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<u>Historian</u> at <u>MSC</u> [location of interview]	
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July 3, 1968

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Rm 468 Bldg 10B

Mr. Charles W. Mathews Deputy Associate Administrator for Manned Space Flight, MD NASA Headquarters Washington, D. C. 20546

Dear Mr. Mathews:

At the request of Dr. Eugene M. Emme, the NASA Historian, this Center has agreed to assume responsibility for the preparation of an MSC history. This effort will place primary emphasis on the Center as an institution. That is, its general management philosophy, the evolution of its major organizational elements, growth and modification of its staff, management of its financial resources and contracts, acquisition of its facilities, and its impact on the economy, culture, and society of the community in which it exists.

This project is what can be termed a "contemporary history" since many of the people who played key roles in the establishment and evolution of the Center are able to give credible witness to the events and decisions occurring in this period. It is vital that these participants be consulted. This pleasant duty is mine as I have been commissioned to prepare this history. I am a professionally trained historian with considerable experience in research of this type.

I would very much appreciate the privilege of spending an hour or so with you in an interview for the purpose of recording your personal recollection of significant details that have a bearing on the Center's past. If you have no objection I would like to use a tape recorder while I am with you as it is a convenient way of obtaining a lot of information quickly and economically.

I recognize your time is valuable and limited and will leave to your discretion what you will want to comment on. I am interested in any information you consider to have been important to the development and growth of the Center. Please feel at liberty to go into whatever depth of detail you feel advisable and within the limits of your available time. Sometime during the last week of July and the first week of August, I expect to be in your area conducting other interviews in connection with this project. If you have some open time during this period I would greatly appreciate the opportunity to talk to you. NASA's travel funds are extremely tight this year and I would like to schedule several interviews during this trip in order to avoid the necessity of a second trip to the same area. I realize also that this is vacation time for many families and thus will constitute another handicap to seeing a large number of people during such a brief period. So if you can fit me in, I will appreciate it very much. May I call your office in a few days to arrange for an appointment that will be mutually convenient.

Sincerely,

Robert B. Merrifield

## Interview with Charles W. Mathews 7/25/68

As we started our activities in manned space flight before the advent of NASA itself, our main emphasis was on just what sort of a spacecraft would be most feasible. There were a number of different proposals, but ultimately we decided on the Mercury configuration. We detailed that configuration and the systems approaches that would be employed, etc., well before Mercury became an official program. Once it became the responsibility of the STG to carry out this program, it was realized there were a large number of very important aspects in terms of organization which hadn't been considered at all. We had the nucleus of a systems engineering capability, but missing were the capabilities for planning and implementing operations and also the capabilities for doing the detailed engineering management that would result in the implementation of satisfactory hardware. This was recognized as being a problem by Dr. Gilruth and our initial organization provided for an operations division. an engineering division, and a flight systems division. These were the main elements of our organization at that time. The organization was very strongly program management oriented and in fact was just one large program office. It was fortunate that it was an offshoot of the Langley Research Center, and Langley provided institutional support and a source of manpower. Langley was a pool of resources to STG management, not only in terms of STG staffing, but even more important, being available to do all sorts of sub-projects. Langley not only was the nucleus of the basic capabilities for the ultimate MSC organization, it also sustained the initial effort in terms of providing that very important institutional base. Credit should be given to Dr. Thompson and other people at Langley for the manner

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in which they supported the growth of manned space flight.

Within STG we had some problems in creating well balanced organization, because in the evolution of STG from a research oriented center, we could do a pretty solid conceptual job but were weak in terms of the major hardrock engineering activity required for implementation of programs. I think it was very fortunate therefore that we were able to make the arrangements with the Canadian Government and the Avro Corp. to hire a number of very high quality personnel out of their aircraft industry. We then had limited manpower, but with the addition of this capability we did have the necessary elements to conduct the program and that was a major factor leading to the ultimate success.

In the operational area we tended to draw heavily on people with flight test experience. Most of the nucleus of people in our operations organization were from the Flight Research Division at Langley. They had been involved in flight test programs for airplanes and associated crew activities. In addition to that, about a year after the STG was formed, a few key people from the Flight Research Center at Edwards transferred to key roles in STG and that again added strength by bringing in operational experience in advanced experimental equipment.

Essentially, most of the people involved in STG in those days were perfectly happy to operate as a program organization and draw support from Langley. At the time of Shepherd's flight when consideration began to be given to expanding STG activity to enable it to provide its own institutional base were looked upon with concern by many of our key people. For one thing, we were still attempting to develop the capability

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required to conduct the initial manned orbital flights for this country, and in addition, planning was being initiated at that time related to some very large, significant follow-on programs; namely Gemini and Apollo. Many of our people had reservations as to whether, with all these things to do. STG had the ability to develop a new center or institution. Nevertheless, when the decision was made that that was what we were going to do, people not only accepted it, but enthusiastically attempted to develop that kind of capability. They had much outside support and help. One of the big advantages that we had in embarking on this endeavor of building a new center, in contrast to other NASA centers, was that it was/brand new start. We could develop it along the lines of what we wanted, and we had these several years of experience in the space business to draw on. It gave us an opportunity to consider, from a lab standpoint, the kinds of things that were really needed. In retrospect this enabled MSC to evolve as an integrated facility, and in so doing constituted the best example in NASA of systematic growth and development. We are all very pleased with the capable contract support we got in the architectural area and in the contribution of the Corps of Engineers and other people who assisted in planning MSC. We not only achieved a very capable facility, but as well a very esthetically pleasing facility because of the careful planning done.

At the time we began making the move to Houston there was a requirement to expand the organization to provide for various administrative and institutional support such as facilities planning. Although the basic

elements of our organization were retained, the new activity was somewhat traumatic for people like me, who were involved in one area but were required to make judgments in other areas where we didn't feel the same degree of competence.

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In that particular point I believe we had a lot more capability to do advanced work, and generating systems concepts, such as the LM and the space station, than we did later because actual programs such as Gemini and Apollo have tended to absorb all the resources that MSC can muster.

Another point to be made in connection with the move was the tremendous support and enthusiasm that Houston as a community provided. People in the Houston area were generous in helping us meet our needs with regard to residences, in becoming familiar with the Houston area, in providing social contacts, etc., and all this added up to a warm welcome for the group of about 750 that made the move. It was a big factor in helping us become comfortable in the Houston area. Houston certainly has been very enthusiastic about the idea of space exploration which was quite a contrast with the Langley environment. The Houston community felt strongly that what we were doing was very important. This attitude was stimulated probably by the fact that this was in the period of the initial manned orbital flights when a large amount of enthusiasm was engendered around the country for this activity.

Dr. Gilruth felt that although the main job of the Center was to manage large manned space flight development programs that were coming the after/Mercury effort, in order to maintain the basic competence of the Center in technical areas, there had to be a lab base for our activities. A great many people who were brought in during the expansion of the Center were oriented toward that particular type of activity. Initially the total

support for this type of activity, in terms of the total capabilities of the Center, was probably more limited than it could or should have been. It wasn't until after the move to the permanent site that these kinds of problems began to disappear.

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As the Center developed, the chief problem encountered was that the size of the programs and the capabilities of the facilities available to us really were larger than the ability of the personnel complement to expand and absorb them. Practically everyone was severely overworked, and although this did not appear to create any major personnel problems (probably because the activity was generally intriguing and stimulating), it did result in a requirement to focus on large projects. MSC was still largely program oriented as an organization, and the institutional base developed much more slowly. At the same time, the Center compiled an astrounding record in initiating and carrying out the Gemini program over a period of less than 5 years which involved a dozen successful flights, in which many new areas of space capability were demonstrated, such as 2-week duration flights, rendezvous, and extravehicular activities. At the same time, the Apollo Program was brought to the initiation of the manned flight phase.

As the Center is now constituted, the focus of attention must necessarily be on the manned lunar landing but the challenge before us is really to develop the planning base which will furnish the foundation for the next series of steps in manned space flight. Much of the capability and experience in manned space flight is located in the MSC organization, and therefore it will be a requirement to focus on these next steps, and clarify them as rapidly as possible, recognizing that

the initial outburst of enthusiasm for space activities has come and gone and we need to inspire a vision of the future.

Because we realized that the space exploration activities opened up many vistas in the advance of our knowledge, even though the organization was small, it was felt we ought to develop capabilities on a fairly broad base in technology, in science, and ultimately in applications. Therefore although the spacecraft technology division had in it's name technology, just in dealing with many of the aspects of the unknowns associated with this technology, say as applied to lunarexploration, came the need for new knowledge in science. Just landing on the surface of the moon, required a knowledge of lunar geography and geophysical characteristics. We not only had to develop knowledge in that area, but such knowledge ultimately would be important for scientific reasons. Similarly in the development of technology itself for the areas of G&N systems, the problems of maneuvering in space in a precise way generated the desires for greater accuracy and higher performance. We brought into the STD individuals who were worrying about the character of the lunar or about the higher inertial performance for G&N. In general, there was a thrust to cover these areas using these ongoing programs as a point of departure. From this very small group effort, emerged the capabilities of the several laboratory facilities and analytical organizations that ultimately became an important part of the Center capability. One of our jobs was to determine just what these capabilities should be, and what sort of equipment and facilities were needed, such as computers, simulators, an optical lab, inertial component labs, preliminary design organizations, and the like.

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It focused on the existing problems and extrapolated them into the future which was vital to the establishing of broader capabilities in the Center.