turbojet engine on a ground test bench. In the test fires, stable modes of continuous-detonation combustion of aviation kerosene are registered — the near-limit mode of longitudinally pulsating detonation (LPD) and the mode of spinning detonation (SD) with one detonation wave. Compared to a conventional afterburner, at the same level of in-chamber pressure, the specific fuel consumption in the CDA is 30% lower, whereas the specific thrust and the thrust boosting coefficient are 30% higher. In the LPD mode, the average heat flux to the CDA walls is about 0.5 MW/m^2 and in the SD mode, it is 0.86 MW/m^2. These findings testify to the high potential capabilities of the CDA as applied to perspective jet engines.

Keywords: turbojet; afterburner; detonative combustion; aviation kerosene; longitudinally pulsating detonation; spinning detonation; specific fuel consumption

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