

# NASA JOHNSON SPACE CENTER ORION ORAL HISTORY PROJECT

## EDITED ORAL HISTORY 2 TRANSCRIPT

JAMES M. FREE  
INTERVIEWED BY JENNIFER ROSS-NAZZAL  
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ROSS-NAZZAL: Today is July 7<sup>th</sup>, 2016. This telephone interview with Jim Free is being conducted in Houston, Texas, and Washington, DC, for the Orion Oral History Project. The interviewer is Jennifer Ross-Nazzal. Thanks again for taking some time this afternoon. Certainly appreciate it. Last time we spoke, you mentioned the Smart Buyer activity. I wonder if you could explain what that was.

FREE: It was an effort run by a team across the Agency to look at a design of the service module independent of what the Project was doing, to flesh out the requirements for the vehicle that was going to be bought through what is now the contract that Lockheed Martin has. It was an effort to take the Agency expertise against a set of requirements and determine were those the right set of requirements and what would that cost.

ROSS-NAZZAL: Also, you mentioned the fairings last time. You mentioned how you needed to win support for that idea. Could you share some details about coming up with that concept and then convincing management that it was the right decision?

FREE: Sure. It was a group of engineers at Glenn [Research Center, Cleveland, Ohio] who were trying to help the entire Orion Project with the mass to orbit problem that was both in the crew and service module. There were efforts under way for both to drop mass off the vehicle, because

it was overweight. This was one of the concepts traded by a couple engineers at Glenn that had come up with the idea, and then there were a lot of technical trades. I don't know that it was convincing management. It was probably more convincing the entire technical side that it was the right thing to do. So that happened through a series of meetings and formal technical presentations that eventually became the baseline on the vehicle.

ROSS-NAZZAL: The last question that I have for you based on the transcript was when you became Director at Glenn, you said that you were helping to make sure that Glenn met the milestones and commitments for EFT [Exploration Flight Test]-1. Can you give a couple of examples?

FREE: The primary one for EFT-1 on our side, we had a number of folks helping the vehicle overall, but the primary one for us was getting the fairing testing done to fly on EFT-1.

ROSS-NAZZAL: We talked about that a little bit last time. You also mentioned that you were watching EFT-1 with the Glenn folks. Were you in Florida or were you back in Ohio?

FREE: I was in Florida for the first attempt, but we had some VIPs [Very Important Persons] coming the next day to the Center, so I had to fly home. So I was at Glenn watching with the employees in our auditorium.

ROSS-NAZZAL: Were you present for the recovery or landing?

FREE: No, I watched that actually at the NASA Glenn Visitor Center at the Science Center in Cleveland. I went down and watched that with a number of folks from the public who were at the Science Center that day. We watched it on TV.

ROSS-NAZZAL: What do you think was your most significant challenge during your time with Orion up to EFT-1?

FREE: Boy, my personal challenge was probably getting the—I want to almost say Project sold, the ability for Glenn to be a contributor on the Project. Once the technical work came, while challenging, that was easy, because I knew we had good people. Getting the Project sold that it was okay to have Glenn be a member of the team was probably the biggest challenge.

ROSS-NAZZAL: Can you explain why? I don't want to put words in your mouth, but I'm just curious. Is it because this is more of a human spaceflight endeavor, and Glenn wasn't necessarily always included in those efforts?

FREE: I think you summed it up well. I think it was the traditional—we still say it today—the human spaceflight centers versus the robotic or the research centers. We tend to stereotype centers and capabilities, and that's what I believe was happening with Glenn. It was stereotyped as a research center because it said research in the title, even though it had done flight projects for a number of years.

ROSS-NAZZAL: What do you think was your most significant contribution to EFT-1?

FREE: I would say any contribution I had from a service module perspective or Orion perspective on the technical side was made years before that. The fairings would probably be the biggest thing. In terms of what I did from my management position, it was hopefully enable as I talked about our products to be of the quality that they needed to be to make EFT-1 successful.

ROSS-NAZZAL: I have a quote from Program Manager Mark Geyer. He said that the Orion Project learned to persevere. Would you agree or disagree with that statement, and why?

FREE: Learn perseverance?

ROSS-NAZZAL: Yes. Learned to persevere.

FREE: Oh yes, absolutely, in many ways. Through the last presidential transition, to every technical challenge that was thrown the team's way, to everybody knowing better how to design a vehicle, in their opinion, right, knowing better how to design the vehicle, I think they more than persevered. I think they really showed why they're the team that's getting it done.

ROSS-NAZZAL: I had a couple of questions for you just related to the service module. The EFT-1 service module was primarily a structural representation of the service module. Were there any lessons learned from that flight that are being then applied to EM-1?

FREE: It was basically a structural element. I think all the environments that the service module saw from a structural perspective, meaning the loads on the structure, were certainly something that were validated via the EFT-1 flight. I know that the data has been used to inform the evolution of the design. So yes, absolutely, there were things that were learned from it.

ROSS-NAZZAL: I wanted to talk a little bit about the ESM [European Service Module], if you could. Can you talk about NASA's relationship with ESA [European Space Agency] and the agreement that led to the partnership for the new ESM?

FREE: I think NASA's relationship with ESA is certainly lengthy. first of all. Second of all, it comes from our work on ISS [International Space Station]. I think it was an opportunity for Europe to play a bigger role in human spaceflight. No other country had been in the critical path, meaning it's got to deliver for our success, meaning the U.S. success. No other country had ever been in that position before. The lessons learned from Space Station of how to work together and how to continue that trust and that development of exploration is what led to the confidence to put Europe in that position.

ROSS-NAZZAL: Were you involved in any of those negotiations?

FREE: I was not, other than supporting them at the time. I was just transitioning out of Deputy Director and transitioning into Center Director when that agreement was signed so just in terms of supporting the team, hearing about the negotiations, giving them some ideas of potentially

how to do things. That was really run by the Project, and certainly Mr. [William H.] Gerstenmaier here at Headquarters.

ROSS-NAZZAL: What were your initial thoughts when you heard about this idea? Did you have any concerns?

FREE: I don't know if they're concerns. Any time you put a different interface in any system, it has the potential to add complexity. But I couldn't look myself in the eye after encouraging the Agency to entrust Glenn to do the work on service module initially by adding an interface—I was basically doing the same thing—to then look at the Agency and say, “You shouldn't do this because it adds complexity.” I think the international piece certainly adds a whole different element to it. ESA's motivation to be a member of the team and the wherewithal to withstand a lot of what we go through in the U.S. on human spaceflight from a political perspective, is something I think Europe has to learn. I don't know that I had reservations.

ROSS-NAZZAL: Did anybody at Glenn worry about job security or any of those issues?

FREE: Boy, not that I'm aware of. I'm sure they did, but I can't speak to the fact of anyone ever saying to me, “I'm worried that our job is getting taken away.” I think initially there may have been some thought of that. The time and effort that it takes to work with an international partner has probably had people realize that hey, there isn't a job issue there at all. We may even have a few more resources than we had previously to do the same work.

ROSS-NAZZAL: You mentioned you had spent some time over in Europe recently, last time we had spoken. What is your role now working on the ESM?

FREE: I'm really trying to be the person that tracks it for Mr. Gerstenmaier here in my new capacity, finding ways to build those international relationships, and really ensure that the Project has everything that it needs to get past this critical milestone. As a Headquarters person I can hopefully help with the relationship with the Europeans. So try to learn some of the folks on the Europe side that I had never worked with before and then also take my knowledge of the service module and maybe help get them through some of the difficult technical issues that they face.

ROSS-NAZZAL: What were some of those issues?

FREE: I think it's just general development of a new spacecraft, the interfaces to the crew module being one of them. I think it's some of the design, how things are designed differently for human-rated vehicles versus robotic vehicles. It's probably more a cultural transition. Once you get the teams in a room talking through specific technical issues, that was demonstrated to be the easy part. It's more gaining the perspective that each side has in this type of development.

ROSS-NAZZAL: Did I read correctly that recently there was a CDR [Critical Design Review] for the ESM?

FREE: Yes, that's what I was over there for, the first phase of that, and the closeout of that will be in the October timeframe.

ROSS-NAZZAL: That will be delivered to KSC [Kennedy Space Center, Florida] in 2017?

FREE: Yes.

ROSS-NAZZAL: I think we've gone through all of my questions. You were fast today. Unless there's anything else that you wanted to talk about in terms of ESM or any other details you think we might have overlooked when we spoke the other day or today. I know you're on a limited time schedule.

FREE: I don't think so. I'd just be interested. Can you tell me what the next steps are for your Project?

ROSS-NAZZAL: Absolutely. I'm going to stop this.

[End of interview]