Comlux takes A318 Elites

VIP charter operator Comlux has placed a firm order for two more Airbus A318 Elites, taking its total orders for the type to five and making it the joint largest customer, it was announced at MEBA yesterday.

Comlux is a launch customer for the A318 Elite, and will be the first to take delivery of one.

Its first A318 Elite is currently being outfitted by Lufthansa Technik, which is equipping the initial aircraft of the type, and will be delivered this spring.

All of Comlux's A318 Elites are powered by CFM International CFM56-5s.

■ Meanwhile, Airbus is celebrating the fact that its tally of corporate jet orders for 2006 means that it has beaten rival Boeing for the third year running.

The Airbus ACJ hit 20 sales in 2006 compared to 14 for the Boeing BBJ. In 2005 to sold 15 against Boeing's 11 while in 2004 they sold 10 aircraft compared to Boeing's four.

Sterling Success

Sterling Courier (Stand C405) specialises in courier services for aircraft spares, and is here at MEBA to reinforce its position in the region with existing customers and potential customers.

"We are hoping that MEBA will be a success for our courier services, and relish the opportunity to discuss new opportunities," says Paul White, director, Aviation Division.

Refuelling delegates

Shell Aviation is well known for its excellent refuelling of aircraft – it is doing the same for conference delegates at MEBA by sponsoring the conference coffee breaks.

A Shell spokesperson says "Safe, timely and efficient fuelling services are what we are renowned for."

Shell supplies a broad range of oil-based products ranging from aeronautical lubricants to fuels, as well as the bigger services such as contract fuel and operational safety training.

All systems go: Airshow 21 from Rockwell Collins has all the right connections.

Inset: The receiver that makes it all happen. This kit is from European manufacturer Thales.

IN THE LAPTOP OF LUXURY

BRENDAN GALLAGHER takes a tour round the cabin of today's network-centric business aircraft

Among the star exhibits at the huge Consumer Electronics Show in Las Vegas earlier this month were electronic networks designed to control most aspects of running a modern house – heating, lighting, air-conditioning, entertainment, Internet access, even switching the oven on and off.

Here at MEBA showgoers are well placed to learn more about how exactly the same capability is already going into VIP and business aircraft.

They should look out too for all the things it's possible to hang on a cabin network – entertainment, voice and Internet communications, controls for lights, temperature, even window blinds.

The three leading suppliers of networks are Lufthansa Technik with its NICE offering, Rockwell Collins with Airshow 21, and Honeywell with Ovation.

The German company has installed the Ethernet-based NICE on a number of VIP Boeing 747-400s and BBJs and was selected last autumn to supply it for the upgraded cabin of the Bombardier Challenger 300 super-mid-size business jet.

Selected

Rockwell Collins' Airshow 21, also Ethernet-based, has been selected for a number of aircraft, including the Raytheon Hawker 750 and 900 and Bombardier Challenger 605 and Global 5000. Honeywell says its Ovation C has been installed in more than 600 business aircraft. Most recent application for the system, with first installations entering service in the second half of last year, is the Gulfstream G150.

The Challenger 300 implementation of NICE – it stands for Networked Integrated Cabin Equipment – shows how powerful and versatile cabin networks have become. In the Bombardier bizjet it supports a wide range of passenger entertainment and cabin environment management functions, including the world's first iPOD docking station for a purpose-designed business jet.

The docking station streams the audio output on to NICE for delivery via cabin-lining flat-panel speakers based on technology licensed from QinetiQ in the UK. iPOD output and all other cabin functions can be controlled at each seat through the NICE graphical user interface neatly integrated into the lining at elbow height. Future enhancements include the addition this summer of the ability to watch iPOD video on bulkhead or seat-mounted LCD screens.

The basic Challenger implementation combines the high-capacity Ethernet network with a pair of 20in LCD screens, a digital amplifier feeding the high-fidelity flat-panel speakers, an interface to other aircraft systems for things like cabin lighting and temperature control, and a DVD player.

Interfaces

Options include the addition of interfaces to third-party systems such as digital cameras, moving-map systems and XM Radio, and multiple-channel surround-sound, Lufthansa Technik's Mobile Access Router to support in-cabin wireless and air-to-ground connectivity,

Air-to-ground communications provision for VIP and business cabins is going through a major transition. Satellite broadband company Connexion by Boeing left the market at the end of last year and North American phone provider Verizon Airfone is due to withdraw its MagnaStar service 12 months from now. But there is still plenty of choice available, and it could get wider still.

Inmarsat, the original global satcoms provider, currently offers voice and data at a basic 64kbit/sec per channel and is due to introduce its new SwiftBroadband 432kbit/sec-per-channel in the middle of the year. AirCell was created to use cellular frequencies for voice services in North America but has since developed a range of terminals capable of using both the Inmarsat and Iridium satellite systems to provide global phone and Internet access.

ARINC continues to develop its SKYLink Ku-band satellite broadband service, which provides megabit connectivity over North America and 22 countries in Europe. About 20 per cent of all new Gulfstream G450s and G550s are being ordered with SKYLink's Broadband Multi-Link (BBML) avionics, and the system has also been named as a factory option on Dassault's new Falcon 7X.

One current outsider that could grow quickly in importance if its plans come off is Panasonic Avionics, the airline in-flight entertainment giant. The company is poised to launch a satellite broadband service for air transport to take up where Connexion by Boeing left off. Its first objective is the airline market – if it succeeds there, business and VIP aviation will surely follow.

The airlines are also the launch market for the first onboard cellphone services. Based on a combination of on-aircraft "picocells" and the Inmarsat system for the air-to-ground link, they are due to be introduced in the first half of the year by ARINC subsidiary AeroMobile and Airbus/SITA joint venture OnAir. AeroMobile has already said that it will also address the business/VIP market in due course.

Alternative

A fast emerging alternative to cellular for passenger phone communications is voice-over-IP (VoIP) – phone conversations reduced to a digital stream and carried economically over the Internet. ARINC last year introduced World Calling, a flat-rate billing plan for SKYLink customers using the system for VoIP calls, and there is no technical reason why such services could not be supported by any combination of VoIP-enabled phone, onboard wireless network and air-to-ground broadband link.

Entertainment options for VIP and executive travellers are also broadening. Lufthansa Technik has developed its own audio/video-on-demand (AVOD) in-flight entertainment system. And California's Intheairnet has introduced the lightweight Sharkfin, aimed initially at airlines but also applicable to large VIP aircraft.

Intheairnet is one of the leading players in in-flight television, supplying Delta Airlines and Virgin America. Its inTV system with low-profile, 30in-diameter antenna is suitable for use on VIP/business aircraft from the Airbus ACJ and Boeing BBJ upwards. Operators of the top-end purpose-built business jets can look to Rockwell Collins and its more compact Tailwind system. Recent Tailwind applications include the Bombardier Challenger 604 and 605 fleets of fractional operator Flexjet.

Knowledge is the key in war on pilot error

Safety and procedures are a key part of today's MEBA conference. BOB AGOSTINO, director, flight operations, Bombardier Aerospace gives a pilot's insight to the challenges facing flight deck professionals.

Safety conferences, lectures, and articles, more often than not are quite challenging for the majority of us pilots to both endure and understand.

Why?

I would suggest there are two basic reasons: 1) the information is boring, since we've heard the same old stuff many times before and 2) we tend to over-focus on the obvious.

If we use Controlled Flight Into Terrain (CFIT) accidents as an example, it becomes obvious that a perfectly good airplane has impacted the earth in an unplanned event.

Focus

We then naturally focus on warning systems and we will eventually conclude PILOT ERROR. This approach, in fact, is reasonable and the logic is sound. Why shouldn't it be? Depending on whose statistics one gathers and studies, approximately 80 per cent of all accidents are due to either poor judgment or human/pilot error.

Yet, we need to progress beyond the superficial, two-dimensional world of cause and effect. Indeed, I would submit that we fly in a four-dimensional world. The fourth dimension is "time," which often represents one of the most critical factors in decision-making. We must start to understand the fundamental reasons and causes of human failure.

Knowledge-based training along with skill-based training is the key to our future survival. This combination of training concepts will guide our profession through its next evolution and reduce accidents due to human error.

We will have to develop an appetite and desire – a passion perhaps – to learn more about those things having little to do with flying. Perhaps the most difficult subject of all is to understand one's self. What are our emotional triggers? How do we interact and react with other people?

Should we find ourselves in an office environment with someone we do not like, it is not that big a deal, we avoid the person, if possible.

But what happens when this situation presents itself in the confined space of a cockpit. Are we willing to accept information from this person? Are we willing to provide information to this person?

We can improve our situational awareness and therefore our judgment by increasing our knowledge and being sensitive to how we all function as human beings. Clearly, human error and interpersonal failure is not limited to aviators – but we clearly need to better understand how to deal with stress, our bias, and prejudice.

Pilots need to have an in-depth understanding of how high reliability organisations (HROs) function. Consequence of failure in HROs is catastrophic, they include places such as flight deck operations on aircraft carriers, nuclear power plants, and I would suggest, the cockpit of a high performance business jet.

Dr. Kathleen M. Sutcliffe and Dr. Karl E. Weike in their book *'Managing the Unexpected'*, say individuals in HROs are focused on being mindful and are anxious with failure rather than success.

Potential

They are focused on identifying failure modes in the very beginning of their endeavours. By identifying potential points of failure at an early stage allows HROs to eliminate as much risk as possible and to develop strategies to mitigate the remaining risk. They are committed to being robust, focused organisations and are extremely sensitive to their operational activities

Aviation has progressed at an astonishing rate since 1964 when the first business jet was delivered.

From October 1964 until January 2007 all manufacturers combined have delivered 15,180 business jets worldwide. This is an incredibly small number when you spread it over 43 years of time. What is significant about this number is over half of these business jets have been delivered in the last 10 years! During this period of time aircraft have become more sophisticated, more reliable, better engineered, and unarguably safer.

So how can the accident rate due to pilot error remain relatively unchanged over 30 plus years? Is it because pilots have become less sophisticated while aircraft have become more sophisticated? Or is it because pilots today are not as well trained as the pilots in generations past? Is it because we simply do not know what we do not know?

In the days of the great ancient philosophers, Epictetus wrote, "It is impossible for a man to learn what he thinks he already knows." This very well may apply to us in 2007.

Contrary to popular belief, what we don't know will hurt us and will hurt others. We need to better understand basic concepts of both our physiology and psychology.

Good decisions yield good results. And strong decision-making depends on perceiving and evaluating critical information in a timely manner. Yet, during times of high stress or high workload, pilot perception and information processing may be deficient. However, we must develop a more thorough understanding of the relationship between stress and performance.

So how do we fix the problem?

Training

I firmly believe that knowledge-based training is a continuous process from the minute we first fly to the day we retire from flying.

If we're unwilling to include knowledge-based training in our daily operations to the same level that we have embraced skill-based training, and if we're reluctant to accept, understand and grow in areas that directly impact our aviation skills, then I am afraid the statistics will continue to prove that the most probable cause of any aviation accident may be YOU.

IN BRIEF

All Action in personal jet market

Action Aviation (stand C412) is building on its recent expansion into the helicopter market. Yesterday it was announced that Action Aviaiton have been appointed as the exclusive distributor for the civilian variant of ATG's Javelin personal jet throughout the Middle East, Africa, the Indian subcontinent, and West Asia.

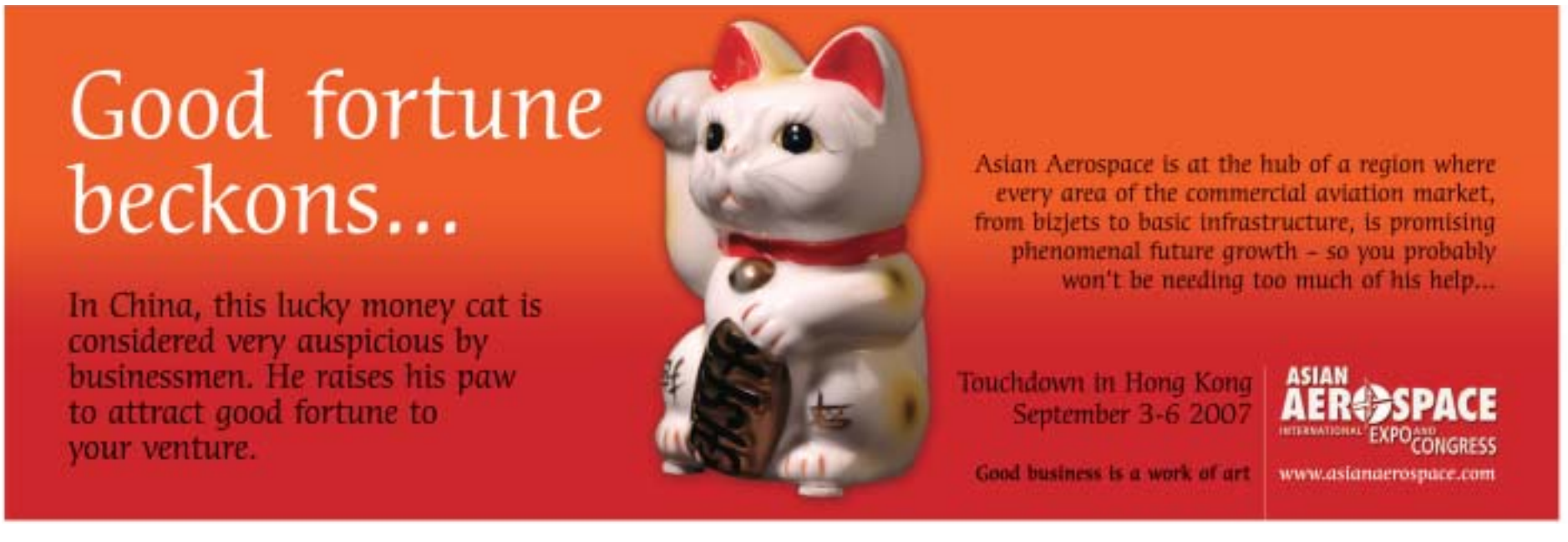
As part of the agreement, Action Aviation has ordered 40 aircraft worth $120m, for delivery over an eight-year period following certification in 2008. "Imagine, as a civilian businessman, being able to fly in a 500kt business jet, capable of aerobatics and an appearance akin to an F/A18 fighter jet." Says Hamish Harding, chairman, Action Aviation.

Javelin fired up for change

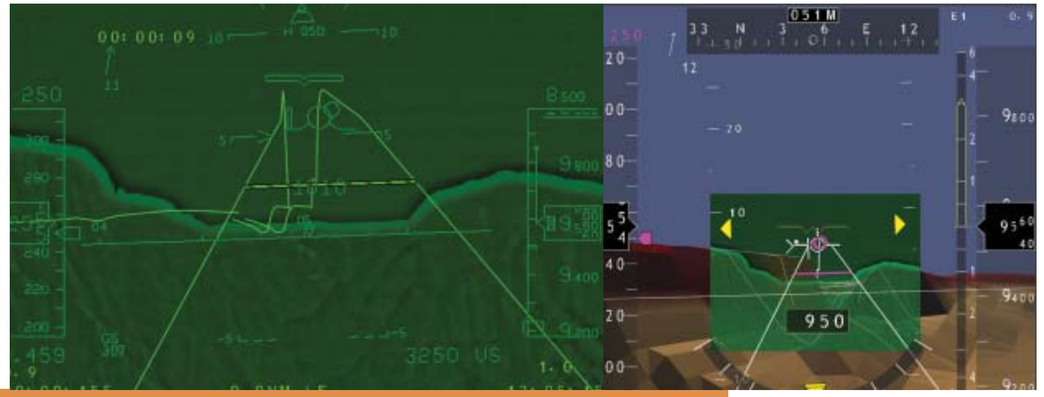
Following special certification conditions imposed by the US Federal Aviation Administration on Aviation Technology Group's (ATG) Javelin very light jet, the aircraft needs to enhance its fire protection for its embedded engines.

The tandem-seat jet has its twin engines embedded side-by-side in the aft fuselage. The fuel tank is mounted forward of the engines, and primary structure and flight controls for the horizontal and vertical tails pass through or near engine bays, the FAA says.

Part 23 certification rules assume physically separated engines, ensuring fire cannot spread.



Synthetic vision is emerging as the next big thing for business jet operators determined not to have their plans disrupted by bad visibility at destination. But, writes BRENDAN GALLAGHER, the ideal solution will also include infra-red imaging.



VISION OF THE FUTURE

HOW INTEGRATED SYSTEMS MAY HELP PILOTS TO SEE BETTER IN A SANDSTORM OR THE FOG

Far left: The approach into Innsbruk is made clearer with Honeywell's synthetic vision system
Inside left: The display shows the SVS runway and when it incorporates Honeywell's RAAS information it will reduce runway incursions too.

Right: See the difference. The green wireframe image shows the Head Up Guidance system but with the new Rockwell Collins SE-Vision or synthetic enhanced vision where the enhanced vision is used the HUD becomes just a 'reality' check with the synthetic vision.

Infra-red-based enhanced vision systems (EVS) for business aviation are no longer the high-tech exotica they once were. Canada's CMC Electronics is supplying Bombardier, Dassault and Pilatus. Kollsman Commercial Aviation Systems has been selected by Gulfstream. And Rockwell Collins has just announced the go-ahead for a system for the Boeing Business Jet.

Cutting through weather and the darkness of night, high-resolution imaging IR sensors are now allowing growing numbers of business aircraft to land in conditions that until recently would have forced a divert.

The drive for ever better situational awareness continues, however, and now the name of the game for a number of suppliers is to integrate the real-time but narrow-field IR imagery with a wider virtual view derived from a powerful terrain database. Such systems could have a particular appeal to operators based in the Middle East, with its summer fogs and occasional sand and dust storms.

"Just as with fog, infra-red can under certain conditions, penetrate sand and dust more effectively than visible light," explains Rob Speijer, CMC's director of EVS.

"But a lot depends on particle size and density, and on whether the aircraft is in the dust cloud or above it. If the latter is the case, the sensor could detect heat reflected off the outside of the cloud, reducing its ability to see through."

Alternative

One potential alternative to infra-red that might prove more effective in Middle Eastern conditions is millimetre-wave radar (MMW), which is capable of producing high-resolution images and does not suffer as much as IR from heat reflection. But this too has its limitations, according to Speijer. "MMW is expensive and prohibitively bulky, and performance begins to fall off beyond a certain particle density in the same way as IR."

In the past CMC considered fusing the data from IR and MMW sensors to produce an all-round solution. But, says Speijer, that work is now on hold pending the emergence of more practicable MMW hardware, and the company is actively pursuing a combination of IR and synthetic vision.

The Ottawa-based company is in the happy position of having a long history in both sensors and synthetic vision. Currently the leading supplier of IR to the corporate aviation market, it has also worked in the past with MMW and charge-coupled device (CCD) low-light cameras. At the same time it was tackling the synthetic vision worst case in the form of development work on a helmet-mounted system for use in Canadian Forces search-and-rescue helicopters.

Ceiling

Aiming to support an ability to operate with a 100ft ceiling and quarter-mile visibility at any location in Canada, CMC assembled a test system combining a Canadian military terrain database with an IR sensor and a CCD camera. The primary sensor image, with a 15-degree field of view, was embedded within the terrain database image, which had about a 35-degree field of view. Successful flight tests in 2000-01 proved the basic concept and also showed that IR rather than MMW was the right solution for the corporate aviation market.

CMC is now putting that fund of experience into Advanced Vision System (AVS), a concept that could firm up soon as a result of last year's agreement with Universal Avionics on distribution of the Canadian manufacturer's M-Series IR sensor. "Universal has a certificated SVS system and we're working towards collaborating with them," says Speijer. "We don't see integrating M-Series with their SVS as a huge step. Though we're not yet officially engaged, we do have people on it and we're spending dollars."

CMC believes that IR-based EVS could be the making of synthetic vision. "We have established that there is value in real-time imagery for the business aircraft community, whereas the value of SVS is not as clearly understood," concludes Speijer. "But we're now seeing that EVS could be an enabler for it - there may be significant market interest in combined EVS/SVS."

Above: Honeywell's EGPWS alert becomes even more apparent when shown on the SVS as shown on this approach.
Right: CMC Electronics' SureSight I-Series Enhanced Vision System sensor is standard gear aboard the Global Express XRS and an option on the Global 5000, pictured here

Of the other three main SVS players, Kollsman and Rockwell Collins are agreed on a "trust but verify" combination with IR, while Honeywell is coming to market with stand-alone synthetic vision.

Kollsman's Vision-Based Cockpit package brings together some certificated hardware – an EVS with the associated GAViS IR imager, a compact head-up display – with a synthetic vision capability that is still in development. Based on high-resolution terrain databases from Jeppesen, the SVS element still has around 15 months to go to certification. The company emphasises the light weight and comparatively low cost of Vision-Based Cockpit and is aiming to carve out a niche for itself in the VLJs and even the upper reaches of general aviation.

Kollsman's IR sensor is also to be combined with the Synthetic Vision Electronic Flight Instrument System from Chelton Flight Systems to create a series of products aimed at general aviation, light trainers and small to medium-sized business aircraft.

"We designed our EFIS to combine all instruments in one scan, and make it safer for a pilot to make rapid, informed decisions under difficult flight conditions," says Chelton president Gordon Pratt. "The integration of a forward-looking infra-red camera like GAViS will blend in the real world and enhance the image, leading to safer take-offs, landings and flight in terrain, especially at night."

Rockwell Collins is working with IR sensor supplier Max-Viz on development of an EVS to be integrated with the head-up display fitted as standard on the Boeing Business Jet. At the same time it is moving towards launch of a combined EVS/SVS. "We have commitments to our synthetic vision offering and are also talking to a number of potential customers," says flight deck systems director David Wu. "You may hear about launch of a commercial product with a first customer within the next 12 months."

That would be the fruit of a decade of work originally prompted by a NASA requirement for synthetic vision in support of its High-Speed Civil Transport concept. "In 2002 we demonstrated a capability on NASA and Boeing flying testbeds," says Wu. "In 2004-05 we moved to an integrated synthetic/enhanced vision system and flew it on a Gulfstream V, an FAA Boeing 727 and an Air Force KC-135."

NASA is also contributing to the all-important high-resolution terrain database, supplying data gathered by a number of Space Shuttle missions.

Rockwell Collins plans to present the terrain imagery in various ways, using displays from its Portland, Oregon, based head-up guidance business, and on the head-down primary flight display (PFD) and multi-function display (MFD) of the Pro Line 21 integrated cockpit. "The high-resolution PFD imagery will set out to represent what you would see if you looked though the windscreen," says Wu. "The MFD will present a plan view, with possibly a cone depicting the field of view available on the PFD."

System development continues, with work remaining to be completed on things like database integrity and graphics. "We're still deciding on how photo-realistic we want the imagery to be," says Wu. "We've carried out studies with operators and have come up with various different formats to choose from."

One of the issues being addressed is the best way to present synthetic imagery on a head-up display. "We expect in due course to offer combined IR and synthetic imagery on a HUD," says Wu. "And since the obvious benefit of head-up is that you are looking outside at the real world, you don't want a database-generated image that obscures the view. That has led us to develop a transparent wire-frame format."

Rockwell Collins is committed to integrated EVS/SVS, according to Wu. "Real-time data from a sensor is the obvious complement to a synthetic vision display," he says. "Infra-red is the leading candidate, but in trials we have also used the weather radar as an additional sensor to further confirm the outside view."

Upgrade

Honeywell's Integrated Primary Flight Display (IPFD) is to be offered as an optional upgrade on the Gulfstream G350, G450, G500 and G550 following certification, currently set for the middle of this year. Designated Synthetic Vision – Primary Flight Display (SV-PFD) by Gulfstream, the capability is hosted by the Primus Epic-based Planeview integrated cockpit and is fed by the proprietary terrain database developed for Honeywell's Enhanced Ground Proximity Warning System (EGPWS).

The data is used to render a three-dimensional view of the terrain ahead. This is presented on the primary flight display in place of the blue/brown artificial horizon, and is overlaid with the symbology used in the head-up display. Also overlaid on the terrain image are low-intensity range rings to provide depth cues, an extended runway centreline, and any obstacles in the EGPWS database.

Honeywell has completed 600hr of flight trials in its Cessna Citation V testbed and will offer the system for line and retrofit to any Epic-equipped aircraft from later this year.

So far Honeywell has announced no plans to integrate IPFD with an infra-red or other real-time sensor. In doing so it seems to be bucking a trend that should see synthetic vision entering the avionics mainstream hand-in-hand with IR imaging over the next few years.