MINUTES OF THE JULY 12-13, 1989 MEETING
OF THE NASA SOUNDING ROCKET WORKING GROUP

Location and Time: The meeting was held at the Wallops Flight Facility (WFF). It convened at 8:30 A.M. July 12 and adjourned at 2:30 P.M. July 13.

Attendance: All NSRWG Members were present for the meeting, with the exception of Dan McCammon, who was represented by John Nousek of Penn State. Mike Mendillo was present on the first day only. The meeting was chaired by Werner Neupert, Project Scientist for Sounding Rockets.

Major Items of the Agenda: As this was the first meeting of the group at the WFF, it provided an opportunity to review the capabilities of the WFF in support of the rocket program as well as its other activities. Additionally, the agenda addressed several issues of particular current interest to the community: Current and future funding prospects for the rocket program, the recent performance record of attitude control systems, the flow of rocket integration activities at WFF, and the prospects of an upgrade of the Poker Flats Rocket Range.

Summaries of Presentations:

WALLOPS FLIGHT FACILITY OVERVIEW - Joseph McGoogan, Director, WFF

Mr. McGoogan provided an overview of the many programs supported by WFF. He stressed the major objectives of the rocket program: Quick response; Low cost; Mobility (launches at remote sites); 85% or better success; Safety.

MEMBERS COMMENTS - Members of the Working Group

Each member of the Working Group had an opportunity to highlight particular needs and concerns that his constituents had regarding the sounding rocket program. The program is highly regarded by the scientific community and is viewed as an indispensible component of NASA's space research activities. Several themes, dealing with technical aspects of the program, were addressed in detail in the presentations which followed or will be addressed at a future meeting. Members voiced their concern over the level of manpower and resources being devoted to the program by NASA, recognizing that this issue needed continuing attention by the community of rocket users.

SOUNDING ROCKET PROJECT OVERVIEW - Larry Early, Chief Sounding Rocket and Balloon Projects Office, WFF

Mr. Early provided an in-depth discussion of the Sounding Rocket Program. This program is supporting 60 flight proposals this year and has 39 launches planned for FY 90. The rocket portion of the suborbital program at WFF currently is comprised of about 113 Civil Service personnel, about 118 contractor personnel at WFF and about 57 contractor personnel at other locations (e.g. WSMR). The present civil service level of support is only about one-half of its past strength, with in-house contractor support increasing only by about 20 positions in the past decade. This has occurred during a period

in which payloads increased markedly in size and complexity. Mr. Early pointed out that with the current accelerated rate of use (experimenters wanting to fly heavier payloads), the inventory of Black Brant motors will be severely reduced within 2-3 years and the program will be in jeopardy if there are any future problems in the procurement or manufacture of these motors. WFF believes that it is prudent to have an 18 -24 month inventory on hand. He also discussed the launch vehicle systems costs for several types of rocket motors: $15,000 - 20,000 for a Taurus-Orion, $150,000 for a Black Brant, $300,000 for a "free" Aries. The cost of using a larger military motor in a guided application would likely run higher than $500,000, even if the motor itself were "free". He noted that WFF is not satisfied with the current success rate of fine-pointed ACS and is actively working to improve the situation.

SOUNDING ROCKET PROGRAM OVERVIEW - Stanley Shawhan, NASA Headquarters

Dr. Shawhan discussed the recent history of funding of the Sounding Rocket program. He noted the impact of the Gramm-Rudman and other budget reductions in FY 86, which were compensated by a one-time "vitality" package of about $6M for the entire suborbital program (balloons and sounding rockets) in FY 87. The decision in FY 88 was to retain this one-time increment permanently, but then to seek no increment in either funds or manpower (except for a nominal 5% annual increase for inflation, which does not compensate for the expected technical inflation rate (12%)) for the next five years. The result may be a reduction in the annual number of flights. (There may be a small supplement in FY 90 to support ACS activities and a Black Brant motor procurement). Dr. Shawhan noted that the current level of funding pretty well matched the number of proposals submitted, with 2/3 of the Space Plasma Physics and 80% of the Solar Physics proposals receiving some level of support (MESSAGE: Create more pressure on the system by submitting more proposals for outstanding science!). Dr. Shawhan also reviewed current Headquarters actions in the formation of a Suborbital Program Board (in addition to the already existing Sounding Rocket Change Board)- the former to formulate policy, the latter to address accommodation issues and determine "fly lists".

ATTITUDE CONTROL SYSTEMS - Frank Boykin, WFF.

Eight types of ACS systems are currently available to pointed payloads. These systems are supported by 11 Civil Service and 6 support contractor personnel at WFF and 14 people at various subcontractors (principally for the Mark VI, Space Vector and Lockheed/SPARCS pointers). The WFF personnel have recently been re-assigned to provide more complete backup coverage for the systems. However, a major problem is turnover of people (4 have been in the group for less than a year) and the potential of loss by retirement (3 eligible to retire within 5 years). Recent failures and anomalies were discussed in detail as were actions that are being taken to avoid such problems in the future (e.g. additional personnel at WFF and contractors and minimal mission manager assignments for ACS engineers).

BOOST GUIDANCE SYSTEMS - Mary Kenny, WFF.

Boost Guidance systems operate during the first few (generally less than 20) seconds of flight to correct the attitude of the vehicle. The S-19 system by Saab has been vigorously adopted by WFF (from 3 flights so equipped in FY 86 to 18 planned in FY 90). Its success rate is 95% and it results in major cost savings as no range extensions and far fewer launch attempts are

required. WFF has introduced modifications that have improved ease of operation and acheived greater reliability.

NEW BOOST GUIDANCE APPLICATIONS - Phil Ward, WFF.

Experimenter requests for heavier payloads to be lifted to greater altitudes have motivated WFF to examine the feasibility of applying the S-19 to a larger vehicle- the Black Brant XI (Talos/Taurus/Black Brant V) - which could carry a 1300 lb payload to 132 miles. Although boost guidance for this vehicle is feasible, it appears that the current S-19 is marginal for this application. Studies of its use in this application are continuing.

INSTRUMENTATION TELEMETRY - Bill West, WFF.

This discussion covered the WFF approach to providing instrumentation telemetry for various payloads. The components used in telemetry systems are generally not high-rel parts and do not undergo vendor piece part testing or screening. Although there are pre-integration tests of the completed subsystems, they are not subject to vibration testing until the entire payload, with experiment, is vibrated during integration. The Wallops approach is to disassemble and inspect the telemetry units after vibration and this causes a hiatus for experimenters in the integration schedule, which is often already quite lengthly.

PAYLOAD INTEGRATION AND TESTING - Bobby Flowers/ Bill West, WFF.

The integration procedure followed for all payloads integrated at WFF was discussed in detail. This is carried out by a project team assigned by WFF, but the teams (and even the mission manager) are not necessarily the same from one flight of a payload to the next. This approach also differs from the earlier Greenbelt approach of having a team set up to carry out the integration activities only. It was recognized that sometimes the required subsystem tests are not yet completed when the experimenter shows up at WFF and that better communications between WFF and the experimenter, as to the readiness to integrate their respective components of the payload, would be desirable. Considerable discussion ensued regarding additional approaches that could be implemented to make the integration process less time-consuming.

FUTURE FACILITIES AT WFF - Bob Burns, WFF.

This presentation covered enhancements that are being planned to the test and integration facilities in the next several years. A tour of the current facilities was also planned, but was cancelled to allow for more presentation and discussion time for the remaining items on the agenda.

POKER FLATS STATUS AND PLANNING - Dr. Charles Deehr, University of Alaska.

Dr. Deehr discussed the status of plans to obtain an upgrade of the Poker Flats Rocket Range through a direct congressional appropriation. Of the approximately $ 30M that is being sought, about $ 5M would be for rocket launch facilities and the rest for enhanced capability for scientific research. Dr. Deehr asked for guidance from the working group as to what new scientific facilities would be most desireable. The working group recognized that this facility has provided a unique capability for auroral research over the past two decades and should be continued, either in full-time operation or in a campaign mode. The group further felt that it would be beyond the

scope of its activities to make specific comments on the enhanced scientific capabilities that were being proposed.

Location of the Next Working Group Meeting:

It was decided that the next meeting of the group would be held at NASA Headquarters in the second week of January, 1990. A one-day meeting was requested by several members. The exact day will be determined when the program of the AAS meeting, also planned for that week in Washington, becomes available. It was agreed that working group members would meet for dinner and an evening of discussion, at a location to be determined, on the evening before our scheduled meeting. We met for dinner on the evening prior to our July meeting and all who could attend felt that this provided an excellent opportunity for informal discussions with other members of the working group.

Werner M. Neupert

Project Scientist for NASA Sounding Rockets