



## **KATHRYN G. HUGHES, M.D., M.P.H., DAvMed CONSULTANT**

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Dr. Hughes is a Consultant at Engineering Systems Inc. (ESi) and a retired US Air Force Colonel. A physician and pilot with 25 years of active duty service, she was one of only 10 Pilot-Physicians in the Air Force. Dr. Hughes has over 3,100 military pilot flight hours primarily in the T-38, RC-135, A-10 and Royal Air Force Hawk. She also has military flight time in 23 other aircraft, 400 hours as a flight surgeon and over 900 civilian hours in a Bonanza Debonair. Throughout her career, she held numerous leadership roles in the Air Force Medical Service to include Chief of Aerospace Medicine, Command of a 107-member Squadron and most recently as Director of the Human Systems Integration Directorate where she was responsible for ensuring human-centric design criteria were included in the acquisition of new Air Force systems. Dr. Hughes is dual board-certified in Aerospace and Occupational Medicine through the American Board of Preventive Medicine, and specializes in Human Factors, Human Performance and Human Systems Integration. Additionally, she has experience in aircraft mishap investigation including the evaluation of pathology, toxicology, and human performance in accident investigation.

Dr. Hughes' experience includes the evaluation of a wide range of medical and human factors issues in aviation, including physical standards, fatigue, perception, medication use, visual impairment, obstructive sleep apnea, substance dependence, injury analysis, egress and evacuation concerns, ergonomics, and the effects of pre-existing disease on operator performance. Work specific to aviation has included investigations of G-induced loss of consciousness, hypoxia, spatial disorientation, and visual and vestibular illusions. She also has analyzed human performance and man-machine interface in aviation developmental/operational test and evaluation. Dr. Hughes currently practices aviation and occupational medicine and has been a Federal Aviation Administration Aviation Medical Examiner since 2001.

### **Areas of Specialization**

- Aviation Medicine
- Medical Standards
- Human Factors and Ergonomics
- Human Systems Integration
- Accident Investigation
- Occupational Medicine
- Aerospace Physiology
- Human Performance (HP)
- Life Support Equipment
- Test Flight HP Risk Mitigation

### **Education**

Certificate in Human Systems Integration, Naval Postgraduate School, 2015  
M.P.H., Health Management and Policy, University of Michigan, School of Public Health, 2009

*January 2021*



Diploma in Aviation Medicine, Kings College London, Royal College of Physicians, 2007  
M.D., University of Nebraska Medical Center, 1999  
B.S., Biology/Minor, Arabic, U.S. Air Force Academy, 1988

### **Medical Certification**

Ohio Medical Licensure since 2000, Idaho Medical Licensure since 2020 (both current)  
Federal Aviation Administration Aviation Medical Examiner, 2001 to present. Senior AME granted 2018  
Board Certification in Aerospace Medicine, 2010  
Board Certification in Occupational Medicine, 2011  
Certification, Aerospace Physiology Association, 2014  
Department of Transportation Medical Review Officer, 2017  
Federal Motor Carrier Safety Administration Certified Medical Examiner, 2017

### **Flight Experience**

Over 4,300 flying hours as a pilot/flight surgeon in 27 military and civilian aircraft  
Military Pilot – 3,100 hours primarily in the T-38A, RC-135, A-10 and British Aerospace Hawk  
Flight Surgeon – 400 hours in primarily the C-17, UH-60, T-38C, F-16, F-15  
Civilian Pilot – 900 hours in a Bonanza Debonair  
FAA Commercial, multi-engine, instrument-rated pilot; Single-engine CFI  
Beechcraft Bonanza Debonair owner for 23 years  
Hawk Qualification Training, Royal Air Force Valley UK (2005)  
A-10 Qualification Training, Davis-Monthan AFB AZ (2002)  
Introduction to Fighter Fundamentals (IFF), Sheppard AFB TX (2002)  
KC-135 Aircraft Commander Training, Castle AFB CA (1993)  
T-38 Pilot Instructor Training, Class 90-07, Randolph AFB TX  
Undergraduate Pilot Training: Class 90-03, Laughlin AFB TX

### **Additional Training**

Current – Basic Life Support, Advanced Cardiac Life Support  
USAF Occupational Medicine Course, Brooks Air Force Base TX (2011)  
Public Health Emergency Officer Course (2011)  
SCUBA Certification (Professional Association of Diving Instructors) (2011)  
Uniformed Services Univ. of Health Sciences Tropical Med Course/Field Trip to Honduras (2010)  
USAF Aircraft Mishap Investigation Course, Brooks Air Force Base TX (2009)  
Night Vision Goggle Instructor Course, Luke Air Force Base AZ (2002)  
Global Medicine, Brooks Air Force Base TX (2001)  
Combat Casualty Care Course, Camp Bullis TX (2000)  
Aerospace Medicine Primary Course, Brooks Air Force Base TX (1999)

## **Professional Affiliations**

### **Aerospace Medical Association**

Executive Committee Member, Council Member-at-Large and Fellow  
International Association of Military Flight Surgeon Pilots, Past President  
Constituent organization member in: Aerospace Physiology Association, Human Factors Association, Space Medicine Association

### **National Aviation Hall of Fame**

Board of Trustees, Executive Committee Member

### **Royale Aeronautical Society**

Fellow

### **International Academy of Aviation and Space Medicine**

Member

### **Society of USAF Flight Surgeons**

Council Member-at-Large

### **American Society of Safety Engineers**

Member

### **Woman Military Aviators**

**Order of Daedalians, Fraternity of Military Pilots**

**American Bonanza Society**

**99's: International Organization of Women Pilots**

**Experimental Aircraft Association**

## **Professional Honors**

Distinguished Graduate - Squadron Officer's School

Aerial Achievement Medal, Meritorious Service Medal, Commendation Medal, Achievement Medal, National Defense Service Ribbon, North Atlantic Treaty Organization Medal, Humanitarian Medal, UN Medal

Air Force Health Profession Scholarship Award (1995)

Victoria Hooper Scholarship (1996)

University of Nebraska Medical Center Student Leader Scholarship (1997)

1996 Alpha Omega Alpha Student Research Fellowship

University of Nebraska Medical Center Class President (1995-1999)

Medical Corps Officer of the Year, 366th Medical Group (2001)

Air Combat Command Flight Surgeon of the Year (2001)

Bronze Team Award, Royal Aeronautical Society (2006)

Aerospace Medical Association Harry G. Moseley Award (2009)



Aerospace Medical Association Julian Ward Award (2011)  
Military Health System Female Physician Leadership Award, Air Force Category (2012)

## **Positions Held**

### **Engineering Systems Inc.**

Consultant, 2016 – Present, Norcross, GA

### **Human Systems Integration Directorate, 711th Human Performance Wing**

Director, 2014 – 2016, Wright-Patterson Air Force Base, Ohio

Led Executive Agency for Human Systems Integration for the Line of the Air Force and Air Force Medical Service

Responsible for optimizing warfighter capability through an Airman-centric approach to system development, sustainment and enhancement

### **Aerospace Medicine Branch, HQ Air Force Reserve Command**

Chief, 2013 – 2014, Robins Air Force Base, Georgia

Command authority on flying waivers, medical standards, medical readiness for 71,000 Reservists

Aerospace Medicine Functional Assessment Manager for 60 bases; Policy development and Implementation

### **412th Aerospace Medicine Squadron, Chief of Aerospace Medicine**

Commander, 2011 – 2013, Edwards Air Force Base, California

Commanded 107-member squadron, executed medical readiness, occupational and aerospace medicine, industrial hygiene, public health, dental and optometry services for > 12,000 base personnel

Delivered medical, physiology, human performance, health/safety support for the 412th Test Wing Developmental/Operational Test & Evaluation mission (F-35/F-22/F-16/B-1/B-2/B-52/C-17/Global Hawk)

Oversaw medical surveillance, physiologic data collection for F-22 On-Board Oxygen Generation System hypoxia-like event investigation

### **Graduate School, Residency in Aerospace/Occupational Medicine**

2008 – 2011, University of Michigan School of Public Health, Brooks City-Base, Texas

### **United Kingdom Royal Air Force Centre of Aviation Medicine**

Senior Medical Officer/Pilot, 2005 – 2008, Royal Air Force Station, Henlow, United Kingdom

Staff Physician, Lakenheath Air Base, United Kingdom

Command/safety pilot, test subject for research and development of existing and new life support equipment

Executed flight trials for helmets, helmet-mounted displays, G-Suits, oxygen regulators for Typhoon, F-35, Hawk

Conducted analysis of G-induced Loss of Consciousness (GLOC) mishaps, full coverage G-suit technology; led to full coverage implementation in US Air Force F-16 fleet

**Idaho Air National Guard**

A-10 Pilot-Physician, Chief of Aerospace Medicine, 2002 – 2005, Boise, Idaho  
2-Ship Flight Lead; A-10 human factors expert (cockpit ergonomics, controlled flight into terrain mishap reduction, night vision goggles instructor)

**366th Aerospace Medicine Squadron**

Flight Surgeon, 2000 – 2002, Mountain Home Air Force Base, Idaho

**Medical School, Surgical Internship**

1995 – 2000, University of Nebraska Medical School, Wright-Patterson Air Force Base, Ohio

**38<sup>th</sup> Reconnaissance Squadron**

RC-135 Reconnaissance Pilot/Evaluator Pilot, 1993 – 1995, Offutt Air Force Base, Nebraska

**87<sup>th</sup> Flying Squadron, ACE Detachment**

T-38 Instructor Pilot, 1989 – 1993, Laughlin Air Force Base, Offutt Air Force Base

**Publications and Selected Presentations**

Cornish KG, Hughes KG, Dressen A, Olguin M: Head-out Immersion in the Non-Human Primate: A Model of Cardiovascular Deconditioning During  $\mu$ G. *Aviation, Space and Environmental Medicine* 1999; 70(8):773-779

Royal Air Force Centre of Aviation Medicine Report 10/2008 Flight Assessment of Hearing Protection Methods in the RAF CAM Hawk Mk1 Aircraft

Gore RK, Hughes KG. Fighter Surface Attack on Night Vision Goggles (NVGs) During Dusk and Dawn: Human Factors, Challenges, and Performance Enhancement. *Aviation, Space and Environmental Medicine* 2008; 79(3)

Holland DA, Boyd F, Culbreth S, Hughes KG, Simmons MD. F-22 Raptor G-Suit Acceptability and Effectiveness Survey. *Aviation, Space and Environmental Medicine* 2009; 78(3)

Royal Air Force Centre of Aviation Medicine Report 02/2009 Flight Assessment of Aircrew Urination Relief Devices for Ejection Seat Equipped Platforms with Single, Tandem or Side-by-Side Cockpits

Simmons MD, Culbreth S, Holland DA, Hughes KG, Boyd F. The Operational Assessment of Two Full Coverage Anti-G Suits in Air Combat Command (ACC) F-15C and F-16 Aircraft. *Aviation, Space and Environmental Medicine* 2010; 81(3)

Hughes KG: You're the (ANG) Flight Surgeon – Aortic Insufficiency. Aviation, Space and Environmental Medicine 2011; 82:1082-3

Hughes KG: USAF GLOC Rates Following the Implementation of Full-Coverage G-Suits, Av Sp Env Med 2014; 85(3)

Hughes KG: Life Support Equipment Development in the US Air Force, Av Sp Env Med 2017; 88(3)

Hughes KG: Pilot's Bill of Rights 2: Intended and Unintended Consequences. Presentation to the Chicago Bar Association, 7 Jun 2017

Hughes KG, Roberts SD: In the Neck of Time, Martin-Baker Aircraft Company Ejection Seat Testing for the F-35. Presentation to the The Society of Experimental Test Pilots, Annual Symposium, Anaheim CA, 21 Sep 2017.

Hughes KG: Human Performance Optimization in Military Aviation. The Mayo Clinic J. Richard Hickman Lectureship, Rochester, MN, 26 Oct 2018.

Hughes KG: Aerospace Physiology Testing. Presentation of The Society of Experimental Test Pilots, Great Lakes Symposium, Dayton OH, 16 May 2019.

Hughes KG: Ejection Seats and Flight Safety Issues. Presentation to the 7<sup>th</sup> AMST Users Congress, Debrechen, Hungary, 14 Sep 2019.

Hughes KG, Bilger C, Lewis, M: Ejection-Associated Injuries: A Retrospective Study for the Evaluation of Modern Escape Systems Safety. Presentation to the 57<sup>th</sup> Annual SAFE Symposium, Reno, NV. 15 Oct 2019.

## **Safety Investigation Board Experience**

Safety Investigation Board – Medical Member (Nov-Dec 2000)

Class A mishap, F-16CG S/N 89-2104 and Cessna 172, N73829 mid-air with one civilian fatality

Safety Investigation Board – Medical Member (Jun-Jul 2004)

Class A mishap, A-10A turbine blade failure, subsequent engine fire and aircraft damage

Safety Investigation Board – Medical Member (Aug 2011)

Class B mishap, F-35 Integrated Power Plant failure resulting in ground engine fire

Safety Investigation Board – Medical Member (Mar-Apr 2012)

Class B mishap, F-35 Hypoxia symptoms following engine bleed failure, Integrated Power Plant shutdown and cabin depressurization



Safety Investigation Board – Medical Member (Jul 2013)

Class C mishap, Ground mishap, inadvertent discharge of fire suppression system in hangar

Instructor, Aircraft Mishap Investigation and Prevention Course, Brooks City-Base TX (2010-2011)

Taught flight surgeons and aerospace physiologists human factors analysis, investigation techniques and conducted reviews of USAF mishap events