Air Force Audiology Association

NEWSLETTER

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Maj (s)
Bob Eppens

Maj
Jenny
Rainwater

Capt
John
Hall

## Military Audiology Short Course 2001

Currently, there are very tentative plans to hold the Military Audiology Short Course (MASC) in conjunction with the Force Health Protection Conference (FHPC), Albuquerque, NM, 24-26 August 2001. The FHPC is also in the early stages of planning and is subject to change. Of course, all is contingent on receiving funding from our services. We will try to keep your updated via the Web site.

## Visit the Air Force Audiology Association

on the Internet at:
<http://www.militaryaudiology.org/afaa/>

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# From the Associate Corps Chief

Capt Pluta asked me if I wanted to submit a note for this AFAA Newsletter. Of course I said "yes", but that was a couple of months ago. Therefore, if any of you are wondering why there may have been a delay in publishing this edition, well now you know. My delinquency is a reflection of the schedule I have been keeping recently, which probably pales by comparison to yours. I have been traveling quite a bit, but fortunately, it has provided me the opportunity to visit with some of you. There is always a silver lining.

Each year about this time, I notice how much change has occurred over the past year. This year is no different. We have seen the arrival of a stellar group of new (AKA young) audiologists who have exceeded my expectations in the quality of care they provide and the degree of professionalism they exhibit. I can't tell you what a relief that is, as I interviewed several of them. Unfortunately, in gaining new talent, that means we have lost several tremendous officers and friends.

•Maj Paula McPhail retired and resettled in the Southeast where she has proceeded to acquire a Southern accent (you would have to know her to appreciate that, y'all)

•Capt (Dr.) Les Loiseau is now going by the Doctor title and is still in Washington State.

•Maj Linda Morris, Maj (s) Tom Spongberg, and Capt Will Lopez decided to separate from the AF, each responding to a separate call to the civilian sector.

We will continue to miss them and the many positive contributions they made to the USAF.

I am really excited about how many you have found it possible to pursue the AuD, regardless of the program. There are more changes occurring with these programs and I am struggling to keep up with these. The important part is that those who are receiving this training are brining even more expertise to their patients and facilities - talents that I depend upon for advice on various topics.

TRICARE has presented each of us with unique challenges, both as practitioners and patients. It is very important that we understand the "system" as well as possible, so that we can competently explain the services available to our beneficiaries. I have heard too many comments from military members that have been negative, which were based on faulty information. No one will argue that there is room for improvement in this program, but we need to work to help our patients (and family members) understand how to get the best use of TRICARE. To do otherwise makes us part of the problem. As providers, we also need to understand the whole issue of accountability; that includes the whole area of coding. If we don't take proper credit for what we do, we won't get proper credit. This does not

## The Editor's Corner

Many thanks to those of you who submitted articles for this issue of the AFAA Newsletter!

If you would like to make a contribution to the next issue, please adhere to the following publication guidelines: submissions as e-mail text may be sent to either Capt Rob Pluta or Capt Jill Juvan. Submissions as text files should be in plain text (.txt) or rich text format (.rtf).

forward to: robert.pluta@offutt.af.mil **or**
juvanji@med77.mcclellan.af.mil

Deadline for the next issue is TBA.

**Disclaimer**: The views and opinions expressed herein are those of the respective authors and do not necessarily reflect those of the U.S. Air Force or the Department of Defense.

mean, “cooking the books.” Accurately counting what we do is what is needed.

There have been some really exciting initiatives over the past year that directly impact audiology and speech pathology. Each of the Consultants was asked to provide input for “Warskills Competencies”, or how we might be utilized in a wartime scenario if not as an audiologist or speech pathologist. The first hack at this was done several years ago by the then Associate Chief, Col (ret) Merle Tanner. Our role was seen as augmenting mental health in counseling during crises. I further expanded this to include augmenting Public Health, Bioenvironmental Engineering, and ENT. Some of you may have seen this already. Please understand that none of this has been coordinated with the respective career field Consultants. This was a vision of where we might go; our ability to get training in the Public Health course at USAFSAM is a reflection of that intent. I hope to approach the leadership in these career fields and see what might be possible.

This vision fits nicely into LtGen Carlton's efforts for the International Health Specialist career tract. I am part of the planning group for this initiative, and have kept our specialties at the front, as we can easily have a role in Humanitarian Relief Operations (HUMRO) and Military Operations Other Than War (MOOTW). With that in mind, each of you needs to look at what language talents you have, or could acquire. If you have language competency, you should arrange to be tested through your Education Office.

You will receive a numeric rating that will determine:

•If you deserve monetary compensation for your skills (yes, you could receive an extra amount of money if you speak a foreign language)

•If you would be a candidate as an IHS.

•For more information about this program, see the International Health Specialist web site <http://206.39.77.2/ihs/index.htm>.

Another exciting area is something just starting (so I can't tell you much about it) and revolves around the concept of “Team Aerospace,” a title we have heard about for several years. We have considered ourselves key players in this arena and, as of this year, are perceived to be just that by our colleagues in Aerospace Medicine, Occupational Medicine, Bioenvironmental Engineering, Health Physics, and Military Public Health. In this case, I am speaking for the audiology career specialty. This is part of LtGen Carlton’s view of a “hub-and-spoke” concept for medical care and prevention. The “hub” would be a “Center of Excellence” (the repository of expertise in a specific area) and the “spokes” would be the direct service at base level. I know all this sounds foreign and vague...because it is. I will keep you posted, as more specifics become available.

There have been many moves that have occurred in the past months that leave me struggling to follow. Maj (s) Steele is helping me in this effort by taking over for Capt Juvan (Smith). As soon as he recovers from a “system crash” he will be able to get a listing to all of us.

Regardless of whether or not you have moved or been recently assigned, I would like you all to, once again, conduct a Business Case Analysis of your operations. Lt Col (s) Stokes can provide you the tool and guidance in this area. Once you have done so, put together a briefing for your SQ/CC or Group/CC that describes what you do and shows them how cost effective you are in doing so. Before you do, please contact me so I can have a copy of your briefing. This approach was extremely helpful last year in proving the need for our services in uniform and that it was the best business decision. A copy of a briefing template can be obtained from Maj Narrigan.

Let me close by thanking each and every one of you for being the outstanding professionals that you are. This is recognized by your fellow BSCs at every meeting that I attend. It is also recognized by the successes we have had with promotions. As you know, I was thrilled for the wisdom of selecting Col Wirth; he is certainly one the premier AFMS leaders. Our most recent selectees to Major are Ava Craig, Ane Shull, and Stephen Steele. There have been several others over the past year. All of this means a great celebration at the next Short Course (which should be in August 2001). Congratulations to all!

Have a Happy Kwanzaa, Happy Hanukah, and a very Merry Christmas! God’s blessings on all of you for the year to come.

Sincerely,
John Allen

# News and Announcements

## Promotions

Congratulations to LtCol John Allen of Andrews AFB, MD, and LtCol David Wirth of Travis AFB, CA. They've both been selected for Colonel and are the fourth and fifth AF audiologists to have achieved that rank!

Congratulations to Majors Angela Williamson, CCC-A, and Ann Stokes, CCC-SLP, who'll soon be wearing the silver leaf! Both promotees are stationed at Keesler AFB, MS.

Congratulations to Maj (s) Karen Agres, Maj (s) Bob Eppens, Maj (s) Joe Narrigan, Maj (s) Robert Shull, Maj (s) Tom Spongberg, and Maj (s) Tressie Waldo who were all selected for Major in the earlier promotion board! Maj (s) Ava Craig, Maj (s) Ane Shull and Maj (s) Stephen Steele were selected in the most recent board.

Congratulations to Captain selects Alicia Burke and Louis Duncan, both of Wilford Hall Medical Center, Lackland AFB, TX.

## On the move

Capt Brien Weston from Wilford Hall Medical Center, Lackland AFB, TX to Tinker AFB, OK.

Col Ben Sierra from Bolling AFB, DC to Wilford Hall Medical Center, Lackland AFB, TX.

Captains Virginia Hays and Melissa Hatcher from Wilford Hall Medical Center, Lackland AFB, TX to Lakenheath AB, UK.

LtCol (s) Angela Williamson from Keesler AFB, MS, to Robins AFB, GA.

Maj Joe Narrigan from Wright-Patterson AFB, OH, to Bolling AFB, DC in the Office of the Surgeon General.

Capt Sharisse McCoy from Sheppard AFB, TX, to Wright-Patterson AFB, OH.

LtCol Carolyn Bennett from Wright-Patterson AFB, OH to Hill AFB, UT, in the Health and Wellness Center.

## Retirements and Separations

Congratulations and thanks to Maj Paula McPhail who retired in June 2000 from Travis AFB, CA.

Congratulations and thanks to Capt Lesly Loiseau who retired in November 2000. Dr. Loiseau will remain in the Spokane, Washington area as a private practitioner.

Capt Wil Lopez and family enjoy middle Georgia so much that he's decided to separate from the military rather than move from the area. Best of luck to you, Wil.

Maj (s) Tom Spongberg has decided to leave military service in order to pursue other oppurtunities in the Washington, DC, area. Thanks, Tom, and all the best to you!

Maj Linda Morris has also decided to separate from the military. Thanks for everything, Linda, and good luck!

## New Accessions

Welcome to 1Lt Lauren Behm! Lauren has degrees in Marketing and Communication Disorders from Texas Tech. She completed her CFY at Henry Ford Hospital, Detroit, MI. In August 2000 she completed Commisioned Officer Training (COT) and is now a staff audiologist at Wilford Hall Medical Center, San Antionio, TX. We wish you success at your new career!

Welcome to 1Lt Sara Teufert who is the new audiologist at Sheppard AFB, TX. Lt Teufert hails from Northern Minnesota and has degrees from the University of Minnesota. She completed her CFY at Henry Ford Hospital in Detroit, MI, and graduated from COT, August 2000. Sara enjoys traveling, watching and participating in athletic events, reading and spending time with family and friends. Welcome, Sara!

Welocme to 1Lt David Pedersen who hails from Jefferson, OR. He eventually left the Northwest for Alabama where he earned his M.S. in Audiology from Monticello University. He did his CFY at Sonus-USA focusing on programmable and digital hearing aids, marketing and aural rehabilitation. His hobbies include baking breads and cheescakes, traveling, and he's the pianist for the Larcher chapel at Keesler AFB, MS, where's he's stationed. Welcome, David!

Capt Ada Haber-Perez returns to the AF and is now stationed at Andrews AFB, MD. Welcome back, Ada!

## Other News

Welcome to Zachary Tyler Shull who was born on 21 Jan 2000. Captains Ane and Rob Shull are both audiologists stationed in San Antonio, TX. Congratulations!

Welcome to Allison Danielle Morris who entered this world on 4 March 2000. Congratulations to Major Linda Morris and her husband Mike (Maj, USAF)!

Congratulations to Capt Bridget McMullen and husband Robert on the birth of Andrew on 30 April 2000

Congratulations to Capt John Hall and his wife Leticia on the birth of Alyssa Kay who was born on 20 May 2000!

Congratulations to Capt Lesly Loiseau, AuD, the first AF audiologist to earn the new advanced doctoral clinical degree! The University of Florida awarded him the degree.

Congratulation to LtCol Carolyn Bennett who received the Crew System Interface Division Quarterly Achievement Award. LtCol Bennett was stationed at the AF Research Laboratory at Wright-Patterson AFB, OH

Remember, it's a secret unless you tell us so do feel free to tell others of your accomplishments!

# A View From Inside an Aud Program

LtCol (s) Angela Williamson

As a long-time supporter of the AuD as the entry level degree to our profession, I felt sure that when the avenue opened for those of us in the field to upgrade our degrees became available, I would take the opportunity to do so. The Univ of Florida and CMU/Vanderbilt programs launched at about the same time. After a comparison of the requirements for travel vs. research, costs involved, and classes offered, I opted for the CMU program. I applied to CMU, was accepted and became one of a "cohort" to take the first classes before the program was opened to the general public. I have now completed 5 of 8 required courses and would like to give a report of how it is going to those of you who might be considering working toward your AuD.

The literature from CMU leads one to believe that it may be possible to obtain the AuD from their program in 12-18 months. If you are able to take two classes at a time, and begin work on your research project while taking classes and working full-time, this is a true statement. I have found that my schedule allows me to take one class at a time, while working and keeping up with family, church, and social obligations. Overall, the courses have been very good, quite interesting, very topical and relevant to my clinical day. I entered the program feeling that I was quite current in Audiology, as I have more than 600 hours of continuing education since leaving graduate school. However, I have been pleasantly surprised to find that there is a **lot** of information to be gained through in-depth study in a given area—things that can't be covered in 2 or 3 day continuing education seminars. The CMU/Vanderbilt professors are nationally recognized in their respective areas of expertise, and bring valuable information to the table (or computer screen) during each course. This is not to say I've found each course easy; at least two courses come to mind that were incredibly demanding, stressful and forced me to work much harder than I wanted to just to earn a B.

I recently took six months off for personal and health reasons. I plan to register soon for the January 2001 term, and as I look ahead to the next few months, I plan to finish the coursework, and begin work on my research or "capstone" project. I've given myself a personal deadline to finish, although CMU allows you eight years to complete the program once you've enrolled. Many colleagues in and out of the AF have asked me why I'm doing this. I've realized it isn't for potential AF advancement or recognition, and I'm not even sure that I'll ever touch another ear or hearing aid once I retire from the AF. My answer to them is I wanted to do it for me, for my own professional interest, because I want to be the best audiologist I can be, and certainly to stay current in the field, as long as I remain in the field. I also suspect that an earned AuD will open doors for me when I depart the AF, if I decide to stay in audiology.

So, just to let you know, it isn't easy, it requires a strong commitment of time, and an understanding and supportive family to make the AuD a reality in your life. Distance learning isn't for everyone, and the program isn't as "self-paced" as CMU would like you to believe. It is self-paced in that you may take classes when you want to, taking off certain terms for vacation or other commitments, but while in a term, projects, papers and tests are due at given times. The requirement is there from the professors that you attend weekly chat sessions and submit assignments on time. It is possible in most classes to work ahead, but it could be lethal if you fall behind.

Several of us in the AF are taking classes from CMU and would be happy to talk to those of you with specific questions. Two classmates who come to mind are Col Ben Sierra and Capt Anne Shull. If you have questions about the CMU program, contact one of us for truly honest, informed opinions on life as a student (again).

*LtCol (s) Williamson is the Director of Hearing Conservation and Audiology Services at Robins AFB, GA.*

# 2000 Military Audiology Short Course

*The 2000 Military Audiology Short Course (MASC) was held at the Sheraton Norfolk Waterside Hotel, Norfolk, VA, during 1 - 3 February 00 in conjunction with the Fortieth Navy Occupational Health and Preventive Medicine Workshop. The following Air Force Audiolgists and Speech/Language Pahologists abstracts were presented at the meeting.*

## A Comparison of HPD Attenuation Measurements Obtained with Subject and Experimenter Fittings

Carolyn S. Bennett, Lt Col, USAF, BSC
Air Force Research Laboratory
Wright- Patterson, AFB, OH

The American National Standards, ANSI S12.6 - 1997, Methods for Measuring the Real-Ear Attenuation of Hearing Protectors, paragraph 0.2 states: "The need for a better human-factors model... experimenter-supervised fitting of HPDs...is intended to describe the upper limits of hearing protector performance...provide inadequate insight into the performance of HPDs when real-world human-factor considerations must be taken into account." In an attempt to provide more valid estimates of field performance, the working group responsible for the revision of the ANSI 1984 standard for measurement of real-ear attenuation developed the subject-fit method of ANSI S12.6 - 1997. Under the subject-fit method, subjects must be naive hearing protector users.

The Department of Defense (DoD) Hearing Conservation Working Group (HCWG) Memorandum For The Record, 31 March 97, paragraph 14 states: "Consensus was reached that DoD should use subject fit methods to determine NRR...consensus that subject fit data were most appropriate for both the purchasing process and for field evaluation."

Empirical data has not yet been presented, however, that validates a single HPD attenuation measurement method. The Air Force Research Laboratory, Wright-Patterson AFB has undertaken a group of experiments to determine empirically which method of hearing protector attenuation measurement will provide the most valid measurement of field performance. The present study, "A Comparison of HPD Attenuation Measurements Obtained with Subject and Experimenter Fittings" is a preliminary study in the investigation of the most valid method to predict hearing protector attenuation. Air Force Research Laboratory, measured attenuation values using ANSI S12.6 - 1997, Method B. Procedures followed were those specified in ANSI S12.6 - 1997, 9 Method B: subject-fit.

The study to be presented compared the attenuation values obtain using subject fit method with attenuation values obtained using the experimenter fit method previously employed by the Air Force Research Laboratory.

## Deployment of an Auditory Readiness Information Center (ARIC) at International Military Air Show in England

Capt John Hall, USAF
48MDOS/RAF Lakenheath, UK

Air Fete, held each year at RAF Mildenhall in England, is one of the largest military airshows in the word. The event attracts nearly 200,000 visitors from around the globe and is joint sponsored by the American and British air forces.

Last year, at Air Fete '98, a new display was introduced in the exhibition hanger to promote awareness of hazardous noise in aviation and the need for hearing protection and hearing conservation. To appeal to an even larger area of interest, the Auditory Readiness Information Center was combined with other displays of aviation human systems technology under the title of Aerospace Medicine.

Flight medicine topics from hypoxia to G-suite development were presented in conjunction with auditory readiness and hearing conservation. Hands-on items such as the Combat Edge Pressure Suite, an ejection seat, a centrifuge ride video, and personal protective gear attracted much attention. Over 200 pairs of foam insert noise plugs were dispensed to the public and The Radio Suffolk BBC commentary reported this display to be the "most interesting" in the Air Fete exhibition hanger. The Aerospace Medicine Squadron Commander was even on hand for an interview.

A complete description of the planning and implementation will be offered. Ideas and talents from base graphics to the base arts & crafts shop were utilized to put together this museum quality professional display.

## The Impact of Accent, Noise, and Linguistic Predictability on the Intelligibility of Non-native Speakers of English

Maj. Kimberly R. Scott, CCC-SLP
Department of Communication Sciences and Disorders
Alice M. Dyson, Ph.D., Committee Chair

In noisy, fast-paced situations, listeners have difficulty

understanding speakers with foreign accents, especially when listeners cannot predict the meaning from other words in the sentence. This study examined the effects of noise levels and degrees of foreign accents on 50 listeners understanding of words in predictable and unpredictable sentences. Although noise and sentence predictability did affect understanding, the degree of foreign accent further compromised listener accuracy. As listening conditions became degraded by noise or unpredictability, listeners were less able to accommodate for the degree of accent.

In international airspace, communication breakdowns often occur because of accented speech and poor radio systems. The findings of this study have an implication for those who speak English as an international language in such situations or when English is the common language of two non-native speakers. These findings are also applicable to settings such as emergency rooms, telephone or radio communications, and classrooms.

## Acoustic Remote Threat Detection (ARTD)

Dr. Daryl Hammond, AFRL/HECB
Lt Col Carolyn S. Bennett, AFRL/HEC, Wright-Patterson AFB, OH

Defense and protection of USAF personnel and resources is a high Air Force priority and a prerequisite for air power operations (MNS CAF 314-92). The most obvious example: the Khobar Towers bombing demonstrates the need capability to detect, identify, warn, report, and protect against enemy attack

The Acoustic Remote Threat Detection will realize improved force protection through increased speed of location and classification of threats via integrated acoustic sensor arrays, signal processing, and human centered distributed interfaces. This expanded research program builds upon the 1992 & 1996 successful field demonstrations of 3-D auditory displays and the 1995 field application of the remote sonic boom monitoring and recording system.

Ears and eyes for security forces/sentries, Acoustic Remote Threat Detection, utilizes a series of affordable, expendable, small, low power, easily deployable multi-sensor research to process sensor information to identify and locate potential and/or active threats. High fidelity two-way communication links the sensors to a central command post and/or distributed users. The resulting product will provide a dramatically improved threat response for the Air Expeditionary Forces.

The Acoustic Remote Threat Detection package will employ at least 6 microphones at each location, a differential GPS for automatic sensor location, remotely generated acoustic impulse for microphone array calibration, local processing of sensor information to reduce communications and spectrum communications links for low probability of intercept, low power, secure, and jam resistant communication. The Acoustic Remote Threat Detection package will be able to screen against a library of sounds by determining what is different from background normal sounds. It will have the capability for remote updates of sound libraries and models in its motion analysis for velocity and direction and change in sound over time (loaded truck?).

The payoff for the remote user will be information to the scout/shooter, intuitive sensing of friendly vs. foe, enhanced signaling for target, locality information for potential threat (acoustic pointing), hands free/eyes free interface to the deployed troop and directional Information. Khobar Towers bombing demonstrates the need capability to detect, identify, warn, report, and protect against enemy attack.

## New European Design: Venturi HPDs

Capt John Hall, USAF
48MDOS/RAF, Lakenheath

A new custom Hearing Protection Device (HPD) ear plug has recently been tested at RAF Lakenheath and RAF Mildenhall which utilizes a venturi to limit sound pressure reaching the eardrum. Preliminary real world tests of this technology with 48th Fighter Wing F-15 pilots and 352nd Special Operations Combat Controllers have demonstrated significant benefits which will be studied further at the Air Force Research Laboratory at Wright-Patterson AFB.

The venturi principle has been used in gasoline engine carburetors for over 50 years, but a designer in Holland has creatively applied the principle to hearing protection. A venturi is a narrow opening designed to create aerodynamic turbulence as air pressure increases. Since sound is oscillating air pressure, it makes since that this technology can be used to restrict hazardous noise.

The venturi on board the “Sound Censors” custom earplug restricts sound pressures progressively more in the high frequencies where noise is most harmful. The attenuation characteristics pass enough low and mid frequency information (at safe levels) to enable the wearer to understand speech (as well as environmental auditory cues) in noise significantly better than other HPDs currently on the market. The plugs meet all International Standards Organization (ISO) requirements for hearing protection in hazardous noise and are low profile enough to fit comfortably under all DoD headgear, helmets, and communication headsets.

Several pairs of Sound Censors were tested this year. An

493rd Fighter Squadron F-15E pilot who recently mission tested a pair reports "marked improvement of radio and intercockpit voice communications." Likewise, Combat Controllers at the 352nd Special Operations Group (SOG) report the devices "greatly enhance mission effectiveness" aboard SOG airframes and during tactical operations on the ground.

A complete summary of the venturi HPD principle, real world performance in the USAF, effective Noise Reduction Rating (NRR), and directions for further study at the Air Force Research Lab for possible Air Force wide approval will be discussed.

### Audiology Support Following the Bombings of US Embassies in Africa

Jenny Rainwater, Maj, USAF
David Chandler, COL, USA
Lynnette Bardolf, CPT, USA

On 7 August 1998, terrorist bombs were exploded outside US Embassies in Nairobi, Kenya and Dar Es Salaam, Tanzania. Five months after the Kenya bombing and eight months following the Tanzanian bombing, a team from Landstuhl Regional Medical Center, Germany, was tasked to provide ENT/Audiology support to the victims who worked at the embassies. Over 200 individuals were evaluated, and recommendations were made for further follow-up and rehabilitation. Despite the severity of the blast, fewer traumatic losses and more chronic losses were encountered than expected. Data will be presented, as well as an overview on blast injury. The nature of the mission, the logistical support of such a mission, and lessons learned will also be discussed.

## Attenuating Custom Communication Earpiece System (ACCES)

### Prototype Description Summary

ACCES is a customized silicon earpiece poured from individual impressions of the wearer's external ear. The earpiece contains a miniature receiver embedded deep within the earpiece. Worn under conventional headsets or helmets the product provides comfortable attenuation of high intensity ambient noise (150 dB) while enabling the wearer to hear voice communication and audio signals clearly. Two versions have been developed, one for ground support crew, the other for aircrew.

ACCES is attached via shielded coaxial cable to the communication headsets or aircrew helmet communication line. The attachment is made via connectors which permit easy disconnect so ACCES can be worn alone as hearing protection when noise levels subside to permissible levels. The F-22 Combined Test Force (CTF) and AFRL conducted a highly successful field demonstration with the F-22 ground crew at Edwards AFB. The aircrew version designed for pilots will be flight-tested this summer at Nellis AFB.

### Background

Military personnel are exposed to occupational noise intensities far exceeding their counterparts in commercial industry. According to the National Institute of Occupational Safety and Health (NIOSH) 90% of private industry noise is 90 dB (A-weighting) or below. For comparison, U.S. Air Force and Navy personnel supporting jet fighter aircraft are routinely exposed to noise hazards of long duration from 130 to 150 dB (A) which 400 to 600 times more energy than noise at 90 dB. As such, the current hearing protection and voice communication equipment commercially available is grossly ill equipped to accommodate military aviation environments.

Hearing loss compensation from exposure to noise in the military exceeds $300 million annually. Moreover, aerospace operations and personnel can be seriously compromised by inadequate voice communications amongst high ambient noise (100-150 dB (A)). Current military communication headsets are incapable of generating sufficiently intelligible audio signals in this environment. It is therefore critical that military hearing protection and communication headset technology be updated to achieve the necessary combination of hearing protection and voice communication clarity.

ACCES enables all standard military communication headsets and flight helmets to be upgraded economically and easily. No modifications are required to helmets, and only a single wire splice is necessary for the headsets. Following installation, ACCES can be removed without any residual detriment to the helmet or headset. ACCES can be worn alone when noise levels permit use of earplugs only. When noise levels increase and requirements change to double hearing protection, ACCES is then plugged into the helmet or headset, which is worn over ACCES. Double hearing protection is achieved. Once plugged into the headset (for ground support crew) or helmet (for aircrew) common interface with the aircraft intercom is complete.

### Advantages

ACCES eliminates the possibility of poor earplug insertion (as is typical with generic earplugs) as the ACCES earpieces are custom fabricated from impressions made of the

users ears. This is significant because as little as 3dB lost protection due to poor earplug insertion can double the wearer's exposure to noise.

Comfort is superior with custom fit earpieces, affording higher acceptance by users and permitting deeper insertion into the ear canal. Deeper insertion results in increased attenuation (10 dB) over generic earplugs, reducing noise dose by 150% (the dB scale is exponential).

The volume of air trapped between the plug and the eardrum is reduced due to deeper insertion. The result is less trapped air vibration from bone transmission of acoustic energy through the skull (which limits attenuation quality of generic plugs) and more robust speech signal from the miniature loudspeaker in the end of the ACCES earpiece. The signal to noise ratio is significantly improved.

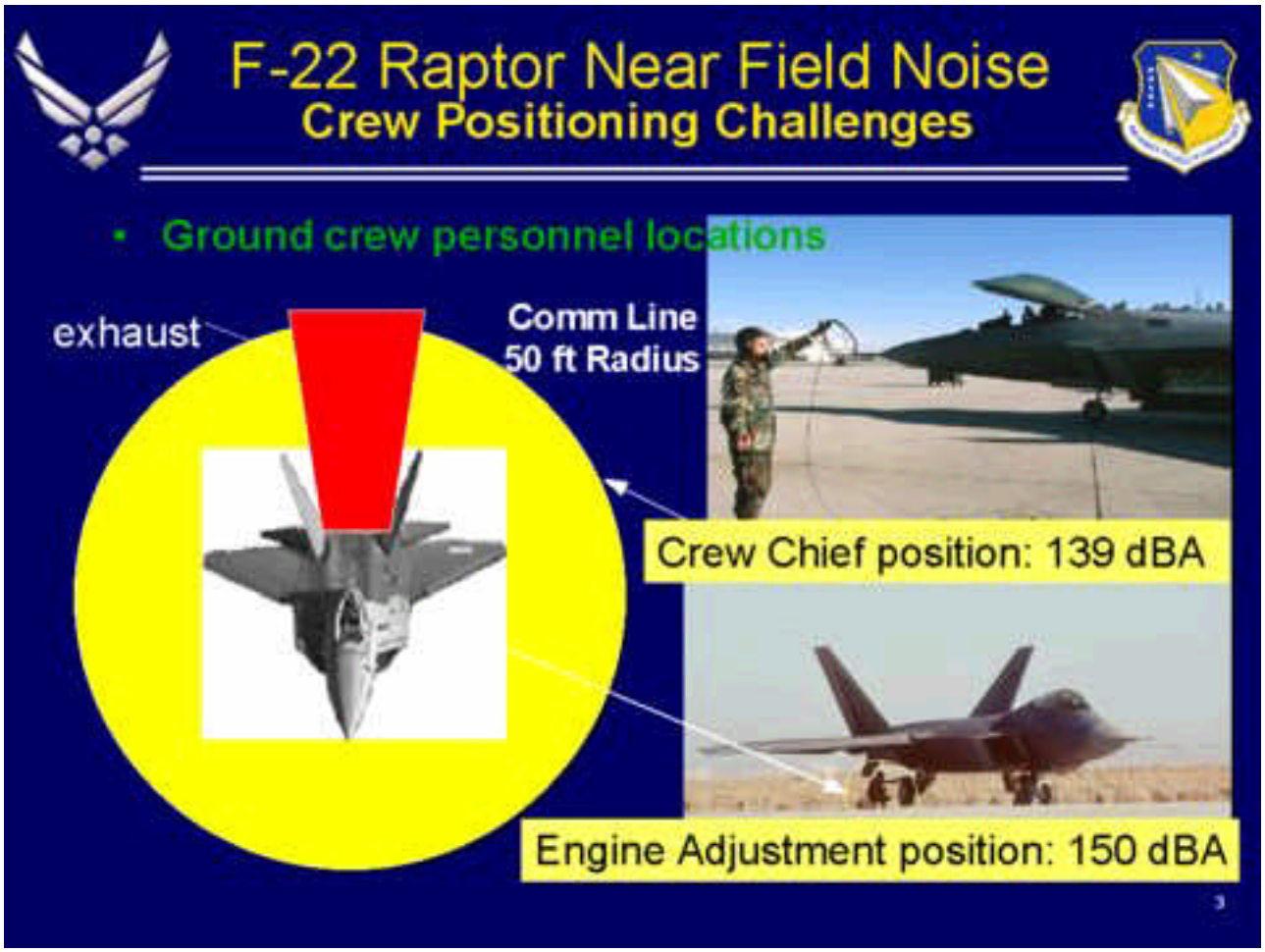
ACCES also provides a solution to the critical need for clear intercom and radio listening under the Nuclear, Biologic, and Chemical (NBC) protection hood. Communication headsets worn over the hood have always been an unsatisfactory situation.

## Applications

Wherever intercom communication in high noise is required: launch and recovery of aircraft; jet engine run-ups; engine test cell operations; rocket engine tests; air base security forces; aircraft cockpits; loadmaster operations; ground forces on radios deployed in NBC protection; ground forces operating tanks and mechanized vehicles; aircraft carrier operations; navy power plant operations.

ACCES delivers improved speech intelligibility (as verified by Edwards AFB) in high intensity ambient noise environments while simultaneously providing increased protection against noise induced hearing loss. Controlled lab tests of ACCES speech intelligibility performance currently are under way at the Air Force Research Laboratory, Wright-Patterson AFB.

*Capt John Hall is an audiologist with the Human Effectiveness Directorate, Crew System Interface Division, Aural Displays & Bioacoustics Branch, Wright-Patterson AFB, OH. Phone DSN 785-3660 ext. 419.*



# Deep Insert Custom Plug Prototype Technology Demonstration

# Deputy Undersecretary of Defense Recommendations

- **Mandate requirements to improve hearing protection to address today's tactical noise environment**
- **Identify specific funding sponsor(s) and R&D responsibilities for a dedicated hearing protection improvement program**
  - $11M over FYDP
  - Custom Fit Molded Earplugs
  - ANR Earplugs
  - Improved Passive Cranial
  - Active Vibration Control Cranial/Helmet
  - Enabling Research e.g., sensors, models
- **Establish a joint Navy-Air Force DTO to best coordinate research efforts**