NASA/University JOint VEnture (JOVE)Program

FINAL TECHNICAL REPORT

Date: 1/12/01

NAG-1284
Grant Number

Report Period: 8/1/96 - 8/28/99
From To

Scott M. Jordan
Name

SCOTT.JORDAN@MAIL.ATU.EDU
E-Mail Address

A New Method for Evaluating Elastomeric Materials for Use in High Pressure Oxygen.
Research Title

Institution Name: Arkansas Tech University

Address: Russellville, AR 72801

NASA/University JOint VEnture (JOVE)Program

FINAL TECHNICAL REPORT

I. Summary of Research

The following represents a comprehensive summary of significant accomplishments over the duration of the grant. ***(Attach additional page(s) and/or relevant documentation as necessary.)***

See Attachment

NASA/University JOint VEnture (JOVE)Program

FINAL TECHNICAL REPORT

II. Subject Inventions

Provide a complete list of all subject inventions or patents resulting from work performed under the award or provide a statement that there were none.

There were none

Scott Jordan
Signature

1/12/01
Date

NASA/University JOint VEnture (JOVE)Program

FINAL TECHNICAL REPORT

For Summaries of Research and published reports, one Micro-reproducible copy shall be sent to the NASA Center for AeroSpace Information (CASI), Attn: Acquisitions Department, 7121 Standard Drive, Hanover, Maryland 21076-1320.

pll Attachment

I. Summary of Research

The seal configuration tester (SCT) developed at the Stennis Space Center (SSC) was designed to replicate the intended application of different seat and seal materials in a high pressure oxygen system and assess the wearibility of those materials. Statistical models were used to test the reliability of the SCT in its intended application, and the tests showed very consistent measurements over time, indicating that the device was working as intended. Other statistical designs were used to test different O-ring materials in a high-pressure oxygen system. Those tests indicated that the SCT could be used to rank the performance of O-ring materials in certain environments. The results indicated that some cheaper materials performed as well as, if not better than, other more expensive materials. Different lubrications were integrated in the testing as well and had a significant impact on the performance of the materials. Testing of seat materials is the next stage of this project. An augmentation grant (JAG) was obtained to further this experimental testing at the Stennis Space Center. This part of the project is ongoing at this time and therefore there are no significant accomplishments with respect to seat materials as of yet.

FINAL TECHNICAL REPORT

The seal configuration tester (SCT) developed at the Stennis Space Center (SSC) was designed to replicate the intended application of different seat and seal materials in a high-pressure oxygen system and assess the wearibility of those materials. Statistical models were used to test the reliability of the SCT in its intended application, and the tests showed very consistent measurements over time, indicating that the device was working as intended. Other statistical designs were used to test different O-ring materials in a high-pressure oxygen system. Those tests indicated that the SCT could be used to rank the performance of O-ring materials in certain environments. The results indicated that some cheaper materials performed as well as, if not better than, other more expensive materials. Different lubrications were integrated in the testing as well and had a significant impact on the performance of the materials. Testing of seat materials is the next stage of this project. An augmentation grant (JAG) was obtained to further this experimental testing at the Stennis Space Center. This part of the project is ongoing at this time and therefore there are no significant accomplishments with respect to seat materials as of yet.

The following is a list of publications and presentations.

Title: "*Using Sequential Experimentation to Determine the Number of Blocks to Use in a Multifactor Experiment with Randomization Restrictions*". Presented at the American Statistical Association Proceedings of the Section on Quality and Productivity (1997).

Title: "*Using SAS Macros to Develop Confidence Intervals for the Weibull and Extreme Value Distribution Using Type II Censored Data*". Presented at the Proceedings of the Twenty-Fourth Annual SAS Users Group International Conference (1999).