

It's not just carrots that help you see in the dark

Pilots are increasingly demanding the same capabilities from their night vision equipment as they get from their daytime helmet-mounted display systems. Drew Brugal, president of **Vision Systems International**, explains how his company is making this possible and the positive implications it has for the safety and effectiveness of fighter operations.

Vision Systems International (VSI), located in California, US, provides advanced helmet-mounted display systems for tactical aircraft. The company recently supplied its NVCD-ANVIS night vision system to the Royal Danish Air Force to assist in its Libyan operations. This, says VSI president Drew Brugal, a former naval officer and holder of the US Legion of Merit, was just the latest phase in the company's long relationship with its Danish customer.

How did the partnership with the Royal Danish Air Force come about?

Drew Brugal: The Royal Danish Air Force was the first international customer for our joint helmet-mounted cueing system (JHMCS). It placed its first order in 2000, and we've been supplying training, spares, product support, consumables and upgrades ever since.

We did a demonstration of our NVCD-ANVIS system and it proved very successful. Following that, the Royal Danish Air Force took part in Operation Odyssey Dawn in Libya, where it was asked to police the no-fly zone. It realised that the capability of the NVCD-ANVIS system could significantly aid this operation.

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What difficulties do pilots face when switching between daylight and night-time operations?

JHMCS provide pilots with all the information they normally get inside the cockpit or on the heads-up display, in addition to being able to cue their weapons systems. Pilots have become accustomed to this level of information and want it all the time. But when these systems were first introduced they could only be used in daylight – we did not have a way of incorporating that cueing video information into night vision goggles. Pilots had to take off the display used during daylight and put on night vision goggles that did not provide any of that information.

In the past few years we have developed a device that combines the system's cueing and display capability with

the ANVIS-9 goggles. This device clips onto night vision goggles and provide the same information that pilots have access to during daylight operations.

Was there a particular technological barrier to overcome in consolidating these systems?

Yes – because the projection system that is used on the daylight system is fairly large, we needed to create a means of transmitting that information onto a smaller device to allow it to be integrated with the night vision goggles. We were able to create that technology and now we are getting it out into the field to enhance situational awareness, survivability and mission effectiveness.

Your systems are based around the ‘look and shoot’ concept. Can you explain how this works?

This technology is a targeting system already in use in the F-15, F-16 and F-35. I always use 1986 film *Top Gun* as an example – Tom Cruise has to turn his whole aircraft so that he can get his target into the centre field of view in the heads-up display. What we do is put the heads-up display on the pilot's visor, so instead of turning the aircraft, all he has to do is turn his head.

The best example is the employment of modern anti-aircraft missiles: the pilot seeks a target with his eyes and points his helmet towards it; the high-off boresight missile seeker adjusts to this direction; the missile seeker locks onto target; and then the pilot shoots the missile. This process takes only one or two seconds, giving a JHMCS user a decisive combat advantage.

What aftermarket support do you provide?

We provide repairs, spares and consumables for the helmet systems. For instance, the visors are susceptible to being scratched, damaged or broken if the pilot drops the helmet. We also provide upgrades to the electronic units that run the helmet system and offer new capabilities as they are developed.

One example of this is the means by which the system knows where the pilot is looking. It is called a magnetic tracker and requires a magnetic map of the cockpit to be made. When we originally created the system the mapping process took about 24 hours, but we've since introduced a model that does it much more quickly. Night vision is



The NVCD-ANVIS is combat proven and designed for use with existing JHMCS helmets, meaning that customers are not faced with hidden investment costs.

another new capability and we offer training to our customers' maintenance personnel that covers how to service the equipment.

In light of military budgets being reduced, how important is cost-effectiveness to your clients?

Very. That's why the NVCD-ANVIS is built to be mounted on the current JHMCS helmet – no modifications are needed to the helmet, the JHMCS or the aircraft's wiring and computer software. In addition, the NVCD-ANVIS was built to use current night vision goggles – in other words, customers do not have to invest in a new inventory.

We are also advancing the sustainability of our systems by using new technologies as soon as they are developed, which helps to make the helmet more affordable. For instance, in the early days there was only cathode ray tube technology; now we can use LCDs, which are significantly less costly. Cathode ray tubes require a high-voltage connection, but LCDs only need a low-voltage one, and that makes the wires that support them less expensive. We are constantly exploring avenues to make our system more affordable.

What technological developments would you like to see over the next year or two?

One of the things we are looking at is digital display, in particular being able to present video footage to pilots. A lot of this technology is carried over from our most advanced helmets, which are currently used in the F-35. We are taking some of that technology, picture and video display, and the

fusion of different sensors, and transferring it to our other offering. Another emerging requirement is the implementation of JHMCS into advanced training, light attack and tactical transport aircraft.

We are trying to come to terms with how to make all of this increasingly affordable. With it all being fifth-generation technology, it is fairly expensive. With the budget cuts that are occurring, we will do all we can to make sure that our equipment is available to the broadest customer base.

What would you say is the company's chief competitive advantage?

VSI does one thing only: it makes helmet-mounted displays and cueing systems for the world's fighter fleet. We have a dedicated team of operational-oriented users, working tightly with our outstanding, creative engineering personnel, backed with the strong business and financial support we get from our parents, Rockwell Collins and Elbit.

Pilot satisfaction and safety are the ultimate measures of our success and over the years we have developed a very close relationship with the world's fighter community. We have a good sense of what they need and incorporate those things into our products to make those fighter pilots as lethal as possible. ■

Further information

Vision Systems International
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