An interview with William (Bill) E. Cobb, NASA Engineer

Question: What is your connection to the Apollo missions?

Answer: I was in the Structures Division of Marshall Space Flight Center and our responsibility was designing and monitoring or overseeing the structural design of all of the [Saturn V] vehicle up to the bottom of the Apollo hardware. That would be the large, long conical part just under the Command Service Module. In particular, my responsibility focused mostly on the design of the instrument unit (Figures 1 and 2), which was the uppermost part of Marshall's responsibility. This was the little 36-inch tall ring that was, I don't remember now, seems like it was 270 inches in diameter, I think. But it contained all of the instrumentation, the computers, and the gyros, all the stuff that controlled the vehicle. And it had a cooling system built into it to cool the electronics and all that sort of stuff. Our large group – we had a little over 100 people – also had the monitoring responsibility for the work that was being done on the stages*, like the S-2 Stage and the S-IVB Stage. Now the S-1C stage, which was the very bottom stage, the first stage, it had been designed completely at Marshall and our group was very heavily involved in it. But most of the time that we were working on that, I was working on the instrument unit. The instrument unit was made out of [aluminum] honeycomb. We had not done any honeycomb, so the first thing I had to do was I spent, gosh I don't remember now how much time in Nashville. There was an aircraft company up there called Avco that produced a lot of honeycomb structure. And we went through some pretty extensive training up there on how to design and manufacture the honeycomb. But uh, let's see, I guess that was mostly it. Now all of the lunar lander and all of that sort of stuff was sitting on top of my little old instrument unit. That structure, that instrument unit, it was 36 inches tall and I think it was 270 inches in diameter, and it was supporting, it was an awful lot. I remember the loading was 1100 lbs per inch going around the circumference. So, if you calculate that circumference and multiply it by 1100 lbs you'd find out how much that little old honeycomb instrument unit was supporting and the honeycomb structure itself only weighed 300 lbs. So, it was a complex little structure. Like I said, our group was responsible for all of the structure in one way or the other, either overseeing the contractors or doing it ourselves, from that instrument unit all of the way down to and including the thrust structure that the main engines were attached to.

Q: What was your reaction to Kennedy's 1962 declaration that we would put a man on the moon within a decade?

A: Oh, we were all celebrating! You see, when I started to work in Huntsville, it was before there was a NASA. I started working up there in 1956 and we were working for the Army Ballistic Missile Command. The Army Ballistic Missile Agency (ABMA), to be exact. And it was commanded by a guy named John Medaris, General John Medaris. And he had as a right-hand man a civilian guy by the name of Dr. Werner von Braun. And von Braun was doing all of this, you know, he had been promoting space flight for years and years and years. And we had, we were working on an Earth orbiting satellite and, I'm going to get around to answering your questions in a minute, but anyway, we were working on this Earth orbiting satellite using this Jupiter-C R&D rocket, which was based on the Redstone missile, a short-range ballistic missile (SRBM) that was designed and built right there in Huntsville, and tested and test fired and everything right there. And it was getting pretty much ready to go but this guy, he was, his last name was McNamara,

he had been appointed the Secretary of Defense, I think. He came up with this weird idea that he was going to give the Navy the responsibility for launching America's satellite. Now the Navy had never done any rocketry or anything. But anyway, they had several they blew up on the pad and von Braun and Medaris went to Washington and told them, you let us do it and we'll have you one in orbit in three months. They thought they were kidding, but anyway they did, and they came back ... what they didn't know in Washington – you know, a general has got quite a bit of authority – they had already built this thing and it was sitting in a warehouse, and so the only thing they had to do was get it out of the warehouse and get the dust off of it and get it all checked out and everything and ship it down to the Cape and it would be ready to go. So, they did, and then Kennedy made this announcement and we were all really, really excited, but uh, you know that's what we were hoping for anyway. Then, once he made this announcement and NASA was formed. Well, NASA was formed before he made that announcement, but the politics got involved in where these centers would be, you know, the Marshall Space Flight Center would be in Huntsville and Johnson would be in Texas. It all worked out pretty good. But anyway, to answer the question in short, it was really exciting. We were glad to hear it.

Q: What was it like seeing the rockets you worked on take flight for the first time?

A: Um, well, it, I guess, it's exciting, you know. Even those rockets that we were working on for the ABMA, they were pretty small, but still when you light a rocket engine, you've got a lot of fire and all of the sudden you've got a big push and it's always exciting to see everything work the way you thought it was supposed to work. The way you planned for it to work. One of the amazing things that happened and very few people know anything about it, in one of the moon launches the rocket, the entire Saturn V rocket, was designed to withstand a lightning strike. There's no way of testing for that. But one of them was struck by lightning just a few feet off the pad, maybe a couple hundred feet off the pad or something like that. It survived it. The computer's memory, it lost some of its memory, but since it went into orbit to start with anyway, there was time to upgrade that memory and everything and then it went on its mission with no problem whatsoever. That was a big thing. That was something we couldn't test and yet it worked just like planned.

Q: Please describe your experience watching the lunar landing and seeing Neil Armstrong take the first step on the moon.

A: (begins laughing) We had a farm and we had 80, 88 pigs. I had this wild idea of growing pigs and fattening them up and then selling them, see. And so about dusky dark, the landing was going to take place here around 11:00 PM local time or somewhere in that neighborhood. It was a Sunday night and we had been at church. We got home and there were pigs all over the world. They were all over the world. So, we were going to see if we could get these pigs back in. After driving ourselves crazy and everything else, I came to the conclusion you can't make a pig do anything after dark. So, we decided to go in and turn the TV on and watch the lunar landing and then the next morning we would get up early and get those pigs back in the pen. So that's the way it went. And we got there just in time to see the landing, to see him step off of the thing. So, I missed out on a lot of the excitement of the landing. Now I know everybody in NASA that was watching it was really on pins and needles because that character Neil Armstrong, he didn't have any nerves. He was flying that thing (the lunar module) around looking for a good landing spot. When he finally found one that he liked and set the lunar lander down and shut the engine down he had gosh, I don't remember now, like three or four seconds worth of fuel left. And he was just about out of fuel and, of course, they were getting feedback here about how much fuel he had remaining and everybody was about to have a fit because if he ran out of fuel then they were going to crash.

Q: What is your favorite NASA mission? Why?

A: I'm going to say my favorite one was one I had an awful lot to do with. It was later on after the lunar

missions were in progress. NASA had all of this space hardware, all of this capability and so they were looking around to see what we might do next. What can we do after we do as many lunar landings as we want to? And there was a program called Apollo Applications, basically it was applying the Apollo hardware to doing something else. Some world-famous astronomers had been pushing for telescopes in space and they had designed some small telescopes that they thought it would be feasible to put in space. So, our program development group got to looking into this and they decided that year we could launch some telescopes using all of this Apollo hardware. And of course back then, now, there wasn't digital photography. If you wanted to make a picture of something you had to make it on film. So, making pictures with these telescopes using film and then getting the film back to Earth was a big problem, but anyway, to shorten the thing up, we did do a thing called the Apollo Telescope Mount, ATM (Figure 2). I had a lot of responsibility for that little thing called a canister, which is a big barrel-like thing and all the telescopes were mounted in it. It was a successful thing although it wasn't anything compared to say, Hubble, because like I said, we didn't have digital photography back then. Had no way of sending pictures or anything back. But it was very successful and it did show that you can in fact launch telescopes and they can be used in space and you can see a lot of stuff from a space telescope that you can't see from the ground and everything. You can google that, by the way, the Apollo Telescope Mount on google and pull up a lot of stuff.

Q: Have you met any of the Apollo astronauts?

A: Let's see. I can't remember now how many I have met. I have met a bunch. They are interesting people. They were all, all of the Apollo astronauts, had to be test pilots. Test pilots don't know what being scared is. They just don't have any nerves. But at the same time, they are very precise, they don't believe in taking chances. They liked to get their nose in things and make sure they think at least it's going to work.

**The Saturn V rocket had three stages that took it from the launch pad to space. As the fuel from each stage was depleted, the next stage was fired up.*

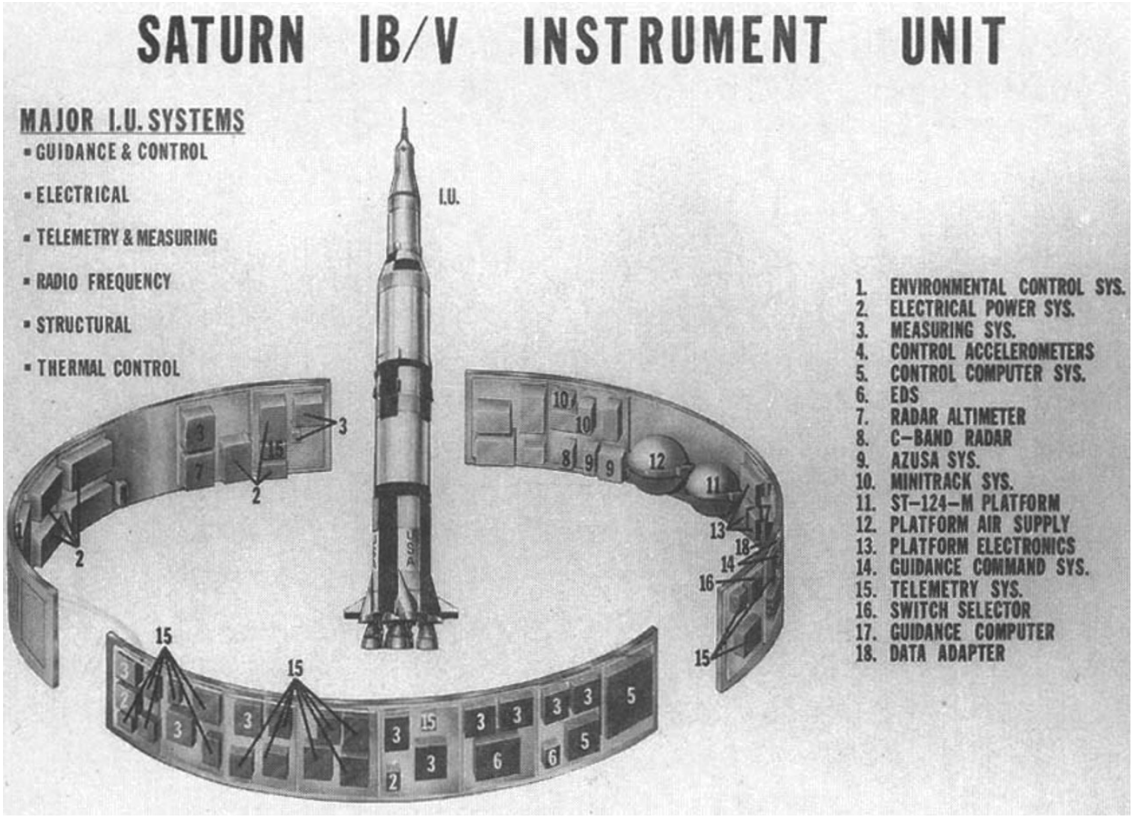


Figure 1. Saturn IB/V Instrument Unit. Credit: *https://history.nasa.gov/SP-4206/p246a.htm* Retrieved 7/22/2021

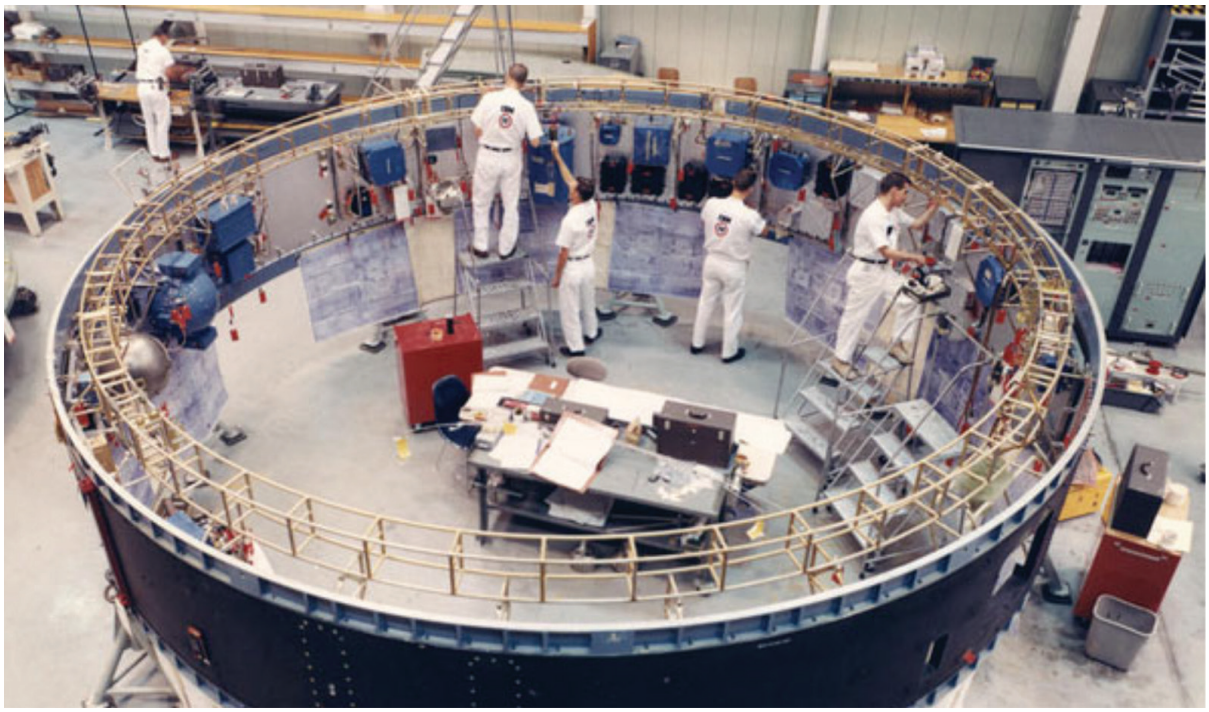
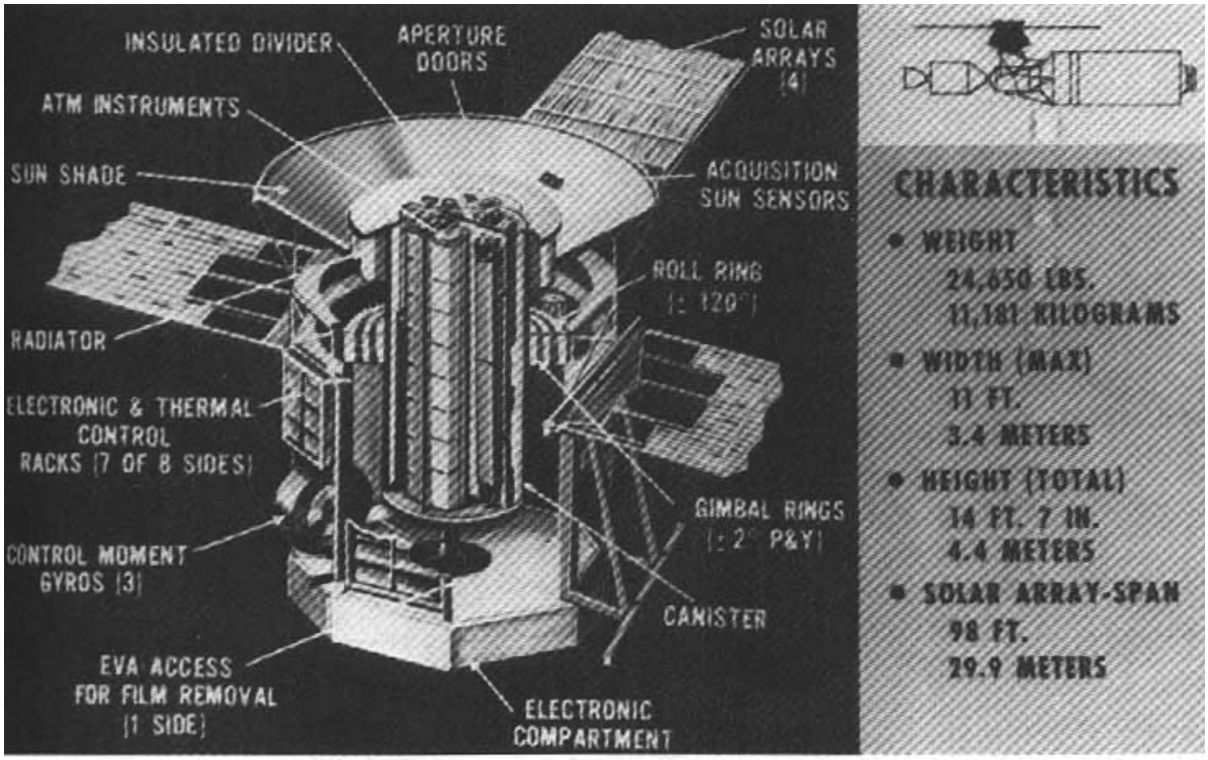


Figure 2. Manufacturing the Saturn V Instrument Unit. Credit: *https://www.ibm.com/ibm/history/ibm100/us/en/icons/apollo/breakthroughs/* Retrieved 7/22/2021



Sketch of the Apollo telescope mount.

Figure 3. Sketch of the Apollo Telescope Mount (ATM). Credit: *https://history.nasa.gov/SP-4011/p197.htm* Retrieved 7/22/2021.