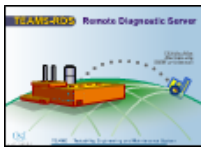
ABOUT QUALTECH SYSTEMS

2-Minute Overview



Flash presentation

What can QSI do for you?

News

Events

Customers/ Case Studies

Partners

Careers

Contact

Request a Quote

Customer Login

Register

Search

TEAMS: Rocket Science Any Service Technician Can Use

2020 is the year circled on NASA's calendar marking the goal that engineers and scientists involved in the Constellation Program have set for themselves to transport astronauts back to the moon. NASA formed the Constellation Program specifically to establish a base there, and to lay the foundation for eventual explorations of Mars and the solar system before the end of the first half of this century. Much has already been learned from NASA's previous spaceflight programs, beginning with Mercury and Gemini, and continuing through current projects with the Space Shuttle and the International Space Station. The Constellation Program, however, focuses on a new generation of spacecraft for human spaceflight, consisting primarily of the Ares I and Ares V launch vehicles, the Orion crew capsule, the Earth Departure Stage, and the Altair lunar lander. These spacecraft will be capable of performing a variety of sophisticated missions ranging from Space Station resupply to lunar landings.

Qualtech Systems, Inc., (QSI), a technology company based in Wethersfield, Connecticut, has been intimately involved with the NASA Space Program since the mid-1990s. QSI's team has worked closely with engineers and scientists at NASA's Ames Research Center on designs for the program's evolving launch vehicles, ranging from reusable launch vehicles (RLVs) in the mid-90s to the current Ares launch vehicle, as well as the International Space Station. QSI develops software that captures the knowledge of how a system fails and how the failures are detected, then uses that knowledge to guide engineers to make troubleshooting and real-time diagnosis more efficient, capabilities essential to the design of any crew launch vehicle. QSI's software suite includes three tools used by NASA specifically for the Ares launch vehicles and Orion crew modules. These tools support systems engineering; systems design and testability; automated diagnostics and troubleshooting; and system autonomy. The first, TEAMS-Designer® (Testability Engineering and Maintenance System), is a tool used in design/analysis phases of complex systems. TEAMS-RT© is a real-time diagnostic engine that provides diagnostic functionality for integrated vehicle health systems on board a flight vehicle or embedded into a run-time architecture. Finally, TEAMS-RDS™ (Remote Diagnosis Server) is an application that can support multiple simultaneous diagnostic sessions from a variety of remote systems. It was for this software suite, developed during a seven-year collaboration with ARC researchers, that QSI was selected for NASA's prestigious Space Act Award in 2002.

This exceptional level of technical expertise, combined with the company's responsiveness and adaptability to NASA's needs, are among the many reasons why Dr. Ann Patterson-Hine, Tech Area Lead for Discovery and System Health, and the technical contact for the projects QSI has done with NASA since '93-'94, enjoys working with the QSI team. She notes that the NASA and QSI teams have developed a genuine collaboration that often alters the outcome of a project and that Qualtech's technology sometimes materially changes the way NASA proceeds with its designs. NASA's approach isn't simply to purchase a software product and apply it to their designs: they like the ability to test analyze and modify as they go along. NASA quickly realized that they could get analysis results out of QSI's software, (modifying, for example, the placement of sensors based on TEAMS® analysis) and thereby use the tools to improve their designs.

QSI's willingness to adapt to NASA's requirements has resulted in some exciting developments in critical systems engineering efforts in the design phases of the Ares launch vehicle project. Working with Crew Launch Vehicle Fault Detection, Diagnostics and Response (FDDR) team members at Ames Research Center and Marshall Space Flight Center, QSI began to enhance their original diagnostic software, actually building NASA's requirements into their toolset. According to Dr. Patterson-Hine, "The responsiveness of the QSI team enabled us to define new features that we needed in the TEAMS-Designer® tool to support development of launch abort algorithms and QSI rapidly implemented the new functionality to support our project schedule."

As a result, the systems engineering analysis capability has been significantly improved. Initially, FDDR engineers were building functional fault analysis models of vehicle

News Update

TEAMS® Diagnose Before Dispatch Solution Pack Promotional Offer

Testability Presentation

QSI Featured as a 2010 NASA Spinoff Technology Company (Click here for the full article)

TSIA Selects Minntech and QSI to Present "Remote Services Made Simple" at Technology Services World Conference in Las Vegas

QSI Announces Three New Sofware Bundles

QSI Expands and Relocates their Corporate Headquarters

TEAMS: Rocket Science Any Service Technician Can Use

QSI provides software and services to overcome problems like these:

Low machine availability

High training costs

Poor service due to high employee turnover

Inadequate data

collection and service logs

False pulls, unnecessary replacements, high spares consumption

Customer dissatisfaction

subsystems that would ultimately support the design of the abort logic for the new launch vehicle. As details were added and reviews were held, the subsystems engineers began asking for QSI's tools so that they could utilize the various analysis features of TEAMS-Designer® themselves in the design of the subsystems. As timing analysis and effects analysis were added, a TEAMS-NASA version emerged. Due to the popularity and widespread benefits of these capabilities, QSI merged TEAMS-NASA with their commercial product and have recently released TEAMS-Designer® 11.0. According to Dr. Somnath Deb, President and Chief Technical Officer for QSI, "QSI draws on its customers' needs to select the feature sets for its tools. It is a win-win situation: the customer gets features that are important, and QSI gets to refine the new concept with a real-life application. This new functionality forms the FMECA-module of TEAMS-Designer® 11.0, and other Aerospace customers, such as Gulfstream, are already benefiting from these."

Now, multiple centers are using the QSI technology. Ames Research Center, Marshall Space Flight Center, and Johnson Space Center all have TEAMS-Designer® site licenses and several other centers are currently purchasing single-user licenses to support their Constellation tasks. The innovative modeling and analysis capabilities provided by the QSI tool suite enable design information to be utilized during later system lifecycle phases, such as in ground processing at the launch site and on board the vehicle itself. QSI's Remote Diagnostic Server is slated for use in the Engineering Technology Development Program (ETDP) ground systems automation project which is a joint effort between Ames Research Center and other key NASA centers. In addition, Honeywell, the Orion avionics subcontractor, has selected TEAMS-RT® for on-board Vehicle Health Determination.

Another aspect that Dr. Patterson-Hine likes about working with QSI is that their methodology fits right in with NASA's goals. While they are using this technology specifically for Project Constellation, NASA is also developing a process that future project managers can use to ensure that there is greater consistency throughout the project lifecycle. According to Dr. Patterson-Hine, Qualtech's methodologies are part of this "blueprint". "NASA continually works to improve its systems engineering practices and the QSI approach, starting with design assessments and utilizing the same basic model throughout the development and implementation of run-time diagnostic systems and into operations and maintenance phases, enables system health management practices to be integrated seamlessly with conventional systems engineering processes."

According to Dr. Deb, many organizations, not just NASA, are embracing a systems-oriented approach to the design process. He notes that, "Tools that can reduce unnecessary tests provide cost effective testing procedures, and which are built to work seamlessly in an integrated design environment can yield substantial cost savings over the system's lifetime. Markets for such design tools include large prime contractors and government organizations that must integrate numerous subsystems and study testability at the system level." He adds, "The TEAMS® tools can be used as training aids for field maintenance engineers and/or diagnosticians. Most significantly, Qualtech's "Remote Diagnostic Server (RDS)" or TEAMS-RDS® provides these capabilities from a central server computer to thin clients (PC with a web browser) over the Internet, anywhere in the world. The e-commerce potential of this solution has very large (and rapidly expanding) commercial potential. The Qualtech Integrated Toolset is unique in that it provides a comprehensive solution for cradle-to-grave supportability of complex systems whether they are new development or legacy platforms."

Qualtech was just recently selected a second time for NASA's prestigious Space Act Award, which highlights "significant and technical contributions to aeronautical, commercialization, technology transfer and space goals" and is given for mature technologies that are proven in NASA applications. The 2008 award was announced in early May, citing QSI's technologies used by Project Constellation, specifically TEAMS®RT and its related to real-time diagnosis of dynamic systems.

The beauty of the TEAMS® software is that while it can be used in the complex applications of NASA's research projects, it functions in essentially the same way for the simpler applications required by other industries and companies, especially those who, like QSI, work closely with NASA. The idea is to help companies capture information about how their equipment might fail so they can keep it working. The software improves fault isolation, eliminates shotgun maintenance, and increases equipment availability. What works so well for NASA can work equally well, even at a less complex level, for field service organizations with high value business critical assets, where downtime is expensive. Orbotech, for example, a company that designs, develops, manufactures, markets and services automated optical inspection (AOI) systems and imaging solutions for PCB production, has deployed the TEAMS® solution worldwide for their entire field service workforce to minimize troubleshooting time and eliminate false pulls. The advanced reasoning of the software enables every technician to perform like an expert, and the solution has paid for itself many times over in the last few years. KLA-Tencor, a leading supplier of yield enhancement equipment to IC manufacturing lines, acquired the TEAMS® solution after an extensive

evaluation showed that a novice technician equipped with the TEAMS® guided troubleshooting solution (GTS) could routinely outperform an expert in troubleshooting a complex system. Their entire field service workforce (about 1000 technicians) is now using the TEAMS GTS. Other companies that utilize Qualtech software include Lockheed Martin, Honeywell, BAE and General Motors, making it an integral part of a number of critical, innovative projects that receive international attention.

As Dr. Deb likes to point out, these companies, and the customers they serve, don't always stop to consider how the collaboration between NASA and QSI benefits them in terms of efficiencies and cost savings. "The technology that works so effectively in a space station environment can be adapted to work just as well on an oil rig or even in a kitchen. Software has to be of the highest quality and innovation to meet NASA's needs. Historically, technology developed for NASA requirements has been prohibitively expensive for any down-to-earth application. In this case, we have taken a commercial off-the-shelf technology, the TEAMS® toolset, and raised it to NASA standards, without raising the price. The net result is that we now have a very sophisticated software toolset that companies can utilize to save money." He adds, "The same technology that allows NASA to make complex systems easy to maintain, can now help any technician troubleshoot like an expert and fix problems right the first time – be it business jets or automobiles or submarines; and from million dollar semi-conductor fab equipment to affordable kitchen appliances – if it is hard to troubleshoot, our TEAMS® toolset can help service organizations to save money!"

For more information visit http://www.teamqsi.com

© 1993-2012 Qualtech Systems, Inc.

TEAMS, TEAMS-RT, TEAMATE, TEAMS-KB, TEAMS-RDS, and RDS are registered trademarks of Qualtech Systems, Inc.