



**United States Air  
Force School of  
Aerospace Medicine  
USAFSAM**



*Hearing Conservation Data Registry  
F-35 Project*

*C-17 Noise Assessment  
Maj Bridget McMullen*

**Sustaining Readiness through  
Healthy Communities**





# *Hearing Conservation Data Registry*



- ✦ **AF Hearing Conservation Program Manger**
- ✦ **DOERHS-DR administration**
- ✦ **Hearing Conservation Configuration Management Working Group**
- ✦ **DoD Hearing Conservation Working Group**
- ✦ **F-35 Project**
- ✦ **C-17 McChord Project**



# ***AF Hearing Conservation Program Manager***



- ✦ **Consultant to AF on matters of hearing conservation**
- ✦ **Fields calls from all over the AF on running of HC program at base/MAJCOM/Headquarters level**
- ✦ **Pushes STS, records received and compliance reports to the field for use at OHWG, etc**
- ✦ **Calls for denominator data once a year**
  - ✦ **Denominator is the number of people on the hearing conservation program at base level**
    - ✦ **Without this number we cannot see how we're doing**



# ***DOERHS-DR Administration***



- ✦ **Manages the Data Registry**
  - ✦ **Manages 2 NCO's**
  - ✦ **Unlocks/approves accounts**
  - ✦ **Adjunct instructor at the USAFSAM schoolhouse**
    - ✦ **Hearing conservation, data repository**
    - ✦ **Teaches entire certification and recertification classes when needed**
  - ✦ **CAOHC Certified (Council for Accreditation in Occupational Hearing Conservation)**
    - ✦ **Can certify hearing conservation technicians**



# ***Hearing Conservation Configuration Management Working Group***



- ✧ **TriService Working Group**
- ✧ **Interfaces with DOEHRS-HC/DR software developer contractors**
- ✧ **Bi-weekly teleconferences**
- ✧ **Quarterly 4 hours teleconferences**
  - System Change Requests
  - Audiometer Equipment Refresh
  - New Software Versions



# ***DoD Hearing Conservation Working Group***



- ✦ **TriService working group**
- ✦ **Discuss DoD Hearing Conservation Concerns**
- ✦ **Meet once/twice a year or more as needed**
  - ✦ **Either in person in DC or by telecon**
- ✦ **Past meetings in conjunction with the VA and DoD noise working group**



# Contact Information



## ✧ Address:

- ✧ AFIOH/RSHE
- ✧ 2513 Kennedy Circle, Bldg 180
- ✧ Brooks City-Base, TX 78235-5123
- ✧ DSN 240-2940/6132 (Voice) -2153 (Fax)
- ✧ Comm. (210) 536-2940

## ✧ Staff:

- ✧ Maj Bridget McMullen ([bridget.mcmullen@brooks.af.mil](mailto:bridget.mcmullen@brooks.af.mil))
- ✧ MSgt (s) Maurice Allen ([maurice.allen@brooks.af.mil](mailto:maurice.allen@brooks.af.mil))
- ✧ SSgt Vanessa Bender ([vanessa.bender@brooks.af.mil](mailto:vanessa.bender@brooks.af.mil))

## ✧ Website:

- ✧ <https://kx.afms.mil/hcdr/>





# JSF



- ✧ **Joint Strike Fighter (F-35 Lightning II)**
  - ✧ **Single Engine, Single Seat, Stealth Capable**
  - ✧ **3 configurations**
    - ✧ **Air Force Variant F-35A**
      - Replaces F-16 & A-10
    - ✧ **Navy Carrier Variant F-35B**
      - Replaces F/A 18
    - ✧ **Marine Variant F-35C STOVL(Short Take-off Vertical Landing)**
      - Replaces AV-8B Harrier
  - ✧ **LOUD: louder than anything we have**



# ***JSF Project***



- ✧ **Eglin off base population expressed concerns about noise levels of new plane: due to Eglin in 2010-2014**
- ✧ **City of Valparaiso sued the AF to obtain information about noise levels under the Freedom of Information Act**
- ✧ **AFMSA asked for information on hearing conservation and noise levels of new Joint Strike Fighter**
- ✧ **With the BEEs (Bioenvironmental Engineers) composed a Health Risk Assessment (HRA)**

***McChord AFB  
C-17 Globemaster III***





# *Field Work-McChord AFB*



- ✦ **McChord AFB in Washington State had a question about when/where to use double hearing protection**
  - ✦ **Safety: mandated that all personnel on flightline wear double hearing protection around flight line regardless of duty.**
    - ✦ **Including when aircraft was not running and duties did not warrant double protection**
    - ✦ **C-17 surveyed by Base Bio and sound level meters showed noise in excess of 115dB**
- ✦ **McChord Public Health called AFIOH for consultation**
  - ✦ **9 Person team sent to McChord to do noise survey of C-17.**



# *Noise Team*



## ✧ Noise Team composition

- ✧ USAFSAM (former AFIOH): 1 Noise Consultant (Engineer-Bio)
- ✧ USAFSAM: 2 ESOH Service Center technicians
- ✧ USAFSAM: 1 Audiologist
- ✧ McChord AFB: 2 Bioenvironmental Technicians
- ✧ Contractors: 2 Engineers and 1 Technician



# *Survey Process*



- ✦ **10 Microphone array was set up on a large retractable ladder**
- ✦ **Attached to laptop with special noise sampling software**
- ✦ **Area gridded on tarmac every 6 feet**
- ✦ **Plane was started in various configurations including:**
  - ✦ **APU (auxillary power unit) only**
  - ✦ **APU and engines**
  - ✦ **Various Engine RPM settings**



# ***Audiologist Role***



- ✧ **Manual Labor☺: Any pair of hands utilized!  
Beautiful weather, awesome view of Mt Rainier!**
- ✧ **Military Liaison: Only AF officer on the team.  
Believe it or not they thought I knew what to do on the flight line! (I'd never been on the flight line except during an air show and never seen a C-17 close up!)**
- ✧ **Resident expert on hearing protection**
- ✧ **Clinical specialist: your clinic experience will take you far. Lots of questions about hearing loss as it related to hearing protection/work ability**



# *Flight Line etiquette*



- ✧ **Red Line:** You need wing commanders approval to step over the red line. (We had special approval)
- ✧ **Pilots and flight crew are bused to the plane.**
- ✧ **Walking over the red line is called “breaking red”**
  - ✧ **Next step:** laying on your stomach on the tarmac with a very sincere SP pointing a loaded M-16 at you
  - ✧ **Lead contractor was 2 steps away from laying flat on the ground. SP’s were getting out of their car with their guns. They didn’t get the “memo” from the wing commander.**
- ✧ **Be courteous!**



# *Other Audiologist's Duties*



- ✦ **Strap yourself into the 5 point harness jump seat with communication headset: relayed directions from noise team to the flight crew**
- ✦ **Be in jump seat during a Compressor Stall: which is a complete breakdown in compression resulting in a reversal of flow and the violent expulsion of previously compressed air out through the engine intake, due to the compressor's inability to continue working against the already compressed air behind it.(thank you Wikipedia) Think FIRE BALL.**
- ✦ **Plug in and start APU**



# •How to Start the APU

## •(Audiologist Version)



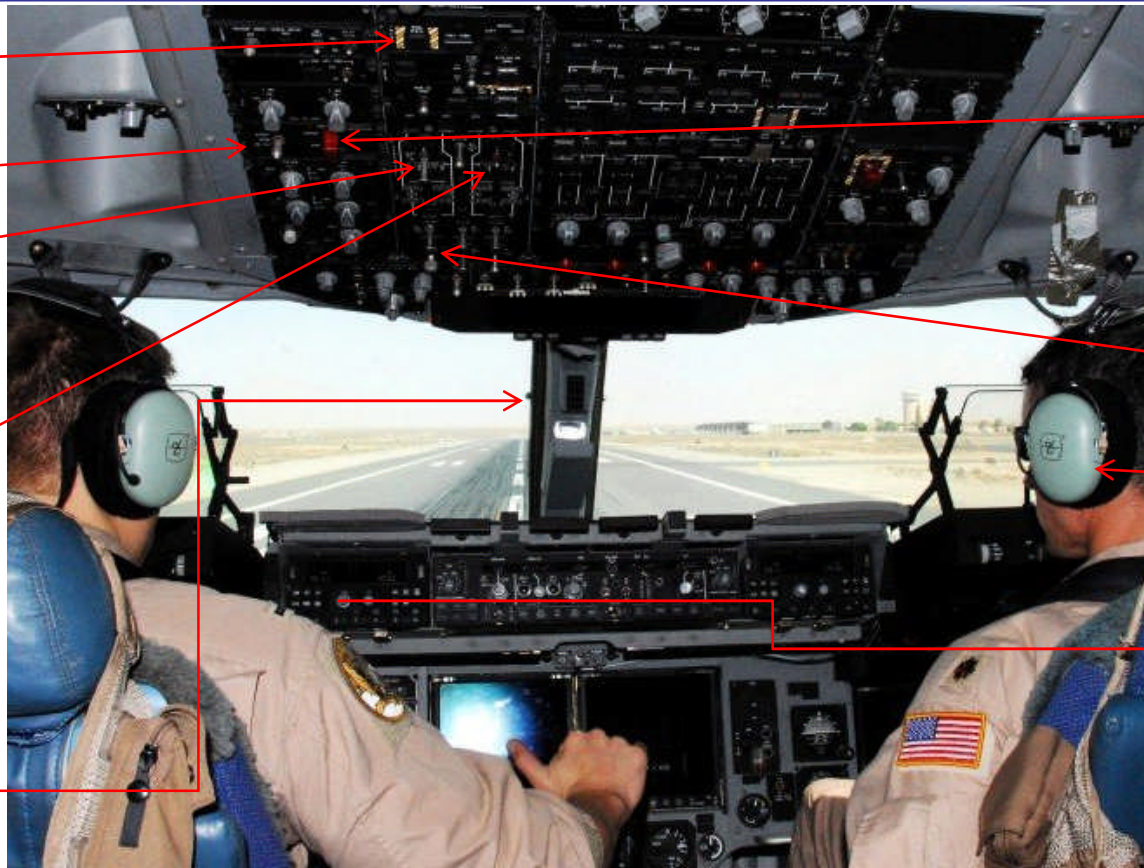
•Turn That

•Push That

•Flip That

•Wait! Don't  
Push That!!

•Whoops,  
sorry



•Check That

•Flip That

•What??? Opps,  
let me turn my  
comm set on

•Push That

Disclaimer: Actual method of starting the APU may vary. I've slept since then.



07 Ulrich Grueschow - www.MilitaryAircraft.de

•APU



# *C-17 APU running*



[C17\\_A weighted SPL contours\\_APU Running \(2\).pdf](#)



# Lessons Learned



- ✦ **Wearing earplugs under communication headset really does makes speech more audible (you need normal hearing)**
- ✦ **Safety is #1.**
  - ✦ **Contractor with hearing loss in double hearing protection could not hear (she didn't have normal hearing)**
    - ✦ **She was standing too close to the engine intake. She could not hear safety representative.**
  - ✦ **Hearing is necessary for safe operation**
- ✦ **Audiology expertise is of great value to line side**



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