

Enhancing Collaboration Among NASA Engineers through a Knowledge Sharing System

Daria Topousis, Keri Murphy, Erin Means, and Manson Yew

Abstract— Because solar system exploration often involves highly complex missions, a strong infrastructure to support knowledge sharing among engineers is critical to facilitate problem solving and preserve solutions for future work. Any system developed to meet these needs must include the ability to rapidly disseminate content, connect users to the right information regardless of where it is stored, and connect people with the experts and they need. This paper describes the knowledge sharing solution called the NASA Engineering Network, which includes a faceted search, communities of practice, an expertise locator, and a centralized engineering portal. The paper includes details on how the components were developed and provides best practices that other aerospace organizations might use when implementing similar systems.

Index Terms— Communities of practice, information retrieval, knowledge based systems

I. OBJECTIVES OF THE WORK

THE NASA Engineering Network was developed in the wake of the Space Shuttle Columbia tragedy and the agency's new direction to return to the moon and send astronauts to Mars. Prior to 2005, geographically isolated field centers inhibited personnel from sharing experiences and ideas. In addition, as the Constellation Program formed to meet the challenges of the next era of space exploration it became clear that it would require consistent engineering practices across the centers. After extensive benchmarking, the NASA Engineering Network was formed to encourage knowledge capture and reuse and to facilitate information retrieval.

II. DESCRIPTION OF THE RESEARCH

The NASA Engineering Network is comprised of a search the mines data from distributed repositories, communities of practice formed along engineering disciplines, the agency's vetted and official Lessons Learned, an expertise locator, and a portal that draws these tools together and provides links to

internal and external engineering resources. This research explores the components of a successful knowledge sharing system, the factors necessary for creating successful communities of practice, and the factors that enabled effective cross-repository information retrieval.

III. RESULTS

Results of this research and development corroborated findings from early benchmarking on successful knowledge sharing systems. Surveys with search users showed that while queries brought back accurate results, users were not familiar with query formatting. Changes were made to improve the usability of search. Results on communities of practice show that progress with engineers was slower than initially anticipated and each community had a different rate of success based on involvement of the discipline leader and funding availability. In addition, new uses were found for other organizations within the agency such as the Academy of Program, Project and Engineering Leadership (APPEL).

IV. DISCUSS OF IMPACT FOR SPACE SYSTEMS

This paper includes lessons learned from the various components of the NASA Engineering Network that can be used by other aerospace organizations. The paper includes success factors for implementing virtual communities of practice and best practices for implementing metadata and faceted search. Some discussion of how search capabilities can be applied to a wide range of search architectures will also be covered.

V. FUTURE DIRECTIONS

Future plans for the network include rolling out new engineering communities of practice, integrating a wider array of Web 2.0 technologies into the network, and integrating semantic search capabilities.

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D. Topousis is with the Jet Propulsion Laboratory, Pasadena, CA 91109 USA (phone: 818-314-8794; fax: 707-839-8410; e-mail: daria.e.topousis@jpl.nasa.gov).

K. Murphy is with the Jet Propulsion Laboratory, Pasadena, CA 91109 USA (email: keri.s.murphy@jpl.nasa.gov)

E. Means is with the Jet Propulsion Laboratory, Pasadena, CA 91109 USA (email: erin.means@jpl.nasa.gov)

M. Yew is with the Jet Propulsion Laboratory, Pasadena, CA 91109 USA (email: manson.yew@jpl.nasa.gov)

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