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[full name of interviewee]

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U.S. Gov't

CONTENTS:

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

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Education - _____

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Career Path - Langley Research Center, Instrument Research Division;

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Topics - Initial informal discussion of photography in space; photo-coordinator assignment at LRC; ~~&~~ Photo & tracking ~~in~~ jet aircraft; Space Task Group at LRC; temporary photo lab at Ellington AFB; duty separation of photographers in field and lab personnel; early problems with Public Affairs Office; specialized cameras; photo coverage of drop tests; cooperation w/ Advanced Spacecraft Technology Div; coop w/ Flight Crew Support Div; camera and film developments; closed-circuit TV networks; Instrumentation & Electronic Systems Div; Crew Systems; Work load growth & contracting w/ Jamison Film Corp (Dallas). Shift to on-site processing in 2 shifts around the clock; processing machine of modular construction & triple capability (16, 35, 70 mm); film reproduction and printing; space science photography

1319

Interview with John R. Brinkmann
November 2, 1967

At the time that the space program began expanding I was working with the Instrument Research Division at Langley Field. I made my first real contact with the people who are today in high positions at MSC sometime around 1961. My first contact was with Jack Heberlig who was then in what was then called the Pilotless Research Division at Langley. We had kind of a bull session and discussed certain camera equipment that might go on a vehicle that would eventually carry a man in space. Of course that was a totally new concept because NACA's effort was directed more toward testing, aerodynamic or propulsion characteristics of a high speed vehicle and things like that. So when you put man in the picture you were talking about something that was completely new and novel. In talking about what might become a manned vehicle one day, we discussed problems of on-board photography at high altitude. Jack and other people in the Pilotless Aircraft Division came to the IRD and asked some of our people for assistance in providing these cameras and instrumentation etc. We were working on many many special projects and I suppose every organization has some people that are a bit reluctant to do new things and get new ideas. Although PARD got a lot of support from IRD, I'm sure they could have gotten more. I guess I was one of the willing ears that Jack found and what he had to say certainly sounded very interesting. As I recall, the program for this particular operation was called "Project Hi-ride". We used to refer to it as a

capsule in which we could carry a primate or monkey. Project Hi-ride eventually became the Little Joe Program. A number of boilerplate capsules were fired from Wallops Island, Virginia, and in the program we had primates or monkeys aboard. I think one monkey's name was SAM, which was an acronym for School of Aviation Medicine.

I was assigned to the project as the prime photo-coordinator representing the Langley Research Center. It was also at that time that Dr. Gilruth and a number of other people were assigned to the Space Task Group. The Photographic Lab at Langley continued to support them and we became more and more involved with these people, especially after the decisions were made to put cameras aboard the unmanned early boilerplates. My responsibility was to procure the cameras and be sure that they met flight qualifications. It was extremely interesting. I had a background in aviation in World War II. I was also a reservist at that time flying B-57's and other jet aircraft out of Langley. This background came in handy when we decided somewhere along the line to photograph the Little Joe from launch to impact. This required close coordination and planning with the Air Force, who furnished the planes and the pilots who flew us. I was one of the first to fly on such missions and later Gene Edmond joined me. Then Gene and I began to do most of the flying ourselves with chase planes. I think this was the first time that a vehicle was ever pursued and tracked by jet aircraft from the time of launch to the time the vehicle impacted into the water. We did this by tying the radar in the countdown and flying at various altitudes. We flew with two T-33's at different altitudes (later we switched to F-101's

and still later eventually the F-106). When we had three aircraft on target (was in the third plane), we would fly at three altitudes normally with one aircraft at 5,000 feet, one at 15,000, and the other at possibly 20,000. The idea was to come as near to the pad as possible without placing the aircraft or personnel in jeopardy. Between the three aircraft then we were able to track the missile from the time it took off all the way on through the flight. Several times when Little Joe was going by us we could easily see the letters "US" on the side of the spacecraft. By this time it was going by us at a speed of maybe Mach 1 to 1.5.

That work got us well into the Mercury program, and we became familiar with that small group of people called the Space Task Group. It was about this time that Shorty Powers arrived on the scene, and the original seven astronauts were chosen. Andy See was then part of my organization in the motion picture group. Andy eventually transferred over to the Space Task Group to work with Shorty Powers. Shortly after that one or two of our other people went with STG. It was about this time, I believe, that the Little Joe series was ended. The Space Task Group was getting larger and larger as it was bringing many people in from other places and hiring contractors. Its budget had increased substantially. Langley continued to support the Space Task Group. About this time talk began about the Group becoming a Center, and I believe at one time it was to be transferred to Greenbelt, Maryland. Then there were places in Florida that were mentioned, and eventually Houston was selected as the place for the Center. At about the same time STG was renamed the Manned Spacecraft

Center. It was November or December 1961, when I first considered joining the MSC mainly because of the tremendous challenge that it offered. It also looked like when MSC left Langley that there wouldn't be too much remaining there.

I came to Houston for the first time in early December mainly to look the place over. At that time I just couldn't see where there was really anything here to offer. I remember driving around the Seabrook area and LaPorte, Baytown, and LaMarque, looking for a suitable place to live. Most of what I saw was in dire straits, run down, with a lot of broken up buildings. I didn't realize that Hurricane Carla had just passed through here which caused most of the disorderly appearance to the entire area. I left here pretty much discouraged at what I saw and went back and told my wife that I didn't think I was going to make the move. But it's one of these things that keeps gnawing at you.

In January 1962, I reconsidered again and decided I would make the move providing I knew a little bit about what was in store for me in the future. Again my main contact remained Jack Heberlig. Jack had a pretty good insight into the kind of organization, the buildings, activities that would be carried on here, etc., and convinced me that I should come. I started alone. I had a small office and a couple of pencils and was told to form an organization and lay out the preliminary design for a laboratory as good or better than existed at Langley. So with that I started to look for people and

the first two people that joined the group were Gene Edmonds and John Holland. Later on I picked up other people from all over the country. We began to commute between Langley and Houston.

Somewhere along in here I was asked to lay out the temporary lab at Ellington. I was given my choice of several buildings and the one we slected was Building 122 which at one time had been an Air Force Commissary. We made it into a lab and began to procure our equipment. It was designed and laid out in such a way that we could get the equipment out of there with a minimum of trouble, as we knew that we had to move from there to the Center in 18 months to 2 years. It turned out to be a wise decision in that we were able to shake down a lot of the equipment we are using today and some of the principles that were applied in Building 122 were also applied to this building. We had to knock out panels in the walls to move the equipment in and out.

I guess we had about the same number of problems that most other organizations had in coming into being, struggling for a position, who's going to have what, and how he's going to get there. By the time we really made the final move to Houston, I think we had a staff of about maybe 12 people. By June 1962, we had a lab in being at Ellington. I think we have one of the finest labs in the country right now. It's certainly one of the most diversified and completely modern. Having lived with the unhappy situation at Langley of having a branch which combined both the laboratory and photography function, I felt that I should divide my organization

into two separate branchs. One would be photography and the other would be the laboratory. A good deal of travel is required for photographers and it doesn't work to have people in the laboratory one day and they are out on a mission somewhere the following day. They soon lose continuity. I felt it would be much better to keep the lab people in the lab and the photography people in the field. This way you could become more specialized and in the long run each group is capable of doing a better job. This decision was sound, the quality of our product is very good in both areas, and the people in the field are gone so much of the time, that when they come back to the laboratory they just wouldn't know where to pick up where they left off.

The photography branch has responsibility for still photography and scientific or photographic instrumentation. These people are under Gene Edmonds. Under John Holland we have the still laboratory processing section and the motion picture processing laboratory section.

I mentioned earlier that there were some problems involved in our relations with other ogranizations, and particularly was there some discontinuity in those days as to who would do what. I suppose we had our biggest conflict with the PAO people as to who was going to eventually be the prime photographic organization at the center. There was quite a struggle for some time. I'm happy to say that since then these problems have been ironed out and things are working very well right now. But, I think this was experienced by other people too.

It was also during the time that the Center was being constructed that we were worrying about cameras to be placed aboard the Gemini spacecraft. I recall writing a memo one time to the head of the Gemini program and some of the people associated with it that it was time that we begin to think about photography and cameras and hardware to be used by the astronauts aboard the spacecraft and also to look into the possibility of using television cameras. I believe there had been some work done with television and it was my impression in talking to some of these people that the television would be all right, but only over their dead body would there ever be a camera aboard a Gemini spacecraft. This attitude was a little hard to believe, but nevertheless it was real and it was experienced by other people who are still here at the Center today. As we know, it turned out to be just the reverse. We had hoped to have better camera equipment earlier in the Gemini program based on experiences with Mercury, but this wasn't true until we got into Gemini 4 or Gemini 5. Before we had specialized cameras on board for dim-light photography, air-glow horizon, steller photography, etc. We had cameras aboard the very first flight with Grissom and Young, but they were not as sophisticated as those of the later flights.

When we first set up our temporary quarters at Ellington, our primary work consisted of making slides and general purpose photography--nothing very sophisticated. Of course this was a rather natural thing since there really weren't too many engineering installations in being and we bided our time until these people

were capable of generating work. Our staff was relatively small at that time and some of the people that joined us from different parts of the country and who had come from laboratories that had been in being for a long time, really began to wonder what we were going to do. Of course it was pretty obvious to some of us that before long we would have more than enough to do, and this proved to be true. Before we were in operation a year we were beginning to feel the bind for additional help and we weren't able to staff up quickly enough to keep up with the work load, so we were obliged to call upon the services of support contractors. We really didn't have a fund source of our own at that time. PAO had a contract with Texas Industrial Film Corporation (TIFCO) operated by Don Macon here in Houston, and consisting of about a dozen people. I believe when Macon sold the business some three years later he had a staff of close to 100 people largely due to NASA's business. TIFCO provided us with needed backup help. Of course this caused a problem too, in that we were more or less scabbing on PAO's contract to get going. But then we weren't doing too much sophisticated work. After a few months we began some of the parasail testing, and drop tests from Ellington and on Galveston Bay. We were asked to provide the photographic coverage both motion picture and still on these tests. We also installed data cameras in the drop vehicles. This was more or less a turn more towards scientific photography as opposed to general photographic work. In the early days we were probably processing 20 to 30 work orders in a month's time which really isn't much. Today we are processing

377-1

approximately 1500 to 1800 work orders a month, including both scientific photography and usual documentary photography, but nothing in direct support of the earth resources program, which has its own system of reporting, or TV assignments. As the Gemini flights began we found ourselves working very closely with Jack Eggleston, Roy Stokes, George Boaner and others in the Advanced Spacecraft Technology Division. That looked like the really going organization at that time. We found we had a joint interest in scientific photography and really wanted to get more sophisticated cameras aboard the spacecraft. This, of course, was a departure from the normal run of the mill documentary or you might say ground-based scientific photography. We knew that we were going to become involved in another set of parameters which were completely different and foreign to us. We worried about such things as the light transmission of the spacecraft windows, the space environment differential in vacuum and temperature, etc., and the ability of the crew to handle these cameras. It wasn't too long after that that we began to be involved with the Flight Crew Support Division on human factors considerations and the handling of problems associated with the fully inflated space suit. This then brought us in contact with people like Helmut Kuehnel, Jeff Bremmer, and several other people.

288-V

At this time we weren't doing much work with IESD, in spite of the fact that it had a major concern with instrumentation. Either the IESD's staff wasn't large enough or it lacked people with the proper background to really become involved. But as time went by, ASTD began to fade out of the picture and the Flight Crew Support

people began to play a more important role in cameras development and camera problems. Of course we always thought we should be directing more effort toward the development of cameras and film and so on because we felt that it was our responsibility, but we always recognized that we were not an engineering division, and such development is usually associated with an E&D division. Our involvement was challenged sometime ago when several management studies were conducted and it was determined that IESD should be playing the major role at the Center in developing cameras and associated flight hardware, that we should play more of a supporting role and direct our attention more toward the development of film and processing techniques and the interfacing of films with the camera system. However, this ideal situation really has not yet materialized.

As time went on Helmut Kuehnel and his people began to assume a major role in scientific photographic work and there seemed to be some conflict in this function at the Center between organizations. ASTD, Crew Systems, Flight Crew Support, and IESD all felt responsibility for the function as well as our Division, which created a state of confusion. I think more in desperation than anything else, the Camera Development Board was created, with Mr. Purser as its Chairman. I think the intent was to bring all of the people together who had unique problems with photo gear and attempt to satisfy the needs of everyone. Now the Board holds regular meetings and all

concerned organizations are represented.

Most of the people who were working with cameras found that they needed us to a greater extent than they originally thought they would, and that our people had actual field experience with cameras and more or less knew how to approach some of the problems usually encountered in the field. We became involved with IESD and also with the Flight Crew people. We played a major role in assisting the development of the present 16mm NARR camera and the Hasselblad camera, which is generally regarded as the primary 16mm camera we will expect to use in space and on the lunar surface. Other special purpose cameras were for specific experiments, and in these cases the experimentor himself usually did the development of these cameras. MSC contract monitors worked closely with these contractors to be sure that the camera was space-qualified to be sure that the cameras could be operated by the astronauts. Dr. Nye from the University of Minnesota was interested in dim light photography and stellar spectre. Dr. Peterson from MIT was interested in the earth air glow, Mr. Nuckleman from Goddard Space Flight Center was interested in dim-light photography, and Dr. Lohmann from Goddard was interested in snoptic weather and snoptic terrain photography. People who had a good reason for flying a photographic experiment in many cases would alter either state of the art equipment or in some cases design new equipment to do their specific job. All of the film produced from these cameras were developed here at MSC. By directive these film can only leave here for processing under approval of Dr. Gilruth and must receive a waiver prior to the mission.

Otherwise all original films must be processed and duplicated here.

As the organization began to grow it was suddenly realized that closed-circuit television was going to play a major role at the Center. Mr. Whitbeck asked me to see if we couldn't develop it as a function of the Photographic Division. We worked closely with IESD. We formed a team with them to survey the field and come up with a system which was workable and economical, but would also eliminate some of the problems that some of the other field installations were experiencing. We searched the market and we really didn't come up with anything that was outstanding. We were given only several weeks to do the project. People at IESD felt this time limitation was unrealistic that probably we should take this as a study program and work on it for five or six months before we came up with a recommendation. This attitude didn't appear to be in keeping with our instructions, and we set out to attempt to meet the deadline. IESD people indicated that they would rather be out of the program rather than to come up with a half-baked recommendation which was likely to result in a flop or failure of the program. At that time I went to our personnel people to see if we couldn't find someone either on the Civil Service register or in another Government agency who had a background or a great deal of experience in closed-circuit television. They came up with a name of a fellow, Jim Stamps at White Sands. I later went to White Sands and talked to Jim who was a real expert in closed-circuit television. I finally convinced

Jim to join us here and he now is head of the Television Office within the Division.

The original plan was to have only three or four buildings at MSC in the closed cirucit TV loop. All of us had the feeling at the time, though, that if we ever had a system that was really good that it would expand rapidly and this certainly proved to be true. Right now I would say that between 80 and 90% of the buildings in the Center are interconnected with closed-circuit television, approximately 150 to 175 individual television systems are located in these buildings. A control room here in Bldg 8 is one of the largest closed-circuit networks to be found anywhere. It surpasses the facilities of local TV studios and many of the national network studios.

At first our closed circuit TV system only transmitted information which was fed into it from Building 30, and was more or less mission oriented. But before long TV cameras were placed in Bldg 32 (the altitude chamber), Bldg 7 (the centrifuge) and Bldg 5 (trainers and simulators) to really give us a real view of what was going on in real time. At the same time the information could be recorded in Bldg 8. Incidentally one of the reasons for centrally locating our recording equipment was cost. This equipment is extremely expensive. Video tape recorders cost anywhere from $30,000 to $60,000 each. At one time it was thought that we should use one inch video tape recorders because they were considerably cheaper. We found that we could not get the fidelity from one inch video tape that we could from the two inch tape, therefore

we went into a two-inch tape system. This decision was quite important in that we got more flexibility as well as greater fidelity with the two inch tape and it'also broadcast standard-- tapes can be interchanged with various TV installations located throughout the country. There are TV cameras on some of the drop vehicles that are drop tested at Fort Hood and over Galveston Bay and at Ellington. More recently we have used cameras in tests conducted in the under-water facility here at the Center.

The whole TV complexion has changed from our original concept in that it has become very sophisticated now and the cameras need to be certified for 02 environment, human factors considerations, etc. We have had some difficulty in impressing this upon our contractors. What originally started out as a small unit (and as a matter of fact is still remained small as far as Civil Service employees are concerned-- we still only have four people in the entire office) has grown from you might term a call type contract on which we spent something like $15,000 and the services of four or five people during that first year, to approximately $650,000 and the services of about 34 to 36 people three years later. The contractor has had his growing pains. Although most of the people he hires are qualified television people they are dealing with something which is entirely foreign to their previous experience. Considerations of O_2 compatibility under water vacuums and pressure, and remote camera orientation in test spacecraft.

One of the real problems facing us and industry today is the real real shortage of qualified people. It seems that contractors steal people from each other and from Civil Service trying to steal

qualified people from them. I don't know where it's going to end. There's just a very real critical shortage of skilled people in this area. Television itself has grown faster in the past several years than it has during its entire previous lifetime.

IESD never did assume a major role in the Center as far as institutional closed circuit television was concerned. There is supposed to be a dividing line; IESD does all R&D work in television as it relates to the spacecraft, anything that is not ground-based or purely experimental. More recently ISD became involved in closed circuit display television. During the past couple of years that television has been with us we have experienced the same kind of growing pains that we had with photography a few years earlier. To establish an organization with the authority and responsibility for this work and then to try to keep it as clean as possible is not always easy.

We made an early decision that in order to pinpoint responsibility for flight films, that we would handle and process all of the flight films and turn the more routine work over to the contractors to process either off-site, or later in our own laboratory when he became an on-site contractor. When we moved here to the Center, we found that our Civil Service staff just couldn't cope with the amount of work that we had to do and we tried a number of ways to get this work done. We did not use the services of Tifco anymore, as we decided that we needed a contractor of our own to support our mission. We got a contract with the Jamison Film Corporation in Dallas.

Jamison provided people for us in the laboratory. They originally started out running our library and then later on providing us with documentary photographers. The latter function soon resulted in conflict with PAO and we found it wasn't desirable from a contracting standpoint. I made several studies of how to handle the large volume of processing work we faced. I found that it was very costly to have a lot of work done off-site where MSC paid for the processing and printing by the foot. I felt it would be cheaper if we could do this work in-house since we had a great deal of equipment already here, and although our staff was not large enough to do the volume of work, we felt that if we brought a contractor onboard to work with our equipment in our laboratory that this might be a better arrangement. I discussed this with our contracting people and found that this could be done legally. We then decided that we, as Civil Service people, would operate the lab on a daylight shift and the contractor would take over from us and operate the laboratory on a second shift basis. There were a lot of people who felt at that time that this wouldn't work efficiently and that it would cause a lot of problems. However, I believe that it has worked out very very well. We arranged a good phaseover system from the day shift to the night shift, although the the contractor (Tifco--later redesignated Av Corp) did have his problems in the beginning as he lacked experience in the still laboratory functions. This was an area in which he did not have an off-site capability and he was unfamiliar with our equipment for such work. However, whenever we needed motion picture film to be processed and printed off site he was able to do a very good job. This skill he brought with him to on-site operations, and

after several years on-site he has gained experience in the still lab as well and is now doing an outstanding job in all areas of responsibility.

Let me now say something in regard to our equipment. The process which we use in the laboratory today, is unique, in that it has a triple capability. It processes 16, 35, and 70 mm film in one machine using two independent drives. I don't know of another machine like this in the country. It has worked out very well for us although it is not a large producer in terms of 70 mm volume work. However, it gives us processing capability for all three sizes and this is all we planned for originally. Rather than buy two different machines to do the same work, I made a decision before we left Langley, to have a machine of this kind designed. I wrote the specs for it and it was designed and produced by the Artisan Corporation up near Boston, Mass. A design feature that we insisted on having was that the machine should be modular and be built in at least three or four different sections which could be connected and disconnected easily. We knew we were going to move into the temporary facilities at Ellington and later to the permanent lab at Clear Lake. We couldn't have a machine 40 to 50 feet long and not be able to get it in and out of the buildings. It was built in four modules: a dark section, a light section, a drying section, and a loading section. The plumbing connected with regular unions and joints. As a piece of equipment, the processor was easy to move into the temporary building and later to move to Bldg 8 at the Site. The machine is still operating today and it has processed every foot of flight film that has been exposed today. Hopefully, we will go right on through the Apollo

program with it. It's not a speed demon but very reliable.

There have been a number of things done to the machine to make it reliable, especially when thin-base films came into being. This innovation created a processing and handling problem that very few laboratories in the country were able to cope with. As a matter of fact, the Kodak Company itself at that time would not guarantee the processing of the film. A number of our people did such things as putting teflon coating in the dry box and using auxiliary dryers to partially dry the film before entering the dry box (at which point the film was very tacky). If the strands of film ever came in contact with one another at that point it was almost impossible to separate them. This pre-drying was the thing that really insured successful processing within our lab.

Another problem we had was in duplicating the film after processing. It is a very simple thing, but yet it's one that can cause you a great deal of trouble. The White Sands Range was using cameras data cameras which had type 2 perforations on the 70 mm film and the Eastern Patrick AFB Range was using cameras which had type 1 perforations. This means you cannot use a printer to duplicate both kinds of film, because of the difference in the sprocket holes of the film. The type 2 film had 6 sprocket holes per inch and type 1 has 5 per inch. Now this could be 6 and 5 or 5 and 4, something like that, but anyhow they are not compatible, and if you have one kind of printer you're out of business when you receive the film having a different perforation.

I tried desperately to talk film manufacturers into somehow initiating a program whereby they would phase into either type 1 or type 2 perforations, but this is very very difficult. A great deal of money was invested by the various ranges and to change the cameras, processors, printers and other data gear from one kind of perforation to the other would be very costly. It is very difficult to get cooperation under these conditions. I arranged a meeting in Chicago during one of the conventions there to bring these people together to discuss the problem. I found that it may have been a rather new problem to us, but it wasn't exactly a new problem to some of these other older ranges, and furthermore, no one was really worrying about it. They had their own processing and reproduction abilities and they weren't worried about anyone else.

We felt that we were in a different situation as we were going to have to interface with all the ranges not only here in this country but tracking stations located around the world and over which we had no control. The cameras that they used employed type 1 perforation in one location and type 2 perforations in another. Yet all the film was going to come back here for processing and duplication. We were told by all the other people that it was our problem and it was up to us to worry about it. To get out of this bind I went to the Bell and Howell plant in Chicago and I talked with a Mr. Wassell who was their production manager and engineer. He too thought that something should be done and if our situation were unique it should be so treated and somehow come

up with a solution. We already had a new model C 70 mm Bell and Howell printer on order with this company and we suggested that if we could interchange the printing heads and the drive sprockets easily and quickly then we would be out of the woods. He told me that he would take this up with his engineering department and call me back in several weeks, which he did. They found this to be a workable arrangement. Our original printer was going to be delivered with tye type 1 sprockets and they began work immediately on an interchangeable head which would have the type 2 sprockets. This effort resulted in a considerable savings, in that the printer itself cost us about $27,000 and the interchangeable head was designed and delivered for $5,500. (It could be interchanged within a matter of maybe 30 to 45 minutes). Since they built the interchangeable unit for us, they soon had orders for many many more and I feel now that this problem has been overcome on the other ranges too where they are able to interchange films quickly and easily at minimum cost. These are two areas where I think we have participated in the development of something unique.

I'm not really sure that we had a lot to do with the development of new film, but I do recall that Jack Eggleston and I attended a number of scientific gatherings at which we outlined our program as well as we could based on what we knew at the time. We were always talking about lunar photography and of course at that time we just didn't know quite what to expect as to the surface illumination and the general conditions there. We needed film which was extremely fast, which would withstand the space environment, and at the same time produce

pictures of high quality. We preached long and hard for color films that had resolutions of at least 100 to 200 lines per milimeter and had a speed rating of maybe 1,000 to 2,000 and yet had all the color reproducing fidelity of the films we are using today. Anyone in the photographic business knows if you can't have speed and resolution as they just don't seem to go together. However, some of the people who manufacture film and some of the people from the scientific groups recognized that there was a problem here and were sympathetic. They thought that they could come up with something that would at least approach what we needed. As it turned out, today we do have color films that do most of these things. It might take six to seven years to produce anything close to what we need, but I found that in a little less than 5 years that industry has achieved most of these goals. We have color films resolving from 180 to 200 lines per milimeter. The speed reading is not as high as we would like but these films can be forced processed to give you speed readings anywhere from 1,000 to 2,000 with a little loss in quality. However, I think we are a little further ahead than we thought we were going to be at this time and I would like to think that we were at least instrumental in urging these people to move forward.

I mentioned earlier as we began to work more closely with the space sciences people, the people who were working on at that time the lunar orbiter project and surveyor etc., we felt we needed capability within our division to furnish photographic products which could be used for detailed analysis. In talking with John Dornbach,

Jack Eggleston, and other space science people, it was recommended that we try to hire a fellow by the name of Dick Underwood who was at that time working for the Army Map Service in Washington. We approached Dick and succeeded in hiring him around February 1964. As I mentioned much earlier when the office arrived in Houston we were wondering what our mission in life was going to be and how much work were we really going to do. Well the Lab soon got to the point where we had more to do than we had bodies to do it with and we obtained the services of a contractor. Later on when Jim Stamps joined us he milled around here for a number of months wondering what he was going to do, and before long he found himself so busy that he met himself coming and going. When Underwood arrived he found that he had little to do and really didn't know what his mission in life was. All of the people who had gone through this before warned him that just to wait a few months and he would find himself so involved that he wouldn't know where to turn next. Again this happened and we were forced to hire four other people to help him and also to work in the precision processing laboratory where we create the kind of things that people like John Dornbach and the other photogra could use for detail measurements. Dick at this time also has a support contractor. Dick came at a very good time. He was here before the first Gemini flight and made the first evaluation of the film, and also identified the areas of the earth where the pictures were taken. We began to depend on him more and more as time went on, and he has become quite an authority in photo interpretation.

264-1
307-1
377-1

To date he has identified either single handedly or in some instances with the help of Mr. Lohmann from Goddard all of the films that were exposed in the Gemini flights. He has been a real asset to the Center and to this organization.

In the beginning when our staff was relatively small we used almost all our photographers in the recovery areas during a mission and the idea was to provide photographic documentary coverage in the recovery area, serve as couriers for the film exposed by the astronauts, and to rush this film to Houston as quickly as possible after splashdown. We've been doing this since the first Gemini flight and will be doing the same thing in the Apollo Program. In the early days we requested the support of other Centers such as the Lewis, Ames, and the Langley Research Center. We paid for their travel, and asked them to help us to provide the coverage and the courier service. They were very cooperative. As we became a little larger and a little more self sufficient we began to take on more and more of the work ourselves. Later on we began to get contractor assistance, using their people for the more routine photography while we continued on with the scientific and technical photography and film handling. We load the cameras, accompany the film containers to the spacecraft, they are placed then aboard the spacecraft by KSC personnel or by contractor personnel at the Cape, and the only time the film is out of our control is the time it is aboard the spacecraft or in flight. Immediately upon its return again our couriers take the film from the spacecraft, package it, and carry it back to MSC where it is processed and back into our archival storage.