

April 2011, Issue 15

Davis

IR SUPPRESSION FOR THE KING AIR 350



RC-12 Guardrail



Davis KA350 IR Suppressor

Light turboprop fixed wing aircraft are increasingly being used by militaries worldwide for intelligence, surveillance, and reconnaissance (ISR) operations, as a low cost alternative to unmanned aerial vehicles. The aircraft are being adopted by advanced countries as well as smaller or less wealthy countries since new sensor suites can be easily integrated.

The King Air twin-turboprop utility aircraft is the most common platform used in this role. For example, the US Army and US Air Force operate King Air fleets under the Project Liberty and Guardrail programs.

The Model 350 aircraft is powered by two Pratt & Whitney PT6A-60A engines, each with a collector directing the exhaust flow to two tailpipes on either side of the nacelle.

PROFILE

Aircraft self-protection has continued to be a high priority for militaries operating in hostile environments. Davis has met that demand in the last two years with new qualified IR suppressors for the CH-47, AW129, and AW139. We are currently developing devices for the KA350 and HAL LCH.

We have found it to be very beneficial to work with the airframers to integrate our IR suppression technology into each platform. This approach permits all aspects of the integration to be considered, including aircraft structural and flight performance effects. We have developed successful working relationships with Boeing, Agusta Westland, and HAL.

As can be seen in the articles in this newsletter, we are currently very active in research and development and also are engaged in several long term rate production projects.

Davis is designing an IR suppressor which replaces each side mounted factory pipe with a very compact effusion and film cooled tailpipe. The suppressor is easily ported to other PT6 based turboprop aircraft with similar exhaust configurations. For example, it would find application on single prop aircraft, such as the AT-6, which are being considered for Light Attack and Armed Reconnaissance (LAAR) roles.



DAVIS AND STANDARD AERO TEAMED ON C-130 IRS DEVELOPMENT

The C-130 Hercules is a four turboprop tactical transport aircraft which is used by 70 different countries. The aircraft is capable of take-off and landing in unprepared runways and therefore tends to operate in hostile theatres. As a result, there is strong interest in self-protection technology.

The IR suppressor must provide significant IR signature reduction and minimal aircraft performance impact due to the fact that the C-130 has a large baseline signature and tight margins on existing mission parameters.

Davis is teamed with Standard Aero to develop a high performance, low impact, IR suppressor for the C-130. The program is currently internally funded and has progressed to the completion of an engine test on a T56 test cell. The engine test verified the predicted IR signature and provided an evaluation of the impact on engine performance.



C-130 IRS on a T56 Engine Test Cell

The device is being designed to integrate to either an H or J model. The next steps will be to modify the current design to further reduce the aircraft performance impact and also ensure compatibility with the C-130J and RR AE2100 engine.



Bell 407 Helicopter with Davis IRS

IRAQI ARMED 407

An armed version of the Bell 407 – the Armed 407 – is being supplied by the US Army through Foreign Military Sales (FMS) to the Iraqi Air Force. Davis is supplying the engine exhaust IR suppressor system for the aircraft.

The suppressor, the B407 FCT, was developed by Davis and FAA certified in 2004.

The B407 FCT provides very good allaspect signature reduction with a minimal effect on engine and aircraft performance. The device splits the exhaust flow with a bifurcating nozzle into two film cooled tailpipes in order reduce tail signature and direct the exhaust gas away from the airframe.

We have delivered 6 shipsets to date and are under contract to deliver another 26 sets over the next year.



AW139 IR SUPPRESSOR FLIGHT TEST SUCCESSFUL

The Agusta-Westland (AW) AW139 is a medium size 6.4 tonne transport helicopter. Over 200 AW139 aircraft are in use in over 30 countries, with another 230 on order. Besides civilian use, the aircraft is deployed for border patrol, law enforcement, and VIP transport.

A militarized version is currently under development in the United States and will be offered internationally via Foreign Military Sales. The aircraft is also being proposed for the US Air Force Common Vertical Lift Support Platform (CVLSP).

Davis has been under contract with Agusta-Westland since April, 2010 to develop an IR suppressor (IRS) for the AW139. The first flight prototype was delivered in December, 2010, and the qualification will continue until the summer of 2011.

The IRS has been designed to fit within the factory cowling configuration to minimize aircraft modifications and allow for easy retrofit to existing aircraft.

A flight test was completed in January, 2011, in Cascina Costa, Italy, to verify IR signature performance and the effects on engine power output.



Installed Davis AW139 IR Suppressor

LIGHT COMBAT HELICOPTER (LCH) IRS DEVELOPMENT FOR INDIA

We are pleased to announce that we have recently signed a contract with Hindustan Aeronautics Limited (HAL) of Bangalore, India, for the development of an IR suppressor for the Indian Light Combat Helicopter (LCH).

The LCH is an attack helicopter which will be used for ground support and anti-tank roles by the Indian Air Force and the Indian Army. The first prototype, the TD-1, was flight tested in March, 2010.



Light Combat Helicopter

Davis has worked in India since 1995, and we have supplied IR suppression systems for the Indian Navy (IN) P-17 stealth frigates and the IN aircraft carrier.

The LCH IR suppressor development program involves the design, full qualification, and delivery of four prototype suppressors in the spring of 2012. India ultimately plans to produce over 60 LCH aircraft.

CH-47 IRS FIELDED AND OPERATIONAL

The Davis-Boeing-Honeywell development and fielding of an IR suppressor for the CH-47D/F has been a success. Full fielding of the device on the US Army F model began in April 2009, and an AWR has now been issued for the D model.

The part is ordered through Boeing and is comprised of an A-kit (airframe backup structure, and equipment to treat secondary IR signature contributors) and a B-kit (the engine exhaust suppressor).

Davis has delivered over 100 B-kit shipsets to date and we expect to be in rate production through to the end of 2014.

The IR suppressor is available to international CH-47 operators. The provision of data and the hardware is controlled through the US Army FMS office (and the US DoS).



Centre Body Tailpipe (CBT) on a US Army CH-47F

Aircraft Type	Engine Compatibility	Shipsets in Operation or Delivered	Average IR Signature Reduction (Band IV)
Boeing CH-47D/F	Honeywell T55-714A	103	90%
Bell 412	P&W PT6T-3BE	94	70%
UH-1H	Honeywell T53-L-13B, T53-L-703	183	80%
Bell 407	RR 250-C47B	8	80%
MIL Mi-17	Klimov TV3-117MT	19	70%
Eurocopter AS332	Turbomeca Makila 1A1	6	85%
CASA CN-235	GE CT7-9C3	4	85%
Agusta-Westland AW129	Honeywell T800	6	85%

PRODUCT SUMMARY

Davis IR suppressors have been operational on military aircraft since 1995.

Davis suppressors are presently installed on eight different aircraft types on over 400 aircraft. The table lists installed shipsets by aircraft and engine type, along with the measured IR signature reduction which is achieved in Band IV.



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