

# With Adm. Craig E. Steidle

Interview by Frank Sietzen Jr.

*What in your opinion have been your major accomplishments since your office was established in January 2004?*

Well, it was a great year, and we got an awful lot done. In fact, I just commented this morning that we announced an all-hands meeting to talk about what we've accomplished. We started out last year at this time with two people and zero dollars, and we have considerably more than that now! We have a plan, which we've put in place; we have an acquisition strategy in; we've let significant contracts. And intramural contracts with all the centers. Out to industry, we've received 3,700 responses.

We've established the requirements office with technologists and operators together. They've produced the Level 1 requirements for the first three spirals. I think, aside from that, the extramural contracts—70 from the 3,700—have over 1,000 links with academia and centers. It's a tremendous horizontal integration of the capability of NASA.

We've instituted some new ways of doing processes. We've used the BAA [Broad Area Announcement], we're using current value management, we're using a disciplined approach. We've held industry days. We've met every milestone.

*So you're off on a firm footing?*

There's something else that's significant. I saw throughout the year in the congressional briefings that I had, either with members or with staff, that they've actually gone from being cynical right from the start, very very cynical, to skeptical, to interested, to not necessarily supportive but more interested and aware of what we're doing. That was a tremendous process, going over there all the time. The boss certainly made that happen.

*You've managed programs in the Pentagon and now NASA. What is different, and what is*

*the same, at NASA as compared to your Pentagon experiences?*

What is similar is that we have a lot of hard-charging people here, and I found that over there as well. If you give people an opportunity to work and make a contribution, they really step up to bat. I've not seen any difference here at NASA. A lot of very talented people who want to participate. What I've seen that's different is that we don't have all the tools at our disposal here yet for the management of programs, but we have them under way.

*What tools are you missing?*

Integrated financial management system, earned value management systems, but Mr. O'Keefe had initiated those and we're getting those in place. We did have them over in the Pentagon. It was a little bit easier in the Pentagon to manage some large systems integration programs. So we're making that work.

The other difference is a lot of expertise that is resident in the centers that you don't find necessarily in the DOD centers. In DOD we managed a lot of contracts actually executed by contractors, and the expertise was in the contractor realm. Here at NASA a lot of the expertise is resident in the centers. Just some basic core

competencies reside there. And that's different, and the wealth of expertise I've found here.

I'd add that, during my military career I have met leaders of all kinds, but I have never met a better leader than Sean O'Keefe. Mr. O'Keefe's leadership has been exceptional. He has proven to be a tremendous asset for NASA, an inspiration for me. He will be missed. I wish him all the best as he begins a new journey.

*What are your goals this year for the Exploration Directorate?*

Last year was the year of planning and processes and organizing and establishing credibility to manage this program. This is the year of systems engineering and integration. We need to go forward with our plan to bring all of these pieces together, systems engineering and integration of all of these technology development programs, the CEV [Crew Exploration Vehicle], Prometheus nuclear vehicle, and the requirements.

The other goal is to continue on and establish the credibility that we have, that we will meet every milestone, and we can manage these programs that we've put in place affordably. And then we'll have an RFP on the street and a selection made by August for two teams to go forward with the CEV demonstration. By the end of the year we'll also have a selection of a systems engineering and integration team.

*You mentioned the BAA contracting tool. Why have you made use of that when NASA hadn't done so before?*

One, because I was comfortable with it. Two, because I used it before, and understood that there was a lot of rigor in it, and it had been proven in programs I had managed before. If you actually compare the AO [Announcement of Opportunity] that the science community uses, it's actually very similar to the BAA. You go dig

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itally in the source selection; you down-select and have a review committee, and then you have a selection. The BAA allows you to do this very quickly: Make your announcements, put your team together, review it, and then present it to the source selection official. Usually less than 90 days. A very credible process that works very well.

#### *How do you see the evolution of the CEV?*

Evolvability is one of our figures of merit. It is key. This down-select and demonstration that we're going to have in '08, 30% of that selection is predicated on the demonstration itself, another 30% on our technology maturation programs, so that those technologies are introduced in later spirals. But here's the answer to your question: 40% is predicated on where we're going in the future [with the CEV]. The Moon and beyond.

So you have the contractor teams constantly focusing on beyond just the Moon, or a single data point of a CEV in orbit; you're always looking beyond it. And working together, the contractors will tell us how to do that. These 11 contractor teams we have right now on board are signed up and contracted to do CEV concepts and lunar concepts. So they are already studying those pieces. But if you make a selection predicated only on the demonstration in '08, or only a crewed vehicle in 2014, you're going to miss what you described as being very important, and that is to focus on the end point.

#### *And the end point is?*

The evolvability of this to do more than one mission.

#### *What do you expect the CEV flyoff to accomplish for NASA? What are you going to get out of a manned spacecraft flyoff competition?*

We're going to get a couple of things. One, by the criteria I've just described, we

*Adm. Craig E. Steidle was named associate administrator of the newly created Office of Exploration Systems in January 2004. The office was established to set priorities and direct the identification, development, and validation of exploration systems and related technologies. Users and technologists will work together to enable a balancing of factors between requirements, program schedules, and costs, leading to future space exploration systems. The office became the Exploration Systems Directorate in an August 2004 NASA reorganization.*

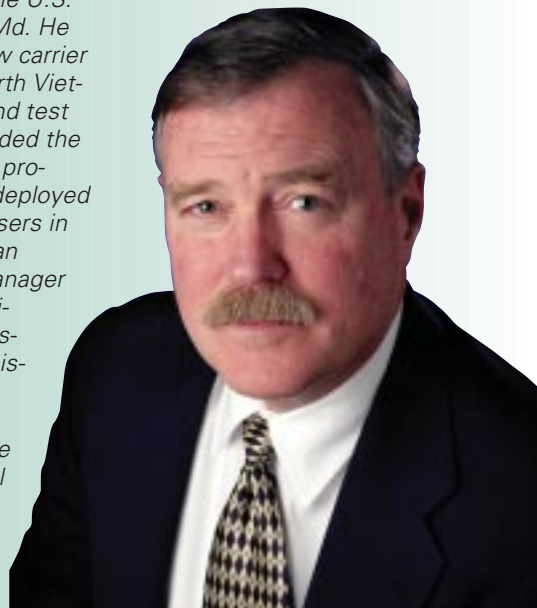
*After retiring from the Navy in March 2000, Adm. Steidle served as an independent aerospace consultant. His last assignment was as chief aerospace engineer and vice commander, Naval Air Systems Command, which develops, acquires, and supports naval aeronautical systems.*

*The admiral entered the Navy after graduating with merit from the U.S. Naval Academy, Annapolis, Md. He trained as an attack pilot, flew carrier night combat missions in North Vietnam, served as a test pilot and test pilot instructor, and commanded the Navy's A-3 weapon systems program. During the 1980s, he deployed on carriers, frigates, and cruisers in the Western Pacific and Indian Ocean. He also served as manager of the Navy's aerospace engineers and as the special assistant for air combat to the assistant secretary of the Navy.*

*Adm. Steidle commanded the Navy's F/A-18 program, naval aviation's largest production, R&D program, as well as the largest foreign military sales*

*program. The secretary of defense presented him with the Navy's Outstanding Program Manager Award. Steidle served as the director of the DOD Joint Advanced Strike Technology Office and was the director of the Joint Strike Fighter program. Under his command, the JSF program was awarded the David Packard Excellence in Acquisition Award.*

*He earned an M.S. in systems management from the University of Southern California and another in aerospace engineering from Virginia Polytechnic Institute. He is a member of the Society of Experimental Test Pilots and a Fellow of the Royal Aeronautical Society. His decorations and honors include the Defense Distinguished Service Medal; Navy Distinguished Service Medal; Legion of Merit; Distinguished Flying Cross; Meritorious Service Medal with gold star; Air Medals with bronze star; and Navy Commendation Medals.*



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are going to get teams competing against each other, and our return on investment will be much, much more significant. In a competition environment like that, you’re going to have those contractors basically stretching themselves as far as they possibly can during competition. We will also get a demonstration focusing on our tech maturation programs, and making certain they are included and that the contractors are participating with us. We’ll also get a demonstration that’s going to have applicability to this question, which is, what is the evolvability of the CEV.

So we’ve got affordability, we’ve got a tremendous return on investment, we’ve got participation by the contractors and the tech programs, and we’ve got them focusing on the long-range plans.

*If a flyoff is a good idea for the CEV, are you contemplating such a step in the development of the Earth Departure Stage [EDS] or the Lunar Surface Access Module [LSAM], should you choose an architecture that deploys those assets along with the CEV spacecraft?*

It could very well be some kind of a demonstration. That’s only one architecture, around which we’ve done a lot of trades. Spent a year developing that scenario, and thus far it looks like a good one. The EDS sends the vehicle out of Earth orbit to the Moon, the LSAM lands the crew and cargo on the surface. If it works for the CEV, as you’ve pointed out, a fly-off hasn’t been done in the manned space business before. It has been done in other businesses. If it works, we might like to employ that in other systems (a flyoff or a vehicle demo).

*How will the Directorate grow this year?*

The president’s budget fully funded the VSE [Vision for Space Exploration]

and our tech maturation programs. So we’re in very good shape in ’05.

*You’re going to have a new administrator; are you getting new people?*

As far as the office is concerned, we merged the biological and physical research into ours, and we are still sorting that out, and moving people in ones and twos. But what we don’t have is a good level of systems engineering and integrators from which we can pick people and put them in here. We’re going to have to train our own.

So to answer your question, the budget has gone up, but from a people standpoint we probably aren’t going to be adding that many more here. Perhaps a few in the systems engineering. I am focusing on people from an inside-NASA perspective, along with the assistance of industry. But leading these programs from NASA HQ will be a small group; a lot of work will be done at the centers, and then linked to industry.

*How important to the vision is Prometheus?*

Prometheus is a tremendous capability. I think that if we look back years from now, we’ll see that that was one of the larger steps we had to take. Having that electric capability in space, somewhere, is going to offer unknown capabilities to science in the future. We don’t even know what its capabilities will mean—thousands of times our current power capability. So Prometheus is crucial.

We do have an Analysis Of Alternatives going on that’s looking at other applications, now that we are on our way. We have this MOU with the Dept. of Energy Naval Reactors, where can we apply this system, this nuclear electric system. We have a task for lunar and free flyers. We don’t even know where else it might be used. That will be finished in the March timeframe. It will be significant. And it rolls together with the integration piece, brings in all the technologists. All these systems, the CEV, all have to be pulled together. That’s the largest effort that we have.

*What’s going to happen to the Lunar Reconnaissance Orbiter? Will it fly?*

I have right here the announcement of instruments. I’ve signed it, and we’ve

just completed our source selection. This has been a very good collaboration between science and engineering. When I looked at the instruments that we selected for this package—it will be a polar orbital mission—it dovetails very well.

*Is the booster a Delta II?*

Quite possibly, yes I think so.

*Can you help explain your philosophy concerning choosing a launch solution? EELV variant? Shuttle derived? Or a clean sheet? What in your view are the benefits or drawbacks of each?*

There have been so many trade studies on launch systems in this field already. It’s difficult to make sense of all of it. You can take those trade studies and go off in any direction you want. We started a couple of studies and I was getting the exact same answers.

But this is what we have: We have our requirements, point of departure architecture. We have 10 scenarios on lifting capability. If we need to lift 20, or 40, or 60, or 80, or 100, do we have the right vehicles to do that?

At the same time that this is going on, the same group that has done the previous studies has been asked to finalize those things. Everything from a shuttle-derived to a hybrid to EELVs is in the group. Apply those particular capabilities to these particular architectural studies and our point of departure reference. Then we’ve hired Aerospace Corporation to work with them to do the cost analysis. That’s all due to be finished in March.

*Anything specific talking to you out of that mix?*

I’m not leaning toward a clean sheet. That’s the only thing that has come out of this so far. Other than that, I’m not leaning in any direction or developed any bias.

*What about heavy-lift solutions?*

We’re looking at cargo and human-rating pieces. They don’t necessarily have to be the same, don’t necessarily have to be the same family [of boosters]. In the vision statement, we said, to the extent possible, separate cargo from human. The contractors are good at providing us with families of lifting capabilities. We have the shuttle-derived piece to be considered.

*Isn't there a certain logic to the shuttle-derived solution? You've got the flight history, the infrastructure there, the trained workforce there. Doesn't that make a good case for that vehicle?*

We're doing these particular trade studies on that, looking at the infrastructure costs, what has to be changed. What are the reliability levels that we need right now, what makes sense for growth capability. And what can we use to meet our vision capability, eventually get to Mars. But we won't have anything more until the March timeframe.

*Why does spiral development reduce risk?*

It does a couple of things. It would have been very difficult to go forward this past year and define with any kind of certainty a program that takes you to Mars. Milestones, the programs, the entry and exit criteria, the dollar value. We couldn't have gone over and defended anything like that. We wouldn't have gotten our program, we or Mr. O'Keefe, or anyone.

To define a program to that extent before members or staffers would have been impossible. But what you could do with rigor is define the upfront pieces, what it takes to get to 2014. We know the development costs. We could define with certainty that spiral. Then, therefore, we could define such a program. Then, the next piece develops—it may mature or not mature.

The ones that are successful lead to the next phase, take that particular vehicle and send it to the Moon, short duration. Then send it to the Moon for a long duration; send it in a fly-by to Mars; then a Mars sustained presence. So we can grow all these particular pieces. These development programs are also demonstrations of the technologies needed for the next stage. So they grow into the next step. At the same time, you can defend those programs. That's what's so special about spiral development.

*You've made much of this idea of linking robots and humans. How will that play out?*

There is synergism between humans and robots. Opportunity just came out of a crater [on Mars]. If we're on the lunar surface, and we come to a similar crater, I'm sure the human isn't going to go in there. Take that robot and send it down

*"Opportunity just came out of a crater [on Mars]. If we're on the lunar surface, and we come to a similar crater, I'm sure the human isn't going to go in there. Take that robot and send it down there to explore and come back."*

there to explore and come back. So that's a good utilization of both together.

We will continue on with demonstrations, such as the DART program and Orbital Express. Autonomous rendezvous and docking. It gives us the ability to demonstrate telerobotic operations. In the long run—if we can have commercialization of from here to LEO, the placement of supplies, fuel, and things of that nature, then robotically rendezvousing and docking pieces together—we don't have, as you pointed out, a Saturn V, so we'll have to do manned in-space assembly of some types. That can in some cases be done robotically. Those are the synergistic pieces of human and robotic collaboration.

*Do you look upon the remaining shuttle flights as providing the directorate with anything like a technology test bed capability?*

Yes, I hope so. Most of the next 10 flights for sure are tied up with equipment. But Mike Foale's task is to review what we're doing [on shuttle] from an exploration standpoint—the biological and physical research programs on the space station—and come up with recommendations for what we can do, what we should change. And what kind of operational demonstrations we can do that will enhance exploration either on the shuttle or on the station.

*Do you see operating the Constellation vehicles and spacecraft using some form of SFOC-type outsourced contracting instrument?*

I see SFOC [Space Flight Operations Contract] as one model that we need to explore to see if it meets our needs. I think SFOC has been successful. We are doing things slightly differently. Should it be a model? I'm not going to rule it out, it could possibly fit.

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