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LEWIS RESEARCH CENTER

OFFICE OF THE DIRECTOR

May 12, 1969

Dear Mr. Merrifield:

I am pressed for time and have not attempted to do a thorough editing of this document but in general it is quite good and you may use it in the manner you described. I would appreciate a copy when it is convenient.

Sincerely,

Abe Silverstein

Enclosure

Mr. Robert B. Merrifield BN/Manned Spacecraft Center Houston, Texas 77058

INTERVIEW WITH ABE SILVERSTEIN January 30, 1969

In putting together the STG, Bob Gilruth and I went to Headquarters and worked with Hugh Dryden. We discussed some of the important aspects of how the program would be conducted. Bob was at Langley and I was at Lewis and we were in and out of Washington on a transient basis for several months. I spent about four or five days a week in Washington and the rest of the time in Cleveland. Neither NASA nor the STG were yet in existence; Bob was working with men like Faget, Thibodaux, Purser and others at Langley who had been interested in manned flight for some time. Bob's interest rather quickly moved in the direction of manned flight although he was also interested in other aspects of the space program. I worked not only with Bob and his people but also with a group from the Naval Research Lab who formed the core of our unmanned program.

Bob and I kept Dryden informed on our thinking on the manned space flight program. After it became evident that it would be necessary to create a special task group if this work were to be prosecuted, we approached Dr. Dryden with the request that such a group be formed. This was probably about the middle of August 1958. It was recognized that this group could perform most effectively at LaRC since most of the men involved were being transferred into the group from LaRC. One of the first matters that was put on Dr. Glennan's calendar for consideration when he officially took over as Administrator of NASA was a review of NASA's activity in the manned flight area and a request for his approval of the Mercury Program. He agreed to this review and on the afternoon of October 7 a meeting was held at which he was briefed on the program and his approval was gained to move ahead at full speed. It was agreed that STG would be created at LaRC and would report to my office at Headquarters, which was then known as The Office of Space Flight Development. Bob Gilruth would be the head of STG. The STG was formed unofficially on October 8 and after the first organizational chart was prepared for NASA, it was officially established. The group included 45 men, 35 men from Langley, and 10 transferred from the Lewis Center. The Lewis people provided talent in areas that seemed to be lacking or could not be provided from the Langley complement. For example, the Lewis group had substantial experience in flight operations, and most of them ended up at the Cape. Andre Meyer was transferred with the group to take care of some of the structures problems, and Simpkinson provided talent in the electronics and instruments field.

45

The nucleus of STG began technical studies and work statements that led to the award of the contract for Mercury spacecraft to the McDonnell Corporation on January 9, 1959. There were lengthy discussions as to what the correct name of the first manned program should be. I finally selected the name Mercury as being appropriate since this was to be the first of the manned messengers into space.

Within my organization at Headquarters an office called Manned Space Flight was established, with George Low as its head. He reported through Newell D. Sanders to me. George Low had been transferred to Headquarters from Lewis along with John Disher and <u>feldor</u> Hall. I picked these men because they appeared especially well qualified for the work to be done, and could be transferred without detriment to the work at Lewis.

During the early days, STG had good technical strength but lacked adequate manpower to carry out budget, finance and general administration.

I held many discussions with Bob Gilruth over how to strengthen his group in these areas so that when justifications and budget presentations were needed in Headquarters for presentation to Congress, they could be obtained. The difficulty arose from both not having enough people and in particular not having enough administrative types. Most of the budget presentations and much of the administrative, financial and procurement activity was undertaken by our Headquarters group instead of at the STG. D. Wyatt of our staff was particularly helpful in this regard. George Low provided very fine liaison with STG in digging out, verifying and recording the important statistics needed for the budget planning of future manned programs. An extremely close relationship existed between my office in Headquarters and Gilruth's office at LaRC. We held meetings almost weekly, and at them the key technical and administrative problems were discussed.

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It was at this time that it came to our attention that the Canadian effort on the Avro airplane was to be discontinued. Some highly skilled aeronautical engineers were to be released and might become available for building up STG. I immediately contacted the leader of the Avro group, a Mr. Lindley, asking if we could arrange to interview him and members of his group for possible hiring. I interviewed him at Headquarters several days later and subsequently had him talk to Bob Gilruth at the STG. We failed to hire him but were successful in recruiting some 29 of the Avro group who brought a fine technical capability to STG. An important member of this group was Jim Chamberlin who had been responsible for much of the design of the Canadian Avro Arrow. His design skill was utilized in the development of the Gemini capsule, a grossly improved Mercury capsule in terms of layout and equipment arrangement.

It became clear fairly early in the operation of the STG that it would be desirable for STG to be disassociated from the LaRC in order to assume a rank commensurate with the importance that we could forsee for manned space flight in the total NASA operations. As a satellite to a research center, it was feared that damage might be done to the research center, due to the bleeding away of manpower to support the operational organization, and also to the manned center as growth might be inhibited due to the historically slower buildup of research centers. I discussed this point with Dryden numerous times and we agreed that as early as possible the STG should be moved to quarters from which they could expand freely and take a part in the organization that was proportionate to the importance of manned flight in the total national mission.

At the same time that the STG was being assembled and the Mercury Program started, I had arranged with the Navy for the transfer of some 250 members of the Naval Research staff to NASA. This group consisted of two elements, one doing upper atmosphere research under Dr. Homer Newell and another conducting the Vanguard Program under Dr. John P. Hagan. After dilegent negotiations with the Navy and discussions with the personnel of the Naval Research Laboratory (and pursuant to the legislation that provided that NASA transfer into its organization personnel from other Government agencies who were working in this field), we transferred these 250 men and provided them initial quarters at Naval Research Laboratory. The Navy was happy to provide them with temporary quarters which were modified by NASA as appropriate labs, but they were also careful to let us know that they expected this arrangement to be temporary. They asked that we provide permanent quarters for the team off the Naval Research Lab site,

as they were afraid that if the team were permanently located at the Naval Research site, it would continue to recruit for NASA and strip out their best people, as a program as attractive as NASA's was a magnate to the scientific community. I mentioned to Dr. Dryden that we would have to provide quarters for the scientific group of the Naval Research Lab and asked if he favored any particular area around Washington where they could be housed. I mentioned the Washington area because many of the NRL people lived in the Washington area and I was afraid we would loose them if we were to move the Center elsewhere. Dr. Dryden commented that just the day before at a meeting of the National Geographic Society he had been asked by a representative from the Agricultural Department if NASA needed any land in the Washington area for a lab site and that they would welcome NASA's use of land at the Beltsville site. There was some question as to whether there was adequate justification for them to continue to hold on to as much land as they had and they felt NASA's co-occupancy would help them maintain control of the property. He suggested that I interview the Beltsville people and follow up on this lead. I did so the same day and got a promise of a tract of 500 acres for almost immediate use by NASA on a transfer basis. This was the beginning of the Goddard Space Center which I named in honor of the great genius Robert H. Goddard. The Goddard SFC was officially created on May 1, 1959, and STG was incorporated as part of the GSFC organization with Gilruth as assistant director for manned satellites. The transfer of STG to the GSFC was done as a first step in attempting to provide greater autonomy for the manned space flight operation, and in recognition that this new Center might be a location where the manned space operations could develop to its appropriate stature. At the time

the Center was originally established no director was named; I served as acting director during its first few months of operation.

Although STG was attached to the organization at GSFC, it was not intended that it then be moved to the Goddard site, as at that time there were no facilities available to receive them, and since the Mercury Program was in full swing, it was thought unwise to upset the team by a move at that time. Consideration was given to moving at some later date but no definite target was established.

After Harry Goett was named director at GSFC, there was a nominal line of supervision from my office to Goett down to Gilruth's STG. This chain for command was loose and some friction existed in relationships between Goett and Gilruth in the total operation. Most of the decisions that were troublesome were brought to Headquarters for resolution but none were of such a serious character that they could not be handled. In the long run GSFC-STG relationship was extremely advantageous to STG because the GSFC team was able to supervise the development and maintaince of the range in support of Mercury and subsequent manned flights.

In the time period of late 1959 and early 1960, some gains had been made in strengthening the administrative complement at STG so that contractor relationships could be handled in a more expeditious fashion and budget preparations more carefully completed, but it was still apparent that the organization was undermanned and without strong leadership in the area of flight operations. This was evident in the operations at the Cape where a special field group had been established for checkout of the spacecraft and to supervise the conduct of flight operations. Difficulties were encountered in establishing proper relations with the Air Force at Canaveral

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even though a special office for that purpose had been established at the Cape. The paperwork being created in support of flight operations also appeared to be somewhat inadequate and further evidence of the lack of firm leadership. After discussions with Gilruth and Dr. Dryden, I invited Walt Williams to Headquarters to discuss the possibilities of his taking over operations for STG and the Mercury launches. Williams' experience at Edwards in supersonic flight testing and the relationships he had established with the Air Force in the process, seemed to be of value for the Mercury Program. After some hesitation, Williams discussed the situation with me and Dr. Dryden, obtained assurance from Gilruth that he would be invited with open arms into the group, and accepted the position.

As the Mercury Program moved along and the initial flights were beginning, it became apparent that a major follow-on program needed to be created. Several general staff meetings involving leadership from our Headquarters manned flight area and the STG were held in the 1959-1960 time period and as a result, the Apollo program was originated. Apollo was initially visualized as a three part program: A, B, and C--A to be earth orbiting, B to be lunar orbiting, and C to be lunar landing. This program layout as well as the general concept of the Apollo capsule as being an enlarged Mercury capsule and weighing between 10-15,000 pounds was arrived at in the very first meeting when the concept of the Apollo program was agreed upon. At that time the final characteristics of the S-V booster had not been fully established and project development in greater depth was not attempted. I named this project "Apollo" shortly thereafter in recognition of the ascendency of Apollo over most of the other Gods of the Greek pantheon and correlated this with the ascendency of the Apollo program within

the manned flight program. The Gemini Program was created as a filler between the Mercury and Apollo programs since it was recognized that the flight operations in Mercury would be terminated long before Apollo hardware would be ready to fly, and it was felt that the astronaut and flight operations capability of the group would be destroyed with too lengthy an interval without flight.

The experience on the Mercury program with its extremely long checkout periods at the Cape, led us early in the Gemini Program to spell out the first order of necessity for design of the Gemini capsule was that all components of the system should be readily accessible for checkout inspection and rework. The principle design concept for the capsule seemed to come from Mr. Chamberlin who was head of the project. His brilliance in design was amply demonstrated by the ease with which the Gemini capsule could be prepared for flight at Canaveral in contrast with that required for Mercury.

With the growth of these new projects and the full realization of the true size of the manned effort within the NASA program, it became clear to Drs. Glennan and Dryden and me that perhaps the concept of using Goddard as a place to house the manned program was wrong and that Goddard should direct the unmanned satellite program and a wholly new Center be created for manned flight program. Discussions on the subject continued thru early '61 and in the summer of that year a site selection group was officially established under the chairmanship of John F. Parsons. Philip N. Miller was its secretary and Wesley Hjornevik, and Ed Campagna completed the team. A formal set of site criteria was established and reviewed by Glennan and Dryden as well as our office. The importance of the criteria was emphasized

18

to the site selection team. It seemed clear that the Center had to have direct access by water to the Cape without overland handling. It was visualized that in later years major space station systems with large diameters--larger than could be handled under bridges and railroad tracks-would be created within the Center and would need transportation to the Cape. If complete teardown of the system and rebuilding at the Cape was to be avoided, it was essential that a barge or ocean going vessel transportation option be provided. This important criteria focused consideration on a number of areas and immediately elimeninated many others. Other criteria considered to be of importance were more general--such as the access to labor markets, good schools, good housing, opportunity for expansion of the site, etc. Parson and Miller were selected because of their long experience in NACA organization in the area of both site selection and building construction. Jack Parsons had participated in site selection teams dating back through the previous 20 years, and was responsible at the Ames Center for much of the lab design and construction. Miller's background included 25 years' experience in construction activities in NACA-NASA Centers and most recently the design and construction of the Goddard Center. I was certain the team would pick a site that would be completely satisfactory if we could get agreement among team members.

The site evaluation data produced by the team was of the highest quality. Houston ranked very high, not only because it satisfied all the site criteria, but also because of the great enthusiasm evidenced by its community leaders who seemed determined to provide an environment for the Center that would enable it to fulfill its mission. The second choice of the site was in California. However, there was continuing pressure at that time on NASA

118

not to place any more business in California since it already had a lion's share of the aerospace work. The favored concept was that NASA's business should be distributed throughout the states of the U.S. so that local industry could participate more readily and so that the benefits of the space program would be distributed widely throughout the country. This point was emphasized by Mr. Webb who was administrator at the time the site selection was announced. I heartily subscribed to this philosophy and hope the NASA will continue to distribute its business as equitably as possible among states of the Union.

After the Houston Center was authorized, and as budget time had arrived, it became necessary to establish a \$ number for construction at the site. This number was arrived at in a single afternoon as a result of calculations that I myself made. I had been following the Goddard construction for several years and had a good feeling for current costs in office and lab construction. I visualized a Center in Houston that would include about eight buildings and would accommodate a staff of about 3000 people. These included large engineering buildings for housing the principle engineering staff, an assembly shop area for working on spacecraft assembly and checkout, a building for the simulation work, a standard machine shop-sheetmetal workshop, a general administration building and warehouses, etc., a couple of instrument labs and other electronic laboratory. I put these facts on the back on an envelope and put dollar figures beside them. My estimate did not include the mission control center for I intended to keep it at the Cape. I figured 3000 people would be a good estimate for the first growth period of the Center. My cost estimates added up to about \$60 million and I put this figure down. By the time we got to the

budget presentation, we revised our estimates somewhat of what we would need in terms of individual buildings, and by the time they were described, we had a little different description than I originally intended, but I realize it had to go through a couple of versions before it finally got out and I didn't think too much about it. There wasn't a great deal more thought given to the matter than that in terms of the initial planning and development of the Center's original appropriation. It was agreed that there would have to be a growth beyond the \$60 million, but I believed that chances of getting more than \$60 million for the first year was slight and that possibly the \$60 million might be enough to get the staff pulled together, organized, and with a better understanding for what else they needed.