

CASE STUDY

Client:

United States Air Force

Challenge:

Provide a wide variety of range services and technical know-how to support the launch of NASA's pioneering Ares I-X booster rocket.

Solution:

Planning, teamwork and engineering expertise to support launch operations and data collection, including implementation of advanced telemetry ground systems technology.

Results:

Successful support of Ares I-X launch and vehicle splashdown; establishment of a new record for data rate collection involving an Eastern Range mission.

For More Information:

Visit www.csc.com/government or www.csc.com/aerospace_defense.

The next generation of human spaceflight has begun, and CSR, a CSC-managed joint venture, provided essential support for NASA's initial Constellation Program test launch from Kennedy Space Center in Florida.

CSR supplied range services and technical support for the successful Oct. 28, 2009, launch of the Ares I-X booster vehicle. It was an important first step in NASA's efforts to replace the space shuttle and return astronauts to the moon.

CSR, a joint venture between CSC and Raytheon Technical Services, helped develop the Ares I-X mission plans for the Eastern Range, a rocket range that supports missile launches and space flights from Kennedy Space Center and Cape Canaveral Air Force Station.

CSR also provided real-time radar and optical tracking and telemetry data collection for the launch and splashdown. On launch day, a team of about 150 CSR personnel operated the Eastern Range's integrated communications, command and control systems and performed real-time weather observations.

Responsive range services

The Ares I-X flight demonstrated the basic design and aerodynamic performance of the booster rocket that will be used as NASA's primary launch platform for the next generation of human spaceflight. Extensive flight data was collected from the mission. It is being used to improve the design and safety of the next crew launch vehicle, which NASA hopes to send into orbit by 2014.

The mission also provided an opportunity to test and prove the range capability for the new era in spaceflight. Michael M. Maier, CSR vice president

and general manager says, "This successful mission demonstrates our ability to provide responsive range services for the new launch systems under development, while ensuring a high degree of range safety and excellent technical performance."

Due to the developmental nature of the test flight, there were many late-breaking changes in mission requirements. The CSC-led team was able to accelerate production of the range instrumentation plans, which were completed in just 20 days instead of the standard 50 days. Maier says, "We have made great progress in terms of range technology and planning processes and these advances were put to the test for Ares I-X."

Ground tracking systems success

As part of the Eastern Range Technical Services Contract with the U.S. Air Force, the CSC-led CSR team provides range support for all scientific, national security, and commercial launch operations from Cape Canaveral or the NASA Kennedy Space Center. Our support also includes tracking, real-time range safety data processing, command and control, range surveillance, meteorological services and the communications networking to integrate the range systems and provide effective management of the Eastern Range and communications with range customers.

Much of this work requires adapting commercial technologies to the exacting standards required for space launch operations. For example, CSR

CASE STUDY

CSC HELPS USHER IN NEW ERA OF SPACE EXPLORATION (CONT.)

"We have made great progress in terms of range technology and planning processes and these advances were put to the test for Ares I-X."

*Michael M. Maier, CSR
vice president and
general manager*

personnel provided NASA with high-resolution wind profiles in the launch area every 60 minutes to ensure that air loads on the Ares vehicle were within acceptable limits prior to launch. These profiles are quality controlled by a CSR meteorologist to ensure the vehicle is not exposed to any unexpected wind shears or that measurement errors don't inadvertently lead to a launch delay.

Under the direction of the 45th Space Wing at Patrick Air Force Base, CSR operates range systems that cover over 15 million square miles of the Atlantic Ocean extending from Cape Canaveral to Ascension Island, more than 5,000 miles downrange. CSR has served as Eastern Range prime contractor since 1988. During that time, more than 450 launches have been completed, including an unprecedented string of 205 consecutive countdowns over a seven-year period without a launch scrub due to CSR-operated and maintained equipment.

The CSR team worked closely with NASA and the U.S. Air Force Space and Missile Systems Center to interface developmental telemetry receivers and recorders to Eastern Range telemetry ground stations to capture critical engineering data from the heavily instrumented Ares I-X vehicle.

Although fully integrated and tested only days before the mission, the telemetry ground systems captured all of the required data and established a new record for maximum data rates for the Eastern Range. Prior to the mission, maximum data rates were typically limited to 1 mbps, but for the

Ares I-X mission, data rates of 4 and 14 mbps were received and recorded. The higher data rates enable NASA engineers to more fully evaluate the performance of the Ares I vehicle design and reduce the number of test flights required to achieve operational capabilities.

To the moon, and beyond

The Ares I-X mission marks the first flight of NASA's Constellation Program, which will replace the space shuttle program and eventually allow a sustained human presence beyond low Earth orbit. As part of the program, NASA plans to return American astronauts to the moon, and also possibly attempt the first human mission to Mars.

Since 1959, we've supported NASA in a broad range of areas, and CSR's support of the Ares I-X mission marks yet another chapter in our prominent role in space exploration.

"The Ares I-X mission demonstrated the flexibility and responsiveness of the Eastern Range government-contractor team," says Maier. "This sends a clear signal we are ready to provide responsive range services for the new launch systems under development."

By exploiting new range technology and innovative business processes, CSR is now providing the same or better levels of service with fewer than 900 employees, compared with 1988 when we started the contract with over 2,000 employees.