SESSION IX IGNITION/COMBUSTION PROCESSES

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The objective of the work elements within this session is to extend the state-of-the-art for main chamber and turbine drive combustion components with emphasis on operational and service life problem areas exposed during SSME development.

The approach is a combination of contracted and in-house NASA analytical/experimental research tasks under the two major combustion component headings mentioned above. Efforts thus far have been limited to the turbine drive technology area and the two papers presented herein address activity from that contracted work element. The overall objectives for this initial technology are to generate an advanced, comprehensive combustion analytical code, and to verify the combustion flow dynamic predictions from this model with hot test experimental data. The first paper, "Liquid Rocket Combustion Computer Code Development" by Mr. P. Liang, discusses the code development while the gathering of code anchoring data is the subject of "LASER Schlieren and Ultraviolet Diagnostics of Rocket Combustion" by Mr. S. Fisher.

Research in the main combustor area is scheduled to begin in the winter of 1984/1985. This contract will eventually compliment the ongoing turbine drive technology effort with a set of advanced main combustor hardware providing a scale model staged combustion system. Specific tasks on main chamber thermal/structural life and stability rating will be conducted leading to the selection of this advanced model main combustor.

The thermal/structural life assessment process for SSME configuration hardware has been modeled by a separate contracted task completed in early 1983, and

the forthcoming main chamber technology is intended to build on this analytical base.

The advanced version hardware from both the turbine drive and main combustor contracts is intended for government test at MSFC. Common scaling between the two combustors will allow them to be assembled into an advanced staged combustion model for high pressure test evaluation with results feeding into the full scale SSME Test Bed effort.

Long range technology from this working group includes an evaluation of derivative SSME concepts as they might appear within the dual throat engine concept.