

accident investigation practices, all intended to manage risk for the benefit of the most important aspect of the world's airspace system—the human operator and the public s/he serves. Facilities that support these activities include B-747 Aircraft Environment Research Facility, Flexible Aircraft Cabin Simulator, Water Tank, Altitude Chamber, Impact Sled, and High-Performance Computer.

Learning Objectives:

1. Introduce the activities of the aerospace medical research division of the FAA to identify potential opportunities for research collaboration across the world.

[188] AEROSPACE MEDICINE COLLABORATIVE RESEARCH OPPORTUNITIES AT CFEME AND DRDC

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(EDUCATION - TUTORIAL)

MOTIVATION: The Canadian Forces Environmental Medicine Establishment (CFEME) and Defence Research and Development Canada (DRDC) Toronto Research Centre (TRC) have been partners for more than seventy-five years, and continue to seek international collaboration in aeromedical research. A human factors research laboratory, flight simulation and task modelling laboratory, 3D laser anthropometry laboratory, hypobaric chamber and human centrifuge are a few of the facilities available for collaborative research. Today's aeromedical problems are multi-faceted and require not only a multi-disciplinary approach, but also multi-organization collaboration with academia, industry, OGDs, and international partners. This presentation focuses on current international collaborative activities, as well as identifies future collaboration opportunities with CFEME and DRDC. **OVERVIEW:** Aeromedical research at CFEME and DRDC TRC spans several projects, including: Aircrew Neck- and Back-trouble Assessment & Mitigation Solutions, Fatigue Avoidance Scheduling Tool Validation, Advanced Aircrew Accommodation Models, Anthropometrics, Low Level Hypoxia, Operational Vision Requirements and Assessment, Human Factors Engineering for Surveillance Aircraft, Processing, Exploitation, and Dissemination Concepts, Unmanned Aircraft System Operator Training Requirements and White Matter Hyperintensities related to Hypobaric Exposure. There is additional clinical research and international collaboration in exercise and human performance and aerospace cardiology, respectively. Many of these projects involve collaborative efforts under 1) NATO Human Factors and Medicine Panel and Information Technology Systems panels, 2) TTCP HUM group Collaborative Projects or Joint Projects, and/or 3) US/CA Technology Research and Development Program. **SIGNIFICANCE:** Given the current fiscal climate, it is becoming increasingly beneficial to collaborate and leverage each other's research beyond simple information sharing. In order to further maximize resources, there is a move afoot to conduct face-to-face planning of joint experiments, share experimental protocols, participants, equipment and facilities amongst the nations. Resource sharing is slightly more costly in some ways than simple information sharing, but the leveraging and outcome benefits significantly outweigh the costs.

Learning Objectives:

1. To understand the relationship between CFEME and DRDC Toronto.
2. To be aware of the research facilities available for collaborative research at CFEME/DRDC Toronto.
3. To be aware of the current aeromedical research being conducted at CFEME/DRDC Toronto.

[189] AEROSPACE MEDICAL CENTER: LOOKING TO THE FUTURE THROUGH THE RESEARCH CENTER IN AERONAUTICAL AND SPACE BIOMEDICAL SCIENCES.

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(EDUCATION - TUTORIAL)

During the last 23 years, the Aerospace Medical Center of the Colombian Air Force (CEMAE) has been working in different fields of aerospace medicine such as aeromedical certification, physiological

training, education, and research. Nowadays, CEMAЕ has 9 laboratories which have different applications that include aeromedical and human factors research and training in different operational scenarios. These changes have promoted its recognition as a reference center in Central and South America. Other areas of CEMAЕ are related to medical evaluation focused in aeromedical certification processes that generate huge amounts of research data. Looking for an expansion of research, CEMAЕ and the Educational Directorate of the Colombian Air Force have created the Research Center in Aeronautical and Space Biomedical Sciences (CIBAE). Their objective is to present and promote processes to increase knowledge in aerospace medicine and related fields through scientific networks between the Air Force, allied universities, and other public and private institutes. A brief description of the areas of interest that CIBAE supports will be discussed: aeromedical certification, human factors, flight and space physiology, extreme environments, altitude medicine, and physiology. Currently, CIBAE is conducting several research projects, including Antarctica and uninhabited air vehicles (UAVs). CIBAE is the leader of the research line in human factors in aviation, an effort that integrates the Master's degree program in Operational Safety in Aviation of the Postgraduate School of the Colombian Air Force. Through CIBAE, CEMAЕ is growing constantly to promote an aerospace culture, increasing science and technology networks that allow higher standards for effective and safe flight operations.

Learning Objectives:

1. To review the structure and fields of study at CEMAЕ and CIBAE.
2. To analyze the future of research networks in aerospace medicine and aviation operational safety.

[190] UNITED STATES AIR FORCE SCHOOL OF AEROSPACE MEDICINE - OVERVIEW

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USAFSAM. Wright-Patterson AFB, OH

(EDUCATION - TUTORIAL)

MOTIVATION: USAFSAM executes the 711th Human Performance Wing (711HPW) and AFRL Defense Health Program-funded research mission. USAFSAM's research portfolio exceeds \$50M in funding and includes over 150 active projects per year. The research portfolio is wide-ranging, with major efforts in human performance, force health protection, and en route care. **OVERVIEW:** The United States Air Force School of Aerospace Medicine (USAFSAM) is a part of the 711HPW within AFRL. Headquartered at Wright-Patterson Air Force Base with five geographically separated units, USAFSAM employs over 600 active duty and civilian members. USAFSAM is a unique institution; in addition to containing the U.S. Air Force aeromedical research laboratory; USAFSAM also has primary missions in education and consultation. Through these missions, USAFSAM supplies the Air Force with four broad capabilities: Aerospace and Operational Medicine; public health and preventive medicine; occupational and environmental health; and en route care and expeditionary medicine. USAFSAM has a long history of excellence; established in 1918, it has played a central role for the Army Air Corps and the U.S. Air Force for 100 years. As an educational institution, USAFSAM offers training for all "Team Aerospace" career fields through 80+ courses and graduates over 4000 students per year. Internationally, USAFSAM has educated students from over 130 countries since 1923. As a center of aeromedical expertise, USAFSAM conducts a robust consultation mission, with four services completing 8800+ consults per year. **SIGNIFICANCE:** Within USAFSAM, the education, consultation, and research missions are interconnected. USAFSAM's research benefits from its organizational location within the 711HPW and connection to Navy Aeromedical Research Unit. USAFSAM research is multi-disciplinary and highly collaborative, including U.S. Department of Defense and federal agencies, multiple universities, and numerous partner nations.

Learning Objectives:

1. Understand the role USAFSAM plays in aeromedical research, as well as education and consultation for the Aerospace Medicine Enterprise.

[191] AEROSPACE PHYSIOLOGY AND MEDICINE AT KING'S COLLEGE LONDON

T. Russomano, D. Gradwell, T.G. Smith and S. Harridge
King's College London, London, United Kingdom

(EDUCATION - TUTORIAL)

The Centre of Human and Aerospace Physiological Sciences (CHAPS) is a cross-disciplinary department of the School of Basic and Medical Biosciences (Faculty of Life Sciences & Medicine), Guy's Campus of King's College London (KCL). It is the largest such grouping within the UK. CHAPS research addresses fundamental questions regarding human physiological function and adaptation in health, disease and aerospace and extreme environments. Its activities focus on 4 overlapping areas: Aerospace and Extreme Environment; Muscle: Form and Function; Movement, Function and Behavior; Respiratory Physiology and Medicine. CHAPS has pioneered the establishment of aerospace medicine as a clinical specialty within the UK, as well as the first aerospace medicine clinic. CHAPS' academic activities are based on integrative and translational research conducted in collaboration with other groups within KCL and King's Health Partners (one of five accredited Academic Health Sciences Centers in England), and externally with partners including the UK Royal Air Force Centre of Aviation Medicine and European Space Agency, which facilitates delivery of both research and post-graduate teaching. The laboratories are equipped with tools for a range of human physiological research (muscle, cardiovascular and metabolic systems) and has the biomedical capability for an array of ground-based analogues of microgravity (e.g., hyper buoyancy floatation) and aerospace conditions (e.g., tilt-table; climatic chamber with hypoxic capability). Our center delivers a unique portfolio of post-graduate programs. Science students can undertake a one-year full-time MSc program in Human & Applied Physiology or Space Physiology & Health. Medical doctors may study for the Diploma in Aviation Medicine (DAvMed) awarded by the Royal College of Occupational Medicine, as well as a KCL Diploma or MSc in Aerospace Medicine. We have PhD students from different countries and our MSc students can undertake their research projects at our international partner institutions. CHAPS is an academic teaching and research center which strives for excellence in the areas of human physiology, aerospace medicine and space physiology. Its portfolio of post-graduate programs is unique and in the most recent evaluation of its research (REF 2014), 82% of its research outputs were judged as world-leading or internationally excellent.

Learning Objectives:

1. To understand the nature and purpose of interdisciplinary academic activities and research in human physiology, space life sciences and aviation medicine.
2. To present the rationale supporting cross-translational physiological and biomedical research and development in the UK academic system.
3. To discuss collaborative efforts related to international collaboration in space life sciences and aviation medicine.

Tuesday, May 08**2:00 PM****Senators****S-041: PANEL: AEROSPACE MEDICINE BOARD REVIEW SERIES #2***Sponsored by ASAMS***Chair: Timothy Burkhart***Annapolis, MD*

PANEL OVERVIEW: The Aerospace Medicine Board Review series will review core topics in Aerospace Medicine and is designed to prepare Aerospace Medicine specialists for the ABPM re-certification exam. Topics are presented in three sessions, adhere to the ABPM Study Guide Outline, and intended to cover its entirety over the course of three consecutive years. Combined with the annual RAM Bowl and Aerospace Medicine Grand Rounds sessions, these board review sessions will address preventive medicine core topics along with core knowledge areas of Aerospace Medicine. This panel will cover essential elements of Health Exposures (vibration), Neoplastic Diseases (epi, screening, prevention), and Aviation Organizations and Functions.

[192] AEROSPACE BOARD EXAM REVIEW - HEALTH EXPOSURES: VIBRATION**A.L. Solis***Naval Aerospace Medical Institute, Navy Medicine Operational Training Center, Pensacola, FL***(EDUCATION - TUTORIAL)**

Health Exposures to the Aerospace community include Vibration and Toxic Exposures, the Aerospace Medical professional should be aware of the health effects of the exposures in order to recognize the symptoms associated with the exposure as well as the mitigation measures in order to provide appropriate care to the aviation personnel.

Learning Objectives:

1. The participant will be able to Define Vibration.
2. The participant will be able to identify disorders caused by Vibration.
3. The participant will be able to describe the operational implications of vibration exposure.

Tuesday, May 08**4:00 PM****Ballroom D****S-042: PANEL: PILOT-PHYSICIANS: WHAT HAVE YOU DONE FOR ME LATELY?***Sponsored by IAMFSP***Chair: Christopher Backus***Joint Base Maguire-Dix-Lakehurst, NJ***Chair: William Smith***Clovis, NM*

PANEL OVERVIEW: The synergy of multidisciplinary problem solving is central to solving complex aeromedical issues. Pilot-physicians are an important component of aerospace medicine teams in both civilian and military settings as they merge two disciplines as pilots and physicians, allowing thorough integration in one person, leading to a deep experiential synergy. Their dual qualifications as both pilots and physicians make them subject matter experts on optimizing human performance in aircraft on which they are qualified to fly, as well as other aircraft with similar mission capabilities. This panel will present case studies that demonstrate unique contributions made by pilot-physicians in both military and civilian organizations. The presentations will demonstrate how pilot-physicians seamlessly integrate with inter-disciplinary teams due to their dual qualifications in both medical and operational environments. The resulting contributions optimize human performance & operational effectiveness and, as a result, make important contributions to the body of knowledge Aerospace Medicine and optimization of Human Performance.

[193] THE USAF PILOT-PHYSICIAN PROGRAM: APPLYING HUMAN SYSTEMS INTEGRATION PRINCIPLES TO OPTIMIZE AIRMAN PERFORMANCE.**W. Mueller***U.S. Air Force, Falls Church, VA***(EDUCATION - CASE STUDY HUMAN PERFORMANCE)**

PROBLEM STATEMENT: This talk will describe how the USAF Pilot-Physician Program helps achieve synergy with other aerospace medicine professionals by applying principles of Human Systems Integration (HSI) to optimize human performance in weapon systems to which they are assigned. **BACKGROUND:** The USAF Pilot-Physician Program is an integral part of the USAF Aerospace Medicine Enterprise and provides dual-rated officers who serve as subject matter experts in the operational missions and weapon systems to which they are assigned. As a result of this blended expertise, pilot-physicians are well-positioned to identify human-centric capability gaps in their respective mission sets. By applying principles of HSI, Pilot-Physicians work with other aerospace medicine professionals, MAJCOM requirement directorates, and the Air Force Acquisition & Sustainment Enterprise to solve these capability gaps and optimize human performance in the