

Capgemini explores innovative capabilities with the Royal Netherlands Air Force!

Capgemini developed an innovative process based on augmented reality, which enabled the Royal Netherlands Air Force technicians to seamlessly perform the maintenance jobs.

A need to overhaul the maintenance function

In 2017, the interest in Augmented Reality (AR) and Virtual Reality (VR) was notably increasing. AIR, the RNLAf's dedicated innovation research wing, wanted to explore the potential of these new technologies. Their idea was to use AR/VR to enhance and upgrade its maintenance function. Using AR/VR technology RNLAf wanted to innovate the entire maintenance process.

The large number of devices meant it was impossible to delegate senior technicians for every maintenance job, and this presented the main challenge for RNLAf: could AR technology be used to capture knowledge from the senior maintenance technicians to allow junior technicians to deliver the work?

Why Capgemini?

Capgemini has enjoyed a long-term relationship with the Dutch Ministry of Defense and the Royal Netherlands Air Force. We have delivered several successful projects for the AIR over the last couple of years and are continuing our cooperation to deliver innovation to the Dutch Air Force and to support a safer world. When the interest in AR/VR was on the rise and the RNLAf wanted to discover the potential of this new technology, Capgemini's rich expertise and proven AR/VR experience became their go-to. The RNLAf decided to leverage our significant innovative capabilities within their aging maintenance function and achieve their aim of upgrading the entire maintenance ecosystem.

Overview

Customer: Royal Netherlands Air Force

Industry: Aerospace & Defence

Location: Netherlands

Client Challenges / Business Need:

RNLAf wanted to discover the potential of new technologies such as augmented and virtual reality, especially within their maintenance function.

Solution-at-a-glance:

Capgemini developed an innovative system which RNLAf's technicians allowed to create seamless maintenance jobs based on templates, in order to perform smooth maintenance of equipment using HoloLens technology.

Results:

- Implementation of a new and innovative system to enable equipment maintenance and repair.
- Enablement of high-quality maintenance while simultaneously ensuring reduction of logistics costs.
- Optimization of processes, including easy tracking and auditing of maintenance jobs.



“Capgemini has been instrumental in leveraging its significant AR/VR experience to create a new and innovative solution that has helped us enhance our equipment maintenance process. Not only have we benefited from the cost reduction and process optimization, we are now able to focus on supporting more peace missions with the same budget!”



Innovating the ecosystem

Capgemini leveraged its significant AR/VR experience to organize and host a series of innovation sessions at its Applied Innovation Exchange (AIE) facilities in Utrecht and Toulouse, the latter of which specialized in Aerospace and Defense. Based on the learnings from the AIE sessions, Capgemini decided to adopt an agile way of working.

The combined, unified team included personnel from Capgemini, AIR, and end-users at the Airbase Volkel. The first sprint faced a minor hiccup when the joint team discovered that the proof of concept would not lead to a fully operational product. However, the team took a rather difficult and radical decision by electing to change the underlying technology! The team subsequently set about creating a new solution based on Mendix (low-code software) and Unity (immersive content creation) technologies. After the initial technology change, the team was able to create a working solution within 5 weeks. This AR solution combined the bare Framework for AR content and work flow management into a solution that was the base of a new innovative process.

During the development process the team also ensured to incorporate certain features which made it possible to use the HoloLens without a continuous connection to the Wi-Fi network. This proved to be highly important in certain mission areas where Wi-Fi was unavailable. We also made the solution available on tablet and desktop devices, so that it can be used without the HoloLens by seniors for job progress administrative purposes

Successful implementation of innovation

Capgemini ultimately developed an innovative system which allowed RNLAf's senior technicians to seamlessly create maintenance job templates. These templates provide the inspection and instructions steps, supported by 3D images, PDF documentation, and videos. Once the templates are approved by a supervisor, the junior technicians are then scheduled for work orders. Once scheduled, work order technicians will be required to wear Microsoft HoloLens (mixed reality smart glasses) to open a maintenance job and receive guided instructions to complete the required maintenance. During the maintenance work, technicians can track their progress and record videos for supervision, review, and approval.

It is important to note that the new, improved system was successfully implemented, not only for several Air Force maintenance workshops but also for other Navy and Army departments.

Improved functionalities for enhanced maintenance

A unique feature of this application is that it enables senior technicians to record the job template content themselves instead of having to use complex and expensive 3D models of military equipment (which are often not available in practice). This feature is the base for adoption in workshops and key for our business case.

Some of the key advantages for RNLAf are that:

- Technicians can perform maintenance jobs without requiring physical manuals to be made available. On missions, this means a reduction of logistics costs.
- Technicians can be guided on maintenance of equipment in which they have little experience. A positive side effect is that more junior technicians can be hired, who are cheaper and readily available.
- The solution can be used in training environments. This increases the teacher to student ratio, once again leading to a cost reduction.
- Technicians are often required to join missions for maintenance and repair of equipment. Previously, a senior technician used to be flown in (expensively) when technicians at the base lacked knowledge of certain equipment. With this solution, a senior can create a job card from his base location and the mission technicians can perform the repair, thereby performing high-quality maintenance at a much lower cost.
- Importantly, the new solution enables easy tracking and auditing of maintenance jobs.

Apart from the immediate benefits, the new system ensures that the cost reduction and the fast process optimizations enables the Dutch forces to now support a greater number of peace missions with the same budget. With this project, Capgemini feels proud to have been able to contribute to a safer world for us and our children.

In it together with the client at the heart!

Capgemini, AIR, and Airbase Volkel worked very closely together in a truly collaborative and agile model. Be it defining the development goals or designing, developing, and testing the requested part of the solution, all three stakeholders worked together towards the common aim of modernizing the existing functions and demonstrating the innovations to the key technicians concerned.

About Capgemini

A global leader in consulting, technology services and digital transformation, Capgemini is at the forefront of innovation to address the entire breadth of clients' opportunities in the evolving world of cloud, digital and platforms. Building on its strong 50-year heritage and deep industry-specific expertise, Capgemini enables organizations to realize their business ambitions through an array of services from strategy to operations. Capgemini is driven by the conviction that the business value of technology comes from and through people. It is a multicultural company of over 200,000 team members in more than 40 countries. The Group reported 2018 global revenues of EUR 13.2 billion.

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About Royal Netherlands Air Force (RNLAf)

The Royal Netherlands Air Force is a modern, high-tech armed forces Service that is active on a global basis. The Air Force lends support in combating international unrest and provides disaster relief. At home in the Netherlands, the Air Force ensures security from the air. For these purposes, it has highly-qualified personnel, aircraft, helicopters and other weapon systems at its disposal.

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