

Study Group report SG.4.1. Knowledge Management of Space Systems

Responsible Commission:

- **IAA Commission 4: Space Systems Operations and Utilization**

Study Number and Title:

- **S.4.1. Knowledge Management of Space Systems**

Short Study Description

- Define the organizational and inter-organizational issues that support or inhibit knowledge sharing amongst aerospace organizations (including capturing knowledge of our key experts and aging workforce)
- Identify and recommend standards for knowledge management activities and initiatives to promote interoperability of key systems (such as lessons learned or publications)
- Create, through consensus, a position on the recommended approaches for an aerospace organization to investigate to excel at knowledge management

Website Study Information up to date?

- Information has been updated on group collaboration site, but not the IAA site.

Issues requiring resolution?

- None.

Progress and Product Deliveries on Schedule?

- **Plan:** Support a better understanding among member and aerospace organizations of the ways in which they can share knowledge
 - **Action (new):** Co-led “Collaboration and Knowledge Management in a Global Space Environment” track at *Space Mission Conference on Information Technologies* in Pasadena, California on July 18. Attendees represented 21 organizations, including JAXA, Canadian Space Agency, Netherlands, NASA, science fiction writers, industry, and academia. Talks were focused around a sample future space mission (Europa Submersible in 2015) and looked at all issues surrounding knowledge management and collaboration on international missions. Topics included “A Vision for Space Missions of the Future: Using Collaboration and Web Technology in 2015,” “Virtual Humans—Pushing the Frontiers of Robotic Exploration,” “Current Knowledge Management Best Practices and Gap Analysis for Our Future Space Mission Needs,” and best practice presentations on knowledge management, collaboration, and knowledge capture. Break out meetings for key topics led to further meetings and collaborations.
 - **Action (new):** Organizing first *International Conference on Knowledge Management for Aerospace* in Pasadena, California in March 2007. Call for participation initiated last week, with call for papers expected in November. Based on the conference in Houston in March, expect ~150 attendees.
 - **Action (ongoing):** Help to co-lead an consortium of US aerospace industry and NASA meetings on knowledge management. Team meets face-to-face 4-6 times a year (meetings this year on March 14, June 2, June 20, September 27, and December 13 to come). Participants include Northrop Grumman, The Aerospace Corporation, Boeing, Pratt Whitney Rocketdyne, Lockheed Martin, University of California at Irvine, Pepperdine University, California State University at Northridge, and NASA.

- **Action (previous):** *Managing Knowledge for Successful Mission Operations* conference held in Houston, Texas on 2-3 March 2006. Attendees from North America: aerospace industry, NASA, and Canadian Space Agency. Will hold international conference next year based on interest this year. 25 presentations, 2 panel discussions, and 19 organizations represented by 95 attendees. 75 of the attendees expressed interest in being part of discussions on KM in the international aerospace sector.
- **Plan:** Ensure that there is a set of related papers from workshop participants at the 2006 IAF conference that exemplifies excellent knowledge management practices at aerospace organizations.
 - **Action:** Best papers from IAC 2005 and other discussions were featured in *Journal of Knowledge Management, Special Issue: Knowledge Management In the Space Industry*, vol. 10, no. 2, 2006. This special edition was edited by Philip Olla and Jeanne Holm.
 - **Action:** Seven papers selected from 12 papers submitted for the KM track for the Valencia conference:
 - “Journey from Space Projects to Portfolio and Knowledge Management,” Serge Garon, Canadian Space Agency.
 - “Integrating Knowledge Management at ESOC,” Roberta Dow, ESA/ESOC.
 - “Knowledge Management Activity in JAXA,” Shinichi Sobue, JAXA.
 - “Developing a Knowledge-Based View Across an Aerospace Organization: InsideNASA,” Douglas Hughes, JPL, Caltech.
 - “Hardware/Software Facilities for Product Assurance, Control, and Management at Krunichev State Research and Production Space Center,” Yury Mirosh, Krunichev State Research and Production Space Center.
 - “Emerging Applications of Knowledge Management and Innovation in Space Activities,” Gabriela Prelipcean, Stefan cel Mare University of Suceava, Romania.
 - “IAA Knowledge Management Working Group Update,” Jeanne Holm, NASA JPL.
- **Plan:** Meetings outside of the conference would be held virtually to minimize travel and increase participation. Information will be posted on a web site for each of communication and status reference.
 - **Action:** Group has an online collaboration workspace and has held face-to-face meetings as well.
- **Plan:** Coordination with other key working groups such as the OMG standards committee for knowledge-based engineering and the W3C committees for interoperability.
 - **Action:** Study Group Chair was appointed to governing board and co-chair of U.S. Federal Knowledge Management Working Group, which focuses on identifying emerging standards in the KM area and best practices in the field. These will be brought up as part of the IAA group discussions for any potential applicability.
 - **Action:** Successfully got a task funded by JPL to work with Tim Berners-Lee (MIT) and Eric Miller (W3C) to look at standards in this area. Work will be presented at March 2007 conference.
 - **Action:** Support given to IAF President on Web Portal site management and vendor selection to ensure KM works within our own organization.
- **Plan:** A position paper on the recommended approaches for an aerospace organization to follow in knowledge management that would promote knowledge sharing and interoperability with other organizations
 - **Action:** Discussions have begun, paper has been outlined for draft review. Draft paper to be published for March 2007 conference discussions and finalization.

Study Team Member Changes?

- No formal additions since March.
- Many additional collaborators and community members.

Name of Person Providing Study Group Status

- Jeanne Holm, Chief Knowledge Architect, NASA, Jet Propulsion Laboratory.

Status Report Date

- 1 October 2006