

Entry Date 5-12-93
Data Base HDOCNDX
Index # INS.0206069

ORAL HISTORY INTERVIEW

DATE OF DOCUMENT [Date of Interview] = 10 - 25 - 68
OFFICE OF PRIME RESPONSIBILITY = JSC
NUMBER ON DOCUMENT = 00
TYPE OF DOCUMENT [Code for Interview] = 1
PROGRAM [3-letter Program Archive code] = INS
AUTHOR [Interviewee's Last Name] = PILAND
LOCATION OF DOCUMENT [Numeric Shelf Address] = 091-3

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

Oral history interview with Robert O. Piland
[full name of interviewee]

about Apello program planning - Study
[main focus of interview]

Contracts, Staff and program elements

Title: Lunar Landing Module, Spacecraft & Project Office (ASPO)
[interviewee's current and/or former title and affiliation]
1962 - Apello Project Office (ASPO)
1963 - Dep Mgr, Apello Spacecraft Project Office
1968 - Technical Asst to Director, MSC

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

Historian at MSC
[location of interview]

Transcript and tape(s). [for inventory only: # pages 9; # tapes 1]

Master 1

CONTENTS:

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

Education - _____

Career Path - Langley Research Center; 1958 STG
Asst Chief, Flight Systems Div; 1960 -
head of Apollo Project Office

Topics - 1960 Technical Guidelines for lunar mission & spacecraft
design; Fall 1959 Contract studies on lunar
spacecraft & mission (for circum lunar mission);
May 1961 STG Study Contract reports; Apollo technical
conference; NR selected for command & service
module (CSM); STG move to Houston; formation of Apollo
Program Office; growth in study for Apollo program;
lunar rendezvous & (LEM) ^{lunar excelsior module} concepts; Lunar
orbit rendezvous (LOR) preferable to earth rendezvous;
RFP for LEM; MIT ~~Solo Source~~ contract for navigation &
guidance system: MIT, Raytheon, Kohlsman, AC Spaulding;
1963 Brief shift to Asst Mgr LEM; then acting mgr Prog Office;
new schedule w/ NR; Convair contract Little Joe booster
1963 reorganiz of MSC Apollo Prog Office (parallel HQ);
formation of Experiments Program Office; formation of Space
Sciences Div; Trick's leaving Apollo prog; Earth Resources Program

→ Science

- early ASPO managers had no use for science
- service for Apollo performed in E&D
Dombark - lunar surface, Eggberton

Gemini started subprojects office under Norm Foster.

Low decided to form EXPO (in E&D)

3 elements

Apollo lunar science

" orbital science

Gemini experiments

* experimental aircraft

Low hired Hess to form

- EXPO

- old E&D Division

-

part of EXPO being shifted get pulled in back out & put back into E&D

Hess' Directorate contained engineers & what he considered
* 2nd rate scientists - hired folks for cosmic
group & lunar rocks

significant input into ASLP

lunar geology - flagstaff - Phoenix

geochemical - Jim Arnold

lunar receiving & decontamination facility - 1st
place scientific community really affected

JSC

- Jim MacLennan & Bob Peeland bore the brunt of that
facility.

Piland 12/18/82

→ STG - 3 DIVISIONS

→ Contract Engineering - Charles Zimmerman, genesis of program office concept; knew there had to be contract management of some ~~sort~~ ^{kind}

Flight Systems - as an organization, did not get involved in Gemini. went from Mercury to Apollo,

↳ Termis run from Proj. Office (Chamberlin) : Operations
reason, theoretically Mercury was left on Mercury, also, Schmidt worked Chamberlain on Mercury, if forget on Apollo.

→ Subsystem Dept.

- Apollo PO grew fast & soon NAR

E&D tied up w/ designing facility & doing system effort on mission, part. lunar orbit as those efforts came to fruition.

- Detailed subsystem ~~assembly~~ ^{manuf.} transferred from ASD to E&D, more to evolution of Center.
natural evolution in growth of Center.

E&D became more a part of program

Piland

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- EXPO offci

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subsystem management

INTERVIEW WITH ROBERT O. PILAND
October 25, 1968

64 The STG was formed in October 1958. I had been away from Langley since March on an assignment in Washington and I returned in February 1959. During this period, STG had been told to avoid using its manpower for advanced programs because the Mercury job was more than the available manpower could handle. The first advanced work was done by Kurt Strass who was then in Flight Systems Division. Faget was ^{Chief} head and I was Assistant Chief of the division. Later on Owen Maynard who came down from Canada worked with Strass doing some early studies, one of which was a ^{study} test shot of a recovery satellite to make radiation measurements. ^{pertinent to future manned programs.}

64 Max Faget was serving on a committee that was chaired by Harry Goett and this ^{that} committee was considering what should be the next step in the manned program. They came to the conclusion that it should be the lunar program. It wasn't clear whether their recommendations called specifically for a lunar landing, a lunar orbital or circumlunar mission.

64 Around the early part of 1960, the STG first began ^{on} ~~a more~~ extensive study of advanced spacecraft. ^{beyond Mercury. Mercury} This effort was started by putting together a set of technical guidelines or ground rules on which the mission and spacecraft design would be based, and in that spring a team of STG people visited most of the other NASA Centers and presented these guidelines.

The purpose was to provide a framework within which the other Centers could do research studies. That same spring, the Apollo Project Office was formed and I was made head of it. It is not to be confused with the Apollo Program Office that was formed later. The Project Office was to manage and coordinate studies pertinent to Apollo.

This guideline envisioned a spacecraft that could accomplish a lunar circumlunar or lunar orbital mission or alternatively be used in Earth orbital spacecraft.

~~forming~~
preparing

In addition to ~~forming~~ these technical guidelines, and visiting other Centers, we began preparing a work statement and request for proposal for three studies of an Apollo system. This work was carried on during the summer of 1959 and Charlie Donlan played a significant role in the preparation of this work statement and RFP. We held a bidder's briefing around September, took bids, and in the fall let a contract to three firms GD-Convair/San Diego, Martin/Baltimore, and GE in Philadelphia. Contracts were for \$250,000 apiece to study a lunar spacecraft and mission. It should be ~~pointed out~~ *emphasized* that during this whole period our primary effort was directed toward a circumlunar mission as opposed to a lunar landing. ~~Where~~ *when* we considered a lunar landing, we assumed the use of a single large booster that was then known as Nova, not a C-5, and the concept was that the entire spacecraft would be landed on the lunar surface. In addition, it was also intended that the spacecraft would be a useful earth orbital spacecraft if it was decided we would not perform lunar missions. Considerable emphasis was placed on earth orbital missions. The reason was that adequate study had not been made of the radiation belt and in some quarters there was concern whether the lunar mission was feasible.

industrial
The study contracts were completed in about May.

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~~Now when~~ The study reports were ~~received from the three contractors,~~ *by the STG staff* they were reviewed and critiqued in detail. ~~Parallel to the studies being conducted by the contractor, other studies were conducted in-house by the Flight Systems Division which~~ *by then* was almost completely engaged in Apollo work. From the combination of the in-house study and the contractor studies, the basic Apollo design concepts were ~~agreed upon~~ *determined*. These basic design features have not been materially changed throughout the course of the ~~program~~ *Apollo*.

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A significant Apollo technical conference ^{was} held in Washington ^{to} summarize ~~zed~~ the results of ^{the} studies. The three contractors participated. Practically all the NASA Centers ^{also participated} ~~were present~~, as well as STG. It was a significant technical conference and the basic technical concepts that were to be used in Apollo were presented, ^{and} discussed ~~and agreed upon~~ at that time. A bidders briefing ^{for the development of the Command & Service Module} was conducted later in the summer of 1961 at Langley, and we received proposals from contractors around September. Evaluation of these proposals was carried out in September-October at the Chamberlin Hotel and NR was subsequently selected by the Administrator. Negotiations were ~~subsequently~~ held in Williamsburg and a letter contract was signed just before the end of ¹⁹⁶¹ ~~the year~~. This contract ^{as stated above} was for the command and service module and it envisioned that the total spacecraft would set down on the moon if a lunar landing was contemplated. IRC at the time was studying the lunar rendezvous concept and although it has been stated that STG was then opposed to this concept, the fact is, STG had not significantly studied it to establish a position.

This would require a lunar landing module.

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The letting of the ^{CSM} contract, the negotiations, the evaluation had soaked up the entire Apollo effort from early spring to the end of the year. When we moved to Houston ^{at the end of May beginning of June} several things happened simultaneously.

(1) The move itself. (2) The Apollo Program Office was formed. (3) Mr. ^{Chab} Frick came on board as head of the Program Office. (4) NR began work on the contract. The program office headquarters were first set up in the Farnsworth-Chambers Building with the Manager and the Deputy being located there. The rest of the program office was initially located in the Houston Petroleum Center. At Langley there had been only a very small project office of five to ten people supported by 80-100 people in the Flight

Personal from
Systems Division and supported by other divisions on special occasions
such as the evaluation of the Apollo proposals. *CSM* Mr. Frick devoted his *primary*
effort time after coming to Houston to getting the MR effort underway, and I
as Deputy emphasized getting the program office formed and moving. There
was a large amount of *staff* hiring. Since ~~The~~ initial Apollo Program Office
group was *Consisted of* ~~probably~~ no more than 10-20 people when we moved to Houston.

however,
Just before we left Langley we had hired people to come on duty in Houston,

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In the next six months there was a rapid rise in the number of people in
the program office. The Flight Systems Division became the Engineering
and Development Directorate about this time and they were faced with the *new*
of additional task of the planning and building of the technical facilities
of the new Center, a considerable effort. As a result of these new re-
sponsibilities there was a somewhat less close working relationship between
the Program Office and E&D than had existed back at Langley. The E&D
Directorate at this point started a significant study of the lunar rendez-
vous and the *LEM* ~~EM~~ concepts. This is the first time they had been able to *study*
dig into this area - depth.
768
54-1 *this area - depth.*
in their groups
under them made a large effort in this area, carried the *majority of the study* *whole technical*
*LEM**
study with a relatively small amount of work on the *LEM* being done by the
Program Office.

MSC took the position that the LOR was a preferable mode to the earth
rendezvous which had been studied at Marshall and other places. It is im-
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portant to recognize that MSC took the position that this was preferable
to earth rendezvous but did not take a position that this was preferable
to a direct lunar landing *with large* ~~in~~ a single booster. This option was no longer
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open since it had been decided the previous fall to build a C-5 rather

** The name LEM or Lunar Excursion Module was suggested by C.E. Johnson. The 'Excursion' was necessary to distinguish it from the 'Lunar Landing Module' also under study at the time. The definition of 'Excursion' was not appropriate to its task despite its later deletion.*

than a Nova. This point is not generally understood. MSC might have reached the conclusion that ~~it~~ ^{a direct lunar landing} was preferable, but it had already been decided that the C-5 ~~S-5~~ booster would be built and it was not large enough to allow a direct landing. MSC then decided as a result of studies that the lunar rendezvous mission was preferable to the earth rendezvous approach. In about May or June, it was decided that the lunar rendezvous work would be the accepted approach. Toward the end of the study, ^{LOR/LM} the Apollo Program Office had become more involved and I took on the task with Bill Rector of preparing the RFP. ^{for the development of the lunar industry.} Jim Neal was the procurement representative. Using the results of the technical studies, we put together an RFP to purchase a lunar excursion module. This procurement resulted in a pattern of activity for the remainder of the year somewhat similar to the preceeding year. A bidders briefing was held in the summer and proposals were received in the early fall. The actual selection was delayed somewhat while the final decision on the lunar orbital mode was given management certification at Headquarters. After that we negotiated a contract with GAEC and the negotiations were completed ^{at the end of 1962 or} ~~just prior to the beginning of 1963.~~ ^{one year behind the letting of the CSM contract.} The IM evaluation and negotiations were conducted at EAFB and the Franklin Apartments.

Prior to the ^{letting of the CSM contract and the necessary preceding proposal,} ~~lunar effort at the IM effort,~~ in the early part of 1961, there was a significant procurement activity ^{for} on the navigation and guidance system. ^{in the first half of 1961,} A sole source systems contract had been awarded previously to MIT. ~~and~~ Three industrial contracts were let in the spring to Raytheon, Kohlsman, ^{for the actual production of the system.} and AC Sparkplug. It was a difficult evaluation and selection.

About the time the IM contract was signed, Jim Decker came onboard in the Apollo Program Office ^{in early 1962} and I was named assistant manager for ^{LEM} ~~IM~~ and

as assistant manager for CSM.

~~Jim was named assistant manager for the C&SM.~~ Around May 1963, Mr. Frick announced he was leaving and I was named acting manager of the Program Office as well as manager of the ^{CSM} NR effort. Jim Decker took over management of the ^{L.E.M.} lunar excursion module. Somewhere during this period, the entire Program Office moved into quarters at Office City, where we stayed until we moved to the Center.

I had visited NR only once or twice since I had been assigned to getting the ^{LEM GAEC and} ~~GAEC~~ navigation and guidance contracts going, and in performance administrative duties in the Apollo Program Office. My first significant activity at NR was associated with a new schedule. The existing schedule was out of date, and a new schedule was being proposed. It was readily apparent that the new schedule was unrealistic in many respects and schedule problems became important from this time on. There were several significant meetings on this subject which culminated in a schedule review in Headquarters around June 1963. Brainerd Holmes and Dr. Seamans both attended. Every effort was directed toward getting as realistic an appraisal of the schedule as possible.

During the summer NR completed the first flight tests of fullscale vehicles. These tests were ~~subsequently~~ conducted at WSTF. The first test article was BP-6. Initially there was considerable difficulty with the wiring and associated quality procedures.

A parallel contract had been going on to build the Little Joe booster which was done by Convair. It was a larger version of launch vehicle that had been flight tested and used in the Mercury program. At WSTF we checked out such things as the recovery system, the launch escape system, and studied the aerodynamics of the capsule itself.

253 In the fall of 1963, Joe Shea was selected to manage the Program Office. Jim Decker returned to Martin just prior to Shea's arrival on the scene. With the coming of Joe Shea, the Program Office underwent reorganization. Essentially, project groups ceased to be oriented toward the various contracts, and instead became more functionally ^{oriented} ~~concerned~~. Coincident with this activity, and at the urging of Jim Elms, the subsystem manager concept was adopted. Under this system various individuals in E&D were made responsible for the technical management of various hardware components of the spacecraft, ^{This resulted in the transfer of a number of personnel} and still others were transferred from the Program Office to E&D. ^{add 'A' from next page here as new P}

226 The MSC Apollo Program Office was organized to parallel the Headquarters Program Office in structure. ^{As Deputy Manager I was given a special assignment} I assumed responsibility for management of the 009 Spacecraft which was the first Apollo spacecraft flown on the ^{Saturn} S-IB. In an effort to expedite activity on this spacecraft, I spent portions of 35 ^{out} of 52 weeks during that year at NR.

315 297 Sometime after that activity, I was offered the opportunity to form an Experiments Program Office, ^{'B' from next page} which I did, incorporating some existing elements from the Gemini Project Office and from E&D, and hiring ^{the Experiments Office integrated} a few additional people. This office ultimately grew to about 80 people. We worked the Gemini experiments program, initiated and worked on the lunar surface science package, including the ALSEP, worked on the lunar mapping and survey system which was subsequently cancelled, and studied the PALLET concept for carrying large numbers of experiments on Apollo. In addition, we worked on the Apollo experiment program which was eventually ^{Cancelled} wiped out after the Apollo fire. ^{and the Earth Resources aircraft project}

315 About a year later The Space Sciences Division was formed from three branches that were

in ASTD and I was made acting head of the Space Sciences Division as well as managing the Experiments Program Office. These two groups were ~~then~~ ^{Subsequently} made the nucleus of the ~~future~~ ^{and I was named acting head of this new organization.} S&AD. The earth resources aircraft program was ~~taken under the wing of the Experiments Program Office somewhere during the course of its history.~~ ^{After leaving S+AD} Later on I was asked to integrate the ^{manage} ~~the~~ ^{S+AD} earth resources effort and subsequently formed an Earth Resources Division ^{in S+AD} of which I am the acting chief.

Charlie Frick left after a year. I don't think it's easy to appreciate what a man-killing job he had. Charlie also believed very strongly that the program had to be managed by the Program Office rather than other elements such as at Headquarters. ^{During his stay in Houston Mr Frick maintained} Furthermore, another factor in his dissatisfaction with Houston was that his home was in San Diego. He did not move his family to Houston and this arrangement appeared to place additional strain on him.

I left the Program Office because I felt I had made as many contributions as I could. The testing and specific detail work ^{that remained} were not ~~particu-~~ ^{Particulate} larly my forte. I was looking for and receptive to starting in a new area such as the experiments program. I also had been with the Apollo program since its inception--over five years.

Dave Gilbert was with the program in the navigation and guidance area until Shea came ~~and he~~ ^{and} subsequently moved into E&D. It should be noted that Shea himself had an extensive background in the guidance field.

MSC got involved in the earth resources program in essentially a service capacity. We didn't initiate the program, and we didn't provide the technical inputs that would have made us responsible for the technical content of the program. For the first several years, we furnished an air-

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craft and necessary instruments upon the recommendations of Headquarters or the Headquarters-sponsored consultants. We maintained the equipment, flew the missions, and provided the data to outside people. Based on responsibilities subsequently given to MSC, MSC ^{is now attempting} ~~has tried~~ to put itself in a role of understanding the program and ~~what's going on in it~~ and thereby assumes technically responsibility for it. This has required the addition of numerous types of technical people, and we are still in a relatively primitive stage of development. Exaggerated claims have been made for the earth resources program and what might be accomplished with it. I would say we ^{should} ~~would rather~~ take a conservative position, and although there is no doubt that useful technical information can be obtained about the earth from space, and intuitively you can estimate this will result in benefits to the earth, the showing of direct, economic benefits is difficult to do. We feel there is more than the usual technical reasons for going ahead and gathering such data, and that the justification and opportunities for studying the earth are legion but considerable work remains to be done. MSC to date is hobbled because it's using mainly old instruments, and only recently did we begin getting some good instruments on our airplanes, ^{which} ~~and~~ which are capable of doing useful work.