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≡ʔLockheed

HUNTSVILLE RESEARCH & ENGINEERING CENTER
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In reply refer to:
LMSC-HREC PR F042316
1 February 1985

National Aeronautics and Space Administration
George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Attention: AP29-F

Subject: Contract NAS8-35984, "HPFTP Flow Diverter Analysis," Monthly
                 Progress Report

Report Period: January 1985

Gentlemen:

This letter is submitted in accordance with the provisions of Exhibit "A" of
the subject contract and describes the direction of effort and accomplish-
ments for the period shown above. This study is being performed by per-
sonnel in the Computational Mechanics Section of the Lockheed-Huntsville
Research & Engineering Center.

Introduction

A computational fluid flow analysis will be conducted on the flow diverter
system currently under consideration for the Space Shuttle Main Engine High
Pressure Fuel Turbopump (SSME HPFTP). A three-dimensional viscous flow
environment will be computed to optimize the geometric configuration and
location of the flow diverter system. The analysis will consist of a fully
turbulent cold flow calculation using the Navier-Stokes equations and a
Baldwin-Lomax turbulence model. The equations will be solved numerically
using a finite difference/element procedure. The results of the analysis
will provide the steady and unsteady pressure field and thermal environment
required to assess the usefulness of the flow diverter system in deflecting
the cold flow away from the hot turbine components. A geometry optimization
study will be conducted to determine the best diverter shape and location to
avoid larger thermal gradients on the rotor/stator components.

Progress Summary

A meeting was held with the NASA-MSFC Contracting Officer's Representative to establish specific items to be accomplished, to set-up a schedule and to initiate the tasks. A final version of this work plan will be presented in next month's report.

Planned Activities

A final version of the work plan wil be prepared. Task 1 will be initiated.

Total cumulative costs incurred on Contract NAS8-35984 through January 1985 were zero, insomuch as only preplanning work has been completed. Estimated cost to complete the contract is $156,955.

Very truly yours,

LOCKHEED MISSILES & SPACE CO., Inc.

L.W. Spradley
Computational Mechanics Group

LWS:pgp

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