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SPACEX RELIES ON A STREAMLINED DESIGN PROCESS TO HELP REVOLUTIONIZE SPACE TRANSPORTATION

Jama helps the innovative aerospace company keep track of thousands of requirements by providing a platform for greater visibility and collaboration with its team and customers.

Founded in 2002 by Elon Musk, Space Exploration Technologies (SpaceX) designs, manufactures and launches the world's most advanced rockets and spacecraft for customers such as NASA, SES, and Iridium. In just ten years, SpaceX has emerged as one of the fastest growing aerospace companies in the world with around 2,000 employees working toward Musk's vision to revolutionize space travel. SpaceX has gained worldwide attention and made headlines recently for a series of historic missions by carrying cargo aboard its Falcon rocket to the International Space Station.

SpaceX's Falcon 9 rocket delivers cargo to and from the International Space Station under a $1.6 billion Commercial Resupply Services contract with NASA. In August 2012, NASA awarded SpaceX a $440 million contract for the Commercial Crew integrated Capability (CCiCap) initiative to transport humans to space.

THE CHALLENGE
THIS IS ROCKET SCIENCE

Launching spacecraft and satellites into space are highly complicated endeavors. Like many other large organizations tackling complex projects, SpaceX initially faced a few critical business challenges that Jama could help them address:

- Providing visibility and managing customer expectations

- Managing inevitable change to requirements and other important details

- Eliminating re-work in order to meet aggressive schedules

As a customer, NASA needed visibility into SpaceX's progress to ensure key requirements were being met. Prior to using Jama, SpaceX did not have an easy way to share quick status reports on requirements verification. As a result, many hours were spent compiling status and change control reports.

This process, although effective, took too much time. Hours were spent in meetings reviewing large cumbersome spreadsheets – going line by line to review thousands of details. SpaceX had to implement complex macros to pull information from Microsoft Excel into Word documents to create specific reports. This was time consuming for everyone involved. SpaceX wanted to share real-time information with NASA for their review and approval, but they did not have an easy way to accomplish this level of collaboration prior to using Jama.

SPACEX
RESULTS SUMMARY

- Helped reduce meeting times, simplify cumbersome specification docs, and improve overall communication to ensure all requirements were accounted for accurately.

- Provided a method for traceability from requirements to derived requirements to verification events.

- Improved customer relations with shared project visibility and enhanced communications.

- Accounted for contract milestones and ensured timely payments.

THE SOLUTION
ONE SMALL STEP FOR SPACEX, ONE GIANT LEAP IN EFFICIENCY

SpaceX implemented Jama in 2010. The team wanted to develop new ways of working to simplify requirements management, improve visibility and customer communication, and create an efficient, paperless product delivery process. Jama helped SpaceX in three significant areas.

1. Open Customer Communication

In order to provide better visibility and manage customer expectations, SpaceX implemented Jama's Review Center. Review Center offers a well-organized review and approval process to capture feedback, including voting for priority and electronic signatures for formal approval. With Review Center, SpaceX can share and collaborate on requirements with their customers, as well as internally within their engineering teams. This helps to ensure requirements are captured accurately and executed according to expectation. In addition, mission managers can segment requirements so that engineers can easily find requirements applicable to them, minimizing search time while keeping engineers informed of the latest changes.

2. Improve Change Management

SpaceX also uses Review Center for customers to review and approve "verification events" that are linked to requirements using traceability and coverage. These events demonstrate to the customer how SpaceX will review and meet every requirement. By reviewing all verification events through Review

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Center, the team is able to more quickly discuss, comment and change items until everyone is satisfied and all requirements are approved.

By tracking requirements in Jama, SpaceX has been able to automate the Interface Control Document (ICD) development process. This document contains all mission requirements and is used as a milestone deliverable to the customer. After approval of requirements and verification events through Review Center, mission managers can now easily output an ICD for delivery, which was previously only done through Word and Excel document exchanges. Using Jama for ICD development, SpaceX now can easily manage revision control, feedback and comments, and eliminate confusing track changes.

3. Automate Processes and Reduce Repetition

Using Jama's Enterprise Reuse capabilities, SpaceX creates common assets once and uses those to support parallel development efforts. This allows SpaceX to maintain all the common requirements in one central place. These are managed by a core engineering team ensuring that they are current and accurate. Engineers working on specific projects can access those requirements quickly and easily. Additionally, if any of the common requirements change, the engineers are notified and can determine the appropriate action. This enables them to spend their valuable time on the requirements unique to each project.

RESULTS
IMPROVED COMMUNICATION, HAPPY CUSTOMERS

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The most significant outcome of using Jama at SpaceX is improved collaboration and streamlined communication with its customers. Customers have greater visibility with Jama, which translates into increased customer satisfaction. Consequently, SpaceX can quickly turn around requirements for review and approval, and increase efficiency on the engineering side. Both customers and SpaceX teams are happier because Jama helps keep everyone in sync on the latest plans and status of projects.

Jama has eliminated the endless meetings and cumbersome spreadsheets to track requirements and other important details of projects. This allows the company to focus on design and development. SpaceX now pulls requirements from Jama to create status reports within an hour or two.

ABOUT SPACEX

SpaceX designs, manufactures and launches the world's most advanced rockets and spacecraft. With a diverse manifest of more than 40 launches to resupply the space station and deliver commercial and government satellites to orbit, SpaceX is the world's fastest growing launch services provider. In 2012, SpaceX made history when its Dragon spacecraft became the first commercial vehicle to successfully attach to the International Space Station — a feat previously achieved by only four governments. With the retirement of the Space Shuttle, the SpaceX Falcon 9 rocket and Dragon spacecraft are carrying cargo, and one day will carry astronauts, to and from the space station for NASA. Founded in 2002 by Elon Musk, SpaceX is a private company owned by management and employees, with minority investments from Founders Fund, Draper Fisher Jurvetson, and Valor Equity Partners. The company has more than 2,000 employees in California, Texas, Florida and Washington, DC. For more information, visit http://www.spacex.com.

ABOUT JAMA SOFTWARE

Jama Software is the definitive system of record and action for product development. The company's modern requirements and test management solution helps enterprises accelerate development time, mitigate risk, slash complexity and verify regulatory compliance. More than 600 product-centric organizations, including NASA, Thales, Boeing and Caterpillar have used Jama to modernize their process for bringing complex products to market. The company is headquartered in Portland, Oregon. For more information, visit http://www.jamasoftware.com.