



Case Study



Royal Netherlands Army

Successful Experiment by the Royal Netherlands Army and DiManEx demonstrates potential for AM in Supply Chain

About the Royal Netherlands Army

The Royal Netherlands Army (Koninklijke Landmacht) is the ground forces element of the Dutch military. The institution's origins can be traced back to 1572, making it one of the oldest armies in the world. The army operates in several locations around the world, including Mali, Iraq, Afghanistan and South Sudan.

Challenge

To carry out its missions, the army must ensure the availability of equipment at all times. But securing parts for aging equipment is a challenge. In Mali, for example, materials suffer in the desert climate, causing parts to break. Securing a replacement can take up to 2 weeks, assuming the supplier is available and there are no delivery issues. The army saw an opportunity to leverage Additive Manufacturing (AM) as part of its supply chain in order to reduce the lead time for spares and improve the availability of their

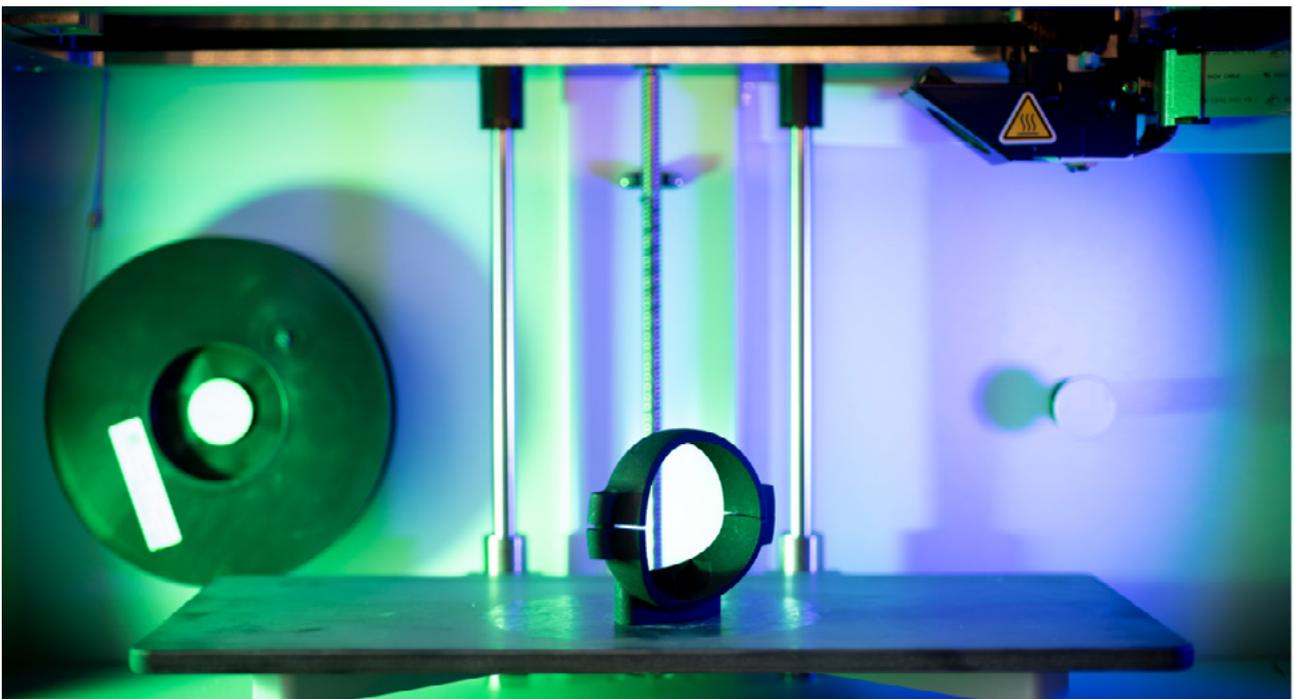
assets. They set up an AM center to start experimenting with the technology.

As part of this initiative, the ground forces selected a number of parts for Fennek vehicles to be produced through DiManEx's platform. The Fennek is a four-wheeled armed reconnaissance vehicle used by the Dutch and German armies. The parts selected for AM were all non-critical, though necessary to guarantee the vehicle's uptime.

Solution

A total of eight parts were selected for AM production:

- ✓ A door handle
- ✓ A camera support, used to keep a camera in place at the back of the vehicle
- ✓ An exhaust grill
- ✓ A reservoir seal, used to protect the underlying pressure sensor in brakes from external influences
- ✓ A support plate used in the engine compartment
- ✓ A locking pin which ensures the vehicle's hatch remains open when in use
- ✓ A winch roller
- ✓ A filling ring



In the case of the door handle, wear and tear can make this part break, but the traditional supplier has a high lead time and a minimum order quantity (MOQ) that would result in overstocking. Similarly, getting an exhaust grill replacement by traditional means takes several weeks, resulting in equipment downtime.



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Proud that with the application of Additive Manufacturing we were able to improve the availability of parts for the Royal Netherlands Army.

- Chris van Malkenhorst, Senior Project Manager at DiManEx.

The MOQ for this part was also less attractive, posing a high risk of overstocking and eventual waste. Other parts, such as the camera support and the reservoir seal have a high lifecycle cost (LCC). To replace them, the army would have to buy an entirely new camera and an entirely new reservoir unit. Securing the part through AM created a combination of benefits in terms of lead times, waste reduction and lifecycle costs, and provided a solution when there's no part supplier available.

The parts were produced using several materials, including aluminum, steel, PEBA and PA (plastic). Stress tests were performed to ensure their proper functioning, in a controlled environment and in the field. One of the parts was modified to improve its function in the field.

Results

All but one of the parts passed the mechanical and functional tests as service/spare parts, resulting in a near 90% success rate for this pilot. All parts were secured in a much shorter time frame than through traditional means, guaranteeing more vehicle uptime. By printing parts on demand, the army was able to avoid overstocking and scrapping costs as well, resulting in an optimized supply chain.

The results in a nutshell

- ✓ Shorter lead times
- ✓ Equipment uptime
- ✓ Optimized cost of supply
- ✓ Parts improved through re-engineering

Demonstrating potential benefits of AM in the Supply Chain

The Army was able to reduce its logistics footprint and improve equipment uptime through this initiative. The camera support is an example of a component they were able to fix within a day using 3D printing, without incurring the cost of a new camera. Similarly, they secured a replacement for the brake reservoir seal on demand without having to purchase an entirely new unit.



About DiManEx

DiManEx provides a cloud-based end-to-end service for distributed 3D manufacturing through a network of certified Additive Manufacturing partners. Ideal for manufacturers and parts intensive companies, our digital supply platform can be accessed anywhere in the world to produce industrial parts and small series with the click of a button. We are a partner you can trust, with a strong commitment to quality.

Visit www.dimanex.com to learn more.

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