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Deadline: Shown in Syllabus

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Two-Page Annotated Bibliography Template

A. Summarize

Reference Document Examined:	Marsh, B. W. and Sears, G. A., "Introduction to the Analysis of Supersonic Ramjet Power Plants," American Rocket Society, Vol. 24, No. 3.
Reviewer:	Veronica Loomis
Source of Document:	Canvas
Date of Review:	March 22, 2023
Electronic File Name:	Introduction to the Analysis of Supersonic Ramjet Power Plants-1.pdf

Summary:

Ramjet diffusers are designed so that the total pressure lost is not as much lost by a single normal shock. Once this air has slowed to a high subsonic velocity, it is diffused to a low subsonic velocity. This air is burned in a combustion process that is at constant pressure. Expansion is performed in the nozzle exit and atmosphere behind the engine. The combustion takes place at constant static pressure with small total pressure losses.

The diffuser has a supersonic section and a subsonic section. The inlet geometry depends on the Mach number that the engine is designed for. A spike that projects outwards improves supersonic diffusion efficiency at higher Mach numbers.

B. Assess:

Important Facts from Document:

1. In supersonic ramjet diffusers, the inlets are designed so diffusion occurs through an oblique shock along with a normal shock.
2. The combination of oblique and normal shocks is desirable since the increase in entropy is less than one produced by a normal shock.
3. As air spillage increases, the flow into inlet becomes unstable and the normal shock oscillates rapidly axially.
4. The performance of ramjet engines are influenced by the quantity and efficiency of the heat the burner can release.
5. The main things that affect combustion are: incoming velocity, fuel to air ratio, combustion chamber pressure level, and total inlet stagnation temperature.

Key Figure from Document:

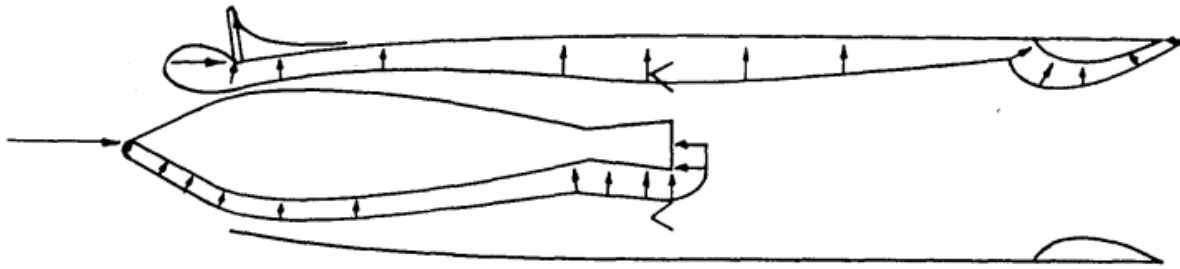


Figure 1: Pressure Distribution on Representative Ramjet Engine

Important Relationships among Parameters Described in the Paper:

1. Compression ratio and power output increase with speed.
2. Circular engines have the least drag per square foot of the frontal area compared to other cross-sectional shapes.

C. Reflect

This paper is really helpful in detailing each component of a ramjet engine and what its role is.