

C. Murino
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NSBF Panel Book
(Jones' Book)

NATIONAL SCIENTIFIC BALLOON FACILITY
ADVISORY PANEL MEETING
16, NOVEMBER 1976

The meeting was convened at 0845 at the NSBF, Palestine, Texas. Members present were: G. Fazio, Chairman; R. Chasson, R. Golden, W. Gordon (UCAR Trustee Representative), D. Kniffen, W. Lewin, D. Mueller and M. Pelling. Others present were G. Tesi, NSF, W. Jones, C. Murino and D. Waltman, NCAR, R. Kubara, C. Palmer, and A. Shipley, NSBF. Present for parts of the meeting were S. Smith and J. Snider, NSBF.

Agenda Item 1. Approval of Minutes of the Previous Meeting

Fazio announced that he had contacted the NSF and the Chairman of the NSF Astronomy Advisory Panel concerning ballooning representation on the Panel. The question is not resolved and no action has been taken to date.

The minutes were approved.

Agenda Item 2. Comments by Director of the ATD, NCAR

Murino said that the most important matter before the panel was the funding for the Long Duration operational program in FY 1978. The funding for this program has been eliminated from the FY 1978 budget, thus causing a delay in the program becoming operational. The UCAR Board expressed concern over this and asked NCAR management to bring this concern to the attention of the NSF.

Agenda Item 3. Report of Operations Subcommittee (copy attached)

Kniffen, Chairman of the Subcommittee, introduced this item by stating that the subcommittee was very pleased with the operations of the NSBF during FY 1976. The operations were characterized by a very

high success rate, although marginally below that of the previous year. Each failure is carefully investigated in an effort to obtain the cause and take corrective action.

The high failure rate for heavy loads (greater than 2700 Kg), using dynamic launches, was then discussed. Shipley gave the alternatives for dynamic launches. The first is vertical inflation which requires nearly perfect wind conditions. The second was tandem balloon systems which is too expensive. Other systems such as the use of a blimp for securing the top of the bubble or a winched spool offer possibilities and are under study. Payloads using dynamic launches may have to be limited to 2700 Kg suspended weight.

The discussion then shifted to the recent Policy Statement on Use of the NSBF and the required forms. Objections to these forms have been raised by several users. Murino explained that the present policy is the best of a number of alternatives that were considered. The balloon program is a visible one and the NSF requested that a comprehensive user policy statement be developed. The Panel recognized that it had extensive input into the formulation of the Policy statement and recommended that a short statement explaining the need for the policy be placed in the next Newsletter.

A question was raised concerning the foreign users fee in the case of a U.S.-foreign collaboration. Shipley asked for clarification of this point as it was unresolved at the present. Some solution is required in order to preserve fair and equitable treatment of all groups. Murino suggested that NCAR would draft a policy for discussion by the Panel at the next meeting.

In response to a question from the Panel, Shipley then presented the status of the new staging building. An Architect and Engineering (A & E) contract has been let and the first schematic drawings were presented. The schedule calls for occupancy in September, 1977. The Panel reviewed and endorsed the general design and recommended that two of the bays have doors facing south.

Agenda Item 4. NAS Study

The NAS Study on the USE of Balloons for Physics and Astronomy has been printed and is being distributed. A copy will be sent to each member of the Panel.

The Panel expressed concern over the follow-up to this report. It was suggested that NASA and NSF could ask NCAR to host a workshop to look at future plans for support of balloon-borne science in light of the report. Tesi and Murino agreed to consider this suggestion.

Agenda Item 5. Status of Southern Hemisphere Launch Facilities

Shipley introduced this item with a short history of NSBF southern hemisphere ballooning. Previous expeditions have been conducted in Argentina, Brazil and Australia. The political situation in Argentina is not favorable and the last expedition to Brazil was quite expensive.

The U.S.-Australian agreement covering the Australian Balloon Launch Station (ABLS) is still in effect, The Scientific Advisory Panel, established under this agreement, strongly recommended that the Station be moved from Mildura to Alice Springs. The Department of Science has this new recommendation under study and present indications are that it will be implemented. The NSBF proposes to loan the BLS a launch vehicle and spool, subject to proper approvals. The Australian crew will be

augmented by NSBF personnel as required. The NSBF can train Australian crew members if requested.

Agenda Item 6. Trans-Atlantic Program

Shipley briefly discussed the status of the Trans-Atlantic program. One flight was flown in 1975 and two in 1976. The 1975 flight was successful. The first 1976 flight failed and is presumed down in the Atlantic. The second 1976 flight was successful and landed near Worcester, Massachusetts. Unfortunately, the scientific experiments were destroyed in a fire during return to the NSBF for customs clearance.

There is a possibility of flights in 1977 although no decisions have been made at this time. If the NSBF does participate, we will require better defined lines of command and improved communications.

Agenda Item 7. Long Duration Development Program

Snider discussed the electronic development program. An earlier study showed that HF communications would be prohibitively expensive and unreliable. Attention then turned to satellite data links. With the assistance of a consulting firm in Washington (Satellite Systems Engineering), the MARISAT system was selected as the most promising. Tentative approval has been obtained from the FCC and COMSAT General for use of the system.

MARISAT consists of two synchronous satellites. A blind area of 200 to 400 miles may exist in the areas between the two, although this is probably not a serious problem at balloon altitudes. One channel would be used on each satellite with a 4800 BPS rate. Each channel can then be time shared between balloons.

A contract for the development of the airborne package and the ground station will be let shortly. Both DRI and the University of New Mexico have shown interest in this development. No difficulties are anticipated in the

development and design of the ground station and delivery of the prototype airborne packages are scheduled for December, 1977.

Smith introduced the vehicle design study. Three super-pressure sphere flights have been flown. The first, October 1975, was a 127.6-foot sphere which floated through sunset. The second, a 180.4-foot sphere, reached altitude but failed at 6500 psi. The third flight, a 127.6-foot sphere, was flown in October, 1976. This sphere reached altitude and failed in excess of 11,500 psi. This would have been sufficient to survive the most severe conditions, but with insufficient safety margin.

Further investigation is under way to increase the strength of the material. One is mylar bi-laminate with an adhesive grid. The second is also mylar with a Kevlar scrim reinforcement.

A parallel development is that of a ballastless system, using a super-pressure sphere as a drag, or ballast. This permits the use of a smaller sphere operating at less pressure. The advantages are a much cheaper system and the capability of payloads on the order of 1000-2000 lbs. This system will be test-flown in January, 1977.

Fazio and Snider presented a list of scientists who were interested in the long duration program becoming operational. The Panel agreed that at least four could be ready for flights in 1978. If the ballastless system proves out, this number could easily double.

The Panel saw no problems in the electronic development and urged that the development of a ballastless system be aggressively pursued. The Panel agreed the probability of success in developing the long duration capability was high and urged that NCAR-UCAR should explore all possibilities of funding at minimum an "all-systems-up" test of long

duration operations. Tesi advised that the opportune time for approaching the NSF for augmented funding (out of NSF Director's reserve) would be in early March 1977 following the successful test of the ballastless system. (During the discussion on funding, both Tesi and Murino agreed that a separate UCAR-NSF contract for the operation of the NSBF is desirable and should be discussed during the contract negotiations this spring.)

Agenda Item 8. Budget Status

Palmer stated that the main budget issue was the long duration operations funding, already discussed under Item 7. The remainder of the multi-year plan remains as presented to the panel previously.

Agenda Item 9. Election of Chairman

D. Mueller was elected Chairman of the NSBF Advisory Panel.

Agenda Item 10. Date of Next Meeting

It was agreed that a meeting should be held at an appropriate time following the test of a ballastless system, probably in late February, 1977. Murino will poll the Panel for a date.

The meeting adjourned at 5:10 p.m.

- END OF MINUTES -

Attachment: Report of Operations Subcommittee

National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland
20771

NASA

NOV 8 1976

M-3078-76

Reply to Attn of: Code 662

October 28, 1976

Dr. Giovanni Fazio
Smithsonian Astrophysical Observatory
60 Garden Street
Cambridge, MA 02138

Dear Giovanni:

On 18 October 1976 the Operations Subcommittee held its annual review of the National Scientific Balloon Facility. In attendance were Bob Golden, Dietrich Mueller, and Don Kniffen of the Subcommittee and members of the Facility Staff, including Al Shipley, Charlie Palmer, Bob Kubara and others as required.

The principal discussion of the meeting concerned the annual report which was distributed in advance for review by the committee. In addition, several other important topics were discussed and I will attempt to summarize the high points in this report.

The operations during FY 76 were again characterized by a very high success rate, though marginally lower than the record high for FY 75. The previous indication of a possible reduction in average payload weights and balloon sizes now appears to be erroneous with overall linear growth over the last 12 years. The facility shares with the Subcommittee the view that any failure is extremely undesirable, and in that spirit a careful analysis of all failures is made and corrective action taken. As has been the case for several years, balloons are the leading cause of failure. In addition to its excellent materials testing and quality control programs the facility in studying previous flight records, has discovered a high correlation between calm and near calm wind conditions at launch and balloon failure. A TV tape of a recent failure of this type for Bob Golden was shown to the subcommittee and it was pointed out that the "dumping" which follows "sailing" of the balloon, can put undue stress on the balloon material. Several operational changes are being considered to alleviate this problem. All other failure categories are traceable to hardware failures, except for one human error, and in all cases necessary steps to prevent recurrence have been taken.

One bright note is that Raven balloons have had a good performance record for the last 14 launches. If an alternate source to Winzen Stratofilm can be found for the material, a competitive market may once again become

available and check the soaring balloon costs. It was noted that, even with stratofilm, Raven balloons are considerably cheaper.

The high failure (~ 50 percent) rate for heavy load (> 2700 kilograms) launches has been of great concern to the Facility staff. The existing experiment load limit of 3500 kilograms is considered to be too high for a dynamic launch with the available equipment, and a lower limit is being seriously considered. For loads in excess of the limit, quasi-static launches will be necessary. This will mean higher costs, but an increased success rate which compensates for these costs. In addition to this point, the visibility of the facility in an era of very tight budgeting makes a high success rate politically essential.

Other developments include a new payload assembly building similar to the existing stratoport which is now operational and the construction of the new staging building is planned to begin in late CY 1976. The back bay staging area has also been extended. A replacement for the present recovery truck is expected in late CY 1976. A redundant command shutdown system is being implemented to replace the shutdown timer, and a downrange repeater for data recovery is being tested.

One of the highlights of the year was the successful European-U.S. trans-Atlantic balloon flight in 1975. Problems developed in the 1976 series, the most notable being a fire which destroyed the payloads, recorded data and truck during the return of the equipment from the recovery operation to Palestine for shipment to Europe. A review of these operations indicates the NSBF performed its responsibilities to this project very well despite less than optimum circumstances, and was in no way at fault for the unfortunate situation which occurred. The subcommittee strongly recommends a review of this operation by the full committee, so that a report of our findings and recommendations can be made and possibly transmitted to all concerned parties.

The most recent turnaround seems to have been very successful. The recommendations of the full committee concerning priorities for these flights were implemented and helped alleviate the impact on the operations. Apparently all scientists who required turnaround flights and had payloads ready were accommodated.

The subcommittee made several recommendations to the staff for possible new support capabilities such as recording magnetometers, time standards, and CAMAC interface capability with the PDP-11's. Subcommittee members assumed responsibility for looking into these possibilities further.

We once again would like to commend Al Shipley and his staff for their continued high standards of professionalism, and their strong programs

to improve these standards. This Facility continues as an example of economy and efficiency. There are no outstanding weaknesses, and consequently no urgent recommendations by the subcommittee for changes.

We are pleased to submit this report for consideration by the full committee at its 16 November 1976 meeting.

Respectfully yours,

Donald Kniffen, Chairman

Robert Golden

Dietrich Mueller