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# USAF PILOT/PHYSICIAN PROGRAM: HISTORY, CURRENT PROGRAM, AND PROPOSALS FOR THE FUTURE

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This report has been reviewed and is approved for publication.

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Pilot-physicians have existed since the very beginnings of aviation. Even though they were not a recognized or formal group of individuals until after World War I, they have made great contributions to the general knowledge of aviation physiology and human factors. They have been able to communicate with both the line and the medical corps through their knowledge of both languages. This paper presents the history of pilot-physicians from their beginning through to the present. It outlines for the pilot-physician program the goals and objectives, selection process, and program outline. It documents accomplishments and outlines career progression of pilot-physicians who were located and sent questionnaires. And finally, it summarizes the possible future direction of the program through the eyes of its participants.

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# THE USAF PILOT-PHYSICIAN PROGRAM: HISTORY, CURRENT PROGRAM, AND PROPOSALS FOR THE FUTURE

## INTRODUCTION

Pilot-physicians have existed since the very beginnings of aviation. Even though they were not a recognized or formal group of individuals until after World War I, they have made great contributions to the general knowledge of aviation physiology and human factors. They have been able to communicate on aeromedical issues with both the line and the medical corps better than the non-pilot-physician through their knowledge of both languages. This paper presents the history of pilot-physicians from their beginning through to the present. It outlines for the pilot-physician program the goals and objectives, selection process, and program outline. It documents accomplishments and outlines career progression of pilot-physicians who were located and sent questionnaires. And finally, it summarizes the possible future direction of the program through the eyes of its participants.

## ORIGINS THROUGH THE BEGINNINGS OF USAF

The original pilot-physician might have been an American physician named John Jeffries who made the first scientific flight over England to study the atmosphere. He was accompanied by a French balloonist, Jean-Pierre Blanchard, as navigator. On November 13, 1784, Dr. Jeffries ascended over London with a barometer, a thermometer, an electrometer, a hydrometer, and several vials for air samples. The barometer documented an ascent to 9250 feet, and the thermometer documented the expected temperature drop by today's standards. The hydrometer and electrometer showed little change. Dr. Jeffries, a native of Boston and a graduate of Harvard, studied medicine in England and Scotland, but returned to Boston to practice. During the American Revolution Jeffries was a British Loyalist and served as a surgeon on a British warship. It was during his postwar years in London that he heard of balloon flights. Jeffries' other accomplishments include being the first air mail carrier by dropping a note to a friend while aloft, being the first balloonist to accomplish an overseas crossing by floating over the English Channel into France, and being the first to publish accounts of these flights and his experiments, in the first book written on aeronautics titled Narrative of Aerial Voyages.

Though other physicians may have flown during these early times of balloons, they probably flew for recreational purposes since no professional accounts are available today. It was not until 1903, with the flight of the Wright brothers' airplane at Kitty Hawk, North Carolina, that practical aviation became a reality.

An Italian medical officer, Lieutenant Luigi Falchi, was the first known military pilot/physician of heavier-than-air aircraft. In an expedition against Libya in 1911 he acted primarily as a pilot and was awarded the Bronze Medal of Military Valor. Even though Lieutenant Falchi was not credited with any medical activities, it was during this time that "staleness" was described in aviators. It most likely represented chronic carbon monoxide poisoning due to the short vertical exhaust stacks of the engine which were directly in line with the cockpit, even though other causes such as "chronic anoxia" or "war neurosis" were given. "Fainting in the air" was also described and most likely represented the earliest episodes of G-induced loss of consciousness (GLOC). It was a frequent attributable cause of many aircraft accidents during this time. These descriptions of the effects of flight could be one of the earliest occurrences of man-machine interface problems being described from the field by a pilot/physician with the benefit of knowledge of both human physiology and aviation. Lieutenant Falchi also used his knowledge of public health to assist his commander to select a site for his unit's airfield. During this

campaign he was forced to relieve his commander because of "fever" and may have initiated treatment Lieutenant Falchi's medical knowledge while deployed foretold some of the future roles of flight surgeons

The technology of aviation progressed without the concept of flight medicine until just prior to World War I The description of the flight surgeon was an American innovation as outlined by several young medical corps physicians studying in Europe on allied medical facilities The flight surgeon is a medical officer attached to flying units with the special duty of monitoring the health and physical fitness of aircrew, serving beside them in the capacity of a friend and trusted advisor, and flying with them to understand the flyer's job. The flight surgeon was specifically assigned to the flying unit as an assistant and advisor to the commander. To understand the aviation-specific terminology, the flight surgeon was designated to fly eitner as a passenger or aviator. This philosophy is as appropriate today as it was in World War I, and the concept of the pilot-physician is a direct extension of this philosophy. The first school to specially train flight surgeons in the United States was established at the Medical Research Laboratory at Hazelhurst Field on Long Island in 1918. In 1926, the school, then called the School of Aviation Medicine, was moved to Brooks Field, and later, in 1931, it was moved to Randolph Field, both in San Antonio, Texas.

During World War I, Major Ralph N. Greene was the first U.S. Army medical officer known to have received orders as a military aviator; he was a neuropsychiatrist from Florida who had served on the Mexican border as part of the Third Aero Squadron. Little is known of his contributions as a pilot/physician, but he later became one of the first civilian flight-medical examiners and the second president of the new Aero Medical Association, later to become the Aerospace Medical Association, replacing Dr. Louis Bauer

Other nations also had productive pilot physicians during this early era of aviation. One of these, H. Graeme Anderson, Surgeon Lieutenant, British Royal Navy, was a pilot/physician during and after World War I. He researched and documented crashes occurring during six months of flying at a training base in England. He called attention to the frequency with which the head and face were injured by striking the instrument panel and the likelihood that a crash in an aircraft with a pusher engine would kill its pilot due to crush injuries the pilot sustained as the engine moved forward in the airplane during deceleration from impact. In the tractor-type aircraft the front cockpit was demolished when the engine was pushed back in a crash and the rear cockpit remained intact. Through this crash analysis he documented the value and need for the safety belt in aircraft. From his own experience, Anderson recommended flight surgeons fly to the scene of accidents to assist in "cutting" the aircraft away from the pilot, rather than dragging the pilot away from the aircraft, to prevent worsening of injuries sustained during the crash unless, of course, the aircraft was burning. He was one of the first to document the typical injuries and fractures of the bones of the foot and ankle sustained during a crash as a result of the rudder bar design. He wrote one of the classic aeromedical texts, The Medical and Surgical Aspects of Aviation.

After World War I, most of the aviators and physicians trained in aviation medicine returned to civilian practice. The Army foresaw no difficulty in replacing pilots, but, in order to replace the separating flight surgeons, the Surgeon General published a letter on April 25, 1919 requesting volunteers from among the current medical officers to serve as flight surgeons. Inducements included an opportunity to become pilots themselves, with a 25% bonus in salary as flight pay Even though this was more of a recruiting effort than a formal initiation of a productive program, it represents the first documented origins of pilot-physicians from the Surgeon General. It was through this program that two of the early pilot physicians, Captain Charles V. Hart and Captain Alexander Mileau, were trained and stationed at Brooks Field with duties including both flight medicine instruction and aviation. It also represents a philosophical change of providing the flight surgeon an extra incentive to stay on active duty rather than an opportunity to enhance his credentials as a flight surgeon. The earliest pilot-physicians were aviators motivated only by their own desire to fly rather than by extra compensation.

After the move of the School of Aviation Medicine to Randolph Field in 1931, it was still possible for young flight surgeons to undergo pilot training, but it was a rare occurrence. It was very informal, and of those who took part, only a few actually soloed. This trend continued until World War II when, due to the severe need for combat pilots, all flight surgeon aviation training was cancelled. The war spelled the end of the pre-Air Force pilot/physician program except for those physicians who wished to serve as pilots only and not be assigned to the medical corps.

## AFTER FORMATION OF USAF

Dr. Harry G. Armstrong, who became Surgeon General of the USAF in 1949, and who wrote Principles and Practice of Aviation Medicine, one of the definitive texts of aviation medicine, is probably the father of the modern pilot-physician program in the USAF. As early as 1946, he considered placing physicians back in the cockpit as pilots. This goal stems from his long-term belief that one must participate in activities firsthand to fully understand the associated risks and problems. Throughout World War II, aircraft were continuously developed to be faster and more maneuverable; they were also more stressful to the pilots. With the dawn of the jet age, Dr. Armstrong decided to train several physicians as pilots to help solve physiological and psychological problems associated with the new technology.

Two officers of the medical corps, Captains Burt Rowen and Randall W. Briggs, graduated from undergraduate pilot training in Class 48B as a direct result of the influence of the Commander of the School of Aviation Medicine, Colonel Harry Armstrong. Dr. Rowen went on to fly fighter-type aircraft and Dr. Briggs flew heavy aircraft, initially the B-29. They were both line pilots during their first assignment to learn their new professions in aviation.

Dr. Armstrong directed the pilot-physician program personally, and continued to support the program after he became Surgeon General of the Air Force. During the early years, individuals were identified as prospective pilot-physicians by recommendation to the Surgeon General, and trained after approval by the USAF Director of Operations. Follow-on assignments, after the first assignment of line flying, included assignments at the School of Aviation Medicine as an instructor, research at the Aeromedical Laboratory (renamed the Air Force Systems Command Special Projects Office), operational flight test, and command.

The program was loosely organized until, in January 1954, the Surgeon General decided to formalize it by regulation. In May 1954, the Director of Military Personnel authorized 25 positions for pilot-physicians, delegating the authority to manage assignments and utilization to the USAF Surgeon General. There were only five actively participating pilot-physicians at this time even though there were 28 physicians identified by the USAF Military Personnel Center (MPC) who had prior aviation experience on active duty.

The goals and objectives of the pilot-physician program were as pertinent then as they are now, and remain essentially unchanged. One of the ultimate goals always is improved flight safety. The pilot-physician, properly trained in human factors, can help identify and assist in correcting man-machine interface problems that arise either operationally, or in flight test and evaluation. Multiple programs consider human factors from different perspectives: aerospace medicine, aerospace physiology, flight safety, flight test, and research and development. Even though these programs each provide essential information, frequently integration and cross communication are lacking. The pilot-physician is uniquely qualified to identify, evaluate, and integrate information from the various factors affecting the pilots' ability to interface with the aircraft and weapons systems. Through these inputs there is an extra margin of safety which often helps save lives and equipment. The pilot-physician should serve as the ultimate interface between the line and the health professionals. As a pilot, the pilot-physician is a member of a rather

exclusive group of professionals who speak a very different "language" than health professionals. Speaking both "languages," although not a quantifiable benefit, enhances rapport and cross-communication between the line and the medical corps. By virtue of the expertise gained in both aviation and medicine, the pilot-physician can make special contributions in other areas such as flying safety programs, aircraft accident investigations, inflight medical evaluations, and education.

Even though the program was formalized in 1954, there were no specified positions which required a pilot-physician. They were assigned along with all other flight surgeons on a best qualified basis, which is still the method of assignment today. Several positions, however, were listed as desirable locations where pilot-physicians may be very beneficial. This listing has changed over the years and a current list is in Appendix A.

Pilot-physicians, prior to World War II, were initially physicians who went into pilot training for their flight training. After the war there were some pilots who had subsequently completed their medical education. These applicants were requalified as pilots and placed on dual status as a less expensive means of recruiting pilot-physicians. However, by 1964, even though there were 20 physicians actively participating in the program, they had been trained during World War II; the majority was over 40 years of age. To correct the problems of increasing age and attrition, the Air Staff allocated two pilot training slots per year for qualified and highly motivated young flight surgeons. These dedicated pilot training slots were developed by MGen. R. L. Bohannon, then the USAF Surgeon General, with the idea that with the development of the US Space Program, a requirement for new pilot-physicians for the USAF Manned Orbiting Lab would exist. The new pilot-physicians trained under this new program and then served a two-year commitment as a line pilot before returning to medical duties. By 1968, there were 16 active pilot-physicians, six of whom had been trained in this new program.

By 1969, the Manned Orbiting Laboratory was cancelled and with it the justification to train physicians as pilots. There were still a number of physicians in the Air Force who had been prior pilots and it was thought that these physicians could be recruited to fulfill the pilot-physician needs of the future, thus saving money and reserving the reduced number of available pilot training slots for future line pilots. BGen. Edgar R. Anderson, now SAC/SG, graduated from pilot training in 1970 and was the last of eight physicians to become a pilot under this program.

A detailed review of the pilot-physician program was accomplished in 1974 in conjunction with implementation of the new Aviation Career Incentive Act. The program was revalidated in light of the programmed development of new high performance fighter aircraft and weapons systems. The request by the USAF Surgeon General, MGen. Robert A. Patterson, himself a pilot-physician, for authorization of eight active pilot-physicians was approved in January 1975, by MGen. Moore, USAF Director of Operations. The pilot-physician program continued under the new Aviation Career Incentive Act, Air Force Regulation (AFR) 60-1, Flight Management, para 2-7, and AFR 35-13, Aviation Service, Aeronautical Ratings and Badges, para 2-11g (now AFR 60-13, para 3-8d and para 3-10f). These regulations are still in effect. The request for active pilot-physicians was dropped to eight because of the soaring cost of training and the reduced number of flying hours available after the end of the Southeast Asia conflict.

In reviews for the Air Staff in both 1978 and 1984, the pilot-physician program was noted to be a small, but valuable resource to the Air Force. The active force of pilot-physicians was again beginning to age, and it was determined that the best source of recruits was the active force of physicians who also had pilot ratings. Of these, only captains and majors should be recruited to allow sufficient retainability.

Currently, pilot-physicians are assigned to recently developed aircraft. They are assigned to these aircraft because, for the first time in the history of aviation, the human is the limiting factor in performance of these new fighters. Pilot-physicians help identify and solve human factors issues

associated with these new aircraft. Each pilot-physician must submit an annual report to the major command surgeons; the report is then forwarded to the Air Staff (Appendix B). These reports are summarized, then redistributed to all pilot-physicians to assist in cross-communication. In this report, trends in human factors problems in the respective aircraft are identified to include summaries of episodes of G-induced loss of consciousness, spatial disorientation, hypoxia, and others. Also, summaries of papers and lectures are documented. New tactics and other aspects of the individual aircraft with aeromedical implications are identified from the perspective of both pilots and flight surgeons. BGen DeHart has been the designated director of the program through 1989 by the USAF Surgeon General.

The U.S. Navy and several allied air forces also have active pilot-physician programs. The Navy's program has continued for over 40 years and employs the pilot physicians primarily in research, development, test, and evaluation (RDT&E), and in training squadrons as both pilots and flight surgeons. One pilot-physician is currently assigned to the National Aeronautics and Space Administration (NASA) as an astronaut, mission specialist. The Canadians, Germans, British, and other nations also have active and productive programs. In addition, the USAF and British Royal Air Force have a pilot-physician exchange at Farnborough, U.K., to conduct inflight test and evaluation of prototype life support equipment such as flash blindness protection visors, pressure breathing under high-G, liquid cooled coveralls, chemical defense equipment, and others.

## CURRENT PILOT-PHYSICIAN PROGRAM

Duties and responsibilities of the pilot-physician include those of flight surgeon and pilot. In addition, the pilot-physician is the operational human factors specialist for the respective weapons system, and advisor for aircrew standards to the major command surgeons and the chiefs of aerospace medicine. The pilot-physician serves as medical and human factors consultant for accident investigations involving the assigned aircraft. Every mishap board does not have to be attended, but the appropriate pilot-physician should always be available, if needed. The pilot-physician has the training and experience to be able to speak the correct language of line pilots, to teach them human factors as they may be encountered, and to provide expert advice on how to deal with physiologic problems that may develop in flight. Examples might include chemical warfare defense, G-tolerance, disorientation and its etiologies, desensitization training for airsick aircrew, etc. In addition, all flight surgeons should be provided orientation flights and continuation training associated with the weapons system.

The pilot-physician, by definition, must fill two roles: pilot and flight surgeon. Medical competence must be maintained since it is medical expertise which sets the pilot-physician off from other pilots and since credibility in the medical community is essential to success. Currency in all mission aspects of the assigned aircraft must be maintained, even though the pilot-physician is not a combat resource. Proper utilization of the pilot-physician, however, should make him an effective force multiplier for existing combat resources. This combination should produce an individual who, by drawing on both flying and medical skills, can synthesize solutions to man-machine interface limitations. The ratio of time required to maintain proficiency in each role should be about 50:50 to 60:40, slightly in favor of flight medicine depending on the individual and assignment. A listing of prior and active duty U.S. Army and Air Force pilot-physicians is presented in Appendix C. The current status of active duty pilot physicians is presented in Appendix D.

Recruitment of pilot-physicians has been accomplished by drawing from former pilots who subsequently became physicians rather than training physicians to become pilots. The cost of training a pilot to be a physician is much less than the cost of training a physician to be a pilot. Pilots frequently enter various medical schools, including the Uniformed Services University of Health Sciences (USUHS), to further their careers, and are a ready pool of prospective pilot-physicians to choose from. In addition, risk is

less with a previously trained pilot sent to medical school A physician sent to pilot training has not demonstrated his flying abilities and may not be a good "stick"

Beyond this, qualifications for selection as a pilot-physician must be based on common sense The prospective pilot-physician must be both a competent physician and a good pilot Currently, there is no dual rated pilot-physician program in heavy aircraft, although BGen Anderson, SAC/SG, is trying to start one. If this program materializes, former fighter pilots would continue in fighter aircraft and TTB (tanker transport, bomber) pilots would continue in heavy aircraft This assignment continuity would also apply to rotary wing aircraft. Past selection has been based on individual merit, but attributes of future selectees should include three years operational experience and 750 hours flying time for fighter pilots, or aircraft commander status and three years experience for heavy pilots Other measures to help evaluate prospective pilot-physicians include career goals in aerospace medicine, commitment to more than one tour as a pilot-physician, and general maturity

The pilot-physician must meet flight surgeon qualifications and credentialling procedures and must maintain a flying Class II physical Additional training should be attended in accident investigation available at Norton AFB, CA, and in human factors, being developed at USUHS The program is now attempting to recruit prior pilots in their early years of medical education Advantages include motivation of the prospective pilot-physician, ability to design the medical education to suit future purposes, attendance at USUHS for military continuity purposes, and the establishment of a "pipeline" to select only the best that apply

One of the most recent revisions of the program includes a formal two-tier assignment system, which was previously in use, but only in the loosest sense The lower tier would be, as it currently is, squadron level flight surgeon duties combined with individual research/operational flying duties Flying should be the sole duty of the new pilot-physician until fully qualified in the weapons system. This includes fighter-lead-in-training in the T-38 at Holloman AFB, NM, Replacement Training Unit (RTU) training at the appropriate training base for the weapons system, and mission qualification training (MQT) at the unit of assignment. Once fully qualified, then medical duties can begin Training in this way should avoid spreading time too thinly between flying and medicine when most of the time must be spent learning the weapons system. Flight safety would otherwise be compromised. In addition, if flying performance is not adequate initially, it will take quite some time to get rid of the "weak stick" reputation Since the pilot-physician program is so small, yet so visible, the reputation of one member colors the reputations of others. Flying performance can be no less than the best.

Recently, upper tier assignments have usually been command oriented, but in the past have included flying duties requiring special training such as flight test or NASA These assignments should require completion of a Residency in Aerospace Medicine (RAM) plus a lower tier assignment An engineering background is recommended for selection to an upper tier research and development (R&D) assignment, but is not required. Test pilot school may also be a consideration for second tier assignment, but this idea is rather controversial, since the pilot-physician may be trained in areas not required There is a short course of flight test education lasting several weeks for those, such as pilot-physicians, who need some education in test ops, but do not need to know how to determine the outer fringes of the aerodynamic spectrum or the minute particulars required for a specific aspect of the radar of a new aircraft system. To be a human factors specialist, a pilot-physician may need only the short course to still be a contributing member of the test team

## EVOLVING PROPOSALS

Career progression would typically follow a command oriented direction in aerospace medicine The first tier assignment occurs after an internship, licensure, flight training and the primary course in aerospace medicine As previously described this would be as a squadron level flight surgeon After completion of the first tier assignment the pilot-physician would attend the RAM course followed by an upper tier assignment as chief of aerospace medicine at base level An alternative to the upper tier assignment described might be an R&D assignment to the life support office at Wright-Patterson AFB, OH or human factors research at Brooks AFB, TX Next would be command responsibilities The rating official should be the same as for other flight surgeons If assigned to a flying squadron, the commander writes the evaluation with a Letter of Evaluation (LOE) attached by the chief of aerospace medicine If assigned to the hospital, either the chief of aerospace medicine or the hospital commander should be the rating official with an LOE attached by the flying squadron commander or the director of operations for the assigned wing Many pilot-physicians would rather the flying unit be responsible for the evaluation since it is the flying unit commander who actually observes and gains from the expertise of the pilot-physician

The pilot-physicians in fighter aircraft should be assigned primarily to operational units to better understand the human factors problems experienced in the more complex mission scenarios compared to those missions in an RTU setting. The pilot-physician must be exposed to the most complicated sorties to properly analyze human stresses and man-machine limitations However, in an RTU setting, the pilot-physician could interact more with the new pilots entering the weapons system This interaction would allow easier dissemination of human factors problems knowledge to new inexperienced pilots and hopefully, prevent associated mishaps through increased awareness It is important to expose new pilots to this training early in their flying careers to insure the development of proper flying habit patterns to help prevent G-induced loss of consciousness, disorientation, and other human factors problems For these reasons, the pilot-physician should be assigned to both operational and to RTU units, but primarily to operational units, if a choice must be made.

The Air Force Specialty Code (AFSC) of the pilot-physician should be 935X with an identifying prefix 'P'. The prefix is necessary for billet authorizations and manpower management A RAM pilot-physician would, then, have the AFSC P9356A The managing agency for coordinating pilot-physician assignments should be the U S Air Force, Chief of Aerospace Medicine (AF/SGPA) The selection of pilot-physicians should be made by a committee consisting of representatives from Air Force Director of Operations (AF/XOO), Air Force, Director of Professional Services (AF/SGP), and several senior pilot-physicians. Recommendations of the board are forwarded to AF/SGP, Air Force, Surgeon General (AF/SG), AF/XOO, and AF/XO, in turn, for approval. A regulation formalizing the program and defining proposed career paths should be developed and coordinated with Air Force Director of Personnel (AF/DP), AF/SG, and AF/XO.

## SURVEY RESULTS

Twenty-three current and former pilot-physicians were located and sent a questionnaire concerning career progression, assignments, current location and employment, accomplishments, and suggestions for future pilot-physicians Of the 23 sent questionnaires, 16 responded. The following represents a summary of those 16 pilot-physicians responding to the questionnaire (Appendix E) Appendix F summarizes responses by each individual pilot-physician It is only a small sample of all pilot-physicians and is probably biased since only those who are interested in the program will have responded There is no statistical analysis because only subjective answers were given to subjective

questions. Despite these deficiencies, the response probably represents a good cross section of accomplishments and opinions of all recent pilot-physicians.

From the questionnaires, several suggestions have surfaced that might be considered for the future program direction. It seems that the operational flying and unit level human factors research appears to be about right. Most program participants feel that research and development and flight test are areas that need to be expanded into. The research could take several forms such as assignments to Wright-Patterson AFB, OH, Brooks AFB, TX, or it could take the form of flight test at Edwards AFB, CA. Whether the pilot-physician assigned to flight test should take the form of a fully trained test pilot or a pilot that contributes to the flight test team after taking the short course is a matter of controversy.

Recent acquisitions to the program suggest that the pilot-physician training in human factors is inadequate when compared to a college graduate with a human factors major. The Residency in Aerospace Medicine currently teaches minimal applied human factors, but it is the only source of human factors now for pilot-physicians. Even though pilot-physicians are the experts in human factors in their particular aircraft, they could still use further training in human factors.

Administrative control of the pilot-physicians has been and still is a source of difficulty with the program. Until a formal regulation is implemented, the program will continue on a day to day basis.

Other future needs of the program identified in the questionnaire include the development of an assignments process, development of more defined career tracks, and improved routes of communication. The assignments available to pilot-physicians should be specifically designed to take advantage of the expertise of the pilot-physician rather than just allow the use of the expertise in spare time as is done now. Developing more specific career tracks would allow better use of the pilot-physician and would also help develop the assignments as described above. Currently, routes of communication are subject to local prejudices. Problems identified and submitted through established communications channels may be softened or altered as they go up the chain due to political reasons, misunderstandings or ignorance of the subject.

Of the 16 pilot-physicians who responded, four are general officers, either active or retired. LGen (ret) Patterson is a former Air Force Surgeon General. Of those no longer in service, all went on to either private practice in occupational medicine, or became corporate medical directors of occupational medicine departments. Nine out of the 16 respondents have published multiple papers. Eight of the nine have published papers particularly requiring their pilot-physician expertise. Essentially all of the respondents have participated in some human factors project or problem identification/solving requiring their pilot-physician abilities while in the Air Force.

## CONCLUSIONS

Pilot-physicians have been involved in aviation from the very beginnings of flight. More recently the program has undergone scrutiny because of the increasing costs of flying. Despite the increasing cost, there is a pilot-physician program because pilot-physicians have made continuous and significant contributions to human factors knowledge. Other benefits of the program include a better understanding of the Air Force mission by the Medical Corps through cross communication with the line, increased trust and credibility with line pilots, and a means to improve the talent and training of future Medical Corps leaders.

The pilot- physician program should definitely continue and should be more formalized with its own regulation. The unique combination of professional talents found in the pilot-physician provides a valuable resource which, with proper support and monitoring, will continue to contribute to human factors research and knowledge leading to improved peacetime safety and combat effectiveness.

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8. Kitching, G. USAF Pilot-Physician Program Report for 1983. (Unpublished, 2 Mar 84).

9. Hormatz, M. Pilot-Physician Study Group Meeting. (Unpublished, 27 Sep 84).

10. Rowen, Burt. Personal interview conducted by Tom Koritz, March 1989.

11. Roadman, MGen Charles H. (ret). Personal interview conducted by Tom Koritz, March 1989.

12. Questionnaires sent to multiple prior pilot-physicians, March 1989.

13. Mapes, P. History of the Pilot-Physician Program. (Unpublished, 1987).

## APPENDIX A

## ASSIGNMENT RECOMMENDATIONS AS OF 1987

| AIRCRAFT | LOCATION |
|---|---|
| ----- Note 1 | AFFTC (Edwards AFB, CA) |
| ----- Note 1 | TAWC (Eglin AFB, FL) |
| ----- Note 1 | Life Support SPO |
| ----- Note 1 | USAFSAM |
| ----- Note 1 | AFISC |
| SR-71 / TR-1 | Beale AFB, CA |
| F-4 | ----- Note 2 |
| F-15 | ----- Note 2 |
| F-16 | ----- Note 2 |
| F / EF - 111 | ----- Note 2 |
| A-10 | ----- Note 2 |
| AT-38B | ----- Note 2 |
| B-1B | ----- Note 2 |
| B-52 | ----- Note 2 |
| T-37 | ----- Note 2 |
| T-38 | ----- Note 2 |

NOTES:

1. Aircraft to be determined by MAJCOM.
2. Location to be determined by MAJCOM.
3. Other aircraft such as E-3A, E-4, C-9, C-141, C-5, KC-10, KC-135, HH-53 assigned as aircraft open for pilot-physicians.

## APPENDIX B

## PILOT-PHYSICIAN REPORT FORMAT

I. Monthly Flying Activity
   - A. Sorties
   - B. Time

II. Safety and Life Support
   - A. Summary of Incidents and Accidents (sanitized)
   - B. Trends Identified (if any)

III. Training and Research
   - A. Papers Authored
   - B. Lectures Presented

IV. Aircraft / Mission Integration
   - A. Aircraft Characteristics
   - B. Current Mission Environment
   - C. Specific Tactics with Aeromedical Implications

V. Personnel and Logistics
   - A. New Acquisitions of Aeromedical Interest
   - B. Names, Phone Numbers, and Addresses of Contacts of Interest to Personnel in the Field
     1. Technical Representatives
     2. Company Representatives
     3. Higher Headquarters Points of Contact

VI. Narrative (optional)
   - A. Discussion of any other topic which the PP believes is of aeromedical significance.
   - B. Review of aircraft or tech order changes which should be presented to the aeromedical community

## APPENDIX C

## PRIOR U.S. ARMY AND AIR FORCE PILOT-PHYSICIANS

The following are all the prior Pilot-Physicians found during research on this project and signify those on active duty as pilot-physicians on the date noted. The date does not represent, necessarily, the year of acquisition to the pilot-physician program or date of rank. Starting in 1975, the date represents year of acquisition and rank at the time of acquisition.

| | | |
|---|---|---|
| 1916 - | Col Ralph N. Greene, USA | |
| 1918 - | Maj William R. Ream, USA | |
| 1926 - | Maj Robert A. Hale, USA | Capt Alexander Mileau, USA |
| | Capt Fabian L. Pratt, USA | Capt Andrew W. Smith, USA |
| | Capt Percy D. Moulton, USA | Capt John P. Beeson, USA |
| | Capt Charles V. Hart, USA | |
| 1948 - | Capt Burt Rowen, USA | Capt Randall W. Briggs, USAF |
| 1964 - | BGen Charles H. Roadman, USAF | Col John P. McCann, USAF |
| | Col Robert A. Patterson, USAF | Lt Col Robert H. Adams, USAF |
| | Lt Col Barry R. Bratt, USAF | Lt Col Alonzo M. Donnell, Jr., USAF |
| | Lt Col Louis F. Johnson, Jr., USAF | Lt Col Wilbert H. McElvain, USAF |
| | Lt Col William W. Thompson, USAF | Maj James A. Roman, USAF |
| | Maj William H. H. Shea, USAF | Maj Raymond O. Waters, USAF |
| | Maj Terrell R. Woodmansee, USAF | Capt Frank H. Brunstetter, USAF |
| | Capt Theodore Dake, Jr., USAF | Capt Robert A. Gay, USAF |
| | Capt George E. Kandel, USAF | Capt Ir~ M. Yount, USAF |
| 1960's & 1970's - | Lt Col Warren Parker, USAF | Lt Col Bill Brath, USAF |
| | Maj Rufus M. Dehart, Jr., USAF | Maj Robert M. Chapman, USAF |
| | Maj Edward F. Cramer, Jr., USAF | Capt Charles P. Kirkland, USAF |
| | Capt David E. Root, USAF | Capt Edward L. Giffen, USAF |
| | Capt Richard P. Marorello, USAF | Capt Wayne A. Johnson, USAF |
| | Capt Samuel C. Puma, USAF | Capt Robert E. Gold, USAF |
| | Capt Burford W. Culpepper, USAF | Capt Benjamin G. Martin, Jr., USAF |

| | | |
|---|---|---|
| 1975 - | Lt Col Edgar R. Anderson, USAF<br>Lt Col William B. Moore, MC, USAF | Lt Col William E. Barry, USAF |
| 1978 - | Maj Leroy P. Gross, USAF | Maj Peter R. Nash, USAF |
| 1979 - | Maj Frederick E. Tilton, USAF | |
| 1981 - | Maj Carl A. Haller, USAF | |
| 1982 - | Lt Col Thomas M. McNish, USAF | Maj Geoffrey W. McCarthy, USAF |
| 1985 - | Capt Thomas F. Koritz, USAF | |
| 1987 - | Maj Roger Vanderbeek, USAF<br>Capt Tom Jarvis, USAF | Capt Peter Demitri, USAF |

## APPENDIX D

## CURRENT STATUS PILOT-PHYSICIANS

A. Active Pilot-Physicians

| | |
|---|---|
| Lt Col Romaine L. Bendixen, 185 TFG (ANG), Sioux City, IA | A-7 |
| Lt Col Geoffrey W. McCarthy, Edwards AFB, CA | T-38 |
| Maj Roger Vanderbeek, Moody AFB, GA | F-16 |
| Capt Tom Jarvis, Langley AFB, VA | F-15 |
| Capt Pete Demitry, Myrtle Beach AFB, SC | A-10 |

B. Inactive Pilot-Physicians

BGen Rufus M. Dehart, HQ USAF/SGP
BGen Edgar R. Anderson, SAC/SG
Col Leroy P. Gross, Air War College, Washington, D.C.
Col Thomas M. McNish, USAF/SGPA
Maj Thomas F. Koritz, Residency in Aerospace Medicine, Brooks AFB, TX
Assigned to Seymour-Johnson AFB, NC, to fly F-15E

C. Pilot-Physician Candidates

Maj Roger U. Bisson
Maj Fred Leonard
Capt Peter Mapes

DEPARTMENT OF THE AIR FORCE
USAF SCHOOL OF AEROSPACE MEDICINE (AFSC)
BROOKS AIR FORCE BASE, TEXAS 78235-5301

## APPENDIX E

RTAO: USAFSAM/EDK (Maj Koritz)

Subject: Pilot/Physician Questionnaire

To: All Pilot/Physicians

I would appreciate your comments and opinions of the history and the future of the Pilot Physician Program in the USAF. I have undertaken this as a RAM project to document prior accomplishments of pilot/physicians in the Air Force, to review the history from the onset of the program, and to explore possible directions for the program that may not have been considered yet. Please return the questionnaire as soon as possible in the enclosed envelope and feel free to use the back (or extra paper) if required.

1. Please give a brief career sketch, including aircraft flown and job title, dates actually dual rated and flying as a pilot/physician.

| Dates | Job Title | Aircraft |
|---|---|---|

2. Current location and assignment. If no longer USAF, then current employment. Reason for leaving the Air Force: separated, retired, transfer to AFRes, etc. Were you on status as a pilot when you left?

3. Publications/Projects as a pilot/physician, by title, date, and where published (if applicable).

4. Operational human factors problems worked on / identified / corrected / contributed to the general knowledge of, as a pilot/physician which required your special dual rated expertise.

5. Do you feel the program contributed as maximally as possible to the USAF at the time you flew? If not, what were the deficiencies as you see them? What were the positive elements?

6. What directions should the program take? What is currently not being done that should be? Should the program spread into flight test like the Navy ? Any other pertinent comments?

Thank you for your kind assistance. If there are any questions, please feel free to call me at the RAM Room, Brooks AFB, TX AV 280-2844, comm 512 536-2844. (home 512 647-1832)

Thomas F. Koritz, Maj, USAF, MC, FS
Resident in Aerospace Medicine

## APPENDIX F

## SUMMARIES OF QUESTIONNAIRES

Dave Root:

1. 1965 - sent to UPT as flight surgeon, followed by F-100 assignment for 3 years.
   RAM - MPH at Johns Hopkins, flew T-39 while assigned to Brooks AFB, TX.
   Assignments to Thailand, nonflying hospital commander, Beale AFB, CA as Chief of Occupational Medicine, Deputy Hospital Commander, and T-38 pilot.
   1975 - assigned to Farnborough on exchange, flew Hawker Hunter, performed chem defense research. 1980 - Chief Aeromedical Advisor to USAF Life Support SPO.
2. Left USAF since superiors would not listen when he told them we were behind in chem defense when compared to British and that they had the better approach.
   1980 - retired, passed occupational boards 1982, continues private practice in California.
3. Has published 14 papers on various aeromedical topics including chemical defense and life support topics.
5. Program not well organized after loss of Manned Orbiting Lab, therefore, not as productive as might have been.

John P. McCann:

1. Pilot 1945 - flew PT-19, BT-13, B-25, B-17, followed by med school, internal medicine residency, RAM, return to flight status flying T-33, T-6, T-34, T-28, T-29, C54, B-19, KC-97. Retired 1966.
2. Corporate Medical Director, Pan Am World Airways.
3. Has published 23 scientific papers as listed on curriculum vitae. Several with pilot-physician significance listed here:
   Definition of the Program Requirements to Man Rated Space Systems Simulation Chambers. GDC-ERR-AN-982 Report. Jan 67.
   Aviation Psychology in Pilot Training. USAF Medical Service Digest, Vol. XVI, No. 1, Jan 65.
   In-Flight Pilot Incapacitation. JAMA, Vol. 183, No. 13, Pages 1088-1090. 1961.
   Aeromedical Aspects of Supersonic Pilot Training. Presented at 33rd AsMA Mtg, Apr 1962.
   Fatigue in Flying Personnel. Annual Aviation Medicine Conference, HQ/USAFE, 1958.
   Aircraft Instrument Design. National Advisory Committee for Aeronautics, 1956.
   The Aging Pilot. Aeromedical Symposium, Wright-Patterson AFB, 1956.
   Aeromedical Considerations in Aeronautical Engineering, MIT, 1955.
4. as listed in the papers above.
5. Program contributed, but restricted by skeptical medical corps, good support from line.
6. Recruit 'young' pilot-physicians before too old to contribute.

Bill Brath:

1. 1967 - UPT, followed by F-100 assignment to USAFE. 1971 - F-4C, rear seat.
   1973 - RAM, no flying as pilot until California ANG, 1978, O-2.
2. Medical Director Lockheed Aero Systems Co. Burbank, Ca. Flight Surgeon in CANG.
   Left active Air Force when denied F-15 Pilot/Physician project.
4. On first F-15 accident board as flight surgeon - helped change ejection seat, fuel system, engine restart while airborne, appropriate changes to check lists. Noted increased trust of pilot-physician by flyers.
5. Program discontinued at critical time in career, left active force. Positive elements were the ability of the pilot/physician to become aware of system problems very early.

Tom Travis:

1. Completed UPT in 1978, followed by training and assignment as F-4 pilot through 1982. Completed medical school and internship by 1987. Just recently began pilot-physician status as F-15 pilot, Langley AFB, VA.
4. Currently working on evaluation of high-contrast visor and will do operational evaluation of Combat Edge counter-pressure jerkin and associated equipment.
6. Pilot-physicians should be involved in systems development, flight test, and Life Support Special Projects Office (SPO) at Wright Patterson AFB, OH.

Leroy Gross:

1. Initially, started in USAF as missile officer, followed by UPT in 1967. Following UPT he flew the KC-135Q, then the C-141 in the reserves while in medical school. He completed the RAM program in 1978, then started his pilot-physician status in a U.S. Navy exchange at Pensacola NAS flying the TA-4. From 1980 - 1983 he flew the F-15 at Langley AFB, VA and was the Chief of Aeromedical Services. Afterwards, he became commander, first of the USAF Hospital, Bitburg AB, Germany, and then, the USAF Hospital, Langley AFB, VA.
2. Currently a student at National War College, Washington, DC.
5. Deficiencies include:
   No established pilot-physician billets.
   No formal mechanism to provide inputs to the line and medical systems without dilution of content as it goes up the chain.
   No formal method to enter program, application procedures, etc. Difficulty with recruiting.
   No established mechanism for pilot-physicians to fly mission-ready vs. mission-support rates.
6. Complete RAM as soon as possible for appropriate training and credibility as pilot-physician.

Charles P Kirkland:

1. Aircraft include T-33, T-37, T-39, F-100, F-104, RF-4C. No medical career info given.
2. Currently Civil Service Physician, Occupational Medicine, Tinker AFB, OK.
4. X-15, F-104 terrain following, other projects, Edwards AFB, CA, 1966-69. Multiple aircraft accident investigations. Transport vs. fighter crew fatigue research in S. E. Asia combat theatre. Study of feasibility of elimination of T-41 training in UPT, Vance AFB, OK, 1971.
5. Lack of recognition and defined role of dual status during the period 65 - 80. Positively regarded by line AF; responsibility for the major problem in recognition and assignments appropriate for dual rated pilot-physicians rests with the Medical Corps.
6. Continued program for use in human factors, new aircraft development, accident investigations, medical evaluation for waiver cases. Should be fully mission qualified in aircraft assigned. Flight test would be appropriate.

Goeff McCarthy:

1. 1963 - UPT, 1964 - 1969 F-100, 1970 - 1975 medical school and pilot F-100 Mass. ANG. Family Practice and ANG until 1982. 1982 - 1985 F-16A and Chief Aeromedical Services. MacDill AFB, FL. 1985 - 1986 Commander, 432 Med Gp, Misawa AB, Japan, F-16C.
2. Commander, AFSC Hospital, Edwards AFB, CA, T-38.
3. USAF GLC Accidents, info for TAC/SG, 1984.
   The Standby Attitude Indicator, Safety Magazine, 1984.
   Three "T's for Nine G's", TAC Attack, 1985.
   Test of Servo G-valve at AMRL, 1985.
   The Right Move, Safety Magazine, 1987.
   USAF Ground Level Ejections, ASEM, 1988.
   USAF/SG Working Group on SDO, F-15 vs F-16, 1988.

4. GLC accidents: suggested training in centrifuge while looking back, now part of curriculum Required knowledge of BFM tactics.
   F-16 unique human factors aspects briefed at AsMA 1985,1986,1987.
   G-tolerance course taught to all new F-16 students at MacDill AFB, FL, 1983-1985.
5. Deficiencies exist in the program. Flying and analysis are always additional duties should be primary. Restricted flying because only on a mission support role - damages credibility and degrades effectiveness. Should assign to combat position. No documented program for information dissemination - when agencies receive information, frequently don't know what to do with it. Also, no direct access to policy formation - must submit changes through local channels, subject to local prejudices.
6. Develop 2 - track, or 2 - tier program: (1) human factors and test role (2) Command Need to actively recruit more. Need to allow combat, to make our assignment to a squadron not cost in combat resources. But, must always keep hand in patient care.

Pete Demitry:

1. 1979 UPT, 1979 - 1982 F-4 pilot, 1982 - 1986 med school.
2. 1987 - present A-10 pilot-physician, Myrtle Beach AFB, SC.
4. Discovery of "distant illusion phenomenon", soon to be published.
   Circadian fatigue - NASA/USAF study. Night working group lecture on SDO / illusion with FLIR technology. Enhanced Visor Testing and Evaluation in CAS missions. Laser threat to A-10 pilots.
5. Positive: Good credibility with line. Only way to bridge human factors, medicine, and tactical flying - good cross talk. Safety, investigation, prevention.
   Deficiencies: "Bean Count" far too important in Medical Corps. No funding for active research in field. Real contributions as pilot-physician must be accomplished in spare time. No good career path. Not formalized - uncertain of continuing pilot-physician assignments. Too many "masters" taking a piece of the pie, i.e. Hospital CC, SGP, Squadron Commander
6. R & D is the key as evidenced by the accomplishments in the Navy program Should consider assigning the pilot-physician to MAJCOM level, attached to local wings for flying, to get a wider view of the TAF.

Roger Vanderbeek:

1. 1972 - 1977 F-4 pilot, 1978 - 1983 medical training, 1983 - 1985 Homestead AFB SGP, 1985 - 1987 RAM, now F - 16 pilot-physician Moody AFB, GA.
3. Period Prevalence of Acute Neck Injury in U.S. Air Force Pilots Exposed to High G Forces Aviation Space Environmental Med. 1988. 59 (12) 1176-80.
   "Don't Stick your Neck Out". TAC Attack, Feb 1987.
4. Human Factors Working Group directed by AF/CC comparing F-16/F-15 human factors problems, Bolling AFB, DC, Oct 88. AF/XO Instrument Standardization Working Group. Pentagon, Jan 89, and Wright Patterson AFB, OH, Feb 89 - human factors considerations. Enhanced contrast visor study in TAC, designed study, ongoing.
   Also noted as author of the model semiannual pilot-physician report.
5. Senior officers starting to listen to human factors issues. Should integrate with OT&E and R&D communities.
6. First dual rated assignment operational, then flight test at Eglin AFB, FL, or Edwards AFB, CA.

Fred Tilton:

1. Prior to 1983, B-47, C-141 pilot, followed by medical education. 1980 -1983 Commander USAF Clinic Det 3 AFFTC, Edwards AFB, CA. Flew T-38, C-12, Cessna 206 as

pilot-physician. 1983 - 1985 Chief Aeromedical Services, USAF Regional Hosp, Langley AFB, VA. F-15. Retired 1988 after assignment to Bolling AFB, DC.

3. Human Factors, presented to Canadian Forces, Feb 84. Similar speech at TAC flight surgeon conference, Nellis AFB, NV, May 84.
4. Many contributions while on classified assignment. Cannot be listed.
5. Greatly increased credibility with line, but pilot-physicians need much more time to devote to the weapons system assigned rather than work in spare time for primary job.
6. Need definite pilot-physician billets with a definite career track. It is very difficult to maintain currency in a tactical weapons system and also fill a full time hospital position. R&D is extremely important for pilot-physician involvement, to include flight test. Could go so far as specific budget for pilot-physicians with aircraft and flying hours so as not to take from operational wings. Pilot-physicians should not be assigned to the hospital, but to either an R&D unit or MAJCOM staff. Most medical corps people do not understand standard flight medicine, let alone the pilot-physician program!

MGen Charles H. Roadman (ret):

1. Completed medical education 1940. Pilot training 1942, followed by flying instructor assignment. 1946 assigned to School of Aviation Medicine, acted as Chief of the Preventive Medicine Division and Director of Operations and Executive Officer. Following this, he was Command Surgeon of the Air University, then in 1951, Assistant Air Attache and Air Attache in Buenos Aires, Argentina. From 1955 to 1960, he served as Chief of Human Factors Division in the Directorate of Research and Development, HQ/AF. Assigned to NASA, he eventually became Director of Aerospace Medicine, Manned Space Flight, involved with Mercury, Gemini, and Apollo missions. 1963, Command Surgeon, ADC. 1966. command of Aerospace Medical Division, Brooks AFB, TX. Flew BT-13, AT-6, C-47, B-17, F-100, B-29, F-86, T-33, F-94, and F-104.
2. Retired, San Antonio, TX.
4. Chief of Human Factors at Brooks, AFB, TX - did early NASA work on zero-G gravity studies, and others for NASA as their first medical director.
5. No. Poorly organized

Burt Rowen:

1. 1946, completed medical training. 1947, pilot training, followed by training in P-80 where involved in ferry of first permanently assigned jet fighters to Europe. 1949, instructor, AF School of Aviation Medicine, Randolph Fld, TX. 1952, assistant Air Attache, Stockholm, Sweden. 1956 - 1962, USAF flight test, Edwards AFB, CA, evaluating life support systems in all aircraft undergoing flight test. Also was medical director for X-15 program. 1962. medical director for X-20, Dyna Soar Program. 1963, Deputy Commander, Aerospace Medical Research Lab, Wright-Patterson AFB, OH. 1966 - 1972, staff, including Deputy Surgeon, HQ USAFE, Germany 1972, Commander, School of Health Care Sciences. Randolph AFB, TX. 1974 - 1986, Randolph AFB as member of USAF PEB. Has flown over 50 different aircraft of all types, 131 combat missions, over 7700 hours total flying time.
3. Imparted first-hand experiences of new jet age to new flight surgeons while at School of Aviation Medicine. Published multiple Tech Reports while at Edwards AFB, CA, regarding life support documentation of physiologic data obtained from rocket research program.
4. Responsible for full spectrum of life support evaluation at Edwards AFB, CA, regarding escape systems, heating, cooling, control locations, lighting, visibility, etc.
5. Credibility with line of Air Force. Speak both languages of physician and pilot - could speak to both engineers and operations with credibility.
6. Pilot-physicians should have limited participation in flight test operations. Graduates of the test pilot school are far more qualified as engineers to evaluate performance and stability than

a pilot-physician. It would be "economically unreasonable" to train a pilot-physician to perform such tasks. Assignments should include participation in test ops and command after assignments to operational units.

Louis F. Johnson:

1. Has 4,350 total pilot hours in F-80, B-25, C-47, C-54, T-33. 1949, Harvard Medical School followed by residency in anesthesiology 1954, RAM 1958. Graduated from pilot training in 1943, was transport pilot in multiple theatres. 1952, 50 combat missions in T-6 in Korea. Held multiple research and staff positions including: Chief of Bioscience Division at European Office of Aerospace Research, Director of Technical Operations at European Office of Aerospace Research, Deputy Director for Bioastronautics of Manned Orbiting Laboratory Program, Director of Foreign Technology at Aerospace Medical Division, Brooks AFB, TX.
2. Consultant in Occupational Medicine, Gloucester, MA. Retired, 1975.
3. 15 publications, most having to do with pulmonary physiology.
4. Chief of pressure suit program for Manned Orbiting Lab astronauts.

Tom McNish:

1. UPT in 1964 - 1965, followed by F-105 training. Shot down, POW in Viet Nam for 6 years. Started medical education in 1973, Family Practice Residency 1978, Aerospace Medicine Residency 1981. Dual rated in A-10 1983 - 1986, T-38 from 1986 - 1988.
2. Bolling AFB, DC, HQ USAF/SGPA, Chief of Flight Medicine
3. Has 7 publications, 2 of which have pilot-physician significance:
   G-induced Loss of Consciousness in non-high Sustained "G" Capable Aircraft, TAC Brief
   A-10 Aircraft Specific Medical Problems, AsMA Scientific Meeting, 1986.
4. GLC - Holloman Centrifuge Program, and A-10 specific episodes.
   SDO - ground trainer work.
5. Need much more direct involvement of pilot-physicians at development, test, and evaluation of all human factors related aspects of flying in all weapons systems. Operational involvement in tactical aircraft is about right, but should expand into tanker, transport, bomber, and reconnaissance.
6. Should be involved in flight test.

Rufus DeHart:

1. 1956 - F-89 Scorpion pilot. Began medical education in 1961 followed by rotating internship, then Residency in Aerospace Medicine. Active pilot-physician starting 1967, flew various fighter aircraft. Held various flight medicine positions through 1974. DBMS, George AFB, CA, 1974 - 1977. 1977 - 1978 Chief Flight Medicine, USAF /SGPA. 1978 - 1983 Chief, Aerospace Medical Consultants Div., HQ AFMSC/SG. 1983 - 1984, Command Surgeon, HQ PACAF. 1984 - 1987, Command Surgeon, HQ/TAC
2. Director of Professional Affairs, Office of USAF/SG, Bolling AFB, DC
3. Has presented/published up to 35 papers according to curriculum vitae, 14 of which have pilot-physician significance. Several include:
   Environmental Factors that Affect Military Performance in Strike Aircraft, classified, 1972
   Operational Aspects of G-LOC in High Performance Aircraft, 16th Annual SAFE Symposium
   Pilot Selection and Flying Physical Standards in the 1980's, OAP, 1980
   Visual Problems and Requirements in High Performance Fighter Aircraft. TAC Fighter Aviation Medicine Seminar, Nellis AFB, NV. Apr 80.
   The USAF Pilot-Physician Program, Medical Service Digest, Vol 32, No 2, Apr 81
   Spatial Disorientation, Chap 7, AFM 51-37, Instrument Flying, Oct 82.
   Human Factors Problems in the Tactical Air Force. PACAF Commanders' Conference, 1984.

Medical Selection and Physiological Training of Fighter Pilots, Keynote speaker at NATO AGARD meeting in Athens, Greece. Apr 85.

Human Factors Problems in TAC and the Tactical Air Force. Smith Ames Lecture. AsMA 86

Human Factors Problems in TAC, SAFE Vol 16, No. 2, Summer Quarter, 1986

4. 1. Categorical medical waiver system. 2. High-G training, fighter specific physiological training at Holloman AFB, NM. 3. Spatial Disorientation - inflight procedures rewritten in Air Force Manual 51-37, ATC instrument training changed to reflect, re-established instrument flight center at Randolph AFB, TX. 4. Physical conditioning for fighter pilots 5 CARE 1&2. 6. Medical screening of SR-71 crew. 7. Modified physical standards of eye cholesterol.
5. No - Program not fully accepted or formalized, but slowly moving in right direction
6. 1. Formalize program. 2. More oversight at HQ USAF/SGPA for better reporting of activities 3. Closer interface with SPO's/ASD, AFISC, other flight surgeons, and AFSC in test activities. Possibility does exist to spread into flight test with right candidate.

LtGen Patterson (ret):

1. Aircraft include Spitfire, P-47, P-51, B-26, B-25, VC-3, C-47, T-33 instructor, C-54, T-39, and F-102. Held many medical positions in Air Force, retiring in 1975 as USAF/SG
2. Retired 1987 from full time, but still consulting for Baxter-Travenol Corp., in which he was a senior vice president for 12 years.
3. No publications.
4. In Air Force was on B-52 human factors committee during development where his expertise was greatly required. Also did consulting throughout career for various projects at Wright Patterson AFB, OH. At the unit level, he was a T-33 instructor pilot and found great use in his expertise in solving human factors problems of pilots and students within his unit. He felt it necessary to understand the pilot perspective in working with these problems.
6. Need to get program into R&D at Brooks AFB, TX, and Wright Patterson AFB, OH. Must also get involved in R&D in aircraft development at Edwards AFB, CA. Should also be involved in flight safety on a daily basis.



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