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Oral history interview with Wesley L. Hjornevik
[full name of interviewee]

about MSC origins, organization and management.
[main focus of interview]

Title: 1962 Asst Dir for Administration MSC
[interviewee's current and/or former title and affiliation]

1962 Assoc Director, MSC

Interview conducted by Robert B. Merrifield, Staff Historian **at** MSC
[interviewer's name/position] [location of interview]

Transcript and tape(s). [for inventory only: # pages 44; # tapes 2]

Masters 2

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Biographical - [date/place of birth; family background] _____

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Education - _____

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Career Path - Oct 1, 1958 - Personal Asst, Glennan

19 At Seipert's Deputy NASA Administration

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1958 President

Topics - Presentation to Eisenhower on manned spacecraft; beginning of STG; retention of research centers (Langley, Ames, Lewis); paper move of STG to Goddard; envisioning a new Manned Space Center; selection as Admin of STG; initial STG staffing; procurement (Lang); finance (Ray); personnel (Clarke); facilities (Zbanek, Campanga, Bayne); admin (Whitbeck, Bangman); site selection; land acquisition; departure from initial 3-building concept; working w/ Corps of Engineers; on-going design changes; relocation logistics (Virginia to Houston); temporary Quarters; Edington #3; Selection of White Sands Missile Range; center-Cape checkout teams; Apollo program — responsibilities; division of failure of GE integration role; initial opinion of Houston site; benefits to Houston; & Houston welcome NASA lobby for UH branch, improved roads, employee civic involvement; Congressional relations; minority employment

(over)

recruiting & pay scale; MSC - MSFC relations;
shift from "budget shop" resources organization.

Gordon Gibson = 3365

- where function located — GSFC, MSFC, KSC
- scope of function
- grade levels
- full time?

Interview w/ Hymowitz.

12/16/82

Organization of project offices

~~How PMS~~ w.

→ strong program offices very early
little concurrence from E&D and operations side, also ~~but~~ from Admin.

→ Introduction of subsystem managers
- Max Faget
-

→ Key - Prg. Mgr. had the budget
he would make the decision
Ch. Director was appeal route

- Didn't recall any particular input from Hgs
Galuth, W. Williams.
interest

- Usually only two project offices, staffed strong
but basis of repetition in functions
small enough to do their job, but not large
large enough to compete

Director of Programs

- too few programs
- level between Exec. Director & programs
- strength → place holder for senior program managers.

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Interview with Wesley L. Hjornevik
March 9, 1967, July 1, 1967, and
September 9, 1967

My first contact with any individuals in what is now the Manned Spacecraft Center was on October 1, 1958, when I came to work as Dr. Glennan's Personal Assistant. I had no background whatsoever in this kind of technical area. Most of my prior experience had been in the administrative part of medical research, so that technology lingo was all new to me. This first contact occurred while listening to a dry run of a presentation that was scheduled to be made to the President later that week by Dr. Gilruth. A group of people from Langley were making a presentation on a concept of a manned spacecraft that would stay up for three orbits using the Atlas, a cone-shaped spacecraft, a parachute recovery in the water, and so on, much like the Mercury concept that finally evolved. They went over to the White House and made the presentation to Eisenhower. When they came back, a fascinating incident took place, at least from my point of view, being brand new in the Agency and hardly knowing what was going on. We gathered in the Administrator's Conference Room in the Old Dolly Madison House, in Washington, then the Headquarters of the Space Agency. The group conducted a postmortem of their discussion with the President and his staff. This went on for maybe half an hour or so. They assessed reactions and one thing and another, and it was evident they had gotten an approval from the President to go ahead with the Program. I guess after Dr. Glennan thought the meeting had gone on long enough, he rapped on the table with his fist and said "okay men, let's get on with it." I can still visualize in my mind the consternation

on Dr. Gilruth's face. Gilruth was sitting down near the other end of the conference table. His mouth fell open, and he made some queries about staff and money and facilities, and Dr. Glennan just got red in the face. He didn't have any answers for any of these questions. There was a program concept, but the planning stopped there. So he just got red in the face and got a little mad and pounded on the table and said, "I said get on with it," and got up and walked out.

Dr. Gilruth went back down to Langley and I guess he went in and talked to Floyd Thompson, head of Langley. They agreed between themselves to let Gilruth have 35 or 40 people out of the Langley Center that he could use to do the planning until an appropriation was made, and otherwise get themselves ready to go.

Now, the group, as you know, wound up on the other side of Langley Field from the Langley Center and I think that there is a significance to this fact. In many of the early discussions between Dryden and Glennan and Abe Silverstein and the other senior people in NASA Headquarters, they all agreed on one basic interpretation of the technical world. I like to refer to it as Gresham's Law of Research vs Hardware Development and just as Gresham's law in currency says that bad money will drive out good, Dr. Dryden in particular, and I think it was accepted by the other members of the community up there, believed that the principle applied to R&D. Dr. Dryden through his experience and his knowledge of the scientific community, thought he could illustrate the workings of this Gresham's Law of Research vs Hardware Development. He believed

very strongly that the research mission of the new Space Agency, by virtue of having added to the old responsibilities for aeronautical research and support of commercial aviation to the new space responsibility, that the need for this underlying, underpinning of research support was greater, not less, under the new NASA. It was largely due to this influence that a very positive and very conscious policy decision was made that NASA would not turn Langley and Lewis and Ames into development centers. They would be retained in their roles as research centers, even though in a sense this tied one of NASA's hands behind its back in terms of trying to get off the ground in the space business. It was this influence then, and this kind of thinking that said we must put this group that was going to do this manned flight operations, as a separate organizational entity and to the extent feasible within the geography of Langley Field, to separate it from the research activity so that it would not permit the operation of this Gresham's Law of Research vs Hardware Development.

While I never heard anyone say it, I certainly had the feeling that in those early months in NASA, that there was a very real significance to the selection of a title like the Space Task Group for the Mercury Group. I think there were many senior people who felt that this program, which became known as Mercury, was a stunt that amounted to an over-reaction to the Russian activity. They felt in fact, that manned flight was very premature, and that while the exigencies of the situation might require a stunt like Mercury, the task group would soon fade away and manned flight would develop much later after the technology had been evolved for unmanned spacecraft. The feeling of some very senior,

responsible, thinking people was that manned flight was premature at that time because our experience had been limited to spacecraft the size of basketballs and grapefruit. But even recognizing that it was temporary, it was very conscious decision not to assign the responsibility to the Langley Research Center; rather to create a separate organizational entity, the Space Task Group.

Although Abe Silverstein, who was heading up the space activities as opposed to research activities in Headquarters at that time, basically believed this same philosophy, Drygen was the major advocate. Glennan accepted this philosophy. In retrospect, it was a damn good decision. We would have turned all of our research centers into development Centers. You m ust remember too, there was tremendous pressure from these research Centers to get into the hardware business, so it took real effort on the part of the management to keep these people from going from research into hardware development.

During the next couple of years, particularly as people got more accustomed to the idea of manned flight, the earlier attitude that it was a stunt, a temporary start, began to wane a little bit. There got to be an increasing concern about where should the Space Task Group be located organizationally in a permanent sense. My contacts with this problem were sporatic but my memory of them goes something like this. The concern was generally in Headquarters and from people who were not directly in the loop. They didn't like the lack of neatness with this Space Task Group hanging on the organizational charts. No one, at this point

conceived of an idea of a Center devoted to this kind of activity. As the Goddard Center evolved, some one, I don't know who, suggested that we make the Space Task Group a part of the Goddard Space Flight Center since at that point it was really the only new Center that had been created specifically for development work in pursuance of this policy of separation of R&D. After consideration, and although I wasn't directly involved in, I got the impression that there was more a passion for neatness than any other compelling circumstance, a decision was made to make Dr. Gilruth an Assistant Director for Manned Spaceflight of the Goddard Space Flight Center. This was not, as I understand it, a particularly palatable decision for the Space Task Group people at Langley and they resisted it. Once the decision was made, they changed from resisting the idea to one of resisting the move--the physical amalgamation with Goddard--on the grounds that such a move would disrupt their ongoing Mercury program, which, of course, was increasing in tempo and beginning to get to the point where people could see hardware. Dr. Gilruth took the position that he could not carry out his Mercury responsibilities and at the same time move these people geographically. He was supported in this by Abe Silverstein, (at least I think I remember Abe's supporting this) and as a result, the organizational change was really simply a paper change. Mike Vaccaro, the Assistant Director for Administration at Goddard, initially after the change was made, made strong efforts to try to integrate the Space Task Group in a management sense into the Goddard Space Flight Center, through the budget process, the accounting process, and the other mechanisms he had, even though it was geographically separate. He met

with resistance at every step, in part, because the Space Task Group had not really created any of its own support in any of these areas and operated by means of using the Cent ER Services at Langley. Vaccaro was in a very difficult position to try to force the utilization of service groups like procurement or finance, or budget, or what have you, that were 150 miles away as opposed to support groups that were immediately adjacent. So I am sure Vaccaro was a mighty frustrated guy in trying to make some kind of reality out of the paper change that made Dr. Gilruth the Assistant Director of Goddard.

Dr. Glennan, as time went on, realized that this paper change had not been real, and I think from my personal contact with him, pretty much sympathized with Gilruth's resistance to this move. Shortly before the change in administrations, I guess he had come to the conclusion that the Space Task Group should not be amalgamated with Goddard. His reasons were several - over time, of course there was an increasing acceptance of the idea of manned flight, that the earlier concept of it as a stunt had disappeared for the most part. There also was very real feeling on his part that putting a program that involved the scale and cost of hardware that is involved in MANNED flight activity, even in the early Mercury days, in with what he was trying to create at Goddard, which was essentially a long-haired, scientific-oriented development center was a mistake. If there ever were a follow-on program to Mercury, the manned flight effort would simply dwarf and bury the scientific effort at Goddard. He recognized, however, with the nearing change in Administrations (Eisenhower was clearly not running again) he had to be careful, so he took only a half-step in this direction. He issued

a piece of paper which disassociated the Space Task Group from Goddard and established it as a separate field entity without changing its title. He left for his successor a memorandum which explained the reasons I have given you here. He went on to tell his successor in this memorandum that in view of the fact that administrations were about to change, that he felt he should not take the step of choosing the physical location of this group. He noted that he felt that it should not be co-located with the Langley Research Center. This was one of the legacies and tasks that he was leaving his successor in administration.

I don't recall Dryden being a significant factor in this decision. Dryden, given his bent for the Gresham's Law approach, I'm sure agreed with the idea that if there ever were a significant manned flight activity that he would not want it co-located with the scientific satellite work at Goddard, but I don't recall him being a major influence here, although, Glennan, on any decision like this was very very careful to obtai ~~and relied very heavily on~~ counsel from Dryden. My own recollection is that this was essentially a conclusion that Glennan had come to himself, and in which he had Dryden's concurrence. So, the status of affairs there at the time of the change of administrations between Eisenhower and Kennedy was that a decision had been made to create ~~a~~ the Space Task Group as a separate field entity leaving to the successor Administration the problem of where to put it.

Now, about this point in time, I moved from being Dr. Glennan's personal assistant. I'd spent 3 years as personal assistants to people, both as under secretary to HEW and to Glennan, and I wanted to get out of the bag-boy routine and into my own operations. I had become Al Sepert's Deputy Director of Administration for NASA in Washington.

Knowing the legacy that was being left to the upcoming Administrator, I had pretty much made up my mind that this looked to me like the last major field Center of the Agency, and that it was an area of work that fascinated me personally. I personally believed that manned flight was going to be essential and not perpherrial to the Nation's space effort. It was about this time that I kind of set my sights on getting onto this new entity as opposed to the Washington maelstrom.

Now, I'll have to skip a bit because we had Webb come in as Administrator. After the Gagarian flight, we'd had the President's inquiry as to what step we could take in space to assure that we could gain preeminance and we had the conclusions that in order to assure that we had a high probability of being able to gain preeminance, We had to pick a task to do that went beyond the existing state of the art to new booster systems that neither we nor the Russians had, so we would be starting on a par. Out of this, the presidential study group recommended that a lunar landing was the type of mission on which this Nation could embark with reasonable assurance in being able to be pre-eminent. Of course, consideration of this sort of thing greatly strengthened the concept of a separate field entity for the Space Task Group and enlarged the people's vision of what this Center would have to be to create the kind of spacecraft capable of that kind of voyage. I recall being called into Webb's office with Abe Silverstein, Al Sepert and myself, just the three of us I believe. At this time, Webb was

considering in-house studies and what kind of an input he was going to make to the President on the question that had been put to him. Webb asked us a number of questions, I don't recall the whole meeting very clearly, but I do recall several things. After some discussion, Webb indicated, well, now if I were to create a new center out the Space Task Group, concentrated on Manned Spacecraft, what am I talking about? How many people would it take to do this? As I recall, Abe Silverstein answered that question with the number 3,000. As I recall his explanation of this number 3,000 was based on his idea of the ideal size of a Center in which the Director, a single man, could manage with reasonably complete knowledge of what went on in the various nooks and cranies of his organization. This was based on, I assume, on his experiences as a Center Director at Lewis. I stress it bore no relation to any estimate of the workload, but was kind of like the argument of how big should a small college be. One of the other questions that I recall Webb asking was, well, what would it take in the way of facilities? I looked at Seipert and at Silverstein and they both looked at me, so I decided to live dangerously and give Webb a number. What I had in mind at the time was the numbers that we had been spending on Goddard which was a new Center evolving at that point in time, and I recall throwing out a number of $50 million as the cost of creating a new Center. Again, this was based only on what I have indicated, and I had no notion of what kind of facilities a new Center like this would require. Abe talked a bit about a concept of test and evaluation and a basic facility concept for the new center because he had been wrestling with problems of what do you do in-house and what you do out-house

at places like Goddard. Of course, manned spacecraft are very large and it is pretty hard to divide it up in in-house and out-house so the concept was basically one of contracting with industry, and Abe contributed a concept of test and evaluation of hardware as a device for keeping the Center competent. After these comments by Abe, Seipert decided he better mend my number upward, so he threw out $60 million as a number. I guess he was influenced a bit by what Abe had said about his concept of the Center. As a result of this discussion, and apparently decisions had been made, we had a weekend then in which to put together a justification for the facilities for this new Center. We talked a bit about a Control Center--a Mercury Control Center, you recall was at the Cape--and we agreed that we wouldn't define where the Control Center would be, but we would put planning money in the budget for it. This, by the way, was to be a Kennedy amendment to the Eisenhower budget that we were talking about, so this was happening in the February-March time period. The Space Task Group people had some inputs to make in the sense that they had gone through at least the half-hearted exercise of developing what kinds of facilities they would need if they were amalgamated with Goddard--physically moved from Langley to Goddard, so we had some little input there. The basic input was in Abe's concept of test and evaluation, and particularly the idea of a large space chamber. So, this justification with the help of people from the Space Task Group, over the weekend we wrote the budget justification to justify a $60 million construction effort and the planning money for a Control Center where the location would be studied. The budget did reflect a goal of 3000 people and I think we were scheduled to be at about 700 by the end

of the existing fiscal year. We put a number in like 1450 as I recall for the following fiscal year on the basis that that was as fast as we could grow toward the 3000 in any event. The budget reflected that the site for the new Center had not been selected, there would be a need for a site selection board, a site evaluation committee, etc.

To recapitulate then, I came into NASA on October 1, 1958, as Dr. Glennan's personal assistant. As I understand it, I was recommended among other candidates by John Corson who was the Washington Chief of the Kingsey Company and doing some Management Studies for Dr. Glennan to help in the creation of the new Agency. I spent about 18 months as Dr. Glennan's personal assistant and developed a very close rapport and working relationship with him during that time. Immediately prior to coming to NASA I had spent 2 years as a personal assistant to the Under Secretary of HEW, and had expressed to Dr. Glennan a number of times that I didn't want to spend my life being personal assistant to people. He had, in a generalized sense, encouraged me to consider a line operating job and indicating to me that he had confidence that I could succeed in such a role. Now it happened that I made the decision to leave Dr. Glennan and go into a line role and it came about this way. One day, and I don't remember exactly when it was, Dr. Glennan had tried to call a meeting, and it turned out that on that particular day, everyone of his senior people were out of town. He couldn't get Abe Silverstein, he couldn't get Dr. Crowley, he couldn't get Al Seipert, everybody was out of town and he just flipped his lid. He called in his secretary and he issued an edict by memo to each of his senior people that they would get a

deputy. He couldn't stop the Agency's business because these people were out of town. Having knowledge of this, I of course started thinking seriously about getting into a line job and as circumstance would have it, Al Seipert, before I had made any overt move, approached me as to whether I would be interested in being his deputy. I was encouraged to make the move by Dr. Glennan and did.

I served as Seipert's deputy, specializing primarily in finance and procurement which Seipert felt in particular he needed help with. I served with Seipert about 2 years before I moved down to the Space Task Group. Maybe I'm a Space Cadet, but I had been intrigued and fascinated by the whole idea of manned space flight. I strongly felt the lack of field experience in operating at a senior level in the Administrative side of Headquarters and on occasion some of the field people were quick to point out this lack. I had pretty much come to a conclusion that I ought to get some line experience in the field. What with my personal belief that manned flight as opposed to unmanned flight had become central in the Agency, and what appeared to be in the cards in the way of a separate field entity for manned spacecraft activity, that this was a rare opportunity indeed for meeting my own personal objectives.

I asked Al Seipert to call Dr. Gilruth and put my name in the hat for Administrative Officer of the Space Task Group. At that point in time, no decision had been made on the lunar program. This was in February or early March, 1961. Dr. Gilruth interviewed a number of people including some super grade level people from around the Government, particularly

some people from AEC, and he also interviewed me. I was interviewed by both Dr. Gilruth and Walt Williams, who I came to learn was obviously a power in the structure down there. I was ultimately selected as Chief Administrative Officer of the Space Task Group over the other candidates. From a period of March to June of 1961, I worked part time both in Washington and at the Space Task Group commuting down to Langley on the NASA aircraft that regularly flew between Washington and the Space Task Group.

The first things I tried to do, once I'd been selected as Administrative Officer of the Space Task Group was to try and assess the areas and the people that were then in the areas that I would have responsibility for at the Center. Gilruth gave me a wide area of responsibility, perhaps wider than most administrative people in other Centers in NASA and I assume his confidence was based on Abe Silverstein's and Al Seipert's assessment of me. My problem, obviously, was to demonstrate that I could contribute. We were facing a number of problems. It was clear we were going to be a separate field entity. It was clear we were going to move. It was not clear where, when, or exactly how big we would be. One of the first things we did was set up a task group under Andy Meyer to look at the facility requirements. Now this was, of course, after we were already committed in terms that first $60 million budget. I had to create a facility group, because there was none in existence. As a matter of fact, when I came down to the Space Task Group, out of the approximately 500 people that were onboard, in February or March 1961, of the authorized strength for that fiscal year of about 700, literally all were to be in the technical elements of the organization. There were between 30 and 40 people onboard in the

functional areas for which I would be responsible. The balance of the support, which was very very heavy, came from the supporting groups in the Langley Research Center. I tried, as best I knew how, in the short period of time that I had to make decisions as to whether or not the key individuals who were then leading the various satellite groups of the Langley Research Center supporting the Space Task Group were of the caliber and quality to grow into leaders of those functions on a completely independent Center basis. You must appreciate that these people were not selected with this sort of thing in mind. They had the capability of falling back on a parent group in the Langley Research Center, and it is not surprising that many were junior people. As it turned out, the only two that I kept as leaders of a significant function were Jack Kinzler in the Tech Services area, and Don Blume who was Chief of Security Operations. The others, I decided, were capable, but lacked what I felt was required to embark on a major new independent center enterprise. These people are all still with me and many of them are now senior people in the functions they were in then, but of course they are in less than the leadership role.

In looking over the organization I had, it seemed to me that two areas were going to spell my success or failure in terms of the functions that I had, as opposed to my influence on the way the Center was organized and managed generally. These, obviously, in an R&D outfit are your chief of procurement and chief of financial management, or whatever you want to call it. At the time I came to the Manned Spacecraft Center, the senior

individual in procurement supporting the Space Task Group was Glen N. Bailey. Glenn was a fine procurement man with many years of experience. In my estimation, however, he did not have the leadership qualities that would be required to build a major fullscale procurement group. In terms of the techniques and the knowledge of the procurement business, Glenn Bailey was and still is one of my most respected senior procurement people. But as a personality to lead and develop a large scale procurement group, as much as I respected him, I felt I had to get a different kind of personality.

In looking for this personality I obviously turned to the areas of Government where a major large scale R&D activity was conducted. I interviewed a number of people from the Atomic Energy Commission and from the Defense Department before I settled on what I think is one of the unique personalities in the procurement business, Dave Lang. His experience in particular was heavy in manned flight vehicles and he had been the contracting officer for the B-70 program immediately before coming with me.

My problem was a little different in the finance area. I was very conscious of the problems of estimating and budget control of R&D programs based on my experience at Headquarters and the knowledge I developed of the difficulties of estimation and control of R&D activities. A Chief of Finance, Doug Hendrickson, had been selected a few weeks before I came to Space Task Group. Doug is a loyal and capable

financial management officer. He had been the civilian chief of finance at Patrick AFB outside of Cape Canaveral, Florida. Of course, a military officer, his immediate superior was Chief of Finance. His experience had been essentially on base operations type financial management, and at this he was extremely competent. He was a very hardworking and particularly loyal person. However it was clear that, as it is elsewhere in NASA, that 90 percent of our dollars were going to be spent external to the Center, that our primary problem was not base operations at all but one of contractor management. I felt very strongly that I had to have very very strong support in this area. As a result I had a frank discussion with Doug, and asked him to step down to the Deputy role. I told him that as a new and separate Center in NASA we were going to have very serious problems in the institutional financial management area and I felt that I had to have strength in this other area and would he be willing to move down to Deputy. I felt that I had to handle this case a little more carefully than the others because he had just recently been recruited. Doug, as he has always been in my entire relationship with him saw my point of view and was completely cooperative. I then embarked on a recruiting campaign for someone I felt could contribute this other element I required--the capability to deal with industry, and after interviewing a number of people from both government and industry, I settled on Rex Ray, who, although he had not had financial management experience in quite the direct industry route, had been in the Atomic Energy Commission where a substantial amount of this activity was carried on, and also had been auditing contractor operations. I felt he would have a good insight into some of the pitfalls of dealing with contractors based on that experience. Now, beyond the

first two areas of finance and procurement, which I regarded as critical, it was obvious that if we were going to create a new Center, certain other activities also had to have strong, competent leadership. One of the first that I concerned myself with was Personnel. The Personnel support assigned to STG from Langley was a very personable competent young man -- Bernie Goodwin-- who as I recall at the time was about a grade 9. It seemed obvious that a much more mature and experienced person would be required to lead the establishment of the kind of recruiting and personnel program that would be required for a Center to grow from a very few hundred people to several thousand. In the process of my involvement with the ABMA transfer at Huntsville, I had become aware of Stuart Clarke, who had been a Deputy Director of Personnel at ABMA, who seemed to have a lot of ideas, who was very personable, and who had the experience of recruiting the kind of people that we would need in the R&D business. We went after Stu. I used Phil Whitbeck largely as the guy to pursuade Stu to come. Stu did and forthwith developed into a very strong Personnel Officer.

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The Space Task Group had literally no facility organization. We were occupying Langley Research Center facilities. When we did require some rehabilitation of buildings, we simply turned to the Central Service at Langley. We were going to be faced, it was clear, with the problem, the challenge, and the opportunity, if you will, of building a new Center from scratch. It was already clear that we were going to be required, based on general Agency agreements with the Department of the Army, to use the Corps of Engineers. However, this didn't trouble us too much since we had no capability at all, and the capability of the Corps was welcome. In looking about for people to form our leadership in the

facility area, I essentially looked outside of NASA. There were some very competent people available at Langley but the counsel I received was that these people were tied to the local area and would not be willing to move with Space Task Group. I selected three people. The first is Leo Zbanek who had lengthy experience in major developmental-type construction projects. For example, the largest R&D type construction program in the country during the post-war period, was the Taconite Iron-ore system in Minnesota. Under the aegis of a number of steel companies this program involved both the machinery and the methodology of processing the iron ore into pellets. The logistics system including the specialized ore boats plus the problem of redoing the blast furnaces to fit this mode, was one he had been heavily involved in and was a development-type operation. In addition, his experience was very broad in other kinds of major construction activities. Ed Campanga had been recently involved and was just closing out the Department of Agriculture construction program involving a major research center for Agriculture at Ames, Iowa. Thus, he too had recent experience in the development of what amounted to a new field development facility. Jim Bayne who was an architect, came highly recommended by a number of sources as an individual who was extremely capable in original design and control of design of a major project. He came to us from an architectual firm in Detroit, Michigan. The building of the construction staff from that point on, was one I left essentially to these three.

Perhaps the two most significant key personnel, were two that I brought with me from Headquarters. These were Phil Whitbeck and Chuck Bingman. I had supreme confidence in them. I had worked with them the prior three or four years in NASA Headquarters. They understood how I thought, and mixed well with my way of doing things. I brought them in in the nonspecialized areas other than financial, procurement, and construction, to essentially build from scratch all of the remaining elements of the administrative organization. With time, Phil, as I had expected, demonstrated his abilities and later was elevated to be my Deputy. For all practical purposes, once I selected a key leader in any given functional area, I gave him complete authority for recruiting and creating the type of organization he felt was necessary. Of course, I was consulted on Branch Chief assignments and other significant policy aspects of what a Division Chief was doing, but we were all extremely busy and I tried to pick extremely competent people whom I felt had the capability of building their own organization. As a result, I think they achieved a personal self-confidence and sense of responsibility for their own organization that perhaps could not have existed if the hand-holding had been greater.

Very early in the summer, Mr. Webb asked that Dr. Silverstein, working with Webb create a site survey team to evaluate the competing sites for the location of the Manned Spacecraft Center. Working with Dr. Silverstein, we established a set of criteria which were reviewed by Dr. Gilruth and Silverstein and Webb, and which were then published and dispersed widely to all interested in competing, so they would know the requirements that the Government felt it had to have for the location.

I was initially appointed as head of this site survey team, but shortly before it was scheduled to take the field, I became ill with a kidney infection and as a result, Martin Byrnes who was at that point Special Assistant to Walt Williams, was assigned in my stead. As I recall, they visited 20 to 30 sites that submitted brochures to be considered, and subsequently wrote a report which simply evaluated and graded each site on the basis of the criteria previously established, and this set of raw evaluation data against the criteria was given Webb. The decision to locate the Center in the outskirts of Houston, Texas, was made as I recall in September of 1961. The decision was delayed slightly by virtue of Hurricane Carla and was made a week or so later. I think that was wise, because when Gilruth, Walt Williams and I first came down here to look at the site, we were, of course, shocked and moved by the devastation we saw in the local areas. It is amazing however, what the announcement of the location of the Space Center did for the morale of the people in this devastated area. The determination to pick up and start again, while there anyhow, was substantially enhanced by this announcement.

I believe I covered earlier the fact that we set up Andy Meyer early in the game as the facilities requirements task group. At that point, the work of his group was aimed primarily at converting the base data that had been used for the previous plan to put some facilities at Goddard. As the three men in the facility area got into this thing, we moved from this kind of technical requirements data to selecting an engineering firm for preliminary master plan designing of the Center. The firm selected was Brown and Root Engineering of Houston and it had several associate contractors including the firm of Charles Luckman of

California. Luckman was largely responsible for the master plan and architectual concepts of the Center.

Merrifield: Why was it deemed necessary to have a master plan for the Center?

Hjornevik: It just seemed so logical--you see, very few people have the opportunity to start out from scratch. When you are starting out from scratch you obviously want a master plan. Now, the budget was $60 million, but it also contemplated only three massively large buildings and one of the things that came out of this early architectual effort was a breaking up of these very large buildings into smaller, more functionally cohesive units interrelated in such a way that you didn't lose the advantages of making separate buildings out of a large building. Also out of this, came the very clear indication that the 1,000 acres, if the Government were to reasonably protect itself, in terms of having adequate land for a new Center, was beginning to look very very tight. For example, the areas that used a large amount of space were the Antenna Test Range and the Thermochemical Facilities, and these were beginning to crowd in in such a way that the kind of isolation they required, either electronically or by virtue of hazard, was going to be compromised. On this basis, Dr. Gilruth and I discussed with Congressmen Thomas and with George Brown, President of the Board of Trustees of Rice University our belief that the gift of land should include an additional 600 acres over and above the early 1000 acres. This initially presented some trauma to both the Congressmen and the President of the Board of Trustees of Rice--that is trying to go back to

the Rice Board and to other people who might be involved and enlarge an already generous gift. We suggested that it might be possible for the Government to purchase th e other 600 acres rather than to simply make the gift larger. It turned out that this was the only feasible way of making the arrangements. As a result, the Government did purchase through Rice University, an additional 600 acres and the total land site for the Center then was 1600 acres plus a 20 acre reserve drilling site, or 1620 acres. This was Humble's land. Humble gave it to Rice, and Rice gave it to us. [Now the advantages of Humble giving it to Rice of course, was that it represented a tax benefit, which Humble would not get if it gave the land to the Government. I think Rice made some kind of swap on some other property they had for the additional 600 acres.]

this is not authoritative I have no personal knowledge of Humble's reasoning nor of its arrangements with Rice University

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A presentation was made, I believe in January, of the basic scheme and architectual vocabulary of the proposed new Center. It involved departing from the 3 building concept, laying out instead functional, but nice-appearing buildings in what amounted to a campus-like environment. It was presented to Dr. Seamens and others of the Headquarters staff and was given general approval. On this basis, the ground was broken in March of 1962, with the first major contract being the contract to lay the underground utility systems and the basic road structure to service the Center. The Corps of Engineers established a local project office. We had suggested this action to them and they were very responsive in terms of putting people into the office. We did have some early difficulties in working out the detailed relationships between NASA and the Corps. NASA clearly wanted the Corps to be its agent

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for implementing the Program, but insisted on maintaining the decision-making authority on changes and the evolution of the project to a degree that apparently was somewhat uncomfortable to the Corps. However, as time went on, and it became clear the Corps' efforts at cost control were not as effective as they might have been, we insisted with increasing vigor, since we were the ones that had to live with the appropriation limitations, that decision-making on changes, etc., be retained in NASA's hands. We established a NASA Change Board and other control devices to assure that the project was kept under control. For some reason, like many of the contractors, the Corps seemed to have the feeling that the one thing that NASA had was lots of Congressional support and lots of money, and that if there were any problems that the solution was more new money. This was an attitude that we absolutely could not live with. As far as the Center was concerned, we were determined to bring in the initial group of facilities for precisely the budget amount, which was done. However, in order to do this, it was necessary to retain very very tight controls over the activities of the Corps, the construction contractors, and the architects.

Now, in all fairness to the parties involved, I should make clear that as we got increasingly into the detailed design of the various special facilities, there was strong pressure from the technical side of the house to change or increase the original concept. This is not surprising because many of the early conceptual designs that grew out of the Andy Meyer committee work were functions for which no one then onboard was going to be responsible for actually operating. As recruiting

progressed and the leadership in each new functional area was brought onboard, he had his own ideas and made major impact on the original planning of the Andy Meyer group. Now, this created a very very difficult situation both for our own construction people and for the Corps. In this kind of environment, it was absolutely essential that we had to change the mode a bit from the more traditional approach of giving the Corps the design and telling them to go ahead and build it, because the change picture and the input of the new people who were going to be actually using the facility was constant during the process and only MSC could really control this factor in the sort of hard-nose fashion that was required if we were to get acceptable facilities within the dollars.

At the same time that all the activity on the design was going on, I appointed Marty Byrnes and Kimbell Johnson to establish a logistics plan, a movement plan and a housing plan. The Center was going to move itself half way across the country at the same time that it was getting to the peak of activity on the Mercury Program, and at the same time it was trying to put into motion the first steps on both Apollo and Gemini. The discussions of this with the MSC senior staff resulted in the establishment of a couple of ground rules. One was that the operations group would not be able to move until they were largely clear of the Mercury Operations problem. We would have to leave them in place and they would clearly be the last group to move. Another ground rule was that practically every element of the Center was to be operational at both ends, and when the operation in Houston became able to carry the load, then the group in Virginia would pick up and move. We were troubled by the recruiting problem in this context. It was very difficult to

recruit people who would move to Virginia and then in a very short few months later move to Texas. In every area that we could, the plan was to establish a cadre in Texas and have all the new employees report for the first time into Texas rather than into Virginia. Now this meant that we had to be very careful in picking the supervisory people and the cadre from MSC in Houston to avoid any lost motion. In terms of logistics, werwere also very very concerned about the problem of what was obviously going to be a high rate of travel back and forth between Texas and Langley. The air connections between Langley and Houston were not of the best, plus the fact we were quite concerned that we maximize the opportunity of families to be able to go to Texas and have an opportunity especially the wives to participate with their husbands in the selection of a residence.

In planning our temporary Houston quarters, there were a number of considerations. We wanted to so locate ourselves that we could rationally take the position that there was only one change of station move which the Government had to finance for each employee. In other words, we did not want to get into a situation where we were moving from Langley to Houston and then a year or two later, when the site was completed, we had another change of station move from Houston to Clear Lake. We looked at a number of the situations in the Washington, D. C. area, where, in fact, agencies under the law had paid change of station moves from the environs of Washington to a significant suburb area. As a result of these studies we made a determination that on this move we would clearly announce to people where the permanent home of the Center was going to be and that they should locate their housing accommodations in

accordance, so that there would be no second change of station for the Government to finance. We solved the problem of transport and what at that time were niggardly Government allowances for change of station costs to employees. We put together a major staff paper which went up to Mr. Webb in which we proposed both that the Agency seek some legislative remedies, but more importantly that the Agency contract for a special flight directly between Houston and Langley which would be used for the high rate of travel that would be required between the two locations of the Center, and which also could be used on a space available basis to permit wives to go to Texas and assist their husbands in the relocation of their families. After much debate in Headquarters, this basic element of the plan was approved. In addition, we negotiated with the common carriers very good rates on a government bill of lading basis for the movement of household goods between the two locations.

I established Martin Byrnes and a cadre of both administrative and technical people as an advanced team to go to Houston to make the many preparations that would be required to acquire temporary quarters and to develop information on housing availability. He established close relations with both the school systems and the Chamber of Commerce. As a result of this, we had many visits from personnel from the Houston Chamber of Commerce and the various school systems. They came back to Langley to counsel our people who were moving. One of the key jobs that Mr. Byrnes and his group had, of course, was the effort to find interim space ~~within~~ which could be used by the Center. As I indicated earlier, we were highly motivated to keep the location adjacent as possible to where the Center would permanently be located so that the people could locate

their permanent residence with due regard for the permanent location of the Center and still not have an unreasonable commuting distance to the interim location.

The first and most obvious and largest resource we had available to us in the way of a place to locate was Ellington Air Force Base. Ellington was a World War I training base. Some of its World War II type wooden barracks buildings were being used by other agencies Very few of these barracks had any kind of concrete floors. Most of them had raised wooden floors with severe limitations on equipment loadings. It was obvious that we could rehab many of these structures into adequate office space, but it was also clear that they were unsuitable for any of the major laboratories which the Center had to start. As it evolved then, we picked up space in some 13 or 14 buildings scattered over fairly substantial areas in the southeast part of Houston but with the largest single concentration of Government people being Ellington Air Force Base. Shortly before we moved into the Center, we had about 1500 people there.

In dealing with the Air Force on the use of Ellington Air Force Base, it was agreed that we could use,with a few exceptions, most of the buildings south of the main entrance road into Ellington. The Air Force reserve elements and various other units would concentrate their activities north of this area. This was a fair and generous allocation by the Air Force because the barracks in that area were clearly the best at Ellington. We began a major rehab prcgram of these barrack buildings, many of which hadn't been used for 15 or 20 years. At a cost of between 6 and 7 dollars

a square foot we were able to create out of them reasonable office space for about 1500 people. Our other facilities, and these were largely the lab areas, were put into more permanent type structures available to us at various points around the southeast part of Houston. Much of the laboratory area that Max Faget had we located in the Rich Building, in the Lane-Wells Building, and in a building formerly used by the University of Houston as a radio station. Because we were limited at Ellington-- the 1500 people being about the maximum-- the Headquarters of the Center and the staffing of the major program offices was put in permanent first class office space in the southeast part of Houston.

Even though the NASA had authority to lease its own space outside of the District of Columbia, it made every effort to use the services of GSA. However, it turned out that the nearest office of GSA was in Dallas. We had a very tightly scheduled move plan from Langley to Houston plus a very aggressive recruiting program and the capabilities of GSA to take on this large new work load by remote control from Dallas proved very difficult for them. It was clear to us that given the restrictions that both GSA and NASA worked under in terms of the amount of renovation or the square foot cost that they could pay for rental space, this major effort required fulltime on the scene of a very aggressive sort, which GSA, with all the other demands on their services, simply was not able to provide. About mid-way through the leasing program we took this on ourselves and relieved GSA of its support responsibilities.

In the evolution of the Apollo Program three major propulsion systems required for the LM and the service module were to use hypergolic fuels, which are highly toxic and which require fairly remote testing sites. Both Grumman and North American were proposing their own test sites at isolated areas in the general part of the country that they were from. After some study by the project office we concluded that there would be some substantial economies if these two facilities could be located together and have the same central support in the way of fueling capability, etc., and also that the costs of getting one isolated area versus two would be substantially less. As a result, surveys were made and it was determined that the White S nds Missile Range had substantial land which they were not using in detail and which could be used for engine test facilities without interfering with missile range utilization. As a result it was determined that the Government would build an integrated engine test facility covering all three of these engine systems to be constructed on government property and which the development contractors would utilize under NASA direction. Since this was solely and totally for the Apollo Program Office use, the original concept was to have the thing developed under the Apollo Program Office. It quickly became apparent that there was a substantial construction program which required the services of the Administration Directorate, and that the Apollo Program Office was really interested in only having a small project group out there to control the two contractors and wanted the facility as an institution to be run by somebody else. This resulted in treating a good part of the staffing of the facility out there as institutional, essentially under the Administration Directorate with the technical capability in depth

being a part of the propulsion division of E&D and the program office having a small project office there to control changes and the program office interests. In time divided authority developed which was complicated by a series of personality conflicts. It was not really a very sound administrative procedure, although what we were attempting to use a concept of a director of the installation who would serve the same purpose as a base commander in the Air Force, where the tenants do not report to him but are only serviced by him. As I say, the personality conflicts tended to break this concept down and really the concept itself was probably not sound for as small an installation as we were dealing with. In an effort to resolve some of the personality conflicts, Wes Messing was transferred to the Cape, Marty Raines was put in as a manager responsive to the Program Office, Administration and E&D and in that role was to report to the Director. Since then, I think all of the problems have gone away.

Early in the game, the basic idea was to have people from the Space Task Group who were involved in the development of the hardware go down to the Cape and handle the checkout of the vehicle before flight. The group was very small and growing all the time. In fact, this turned out to be a combination of both new people and people who had been involved in the original design and development of the vehicle. Under G. Merrit Preston they evolved into a pretty sizeable group. The first Big Joe flight for example, was essentially a task group from the parent STG group supplemented by some new people sent down there to check the thing out. Even Chuck Matthews, for example, went down to the Cape to participate in this checkout. As time went on, the Cape group tended to become institutionalized and as an organization was permanently located at the Cape.

Even though there was a lot of travel back and forth and for a substantial period of time there was real doubt as to whether these people spent more time at the Cape or at STG. About this time we decided to create a permanent organization at the Cape to handle the checkout functions, but tied closely to the design people back at Langley. I think the basic philosophy of having the people who were involved in the design also be involved in operations at the Cape was pretty strongly held. About the time that the permanent STG element was created there, other elements of the Agency who had Cape operations operating essentially under the same philosophy also began to become institutionalized. For example, the group from the Jet Propulsion Lab that handled the checkout activities at the Cape for JPL programs and who also had participated in design was also institutionalizing. The Goddard Space Flight Center had a group under a Mr. Gray which initially had come down with the Vanguard Program, and had been involved in the Vanguard design and it was also tending to become institutionalized, although Goddard had so many satellites, they tended to keep a cadre at the Cape and supplemented it with people who had been involved in the design of a particular vehicle when that vehicle was fired. The booster checkout people who had their home base at Huntsville but who went back and forth to the Cape to handle the flight of the boosters developed at the Marshall Space Flight Center were also tending to become institutionalized at the launch site. The concept of having all of these organizations involved in the hardware development cycle was tending to break down in all of these groups. So there we were with 4 or 5 groups at the Cape representing each of the Centers, each tending to become more institutionalized and less just temporary, details of people who had been involved in the development of a

particular flight system. Looking at it from the Nasa Headquarters standpoint, it began increasing to look as though NASA had a whole series of unrelated, uncoordinated independent organizations at the same geographical location. It was the context then, that NASA Headquarters made the decision to create a Center whose function was a service and support function of checkout and launch. This was a major trauma to every Center involved. The people at all four Centers believed very strongly in the concept that the people involved in the development and design of a project should be the ones that handled it at the Cape. The problem with this basic philosophy was that the facts of the existing situation and the tendency toward institutionalization of the Cape people flew in the face of this idealized concept. MSC believed so strongly in the essentiality of this close tie that as a part of the arrangement to make Preston and his people a part of this new Center - an arrangement was made so that for the life of the Gemini Program Preston would operate directly with MSC as though he were still a part of the Center. This was agreed to by Debus, whose people had had no experience with the Titan or with manned spacecraft in any event, and the Gemini Program was carried on in that fashion, and the first real transition to the new mode of operation was with the Apollo Program, not with Gemini.

The size and scale of the Apollo Program as opposed to the predecessor Mercury Program and the concurrent Gemini Program required major reevaluation of the entire Agency's management structure to handle a program of this size and scale. The various elements at the Cape, particularly from MSC and Marshall had been joined together in a new Center to accomplish the checkout and launch service mission. Boosters

for the Apollo Program were, of course, to be developed under Von Braun and the Marshall Space Flight Center and the spacecraft was to be developed by MSC. With respect to Manned Flight, this was the first time that MSC had not been totally responsible for the full program. Under Mercury, the Space Task Group was responsible for the spacecraft, for the booster, and for major parts of the ground system even though Goddard was in a support role. Similarly in the Gemini Program, MSC was responsible for the entire set of hardware, the booster, the spacecraft, and the changes to the ground system that were required. The scale of the Apollo Program and the division of responsibilities between major field Centers obviously required a major re-look at what kind of management structure would be required. Earlier, NASA Headquarters had recognized the fact that in many programs this kind of neat package within one Center would not be the pattern. For example, it was already clear that JPL in its deep space programs and that Goddard and its space science programs would be using boosters developed by Marshall, which broke down the single field Center responsibility for a total project. The solution developed in Washington for this mode of operation was incorporated in NASA Management Issuance 4-1-1, in which the concept was one of a lead center-subservient center arrangement. If the major purpose of a program, for example, was booster development, and the payloads were simply piggy-back during the development phase of the vehicle, then the lead Center would be the booster Center. That Center then would have the overall program management, and the payload Center would take direction from the booster Center. Conversely, where the primary purpose of the mission was the payload, the concept under 4-1-1 was that the payload

Center would be the lead Center and the booster Center would take direction from the payload Center. Thus the concept boiled down to this: The overall project management for any given project would put into the field at one of the major field Centers even though more than one Center was involved in the project. In the case of Apollo, in the eyes of all the parties, it was not possible to select either MSC, which was a relatively young immature organization, or Marshall, or the Cape, as the lead Center for a program of that size and ~~people~~ scope. So, in effect, Apollo was organized as an exception to the basic 4-1-1 policy of the Agency, and it also represented a departure from the concept that project management would always be in the field. Brainerd Holmes was brought into the Agency at Headquarters to set up what amounted to the program management level for the Apollo Program in Headquarters. This was not accomplished or achieved without a significant trauma, in part, because of this history of the Center's always having previously been the project managers and the general feeling in the field that detailed technical running of a project from Headquarters was not a feasible mode of operation.

Mr. Holmes set out to develop the kind of central project management effort in Washington that had been historically in the field. At the same time, the concern with the magnitude and scale of Apollo Program resulted in a decision by Mr. Webb to bring GE in as a major integration contractor across the entire program. In my personal view, this later turned into a failure largely because the field Centers would not accept the idea that a major industrial contractor would run the government. As a result, GE was relegated to roles that fell far short of the initial image of an overall integration type contract.

Now you asked me about the attitudes of people in connection with the move from Langley to Texas. I think that it is fair to say that the group of people who had accomplished the Mercury Program, most of whom were long time residents of the Langley area in Virginia and very comfortable and at home in that area, were extremely negative on the move to Texas. I think thisis true with respect to Gilruth and to Williams, Chris Kraft and others of that level. Kraft, for example, in a recent article in National Geographic commented that that was his original attitude. It was particularly emphasized, I think, in the first visit when Dr. Gilruth, Williams, and I came down to look at the site. The contrast of the rolling hills of Virginia and the flat prairie of Texas, and the fact that the visit occurred immediately after Carla had devastated the area in the vicinity of the site (up and down the coast to LaPorte which we traversed by car--was a scene of real catastrophe), added to their gloomy outlook. In addition, we drove through Ellington to look at it as a possibility for interim location of our people, and the dreary buildings with the pealing paint and a high state of disrepair, combined to amplify essentially what was a pretty negative attitude.

However, I think most of the people, once they accepted the idea of a move were determined to make the best of it and tried to adapt a positive mental attitude. I personally think that one of the most significant things in changing the attitude of our people as they moved down here was the welcome they received in Houston. I don't mean the

official welcome in the Coliseum with the Mayor and Congressmen, etc., although the officials of the area went out of their way to try to welcome us. The thing that really made the difference was the welcome that was given us by everyone NASA people bumped into whether the guy at the gas station, the grocer, or their new neighbors. The space program was still a very unique and mind-stretching activity that was looked at in some awe by the average citizen, and the NASA employees, from the lowest to the highest, in whatever neighborhood he went into, found himself a very important individual. He was treated as such by his neighbors and there is nothing like that kind of attitude to add to the ego and make people change their minds about their location! I think that it is just clear that even the old time Virginians, as the result of all of these things, embraced the Texas area. I think we had only a handful of people who moved back to Virginia after we moved down here. It is my current impression that our people have very largely turned Texan, and for the most part, you would have trouble now getting them to leave here.

For some of the same reasons, I think the socio-economic impact of MSC on the Houston area went far beyond the impact that would have occurred just from that number of people. Houston, after all, is one of the major metropolitan areas of the country, and the largest metropolitan area in the South, and our few thousand people didn't have a major numerical impact on Houston. However, the educational institutions in particular, and many of the leaders of the Houston Chamber of Commerce, who felt that the future of Houston was linked with the change in the nature of our society. They felt it would become a highly technical society and that the combination of forward looking universities and a diversity of

technical industry was the secret of future growth. As a result, the universities were encouraged not only by their own self-interest, but by the interest of the leaders in the community to move even further in the direction that would support this kind of image for Houston. It should be noted that Rice University was the first school in the country to establish a space-science department. We have, as an institution tried to establish working relationships with not only the universities in the immediate Houston area, but also universities within a reasonable commuting distance, such as Texas A&M, Texas, the Baylor School of Medicine, LSU, Texas Southern, and so on, both in our own self-interest and in the interest of shortening the lead time between the acquisition of knowledge in our programs and its integration into the university carricula. In particular, since we are a development Center, and since the management problems involved in the direction of major R&D programs of the scale we are involved in, put a strain on the management techniques, we have quite extensive relationships with universities in the area of management. Many of these same schools are involved, and in addition schools in other parts of the country. I think that it is clear that it would be very hard to measure the direct economic impact we have had on Houston as a metropolitan area. On the other hand, it's obvious to the eye and the statistics also support the fact that we have had a very major impact on the Clear Lake area. Prior to the Center moving here, Clear Lake was essentially a resort area with a few businesses that catered to fisherman, weekend cottage owners, or those who owned summer homes on the water. While this element is still thriving in the area, the bringing in of our Center has completely changed the character of the Clear Lake area and I'm sure has been a significant consideration in parallel Humble development of Bayport. The turning of the pasture lands here into major business

and residential areas is one of the phenomena of our coming.

NASA as an institution has not taken a strong role in local community affairs. I think that it is inappropriate for ~~the~~ a government installation to involve itself in quasi-political activities of the several small communities or even in the counties nearby. However, we have expressed ourselves very strongly and attempted to influence them very strongly in a number of areas. First, we have worked very hard to try to get a branch of the University of Houston located in our vicinity. We have worked hard with the State Highway Department and with all of the developers in the area to get a logical, cohesive road network to service the Center. We have tried to work with the school systems on some of the special requirements of the employees of the Center, particularly, in trying to assure that some of the minority groups in the local school systems are prepared adequately to pass Civil Service Exams in the areas in which the Center requires people. We have urged and supported our employees in their participation in local community elective offices--whether on water district boards on city councils, or what have you. We've gone as far as the policy allows and perhaps beyong in terms of both encouraging and approving the participation of our people in such activities. I'm personally very very pleased with the way NASA's employees have integrated themselves into the many communities within radius of 10 to 15 miles of the Center. It is not by virtue of not any particular action that Center Management has taken, but by the propensities of our people that a situation has developed where we do not have NASA communities or the company town environment. On the contrary, our people have been integrated into LaPorte, Seabrook, Kemah, Friendswood, Dickinson, League City, Pasadena, and Southeast Houston in a way that has spread us around and enabled

us to participate in a wide variety of community activities in which we become just another citizen.

At the field Center level, relationships with Congressional delegations are fairly constrained. The basic responsibility for dealing with Congress, of course, rests with Headquarters. On the other hand, the interest of individual Texas Congressmen, both in the Space Program and in the Center as an institution is of a high order. Thus, Center Management has been outgoing in its efforts to be sure that each of the Congressmen from the surrounding areas are kept as informed as they desire to be about the activities of the Center. We normally contact each of them at least once a year to invite them out to the Center to observe the things that we are doing and to answer any questions about the Center or about the Space Program that they may have. We don't deal with the Texas Congressional delegation as a delegation; we have dealt with Casey and the other congressmen as individuals. The congressmen from the local area, although interested in the Center, have not tried to pressure the Center to do this or that or the other thing. This is not to say, however, that these Congressmen, as representatives of their constituents have not made inquiries about contractual actions that affected constituents or they have not made inquiries on behalf of prospective employees. In no case has this been regarded as undue pressure, but rather was in the normal context of what a Congressman always does in behalf of his constituents.

In the Virginia environment, the Manned Spacecraft Center had no Negro employees in other than the traditional occupations. I believe there were only two that transferred with us to Texas, both of whom were in

the shop activities in a helper-sweeper type role. The proportion of Negro population in the Houston metropolitan area is about 15 percent, and even lower in the immediate vicinity of the Center. Notwithstanding this, the Center from the day it came to Houston, made a concerted effort to create an environment that was truly that of equal employment. The philosophy we used was one which in effect says that it is not enough simply to refrain from discrimination. Rather, one has to be outgoing to create opportunities for minority groups. We entered into a contract with Texas Southern University to study our job opportunities to relate this to availability of minority talent, and to identify sources of this talent, particularly among the Negro colleges of the nation which we had found rather difficult to penetrate in the past. Similarly, we have embraced a number of the so-called poverty programs such as the JOY program and the YOC program, and we've developed a special program with the vocational education agencies in Houston in an effort to provide opportunities for underprivileged in the slums of Houston and the one or two smaller Negro ghettos that exist in the vicinity of the Center such as in Dickinson. We feel that we have had a high success at this, in part because we have tried very hard to treat each of these efforts not as an income producing device for these people, but rather as an effort to create a saleable skill. We've tried to hold this criterion in front of us as we worked on each of these program. In a number of these programs, for example, the work day is 6 hours long with another 2 hours of training in such things as English usage, grooming, and related simple math. However, it's simply true that in most of our technical areas and in the more demanding administrative management areas, that the educational system of this country is not turning out qualified

Negro candidates. This gets to be something of a sore point with schools when we try to talk to them.

In general NASA has had extremely good recruiting luck. Luck is probably not the right word, because we had many things going for us. A new and growing Center, with all of the implications that exist for getting in on the ground floor and the high degree of promotion opportunity as well as the shear magnitism of the program content -- all have been positive factors in recruiting. Even though we have almost always been at a monetary disadvantage with the aerospace industry, we have found that, in general, we could get the people of the caliber and quality we need if we can get [illegible] relatively close to what they could earn in industry--say 2 to 3 thousand dollars or perhaps more at the higher levels. There is a very real psychic difference between being at the center of activity with the capability of directing industry as opposed to being in industry on the receiving end of the direction. I don't have a good feel for how far behind industry pay scales the Government could be and still survive, nor is it yet clear what the impact will be of what seems to be something of a wane in the enthusiasm for space which exists at the current time largely due to other pressures such as the Viet Nam war and the riots in the cities. But up to this point in time, I think our success has been all that the program required or all that we could expect.

MSC-MSFC relations have a history that goes back all the way to the Redstone Days in Mercury. I think Marshall all through this time has been well respected by MSC people in terms of booster capability. The sore point in the relationship with Marshall has focused around the tendency, understandable as it may be, for Marshall to attempt to expand

into what many of the people in our Center regard as spacecraft activity. It's understandable that the Marshall people with their eyes on the stars, would want to expand their horizons beyond just the booster devices that put things into orbit, and of course this creates immediately a conflict with the Mission of MSC. This situation has become increasingly critical over the last 2 years as it becomes clear that there is not likely to be a successor booster to the Saturn series in the immediate future. This has meant that the two Centers have had to go through an accommodation involved in dividing up the major effort on experiments hardware and adaptations of manned flight hardware for the AAP program. I think one of the things that has made this rather uneasy relationship work as well as it has, has been the pressure of work at MSC. The facts of the matter are that MSC, with the responsibility for crew training, for flight operations, and more recnetly, for major science activity in addition to spacecraft hardware development, has spread itself pretty thin in all four of these areas and the pressure of ongoing programs has been such that whatever our propensities, we've had to limit what we could do by the resources we had. Accommodations have been made to recognize the large structure capability of Marshall as opposed to the more generalized capability for boosters. Concepts have been adopted which would share the workload on major future programs by capitalizing on this big structure capability. In addition, Marshall as well as MSC has been getting into certain of the scientific areas and the decisions on the ATM and astronomy are a good example of this, although astronomy is an area that MSC has not expanded into. So there has both been some give and take and some growth into noncompetitive areas. I think the fact remains, though, that deep in the hearts of most

MSC people, they feel that the distribution of in-house resources between Marshall and MSC does not reflect the current work load facing each Center, but rather, has a historical growth pattern. They tend to resent slightly the distortion of missions to accommodate historical institutional growth patterns. However both Centers, particularly at the leadership level, recognize they must cooperate or both will fall. At the same time that competitive aspects of the two Centers has intensified over the last two years, I think the cooperative aspects of working together for a common goal has also intensified. If you can have that kind of anomaly, I think it exists.

We developed our resources organization, initially, in the traditional mode which I might refer to as the adversary role. In the budget side of the thing, for example, we adopted the traditional Government structure of a central budget shop. We required elements of the organization to submit requirements to be reviewed in an antagonist role by the budget shop and then contrary views are presented to Center Management for resolution. The facts of the matter were that the nature of the R&D business was such that the central budget shop found itself at a material disadvantage in terms of its capability to understand whatwwas going on by virtue of not being in a part of the mainstream activity. Again and again they would be out-informationed and were becoming in my eyes increasingly ineffective. Now, this varied of course with individuals. As a result of observing this, I met with the entire group of financial management people and proposed to them a complete departure from this traditional mode. Rather we would move in the direction of doing the resources job for all the operating elements, and in that role, they would have to wear two hats--that of supporting the

operation elements and helping to solve their problems and also acting as staff to Center Management in reviewing the total budget. They had the disadvantage of divided loyalties but had the advantage of intimacy and involvement in the real life problems of resources management in each of the elements in the Center. We moved in this direction, and now, after about three years I have about concluded that it has been highly successful. The degree of success has varied with the organizational entity. It has been most successful in working with the Directorates and doing their resources management job for them. It has been least successful in the Program Offices. With AAP, which is the new Program Office, we will be able to start out from scratch doing the entire job for and with the program manager. One of the reasons it was less successful in Apollo was that an organization had developed before we made this move. The result of moving our people in was not to take over, but to participate, and this was a less successful relationship than we had in other elements of the Center. I personally think that the next step is to combine these co-located groups with their closely related management brothers in procurement and create a total single business organization and support for the major program offices.