Sonic Burner compared to Carlin for propulsion grade fire testing - how equivalency can be maintained? [Battle of the burners]

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Abstract:
Certification fire testing is used as a means for determining if a component of an aircraft is fire proof or fire resistant to the regulations. Criteria has been established to try to define that all components undergoing such a test are subjected to the same severity of flame from a burner which satisfies set requirements, to ensure that the test is comparative and consistent.

In particular the flame temperature and heat flux produced by the burner have to be calibrated at the given test location both pre and post testing, to qualify the test environment accurately simulates the real-world condition.

Approved instrumentation is used to provide calibration data to show the repeatability and consistency of the results achieved.

A new burner has been developed by the FAA, the sonic burner, with the aim to provide more consistency in testing and more easily configure burners between test facilities. To ensure this is achieved, an appropriate method for determining equivalency to existing burners needs to be developed.

The rationale is that standardisation across test labs could occur with an alignment of burn through times or equivalent damage from a common uniform material, or indeed methods to provide accurate and adequate characterisation of the flame.

This work extends previous trials which have shown that Sonic can be modified from its baseline configuration to achieve traditional burner like output, for propulsion grade fire tests. It describes tools developed to achieve greater understanding of burner outputs, including novel mapping techniques to compare the temperature burner flames in 2 and 3 dimensions, BTU mapping and burn-through trials using strips of material to more accurately assess the burn through time.