

Advanced Knowledge Management

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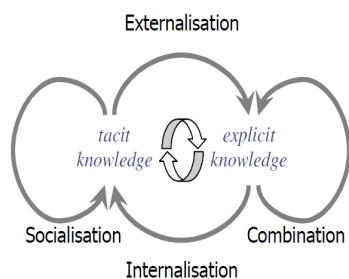
Background

ESOC is a knowledge intensive organisation. The key asset is the knowledge of the highly skilled people working in specialised fields. This knowledge represents a huge investment in time and effort used to obtain it. It is also the key asset characterising ESA as a highly respected organisation in the space domain. In order for ESA to successfully conduct complex missions and collaborate with international partners this asset, like any other, must be managed properly.

To reduce risk and increase efficiency and quality, ESOC as an organisation must be able to give its teams the knowledge they need on demand.

ESOC's knowledge is retained in different forms; as 'tacit' knowledge, that is, knowledge of a person or group of persons, either as experience, tradition or best-practices, or as 'explicit' knowledge of the organisation, that is, knowledge that has been documented in some form.

There are many complex knowledge streams within an organisation; flowing from person to person as part of the daily work (tacit-to-tacit, called 'socialisation'), from person to the organisation as part of documentation processes (tacit-to-explicit, called 'externalisation'), from the organisation to a person (explicit-to-tacit, called 'internalisation'), and from one form within the organisation to another form (explicit-to-explicit, called 'combination').



Whereas traditional knowledge management programs (the so called "second age of KM") have focused on transforming tacit knowledge to explicit knowledge through procedures and structured repositories, such as databases, modern knowledge management techniques (called the "third age of KM") have realised that this transformation is at best incomplete, and at worst it actively hinders knowledge retention due to the perceived complexity. Staff only enter knowledge when demanded to and actively seek to circumvent the process where possible creating small sub cultures of knowledge sharing not captured in the organisation.

The solution has been to accept that knowledge flows in all its form are desirable and realising that the role of knowledge management is to facilitate the flow, creating a culture of sharing and a pervasive IT infrastructure for retaining, managing and supporting knowledge no matter which technologies and tools are actually being used. Modern knowledge management systems focus on integrating diverse data sources such as

documentation, databases, as well as social media such as Facebook, linked-in and Xing, and on building specialized tools for knowledge capture and retention for specific situations such as staff leaving the organisation.

The stage is now set for the 'fourth age' of Knowledge Management: the ability to suggest to knowledge experts specific information articles to read and to recommend peers to open a dialogue with, based on the capability to capture the inherent meanings within a document and match them to a knowledge expert's skills, experiences and interests.

This Project

The "Advanced Knowledge Management Systems for Space Operations" project was awarded to Logica under the EMITS GSP study program (ESA AO/1-5757/09/F/MOS) in mid-2009 with the aim of identifying the current knowledge management maturity of ESOC as an organisation, identifying knowledge management best practices from similar programs, and defining and prototyping a knowledge management infrastructure. The infrastructure would focus on knowledge capture and specifically on retention of knowledge from experts leaving the organisation.

The project analysed the current knowledge management maturity of the organisation through a sequence of interviews. The analysis showed a very high awareness of the needs and benefits of knowledge management, and a high desire for a knowledge management enabled working environment. The resulting maturity model showed that ESOC has already matured considerably through the previous knowledge management programs in the areas of process and behaviour, whereas the area of information structuring and IT systems have fallen behind.

The project then refocused on improving the IT infrastructure for knowledge management. This involved building a portal to simplify access to shared knowledge as well as opening existing knowledge repositories to a wider audience, and integrating an advanced search engine to support knowledge discovery over many different knowledge sources in a non-invasive way. In order to test the feasibility of a non-invasive structure the system was integrated with the infrastructure of the mission XMM, ExoMars and Rosetta without changing their tools and processes.

An elaborate procedure was developed for knowledge capture of experts leaving the organisation, based upon the concept of expert debriefing recorded through video capture. Capture events were performed with a number of staff who had either just left the organisation or were due to leave in the near future.

Conclusions

There is a real need for knowledge management within ESOC. The organisation's knowledge is a highly valuable asset and holds a huge potential for ESA as an organisation, reduces risks to the projects and at the same time improving efficiency and reducing costs. Furthermore, the knowledge represents a huge investment by the organisation, as with any investment it is wise to reap a dividend. To realise this potential effort must be put into creating a pervasive knowledge management infrastructure of processes enabled through technology. For even modest investments, the return will be very large.

This project has successfully evaluated the maturity of ESOC, identified gaps for improvements, created the core of such an integrated knowledge management infrastructure, and created a process for retaining knowledge from leaving experts, based on the latest best practices and lessons within knowledge management.