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ORAL HISTORY INTERVIEW

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SUBJECT OF DOCUMENT: [use relevant bold-face introductory terms]

Oral history interview with John W. Holland  
[full name of interviewee]

about Photography - cameras, processing  
[main focus of interview]  
laboratory features

Title: 1963 Photo Lab, Photographic Services  
[interviewee's current and/or former title and affiliation]

1968 Technical Laboratory Branch, Photographic  
Tech Lab, Almen

Interview conducted by Robert B. Merrifield Staff  
[interviewer's name/position]

Hesterian at MSC  
[location of interview]

Transcript and tape(s). [for inventory only: # pages 27; # tapes 2]  
Master 2

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\_\_\_\_\_

**Education** - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Career Path** - <sup>Commercial Studio, Newport News, Va +</sup> Naval Weapons Station, Photo Lab; 1962 STG  
Langley; ~~etc~~

**Topics** - STG position as photographer; Glenn recovery mission;  
life on aircraft carrier Randolph; <sup>coverage</sup> camera on helicopter  
and medical exam; Glenn <sup>Washington</sup> parade; <sup>photo</sup> Lab set up in  
Holliston at Ellington AFB; <sup>new</sup> equipment orders; facilities  
at new center; <sup>space</sup> photographic experiments; special  
film, emulsions, processing, etc; first space walk  
film; controversy between Photography Div +  
Sub Affairs Office; <sup>67-12</sup> unauthorized photo release  
<sup>contract support</sup> organization of Tech Laboratory Branch into  
Motion Picture Processing + General Lab Processing;  
description of photo Lab <sup>equipment</sup> volume of color slides  
and viewgraphs; custom-built color motion picture  
processing machine (16, 35-, 70 mm); safety precautions;  
motion picture processing; cleaning machine;  
chemical storage + mixing; quality control  
in-flight photo experiment support.

UNITED STATES GOVERNMENT

# Memorandum

TO : *BL3/John W. Halland*

DATE: *10/23/67*

FROM : ET5/Robert B. Merrifield

SUBJECT: Preparation of a History of Manned Spacecraft Center

As is pointed out in the cover memorandum, I have been commissioned to prepare a history of the Center. There is a large volume of information (memoranda, blue prints, sketches, etc.) available in the official files and, of course, I plan on exploiting it. However, such information is only the bare bones of history; I will also need intimate detail and personal insight from major participants and informed observers. It is especially vital that I have the benefit of the personal recollection of our key personnel who shaped the management philosophy of the Center during its early formative years. It is for this reason that I would like to have the privilege of spending a few hours with you, to help you put together a statement reflecting your knowledge of the Center's history.

If you have no objection, I will plan on using a tape recorder while I am with you, as it is a convenient way of obtaining a lot of information quickly and economically. I fully appreciate the fact that you have been involved in a seemingly infinite number of major activities, all of which are complex and of such significance that they cannot be disregarded in a Center history. At the same time, I recognize that your time is valuable and limited, and will leave to your discretion what you should put into your statement. I am interested in any information you consider to have been important in the establishment, growth, or maturation of the Center, and invite you to feel free to go into whatever depth of detail you feel advisable and within the limits of your available time. There will be no need to be concerned about grammar, structure, or repetition at this point. I will plan on submitting a transcript of this recording to you as soon as I can get it typed; if you wish, you may then amend or add to it.

I am keenly interested in those minor details that will add vividness and vitality to a historical narrative. For example, a key management decision may have been reached in one of those drab, crowded, stuffy conference rooms of the "Dolly Madison House" (rather than "at OMSF"); or the wisecrack or joke that relieved the tension or boredom or weariness of an important meeting; or the unprepossessing appearance of the Carla-battered Clear Lake Site. Although such details may seem trivial, their judicious use will make the difference between dull and interesting reading.



Because of your position and long association with the Center, it is quite likely that you are familiar with events where personality clashes, conflicts in judgment or other human failings have played a considerable role. The natural tendency in dealing with such sensitive issues is to avoid them or to gloss over them with generalities. Obviously, any history based on this type of treatment will be bland, innocuous, and superficial. On the other hand, if potentially explosive information were to be incorporated into a history, it would certainly lead to embarrassment or more serious consequences to the Center. As an alternative to these two extremes may I suggest the following: I would like to have your statement to be completely candid; I will consider it to be personal and confidential, and will safeguard it accordingly. After typing your narrative, I will return it to you for verification. At this time, I will ask you to indicate those portions of your statement which you regard as "privileged information." They would never be alluded to in any way in the Center history, and would have the sole purpose of giving me the necessary background information I need to write a factual and objective history.

May I call you in a few days to make arrangements that will be mutually convenient for me to see you?

Robert B. Merrifield

ET5:RBMerrifield:cc

Interview with John W. Holland  
12/4/67

My first exposure to the space program was in December 1961. At the time I was engaged in a dual operation. I was supervisor of the photographic laboratory at the Naval Weapons Station in Yorktown, Virginia. On the side I had been moonlighting in my own portrait and commercial studio in Newport News, Virginia. In early December I received a phone call from a friend, Gene Edmonds. Gene also had a photographic studio in the Newport News-Hampton area and had been one of my biggest competitors over the years in weddings, portraits and commercial work. A few years before, Gene had joined NASA as an aerial photographer-scientific photographer. Gene called me in December and asked me how I would like to move to Texas. I thought he was joking and as it was Christmas time, and I had a lot of things to do, I really didn't have time to talk to him. He said he was in earnest and mentioned that he was in the space program and was working in the Space Task Group at Langley. His boss, John Brinkmann was interviewing people and Gene had told John about me and that I had a good background in photography. They felt I could be valuable in photographic work of the type they were doing. Well, when you're doing well in one locality and your friends are there, you just think this isn't for me. I told him thanks but no thanks, and if I were to change my mind I would call him.

A week passed and I started reading a little about the space program. It was relatively new to all of us. Alan Shepard and Grissom had made their flights which I knew about. I really started to do some soul searching, my wife and I talked about it, and I decided I would go out and have an interview with John Brinkmann, the head of the Photographic Laboratory at Langley Research Center. John had a lot of plans as far as MSC photography was concerned. Some were in his head and some of them were on paper, but all of them sounded tremendous. He really made me see and start thinking about the challenge in photography it offered. I came back home and my wife and I continued to talk about it and all through Christmas. People would be talking about Santa Claus and I was on the lunar surface. In January I received numerous calls from John Brinkmann. He had an opening for me and wanted me to fill it. After many bottles of aspirin and a lot of sleepless nights, about the middle of January 1962, I finally decided to take the job. I liquidated my photographic holdings, turned them over to Ferrebee Studio in Newport News, and got rid of everything except our home.

I went to work at the Space Task Group at Langley February 1, 1962. Officially, I guess I was the second person to be hired in the Photographic Division. John Brinkmann had already transferred from Langley and Gene Edmonds was in the process of transferring from Langley but it had not yet come through officially.

When I first came to work our office was so new we didn't even have paper or pencils to work with. I had to go to supply and draw paper and pencil to begin ordering equipment for a dream laboratory that would in time process film from the lunar surface.

After I had been on the job for 10 days, I was told that I was going to go on a recovery mission and act as a motion picture and still photographer. With only two or three people in our Division, we were expected to cover the first orbital flight of John Glenn. Gene Edmonds and I took approximately 500 pounds of camera equipment- everything from EKTACHROME/type film that would go in the Millikin cameras on helicopters to hand-held Bell and Howell cameras for documentation filming after the flight.

I left Langley late one afternoon in one of the old NASA Plymouth station wagons loaded down with our gear and drove over to the Norfolk Naval Base. There I boarded the carrier - the Randolph. The next morning it left Hampton Roads to go to the recovery area for John Glenn's flight which was approximately 250-300 miles from the Virgin Islands. The carrier life brought back a lot of memories because during World War II I was attached to a couple of carriers in the Pacific. The shipboard life was quite a bit different this time. This time I had plush quarters directly below the flight deck forward in the same compartment that would be occupied by a full Commander. This was quite a step up for a First Class Petty Officer at the end of World War II. Aboard ship I met quite a few interesting people. Dean Conger, one of the National Geographics' leading photographers was assigned to the ship to cover the flight and the recovery.

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It's always a privilege and an honor to be asked by the Admiral's aide to have dinner with the Admiral. The second day out I received such a request. As he put it "The Admiral" requests your presence at dinner this evening; I will pick you up at 6:30." I hadn't had this experience before but I really looked forward to it. That afternoon when we went up to the Admiral's stateroom we met the Admiral's complete staff, about 12 Captains and Commanders and the Admiral. We sat down to dinner with the Admiral at the head of the table and I was on his right. He was really an engaging person to talk to. During World War II he also was in the Pacific as commander of a carrier task force and I related my experiences on torpedo bombers at Iwo Jima and places like that. Finally he asked how long Had I been with the Space program. Sinking low in my chair, I asked "would you believe 14 days, Sir?" Needless to say that got a good laugh from the Admiral and his staff.

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The Admiral's table was served by Philippino mess boys. There must have been a half dozen of these busboys, about three on each side, watching like vultures that you never pick up your silver until the Captain starts. He is the host and it's the same as in a regular formal dinner. Anything the Captain does you follow suit. As the Admiral and I were talking about our war days, we were served shrimp for the appetizer. If there is anything I love it's shrimp. I had had one shrimp and I put my cocktail fork down, to make a gesture to the Admiral, and suddenly my shrimp disappeared. It seems that when you put your fork down, it's an indication that you want that course removed by the messboy. It looked like a tornado had struck, as he swept that shrimp cocktail away from me. The same thing happened during the main meal.

We had a small steak and potatoes and string beans. I was about half way through, fork down to make a gesture, and swish, my meal was gone. I noticed they would never take anything away from the Admiral until he gave them a nod but it seemed that as far as the staff was concerned, if they put down their utensils they'd had the course. After the main meal the Admiral passed around big cigars to everybody in his group. There was a movie whether you wanted to see it or not. These movies were passed from ship to ship in the fleet. I think the one we saw that night was 1929 vintage or maybe earlier. But we propped our eyes open to stay awake and laughed when the Admiral laughed. After the movie was over, the standard procedure called for visitors to go back to their quarters and the Admiral would always go up to the bridge to check on what had transpired while he was at dinner.

Shipboard life is really unusual, especially aboard an aircraft carrier. You hear various bugle calls. You ask about one. It's flight orders, and you see the plane handlers pushing aircraft across the deck and spotting them on the catapult for takeoff. That night after the meal with the Admiral night flights were scheduled, and I was allowed to go to the bridge in the Flight Officers area. The Flight Officer explained that the planes would take off on a routine training flight and then return to the carrier. It was interesting to watch. The carrier was dark except for lights on the deck. The signal officer guides the planes in with two illuminated paddles. It's an entirely new world with the Navy at sea.

Being this was Glenn's first orbital flight, everybody on the carrier was "up". It was a new program, and for the first time we were

to have a man orbiting around the world. At the end of the day we would have taps. The lights would go out throughout the ship and the Chaplain would deliver an evening prayer. As he prayed for the success of this first flight, I couldn't help getting a lump in my throat. Dean Conger and I listened to this together one evening on the hangar deck.

During the daytime Gene Edmonds and I were busy adapting cameras to the helicopters. The helicopters were to hover over the spacecraft and drop frogmen who were to attach a flotation collar to the spacecraft. We checked out the cameras and loaded them with film.

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The Glenn flight went off like clockwork and when he splashed down in the Atlantic we deployed helicopters from the carrier to go to the spacecraft. Our carrier was then 25 to 30 miles away. The carrier as it closed in on the spacecraft, operated at full power and the whole ship vibrated so it seemed like it would fall apart. Everything was full speed ahead to be the lucky ship to pick up the spacecraft and John Glenn. It so happened that a destroyer reached the scene first, and it took John Glenn. Gene Edmonds was loaded down with all type of photographic equipment and quickly put onboard a helicopter for flight over to the destroyer. After landing on the destroyer he took the first pictures of John Glenn during his initial debriefing on the destroyer.

In the meantime, I had the dispensary lined up for his debriefing and mis medical examination aboard the carrier. We had had cameras and

floodlights strategically located in that area so we could have complete photographic coverage during this first medical examination of a man who had been in outer space. Late that afternoon as the sun was going down, the helicopter from the destroyer landed aboard the carrier. The flight deck was 3/4 filled with Navy personnel, and a big cheer went up when John Glenn climbed out. He signed the roster and the Admiral welcomed him aboard. He posed briefly for the variety of newsmen aboard the carrier. All the big broadcasting companies and newspapers throughout the world covered this event. John Glenn was then ushered down to the dispensary and a complete motion picture record was filmed while the doctors examined him. After he left the dispensary a call came over the speaker that three aircraft would leave the ship within a half hour. John Glenn would be aboard one plane, and all the film taken during recovery and the flight would be on the other two; to be flown to Cape Canaveral. I had just a few minutes to unload my cameras, pack my personal belongings, and get aboard one of the aircraft. When we got topside, John Glenn was already in the first plane. I was in the second and Gene Edmonds was put in the third with the vital film that he had taken during recovery. After launching we headed for Grand Turk, the closest landing field to the carrier. I never will forget that night. There I was in the back of a 2-engine COD aircraft after only about  $2\frac{1}{2}$  weeks in the space program and was flying wing on the plane that John Glenn was in.

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After landing at Grand Turk we took a larger aircraft on to Cape Canaveral and delivered the film for processing. After arriving at the Cape, I took a commercial aircraft back to Newport News and Langley Field.

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Two days later I was called to Washington to cover the parade for John Glenn. John Brinkmann and I went on this assignment. Brinkmann was to use a motion picture camera, and I was going to double as a motion picture and still photographer. Brinkmann drew the job of covering the White House, and I was to cover a portion of the parade route and the Capitol. After a beautiful parade and a rain-soaked day, John Glenn and the complete cavalcade arrived at the Capitol. He was ushered directly into the Senate Chamber where he gave a report of his flight. I was in the news booth directly above the podium. I had a job to do, and took pictures which to my surprise ended up fairly good. Afterwards, as I left the Capitol and walked through one of the parks behind the Capitol trying to find our NASA car (I was to pick up John Brinkmann who was still in the downtown area), I looked back. The illuminated Capitol was in the background. Seemingly I was in that park all by myself, and as I walked to the car, I really did a lot of reminiscing in those few minutes of what had transpired, what had changed my life, in a period of about three weeks.

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On my arrival back at Langley I started consulting catalogs and company representatives, and ordering the latest photographic equipment available. I also drew up plans for fabrication of special photographic equipment. About this time I began commuting between Langley and Houston on a Convair 440 shuttle aircraft. On my first trip to Houston I was met

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by Grace Winn and some of our other MSC people in Houston at the airport around 10:00 or 11:00 p.m. and escorted to the Skylane Motel. The following morning I was told to report to the Farnsworth-Chambers Building. That was the Photographic Division's first office location and we shared it with Kemble Johnson. Kemble was also on a temporary assignment. He alternated about every two weeks between Houston and Langley, and that's the same pattern that I followed for about the next four months. Our main objective was to set up a laboratory that could furnish support to the Center. We didn't even have a building until the Air Force gave us an old building at Ellington that had been used as a base commissary during World War II. It had approximately 20,000 feet of floor space and this was to become our lab and offices for the next two years. Until we could get set up there, we needed some place to process film and prepare slides. We were allowed the use of an old base photographic laboratory formerly used by the Air Force during the War. It was obsolete as it could possibly be and filthy dirty. It just didn't look like it would be suitable even on an interim basis, but this was the only place we had. I was the only representative of the Photographic Division in Houston. I can remember scrounging some paint and a six inch paint brush and after close of business at Farnsworth-Chambers I drove the rented car to Ellington AFB and stripping down to my shorts, I painted that room myself. It took a couple of nights to do it. This was the first laboratory that we had to process slides and film for the Center.

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I worked in Houston for two weeks and then returned to Langley for two weeks. After two weeks at Langley, I repeated the cycle. I did this for four months before I finally made a permanent move to the Houston area.

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My wife came down on an orientation visit on one occasion. I met her at the airport around 11:00 one hot night and took her to the Skyland Motel. At 7:00 a.m. the next morning as I left the motel I told her I would be back in an hour. I had a lot of places-- houses, lots, etc.,-- lined up to show her. I got tied up at work, didn't return to the motel until 4:00 p.m. that afternoon and she was so mad she almost divorced me. My wife looks back and recalls that eight hours of that first day while waiting for me to return, and all she could see of <sup>the</sup> Gulf Coast Area was an open field through two glass doors. After three days of looking and 60 gallons of gasoline consumed in that rented car, we finally settled on a lot in the Taylor Lake area four miles from where the site was to be built.

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Our first temporary laboratory we soon outgrew, and moved into the converted commissary. This was our first official photographic laboratory. Equipment began coming in from Eastman Kodak Company and other manufacturers throughout the country. Our workload to begin with averaged about 50 work orders per month, generated from various engineering and public affairs offices throughout the Center. That was in mid-1962. As of November 1967, photo is averaging approximately 1400 work orders a month.

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In the early days of the program, we suffered from a shortage of personnel which made it hard to do the work that we needed to do. We were obliged to go outside for contract help. We contracted with five different vendors in the Houston area. These five vendors had private studios or shops to do our black and white color printing. We had to pay a premium price for this work but, we did not have the people to do it on site, and our workload was so large and demanding that our only solution was to get it subcontracted.

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The first on-site support contractor was hired in early 1963. They supplied laboratory technicians to do black and white and color print work. That first contractor was the Texas Industrial Film Company.

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All the time that we were in this converted commissary that we used as a laboratory we were preparing for construction of our facilities at the new site at Clear Lake. In 1962 I started working with draftsmen and engineers on plans for the ultimate in a photographic laboratory. On George Washington's Birthday 1964, the Photographic Division moved from Ellington Air Force Base to our new facilities at Clear Lake. Just like any other new operation, it required a lot of time and patience to install and check out new equipment. It took a lot more patience to get the lab into full production. During the Mercury flights, all the on-board flight film was handled at the Cape. Now with our new laboratory, we were in a position to request approval to process this film. After months of meetings and proving our capabilities as a technical laboratory we were given the assignment of handling all the Gemini onboard flight film. What we had strived for finally had become a reality.

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Our exotic laboratory began to attract the interest of scientists who wanted to fly scientific experiments in the Gemini Program. Our quality assurance technicians and chemists worked with these people in testing and evaluating various photographic emulsions suitable for flight experiments. During the GT-4 mission, we had Experiment MSC-10, a two-color earth limb photography experiment, conducted by a Mr. Max Peterson from MIT. We also had an S-1 zodiacal light photograph experiment conducted by Mr. Ney from the University of Minnesota, on the GT-5 flight. Others included the Experiments S-7, the cloud top spectrometer experiment, conducted by Mr. F. Saiedy from the National Satellite Center and S-13, the violet astronomical camera experiment conducted by a Dr. Carl Henize from the Dearborn Observatory. This Dr. Henize is now one of the last group of scientific astronauts. We worked with him during the Gemini Program as an experimenter and now as a scientific astronaut.

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A Gemini experiment assignment would be as follows: first, the experimenter -- let's take Mr. Max Peterson from Massachusetts Institute of Technology, who contacted the Experiments Program Office, then under the direction of Bob Piland. Mr. Peterson wanted to put this two-color earth limb photography experiment on the GT-4 mission. The Experiments Program Office contacted the Photographic technology laboratory and asked us to work with Mr. Peterson to develop the proper photographic emulsion. Dr. Peterson came to our laboratory and worked with Fred Southard our chemist. Dr. Peterson had film that he thought would be suitable. All of this film was designed to work with the Hasselblad camera which is a 120 type or 70 mm used by the astronauts exclusively

during the Gemini Program. This particular film that Mr. Peterson had was a black and white emulsion. For the two-color earth limb photography experiment he had a variety of filters that he would use to pick out different layers. We worked with a variety of type black and white emulsions with Dr. Peterson and came up with the correct developing time and the correct gamma to give him the maximum information that he needed regarding the photographic emulsion. All types of test strips and special processing was set up for his evaluation to make sure that our technicians were fully qualified and could give him the information that he wanted from this film when it came back from the flight. After Mr. Peterson was satisfied that we could handle his film, he gave us the assignment of processing material after the flight. After the film came back from the mission it was delivered to the laboratory and our technicians processed it to the same temperature and gamma standards that the test material had before the flight. This particular film from the two-color earth limb photography experiment for Mr. Peterson turned out exactly the way all the test strips and all the pre-investigation and pretests had indicated they would. This made Mr. Peterson, the Photography Technology Laboratory, and the Experimenta Program Office very happy. This was the first of the major experiments that we had participated in and it met the specifications and the quality standards MIT had requested. Before the original flight film on this experiment was turned over to Mr. Peterson at MIT, it was duplicated for our own evaluation here at the Center. The original film was then passed to Mr. Peterson on loan for 90 days for him to evaluate and analyze. The original film was returned to our laboratory

and it is in safe keeping in our archive storage area here in Building 8.

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During the early days of the Gemini Program my greatest thrill came from processing of the GT-4 mission film. The entire world was anxiously awaiting the photography of the first walk in space. It started coming off the processing machine at 2:30 in the morning. Our morale was at an all time high. Dr. Gilruth, Mr. Low, Mathews, and other top echelon people from the Gemini Program Office were soon in our laboratory there in the wee hours of the morning looking at this film. The motion picture footage from that flight was the greatest that was ever processed, as far as I'm concerned. It was beautiful and it was something that will go down in history as a first in the space program.

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In each flight after Gemini 4 a special emphasis was placed on photography because it has truly come into its own. Prior to that many people were a little skeptical as far as photography was concerned. When they found out that through the use of good cameras, good lens, good film and good laboratory support it was possible to get the ultimate in the way of a photographic record, their tune soon changed, and it certainly did put the Photography Technology Laboratory on the map.

For the balance of the Gemini Program photographic Technology Laboratory supported the mission and delivered the space photographs that had been invaluable to geologists, meteorologists, and other scientists. The Technical Laboratory Branch is now working on Apollo photographic requirements that will be even more complex than either

Mercury or Gemini

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In processing original flight film from the entire Gemini Program the only discrepancy that occurred, to my knowledge, and that involved the Photographic Technology Laboratory was the zodiacal light experiment, for E. P. Nye of the University of Minnesota. [ On the film there was condensation or some foreign matter. I have conducted experiments to try to find out what it was and I do not know what the final conclusion was. John Brinkmann did work with this problem and talked to Mr. Nye at length. ]

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There always has been a controversy over functions between the Photographic Division and the Public Affairs Office. A lot of people think it's been mostly ill will on both sides. Public Affairs has a job to do and so do we. Public Affairs is pressured constantly from the outside from the press and I can see how they would push the Photographic Division because the public demands that we turn out film and Public Affairs is a middle man. This I'm aware of. We enjoyed a good relationship with Public Affairs during the entire Gemini Program. Mr. Scheer sent one of his assistants from the Washington Office to work with us during the entire Gemini Program. From the first manned Gemini flight up 'til the last, the only problem to my knowledge occurred during GT-12, the last in the Gemini series. You can work at a job day in and day out for four years and if you do one thing wrong, at the end of this period, people wonder what you learned in the four years. After GT-12, the flight film came in and the first few magazines were processed. Dr. Gilruth and Mr. Low came over and viewed the film for an

8:00 p.m. news release, and when they left they said that there would not be another news release until 8:00 in the morning. I had 30 hours of original film to be processed. The Public Affairs news people were knocking on our door demanding to have this or that. In the early part of the morning, about 2:30<sup>a.m.</sup>, some earth-sky pictures came through that the news people saw. Public Affairs news types know they have liberty to go in our laboratory, but they know the limitations of this privilege. On this occasion they came in the laboratory and picked out a few frames that were good for news release. It was understood that they wouldn't release anything until it was passed by the Director. Les Gaver from Washington who represented Mr. Scheer was working with our Public Affairs people here at the Center. If I have said it once I have said it hundreds of times, "you know that none of this film can be released without the approval of Dr. Gilruth or his designated assistant," The answer that I would always get back was "we're in public affairs; we never release anything unless it's sanctioned by the Director." As these 2:30 a.m. pictures came through, the newspeople saw them and ordered quite a few still black and white prints and still color prints and transparencies. They were delivered to them sometime before 6:00 in the morning. They were to hold this until Dr. Gilruth gave his approval. As soon as they had received the material from me they ran over and passed it out to the news people and it hit the street. Dr. Gilruth and Mr. Low came over to Building 8 the next morning and asked if we had any additional pictures. I told them we had and they had been released to public affairs. At that time I was told in no uncertain terms that it was not my business

to release this material, and that it was already on the street. Les Gaver from Washington and I talked to Dr. Gilruth, Paul Haney, and Mr. Low at great length and I'll always admire Les Gaver for sticking up and saying don't blame it on John Holland. I assumed part of the blame in that I didn't have any business releasing this material. But Gaver is the only one that gave me any moral support or any backing whatsoever. Public Affairs didn't say one word. After many memorandums to Dr. Gilruth and Mr. Low explaining what transpired and after discussions with Mr. Haney and Gilruth and Low the matter was finally dropped, but it was <sup>a</sup>pretty embarrassing situation for me and for the Division.

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I'm in charge of the Technical Laboratory Branch, and the Branch has two sections. One is the Motion Picture Processing Section and the other is the General Laboratory Processing Section. At present I have 13 civil service people assigned to my Branch and a support contract staff of 44 people. Now these 44 people are supplied by AV Corporation, our prime contractor. Our original contract was with the Texas Industrial Film Company. This company changed ownership some two to three years ago, is now under new management, and is known as AV Corporation. The Branch has a two shift operation; during the day the receiving desk, a library, and film repository are operated by contract personnel and I have a civil service contract monitor in charge of the library and receiving desk area. In the general laboratory processing section, I have a civil service contract monitor and a full

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daytime operating contract shift operation of approximately 16 people. In the motion picture processing section I have civil service people working during the daytime shift and contractor personnel man the second shift. The second shift comes on about quarter of 4 in the afternoon and works until 12:15 at night. This contract operation at night has approximately 10 people in motion picture processing and they have chemists and quality control people that support their effort. The precision slide laboratory is directly under the Branch office and I have one contract monitor in this area. It is new and has been recently assigned to the PTL. This precision slide laboratory directly supports mission control. Two years ago it was operating in Building 30 under flight operations, but because it was a photographic function, and a few years ago as they were trying to put all photographic functions together, this precision slide laboratory was assigned to me. The mission of the laboratory is to furnish data TV slides and projection plotting slides for the use of mission controls personnel during mission time. The function is housed in about 2,000 feet on the second floor of Building 8. It has a lot of highly technical equipment -- precision copy cameras and a clean room for processing and producing the quality slides that are required for the flight controllers. This is a different type of photographic assignment altogether from our regular still laboratory. We have the slides that are produced in this precision slide laboratory that work in tolerances of plus or minus one ten thousandths of an inch and this tolerance has to be adhered to for the flight controllers during a mission. This laboratory is a contract operation, is composed of 11 people, and the prime contractor is Philco Corporation.

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Now let's take a little walk through our laboratory. We have approximately 12,000 square feet in the still laboratory, motion picture laboratory, the film library, and receiving desk. Our film repository maintains all the original motion picture footage and still negatives dating back to the beginning of the Space Task Group, at Langley Field Virginia in 1959. All the onboard Mercury and Gemini film is kept in the archives here at the photographic technology laboratory, in a temperature and humidity controlled environment, and it is stored in a walk-in vault. Our library at the present stores approximately 350,000 still negatives and over 3 million feet of motion picture film. Our library has developed a unique retrieval system for locating both still prints and motion picture footage. An off-the-shelf Kodak Recordax, a 16 mm viewer, was modified to accept still pictures and motion picture scene lifts for our particular needs. This material has been integrated into our library retrieval system and now it's possible for anyone to request certain views and in a matter of a few minutes can have all this film on a readout screen in front of them. This is a one of a kind item developed in the Photographic Laboratory and is now being used in industry as an important tool. So we are real proud of this retrieval system. We'd like to send copies of all our retrieval material to other centers and encourage them also to get one of these Kodak retrieval systems. If Langley, Marshall, Goddard and other Centers were to start a system similar to ours, in the long run it could be quite a space saver and a money saver.

As we go into our still laboratory the first room we come into is for still black and white printing. In this particular area are

4x5 enlargers, 35 mm enlargers, and contract printers. In this area we can print photographs up to about size 16x20. Our laboratory is unique in many ways. Throughout the entire area we have hot, cold, and chilled water that is used for precise temperature controls. We have nitrogen and air and also special exhaust systems in each particular room. In our contact printing room we have large sinks that are designed to handle almost any type of photographic assignment. We have enlargers that can handle format of a negative up to 8x10 in size and print 40x60" or even larger for displays or whatever the object may be. We're particularly proud of our color section. The large color photographs that you see throughout the Center are made in our laboratory. Also we have just recently purchased a color video negative analyzer. There are only a few of them in the country at the present time. This item is designed by Eastman Kodak Company. We're able to put our color negatives in a negative carrier and it is projected on a photo-electric tube very similar to that of a color television set. Our technicians are able to dial the correct color balance that is pleasing to the eye on this screen and document the color balance of this material. It is fed into the color enlargers and after processing the material approximately 75 to 80% of our first prints are acceptable. This piece of equipment has only been with us a few months but I can see how it will definitely be a timesaver and an economy to the Center. When we started

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 contracting our color print work in the Houston area there were five major firms we did business with. Since we hired in-house contractors, we only have need for one or two contractors and we only call on them occasionally. A couple of years ago I was paying as much as \$45,000 a month and dividing the work among five off-site small Houston businesses. Now if I send a \$1,000 in business to them a month, I've had a big month. We are now utilizing all of the equipment that we have in our laboratory. We get our money's worth out of it and the only time I now go outside, is for large photographs I cannot do in the Center, or if the work load demands that someone needs anything on a rush basis and our laboratories have reached their capacity.

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 Two of these five contractors we had were large outfits and were able to lose the Manned Spacecraft Center business and still do well. Two others went under after NASA began large scale in-house contracting. They had geared up to service NASA, and had lost all their good clients. There was a lot of sour grapes complaints by these two suppliers after MSC began in-house contracting. In the third case the business almost went under but survived. Unfortunately the sudden large volume of work going off site created a false boom and perhaps they expected it to continue. When the cut came they suffered and made their suffering known. In our color area we have five enlargers that can handle all the large photographs. We also have automatic film processing machines. These are all off-the-shelf items available from Kodak, ~~Paco~~, or other large companies. Our color

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printing process is not unique. The type of work that we print may be a little unique but as far as the processors and the enlargers themselves, they are strictly off-the-shelf items.

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In a few instances we have modified equipment to better service our needs. The same is true of our black and white processor. We have automation processor<sup>s</sup> and supporting it we have contract printers and enlargers. One thing we've got to be unique in is cleanliness. We call it our hospital. In a lot of laboratories you find that the cleanliness is <sup>NOT</sup> one of their traits. We find that in our operation that cleanliness is next to godliness and necessary to produce a good product.

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Color slides and color viewgraphs and black and white slides are really a big business as far as the Center is concerned. We use them in presentations, not only here at the Center but all over the country. We end up with maybe 2500 color slides a month and maybe 1000 viewgraphs. We make approximately 2000 black and white slides a month. We do not make any pol<sup>o</sup>roid slides in our shop at all. All slides are made from artwork produced by graphic arts in the Administrative Services Division.

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In processing color film we have an automatic processor that can process Ektacolor negatives. Before, all this was done manually. Now production has been increased through the use of automation equipment. Throughout the entire laboratory, I'd say that we are about 75% automat<sup>e</sup>d. It has been costly, but in the long run we have saved money by automating as many areas as possible.

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Our motion picture section is a little unique; because we have so many pieces of unusual support equipment. We have a color motion picture processing machine built exclusively for our use and to our specifications. In the trade you find maybe a color processor designed strictly for one size of film, let's say. This particular color processing machine represents three machines built into one: it can handle 16 mm, 35- and 70-mm. This particular machine has quite a history. It processed all the onboard flight film during the entire Gemini Program. We handle this machine with kid gloves and give it tender loving care.

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We take every safety precaution that we can in handling onboard flight film. Our laboratory is locked. We have electric locks on our doors that keep all unauthorized people out. During processing of original flight material we operate our processor off auxiliary diesel power. We also have standby emergency airlines in case anything happened to our regular air supply. We even call the power house and alert them to the fact that we are processing original material, and if any emergency comes up, they are to let us know immediately so we can take proper precautions. On this color processor we have special technicians that work for weeks before a flight becoming familiar with the type of material that will be processed and to make sure that the machine is in excellent working condition. It processes Ektrachrome commercial film for our documentary films and an Ektrachrome ER film which is used for duplicating material. This is a 75<sup>0</sup> process.

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In order to keep up with the state-of-the-art we just recently installed a new motion picture processing machine that was built exclusively for the Manned Spacecraft Center. This is a 100° processor that processes 16 mm Ektrachrome material at a speed of 80 feet a minute. This is quite a contrast to our old work horse that has an output of approximately 35 feet a minute.

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After our film has been processed we go to our five different motion picture printing room. The 70 mm film is ~~processed~~ <sup>PRINTED</sup> on a 70 mm printer built by Bell and Howell Corporation to our specifications. It is one of the few in the country that can handle two different perforations. It can handle a type 1 or type 2 perforation film by a slight modification and to my knowledge this is unique. We have two 16 mm Bell and Howell printers reproducing engineering material and documentary footage and a 35 mm Bell and Howell printer.

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When we started to order equipment in early 1962, we were told to build up a laboratory second to none. Before we went out and purchased a lot of pieces of equipment or even designed some, I personally talked to a lot of engineers and asked what they thought they would need in future camera equipment, films, and processing equipment. Looking back, all of this material has become a reality. Our 35 mm material is not being utilized like our 16 or our 70 but we do have the capability even though our requirements are not as great as they used to be.

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We have an optical printer designed by Producers Services that is capable of handling 16, 35, or 70 mm film. All of the flight film of Ed White's walk in space on GT-4 was exposed at a camera frame

rate of 6 frames per second. Normal frame rate for home movies is 24 frames per second. In order to make this come out in real time, this original film was put on this optical printer and step frame printed, which means that it was stepped up from 6 frames per second to 24 frames per second. This equipment is also unique in that where film is exposed at 6 frames per second, taken through a mirror which would be upside down and come out backwards, this particular optical printer can correct any scene so that it can be viewed in real time. A 70 mm attachment has been recently acquired for it ~~and~~ came into its own on <sup>the</sup> ~~the~~ first Apollo flight. To my knowledge it is the only 70 mm reduction equipment in existence in this country. Bell and Howell produced the system and constructed it for us. An example, a big portion of the tracking cameras at the Cape are 70 mm, and so much of the film for viewing has to be reduced down to 16 mm. The only thing the Cape can do is to take the 70 mm and reduce it to 35 one step and then take another step down to 16. Of course there is a loss of fidelity and time in this process. With our equipment we were able to maintain our sharpness of print and our Apollo project office was pleased with the result.

We also have a motion picture timing area which has all types of equipment in it some of which is designed to maintain the correct color balance before printing. We have three black and white processors-- a 16 and 35 mm combination, a 16 mm negative-positive machine, and a 16 mm reversal machine. Our black and white facilities are capable of handling just about any type of subject in any type of request. However, since color has come into its own, our black and white photography has

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taken a back seat. Black and white is used mostly now for news releases, but even there, with the advent of color television, people want color instead of black and white. However, we do have to maintain our black and white capability for onboard flight experiments.

Our large tables on the side of the lab are used for collating completed motion picture film and preparing that material for shipment. We also have an ultrasonic machine designed to clean the 16 and 35 mm motion picture film before it is sent to our printing rooms. It takes any lint or smudges off the film before it is printed and processed. On the second floor is our quality control and chemical mixing area. This is a vast area composed of approximately 90 stainless steel tanks ranging in size from 15 gallons to 350 gallons, and known as our filling station. It furnishes the machinery on the first floor with the color developers, mixers, and other solutions. Each tank has a different solution and furnishes its chemicals to one of the numerous processors throughout the laboratory. At present we are using approximately 800 pounds of dry chemicals during a two-shift operation, and the water that is used in our laboratory on a two-shift operation averages about 80,000 gallons per two-shift operation.

Quality control is really the backbone of the photographic laboratory. You can have the best film in the world but if it is not processed correctly, the film will not come out the way it should. We take special pride in our quality control. Control strips are run

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hourly through our different processors in the laboratory to assure that we are getting the ultimate in processing. Through a special contract with Eastman Kodak Company we send copies of our centrimetric strips and samples of our chemistry to the Eastman Kodak Plant for analysis to ensure that we are tops in the country in quality control. We also have all types of instruments--densitometers, sensitometers, and pH meters--for checking our solutions and emulsions for recording, and for maintaining perfect quality control in the lab.

I have a new office that I'm in the process of trying to get established. It will furnish direct support to all experimentors who desire to put a photographic experiment on Apollo flights. We will evaluate their film, their processing requirements, and make recommendations on the type of photography that we think best. We are also looking at an extended range film for use on the lunar flights. Our people in this area will also work with the lunar receiving laboratory. At the present time they are experimenting with the affects of radiation and trying to decontaminate film by exposing it or treating it in an autoclave before it's processed here.