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 [full name of interviewee]

about Semini & Apello Astronaut training,  
 [main focus of interview]

Operations & post-mission activities

Title: Astronaut  
 [interviewee's current and/or former title and affiliation]

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

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Biographical - [date/place of birth; family background] 1-20-30 in

Montclair, New Jersey; Parents - (late) Marion Moon Aldrin & Col. (USAF Retired) Edwin E. Aldrin; married Joan A. Archer; 3 children

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Career Path - 1952 Pilot wings; 57<sup>th</sup> Fighter Interceptor Wing, Korean War; Aerial Gunnery Instructor, Nellis AFB, Nevada; Aide to Dean of Faculty, USAF Academy; Flight Commander, 36<sup>th</sup> Tactical Fighter Wing, Bitburg, Ger; Gemini Target Office, Air Force Space Systems Div; USAF Field Office, MSC; 1963 NASA astronaut; Gemini ~~12~~ Apollo 11; 1970 NASA Advanced Missions Program

## Topics -

Comparison of Gemini & Apollo training; Astronaut Manoeuvring Unit (AMU); Astronaut - Public Affairs Office relationship; Flight Crew - Flight Surgeon Relationship; post Apollo 11 trip; Extra-Vehicular Activity <sup>(EVA)</sup> training; underwater training; maneuvering problems; zero g problems; photographic work; scientist vs. pilot astronauts; Apollo 11 - decision on <sup>first out for</sup> lunar landing; lunar descent problems; lunar surface operations; Astronaut personal stories contracts; post-mission gratuities and activities; awards + memorabilia; future training schedules

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Interview with Col Edwin E. Aldrin  
7/7/70

In comparison with the Gemini Program, the training activities the Apollo missions were quite well spelled out as to what the total mission would be. In a sense, the Apollo missions were far more completely defined. The training activities in each Gemini flight depended to a major degree on the preceeding flight. As missions evolved- perhaps 2-3 ahead, and/ <sup>they</sup> became defined working in concert with the crews--the mission plan was developed for the extravehicular activities, ~~an~~ for the rendezvous exercises and how the experiments would be integrated. I think there was a lot more crew participation in setting up the total mission profiles. The training activities in the Apollo missions were built considerably one mission on top of the other. Procedures were developed in one flight and carried on and added to - refined to some degree in the next. We've had a good bit of problems within the office centered around the idea of each crew wanting to do things in their particular way. I think this is natural when one is in training for such a long time period for a mission. Each crew has its own views on how to go about performing a particular task like undocking, transposition in docking, portions of inspection of the lunar module, and whether to fly heads up or heads down. These things are largely subjective and vary with the judgment of the crew and its commander. The time span of training

of the Apollo missions was a good bit longer. The interval between Gemini missions was about every 2 months in the latter phases of Gemini. In Gemini XII we were taking one approach where EVA was involved, (and this involved the AMU) and this changed drastically after the flight of Gemini XI because we found we still had some unknowns as to capabilities of people to work in this zero g environment. We found we needed to learn a good bit more about restraining yourself and attaching yourself in a means that allowed you to perform your work most effectively. It was quite a disappointment to me not to have flown the AMU. It was a fairly high level decision and was influenced a good bit by the fact that it was the last flight in the series, and we wanted to end up with an unqualified success. The AMU required the successful completion of a long series and chain of events in order for it to be able to be completely checked out, donned, and used. I personally think we should have gone ahead with that, but it was not up to us to make that decision.

In regard to relationships with the PAO, since the Gemini flights were scheduled frequently, crews were so involved in training that they were unable to partake in many activities. For the most part, crews were assigned or reassigned back to missions shortly after their flights so they weren't involved in large scale public affairs activities.

There is an unfortunate division of responsibility between the PAO activities and the crews. A certain amount of it is handled by our office here, a certain amount handled by Washington, and of course some of it filters through the PAO here. To say the least, it is decentralized.

The relationship between the Flight Crews and the Flight Surgeon improved somewhat in Apollo after one particular flight surgeon was assigned to a flight and he worked a lot closer with the crew. The medical aspects of flight operations have provided some friction in the past, and some of which stemmed from the early days of manned space flight when some of the crews got the feeling that the medical people were trying to interfere in the operational aspects of the flight. I am not sure we do have a good working relationship on that even now. Many of the experiments that were performed on the crew were bothersome and did interfere with the flight activities, and it was rather difficult for us to see exactly where this related into obtaining useful information. Many people felt there was a lot of data acquired on Gemini flights but not too much was derived from it.

The public affairs functions after the Apollo 11 flight gained a tremendous increase in emphasis and was controlled a good bit more out of Headquarters than here. Things went well on that trip but there still was a problem of unfamiliarity with public affairs activities and people. It was a very demanding trip, and I found it a letdown after

the activities of the flight. I noticed it to some degree after the Gemini XII flight, as it meant a complete change of life. Being in the public eye continually without any particular isolation was not a situation I relished in Gemini, and I certainly didn't look forward to an intensification after the lunar landing. I've gotten somewhat used to it since then. I still think it's unfortunate however, that we have splintering of the function of arranging appearances and staffing visits. Each individual has different requirements with respect to preparing talks and speeches and assistance is obtained from both Washington and MSC but doesn't appear to be well coordinated. In a lot of cases, it is left to the individual to handle himself.

I was the 5th man to EVA in space: there was Ed White, Gene Cernan, Mike Collins, Dick Gordon, and then me. We suffered a good bit in our EVA program by the problems we had on Gemini VII because we were not allowed to carry out the exercise with the backpack and the hand held maneuvering unit on that flight. I think after that flight when looking at some of the procedures, we found that the crew probably would have a good bit of trouble with that. Again, it may depend on the individuals adapting to the environment and learning how on the spot to work reasonable ways around body positioning difficulties. That was a very ambitious EVA flight and for us not to have that one under our belt when we went into the AMU exercise on Gemini IX decreased our chances for success. A great job was done by all the crews in all their

exercises. It appeared to me it wasn't the big things that got us but the small ones, and required a fairly complete familiarization with zero g environment in terms of thinking things out. I think some of the advantages offered by the underwater training facility that I was involved in and started just about the time Gemini XI flew gave me a considerable advantage. We had a contract with a firm in Baltimore who did a considerable amount of work for Langley. Our underwater training was held in a pool in a school in Baltimore.

The gloves gave us problems; also hand dexterity and being able to handle little locks in the thermal environment would sometimes change the lubricating requirement and the amount of friction on the AMU arms. Tolerances were not worked out completely with all the thermal properties in mind. Some of the small hooks that were required to be connected on Gemini IX were too difficult to handle with a one handed operation. Because the foot restraints weren't adequate, Gene had to hold on with one hand and try and operate everything with the other hand.

Even though Gemini X was terminated early, the first umbilical stand-up EVA was cancelled because of some problem that caused eye irritation. The next EVA was a very ambitious task and involved recovering something from another vehicle that was not attached directly to it. Mike was going to maneuver over with the handheld maneuvering unit to pick up this experiment from the Agena that had been left up there from Gemini VIII. That was a very difficult task to perform. It required a tremendous amount of team work between the 2 men and they carried it out very well.

Little things like screws on cameras caused us to lose that one camera on Gemini X - it worked itself loose in the zero g environment. Stowage problems caused the loss of one experiment magazine. Body positioning was one of the keys to the problems on Gemini XI. Dick Gordon had the impression that he could straddle the Agena and make that tether connection between the spacecraft and the Agena and he gathered this feeling from rather short flights in the KC-135, but found in space it wasn't that easy. I think it depended upon a very high fidelity representation of the working surface of the spacecraft that he was trying to straddle. He was also hampered a good bit by some overheating they had before they opened the hatch. I think that was a procedural problem.

Regarding the technical equipment: Any new program is going to suffer somewhat because each item of equipment is tailor made for that special purpose and is not given the test that many commercial products do by being exposed to extensive evaluation and longtime development. We have to develop items of equipment in a hurry and make modifications for special environment. It's a whole new technology and because there were special purpose items, perhaps they didn't get all the attention that commercial items would have. That's something we are going to have to work around in all of our efforts.

We've done quite well in our photographic work in all of our flights. Many of the pictures have done a tremendous amount of good from the public relations and public affairs standpoint, putting across just what the space environment is like. A lot of these weren't spelled out as specific tasks but they were done on an as available basis. The cameras were modified commercial models and for the most part



required more manual manipulation than most cameras now require. Electric eye and automatic operation is much to be preferred than manual operation, especially in an EVA environment.

Concerning the controversy over scientist astronauts vs pilot astronauts, I think the selections of the original scientist astronauts were made when our best estimate was that we would be flying them on AAP or a space station type operation far sooner than the budget and schedules have proved out to be. There is a requirement for a close relationship between the experimenters and the pilots. The early missions were primarily of flight development type and experiments were carried on as a secondary function to the operation of the major mission objectives. As we start getting into the Skylab operation we will find there will be a good bit more crew specialization. The need for all 3 members - if it's a 3-man crew-- being test pilots will fade away. We will want to emphasize the scientific disciplines that can be supplied by the scientist astronauts. Each one of them in their particular category has been able to assist in the development of experiments that fall within the range of their scientific background.

The decision as to who would go out first on the lunar surface was mixed with some personal involvement and emotion. It was tied in with a little bit of tradition that had developed concerning the role of the co-pilot as being the man in charge of experiments and perhaps lunar surface operations whereas the commander would be in charge of the total mission direction and directly involved in the two major new events that were performed on the landing mission. These were the actual

touchdown and liftoff. The preparation for EVA, opening of the hatch and descending to the surface were things that had been done previously in zero g, which was perhaps more difficult environment to operate in because of the demands placed on body control. Whereas when you have the orientation of a gravitational field even when it is as small as that on the moon, we found it more than adequate to provide us with that body orientation. Really operations on the lunar surface were anticipated and proved to be easier to perform than those in zero g. It was not up to us to make this decision as to who would be the one going out first. Tradition seemed to dictate that perhaps the lunar module pilot might. The positioning in the cockpit and the way the hatch opened seemed to favor the commander going first. Otherwise, a change around in crew positions would be required before egress which would be undesirable. I think all these things plus the traditional role for significant expeditions of the man in charge being the first one to do something were considered. It was a fairly high level decision and I don't think it had anything to do with the background of the individuals or whether they were military or civilian.

During the descent when we started having problems with the computer, my attention was focused entirely inside the cockpit looking at the displays and trying to relay the information on the computer and also on the altitude and altitude rate meters to Neil so he could use this with his out the window determination as to where we should go to

find a suitable landing place. Things were happening fairly fast and it was just a question of making sure the most correct thing was done from my standpoint at that instance. Not much time was allowed for reflection on the situation. We all felt we had confidence in our ability to abort and to get out of there at any time. This has been demonstrated quite well by simulation, where short distances from the surface, we've been able to abort. A lot of our training did involve landing with low amounts of fuel. I think everyone was concerned about trying to get on the ground as soon as we could, but then we also wanted to make it a deliberate and methodical descent and we felt we had adequate fuel to do this. It turned out we did.

The operations on the lunar surface in terms of the difference in what we found and what we could have simulated ahead of time were tied into the visual impressions we had. The very brilliant sun and the little amount of detectable heat increase coming into the visor when your face was toward the sun--these things are impossible to simulate even in thermal conditions. Both of us were concerned with the next item on the agenda to be accomplished. This took precedence over any reflective thinking we might have been able to do. We understood the significance of what we were doing. I felt like we were not alone-- we had people listening and looking at everything we were doing and I had the impression of being on center stage during the entire operation. It was a fairly full schedule of activities. We attempted to get each one done as rapidly as possible and move onto the next one. We did get a little behind and had to abbreviate some of the documented

sample collection work at the end. I felt everyone knew we had an adequate reserve of consummables and I felt there was a little tendency to rush us trying to get back in. I can understand that - the people on the ground had a preplanned termination point and they felt we should adhere to that as closely as possible. Our debriefings covered the conditions inside the cockpit and the ease with which we adapted to the  $1/6$  g both inside and out. The suit has a tendency to detract from the mobility which one would naturally expect to have in a  $1/6$  g environment. It tends to make things more like 1 g if anything. The distance between steps is about the same on the surface of the moon as it is on the earth in walking and running. We could have stretched our pace considerably but when one is away from the ground and control point for a longer period of time and the biggest characteristic difference is that time lag and the slow down of response. While one is away from the ground in any large step, he is still susceptible to any disturbance he had when you left the ground and is going to start to lose his balance if he is away from the ground too long. This was the concern that kept us from taking too large a step. We did have tremendous amount of mass that we would have to get into the air to be able to take longer steps.

We all had a very keen appreciation of the significance of what we were doing but, along with most other people in the world until the situation came up, we tended to underestimate the effect the flight would have.

With masses of people joining together to observe what was taking place, this tended to be transferred from one individual to the other and we were 3 of us 240,000 miles away and we didn't have the benefit of transference of enthusiasm and emotion concerning the flight. We were the ones who were busy and the other people were the observers of something new.

Comments on the astronaut personal stories contracts. When our group came in we inherited precedence that had been set previously by other contracts. It was just a question of carrying these on. They served a beneficial purpose from a twofold standpoing - in getting the story across in one good package and at the same time providing a certain amount of insulation to the crews and their families from being involved with relating the same type of a story to many different agencies. The demands placed on us in terms of living standards, travelling around the country are a little above the normal pay we get, so any remuneration that was obtained from the contract was well deserved. Near the end as we started having more and more people involved, the amount of return from the contracts was rather negligible, because it had to be split up into about 50 different segments.

Comments on post-mission gratuities: We found there were so many demands placed on our time after our around-the-world trip that we had to split these up and go individually instead of all 3 of us appearing at the functions. There were so many requests that came in that it was almost unbelievable. Every organization wanted to give us some award. This was genuine on their part but at the same time provided them with

much publicity. It appears to get out of hand if let to go completely on its own without providing some control. Each organization feels bad if they are not provided the opportunity to honor someone.

Post-mission gratuities are nonexistent to my knowledge. We've received so many gifts of all different natures--varying from poems that people were inspired to write, recordings, records and songs that they have composed, various things they have made, each one obviously representing an intense feeling of emotion on the part of the giver. It is unfortunate we are not able to respond as completely as we should have had we geared up an office to be able to handle this in a professional way. All the people who are doing this are still learning. This sort of thing has been done previously by people in the motion picture business and others who have agencies to handle a lot of this and perhaps are more professional. Being a government agency, we are somewhat tied from a budgetary limitation and staffing as to just how much time we can devote to this sort of thing.

At this point I'm not clear just where a lot of these awards will go. We received many different plaques from cities and companies who participated or didn't participate but had the honest feeling of wanting to present us with something. They might vary from photographic awards from some photographic society to just resolutions passed by some town or city. The ones that have more meaning are things like scholarships, and there is a museum that has been established for Neil and there is a scholarship fund that's been established in my home state in my name. These have more of a lasting nature to them and of more benefit to a wider number of people. Just what will be done

and what is the appropriate place for all of these items is not real clear to me. Each one of us is holding on to them without the time or the means to properly display them at this point. They would completely saturate any museum that I can think of around the country and many of them are individualistic and don't necessarily have a place in a national museum. They would provide a very handsome display if they were ever worked into some display cabinet. If they are in an individual's home, that is rather selfish and the only people to end up seeing them are the closest associates of that individual. A loan to a local museum should be worked out at some time. Perhaps in an individual's home state or something like that would be more meaningful.

Obviously there is going to be considerably more specialization as to crew duties in the future just as we have pilots for the airlines that fly particular type of equipment. We are going to have people in a crew position. There will also be people who will be passengers who once they get into the Space Station will perform a specialized position in there - an engineer, scientific observer one involved in some of the housekeeping, and medical operations, command and operations roles performed in space stations.

I think it's going to be a lot more like the operations of an airline than just adopting the long time training we've had available to us for each of the flights up to now. We may still be able to provide 6-8 months training and know ahead of time exactly what that mission is going to evolve into, but at the same time we will have to have some crews available for contingency operations.

and rescue missions. These people are going to have to be trained to do this. To the extent that the shuttle operations fall into a pattern of just into orbit and back down again after a certain period, I think we would be able to shorten the overall training time and have longer general training to bring people up to a standard. If they are in a pool where they are available with 3-4 weeks notice or even less than that with regard to some of the standby requirements we will have to have for rescue operations. Just what numbers of people involved to do this will depend on looking at a realistic schedule and then trying to anticipate the training time to bring a person up to flight level, which I don't think will be any less in the future. The total training time I think will require 3-4 years from taking them from some previous operation either in military or civilian testing business. It will take a good while to bring them up to the point where they will be commanders and operators in space missions. That won't be true of the ones who have the role of operating specialized equipment on space stations where they aren't involved in anything other than the passenger role during the departure from the surface of the earth and recovery back there. I think we'll be able to expose these people to a minimum amount of training, familiarization with emergency procedures and the environment and then let them specialize in their particular activities. I think that until we resolve the questions of some of the longer term affects of zero g environment on



people, (especially that of individual susceptibility to disorientation such as nausea that has been experienced by both the Russians and ourselves). We've experienced this to a much lesser degree than they have, and a lot of that is due to the higher level of screening we've done and the greater exposure to the zero g environment in the KC-135. I think we will want to expose people to that sort of thing. Otherwise we will have to stand by to recover some people, who just by the wrong projective differences would not be able to adapt themselves.