

# Improving Knowledge Management to accelerate aircraft repair

**AIRBUS**

The IDC has halved the time Airbus engineers spend looking for repair information enabling their customers to keep their aircraft airborne.

Airbus is the second largest aeroplane manufacturer in the world delivering over 10,000 aircraft to customers globally. These planes remain airborne through Airbus' engineering teams resolving problems quickly and supporting the maintenance and repair of this fleet. The Airbus "Wing In-Service" repair team receive over 300 wing repair enquiries a week from around the world. As the number of these requests increases as Airbus' fleet expands and ages, so minimising the time spent reviewing previously recorded cases of similar damage to provide the latest repair information is vital to reducing aircraft downtime.

## What the IDC did

Airbus have engineering teams across the globe searching for wing repair information using an in house thesaurus search function database called Daedalus and its supporting workflow system, Icarus. These systems result in engineers spending a lot of time searching the database and reviewing a high number of potential repair options.

Researchers at the IDC reviewed a number of knowledge management approaches before applying the technique of "semantic expansion". The key challenge was to capture the language being used by these engineers to describe repairs and develop an intelligent search engine to identify different types of repair based on the terms provided.

Given its evolving nature semantic expansion is a more dynamic, efficient and sustainable approach than more commonly used thesauri based search engines which often become redundant after time without maintenance.

By working closely with the Wing-In Service engineers, IDC researchers were able to capture the terms they were using and constantly improve the capability of the system.

## The Impact

The research resulted in a 50% reduction in the time that Airbus repair engineers spent searching for wing repair information, which improved their response to customer enquiries without the need for additional resources. As a result of the new system, the annual time savings equate to 20 man weeks of time in searching for information allowing more time to focus on devising repair strategies:

- The improved Daedalus system has been rolled out to Airbus sites in the UK (Filton, 2011), Germany (Bremen, 2012) and the US (Wichita, 2011) with roll out to further sites within Airbus being planned.
- Development of follow-on projects focussed on enhanced image recognition of damage to further accelerate identification of repair solutions.
- As a result of the improved Daedalus system, the Wing In-Service support team is now the best performing in terms of response rate and workflow compared to all other Airbus repair teams.

- The project supported a cultural shift within the business unit to engage more closely with research and have PhDs students involved in the team.
- A deeper relationship with Airbus that led to several follow-on and new projects including Airbus' involvement in the £1.9M EPSRC Language of Collaborative Manufacturing Programme and an EPSRC Impact Acceleration Account funded project titled "Big-data: improving aircraft performance".

## The Future

Airbus are investigating opportunities to develop the technology for applications to pylons to roll out in France, whole fuselage applications for roll out in Germany and France and empennage for roll out in Spain. The existing system is being further developed by Airbus to utilise the image recognition developed in a follow on project from the EngD programme.

## Related publications

G. Vianello, Y. Xie, S. Ahmed, S.J. Culley (2010), 'Handling Of In-Service Support: Comparison Of Two Case Studies From Complex Industries'. *International Design Conference - Design Dubrovnik - Croatia*.  
Xie, Y., Weber, F., Culley S., (2010), 'Opportunities & Challenges for Context Aware Systems in Aerospace Industry'. *Journal of Enterprise Information Management*.

