

## SITUATION

Draeger is a leader in the design and manufacture of breathing apparatus and gas detection systems for professional firefighters and for industry worldwide. It decided to differentiate itself from competitors by producing a completely new type of breathing apparatus for firefighters. Called the PSS 500 Personal Safety System, the new design took into account extensive ergonomic research conducted by a university on the carrying of loads. As a result, the new apparatus would be easier to lift and to carry, give greater freedom of movement, and enable more adjustment for personal comfort. This would be achieved by using three 2-litre, spherically shaped containers of compressed air, instead of the large 6- or 9-litre cylinders used in previous designs, and by positioning them lower on the body to improve weight distribution and alleviate strain to the back, the most common injury within the fire service.

## OBJECTIVES

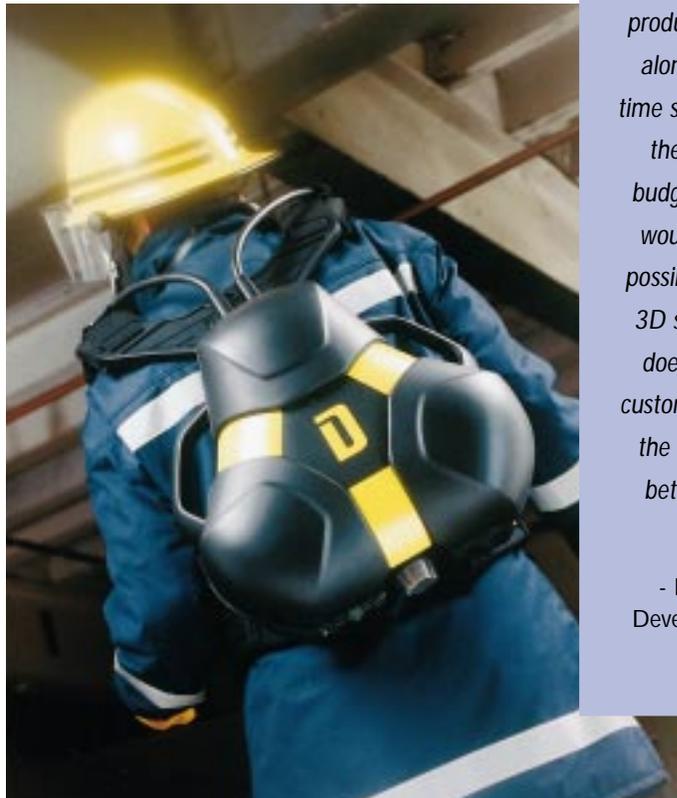
- ✓ Develop and produce a firefighter back pack which was more ergonomic and safer than previous models.
- ✓ Bring the product from concept to customer samples in record time.

## PROCESS VISION

- ✓ Reduce time-to-market to take full advantage of innovative designs and patent protection.
- ✓ Utilize new techniques such as rapid prototyping.
- ✓ Be able to visualize new designs as they evolve.
- ✓ Be able to produce shapes with more natural curves.

## ACTIONS

- ✓ Using I-DEAS™ software, Draeger modeled the internal components. These included a pressure reducer which was brought over from another product designed in I-DEAS. To save on design time and production costs, Draeger used some standard components in different products. With the optimization capabilities of I-DEAS, the Draeger designers were able to fit all the internal parts into the smallest possible space.
- ✓ Draeger contracted with Geo Limited, industrial designers, to create the casing and carry out detail design to supplement Draeger's internal resource. I-DEAS files were shared between the two work centers.



# Draeger Breathes Life Into New Product With I-DEAS™

*"I-DEAS™ software helped Draeger quickly incorporate new technology in our products. In one project alone, we achieved a time saving of 70% using the same staff and budget resources. This would not have been possible without I-DEAS 3D software. Not only does this benefit our customers, it also widens the technological gap between us and our competitors."*

- Dave Middleton  
Development Engineer  
Draeger Ltd.



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## **Draeger Breathes Life Into New Product With I-DEAS™**

- ✓ Using I-DEAS, the Geo designers were able to create the many complex surfaces of the air containers which were a special feature of the new product. They also designed the components that fitted around the cylinders. At the same time, the Draeger designers continued with the overall design of the harness, the unique shoulder yoke system, the waistbelt, and the valve arrangements.
- ✓ One set of SLA prototypes was made to test the fittings and clip fastenings. Five sets of vacuum castings were made for evaluation and display. These were shown at an industry exhibition and generated much interest, including one firm order.
- ✓ Working in the 3D model, modifications to the harness and clip mechanisms were easily made following feedback from the firefighters who tested the equipment.
- ✓ 3D files were passed to three specialist toolmakers for comment and quotations before final commitment to tooling. Their suggestions were then incorporated into the model before the completed files were passed to the toolmakers.

### **RESULTS**

- ✓ The entire design cycle, from concept to production, was completed in record time, reducing the design period by 70% compared to previous projects.
- ✓ The Lincolnshire Fire Brigade, which took part in field trials and regarded the PSS 500 as a breakthrough product, placed an order for the new equipment before it even went into production.
- ✓ The use of 3D enabled the company to be innovative. Draeger would not have been able to produce the PSS 500 Personal Safety System as quickly and affordably if the designers had been working in 2D using AutoCAD, their previous system.
- ✓ Overall product quality was improved. The designers could predict how components would fit together and were confident of the end result.

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