

1 p. 2 of 4 All-up

Transcript of interview with Dr. Seamans by Prof. Paul P. VanRiper of Cornell University, Tuesday, 6 December 1966, in Dr. Seaman's office, NASA Hqs., between 2:40 and 3:20 p.m. The following is from notes taken by Dr. Van Riper during the interview and transcribed by him.

Primary subject: The "all-up" decision on Saturn; a little material on Gemini 76

Note by PVR: Mr. Shapley had suggested in a letter of 15 Nov 66 to PVR that there might be an input on the all-up decision from Dr. Seamans in light of the fact that he had been essentially responsible for the manned space flight program in between Holmes and Mueller. Shapley felt the all-up decision had derived from this time. The interview began with an explanation of the research project involved and the decisions to be covered, plus a few administrative details. The interview proper then began. Material is not precisely a quotation unless in quotes.

Seamans: Where do you want to begin?

Van Riper: How would you define the all-up concept? Isn't it really something of a continuum?

Seamans: Well, that's a good place to start. Maybe I should just begin talking and see how things develop.

Van Riper: That's fine with me. Do you mind if I take notes?

Seamans: Not at all. Bring in a tape recorder if you like.

Van Riper: I find them impossible to work from--well, go ahead.

Seamans: The all-up decision, if it can be called that, occurred during the time between when Holmes prepared to leave, while Mueller was preparing to come on and during a few months thereafter.

It was following the May flight of the last Mercury (Cooper, VI or VII) that the change was initiated (Holmes leaving, i.e.). As a result I had to spend considerable time with Shea and George Lowe (both now at Houston; then with Holmes here). I had private conversations with each; then visited with Holmes at Houston and elsewhere on a number of trips. Webb was with us on one trip.

During these trips the "methodical procedure" of Huntsville "stood out"--"a pedestrian kind of thing". We saw that it would be slow and that a lot of time would pass in between tests--in analysis, preparation for the next test, etc., in this step by step approach.

Van Riper: I've heard this described as the block approach. What is the best terminology? I know the Air Force has also used "concurrency", which, while not exactly the same has elements of the all-up approach in it.

Seamans: "Blocks" were used but it seems to me that ~~the~~ "step-by-step" is better. It was apparent that Huntsville felt the way to go was as they had done with the V-2, Redstone...Shea, Lowe and I all felt this. The ground equipment, too, was not "concurrent" with the other technical developments. Shea said, "bite the bullitt" and take the risk of testing all elements at the earliest opportunity".

Seamans (contin.)

Some time in July--the same day of the big parade for Cooper in New York--I had agreed to see Mueller about a NASA job. I had been coming back from Nova Scotia coast ~~near~~ and was nearing ~~the~~ Rock (?) Island, when I got a message that Webb wanted to talk to me. ~~Immediately~~ I called back and Webb said he had talked with Mueller, and ~~that~~ he and Dryden felt Mueller was qualified for Holmes' job; he said T-Ramo-Woolridge concurred. But he said he didn't want to go further without talking it over with me.

By the time Mueller arrived he had thought a lot about the program and the organization (of the manned space flight program). Under Holmes were doing a lot of "counterparting" between the headquarters and the various programs. Mueller felt we should be organized differently at headquarters, ~~that~~ that we should be reorganized "across programs."

*where* } The first thing he did was to review the program (MSF). Then there came a time to sit down and reach a decision. George came in with a time chart and met with Webb, Dryden, and myself. George explained that, in view of the time and budget situations (budget was down from 5.7 to 5.1 billions) we had to leave out something.

We decided to leave out manned flights in Saturn I and concentrate on integrating with Saturn ~~I~~ IVB, to follow on with Saturn IB and Saturn V. Since it appeared the launch vehicles for IB and V were slipping, we decided to try and match the slippage by developing a launch vehicle to match (i.e., ~~skip I and work ahead~~ skip I and work ahead) in timing.

We also had IB and V overlapping, so, if all goes well, we can move from IB to V on the 4th or 5th flight, and use the other 4 or 5 flights for other purposes. It has been laid out so we "could capitalize on success" and also capitalize on alternatives if need be.

Here we had a brief discussion of two sets of documents which S. felt I should look at:

1. Mission assignments documents--describing the missions and alternative vehicles.
2. Apollo contingency plans (or, S. said, something like that title)--if difficult on a 207 flight, for example, can do the 207 experiments, etc. on other flights; there are 40 some contingencies dealt with.

Van Riper: Howabout the old NACA testing philosophy, based on the need to have a plane flown by a human being? Did this have any impact along the way on testing procedure?

Seamans: Of course Houson <sup>t</sup>drew on NACA (Langley) as Mueller was drawing on ICBM experience. Mercury had been done step by step; Houson wanted to do Gemini the same way. But, and this may be a little beside the point, the biggest thing in Gemini was not to ship to the Cape, where everything was taken apart, retested, and put together again. ~~But~~ take the Houson team to McDonnell and then to the Cape. Mueller got Gemini launches going every two months this way.

Seamans (contin.)

Mueller was helped by ~~MEMO~~ Shea at Houston of course, who concurred with Mueller's views. He had got Shea and Lowe in Houston to help on the problem. When Mueller got down to cases, Houston fell in with good spirit.

But Mueller still had a special problem in his relations with the center directors at Housen, Huntsville and Kennedy. For this he devised a special management technique, which I was not at all sure would work.

~~Remember~~ There was Phillips (with a Minuteman input) heading the Apollo program here (S. was not just sure when Phillips came, but thought he was heading Apolle at this time--summer and fall of that year); O'Connor (?) was at Huntsville; Patrone (?) at the Cape. The danger was that headquarters would be dealing directly with the program people at the centers, with the center directors feeling ~~abandoned~~---what were they, "just caretakers".

So, Mueller said to the three center directors, we are a board of directors and we will get together and review decisions monthly, so as not to offend the center directors. And it worked !

Van Riper: What about documentation on these reviews?

Seamans: There is some of course; it is available. There is also a statement by Webb in the spring of 1965. He had to see the idea to Congress on the way. You might check the legislative hearings.

Van Riper: I am in the process of doing so.

Seamans: Of course the 1st Saturn flights are known as Block 1 and on through Block 5, in series. The first ones are not 100 per cent all-up the first time. There is...

Van Riper: Something of a continuum here?

Seamans: Yes.

Van Riper: Howthe the all-up idea seem to you? Where did you get any such concept?

Seamans: "That's a good question" Well, let's see. The idea had appealed to me. Guidance and control had been my specialty at MIT, where I had concluded we couldn't wait too long to test. There at one time I was in charge of the Meteor Project, its Chief Engineer. I had worked until 1950 with Draper; then into Meteor. Here we had been set to fly a test, but, the day before, some felt the design was unsatisfactory. The vehicles was ~~manufactured~~ aluminum and the final design was to be steel; and they weren't sure what would happen. So it was cancelled, and we had to wait a whole year more and the impact on morale was considerable. So I felt, what could we lose? This was one example. I felt we "had to take some risks and accept some deficiencies in order to get moving at the earliest possible time."

Seamans on "all-up" (PVR, 6 Dec. 66)

Van Riper: For each of these decisions I like to get a "cast of characters" as well as a chronology. Who should I consider interviewing further--besides Dr. Mueller of course?

Seamans and Van Riper then discussed possibilities with some interchange, resulting in the following:

- Houston: Shea, Lee and Gilruth
- Huntsville: Von Braun and Eberhard Ries (deputy) (? sp.) (S not sure either)
- The Cape: Debus, Rocco Patrone (?), and probably Siepert (on this and other matters)
- Lewis: Silverstein (S. said he was in early planning but for Mercury only)
- Langley: Thompson

Seamans (in an aside) After all, Houston came from Langley. It was interesting to see the development of the Houston group at Langley side by side. When it came time to ~~rearrange~~ move, there were only 2 or 3 who wouldn't. There was even a secretary ~~or~~ two who moved without her husband; wanted to be in on the new program.

Van Riper: What about the position of Webb and Dryden on the all-up decision.

Seamans: There was no real concern on their parts. Mueller was a new man and they wanted to let him do a job. Hardest for Hugh was White's extra-~~vehicular~~ vehicular trip on Gemini IV. I was for it and Webb ~~was~~ wanted unanimity. Webb picked up the Gemini 76 "just like that and immediately called the White House". On the "all-up", Webb listened; he asked George some questions; Dryden asked some questions; but "it was the only position they could take".

*Dry to work on this*

Seamans then stated he would try to find documentation on the decision and the project approval documents. Since 1961, Seamans said, they had tried to put dollars, ~~and~~ program content, and time into their documents. I should see Wyatt in the office of programming for some of this documentation.

Van Riper ~~expressed~~ expressed his desire for such documentation, but said that he would followup with Wyatt; and an appointment was then arranged with Wyatt.