

Using Knowledge Management Practices to Enhance Spaceflight Operations

Douglas Morris, Johnson Space Center
Kenneth Long, Johnson Space Center
Dat Bui, Johnson Space Center
Tho Pham, Johnson Space Center
Michael Tsau, Johnson Space Center

Brian Ulczynski, Johnson Space Center
Shashi Gowda, Johnson Space Center

Complex operational environments need to meet the following objectives: the recording of day-to-day events, decisions, and system states; the distribution of the operations information to interested parties and systems; and, when necessary, the ability for analysis and traceability of captured information. The analysis of such complex operations usually entails the splicing and integration of numerous information sources into a single coherent repository.

One solution is to build a system that facilitates and encourages collaboration, communication, subscription, and publication of information. This is accomplished by giving the user a customizable work environment that will allow a more flexible navigation through the information, change the way it is displayed, and how it relates to other information.

A web tool is an innovative leap forward. It allows the participants to access the system remotely from their office, residence or on the road. This allows specialists to have almost constant access to the latest operational environment knowledge. A web tool allows integration with any currently existing web-based tools in the spirit of collaboration and knowledge management.

WebLogger is a web-based tool used by the flight controllers in the Mission Control Center at Johnson Space Center. Intended to be both a replacement and an enhancement of communication between flight controllers for their current logging procedure of events that occur during a Shuttle or Station mission, communication is based on two parts: the production of items to be communicated and the subsequent comprehension of those items. In the case of WebLogger, the recording in an entry of what is occurring on Station is the production part of communication. The handover to the next flight controller is the comprehension part of the communication issue. With WebLogger addressing both the entry and hand-over issues of logging events and trends, the

overall knowledge capture and redistribution of information inside of the Station flight controller community should increase. This could be viewed as a step towards reducing the “brain drain” effect that could negatively affect NASA in the upcoming decade as many of their more senior engineers and managers will become eligible for retirement.

The benefit of a web-based system is that web pages can typically be viewed as long as the user has access to an up-to-date web browser and permission to access the server that is hosting the application. This built-in advantage will allow flight controllers who are currently not on console the ability to view the logs and remotely help with problem solving. They could access the system from a conference room or any other room with wireless access via a laptop, tablet pc, or PDA. Not only can WebLogger’s data be viewed from a computer with internet access, but also updates can be distributed to PDAs with wireless access via RSS (Really Simple Syndication) feeds. These feeds can distribute newly recorded information that contains a user-defined set of keywords.

When in a situation with the potential for being overwhelmed with information, trends can easily be missed with the “clutter” of unrelated events. By creating timelines of past or current events, the user can easily identify visual trends. There is the ability to view a piece of the timeline in more detail, allowing the user to read about the individual events while seeing a visual relationship in regards to when the other events occurred.