

CALLBACK

From NASA's Aviation Safety Reporting System



Special Edition

2011

ASRS FOUNDER REMEMBERED: DR. CHARLES E. BILLINGS

(JUNE 15, 1929 - AUGUST 30, 2010)

Over a year ago, on August 30, 2010, the ASRS program, NASA Ames Research Center and all who fly, lost a friend and aviation icon when Dr. Charles E. Billings died in Columbus, Ohio.



*Dr. Charles E. Billings,
USAF Flight Surgeon*

Dr. Billings was one of the founders of the ASRS program and an early pioneer of human-centered cockpit automation.

He began in aviation as a flight surgeon and specialist in aviation medicine then became an influential and distinguished NASA expert in aviation

human factors with more than 80 professional publications. In his late career he was a lecturer, aviation consultant and researcher in cognitive systems engineering and human factors for Ohio State University (OSU).

Born in Boston, Massachusetts on June 15, 1929, Charles Billings attended the Eastman School of Music in Rochester, New York and then transferred to Wesleyan University in Middletown, Connecticut to complete his undergraduate degree. He received his Doctor of Medicine degree from Manhattan's New York University and later a Master of Science degree from Ohio State University.

Charles Billings attended the USAF School of Aviation Medicine and after completing medical studies, was assigned as a squadron Flight Surgeon for a Fighter Interceptor Wing based in England. He was joined at RAF Manston by his wife and lifelong partner, Lillian. The tour of duty in England was the beginning of a career devoted to aviation medicine and the

introduction to his "off-duty" interest in breeding and judging Whippet sighthounds.

After discharge from the Air Force, he finished his medical residency at Mary Fletcher Hospital in Burlington, Vermont. In 1958 he began graduate training in aviation and occupational medicine at OSU and taught there for the next 15 years.

AN ARCHITECT OF THE ASRS PROGRAM

In 1973 Dr. Billings joined NASA Ames Research Center at Moffett Field, California as a medical research officer. During his 19 years at Ames, he served as Chief of the Aviation Systems Research Office and later, Senior Scientist of the Aviation Human Factors Research Division. He was selected as an Ames Research Center Fellow before his retirement from NASA in 1992.



*Dr. Charles E. Billings,
NASA Ames Chief Scientist.*

In the early 1970's, NASA Ames researchers were at the forefront of those attempting to identify the human factors underlying aircraft accidents. This group included Dr. Billings, a pilot and flight surgeon; Dr. John Lauber, a pilot and aviation psychologist; Gene Lyman, a NASA HQ manager; and NASA Ames research pilot George Cooper, the author of the "Cooper Harper Rating Scale for Aircraft Handling Qualities." Additionally, Dr. Billings, Dr. Lauber, and G. Cooper were contributors to cockpit resource management practices.

The crash of TWA Flight 514 on December 1, 1974 on its approach to Dulles airport, and the loss of all lives onboard, became a catalyst for linking the influential NASA Ames human factors research with a proposed voluntary, confidential, aviation incident reporting program. Following a period of industry-wide comment, the FAA agreed to fund a new program that would be administered by NASA as a respected third party.

Dr. Billings was the architect of the NASA Aviation Safety Reporting System (ASRS) which became operational in April 1976. Truly the father of ASRS, Dr. Billings conceived the essential details of the program in its entirety and did it so well that it has remained essentially unchanged for more than three decades.

Direction of the program initially fell to Dr. Billings, but soon after, William (Bill) Reynard, a pilot and aviation lawyer, became the first NASA ASRS Director.

DR. BILLINGS AND *CALLBACK*

In 1978 the ASRS Advisory Committee recommended that a regular means of communication be established between the ASRS program and its potential aviation users. Subsequently, Captain Rex Hardy was assigned the task of creating a monthly safety bulletin and prepared the first issue of *CALLBACK* in July 1979. He submitted the bulletin to Dr. Billings who approved publication. Rex observed many years later:

“Letters of approbation soon began to arrive from readers...CALLBACK had apparently hit the spot, justifying Dr. Billings’ confidence.”

AVIATION AUTOMATION

By the early 1980’s, the buzz-word “automation” was heard throughout the airline industry. An industry-wide transition to Advanced Technology aircraft was underway, driven by innovations in cockpit technology, pressures to reduce airline operating costs and efforts to reduce flight crew workload (and crew size).

As with later aviation technology transitions, ASRS reports became a barometer of how the new technology introduction was going. While many pilots liked the labor- and fuel-saving capabilities of advanced aircraft, some expressed concern over interactions with the Air Traffic Control system and pilot monitoring of the new automated systems.

Dr. Billings and NASA human factors colleagues had access to the rich human factors data provided by ASRS reports. Their challenge was to describe the

circumstances under which tasks were appropriately allocated to the machine and/or to the pilot.

In October 1989, Dr. Billings and Dr. Curtis Graeber of NASA Ames presented the main principles of “human-centered automation” to an Aviation Safety/Automation Program Conference.

FLIGHT CREW FATIGUE

Dr. Billings was a valued advocate and advisor for the flight crew fatigue and jet lag research program at NASA. Much of the success of the program was due to his wise counsel and tireless support at NASA Headquarters and with the airlines, both domestic and international. The ultimate impact of that effort was the Fatigue Risk Management Systems (FRMS) Standards and Recommended Practices approved by the International Civil Aviation Organization (ICAO) in June 2011.

A LASTING AVIATION LEGACY

Dr. Charles Billings retired from NASA Ames Research Center in 1992, but continued his career as an aviation consultant, lecturer, and researcher. As a Visiting Lecturer, he offered his special talents internationally at prestigious institutions in the United States, Canada, England, New Zealand and Australia.

In 2009 he presented his lecture, *Aviation Medicine Research: An Unending Adventure*, to members of the Royal Aeronautical Society, at the 40th Annual Stewart Memorial Lecture, in London, England.

Dr. Billings’ many honors included being named President of the Aerospace Medical Association, Fellow of the Royal Aeronautical Society, and a two-time NASA Leadership Award designee.

His friends at NASA and ASRS and many international admirers, honor and remember Dr. Charles E. Billings as the pilot physician who helped the ASRS succeed in its formative years and left an enduring human factors legacy.

Editor’s Note: *The Editor (Don Purdy) acknowledges with gratitude the following resources for this article: Dr. Curt Graeber, Dr. John Lauber, Ms. Linda Connell (NASA ASRS Director), Dr. Rowena Morrison (previous CALLBACK Editor), Dr. Glenn Bugos, Lee Ellen and Dean Kreinbihl, the Billings’ daughter and son-in-law, and Rex Hardy’s CALLBACK (Washington, DC: Smithsonian Institution Press, 1990).*

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