

**James D. Halsell, Jr.**  
**Vice President**  
**Space Exploration Systems**  
**ATK Launch Systems**



*This is the eighth in an ongoing series of interviews with business executives, government officials, academics, and project managers published in the PMI NAC Newsletter.*

*Our goal is to present leading ideas and insights on the practice of project management for our readers.*

***Jim Halsell** is the vice president of Space Exploration Systems at ATK Launch Systems – a major supplier of rocket motors and boosters to the U.S. Air Force, U.S. Navy, NASA, and to commercial users as well.*

*In this interview – Jim discusses his experiences with project management challenges in government contracting and also serving as a NASA project manager and astronaut with five Space Shuttle Missions and 1,200 hours in outer space.*

**Jim Halsell was interviewed for the PMI-NAC Newsletter by Don Ross, PMP**

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**ATK Corporation** was launched as an independent company in 1990, when Honeywell spun off its defense businesses to shareholders. The former Honeywell businesses had supplied defense products and systems to the U.S. and its allies for 50 years, including the first electronic autopilot that enabled the B-17 aircraft to accomplish pinpoint bombing missions during World War II.

ATK expanded into the aerospace market with the acquisitions of Hercules Aerospace Company in 1995 and Thiokol Propulsion in 2001, which transformed the company into the world's largest supplier of solid propellant rocket motors and a leading provider of high-performance composite structures.

ATK conducts its operations within four business groups: ATK Mission Systems, ATK Armament Systems, ATK Launch Systems, and ATK Space Systems.

**In Huntsville, ATK Launch Systems** provides innovative and cost-effective launch systems solutions. ATK Launch Systems is the world's leading manufacturer of rocket motor systems for human-rated and unmanned space launch vehicles, strategic missiles, prompt global strike missiles, and missile defense interceptors. The group has approximately 5,000 employees with about 100 employees in Huntsville. ATK Launch Systems serves both commercial and government customers, including prime contractors, NASA, the U.S. Air Force, U.S. Navy, U.S. Army, and U.S. Missile Defense Agency.

Visit <http://www.atk.com> for more information.

**PMI-NAC:** *For our readers who may not be familiar with your NASA background as a member of the astronaut corps – and the tasks you managed for the Space Shuttle Launch Integration and Space Shuttle Return-to-Flight projects – can you give us a summary on what matters most to you – about such extraordinary experiences?*

**Halsell:** I graduated from the U.S. Air Force Academy in 1978 and went to pilot school, then spent four great years as an F-4 fighter pilot. From there I went on to graduate school in engineering. I then got lucky and was selected for test pilot school and assigned as a test pilot at Edwards Air Force Base in California from 1986 until 1990.

From 1990 to 2005 I served as a NASA astronaut. Again, I was very fortunate to fly on five space shuttle flights. Three of these were Spacelab missions conducting experiments mainly in the life science and material science disciplines. My other two flights involved rendezvous and docking with the Russian *Mir* Space Station in 1995 and later rendezvous and docking with a virtually brand new International Space Station in 2000. That was also the last time I was in space.

From there I continued as the NASA manager for space shuttle launch integration at Kennedy Space Center (KSC) in Florida. I was the program manager's deputy. The program manager was located at Johnson Space Center (JSC) in Texas.

My role was to oversee the processing of the orbiter from the time it landed and was pulled back into the processing facility to prepare for its next mission. That was typically a 90-100 day flow including steps to integrate the payload and the main engines for the next mission. At the same time we had external tanks coming in from the Michoud Assembly Facility in Louisiana. We would prep those tanks and solid rocket motors coming from ATK [my company today] in Utah and then these would be prepped and stacked as well. So everything came together at KSC: space shuttle main engines, solid rocket boosters, external tank and the orbiter itself in the Vehicle Assembly Building (VAB), the large hanger-like building at the cape.

We'd stack the vehicle on the mobile launch platform there and roll it out to the launch pad 3-4 weeks prior to the launch. We would run numerous integration checks there and then launch the vehicle. So it was a very exciting job. It had a lot of different aspects to it and I certainly learned a lot.

That assignment ended with the Columbia disaster. I was called on to go back to JSC to serve as lead of the Return to Flight Planning Team. It was a small group from across the Agency that was very knowledgeable about the shuttle.

Our job was to take the recommendations of the Columbia Accident Investigation Board (CAIB) and turn those into concrete programmatic directives. Then we'd issue a directive that implemented what we needed to do. We shepherded that process for the next couple of years and watched over the program as they implemented the recommendations and directives that we put in place.

Just like everyone associated with the program – Columbia was an emotional experience for me. In hindsight we'll always remember it as one of the most difficult times of our lives. I'm no different than about 10,000 other people in that regard.

Following that it was time to make a decision. Did I want to stay in NASA management or try it on the contractor side? I decided to come to ATK. My position now is vice president of Space Exploration Systems. My focus is on Ares I work now under way – developing the first stage booster is one activity – but we're jumping ahead now and looking at what Ares V could become. What's the design going to be like? How will ATK's boosters be a part of that design? How can we improve them to help get bigger payloads into orbit, at lower cost, and make other advancements that will benefit NASA on Ares V?

***PMI-NAC: I'm curious as I'm sure many of our readers are about your perspective on what it's like being in space and your other special NASA experiences?***

Let me work backwards. Like everyone, I was shocked about the impact Columbia had on each of us personally and on our space program as a whole. The loss of our friends and the grief that accompanied that loss was life-changing. But it also led to a high point in the sense that being part of a group that responded to it and tried to bring the Agency back to flight as effectively as we could. That was certainly a career high point.

Before that, having the opportunity to work in the Launch Control Center as the launch integration manager and be responsible to give the final go for launch on 13 shuttle missions was a great privilege. Most people would think that your concern must be the highest when you are going to go fly. I really never felt fear when I was going to fly in the vehicle. When I had to give the go so someone else could fly that was tough a job to do.

That's a totally different set of buttons getting pushed there. I was good at accepting the personal risk. But it weighs more heavily to be responsible for someone else's safety.

That was a high point of my learning – and being associated with and learning everything that goes on behind the scenes in preparing an orbiter. Before that I got to fly five times. I can tell you – you will never, never hear an astronaut come back from a space flight and say it was not a really big deal. A space flight is not that way. It does not disappoint. It lives up to every expectation you ever had about the experience.

From the launch and the noise and the acceleration – going from zero to 17,500 mph in just eight and a half minutes – to being on orbit and looking out the window above it all to see the spectacular sights of our planet – looking up at the stars yes – but even more so looking back down at the earth and the really fantastic views that you're afforded. The technical and operational challenges of running an on-orbit laboratory or rendezvousing and docking with a space station or conducting a space walk safely and successfully keep you on your toes, too. All the while feeling tremendously privileged just to get that rarest of opportunities.

***PMI-NAC: You've flown both as shuttle pilot and commander – are there differences in the roles you can share?***

Today the astronaut corps includes pilot astronauts and mission specialists.

Mission specialists are scientists, technicians and engineers. They come from a broad range of backgrounds. They do space walks and science. Pilot astronauts typically are military test pilots brought in and trained to fly the shuttle. Your first mission or two will be as a pilot which in airline language means the "copilot."

Pilots occupy the front right seat. The commander or "captain" has the front left seat. Both commander and pilot have the same flying skills: to fly the shuttle both during ascent and on orbit, do maneuvers necessary to rendezvous and dock, and then come back and land. The pilot and commander are trained equally well to do all those functions. The thought is redundancy here is good for mission safety. Avoid single points of failure.

The big difference is the pilot works for the commander. Indeed, everyone on the crew works for the commander. As the commander you are responsible for most of the flying tasks, running the crew and running the vehicle. It's like running a small ship.

The commander has administrative responsibilities that include human resources tasks, training, and development. You're responsible first and foremost for the training of each of your crew members. You have to analyze your mission and who is on your crew. Then you match up each of the missions or tasks with the crew. You try to even-up workload. You try to assign people to things they are interested in or they have a background that would make them a natural for it. And when it doesn't work you have to make decisions. Then it's your job to ensure by working with a large training organization at JSC that each of those crew members gets everything they need to do their task successfully. When you get on orbit – hopefully everything is done so well in the training phase that it runs like clockwork. Nine times out of ten that's how it works. But a few things will crop up during the missions that require real-time decisions.

***PMI-NAC: This sounds like a very well-defined life cycle process?***

You're right. This is a good-sized project and the commander is the project manager. The "customers" include the lead flight director and space shuttle program manager.

Your product is successful accomplishment of each of the major and minor tasks of the mission which usually number in the hundreds and they're defined in the flight plan for you. Every minute of a space shuttle mission is orchestrated by the flight plan.

The plan calls out minute-by-minute what everyone is supposed to do. As commander you are responsible to make sure everyone is trained to do every task in the plan. The secret, just like in program management, is getting important early steps right. Getting the right people matched up with the right tasks, making sure they get the right training, and then making adjustments to achieve efficiencies. Your goal is to get the optimum mix in all this. Just like the adjustments you would make in project management. Hopefully [therefore] execution of the project in real time comes out the way you planned it.

***PMI-NAC: Taking the project management analogy another step – it seems you literally can't get off the ground without superb team communication skills?***

Again, the analogy with project management is 100-percent dead on. First and foremost you have to know the requirements. In astronaut lingo that means tell me exactly step-by-step what you need accomplished and hopefully you'll let me – *as the astronaut* – you'll let me participate in the definition of how we get there. Because things go better if you allow people, especially with astronauts but it's true for everyone, to participate in the training and mission development process. But first and foremost you must have a firm set of requirements to work with the same as in any other project.

And the degree to which you succeed or don't succeed in defining requirements will invariably reflect back on how successful you are in the long run.

So communication is important in defining requirements and not allowing any ambiguity to slip in or go unnoticed. If you do it's just going to bite you. It always does.

What you communicate – data and information – is just one part of this. I've learned that style and manner and demeanor have everything to do with it also. People respond better to certain cues than others. So the way you communicate is just as important as what you communicate to the effectiveness of the final product.

***PMI-NAC: Given that many of our readers may not have a detailed understanding of what ATK Launch Systems is involved in – can you tell us about your company and its current business and project-related activities?***

**Halsell:** Our flagship product is the four-segment reusable solid rocket motors that are flown on each and every space shuttle mission. Marshall Space Flight Center manages that product and they are our customers.

A growth version of those space shuttle boosters, that is comprised of five-segments, is being used for the Ares I first stage booster. ATK was awarded the prime contract to develop, manufacture and deliver those solid rocket boosters to NASA. We're currently moving into the next chapter of utilizing our proven booster to continue to launch humans into space.

That is our focus in Huntsville. I've mentioned we're starting to look ahead and work with NASA as they plan the Ares V design and how these five-segment boosters can be used on this launch vehicle as well.

We have about 100 people working in Huntsville. In addition to focusing on solid rocket motors and human space flight, our engineers and technicians run some of the materials and processes labs for large and small solid rocket motors, composites manufacture, and some testing facilities at Marshall.

More broadly, ATK Launch Systems builds several families of solid rocket motors used as strap-on first-stage boosters for the Delta rocket and other commercial rockets. We also build all three stages of the Trident II D-5 fleet ballistic missile for the Navy and support the Minuteman missile for the Air Force.

**PMI-NAC:** *In your years managing space projects and business operations with NASA and ATK, are there lessons learned about how to manage people, projects, and technology that you can share with us?*

**Halsell:** I started life as a fighter pilot. My mindset was – don't bother me with project management stuff. Just tell me what I need to know to put the bomb on target.

If you were to characterize my career over the past 25 years – my aperture has widened considerably from that starting point! I have learned that getting the bombs on target – or getting astronauts to and from space safely – only happens when good engineering is applied to a well-defined and validated set of requirements.

My learning started to accelerate when I went to test pilot school and I was taught what it takes to test a weapon system so it can be successfully fielded to young pilots with the mindset I had back then. Your work process must deliver an end product they can use simply but very effectively in the defense of our country.

To do that, the test pilot must set up a test program and then conduct it so you get back the data to answer the questions you religiously structured your test program to achieve.

My learning continued when I was selected as an astronaut and it became my responsibility to prepare my crew for space flight. Then my learning really accelerated when I moved to the space shuttle program as a deputy manager. I learned that it's always the requirements and understanding what the requirements mean. Defining the requirements or helping the customer define them so you can succeed. You must focus on a firm set of requirements to stay within budget and schedule with a technically acceptable solution.

From the NASA side of the fence – understand what you're trying to achieve and what you are telling the contractor to do. The requirements generation process is mature and sound enough that you will know immediately when you are bumping into a “fuzzy area.”

The fuzziness might be you don't understand the requirements well enough yet to write a firm statement of work, or it might be that you have a good understanding of the goal but you don't yet have a firm design concept for the contractor to build. In this case, you must plan on a significant design and development effort that's iterative. That's when my radar comes on because whenever you know you're going down that path – you're buying into task ambiguity that can cause cost overruns or schedule overages.

Flying in space, especially flying humans in space, is a very difficult thing to do. It is still supremely difficult to know *how much* to budget for the unknown.

Because the nature of the business means we stretch any mechanical systems to the very limit to be able to survive in space. There are simply no margins for error in the analysis.

The hard thing to know and what very often involves too much optimism from the contractor and NASA side – is determining just how much hardware development it's going to take and how much learning is needed in the process before you get to that final acceptable product. Contractors tend to be optimistic in order to satisfy and support customer goals.

NASA as a customer is optimistic because that's the way we are as human beings. But in the end, it's important to remember that nothing about flying humans in space is easy, and we must expect to confront problems and accept solving them as part of the price of safe and successful space flight.

I was also fortunate to get a key management lesson early on. I recall as a newcomer starting in shuttle program management that we had a gentleman at the table who was working on a very different set of tasks. He spent his time working numbers, schedules, budgets, and requirements. He was in charge of engineering integration for the shuttle program. Within a year – I knew he was one of the most important – if not THE most important “go-to” guy at that table.

Because he worked budgets he knew where the money was going. Because he worked requirements he knew why money flowed in the direction it went, and equally important, why difficult choices had been made to *not* do things that appeared to be very important because they got out-prioritized by even more important things that we had to spend our limited resources on.

He became my closest confidant and mentor. That's exactly the kind of talent you need in your organization to have any hope of success.

You need many kinds of people to be successful. You must have that integration skill set: someone who drills into details, remembers past decisions and how we got where we are now and therefore knows why we're on the path we're on with changes as new data gets rolled into the equation. If you don't have someone like that – you won't be as successful as you need to be to win. I've learned that integration is the most important task of all.

And the integration guys rarely get the applause they deserve for making the right calls for us 99.9 percent of the time.

***PMI-NAC: The PMI North Alabama Chapter is growing and reaching out to serve our companies and organizations in Huntsville today. From your perspective – do you see benefits coming back to ATK when your employees earn PMI credentials and participate in PMI education and development opportunities?***

**Halsell**: The same evolution in my growth as a professional in the aerospace business led me to understand that the kind of education, instruction and accreditation that PMI offers is absolutely critical to the success my company is trying to achieve. Like most firms in Huntsville, ATK is stretching the capabilities of our project managers and engineers now working on the important DDT&E projects we're performing during this growth spurt.

So PMI offers us the opportunity to grow the folks we have with new skill sets we need. Our folks have a lot of experience working with NASA on the space shuttle over the past 25 years and running an established program with processes already in place and proven and improved over time. PMI and other training programs allow us to augment that proven experience with additional skills to design, develop, test and integrate our work on Ares.

**PMI-NAC:** *Given your experience with and understanding of the space exploration infrastructure of the United States and its partners – what motivates or excites you about our opportunities and challenges in space exploration – in the years ahead?*

**Halsell:** For the first three quarters of my NASA career it was important to explain to the American people that we needed to be in space because we were going to discover things and make medicines or alloys or other products that you simply can't create on earth.

What we weren't encouraged to talk about then – but are now – are more esoteric things about going into space. For example, I like to talk about Lewis & Clark and their expedition of discovery and exploration, and the analogy to our current plans to return to the moon and venture beyond. It's totally appropriate to talk about the importance of continuing those things in the next frontier which is mankind's first steps off the planet.

Something I talk about and really feel in my heart is what's neat about working on these programs at this time is that whether mankind lasts a thousand, ten-thousand or a million more years – people will always know and will always talk about us and what we did.

We are pioneers working on the space program when mankind is taking its first fledgling steps off this planet. What a tremendous privilege to be associated with doing something we know is this important.

Lewis & Clark had no comprehension of the magnitude of what they were doing and how it would benefit the economic sphere we operate in today. In hindsight we see it changed the paradigm for our country and the way we saw our place in the world.

What we're doing now, going back to the moon and going to Mars, we're expanding our economic sphere and changing the paradigm again. Someday our lives on this planet, or wherever else we migrate, are going to be much better because of our initiative in leaving earth orbit today. That's the big picture. It's what I want to be part of and I think everyone who works here feels the same way.

Mankind is destined to move off this planet. Someday life on this planet will be challenged and we must have alternatives. Not just for our preservation but for our prosperity.

In the meantime, the space station is just completing construction and starting to hit on all cylinders. Our astronauts will be hitting scientific home runs up there in this new domain for years to come.

So if we can benefit taxpayers today and deliver more esoteric benefits over the long term, then in 100 years people will know the path to the future included the important first steps we are taking today.

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Thanks to Jim Halsell for discussing his ATK business activities and NASA experiences and thanks to ATK Public Affairs and to NASA Public Affairs for their help with this interview published in the PMI-NAC Newsletter.

The PMI-NAC Newsletter is published monthly by North Alabama PMI P. O. Box 5037, Huntsville, AL 35814. Copyright © 2008 by PMI-NAC. All rights reserved.