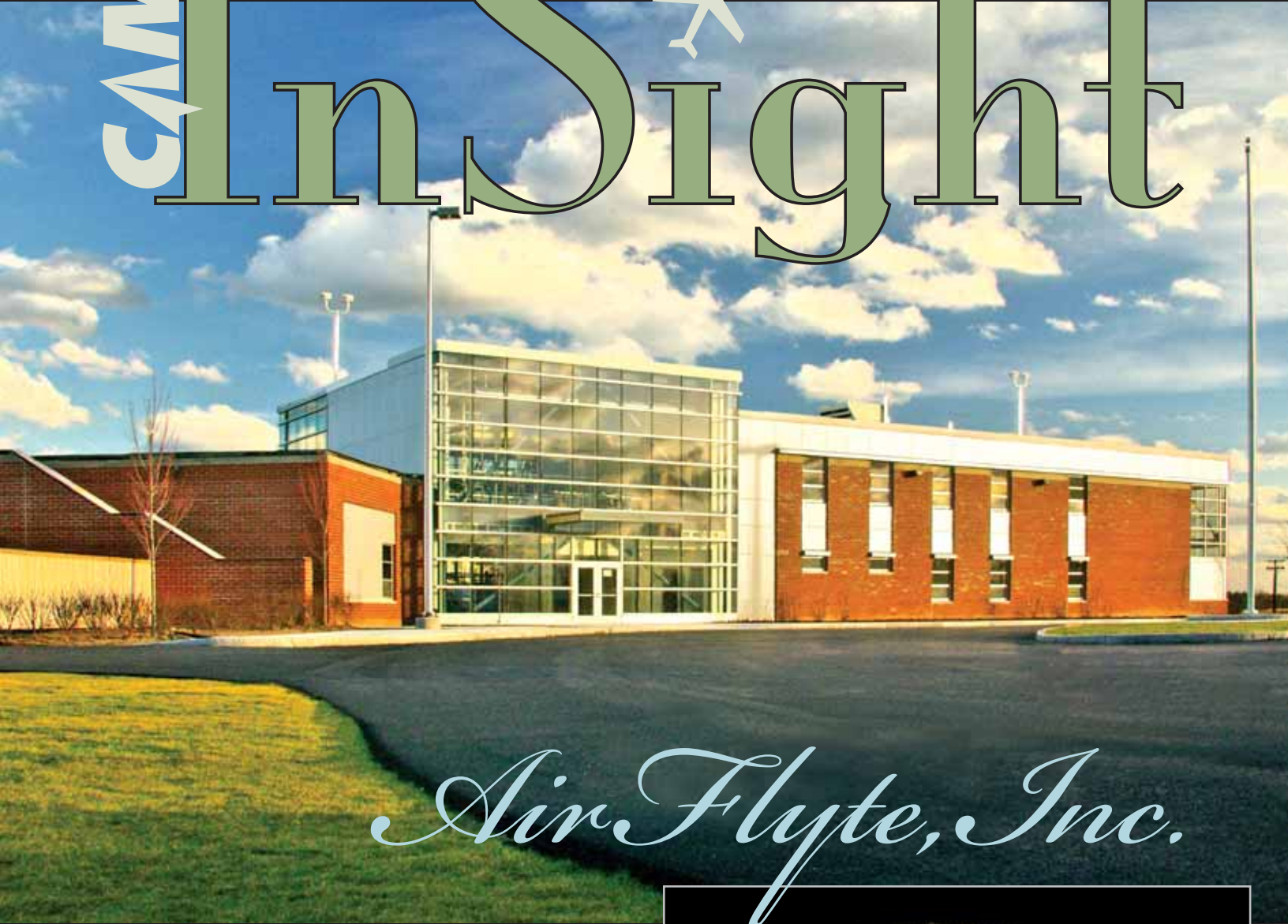


CAMP In Sight



Air Flyte, Inc.



Interior Noise Reduction
Technology for
Business Aviation p8

CAMP FS Mobile p18

JULY 2007



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Contents

- 4 CUSTOMER SPOTLIGHT:
AirFlyte, Inc: 'Fixed' for Flight
By Karie White
- 6 CAMP WORLDWIDE:
Offices and Contacts
- 7 AMSTAT MARKET ANALYSIS:
Trust Worthy
By Kathy Dowd and Judy Nerwinski
- 8 Interior Noise Reduction Tech-
nology for Business Aviation
By Flo Ciobotaru
- 10 USER HOT TIP:
CAMP's Hangar
By Victor Josephson
- 12 AIRCRAFT MANUFACTURER
HIGHLIGHT: Hawker Beechcraft
Hawker Beechcraft Corporation
- 14 TOOLBOX Q&A
- 18 DID YOU KNOW?:
CAMP FS Mobile

CAMP InSight is an internal magazine published monthly by CAMP Systems International and circulated to its 2,500+ customers who collectively operate, own and manage the over 4,200 aircraft on CAMP's maintenance tracking system.

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Cover: Photo courtesy of TAG Aviation USA, Inc.

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Greetings

Welcome to July.

As you know, CAMP Systems devotes ample resources to the development of our products – Maintenance Tracking, Flight Scheduling and Inventory Management. Through customer feedback, internal analysis, and external evaluation we are constantly challenged to produce a superior product and provide unparalleled service.

It is always a pleasure to share with you the enhancements being made. One such feature, added to CAMP Flight Scheduling (FS), can be found on pages 18 and 19. FS Mobile, designed for the Palm in your life, is an ideal way to get the FS information you need while on the go.

I'd also like to announce the addition of a new tool in your 'Toolbox.' *Toolbox Q&A* will now provide coverage on a variety of industry topics outside of CAMP that affect us all. Very handy! By the way, have you seen the quote of the month? Another tool of enlightenment! Take a look for yourself! Don't forget to submit your CAMP related questions to Toolbox@campsystems.com.

Finally, I want to bring this month's OEM Highlight to your attention. Hawker Beechcraft Corporation talks about the sale of Raytheon Aircraft Company.

Best regards,

Rich Anzalone
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CAMP CALENDAR

SUMMER SEMINARS ON DEMAND

Thank you Sandra Hanly of Pentastar Aviation, Waterford, MI and Larry Galarza of VC Jets, LLC, Carlsbad, CA for hosting CAMP seminars. July and August are vacation months, which means staff is stretched to the limit while covering for fellow vacationing employees. If employees are on holiday then they aren't attending CAMP seminars. Thus our seminars slow down for these months.

However, there's great news! If you can put a group together and offer us a venue to hold a CAMP seminar during July and August, we will come at our expense. Make the request through your Analyst. Enjoy the summer.

Interior Noise Reduction Technology for Business Aviation

By Flo Ciobotaru



Example of poor noise reduction application on an early model Challenger (behind flight deck).



Noise reduction application (by A.I.M.S. Int'l) on a Challenger 870 pending final delivery to customer.

Most aviation professionals in the aircraft completions business, at one point in time during their careers, have had to grapple with the issue of "noise reduction." Much has transpired in terms of the technology and materials driving this issue within the last decade. I will briefly touch upon some of these developments in the hope that it provides a better understanding of the noise reduction technology used in business aviation today.

Genesis of the new regulatory standard

The genesis of the new regulatory standard regarding noise reduction materials currently in force in the aviation industry emanated from the 1998 Swissair crash of Flight 111 near Peggy's Cove Nova Scotia. The Transportation Safety Board of Canada concluded that an electrical arcing event above the ceiling on the right side of the cockpit ignited the cover material on a nearby metallized polyethylene terephthalate (MPET) covering on the thermal acoustic insulation blankets¹. That incident cost the lives of 229 passengers and crew on board. The tragedy did much to thrust thermal acoustic insulation into the spotlight regarding its standards, the materials and methods being used and their installation. As a result of this tragedy, the FAA issued U.S. Federal Aviation Regulation FAR 25-856 A and B to improve the resistance to heat and direct flame contact of acoustic insulation. This established the current standard to which improved noise reduction materials (both from a safety and utility perspective) are measured against today.

Basic noise reduction factors in business aviation

Managing interior noise levels in business aircraft is a simple proposition based on the following conventional wisdom: Soft substances will absorb sound where harder substances will repel them (e.g. cloth seats will absorb more sound than leather seats). Bulkheads covered in fabric or leather usually absorb sound better than veneer or mirrors. Shock mounted components assist in reducing noise transmitted by vibration, while hard mounted ones will not. Weight is another critical factor in noise reduction: the heavier the interior, the noisier the aircraft will get. When these parameters are generally respected in the interior design process, the issue of noise reduction is really not an issue at all. However, in an industry where specialization, continuous refurbishment and eclectic taste reign supreme, what's functionally "better" is not always what's required or even desired. This is when design and completions professionals turn to noise reduction technology.

Proper installation

Even though the right material might be used, installing it in the wrong location will result in carrying excess dead weight. For example, I've witnessed first-hand the effect of improper installation of noise reduction material (especially on older business jets) where we found as many as seven different types of insulation bags were used. The net effect of periodically introducing additional insulation bags not only worsened the situation by compressing the existing in-

sulation thus reducing its efficiency, it also added weight. In one case involving a Challenger 601, the weight of the old insulation material removed was approximately 750 lbs. The replacement insulation material weighed only 250 lbs. Using the manufacturer's data, the 500 lbs in net weight savings added at least 3% to the range, or an equivalent reduction in fuel consumption. In this particular case, compounding the issue of improper installation was the use of a hazardous material (lead vinyl) in the treatment technique. For the most part, periodically adding noise reduction insulation without any consideration to its installation efficiency or the materials being used is merely a stop-gap measure aimed more at controlling costs than reducing cabin noise. As incredible as this sounds, cases like this are commonplace.

Materials & methods

There are basically four (4) methods of controlling the transmission of noise inside an aircraft: employing the use of damping materials, absorption materials, barriers and vibration isolation.

Damping Material: Damping material absorbs vibration and is primarily used on the skin between the frames where most vibration occurs. Optimum coverage between the stringers and frames is normally 50%. The threshold is important as anything above that level is rendered ineffective and only adds dead weight to the aircraft.

Absorption Material: Absorption materials normally have some type of barrier attached. The key component is a porous material that permits the noise to pass through it and, at the same time, be absorbed. The insulation bags are normally placed between the frames, behind headliners and sidewalls and behind the dado area. The most common mishaps involving absorption materials are when maintenance personnel are required to handle the noise reduction material during maintenance inspections and either dislodge, damage or forget to reinstall the insulation blankets altogether.

Barriers: A sound barrier is usually a solid material that acts as an acoustical reflector by virtue of its mass. Lead vinyl, the material of choice for barriers used on early model aircraft, has now given way to more effective and environmentally friendly materials. In some cases the interior trim can act as a barrier but only if the material is not compromised; and we all know that during the installation process, there is a tendency to drill holes in barriers and not reseal the openings.

Vibration Isolation: Vibration isolation is normally attached to the mounts of components like galleys and bulkheads. The objective is to prevent the transmission of aircraft vibration to these components. This is normally done at the completion center. Here again, proper installation is critical. If vibration isolation is simply jammed tightly onto the bulkhead up against the soundproofing barrier, you've only created another path for the vibration to travel.

Essentially, the right material in the correct places optimizes results. However, using too little or too much material could also have an adverse effect e.g. the absorption material, like the insulation bags, should be loose to allow the noise to be absorbed by the core material and not having the core material compressed which renders it ineffective.

dB levels and SIL guarantees

Whether due to more stringent requirements or simple aesthetics, it's clear that noise reduction technology is fast becoming an important consideration given the increasing complexity of business aircraft interior design. So much so that dB level guarantees are part of standard terms and conditions of any aircraft sale.

Even measuring sound quality has gone beyond the simple tracking of an aircraft's dB levels. Today, sound quality is measured in SIL (speech interference levels) which measures how effectively a passenger is able to hear another passenger talking. The SIL is based on 1000, 2000, 4000 Hz octave bands. We have traditionally seen corporate jets between 50 and 55 SIL.

Testing an aircraft's SIL is pretty much straightforward. An aircraft going through a noise reduction program has its SIL tested in flight before the new sound insulation materials and techniques are applied, and then subsequently retested after the materials are installed. Of course, in order to ensure the integrity of the SIL test, great care is taken to replicate the same flight profile before and after the noise reduction program is performed.

About the author

Flo Ciobotaru is President & CEO of A.I.M.S. International. A.I.M.S. is a leading aviation specialty firm that has developed its own supplemental soundproofing kits to reduce the noise levels in various types of corporate jets without removing the original insulation. A.I.M.S. has also developed an insulation bag which is very effective in the absorption of sound and also acts as a fire blocker which surpasses the requirements of FAR. 25.856B. A.I.M.S. designs and manufactures the kits as well as provides the necessary drawings and certification which is all managed by an on-site expert during the installation of the soundproofing. Should you have questions or require further elaboration on this article, noise reduction technology or A.I.M.S. International's products and services, please contact Mr. Ciobotaru at the coordinates provided.

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¹ Transportation Safety Board of Canada: *Swissair 111 Investigation Report – Executive Summary* (source: http://www.tsb.gc.ca/en/media/fact_sheets/A98H0003/execsummary_a98h0003.asp)