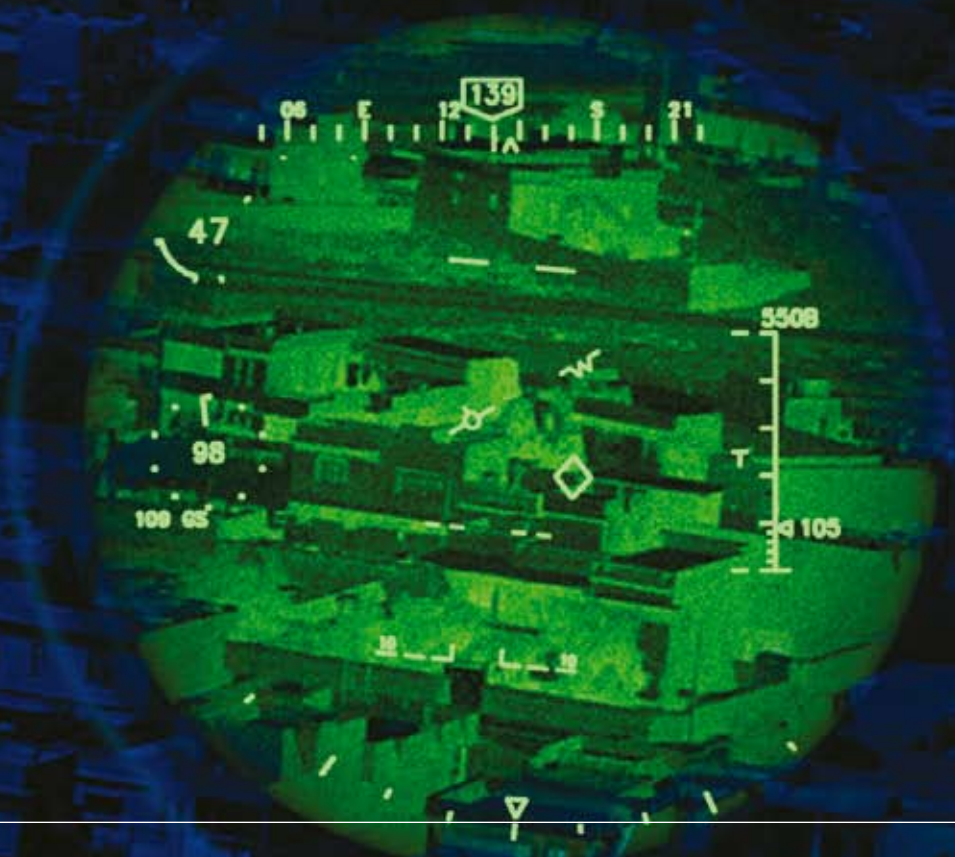


# The Q-Sight™ family of helmet display products



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The Q-Sight™ family is a new line of helmet display products developed by BAE Systems. Using patented technology, the Q-Sight family employs a revolutionary means of moving light using holographic waveguides. It offers a modular approach to providing pilots with heads-up/eyes-out capability, delivering mission-critical situational awareness with significant improvements in weight, cost, flexibility, simplicity, and optical performance.

Weighing less than 4 ounces, with no bulky projection optics and no undesirable center-of-gravity issues, Q-Sight offers maximum pilot safety and comfort. The lightweight, miniature display clips to any standard helmet, allowing the pilot “plug-and-play” capability.

Q-Sight technology features a larger exit pupil for pilot viewing and seamless transitions between day and night, increasing pilot situational awareness and mission capability. The increased visibility and lightweight design minimize eye and neck strain, common problems for pilots managing the demands of longer missions and increasingly complex rules of engagement. The decreased size and weight of the display allow the pilot complete freedom of movement within the cockpit.

#### **Modular modernization**

The system’s modular design allows for the low-cost addition of new, mission-specific capabilities as required. It also makes Q-Sight easily retrofittable and/or upgradeable, as well as compatible with other helmet display technologies. The basic monocular Q-Sight architecture offers plug-

and-play solutions for any cockpit with either analog (stroke) or digital video interface connections. Symbology drawing capacity is unlimited. The Q-Sight devices work in either left- or right-side configuration, allowing the pilot to choose his or her dominant eye. Binocular solutions, of particular benefit for sensor overlay, also are available. The Q-Sight electronics drive both left and right displays. Helmet tracking capability can be added by simply attaching the tracker pads to the helmet.

Flight demonstrations of the Q-Sight system are planned for late 2007 and early 2008.

#### **Quantum displays explained**

Conventional helmet display systems use complex and expensive lens groups to move the image from an LCD to an objective lens. These lens groups introduce distortions, losses, and severe weight penalties.

BAE Systems’ patented quantum technology overcomes these limitations by using holography techniques, directly coupling the output of an LCD device to a credit-card-size combining lens — eliminating the need for any intermediate lenses.



Benefits to the user include improved flight safety, reduced neck strain, and seamless transition between day and night. Q-Sight also offers improved operational capability and situational awareness.

#### **System description**

Q-Sight attaches to all standard in-service aviators' helmets with minimal modification. The sight is placed approximately 25mm from the eye in the day operating mode. Symbology and/or video can be displayed to provide the user with eyes-out operation.



In high-ambient-light conditions, a dark visor can be deployed to improve the contrast of the imagery. Q-Sight is designed to be compatible with the ANVIS night vision goggle (NVG). Operation at night can be achieved by simply clipping on the NVG and deploying in the normal manner. The sight is located in its own mount and positioned behind the goggle's eyepiece.

#### **Optional configuration**

The modular design allows incremental upgrades in capabilities, such as helmet tracker, binocular, and external interfaces. The sight can be configured to interface via MIL-STD-1553B, ARINC 429, or via traditional analog and discrete components.

#### **Key features**

- Very large exit pupil
- Lightweight — less than 4 ounces
- Clips on to existing helmet
- Single Q-Sight display provides day and night operations
- Compatible with ANVIS night vision goggle
- Low cost
- Modular design, allowing progressive capability upgrade without major modification

#### **The world leader in helmet-mounted displays**

BAE Systems is the world leader in helmet-mounted display technology and innovation. The company has a long heritage of firsts in the world of airborne displays — the first head-up display, introduced in 1960; the first primary flight reference display in the 1980s; and the first holographic HUD, providing wide-field-of-view displays, in the 1980s. Throughout the 1980s and 1990s, BAE Systems developed the world's first binocular helmet-mounted display for a fixed-wing aircraft, the Eurofighter Typhoon. This display, provides a helmet solution that integrates night vision and full crew head protection.



# Features

Q-Sight features	Q-Sight 100	Q-Sight 150	Q-Sight 200	Q-Sight 250
Display configuration				
Monocular	X	X		
Binocular			X	X
Tracker		X		X
Display drive unit (basic)	X	X	X	
Display drive unit (full)				X
Night vision camera				X
Q-Sight interface adaptor monocular	X	X		
Q-Sight interface adaptor binocular			X	X
Plug-and-play interface	X	X	X	X

Spec Item	Performance	Comment
Luminance	1800ftL	In daylight conditions
Contrast ratio	1.2:1	Maintained with dark visor
Exit pupil	> 35mm	Very large eye box, size of eye piece
Eye relief	> 25mm	
Power consumption	<5 watts, head-mounted	Total 10 watts, man-mounted
Head-mounted mass	< 4 oz	
Optical design	Monocular 30 deg. FOV	Expandable to 40 deg. FOV
Mechanical fixture	Clip-on bracket	
Plug-and-play	Interface to CRT (X, Y, Z deflection signals)	Designed to plug into existing ANVIS HUD interface
NVG-compatible	ANVIS interface	

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