

# Simulated Tornado Head Up Display Case Study



## Description

Due to increased problems with the availability of cathode ray tubes the Royal Saudi Air Force decided to upgrade the Head Up Displays in its Tornado GR1 simulators using digital technology. Beck Optronic Solutions was selected to design and manufacture a solution.



Attempts by others to do this have failed due to the difficulty of achieving the required image brightness using conventional light sources. Beck's design team solved the illumination problem by using an SXGA FLCOS display together with a new light source technology that has illumination levels far exceeding that available from the very best LED sources.

A custom manufactured, high resolution, low distortion telecentric lens relays the image from the FLCOS and presents it onto an embedded micro-lens diffuser where the original CRT faceplate would have been.

This highly innovative solution met all the Client requirements. The complete system is contained in the space envelope of the original HUD and with no discernable difference in appearance.

Beck Optronic Solutions engineers installed and commissioned the systems on-site in Saudi Arabia.

Field of view	25°
Exit pupil diameter	127mm
Eyebox diameter	320mm
Pasallax	<1mR
Brightness	20 Cd/m <sup>2</sup> with a 30% reflectivity combiner plate*

\* At least twice this level is achievable if required.

## About Beck Optronic Solutions

BOS has a reputation for excellence in design and manufacture of precision optics that can be traced back over 175 years. Based near London, UK, BOS delivers complex, integrated electro-optic systems for defence and commercial use across the electromagnetic spectrum from UV to LWIR.

For pricing or further information please contact us at:

t: +44 (0) 1442 255755 | f: +44 (0) 1442 210770 | e: [info@beckoptronic.com](mailto:info@beckoptronic.com) | [www.beckoptronic.com](http://www.beckoptronic.com)

Registered in England No 09072729 | VAT No GB 196 4396 58  
Registered office: Focus 31 – West Wing, Mark Road, Hemel Hempstead, Hertfordshire HP2 7BW, UK



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