

Spaceport News

John F. Kennedy Space Center - America's gateway to the universe



Inside . . .

Director Addresses NASA Alumni League



Page 2

PIT Crews Keep CCDev2 On Track



Page 3

Mobile Launcher Test Results



Page 6

Heritage: Visitor Complex



Page 7

Historic shuttles to arrive at permanent homes by year's end

By Linda Herridge
Spaceport News

By the end of this year, NASA's space shuttles will be in their new homes.

Recently, the shuttles were on the move as part of the transition and retirement (T&R) activities at Kennedy Space Center in Florida.

On Feb. 1, NASA Vehicle Manager for T&R Bart Pannullo watched as shuttle Endeavour was backed out of the Vehicle Assembly Building (VAB) and towed to Orbiter Processing Facility-2 (OPF-2).

The next day, shuttle Atlantis made an appearance outside the VAB as it was towed from the VAB transfer aisle into high bay 4 for temporary storage.



CLICK ON PHOTO

NASA/Kim Shiflett

One of space shuttle Endeavour's payload bay doors has been fully opened and an antenna retracted on Feb. 3 in Orbiter Processing Facility-2 at Kennedy Space Center. Space Shuttle Program transition and retirement work continues on Discovery and Endeavour in the orbiter processing facilities, while shuttle Atlantis is in temporary storage in high bay 4 of the Vehicle Assembly Building. Endeavour is being prepared for display at the California Science Center in Los Angeles. For more on the space shuttles' transition and retirement, click on the photo.

Atlantis is being prepared for public display at the Kennedy Space Center Visitor Complex in 2013.

"It's been two beautiful

days here for these operations and seeing people I haven't seen in a while," Pannullo said.

"I'm not taking these

events for granted."

Endeavour was moved to OPF-2 so that technicians can continue to prepare it for display. The shuttle will remain in the OPF until it is ready to be ferried to the California Science Center in Los Angeles in the fall.

Once inside the facility, Endeavour was leveled and safed. Then, water and Freon from lines in the shuttle's midbody were offloaded.

The orbital maneuvering system (OMS) pods and forward reaction control system (FRCS) were delivered to the Hazardous Maintenance Facility (HMF) on Feb. 6 from White Sands, N.M. The FRCS was uncrated and transported to OPF-2 on the same day and

See T&R, Page 2

More information

Discovery, atop a NASA Shuttle Carrier Aircraft (SCA) modified 747 jet, will arrive at Dulles International Airport in Virginia on April 17 and then be transported to the Smithsonian's Udvar-Hazy Center on April 19.

Endeavour, taking the final SCA "ferry flight" ever, currently is scheduled to fly to Los Angeles this fall.

Atlantis will be transported from the Orbiter Processing Facility to the Kennedy Space Center Visitor Complex in November. The exact date of rollover to the visitor complex is being evaluated. The Kennedy Space Center Visitor Complex is targeting a July 2013 grand opening for Atlantis' new home.

For more information, go to www.nasa.gov/transition.



NASA/Kim Shiflett

Space shuttle Atlantis is towed into the Vehicle Assembly Building (VAB) high bay 4 after being towed around from the VAB transfer aisle at Kennedy Space Center on Feb. 2. Shuttle Atlantis will remain in temporary storage in high bay 4, while Space Shuttle Program transition and retirement work continues on Discovery and Endeavour.

Center director briefs NASA Alumni League

By **Brittney Longley**
Spaceport News

The NASA Alumni League (NAL) has always championed the many programs at Kennedy Space Center, and with all the exciting news lately, the group wanted to learn about the latest and greatest. They had the opportunity to do so during the NASA Alumni League breakfast Jan. 31 at the Kennedy Space Center Visitor Complex's Dr. Kurt H. Debus Conference Facility.

Kennedy's Center Director Bob Cabana told the league the center still has a lot of new work ahead of it.

Hugh Harris, along with about 40 other NAL members, attended the briefing in order to get a better understanding of the changes Kennedy currently is undergoing.

"Being an informed advocate is the key to being an effective advocate," said Harris, a former president of the NASA alumni group. "Understanding NASA's vision for the future is key in helping paint a clear picture for what's in store."

Cabana presented an overview of the center's new goals, the programs that were created as NASA's Space Shuttle Program came



NASA/Jim Grossmann

Kennedy Space Center Director Bob Cabana shares the latest happenings at the center with the NASA Alumni League on Jan. 31 at the visitor complex.

"Being an informed advocate is the key to being an effective advocate. Understanding NASA's vision for the future is key in helping paint a clear picture for what's in store."

**Hugh Harris,
NASA Alumni League member**

to an end and the new and exciting missions Kennedy is planning to launch.

"(Cabana's) presentation gave us a lot of hope that there are many sensible changes occurring and that Kennedy is headed in the right direction," Harris said.

A few of the center's goals he discussed during the briefing included: ensuring mission success by enabling

government and commercial access to space; providing a flexible and cost-effective institution to enable success; and inspire, engaging and educating through enriching programs, internships and partnerships.

Explaining the benefits of going from private to commercial space access helped some of the members get a full understanding of what

exactly is going on and how the budget will be maximized.

"We want to go from focusing on one big program, such as shuttle, and focus on several programs," Cabana said.

NAL President Chuck Taylor said, "This helps us out a lot when we have teleconferences with Cabana and (NASA Administrator

Charlie) Bolden. It enables us to have more intelligent conversations with them because they are up to speed with what's going on."

The NAL applauded Cabana and his staff for coming out to the meeting.

"It's one thing for the director to speak to us, but his staff had to do a lot and went out of their way, and everyone was very thankful and appreciative of it," Taylor said.

Cabana imparted to the group the need to support NASA's mission.

"I would love for all of you to become advocates for the center."

From T&R, Page 1

was installed on Endeavour Feb. 8. The OMS pods remain at the HMF and are scheduled to be installed on Endeavour in March.

Pannullo said that while Atlantis is in the VAB, technicians will be working in the aft compartment to remove components that may be used in future programs, as well as continuing to safe the spacecraft.

Future work on Atlantis includes reinstallation of its FRCS and OMS pods once it is moved back to the OPF in late March.

Replica Shuttle Main Engines also will be installed, and safing of the pyrotechnic systems will be completed.

Atlantis then will be configured for its display site, and prepared for its short trip to the visitor complex just down the road in early 2013.

Discovery is in OPF-1 where processing is quickly coming to an end as it is being readied for display at the Smithsonian's National Air and Space Museum, Steven F. Udvar-Hazy Center in Chantilly, Va.

NASA Flow Director for Orbiter T&R Stephanie Stilson said remaining work includes remov-

ing components from the aft of the shuttle that will be used to support NASA's Space Launch System Program.

"We also are doing the final configuration and closeouts to ensure the vehicle is ready to ferry," Stilson said. "Although Discovery is not leaving Kennedy until mid-April, it is scheduled to leave the OPF for the last time in March."

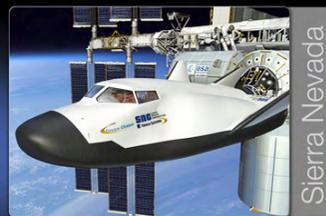
Stilson said Discovery always will hold a special place in her heart, but she also is enjoying her time with the other shuttles.

"I continue to be impressed by the dedication and devotion of the

team working to ensure Discovery, Atlantis, Endeavour and Enterprise are delivered to their new homes in the best possible condition," Stilson said.

"There is a great sense of pride and appreciation for the opportunity to work with so many great people on the greatest space program in the world," Pannullo said.

"This will be a difficult transition for all of us," Stilson acknowledged, "but we can feel good knowing their new families will love them as much as we do and will care for them as well as we have for the past 30 years."



PIT Crews fly high as driving force behind space transportation

By Rebecca Regan
Spaceport News

Just as every race car driver has a pit crew to keep them on track on the way to a victory quickly and safely, the seven aerospace companies that have teamed up with NASA's Commercial Crew Program have their own PIT Crews, called Partner Integration Teams, to help guide them in their race to space.

They're not packing an arsenal of air compressors, fuel or even spare tires, though. Instead, NASA PIT Crews are equipped with the intimate knowledge of what it takes to design, develop, manufacture, process and launch space transportation systems. Lately, those teams have been making significant progress under Commercial Crew Development Round 2 (CCDev2).

"We call this insight," said Scott Thurston, who is leading the PIT Crews as chief of the Commercial Crew Program (CCP) Partner Integration Office. "We're there to glean the information and then watch, and help, if needed. Be a part of their program, but not get in the way."

Each PIT Crew is made up of about 10 to 15 dedicated spaceflight experts, supported

Commercial Crew Program introduces CCIcap initiative

NASA anticipates a bright next phase of development for its Commercial Crew Program (CCP) as it prepares to award funding to the makers of spacecraft and launch vehicles. The awards are expected to lead to activities aerospace engineers dream about, such as drop tests, engine test fires, demonstration flights and pad abort tests.

On Feb. 7, the agency issued an Announcement for Proposals (AFP) for companies to submit their plans for the Commercial Crew Integrated Capability (CCIcap) initiative by March 23. During CCIcap, the program plans to award multiple Space Act Agreements, valued from \$300 million to \$500 million each, in the summer of 2012 toward the development of fully integrated commercial crew transportation systems.

"We want to advance multiple integrated crew transportation systems with the path of getting to an orbital demo flight by the middle of the decade," said Ed Mango, CCP program manager.

by 10s if not 100s of system expert engineers, who are available to help industry partners meet their established milestones in developing commercial crew transportation capabilities. Their expertise ranges from engineering and safety to health and medical and mission operations. Representatives from NASA's Astronaut Office also are members of the seven PIT Crews, one for each of the

A fully integrated system would include a spacecraft and launch vehicle, as well as blueprints for mission control and ground operations.

The announcement asked for proposals to include a base period of about 21 months, running from award through May 2014. Optional milestones beyond the base period also should be outlined leading to and culminating in a crewed orbital demonstration flight.

The goal of CCIcap is to continue to foster the development of a U.S. transportation system that can safely, affordably and routinely fly to low Earth orbit for commercial and government markets.

"Being a part of this program and this agency right now should give you chills," Mango said, "because this is the program that is going to take American astronauts back to space with American developed spaceships."

— Rebecca Regan

seven funded and unfunded CCDev2 partner companies.

Thurston said CCP is very much like a venture capitalist endeavor because NASA is investing in systems and laying out expectations, but not dictating how companies make their systems work.

"You know, it's funny. It's the companies telling us why they feel comfortable about their systems,"

Thurston said. "It's not them telling us why it's OK to buy their spacecraft or launch vehicle, but why it's OK to invest money in them."

"The milestones are really the mile markers of each one of these companies," Thurston said. "It's based on each company's development plan, not what the government wants, so each company is a little bit different."

Some of the spacecraft and launch vehicle designs are infant in nature while others have been proving their experience and reliability for many years.

UNITED LAUNCH ALLIANCE

United Launch Alliance (ULA), for example, has 28 successful launches under its belt with the Atlas V rocket. For CCDev 2, ULA and NASA are working under an unfunded Space Act Agreement to assess human rating that system.

"Many want to know why the Atlas V needs to be assessed to fly humans. After all, they've been flying high-value robotic, science and defense missions for years," said Cheryl Malloy, the NASA partner manager for ULA.

Malloy's answer is simple: "If there's a problem with the

See **CCDev2**, Page 8

Scenes Around Kennedy Space Center



Delores Abraham, third from left, celebrates her retirement Jan. 20 after 40 years of federal service. Abraham worked for NASA and supported every shuttle mission from STS-1 through STS-135. With her are her sisters, from left, Pat Wiltz and Verlie Batiste, both from Houston, and Laurenzia Lewis, spouse of NASA retiree Bob Lewis of Port Orange, Fla.



Photo courtesy of John L. Salisbury

Astronaut Nicole Stott shows off her award after induction into the Florida Aviation Hall of Fame in Lakeland, Fla., on Jan. 28. Stott is working with the Commercial Crew Program for the Astronaut Office at Kennedy Space Center.



Controlled burn clouds Kennedy

At left, a controlled burn on Jan. 31 consumes the brush in the vicinity of the Industrial Area at Kennedy Space Center. Below, NASA Fire Rescue Services were on scene to support the controlled burn in the vicinity of the Industrial Area. The burn, managed by the U.S. Fish and Wildlife Service, targeted 2,174 acres near Kennedy's administrative complex. Shifting winds caused the fire to flare up in places to dramatic effect. This burn was one of the larger parcels that had 12 years of growth, so it was very fuel rich. Limited visibility caused by the smoke required NASA Security to close some roadways and delay the opening of buildings in the Industrial Area on Feb. 2 Controlled burns are commonplace on the center to reduce the likelihood of an unplanned brush fire during Central Florida's dry season.



Photos by NASA/Dimitri Gerondidakis



Reader-submitted photo

Occupational Safety and Health Administration (OSHA) Assistant Area Director Keven Yarborough of Tampa, Fla., presents the Voluntary Protection Program (VPP) STAR award to Kennedy Space Center's InoMedic's Quality Assurance and Safety Manager Mike Runion and Dr. Leroy P. Gross, CEO of InoMedic Health Applications Inc., on Jan. 25 in the Training Auditorium. The VPP STAR, OSHA's highest award, is presented only to businesses that pass a rigorous inspection for comprehensive safety and health management systems.



Reader-submitted photo

Russel Rhodes, surrounded by friends and colleagues, celebrates his retirement on Feb. 3 at OSB II after 52 years of federal service with NASA.

Results from mobile launcher testing validate approach

By Steven Siceloff
Spaceport News

The 355-foot-tall mobile launcher, or ML, behaved as expected during its move to Launch Pad 39B at NASA's Kennedy Space Center in Florida in November 2011, an analysis of multiple sensors showed. The top of the tower swayed less than an inch each way.

"I would think you would have perceived it," said NASA's Chris Brown, the lead design engineer for the ML.

The tests showed that computer models used in designing the massive structure were correct. The actual results varied less than 5 percent of what was predicted.

"This gives us much higher confidence in the models," Brown said. "We know that our approach is valid."

The computer models for the launch support structures will be used with those for NASA's Space Launch System, or SLS, a huge rocket envisioned to launch astronauts into deep space, to fine tune both designs.

Engineers had the tower wired with dozens of accelerometers and strain gauges along with wind sensors to record the launcher's movement during its slow ride atop a crawler-transporter from a park site beside the Vehicle Assembly Building to the launch pad.

The ML is expected to make the same trip numerous times during its career as the support structure for SLS. The move and testing were planned to show designers whether the structure and crawler would be up to the challenge.

Crawler drivers performed several speed changes during the six-mile journeys to and from the

"This gives us much higher confidence in the models," Brown said. "We know that our approach is valid."

NASA's Chris Brown, lead design engineer for the mobile launcher

pad. While at the pad, which is being refurbished after decades of hosting space shuttles, workers connected ventilation, fire support and alarm systems, and other water lines.

The instruments used in the testing are very precise, accurate enough to record even the most subtle of vibrations and movements.

"We were measuring milli-g's," Brown said.

The readings also will be used for determining how fast the crawler will be allowed to go as it carries the rocket to the launch pad. For instance, there is substantial vibration at 0.8 mph, so engineers want drivers to



NASA/Kim Shifflett

Technicians monitored nearby as the mobile launcher (ML), sitting atop the crawler-transporter, moved Nov. 16, 2011, from next to Kennedy's Vehicle Assembly Building (seen in the background) to Launch Pad 39B, a distance of 4.2 miles.

stay away from that particular speed. But that does not necessarily mean the crawler will be ordered to

slow it down.

The ML, designed for the Ares I rocket of the cancelled Constellation



NASA image

This artist rendering depicts the 355-foot-tall ML structure, originally designed for the Ares I rocket of the canceled Constellation program, which is due for modifications in the coming few years as it is strengthened to support the much-heavier Space Launch System.

Program, is due for major modifications in the coming few years as it is strengthened to support the much-heavier SLS. It took two years to build and was completed in August 2010.

A structural design contract is expected to be awarded this year and a construction contractor in 2013. Umbilical arms reaching from the tower to the rocket are scheduled to be installed in 2015.

The ML is the biggest structure of its kind since the Launch Umbilical Towers were constructed to support the Apollo/Saturn V rocket. Those towers saw numerous modifications through their lives as trial-and-error showed where changes were needed, Brown said.

"Our goal here is to have less of those kinds of problems," Brown said.

Computer models also were used when NASA designed the Apollo towers, but those models were much simpler than today's versions by virtue of the computing power available now, Brown said.

"We can run in five minutes what would have taken them days to run," Brown said.



NASA/Kim Shifflett

The mobile launcher, or ML, stands at Launch Pad 39B at Kennedy Space Center on Nov. 28, 2011. Data on the ML was collected from structural and functional engineering tests and will be used for the ML's next phases of construction.

Remembering Our Heritage

Real-world technology provided perfect tourist attraction

By Kay Grinter
Reference Librarian

When plans for a permanent welcome station for guests to Kennedy Space Center were germinating, Walt Disney briefed Kennedy's senior management on a tourist attraction he envisioned for Central Florida.

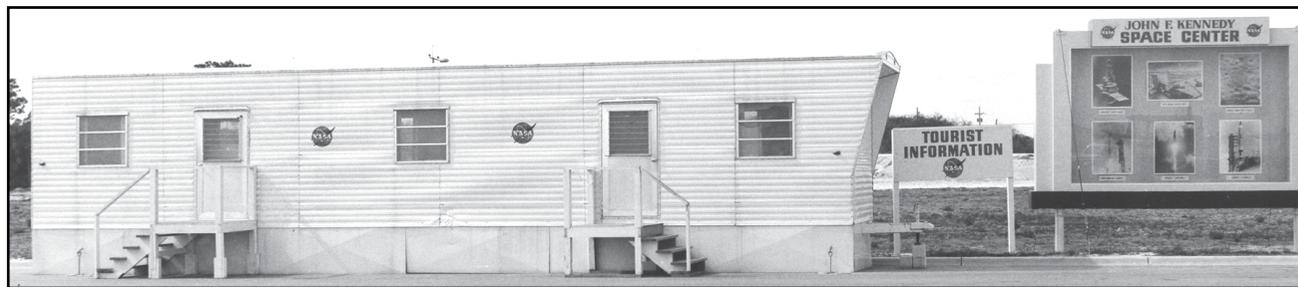
In his presentation, Disney revealed that he was going to spend a lot of money on technology for exhibits and shows, a sum that would be impractical for NASA to match. He made it clear, however, that NASA had something to showcase to the public that he did not -- real-world technology in action.

Construction of a permanent Visitor Information Center (VIC) began outside Kennedy's security gates not far from the center's industrial area. The approach to the site, though -- over a causeway to the east side of the Indian River -- provided visitors with the sense that they no longer were on the mainland. They had arrived at Cape Canaveral where astronauts would soon launch to the moon.

The design connected two rectangular buildings by a portico. Food service, a souvenir shop and ticket booth were housed on one side; exhibits and a small theater, on the other. With support from NASA Headquarters and non-appropriated funding from bus tours of the center, the VIC opened in August 1967.

The Magic Kingdom theme park at Walt Disney World Resort outside Orlando followed four years later, opening in October 1971.

The millionth visitor to the VIC was recorded in July 1968, just three months before launch of the first



NASA file/1965

This trailer was being used as the Tourist Information Center on Feb. 9, 1965, while the permanent buildings of the Visitor Complex were being constructed (image below). The trailer was at the west end of the Indian River Causeway.

crewed Apollo mission in October.

In the intervening years, the VIC was rebranded the "Kennedy Space Center Visitor Complex" (KSCVC) to capture in name the ongoing growth of the compound.

The complex has been managed by Delaware North Companies Parks and Resorts since 1995.

A full-scale, high-fidelity replica of a space shuttle -- dubbed Explorer -- made its debut in 1993, alongside a gantry-style tower and a replica of an external tank mated to two solid rocket boosters.

Nearby, a facility housing the "Shuttle Launch Experience," an attraction that puts guests through a simulated shuttle launch, opened in May 2007.

Two IMAX theaters show space program-related movies daily, as well as an occasional science fiction-themed Hollywood film release.

Attendance has grown to 1.5 million visitors a year but is expected to increase when space shuttle Atlantis goes on display next year.

In anticipation, a new entry, ticket plaza and the main circulation path are being constructed. Called the Vapor Trail, it will start in the Rocket Garden (instead of the middle of the visitor complex as is the case now) and lead to the Shuttle Plaza, site of the new home for Atlantis. The Vapor Trail will provide places for families to stay together as some play, rest and relax. It will include water features, interactive zones for children and

comfortable seating.

The Vapor Trail should be ready to welcome guests in the fall of 2012.

In December 2011, following the conclusion of the shuttle program in July, the high-fidelity replica was transported to Kennedy's Launch Complex 39 turn basin where it awaits transport by barge to NASA Johnson Space Center's visitor center in Houston, where it will be given a new name and another opportunity to inspire the next generation of dreamers.

The move made way for the ground-breaking Jan. 18 for the future home of Atlantis which will be displayed permanently at the visitor complex.

"This is an incredible day for our nation's space

program," said Bill Moore, chief operating officer of the KSCVC. "Today marks the start of a new era in which this magnificent ship, Atlantis, which has traveled to space and back an astounding 33 times, will remain docked in her home port, displayed in all her glory with a new mission to uphold -- to inspire a new generation of space explorers who will take us to even greater heights."

The \$100 million, 65,000-square-foot exhibit will provide guests a unique vantage point to view Atlantis up close, with payload bay doors open and the Canadarm extended, while telling the story of the 30-year Space Shuttle Program through a number of hands-on, interactive and immersive mediums. The exhibit also will feature a crawl-through model of the International Space Station. The six-story exhibit will be in the complex' Shuttle Plaza adjacent to the Shuttle Launch Experience. Designed by the architects of PGAV Destinations of St. Louis, Mo., the structure will be built by Whiting-Turner Contracting Co. from Orlando.

Atlantis is scheduled to make the trek from Launch Complex 39 to the visitor complex in November, with the grand opening of its showcase facility slated for July 2013.



NASA file/1970

The rectangular buildings connected by the portico remain the heart of the Visitor Complex. Shown is an aerial view in 1970.

From CCDev2, Page 3

spacecraft or rocket during ascent, options must be available to abort the mission and bring the crew back to Earth safely."

To develop that abort capability and keep the cost of human spaceflight affordable, NASA and ULA are exploring "kitable" solutions that would only be added to a rocket when launching humans.

During ULA's recent Tailored System Requirements Review, NASA received an in-depth look at what it would take to get a crew in and out of a spacecraft on the launch pad, a dual engine configuration on the upper stage that would improve performance, an emergency detection system, and vehicle structural modifications that would accommodate unique spacecraft designs.

BLUE ORIGIN

Blue Origin also completed two milestones for the development of its Space Vehicle. First, the company completed a Mission Concept Review in which NASA was able to look at the goals and objectives, high-level requirements, mission feasibility, concept evaluation criteria and risks associated with the spacecraft. The second was a review of the company's plan to hot-fire its Reusable Booster Stage Engine Thrust Chamber Assembly (TCA).

"The teams reviewed the TCA interface control diagram requirements, test plan and systems requirements document for testing at NASA's Stennis Space Center in Mississippi," said Bill Lane, the NASA partner manager for Blue Origin. "After that hot-fire, Blue Origin will deliver a test report to NASA."

Lane said the company's pusher escape team continues to make progress toward the upcoming motor ground firing and pad escape testing milestones. Blue Origin's space vehicle team also is continuing with spacecraft system designs that will lead to the System Requirements Review milestone scheduled for May.

THE BOEING CO.

Boeing recently completed a simulation between the launch vehicle emergency detection system and avionics system integration facility for its CST-100 spacecraft. The spacecraft also underwent wind tunnel testing.

"We are looking forward to several other significant milestones," said Gennaro Caliendo, the NASA partner manager for Boeing. "Next will be the launch abort engine fabrication and hot-fire demonstration, and then a full-up landing system air drop demonstration test where the capabilities of the parachutes and air bags are tested."

EXCALIBUR ALMAZ INC.

Excalibur Almaz Inc. (EAI) is considered the newcomer to CCDev2, but has jumped into the space race full throttle with plans to upgrade its heritage hardware with American-made life support systems.

"This whole program is really like a portfolio," Thurston said. "We're not just going with people we know, we're also enticed to work with people who might do things considerably different."

"Both EAI and the PIT Crew currently are preparing for the upcoming System Requirements Status Review," said Sarah Waechter, EAI's partner manager for NASA. "We also

are looking forward to the Launch Vehicle Compatibility Review where we will discuss the initial spacecraft to launch vehicle integration."

SIERRA NEVADA CORP.

Sierra Nevada Corp. (SNC), which is the only CCDev2 company building a winged spacecraft, just delivered the structural pieces for its Dream Chaser Engineering Test Article (ETA) to its plant in Louisville, Colo.

"The company can now begin assembly and integration of their secondary structures and subsystems," said Valin Thorn, SNC partner manager for NASA. "This will lead to the ETA captive carry flight test scheduled for this spring."

During that test, a Virgin Galactic White Knight 2 carrier aircraft will drop the Dream Chaser test article over NASA's Dryden Flight Research Center in Edwards, Calif., to measure its performance.

ALLIANT TECHSYSTEMS INC.

Alliant Techsystems Inc. (ATK) has been focusing its attention on TIMs, which are Technical Interchange Meetings. The first focused on preliminary models and design analysis planning of the Liberty launch vehicle, including certification, requirements allocation, safety and mission assurance, as well as failure and hazard analysis data. Ken Tenbusch, NASA partner manager for ATK, said his team is looking forward to the second TIM, which likely will include more details of ATK's upper stage design.

"Our NASA team is excited about working with ATK's French partner, Astrium, and supporting their efforts in converting the core stage of the

Ariane V rocket that will become Liberty's upper stage," Tenbusch said.

SPACE X

Jon Cowart, NASA partner manager for SpaceX, said he and his PIT Crew are working with the company while it develops a launch abort system and outfits the Dragon capsule with interior systems, such as seats, displays, air circulation, and air conditioning and heating.

"When you add humans into the mix it really complicates things," said Cowart. "We need to keep the crew alive and informed about what's going on around them."

The most recent milestone SpaceX completed was the second Design Status Review, which gave CCP an overview of the entire system, from the Falcon 9 rocket and capsule to the Merlin engines that help loft the system into space. The company also completed a full-duration, full-thrust firing of its new SuperDraco development engine in preparation for the ninth milestone to be completed under its funded Space Act Agreement with NASA.

"We're actually seeing smoke and fire, which is pretty exciting," Thurston said.

Much like the pit crew chief coordinates operations during a race, the CCDev 2 partner managers are keeping their industry partners on a path toward ferrying U.S. astronauts to and from the International Space Station in just a few years.

"We make sure that they're channeled and focusing in on the things that we're most concerned about," Cowart said.

Looking up and ahead . . .

* All times are Eastern

2012

No earlier than Feb. 16	Launch/CCAFS (SLC-41): Atlas V, MUOS Launch window: 5:46 to 6:30 p.m.
No earlier than March 14	Launch/Reagan Test Site Kwajalein Atoll: Pegasus XL, NuSTAR Launch window: 11:30 a.m. to 3:30 p.m.
No earlier than late March	Launch/CCAFS (SLC-40): SpaceX Falcon 9, Dragon C2/C3 Launch window: TBD



John F. Kennedy Space Center

Spaceport News

Spaceport News is an official publication of the Kennedy Space Center and is published online on alternate Fridays by Public Affairs in the interest of KSC civil service and contractor employees.

Contributions are welcome and should be submitted three weeks before publication to Public Affairs, IMCS-440. E-mail submissions can be sent to KSC-Spaceport-News@mail.nasa.gov

Managing editor Candrea Thomas
Editor Frank Ochoa-Gonzales
Copy editor Kay Grinter

Editorial support provided by Abacus Technology Corp. Writers Group.
NASA at KSC is on the Internet at www.nasa.gov/kennedy
USGPO: 733-049/600142