



# UPDATE

Spring 2007

## Making progress toward repair, recovery and recertification

Sea Launch continues its progress on the investigation into the cause of the unsuccessful launch on January 30 and repair assessments for the *Odyssey* Launch Platform. The Sea Launch partners – Boeing, RSC Energia, SDO Yuzhnoye/ PO Yuzhmash and Aker ASA – remain fully committed to working together to resolve the root cause and recover from its consequences in a timely and successful manner.



## Launch Investigation

The national space agencies of Russia and Ukraine formed an interagency commission on February 5 to investigate the cause of the incident and determine necessary corrective actions. The commission concluded its investigation on March 12 and issued a

summary statement to Sea Launch, indicating that an anomaly within the first stage engine caused an early termination of thrust, resulting in the loss of the mission.

The Sea Launch Failure Review Oversight Board (FROB) held its first meeting on April 4-6 in Dnepropetrovsk, Ukraine, with representatives of the interagency commission and Sea Launch partner companies. The FROB is currently reviewing the commission's findings, conclusions and recommended corrective actions and plans to meet again in May, following the completion of internal inspections of already manufactured RD-171M engines.

Chaired by Kirk Pysher, Sea Launch vice president and chief systems engineer, the FROB is comprised of Sea Launch technical leadership and U.S. aerospace industry experts as well as spacecraft manufacturer Boeing Satellite Systems. Sea Launch anticipates additional customer representation, pending further licensing approvals.

## Repairs on the *Odyssey* Launch Platform

The Sea Launch team has completed its damage assessment phase of the *Odyssey* Launch Platform, including a full inventory of repair and recertification requirements and scheduling of repair activities. The team is now engaged in a fully integrated recovery process to restore all damaged systems back to their original operating capability. The most significant of these efforts are: the construction and installation of a new gas deflector located beneath the launch pad, replacement of heat-affected cable and wiring, replacement of the launch support umbilical interface to the launch vehicle, and painting of the vessel's external surfaces.

The one-of-a-kind gas deflector directs the engine exhaust away from the platform and controls the acoustic environment during launch operations. The Design Bureau of Transport Machinery (DBTM), Sea Launch's Russian contractor for much of the launch support equipment, is managing construction of the deflector with the original manufacturer at a shipyard in St. Petersburg, Russia. Additional heavy industrial repair work and painting will be performed at a shipyard on the West Coast of North America. The Launch Platform repair and recertification operations are expected to be completed by September.

Sea Launch is doing everything possible to meet our customers' requirements. We are working to a highly integrated recovery plan and we are prepared to succeed in its implementation in a methodical, professional approach. Safety continues to be our number one priority throughout this process.



## The Sea Launch team: working together on the recovery program

*Following the unsuccessful launch on January 30, the Sea Launch team shifted instantly from launch mode to recovery mode and promptly initiated a systematic three-phased integrated approach to the recovery process: damage assessment, repair/recertification and system certification. Some of the people leading the operations shared their impressions of this process.*

While the structural integrity of *the Odyssey* Launch Platform was found to be intact, there are some 200 systems that need repairing, from light fixtures and plug covers to the hangar doors and roof. "The easy part is assessing the visible damages," said Jan Bakke, superintendent of the platform. "The more challenging parts are the ones you don't see." The platform's marine segment alone will require more than nine miles and 35 different types of new cable. But Bakke says the biggest repair is the paint. It will take almost 20 tons of paint and 1.8 tons of paint thinner to paint 36,000 square yards on the vessel. Another major consideration is the installation of a new gas deflector, which will be shipped from its manufacturer in St. Petersburg, Russia, to Long Beach, California.

The team flexed its understanding of the enormous scope of the job ahead. When the platform returned to Home Port, service technicians were already in place to begin repairs. "From my point of view, one of Sea Launch's really strong suits is its ability to deal with off-nominal situations," said Joe Carpico, director of mission operations. "We have taken those skills of coordination and cooperation and effectively applied them to the platform repair effort on a grand scale."

Keith Dayton, vice president of operations, agrees. "If you look at the breadth of the team, you have all the essential elements to repair this thing," he said. Dayton chairs the Repair Operations Center (ROC), a cross-functional group responsible for repairing the critical systems. "When someone has ownership, when they are the go-to guy, they accept responsibility and remove barriers. They know what to do. If ever you needed the right people at the right time," he said, underscoring this point, "we've got them."

Dan Dubbs, deputy vice president of operations, believes the professional attention to each step is due in large part to the team's ability to redirect their expertise and focus. "It's just as we would operate normally. But we've flipped the switch and it's now a different operation," he said. "We're multi-tasking and cooperating to the nth degree."

All agree that Sea Launch's goal of returning to flight in the 4th Quarter of 2007 is achievable, but the team must overcome some significant challenges to achieve it. One such challenge will be the installation of the gas deflector. The 280-ton steel structure must be installed under the deck of a floating vessel. Safety, cost and efficiency are all considerations in planning this operation.

Artie Donahue, director of operations integration, acknowledges there are also cultural challenges. "We always cooperate across international cultures, languages and export management," he said. "To a certain extent it's not anything new. We are simply applying that cooperation to a new set of circumstances."

Donahue and his colleagues maintain that overcoming challenges as a team is what has made Sea Launch such a success in a short period of time. "Everyone has taken on tasks beyond their job description," he said of the recovery process. "People are stepping up to the plate, across the board. The team has really come together on this effort."

Lionel Cheri is director of operations support and pier operations at Home Port. Cheri came to Sea Launch nine years ago and says that what strikes him the most about the Sea Launch system is the creativity of the team. "We have challenges nobody else in the world has. Every day we're coming up with solutions," he said. "We create ways to do things that have never been done before. We set a goal, and what we have to do is achievable."

Dan Dubbs says passion and success are partners in this repair endeavor. "We love this business and we'll be right back doing it again," he said. "Extraordinary people arise from extraordinary circumstances."



### On the Road

June 5-7  
ISCe 2007  
San Diego, CA

June 18  
CASBAA Satellite  
Industry Forum  
Singapore

June 19-22  
CommunicAsia  
Singapore

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