

SECTION 2 pt. 2 - 50 YEARS OF HUMAN ENGINEERING: BIBLIOGRAPHY

1975-1984 - Keeping Pace with the Avionics Revolution

1985-1994 - The End of the Cold War



Keeping Pace with the Avionics Revolution

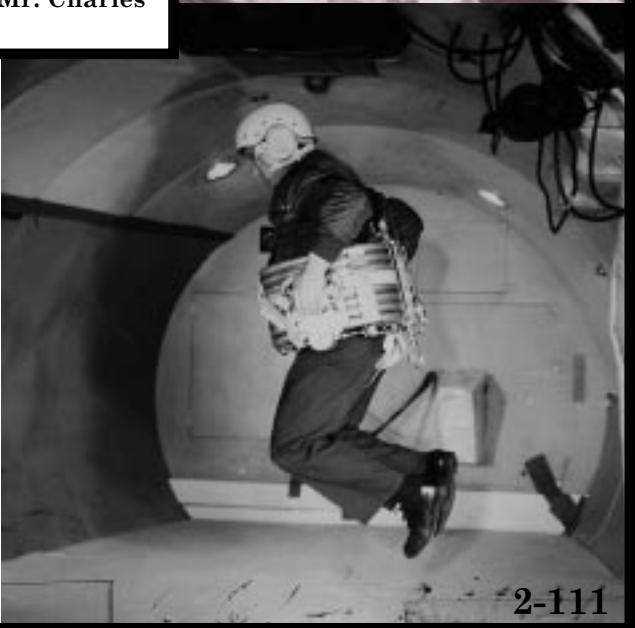
1975-1984

Computer technology enters a period of phenomenal growth triggering a revolution in aircraft avionics. Efforts to bring additional information into the cockpit and extend Air Force mission areas will bring about the development of controls and displays of unprecedented complexity. Resulting human engineering issues of pilot workload and man-machine interface must be addressed. The stage is set for revolutionary strides in such areas as visually-coupled systems, mental workload, and anthropometry. Dr. Julian Christensen retires from the Human Engineering Division and is replaced by Mr. Charles Bates, Jr.



1975-1984

Situational Awareness



2-111

Alexander, M., Heckart, S. A., McConville, J. T., & Mitchell, S. M. (1978). Human factors engineering evaluation of the munitions transfer truck. In V. L. Mahugh (Ed.), *Development test and evaluation of Munitions Transfer Truck A/S 32K-5* (ADTC Technical Report 78-2, pp. 61-75). Eglin AFB, FL: Armament Development and Test Center.

Alexander, M., Laubach, L. L., & McConville, J. T. (1976). *Effects of encumbering clothing, personal-protective equipment and restraints on body size and arm-reach capability of USAF Aircrewmen* (AMRL Technical Report 76-118). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A036 682)

Alexander, M., & McConville, J. T. (1979). *Anthropometric sizing, fit-testing and evaluation of the MBU-12/P oral-nasal oxygen mask* (AMRL Technical Report 79-44). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A074 732)

Alexander, M., McConville, J. T., & Tebbetts, I. (1979). *Revised height/weight sizing programs for men's protective flight garments* (AMRL Technical Report 79-28). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A070 732)

Almagor, M., Farley, W. W., & Snyder, H. L. (1979). *Spatio-temporal integration in the visual system* (AMRL Technical Report 78-126). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A069 558)

Anderson, C. D., & Kraft, C. L. (1977). *Stereo acuity and reconnaissance. Phase I: Development of a precision chromostereopsis test and test equipment* (AMRL Technical Report 76-112). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A040 450)

Aume, N. M. (1984). *A machine for weight-lift testing* (AFAMRL Technical Report 84-040). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A101 766)

Aume, N. M., McDaniel, J. W., & Garver, T. (1983). *Human strength capabilities for the operation of parachute ripcords and riser releases* (AFAMRL Technical Report 83-081). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A138 328)



EYE TRACKING RESEARCH

Kirk Moffitt and Martha Hausman working with the Stanford Research Institute (SRI) eye tracker as part of research on eye tracking at the Human Engineering Division in 1979-1980.

Aume, N. M., & Mills, R. G. (1981). *The results of AFAMRL Remotely Piloted Vehicle (RPV) simulation studies VII and VIII* (AFAMRL Technical Report 80-98). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A100 551)

Aume, N. M., Mills, R. G., & Gillio, A. A. (1976). *Summary report of AMRL Remotely Piloted Vehicle (RPV) system simulation study IV results* (AMRL Technical Report 76-55). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A028 877)

Aume, N. M., Mills, R. G., Gillio, A. A., Sebasky, G., & Wartluft, D. (1977). *Summary Report of AMRL Remotely Piloted Vehicle (RPV) system simulation study V results* (AMRL Technical Report 77-23). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A041 673)

Ayoub, M. M., Deivanayagam, S., & Kennedy, K. W. (1976). *Paths of movement for selected body segments during typical pilot tasks* (AMRL Technical Report 75-111). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A025 773)

Ayoub, M. M., Deivanayagam, S., & Kennedy, K. W. (1977). *Selected design parameters for reclining seats based on engineering anthropometry* (AMRL Technical Report 77-44). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A048 458)

Ayoub, M. M., Dryden, R. D., McDaniel, J. W., Knipfer, R. E., & Aghazadeh, F. (1978). Modeling of lifting capacity as a function of operator and task variables. In C. G. Drury (Ed.), *Safety in Manual Materials Handling* (DHEW(NIOSH) Publication No. 78-185, pp. 120-130).

Ayoub, M. M., Powers, R. F., Bethea, N. J., Lambert, B. K., Martz, H. F., & Bakken, G. M. (1978). *Establishing criteria for assigning personnel to Air Force jobs requiring heavy work* (AMRL Technical Report 77-94). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A060 114)

Bapu, P., Evans, S., Kikta, P., Korna, M., & McDaniel, J. (1981). *User's guide for COMBIMAN programs (Computerized Biomechanical Man-Model), Version 4* (AFAMRL Technical Report 80-91). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A097 705)

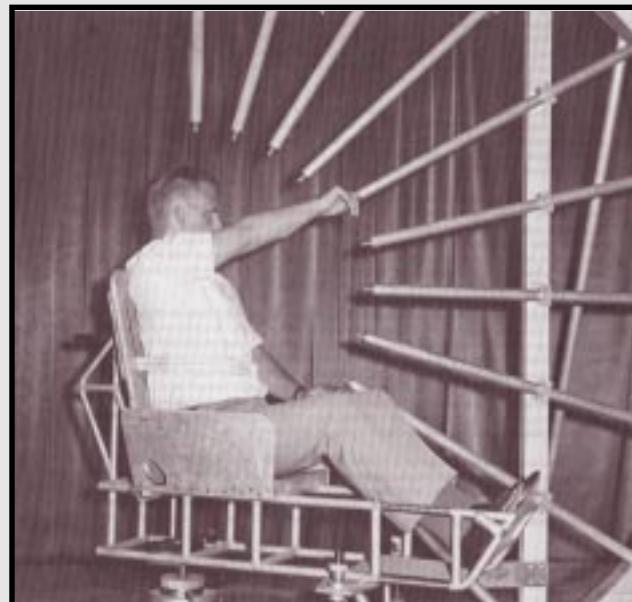
(Computerized Biomechanical Man-Model), Version 4 (AFAMRL Technical Report 80-91). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A097 705)

Bapu, P., Evans, S., Kikta, P., Korna, M., & McDaniel, J. (1982). *User's guide for COMBIMAN programs (Computerized Biomechanical Man-Model), Version 5* (AFAMRL-TR-81-151). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A116 281)

Bapu, P., Korna, M., & McDaniel, J. (1983). *User's guide for COMBIMAN programs (Computerized Biomechanical Man-Model), Version 6* (AFAMRL Technical Report 83-097). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A139 139)

Bates, F. J., Jr., Evans, S. M., Krause, H. E., & Luming, H. (1976). *Three dimensional display of the COMBIMAN man-model and work space* (AMRL Technical Report 74-15). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A027 175)

Beamon, W. S., Snyder, M. S., & Snyder, H. L. (1975). *An experimental evaluation of the spot wobble method of suppressing raster structure visibility* (AMRL Technical Report 75-63). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A018 566)

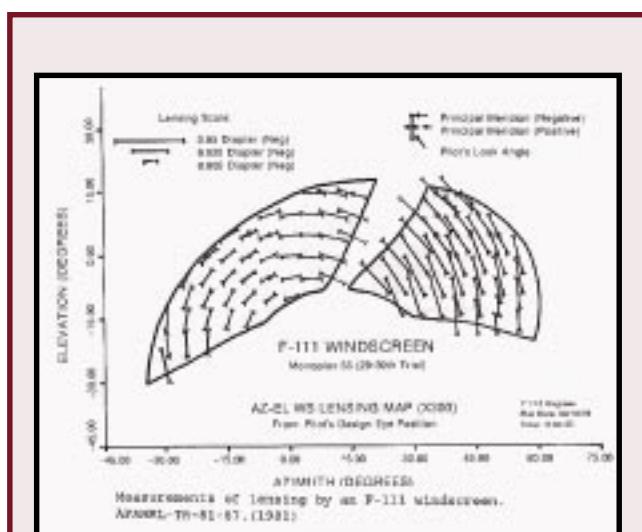


MEASURING A SUBJECT'S GRASP-REACH ENVELOPE

Subject reaching along a 30-degree line in the left 15-degree plane in a study to determine the 5th, 50th, and 95th percentile grasping-reach envelopes in three dimensions for men and women. The data were collected to serve as a guide to the placement of critical hand-operated controls for the seated operator. The work was done by Kenneth W. Kennedy under Workunit 71840832, "Design and Evaluation of Work Stations." AMRL-TR-77-50 (1978)

- Bermudez, J. M., Schwank, J. C. H., Longridge, T. M., Smith, B. A., & McCloy, T. M.** (1979). *Effect of peripherally presented visual signals on pilot performance during flight simulation* (AMRL Technical Report 78-120). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A073 604)
- Boff, K. R.** (1982). Critical research issues on cockpit applications of 3-D displays. *Proceedings of the National Academy of Sciences*.
- Boff, K. R.** (1982). Integrated perceptual information for designers. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 1, 430-434.
- Boff, K. R., & Calhoun, G. L.** (1983). Research requirements for advanced aircrew 3-D displays. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*.
- Boff, K. R., Calhoun, G. L., & Lincoln, J.** (1984). Making perceptual and human performance data an effective resource for designers. *NATO DGR Workshop (Panel IV): Weapon System Development Process and Technology Transfer*. Shrivenham, England: Royal College of Science.
- Boff, K. R., & Martin, E.** (1980). Aircrew information requirements in simulator display design: The integrated cueing requirements study. *Proceedings of the 2nd Inter-Service/Industry Training Equipment Conference*, 355-362.
- Brandt, W. E.** (1977). *Program documentation for the T4 EWO crew station simulation programs* (AMRL Technical Report 77-6). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A037 944)
- Brandt, W. E., Jr.** (1976). *Program documentation for the bimodal short-term recognition memory program* (AMRL Technical Report 76-36). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A025 745)
- Brandt, W. E., Jr., & Aldrich, K. A.** (1978). *Program documentation for the terrain and flight dynamics program* (AMRL Technical Report 78-35). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A056 116)
- Brandt, W. E., Jr., & Wartluft, D. L.** (1975). *Program documentation for the DAIS triple task experiment program* (AMRL Technical Report 75-24). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A024 101)
- Brandt, W. E., Jr., & Wartluft, D. L.** (1975). *Program documentation for the phase VI EWO crew station simulation programs* (AMRL Technical Report 75-22). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A013 848)
- Bridenbaugh, J., Kama, W. N., & Task, H. L.** (1982). The helmet-mounted HUD: A change in design and applications approach for helmet-mounted displays. *AGARD Conference Proceedings No. 329*. Blackpool, UK. (NTIS No. AGARD-CP-329)
- Brown, C. E., Jennings, L. S., & Ward, S. L.** (1984). *Team problem solving: Leader proficiency, communication, and co-workers' functions* (AFAMRL Technical Report 84-056). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.
- Buchroeder, R. A., Seeley, G. W., & Vukobratovich, D.** (1981). *Design of a catadioptric VCASS helmet-mounted display* (AFAMRL Technical Report 81-133). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A109 431)
- Calhoun, G. L., Arbak, C. J., & Boff, K. R.** (1984). Eye-controlled switching for crew station design. *Proceedings of the Human Factors Society 28th Annual Meeting*, 258-262.
- Cannon, M. W.** (1979). *Contrast sensation: A linear function of stimulus contrast* (AMRL Technical Report 78-56). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A074 858)
- Cannon, M. W., Jr.** (1983). Contrast sensitivity: Psychophysical and evoked potential methods compared. *Vision Research*, 23, 87-95.
- Chandler, R. F., Clauser, C. E., McConville, J. T., Reynolds, H. M., & Young, J. W.** (1975). *Investigation of inertial properties of the human body* (AMRL Technical Report 74-137). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A016 485)

- Chubb, G. P.** (1977). *Modeling and analysis using SAINT: A combined discrete/continuous network simulation language* (AMRL Technical Report 77-78). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A075 396)
- Chubb, G. P.** (1978). *SAINT: A combined simulation language for modeling large complex systems* (AMRL Technical Report 78-48). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A058 040)
- Chubb, G. P., & Berisford, K. M.** (1977). *Manned system modeling: SAINT applied to strategic navigation* (AMRL Technical Report 76-105). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A129 877)
- Churchill, E., & Kikta, P.** (1977). *The AMRL anthropometric data bank library: Volumes I-V* (AMRL Technical Report 77-1). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A047 314)
- Churchill, E., Kikta, P., & Churchill, T.** (1978). *Intercorrelations of anthropometric measurements: A source book for USA data* (AMRL Technical Report 77-2). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A058 616)
- Churchill, E., & McConville, J. T.** (1976). *Sampling and data gathering strategies for future USAF Anthropometry* (AMRL Technical Report 74-102). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A025 240)
- Churchill, E., Rabinow, D., & Erskine, P.** (1979). Factor analysis of anthropometric data for fifteen race-age-national origin specific groups. In W. A. Stini (Ed.), *Physiological and Morphological Adaptation and Evaluation*. New York: Mouton.
- Cohen, B. J.** (1979). *Helmet-mounted displays: A computer-assisted analysis of day-night visual requirements* (AMRL Technical Report 79-62). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A072 061)
- Cohen, B. J., Bloomfield, J. R., & McAleese, K. J.** (1979). *Helmet mounted displays: An experimental investigation of display luminance and contrast* (AMRL Technical Report 79-60).
- Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A072 059)
- Cohen, B. J., & Levit, R. A.** (1979). *The role of the upper field of view in selected HMS/D visual tasks* (AMRL Technical Report 79-65). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A072 064)
- Cohen, B. J., & Markoff, J. I.** (1979). *The presentation of different visual information to each eye* (AMRL Technical Report 79-66). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A072 065)
- Connelly, E. M., Zeskind, R. M., & Chubb, G. P.** (1977). *Development of a continuous performance measure for manual control* (AMRL Technical Report 76-24). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A041 676)
- Corrick, G. E., & Scanlan, L. A.** (1978). *Human performance evaluation of matrix displays* (AMRL Technical Report 78-110). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A080 120)



AN EXAMPLE OF WINDSCREEN OPTICAL DISTORTION

Illustration of the lensing produced by an F-111 windscreens in a study of windscreens distortion. The study was conducted in order to develop a computer analysis of the distortions to enable aiming correction for optical distortion in visually-coupled systems. The work was done by Major Rick Seid. AFAMRL-TR-81-67 (1981) (Task 718418)

A LINK-ANALYSIS SAMPLE

A sample link analysis extracted from a human engineering procedures guide by Charles W. Geer of the Boeing Aerospace Company developed under Workunit 71841212. AFAMRL-TR-81-35 (1981)



- Corso, G., Kelly, S., & Bridges, D.** (1983). *Binary classification and the subtractive approach* (AFAMRL Technical Report 83-050). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A137 716)

Courtright, J. F. (1981). *Effects of whole and partial body exposure to dry heat on certain performance measures* (AFAMRL Technical Report 80-43). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A100 305)

Courtright, J. F., & Kuperman, G. G. (1984). Use of SWAT in USAF System T&E. *Proceedings of the Human Factors Society 28th Annual Meeting*, 21-26.

Craig, J. L. (1984). Night formation/aerial refueling. *Proceedings of the Society of Automotive Engineers Fall Meeting*.

Craig, J. L. (1984). Night vision goggle/head-up display. *Proceedings of the Tri-Service Aeromedical Research Panel Fall Technical Meeting*.

Craig, J. L., & Simons, J. C. (1983). *Electroluminiscent formation lights for HC-L30 P/N special operations: I. Flight test candidates* (AFAMRL Technical Report 83-069). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A137662)

Crawford, B. M. (1979). *Workload assessment methodology development* (AMRL Technical Report 79-120). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A081 032)

Crawford, B. M., Hoffman, M. S., & Pearson, W. H. (1978). *Multipurpose digital switching and flight control workload* (AMRL Technical Report 78-43). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A069 606)

Crawford, B. M., Topmiller, D. A., & Kuck, G. A. (1977). *Man-Machine design considerations in satellite data management* (AMRL Technical Report 77-13). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A041 287)

Day, C. N. (1977). *Modern control applications to manual control - historical perspective and future direction* (AMRL Technical Report 77-82). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A054 922)

DeRego, P. J. (1984). A multipole model of the observed cerebral cortex magnetic field [Master's Thesis]. (Report No. AFIT/GE/ENG/84D-23). Wright-Patterson AFB, OH: Air Force Institute of Technology.

DeRuyck, A. R., & Kuipers, J. (1976). *An Extended-range Sensor Package (ESP)* (AMRL Technical Report 73-59). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A027 850)

Dobbins, J. P. (1976). *Variable-transmittance visor for helmet-mounted display* (AMRL Technical Report 74-28). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A027 177)



**MEASURING THE PERFORMANCE
OF A VISUALLY-COUPLED SYSTEM**

Measuring head position and aiming accuracy in a visually-coupled system to examine the engineering interface. The work was done under Project 7184, Workunit 71842005 by Sheldon MacLeod of AMRL and David B. Coblintz of McDonnel Douglas. AMRL TR-79-32 (1979)

Donaldson, E. (1983). *Preliminary investigation of variation in some dark adaptation aspects of possible relevance to military helicopter aircrew* (AFAMRL Technical Report 83-053). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A130 231)

Donohue-Perry, M. (1984). *Brightness comparison of electroluminescent versus incandescent lighting: A photometric validation* (AFAMRL Technical Report 84-036). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.

Duket, S. D., Wortman, D. B., & Seifert, D. J. (1976). *SAINT simulation of a remotely piloted vehicle/drone control facility: Technical documentation* (AMRL Technical Report 75-119). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A029 944)

Duket, S. D., Wortman, D. B., Seifert, D. J., Hann, R. L., & Chubb, G. P. (1978). *Analyzing SAINT output using SPSS* (AMRL Technical Report 77-64). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A058 723)

Duket, S. D., Wortman, D. B., Seifert, D. J., Hann, R. L., & Chubb, G. P. (1978). *Documentation for the SAINT simulation program* (AMRL Technical Report 77-63). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A059 198)

Eggemeier, F. T., Crabtree, M. S., Zingg, J. J., Reid, G. B., & Shingledecker, C. A. (1982). Subjective workload assessment in a memory update task. *Proceedings of the Human Factors Society 26th Annual Meeting*.

Eggemeier, F. T., McGhee, J. Z., & Reid, G. B. (1984). The effects of variations in task loading on subjective workload rating scales. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*.

Evans, S. M. (1976). *User's guide for the programs of COMBIMAN (Computerized Biomechanical Man-Model)* (AMRL Technical Report 76-117). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A038 323)

Evans, S. M. (1978). *Updated user's guide for the COMBIMAN programs* (AMRL Technical Report 78-31). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A057 968)

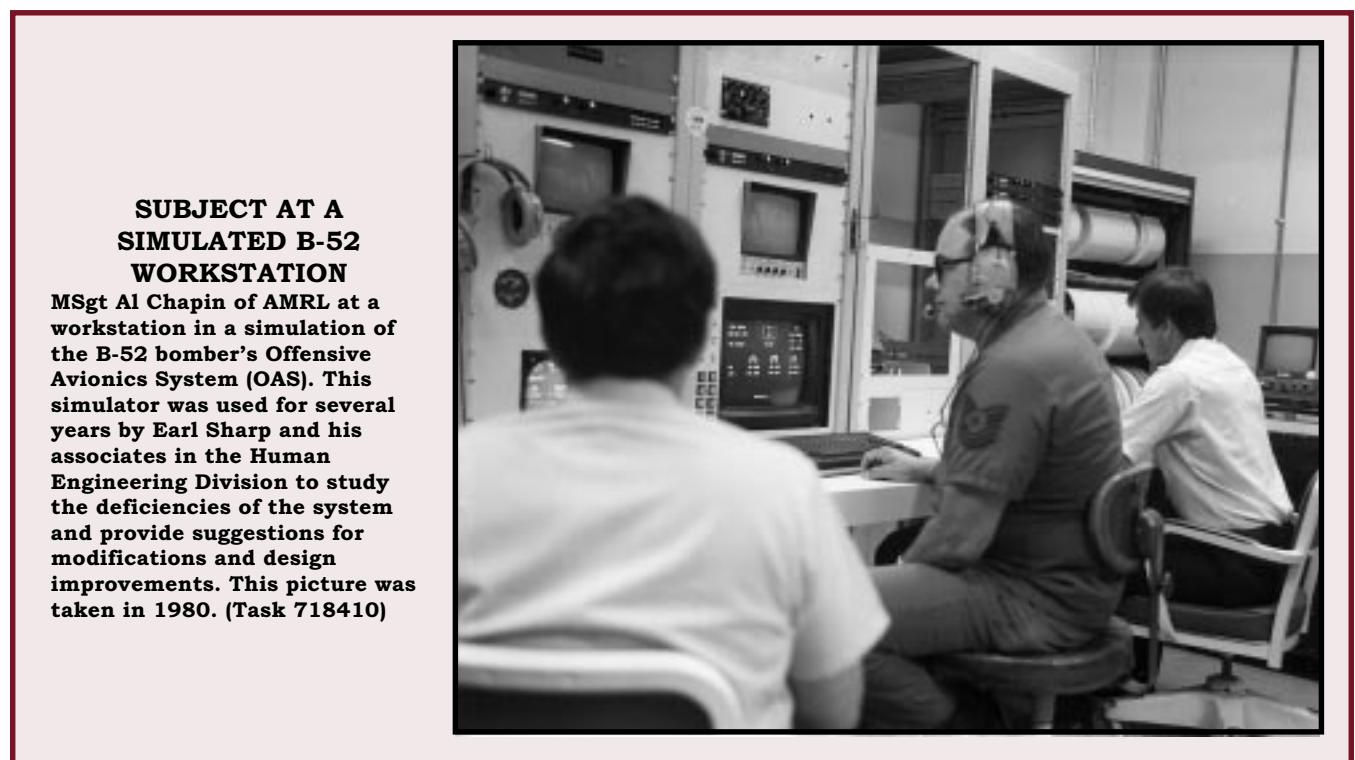
Evans, S. M., Himes, M. J., Kikta, P. E., & Nearing, D. F. (1976). *Biomechanics and anthropometry for cockpit and equipment design* (AMRL Technical Report 77-7). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A037 020)

Felkey, M. A., Monk, D. L., & Stec, L. J. (1984). *The effect of jamming/deception on decision making* (AFAMRL Technical Report 84-055). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.

Flach, J. M., Snell, M. K., McMillan, G. R., & Warren, R. (1984). Dynamic seat tactal cuing can be superior to visual cuing (Abstract). *Bulletin of the Psychonomic Society*.

Freitag, M., Hilgendorf, R. L., & Searle, R. G. (1975). *The effect of simulated sun angle on air-to-ground target acquisition* (AMRL Technical Report 74-130). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A011 567)

- Geer, C. W.** (1981). *Human engineering procedures* (AFAMRL Technical Report 81-35). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A108 643)
- Genco, L. V.** (1982). *Angular deviation and its effect on HUD-equipped aircraft weapons sighting accuracy* (AFAMRL Technical Report 82-83). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A122 547)
- Genco, L. V.** (1983). Optical interactions of aircraft windscreens and HUDs producing diplopia. In W. L. Martin (Ed.), *Optical and human performance evaluation of HUD systems design* (Report No. AFAMRL-TR-83-095, pp. 20-27). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A140 601)
- Genco, L. V., Eggleston, R. G., & Task, H. L.** (1980). A portable transparency optical test system. *Proceedings of the Conference on Aerospace Transparencies*. London: Society of British Aerospace Companies.
- Genco, L. V., Ginsburg, A. P., Self, H. C., Task, H. L., Lee, R. D., Schwartz, R. W., Wilson, W., & Coonrod, J. F.** (Contributing Authors). (1983). In W. L. Martin (Ed.), *Optical and human performance evaluation of HUD systems design* (Report No. AFAMRL-TR-83-095, pp. 20-27). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A140 643)
- human performance evaluation of HUD systems design** (Report No. AFAMRL-TR-83-095,). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A140 601)
- Genco, L. V., & Task, H. L.** (1981). *Aircraft transparency optical quality — New methods of measurement* (AFAMRL Technical Report 81-21). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A096 183)
- Genco, L. V., & Task, H. L.** (1984). *Testing changes in visual function due to orbital environment* (AFAMRL Technical Report 84-049). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A096 183)
- Ginsburg, A. P.** (1978). *Visual information processing based on spatial filters contained by biological data* (AMRL Technical Report 78-129(I & II)). Wright-Patterson AFB, OH: Aero-space Medical Research Laboratory. (DTIC No. A090 117)
- Ginsburg, A. P.** (1981). *Proposed new vision standards for the 1980's and beyond: Contrast sensitivity* (AFAMRL Technical Report 80-121). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A116 296)



Charles Bates, Jr.
Chief, Human Engineering Division

1975 to 1991

Charles Bates, Jr., following a tour in the US Army Air Forces, received his Masters Degree in Industrial Psychology from Kansas State University. Subsequent graduate studies involved industrial training in side-looking radar and photo interpretation.

Starting in 1956, he engaged in research directly supporting Air Force weapon system development. After nearly 35 years of government service entirely devoted to the Armstrong Laboratory at Wright-Patterson Air Force Base, Ohio, Bates retired as Director of the Human Engineering Division of the Crew Systems Directorate.

Under Bates, the division performed research dealing with a wide range of human performance issues in Air Force systems, including programs in workload measurement, visually coupled systems, strategic aircraft crew station design evaluation, effects of microgravity on vision, cockpit design support technology and basic research in human visual performance.

Bates was a key factor in the success of many different projects during his career. From his start in the Crew and Systems Branch, he was involved in crew station design for the Snark, Atlas, Navaho, B-52, B-70, Skybolt, and Hound Dog Programs. Participation in the development and test activities of these programs led to a research project to quantify the contribution of the human component to system reliability.

In 1962, Bates was promoted to Chief, Performance Requirements Branch, where his primary responsibility was human engineering support of Air Force advanced system development, including analysis and experimental activity on human performance problems peculiar to advanced systems. Bates was project engineer for the human performance aspects of the Manned Orbiting Laboratory Program. His branch initiated the early work in visually coupled systems, including the development of the first airborne qualified helmet-mounted sight and helmet-mounted display, and provided the initial human performance data for multisensor and real-time reconnaissance program development. In 1975, Bates was promoted to Director of the Human Engineering Division and then selected for the rank of Senior Executive Service in August 1983.

Bates was the recipient of several performance and professional awards, including the Air Force Systems Command Distinguished Civilian Service Medal and the Presidential Meritorious Executive Rank Award. A past Chairman of the Aerospace Medical Panel of the Advisory Group for Aerospace Research and Development of the North Atlantic Treaty Organization, Bates held four patents in the areas of visually coupled systems and helmet-mounted displays.



Ginsburg, A. P. (1983). Direct performance assessment of HUD display systems using contrast sensitivity. In W. L. Martin (Ed.), *Optical and human performance evaluation of HUD systems design* (Report No. Air Force Aerospace Medical Research Laboratory-Technical Report-83-095, pp. 55-66). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A140 601)

Ginsburg, A. P., Martin, W. L., & Self, H. C. (1983). Contrast sensitivity performance assessment of HUD display systems. *Proceedings of the Second Symposium on Aviation Psychology*.

Gliatti, E. L., Martin, W. L., & Kuperman, G. G. (1977). *Imagery interpreter performance in the comparison of subjective estimates of photographic image quality* (AMRL Technical Report 77-38). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A061 160)

"As far as I know I am the only person to have done human experiments in the Thomas domes. Volunteers were exposed to low levels of carbon monoxide as they slept. They were in there for about ten hours—eight hours of sleep and two hours of performance tests. The reason for the study was that a report out of Stanford had stated that 50 parts per million affected performance. At that time the military limit was 100 parts per million per eight hour period, so they were concerned about performance decrements, as well as the possible need to make changes in workplaces and work shifts. We found no performance effect at all. We had essentially replicated the procedure of the Stanford scientist, so he rechecked his data and found an error. He retracted his findings. That was a big success for us."

— Robert O'Donnell, Chief
Workload and Ergonomics Branch
Human Engineering Division

Gomer, F. E., Spicuzza, R. J., & O'Donnell, R. D. (1976). Evoked potential correlates of visual item recognition during memory-scanning tasks. *Physiological Psychology*, 4, 61-65.

Gomer, F. E., Spicuzza, R. J., & O'Donnell, R. D. (1976). *Evoked potential correlates of visual item recognition during memory-scanning tasks* (AMRL Technical Report 74-141). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A027 808)

Graham, C., & Cook, M. R. (1984). *Effects of pyridostigmine on psychomotor and visual performance* (AFAMRL Technical Report 84-052). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.

Gutmann, J. C., Snyder, H. L., Farley, W. W., & Evans, J. E. (1979). *An experimental determination of the effect of image quality on eye movements and search for static dynamic targets* (AMRL Technical Report 79-51). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A077 728)

Hann, R. L. (1979). *Modality effects in scaling nonverbal information: Evidence for multiple memory codes* (AMRL Technical Report 79-53). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A072 297)

Hann, R. L., & Kuperman, G. G. (1975). SAINT model of a choice reaction time paradigm. *Proceedings of the Human Factors Society 19th Annual Meeting*, 336-341.

Harris, J. S., & Harding, K. G. (1981). *Study and evaluation of existing techniques for measuring aircraft windscreen optical quality: Development of new techniques for measuring aircraft windscreen optical distortion* (AFAMRL Technical Report 81-25). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A097 731)

Haywood, W. J., Jr., & McMahon, D. J. (1975). *Advanced helmet mounted sight study program* (AMRL Technical Report 73-10). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A007 874)

Heckart, S. A., Alexander, M., & McConville, J. T. (1977). Human engineering evaluation. In J. R. Weiss (Ed.), *Development test of the A/S 32K-4 Bomb Lift Truck* (ADTC Technical Report 77-41, pp. 28-37). Eglin AFB, FL: Armament Development and Test Center.

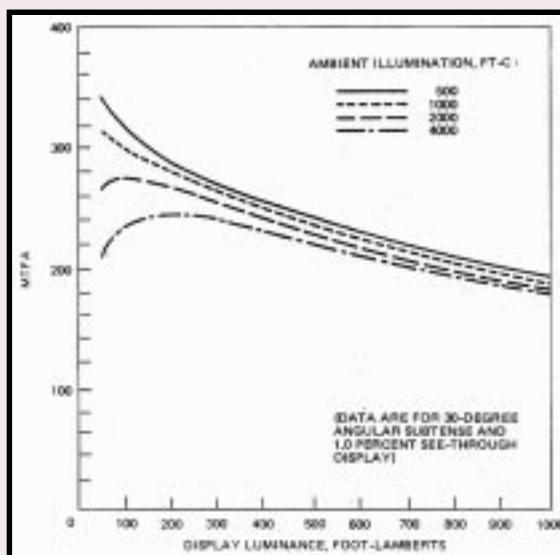
Heckart, S. A., & Kennedy, K. W. (1979). Human engineering evaluation of the aerial stores lift truck. In F. B. Atkinson (Ed.), *Development test and evaluation of Aerial Stores Lift Truck (ASLT) A/S 32K-8* (ADTC Technical Report 79-5, pp. 64-72). Eglin AFB, FL: Armament Development and Test Center.

Herron, R. E., Cuzzi, J. R., & Hugg, J. (1976). *Mass distribution of the human body using biostereometrics* (AMRL Technical Report 75-18). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A029 402)

Hershberger, M. L., & Guerin, D. F. (1975). *Binocular rivalry in helmet-mounted display applications* (AMRL Technical Report 75-48). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A013 838)

Hoffman, M. S., & Chubb, G. P. (1980). *Sampling methodology developed for preliminary SACDEF study* (AMRL Technical Report 78-33). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A083 091)

Hornseth, J. P., McMurry, R. L., Monk, D. L., & Porterfield, J. L. (1978). *Two dimensional eye tracking, sampling rate of forcing function* (AMRL Technical Report 78-26). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A058 896)



THE MODULATION TRANSFER FUNCTION OF A DISPLAY

Modulation transfer function area (MTFA) as a function of display luminance and ambient illumination. This graph, from "Binocular Rivalry in Helmet-Mounted Display Applications" is one of several graphs in this research study done for AMRL by M.L. Hershberger and D.F. Guerin of the Hughes Aircraft Company. This study is one of many conducted over a period of several years by various organizations in support of the Human Engineering Division's extensive research and development program on helmet-mounted display systems. AMRL-TR-75-48 (1975) (Task 718411)

Howland, B., Ginsburg, A., & Campbell, F. (1977). High-pass spatial frequency letters as clinical optotypes (AMRL Technical Report 77-88). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A072 889)

Jex, H. R., Magdaleno, R. E., Jewell, W. F., Junker, A., & McMillan, G. (1981). Effects on target tracking of motion simulator drive-logic filters (AFAMRL Technical Report 80-134). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.

Kaleps, I., Clauser, C. E., Young, J. W., Chandler, R. F., Zehner, G. F., & McConville, J. T. (1984). Investigation into the mass distribution properties of the human body and its segments. *Ergonomics*, 27(12), 1225-1237.

Kama, W. N. (1980). *Human operator interface with FLIR displays* (AMRL Technical Report 79-114). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A086 284)

Kama, W. N. (1983). Visual perception through windscreens: Effects of minor occlusions and haze on operator performance. In S. A. Marolo (Ed.), *Conference on Aerospace Transparent Materials and Enclosures* (Report No. AFWAL-TR-83-4154). Wright-Patterson AFB, OH: Air Force Wright Aeronautical Laboratories.

Kama, W. N., & Genco, L. V. (1982). *The effect of size and number (density) of minor optical occlusions on target detection performance* (AFAMRL Technical Report 82-48). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A122 546)

Kama, W. N., Genco, L. V., Barbato, M. H., & Hausmann, M. A. (1983). *The effect of haze on an operator's visual field and his target detection performance* (AFAMRL Technical Report 83-066). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A138 330)

Kama, W. N., Kuperman, G. G., Tutin, M. B., & Green, T. B. (1984). *The effectiveness of Radar Corner Reflectors (RCR) as a deception technique* (Report No. AFAMRL-TR-84-034). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.

Kama, W. N., Martin, W. L., & Kuperman, G. G. (1976). The effects of HUD symbology size on operator performance under various luminance conditions. *Proceedings of the 5th Psychology in the Air Force Symposium*. Colorado Springs, CO: USAF Academy.

Kama, W. N., Martin, W. L., & Kuperman, G. G. (1979). *Interim summary report of display working group joint DARCOM/NMC/AFLC/AFSC panel on the field of night vision technology* (AMRL Technical Report 79-101). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A077 061)

Karl, A. A., Buehring, W. J., McMillan, G. R., & Kissen, A. T. (1977). A head enclosure for exposing monkeys to selected gas mixtures. *Laboratory Animal Science*, 27, 267-270.

- Karl, A. A., McMillan, G. R., Ward, S. L., Kissen, A. T., & Souder, M. E.** (1978). Effects of increased ambient CO₂ on brain tissue oxygenation and performance in the hypoxic rhesus. *Aviation, Space, and Environmental Medicine*, 49(8), 984-989.
- Karl, A. A., Ward, S. L., Souder, M. E., Kissen, A. T., McMillan, G. R., & Clauser, G. L.** (1979). Rhesus brain gas tension and learned task performance responses to normoxic and hyperoxic breathing. *Preprints of the 1979 Annual Scientific Meeting of the Aerospace Medical Association* (pp. 189-190). Washington, DC: Aerospace Medical Association.
- Keesee, R. L.** (1976). *Prediction of modulation detectability thresholds for line-scan displays* (AMRL Technical Report 76-38). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A035 735)
- Kelly, S.** (1984). *Choice reaction time and color. An annotated bibliography* (AFAMRL Technical Report 84-022). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.
- Kennedy, K. W.** (1976). *International anthropometric variability and its effects on aircraft cockpit design* (AMRL Technical Report 72-45). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A027 801)
- Kennedy, K. W.** (1978). *Reach capability of men and women: A three-dimensional analysis* (AMRL Technical Report 77-50). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A060 312)
- Kikta, P., & Churchill, T.** (1978). *Editing procedure for anthropometric survey data* (AMRL Technical Report 78-38). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A060 393)
- Kissen, A. T., Alexander M., Smedley, D. C., Buehring, W. J., Ward, S. L., & Lowe, D. H.** (1976). *Evaluation of a face cooling device integrated with the standard HGU-type USAF flight helmet* (AMRL Technical Report 76-71). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A036 276)
- Kissen, A. T., Summers, W. C., Buehring, W. J., Alexander, M., & Smedley, D. C.** (1976). *Head and neck cooling by air, water, or air plus water in hyperthermia* (AMRL Technical Report 75-38.). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A027 614)
- Kocian, D. F.** (1975). *Investigation of a strap-on visual display for deaf lipreaders*. Unpublished master's thesis, The Ohio State University.
- Kocian, D. F.** (1976). *A Visually-Coupled Airborne Systems Simulator (VCASS): An approach to visual simulation* (AMRL Technical Report 77-31). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A039 999)
- Korna, M., & Aume, N.** (1980). *Designer's guide for the panel program* (AFAMRL Technical Report 80-124). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A093 989)



EVALUATING MODALITY EFFECTS IN SCANNING NONVERBAL INFORMATION

Sketch of a subject using a computer display in a study measuring modality effects in scanning nonverbal information to obtain evidence for multiple memory codes. The work was performed under Workunit 71841407 by Reuben L. Hann. AMRL-TR-79-53 (1979)

- Kou, R. S., & Glass, B. C.** (1979). *Development of observer model for AAA tracker response* (AMRL Technical Report 79-77). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A080 972)
- Kou, R. S., Glass, B. C., Moran, M. S., & Vikmanis, M. M.** (1979). *Development of MTQ tracker model and identification of model parameters* (AMRL Technical Report 79-80). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A080 807)
- Kou, R. S., Glass, B. C., & Vikmanis, M. M.** (1979). *Reduced-order observer model for AAA tracker response* (AMRL Technical Report 79-79). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A080 932)
- Kraft, C. L., & Anderson, C. D.** (1977). *Stereo acuity and reconnaissance: Phase II* (AMRL Technical Report 77-34). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. 043 258)
- Kraft, C. L., Anderson, C. D., Elworth, C. L., & Larry, C.** (1977). *Windshield quality and pilot performance* (AMRL Technical Report 77-39). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A048 457)
- Kroemer, K. H. E.** (1975). *Human force capabilities for operating aircraft controls at 1, 3, and 5 Gz* (AMRL Technical Report 73-54). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A011 545)
- Kroemer, K. H. E.** (1976). *Effects of high G on pilot muscle strength available for aircraft control operation* (AMRL Technical Report 73-22). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A027 802)
- Kulwicki, P. V.** (1976). *Influence of aircraft angle of attack on high G cockpit design* (AMRL Technical Report 75-124). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A025 083)
- Kulwicki, P. V.** (1978). *Research on visual display integration for advanced fighter aircraft* (AMRL Technical Report 78-97). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A069 605)
- Kulwicki, P. V., & Sinnott, J. M.** (1975). *Advanced maneuverability options for future fighters* (AMRL Technical Report 74-140). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A008 497)
- Kuperman, G., Kettlewell, J., Kama, W. N., & Fraggiotti, J.** (1977). *Research and simulation in support of near real/real time reconnaissance RPV systems* (AMRL Technical Report 77-33). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A044 598)
- Kuperman, G. G.** (1980). Evaluation of an image quality assessment technique based on magnification. *Proceedings of the Seventh Psychology in the Department of Defense Symposium*. Colorado Springs, CO: USAF Academy.
- Kuperman, G. G.** (1980). *Investigation of photographic image quality estimators* (AFAMRL Technical Report 80-27). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A087 805)
- Kuperman, G. G.** (1980). *Sensor-aided target acquisition simulation studies* (AMRL Technical Report 79-118). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A083 949)
- Kuperman, G. G.** (1982). *Systems performance and survivability considerations for tactical target recognition* (AFAMRL Technical Report 81-60). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A122 431)

"We have a fairly broad program in our division that is built on the foundation that Paul Fitts had laid when he first formed the organization 40 years ago. Much of his original work dealt with the solution of operational problems that he found occurred during World War II. From that work he developed general design principles that were then, in turn, translated into standard design practice, some of which are still in use today. The systems he worked on were comparatively very crude compared to the design challenges today; however, the basic paradigm still works."

— C. Bates, May 1985, "Human Engineering, Yesterday and Today," *Civilian Employees Reporter*

Kuperman, G. G. (1984). Criteria for selecting subjects for the assessment of advanced crew system concepts. *Proceedings of the Ninth Psychology in the Department of Defense Symposium* (Report No. USAFA TR-84-2). Colorado Springs, CO: USAF Academy. (DTIC No. P003354)

Kuperman, G. G., Burns, R. K., & DeFrances, A. J. (1980). Human factors and terrain map display design. *Society for Information Display International Symposium: Digest of Technical Papers*.

Kuperman, G. G., & DeFrances, A. J. (1979). *Airborne electronic terrain map system: A literature review* (AMRL Technical Report 79-92). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A079 402)

Kuperman, G. G., DeFrances, A. J., & Sander, D. L. (1980). Information requirements for airborne electronic terrain maps. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*.

Kuperman, G. G., & Gliatti, E. L. (1980). A comparative application of two subjective image quality assessment methods. *Society of Photographic Scientists and Engineers 33rd Annual Conference*.

Kuperman, G. G., & Gliatti, E. L. (1981). A comparison of two subjective image quality methods. *Journal of Applied Photographic Engineering*, 7(1).

Kuperman, G. G., Hann, R. L., & Berisford, K. M. (1977). Refinement of a computer simulation model for evaluating DAIS display concepts. *Proceedings of the Human Factors Society 21st Annual Meeting*.

Kuperman, G. G., & Kama, W. N. (1978). Real time reconnaissance systems simulator. *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Visual Simulation & Image Realism*, 162, 146 - 156.

Kuperman, G. G., & Kulwicki, P. V. (1984). Mission scenarios for cockpit automation technology. *Proceedings of the 6th Digital Avionics Systems Conference*, 3-6.

Kuperman, G. G., Moss, R. W., & Bondurant, R. A. (1983). Crew system assessment methods



SUBJECT WITH AN OXYGEN MASK IN TESTS FOR FITTING AND EVALUATION DATA

Front face view of a subject wearing an MBU-12/P oral-nasal oxygen mask in a study on the anthropometric sizing, fit-testing, and evaluation of this mask for air crew members. The work was done under Project 7184, Workunit 71840826. The researchers were Milton Alexander of AMRL and John T. McConville of Anthropology Research Project, Inc. AMRL-TR-79-44 (1979)

applied to derivative fighter cockpits.

Proceedings of the Human Factors Society 27th Annual Meeting.

Kuperman, G. G., & Seifert, D. J. (1975).

Development of a computer simulation model for evaluating DAIS display concepts. *Proceedings of the Human Factors Society 19th Annual Meeting*.

Kuperman, G. G., Wallquist, D. L., & Katz, L.

(1984). A digital image processing facility for human factors research. *Proceedings of the Human Factors Society 28th Annual Meeting*.

Laubach, L. L. (1975). *Muscular strength of women and men: A comparative study* (AMRL Technical Report 75-32). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A025 793)

Laubach, L. L. (1976). *Comparative muscular strength of men and women: A review of the literature* (AMRL Technical Report 75-120). Wright-Patterson AFB, OH: Aerospace

Medical Research Laboratory. (DTIC No. A072 892)



**MULTIPLE OPERATORS
CONTROLLING A
REMOTELY PILOTED
VEHICLE**

Multiple operators in a simulation of remotely operated vehicles in a study designed to examine control smoothing and automatic heading correction. The work was done under Workunit 71841402 by Robert G. Mills, Robert F. Bachert, and Nilss M. Aume. AMRL-TR-75-87 (1975)

- Laubach, L. L., & Alexander, M.** (1975). Arm-reach capability of USAF pilots as affected by personal protective equipment. *Aviation, Space and Environmental Medicine*, 46(4), 377-386.
- Leupp, D. G.** (1983). *Aces II negative Gz restraint investigation* (AFAMRL Technical Report 83-049). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research. (DTIC No. A140 326)
- Levison, W. H.** (1983). *Development of a model for human operator learning in continuous estimation and control tasks* (AFAMRL Technical Report 83-088). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.
- Levison, W. H., & Junker, A. M.** (1977). *A model for the pilot's use of motion cues in roll-axis tracking tasks* (Report No. AMRL-TR-77-40). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory.
- Levison, W. H., McMillan, G. R., & Martin, E. A.** (1984). Models for the effects of g-seat cuing on roll-axis tracking performance. *Proceedings of the 20th Annual Conference on Manual Control* (pp. 735-751). Moffett Field, CA: NASA Ames Research Center. (NASA Conference Publication 2341)
- Lewis, D. E.** (1983). *Feasibility demonstration of a target cuer simulator* (AFAMRL Technical Report 83-084). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A138 344)
- Lewis, D. E.** (1984). *Two-dimensional Fast Fourier Transforms in image processing* (AFAMRL Technical Report 84-006). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A139 997)
- Lewis, D. E., & Kuperman, G. G.** (1980). Non-conventional application of longitudinal tape recording to simulation of cued sensor imagery. *Journal of Applied Photographic Engineering*, 6(5).
- Lewis, D. E., & Kuperman, G. G.** (1980). Target cuer simulator with variable image speed. *Society for Information Display International Symposium: Digest of Technical Papers*. San Diego, CA.
- Lewis, W. N., Close, D. H., Cook, L. G., & Jacobs, R. S.** (1977). *Diffraction optics study* (AMRL Technical Report 76-119). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A043 632)
- MacLeod, S.** (1977). *Identification of alphabetic symbols as a function of their location in the visual periphery* (AMRL Technical Report 77-37). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A049 345)
- MacLeod, S., & Coblinz, D. B.** (1979). *Visually Coupled System-Computer Generated Imagery (VCS-CGI) engineering interface* (AMRL Technical Report 79-32). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A080 931)

- MacLeod, S., & Eggleston, R. G.** (1980). *Pilot reactions to optical defects found in F-111 bird impact resistant windscreens* (AFAMRL Technical Report 80-4). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A093 937)
- MacLeod, S., & Martin, W. L.** (1977). *Performance on a reciprocal tapping task with variations in intertapping interval* (AMRL Technical Report 77-49). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A055 145)
- Mallory, W. R., & Task, H. L.** (1981). Dynamic spatial filter for optical signal processing using a liquid crystal light valve. *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE)*. San Diego, CA.
- Martin, E. A., & McMillan, G. R.** (1982). Development of a g-seat roll-axis drive algorithm [Abstract]. *Proceedings of the 18th Annual Conference on Manual Control* (Report No. AFWAL-TR-83-3021, pp. 165). Wright-Patterson AFB, OH: Air Force Wright Aeronautical Laboratories.
- Martin, E. A., & McMillan, G. R.** (1983). Validation of a g-seat roll-axis drive algorithm (Summary). *Proceedings of the 19th Annual Conference on Manual Control* (pp. 419-421). Cambridge, MA: Massachusetts Institute of Technology.
- Martin, W. L.** (1979). *Optical power spectrum analysis of processed imagery* (AMRL Technical Report 79-29). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A073 083)
- Martin, W. L., & Task, H. L.** (1976). *Human factors design criteria for liquid crystal displays* (Report No. AMRL-TR-76-48). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A030 823)
- Martin, W. L., & Task, H. L.** (1976). *Matrix element display devices and their application to airborne weapon systems* (AMRL Technical Report 76-49). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A027 449)
- Martin, W. L., Task, H. L., Woodruff, K. R., & Pinkus, A. R.** (1976). *Element density and percent active area design requirements for liquid crystal displays* (AFAL Technical Report 75-235).
- Wright-Patterson AFB, OH: Air Force Avionics Laboratory. (DTIC No. A024025)
- McConville, J. T., & Alexander, M.** (1975). Anthropometric sizing program for oral-nasal oxygen masks based on 1967 U.S. Air Force survey data. *Aviation, Space, and Environmental Medicine*.
- McConville, J. T., & Churchill, E.** (1976). *Statistical concepts in design* (AMRL Technical Report 76-29). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A025 750)
- McConville, J. T., Churchill, E., & Clauser, C. E.** (1977). *The Aerospace Medical Research Laboratory's anthropometric data bank: A resource for designers* (AMRL Technical Report 79-42). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A069 195)
- McConville, J. T., & Clauser, C. E.** (1977). *Comparative anthropometry of Air Standardization Coordinating Committee personnel for equipment designing: Helmets* (AMRL Technical Report 77-77). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A052 893)



TESTING A HOLOGRAPHIC HEAD-UP DISPLAY (HUD)

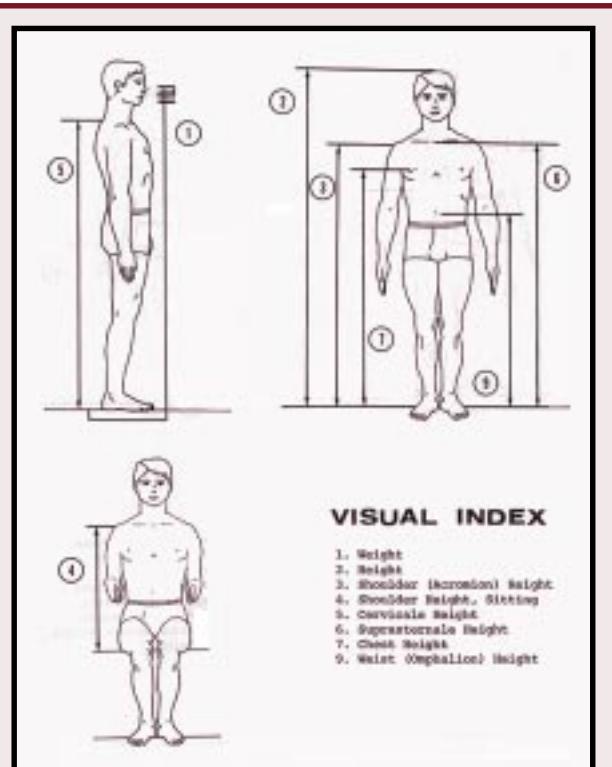
Testing a pilot in the cockpit of a YF-16 aircraft looking through the head-up display (HUD) in a study of diffractive optics. The goal was to determine the utility of both reflective and transmissive holographic optical elements for extending the information display capability of fighter aircraft. The study was done on contract under Workunit 71840448 by W. N. Lewis, D.H. Close, J.G. Cook and R.S. Jacobs of the Hughes Aircraft Company. AMRL-TR-76-119 (1977)

McConville, J. T., & Clauser, C. E. (1978). *Anthropometric resources vs civilian needs* (AMRL Technical Report 78-111). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A061 390)

McConville, J. T., Tebbetts, I., & Alexander, M. (1979). *Guidelines for fit testing and evaluation of USAF personal-protective clothing and equipment* (AMRL Technical Report 79-2). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A065 901)

McDaniel, J. W. (1976). Computerized biomechanical man-model. *Proceedings of the International Ergonomics Association*.

McDaniel, J. W. (1977). Aerospace Medical Research Laboratory's pilot strength and endurance screening program. *Proceedings of the 48th Annual Scientific Meeting of the Aerospace Medical Association*.



MEASUREMENTS USED IN A HEIGHT-WEIGHT SIZING MANUAL

Some of the 71 different measurements taken for a revised height-weight sizing manual for protective flight garments. The work was done under Workunit 71840826 of Project 7184 by Milton Alexander, and by John McConville and Ilse Tebbetts of Anthropology Research Project, Inc. AMRL-TR-79-28 (1979)

In 1983, the Strategic Air Command asked my group to build a simulator facility for the new B-1 bomber, which was under construction, but for which there was no training device. We built them two simulators to serve as interim trainers while the production trainers were being produced. While these were being fielded, we built another, higher fidelity, defensive simulator and began a similar operation for the B-1 as we had done for the B-52. Later the two fielded units were returned to the lab and served as experimental platforms for all B-1 crew positions. This group is now working on a similar device for the B-2.

— Earl Sharp. Program Engineer
Human Engineering Division

McDaniel, J. W. (1978). Aerospace Medical Research Laboratory's pilot strength and endurance screening program (AMRL Technical Report 78-112). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A061 706)

McDaniel, J. W. (1981). Male and female capabilities for operating aircraft controls (AFAMRL-TR-81-39). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A098 256)

McDaniel, J. W. (1982). Biomechanical computer modeling for the design and evaluation of workstations. In R. Easterby, K. H. E. Kroemer, & D. F. Chaffin (Eds.), *Anthropometry and biomechanics theory and application*. New York: Plenum Press.

McDaniel, J. W. (1984). CREW CHIEF: Techniques for maintenance and workplace evaluation. *Proceedings of the NATO Defense Research Group Panel VIII: Applications of System Ergonomics to Weapon System Development* (pp. 25-26). England: Royal Military College of Science.

McDaniel, J. W., Skandis, R. J., & Madole, S. W. (1983). Weight lift capabilities of Air Force basic trainees (AFAMRL-TR-83-0001). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A129 543)

McGillem, C. D., & Aunon, J. I. (1979). Analysis of single event evoked potentials (AMRL Technical Report 79-83). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A080 896)

McMillan, G. R., Cody, W. J., & Mills, R. G. (1983). Laboratory studies of aircrew chemical protective ensemble: Effects on pilots' performance. *AGARD Conference Proceedings No. 338: Sustained Intensive Air Operations: Physiological and Performance Aspects*. Paris: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-338)

McMillan, G. R., & Crabtree, M. S. (1978). *Some effects of television sensor blooming on operator tracking performance and weapon system effectiveness* (Report No. AFAL-TR-77-57(1&11)). Air Force Avionics Laboratory: Wright-Patterson AFB, OH.

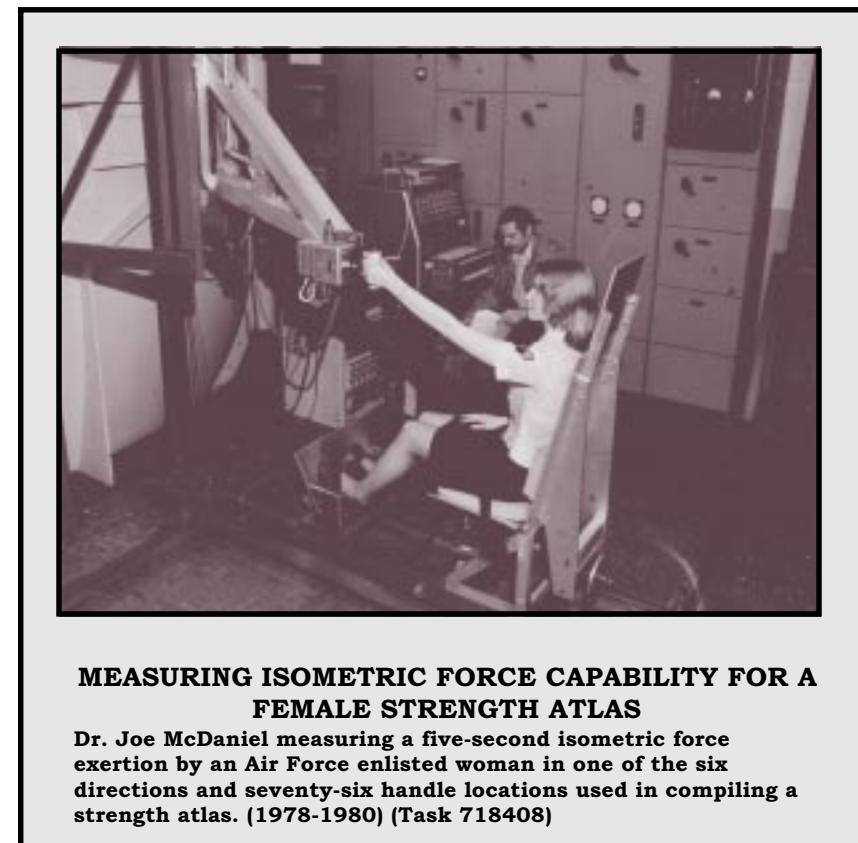
McMillan, G. R., Levison, W. H., & Martin, E. A. (1984). Motion simulation with a g-seat system: Sensory and performance mechanisms. *Proceedings of the Ninth Psychology in the Department of Defense Symposium* (Report No. USAFA-TR-84-2, pp. 158-162). Colorado Springs, CO: USAF Academy. (DTIC No. P003354)

Meyer, E. G., Rickels, W. H., & Mills, R. G. (1983). *The user-assisted Automated Experimental (TEST) Design program (AED): Version II* (AFAMRL Technical Report 82-100). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A124 303)

Meyer, G. R. (1976). *Survey of computer software for the human engineering systems simulation facility* (AMRL Technical Report 71-61). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A028 301)

Miller, J. J., Jr. (1976). *Program documentation for the analog digitization program* (AMRL Technical Report 76-12). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A021 918)

Miller, J. J., Jr. (1977). *Program documentation for the head switching software package* (AMRL Technical Report 77-41). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A046 175)



Mills, R. G., Aume, N. M., & Bachert, R. F. (1975). *Report of AMRL Remotely Piloted Vehicle (RPV) system simulation study III results* (AMRL Technical Report 75-126). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A020 064)

Mills, R. G., Bachert, R. F., & Aume, N. M. (1975). *Summary Report of AMRL Remotely Piloted Vehicle (RPV) system simulation study II results* (AMRL Technical Report 75-13). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A006 142T)

Mills, R. G., Bachert, R. F., & Aume, N. M. (1975). *Supplementary report of RPV system simulation study. II: Evaluation of RPV position report smoothing and automatic heading correction* (AMRL Technical Report 75-87). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A017 334)

Mills, R. G., Bachert, R. F., & Hatfield, S. A. (1975). *Quantification and prediction of human performance: Sequential task performance reliability and time* (AMRL Technical Report 74-48). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A017 333)



TESTING AN OBSERVER AT A SIMULATED B-52 BOMB-NAVIGATION STATION

An observer working at the bomb-navigation station of a B-52 aircraft simulator in the Armstrong Laboratory. This station was part of the Offensive Avionics System (OAS) on the B-52. The Human Engineering Division performed human factors-oriented exercises with the system and conducted experiments and analyses of human and system behavior to obtain design recommendations for improving it. The work was done by Earl Sharp and coworkers in 1974-1976. (Task 718410)

Mills, R. G., Hutson, F. T., Hartman, W. B., Meyer, E. G., Hoyland, C. M., Navarro, H., & Covelli, R. R. (1981). *Evaluation of alternative video imagery processors in unjammed and jammed environments in terms of operator performance in a weapon delivery simulator* (AFAMRL Technical Report 81-45). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A105 222)

Moise, S. L. (1980). *Development of neurophysiological and behavioral metrics of human performance* (AFAMRL Technical Report 80-39). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A087 840)

Monk, D. L., & Jagacinski, R. J. (1983). *A test of Fitts' Law in two dimensions with hand and head movements* (AFAMRL Technical Report 83-054). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.

Monk, D. L., Porterfield, J. L., Hornseth, J. P., & McMurry, R. L. (1978). *Head tracking at large angles from the straight ahead position* (AMRL Technical Report 78-27). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A058 900)

Morrisette, J. O., Hornseth, J. P., & Shellar, K. (1975). Team organization and monitoring performance. *Human Factors*, 17(3), 296-300.

Mras, J., Brandt, W. E., Nagel, J. L., & Sebasky, G. M. (1978). *Program documentation for the helmet-mounted-display processor flight software* (AMRL Technical Report 78-36). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A063 312)

Mueller, L. J. (1979). *Helmet-mounted sight/display program: CESSNA 310 flight test* (AMRL Technical Report 79-59). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A072 058)

Muick, C. J. (1978). *Lexicon of aircraft transparency terms* (AMRL Technical Report 78-122). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A071 319)

Murray, R. D. (1983). The application of a superconducting quantum interference device second-order gradiometer to measure visual evoked responses [Master's Thesis]. (Report No. AFIT/GE/EE/83D-50). Wright-Patterson AFB, OH: Air Force Institute of Technology.

Nelson, D., & Ritchie, M. (1976). *Using computer-generated displays for research on synthesized displays: Distance perception aided by aerial perspective and texture* (AMRL Technical Report 76-34). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A030 589)

Newman, R. L. (1980). *Operational problems associated with head-up displays during instrument flight* (AFAMRL Technical Report 80-115). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A093 992)

DEVELOPING OPERATIONAL PROCEDURES FOR COMBIMAN

Susan M. Evans from the University of Dayton Research Institute working with a display used in developing a user's guide on operational procedures for the COMBIMAN program. The work was done under Workunit 71840824. COMBIMAN is the acronym for COMputerized BIomechanical MAN-model, a computer-generated manikin of the human body representing its various and variable dimensions and motion characteristics. COMBIMAN was developed earlier for the Human Engineering Division. This model has been revised several times since this report by Susan M. Evans.

AMRL-TR-78-31 (1978)



- O'Donnell, R. D., & Spicuzza, R. J. (1977). *Visually evoked brain potentials as aids in display design* (AMRL Technical Report 77-58). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A043 853)
- Olson, B. A. (1979). *Operational pilot factors analysis report* (AMRL Technical Report 79-64). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A072 063)
- Pantle, A. J. (1980). *Analysis of dynamic visual processing* (AFAMRL Technical Report 80-117). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A094 077)
- Pantle, A. J. (1983). *Spatial contrast sensitivity with extremely small pupils* (AFAMRL Technical Report 83-092). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A141 970)
- Pearson, W. H. (1980). *Studies in tactical display symbology: II. Symbol meaningfulness and learning efficiency* (AFAMRL Technical Report 80-115). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A093 952)
- Pearson, W. H., Rundle, M., & Hoffman, M. S. (1979). *Studies in tactical symbology: I. Preferred tactical symbology for joint tactical information distribution system (JTIDS)* (AMRL Technical Report 78-115). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A070 706)
- Pinkus, A. R. (1982). *The effects of color and contrast on target recognition performance using monochrome television displays* (Report No. AFAMRL-TR-82-9). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.
- Post, D. L. (1984). CIELUV/CIELAB and self-luminous displays: Another perspective. *Color Research and Application*, 9, 244-245.
- Post, D. L., & Sheibenberger, D. (1984). Angular subtense requirements for colored CRT symbology. *Proceedings of the Human Factors Society 28th Annual Meeting*, 2, 937-941.
- Potter, E., Burkott, P., & Gordon, J. (1976). *Visually activated switch system* (AMRL Technical Report 76-70). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A031 589)
- Pratt, P. D. (1976). *Advanced Helmet Sight Reticle Assembly (AHRA)* (AMRL Technical Report 73-11). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A039 057)
- Price, J. (1979). *Visor fabrication process study* (AMRL Technical Report 79-63). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A072 062)
- Prouhet, E. P., & Kulwicki, P. V. (1977). *High acceleration cockpit simulator evaluation summary report* (AMRL Technical Report 75-123). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A045 165)

Reid, G. B. (1980). An operational application of neurophysiological and behavioral workload indices. *Proceedings of the Human Factors Society 24th Annual Meeting*.

Reid, G. B., Eggemeier, F. T., & Nygren, T. E. (1982). An individual differences approach to SWAT scale differences. *Proceedings of the Human Factors Society 26th Annual Meeting*.

Reid, G. B., Eggemeier, F. T., & Shingledecker, C. A. (1982). Subjective workload assessment technique. In M. L. Frazier, & R. B. Crombic (Eds.), *Proceedings of the AAA Workshop on Flight Testing to Identify Pilot Workload and Pilot Dynamics*. Edwards AFB, CA: Air Force Flight Test Center.

Reid, G. B., Shingledecker, C. A., & Eggemeier, F. T. (1981). Application of conjoint measurement to workload scale development. *Proceedings of the Human Factors Society 25th Annual Meeting*, 522-526.

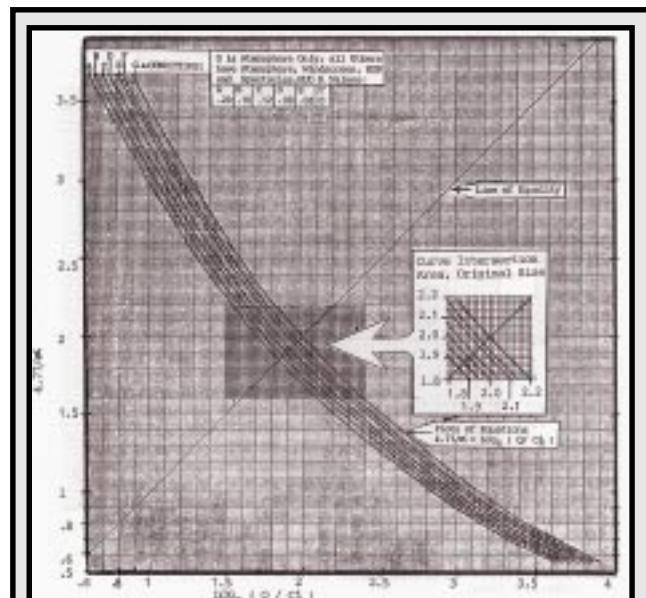
Reid, G. B., Shingledecker, C. A., Hockenberger, R. L., & Quinn, T. J. (1984). A projective application of the subjective workload assessment technique. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*.

Repperger, D. W., & Junker, A. M. (1977). *Study of identification methods and structural modeling techniques on empirical data from a motion study* (AMRL Technical Report 77-45). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A041 856)

Reynolds, H. M. (1980). Three-dimensional kinematics in the pelvic girdle. *Journal of AOA*, 80(4).

Reynolds, H. M. (1983). *A foundation for systems anthropometry: Lumbar/pelvic kinematics* (AFAMRL Technical Report 83-016). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A129 517)

Rinalducci, E. J., Bertinison, J., Caplan, R. D., Guion, R. M., King, V. M., Sliney, D. H., Smith, S. W., Snyder, H. L., Sommer, A., Stark, L. W., Task, H. L., & Taylor, H. R. (1983). *Video displays, work, and vision*. Washington, DC: National Academy Press.



CONTRAST LOSS DUE TO ATMOSPHERE, WINDSCREEN, AND SPECTACLES

One of the tutorial examples in a theory paper showing how to determine airborne contrast loss due to the atmosphere, the aircraft windscreen, and spectacles. A paper by Herschel C. Self; one of several papers in a joint AFAMRL-ASD (ENA) technical report edited by Wayne Martin. AFAMRL-TR-83-095 (1983) (Task 718418)

Robinette, K., & Churchill, T. (1979). *Design criteria for characterizing individuals in the extreme upper and lower body size ranges* (AMRL Technical Report 79-33). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A072 353)

Robinette, K., Churchill, T., & McConville, J. T. (1979). *A comparison of male and female body sizes and proportions* (AMRL Technical Report 79-69). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A074 807)

Robinette, K. M. (1983). *An annotated bibliography of United States Air Force Engineering Anthropometry - 1946 to 1983* (AFAMRL Technical Report 83-045). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A129 981)

Rolek, E. P. (1980). *SAM system performance evaluation: E-O data for human operator model development* (AFAMRL Technical Report 80-118). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A094 023)

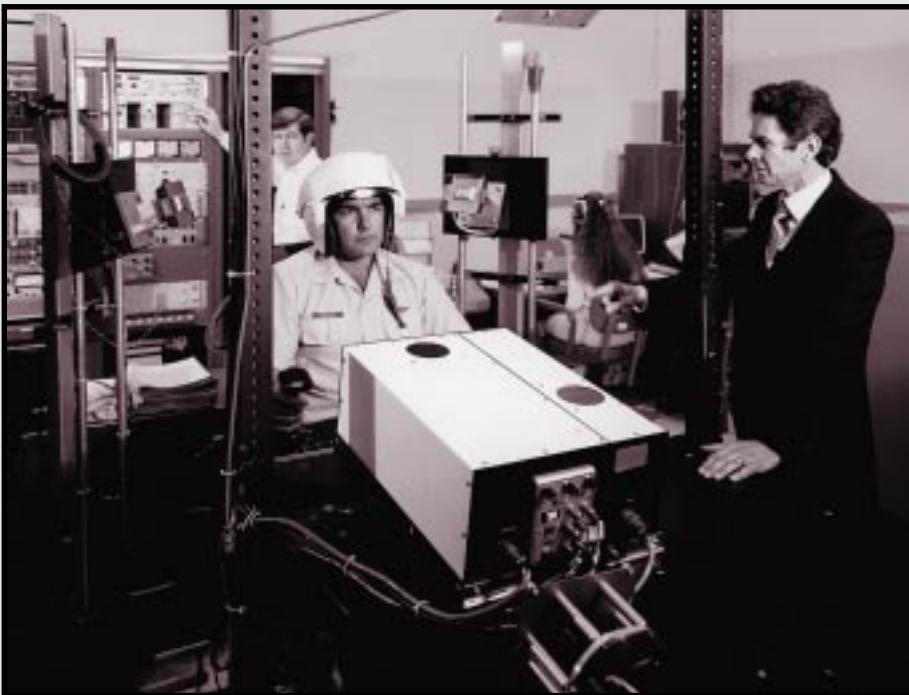
- Rouse, W. B., & Rouse, S. H.** (1983). *A framework for research on adaptive decision aids* (AFAMRL Technical Report 83-082). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.
- Scanlan, L. A., & Carel, W. L.** (1976). *Human performance evaluation of matrix displays: Literature and technology review* (AMRL Technical Report 76-39). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A029 932)
- Schindler, R. A.** (1976). *Optical power spectrum analysis of display imagery. Phase I: Concept validity* (AMRL Technical Report 76-96). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A035 377)
- Schindler, R. A., & Martin, W. L.** (1978). *Optical power spectrum analysis of display imagery* (AMRL Technical Report 78-50). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A058 040)
- Seeman, J. M., & Homstad, L. E.** (1979). *Integrated helmet-mounted sight/display program* (AMRL Technical Report 79-61). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A072 060)
- Seid, R.** (1981). *Computer analysis and correction of the optical distortion in the F-111 bird impact resistant windscreen* (AFAMRL Technical Report 81-67). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.
- Seid, R. C., & Self, H. C.** (1978). *Influence of gridboard line width and spacing on windscreen distortion measurements* (AMRL Technical Report 78-93). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A065 821)
- Seifert, D. J.** (1979). *Combined discrete network: Continuous control modeling of man-machine systems* (AMRL Technical Report 79-34). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A072 376)
- Seifert, D. J., Koeplinger, G., & Hoyland, C. M.** (1980). *Redimen: SAINT redimensioning program* (AMRL Technical Report 80-5). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A082 735)
- Seifert, D. J., Wortman, D. B., & Duket, S. D.** (1977). *SAINT: A combined discrete/continuous network simulation technique* (AMRL Technical Report 77-24). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A039 586)
- Self, H. C.** (1978). *The behavior of observers in detecting unbriefed targets at different aircraft speeds with side-looking radar* (AMRL Technical Report 77-95). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A060 908)
- Self, H. C.** (1979). *Detecting tactical targets with motion pictures from low slow aircraft* (AMRL Technical Report 79-31). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A074 808)

One of Earl Sharp's first projects on his newly developed B-52 EWO simulator was to redesign it based on available anthropometric data. This project was spurred by his observations that the crews were sometimes unable to reach or see important components of the workstation. Simply by applying an existing database of reach data with data about forces required to operate certain switches or knobs and dials, Earl came up with a more ergonomically sound workstation.

In order to test the new design concepts, Earl recruited crews to run as subjects in highly realistic mission scenarios which consisted of real mission briefings, the mission itself, and the debrief, to provide the crews with the most real experience possible. SAC provided the details of the up-to-date threat types from Vietnam (at the time) to challenge the crews and make them act as if they were really there. The crews reported that after about 30 minutes, they had forgotten they were in a simulator. They also reported that the realistic missions provided them with better training than some of the simulator training conducted in the wings.

Some of Earl's discoveries were frowned upon by SAC. Earl would discover what really went on in the aircraft rather than what doctrine dictated or what SAC thought was happening. He was able to guarantee the subjects' anonymity and confidentiality while they were being tested and so the crews acted as they would in the real aircraft. This brought credibility and respect to Earl's findings from the crews and SAC.

— Klein Associates
Interview with Earl Sharp

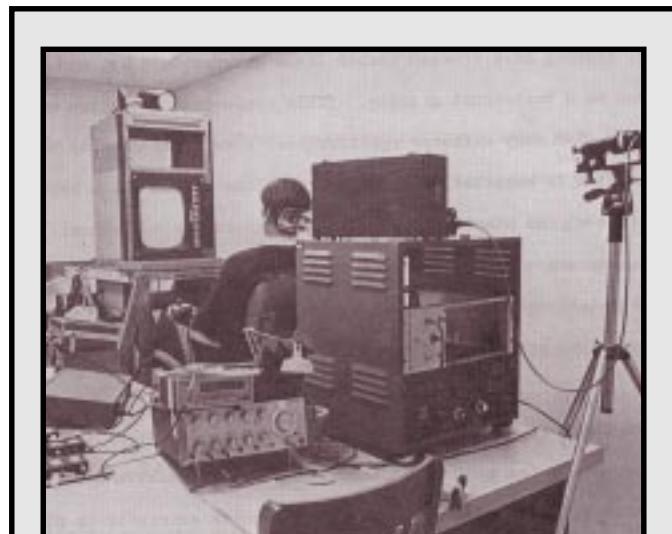


EYE TRACKING PERFORMANCE

Capt Al Dickson is the experimental subject, James L. Porterfield is the experimenter, and Don Monk is adjusting the equipment in an investigation of eye tracking performance with the Honeywell Remote Oculometer. This work was done in 1978.

- Self, H. C.** (1982). *Image size range and TV camera separation distance for large secure areas* (Report No. AFAMRL-TR-81-94). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A122 444)
- Self, H. C.** (1982). *Visual judgments of optical distortion in aircraft windscreens* (AFAMRL Technical Report 81-24). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. 1 124 307)
- Self, H. C.** (1983). Contrast loss and target detection. In W. L. Martin (Ed.), *Optical and human performance evaluation of HUD systems design* (Report No. AFAMRL-TR-83-095, pp. 31-54). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A140 601)
- Self, H. C., & Heckart, S. A.** (1979). *Daytime visual acuity of observers through a window with and without binoculars* (AMRL Technical Report 79-23). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A074 722)
- Self, H. C., & Heckart, S. A.** (1982). *Visual acuity with and without binoculars through thick observation tower windows* (AFAMRL Technical Report 81-95). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A093 814)
- Force Aerospace Medical Research Laboratory. (DTIC No. A114 916)
- Self, H. C., & Task, H. L.** (1980). *Potential of optical Fourier analysis for measuring windscreen distortion* (AFAMRL Technical Report 80-104). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A094 127)
- Shingledecker, C. A., Crabtree, M. S., Simons, J. C., Courtright, J. F., & O'Donnell, R. D.** (1980). *Subsidiary radio communications tasks for workload assessment in R&D simulations: I. Task development and workload scaling* (AFAMRL Technical Report 80-126). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A094 021)
- Shirachi, D. K., Monk, D. L., & Black, J. H., Jr.** (1976). *Effects of headgear and visual angle on head rotation spectral characteristics* (AMRL Technical Report 76-68). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A093 814)
- Skelly, J. J., Rizzuto, A., & Wilson, G. F.** (1984). Temporal patterning and selective attention effects on the human evoked response. In J. Gibbon, & L. Allan (Eds.), *Timing and Perception, Annals of New York Academy of Science*, 423, 646-649.

- Skelly, J. J., & Wilson, G.** (1983). Temporal context and instructional set effects on evoked potentials. *Proceedings of the 149th National Meeting of the American Association for the Advancement of Science*.
- Smedley, D. C., & Nelson, D. R.** (1979). *Effects of background illumination and target contrast on flashblindness recovery time* (AMRL Technical Report 79-30). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A071 906)
- Snyder, H. L.** (1976). *Visual search and image quality* (AMRL Technical Report 76-89). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A036 263)
- Snyder, H. L., Dunske, E. D., Beamon, W. S., & Gutmann, J. C.** (1980). *An evaluation of the effect of spot wobble upon observer performance with raster scan displays* (AMRL Technical Report 79-91). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A083 090)
- Stern, J., & Skelly, J. J.** (1984). The eyeblink and workload considerations. *Proceedings of the Human Factors Society 28th Annual Meeting* 2, 942-944.
- Stockman, G. C., & Kopstein, S. H.** (1979). *The use of models in image analysis* (AMRL Technical Report 78-117). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A067 166)
- Targove, B. D., & Seid, R.** (1979). *Paraxial optocvisual analysis of the F-111E windscreen with generic application* (AMRL Technical Report 79-107). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A080 143)
- Task, H. L.** (1979). *An evaluation and comparison of several measurements of image quality for television displays* (AMRL Technical Report 79-7). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A069 690)
- Task, H. L.** (1979). *Raster-scan display photometric noise measurement* (AMRL Technical Report 79-13). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A073 024)
- Task, H. L.** (1983). Measurement of HUD optical quality. In W. L. Martin (Ed.), *Optical and human performance evaluation of HUD systems design* (Report No. AFAMRL-TR-83-095, pp. 11-19). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A140 601)
- Task, H. L.** (1983). Optical effects of F-16 canopy-HUD integration. In S. A. Marolo (Ed.), *Conference on Aerospace Transparent Materials and Enclosures* (Report No. AFWAL-TR-83-4154, pp. 809-824). Wright-Patterson AFB, OH: Air Force Wright Aeronautical Laboratories.
- Task, H. L.** (1984). Image quality measurement. In C. P. Gibson (Ed.), *Proceedings of the Workshop on Colour Coded vs Monochromatic Electronic Displays* (Report No. DS/A/DR(84)431, pp. 20.1-20.15). Farnborough, England: Royal Aircraft Establishment.
- Task, H. L., Eggleston, R. G., & Genco, L. V.** (1980). A new angular deviation measurement device for aircraft transparencies. *Proceedings of the Conference on Aerospace Transparencies*. London: Society of British Aerospace Companies.



TESTING FOR AN OBSERVER'S MODULATION DETECTABILITY THRESHOLD

A subject observing the display in a study of the modulation detectability thresholds for line-scan displays. This contract research was done for AMRL by Robin Keesee of the Virginia Polytechnic Institute and State University. AMRL-TR-76-38 (1976) (Project 7184)

Shortly after being assigned to the newly formulated Visual Display Systems Branch (May, 1974), under the direction of Thomas A. Furness, I was asked to consult with Avionics Laboratory personnel at WPAFB involved with detecting and monitoring the presence of satellites in deep space. By that time, there were sufficient pieces of disintegrated satellites, as well as functional satellites launched by this country and others, that the Avionics Laboratory, in conjunction with Lincoln Labs, was proposing to build GEODSS (Ground Electro-Optical Deep Space Surveillance System), a satellite detection, tracking, and cataloging system. The plan was to build a few tracking stations at selected sites around the globe which would house high-powered telescopes, slaved to the movement of the starfield, having very sensitive TV cameras at the image plane. The video information was to be displayed on high-resolution displays which would be monitored by operators who would identify anything that moved as either a satellite or noise. Problems of vigilance and visual differentiation between a real satellite and artifacts of electronic noise were mixed with boredom and visual fatigue to produce a very challenging human task.

A short time earlier, Larry Scanlan at the University of Illinois at Urbana-Champaign had produced a PhD dissertation on "time compression" under the contractual support of the Air Force Office of Scientific Research. His research, and that of C.T. White of the Naval Electronics Laboratory, nearly 20 years earlier, demonstrated greatly improved target detection performance using the coherent motion cues provided by a time-compressed display. White had filmed successive scans of a radar display and projected them back at a standard movie frame rate, thus making the coherence of target movement much more apparent. Scanlan used a computer-driven plasma panel display to generate the stimulus material and explored the effects of various time-compression ratios and number of stored frames on detection time.

An inexpensive dual-screen black and white TV had just come on the commercial market, having approximately five-inch and eight-inch screens, together with a "one-shot memory" video disk for recording and displaying on the smaller screen, single frames of video for study by sports enthusiasts. We bought seven of these devices, and had the video disks pulled out of them and wired so as to be able to manipulate the time between stored frames, the number of times a stored frame was displayed before the next one was presented, and the number of frames stored. Bill Kama and I (with the help of Maryann Howes of SRL) were in the process of generating experimental stimulus materials using a satellite/starfield simulator the Avionics Laboratory had fabricated, in which sky background, satellite magnitude (brightness), movement and viewing distance could be controlled. We wanted to use the video time compression equipment in our laboratory to determine the best combination of parameters, prior to using it on real satellite imagery. However, once the Avionics Laboratory witnessed the dramatic improvement in detection time and ease of use, they insisted on taking the rack-mounted hardware to their Lincoln Labs test site at White Sands, New Mexico. After our brief indoctrination of the workings of the system with real satellite imagery, the Avionics Lab and Lincoln Lab personnel were so enamored by the capability they saw, they refused to release the device for our further testing. They used it to hone the time-compression parameters in a computerized version of the device, which is still in use today in GEODSS sites such as that on Maui, Hawaii.

-- Wayne L. Martin, Chief
Visual Display Systems Branch
Human Engineering Division

Task, H. L., & Griffin, L. L. (1982). Electroluminescent lighting and other techniques for improving night vision goggles compatibility with cockpit displays. *AGARD Conference Proceedings No. 329*. Blackpool, UK. (NTIS No. AGARD-CP-329)

Task, H. L., & Griffin, L. L. (1982). PAVE LOW III: Interior lighting reconfiguration for night lighting and night vision goggle compatibility. *Aviation, Space, and Environmental Medicine*, 53, 1162-1165.

Task, H. L., Kocian, D. F., & Brindle, J. H. (1980). Helmet mounted displays: Design considerations. *AGARDograph 255: Advancement on Visualization Techniques* (pp. 10-1 - 10-13). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-AG-255)

Task, H. L., Mallory, W. R., Griffin, L. L., & Defrances, A. J. (1981). Incandescent versus electroluminescent lights for austere runway lighting. *1981 AFSC/NAVMAT Science and Engineering Symposium* (pp. 249-270). Wright-Patterson AFB, OH: Air Force Systems Command.

Task, H. L., Pinkus, A. R., & Hornseth, J. P. (1978). A comparison of several television display image quality measures. *Society for Information Display International Symposium: Digest of Technical Papers*, 9, 32-33.

Task, H. L., & Verona, R. W. (1976). *A new television display quality measure relatable to observer performance* (AMRL Technical Report 76-73). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A030 568)

Task, H. L., Verona, R. W., & Brindle, J. H. (1975). Sine wave response analysis and its interpretation for determining television display quality. *Optical Society of America Symposium*.

Taylor, D. F., Snyder, M. S., & Snyder, H. L. (1976). *Computerized analysis of eye movements during static display visual search* (AMRL Technical Report 75-91). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A024 100)

Tebbetts, I., McConville, J. T., & Alexander, M. (1979). *Height/weight sizing programs for women's protective garments* (AMRL Technical Report 79-35). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A072 376)

Topmiller, D. A. (1976). Man-machine command-control-communication simulation studies in the Air Force. In R. M. Thrall, C. P. Tsokos, & J. C. Turner *Proceedings of AFOSR Workshop on Decision Information for Tactical Command and Control* (AMRL Technical Report 76-122). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. 042 148)

Topmiller, D. A. (1978). Simulation. *Encyclopedia of neurology psychiatry and psychology*.

Topmiller, D. A. (1981). Methods, past approaches, current trends and future requirements. In Moral, & Kraiss (Eds.), *Manned systems design*. New York: Plenum Press.

Topmiller, D. A., & Aume, N. M. (1977). *Computer-graphic design for human performance* (AMRL Technical Report 77-74). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A055 132)

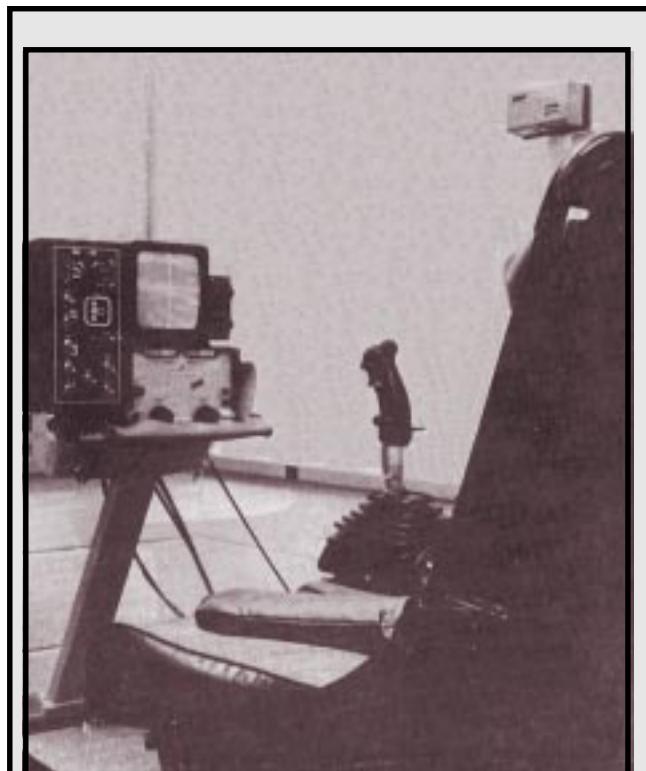
Tutin, M. B., Nelson, D., & Task, H. L. (1982). *Effects of windscreen halation on night visual performance* (AFAMRL-TR-82-47). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.

Verona, R. W., Task, H. L., Arnold, V. C., & Brindle, J. H. (1979). A direct measure of CRT image quality. *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE)*, 196.

Verona, R. W., Task, H. L., Arnold, V. C., & Brindle, J. H. (1979). *A direct measure of CRT image quality* (USAARL Report No. 79-14). Ft. Rucker, AL: US Army Aeromedical Research Laboratory.

Vikmanis, M. M., & Kou, R. S. (1979). *Monte Carlo simulation of an AAA system using the observer model* (AMRL Technical Report 79-78). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A080 972)

Ward, F., Wilson, D., & Wallquist, D. (1984). *Development of color criteria for advanced*



WORKSTATION FOR A GUIDED BOMB SYSTEM

Operator's workstation of the weapon delivery simulator for the GBU-15 TV-guided bomb used to evaluate alternative video imagery processes in jammed and unjammed environments. Researchers were Robert G. Mills of AMRL, Franklin T. Hutson and Walter B. Hartman of the Air Force Wright Aeronautical Laboratories, and Edwin G. Meyer, Herbert Navarro, Constance M. Hoyland, and Robert R. Covelli of the System Development Corporation. AFAMRL-TR-81-45 (1981) (Project 6893)

displays (AFAMRL Technical Report 84-23). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. 143 246)

Ward, F., Wilson, D., Wallquist, D., & Kuperman, G. G. (1984). Color coding of synthetic aperture radar imagery. *Proceedings of the Human Factors Society 28th Annual Meeting*, 1, 303-307.

Ward, F. E., DeFrances, A. J., & Eggleston, R. G. (1979). *Development of a visual inspection technique (optical assessment of aircraft transparencies)* (AMRL Technical Report 79-67). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A079 369)

Ward, S. L., & Poturalski, R.
 (1983). *Maze-solving as a performance measurement tool for human operations under time-stress* (AFAMRL Technical Report 83-052). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A133 394)

Warren, R., Genco, L. V., & Connell, T. R. (1984). *Horizontal diplopia thresholds for head-up displays* (AFAMRL Technical Report 84-018). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A141 965)

Warren, R., & McMillan, G. R.
 (1983). Application of active psychophysics to an altitude regulation task. *Bulletin of the Psychonomic Society*, 22, 349-350.

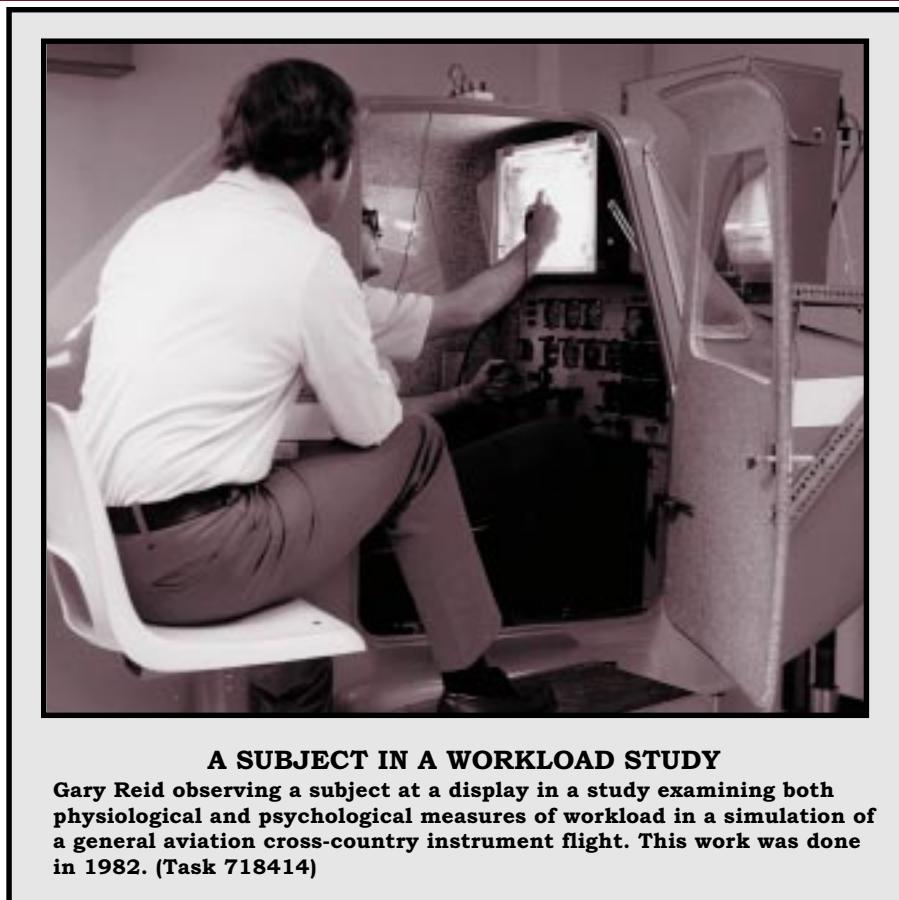
Warren, R., & McMillan, G. R.
 (1984). Altitude control using action-demanding interactive displays: Toward an active psychophysics. *Proceedings of the 1984 Image III Conference* (pp. 37-51). Williams AFB, AZ: Air Force Human Resources Laboratory.

Warren, R., & McMillan, G. R. (1984). Individual differences in altitude holding. *Aviation, Space, and Environmental Medicine*, 55, 461.

Wartluft, D. L. (1975). *Program documentation for the RPV-auto simulation program* (AMRL Technical Report 75-21). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A013 847)

Wartluft, D. L. (1976). *Program documentation for the RPV mission control center system simulation program* (AMRL Technical Report 76-47). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A028 879)

Wei, K. C. (1981). *A human operator gunner model for tracer-directed antiaircraft artillery fire* (AFAMRL Technical Report 80-142). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A097 824)



Williams, J. I. (1984). *Human response to pyridostigmine bromide* (AFAMRL Technical Report 84-004). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A140 960)

Wilson, G. F., & O'Donnell, R. D. (1981). *Human sensitivity to high frequency sine wave and pulsed light stimulation as measured by the steady state cortical evoked response* (AMRL Technical Report 80-133). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A097 730)

Wilson, G. F., O'Donnell, R. D., & Wilson, L. (1983). *Neuropsychological measures of A-10 workload simulated low altitude missions* (AFAMRL Technical Report 83-0003). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Lab-oratory. (DTIC No. A128 184)

Wilson, G. F., Ward, S. L., & Hann, R. L.
 (1983). Use of the transient evoked response in a crucial event task. *USAF Medical Service Digest*, 20-22.

Wortman, D. B., & Duket, S. D. (1976). *New developments in SAINT: The Saint III Simulation Program* (AMRL Technical Report 75-117). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A029 894)

Wortman, D. B., & Duket, S. D. (1976). *SAINT simulation of a remotely piloted vehicle/drone control facility: Model development and analysis* (AMRL Technical Report 75-118). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A031 085)

Wortman, D. B., Duket, S. D., & Seifert, D. J. (1976). *SAINT simulation of a remotely piloted vehicle/drone control facility* (AMRL Technical Report 75-68). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A027 812)

Wortman, D. B., Duket, S. D., Seifert, D. J., Hann, R. L., & Chubb, G. P. (1978). *The SAINT User's Manual* (AMRL Technical Report 77-62). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A058 724)

Wortman, D. B., Duket, S. D., Seifert, D. J., Hann, R. L., & Chubb, G. P. (1978). *Simulation using SAINT: A user-oriented instruction manual* (AMRL Technical Report 77-61). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A058 671)

Wortman, D. B., Sigal, C. W., Pritsker, A. A. B., & Seifert, D. J. (1975). *New SAINT concepts and the SAINT II Simulation Program* (AMRL Technical Report 74-119). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A014 814)

In 1969 I found myself working in the lab with a new boss, Dick Ravanell, an Air Force major. He was a fighter pilot and knew the ins-and-outs of high speed maneuvering and its effects on the pilot. I had worked with zero-G environments and was aware of the potential effects on human performance under different G forces. We began to anticipate the potential impact on the pilot of the new, higher G loads that the next generation of fighter aircraft were going to be able to withstand."

*— Phil Kulwicki, Technical Director
Crew-Centered Cockpit Design
Human Engineering Division*

"My most enjoyable project was working on the pre-cursor of the Manned Orbiting Laboratory (MOL). When NASA was set up, that research was turned over to them, but until then the Air Force had a program in the area. I worked on it intermittently for two or three years as the Human Engineering focal point on the MOL team. One of the things we investigated was whether humans could operate outside of a spacecraft to make repairs—what was later called the "space walk"—and to determine what kind of tools they would need. This was a very fundamental question in those days. The lab had access to C-131 and C-135 zero-G aircraft, and many people were involved in studying what kind of tools would be required — such as torque-canceling socket wrenches — to work in that kind of environment."

*— Steve Heckart
Applications Human Engineer
Human Engineering Division*

Wortman, D. B., Sigal, C. W., Pritsker, A. A. B., & Seifert, D. J. (1975). *SAINT II Documentation Manual* (AMRL Technical Report 75-116). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A024 286)

Yates, R., Replogle, C., & Veghte, J. (1980). *Thermal and acceleration effects on aircrew members in chemical defense gear* (AMRL Technical Report 79-71). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A086 026)

Young, J. W., Chandler, R. F., Snow, C. C., Robinette, K. M., Zehner, G. F., & Lofberg, M. S. (1983). *Anthropometric and mass distribution characteristics of the adult female* (FAA-AM-83-16). Washington, DC: Federal Aviation Administration.

Yu, C. (1981). *A human operator gunner model for a tracking task with interrupted observations in an antiaircraft artillery system* (AFAMRL Technical Report 81-37). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A097 360)

Zacharias, G. L. (1978). *Motion cue models for pilot-vehicle analysis* (Report No. AMRL-TR-78-2). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory.

Zacharias, G. L., & Levison, W. H. (1979). *A performance analyzer for identifying changes in human operator tracking strategies* (AMRL Technical Report 79-17). Wright-Patterson AFB, OH: Aerospace Medical Research Laboratory. (DTIC No. A070 632)

Zehner, G. F. (1984). Analytical relationships between body dimensions and mass distribution characteristics of living populations. In A. Mital (Ed.), *Trends in Ergonomics/Human Factors I*. Amsterdam: Elsevier.

The VCASS (Visually-Coupled Airborne Systems Simulator) helmet is an example of an incredible design option. The helmet's miniaturized electronics project an image onto a screen approximately two inches in front of the pilot's eyes and offer a view of what is outside the cockpit. Flight data are superimposed over the scene. Using that information, the pilot activates aircraft systems with eye and hand movements and also voice commands. This replaces the pushing of knobs and buttons which are nearly eliminated from the cockpit.

*— May 1985, “Human Engineering, Yesterday and Today,”
Civilian Employees Reporter*

This page intentionally blank

- Aaranson, J., Hassoun, J., Sharits, T., & Sharp, E.** (1986). *Unknown signals on the B-1B's threat situation format display of the AN/ALQ-161 electronic warfare system—Will color coding help?* (Report No. AAMRL-TR-86-048). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B108346)
- Abrams, T. S., Martin, C. D., Orr, C. E., & Hinson, T. A.** (1991). *Cockpit automation technology CSERIAC-CAT Jul 89 - Dec 90: Final report* (Report No. AL-TR-1991-0078). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A273124)
- Acton, W., Perez, W., & Reid, G. B.** (1986). On the dimensionality of subjective workload. *Proceedings of the Human Factors Society 30th Annual Meeting*, 1, 76-80.
- Albery, W. B., Repperger, D. W., Reid, G. B., Goodyear, C., Ramirez, L. E., & Roe, M. M.** (1987). Effects of noise on a dual task: Subjective and objective workload correlates. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*.
- Allen, D., Tsou, B., Gieske, G., Bien, J., Shipley, M., & Walker, J. L.** (1987). System performance of a servo-optical projection system (SOPS). *The 1987 IMAGE Conference IV* (pp. 121-127). Williams AFB, AZ: Air Force Human Resources Laboratory.
- Amell, J., Eggemeier, F. T., & Acton, W.** (1987). The Criterion Task Set: An updated battery. *Proceedings of the Human Factors Society 31st Annual Meeting*, 1, 405-409.
- Anderson, A. F., Amell, J. R., Boyd, S. P., Edwards, R. E., Hanson, D. C., Koehn, M. S., Kraushar, P. G., Leininger, W. E., McCon nell, J. N., Ostrand, R. A., Pippin, C. C., Stollings, M. N., Wallace, M. R., White, R. W., & Zaitzeff, L. P.** (1994). *Cockpit automation technology final report volume I: Summary of technical effort* (Report No. AL/CF-Technical Report-1994-0004). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B182787)
- Anderson, A. F., Crouch, D. A., Edwards, R. E., Kraushar, P. G., Leininger, W. E., McConnell, J. N., Ostrand, R. A., Stollings, M. N., & White, R. W.** (1991). *Cockpit automation technology interim technical report 8* (Report No. AL-TR-1991-0100). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B161113)
- Andes, R. C., & Hunt, R. M.** (1990). *Adaptive aiding for human-computer control: Final report and future directions for research* (Report No. AAMRL-TR-90-055). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A236799)
- Andes, R. C., Hunt, R. M., Andriole, S. J., & Adelman, L.** (1989). *Cognitive engineering of advanced information technology for Air Force systems design & development* (Report No. AAMRL-TR-89-038). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A218558)
- Andrews, R., Baltzer, R., Boone, A., Garcia, L., Gier, R., Givens, B., Jackson, K., Korna, M., Lehman, E., Martin, C., Rolek, E., Rountree, M., Runnder, K., Sharp, R., Stadler, J., Storey, B., & Sweeney, M.** (1994). *Interim technical report no. 1 (ITRI)* (Report No. AL/CF-TR-1994-0077). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A286426)
- 

A LAB SCIENTIST AT THE SABER STATION
Gilbert G. Kuperman working at a repeater station of the Strategic Avionics Battle management Evaluation and Research (SABER) facility which supports in-house exploratory development in sensor-mediated target acquisition. The work at SABER aids the design and integration of advanced avionics capabilities including integrated multi-sensors, automatic target cuers and recognizers, precision strike, and mission planning. (1989) (Workunit 71841044)



REFRACTIVE ERROR IN DIOPTERS
Effect of attendance at USAF Academy on eye refractive error of aviation cadets. The study was done by Maj Melvin R. O'Neal and Capt Thomas R. Connon under Workunit 71841803. AAMRL-TR-86-026 (1986)

Annis, J. F., McDaniel, J. W., & Krauskopf, P. J. (1991). Male and female strength for performing common industrial tasks in different postures. In W. Karwowski, & J. W. Yates (Eds.), *Advances in Industrial Ergonomics and Safety III* (pp. 193-200). London: Taylor & Francis.

Arbak, C., King, P., Jauer, R., & Adam, E. (1988). *Helmet-mounted display/sight tactical utility study* (Report No. AAMRL-TR-88-022). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A240170)

Arndt, C. M. (1991). *Development of the expert system domain advisor and analysis tool* (Report No. AL-TR-1991-0150). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A255768)

Arndt, C. M. (1992). Applications for neural networks to landmark detection in three-

dimensional surface data. *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE)*, 880-886.

Aume, N. M. (1989). CREW CHIEF: A computer graphics simulation of an aircraft maintenance technician. In S. Griffin (Ed.), *Third Annual Workshop on Space Operations, Automation, and Robotics (SOAR '89)* (NASA CP-3059, pp. 139-141). Washington, DC: National Aeronautics and Space Administration.

Ayoub, M. M., Jiang, B. C., Smith, J. L., Selan, J. L., & McDaniel, J. W. (1987). Establishing a physical criterion for assigning personnel to U.S. Air Force jobs. *American Industrial Hygiene Association Journal*, 48(5), 464-470.

Ayoub, M. M., Smith, J. L., McDaniel, J. W., & Selan, J. L. (1985). Job demands in some maintenance operations. In I. D. Brown, R. Goldsmith, K. Coombes, & M. A. Sinclair (Eds.), *Proceedings of the 9th Congress of the International Ergonomics Association*, 445-447.

Badeau, A. (1991). Task difficulty assessed using the correlation dimension of EEG [Poster]. In D. W. Duke, & W. S. Pritchard (Eds.), *EEG/Chaos Conference/Workshop* (pp. 60-63). River Edge, NJ: World Scientific.

Ballman, J. (1985). *A study of error rates in voice recognition* (AFAMRL Technical Paper 85-300). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.

Barbato, M. H., Hausmann, M. A., Kama, W. N., Bridenbaugh, J. C., & Task, H. L. (1993). *Definitions of terms relating to aircraft windscreens, canopies, and transparencies* (Report No. AL-TR-1993-0036). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A268403)

Barrett, E. S., & Wilson, G. F. (1987). *Topographic mapping of brain activity* (Report No. AAMRL-TR-87-069). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A204056)

Bart, R. D., Dembeck, C. M., & Masak, J. R. (1987). *SCPS-M processing study — phase II* (Report No. AAMRL-TR-87-057). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B118552)

- Bartell, R. J., Unger, S. E., & Task, H. L.** (1993). *Backscatter haze device for measurement of haze in aircraft transparencies* (Report No. AL/CF-TR-1993-0102). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A275127)
- Beaton, R. J., & Farley, W. W.** (1992). *Comparative study of the MTFA, ICS, and SQRI image quality metrics for visual display systems* (Report No. AL-TR-1992-0001). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A252116)
- Beaton, R. J., & Farley, W. W.** (1994). *Image quality metrics for color CRT displays* (Report No. AL/CF-TR-1994-0115). Wright-Patterson AFB, OH: Armstrong Laboratory.
- Beaudet, D. B., Price, D. L., Kuperman, G. G., & Wilson, D. L.** (1987). *Human factors report on information management requirements for next-generation manned bombers* (Report No. AAMRL-TR-87-042). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A195870)
- Beecher, R. M.** (1986). Computer graphics and shape diagnostics. *Proceedings of the Human Factors Society 30th Annual Meeting*, 1, 211-215.
- Beecroft, S. L., Perez, W. A., Kirtland, W. H., & Taylor, T. G.** (1988). *Strategic mission decomposition: III. Mission planning requirements and scenario implementation for advanced conceptual bomber simulation studies* (Report No. AAMRL-TR-88-072). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C956971)
- Beer, J.** (1992). Mental models midst the optical flow [Abstract]. *Proceedings of the 33rd Annual Meeting of the Psychonomics Society*, 335.
- Beer, J.** (1993). Perceiving scene layout through an aperture during visually simulated self-motion. *Journal of Experimental Psychology: Human Perception and Performance*, 19(1), 1-16.
- Benedict, C. P., & Gunderman, R. G.** (1992). Helmet-mounted systems test and evaluation process. *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Helmet-Mounted Displays III*, 1695, 8-12.
- Berkstresser, G. W., Shmulovich, J., & Wittenberg, A. M.** (1987). *Single crystal phosphor development* (Report No. AAMRL-TR-87-041). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B122929)
- Bhatia, G.** (1994). *Whole body surface scanner for design of protective equipment* (Report No. AL/CF-TR-1994-0034). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B186313)
- Bhatia, G. H., Smith, K. E., Commean, P. K., Whitestone, J., & Vannier, M. W.** (1994). Design of a multi-sensor optical surface scanner. *Photonics East '94, SPIE, Sensor Fusion VII*, 2355, 262-273.
- Bhatia, G. H., Smith, K. E., Commean, P. K., Whitestone, J. J., & Vannier, M. W.** (in press). Design and simulation of a whole body surface scanner. *Optics and Lasers in Engineering*.
- Biberman, L. M., & Tsou, B. H.** (1993). Image display technology and problems with emphasis on airborne systems. In W. D. Rogatto (Ed.), *The infrared and electro-optics systems handbook: Vol. 3. Electro-optical components* (pp. 437-506). Bellingham, WA: SPIE Optical Engineering Press.
- Billman, E. R.** (1987). *The role of adaptive supplemental visual cuing in flight simulation* (Report No. AAMRL-TR-87-070). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A185932)
- Billman, E. R.** (1989). Interactive, real-time formation flight concept trainer. In R. S. Jensen (Ed.), *Proceedings of the Fifth International Symposium on Aviation Psychology*, 2, 209-214.
- Blackwell, S. U., & Robinette, K. M.** (1993). *Human integration evaluation of three helmet systems* (Report No. AL-TR-1993-0028). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A271320)
- Blue, D. V., Flanagan, D. P., Giacaglia, R. A., Lenorovitz, D. R., & Stanke, E. C.** (1987). *Rapid Intelligent Prototyping Laboratory (RIPL) architecture and use* (Report No. AAMRL-TR-87-004). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.

Boer, L., Farmer, E., & Wilson, G. F. (1988). Standardized tests for research with environmental stressors: The AGARD Stress Battery. *AGARD Conference Proceedings 458: Human Behavior in High Stress Situations in Aerospace Operations* (pp. 23-1 - 23-16). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-458)

Boff, K. R. (1986). Factoring ergonomics data into system design. *23rd Meeting of ASCC Working Party 10: Aircraft Information Display and Aircrew Design.*

Boff, K. R. (1987). Designing for design effectiveness of complex avionics systems. *AGARD Conference Proceedings 417: The Design, Development, and Testing of Complex Avionics Systems* (pp. 22-1 - 22-9). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-417)

Boff, K. R. (1987). Matching crew system specifications to human performance capabilities. *AGARD Conference Proceedings 425: The Man-Machine Interface in Tactical Aircraft Design and Combat Automation* (pp. 29-1 - 29-9). Neuilly sur Seine, France: NATO Advisory Group for Aerospace

Research and Development. (NTIS No. AGARD-CP-425)

Boff, K. R. (1987). The Tower of Babel revisited: Cross-disciplinary chokepoints in system design. In W. B. Rouse & K. R. Boff (Eds.), *System design: Behavioral perspectives on designers, tools, and organizations* (pp. 1-13). New York: North Holland.

Boff, K. R. (1988). The value of research is in the eye of the beholder. *Human Factors Society Bulletin*, 31(6), 1-4.

Boff, K. R. (1990). Integrating ergonomics into system design. *CSERIAC Gateway*, 1(2), 1-2.

Boff, K. R. (1990). Meeting the challenge: Factors in the design & acquisition of human-engineered systems. In H. Booher (Ed.), *MANPRINT: An approach to systems integration* (pp. 551-572). New York: Von Nostrand Reinhold.

Boff, K. R. (1993). Advances in human prototyping: Implications for crew system integration and system safety. *Proceedings of the International Conference on Aircraft Flight Safety*. Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development.



CREW-CENTERED ANALYSIS AND DESIGN SUPPORT

The Crew-Centered Analysis and Design Support Laboratory is the focal point for demonstrating advanced concepts in crewstation design and evaluation technology for the Crew-Centered Cockpit Design (CCCD) project. The rapidly reconfigurable Engineering Design Simulator (EDSIM), as seen here, is used for rapid prototyping and design evaluation. Using the EDSIM, under part-task/full-mission scenarios, various data are collected to verify and validate crewstation designs including mission events and human performance measures (aircrew actions, audio, visual, and physiological responses). (Workunit 28290309)

Boff, K. R. (1994). The usability of behavioral research findings in system design. In Gartner, Widdel, & Ste (Eds.), *Mensch-Maschine-Systeme und Neue Informationstechnologien*. Dusseldorf: Carl Hansa Verlag Mur and VDI Verlag.

Boff, K. R., Kaufman, L., & Thomas, J. (1986). *Handbook of perception and human performance: Cognition and performance*. New York, NY: John Wiley & Sons.

Boff, K. R., Kaufman, L., & Thomas, J. (1986). *Handbook of perception and human performance: Sensation and perception*. New York, NY: John Wiley & Sons.

Boff, K. R., & Lincoln, J. E. (Eds.). (1988). *Engineering data compendium: Human perception and performance* (Vol. 1-3). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.

Boff, K. R., & Lincoln, J. E. (Eds.). (1989). *Engineering data compendium: Human perception and performance (Compact Disk ed.)*. Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.

Boff, K. R., & Martin, E. A. (1988). Human performance data in simulation design. *AIAA Flight Simulation Technologies Conference*, 1-5.

Boff, K. R., & Monk, D. L. (1992). Computer-aided systems human engineering: A hypermedia tool. *CSERIAC Gateway*, 3(2), 1-5.

Boff, K. R., Monk, D. L., Swierenga, S. J., Brown, C. E., & Cody, W. J. (1991). Computer-aided human factors for systems designers. *Proceedings of the Human Factors Society 35th Annual Meeting*, 1, 332-336.

Boff, K. R., Polzella, D. J., & Morton, K. (1990). Crew system ergonomics information analysis center: A gateway for technology transfer. In R. W. Harrison (Ed.), *Proceedings of the Technology Transfer Society 15th Annual Meeting, International Symposium and Exhibit: Technology Transfer in a Global Economy*, 277-282.

Bondurant, R., Coonrod, J., Kuperman, G., Moss, R., Graham, D., Hughes, R., & Kraska, A. (1986). *F-16E crew system assessment working group, Volume I, executive summary* (Report No. AFWAL-TR-85-3111). Wright-Patterson AFB, OH: Air Force Wright Aeronautical Laboratories.

Dr. Fitts is the premier leader in the analysis and solution of World War II crew station design issues which, in turn, led to the founding of human engineering technology. We are indeed honored to be able to honor him by naming a modern human engineering research facility in his name.

— Col George C. Mohr, AFAMRL
Commander, May 1985, "Pioneer in Human Engineering is Due the Ultimate Honor," *Civilian Employees Reporter*

Borah, J. (1989). *Helmet-mounted eye tracking for virtual panoramic displays Volume I: Review of current eye movement measurement technology* (Report No. AAMRL-TR-89-019). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A273101)

Borah, J. (1989). *Helmet-mounted eye tracking for virtual panoramic displays Volume II: Eye tracker specification and design approach* (Report No. AAMRL-TR-89-019). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A273101)

Bortolussi, M. R., & Vidulich, M. A. (1989). The benefits and costs of automation in advanced helicopters: An empirical study. In R. S. Jensen (Ed.), *Proceedings of the Fifth International Symposium on Aviation Psychology*, 2, 594-599.

Bortolussi, M. R., & Vidulich, M. A. (1991). The effects of speech controls on performance in advanced helicopters in a double stimulation paradigm. *Proceedings of the Sixth International Symposium on Aviation Psychology*, 1, 216-221.

Bortolussi, M. R., & Vidulich, M. A. (1991). An evaluation of strategic behaviors in a high-fidelity simulated flight task: Comparing primary performance to a figure of merit. *Proceedings of the Sixth International Symposium on Aviation Psychology*, 2, 1101-1106.

Bradtmiller, B., Blackwell, S., Case, H., Churchill, T., Mountjoy, D., Gross, M., Kennedy, K., Pollack, R., Robinson, J., Seely, C., & Wysong, M. (1994). *Human morphometrics, motion, and performance research* (Report No. AL/CF-TR-1994-0038). Wright-Patterson AFB, OH: Armstrong Laboratory.

- Brainard, L. F., Johnson, M. N., Perez, W. A., Taylor, T. G., & Kuperman, G. G.** (1987). *Strategic mission decomposition: II. Artificial intelligence frame-based workload analysis study* (Report No. AAMRL-TR-87-077). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B119938)
- Brett, B., Daugherty, E., Waltensperger, M., & Arndt, C.** (1994). *Minuteman III Weapon Systems Safety Assessment (WSSA) human factor analysis* (Report No. AF/CF-TR-1994-0125). Wright-Patterson AFB, OH: Armstrong Laboratory.
- Brown, C. E., Boff, K. R., & Swierenga, S. J.** (1991). Cockpit resource management: A social psychological perspective. *Proceedings of the Sixth International Symposium on Aviation Psychology*, 1, 398-403.
- Brown, C. E., Jennings, L. S., & Ward, S. L.** (1984). *Team problem solving: Leader proficiency, communication, and coworker's functions* (Report No. AFAMRL-TR-84-056). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.
- Brown, C. E., & Leupp, D. G.** (1985). *Team performance with large and small screen displays* (Report No. AFAMRL-TR-85-033). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. 158 761)
- Brown, C. E., Selvaraj, J. A., Zaff, B. S., McNeese, M. D., & Whitaker, R. D.** (1994). An integrative bargaining paradigm for investigating multidisciplinary design tradeoffs. *Proceedings of the Human Factors and Ergonomics Society 38th Annual Meeting*, 2, 1028-1032.
- Brown, C. E., Swierenga, S. J., & Wellens, A. R.** (1991). Social psychological metaphors for human-computer systems design. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 793-799.
- Brown, R.** (1986). *Aircraft Ground Flotation System (AGFS) test, evaluation, and analysis for an F-16* (Report No. AFWAL-TR-86-3024). Wright-Patterson AFB, OH: Air Force Wright Aeronautical Laboratories.
- Brown, R. W.** (1987). Preliminary design of an air cushion crash rescue vehicle. *Proceedings of Air Cushion Technology Conference*, 56-62.
- Brown, R. W., & Thom, R.** (1986). *Preliminary design of an Air Cushion Crash Rescue Vehicle (ACCRV)* (Report No. AIAA-86-2377). Washington, DC: American Institute of Aeronautics and Astronautics.
- Brown, Y. J., Cardullo, F. M., & McMillan, G. R.** (1990). Advanced techniques for cuing the force and motion environment in the simulator of the future. *AIAA Flight Simulation Technologies Conference*, 115-122.
- Brown, Y. J., Cardullo, F. M., McMillan, G. R., Riccio, G. E., & Sinacori, J. B.** (1992). *New approaches to motion cuing in flight simulators* (Report No. AL-TR-1991-0139). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A277571)
- Buchroeder, R. A., & Kocian, D. F.** (1989). *Display system analysis for the LHX helicopter application* (Report No. AAMRL-TR-89-001). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B134738)
- Bui, T. H., Vollmerhausen, R. H., & Tsou, B. H.** (1994). Overlap binocular field-of-view flight experiment. *Society for Information Display International Symposium: Digest of Technical Papers*, 25, 306-308.
- Busch, C., Wilson, G. F., Orr, C., & Papanicolaou, A.** (1989). Crossmodal interactions of auditory stimulus presentation on the visual evoked magnetic response. In S. J. Williamson, M. Hoke, G. Stroink, & M. Kotani (Eds.), *Advances in biomagnetism: Proceedings of the 7th International Conference on Biomagnetism* (pp. 221-224). New York: Plenum.
- Busch, C., Wilson, G. F., & Ullsperger, P.** (1993). Influence of task difficulty and expectedness on the P300 elicited by a warning stimulus [Abstract]. *Society for Neuroscience: Abstracts*, 19(2), 1606.
- Caldwell, J. A., Wilson, G. F., Gaillard, A. W. K., Gundel, A., Lagarde, D., Makeig, S., Myhre, G., & Wright, N. A.** (Eds.). (1994). *Psychophysiological assessment methods* (Report

No. AGARD-AR-324). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-AR-324)

Calhoun, C. S., & Post, D. L. (1990). Heterochromatic brightness matches via Ware & Cowan's luminance correction equation. *Society for Information Display International Symposium: Digest of Technical Papers, 21*, 261-264.

Calhoun, G. L. (1987). *Eye and head response to an attention cue in a dual task paradigm* (Report No. AAMRL-TR-87-033). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A191052)

Calhoun, G. L., Arbak, C. J., & Janson, W. P. (1985). Eye and head response to an attention cue in a dual task paradigm. *Proceedings of the Human Factors Society 29th Annual Meeting*, 1125-1129.

Calhoun, G. L., & Janson, W. P. (1990). Eye and head response as indicators of attention cue effectiveness. *Proceedings of the Human Factors Society 34th Annual Meeting*, 1, 1-5.

Calhoun, G. L., & Janson, W. P. (1991). Eye control interface considerations for aircrew station design [Abstract]. *Proceedings of the 6th European Conference on Eye Movements*, 85.

Calhoun, G. L., & Janson, W. P. (1991). *Eye line-of-sight control compared to manual selection of discrete switches* (Report No. AL-TR-1991-0015). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A273019)

Calhoun, G. L., & Janson, W. P. (1992). *Eye and head response as indicators of attention cue effectiveness* (Report No. AL-SR-1992-0022). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A275391)

Calhoun, G. L., Janson, W. P., & Arbak, C. J. (1986). Use of eye control to select switches. *Proceedings of the Human Factors Society 30th Annual Meeting*, 1, 154-158.

Calhoun, G. L., Janson, W. P., & Valencia, G. (1988). Effectiveness of three-dimensional



DEVELOPING TOOLS FOR COCKPIT DESIGN AND EVALUATION

Dr. Joe W. McDaniel working in the Crew-Centered Automated Design System Laboratory developing a suite of computer tools to assist in the design and evaluation of aircraft cockpits. The work is still in progress in 1994, although this picture was taken in 1993. (Project 2829)

auditory directional cues. *Proceedings of the Human Factors Society 32nd Annual Meeting*, 1, 68-72.

Calhoun, G. L., Valencia, G., & Furness, T. A. (1987). Three-dimensional auditory cue simulation for crew station design/evaluation. *Proceedings of the Human Factors Society 31st Annual Meeting*, 2, 1398-1402.

Cannon, M. W. (1986). Recent advances in understanding peripheral vision. *Proceedings of the Human Factors Society 30th Annual Meeting*, 1, 601-604.

Cannon, M. W. (1989). Attention uncertainty accounts for the thresholds of multiple Gabor Patches. *Optical Society of America Annual Meeting Digest*, 18, 143.



FIT AS A SOURCE OF ANTHROPOMETRIC VARIATION

Three-dimensional geometric scans of two pilots, one a surface model and the other lines, aligned by the HGU 53/P helmets they wear. This illustrates the wide variation in the way equipment is worn, a variation which is often wider than the variation in the body size and shape of the population. (Workunit 71840846)

Cannon, M. W. (1990). Spatial pattern processing in human vision. *Society for Information Display International Symposium: Digest of Technical Papers*, 21, 452-455.

Cannon, M. W. (1992). A model for spatial interactions among contrast sensitive mechanisms. *Optical Society of America Annual Meeting Digest*, 22, 130.

Cannon, M. W. (1992). A model of mechanisms mediating spatial pattern perception. *Proceedings of the Human Factors Society 36th Annual Meeting*, 2, 1430-1434.

Cannon, M. W., & Fullenkamp, S. C. (1987). Probability summation among spatially separated patterns is less than predicted. *Investigative Ophthalmology and Visual Science*, 28, 357.

Cannon, M. W., & Fullenkamp, S. C. (1987). Spatial summation of non-contiguous stimuli [Abstract]. *Journal of the Optical Society of America*, A4, 124.

Cannon, M. W., & Fullenkamp, S. C. (1988). Multiple mechanism model for suprathreshold contrast perception [Abstract]. *Investigative Ophthalmology and Visual Science*, 29, 140.

Cannon, M. W., & Fullenkamp, S. C. (1988). Perceived contrast and stimulus size: Experiment and simulation. *Vision Research*, 28(6), 695-709.

Cannon, M. W., & Fullenkamp, S. C. (1989). A two dimensional model of contrast processing from threshold to high suprathreshold levels [Abstract]. *Investigative Ophthalmology and Visual Science*, 30, 504.

Cannon, M. W., & Fullenkamp, S. C. (1990). Inhibitory interactions in suprathreshold vision [Abstract]. *Investigative Ophthalmology and Visual Science*, 31, 323.

Cannon, M. W., & Fullenkamp, S. C. (1991). Lateral interactions among contrast sensitive mechanisms [Abstract]. *Optical Society of America Annual Meeting Digest*, 17, 164.

Cannon, M. W., & Fullenkamp, S. C. (1991). Spatial interactions in apparent contrast: Inhibitory effects among grating patterns of different spatial frequencies, spatial positions & orientations. *Vision Research*, 31(11), 1985-1998.

Cannon, M. W., & Fullenkamp, S. C. (1991). A transducer model for contrast perception. *Vision Research*, 31(6), 983-998.

Cannon, M. W., & Fullenkamp, S. C. (1992). A model for image sharpness estimates [Abstract]. *Investigative Ophthalmology and Visual Science*, 33, 1349.

Cannon, M. W., & Fullenkamp, S. C. (1993). Spatial interactions in apparent contrast: Individual differences in enhancement and suppression effects. *Vision Research*, 33(12), 1685-1695.

Cannon, M. W., & Fullenkamp, S. C. (1994). Target apparent contrast in the presence of peripheral flanking stimuli [Abstract]. *Investigative Ophthalmology and Visual Science*, 34(4), 2005.

Cardullo, F. M., Brown, Y. J., & McMillan, G. R. (1992). Analysis and development of advanced techniques for cuing the force and motion environment in the simulator of the future. *Proceedings of the European Forum on Matching Technology to Training Requirements*, 16-1 - 16-12.

- Case, H., Ervin, C. A., & Robinette, K. M.** (1989). *Anthropometry of a fit test sample used in evaluating the current and improved MCU-2/P masks* (Report No. AAMRL-TR-89-009). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A215173)
- Chechile, R. A., Eggleston, R. G., Fleischman, R. N., & Sasseville, A. M.** (1989). Modeling the cognitive complexity of displays. *Human Factors*, 31(1), 31-43.
- Chelen, W., Kabrisky, M., Hatsell, C., Morales, R., Fix, E. L., & Scott, M.** (1990). Use of phenytoin in the prevention of motion sickness. *Aviation, Space and Environmental Medicine*, 61, 1022-1025.
- Chen, J. S., Tsou, B. H., & Grigsby, S. S.** (1994). A study on contrast perception in noise. *Society for Information Display International Symposium: Digest of Technical Papers*, 25, 490-493.
- Chevalier, J. R., Porter, C. D., & Replogle, C. R.** (1986). *Chemical warfare scenarios for airbase challenge assessment* (Report No. AAMRL-TR-86-063). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C954809)
- Citera, M., McNeese, M., Brown, C., Selvaraj, J., Zaff, B., & Whitaker, R.** (in press). Fitting information systems to collaborating design teams. *Journal of the American Society for Information Science*.
- Citera, M., Selvaraj, J. A., Zaff, B. S., Brown, C. E., & McNeese, M. D.** (1993). Development of a research paradigm to study collaboration in multidisciplinary design teams. In M. J. Smith, & G. Savendy (Eds.), *Abridged proceedings of the 5th International Conference on Human-Computer Interactions*, 174.
- Coberly, V. J., & Wiederholt, B. J.** (1989). Knowledge representation for simulation. *Proceedings of the 1989 Summer Computer Simulation Conference*, 596-601.
- Cody, W. J.** (1989). Designers as users: Design supports based on crew system design practices. *Proceedings of the American Helicopter Society 45th Annual Forum*, 423-435.
- Cody, W. J., & Rouse, W. B.** (1989). A test of criteria used to select human performance models. In G. R. McMillan (Ed.), *Applications of human performance models to system design* (pp. 511-531). New York: Plenum.
- Cody, W. J., Rouse, W. B., & Boff, K. R.** (1993). *Functional requirements for computer-based associates that support access and use of technical information* (Report No. AL/CF-TR-1993-0069). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A274603)
- Cohen, J. B., Jackson, K., Kulwicki, P. V., Lehman, E. F., Martin, C., Rountree, M., & Storey, B.** (1994). *Industry review of a crew-centered design process and toolset* (Report No. AL/CF-TR-1994-0063). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A282966)
- Cona, T., & Monk, D. L.** (1994). Improving the impact of human performance information on the process of human-system design. *Symposium on Human Interaction with Complex Systems*, 247-250.
- Cona, T. R., & Monk, D. L.** (1993). Bringing human performance data to the design table. *Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting*, 2, 1087-1095.
- Cotton, C. T., Faklis, D., Bowen, J. P., & Morris, G. M.** (1991). *Application of surface-relief diffractive optics in helmet-mounted displays* (Report No. AL-TR-1991-0089). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A278768)
- Crabtree, M. S., & Davis, S. A.** (1991). Criterion Task Set (CTS): Cognitive task battery development. *Proceedings of the Sixth International Symposium on Aviation Psychology*, 1154-1159.
- Crabtree, M. S., Marcelo, R. A. Q., McCoy, A. L., & Vidulich, M. A.** (1993). An examination of a subjective situational awareness measure during training on a tactical operations simulator. *Proceedings of the Seventh International Symposium on Aviation Psychology*, 2, 891-895.
- Craig, J. L.** (1986). Aircraft lighting considerations for formation flying. *Aircraft Attitude Awareness Workshop*, 32-39.
- Craig, J. L.** (1990). AAMRL night vision goggle technology. *HSD Night Vision Goggle Conference* (pp. 61-88). Brooks AFB, TX: Human Systems Division.

Craig, J. L. (1990). Crew interface technologies. *Field Program Managers Conference* (pp. 15-32). Brooks AFB, TX: Human Systems Division.

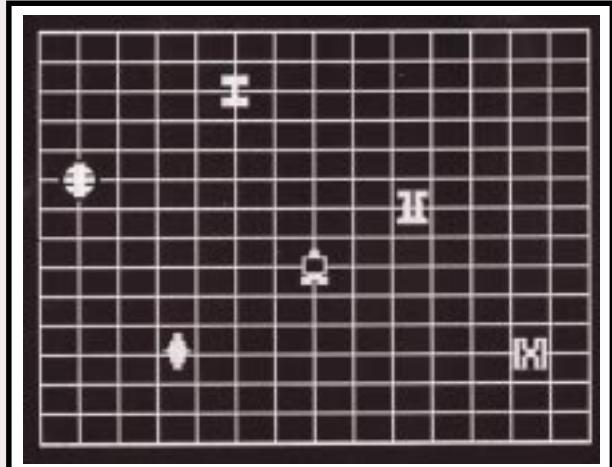
Craig, J. L. (1990). Helmet mounted programs. *Air Force Night Vision Device Working Group*, 72-94.

Craig, J. L. (1990). Status of NVG activity at AAMRL. *5th Annual Joint Service Night Vision Conference*, 47-65.

Craig, J. L. (1992). Laboratory night vision goggle efforts. *Air Force Special Operations Command Acquisition Program Conference* (pp. 514-529). Hurlbert Field, FL: Air Force Special Operations Command.

Craig, J. L., Anderson, M. L., & Simons, J. C. (1987). *Night Vision Goggle (NVG) compatible lighting for MH-53H (PAVE LOW III) special operations* (Report No. AAMRL-TR-87-058). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B119227)

Craig, J. L., Bartell, R. J., Hettinger, L. J., & Riegler, J. T. (1993). *Assessment of interior modifications in C-130 and C-141 aircraft for night vision goggle operations* (Report No. AL/CF-TR-1993-0095). Wright-Patterson AFB, OH: Armstrong Laboratory.



USING A DYNAMIC GRIDBOARD TO MEASURE SITUATIONAL AWARENESS

A grid board with moving symbols used in a study rating measures of situational awareness. The work was done by Maj Martin L. Fracker of the Human Engineering Division and Sharon A. Davis of Logicon Technical Services, Inc. AL-TR-1991-0091 (1991) (Task 718414)

Craig, J. L., & Purvis, B. D. (1987). Laboratory night vision goggle programs. *1st Strategic Air Command NVG Conference* (pp. 15-31). Offutt AFB, NE: Strategic Air Command.

Craig, J. L., & Purvis, B. D. (1990). B-52 night vision goggle head up display development. In H. M. Assenheim, & H. H. Bell (Eds.), *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Cockpit Displays and Visual Simulation*, 1289, 63-71.

Craig, J. L., Purvis, B. D., & Reynolds, M. C. (1988). *Night Vision Goggle (NVG) compatible cockpit lighting for B-52 special operations* (Report No. AAMRL-TR-88-028). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B127914)

Craig, J. L., Purvis, B. D., & Simons, J. C. (1988). *Formation lights for B-52 special operations: I. Design and test plan* (Report No. AAMRL-TR-88-051). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.

Craig, J. L., Simons, J. C., & Unger, S. E. (1985). *Night vision goggle/head-up display for fixed-wing and rotary-wing special operations* (Report No. AAMRL-TR-85-044). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.

Crawford, R. L., Toms, M. L., & Wilson, D. L. (1991). Effects of display luminance on the recognition of color symbols on similar color backgrounds. *Proceedings of the Human Factors Society 35th Annual Meeting*, 2, 1466-1470.

Cress, J. D., McMillan, G. R., & Gilkey, M. J. (1989). The dynamic seat as an angular cuing device: Control of roll & pitch vs the control of altitude & heading. *AIAA Flight Simulation Technologies Conference*, 94-100.

Cress, J. D., & Riccio, G. E. (1986). Frequency response of the visual system to simulated variations in altitude and its relationship to active control. *Proceedings of 22nd Annual Conference on Manual Control*.

Crystal, J. C., & Sigl, J. C. (1992). *Development of a portable G-hardened electrophysiological data input and storage device* (Report No. AL-SR-1992-0023). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B183999)

Curry, D. G. (1992). *Handedness and motor programming aspects of manual control and movement* (Report No. AL-TR-1992-0127). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A264022)

Davis, E. T., Corso, G. M., Barfield, W., Eggleston, R. G., Ellis, S., Ribarsky, B., & Wickens, C. D. (1994). Human perception and performance in 3D virtual environments. *Proceedings of the Human Factors and Ergonomics Society 38th Annual Meeting*, 1, 230-234.

DeLucia, P. R. (in press). Effects of pictorial relative size and ground-intercept information on judgments of object-object collisions in a perspective display: Implications for air-traffic control. *Human Factors*.

DeLucia, P. R. (1991). Object-motion, self-motion and object-motion during pictorial motion and motion-based information for depth perception. *Journal of Experimental Psychology: Human Perception and Performance*, 17(3), 738-748.

DeLucia, P. R., & Warren, R. (1994). Pictorial and motion-based depth information during active control of self-motion: Size-arrival effects on collision avoidance. *Journal of Experimental Psychology: Human Perception and Performance*, 20, 783-798.

Dembeck, C. M., & Masak, J. R. (1987). *SCPS-M processing study* (Report No. AAMRL-Technical Report-87-048). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B117565)

Dembeck, C. M., Porter, C. D., & James, G. M. (1987). *Baseline analysis of SCPS-2 operations* (Report No. AAMRL-TR-87-056). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B119349)

Dent, C., Klein, G., & Eggleston, R. G. (1987). *Metaphor casting of information—Display requirements* (Report No. KA-TR-868-87-01A). Yellow Springs, OH: Klein & Assoc.

Dent-Read, C. H., Klein, G., & Eggleston, R. G. (1994). Metaphor in visual display designed to guide action. *Metaphor and Symbolic Activity*, 9(3).



LINE-OF-SIGHT STUDIES

Lt Bryan Christensen is demonstrating a line-of-sight measuring system being used to study the direction of sight in helmet systems. This information is needed to optimize the design of helmet-mounted displays. (Workunit 71841158)

DeRego, P. (1989). Magnetoencephalographic data indicates separate component modeling is necessary in evaluating evoked responses. In S. Buus (Ed.), *Proceedings of the IEEE 15th Annual Northeast Bioengineering Conference*, 87-88.

DeRego, P. (1989). Magnetoencephalographic localization of simulated evoked response sources affirms the importance of adequate modelling. In S. J. Williamson, M. Hoke, G. Stroink, & M. Kotani (Eds.), *Advances in biomagnetism: Proceedings of the 7th International Conference on Biomagnetism*, 551-554.

Doll, T. J., Gerth, J. M., Engleman, W. R., & Folds, D. J. (1986). *Development of simulated directional audio for cockpit applications* (Report No. AAMRL-TR-86-014). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A175350)

Donohue-Perry, M. M. (1985). Color tolerances for night vision goggle compatible lighting. *Society of Automotive Engineers Interior Lighting Subcommittee Proceedings*, 10-21.

Donohue-Perry, M. M. (1985). A visual performance investigation of ANVIS field of view interference. *Society of Automotive Engineers Interior Lighting Subcommittee Proceedings*, 22-30.



A PROPOSED PANORAMIC COCKPIT FOR INCREASING SITUATIONAL AWARENESS

Panoramic cockpit control and display system (PCCADS 2000) developed in a program for increasing the situational awareness of pilots. This effort was jointly sponsored by AAMRL (AL/HEA) and the Wright Laboratory Cockpit Integration Directorate (WL/KTD). The work was done by John L. Olson, Christopher J. Arbak, and Richard A. Jauer of the McDonnell Douglas Corp. AL-TR-91-0017 (1991)

Donohue-Perry, M. M. (1992). *Changes in visual acuity after night vision goggle exposure* (Report No. AL-SR-1992-0031). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B178591)

Donohue-Perry, M. M., Hettinger, L. J., & Riegler, J. T. (1992). Human factors considerations for night vision system design: Preliminary results of NVG users' concerns survey. *7th Annual Joint Service Night Vision Device Conference*, 129-161.

Donohue-Perry, M. M., Hettinger, L. J., & Riegler, J. T. (1992). Human factors considerations for night vision system design: Preliminary results of NVG users' concerns survey [Abstract]. *Aerospace Medical Association 63rd Annual Scientific Meeting Program*, A6.

Donohue-Perry, M. M., Hettinger, L. J., & Riegler, J. T. (1992). *Night Vision Goggle (NVG) users' concerns survey site report: Hurlburt Field, FL* (Report No. AL-TR-1992-0089). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B171286)

Donohue-Perry, M. M., Hettinger, L. J., Riegler, J. T., & Davis, S. A. (1992). *Night Vision Goggle (NVG) users' concerns survey site report: Charleston AFB, SC* (Report No. AL-TR-1992-0177). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B173525)

Donohue-Perry, M. M., Hettinger, L. J., Riegler, J. T., & Davis, S. A. (1993). *Night Vision Goggle (NVG) users' concerns survey site report: Dover AFB, DE* (Report No. AL/CF-TR-1993-0075). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B178369)

Donohue-Perry, M. M., Hettinger, L. J., Riegler, J. T., & Davis, S. A. (1993). *Night Vision Goggle (NVG) users' concerns survey site report: Pope AFB, NC* (Report No. AL/CF-TR-1993-0071). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B274471)

Donohue-Perry, M. M., & Ramer, D. P. (1990). A visual performance assessment of ANVIS compatible lighting categories. *5th Annual Joint Service Night Vision Conference*, 89-102.

Donohue-Perry, M. M., & Ramer, D. P. (1990). A visual performance assessment of ANVIS compatible lighting categories. *Society for Information Display International Symposium: Digest of Technical Papers*, 21, 130-132.

Donohue-Perry, M. M., & Riegler, J. T. (1990). A compatibility evaluation of the protective integrated hood mask with ANVIS night vision goggles. *Report of the 30th Meeting of Air Standardization Coordination Committee (ASCC) Working Party 61: Aerospace Medical and Life Support Systems Symposium: Aero-medical Aspects of Vision* (Vol. 4, pp. 102-109). Toronto: Defence & Civil Institute of Environmental Medicine.

- Donohue-Perry, M. M., & Riegler, J. T.** (1991). An evaluation of the protective integrated hood mask for ANVIS night vision goggle compatibility. *AGARD Conference Proceedings 517: Helmet-Mounted Displays and Night Vision Goggles* (pp. 4-1 - 4-4). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-517)
- Donohue-Perry, M. M., Riegler, J. T., & Hausmann, M. A.** (1990). *A compatibility assessment of the protective integrated hood mask with ANVIS night vision goggles* (Report No. AAMRL-TR-90-030). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A229956)
- Donohue-Perry, M. M., & Task, H. L.** (1988). *An optical evaluation of laser protective visors* (Report No. AAMRL-TR-88-053). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B133750)
- Donohue-Perry, M. M., & Task, H. L.** (1994). *Visual acuity vs. field-of-view and light level for night vision goggles* (Report No. AL/CF-TR-1994-0076). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A284750)
- Donohue-Perry, M. M., Task, H. L., & Dixon, S. A.** (1994). Visual acuity vs. field of view and light level for Night Vision Goggles (NVGs). In R. J. Lewandowski, W. Stephens, & L. A. Haworth (Ed.), *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Helmet- and Head-Mounted Displays and Symbology Design Requirements*, 2218, 71-81.
- Doyal, J. A., Irvin, G. E., Donohue, T. R., & Dowler, M. G.** (1992). Flight simulation of infrared smoke obscuration using equivalent contrast reduction. *Proceedings of the Smoke/Obscurants Symposium*, 24.
- Doyal, J. A., Ramer, D. P., Stratton, M. D., & Purvis, B. D.** (1994). *Visual contrast detection thresholds for aircraft contrails* (Report No. AL/CF-TR-1994-0116). Wright-Patterson AFB, OH: Armstrong Laboratory.
- Eggemeier, F. T., & Wilson, G. F.** (1991). Performance-based and subjective assessment of workload in multi-task environments. In D. L. Damos (Ed.), *Multiple task performance* (pp. 217-278). London: Taylor & Francis.

- Eggemeier, F. T., Wilson, G. F., Kramer, A. F., & Damos, D. L.** (1991). Workload assessment in multi-task environments. In D. L. Damos (Ed.), *Multiple task performance* (pp. 207-216). London: Taylor & Francis.
- Eggleston, R. G.** (1986). *Apparent motion and prior correspondence effects in visual perception* (Report No. AAMRL-TR-86-027). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A174424)
- Eggleston, R. G.** (1987). The changing nature of the human-machine design problem: Implications for system design and development. In W. B. Rouse, & K. R. Boff (Eds.), *System design: Behavioral perspectives on designers, tools, and organizations* (pp. 113-125). New York: North Holland.
- Eggleston, R. G.** (1987). *Impact of future developments in electronic technology on cockpit engineering* (Report No. AGARD-R-757). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-R-757)
- Eggleston, R. G.** (1988). Machine intelligence and crew-vehicle interfaces. In E. Heer, & H. Lum (Eds.), *Progress in astronautics and aeronautics: Vol. 115. Machine intelligence and autonomy for aerospace systems* (pp. 51-84). Washington, DC: American Institute of Aeronautics.
- Eggleston, R. G.** (1992). Cognitive interface considerations for intelligent cockpits. *AGARD Conference Proceedings 520: Flight Mechanics and Guidance and Control Panel Symposium* (pp. 21-1 - 21-16). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-520)
- Eggleston, R. G., Chechile, R. A., Fleischman, R. N., & Sasseville, A.** (1986). Modeling the cognitive complexity of visual displays. *Proceedings of the Human Factors Society 30th Annual Meeting*, 1, 675-678.
- Eggleston, R. G., Janson, W., & Adapalli, S.** (1994). Manual tracking performance using a virtual hand controller: A comparison study. *AGARD Conference Proceedings 541: Virtual Interfaces: Research and applications*. Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-541)

Eimer, E. O. (1987). *Team problem solving: Effects of communication and function overlap* (Report No. AAMRL-TR-87-037). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A187010)

Eimer, E. O. (1987). *When decision aids fail* (Report No. AAMRL-TR-87-035). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.

Endsley, M. R. (1991). *Situation awareness in an advanced strategic mission* (Report No. AL-TR-1991-0083). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B161348)

Endsley, M. R., & Kiris, E. O. (1993). *Information presentation for expert systems in future fighter aircraft* (Report No. AL/CF-TR-1993-0164). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A275126)

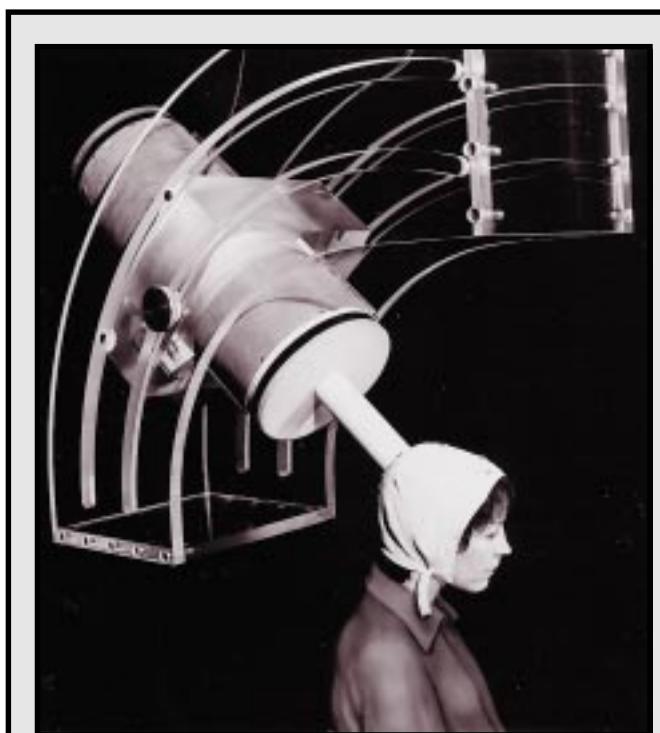
Entin, E. E., James, R. M., & Serfaty, D. (1987). *Cognitive style and multi-stage decision making* (Report No. AAMRL-TR-87-024). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A183891)

Ervin, C. A. (1987). *Annotated bibliography of psychomotor testing* (Report No. AAMRL-Technical Report-87-019). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A181694)

Ervin, C. A., & Robinette, K. M. (1987). *A manual for administering a standardized dexterity test battery* (Report No. AAMRL-TR-87-036). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A188718)

Fang, H., & Nurre, J. H. (1994). *Optimal estimation of head scan data with generalized cross validation* (Report No. AL/CF-TR-1994-0114). Wright-Patterson AFB, OH: Armstrong Labs.

Farley, W. W. (1987). *Design and testing of a luminance and chrominance stabilization system for a computer-controlled color display* (Report No. AAMRL-TR-87-027). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A955697)



MEASURING MAGNETIC FIELDS IN THE BRAIN OF A STRESSED SUBJECT

Ms. Penny Fullenkamp serving as a subject in a stressful task while the locations and intensities of magnetic fields in her brain are measured by the SQUID electronics of a magnetoencephalography (MEG) device. This work is one of a series of investigations of psychophysiological measures of operator workload started by Dr. Glenn F. Wilson. Information about the MEG and other methods for assessing operator workload is available in Dr. Wilson's review of progress in the psychophysiological assessment of workload. AL-TR-1992-0007 (1992) (Task 718414)

Laboratory. (DTIC No. B172004)

Farmer, E., Boer, L., Goeters, K., Grussett, J., Santucci, G., Schwartz, E., Wetherell, A., & Wilson, G. F. (1989). *AGARDograph 308: Aerospace Medical Panel Working Group 16: Human performance assessment methods*. Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-AG-308)

Filipovich, D. (1992). *Enhanced night vision goggle configuration* (Report No. AL-SR-1992-0017). Wright-Patterson AFB, OH: Armstrong

Filipovich, D., Fiore, J., & Craig, J. (1994). *Enhanced night vision goggle configurations: Concept VI-advanced low profile night vision goggle* (Report No. AL/CF-TR-1994-0099). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B192590)

- Filipovich, D., Fiore, J., & Craig, J. L.** (1994). *Further development of NVGs: Concept VIII-wide field-of-view night vision goggle* (Report No. AL/CF-TR-1994-0098). Wright-Patterson AFB, OH: Armstrong Laboratory.
- Filipovich, D., Sobel, A., & Craig, J.** (1994). *Liquid crystal displays within image intensifier systems* (Report No. AL/CF-SR-1994-0011). Wright-Patterson AFB, OH: Armstrong Laboratory.
- Fiorita, A. L., Middendorf, M. S., & McMillan, G. R.** (1992). Maintaining subject motivation in long-term experiments using performance incentives and penalties. *Proceedings of the Human Factors Society 36th Annual Meeting*, 2, 1335-1339.
- Fisher, T. J., Riccio, G. E., & McMillan, G. R.** (1986). The effects of simulator delays on the acquisition of flight control skills. *HQ USAF/DFBL 10th Psychology in the DoD Symposium* (USAFA-TR-86-1, Vol 1, pp. 224-228)
- Fix, E. L.** (1988). Optimizing back propagation training. *Proceedings of the Fourth Annual Aerospace Applications of Artificial Intelligence Conference*, 1, 52-56.
- Fix, E. L.** (1990). Modeling human performance with neural networks. *Proceedings of the International Joint Conference on Neural Networks*, 1, 247-252.
- Fix, E. L.** (1990). Neural network based human performance modeling. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 3, 1162-1165.
- Fix, E. L.** (1990). *Neural network based human performance modeling* (Report No. AAMRL-TR-90-042). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A229822)
- Fix, E. L., & Deer, B. C.** (1988). Extrapolation and interpolation capability of the back propagation algorithm. *Proceedings of the Fourth Annual Aerospace Applications of Artificial Intelligence Conference*, 1, 87-92.
- Fix, E. L., Marshak, W. P., & Burnside, D.** (1990). Advanced reference system cockpit display project. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 1, 338-342.
- Fix, E. L., & Rolek, E. P.** (1991). *Modeling a human operated Soviet SAM system using neural networks* (Report No. AL-TR-91-0016). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B167818)
- Flach, J. M., McMillan, G. R., Warren, R., & Snell, M. K.** (1985). The effects of psychophysical matching on the transfer of training between alternative motion simulators. *Proceedings of the Third Symposium on Aviation Psychology*, 601-608.
- Flach, J. M., & Warren, R.** (in press). Active psychophysics: The relation between mind and what matters. In J. M. Flach, P. A. Hancock, J. Caird, & K. Vicente (Eds.), *The ecology of human-machine systems*. Hillsdale, NJ: Erlbaum.
- Flach, J. M., & Warren, R.** (in press). Low altitude flight. In J. M. Flach, P. A. Hancock, J. Caird, & K. Vicente (Eds.), *An ecological approach to human machine systems II: Local applications*. Hillsdale, NJ: Erlbaum.
- Fracker, M. L.** (1988). A theory of situation assessment: Implications for measuring situation awareness. *Proceedings of the Human Factors Society 32nd Annual Meeting*, 1, 102-106.
- Fracker, M. L.** (1989). Attention allocation in situation awareness. *Proceedings of the Human Factors Society 33rd Annual Meeting*, 2, 1396-1400.
- Researchers in the department today also use computers to help them develop workplace layouts and equipment designs. In fact, computers have produced "a revolution in systems designs," said Bates. "We have tremendous potential from high-speed computers and miniaturization of computer equipment that allows us to do things aerodynamically that we couldn't before because of the instability of some airframes. The engineer now has incredible design options for the way in which he interfaces the pilot with the airframe and the avionics on the airplane."**
- C. Bates, May 1985, "Human Engineering, Yesterday and Today," Civilian Employees Reporter*

- Fracker, M. L.** (1989). Attention gradients in situation awareness. *AGARD Conference Proceedings 478: Situation Awareness in Aerospace Operations*. Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-478)
- Fracker, M. L.** (1991). *Measures of situation awareness: An experimental evaluation* (Report No. AL-TR-1991-0127). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A262732)
- Fracker, M. L.** (1991). *Measures of situation awareness: Review and future directions* (Report No. AL-TR-1991-0128). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A262672)
- Fracker, M. L., & Davis, S. A.** (1991). *Explicit, implicit, and subjective rating measures of situation awareness in a monitoring task* (Report No. AL-TR-1991-0091). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A262702)
- Fracker, M. L., & Vidulich, M. A.** (1991). Measurement of situation awareness: A brief review. *Proceedings of the 11th Congress of the International Ergonomics Association*, 1, 795-797.
- Fracker, M. L., & Wickens, C. D.** (1987). Resources, confusions, and compatibility in dual axis tracking: Displays, controls, and dynamics. *Proceedings of the Human Factors Society 31st Annual Meeting*, 2, 1211-1215.
- Fracker, M. L., & Wickens, C. D.** (1989). Resources, confusions and compatibility in dual axis tracking: Displays, controls, and dynamics. *Journal of Experimental Psychology: Human Perception and Performance*, 15(1), 80-96.
- Franklin, H.** (1993). *Miniature color display phase IV final report* (Report No. AL/CF-SR-1993-0009). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A272920)
- Fraser, N. M., Hipel, K. W., & Kilgour, D. M.** (1987). *Human conflict resolution* (Report No. AAMRL-TR-87-013). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A182740)
- Fraser, N. M., Hipel, K. W., Kilgour, D. M., McNeese, M. D., & Snyder, D. E.** (1989). An architecture for integrating expert systems. *Decision Support Systems*, 5, 263-276.
- Frazier, J., McDaniel, J. W., Skowronski, V., & Aume, N. M.** (1988). *Body displacement measured during sustained +Gz, -Gz, and +/-Gy acceleration using a stereoscopic photographic system* (Report No. AAMRL-TR-88-015). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A197988)
- Freeman, J., Hesse, K., Sauerborn, J., & Sluzky, E.** (1987). *Performance improvement of miniature cathode ray tubes* (Report No. AAMRL-TR-87-062). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B145068)
- Frick, R. K., Hooever, R., Campbell, B., Cotton, F., Aaranson, J., Kuperman, G. G., & Wilson, D.** (1986). *RT mission scenario description* (Report No. AAMRL-TR-86-044). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C036399)
- Frick, R. K., Swinehart, R., & Taylor, M.** (1987). *Functional requirements/systems architecture for Relocatable Target (RT) missions, Vol. II: User's guide to models* (Report No. AAMRL-TR-87-028). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B116589)
- Frick, R. K., Swinehart, R., Taylor, M., Kuperman, G. G., & Wilson, D. L.** (1987). *Functional requirements/systems architecture for Relocatable Target (RT) missions, Volume I: Methodology* (Report No. AAMRL-TR-87-068). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C955978)
- Furness, T. A.** (1986). The super cockpit and its human factors challenges. *Proceedings of the Human Factors Society 30th Annual Meeting*, 1, 48-52.
- Furness, T. A.** (1988). Harnessing virtual space. *Society for Information Display International Symposium: Digest of Technical Papers*, 19, 4-7.
- Furness, T. A., & Kocian, D. F.** (1986). Putting humans in virtual space. *Proceedings of the Conference on Aerospace Simulation II: Society for computer simulation*, 214-230.

- Gallimore, J. J.** (1992). *Review of psychophysically-based image quality metrics* (Report No. AL-TR-1991-0153). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A251053)
- Garcia, L.** (1994). A tool for design traceability management. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 807-813.
- Garness, S. A., Flach, J. M., Stanard, T., & Warren, R.** (1994). The basis for the perception and control of altitude: Splay & depression angle components of optical flow. *Proceedings of the Human Factors and Ergonomics Society 38th Annual Meeting*, 2, 1275-1279.
- Gawron, V. J., Bailey, R. E., Knotts, L. H., & McMillan, G. R.** (1989). Comparison of time delay during in-flight and ground simulation. *Proceedings of the Human Factors Society 33rd Annual Meeting*, 1, 120-123.
- Geiselman, E. E., & Osgood, R. K.** (in press). Helmet-mounted display attitude symbology: An evaluation of compression ratio. *The International Journal of Industrial Ergonomics*.
- Geiselman, E. E., & Osgood, R. K.** (1992). A comparison of three attitude display symbology structures during an attitude maintenance task. *Proceedings of the Human Factors Society 36th Annual Meeting*, 2, 1450-1454.
- Geiselman, E. E., & Osgood, R. K.** (1993). A comparison of three aircraft attitude display symbology structures (Report No. AL/CF-TR-1993-0134). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A275172)
- Geiselman, E. E., & Osgood, R. K.** (1993). Toward an empirically based helmet-mounted display symbology set. *Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting*, 1, 93-97.

CSERIAC

The Crew System Ergonomics Information Analysis Center (CSERIAC) is the central source for up-to-date human factors information and technologies. Human factors, or ergonomics, attempts to understand and quantify human physiological and behavioral interactions with equipment and systems. Prior to 1988, designers and engineers had no resource for complete human factors information. In response to this need, Dr. Kenneth R. Boff, of the Human Engineering Division, Armstrong Laboratory,



conceived and established CSERIAC. Operated by the University of Dayton Research Institute, CSERIAC is a Defense Technical Information Center/Department of Defense organization, managed by the Human Engineering Division at Wright-Patterson Air Force Base, in Ohio.

What Do We Do?

CSERIAC's mission is to provide a quick and reliable source for analytical services, topical publications, software programs, and databases pertaining to human factors. We collect, analyze, and disseminate information and technologies to support the requirements of all parties within the government, industrial, and academic sectors concerned with human-machine systems. We strive to be the premier gateway for the dissemination of human factors-related information and technologies. In short, CSERIAC solves your human factors problems.

Geiselman, E. E., & Osgood, R. K. (1994). Utility of off-boresight helmet-mounted symbology during a high angle airborne target acquisition task. In R. J. Lewandowski, W. Stephens, & L. A. Haworth (Eds.), *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Helmet- and Head-Mounted Displays and Symbology Design Requirements*, 2218, 328-338.

Gibbons, J. R., Llinas, J., Wilson, D. L., & Kuperman, G. G. (1986). *Strategic conventional standoff capability: High resolution radar demonstration project workload analysis approach* (Report No. AAMRL-TR-86-013). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B102292)

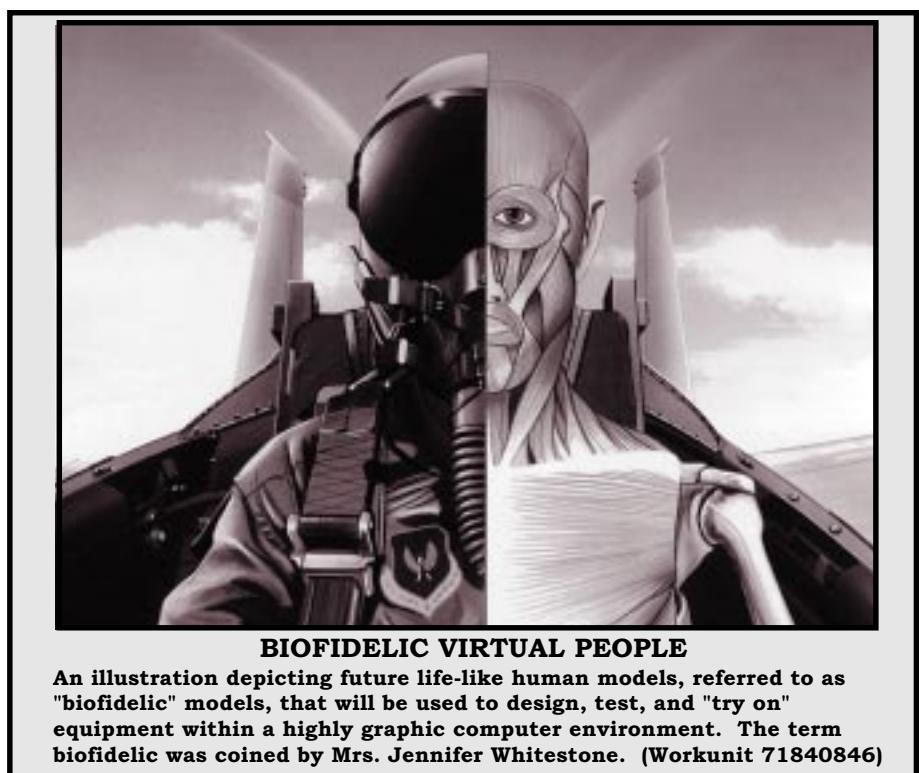
Gibbons, L. E. (1990). *Summary of ergonomics research for the CREW CHIEF model development* (AAMRL-TR-90-038). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A236113)

Gibson, C. P., & Martin, W. L. (1989). Designing the virtual cockpit man-machine interface. *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Display System Optics II*, 1117, 85-93.

Gill, R. T., Kenner, K. M., & Junker, A. M. (1986). Steady state EEG as a measure of peripheral light loss. *Proceedings of the Human Factors Society 30th Annual Meeting*, 2, 1249-1253.

Gilliland, K., Schlegel, R. E., & Dannels, S. (1987). Relationship between Criterion Task Set performance and the personality variables of sensation seeking and stimulus screening. *Proceedings of the Human Factors Society 31st Annual Meeting*, 1, 402-404.

Givens, B. R. (1994). Object-oriented applications in a rapid prototyping environment. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 814-819.



Gleason, G. A., Schor, C., Lunn, R., & Maxwell, J. (1993). Directionally selective short-term nonconjugate adaptation of vertical pursuits. *Vision Research*, 33(1), 65-71.

Glushko, R. J., Weaver, M. D., Coonan, T. A., & Lincoln, J. E. (1988). Hypertext engineering: Practical methods for creating a compact disc encyclopedia. *Proceedings of the ACM Conference on Document Processing Systems*, 11-19.

Goldman, Z. Z. (1988). *Human auditory and visual unimodal and bimodal continuous evoked potentials* (Report No. AAMRL-TR-88-016). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A198845)

Gomes, M. E., Lind, S., & Snyder, D. E. (1992). *A human factors evaluation of the MH-53J helicopter using advanced acquisition and computer analysis techniques* (Report No. AL-TR-1992-0081). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B170365)

Gonsalves, P. G., Kneller, E. W., Zacharias, G. L., St. John, R. J., & Purvis, B. D. (1989). *Model-based method for terrain-following display design* (AAMRL-TR-89-039). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC A219302)

- Green, R. J.** (1994). *Bibliography of research reports and publications issued by the Human Engineering Division, January 1987 - December 1993* (Report No. AL/CF-SR-1994-0003). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A278787)
- Green, T. B., Purvis, B. D., & Marshak, W. P.** (1989). Strategic aircraft engineering design simulation. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 742-745.
- Grigsby, S. S., Rogers-Adams, B., & Tsou, B. H.** (1994). Binocular summation of tonic and phasic stimuli in the near and far periphery [Abstract]. *Investigative Ophthalmology and Visual Science*, 35, 1917.
- Grigsby, S. S., & Tsou, B. H.** (1993). Monocular and binocular grating and flicker sensitivity across the visual field. *Investigative Ophthalmology and Visual Science*, 34, 779.
- Grigsby, S. S., & Tsou, B. H.** (1993). Visual factors in the design of partial overlap binocular helmet-mounted displays. *Society for Information Display International Symposium: Digest of Technical Papers*, 24, 185-187.
- Grigsby, S. S., & Tsou, B. H.** (1994). Grating and flicker sensitivity in the near and far periphery: Naso-temporal asymmetries and binocular summation. *Vision Research*, (34), 2842-2848.
- Grigsby, S. S., & Tsou, B. H.** (1994). Visual processing and partial-overlap head-mounted displays. *Journal of the Society for Information Display*, 2(2), 69-73.
- Grove, R.** (1992). *Interim-Night Integrated Goggle Head Tracking System (I-NIGHTS) final report, Volume II: Flight test pilot survey report* (Report No. AL-TR-1992-0087). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A 282400)
- Gundel, A., & Wilson, G. F.** (1992). Topographical changes in the ongoing EEG related to the difficulty of mental tasks. *Brain Topography*, 5(1), 17-25.
- Gundel, A., & Wilson, G. F.** (1993). Editorial: Psychophysiological measures in transport operations [Special issue]. In A. Gundel, & G. F. Wilson (Ed.), *Ergonomics*, 36(9), 989.
- Gunderman, R., & Stiffler, J.** (1992). *Interim-Night Integrated Goggle Head Tracking System (I-NIGHTS) final report, Volume I: Ground test summary* (Report No. AL-TR-1992-0087). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A 282399)
- Haas, M. W.** (1992). Multi-sensory virtual-interface technology. *AGARD 25th Anniversary Seminar*. Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development.
- Haas, M. W.** (1993). Fusion interfaces for tactical environments: An approach for applying virtual reality technology. In L. Murray (Ed.), *Minutes of the 30th Meeting of the DOD Human Factors Engineering Technical Advisory Group* (pp. AA).
- Haas, M. W.** (1994). Fusion interfaces for tactical environments: An approach for applying virtual reality technology. In K. Krishen (Ed.), *Seventh Annual Workshop on Space Operations, Applications and Research (SOAR '93)* (NASA CP-3240, Vol 1&2, pp. 378-387). Washington, DC: National Aeronautics and Space Administration.



THE HUMAN ENGINEERING DATA COMPENDIUM

Engineering Data Compendium, Human Perception and Performance (1988), edited by K.R. Boff and J.E. Lincoln, an extensive three-volume, in-depth treatment of the basic data on perception and performance (also shown on CD-ROM) for use by the human engineering specialist and an efficient basis for access to the research literature. The figure also shows the primary reference for the Compendium, the two-volume "Handbook of Perception and Human Performance" (1986). These volumes are a unique source of data for guiding trade-offs between the characteristics of humans and machines in designing efficient man-machine systems by fitting the machine to its human users. (Workunit 71842607)

- Haas, M. W., & Hettinger, L. J.** (1993). Applying virtual reality technology to cockpits of future fighter aircraft. *Virtual Reality Systems*, 1(2), 18-26.
- Haas, M. W., & Wells, M. J.** (1990). Head movement during simulated air-to-air engagements. *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Helmet-Mounted Displays II*, 1290, 246-257.
- Hall, P. S., & Campbell, B. L.** (1992). Helmet-mounted systems technology planning. *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Helmet-Mounted Displays III*, 1695, 2-7.
- Hammond, K. R.** (1987). *Reducing disputes among experts* (Report No. AAMRL-TR-87-015). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A182602)
- Harmon, E. E., May, J. G., Love, A. C., Cannon, M. W., & Ellis, G. S.** (1988). Infant preferences: Faces vs. a blooming buzzing confusion. *Investigative Ophthalmology and Visual Science*, 29, 25.
- Haskell, B. E., & Reid, G. B.** (1987). The subjective perception of workload in low time private pilots. *Aviation, Space and Environmental Medicine*, 1230-1232.
- Hecht-Nielsen, R., & John, E. R.** (1994). *Mental workload measurement using brainwave analysis* (Report No. AL/CF-SR-1994-0008). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B187319)
- Hecht-Nielsen, R., Rossen, M. L., & John, E. R.** (1991). *Mental workload measurement using brainwave analysis* (Report No. AL-SR-1991-0003). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B154362)
- Hedges, G.** (1992). *Support of the evaluation of night vision devices* (Report No. AL-SR-1992-0019). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B182038)
- Hennessy, R. T., & McCauley, M. E.** (1986). *Proposal and justification to establish a department of defense crew systems ergonomics information analysis center (CSERIAC)* (Report No. AAMRL-TR-86-022). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A181555)
- Hettinger, L. J., Donohue-Perry, M. M., Riegler, J. T., & Davis, S. A.** (1992). *Night Vision Goggle (NVG) users' concerns survey site report: Eglin AFB, FL* (Report No. AL-TR-1992-0144). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B174198)
- Hettinger, L. J., Donohue-Perry, M. M., Riegler, J. T., & Davis, S. A.** (1993). *Night Vision Goggle (NVG) users' concerns survey site report: Fairchild AFB, WA* (Report No. AL/CF-TR-1993-0094). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B178368)
- Hettinger, L. J., Donohue-Perry, M. M., Riegler, J. T., & Davis, S. A.** (1993). *Night Vision Goggle (NVG) users' concerns survey site report: Robins AFB, GA* (Report No. AL/CF-TR-1993-0070). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B178296)
- Hettinger, L. J., Nelson, W. T., & Haas, M. W.** (1994). Applying virtual environment technology to the design of fighter aircraft cockpits: Pilot performance and situation awareness in a simulated air combat task. *Proceedings of the Human Factors and Ergonomics Society 38th Annual Meeting*, 1, 115-118.
- Hettinger, L. J., Nelson, W. T., & Haas, M. W.** (1994). Comparison of target detection performance using a helmet-mounted display and a conventional flight simulator dome display. *Proceedings of the '94 Symposium on Human Interaction with Complex Systems*.
- Hoffmeister, J. W.** (1994). Better fitting burn masks. In K. Hart (Ed.), *The OATC Innovator*, 94(3), 5-7.
- Horwitz, L. S., & Griffith, O.** (1992). *Ocular vergence and accommodation sensor for helmet-mounted displays* (Report No. AL-SR-1992-0018). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B178051)
- Hunt, G., Armando, A., Brants, I. J. H., Haas, M. W., Leutwyler, R., Parus, R., Beaton, R. M., Deblon, F., Hulme, A., & Pagniz, P.** (1992). *Mission planning systems for tactical aircraft (pre-flight and in-flight)* (Report No. AGARD-AR-313). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-AR-313)

Hunt, G., Jones, T. N., Armando, A., Brants, I. J. H., Haas, M. W., Leutwyler, R., Beaton, R. M., Deblon, F., Hulme, A., & Parus, R. (1991). *Mission planning systems for tactical aircraft (pre-flight and in-flight)* (Report No. AGARD-AR-296). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-AR-296)

Hunt, R. M. (1987). The difficulties of design problem formulation. In W. B. Rouse, & K. R. Boff (Eds.), *System design: Behavioral perspectives on designers, tools and organizations* (pp. 145-157). New York: North Holland.

Hutton, R. J. B., Flach, J. M., Brickman, B. J., Dominguez, C. O., Hettinger, L., Haas, M., & Russell, C. (1994). Keeping in touch: Kinesthetic-tactile information and fly-by-wire. *Proceedings of the Human Factors and Ergonomics Society 38th Annual Meeting*, 1, 26-30.

Ingling, C. R., Jr., & Tsou, B. H. (1988). Spectral sensitivity for flicker and acuity criteria. *Journal of the Optical Society of America*, 5, 1374-1378.

Irvin, G. E., Donohue, T. R., & Dowler, M. G. (1994). *Evaluation and specification of chromaticity coordinates for an effective concrete False Operating Surface (FOS)* (Report No. AL/CF-TR-1994-0035). Wright-Patterson AFB, OH: Armstrong Laboratory.

Irvin, G. E., & Dowler, M. G. (1992). Physiologically based computational approach to camouflage and masking patterns. *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE)*, 481-488.

Irvin, G. E., & Kang, R. N. (1987). Perimetry measures of transient visual field loss in the presence of foveal laser exposures in humans. *Proceedings of the Sixth DOD Conference on Directed Energy Weapons: Vulnerability, Survivability and Effects*.

Irvin, G. E., Kang, R. N., Spravka, J. J., & O'Neal, M. R. (1988). Correlational investigation of contrast sensitivity and visual acuity in the detection of approaching aircraft [Abstract]. *Aviation, Space and Environmental Medicine*, 59(5), 463.

Irvin, G. E., Keep, G. F., & Dowler, M. G. (1991). Two-dimensional aircraft decoys based on perspective rendition: Overview and



ADVANCED NIGHT VISION GOGGLES RESEARCH

Mr. Pete Marasco evaluates the latest high-tech night vision goggle (NVG) system capable of displaying a 45-degree intensified field-of-view on optical combiners. (Task 718418)

experimental results. *Proceedings of the Aerospace Medical Association Convention*, 450.

Irvin, J. G., Doyal, J. A., Sharp, E. D., & LaSalvia, J. M. (1994). *Experimental evaluation of cursors for B-2 Synthetic Aperture Radar (SAR) application* (Report No. AL/CF-TR-194-0020). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A283025)

Janson, W. P. (1989). *Eye and head response to peripheral targets* (Report No. AAMRL-TR-89-033). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A234958)

Janson, W. P., & Calhoun, G. L. (1988). Latencies of the eye & head to targets in the vertical & horizontal planes. *Proceedings of the Human Factors Society 32nd Annual Meeting*, 2, 1424-1428.

Janson, W. P., Quam, D. L., & Calhoun, G. L. (1987). Eye & head displacement to targets fixated in the vertical & horizontal planes. *Proceedings of the Human Factors Society 31st Annual Meeting*, 1, 243-247.

Jauer, R. A., Quinn, T. J., Hockenberger, R. L., & Eggleston, R. G. (1986). *Radar aided mission/aircraft capability exploration RAM/ACE - Full task simulation study* (Report No. AAMRL-TR-86-015). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B107949)

**LASER SCANNING A HUMAN HEAD**

Ms. Kathleen M. Robinette being surface scanned by a laser scanner which provides high-resolution surface data of her head and face. Her surface features are displayed on the computer graphics terminal. Laser scanning has advanced anthropometric methods at the Computerized Anthropometric Research and Design (CARD) Laboratory of the Human Engineering Division. (1993) (Task 718408)

Jauer, R. A., Quinn, T. J., Hockenberger, R. L., & Eggleston, R. G. (1987). *Radar-aided mission/aircrew capability exploration: Full task simulation study* (Report No. AAMRL-TR-86-015). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B107949)

Jensen, J. G., Brunswick, E. A., & Replogle, C. R. (1993). *Analysis of theater missile defense intercept altitude and kill requirements against chemical and biological agent-filled tactical ballistic missiles* (Report No. AL/CF-TR-1993-0104). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. C960153)

Jensen, J. G., Hany, J. V., Vanderveer, D. E., & James, G. M. (1986). *Chemical warfare challenge to aircrews: Executive summary* (Report No. AAMRL-TR-86-032). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C039916)

Jensen, J. G., Hany, J. V., Vanderveer, D. E., & James, G. M. (1986). *Chemical warfare challenge to aircrews: Volume I—Analysis and*

results (Report No. AAMRL-TR-86-054). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C040553)

Jensen, J. G., Hany, J. V., Vanderveer, D. E., & James, G. M. (1986). *Chemical warfare challenge to aircrews: Volume II—Appendices* (Report No. AAMRL-TR-86-055). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C040554)

Johnson, K. L., Brisby, J. M., Prior, R. C., Blazer, D. R., Heaton, H. H., Finch, S. R., Hattershire, B. R., & Sharp, E. D. (1988). *Final report: Strategic Avionics Crew Station Design Evaluation Facility (SACDEF) systems integrator contract* (Report No. AAMRL-TR-88-071). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B131733)

Johnson, S., Shaw, R. L., & Simons, J. C. (1989). *Fighter, bomber, airlift debriefings: I. Facilities and general guidelines* (Report No. AAMRL-TR-89-006). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.

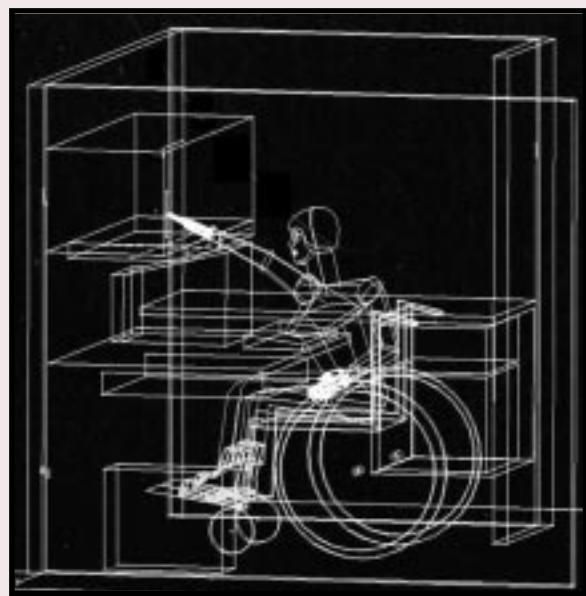
Johnson, W. V., & Middendorf, M. S. (1988). Simulator transport delay measurement using steady-state techniques. *AIAA Flight Simulation Technologies Conference*, 250-254.

Jones, G. W. (1993). *Helmet-mounted visual system components and assemblies (b) miniature cathode ray tubes using field emission devices* (Report No. AL/CF-SR-1993-0004). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B190904)

Jones, M. R., & Skelly, J. J. (1993). The role of event time in attending. *Time and Society*, 2(1), 107-128.

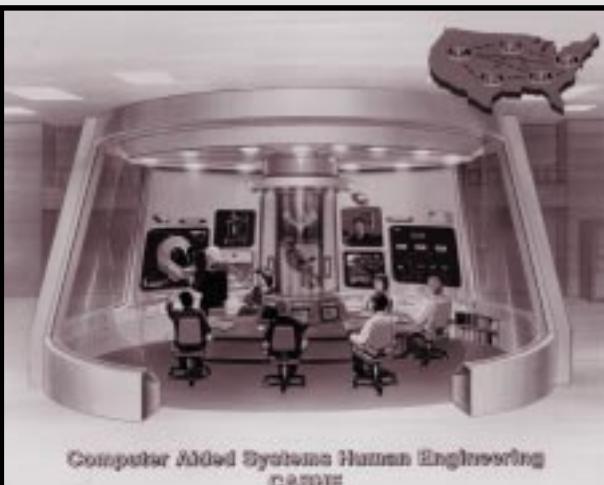
Junker, A. M. (1988). Loop closure of the visual cortical response. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 1523-1529.

- Junker, A. M.** (1988). A real time frequency analyses methodology for evoked potential loop-closure. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 1530-1535.
- Junker, A. M.** (1988). Resource measurement using a closed-loop EEG control system. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 1519-1522.
- Junker, A. M., Kenner, K. M., & Ingle, D. F.** (1986). The effect of task difficulty on the steady state visual evoked response. *Proceedings of the Human Factors Society 30th Annual Meeting*, 2, 1254-1258.
- Junker, A. M., Levison, W. H., & Gill, R. T.** (1987). *A systems engineering based methodology for analyzing human electrocortical responses* (Report No. AAMRL-TR-87-030). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A190809)
- Junker, A. M., Schnurer, J. H., Ingle, D. F., & Downey, C. W.** (1988). *Loop-closure of the visual-cortical response* (Report No. AAMRL-TR-88-014). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A198348)
- Kama, W. N.** (1988). *The effect of binocular rivalry on the performance of a simple target detection/recognition task* (Report No. AAMRL-TR-88-056). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A203512)
- Kama, W. N.** (1989). Measures of distortion: Are they relevant? In S. A. Marolo (Ed.), *Conference on Aerospace Transparent Materials and Enclosures* (WRDC-TR-89-4044, Vol. 2, pp. 1072-1093). Wright-Patterson AFB, OH: Wright Research and Development Center.
- Kama, W. N., Bridenbaugh, J., & Task, H. L.** (1987). *Flexible fiber optics bundle study: Effect of number of active fibers on symbol legibility* (Report No. AAMRL-TR-87-012). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.
- Kama, W. N., & Kuperman, G. G.** (1988). *The effect of HUD symbology size on operator performance under various luminance conditions* (Report No. AAMRL-TR-88-021). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A210460)
- Kama, W. N., Task, H. L., & Merkel, H. S.** (1988). *Field and laboratory evaluation of the optical qualities of the B-1B windshield* (Report No. AAMRL-TR-88-050). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B147487)
- Kang, R. N., Marshak, W. P., Riegler, J. T., Irvin, G. E., & Rogers-Adams, B. M.** (1987). *The effect of internal contrast and simulated shadow on the deceptive effectiveness of aircraft silhouette paint pattern decoys* (Report No. AAMRL-TR-87-073). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B128218)
- Kang, R. N., Riegler, J. T., & Irvin, G. E.** (1987). *Tonedown guidelines for F-16 aircraft canopy shelter entrances* (Report No. AAMRL-TR-87-054). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B119227)



MODIFY WORKPLACES FOR THE PHYSICALLY DISABLED

The COMBIMAN computer model was used to evaluate the physical accommodation of a physically disabled woman in 1993. This proof of concept led to the development of a new program to help modify workplaces to accommodate disabled persons.



CASHE VISION

This Computer-Aided Systems Human Engineering (CASHE) vision shows a multi-disciplinary design team working with a CAD/CAE system in which ergonomic data is a "full partner" among other disciplines within the working environment. The combined use of integrated CRTs, small group wall displays, auditory systems, and virtual display technologies allows designers to fully visualize and experience the operational impact of the crew system design, even in its early conceptual design phase. All team members can interactively communicate their design proposals and solutions to other centers in this distributed design network.

Kang, R. N., Riegler, J. T., Irvin, G. E., & Katz, L. (1987). *An evaluation of the deceptive effectiveness of 2-Dimensional aircraft silhouette patterns as a function of azimuth and contrast in a grouping context* (Report No. AAMRL-TR-87-023). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B111844)

Kang, R. N., Susnik, R. M., Irvin, G. E., & Urban, K. E. (1987). *Target masking-perimeter evaluation of target masking at 530.9 NM and 647.1 NM* (Report No. AAMRL-TR-87-061). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C043778)

Kang, R. N., Susnik, R. M., & Riegler, J. T. (1987). *The evaluation of 2-Dimensional aircraft silhouette joint patterns as a countermeasure for target acquisition* (Report No. AAMRL-TR-87-022). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B112747)

Kapasouris, P., Serfaty, D., Wohl, J. G., Deckert, J. C., & Pattipati, K. (1989). *Mapping missions onto C3 organizations: Incorporating the goal dimension in IAT* (Report No. AAMRL-TR-89-048). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A225582)

Katsuyama, R. M., McNeese, M. D., & Schertler, D. (1987). The effects of stimulus familiarity upon lateral asymmetry in face recognition. In J. M. Flach (Ed.), *Proceedings of the Fourth Midcentral Ergonomics/Human Factors Conference*, 306-312.

Katsuyama, R. M., Monk, D. L., & Rolek, E. P. (1989). Effects of visual display separation upon primary and secondary task performance. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 758-764.

Katsuyama, R. M., Rolek, E. P., Johnson, S., & Monk, D. L. (1989). *Effects of miniature CRT location upon primary and secondary task performances* (Report No. AAMRL-TR-89-018). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A210223)

Keep, G. F., Irvin, G. E., & Dowler, M. G. (1991). Aircraft masking patterns as a deception technique: Experimental results from laboratory and field evaluations. [Abstract]. *Proceedings of the Aerospace Medical Association Convention*, 450.

Kelly, L., Flach, J. M., Garness, S., & Warren, R. (1993). Altitude control effects of texture and optical flow. *Proceedings of the Seventh International Symposium on Aviation Psychology*, 1, 292-295.

Kennedy, K. W. (1986). *The derivation of low profile and variable cockpit geometries to achieve 1st to 99th percentile accommodation* (Report No. AAMRL-TR-86-016). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.

Kennedy, R. S., Jones, M. B., & Baltzley, D. R. (1989). *Regions of isoperformance: An interactive software package for trading off training, personnel, and equipment* (Report No. AAMRL-TR-89-003). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B136770)

- Kenner, K. M., Junker, A. M., & Levison, W. H.** (1994). *A linear, dynamic model for the visual-cortical evoked response system* (Report No. AL/CF-SR-1994-0005). Wright-Patterson AFB, OH: Armstrong Laboratory.
- Kimble, C. E., & McNeese, M. D.** (1987). *Emergent leadership and team effectiveness on a team resource allocation task* (Report No. AAMRL-TR-87-064). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A192105)
- Klein, G. A., & Brezovic, C. P.** (1987). *Human performance data needed for training device design decisions* (Report No. AAMRL-TR-87-010). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A185988)
- Klinger, D. W., Andriole, S. J., Militello, L. G., Adelman, L., Klein, G., & Gomes, M. E.** (1993). *Designing for performance: A cognitive systems engineering approach to modifying an AWACS human-computer interface* (Report No. AL/CF-TR-1993-0093). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A275187)
- Kocian, D. F.** (1988). Design considerations for Virtual Panoramic Display (VPD) helmet systems. *AGARD Conference Proceedings 425: The Man-Machine Interface in Tactical Aircraft Design and Combat Automation* (pp. 22-1 - 22-32). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-425)
- Kocian, D. F.** (1988). Integrated Helmet Systems (IHS) for binocular helmet mounted displays. *Report of the 30th Meeting of Air Standardization Coordination Committee (ASCC) Working Party 61: Aerospace Medical and Life Support Systems Symposium: Head Protection Issues* (Vol. 4, pp. M-14-1 - M-14-24). Toronto: Defence and Civil Institute of Environmental Medicine.
- Kocian, D. F.** (1989). Design considerations for visually coupled systems and their interface to sensor/computer generated cockpit imagery systems. In L. M. Biberman (Ed.), *Proceedings of the Sensor Display Workshop: Vol. 2 Display Technology* (IDA Document D-713, pp. 75-194). Alexandria, VA: Institute for Defense Analysis.
- Kocian, D. F.** (1990). Visually Coupled Systems (VCS): Preparing the engineering research framework. *Eleventh Annual IEEE/AESS Dayton Chapter Symposium: The Cockpit of the 21st Century—Will High Tech Payoff?*, 28-38.
- Kocian, D. F.** (1991). Visually Coupled Systems (VCS): The Virtual Panoramic Display (VPD) "system." In K. Krishen (Ed.), *Fifth Annual Workshop on Space Operations, Applications, and Research (SOAR '91)* (NASA CP-3127, Vol. 2, pp. 548-561). Washington, DC: National Aeronautics and Space Administration.
- Kocian, D. F.** (1993). Helmet mounted displays, miniature cathode-ray tubes, CRT interfaces and miniature color displays, a potpourri. *SID and IICS Symposium: Displays! The Key to Virtual Reality* (pp. 39-71). Playa del Rey, CA: Society of Information Display.
- Kocian, D. F., & Task, H. L.** (in press). Visually coupled systems hardware and the human interface. In W. Barfield, & T. A. Furness (Eds.), *Virtual Environments & Advanced Interface Design* (pp. 175-257). New York, NY: Oxford University Press.
- Korna, M., Krauskopf, P. J., Haddox, D., Hardyal, S., Jones, M. W., Polzinetti, J., & McDaniel, J. W.** (1988). *User's guide for CREW CHIEF: A computer graphics simulation of an aircraft maintenance technician (Version 1 - CD20)* (Report No. AAMRL-TR-88-034). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A201368)
- Korna, M., Krauskopf, P. J., Haddox, D., Hardyal, S., Jones, M. W., Polzinetti, J., & McDaniel, J. W.** (1990). *User's guide for CREW CHIEF: A computer graphics simulation of an aircraft maintenance technician (Version 2 - CD21)* (Report No. AAMRL-TR-90-014). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A230654)
- Korna, M., & McDaniel, J. W.** (1985). *User's guide for COMBIMAN programs (Computerized Biomechanical Man-Model), Version 7* (Report No. AAMRL-TR-85-057). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.



VIRTUAL WORKSTATIONS

Bill Janson who works with Dr. Robert Eggleston in the Virtual Environment Interface Laboratory (VEIL) is pointing the way to virtual reality!

Korna, M., Rothey, J., Jones, M. W., Krauskopf, P. J., Stump, W., Hardyal, S., Haddox, D., Meeks, L., & McDaniel, J. W. (1988). *User's guide for CREW CHIEF: A computer graphics simulation of an aircraft maintenance technician (Version 1 - CV4001)* (Report No. AAMRL-TR-88-045). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A204869)

Kornfeld, J. R. (1985). *Specification and preliminary validation of IAT methods: Executive summary* (AFAMRL Technical Report 85-003). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.

Krauskopf, P. J., Jones, M. W., Stump, W. J., & Quinn, J. W. (1990). *CREW CHIEF CAD system interface guide (Version 2 - SI)* (Report No. AAMRL-TR-90-015). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A231433)

Krauskopf, P. J., Quinn, J. W., Berlin, R., Stump, W. J., Gibbons, L. E., & McDaniel, J. W. (1989). *User's guide for COMBIMAN programs (COMputerized BIomechanics MAN-model) Version 8* (Report No. AAMRL-TR-89-024). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A222735)

Kuipers, J. B. (1994). *Characterization and application of quaternions for enhanced computer processing algorithms* (Report No. AL/CF-SR-1994-0014). Wright-Patterson AFB, OH: Armstrong Laboratory.

Kulwicki, P. V., McDaniel, J. W., & Guadagna, L. M. (1987). Advanced development of a cockpit automation design support system. *AGARD Conference Proceedings 417: The Design, Development, and Testing of Complex Avionics Systems* (pp. 19-1-19-15). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-417)

Kuperman, G. G. (1985). *Bandpass spatial filtering and information content* (AAMRL Technical Report 85-046). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.

Kuperman, G. G. (1985). *Projective application of the Subjective Workload Assessment Technique to advanced helicopter crew system designs* (AFAMRL Technical Report 85-104). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.

Kuperman, G. G. (1986). *Crew system assessment working group, Volume II, composite mission scenario* (Report No. AFWAL-TR-85-3111). Wright-Patterson AFB, OH: Air Force Wright Aeronautical Laboratories. (DTIC No. B102514)

- Kuperman, G. G.** (1986). *Operator requirements for inverse Synthetic Aperture Radar* (Report No. AAMRL-TR-86-023). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C040045)
- Kuperman, G. G.** (1990). Evaluation and integration of ATR crew aiding systems: A human factors approach. *Proceedings of the 1990 Automatic Target Recognizer System and Technology Conference* (GACIAC PR 90-04, pp. 473-479). Baltimore, MD: Guidance and Control Information Analysis Center.
- Kuperman, G. G.** (1992). *Information requirements analysis for transatmospheric vehicles* (Report No. AL-TR-1992-0082). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A261189)
- Kuperman, G. G.** (1992). *Operator interface assessment for the sensor fusion flight demonstration program* (Report No. AL-TR-1992-0117). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A260235)
- Kuperman, G. G.** (1994). Operator interface for a multi-sensor target acquisition system. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 638-645.
- Kuperman, G. G., Bryant, M. L., & Clark, L. G.** (1991). Man-machine interfaces for automatic target recognition systems. *Proceedings of the 4th National Symposium on Sensor Fusion*, 1, 635-642.
- Kuperman, G. G., & Friedman, A. D.** (1994). Prototyping for multisensor integration. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 726-733.
- Kuperman, G. G., & Moss, R. W.** (1986). *Dual role fighter crew system assessment working group: Summary of F-15E crew system assessment* (Report No. AFWAL-TR-85-3112). Wright-Patterson AFB, OH: Air Force Wright Aeronautical Laboratories. (DTIC No. B106798)
- Kuperman, G. G., & Penrod, T. D.** (1994). Evaluation of compressed Synthetic Aperture Radar imagery. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 1, 319-326.
- Kuperman, G. G., & Perez, W. A.** (1988). A frame based mission decomposition model. *Proceedings of the Human Factors Society 32nd Annual Meeting*, 1, 135-139.
- Kuperman, G. G., & Sobel, A. L.** (1992). Design of the man-machine interface for an automatic target cuer system. *Proceedings of the Institute of Electrical and Electronic Engineers (IEEE)*, 2, 691-697.
- Kuperman, G. G., & Sobel, A. L.** (1992). Information requirements analysis for NASP derived vehicles. *4th International Aerospace Planes Conference*, (Paper No. AIAA-92-5078).
- Kuperman, G. G., & Sobel, A. L.** (1992). Training systems for TAV operations. *1992 Society of Automotive Engineers Aerospace Atlantic Conference and Exposition*, (SAE Technical Paper Series 921042).
- Kuperman, G. G., Spravka, J. J., Swonigan, T. T., & Sobel, A.** (1993). *Counter mobile missile avionics demonstration* (Report No. AL-TR-1993-0049). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. C959997)
- Kuperman, G. G., & Vikmanis, M. M.** (1993). Air Force science and technology for precision strike: Human factors technology challenges. In R. Anderson *Proceedings of the Precision Strike Technology Symposium* (pp. 393-405). Fairfax, VA: The Cruise Missile Association.
- Kuperman, G. G., & Wilson, D. L.** (1986). An expert system approach to workload reduction. *Proceedings of the Human Factors Society 30th Annual Meeting*, 1, 702-706.
- Kuperman, G. G., & Wilson, D. L.** (1986). *Human-centered technology for advanced bomber crewstations* (Report No. AAMRL-TR-86-052). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B108960)
- Kuperman, G. G., & Wilson, D. L.** (1986). *Strategic Conventional Standoff Capability (SCSC): Radar operator workload study* (Report No. AAMRL-TR-86-024). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C041410)

Kuperman, G. G., & Wilson, D. L. (1986). *Workload projection for relocatable target acquisition in a FLIR-equipped B-1B aircraft* (Report No. AAMRL-TR-86-028). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.

Kuperman, G. G., & Wilson, D. L. (1987). *Abbreviated workload analysis for HAVE NAP* (Report No. AAMRL-TR-87-067). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C042680)

Kuperman, G. G., & Wilson, D. L. (1988). The design of a tactical situation display. *Proceedings of the Human Factors Society 32nd Annual Meeting*, 1, 111-115.

Kuperman, G. G., & Wilson, D. L. (1990). *Demonstration of concept I avionics capability performance* (Report No. AAMRL-TR-90-059). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C958373)

Kuperman, G. G., & Wilson, D. L. (1991). Objective and subjective assessment of image compression algorithms. *Society for Information Display International Symposium: Digest of Technical Papers*, 22, 627-640.

Kuperman, G. G., Wilson, D. L., & Crawford, R. L. (1989). Discriminability of color symbols through PLZT goggles. *Proceedings of the Human Factors Society 33rd Annual Meeting*, 2, 1378-1382.

Kuperman, G. G., Wilson, D. L., & Crawford, Y. R. (1989). *Wide dynamic range Synthetic Aperture Radar operator performance display study* (Report No. AAMRL-TR-89-020). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C956972)

Kuperman, G. G., Wilson, D. L., & Davis, I. (1993). *High resolution radar demonstration program: Operator performance study* (Report No. AL-TR-1993-0032). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B176914)

Kuperman, G. G., Wilson, D. L., & Perez, W. A. (1988). *Relocatable target acquisition performance with simulated Synthetic Aperture Radar* (Report No. AAMRL-TR-88-025). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B177485)

Kuyk, T. K. (1988). *Visual depth recovery in humans* (Report No. AAMRL-TR-88-035). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A201278)



TERRAIN BOARD IN A STUDY OF DECEPTION TECHNIQUES FOR AIRBASE PROTECTION

An observer approaching a terrain board containing an airbase in a study of the effectiveness of deception using aircraft silhouette patterns on the ground. The work was done under Workunit 68930130, "Deceptive Technique Design and Evaluation" for the Subsystem/Support Equipment Special Project Office (ASD/ANG). The work was performed by Capt Robert Kang of AAMRL and Joseph Riegler, George E. Irvin, and Luan Katz of Systems Research Laboratories. AAMRL-TR-87-023 (1987)

TASK TIME ESTIMATOR
SSgt Wiley Wells (CFHA) was a subject for researcher Glenn Severt of UDRI in a 1994 study of how obstacles lengthen the time required to complete assembly tasks. These data were for the new Task Time Estimator for the CREW CHIEF computer model.



- LaPuma, P. T., & Bridenbaugh, J. C. (1988).** *Specifications and measurement procedures for aircraft transparencies* (Report No. AAMRL-TR-88-058). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A209396)
- Leupp, D. G., Kelly, S., & Bridges, D. E. (1985).** *A comparison of numeric data entry with touch-sensitive and conventional numeric keypads* (AFAMRL Technical Report 85-007). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory. (DTIC No. A153 276)
- Levison, W. H., & Huggins, A. W. (1986).** Modeling the effects of system delays and lags on tracking performance. *Proceedings of 22nd Annual Conference on Manual Control*, 1, 3-25.
- Licht, D. M., Polzella, D. J., & Boff, K. R. (1991).** *Human factors, ergonomics, and human factors engineering: An analysis of definitions* (Report No. 89-01). Wright-Patterson AFB, OH: CSERIAC Program Office.
- Lincoln, J. E., & Boff, K. R. (1988).** Making behavioral data useful for system design applications: Development of the engineering data compendium. *Proceedings of the Human Factors Society 32nd Annual Meeting*, 2, 1021-1025.
- Lind, S., & Marshak, W. (1994).** Cognitive engineering computer interfaces: Part I - Knowledge acquisition in the design process. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 753-755.
- Lintern, G., & McMillan, G. R. (1993).** Transfer for flight simulation. In R. A. Telfer (Ed.), *Aviation instruction and training* (pp. 130-162). Hants, England: Ashgate.
- Llinas, J., Neal, J., & Kuperman, G. G. (1991).** Systematic & practical views on intelligent interfacing for data fusion applications. *Proceedings of the AIAA Computers in Aerospace VIII Conference*, 2, 623-644.
- Longinow, N. E. (1994).** Predicting pilot look-angle with a radial basis function network. *IEEE Transactions on Systems, Man and Cybernetics*, 15(11)-1518.
- Lovering, P. B., Noah, J. D., & Kuperman, G. G. (1988).** *Infrared integration options for B-1B navigation and targeting* (Report No. AAMRL-TR-88-026). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B127695)
- Lusk, S. L., Martin, C. D., Whiteley, J. D., & Johnson, W. V. (1990).** Time delay compensation using peripheral visual cues in an aircraft simulator. *AIAA Flight Simulation Technologies Conference*, 63-70.
- Marasco, P. L., & Dereniak, E. L. (1993).** Uncooled infrared sensor performance. In B. F. Andresen, & F. D. Shepherd (Eds.), *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Infrared Technology XIX*, 2020, 363-378.
- Maresh, J. L. (1991).** Development of a real-time visual flight simulator for tactical operations research and development. *Proceedings of the Sixth International Symposium on Aviation Psychology*, 841-846.



BRAIN ELECTRICAL ACTIVITY
Brain electrical activity determines the pattern of active brain areas used to solve complex problems. This information is used to understand human cognition and will help measure operator state. (Task 718414)

Maresh, J. L., & Todd, R. E. (1989). Realtime graphic flight simulations using multiple mini-computers. In R. S. Jensen (Ed.), *Proceedings of the Fifth International Symposium on Aviation Psychology*, 2, 221-226.

Marshak, W., & Lind, S. (1994). Cognitive engineering computer interfaces: Part II - An objective design process. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 756-760.

Marshak, W. P. (1992). Temporal frequency spectrum for describing and modeling motion perception. *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Automatic Object Recognition II*, 1700, 476-480.

Marshak, W. P., Kang, R. N., Riegler, J. T., & Irvin, G. E. (1988). *Animated computer imagery in the evaluation of F-15 silhouette decoys* (Report No. AAMRL-TR-88-040). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A128216)

Marshak, W. P., Kuperman, G. G., Ramsey, E. G., & Wilson, D. L. (1987). Situational awareness in map displays. *Proceedings of the Human Factors Society 31st Annual Meeting*, 1, 533-535.

Marshak, W. P., Purvis, B. D., & Green, T. B. (1989). Integrating engineering with training simulation. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 754-756.

Martin, C. D. (1994). Application of a crew-centered cockpit design process and toolset. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 701-708.

Martin, E. A., McMillan, G. R., Warren, R., & Riccio, G. E. (1986). A program to investigate requirements for effective flight simulator displays. *Proceedings of the International Conference on Advances in Flight Simulation Visual and Motion Systems*, The Royal Aeronautical Society.

Martin, W. L. (1986). *An assessment of artificial intelligence and expert systems technology for application to the management of cockpit systems* (Report No. AAMRL-TR-86-040). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A175456)

Martin, W. L. (1992). Developing virtual cockpits. *AGARD Proceedings of the 63rd Avionics Panel Meeting: Advanced Aircraft Interfaces: The Machine Side of the Man-Machine Interface* (pp. 8-1 - 8-8). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-521)

Masters, R. M., Horn, P. M., & Kulwicki, P. V. (1987). *Situation awareness and the CAT air superiority missions* (Report No. AAMRL-TR-87-005). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C042570)

Mathews, C., & Johnson, D. (1992). *Combat air operations in the post-cold war world* (Report No. AL-TR-1992-0092). Wright-Patterson AFB, OH: Armstrong Laboratory.

Matin, E., & Boff, K. R. (1988). Information transfer rate with serial and simultaneous visual display formats. *Human Factors*, 30(2), 171-180.

Matin, E., & Boff, K. R. (1990). An adaptive (tracking) procedure for measuring visual search. *Perceptual and Motor Skills*, 70, 243-253.

- Matin, E., & Boff, K. R.** (1990). Human-machine interaction with serial visual displays. *Society for Information Display International Symposium: Digest of Technical Papers*, 257-260.
- Matin, E., Boff, K. R., & Donovan, R. S.** (1987). Raising control/display efficiency with rapid communication display technology. *Proceedings of the Human Factors Society 31st Annual Meeting*, 1, 258-262.
- Matin, E., Shao, K. C., & Boff, K. R.** (1993). Saccadic overload: Information processing time with and without saccades. *Perception and Psychophysics*, 53(4), 372-380.
- May, J. G., Hartmann, E. E., Love, A. C., Cannon, M. W., & Ellis, G. S.** (1987). The 'Face' validity of teller visual acuity cards. *Investigative Ophthalmology and Visual Science*, 28, 301.
- McBride, D. J., & Brown, C. E.** (1989). *Team performance in dynamic decision making: The importance of heuristics* (Report No. AAMRL-TR-89-010). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A209618)
- McCarthy, J., Pantle, A., & Pinkus, A.** (1994). Detection and discrimination performance with flicker gratings in peripheral vision. *Vision Research*, 34, 763-773.
- McCloskey, K., Albery, W. B., Zehner, G., Bolia, S. D., Hundt, T. H., Martin, E. J., & Blackwell, S.** (1992). *NASP re-entry profile: Effects of low-level +Gz on reaction time, keypad entry, and reach error* (Report No. AL-TR-1992-0130). Wright-Patterson AFB, OH: Armstrong Laboratory.
- McCloskey, K. A., Morrow, M., & Perez, W. A.** (1988). *The use of psychophysiological measures in the SABER laboratories: Phase I* (Report No. AAMRL-TR-88-052). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A206825)
- McCloskey, K. A., Morrow, M., & Perez, W. A.** (1989). *Demonstration of physiological workload correlates in crew capability simulation* (Report No. AAMRL-TR-89-002). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A206824)
- McDaniel, J. W.** (in press). Function allocation and automation implementation in the U.S. Air Force. *Proceedings of the Workshop on Function Allocation, NATO DRG 8*.
- McDaniel, J. W.** (1986). Cockpit automation technology: A process for designing advanced aircraft systems. In D. J. Oborne (Ed.), *Contemporary Ergonomics: Proceedings of the Ergonomics Society: 1986 Annual Conference*, 143-147.
- McDaniel, J. W.** (1988). COMBIMAN and CREW CHIEF. In K. H. E. Kroemer, S. H. Snook, S. K. Meadows, & S. Deutsch (Eds.), *Ergonomic models of anthropometry human biomechanics and operator-equipment interfaces* (pp. 55-60). Washington, DC: National Academy Press.
- McDaniel, J. W.** (1988). CREW CHIEF: A computer graphics model of an aircraft maintenance technician. *Proceedings of the Sixth Annual Computer-Aided Engineering Program Users Meeting* (Report No. NWC TP 6910, pp. 601-603). China Lake, CA: Naval Weapons Center.



USING THE COPE WORKSTATION
2d Lt Suzanne Kelley using the Advanced Integrated Command, Control, Communication and Engineering Workstation of the C³ Operator Performance Engineering (COPE) task developed by the Human Engineering Division to study crew performance at command stations. This task was under the direction of Donald L. Monk and Michael D. McNeese. The picture was taken in 1986. (Project 7184)



PROTECTIVE HOOD AND NIGHT VISION GOGGLES

A chemical protective hood mask and aviator's night vision goggles used in a study to examine their compatibility. The work was conducted under Workunit 71841807 by Dr. Joseph T. Riegler of Logicon Technical Services, Inc. and Mary M. Donohue-Perry of the Human Engineering Division. AAMRL-TR-90-031 (1990)

McDaniel, J. W. (1988). Rules for fighter cockpit automation. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 3, 831-838.

McDaniel, J. W. (1989). Modeling strength data for CREW CHIEF. In S. Griffin (Ed.), *Third Annual Workshop on Space Operations, Automation, and Robotics (SOAR '89)* (NASA CP-3059, pp. 143-148). Washington, DC: National Aeronautics and Space Administration.

McDaniel, J. W. (1989). Virtual mockup. *MANPRINT Bulletin*, 4(1), 4-7.

McDaniel, J. W. (1990). Models for ergonomic analysis and design COMBIMAN and CREW CHIEF. In W. Karwowski, A. M. Genaidy, & S. S. Asfour (Eds.), *Computer-aided ergonomics: A researcher's guide* (pp. 138-156). London: Taylor & Francis.

McDaniel, J. W. (1991). The development of computer models for ergonomic accommodation. In A. Mital, & W. Karwowski (Eds.), *Workspace, equipment and tool design* (pp. 29-66). Amsterdam: Elsevier.

McDaniel, J. W. (1994). Strength capabilities for operating aircraft controls. In F. Aghazadeh (Ed.), *Advances in Industrial Ergonomics and Safety VI* (pp. 705-712). Bristol, PA: Taylor & Francis.

McDaniel, J. W., & Askren, W. B. (1985). Computer-aided design models to support ergonomics. In I. D. Brown, R. Goldsmith, K. Coombes, & M. A. Sinclair (Eds.), *Proceedings of the 9th Congress of the International Ergonomics Association*, 442-444.

McDaniel, J. W., Helfter, J., Aume, N. M., Haddox, D. L., & Unger R. A. (1993). Available strength for transferring hospital patients between beds using a drawsheet. *Proceedings of the M. M. Ayoub Occupational Ergonomics Symposium* (pp. 1-7). Texas Tech University, TX: Institute for Ergonomics Research.

McDaniel, J. W., & Hofmann, M. A. (1990). Computer-aided ergonomics design tools. In H. R. Booher (Ed.), *MANPRINT: An approach to systems integration* (pp. 205-235). New York: Von Nostrand Reinhold.

McDaniel, J. W., & Robbins, C. G. (1992). The strength of women for activation of ejection seat controls. In S. Kumar (Ed.), *Advances in Industrial Ergonomics and Safety IV* (pp. 1275-1282). Washington, DC: Taylor & Francis.

McMillan, G. R. (1989). An overview of human performance models & potential applications to combat simulation. *Human behavior and performance as essential ingredients in realistic modeling of combat - MORIMOC II*, 55-68.

McMillan, G. R. (1991). Effects of visual system transport delay on pilot performance. *Visual Issues in Training and Simulation* (pp. 1-10). Williams AFB, AZ: Armstrong Laboratory.

McMillan, G. R., Beevis, D., Salas, E., Strub, M. H., Sutton, R., & Van Breda, L. (Eds.). (1989). *Applications of human performance models to system design*. New York: Plenum.

McMillan, G. R., Beevis, D., Stein, W., Strub, M. H., Salas, E., Sutton, R., & Reynolds, K. C. (1991). *A directory of human performance models for system design* (Report No. AC/243 (Panel 8) TR/1). Brussels, Belgium: NATO Defense Research Group.

McMillan, G. R., Cress, J. D., & Middendorf, M. S. (1990). Dynamic seat cuing with wide versus narrow field-of-view visual displays. *AIAA Flight Simulation Technologies Conference*, 53-62.

McMillan, G. R., Martin, E. A., Flach, J. M., & Riccio, G. E. (1985). Advanced dynamic seats: An alternative to platform motion? *Proceedings of the 7th Interservice/Industry Training Equipment Conference* (pp. 153-163). Arlington, VA: The American Defense Preparedness Association.

McNeese, M. D. (1986). A human factors perspective for developing intelligent cockpits. *IEEE Aerospace and Electronic Systems Magazine*, 1(9), 6-12.

McNeese, M. D. (1986). Human intelligence: A human factors approach for developing intelligent cockpits. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 3, 941-948.

McNeese, M. D. (1989). *The boundaries of hemispheric processing in visual pattern recognition* (Report No. AAMRL-TR-89-042). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A217675)

McNeese, M. D. (1989). *Cerebral weevil: A machine learning model for hemispheric categorization of faces* (Report No. AAMRL-TR-89-045). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A218143)

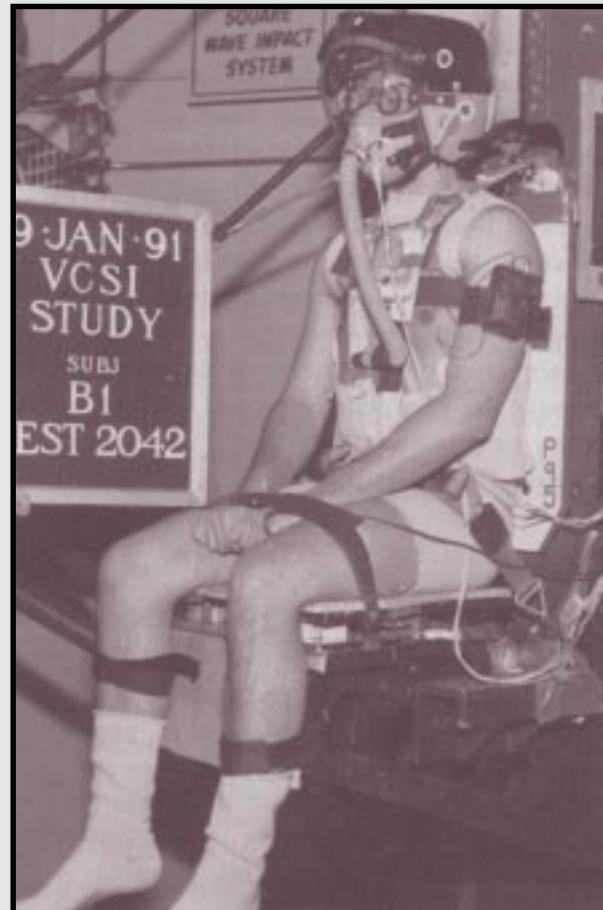
McNeese, M. D. (1989). *The role of chaos in hemispheric process and attention* (Report No. AAMRL-TR-89-043). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A217674)

McNeese, M. D. (1990). *Explorations in cooperative systems: Thinking collectively to learn, learning individually to think* (Report No. AAMRL-TR-90-004). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A218549)

McNeese, M. D. (1993). Analogical transfer in situated cooperative learning (Doctoral dissertation, Vanderbilt University, 1992). *Dissertation Abstracts International*, 54, 528B.

McNeese, M. D. (1993). Methods for sharing knowledge in engineering teams: Case studies involving user-centered design improvement. In L. Murray (Ed.), *Minutes of the 30th Meeting of the DOD Human Factors Engineering Technical Advisory Group* (pp. G-8 - G-9).

McNeese, M. D. (1993). *Putting knowledge to use: The acquisition and transfer of knowledge in situated problem solving environments* (Report No. AL/CF-TR-1993-0052). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A269746)



SIMULATING AIRCRAFT EJECTION FORCES FOR EFFECTS OF NIGHT-VISION GOGGLES
Seated test subject in a ground test vertical deceleration tower (VDF) for simulating forces occurring in ejection from aircraft in a study of integrated night vision goggles and a head tracking system. This is Volume 1 of a report prepared by R. Gunderman and J. Stiffler of Ball Systems Engineering Division for the Helmet Mounted Sensory Technology Project. AL-TR-1992-0087 (1992)



EVALUATING REFURBISHED AIRCRAFT WINDSCREENS

Lee Task (standing) and Bill Kama check out the condition of a refurbished F-15 windscreen at Eglin, AFB, Fla. (Workunit 71841802)

McNeese, M. D. (1994). A synopsis of naturalistic decision making: Implications for design. *CSERIAC Gateway*, 5(1), 6-7.

McNeese, M. D., & Brown, C. E. (1986). *Large group displays and team performance: An evaluation and projection of guidelines, research and technologies* (Report No. AAMRL-TR-86-035). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A255777)

McNeese, M. D., & Katsuyama, R. M. (1987). Neuropsychology in the cockpit: An analysis of configurational processing, hemispheric asymmetry, and masking disturbance. *Proceedings of the Fourth International Symposium on Aviation Psychology*, 202-208.

McNeese, M. D., & Katsuyama, R. M. (1989). *Lateral asymmetry in pattern recognition: Understanding the effects of familiarity, distinction, and perspective change* (Report No. AAMRL-TR-89-049). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A217739)

McNeese, M. D., & Katz, L. (1986). Legibility evaluation of a large screen display system under medium ambient illumination. *Society of Information Display International Symposium Digest*, 59-65.

McNeese, M. D., & Katz, L. (1987). Legibility evaluation of a large screen display system under medium ambient illumination. *Proceedings of the Society For Information Display*, 28(1), 59-65.

McNeese, M. D., & Zaff, B. S. (1991). Knowledge as design: A methodology for overcoming knowledge acquisition bottlenecks in intelligent interface design. *Proceedings of the Human Factors Society 35th Annual Meeting*, 2, 1181-1185.

McNeese, M. D., Zaff, B. S., & Brown, C. E. (1992). Computer supported collaborative work: A new agenda for human factors engineering. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 681-686.

McNeese, M. D., Zaff, B. S., Brown, C. E., Citera, M., & Selvaraj, J. A. (1993). Understanding the context of multidisciplinary design: A case for establishing ecological validity in the study of design problem solving. *Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting*, 2, 1082-1086.

McNeese, M. D., Zaff, B. S., Brown, C. E., Citera, M., & Wellens, A. R. (1992). The role of a group-centered approach in the development of computer-supported collaborative design technologies. *Proceedings of the Human Factors Society 36th Annual Meeting*, 2, 867-871.

- McNeese, M. D., Zaff, B. S., Brown, C. E., Citera, M., & Whitaker, R.** (in press). AKADAM: Eliciting user knowledge to support participatory ergonomics. *The International Journal of Industrial Ergonomics*.
- McNeese, M. D., Zaff, B. S., Peio, K. J., Snyder, D. E., Duncan, J. C., & McFarren, M. R.** (1990). An advanced knowledge and design acquisition methodology: Application for the pilot's associate (Report No. AAMRL-TR-90-060). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A233700)
- Meindl, R. S., Zehner, G. F., & Hudson, J. A.** (1993). A multivariate anthropometric method for crew station design (Report No. AL/CF-TR-1993-0054). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A270652)
- Mellian, S. A., Ervin, C. A., & Robinette, K. M.** (1991). Sizing evaluation of navy women's uniforms (Report No. AL-TR-1991-0116). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A249782)
- Merhav, S. J., Lifshitz, S., & Kocian, D. F.** (1994). Advanced filtering methods in head teleoperated systems and helmet mounted displays (Report No. AL/CF-SR-1994-0002). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A279446)
- Merkel, H. S.** (1988). Investigation of a linear systems model for human visual detection and spatial frequency discrimination (Report No. AAMRL-TR-88-061). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A209397)
- Merkel, H. S., & Task, H. L.** (1987). Airborne direct-view optical system: Effects of target briefing on performance (Report No. AAMRL-TR-87-026). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.
- Merkel, H. S., & Task, H. L.** (1989). An illustrated guide of optical characteristics of aircraft transparencies (Report No. AAMRL-TR-89-015). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A214565)
- Merkel, H. S., & Task, H. L.** (1990). Optical test of the space shuttle overhead windows (Report No. AAMRL-TR-90-024). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A229919)
- Merkel, H. S., Task, H. L., Whiteley, J. D., LaPuma, P. T., Pinkus, A. R., & Block, M. G.** (1990). The development of the Spaceborne Direct-View Optical System (SpaDVOS) (Report No. AAMRL-TR-90-016). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B144518)
- Merriken, M. S., Johnson, W. V., Cress, J. D., & Riccio, G. E.** (1988). Time delay compensation using supplementary cues in aircraft simulator systems. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 295-303.
- Merriken, M. S., Riccio, G. E., & Johnson, W. V.** (1987). Temporal fidelity in aircraft simulator visual systems. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 50-54.
- Merryman, R. F. K.** (1994). Vista Sabre II: Integration of helmet-mounted tracker/display and high off-boresight missile seeker into F-15 aircraft. In R. J. Lewandowski, W. Stephens, & L. A. Haworth (Eds.), *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Helmet- and Head-Mounted Displays and Symbology Design Requirements*, 2218, 173-184.
- Metzler, T. R.** (1986). Register of research in progress on mental workload (Report No. AAMRL-TR-86-007). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A168210)
- Middendorf, M. S., Fiorita, A. L., & McMillan, G. R.** (1991). The effects of simulator transport delay on performance, workload, and control activity during low-level flight. *AIAA Flight Simulation Technologies Conference*, 412-426.
- Middendorf, M. S., Johnson, W. V., Gilkey, M. J., & McClurg, T. D.** (1989). A comprehensive collection of procedures for simulator verification. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 1-7.
- Middendorf, M. S., Lusk, S. L., & Whiteley, J. D.** (1990). Power spectral analysis to investigate the effects of simulator time delay on flight control activity. *AIAA Flight Simulation Technologies Conference*, 46-52.

- Middleton, V. E., Chevalier, J. R., Evans, J. B., Felt, J. E., Hayes, T. R., McIntyre, R. T., Porter, C. D., Rayle, M. E., Rudofski, D., Shelef, S., Shew, R. L., & James, G. M.** (1987). *Evaluation of individual protective equipment improvement objectives* (Report No. AAMRL-TR-87-002). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C040557)
- Miller, R. E., O'Neal, M. R., & Jackson, W. G.** (1991). Vision detection of aircraft by USAF pilots: Spectacle wearers versus emmetropes [Abstract]. *Optometry and Vision Science*, 68(12,Suppl.), 181.
- Miller, R. E., O'Neal, M. R., Woessner, W. M., Dennis, R. J., & Green, R. P.** (1989). *The prevalence of spectacle wear and incidence of refractive error in USAF aircrew* (Report No. USAFSAM-TR-89-28). Brooks AFB, TX: USAF School of Aerospace Medicine. (DTIC No. AD-A220857)
- Miller, R. E., Woessner, W. M., Dennis, R. J., O'Neal, M. R., & Green, R. P.** (1990). Survey of spectacle wear and refractive error prevalence in USAF pilots and navigators. *Optometry and Vision Science*, 67(11), 833-839.
- Mills, R. G.** (1988). A user-assisted Generic Systems Analyst Workstation (GENSAW). *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 1065-1069.
- Mills, R. G.** (1988). A user-assisted Test & Evaluation Methodology Assistant Program (TEMAP). *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 1060-1064.
- Mills, R. G.** (1989). Crew-centered bomber mission model. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 765-771.
- Miyamoto, A., & Wilson, G. F.** (1990). Mapping of evoked magnetic field with visual stimulation: A secondary projection and processing system. *Aviation, Space and Environmental Medicine*, 61, 453.
- Miyamoto, A., & Wilson, G. F.** (1991). Mapping of evoked magnetic field with visual stimulation: A secondary projection and processing area. *Aviation, Space and Environmental Medicine*, 62(7), 638-647.
- Moffitt, K., & Genco, L. V.** (1985). *Criteria for a state-of-the-art vision test system* (AFAMRL Technical Report 85-004). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.
- Monk, D.** (1994). Computer Aided Systems Human Engineering: Performance Visualization System (CASHE: PVS) - An interactive, hypermedia design tool. *Proceedings of the Human Factors and Ergonomics Society 38th Annual Meeting*, 2, 948.
- Monk, D. L., & Lincoln, J. E.** (1994). User's Guide - computer aided systems human engineering: Performance visualization system. Wright-Patterson AFB, OH: Armstrong Laboratory.
- Monk, D. L., Swierenga, S. J., & Lincoln, J. E.** (1992). Developing behavioral phenomena test benches. *Proceedings of the Human Factors Society 36th Annual Meeting*, 2, 1106-1109.
- Morris, N. M.** (1987). Designing for user acceptance of design aids. In W. B. Rouse, & K. R. Boff (Eds.), *System design: Behavioral perspectives on designers, tools and organizations* (pp. 245-255). New York: North Holland.
- Morris, N. M., & Rouse, W. B.** (1986). *Adaptive aiding for human-computer control: Experimental studies of dynamic task allocation* (Report No. AAMRL-TR-86-005). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A166704)
- Morris, N. M., Rouse, W. B., & Frey, P. R.** (1985). *Adaptive aiding for symbiotic human-computer control: Conceptual model and experimental approach* (AFAMRL Technical Report 84-072). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.
- Morton, K., & Swierenga, S. J.** (1990). Developing effective coding schemes for an advanced visual display technology. *Proceedings of the 12th Biennial Psychology in the DOD Symposium*, 328-332.
- Morton, K., & Zirkler, D. J.** (1990). Using engineering models to compare paper and hypermedia-based displays of flight information. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 770-774.

Pilot's helmet helps interpret high-speed world

(New York Times—John Noble Wilford)

The pilot sits in the cockpit wearing a dark, bulging, bug-faced helmet that makes him look like the sinister Darth Vader in the movie "Star Wars." Projected on his visor is a synthesized panorama of the world he is flying over and into, the terrain below and the skies around. It is like having his head inside a marvelous, action-packed video game.

But it just may be the only way pilots will be able to handle the complex, high-speed aircraft of the future, especially in combat. Assisted by computers, tiny video tubes and other electronics, they will almost literally carry all their cockpit controls in the helmets they wear. The engineers who are developing this advanced technology call it a "virtual cockpit" or "supercockpit."

Missiles Streak Across Helmet Visor

On the helmet visor, the pilot sees moving green lines streak before his face, calling attention to antiaircraft missile fire. He applies pressure to the stick and makes a sharp evasive maneuver, away from the line of fire.

The panorama, 120 degrees wide and 60 degrees high, changes accordingly. The pilot swings his head left or right and the view changes each time.

Superimposed on one corner of the panorama are numerical readouts of his altitude, velocity, and heading. There is a small square marked "status." He looks straight at the square, says "select" and sees projected there for a few moments symbols indicating the status of the plane's fuel, oil pressure and temperatures. The purpose is to know what he needs to know when he needs to know it, and not be overwhelmed by panels of gauges and dials.

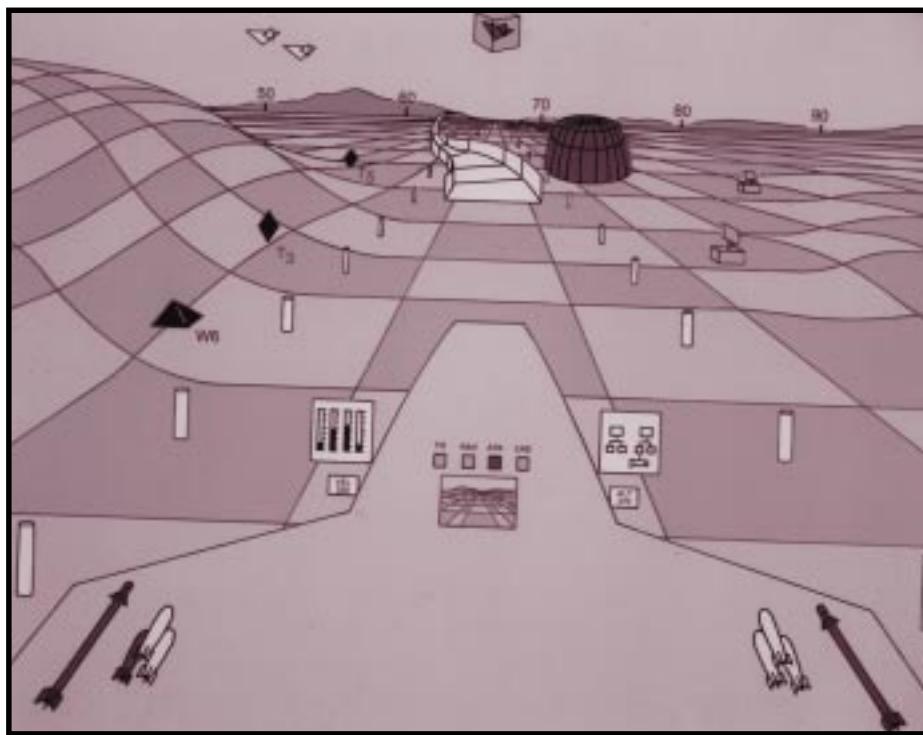
Voice Commands Dispatch the "Bad Guys"

Ahead, above the outline of a distant mountain, appears a green triangle, topped by the number 9. Radar has detected a "bad guy" nine miles away. The pilot checks his weapons, calling by

voice command for a symbolic display of the missiles available under the plane's wing. He selects one, by voice or by pressing a button, and the symbol for the selected missile flashes to remind the pilot it is ready.

The pilot wants a better view. "Zoom," he says, and an electronically synthesized voice echoes the command in confirmation. Instantly, the computer provides a closeup image of the terrain ahead, and of the bad guy. Or the pilot says "god's eye," and hears his command repeated. This, in effect, takes the pilot out of the aircraft and high above for a view of himself, the approaching enemy, and the entire theater of impending battle.

With a "normal" image put back before him, the pilot points the plane so the reticle of his gunsight rests squarely over the triangle marking the location of the enemy craft. He gives the command "lock on." Then, "fire." The missile streaks toward the target. A symbolic explosion of light fills the triangle in the image. An enemy is destroyed.



**SYNTHESIZED PANORAMA PROJECTED
ON VISOR OF FUTURE PILOT**

Conceptual representation of the Super Cockpit in which the pilot has an abstracted pictorial view of the task, mission and threat environments. Night is turned into day, available weaponry are pictorially represented and accessed by alternative controls (voice, eye line-of-sight, or brain actuated). The pilot may navigate along a "highway in the sky." Threats are represented by their zones of lethality. (Workunit 71842601)

Morton, P. E., Tumey, D. M., Ingle, D. F., Downey, C. W., & Schnurer, J. H. (1991). Neural network classification of EEG data generated through use of the audio oddball paradigm. *Proceedings of the IEEE 17th Annual Northeast Bioengineering Conference*, 7-8.

Morton, P. E., & Wilson, G. F. (1988). Back propagation & EEG data. *Proceedings of the Fourth Annual Aerospace Applications of Artificial Intelligence Conference*, 2, 25-27.

Morton, P. E., & Wilson, G. F. (1992). *Back propagation and EEG Data* (Report No. AL-SR-1992-0026). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A279073)

Moss, R. W., Stollings, M. N., & Kuperman, G. G. (1986). *Crew system assessment working group, Volume IV, crew station assessment* (Report No. AFWAL-TR-85-3111). Wright-Patterson AFB, OH: Air Force Wright Aeronautical Laboratories. (DTIC No. B102516)

Nasman, V. T., Palmer, B., & Wilson, G. F. (1991). Effects of linguistic task difficulty on ERPs. *Psychophysiology*, 28(3A,Suppl.), S41.

Nelson, M. A., Sauer, D. W., & Kelly, S. (1987). *Human factors evaluation of the COPE prototype workstation* (Report No. AAMRL-TR-87-008). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.



NEW SIZING METHODS

Ms. Kathleen Robinette is demonstrating the fit of one off-the-shelf size from the new sizing system she helped develop for the Navy women's uniform. This sizing system reduced the need for alterations from 75% to less than 1% without increasing the number of sizes. (Workunit 71840850)

Ochs, J. (1992). *Automated custom-fit production* (Report No. AL-SR-1992-0007). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B164883)

Oliver, C. G., & Wilson, G. F. (1989). A topographical comparison of visual and auditory discrimination processing [Abstract]. *Psychophysiology*, 26(4A,Suppl.), S47.

Oliver, C. G., & Wilson, G. F. (1991). Hemispheric asymmetry in parietal but not occipital MEG during a mental rotation task. *Psychophysiology*, 28(3A,Suppl.), S42.

Olson, J. L., Arbak, C. J., & Jauer, R. A. (1991). *Panoramic cockpit control and display system, Volume II: PCCADS 2000* (Report No. AL-TR-91-0017). Wright-Patterson AFB, OH: Armstrong Laboratory.

O'Neal, M. R. (1986). *In vivo assessment of mechanisms controlling corneal hydration* (Report No. AAMRL-TR-86-004). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.

O'Neal, M. R. (1987). *Effect of refractive error change on pilot classification at the US Air Force Academy-Class of 1985* (Report No. AAMRL-TR-87-009). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.

O'Neal, M. R. (1988). *Contact lenses: An encyclopedia article* (Report No. AAMRL-SR-88-001). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.

- O'Neal, M. R.** (1988). Contact lenses. In J. G. Webster (Ed.), *Encyclopedia of medical devices and instrumentation* (Vol. 2, pp. 867-877). New York: John Wiley & Sons.
- O'Neal, M. R.** (1990). Effect of aircraft cabin altitude and humidity on oxygen tension under soft and hard gas-permeable contact lenses. *AGARD Conference Proceedings 492: Ocular Hazards in Flight and Remedial Measures* (pp. 23-1 - 23-9). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-492)
- O'Neal, M. R.** (1991). Effect of aircraft cabin altitude and humidity on oxygen tension under soft and hard gas-permeable contact lenses. In P. E. Flattau (Ed.), *Considerations in Contact Lens Use Under Adverse Conditions: Proceedings of a Symposium* (pp. 106-118). Washington, DC: National Academy Press.
- O'Neal, M. R., & Bonanno, J. A.** (1993). Effects of contact lenses on corneal physiology. In M. Ruben, & M. Guillon (Eds.), *Contact lens practice* (pp. 969-989). London: Chapman and Hall Medical.
- O'Neal, M. R., & Connon, T. R.** (1986). *Refractive error change at the United States Air Force Academy - Class of 1985* (Report No. AAMRL-TR-86-026). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A175341)
- O'Neal, M. R., & Miller, R. E.** (1987). Further investigation of contrast sensitivity and visual acuity in pilot detection of aircraft. *Proceedings of the Human Factors Society 31st Annual Meeting*, 2, 1189-1193.
- O'Neal, M. R., & Miller, R. E.** (1987). A further investigation of visual acuity and contrast sensitivity in actual aircraft detection performance of pilots [Abstract]. *Investigative Ophthalmology and Visual Science*, 28(3,Suppl.), 301.
- O'Neal, M. R., & Miller, R. E.** (1988). Further investigation of contrast sensitivity and visual acuity in pilot detection of aircraft (Report No. AAMRL-TR-88-002). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A198434)
- O'Neal, M. R., Miller, R. E., Woessner, W. M., Dennis, R. J., & Treadaway, D. K.** (1989). Refractive error change since college graduation [Abstract]. *Investigative Ophthalmology and Visual Science*, 30(3,Suppl.), 141.
- O'Neal, M. R., & Polse, K. A.** (1986). Decreased endothelial pump function with aging. *Investigative Ophthalmology and Visual Science*, 27(10), 457-463.
- O'Neal, M. R., Task, H. L., & Genco, L. V.** (1990). Effect of microgravity on several visual functions during STS shuttle missions. *41st Congress of the International Astronautical Federation* (IAF/IAA-90-536, pp. 1-8). Paris: International Academy of Astronautics.
- O'Neal, M. R., Task, H. L., & Genco, L. V.** (1991). Visual function during microgravity on STS shuttle missions [Abstract]. *Optometry and Vision Science*, 68(12,Suppl.), 181.



**MEASURING VISUAL OBSCURATION
BY A HELMET AND OXYGEN MASK**

Ms. Rebecca Unger is assisting TSgt Robert L. Stewart as he serves as an experimental subject in a study measuring the amount of visual obscuration caused by a helmet and oxygen mask. This work provided a small part of the data for the CREW CHIEF Man Model being developed by the Human Engineering Division. (1992) (Workunit 71840847)

- Osgood, R. K., Geiselman, E. E., & Calhoun, C. S.** (1991). Attitude maintenance using an off-boresight helmet-mounted virtual display. *AGARD Conference Proceedings 517: Helmet-Mounted Displays and Night Vision Goggles* (pp. 14-1 - 14-7). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-517)
- Osgood, R. K., Taylor, K., & McClurg, T. D.** (1988). The dynamic seat as an angular motion cueing device. *Proceedings of the Human Factors Society 32nd Annual Meeting*, 1, 25-29.
- Osgood, R. K., & Venturino, M.** (1990). Information representations for aircraft attitude displays. *Proceedings of the Human Factors Society 34th Annual Meeting*, 2, 1542-1546.
- Osgood, R. K., & Wells, M. J.** (1991). The effect of field-of-view size on performance of a simulated air-to-ground night attack. *AGARD Conference Proceedings 517: Helmet-Mounted Displays and Night Vision Goggles*, (pp. 10-1 - 10-7). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-517)
- Osgood, S. S., Boff, K. R., & Donovan, R. S.** (1988). Rapid communication display technology efficiency in a multi-task environment. *Proceedings of the Human Factors Society 32nd Annual Meeting*, 2, 1395-1399.
- Owen, D. H., & Warren, R.** (1987). Perception and control of self-motion: Implications for visual simulation of vehicular locomotion. In L. S. Mark, J. S. Warm, & R. L. Huston (Eds.), *Ergonomics and human factors: Recent research* (pp. 40-70). New York: Springer Verlag.
- Palmer, B., Nasman, V. T., & Wilson, G. F.** (1991). A comparison of referenced and reference-independent methodologies on ERP evaluation. *Psychophysiology*, 28(3A, Suppl.), S43.
- Palmer, B., Nasman, V. T., & Wilson, G. F.** (1994). Task decision difficulty: Effects of ERPs in a same-different letter classification task. *Biological Psychology*, 38, 199-214.
- Palmer, B., Nasman, V. T., Wilson, G. F., & Gundel, A.** (1992). *A brain evoked potential study of task difficulty using verbal memory and mental rotation tasks* (Report No. AL-TR-1992-0079). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A263871)
- Pantle, A., McCarthy, J., & Pinkus, A.** (1990). Detection of the spatial structure and motion of second-order stimuli [Abstract]. *Investigative Ophthalmology and Visual Science*, 31, 523.
- Pantle, A., Pinkus, A., & McCarthy, J. E.** (1991). The puzzling influence of high spatial frequencies on motion perception [Abstract]. *Investigative Ophthalmology and Visual Science*, 32, 892.
- Pantle, A., Pinkus, A., & Strout, J.** (1992). Motion signal interactions [Abstract]. *Investigative Ophthalmology and Visual Science*, 33, 973.
- Papanicolaou, A., Wilson, G. F., Busch, C., DeRego, P., Orr, C., Davis, I. E., & Eisenberg, H. M.** (1988). Hemispheric asymmetries in phonological processing assessed with probe evoked magnetic fields. *International Journal of Neuroscience*, 39, 275-281.
- Patterson, R., & Martin, W. L.** (1992). Human stereopsis. *Human Factors*, 34, 669-692.
- Pearson, W. H.** (1986). Work rate and ratio, II. Mathematical analysis for multi-resource model. *Psychometrika*.
- Peio, K. J., Crawford, R. L., & Kuperman, G. G.** (1991). *Man-machine interface analyses for bomber flight management system* (Report No. AL-TR-1991-0018). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A245707)
- Penrod, T. D., & Kuperman, G. G.** (1993). *Image quality analysis of compressed Synthetic Aperture Radar* (Report No. AL/CF-TR-1993-0156). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A273399)
- Another current project is space vision research, which the Air Force is working on with NASA. This consists of a series of tests being run on the space shuttle to determine the effects of microgravity on astronauts' vision. Astronauts have commented on changes in their vision in space, ranging from experiences of super vision to degraded near-vision.**
- May 1985, "Human Engineering, Yesterday and Today," Civilian Employees Reporter*

Perez, W. A., Masline, P. J., Ramsey, E. G., & Urban, K. E. (1987). *Unified tri-services cognitive performance assessment battery: Review and methodology* (Report No. AAMRL-TR-87-007). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A181697)

Pinkus, A. R. (1988). Night lighting and night vision goggle compatibility. *AGARD Lecture Series 156: Visual Effects in the High Performance Aircraft Cockpit* (pp. 7-1 -7-16). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-LS-156)

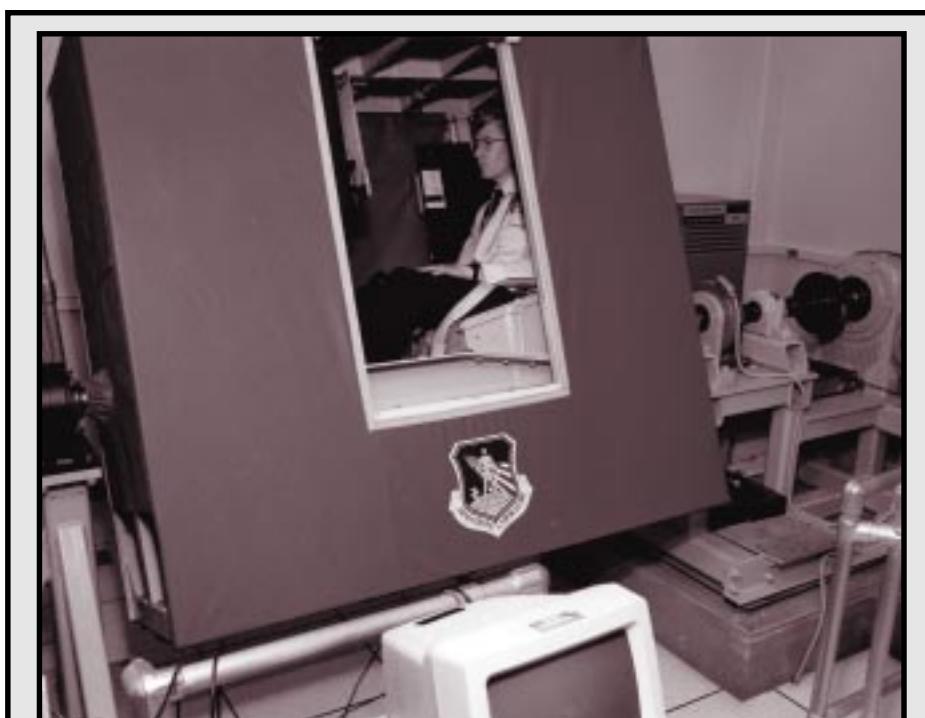
Pinkus, A. R. (1994). *The spatiotemporal characteristics of visual motion priming* (Report No. AL/CF-TR-1994-0084). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A284782)

Pinkus, A. R., & Task, H. L. (1988). Display system image quality. *AGARD Lecture Series 156: Visual Effects in the High Performance Aircraft Cockpit* (pp. 8-1 - 8-17). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-LS-156)

Pollack, R. B. (1990). *An investigation into techniques for landmarks identification on 3-D images of human subjects* (Report No. AAMRL-SR-90-0500). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A218614)

Pollack, R. B. (1993). *Neural network technologies* (Report No. AL-SR-1993-0002). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A262576)

Polzella, D. J., Masline, P. J., Amell, J. R., Perez, W. A., & Ramsey, E. G. (1987). The



BRAIN ACTUATED CONTROL OF MOTION SIMULATOR

Dr. Paul Morton self-regulates his brain electrical activity to control the cab's roll position in the Alternative Control Technology (ACT) Laboratory. Specific patterns of brain electroencephalographic (EEG) activity are identified and monitored. Using a biofeedback training method, operators learn to enhance or reduce brain electrical response strength. Noninvasive scalp electrodes are used to record changes, which are then translated into commands that control the operation of a physical device or computer program. (1994) (Task 718414)

development of a spatial orientation task for inclusion in the Criterion Task Set (CTS). *Proceedings of the Human Factors Society 31st Annual Meeting*, 1, 394-397.

Polzella, D. J., & Reid, G. B. (1987). A multi-dimensional scaling analysis of Subjective Workload Assessment Technique (SWAT) ratings of the Criterion Task Set (CTS). *Proceedings of the Human Factors Society 31st Annual Meeting*, 1, 398-401.

Polzella, D. J., & Reid, G. B. (1989). Multi-dimensional scaling analysis of simulated air combat maneuvering performance data II: A follow-on study. In R. S. Jensen (Ed.), *Proceedings of the Fifth International Symposium on Aviation Psychology*, 2, 920-925.

Polzella, D. J., & Reid, G. B. (1991). A comparison of two statistical approaches to complex performance measurement. *Proceedings of the Sixth International Symposium on Aviation Psychology*, 841-846.

- Porter, C. D., Jensen, J. G., & Chevalier, J. R.** (1987). *Air base attack: Liquid agent challenge assessment—single versus multiple chemical munitions* (Report No. AAMRL-TR-87-025). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C041709)
- Post, D. L.** (1985). Effects of color on CRT symbol legibility. *Society for Information Display International Symposium: Digest of Technical Papers*, 16, 196-199.
- Post, D. L.** (1986). U.S. Air Force color display issues. *Fifth Aerospace Behavioral Engineering Technology Conference Proceedings: Human Integration Technology: The Cornerstone for Enhancing Human Performance*: Society of Automotive Engineers, 227-247.
- Post, D. L.** (1988). Color specification and the CIE system of colorimetry. In K. R. Boff, & J. E. Lincoln (Eds.), *Engineering data compendium: Human perception and performance* (Vol. 1, pp. 374-381). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.
- Post, D. L.** (1989). Basic approaches to color HMD. In L. M. Biberman (Ed.), *Proceedings of the Sensor Display Workshop: Vol. 1 Basic Principles* (IDA Document D-713, pp. 145-160). Alexandria, VA: Institute for Defense Analysis.
- Post, D. L.** (1992). Applied color-vision research. In H. Widdel, & D. L. Post (Eds.), *Color in electronic displays* (pp. 137-173). New York: Plenum.
- Post, D. L.** (1992). Colorimetric measurement, calibration, and characterization of self-luminous displays. In H. Widdel, & D. L. Post (Eds.), *Color in electronic displays* (pp. 299-312). New York: Plenum.
- Post, D. L.** (1993). A new color display for HMDs. *Insight*, 15(3), 8-10.
- Post, D. L.** (1994). Miniature color display for airborne HMDs. In R. J. Lewandowski, W. Stephens, & L. A. Haworth (Eds.), *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Helmet-and Head-Mounted Displays and Symbology Design Requirements*, 2218, 2-6.
- Post, D. L.** (1994). A new color display for HMDs. *Insight*, 15(3), 8-10.
- Post, D. L., & Calhoun, C. S.** (1987). An evaluation of methods for producing specific colors on CRTs. *Proceedings of the Human Factors Society 31st Annual Meeting*, 2, 1276-1280.



RESEARCH TO DEVELOP A HMD SYMBOLOGY STANDARD FOR TACTICAL APPLICATIONS

Dr. Robert K. Osgood, Task Manager of the Tactical Aircraft Cockpit Design and Evaluation Program (Task 718426) and member of the Visual Display Systems Branch, evaluating several candidate helmet-mounted display symbology sets in an operational mission environment using the Visually-Coupled Airborne Systems Simulator (VCASS). Osgood won the first Crew Systems Directorate Scientific Excellence Award in 1992 for his work in this research domain.

- Post, D. L., & Calhoun, C. S.** (1988). Color-name boundaries for equally bright stimuli on a CRT: Phase II. *Society for Information Display International Symposium: Digest of Technical Papers*, 19, 65-68.
- Post, D. L., & Calhoun, C. S.** (1989). Color-name boundaries for color coding [Insert]. *Applied Vision 1989 Technical Digest Series* (Vol. 16). Washington, DC: Optical Society of America.
- Post, D. L., & Calhoun, C. S.** (1989). Color-name boundaries for equally bright stimuli on a CRT: Phase III. *Society for Information Display International Symposium: Digest of Technical Papers*, 20, 284-287.
- Post, D. L., & Calhoun, C. S.** (1989). An evaluation of methods for producing desired colors on CRT monitors. *Color Research and Application*, 14(4), 172-186.
- Post, D. L., & Greene, F. A.** (1985). Color naming as a function of stimulus luminance, angular subtense, and practice. *Proceedings of the Human Factors Society 29th Annual Meeting*, 2, 1070-1074.
- Post, D. L., & Greene, F. A.** (1986). Color-name boundaries for equally bright stimuli on a CRT: Phase I. *Society for Information Display International Symposium: Digest of Technical Papers*, 17, 70-73.
- Post, D. L., & Lloyd, C. J.** (1994). Color display gamuts and ambient illumination. *Displays*, 15, 39-43.
- Post, D. L., Sarma, K. A., Trimmier, J. R., Heinze, W., Rogers, C. R., Ellis, R., Larson, B., & Franklin, H.** (1994). A new color display for head-mounted use. *Journal of the Society for Information Display*, 2, 155-163.
- Post, D. L., & Snyder, H. L.** (1986). *Color contrast metrics for complex images* (Report No. HFL/ONR 86-2). Blacksburg, VA: Virginia Polytechnic Institute and State University.
- Purvis, B. D.** (1992). *An evaluation of B-1B pilot performance during simulated instrument approaches with and without status information* (Report No. AL-TR-1992-0088). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A263874)
- Purvis, B. D., Craig, J. L., & Simons, J. C.** (1988). *Night vision goggle head-up display for B-52 special operations* (Report No. AAMRL-TR-88-019). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B123860)
- Purvis, B. D., Evers, K., Hoyland, C., Hill, J., & Brioida, M.** (1988). *Visual simulation system computer program product specification* (Report No. AAMRL-TR-88-049). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B131762)
- Purvis, B. D., Green, T. B., St. John, R. J., Reynolds, M. C., & Lovering, P. B.** (1988). *B-1B Instrument Landing System (ILS) display format study* (Report No. AAMRL-TR-88-003). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B120771)
- Purvis, B. D., Skelly, J. J., Simons, J. C., & Detro, S.** (1988). *B-52 emergency war order survivability: Pilot effectiveness performance* (Report No. AAMRL-TR-88-032). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.
- Raab, F. H., & Brewster, C. C.** (1988). *Magnetic-multipole technique for moveable scatterer compensation* (Report No. AAMRL-TR-88-054). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B133465)
- Raab, F. H., Brewster, C. C., Stone, F. L., & Mackin, W. F.** (1993). *Algorithms for magnetic helmet-mounted sight* (Report No. AL/CF-TR-1993-0077). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B176447)
- Ramirez, T. L., Morthland, S. P., Soergel, C. D., Allread, G., & James, G. M.** (1987). *Pretreatment side effects data base development* (Report No. AAMRL-TR-87-006). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C040555)
- Ramirez, T. L., Shew, R. L., Dembeck, C. M., Simons, J. C., Shogner, R. C., & James, G. M.** (1987). *Seymour Johnson chemical warfare exercise field study and data analysis* (Report No. AAMRL-TR-87-003). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C040556)

- Ramirez, T. L., Shew, R. L., Felt, J. E., Rayle, M. E., & James, G. M.** (1986). *A method for determining task time increase caused by the individual protective ensemble* (Report No. AAMRL-TR-86-036). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B108357)
- Ratino, D. A., Repperger, D. W., Goodyear, C. D., Potor, G., & Rodriguez, L. E.** (1988). Quantification of reaction time and time perception during space shuttle operations. *Aviation, Space and Environmental Medicine*, 59(3), 220-224.
- Ratnaparkhi, M. V., Ratnaparkhi, M. M., & Robinette, K. M.** (1992). Size and shape analysis techniques for design. *Applied Ergonomics*, 23(3), 181-185.
- Reardon, K. A., Oliver, C. G., & Warren, R.** (1987). Flight simulation training using standard and non-standard tasks. *Proceedings of the Human Factors Society 31st Annual Meeting*, 2, 1291-1295.
- Reardon, K. A., & Warren, R.** (1989). Effect of emergent detail on descent-rate estimations in flight simulators. In R. S. Jensen (Ed.), *Proceedings of the Fifth International Symposium on Aviation Psychology*, 2, 714-719.
- Reeves, D. L., Stanny, R. R., Wilson, G. F., Herning, R. I., Pickworth, W., VanOrden, K. F., & Caldwell, J. A.** (1991). *The OMPAT level 1 Neurophysiological Performance Assessment Battery (NPPAB)* (NAMRL Monograph No. 43). Pensacola, FL: Naval Aerospace Medical Research Laboratory.
- Reid, G. B.** (1985). The systematic development of a subjective measure of workload. *Proceedings of the 9th Congress of the International Ergonomics Association*.
- Reid, G. B.** (1988). The Subjective Workload Assessment Technique: A scaling procedure for measuring mental workload. In P. A. Hancock, & N. Meshkati (Eds.), *Human mental workload* (pp. 185-218). Amsterdam: North Holland.
- Reid, G. B., & Haskell, B. E.** (1986). A multidimensional scaling analysis of subjective work-load in low-time private pilots. *Aviation, Space and Environmental Medicine*, 58(12), 1230-1232.
- Reid, G. B., Potter, S. S., & Bressler, J. R.** (1989). *Subjective Workload Assessment Technique (SWAT): A user's guide* (Report No. AAMRL-TR-89-023). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A215405)
- Reinhart, W. F., Glynn, C. D., Dye, C., Takahama, M., & Snyder, H. L.** (1988). *The role of short-term memory in operator workload* (Report No. AAMRL-TR-88-024). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A200252)
- Reynolds, H. M., Leurg, S., & Kincaid, V.** (1985). *The position and mobility of the shoulder, spinal column and pelvis in seated subjects* (AFAMRL TR84-060). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.
- Riccio, G. E., Cress, J. D., & Johnson, W. V.** (1987). The effects of simulator delays on the acquisition of flight control skills: Control of heading and altitude. *Proceedings of the Human Factors Society 31st Annual Meeting*, 2, 1286-1290.
- Rickles, W., Dunlosky, A., & Scott, B.** (1991). *Anti-Satellite (ASAT) system timeline modeling* (Report No. AL-TR-1991-0092). Wright-Patterson AFB, OH: Armstrong Laboratory.
- Rieck, A. M.** (1993). *Virtual image voltmeter for aircraft maintenance technicians* (Report No. AL-TR-1993-0019). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B182457)
- Rieck, A. M., & Dwyer, E. J.** (1992). *Design of virtual image voltmeter device for maintenance technicians* (Report No. AL-SR-1992-0016). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B174365)
- Riegler, J. T., & Donohue-Perry, M. M.** (1990). *A field evaluation of the compatibility of the protective integrated hood mask with ANVIS night vision goggles* (Report No. AAMRL-TR-90-031). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A230237)
- Riegler, J. T., Whiteley, J. D., Task, H. L., & Schueren, J.** (1991). *The effect of signal-to-noise ratio on visual acuity through night vision goggles* (Report No. AL-TR-1991-0011). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A260579)

Kenneth R. Boff, PhD
Chief, Human Engineering Division

April 1991 to Present

The current Chief of the Human Engineering Division, Kenneth R. Boff earned a PhD in experimental psychology (Dynamic Visual Performance) from Columbia University in 1978. His personal research has focused on facilitating applications of human performance data and models in the design and evaluation of complex human system interfaces. More recently, he initiated the development of innovative data visualization techniques to enable computer-aided design, or CAD, representation of human performance data for crew system designers.

Dr. Boff actively consults and provides technical liaison with a broad range of government agencies, international working groups, universities, and professional societies and is founder and Technical Director of the Crew System Ergonomics Information Analysis Center (CSERIAC). He is the United States' Principal Investigator for the Joint US-French Super Cockpit Technologies Program, and an appointed member of the AGARD Aerospace Medical Panel, within which he chairs the Human Factors Committee.

Holder of a patent for Rapid Communication Display Technology, Dr. Boff has authored numerous articles, book chapters, and technical papers and is co-editor of *System Design* (1987), Senior Editor of the two-volume *Handbook of Perception and Human*



Performance (1986) and the four-volume *Engineering Data Compendium: Human Perception and Performance* (1988).

Beginning in 1993 Dr. Boff served as the Joint Services Working Group Chairman leading the effort to establish the Human Systems Interface (HSI) technology area within Joint Directors of Laboratories (JDL) Reliance. In April 1994, the HSI Panel was formally approved within the Department of Defense and Dr. Boff was appointed Panel Chairman.

Rizzuto, A. P. (1988). *Diazepam and its effects on psychophysiological and behavioral measures of performance* (Report No. AAMRL-TR-87-074). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A198767)

Robinette, K. M. (1986). Anthropometric methods for improving protection. In R. L. Barker, & G. C. Coletta *Performance of Protective Clothing*, ASTM STP 900, 569-580.

Robinette, K. M. (1986). Three-dimensional anthropometry-shaping the future. *Proceedings of the Human Factors Society 30th Annual Meeting*, 1, 205.

Robinette, K. M. (1992). Anthropometry for HMD design. *Proceedings of the Society of Photo-*

Optical Instrumentation Engineers (SPIE): Helmet-Mounted Displays III, 1695, 138-145.

Robinette, K. M. (1993). Fit testing as a helmet development tool. *Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting*, 1, 69-73.

Robinette, K. M., & Annis, J. F. (1986). A nine-size system for chemical defense gloves (Report No. AAMRL-TR-86-029). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A173193)

Robinette, K. M., Ervin, C., & Zehner, G. F. (1986). Dexterity testing of chemical defense gloves (Report No. AAMRL-TR-86-021). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A173545)



**USING AN OPTICAL VIEWING SYSTEM
TO FIND GROUND TARGETS**

An airborne observer visually searching for a ground target with a direct-view optical system in a target detection study measuring the usefulness to observers of briefing aids. The work was done under Program 62202F, Project 6893, Task 11, Workunit 02 by Lt Harold S. Merkel and Harry Lee Task. AAMRL-TR-87-026 (1987)

Robinette, K. M., Ervin, C. A., & Zehner, G. F. (1987). *Development of a standard dexterity test battery* (Report No. AAMRL-TR-87-034). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A188314)

Robinette, K. M., & Fowler, J. (1988). *An annotated bibliography of United States Air Force engineering anthropometry* (Report No. AAMRL TR-88-013). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A198345)

Robinette, K. M., Mellian, S. A., & Ervin, C. A. (1991). *Development of sizing systems for Navy women's uniforms* (Report No. AL-TR-1991-0117). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A250071)

Robinette, K. M., & Whitestone, J. J. (1992). *Methods for characterizing the human head for the design of helmets* (Report No. AL-TR-1992-0061). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A263875)

Robinette, K. M., & Whitestone, J. J. (1994). The need for improved anthropometric methods for the development of helmet systems. *Aviation, Space and Environmental Medicine*, 65(4).

Robinson, J. C., Robinette, K. M., & Zehner, G. F. (1988). *User's guide to accessing the*

anthropometric data base at the center for anthropometric research data (Report No. AAMRL-TR-88-012). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A198771)

Robinson, J. C., Robinette, K. M., & Zehner, G. F. (1992). *User's guide to the anthropometric database at the computerized anthropometric research and design (CARD) laboratory second edition* (Report No. AL-TR-1992-0036). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A273002)

Rogers-Adams, B. M., Riegler, J. T., Irvin, G. E., & Dowler, M. G. (1988). *The effects of masking and shape disruptive patterns on the visual detection of ground parked aircraft* (Report No. AAMRL-TR-88-055). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B133684)

Rolek, E. P., & Snyder, D. E. (1986). *SAM Crew vulnerability to flightpath, ECM, and EO/CM effects for acquisition to track transitions* (Report No. AAMRL-TR-86-053). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C040714)

Rolek, E. P., & Snyder, D. E. (1988). *Demonstration of improved survivability through the use of strategies against Soviet SAM crews* (Report No. AAMRL-TR-88-031). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C956305)

Ross, J., & Ervin, C. A. (1987). *Chemical defense flight glove ensemble evaluation* (Report No. AAMRL-TR-87-047). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A118401)

Ross, J. A. (in press). Multirate video sync stripper. *Electronic Design*.

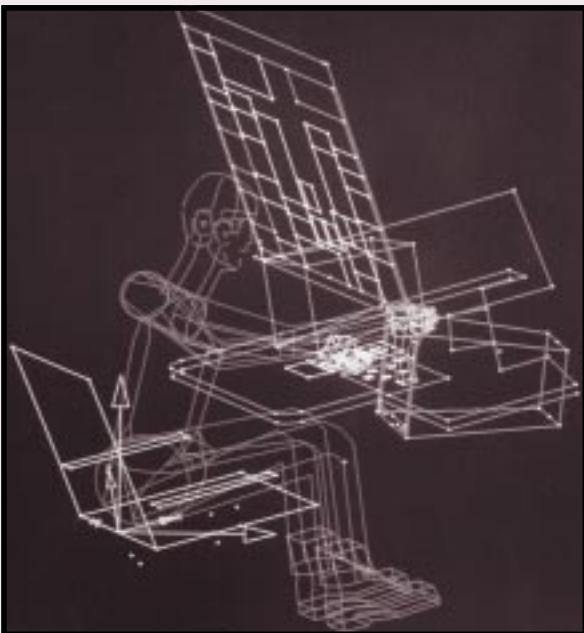
Ross, J. A., & Kocian, D. (1994). *Hybrid video amplifier chip set for helmet-mounted visually coupled systems* (Report No. AL/CF-SR-1994-0031). Wright-Patterson AFB, OH: Armstrong Laboratory.

Ross, J. A., & Kocian, D. F. (1993). Hybrid video amplifier chip set for helmet-mounted visually coupled systems. *Society for Information Display International Symposium: Digest of Technical Papers*, 24, 437-440.

- Rothey, J., Jones, M. W., Maute, K., Martinez, N., Krauskopf, P. J., Stump, W. J., Hardyal, S., Harper, W., Meeks, L., & McDaniel, J. W. (1990). *User's guide for CREW CHIEF: A computer graphics simulation of an aircraft maintenance Technician (Version 1.1 - CV CADDStation)* (Report No. AAMRL-TR-90-013). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.**
- Rouse, W. B. (1986).** A note on the nature of creativity in engineering: Implications for supporting system design. *Processing & Management*, 22(4).
- Rouse, W. B. (1987).** Designers, decision making, and decision support. In W. B. Rouse, & K. R. Boff (Eds.), *System design: Behavioral perspectives on designers, tools and organizations* (pp. 275-283). New York: North Holland.
- Rouse, W. B. (1987).** On meaningful menus for measurement: Disentangling evaluative issues in system design. *Information Processing and Management*, 23(6), 593-604.
- Rouse, W. B., & Boff, K. R. (1987).** Designers, tools, and environments: State of knowledge, unresolved issues and potential directions. In W. B. Rouse, & K. R. Boff (Eds.), *System design: Behavioral perspectives on designers, tools and organizations* (pp. 43-63). New York: North Holland.
- Rouse, W. B., & Boff, K. R. (Eds.). (1987).** *System design: Behavioral perspectives on designers, tools, and organizations*. New York: North Holland.
- Rouse, W. B., & Boff, K. R. (1987).** Workshop themes and issues: The psychology of system design. In W. B. Rouse, & K. R. Boff (Eds.), *System design: Behavioral perspectives on designers, tools and organizations* (pp. 7-17). New York: North Holland.
- Rouse, W. B., & Cody, W. J. (1988).** On the design of man-machine systems: Principles, practices, and prospects. *Automatica*, 24, 227-238.
- Rouse, W. B., & Cody, W. J. (1989).** Designers' criteria for choosing human performance models. In G. R. McMillan (Ed.), *Applications of human performance models to system design* (pp. 7-14). New York: Plenum.
- Rouse, W. B., & Cody, W. J. (1989).** Information systems for design support: An approach for establishing functional requirements. *Information and Decision Technologies*, 15(4), 281-289.
- Rouse, W. B., & Cody, W. J. (1989).** A theory-based approach to supporting design decision making. *Information and Decision Technologies*, 15(4), 291-306.
- Rouse, W. B., Cody, W. J., & Boff, K. R. (1991).** The human factors of system design: Understanding and enhancing the role of human factors engineering. *International Journal of Human Factors in Manufacturing*, 1, 87-104.



- Rouse, W. B., Cody, W. J., Boff, K. R., & Frey, P. R.** (1990). Information systems for supporting design of complex human-machine systems. In C. T. Leondes (Ed.), *Advances in aeronautical systems* (Vol. 38, pp. 41-100). San Diego: Academic Press.
- Rouse, W. B., Cody, W. J., & Frey, P. R.** (1992). Lessons learned in developing human-machine system design tools. *Information and Decision Technologies*, 18, 301-308.
- Rueb, J., Vidulich, M. A., & Hassoun, J.** (1992). Establishing workload acceptability: An evaluation of a proposed KC-135 cockpit redesign. *Proceedings of the Human Factors Society 36th Annual Meeting*, 1, 17-21.
- Rueb, J. D., Vidulich, M. A., & Hassoun, J. A.** (1994). Use of workload redlines: A KC-135 crew-reduction application. *The International Journal of Aviation Psychology*, 4, 47-64.
- Samaras, G. M.** (1992). *Development of a portable biopotential recorder for inflight acquisition* (Report No. AL-SR-1992-0024). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B184000)
- Sanderson, P.** (1994). *MacSHAPA 1.0 software and user's manual*. Wright-Patterson AFB, OH: Armstrong Laboratory.
- Sanderson, P. M., McNeese, M. D., & Zaff, B. S.** (1994). Handling complex real-world data with two cognitive engineering tools: COGENT and MacSHAPA. *Behavior Research Methods, Instruments & Computers*, 17(2), 117-124.
- Santoro, T. P., & Tsou, B. H.** (1992). Trade-off between field-of-view and periscope scan rate in a target detection and bearing awareness study. *Society for Information Display International Symposium: Digest of Technical Papers*, 23, 298-300.
- Sarma, K. A., Trimmier, J. R., Heinze, W., Rogers, C., Ellis, R., Larson, B., Franklin, H., & Post, D. L.** (1993). Miniature color display. In J. Morreale (Ed.), *Society for Information Display International Symposium: Digest of Technical Papers*, 24, 1005-1008.
- Schafer, E., & Bates, B. T.** (1988). *Anthropometric comparisons between body measurements of men and women* (Report No. AAMRL-TR-88-020). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.
- Schafer, E., & Bates, B. T.** (1988). *Anthropometric comparisons between face measurements of men and women* (Report No. AAMRL-TR-88-027). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.
- Schiffler, R. J., & Pinkus, A. R.** (1986). Human factors research and development requirements for future aerospace cockpit systems. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 3, 883-885.
- Schiffler, R. J., & Pinkus, A. R.** (1987). Human factors research and development requirements for future aerospace cockpit systems. *IEEE Aerospace and Electronic Systems Magazine*, 2(9), 2-4.
- Schlegel, R. E., & Gilliland, K.** (1990). *Evaluation of the Criterion Task Set - Part I Appendices A and B - Univariate summaries* (Report No. AAMRL-TR-90-008). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A225188)



COMBIMAN IN THE C-141

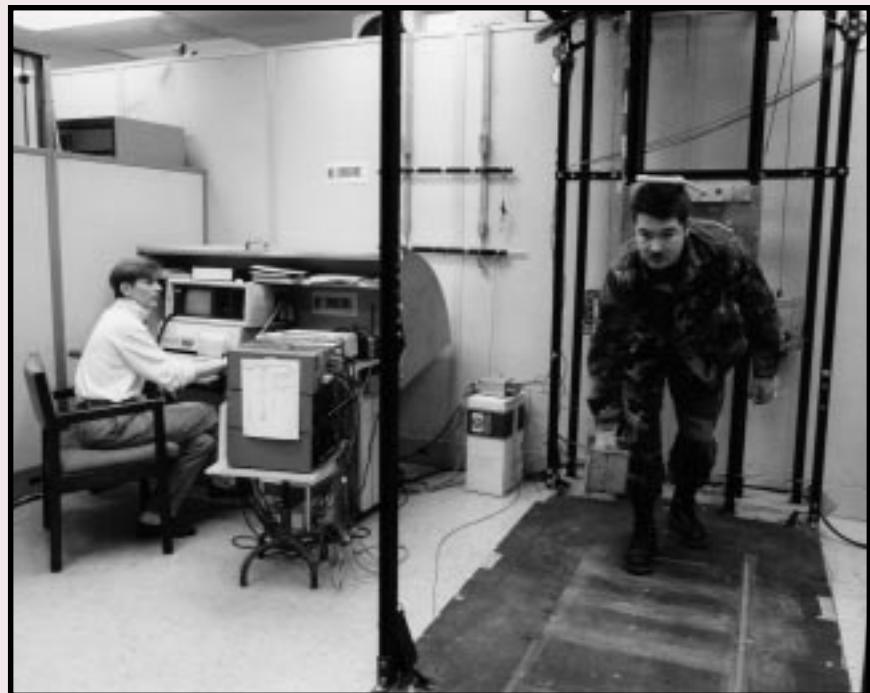
The COMBIMAN computer model was used in 1992 to evaluate physical accommodation of changes to a C-141 navigator's station. Analysis revealed the need to relocate a CRT display. (Workunit 71840847)

- Schlegel, R. E., & Gilliland, K.** (1990). *Evaluation of the Criterion Task Set - Part I CTS performance and SWAT data - Baseline conditions* (Report No. AAMRL-TR-90-007). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A224331)
- Schlegel, R. E., Gilliland, K., & Crabtree, M. S.** (1992). *Development of the UTC-PAB normative database* (Report No. AL-TR-1992-0145). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A271319)
- Schlegel, R. E., Gilliland, K., & Schlegel, B.** (1987). Factor structure of the Criterion Task Set. *Proceedings of the Human Factors Society 31st Annual Meeting*, 1, 389-393.
- Schnurer, J. H., Ingle, D. F., Downey, C. W., & Junker, A. M.** (1992). *Brain actuated control of a roll axis tracking simulator* (Report No. AL-SR-1992-0025). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A275307)
- Schnurer, J. H., Ingle, D. F., Downey, C. W., & Junker, A. M.** (1994). *Real time frequency analysis methodology for evoked potential loop-closure* (Report No. AL/CF-SR-1994-0006). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A279149)
- Schor, C., Gleason, G., Maxwell, J., & Lunn, R.** (1993). Spatial aspects of vertical phoria adaptation. *Vision Research*, 33(1), 73-84.
- Schor, C. M., Gleason, G. A., & Lunn, R.** (1993). Interactions between short-term vertical phoria adaptation and nonconjugate adaptation of vertical pursuits. *Vision Research*, 33(1), 55-63.
- Schuber, M., & O'Neal, M. R.** (1988). Visual examination and performance during Head-Down-Tilt (HDT) induced upper body fluid shift [Abstract]. *Aviation, Space and Environmental Medicine*, 59(5), 486.
- Self, H. C.** (1986). *Optical tolerances for alignment and image differences for binocular helmet-mounted displays* (AAMRL-TR-86-019). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A174536)
- Self, H. C.** (1988). *Display size: A literature survey and a study with SLR imagery* (Report No. AAMRL-TR-88-001). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A200852)
- Self, H. C.** (1989). *Tutorial on the angular positions and velocities of ground objects viewed from aircraft* (Report No. AAMRL-TR-89-047). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A231283)
- Self, H. C.** (1992). *Optical displays: A tutorial on images and image formation* (Report No. AL-TR-1992-0178). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A266230)
- Self, H. C.** (1993). *Stress and the ergonomic design and evaluation of person-machine systems* (Report No. AL/CF-SR-1993-0008). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A275156)
- Self, H. C.** (1993). *A tutorial on exit pupils and eye rotation with virtual image optical displays* (Report No. AL-TR-1993-0010). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A262399)
- Shepherd, D. S., Middleton, V. E., & Masak, J. R.** (1988). *Post-attack hazard monitoring systems analysis, phase I: Chemical Detection, Identification, and Warning (CDIW) requirements* (AAMRL-TR-88-042). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C043700)
- Shmulovich, J.** (1989). *Thin film phosphor development* (AAMRL-TR-89-004). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A272921)
- Shmulovich, J., & Kocian, D. F.** (1989). Thin-film phosphors for miniature CRTs used in helmet-mounted displays. *Proceedings of the Society for Information Display*, 30(4), 297-302.
- Simons, J. C., & Craig, J. L.** (1989). Electroluminescent lights for formation flights. In R. S. Jensen (Ed.), *Proceedings of the Fifth International Symposium on Aviation Psychology*, 1, 251-256.
- Simons, J. C., Kirtland, W. H., Malmstrom, F. V., Normand, K. A., Perez, W. A., Taylor, T. G., & Kuperman, G. G.** (1987). *Strategic mission decomposition: I. Planning materials for advanced bomber simulation studies* (Report No. AAMRL-TR-87-016). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B112312)

POSTURE FOR LOAD CARRYING

SSgt Wiley Wells (CFHA) was a subject for researcher Becky Unger of UDRI in a 1994 study on posture for load carrying. Work posture is determined by a combination of factors, including the low ceiling and the amount of weight carried in the hands.

(Task 718408)



Skelly, J. J. (1993). *Pacing visual attention: Temporal structure effects* (Report No. AL-TR-1993-0024). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A273859)

Skelly, J. J., Irvin, J., Perez, W., Simons, J., Houchard, J., Marshak, W. P., & Eller, M. (1993). *Sensor Preview Imagery (SPI): Target preview from off-board sensor for strike aircraft* (Report No. AL/CF-TR-1993-0129). Wright-Patterson AFB, OH: Armstrong Laboratory.

Skelly, J. J., Purvis, B. D., & Wilson, G. F. (1987). Fighter pilot performance during airborne & simulator mission: Physiological comparisons. *AGARD Conference Proceedings 432: Electric and Magnetic Activity of the Central Nervous System: Research and Clinical Applications in Aerospace Medicine* (pp. 23-1 - 23-16). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-432)

Skelly, J. J., Roe, M. M., & Jones, M. R. (1994). *Temporal pacing in visual attention* (Report No. AL/CF-TR-1994-0087). Wright-Patterson AFB, OH: Armstrong Laboratory.

Slusher, W. M. (1985). *Instrument lighting levels and AN/AVS-6 usage* (AAMRL Technical Report 85-055). Wright-Patterson AFB, OH:

Armstrong Aerospace Medical Research Laboratory. (DTIC No. A161 538)

Smith, J. L., Ayoub, M. M., & McDaniel, J. W. (1992). Manual materials handling capabilities in non-standard postures. *Ergonomics*, 35(7/8), 807-831.

Smith, S. L., Purvis, B., & Turner, S. (1994). Test Planning, Analysis and Evaluation System (Test PAES) a process and tool to evaluate cockpit design during flight test. *Proceedings of the Human Factors and Ergonomics Society 38th Annual Meeting*, 2, 942.

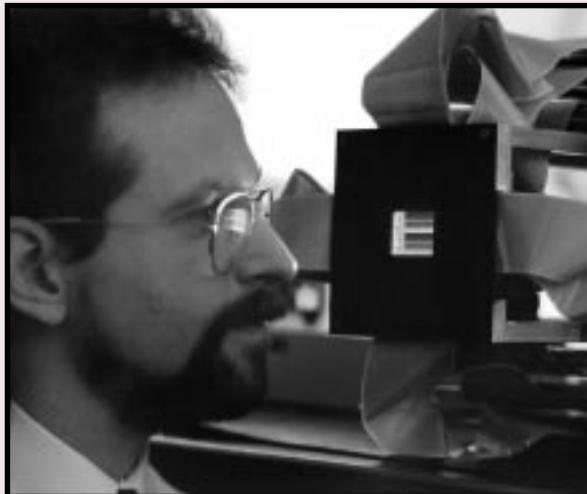
Snell, M. K., Flach, J. M., McMillan, G. R., & Warren, R. (1985). Tactile cuing can produce better performance than visual cuing. *Proceedings of the Third Symposium on Aviation Psychology*, 609-616.

Snyder, D. E., & McNeese, M. D. (1987). *Conflict resolution in cooperative systems* (Report No. AAMRL-TR-87-066). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A190351)

Snyder, D. E., McNeese, M. D., & Zaff, B. S. (1991). Identifying design requirements using integrated analysis structures. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 786-791.

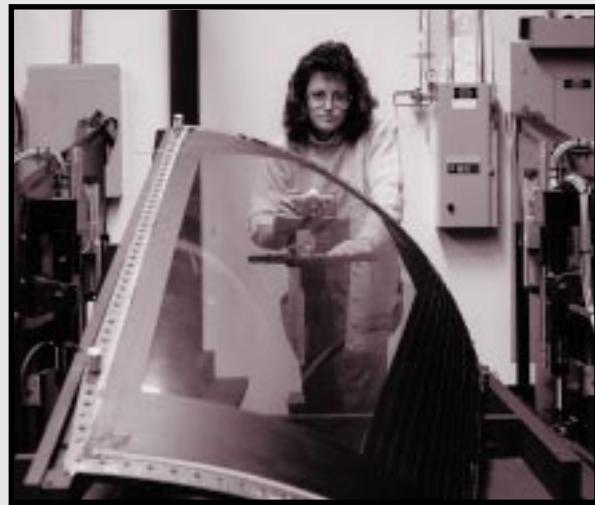
- Snyder, D. E., McNeese, M. D., Zaff, B. S., & Gomes, M. E.** (1992). Knowledge acquisition of tactical air-to-ground mission information using concept mapping. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 668-674.
- Snyder, D. E., Wellens, A. R., Brown, C. E., & McNeese, M. D.** (1989). Three paradigms for the study of multi-person and human-machine interaction. *Proceedings of the IEEE Systems, Man, & Cybernetics Conference*, 840-841.
- So, R. H. Y., & Griffin, M. J.** (1993). *Effects of lags on human performance with head-coupled simulators* (Report No. AL/CF-TR-1993-0101). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A279577)
- Sobel A. L., & Kuperman, G. G.** (1993). Predictive human factors modeling in the flight environment. *Proceedings of the 41st International Congress of Aviation and Space Medicine*, 201-206.
- Spravka, J. J., Crawford, R. L., & Kuperman, G. G.** (1990). *A human factors review of the Synthetic Aperture Radar literature* (Report No. AAMRL-TR-90-022). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.
- Spravka, J. J., Gomes, M. E., & Lind, S.** (1994). *Tools for automated knowledge engineering (TAKE) system evaluation methodology* (Report No. AL/CF-TR-1994-0113). Wright-Patterson AFB, OH: Armstrong Laboratory.
- Spravka, J. J., Gomes, M. E., Lind, S., & Zehner, G.** (1994). *A human factors evaluation of the MH-60 PAVE HAWK helicopter cockpit* (Report No. AL/CF-TR-1994-0056). Wright-Patterson AFB, OH: Armstrong Laboratory.
- Spravka, J. J., Irvin, G. E., & Dowler, M. G.** (1988). T-62 tank gunner tracking performance using a night vision display system of a function of background luminance, countermeasure power and countermeasure wavelength. *Proceedings of the 10th Annual Lasers on the Modern Battlefield Conference* (pp. 91-94).
- Spravka, J. J., & Kuperman, G. G.** (1992). *Preliminary human factors evaluation of ISECC* (Report AL-TR-1992-0069). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. C049863)
- Spravka, J. J., Lind, S., & Gomes, M. E.** (1994). *Exploratory applications of the tools for automated knowledge engineering (TAKE) to the crew-centered cockpit design process* (Report No. AL/CF-TR-1994-0145). Wright-Patterson AFB, OH: Armstrong Laboratory.
- St. John, R. J., & Purvis, B. D.** (1990). AIM SIGHT. *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Cockpit Displays and Visual Simulation*, 1289, 63-67.
- Stengel, J. D.** (1994). *Systems engineering design and technical analysis for Strategic Avionics Crew Station Design Evaluation Facility* (AL/CF-TR-1994-0074). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A286239)
- Stephens, B. R., Cannon, M. W., Ellis, D., & Monachino, L.** (1994). Identification of complex gratings as a function of contrast and spatial frequency [Abstract]. *Investigative Ophthalmology and Visual Science*, 35(4), 2006.
- Stephens, B. R., Cannon, M. W., & Fullenkamp, S. C.** (1992). Perception of image contrast and image profile of low frequency gratings [Abstract]. *Investigative Ophthalmology and Visual Science*, 33, 1350.
- Stern, J. A., Dunham, D. N., & Goldstein, R.** (1988). *An evaluation of electrooculographic, head movement and steady state evoked response measures of workload in flight simulation* (AAMRL-TR-88-036). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A236505)
- Stiffler, J. A., & Wiley, L.** (1992). I-NIGHTS and beyond. In T. M. Lippert (Ed.), *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Helmet-Mounted Displays III*, 1695, 13-20.
- Stoffregen, T. A., & Riccio, G. E.** (1988). An ecological theory of orientation and the vestibular system. *Psychological Review*, 95(1), 3-14.
- Storey, B. A., Osgood, R. K., & Schueren, J. C.** (1994). Aircraft/mission requirements approach for helmet-mounted display decisions. In R. J. Lewandowski, W. Stephens, & L. A. Haworth (Eds.), *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Helmet- and Head-Mounted Displays and Symbology Design Requirements*, 2218, 238-247.

- Storey, B. A., Rountree, M. E., Kulwicki, P. V., & Cohen, J. B.** (1994). Development of a process for cockpit design. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 688-695.
- Strayer, D. L., & Kramer, A. F.** (1988). *The retrieval of information from secondary memory: A review and new findings* (Report No. AAMRL-TR-88-041). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A222760)
- Swierenga, S. J., Boff, K. R., & Donovan, R. S.** (1991). Coding techniques for rapid communication displays. *Proceedings of the Sixth International Symposium on Aviation Psychology*, 1, 204-209.
- Swierenga, S. J., Boff, K. R., & Donovan, R. S.** (1991). Effectiveness of coding schemes in rapid communication displays. *Proceedings of the Human Factors Society 35th Annual Meeting*, 2, 1522-1526.
- Swierenga, S. J., Monk, D. L., & Brown, C. E.** (1992). Human performance data visualization for system design teams. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 675-680.
- Swierenga, S. J., Morton, K., & Boff, K. R.** (1990). Issues concerning the use of human engineering information: The system designers' perspective. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 881-885.
- Task, H. L.** (1985). *Bias and misinformation in technical and managerial communications* (Report No. AAMRL-TR-85-054). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory.
- Task, H. L.** (1985). Glare and reflections in day and night flying. *Aircraft Attitude Awareness Workshop* (pp. 2-12-1 - 2-12-26). Wright-Patterson AFB, OH: Flight Dynamics Laboratory.
- Task, H. L.** (1988). Vision through aircraft transparencies. *AGARD Lecture Series 156: Visual Effects in the High Performance Aircraft Cockpit* (pp. 4-1 - 4-14). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-LS-156)
- Task, H. L.** (1989). Vision through aircraft transparencies. In S. A. Marolo (Ed.), *Conference on Aerospace Transparent Materials and Enclosures* (WRDC-TR-89-4044, Vol. 2, pp. 1047-1071). Wright-Patterson AFB, OH: Wright Research and Development Center.
- Task, H. L.** (1991). Optical and visual considerations in the specification and design of helmet-mounted displays. *Society for Information Display International Symposium: Digest of Technical Papers*, 22, 297-300.
- Task, H. L.** (1992). Cockpit/NVG visual integration issues. *AGARD Lecture Series 187: Visual Problems in Night Operations* (pp. 8-1 - 8-6). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-LS-187)
- Task, H. L.** (1992). Night vision devices and characteristics. *AGARD Lecture Series 187: Visual Problems in Night Operations* (pp. 7-1 - 7-8). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-LS-187)
- Task, H. L., & Genco, L. V.** (1985). *The measurement of aircraft windscreens haze and its effect on visual performance* (Report No. AFAMRL-TR-85-017). Wright-Patterson AFB, OH: Air Force Aerospace Medical Research Laboratory.



COLOR HELMET-MOUNTED DISPLAYS

Dr. David L. Post examines the Miniature Color Display (MCD), developed in 1993 by the Color Display Laboratory for airborne helmet-mounted displays. This breakthrough device has laser-printer resolution and 100 times more light than a TV. The technology has been transitioned to the Advanced Research Projects Agency for advanced development. (Workunit 71841149)



WINDSCREEN RESEARCH
An F-111 windscreens undergoes optical distortion analysis in preparation for a visual assessment study. (Task 718418)

Task, H. L., & Genco, L. V. (1987). Effects of short-term space flight on several visual functions. In M. W. Bungo, T. M. Bagian, M. A. Bowman, & B. M. Levitan (Eds.), *Results of the life sciences DSOs conducted aboard the space shuttle 1981-1986* (pp. 173-178). Johnson Space Center, TX: National Aeronautics and Space Administration.

Task, H. L., Hartman, R. T., Marasco, P. L., & Zobel, A. R. (1993). *Methods for measuring characteristics of night vision goggles* (Report No. AL/CF-TR-1993-0177). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A277046)

Task, H. L., Hartman, R. T., & Zobel, A. R. (1990). New methods for night vision goggle test and evaluation. *Proceedings of Test Technology Symposium III* (pp. 259-268). Aberdeen Proving Ground, MD: U.S. Army Test and Evaluation Command.

Task, H. L., & Merkel, H. S. (1989). *A new method for measuring the transmissivity of aircraft transparencies* (Report No. AAMRL-TR-89-044). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A216953)

Task, H. L., & Pinkus, A. R. (1987). Contrast sensitivity and target recognition performance:

A lack of correlation. *Society for Information Display International Symposium: Digest of Technical Papers*, 18, 127-129.

Task, H. L., & Pinkus, A. R. (1987). The role of the contrast sensitivity function in display image quality metrics. *Electronic Imaging '87: International Electronic Imaging Exposition and Conference*, 1, 161-166.

Teall, T. A. (1992). *Pilot-centric design methodology and concepts program: Technical analytical study program* (Report No. AL-SR-1992-0027). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A276491)

Tolcott, M. A., Lehner, P. E., & Mullen, T. M. (1989). *User interaction with self-learning systems* (Report No. AAMRL-TR-89-029). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A214280)

Toms, M. L., & Kuperman, G. G. (1992). *Sensor fusion: A human factors perspective* (Report No. AL-TR-1991-0152). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B165851)

Tsang, P. S., & Vidulich, M. A. (1987). Time-sharing visual and auditory tracking tasks. *Proceedings of the Human Factors Society 31st Annual Meeting*, 1, 253-257.

Tsang, P. S., & Vidulich, M. A. (1989). Cognitive demands of automation in aviation. In R. S. Jensen (Ed.), *Aviation psychology* (pp. 66-95). Essex, Great Britain: Gower.

Tsang, P. S., & Vidulich, M. A. (1994). The roles of immediacy and redundancy in relative subjective workload assessment. In W. C. Howell (Ed.), *Human Factors*, 36(3), 503-513.

Tsou, B. H. (1989). Visual psychophysical considerations in the design of binocular helmet-mounted displays. In L. M. Biberman (Ed.), *Proceedings of the Sensor Display Workshop: Vol. 2 Display Technology* (IDA Document D-713, pp. 45-74). Alexandria, VA: Institute for Defense Analysis.

Tsou, B. H. (1993). System design considerations for a visually-coupled system. In S. R. Robinson (Ed.), *The infrared and electro-optics systems handbook: Vol. 8. Emerging systems and technologies* (pp. 515-536). Bellingham, WA: SPIE Optical Engineering Press.

Tsou, B. H., Allen, D. M., & Walker, J. L. (1987). Dynamic distortion correction for dome display. *The 1987 IMAGE Conference IV* (pp. 129-139). Williams AFB, AZ: Air Force Human Resources Laboratory.

Tsou, B. H., & Grigsby, S. S. (1993). Visual field-of-view: A design factor for binocular helmet-mounted displays. *Proceedings of the 1993 Meeting of the IRIS Specialty Group on Passive Sensors* (IRIAC Report No. 213400-169-X(II), Vol. 2, pp. 107-109). Ann Arbor, MI: Infrared Information Analysis Center.

Tsou, B. H., & Rogers-Adams, B. M. (1990). The effect of aspect ratio on helmet mounted display field of view. *Report of the 30th Meeting of Air Standardization Coordination Committee (ASCC) Working Party 61: Aerospace Medical and Life Support Systems Symposium: Aeromedical Aspects of Vision* (Vol. 4, pp. 136-146). Toronto: Defence and Civil Institute of Environmental Medicine.

Tsou, B. H., Rogers-Adams, B. M., & Beard, M. (1991). Distance perception and ocular accommodation in helmet-mounted displays. *Society for Information Display International Symposium: Digest of Technical Papers*, 22, 313.

Tsou, B. H., Rogers-Adams, B. M., & Goodyear, C. D. (1991). The evaluation of partial binocular overlap on car maneuverability: A pilot study. In K. Krishen (Ed.), *Fifth Annual Workshop on Space Operations, Applications, and Research (SOAR '91)* (NASA CP-3127, Vol. 2, pp. 562-

“One of the last efforts I was involved with here was dramatically different from any other I had done, but was very enjoyable. It had to do with the design of checkout counters for the commissary system. Since checkout personnel come in all sizes, there was a need to develop a counter which was either a good compromise height for everyone, or to come up with an adjustable version, so that repetitive motion injuries could be avoided.”

— Steve Heckart
Applications Human Engineer
Human Engineering Division

568). Washington, DC: National Aeronautics and Space Administration.

Tumey, D., Morton, P., Ingle, D., Downey, C., & Schnurer, J. H. (1992). *Neural network classification of EEG using chaotic preprocessing and phase space reconstruction* (Report No. AL-SR-1992-0021). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A279098)

Tumey, D. M., Morton, P. E., Ingle, D. F., Downey, C. W., & Schnurer, J. H. (1991). Neural network classification of EEG using chaotic preprocessing and phase space reconstruction. *Proceedings of the IEEE 17th Annual Northeast Bioengineering Conference*, 51-52.

Urban, K. E., Irvin, G. E., & Dowler, M. G. (1989). Detection of aircraft targets during laser-induced transient visual field loss: Effects of canopies and laser protective visors. *Proceedings of the Seventh DOD Conference of Directed Energy Weapons: Vulnerability, Survivability and Effects* (pp. 383-388).

Valencia, G., & Agnew, J. R. (1990). Evaluation of a directional audio display synthesizer. *Proceedings of the Human Factors Society 34th Annual Meeting*, 1, 6-10.

Valencia, G., & Calhoun, G. L. (1989). *Headphone localization with a single sound transducer and moveable manikin head* (Report No. AAMRL-TR-89-005). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B133510)

Valencia, G., Calhoun, G. L., Ericson, M. A., & Agnew, J. R. (1990). *Localization performance with synthesized directional audio* (Report No. AAMRL-TR-90-025). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A230316)

“Some of my most satisfying work was the refinement of the brain stem evoked response as a screening method for detecting hearing deficits in young children. A pediatrician and a neurologist at the Base Hospital picked up on this and used to send kids—and later adults—over to us at the lab for testing. At one time we had 3 to 4 patients a day being transported over there; we must have tested a total of 200 to 300 people. Real medical decisions were being made on the basis of this test. It's interesting that most audiologists at that time were negative about the use of the evoked brain stem technique. Well, I just had my hearing tested at the Base Hospital recently and asked if they ever do brainstem evoked response. The audiologist said, ‘Oh yes, that's our standard procedure.’”

— Robert O'Donnell, Chief
Workload and Ergonomics Branch
Human Engineering Division

Valencia, G., Ericson, M. A., & Agnew, J. R. (1990). A comparison of localization performance with two auditory cue synthesizers. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 749-754.

Vargo, C. G., Brown, C. E., & Swierenga, S. J. (1992). An evaluation of computer-supported backtracking in a hierarchical database. *Proceedings of the Human Factors Society 36th Annual Meeting*, 1, 356-360.

Venturino, M., & Post, D. L. (Eds.). (1992). Visual displays [Special issue]. *Human Factors*, 34, 509-634.

Venturino, M. R. (1987). Capacity limitations in human information processing: Theory & applications. *Proceedings of the Human Factors Society 31st Annual Meeting*, 1, 672-673.

Venturino, M. R. (1987). Concurrent memory search: The roles of automaticity and multiple resources [Abstract]. *Proceedings and Abstracts of the Annual Meeting of the Eastern Psychological Association*, 58.

Venturino, M. R. (1988). Timesharing memory searches: The roles of automaticity & multiple resources [Abstract]. *Proceedings and Abstracts of the Annual Meeting of the Eastern Psychological Association*, 23.

Venturino, M. R. (1989). Performance-based measures of merit for tactical situation awareness. *AGARD Conference Proceedings 478: Situation Awareness in Aerospace Operations* (pp. 4-1 - 4-5). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-478)

Venturino, M. R. (1991). Timesharing memory searches: The roles of automatic processing & multiple resources theories. *Journal of Experimental Psychology: Learning, Memory & Cognition*, 17(3), 677-695.

Venturino, M. R., & Geiselman, E. E. (1992). Quantifying the goodness of mental representations of spatial relationships. *Proceedings of the Human Factors Society 36th Annual Meeting*, 2, 1363-1367.



TESTING A PILOT'S REACH IN GEOMETRY COCKPIT

Testing a subject's reach in cockpits with low profiles and variable cockpit geometry. This study was done under Task 718404, "Crew Station Design and Techniques" and Workunit 71840835, "Engineering Anthropometry for Systems and Subsystems Design" by Kenneth W. Kennedy. AAMRL-TR-86-016 (1986)

Venturino, M. R., & Kunze, R. J. (1989). Spatial awareness with a helmet-mounted display. *Proceedings of the Human Factors Society 33rd Annual Meeting*, 2, 1388-1391.

Venturino, M. R., & Wells, M. J. (1990). Head movements as a function of field-of-view size on helmet-mounted display. *Proceedings of the Human Factors Society 34th Annual Meeting*, 2, 1572-1576.

Vidulich, M., Dominguez, C., Vogel, E., & McMillan, G. (1994). *Situation awareness: Papers and annotated bibliography* (Report No. AL/CF-TR-1994-0085). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A284752)

Vidulich, M. A. (1988). The cognitive psychology of subjective mental workload. In P. A. Hancock, & N. Meshkati (Eds.), *Human mental workload* (pp. 219-229). Amsterdam: Elsevier.

Vidulich, M. A. (1988). Speech responses and dual-task performance: Better time-sharing or asymmetric transfer? *Human Factors*, 30(4), 517-529.

Vidulich, M. A. (1989). Objective measures of workload: Should a secondary task be secondary? In R. S. Jensen (Ed.), *Proceedings of the Fifth International Symposium on Aviation Psychology*, 2, 802-807.

Vidulich, M. A. (1989). Performance-based workload assessment: Allocation strategy and added task sensitivity. In S. Griffin (Ed.), *Third Annual Workshop on Space Operations, Automation, and Robotics (SOAR '89)* (NASA CP-3059, pp. 329-335). Washington, DC: National Aeronautics and Space Administration.

Vidulich, M. A., & Bortolussi, M. R. (1988). Speech recognition in advanced rotor-craft: Using speech controls to reduce manual control overload. *Proceedings of the American Helicopter Society National Specialists' Meeting*, 1-10.

Vidulich, M. A., Crabtree, M. S., & McCoy, A. L. (1993). Developing subjective and objective metrics of pilot situation awareness. *Proceedings of the Seventh International Symposium on Aviation Psychology*, 2, 896-900.

Vidulich, M. A., & Hughes, E. R. (1991). Testing a subjective metric of situation awareness. *Proceedings of the Human Factors Society 35th Annual Meeting*, 2, 1307-1311.

Vidulich, M. A., & Pandit, P. (1987). Individual differences and subjective workload assessment: Comparing pilots to nonpilots. *Proceedings of the Fourth International Symposium on Aviation Psychology*, 630-636.

Vidulich, M. A., & Pandit, P. (1988). Consistent mapping and spatial consistency in target detection and response execution. In J. M. Flach (Ed.), *Proceedings of the Fourth Midcentral Ergonomics/Human Factors Conference*, 39-45.

Vidulich, M. A., Stratton, M. D., Crabtree, M. S., & Wilson, G. F. (1994). Performance-based and physiological measures of situational awareness. *Aviation, Space and Environmental Medicine*, 65, A7-A12.

Vidulich, M. A., & Tsang, P. S. (1987). Absolute magnitude estimation and relative judgment approaches to subjective workload assessment. *Proceedings of the Human Factors Society 31st Annual Meeting*, 2, 1057-1061.

Vidulich, M. A., Ward, G. F., & Schueren, J. (1991). Using the Subjective Workload Dominance (SWORD) technique for projective workload assessment. *Human Factors*, 33(6), 677-691.



OPERATIONAL RELEVANCE

AL/CFHI applies multi-place and distributed crew systems design, evaluation and assessment tools to prototype crew station designs.
(Task 718410)

Vidulich, M. A. (1989). The use of judgment matrices in subjective workload assessment: The Subjective Workload Dominance (SWORD) technique. *Proceedings of the Human Factors Society 33rd Annual Meeting*, 2, 1406-1410.

Vidulich, M. A. (1991). The Bedford scale: Does it measure spare capacity? *Proceedings of the Sixth International Symposium on Aviation Psychology*, 2, 1136-1141.

Vidulich, M. A. (1992). Measuring situation awareness. *Proceedings of the Human Factors Society 36th Annual Meeting*, 1, 40-41.

Vidulich, M. A., & Bortolussi, M. R. (1988). A dissociation of objective and subjective workload measures in assessing the impact of speech controls in advanced helicopters. *Proceedings of the Human Factors Society 32nd Annual Meeting*, 2, 1471-1475.

- Vikmanis, M. M.** (1987). Advances in workload measurement for cockpit design evaluation. *AGARD Conference Proceedings 425: The Man-Machine Interface in Tactical Aircraft Design and Combat Automation* (pp. 10-1 - 10-10). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-425)
- Warch, P., Hill, L., & Gibbons, J.** (1986). *Strategic Conventional Standoff Capability (SCSC) CI system architecture* (Report No. AAMRL-TR-86-031). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C955697)
- Warr, D., Colle, H. A., & Reid, G. B.** (1986). A comparative evaluation of two subjective workload measures: The Subjective Workload Assessment Technique and the modified Cooper Harper Scale. *Proceedings of Psychology in DoD Conference*, 504-508.
- Warren, R.** (1988). Active psychophysics: Theory and practice. *Proceedings of the 4th Annual Meeting of the International Society for Psychophysics*, 47-52.
- Warren, R.** (1988). Future cockpit displays. *Proceedings of the 11th Biennial Psychology in the DOD Symposium*, 91-96.
- Warren, R.** (1988). Visual perception in high-speed low-altitude flight. *Aviation, Space and Environmental Medicine*, 59(11, Suppl.), A116-124.
- Warren, R.** (1990). Preliminary questions for the study of egomotion. In R. Warren, & A. H. Wertheim (Eds.), *Perception and control of self-motion* (pp. 3-32). Hillsdale, NJ: Erlbaum.
- Warren, R.** (1991). Methodological problems in applied cognition & perceptual research: Theoretical implications. In R. R. Hoffman, & D. S. Palermo (Eds.), *Cognition and the symbolic processes: Applied & ecological perspectives* (pp. 507-518). Hillsdale, NJ: Erlbaum.
- Warren, R.** (1992). Fidelity issues in flight simulation, self-motion, and virtual reality displays. *Insight: The Visual Performance Technical Group Newsletter*, 14(September), 1,3.
- Warren, R.** (1993). Total visual scene information for flight. In E. Trautman (Ed.), *Vision Topics for Aviation: A new look at a traditional concern* (Report No. IST-DF-93-01, pp. 37-51). University of Central Florida, FL: Institute for Simulation and Training.
- Warren, R., & Beer, J.** (1992). Perception of on- and off-screen self-motion heading [Abstract]. *Proceedings of the 33rd Annual Meeting of the Psychonomics Society*, 380.
- Warren, R., & Wertheim, A. H.** (Eds.). (1990). *Perception and control of self-motion*. Hillsdale, NJ: Erlbaum.
- Watson, H., & Coleman, A.** (1986). *B-1B FLIR study model development* (Report No. AAMRL-TR-86-046). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. C954764)
- Wellens, A. R.** (1989). Effects of telecommunication media upon information sharing and team performance: Some theoretical and empirical observations. *IEEE Aerospace and Electronic Systems Magazine*, 4, 13-19.
- Wellens, A. R.** (1989). Effects of telecommunication media upon information sharing and team performance: Some theoretical and empirical observations. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 726-733.



PACLAf LOOKS AT VISUAL SAFETY CUES

High-speed, low-altitude flight over rolling terrain is difficult, especially in sparse desert environments. PACLAf, managed by Dr. Rik Warren, investigates the visual cues pilots need to safely accomplish their mission. Here the effects of texture density and a supplemental altitude display are assessed. (Task 689306)



TESTING VISION IN THE SPACE SHUTTLE
Astronauts in orbit around the Earth on Space Shuttle flight STS-36 undergoing vision tests with the Visual Function Testers VFT-1 and VFT-2. This was part of a space vision study conducted by Harry L. Task, Lt Col Mel O'Neal and Col Louis V. Genco of the Human Engineering Division. (1990) (Task 689311)

Wellens, A. R. (1990). *Assessing multi-person and person-machine distributed decision making using an extended psychological distancing model* (Report No. AAMRL-TR-90-006). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A235882)

Wellens, A. R. (1991). Electronic collaboration: Some effects of telecommunication media and machine intelligence on team performance. *Fourth Annual Workshop on Space Operations, Applications, and Research (SOAR '90)* (NASA CP-3127, pp. 606-611). Washington, DC: National Aeronautics and Space Administration.

Wellens, A. R., Brown, C. E., & McNeese, M. D. (1991). Assessing electronic team technologies using computer-based dynamic decision making tasks. In Y. Queinnec, & F. Daniellou (Eds.), *Designing for everyone* (Vol. 1, pp. 667-669). New York: Taylor & Francis.

Wellens, A. R., Brown, C. E., & McNeese, M. D. (1992). Assessing electronic team technologies using computer-based dynamic decision making tasks. *Organizational Design and Management (ODAM) Bulletin*, 11(3), 9-11.

Wellens, A. R., & Ergener, D. (1988). The C.I.T.I.E.S. game: A computer-based situation assessment task for studying distributed decision making. *Simulation and Games*, 19, 304-327.

Wellens, A. R., & McNeese, M. D. (1987). A research agenda for the social psychology of intelligent machines. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 3, 944-949.

Wells, C. H., Collins, M. T., Vanderveer, D. E., & Replogle, C. R. (1992). *Standards for chemical and biological warfare hazard modeling. Volume I, Toxicity of nerve agents and mustard in humans* (Report No. AL-TR-1992-0071). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. C050548)

Wells, C. H., Collins, M. T., Vanderveer, D. E., & Wells, W. (1993). *Standards for chemical and biological warfare hazard modeling volume 1: Toxicity of nerve agents and mustard in humans, abridged edition* (Report No. AL-TR-1993-0026). Wright-Patterson AFB, OH: Armstrong Laboratory.

Wells, C. H., Jensen, J. G., Collins, M. T., & Replogle, C. R. (1992). *Mask protection assessment* (Report No. AL-TR-1992-0166). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. C959951)

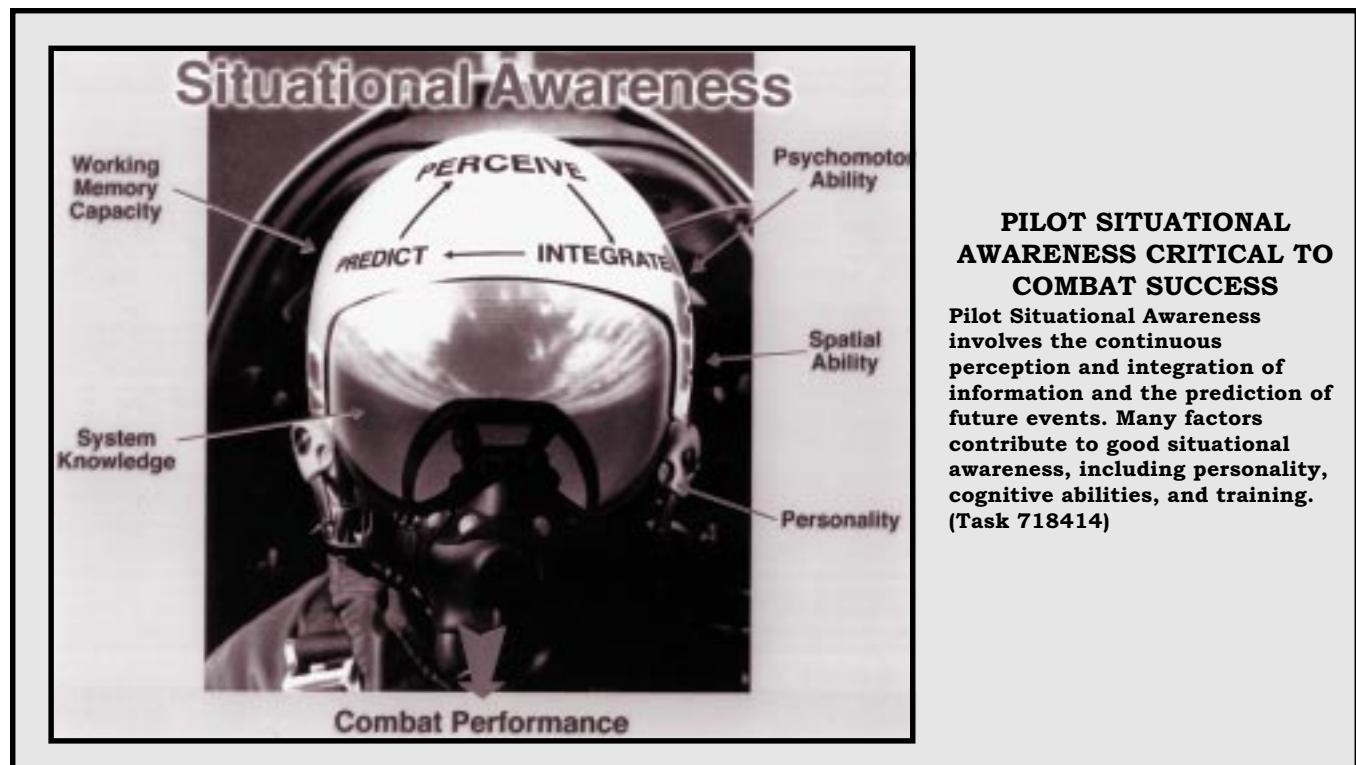
Wells, M. J., & Haas, M. W. (1992). The human factors of helmet-mounted displays and sights. In M. A. Karim (Ed.), *Electro-optical displays* (pp. 743-785). New York: Dekker, Marcel.

Wells, M. J., & Osgood, R. K. (1991). The effects of head and sensor movement on flight profiles during simulated dive bombing. *Proceedings of the Human Factors Society 35th Annual Meeting*, 1, 22-26.

Wells, M. J., & Venturino, M. R. (1989). The effect of increasing task complexity on field-of-view requirements for a visually coupled system. *Proceedings of the Human Factors Society 33rd Annual Meeting*, 1, 91-95.

- Wells, M. J., & Venturino, M.** (1990). Performance and head movements using a helmet-mounted display with different sized fields-of-view. *Optical Engineering*, 29(8), 870-877.
- Wells, M. J., Venturino, M., & Osgood, R. K.** (1988). Using target replacement performance to measure spatial awareness in a helmet-mounted simulator. *Proceedings of the Human Factors Society 32nd Annual Meeting*, 2, 1429-1433.
- Wells, M. J., Venturino, M., & Osgood, R. K.** (1989). The effect of field-of-view size on performance at a simple simulated air-to-air mission. In J. T. Carollo (Ed.), *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Helmet-Mounted Displays*, 1116, 126-137.
- Whiteley, J. D.** (1989). *Military aircrew seating: A human factors engineering approach* (Report No. AAMRL-TR-89-046). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A218049)
- Whiteley, J. D., Lusk, S. L., & Middendorf, M. S.** (1990). The effects of simulator time delays on a sidestep landing maneuver: A preliminary investigation. *Proceedings of the Human Factors Society 34th Annual Meeting*, 2, 1538-1541.
- Whitestone, J. J.** (1993). Design and evaluation of helmet systems using 3D data. *Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting*, 1, 64-68.
- Whitestone, J. J., & Robinette, K. M.** (1992). High resolution human body surface data for the design of protective equipment. *Second Pan-Pacific Conference on Occupational Ergonomics*, 240-247.
- Wickens, C. D., Barnett, B. J., Davis, T., & Hyman, F.** (1989). Expertise, stress, and pilot judgment. *AGARD Conference Proceedings 458: Human Behavior in High Stress Situations in Aerospace Operations* (pp. 10-1 - 10-8). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-458)
- Wickens, C. D., Fracker, M. L., & Webb, J. M.** (1987). Cross-modal interference and task integration: Resources or preemption switching? *Proceedings of the Human Factors Society 31st Annual Meeting*, 1, 679-683.
- Wickens, C. D., Stokes, A., Barnett, B., & Davis, T.** (1988). *Componential analysis of pilot decision making* (Report No. AAMRL-TR-88-017). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A203711)
- Wickens, C. D., Stokes, A., Barnett, B., & Hyman, F.** (1988). *The effects of stress on pilot judgment in a MIDIS simulator* (Report No. AAMRL-TR-88-057). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A210827)
- Widdel, H., & Post, D. L. (Eds.)**. (1992). *Color in electronic displays*. New York: Plenum.
- Wightman, F., & Kistler, D. J.** (1990). *Field measurement of head related transfer functions* (Report No. AAMRL-TR-90-019). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A227850)
- Wiley, L. L., & Brown, R. W.** (1994). MH-53J PAVE LOW helmet-mounted display flight test. In R. J. Lewandowski, W. Stephens, & L. A. Haworth (Eds.), *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE): Helmet- and Head-Mounted Displays and Symbology Design Requirements*, 2218, 207-214.
- Wilford, G. M., Wunsh, E., Zawodny, T. L., & Sharp, E. D.** (1988). *Color coding the B-1B Threat situation format display of the AN/ALQ-161 electronic warfare system: The effect of color change, as both noise and signal, on target search performance* (Report No. AAMRL-TR-88-006). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B121929)
- Wilkinson, M. O., Thibos, L. N., & Cannon, M. W.** (1990). Contrast constancy: Neural compensation for image attenuation [Abstract]. *Investigative Ophthalmology and Visual Science*, 31, 323.
- Wilson, D. L.** (1989). Color contrast requirements for legibility of color symbology displayed against color backgrounds. *Proceedings of the Human Factors Society 33rd Annual Meeting*, 2, 1373-1377.

- Wilson, D. L.** (1992). *Theory of signal detection and its application to visual target acquisition: A review of the literature* (Report No. AL-TR-1992-0083). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A262920)
- Wilson, D. L., & Kuperman, G. G.** (1988). Strategic avionics battle-management evaluation & research/SABER. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 3, 844-849.
- Wilson, D. L., & Kuperman, G. G.** (1989). *Effects of ATARS image compression on image interpretability ratings* (Report No. AAMRL-TR-89-032). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B138023)
- Wilson, D. L., Kuperman, G. G., & Crawford R. L.** (1992). *Effects of maximum allowed time on sustained operator performance in a counter-mobile target acquisition task* (Report No. AL-TR-1992-0070). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. C959947)
- Wilson, D. L., Kuperman, G. G., & Faust, M.** (1992). Psychovisual data for sensor performance modeling. *Proceedings of the Ground Target Modeling and Validation Conference*, 257-265.
- Wilson, D. L., McNeese, M. D., & Brown, C. E.** (1987). Team performance of a dynamic resource allocation task: Comparison of shared versus isolated work setting. *Proceedings of the Human Factors Society 31st Annual Meeting*, 2, 1345-1349.
- Wilson, D. L., McNeese, M. D., Brown, C. E., & Wellens, A. R.** (1987). *Utility of shared versus isolated work setting for dynamic team decision making* (Report No. AAMRL-TR-87-072). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A192434)
- Wilson, G. F.** (1988). Probe evoked magnetic & electrical responses during a spatial rotation task. *Psychophysiology*, 25(4, Suppl.), 490.
- Wilson, G. F.** (1989). PATS: A new generation psychophysiological test battery. *Proceedings of the Human Factors Society 33rd Annual Meeting*, 2, 1173-1176.
- Wilson, G. F.** (1991). The use of heart rate and heart rate variability to measure workload in F4 pilots and WSO's during training flights and a tracking task. *Aviation, Space and Environmental Medicine*, 61, 450.
- Wilson, G. F.** (1992). Applied use of cardiac and respiration measures: Practical considerations and precautions. *Biological Psychology*, 34(2-3), 163-178.
- Wilson, G. F.** (Ed.). (1992). Cardiorespiratory measures and their role in studies of performance [Special issue]. *Biological Psychology*, 34(2-3).
- Wilson, G. F.** (1992). *Progress in the psychophysiological assessment of workload* (Report No. AL-TR-1992-0007). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A263609)
- Wilson, G. F.** (1993). Air-to-ground training missions: A psychophysiological workload analysis. *Ergonomics*, 36(9), 1071-1088.
- Wilson, G. F.** (1993). Cardiorespiratory measures and their role in studies of performance. *CSERIAC Gateway*, 4(2), 18.
- Wilson, G. F.** (1994). Workload Assessment Monitor (WAM). *Proceedings of the Human Factors and Ergonomics Society 38th Annual Meeting*, 2, 944.
- Wilson, G. F., & Badeau, A.** (1992). Psychophysiological measures of cognitive workload in laboratory and flight. *Sixth Annual Workshop on Space Operations, Applications, and Research (SOAR '92)* (pp. 169-175). Washington, DC: National Aeronautics and Space Administration.
- Wilson, G. F., Busch, C., Papanicolaou, A., Oliver, C. G., & Orr, C.** (1989). Cortical resource allocation during mental rotation determined by magneto and electro encephalography. In S. J. Williamson, M. Hoke, G. Stroink, & M. Kotani (Eds.), *Advances in biomagnetism: Proceedings of the 7th International Conference on Biomagnetism* (Vol. 2, pp. 233-236). New York: Plenum.
- Wilson, G. F., & DeRego, P.** (1987). Hemispheric asymmetries in phonetic processing assessed with probe evoked magnetic fields. In



K. Atsumi, M. Kotani, S. Ueno, T. Katila, & S. J. Williamson (Eds.), *Advances in biomagnetism: Biomagnetism 87* (pp. 210-216). Tokyo: Tokyo & Denki University Press.

Wilson, G. F., & Eggemeier, F. T. (1991). Psychophysiological assessment of workload in multi-task environments. In D. L. Damos (Ed.), *Multiple task performance* (pp. 329-360). London: Taylor & Francis.

Wilson, G. F., & Eggemeier, F. T. (1994). Mental workload assessment. *CSERIAC Gateway*, 5(2), 1-4.

Wilson, G. F., & Fisher, F. (1990). Classification of flight segment using pilot & WSO physiological data. *Proceedings of the Human Factors Society 34th Annual Meeting*, 1, 109-111.

Wilson, G. F., & Fisher, F. (1990). The use of multiple physiological measures to determine flight segment in F4 pilots. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 859-861.

Wilson, G. F., & Fisher, F. (1991). Cognitive task classification using EEG spectra [Poster]. *Psychophysiology*, 28(3A, Suppl.), S62.

Wilson, G. F., & Fisher, F. (1991). The use of cardiac and eye blink measures to determine flight segment in F4 crew. *Aviation, Space and Environmental Medicine*, 62, 959-961.

Wilson, G. F., & Fullenkamp, P. A. (1989). A comparison of pilot and WSO workload during training missions using psychophysiological data. In E. Farmer (Ed.), *Stress and error in aviation: Proceedings of the XVIII Western European Association for Aviation Psychology Conference* (Vol. 2, pp. 27-34). Worcester, Great Britain: Billing & Sons.

Wilson, G. F., Fullenkamp, P. A., & Davis, I. E. (1990). Physiological measures of pilot and WSO workload during air-to-ground missions. *Aviation, Space and Environmental Medicine*, 61, 454.

Wilson, G. F., Fullenkamp, P., & Davis, I. E. (1994). Evoked potential, cardiac, blink & respiration measures of pilot workload in air-to-ground missions. *Aviation, Space and Environmental Medicine*, 65, 100-105.

Wilson, G. F., Fullenkamp, P. A., Sullivan, C., Gundel, A., & Davis, I. E. (1989). Evoked brain potentials recorded during airborne and ground tasks. *Aviation, Space and Environmental Medicine*, 60, 495.

Synthesized Immersion Research Environment

SYNTHESIZED IMMERSION RESEARCH ENVIRONMENT (SIRE)
The Synthesized Immersion Research Environment (SIRE) became operational in 1994 and supported the integration and assessment of multi-sensory, virtually augmented human-system interface concepts. SIRE included several autonomous research stations, the largest of which was a 40-foot diameter spherical projection surface linked to a general-purpose Silicon Graphics Onyx graphics generator supporting scientific visualization and multi-sensory research. (Task 718419)

Wilson, G. F., & Hankins, T. (1994). EEG and subjective measures of private pilot workload. *Proceedings of the Human Factors and Ergonomics Society 38th Annual Meeting*, 2, 1322-1325.

Wilson, G. F., Hughes, E., & Hassoun, J. A. (1990). Physiological & subjective evaluation of a new aircraft display. *Proceedings of the Human Factors Society 34th Annual Meeting*, 2, 1441-1443.

Wilson, G. F., Luciani, R. J., & Ratino, D. A. (1987). Motion evoked vestibular potential. *AGARD Conference Proceedings 432: Electrical and Magnetic Activity on the Central Nervous*

System: Research and Clinical Applications in Aerospace Medicine (pp. 32-1 - 32-8). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-432)

Wilson, G. F., & McCloskey, K. A. (1988). Using probe evoked potentials to determine information processing demands. *Proceedings of the Human Factors Society 32nd Annual Meeting*, 2, 1400-1403.

Wilson, G. F., & McCloskey, K. A. (1989). Task and adaptation effects upon cardiac and respiration measures. *Psychophysiology*, 26(4A,Suppl.), S66.

Wilson, G. F., McCloskey, K., & Davis, I. (1987). Evoked response, performance and subjective measures in a linguistic processing task. *Proceedings of the Fourth International Symposium on Aviation Psychology*, 623-629.

Wilson, G. F., & Mulford, L. L. (1994). Register of psychophysiolists. In J. A. Caldwell, G. F. Wilson, M. Cetinguc, A. W. K. Gaillard, A. Gundel, D. Lagarde, S.

Makeig, G. Myhre, & N. A. Wright (Eds.), *Psychophysiological Assessment Methods* (AGARD-AR-324, pp. J-1 - J-42). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development.

Wilson, G. F., & O'Donnell, R. D. (1987). Cortical evoked response and eyeblink measures in the workload evaluation of alternative landing system displays. In A. Roscoe (Ed.), *AGARDograph 282: Aerospace Medical Panel Working Group 16: The practical assessment of pilot workload* (pp. 8-52 - 8-55). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-AG-282)

- Wilson, G. F., & O'Donnell, R. D.** (1988). Measurement of operator workload with the neuropsychological workload test battery. In P. A. Hancock, & N. Meshkati (Eds.), *Advances in psychology: Vol. 52. Human mental workload* (pp. 63-100). New York: North Holland.
- Wilson, G. F., & Oliver, C. G.** (1989). PATS: Psychophysiological assessment test system. In E. Farmer (Ed.), *Stress and error in aviation: Proceedings of the XVIII Western European Association for Aviation Psychology Conference* (Vol. 2, pp. 15-26). Worcester, Great Britain: Billing & Sons.
- Wilson, G. F., & Oliver, C. G.** (1992). PATS: Psychophysiological assessment test system, goals and description. *Aviation, Space and Environmental Medicine*, 63, 403.
- Wilson, G. F., Palmer, B., & Badeau, A. F.** (1993). *Workload Assessment Monitor (WAM) users' manual*. Wright-Patterson AFB, OH: Armstrong Laboratory.
- Wilson, G. F., Palmer, B., Oliver, C. G., & Swain, R.** (1991). Topographical analysis of cognitive task difficulty. *Proceedings of the Second International Congress on Brain Electromagnetic Topography*, 326.
- Wilson, G. F., Palmer, B., Reis, G., & Gravelle, M.** (1994). Changes in cardiac and eyeblink measures while performing the AGARD stress battery after one night sleep loss. *Aviation, Space and Environmental Medicine*, 65, 457.
- Wilson, G. F., Purvis, B. D., & Skelly, J. J.** (1987). Physiological data used to measure pilot workload in actual flight & simulator conditions. *Proceedings of the Human Factors Society 31st Annual Meeting*, 2, 779-783.
- Wilson, G. F., Ratino, D. A., Floyd, L. L., Luciani, R. J., & Rodriguez, L. E.** (1989). *Brain stem evoked responses in altered environments* (Report No. AAMRL-TR-89-016). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A220097)
- Wilson, G. F., Skelly, J. J., & Purvis, B. D.** (1988). Reactions to emergency situations in actual and simulated flight. *AGARD Conference Proceedings 458: Human Behavior in High Stress Situations in Aerospace Operations* (pp. 9-1 - 9-13). Neuilly sur Seine, France: NATO Advisory Group for Aerospace Research and Development. (NTIS No. AGARD-CP-458)
- Wilson, G. F., Swain, R., & Davis, I. E.** (1988). Human event related potentials during spatial processing: A topographical distribution. *Society for Neuroscience: Abstracts*, 14(2), 1014.
- Wilson, G. F., Swain, R. A., & Davis, I. E.** (1994). Topographical analysis of cortical evoked activity during a variable demand spatial processing task. *Aviation, Space and Environmental Medicine*, 65, A54-A61.
- Wilson, G. F., Ullsperger, P., & Busch, C.** (1993). Influence of difficulty level on ERP components elicited in response to warning stimuli. *Psychophysiology*, 30(Suppl. 1), S71.
- Wittenberg, A. M.** (1986). *Single crystal phosphor development* (Report No. AAMRL-TR-86-041). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. B109276)
- Wittman, W. T., & Healy, A. F.** (1994). A long-term retention advantage for spatial information learned naturally and in the laboratory. In A. F. Healy, & L. E. Bourne (Eds.), *Learning and Memory of Knowledge and Skills: Durability and Specificity* (pp. 170-205). Thousand Oaks, CA: SAGE Publications.
- Wohl, J. G., & Tenney, R. R.** (1987). *Integrated analysis techniques for command, control, and communications systems; Vol. I: Methodology* (Report No. AAMRL-TR-87-040). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A197126)
- "The research emphasis at the lab has shifted over the years. When I first got there, we were still really focused in on 'knobs and dials' — the classical applied human engineering concerns. But, after struggling with constructs like 'workload,' I believe the emphasis moved in the direction of cognitive psychology. From my admittedly biased perspective, I see human factors moving more in the direction of the cognitive and neuropsychological sciences. People who get into human factors research now are educated much more in the cognitive areas than previously. They are attacking more complicated problems like situation awareness, workload, and so forth. I think that's where the breakthroughs will come."

— Robert O'Donnell, Chief
Workload and Ergonomics Branch
Human Engineering Division

Wohl, J. G., & Tenney, R. R. (1987). *Integrated analysis techniques for command, control, and communications systems; Vol. II: Applications* (Report No. AAMRL-TR-87-040). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A197126)

Wolpert, L., Reardon, K. A., & Warren, R. (1989). The effect of changes in edge and flow rates on altitude control. In R. S. Jensen (Ed.), *Proceedings of the Fifth International Symposium on Aviation Psychology*, 2, 749-754.

Yolton, R. L., Wilson, G. F., Davis, I., & McCloskey, K. A. (1987). Physiological correlates of behavioral performance on the mathematical processing subtest of the CTS battery. *Proceedings of the Human Factors Society 31st Annual Meeting*, 2, 770-773.

Young, M. F., & McNeese, M. D. (in press). A situated cognition approach to problem solving. In J. M. Flach, P. A. Hancock, J. Caird, & K. Vicente (Eds.), *The ecology of human-machine systems* (Vol. 2). Hillsdale, NJ: Erlbaum.

Young, M. F., & McNeese, M. D. (1993). A situated cognition approach to problem solving with implications for computer-based learning and assessment. In G. Salvendy, & M. J. Smith (Eds.), *Human-computer interaction: Software and hardware interfaces* (Vol. 2, pp. 825-830). Amsterdam: Elsevier.

Zacharias, G. L., Miao, A. X., Riley, E. W., & Osgood, R. K. (1993). *Situation awareness metric for cockpit configuration evaluation* (Report No. AL-TR-1993-0042). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC B176582)

Zacharias, G. L., Miao, A. X., & Warren, R. (in press). Multistage integration model for human egomotion perception. *AIAA Journal of Guidance, Control & Dynamics*.

Zacharias, G. L., Miao, A. X., & Warren R. (1993). Multistage integration model for human egomotion perception. *AIAA Flight Simulation Technologies Conference*, 103-113.

Zacharias, G. L., Venturino, M., & Osgood, R. K. (1992). *Situation awareness metric for cockpit configuration evaluation* (Report No. AL-SR-1992-0020). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B179427)

"The seat in the F-16 had been reclined to 30 degrees due to the raised heel rest line which was designed to accommodate for the air intake under the plane's belly. But the F-16 Program Office advocated that the increased recline angle of the seat would also improve G tolerance. Pilots reported increased ability to tolerate high Gs with this seat; however, we found this anecdotal evidence was refuted by subsequent centrifuge data, and it was thought that the pilot's perceptions of increased G tolerance were just a reflection of the improved comfort of the reclined seat. That is, they were more comfortable, but G tolerance was no better. We used centrifuge studies to test the effectiveness of different angles of seat recline, and a new database emerged providing valuable data on high G tolerance which still serves as a reference today."

*— Phil Kulwicki, Technical Director
Crew-Centered Cockpit Design
Human Engineering Division*

Zaff, B. S., Hughes, E. R., McNeese, M. D., Brown, C. E., & Citera, M. (1993). Diagnosing macro-ergonomic problems: A case study in the use of concept mapping for TQM initiatives. *Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting*, 2, 873-877.

Zaff, B. S., & McNeese, M. D. (1991). Design acquisition: Translating user knowledge into design solutions. *Proceedings of Interface '91*, 42-49.

Zaff, B. S., & McNeese, M. D. (1991). An integrated methodology for knowledge and design acquisition. *Proceedings of the IEEE National Aerospace and Electronics Conference (NAECON)*, 2, 779-785.

Zaff, B. S., McNeese, M. D., Brown, C. E., Citera, M., & Selvaraj, J. A. (1993). Empowering designers with user-centered knowledge: Issues, methods, and solutions. *Proceedings of Interface '93*, 231-235.

Zaff, B. S., McNeese, M. D., & Snyder, D. E. (1993). Capturing multiple perspectives: A user-centered approach to knowledge acquisition. *Knowledge Acquisition*, 5(1), 79-116.

Zaff, B. S., McNeese, M. D., Snyder, D. E., & Lizza, C. S. (1991). An integrated knowledge representation: Developing a large scale knowledge base for the pilot's associate. *Proceedings of the Associate Technology Symposium*, 244-255.

- Zehner, G. F.** (1986). Three-dimensional summarization of face shape. *Proceedings of the Human Factors Society 30th Annual Meeting*, 1, 206-210.
- Zehner, G. F.** (1994). Anthropometric accommodation in USAF cockpits. In K. Krishen (Ed.), *Seventh Annual Workshop on Space Operations, Applications and Research (SOAR '93)* (NASA CP-3240). Washington, DC: National Aeronautics and Space Administration.
- Zehner, G. F., Deason, V. B., Ervin, C. A., & Daziens, P.** (1987). *A photographic device for the collection of anthropometric data on the hand* (Report No. Natick-TR-87-044). Natick, MA: U.S. ARMY Natick Research Development and Engineering Center.
- Zehner, G. F., Ervin, C. A., Robinette, K. M., & Daziens, P.** (1987). *Fit evaluation of female body armor* (Report No. AAMRL-TR-87-046). Wright-Patterson AFB, OH: Armstrong Aerospace Medical Research Laboratory. (DTIC No. A188721)
- Zehner, G. F., Meindl, R. S., & Hudson, J. A.** (1992). *A multivariate anthropometric method for crew station design: Abridged* (Report No. AL-TR-1992-0164). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. A274588)
- Zimmerman, G., & Lintz, A.** (1994). *Magneto-optic gravity induced loss of consciousness monitor* (Report No. AL/CF-SR-1994-0007). Wright-Patterson AFB, OH: Armstrong Laboratory. (DTIC No. B188064)

This page intentionally blank

- Aaranson, J., 143, 158
 Abrams, T. S., 143
 Acton, W., 143
 Adam, E., 144
 Adams, O. S., 33, 40
 Adapalli, S., 155
 Adelman, L., 143, 167
 Adelson, M., 72
 Adler, H. E., 5, 6, 39, 50
 Aghazadeh, F., 114
 Agnew, J. R., 196, 197
 Albery, W. B., 143, 173
 Aldrich, K. A., 115
 Alexander, H. S., 33
 Alexander, M., 33, 36, 45, 51, 59, 60, 73, 77, 85, 97, 98,
 100, 101, 113, 121, 123, 126, 127, 128, 137
 Allen, D., 143, 196
 Allen, M. J., 5
 Allen, R. H., 59
 Allen, R. W., 92, 110
 Allread, G., 185
 Alluisi, E. A., 33, 34, 39, 58, 62, 64, 101
 Almagor, M., 113
 Alprin, S. I., 35
 Altman, J. W., 34, 35, 47, 71
 Amell, J., 143, 183
 Ammons, C. H., 35
 Ammons, R. B., 5, 35
 Anderson, A. F., 143
 Anderson, C. D., 95, 113, 124
 Anderson, M. J., 51
 Anderson, M. L., 152
 Anderson, N. H., 5, 35
 Andes, R. C., 143
 Andresen, K. W., 35
 Andrews, R., 143
 Andriole, S. J., 143, 167
 Angrist, S. S., 35, 36
 Annis, J. F., 144, 187
 Apter, J. P., 81
 Arbak, C., 115, 144, 149, 180
 Archer, E. J., 5
 Archer, R., 77
 Arginteanu, J., 38, 54, 68
 Armando, A., 162, 163
 Arndt, C., 144, 148
 Arnold, V. C., 137
 Aschenbach, J. R., 107
 Ase, P. K., 93
 Askren, W. B., 174
 Atchley, W. R., 35
 Aume, N., 35, 71, 77, 78, 113, 123, 129, 137, 144, 158, 174
 Aunon, J. I., 128
 Averbach, E., 49
 Ayoub, M. M., 114, 144, 192
 Azzari, A. J., 87
 Bachert, R. F., 129
 Badeau, A., 144, 202, 205
 Bailey, R. E., 159
 Baker, C. A., 5, 35, 36, 64, 68, 69, 73
 Baker, D. F., 36, 43, 55
 Baker, K., 101
 Bakken, G. M., 114
 Ballman, J., 144
 Baltzer, R., 143
 Baltzley, D. R., 166
 Bamford, H. E., Jr., 36, 64
 Bapu, P., 114
 Barbato, M. H., 122, 144
 Barcik, J. D., 36
 Barfield, W., 153
 Barger, D. M., 5
 Barling, H. B., 36
 Barmack, J. E., 9, 10
 Barnes, G. H., 21, 36
 Barnes, N. K., 82
 Barnett, B., 201
 Barrett, E. S., 144
 Bart, R. D., 144
 Bartell, R. J., 145, 152
 Barter, J. T., 36, 37, 45
 Bartucci, J. F., 91
 Basinger, J. D., 78, 88
 Bastian, W. R., 12
 Bate, A. J., 78, 102, 105
 Bates, B. T., 190
 Bates, C., 68, 69, 78, 94
 Bates, F. J., Jr., 114
 Bauer, M. A., 100
 Bauerschmidt, D. K., 37, 51, 92
 Baxter, F. S., 11
 Beach, B. R., 12
 Beach, L. R., 80
 Beamon, W. S., 107, 114, 135
 Beard, M., 196
 Beaton, R. J., 145
 Beaton, R. M., 162, 163
 Beaudet, D. B., 145
 Beecher, R. M., 145
 Beecroft, S. L., 145
 Beer, J., 145, 199
 Beevis, D., 174
 Behling, E. A., 78
 Bell, C. A., 93
 Benedict, C. P., 145
 Benenati, A. T., 37
 Benepe, O. J., 5, 8, 24
 Bennett, W. G., 85
 Benson, N., 66
 Benton, R. S., 25
 Berbert, A. G., Jr., 104
 Berisford, K. M., 116, 125
 Berkhout, J., 78
 Berkstresser, G. W., 145
 Berlin, R., 168
 Bermudez, J. M., 115
 Bernhardi, K., 42
 Bertinuson, J., 132
 Besco, R. O., 37
 Bethea, N. J., 114
 Bhatia, G., 145
 Biagioni, J. R., 37

- Biberman, L. M., 145
Biel, W. C., 6
Bien, J., 143
Biersdorf, W. R., 24
Billman, E. R., 145
Birt, J. A., 78
Bishop, H. P., 37
Bitterman, M. E., 6
Bjornstad, J. M., 16
Black, J. H., Jr., 134
Blackwell, H. R., 37
Blackwell, S., 145, 147, 173
Blanchard, R. E., 106
Blazer, D. R., 164
Block, M. G., 177
Bloomfield, J. R., 116
Blue, D. V., 145
Boer, L., 146, 156
Boff, K. R., 115, 146, 147, 148, 151, 171, 172, 173, 182, 189, 190, 194
Bolia, S. D., 173
Bollinger, R., 101
Bonanno, J. A., 181
Bondurant, R., 125, 147
Boone, A., 143
Borah, J., 147
Bortolussi, M. R., 147, 198
Bowen, H. M., 37, 45
Bowen, J. H., 37, 69
Bowen, J. P., 151
Boyd, S. P., 143
Bradley, J. V., 6, 37, 38, 39, 68, 78
Bradtmiller, B., 147
Brainard, L. F., 148
Brainard, R., 37, 39, 79
Brandalise, B. B., 39
Brandt, W. E., 79, 115, 130
Brants, I. J. H., 162, 163
Bressler, J. R., 186
Brett, B., 148
Brewster, C. C., 185
Brezovic, C. P., 167
Brickman, B. J., 163
Bridenbaugh, J., 115, 144, 165, 171
Bridges, D., 117, 171
Bridgman, C. S., 6, 30
Briggs, G. E., 39, 46, 52, 62, 69, 79
Brindle, J. H., 136, 137
Brioda, M., 185
Brisby, J. M., 164
Brody, A. L., 39
Brooks, A. E., 87
Brown, C., 115, 147, 148, 151, 173, 176, 177, 193, 194, 197, 200, 202, 206
Brown, C. W., 6
Brown, D. R., 39, 62
Brown, E. L., 39
Brown, F. G., 5
Brown, J. L., 5, 6, 7, 15, 39
Brown, K. T., 7
Brown, R., 148, 201
Brown, Y. J., 148, 150
Brownell, C., 79
Brucks, C. R., 101
Brunswick, E. A., 164
Bryant, M. L., 169
Buchroeder, R. A., 115, 148
Buckhout, R., 39
Buckley, B. B., 8
Buddenhagen, T. F., 39
Buehring, W. J., 122, 123
Bui, T. H., 148
Bunch, E. P., 66
Bunning, H., 39, 54
Burch, N. R., 44
Burke, C. J., 8, 89
Burkott, P., 131
Burns, R. K., 125
Burnside, D., 157
Busch, C., 148, 182, 202, 205
Byers, R. H., 70
Caldwell, J. A., 148, 186
Calhoun, C. S., 149, 182, 184, 185
Calhoun, G. L., 115, 149, 163, 196
Cameron, R. G., 39
Campbell, B., 158, 162
Campbell, F., 122
Campbell, J. M., 79
Cannon, M. W., 115, 149, 150, 162, 173, 193, 201
Caplan, R. D., 132
Cardullo, F. M., 148, 150
Carel, W. L., 133
Carson, E. R., 108
Carter, G. H., 5
Carter, L. F., 8
Case, H., 147, 151
Caum, K. B., 79
Chaffee, J. W., 45
Chaffin, D. B., 107
Chalmers, E. L., 8
Chambers, A. N., 6
Chandler, R. F., 115, 122, 139
Chason, L. R., 79, 92
Cheatham, P. G., 8
Chechile, R. A., 151, 155
Checov, L., 17
Chelen, W., 151
Chen, J. S., 151
Chevalier, J. R., 151, 178, 184
Chiles, W. D., 8, 23, 33, 34, 39, 40, 41, 44, 50, 79, 80, 101
Christensen, J. M., 8, 9, 12, 21, 25, 27, 41, 43, 68, 80
Christensen, K. K., 41
Christner, C. A., 70
Christy, R. T., 52, 56
Chubb, G. P., 41, 80, 81, 98, 102, 104, 106, 110, 116, 118, 121, 139
Churchill, E., 9, 12, 17, 42, 45, 48, 60, 73, 81, 98, 116, 127
Churchill, T., 116, 123, 132, 147
Citera, M., 151, 176, 177, 206
Clark, D. C., 42
Clark, H. J., 81, 95, 110
Clark, J. R., 29
Clark, L. G., 169
Clausen, H., 66

- Clauser, C. E., 42, 51, 77, 81, 115, 122, 127, 128
Clauser, G. L., 123
Cleveland, J. M., 40
Close, D. H., 126
Coakley, J. D., 9, 10
Coberly, V. J., 151
Coblintz, D. B., 126
Cody, W. J., 129, 147, 151, 189, 190
Cohen, B. J., 116
Cohen, J., 10, 26, 42, 68
Cohen, J. B., 151, 194
Cole, E. L., 10, 23, 24, 30
Coleman, A., 199
Colgan, J. W., 17
Colle, H. A., 199
Collins, H. R., 10
Collins, M. T., 200
Commean, P. K., 145
Cona, T., 151
Connell, S. C., 10, 14, 16
Connelly, E. M., 116
Connelly, M. E., 81
Connon, T. R., 138, 181
Conover, D. W., 42
Contini, R., 43
Cook, L. G., 126
Cook, M. R., 121
Coonan, T. A., 160
Coonrod, J., 119, 147
Cooper, J. I., 64, 69
Copeland, N. K., 64
Coppock, H., 13
Corbett, D. G., 43
Cornog, D., 50
Corrick, G. E., 116
Corso, G. M., 117, 153
Cotterman, T. E., 43, 82
Cotton, C. T., 151
Cotton, F., 158
Coulson, J. E., 50
Coulter, R. P., 82
Courtright, J. F., 117, 134
Covelli, R. R., 130
Cowan, J. D., Jr., 18
Coy, R., 65
Crabtree, M. S., 118, 129, 134, 151, 191, 198
Craig, D. R., 10, 11, 13, 18
Craig, J., 117, 151, 152, 156, 157, 185, 191
Crannell, C. W., 41, 43, 44, 54, 60, 71, 82, 101
Crawford, B. M., 36, 43, 82, 83, 98, 107, 117
Crawford, R. L., 152, 170, 182, 193, 202
Crawford, Y. R., 170
Cress, J. D., 152, 175, 177, 186
Crocker, M. L., 11
Crook, M. N., 11, 37
Crouch, D. A., 143
Cruzen, M., 26
Crystal, J. C., 152
Cubberly, H. A., 92, 106
Curry, D. G., 153
Custer, C. L., 40
Cuzzi, J. R., 121
Dainoff, M. J., 110
Damon, A., 25, 44
Damos, D. L., 155
Daniels, G. S., 9, 12, 17, 42, 60
Danielson, L. E., 12
Dannels, S., 160
Daugherty, E., 148
Davis, E. T., 153
Davis, I., 170, 182, 203, 204, 205, 206
Davis, J. F., 44
Davis, J. H., 83, 91
Davis, S. A., 151, 154, 158, 162
Davis, T., 201
Day, C. N., 117
Day, W. F., 12
Daziens, P., 207
Deason, V. B., 207
Deats, C. V., 83
Deblon, F., 162, 163
Debons, A., 35, 43, 44, 71
Deckert, J. C., 166
Deer, B. C., 157
Deese, J., 8, 12, 44
DeFrances, A. J., 125, 136, 137
Deininger, R. L., 73
Deivanayagam, S., 114
Deleys, N. J., 42
DeLucia, P. R., 153
Dembeck, C. M., 144, 153, 185
Dempsey, C. A., 12, 44
Dempster, W. T., 44
Dennis, R. J., 178, 181
Dent, C., 153
Dent-Read, C. H., 153
DeRego, P., 117, 153, 182, 202
Dereniak, E. L., 171
DeRuyck, A. R., 117
Detro, S., 185
Diamantides, N. D., 43
Diamond, A. L., 6, 12, 17, 44
Dinnerstein, A. J., 42
Dixon, B. C., 83, 104, 106
Dixon, S. A., 155
Dobbins, J. P., 117
Doll, T. J., 153
Dominguez, C., 163, 197
Donaldson, E., 118
Donohue, T. R., 155, 163
Donohue-Perry, M., 118, 153, 154, 155, 162, 186
Donovan, R. S., 173, 182, 194
Doty, A. B., Jr., 83
Dowler, M. G., 155, 163, 166, 188, 193, 196
Downey, C., 165, 180, 191, 196
Doxtater, L., 58
Doyal, J. A., 155, 163
Drillis, R., 43
Dryden, R. D., 114
DuBois, J., 44, 65
Dugan, G. E., 14
Duket, S. D., 118, 133, 139
DuMars, R. C., 55
Duncan, J. C., 177

- Dunham, D. N., 193
Dunlosky, A., 186
Dunsker, E. D., 135
Dupertuis, C. W., 44, 51
Durant, J. R., 36
Dwyer, E. J., 186
Dye, C., 186
Dzendolet, E., 44
Eckstrand, G. A., 6, 12, 44, 69
Edwards, R. E., 143
Eggemeier, F. T., 118, 132, 143, 155, 203
Egleston, R. G., 119, 127, 135, 137, 151, 153, 155, 163, 164
Ehmann, E. D., 84
Eimer, E. O., 156
Eisen, L., 45
Eisenberg, H. M., 182
Eisley, J. G., 45
Eliason, C. D., 83
Elkin, E. H., 45
Eller, M., 192
Elliott, T. K., 45, 83
Ellis, D., 193
Ellis, G. S., 162, 173
Ellis, R., 185, 190
Ellis, S., 153
Ellson, D. G., 5, 11, 13, 15, 17
Elworth, C. L., 124
Ely, J. H., 45
Emanuel, I., 33, 37, 44, 45, 51
Emanuel, J. T., 86
Endsley, M. R., 156
Engleman, W. R., 153
Entin, E. E., 156
Erdman, A. C., 46
Ergener, D., 200
Erickson, J. R., 84
Ericson, M. A., 196, 197
Eriksen, C. W., 13, 46, 49
Erlick, D. E., 46, 84
Ernst, A. A., 46
Erskine, P., 116
Ervin, C., 151, 156, 177, 187, 188, 207
Evans, J. B., 178
Evans, J. E., 121
Evans, S., 114, 118
Evers, K., 185
Ewing, D., 35
Falklis, D., 151
Fang, H., 156
Farley, W. W., 113, 121, 145, 156
Farmer, E., 146, 156
Farr, D. E., 99
Farr, M. J., 80
Faust, M., 202
Feallock, J. B., 46
Federoff, O., 81
Fehr, E. R., 84
Felkey, M. A., 118
Felt, J. E., 178, 186
Felts, W. J. L., 44
Feroglia, W. E., 86
Ferrer, J. J., 88
Filipovich, D., 156, 157
Filler, B. E., 94
Finch, S. R., 164
Finkelstein, B., 62
Fiore, J., 156, 157
Fiorita, A. L., 157, 177
Fischl, M. A., 106
Fisher, F., 203
Fisher, R. P., 79
Fisher, T. J., 157
Fitts, P. M., 5, 13, 14, 20, 21, 22, 24, 29, 34, 39, 46, 48, 57, 62, 66
Fix, E. L., 151, 157
Flach, J. M., 118, 157, 159, 163, 166, 175, 192
Flanagan, D. P., 145
Flannery, M. P., 77
Fleischman, R. N., 151, 155
Fleishman, E. A., 63
Flexman, R. E., 47
Floyd, L. L., 205
Fogarty, L. E., 47
Fogg, R. A., 9
Folds, D. J., 153
Foley, M. F., 84
Foley, W. L., 84
Folley, J. D., Jr., 45, 47, 102
Fontaine, A. B., 46
Forbes, F. W., 79, 84
Ford, A., 14
Fowler, J., 188
Fowler, M. G., 84
Fowler, R. L., 84, 86
Fox, R. E., 40, 41
Fracker, M. L., 157, 158, 201
Fraggiotti, J., 124
Franklin, H., 158, 185, 190
Franks, P. E., 65
Fraser, N. M., 158
Frazier, J., 158
Freeman, J., 158
Freitag, M., 58, 84, 118
Freund, J. E., 60
Frew, J., 53
Frey, P. R., 178, 190
Frick, R. K., 158
Friedman, A. D., 169
Fritz, E. A., 33
Frost, G. G., 47, 48, 59, 84, 98, 99, 109
Fry, E. I., 48
Fucigna, J. T., 9, 10
Fullenkamp, P. A., 203
Fullenkamp, S. C., 150, 193
Funaro, J. F., 91
Furness, T. A., 84, 149, 158
Gabel, W. C., 44
Gabriel, R. F., 110
Gaillard, A. W. K., 148
Gain, P., 48, 50
Gainer, C. A., 62
Gallimore, J. J., 159
Garcia, L., 143, 159

- Gardner, J. F., 14, 48
Gardner, M. S., 69
Garness, S., 159, 166
Garrett, J. W., 77, 85
Garver, T., 113
Garvey, W. D., 15, 22, 59
Gaudiosi, J. V., 85
Gawron, V. J., 159
Geer, C. W., 119
Geiselman, E. E., 159, 160, 182, 197
Geller, R. E., 87
Genco, L. V., 119, 122, 135, 138, 178, 181, 194, 195
Gerhardt, L., 48
Gerth, J. M., 153
Gettys, C. F., 85, 91
Getz, M. H., 14
Ghiselli, E. E., 6
Giacaglia, R. A., 145
Gibbons, J., 160, 199
Gibbons, L. E., 160, 168
Gibney, T. K., 86
Gibson, C. P., 160
Gibson, J. J., 86
Gienapp, E. M., 96
Gier, R., 143
Gieske, G., 143
Gilbarg, D., 13
Gilbert, E. J., 52
Gilinsky, A. S., 12, 15, 44
Gilkey, M. J., 152, 177
Gill, A. T., 50
Gill, R. T., 160, 165
Gillespie, K. W., 100
Gilliland, K., 160, 190, 191
Gillio, A., 93, 98, 113
Ginsburg, A., 119, 120, 122
Girod, C. V., Jr., 86
Givens, B., 143, 160
Glass, B. C., 124
Glass, R. D., 87
Gleason, G., 160, 191
Gliatti, E. L., 120, 125
Glushko, R. J., 160
Glynn, C. D., 186
Goddard, C., 110
Goeters, K., 156
Goldbeck, R. A., 86
Goldman, Z. Z., 160
Goldsmith, C. T., 39
Goldstein, I. L., 86, 103, 104
Goldstein, M., 8
Goldstein, R., 193
Gollin, E. S., 79
Gomer, F. E., 121
Gomes, M. E., 160, 167, 193
Gonsalves, P. G., 160
Goodyear, C., 143, 186, 196
Gordon, J., 131
Gottsdanker, R. M., 39
Gradijan, J. M., 37
Graham, C., 121
Graham, C. H., 7
Graham, D., 86, 147
Grant, D. A., 5, 24, 25, 35, 60
Gravelle, M., 205
Gray, F., 13, 15, 17
Gray, M. A., 48
Graybiel, A., 48, 56, 60, 86, 93, 100
Green, M. R., 48, 52
Green, R. J., 161
Green, R. P., 178
Green, T. B., 122, 161, 172, 185
Greenberg, S. N., 79
Greene, F. A., 185
Greenwood, D. T., 48
Grenier, T. H., 44
Grether, W. F., 5, 7, 10, 15, 16, 29, 30, 48, 49, 86, 87, 103
Griffin, L. L., 87, 99, 136
Griffin, M. J., 193
Griffith, O., 162
Grigsby, S. S., 151, 161, 196
Griswold, G. H., 71, 103
Gross, M., 147
Grove, R., 161
Grunzke, M. E., 63, 65
Grussett, J., 156
Guadagna, L. M., 168
Guerin, D. F., 121
Guion, R. M., 132
Gum, D. R., 87
Gundel, A., 148, 161, 182, 203
Gunderman, R., 145, 161
Gustafson, C. E., 48
Guterman, I. M., 87
Gutmann, J. C., 121, 135
Haas, M., 161, 162, 163, 200
Haddox, D., 167, 168, 174
Hake, H. W., 18, 46, 48, 49
Hall, E. R., 49, 64
Hall, I. A. M., 49, 66
Hall, M. G., 105
Hall, P. S., 162
Hall, T. J., 34, 87
Hammer, L. R., 49, 59
Hammond, K. R., 162
Hanavan, E. P., 49, 78, 87, 88, 102
Haneman, V. S., Jr., 50
Hanes, R. M., 8
Hanff, G. E., 87
Hankins, T., 204
Hanlon, W. H., 61
Hann, R. L., 118, 121, 125, 138, 139
Hannom, T. J. B., 87
Hansen, R., 50
Hanson, D. C., 143
Hanson, J. A., 11
Hany, J. V., 164
Harding, K. G., 121
Hardyal, S., 167, 168, 189
Harker, G. S., 11
Harmon, E. E., 162
Harper, W., 189
Harris, C. S., 50, 106
Harris, J. S., 121

- Harshbarger, J. H., 50, 87, 88
Hart, E. M., 50
Hart, R. S., 88
Harter, G. A., 18, 50
Hartman, B. O., 101
Hartman, R. T., 195
Hartman, W. B., 130
Hartmann, E. E., 173
Haskell, B. E., 162, 186
Hassoun, J., 143, 190, 204
Hatfield, S. A., 100, 129
Hatsell, C., 151
Hattershire, B. R., 164
Haugen, R., 72
Hausmann, M. A., 122, 144, 155
Hawkes, G. R., 34
Hayes, D. O., 88
Hayes, T. R., 178
Haywood, W. J., Jr., 121
Healy, A. F., 205
Heard, J. L., 88
Heaton, H. H., 164
Hecht-Nielsen, R., 162
Heckart, S. A., 78, 88, 102, 105, 113, 121, 134
Hedges, G., 162
Heinz, D. M., 88
Heinze, W., 185, 190
Helfter, J., 174
Hemphill, J. K., 16
Henderson, C., 47
Henneman, R. H., 15, 16, 17, 22, 50
Hennessy, R. T., 162
Herbert, H. J., 88
Herman, J., 98
Hermans, T. G., 17
Herning, R. I., 186
Herrick, R. M., 5, 17, 50
Herron, R. E., 121
Hershberger, M. L., 121
Hertzberg, H. T. E., 12, 17, 30, 33, 50, 51, 89
Hesse, K., 158
Hettinger, L., 152, 154, 162, 163
Heydorn, R. P., 109
Hilgendorf, R. L., 89, 91, 93, 98, 118
Hill, H., 13, 17
Hill, J., 185
Hill, J. H., 21
Hill, L., 199
Himes, M. J., 118
Hinson, T. A., 143
Hipel, K. W., 158
Hixson, W. C., 18
Hockenberger, R. L., 132, 163, 164
Hoffman, A. C., 11
Hoffman, M. S., 117, 121, 131
Hoffmeister, J. W., 162
Hofmann, M. A., 174
Holden, L. D., 78
Holland, J. G., 25, 51, 64
Holmquist, J. A., 103
Homstad, L. E., 133
Hooever, R., 158
Hooper, J. J., 56
Hopkins, C. O., 51, 72
Hoppe, R. A., 83
Horn, P. M., 172
Hornseth, J. P., 51, 83, 91, 105, 108, 121, 130, 136
Horton, G. P., 18
Horton, J. A., 91, 108
Horwitz, L. S., 162
Houchard, J., 192
Houston, R. C., 18, 52, 60
Howard, J. M., 96
Howe, R. M., 18, 47, 52
Howell, W., 52, 60, 69, 86, 91, 103
Howes, D. H., 18
Howett, G. L., 50
Howland, B., 122
Howland, D., 52
Hoyland, C., 130, 133, 185
Hribar, V. F., 84
Hudson, J. A., 177, 207
Huebner, W. J., 51, 52, 53, 59, 70, 71
Hugg, J., 121
Huggins, A. W., 171
Hughes, E., 198, 204, 206
Hughes, R., 147
Hughes, R. L., 79, 92
Hull, R., 37
Hulme, A., 162, 163
Humes, J. M., 92
Hundt, T. H., 173
Hunsicker, P. A., 53
Hunt, D. P., 18, 46, 53
Hunt, G., 162, 163
Hunt, R. M., 143, 163
Hunter, J. R., 87
Hutson, F. T., 130
Hutton, R. J. B., 163
Hyman, A., 53
Hyman, F., 201
Hyman, R., 18
Iberall, A. S., 53
Imber, B. M., 19
Ingle, D., 165, 180, 191, 196
Ingling, C. R., Jr., 163
Ingram, W. D., 41
Irby, T. S., 39
Ireland, F. H., 92
Irvin, G. E., 155, 163, 165, 166, 172, 188, 193, 196
Irvin, J., 163, 192
Isakson, G., 53, 54
Izzo, L. L., 92
Jackson, K., 143, 151
Jackson, W. G., 178
Jacobs, R. S., 126
Jagacinski, R. J., 130
Jahnke, J. C., 54, 84, 101
James, G. M., 153, 164, 178, 185, 186
James, R. M., 156
Janson, W., 149, 155, 163
Jarrett, R. F., 6
Jauer, R., 144, 163, 164, 180
Jeantheau, G., 54, 57

- Jenkins, W. L., 19, 54
Jenkins, W. O., 19
Jennings, L. S., 115, 148
Jensen, J. G., 164, 184, 200
Jerison, H. J., 54, 55, 92
Jewell, W. F., 122
Jex, H. R., 92, 122
Jiang, B. C., 144
John, E. R., 162, 180
Johnson, A. B., 39, 48
Johnson, A. P., 19
Johnson, D., 172
Johnson, K. L., 164
Johnson, L. L., 41
Johnson, M. N., 148
Johnson, P. J., 30
Johnson, S., 164, 166
Johnson, W. V., 164, 171, 177, 186
Johnston, F. E., 58
Jones, G. W., 164
Jones, M. B., 166
Jones, M. R., 164, 192
Jones, M. W., 167, 168, 189
Jones, R. E., 14, 19, 20, 24
Jones, T. N., 163
Jorve, W. R., 65, 71
Jumper, E. J., 78, 93
Junker, A., 122, 126, 132, 160, 164, 165, 167, 191
Jurich, L., 84
Kabriský, M., 151
Kaeding, J. H., 86
Kaeßner, N., 21
Kalb, R., 83
Kaleps, I., 122
Kama, W. N., 43, 55, 63, 64, 69, 82, 83, 93, 98, 105, 108,
115, 122, 124, 125, 144, 165
Kamm, L. J., 55
Kanareff, V. T., 55, 58
Kang, R. N., 163, 165, 166, 172
Kanwisher, J., 27
Kapasouris, P., 166
Kaplan, G., 86
Kappauf, W. E., 8, 20, 21, 27
Kar, A. C., 54
Karl, A. A., 122, 123
Karr, A. C., 19
Kasten, D. F., 56
Katchmar, L. T., 80
Katsuyama, R. M., 166, 176
Katz, L., 125, 166, 176
Katz, S., 93
Kaufman, L., 147
Kay, M. E., 21
Keenan, J. K., 93
Keep, G. F., 163, 166
Keesee, R., 107, 123
Kellogg, R. S., 48, 56, 60, 86, 93, 98, 100
Kelly, L., 166
Kelly, S., 117, 123, 171, 180
Kelso, B. J., 93
Kennedy, J. L., 11
Kennedy, K., 56, 85, 94, 96, 114, 121, 123, 147, 166
Kennedy, R. S., 56, 166
Kenner, K. M., 160, 165, 167
Kent, G. W., 24
Kettlewell, J., 124
Kibler, A. W., 94, 95, 109
Kidd, J. S., 46, 56, 57, 66
Kikta, P., 114, 116, 118, 123
Kilgour, D. M., 158
Kimble, C. E., 167
Kincaid, J. P., 95
Kincaid, V., 186
King, P., 144
King, V. M., 132
Kinkade, R. G., 52, 57
Kinslow, W., 92
Kiowski, J. W., 103
Kiris, E. O., 156
Kirtland, W. H., 145, 191
Kissen, A. T., 122, 123
Kistler, D. J., 201
Klein, G., 153, 167
Klemm, F. K., 60
Klinger, D. W., 167
Kneller, E. W., 160
Knipfer, R. E., 114
Knoll, R. L., 81, 95
Knoop, P. A., 82, 87, 95
Knott, J. R., 41
Knotts, L. H., 159
Knowles, W. B., 57
Kocian, D., 95, 123, 136, 148, 158, 167, 177, 188, 191
Koehn, M. S., 143
Koeplinger, G., 133
Kolers, P. A., 57
Kopstein, S. H., 135
Korna, M., 114, 123, 143, 167, 168
Kornfeld, J. R., 168
Korobow, N., 37
Kou, R. S., 124, 137
Kraft, C., 21, 42, 46, 52, 57, 59, 60, 66, 80, 95, 113, 124
Kramer, A. F., 155, 194
Kramer, J. H., 33
Kraska, A., 147
Krasny, L. M., 57
Krause, H. E., 114
Krause, R. H., 43
Kraushar, P. G., 143
Krauskopf, J., 6
Krauskopf, P. J., 144, 167, 168, 189
Kreezer, G. L., 21, 58
Kreidler, D. L., 52
Krendel, E. S., 21, 60
Kris, E. C., 58
Kroemer, K. H. E., 94, 95, 96, 97, 108, 124
Krogman, W. M., 58
Kuby, A., 42
Kuck, G. A., 117
Kuhns, M. P., 5, 17, 39
Kuipers, J., 117, 168
Kulwicki, P. V., 58, 96, 124, 125, 131, 151, 168, 172, 194

- Kunze, R. J., 197
Kuperman, G., 96, 117, 120, 121, 122, 124, 125, 126, 137, 145, 147, 148, 158, 160, 165, 168, 169, 170, 171, 172, 180, 182, 191, 193, 195, 202
Kurtzberg, J. M., 58
Kuyk, T. K., 170
Lacey, R. J., 14, 21, 48, 68
Lagarde, D., 148
Lakshmanan, T. K., 96
Lambert, B. K., 114
Lanterman, R. S., 106
Lanzetta, J. T., 55, 58, 60
LaPuma, P. T., 171, 177
Larry, C., 124
Larson, B., 185, 190
LaSalvia, J. M., 163
Laubach, L. L., 77, 81, 97, 98, 108, 113, 125, 126
Learner, D. B., 58
Lee, R. D., 119
Lee, W. A., 22, 51, 58
Lehman, E., 143, 151
Lehner, P. E., 195
Lehr, D. J., 35
Leibowitz, H. W., 7, 21, 22, 58
Leininger, W. E., 143
Lemm, R. G., 52
Lenorovitz, D. R., 145
Lenzycki, H. P., 93
Leuba, H. R., 97, 98
Leupp, D. G., 126, 148, 171
Leurg, S., 186
Leutwyler, R., 162, 163
Leverett, S., 78
Levin, E., 92
Levine, M., 22, 58
Levine, R. B., 33
Levison, W. H., 126, 129, 139, 140, 165, 167, 171
Levit, R. A., 116
Lewis, A., 58
Lewis, D. E., 126
Lewis, P., 16
Lewis, T. S., 59
Lewis, W. N., 126
Licht, D. M., 171
Licklider, J. C. R., 59
Lifshitz, S., 177
Lincoln, J., 115, 147, 160, 171, 178
Lind, S., 160, 171, 172, 193
Lindemuth, R. W., 98
Lintern, G., 171
Lintz, A., 207
Livingston, W. A., 15, 59
Lizza, C. S., 206
Llinas, J., 160, 171
Lloyd, C. J., 185
Lofberg, M. S., 139
Loftus, J. P., 59
Lomont, J. F., 21, 22
Long, E. R., 16, 22, 50, 59
Long, G. E., 22
Longinow, N. E., 171
Longridge, T. M., 115
Loret, B. J., 59
Losee, J. E., 59
Loucks, R. B., 17, 23
Love, A. C., 162, 173
Lovering, P. B., 171, 185
Lowder, R. G., 59
Lowe, D. H., 123
Luciani, R. J., 204, 205
Ludwig, U. W., 101
Lum, M. D., 100
Luming, H., 114
Lund, D. W., 29
Lunn, R., 160, 191
Lusk, S. L., 171, 177, 201
Lyons, J. J., 79
Lyons, J. P., 93, 96, 98, 108
Maas, L. O., 19
Mackin, W. F., 185
MacLeod, S., 84, 91, 98, 126, 127
Madole, S. W., 128
Magdaleno, R. E., 92, 110, 122
Maher, F. A., 98
Makeig, S., 148
Mallory, W. R., 127, 136
Malmstrom, F. V., 191
Mangelsdorf, J. E., 59
Manley, C. W., 85
Manning, W., 21
Marasco, P. L., 171, 195
Marcelo, R. A. Q., 151
Marchese, A. C., 35
Marchiando, B. W., 35
Maresh, J. L., 171, 172
Markoff, J. I., 116
Marshak, W., 157, 161, 165, 171, 172, 192
Marshall, M. E., 97
Martin, C., 143, 151, 171, 172
Martin, E., 115, 126, 127, 129, 147, 172, 175
Martin, E. J., 173
Martin, H. B., 34
Martin, O. E., Jr., 64
Martin, W. L., 98, 120, 122, 127, 133, 160, 172, 182
Martinez, N., 189
Martz, H. F., 114
Masak, J. R., 144, 153, 191
Masline, P. J., 183
Masters, R. M., 172
Matheis, C. W., 42
Matheny, W. G., 16
Mathews, C., 172
Matin, E., 172, 173
Matthews, C. W., 85
Matthews, T. L., 16, 50
Maute, K., 189
Maxwell, J., 160, 191
May, C. B., 98
May, J. G., 162, 173
Mazy, F. W., 44
McAleese, K. J., 116
McBride, D. J., 173
McCarthy, J., 173, 182
McCauley, M. E., 162

- McCloskey, J. W., 98
McCloskey, K., 173, 204, 206
McCloy, T. M., 115
McClurg, T. D., 177, 182
McConnell, D., 46, 59
McConnell, J. N., 143
McConville, J. T., 33, 59, 81, 89, 97, 98, 113, 115, 116, 121, 122, 127, 128, 132, 137
McCoy, A. L., 151, 198
McCoy, W. K., 59, 84, 98, 99
McDaniel, J., 113, 114, 128, 144, 158, 167, 168, 173, 174, 189, 192
McFarland, R., 44
McFarren, M. R., 177
McGehee, C. R., 23
McGhee, J. Z., 118
McGillem, C. D., 128
McGuire, J. C., 23, 57, 59, 60, 66, 73
McIntosh, B. B., 10, 23, 24
McIntyre, R. T., 178
McKechnie, D., 60, 63, 71, 78, 88, 94, 99, 102
McKelvey, R. K., 37
McMahon, D. J., 121
McMillan, G., 101, 118, 122, 123, 126, 127, 129, 138, 148, 150, 152, 157, 159, 171, 172, 174, 175, 177, 192, 197
McMurtry, R. L., 121, 130
McNeal, R. N., 99
McNeese, M., 148, 151, 158, 166, 167, 175, 176, 177, 190, 192, 193, 200, 202, 206
McNulty, C. F., 60
McRuer, D. T., 60, 66, 68
Meeks, L., 168, 189
Meighan, T. W., 87
Meindl, R. S., 177, 207
Meister, D., 99
Mellian, S. A., 177, 188
Mengelkoch, R. F., 60
Merchant, J., 99
Merhav, S. J., 177
Merkel, H. S., 165, 177, 195
Merriken, M. S., 177
Merryman, R. F. K., 177
Metzler, T. R., 177
Meyer, A., 100
Meyer, E. G., 129, 130
Meyer, G. R., 129
Meyers, H. C., 12, 60
Miao, A. X., 206
Michels, K. M., 108
Middendorf, M. S., 157, 164, 175, 177, 201
Middleton, R. H., 60, 100
Middleton, V. E., 178, 191
Miehle, W., 106
Milenski, J., 91
Militello, L. G., 167
Miller, E. F., 60, 93, 100
Miller, I., 60
Miller, J. J., Jr., 129
Miller, J. W., 80
Miller, L., 60
Miller, N. D., 25
Miller, R. B., 23
Miller, R. E., 178, 181
Mills, R., 80, 81, 84, 99, 100, 113, 129, 130, 178
Milton, J. L., 10, 14, 20, 23, 24
Minium, E. W., 6
Mitchell, S. M., 113
Miyamoto, A., 178
Mletzko, A. E., 106
Modrick, J. A., 49
Moffitt, K., 178
Mohlman, H., 98, 106
Moise, S. L., 130
Monachino, L., 193
Monk, D., 118, 121, 130, 134, 147, 151, 166, 178, 194
Morales, R., 151
Moran, M. J., 100
Moran, M. S., 124
Morgan, R. L., 35, 44, 58, 69
Morin, R. E., 24, 60
Morris, D. F., 35
Morris, G. M., 151
Morris, J. B., 24
Morris, N. M., 178
Morrison, N., 24
Morissette, J. O., 54, 60, 82, 101, 109, 130
Morissette, R., 99
Morrow, M., 173
Morthland, S. P., 185
Morton, K., 147, 178, 194
Morton, P., 180, 196
Moss, J. L., 49, 64
Moss, R., 125, 147, 169, 180
Moss, S. M., 60
Mote, F. A., 24
Moulton, R. H., 87
Mountjoy, D., 147
Mousted, J. F., 37
Mras, J., 130
Muckler, F. A., 48, 60, 61, 62
Mueller, D. D., 61, 104
Mueller, L. J., 130
Muick, C. J., 60, 130
Mulford, L. L., 204
Mullen, T. M., 195
Muller, P. F., Jr., 34, 62
Munger, S. J., 47
Munt, I., 96
Murray, R. D., 130
Myers, J., 24
Myers, W. S., 105
Myhre, G., 148
Myles, W. E., 101
Naas, D. W., 62
Nagel, J. L., 130
Narasimhan, R., 5, 8, 24
Narva, M. A., 62
Nasman, V. T., 180, 182
Navarro, H., 130
Naylor, J. C., 39, 62
Neal, J., 171
Nearing, D. F., 118
Nelson, D., 130, 135, 137
Nelson, M. A., 180

- Nelson, W. T., 162
Neuberger, T. P., 101
Newman, R. L., 130
Nicholson, J. F., 62
Nicklas, D. R., 62
Nielsen, A. G., 101
Nielsen, G., 83
Nienaltowski, W., 37
Nigro, B. J., 101
Nixon, C. W., 71
Noah, J. D., 171
Normand, K. A., 191
Nurre, J. H., 156
Nygaard, J. E., 62
Nygren, T. E., 132
Nystrom, C. O., 5, 24, 25, 35
O'Brien, B., 25
O'Donnell, R. D., 60, 78, 101, 121, 131, 134, 138, 204, 205
O'Neal, M. R., 163, 178, 180, 181, 191
Obermayer, R. W., 61, 62
Ochs, J., 180
Ohlbaum, M. K., 101
Ohmart, J. G., 37
Oliver, C. G., 180, 186, 202, 205
Olson, B. A., 131
Olson, J. L., 180
Olson, M. W., 14, 19
Omoto, C., 65
Orlansky, J., 45
Ormiston, D. W., 62, 63
Ormond, E., 12
Ornstein, G. N., 79, 109
Orr, C., 143, 148, 182, 202
Osgood, R. K., 159, 160, 182, 193, 200, 201, 206
Osgood, S. S., 182
Oshima, M., 101
Ostrand, R. A., 143
Outcalt, N. R., 50
Owen, D. H., 182
Page, D., 92
Pagniz, P., 162
Palmer, B., 180, 182, 205
Palmore, J., Jr., 46
Pandit, P., 198
Pantle, A., 131, 173, 182
Papanicolaou, A., 148, 182, 202
Parker, J. F., Jr., 63
Parker, T. C., 93
Parus, R., 162, 163
Passey, G. E., 87, 101
Patt, D., 25
Patterson, R., 182
Pattipati, K., 166
Pearson, W. H., 51, 60, 63, 101, 102, 117, 131, 182
Peio, K. J., 177, 182
Penrod, T. D., 169, 182
Peoples, G., 58
Perez, W., 143, 145, 148, 169, 170, 173, 183, 191, 192
Perry, E. L., 63
Peters, G. L., 79
Peterson, J. W., 25
Pickett, R. M., 54, 63, 92, 102
Pickworth, W., 186
Pieper, W. J., 102
Pigg, L. D., 25, 63
Pilmer, R. B., 78
Pinkernell, H., 63
Pinkus, A., 127, 131, 136, 173, 177, 182, 183, 190, 195
Pippin, C. C., 143
Platzer, H. L., 63
Poli, C. R., 87
Pollack, R., 147, 183
Polse, K. A., 181
Polzella, D. J., 147, 171, 183
Polzinetti, J., 167
Pope, L. T., 55, 63
Porter, C. D., 151, 153, 178, 184
Porterfield, J. L., 78, 88, 98, 99, 102, 121, 130
Post, D. L., 131, 149, 184, 185, 190, 197, 201
Potor, G., 186
Potter, E., 131
Potter, S. S., 186
Poturalski, R., 138
Pourciau, L. L., 86
Powers, R. F., 114
Pownall, D., 54
Pratt, P., 95, 131
Price, D. L., 145
Price, J., 131
Prior, R. C., 164
Pritsker, A. B., 70, 102, 110, 139
Prouhet, E. P., 131
Purvis, B., 152, 155, 160, 161, 172, 185, 192, 193, 205
Quam, D. L., 163
Queal, R. W., 22, 25, 73
Quinlan, R. V., 103
Quinn, J. W., 168
Quinn, T. J., 132, 163, 164
Raab, F. H., 185
Rabinow, D., 116
Raisen, E., 93
Ramer, D. P., 154, 155
Ramirez, L. E., 143
Ramirez, T. L., 185, 186
Ramsey, E. G., 172, 183
Randall, F. E., 25
Ranken, H. B., 7, 25
Rappaport, M., 69
Rasmussen, S. B., 63
Ratino, D. A., 186, 204, 205
Ratnaparkhi, M. M., 186
Ratnaparkhi, M. V., 186
Ravenelle, R. L., 96, 108
Ray, J. T., 64
Rayle, M. E., 178, 186
Reardon, J. A., 81
Reardon, K. A., 186, 206
Reed, W. G., 62
Rees, D. W., 64
Reeves, D. L., 186
Reid, G., 118, 132, 143, 162, 183, 186, 199
Reid, L. S., 22, 25, 50, 64
Reinhart, W. F., 186
Reis, G., 205

- Reogle, C., 139, 151, 164, 200
Repperger, D. W., 132, 143, 186
Retterer, B., 103
Reynolds, H. M., 115, 132, 186
Reynolds, H. N., 86, 103
Reynolds, K. C., 174
Reynolds, M. C., 152, 185
Reynolds, R. E., 110
Rhodes, F., 64, 68
Rhodes, K., 98
Ribarsky, B., 153
Riccio, G. E., 148, 152, 157, 172, 175, 177, 186, 193
Richard, P. R., 49, 64
Richardson, W. H., 69
Rickels, W. H., 129
Rickerd, L. D., 110
Rickles, W., 186
Rieck, A. M., 186
Riegler, J. T., 152, 154, 155, 162, 165, 166, 172, 186, 188
Riepenhaff, R. R., 77
Rievley, J. F., 44
Rigby, L. V., 64
Rigler, D., 14, 19
Riley, E. W., 206
Riley, M. B., 71
Rinalducci, E. J., 132
Ring, J. M., 12, 25
Ritchie, M., 130
Ritchie, M. L., 36, 64, 72
Rizzuto, A., 134, 187
Robbins, C. G., 174
Roberts, J. F., 65
Robinette, J. C., 77, 96
Robinette, K., 132, 139, 145, 151, 156, 177, 186, 187, 188, 201, 207
Robinson, D. E., 96
Robinson, J., 147, 188
Rock, M. L., 25, 26, 27
Rockway, M. R., 26, 61, 65
Rodriguez, L. E., 186, 205
Roe, M. M., 143, 192
Roelke, N., 60
Rogers, C., 185, 190
Rogers-Adams, B., 161, 165, 188, 196
Rohles, F. H., Jr., 63, 65
Rohrman, N., 101
Rolek, E., 132, 143, 157, 166, 188
Roscoe, S. N., 72
Rosner, B. S., 57
Ross, D. A., 65
Ross, J., 188
Rossen, M. L., 180
Rothey, J., 168, 189
Rountree, M., 143, 151, 194
Rouse, S. H., 133
Rouse, W. B., 133, 151, 178, 189, 190
Roush, R. G., 5
Rudofski, D., 178
Rudov, M. H., 65, 103
Rueb, J., 190
Ruhsam, W. M., 103
Rulon, P. J., 26
Rundle, M., 131
Runnder, K., 143
Rush, J. H., 41
Russell, C., 163
Ryack, B. C., 53
Ryan, P. J., 81
Sabeh, R., 23, 65, 68
Salas, E., 174
Samaras, G. M., 190
Sampson, P. B., 26
Samson, R. L., 36, 65
Sander, D. L., 125
Sanderson, P., 190
Santoro, T. P., 190
Santschi, W. R., 44, 65
Santucci, G., 156
Sarma, K. A., 185, 190
Sasaki, E. H., 65, 103, 105, 109
Sasseville, A., 151, 155
Sauer, D. W., 180
Sauer, S. C., 30
Sauerborn, J., 158
Scanlan, L. A., 116, 133
Schaeffer, K. H., 69
Schafer, E., 190
Schafer, T., 66
Schapiro, H. B., 26
Schelhorn, A. E., 66
Schertler, D., 166
Schetzer, J. D., 18
Schiffler, R. J., 190
Schindler, R. A., 133
Schipper, L. M., 46, 66
Schlegel, B., 191
Schlegel, R. E., 160, 190, 191
Schlei, E. J., 58, 66
Schmitt, N. E., 44
Schneider, R., 46
Schnurer, J. H., 165, 180, 191, 196
Schofield, J., 79, 84, 98
Schohan, B., 26
Schor, C., 160, 191
Schrenk, L. P., 52, 81, 103
Schuber, M., 191
Schueren, J., 186, 193, 198
Schum, D. A., 69, 86, 103, 104
Schutz, R. K., 107
Schwank, J. C. H., 79, 92, 115
Schwartz, E., 156
Schwartz, N. F., 66
Schwartz, R. W., 119
Scott, B., 186
Scott, C. O., 44
Scott, M., 151
Seaford, H. W., Jr., 66
Seale, L. M., 47
Searle, R. G., 91, 98, 118
Sears, C. W., 66, 69, 104, 106
Sebasky, G., 79, 113, 130
Seckel, E., 66
Seeger, C. M., 14, 48, 66, 68
Seeley, G. W., 115

- Seely, C., 147
Seeman, J. M., 133
Seeman, J. S., 104
Seid, R., 133, 135
Seidenstein, S., 104
Seifert, D. J., 102, 104, 110, 118, 125, 133, 139
Selan, J. L., 144
Self, H. C., 60, 64, 68, 71, 78, 87, 88, 102, 104, 105, 119, 120, 133, 134, 191
Seltzer, L. J., 68
Selvaraj, J., 148, 151, 176, 206
Senders, J., 26, 50, 58, 68
Senders, V. L., 10, 26, 42, 68
Senter, R. J., 105
Serfaty, D., 156, 166
Serio, F. P., 61
Seum, C. S., 102, 110
Shafer, L., 24
Shao, K. C., 173
Shapero, A., 68, 69
Sharits, T., 143
Sharp, E., 37, 69, 105, 108, 109, 143, 163, 164, 201
Sharp, R., 143
Sharp, W. N., 88
Shaw, R. L., 164
Sheibenberger, D., 131
Shelef, S., 178
Shellar, K., 130
Shelly, M. W., 46, 57, 59, 66
Shepherd, D. S., 191
Sherertz, P. C., 55
Sherman, H., 39
Shettel, H. H., 47
Shew, R. L., 178, 185, 186
Shim, I. H., 106
Shinar, D., 79
Shingledecker, C. A., 118, 132, 134
Shipley, M., 143
Shirachi, D. K., 134
Shmulovich, J., 145, 191
Shoenberger, R. W., 50, 106
Shogner, R. C., 185
Sidorsky, R. C., 34, 62
Sidowski, J. B., 69
Siegel, A. I., 106
Sigal, C. W., 139
Sigl, J. C., 152
Simon, C. W., 14, 26, 72
Simons, J., 61, 69, 80, 91, 106, 117, 134, 152, 164, 185, 191, 192
Sinacori, J. B., 148
Sinnett, J. M., 96, 124
Skandis, R. J., 128
Skeen, J. R., 62
Skelly, J. J., 134, 135, 164, 185, 192, 205
Skowronski, V., 158
Sliney, D. H., 132
Slivinske, A. J., 5, 17, 25, 27, 62
Slocum, G. K., 62
Slote, L., 43
Slusher, W. M., 192
Sluzky, E., 158
Smedley, D. C., 123, 135
Smith, A. K., 54
Smith, B. A., 115
Smith, B. J., 27
Smith, E. A., 106
Smith, F. H., 104
Smith, J. L., 144, 192
Smith, K. E., 145
Smith, R. L., 106, 107
Smith, S. L., 192
Smith, S. W., 132
Smith, W. M., 20, 21, 27
Smithson, J. E., 27
Smode, A. F., 66
Snell, M. K., 118, 157, 192
Snow, C. C., 139
Snyder, D. E., 158, 160, 177, 188, 192, 193, 206
Snyder, H. L., 107, 113, 114, 121, 132, 135, 136, 185, 186
Snyder, M. S., 114, 136
Snyder, R. G., 107
So, R. H. Y., 193
Sobel, A., 156, 169, 193
Soergel, C. D., 185
Sommer, A., 132
Sorensen, R. A., 107
Souder, M. E., 123
Southard, J. F., 69, 86, 103, 104
Sowards, A., 26
Soxman, E. J., 107
Spickard, W. A., 64
Spicuzza, R. J., 121, 131
Spragg, S. D. S., 27, 28, 69
Spravka, J. J., 163, 169, 193
St. John, R. J., 160, 185, 193
Stadler, J., 143
Stanard, T., 159
Stanke, E. C., 145
Stanny, R. R., 186
Stark, L. W., 132
Stec, L. J., 118
Steedman, W. C., 35, 36, 69, 73, 107, 110
Steele, J. E., 44
Steffen, L. E., 55
Stein, W., 174
Steinberg, L., 87
Stengel, J. D., 193
Stenson, H. H., 92, 95, 107, 108
Stephas, S. C., 39
Stephens, B. R., 193
Stephens, M. W., 108
Stern, F., 17
Stern, I. D., 19
Stern, J., 135, 193
Stiffler, J., 161, 193
Stilson, D. W., 41
Stockman, G. C., 135
Stoffregen, T. A., 193
Stokes, A., 201
Stollings, M. N., 143, 180
Stone, F. L., 185
Stoner, L. D., 108
Storey, B., 143, 151, 193, 194

- Stoudt, H., 44
Stouffer, J. R., 108
Stratton, M. D., 155, 198
Strayer, D. L., 194
Stroud, J. W., 59
Strout, J., 182
Strub, M. H., 108, 174
Stump, N. E., 28, 38
Stump, W., 168, 189
Sullivan, C., 203
Summers, W. C., 123
Susnik, R. M., 166
Sutton, R., 174
Swain, A. D., 6
Swain, R., 205
Swartz, W. F., 62
Sweeney, M., 143
Swierenga, S. J., 147, 148, 178, 194, 197
Swinehart, R., 158
Switzer, S. A., 60, 69, 82, 101
Swonigan, T. T., 169
Tabory, L., 30
Takahama, M., 186
Talcott, D., 105
Targove, B. D., 135
Task, H. L., 78, 108, 115, 119, 127, 132, 134, 135, 136, 137, 144, 145, 155, 165, 167, 177, 181, 183, 186, 194, 195
Tate, J. D., 69
Taylor, D. F., 136
Taylor, H. R., 132
Taylor, K., 182
Taylor, M., 158
Taylor, T. G., 145, 148, 191
Teall, T. A., 195
Tebbetts, I., 113, 128, 137
Teichner, W. H., 28
Tenney, R. R., 205, 206
Thackray, R. I., 50, 70, 108
Thibos, L. N., 201
Thom, R., 148
Thomas, J., 147
Thomas, J. O., 62
Thomas, R. E., 70
Thomson, R. M., 45
Thorburn, D. E., 93, 108
Thordsen, L., 97, 108
Tieber, J. A., 98
Todd, R. E., 172
Tolcott, M. A., 195
Tomashefski, J. F., 84
Toms, M. L., 152, 195
Topmiller, D. A., 43, 70, 71, 78, 103, 108, 109, 117, 137
Touchstone, R. M., 50, 72, 110
Travis, R. C., 28
Treadaway, D. K., 181
Trimmier, J. R., 185, 190
Truett, B., 37, 42, 45
Tsang, P. S., 195, 198
Tsou, B., 143, 145, 148, 151, 161, 163, 190, 195, 196
Tucker, P. E., 81
Tumey, D., 180, 196
Turner, L., 71
Turner, S., 192
Tutin, M. B., 122, 137
U'Ren, R. M., 6
Ullsperger, P., 148, 205
Unger R. A., 174
Unger, S. E., 145, 152
Urban, K. E., 166, 183, 196
Valencia, G., 149, 196, 197
Van Ausdall, B. A., 60, 71
Van Breda, L., 174
Van Buskirk, R. C., 71
Van Cott, H. P., 71
Van Saun, H. R., 28
Vanderplas, J. M., 10, 19, 28, 29, 36, 65, 71
Vanderveer, D. E., 164, 200
Vannier, M. W., 145
Vannoy, J., 101, 109
Van Orden, K. F., 186
Vargo, C. G., 197
Veghte, J., 139
Venturino, M., 182, 197, 200, 201, 206
Ver Hulst, J., 35, 59
Verdi, A. P., 109
Vergamini, P. L., 58, 66
Verona, R. W., 136, 137
Versace, J., 66, 71
Vicinus, J. H., 71
Vidulich, M., 147, 151, 158, 190, 195, 197, 198
Vikmanis, M. M., 124, 137, 169, 199
Vitale, P. A., 39
Vogel, E., 197
Vollmerhausen, R. H., 148
Volpe, G. T., 106
Vorst, L. A., 98
Vukobratovich, D., 115
Wade, E. A., 6
Wade, J. E., 48, 71
Waggoner, C. E., 71
Walk, D. E., 71, 106, 109
Walker, J. L., 143, 196
Walker, R. Y., 16, 18
Wallace, M. R., 143
Wallis, R. A., 38, 39, 55
Wallquist, D., 125, 137
Waltensperger, M., 148
Walton, D. M., 44
Warch, P., 199
Ward, F., 137
Ward, G. F., 198
Ward, S. L., 115, 123, 138, 148
Warr, D., 199
Warren, C. E., 18, 29
Warren, D., 44
Warren, R., 118, 138, 153, 157, 159, 166, 172, 182, 186, 192, 199, 206
Warrick, M. J., 16, 29, 30, 48, 53, 68, 71, 109
Wartluft, D., 79, 109, 110, 113, 115, 138
Wasicko, R. J., 110
Watkins, W. H., 110
Watson, H., 199
Weaver, M. D., 160

- Webb, I. B., 10, 34, 68
Webb, J. M., 201
Wei, K. C., 138
Weinstock, S., 39
Weir, D. H., 66
Weiss, R., 71
Weisz, A., 11
Weisz, A. Z., 110
Weizman, F., 52
Welch, J. C., 71
Wellens, A. R., 148, 176, 193, 199, 200, 202
Wells, C. H., 200
Wells, M. J., 162, 182, 197, 200, 201
Wells, W., 200
Werner, D. S., 10
Wertheim, A. H., 199
Wescott, H. W., 36
Wessell, N. Y., 11
Westland, R. A., 106, 107
Wetherell, A., 156
Wheeler, K., 86
Wheeler, L. , Jr., 13
Whitaker, R., 148, 151, 177
White, B. C., 30
White, R. M., 110
White, R. W., 143
White, W. J., 10, 30, 71
Whiteley, J. D., 171, 177, 186, 201
Whitestone, J., 145, 188, 201
Whitsett, C. E., 71
Wickens, C. D., 153, 158, 201
Wickens, D. D., 12
Widdel, H., 201
Wiederholt, B. J., 151
Wiegand, K. L., 72
Wiener, E. L., 72
Wienke, R. E., 72, 110
Wigby, J. I., 106
Wightman, F., 201
Wilcox, L. R., 30
Wiley, L., 193, 201
Wilford, G. M., 201
Wilkinson, M. O., 201
Williams, A. C., Jr., 16, 72
Williams, G. S., 106
Williams, J. I., 138
Williams, W. E., 84
Williams, W. L., 110
Wilson, C. L., 30
Wilson, D., 137, 145, 152, 158, 160, 169, 170, 172, 201, 202
Wilson, G., 134, 135, 138, 144, 146, 148, 155, 156, 161, 178, 180, 182, 186, 192, 198, 202, 203, 204, 205, 206
Wilson, L., 138
Wilson, S. E., 36
Wilson, W., 119
Wing, J., 45, 55, 72, 110
Wing, S., 55
Winner, R. N., 72
Wise, H. G. , Jr., 30
Wittenberg, A. M., 145, 205
Wittman, W. T., 205
Woessner, W. M., 178, 181
Wohl, J. G., 166, 205, 206
Wojtyna, R. J., 87
Wolf, E., 72
Wolf, J. J., 81, 106
Wolfe, F. J., 24
Wolpert, L., 206
Wolpin, M. P., 39
Wombolt, L. F., 104
Woodhull, J. G., 62
Woodruff, K. R., 127
Woodward, R. A., 101
Worrall, Sheryl H., 12
Wortman, D. B., 102, 110, 118., 133, 139
Wright, G. O., 73
Wright, K. A., 86
Wright, N. A., 148
Wulfeck, J. W., 11, 28, 30, 69
Wunsh, E., 201
Wyckoff, L. B., 5, 30
Wysong, M., 147
Yates, R., 139
Yolton, R. L., 206
Young, D. D., 84
Young, J. W., 81, 115, 122, 139
Young, K. D., 30
Young, M. F., 206
Yu, C., 139
Zacharias, G. L., 139, 140, 160, 206
Zaff, B., 148, 151, 176, 177, 190, 192, 193, 206
Zaitzeff, L. P., 143
Zajowski, M. M., 84
Zamarin, D. M., 110
Zappanti, A. J., 79
Zawodny, T. L., 201
Zehner, G., 122, 139, 140, 173, 177, 187, 188, 193, 207
Zeigen, R. S., 33, 45, 73
Zeskind, R. M., 116
Zhaner, C. F., 65
Zigler, M. J., 72
Zilgalvis, A., 72, 88
Zimmerman, G., 207
Zingg, J. J., 118
Zink, D. L., 53, 57, 73, 110
Zirkler, D. J., 178
Zobel, A. R., 195