

# At Your Service--Results of the Readership Survey

PAMELA C. DAY AND JAMES T. WEBB

“How may I help you?”, “At your service”, “May I take your order, please?” These are all phrases we are used to hearing in customer-oriented scenarios. At the Aerospace Medical Association, you--the members--are the customers and we need to know how we can serve you. And unless we occasionally ask you, the member, what your opinion is, any efforts on our part to improve are likely to fall short of the mark. What value do you receive as a member of the Aerospace Medical Association? ...As a reader of *Aviation, Space, and Environmental Medicine*? We recently sent a membership survey to all of our members and hope to gain further insights into how we can improve the association and member benefits.

In November 2005, we sent a web-based Readership Survey to 1,000 of AsMA's members; 260 e-mails bounced(!) and about 150 of you actually responded (15%). By comparison, in 1999 we sent out 2,922 surveys by mail and received 154 returns via fax or mail (5.3% response rate)! Back in 1994, when we used a \$1 incentive and a reply envelope, we received 520 usable responses out of 1,000 sent (52%). That says something about the power of the almighty dollar!

Though we must be cautious in drawing too many conclusions from such a small response, the survey certainly gives the journal staff and your executive committee valuable insight into your wishes and reading habits as we seek to improve the journal and our other means of communication, most notably the website.

The Readership Survey indicates that *Aviation, Space, and Environmental Medicine* is going in the right general direction with most of the features and articles, with one important caveat - there is always room for improvement. And our respondents were very willing to provide suggestions as to how to make that happen.

Here are some highlights from the survey responses.

We are predominantly a medical organization with 79% indicating they have an M.D. degree (Table I) and 74% listing physician as their primary job (Table II). Nearly one-third have been members for more than 15 years. The ratio of U.S. to international members who responded was 2:1 (2/3 U.S. to 1/3 international) versus 3:1 for actual membership.

While 45% of all respondents read every issue of ASEM, 92% have an excellent or good overall opinion of the journal. Two-thirds (64%) feel the writing quality is good and 25% excellent and only 6% are not satisfied with the Research Articles. The most popular segment of the journal is the "You're the Flight Surgeon" section.

There are 64% who feel the relevance of ASEM articles to their work is good or excellent (Table III).

Over half are willing to pay for the CD project, which is now proceeding. We will soon be able to offer 77 years of aerospace medicine articles in a CD set.

Interestingly, many felt that the journal would be more professional if the news portion were moved online only; however, many also felt that this would decrease its value to them as readers. It was pretty equal between those who want it both online and in the journal (as we do now) vs. those who want it online only. Although 12% indicated they would rather have the AsMA News as a separate printed newsletter--NOT included in the journal, only one of the individuals with that answer was willing to pay extra for it--funny how when a good idea has a price, it ceases to be such a good idea!

More people find the online journal valuable than have actually used it--hopefully that means that many more of you will begin to use the online journal, now that it is available free with your membership.

Most (81%) have visited the website recently and the majority found it very easy or at least somewhat easy to

TABLE I. DEGREES HELD BY RESPONDENTS (2 HIGHEST).

	Response (%)	Response Total
Medical Doctor, M.D., D.O., or equivalent	79%	87
Ph.D. or equivalent without above 1	14%	15
Baccalaureate, Masters or equivalent	6%	7
Total Respondents		110

TABLE II. CURRENT JOB TITLE AS SPECIFIED BY RESPONDENT.

	Response (%)	Response Total
Physician	73%	81
Researcher	7%	8
Human Factors Professional	6%	7
Administrator/Manager	3%	3
Physiologist	3%	3
Nurse	0%	0
Biomedical Engineer	0%	0
Other (please specify)	8%	9
Total Respondents		111

From the Aerospace Medical Association, Alexandria, VA.  
Address reprint requests to: The Aerospace Medical Association, 320 S. Henry St., Alexandria, VA 22314; www.asma.org.  
Reprint & Copyright © by Aerospace Medical Association, Alexandria, VA.

find what they were looking for. This is good news for those of us who have been working to update information and make it more accessible to our membership.

Many participants took the time to complete several important open-ended questions, giving AsMA valuable suggestions for the future. We have already begun to address some of your concerns and suggestions. For example, we are reprinting case reports from the Federal Air Surgeon's Bulletin in an effort to provide more clinical material; we will be printing historical photographs as space allows; the journal is now very easy to access online through the Members Home page on the website and has a search engine through Ingenta; we are even working on a new journal cover!

One perception that causes some concern is that using the website doesn't matter because everything that is important is printed in the journal. How many of our members feel this way? Since the advent of the online journal

we have been posting supplemental material such as long tables, questionnaires, and color graphics, online only through Ingenta. In addition, our AsMA website has evolved in recent years to become our most valuable resource for communicating all things related to the Association. There are links to the journal online and Editorial Manager, the manuscript submission and review site. We publish our bylaws, minutes, our directory of members (we stopped publishing a printed directory in 2000!), our committees and reports, mentorship, job postings, registration and membership forms, meeting information, member announcements and news, and links to constituent organizations and the abstract

submission site. We no longer put everything in the journal, so unless you use the website, you are missing out on much of what we have to offer!

Again, AsMA thanks all of you who participated in this survey. After all, this is your organization!

**TABLE III. RESULTS REGARDING READING HABITS AND OVERALL OPINION OF JOURNAL (Number of Responses/Total Responses).**

- 45% read every issue of ASEM (52/115)
- 30% have an excellent overall impression of ASEM (31/115)
- 62% have a good overall impression of ASEM (40/115)
- 25% feel the quality of writing in ASEM is excellent (28/113)
- 64% feel the quality of writing in ASEM is good (72/113)
- 64% feel the relevance of ASEM articles to their work is good or excellent (72/113)
- 22% are very satisfied with the Research Articles (25/113)
- 50% are satisfied with the Research Articles (57/113)
- 22% are neutral regarding satisfaction with the Research Articles (25/113)

Most read portions of ASEM:

- 46% read You're the Flight Surgeon every issue (52/115)
- 44% read Clinical Medicine/Case Reports every issue (50/114)
- 40% read Review Articles every issue (46/115)
- 40% read Research Article/s every issue (46/115)
- 37% read President's Page every issue (42/115)
- 35% read News of Members every issue (40/115)
- 34% read Medical News every issue (39/115)
- 33% read Short Communications every issue (37/112)

# President's Page

---

Those of us living in temperate climates look forward to the beginning of Spring with new life and growth, and a renewed hope for the future. The buds on the trees burst open and we enjoy the beauty of the blossom and the new flowers. The new growth is ephemeral as the blossom fades, but we observe maturing nature as life moves forward.

Sometimes I think this is analogous to the election of a new President and Executive Committee, with new hope and ideas and a fresh approach to the governance of our association. However, the analogy stops before we meet Autumn and the onset of dreary Winter, because each President hands on to the next just as those early plans and ideas are maturing. So I feel that we are somewhere in the mid Summer of my Presidential vision as I hand over the reigns to the very capable hands of Dr. Richard Jennings.

It has been a great privilege and a pleasure to serve as your President. But as I have said many times during the year, the President does not function in isolation.

The day-to-day activities of the Association depend on the work of Dr. Russell Rayman and his team at the Home Office, and I wish to publicly acknowledge the work they do on behalf of us all.

I have been fortunate to be supported by an outstanding Executive Committee. The flow of new ideas and the willingness to challenge what and how we do things has been breathtaking. Many changes have been made to process and administration, all the time driven by my mantra of communication being the life-blood of any organisation. You are probably not aware of many of the processes which have evolved, but I hope it will be seen in an improvement to the services delivered to the membership. There has been no 'big bang', but rather a gradual evolution which I know will continue.



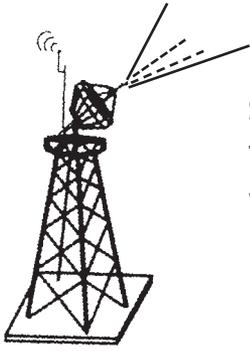
**Michael Bagshaw, M.B., B.Ch.**

Behind the scenes, we have reviewed many aspects of our finances, including paying off the mortgage on our headquarters building and reviewing our investment strategy to gain improved returns. I wish to pay tribute to Dr. James DeVoll, chairman of the Finance Committee, for seeing through the work begun by his predecessor Dr. Robert Weien (now vice-president for member services).

Vice-presidents Dr. Dan Callan and Dr. James Webb have done an inordinate amount of work in reviewing processes and procedures, supporting President-elect Dr. Richard Jennings in ensuring appropriate governance of the organisation. The journal is now available on-line free to all members, and we will soon have available a CD containing all the past issues.

Finally I wish to acknowledge the drive and energy of Vice-president Andy Bellenkes who has worked so hard with Dr. Warren Silberman in seeking the cause and solution for our declining membership.

For me it has been a great year, but there is still much left to do. I thank you for your support and friendship; now over to you Dr. Jennings.



## Science & Technology Watch

### Keeping You Informed Of The Latest Advances In Science And Technology

\*\*\*\*\*

*Although best known for its application in distinguishing wake from sleep, recently the wrist-mounted actigraph has been applied to other fundamental questions of human physiology. Advances in actigraph technology have enabled capture of fine motor biovibrations previously unrecognized. This month's Watch will briefly review the history of wrist-mounted actigraphy and discuss emerging advanced actigraphy technology and applications.*

\*\*\*\*\*

## Digital Signal Processing Actigraphy

M. Russo<sup>1</sup>, A. Vo<sup>2</sup>, R. Conlan<sup>3</sup>, D. Redmond<sup>2</sup>

<sup>1</sup>United States Army Aeromedical Research Laboratory, Fort Rucker, AL; <sup>2</sup>Comprehensive Neurosciences Program, Uniform Services University of the Health Sciences, Bethesda, MD / Henry M. Jackson Foundation for the Advancement of Military Medicine, Rockville, MD; <sup>3</sup>Precision Control Design, Inc., Fort Walton Beach, FL

The application of human body accelerometry by using miniature motion sensors to study the macro- (gross) and micro- (barely discernible) motor activities associated with human motion is termed actigraphy. Actigraphy was originally developed in the 1920s to objectively measure and quantify sleep based on body movements. The first such study was performed by Szymansky (10), who constructed a device that was sensitive to the gross body movements of subjects as they lay in bed.

In the 1970s and 1980s, wrist-mounted accelerometers were developed that made long-term portable measurement and recording of movement data feasible (6). An early pilot study to address validation issues was conducted by Kripke, et al. (5). Using five normal subjects, excellent agreement was reported ( $r = 0.98$ ) between actigraphically-derived, manually-scored and polysomnographically-determined measures of sleep duration. Webster, et al. (11) published the first algorithm that could be used to automatically score wrist-mounted actigraphic data. They determined a correlation of 85% between conventional polysomnography and actigraphically-scored sleep and demonstrated the utility of the actigraph for ambulatory monitoring.

Current conventional actigraph design represents an optimization of past technology based on two key considerations: 1.) consistent reliability of the output data (counts of threshold crossings) as input for the detection

of sleep/wake state transitions using validated weighted moving average algorithms such as that of Cole, et al. (2); and 2.) small size, low weight and power requirements, computational capacity, and other electrical and electronic features realizable as a user-accepted device of reasonable cost.

This optimization produces very sharp and deliberate limitations of the information originally contained in the movement signal and passed on to the scoring algorithm. As discussed in Redmond and Hegge (6), there are four main areas of design constraint:

1. The sensitivity of the sensor must be such as to respond to "normal" arm movements, but not be overwhelmed by the waking movements of a very active person, or by sources of external noise and vibration. In conventional actigraphy, information from very fine, subtle movement is sacrificed.

2. The frequency response of the conventional accelerometric sensor system is sharply confined to a band of 2 to 3 cycles per second (Hz). At the low end, this is to eliminate counts from slow-wave excursions of the sensor (e.g., due to breathing or vehicle motion). At frequencies above 3 Hz, this response helps eliminate false counts due to tremor and vibration.

3. The translation of a complex movement signal into threshold-crossing counts eliminated signal characteristics such as duration, amplitude, and power.

4. The use of 1- or 2-min memory bins keeps data sets down to workable length in electronic memory and matches the temporal scale expected by validated sleep/wake algorithms, but this integration of sensor data over time smoothes over potentially useful physiologic data, such as both rhythmic signals (e.g., tremor) and transient bursts of sensor activity (aperiodic movements).

The wrist-mounted actigraph was redesigned in the early 1990s to permit the automated setting of alternate sensitivities (high [gain = 26] and low [gain = 5]), counting thresholds (high [24 mV] and low [6 mV]), and frequency response bands (0.1 to 1 Hz, 0.1 to 3 Hz, 0.1 to 9 Hz, 2 to 3 Hz, and 2 to 9 Hz). The design intent was to allow investigation of varied settings (or information content), while normal usage emulated the original, standardized settings.

Elsmore, et al. (3) compared the varied wrist-mounted actigraphy settings against polysomnographically (PSG) scored sleep. Their report confirmed agreement with PSG sleep in the range of 79% to 93% for standard wrist-actigraph settings, using both Cole and Sadeh algorithms. However, the authors found that the broad-band frequency settings (0.1 to 3 or 9 Hz) and the low threshold setting produced such high counts in sleep as to render the standard sleep-scoring algorithms useless.

That experience and others reported by Kelly, et al. (4), point again to a fundamental limitation when using the wrist-mounted actigraph to explore outside the bounds of optimization. The chosen settings for gain, threshold, and passband are arbitrary, with no means of readily adjusting them for comparison's sake while controlling for movement characteristics.

A general-purpose ballistic wrist-mounted actigraph, one that will work across a broad range of signal waveforms, has recently been used to detect and quantify physiological microvibration characteristics. This wrist-

mounted Advanced Digital Signal Processing (DSP) actigraph (PCD, Inc., Fort Walton Beach, Florida) allows recording and characterization of individual movements and patterns of movements without destroying the information contained within them. Such features as duration, waveshape, amplitude, and component frequencies may be used to describe movements as they occur. These features may be saved and analyzed in relation to sleep, fatigue, exposure to neuro-motor toxins, or specific environmental conditions.

Digital signal processing technology attempts to utilize detailed accelerometric information which had previously been discarded. For example, current studies are demonstrating very low-level respiratory and ballistographic signatures (8, 9). Low frequency breathing movements from analysis of the signal within a 0.1 to 3 Hz bandwidth are seen. Ballistocardiobursts follow electrocardiographic signals by several milliseconds in synchronized tracings. The time-linked relationship indicates consistency between the chest-recorded cardiac-generated electrical signals and the wrist-recorded flow-generated pulse waves. The flow-generated pulse waves often appear in the shape of a "W," possibly reflecting soft tissue oscillation. Ablation of both cardioballistic and respiratory signals is apparent when the heart and ventilation are stopped during coronary bypass surgery. The return of the W-wave may be seen when cardiopulmonary bypass is terminated and the heart begins beating again.

Motion signals are captured along a range of frequencies, referred to as the bandpass. When the bandpass filters are configured to record motion in the 0.1 to 9 Hz frequency range, and sensitivity is maximized, the actigraph registers non-zero counts continuously, so long as the device is being worn. This activity may be considered a lifesigns signal, and may be related to the microvibrations described by Rohracher (7). According to Rohracher, a low-level tremor occurs in the frequency band of 7.5 to 12.5 Hz, and is readily detected by actigraphy. Bircher, et al. (1) considered that alterations in these micro-tremors may be related to body stress levels. The hypothesis of Russo, et al. (8) is that these microvibrations may be the peripherally measured motion associated with rhythmic physiologic activities. The largest component of this lifesigns signal is the heartbeat, with lesser contributions from gastrointestinal, respiration, and skeletal muscle activities. As such, this signal may be an essential indicator of life. Data from a study conducted at Walter Reed Army Medical Center (9) demonstrate that life and death can be differentiated using actigraph output.

The ballistic actigraph accomplishes the high-resolution capture of motion data through an array of high order Butterworth filters, variable rate sampler, A/D conversion, and storage in a large flash memory.

The DSP actigraph has virtually seismic sensitivity. It can detect human motion from about 0.2 to 14 Hz. When the DSP actigraph is near a major pulse or breathing site (the wrist is not one of these sites) and body motion is not too severe, heartbeat and breathing sequences can be detected 100's of times during a night of sleep. PCD, Inc. uses these lifesigns signals as parameters to detect "off wrist," an important factor in the application of wrist-mounted actigraphy towards performance and

See SCI-TECH WATCH, p. 566

# This Month in Aerospace Medicine History-- May 2006

By Walter Dalitsch III, M.D., M.P.H.

## Seventy-five Years Ago

*Annual Scientific Meeting location and usual travel discounts:* "The Aero Medical Association will hold its 1931 meeting in Kansas City, Missouri. While it is the policy of this Association to hold its meetings whenever possible in connection with the National Air Races or some other outstanding aeronautical event, this year such an arrangement did not appear to be advisable. The National Air Races are to be held at Cleveland, Ohio. In view of the fact that our last meeting was held in Chicago and the previous one in Detroit, the Council felt that it would be very unfair to our members in other sections of the country to hold the meeting this year in the same general locality as the two previous meetings..."

"Railroad representatives have assured us if 125 or more attend the meeting that we will have the advantage of the usual reduced railroad rates. There will be a special program for ladies attending the meeting. Headquarters of the Association will be established in the President Hotel. Further details will be sent to each member as soon as they are decided. In the meantime, it is hoped that everyone will make special plans to attend this meeting" (7).

*First stratospheric flight:* On May 27, 1931, Swiss physicist Auguste Piccard and his flying companion Charles Knipfer departed from Augsburg, Germany, in a balloon, becoming the first humans to fly into the stratosphere. In their 17-hour flight, they ultimately reached a height of 51,793 feet. After descent, the balloon landed near Innsbruck, Austria, on the surface of a glacier (10).

## Fifty Years Ago

*Can medical personnel keep up with the complexities of space flight?* "Space flight is the subject of intensive study today by military services and private organizations. Of more immediate interest to us is their research into the effects on the human body of the upper edge of the troposphere and part of the stratosphere. These altitudes, between 40,000 and 100,000 feet, are receiving the concerted attention of our best scientific and military minds. Surprisingly, some of the problems are greater than in interplanetary space flight, for the skin friction created by high speed aircraft flying through the atmosphere causes severe heat problems and necessitates cooling the pilot. In addition, during ejection, provision must be made to protect the escaping air crewman from wind blast, which at supersonic speeds is one of the most deadly perils for man, together with the deceleration forces to which he is subjected when ejected. It is realized that these problems would also apply to a space vehicle during its course through the atmosphere, but they are more pertinent to the military aircraft of today. The complexity of these difficulties increases as the speed and ceiling of aircraft constantly increase, and there is a grim race by the aviation industry and its medical personnel to keep pace with the requirements" (9).

*Weightlessness and the otoliths:* "In space flight, the state of zero-gravity will prevail... In this case changes in motion or acceleration will not occur, but the gravireceptors may be

in a state of stimulation, noticeable or subliminal. Moreover, if there is no sensation of motion and acceleration, the gravireceptors of the labyrinth and the peripherally located mechanoreceptors are more probably not stimulated at all. This is what actually happens in the weightless state: Practically all of our subjects reported sensations of rest or 'floating'; a few persons observed sensations of motion during the transition phase. This seems to indicate that in the first case the otoliths do not register in spite of the fact that the subject is moving toward the center of the earth with an acceleration of 9.81 meters per second, per second; and that in the second case they may discharge impulses at a rate which is characteristic for weightlessness" (3).

*Monkeys, then men, then large manned satellites:* "In the important research area of space medicine, future satellites will be indispensable tools of experimentation. They will carry small animals into space first, just as animals and not men have made the pioneer rides in existing research rockets. But no one is equipped to tell at this time when man himself will venture into space. Yet, whether we live to see it or not, we are now going ahead to prepare for this day. Like the modest satellites we have on our drawing boards, a big manned satellite will find its primary use as a research tool for advancement of the earth sciences. For a long time to come, our own planet will remain the prime goal of space flight" (5).

*So what exactly is aviation medicine?* "Aviation medicine - A branch of medicine concerned with the study, prevention, cure, or alleviation of diseases or other bodily ailments arising from conditions encountered in, or brought on by, aviation... Aviation medicine is used as an inclusive term embracing both aeromedicine (in its restricted sense) and space medicine" (8).

## Twenty-five Years Ago

The Annual Meeting: The Fifty-Second Annual Scientific Meeting of the Aerospace Medical Association was held from May 3 through May 7, 1981, at the Convention Center in San Antonio, TX.

*Can an accident-prone pilot be identified?* (U.S. Naval Safety Center, Naval Air Station, Norfolk, VA): "Flight activity of all aviators flying naval aircraft and aircraft accident data were analyzed to determine if pilots having pilot factor accidents early in their careers exhibit higher future accident liability than aviators who do not. The results showed that the aviators who had accidents in their first 1,000 h had a higher subsequent accident potential than pilots who did not. The actual number of pilots who had more than one accident was, however, relatively small, and the significance level was 0.19" (1).

*Emerging technologies: an ear oximeter* (Department of Pulmonary Disease, USAF Medical Center, Scott Air Force Base, IL): "The Hewlett-Packard 47201 Ear Oximeter was evaluated to determine the feasibility of its use aboard aircraft. At altitudes up to 2438 m (8000 ft), there was no significant difference between the mean predicted percent saturation of hemoglobin and the measured percent saturation in 25 non-smokers (94.6 ± 1.9 vs. 94.1 ± 2.4; p>0.10) and 20 smokers (94.9 ± 1.8 vs. 94.2 ± 2.5; p>0.10). The accuracy of the oximeter readings on five individuals was further confirmed with a blood gas analyzer aboard the aircraft. We conclude that the ear

oximeter is accurate and reliable for monitoring patients during flights" (2).

*Heat stress in the pilots of the F-4 (USAF School of Aerospace Medicine, Brooks AFB, TX and RAF Institute of Aviation Medicine, Farnborough, Hampshire, England):* "Heat stress can be a serious problem in aircraft flown at low altitudes in warm-to-hot environments. Data are reported here on 36 flights by F-4 aircraft at Eglin AFB, FL. Ground dry-bulb temperatures (Tdb,g) were 19-33°C (mean 28°C) with psychrometric wet-bulb temperatures (Twb) 14-24°C (mean 20°C). Environmental and physiological data were recorded in both front and rear cockpits at 2-min intervals throughout each mission, which simulated low-level ground attack and lasted 94-126 min. Data were analyzed for four phases, A) preflight taxi, B) low-level flight, C) ordnance delivery, and D) postflight taxi. Cockpit dry-bulb temperature (Tdb,c) exceeded Tdb,g during ground operations; the front cockpit cooled in flight, while the rear remained hot. Linear relationships appeared for Tdb,c vs. Tdb,g in the four mission phases, and for globe temperature vs. Tdb,c. Aircrew mean skin temperature was significantly related to Tdb,c, and core (ear canal) temperature rose slightly with heat stress. Sweat rates reflected both Tdb,c and clothing worn." (6)

*Vision, the vestibule, and visual displays* (Naval Aerospace Medical Research Laboratory, Naval Air Station Pensacola, FL): "Legibility of a head-fixed display and visual suppression of the vestibulo-ocular reflex (VOR) were found to be superior when vestibular stimuli and optokinetic stimuli were of like direction (i.e. would produce the same direction of nystagmus) and inferior when they were opposite in direction. Velocities (relating to the head) or peripheral optokinetic stimuli ranging between -18°/s and +180°/s interacted effectively with vestibular stimuli to influence visibility of a head-fixed display. This indicates that peripheral optokinetic stimulation can influence visual suppression of the VOR at velocities that far surpass effective production of optokinetic nystagmus" (4).

## REFERENCES

1. Borowsky MS. Dual accident pilots in naval aircraft. *Aviat Space Environ Med* 1981; 52(5):310-1.
2. Cissik JH, Yockey CC, Byrd RB. Evaluation of the Hewlett-Packard Ear Oximeter for use during routine air transport of patients. *Aviat Space Environ Med* 1981; 52(5):312-4.
3. Gerathewohl SJ. Personal experiences during short periods of weightlessness reported by sixteen subjects. *Acta Astronaut* 1956; 2.
4. Guedry FE Jr, Lentz JM, Jell RM, Norman JW. Visual-vestibular interactions: the directional component of visual background movement. *Aviat Space Environ Med* 1981; 52(5): 304-9.
5. Haber H. Space satellites - Tools of earth research. *National Geographic Magazine* 1956 (Apr).
6. Nunneley SA, Stribley RF, Allan JR. Heat stress in front and rear cockpits of F-4 aircraft. *Aviat Space Environ Med* 1981; 52(5):287-90.
7. The third annual meeting of the Aero Medical Association. *J Aviat Med* 1931; 2 (1):66.
8. United States Air Force Dictionary, 1956.
9. Walker TW. The challenge of space flight. *The Project Engineer* 1956 (May).
10. [www.infoplease.com/ipa/A0004537.html](http://www.infoplease.com/ipa/A0004537.html)

SCI TECH WATCH, from p. 564.

fatigue modeling. The data is then digitized and stored in a flash data card.

The real science begins with the flash data file. This file of waveform samples is chronologically arranged in real time. Depending on the type of experiment conducted, it is common to see a classic time series emerge - breathing waveform modulating a heart waveform directly from the longitudinal data file. By using Fourier transforms or wavelet analyses, frequency domain plots clearly show heart and breath frequencies standing out from random movement.

The advances in technology discussed above permit application of wrist-mounted actigraphy to identification of subtle physiologic motor signals, thereby extending actigraph utility. As uses of wrist-mounted actigraphy continue to expand beyond wake-sleep determination, Digital Signal Processing actigraphy will most likely play an increasingly prominent role in clinical and operational settings.

#### Department of Defense Disclaimer

Citations of commercial organizations and trade names in this report do not constitute an official Department of the Army endorsement or approval of the products or services of these organizations. The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the Department of the Army or the Department of Defense.

#### REFERENCES

1. Bircher M, Kohl J, Nigg B, Koller EA. The microvibrations of the body, an index for examination stress. *Euro J App Phys* 1978; 39:99-109.
2. Cole RJ, Kripke, DF, Gruen W, et al. Automatic sleep/wake identification from wrist actigraphy. *Sleep* 1992; 15:461-9.
3. Elsmore TF, Naitoh P. Monitoring of activity with a wrist worn actigraph: effects of amplifier passband and threshold variations. San Diego: Naval Health Research Center; 1993; Technical Report 93-18.
4. Kelly TL, Ryman DH, Schlangen K, et al. The effects of a single dose of pemoline on performance and mood during sleep deprivation. *Mil Psych* 1997; 9:213-25.
5. Kripke DF, Mullaney DJ, Messin S, Wyborney VG. Wrist actigraphic measures of sleep and rhythms. *Electroenceph Clin Neurophys* 1978; 44:674-6.
6. Redmond DP, Hegge FW. Observations on the design and specifications of a wrist-worn human activity monitoring system. *Behav Res Met Instr Comp* 1985; 17:659-69.
7. Rohrachter H. Permanente rhythmische Mikrobewegungen des Warmbluter-Organismus ("Microvibration"). *Naturwissenschaften* 1962; 49:145-9.
8. Russo M, Vo A, Labutta R, et al. Human biovibrations: assessment of human life signs, motor activity and cognitive performance using actigraphy. *Aviat Space Environ Med* 2005; 76 (7, Suppl.):C64-74
9. Russo M, Vo A, Labutta R, et al. Human microvibration patterns during coma to death transition differ from sleep, as measured by actigraphy. *J Sleep Res* 2004; 13(s1):1-832.
10. Szymansky JS. Aktivitaet und ruhe bei den menschen. *Z Angew Psychology* 1922; 20:192-222.
11. Webster JB, Kripke DF, Messin S, et al. An activity-based sleep monitor system for ambulatory use. *Sleep* 1982; 5:189-99.

The AsMA Science and Technology Committee provide this Science and Technology Watch Column as a forum to introduce and discuss a variety of topics involving all aspects of civil and military aerospace medicine. The Watch can accommodate up to three columns of text, which may include a figure or picture to illustrate your concept.

Please send your submissions and comments via e-mail to: [barry.shender@navy.mil](mailto:barry.shender@navy.mil)  
You can retrieve your favorite copies of previous Watch columns at the AsMA website ([www.asma.org](http://www.asma.org)). Open the link under Publications for the Aviation, Space and Environmental Medicine page and click on AsMA News.

### MIT Detector May Speed Up Interplanetary Communications

CAMBRIDGE, Mass.--MIT researchers have developed a tiny light detector that may allow for super-fast broadband communications over interplanetary distances. Currently, even still images from other planets are difficult to retrieve.

"It can take hours with the existing wireless radio frequency technology to get useful scientific information back from Mars to Earth. But an optical link can do that thousands of times faster," said Karl Berggren, assistant professor in the Department of Electrical Engineering and Computer Science (EECS). Berggren, who is also affiliated with the Research Laboratory of Electronics (RLE), developed the detector with colleagues from the RLE, Lincoln Laboratory and Moscow State Pedagogical University.

The new detector improves the detection efficiency to 57% at a wavelength of 1,550 nanometers (billionths of a meter), the same wavelength used by optical fibers that carry broadband signals to offices and homes today. That's nearly three times the current detector efficiency of 20%. The result will be real-time collection of large amounts of data from space. The work may ultimately permit the transmission of color video between astronauts or equipment in outer space and scientists on Earth.

The detector, which uses nanowires and superconductor technology, can sense extremely low light or laser signals in the infrared part of the optical spectrum -- down to a single photon, the smallest and most basic unit of light. That has not been possible using conventional optical systems.

Berggren and his colleagues published their discovery in the January 23 issue of *Optics Express*. The researchers are now working to make the detector even more efficient.

This work was funded in part by the U.S. Air Force.

For further information contact: Elizabeth A. Thomson, MIT News Office, 617-258-5402; [thomson@mit.edu](mailto:thomson@mit.edu); [web.mit.edu/newsoffice/www](http://web.mit.edu/newsoffice/www).

#### AsMA MENTORSHIP PROGRAM

AsMA has a Mentorship Program for our younger members. Go to our website and click on "Members Login." At the Member Home page, click on Mentorship Program. You can sign up as a Mentor or Mentee, or view Participating Mentors.

### AsMA Future Meetings

May 14-18, 2006  
Caribe Royale Hotel  
Orlando, FL

May 13-17, 2007  
Sheraton and Marriott Hotels  
New Orleans

May 11-15, 2008  
Sheraton and Hilton Hotels  
Boston, MA

### MEETINGS CALENDAR 2006

**September 10-14, 2006, Bangalore, India.** 54th International Congress of Aviation and Space Medicine. This meeting is being hosted by the Indian Society of Aerospace Medicine. A preliminary registration form may be found at <http://www.isam-india.org/conference44/newreg.php>.

**October 16-20, 2006, Moscow, Russia.** 5th International Scientific and Practical Congress. For more info, please call Mr. Valentin Vlasov at 095-953-5842, or Mrs. Dina Valeeva or Mrs. Natalia Mitrokhina at phone/fax 095-239-9851; or e-mail [medic@mak.ru](mailto:medic@mak.ru), attn: Mr. Vlasov V.D. or e-mail [infan.ltd@relcom.ru](mailto:infan.ltd@relcom.ru), attn: Mr. Gabbasov I.Z.; or by fax at 095-953-3508.

**October 23-25, 2006, Reno, NV.** SAFE Association 44th Annual Symposium. For more info: Ms. Jeani Benton, (541) 895-3012; [safe@peak.org](mailto:safe@peak.org); [www.safeassociation.org](http://www.safeassociation.org).

**November 9-12, 2006, Eilat, Israel.** Air Travel and Health. This symposium will deal with flight physiology and a wide array of health issues in air travelers. For more info, visit [www.palexconventions.co.il/ath2006](http://www.palexconventions.co.il/ath2006).

**April 22-26, 2007, Dayton, OH.** International Symposium on Aviation Psychology: "Airspace as a Cognitive System." For more info, visit [www.wright.edu/isap](http://www.wright.edu/isap).

### SAFE Call for Papers

SAFE has issued a call for papers, panels, workshop, briefings, demonstrations & open forums for its upcoming 44th Annual Symposium. The Symposium will be held October 23-25, 2006 at the Reno Hilton Hotel, Reno, NV.

**The Deadline for entries is June 30, 2006.** The SAFE symposium is the premier international showcase for the professionals, inventors, equipment, and systems that have shaped safety in aviation, space, land, and military disciplines. Tentative areas of discovery include: Commercial and Military Crash Safety; NBC Protection; Acceleration; Altitude; Ejection; Life Support Systems; NTSB & FAA Accident Investigation; Human Factors; Biodynamics & Physiology; Hearing Protection; Homeland Security; and many more.

All abstracts must be submitted electronically to the SAFE Office at [safe@peak.org](mailto:safe@peak.org). To receive a form for submission contact SAFE Association, P.O.Box 130, Creswell, OR 97426; (541)895-3012; [safe@peak.org](mailto:safe@peak.org).

Send information for publication on this page to: **Susan Northrup, M.D.**  
snorthrup63@earthlink.net

Get ready for the Third Annual CAMA Sunday from 8:00 am to noon, May 14th, 2006 at the Caribe Royale Hotel! We cordially invite all individuals attending the Aerospace Medical Association Scientific Meeting to attend. It is FREE and a great way to interact with the regulators from several countries. The title of the session is Evidence-Based Medical Certification: An International Challenge. The projected speakers are listed in the box below.

The CAMA luncheon will be on Monday the 15th of May in the Caribe Royale as well. Our speaker will be Frederick E. Tilton, M.D., FAA Federal Air Surgeon. His topic will be Aviation Medical Goals and Objectives. Tickets are available via pre-registration or at the ticket booth in Registration. Tickets go fast, so buy early! Last year we had to turn several people away at the door. We hope to see you there!

In addition, CAMA hosts an annual scien-

tific meeting in October dedicated to current civilian aviation medicine clinical topics. This year the meeting will be in Ottawa, Canada. There will be over 20 hours of CME with an international flavor and opportunities to see some of the local sites. Meeting details will be available as they develop at the CAMA website: <http://www.civilavmed.com/>

CAMA welcomes questions about our organization and stands ready to assist with civilian aviation medical issues. Feel free to contact us via our web site or at:

**CAMA Headquarters**  
P.O. Box 23864  
Oklahoma City, OK 73123  
Phone: (405) 840-0199  
Fax: (405) 848-1053  
Email: [Jimlharris@aol.com](mailto:Jimlharris@aol.com)

We look forward to seeing you in Orlando!

## Evidence-Based Medical Certification: An International Challenge

Speaker	Topic	Hours/minutes
Jack Hastings	Introduction	0:06
Dave Bryman CAMA President	Moderator/Introductions (2 minutes per speaker to open/close each presentation)	0:14
Jorg Siedenbug	JAA	0:30
Sally Evans	UK	0:30
Dougal Watson	New Zealand	0:30
Hugh O'Neill	Canada	0:30
Fred Tilton	FAA	0:30
Tony Evans	ICAO	0:30
Panel Discussion	All Speakers	0:37
Questions Interactive Audience Participation		
Closing Statement	Bryman/Hastings	0:03

## ISAP 2007 Call for Proposals

You are invited to participate in the continuation of the International Symposium on Aviation Psychology to be held in Dayton, OH, April 22-26, 2007. The theme for this symposium is "Airspace as a Cognitive System." Proposals are sought for papers, sessions, workshops, panels, or posters to be presented in any of the major topics in the field including cockpit and air traffic control design, crew management, cognitive processes, physiological factors, stress and fatigue, communication, cultural factors, simulation, pilot selection and/or training, etc. We are also interested in proposals for a small number of sessions directed at human performance in domains other than aviation, to the extent that generalizations from or to the aviation domain are relevant (e.g., medicine, highway safety, supervisory control, etc.).

One-page proposals describing your presentation should be e-mailed to Richard

Jensen, Program Chair, at [rjensen@core.com](mailto:rjensen@core.com). Panel or full session proposals should include a one-page description, plus a list of potential contributors and the e-mail address for each. Your proposal must include the title, your name, full postal address, phone number, and e-mail address (and that of all authors). Please check our website at [www.wright.edu/isap](http://www.wright.edu/isap) for the exact format for proposals. The deadline for proposals is July 31, 2006.

## FREE Online Journal

The online version of *Aviation, Space, and Environmental Medicine* is now available to Members for FREE. Simply go to [www.asma.org](http://www.asma.org), log into the Member Home page, and follow the link to the online journal, available through Ingenta.

## The Aerospace Physiology Society Luncheon & Social

**AsPS Luncheon:** The annual Aerospace Physiology Society Luncheon will be held on Wednesday May 17th at 12:00. Mr. Scot Best from Naval Air Systems Command (NAVAIRSYSCOM) will deliver the Smith Ames Lecture. Mr. Best is currently the Lead Crew Systems Engineer for the V-22 Osprey Program at NAVAIR.

**Evening Social:** The Physiology Society will hold an evening social on Wednesday, 17 May at 18:00 at Friday's Front Row restaurant located on International Drive in Orlando. Dinner features a buffet menu including salad, baked ziti, Italian sausage, garlic-marinated chicken, vegetables, rolls, soft drinks, and dessert. There will be a cash bar available. Space is limited and tickets will be on sale at the Society information table. Cost is \$25 for Society members and \$30 for nonmembers.

## AsPS Member Benefits

*The outstanding network potential and the chance to gain knowledge from the field's top minds.*

*The opportunity to take part in forums for the integration and utilization of experts in many diverse professional fields. Our members have shared their expertise in multinational and multi-service working groups for altitude effects, acceleration, spatial disorientation, passenger and patient transport, and human factors.*

*The opportunity to recognize scientific achievement in the field of aerospace physiology. There are three Society awards presented each year.*

*The chance to contribute to the success and quality of the annual AsMA conference. The Society's Education and Training Day has been one of the most widely attended sessions during the annual conference. Membership is only \$10. For more information, please contact Joe Essex at [joseph.essex@navy.mil](mailto:joseph.essex@navy.mil), or write to:*

LCDR Joe Essex, MSC, USN  
BLDG 2272 Suite 345  
47123 Buse Rd  
Patuxent River, MD 20670

Send information for publication on this page to:  
**Dale Orford**  
15516 E Acacia Way,  
Fountain Hills, AZ 85268  
480-837-7919; dorford@cox.net

## From Caterpillars to Butterflies

by Jo Ivan

As each of the members of the WING starts to experience "empty nest syndrome," we look for other venues, such as community service, hobbies, and philanthropic work to fill those empty spaces. Empty nests can be filled with anything from all day kindergartners to college bound students, to finally retiring from the "paid" work force. For me, personally, "Dress for Success, San Antonio (DFSSA)," has been the spirit lifting gift I found to fill the void of one less person in the house. Their motto is "From Suits to Self-Sufficiency"...but personally, I believe it should be "From Caterpillars to Butterflies"!!

Dress for Success (DFS) was founded in 1996 by a New York woman who had received a small inheritance of \$3000. She developed DFS in her own home basement, but it has expanded rapidly and now has affiliates in 73 cities which also include 9 locations outside of the U.S. DFSSA is a local non-profit agency which provides free economic, social, and professional development and clothing to low-income women transitioning from public assistance to the workforce, hence the motto - from suits to self-sufficiency. DFS must rely on the San Antonio community in order to sustain their operations; including financial contributions, donations of clothing, and volunteer hours. They do not receive funding from Dress for Success Worldwide.

Who is eligible for services? Women who are job-ready, at or below poverty level, and transitioning from public assistance to the workforce are eligible for services. DFSSA served approximately 400 low income women each year in 2003 and 2004. Currently, more than 5,000 San Antonio area women have benefited from DFSSA services.

What assistance is provided? Each client receives a professional outfit for a job interview, work-appropriate clothing when she gets a job, and continued professional wardrobe development through the Professional Women's Group (PWG). In addition to providing women with suitable professional attire, DFSSA helps clients to develop the professional and personal skills that increase self-esteem and employment potential. Trained professional staff and volunteers are able to provide personalized one-on-one assistance to DFSSA clients based on their individual needs.

How to attain services? Clients are referred by non-profit and governmental organizations working with low-income women, such as AARP, the Battered Women's Shelter, and the Texas Workforce Centers.

What is the Professional Women's Group (PWG)? As hard as it is to get a job, it is often harder to keep the job. The PWG is a networking, support group exclusively for clients of DFSSA. Each meeting consists of networking and training; an expert from the community discusses topics such as financial literacy,

career development, parenting, goal setting, communication, or work/life balance. Members of PWG are invited to "shop" in the DFS boutique to continue to build upon their professional wardrobe. The Dress for Success "boutique" in DFSSA consists of a large open cinder block space deep in the bowels of Crossroads Mall, where the doors are always locked behind us so the DFSSA clients can have a better sense of safety and security as many have been sequestered from abusive relationships and they now are attempting to create a life of their own.

I have had the personal privilege of being one of their speakers at a PWG meeting as a home based business proprietor. We talked about wardrobe coordination and creation, sources for inexpensive accessories, as well as taking the time to create a packaged look that is consistent for a professional woman. The group ranged in age from 18 to 60 and they each walked away with a gift of confidence knowing they have all the right ingredients; they just needed to know how to package it.

On a personal level, this has been one of the most rewarding experiences of my life. I have shed many tears as I watch these women walk out the door with a swagger they did not have when they walked through this portal. To watch the self esteem and confidence of a woman who entered the agency with drooped shoulders, unable to have eye contact and the weight of the world upon her, and then to see her emerge from that cocoon of desperation to become this butterfly who now knows she looks beautiful and confident and job worthy. How does she actually know that? It is because we reassure her, repeatedly, confidently and sincerely. They have actually walked out the door, giddy with the anticipation of "strutting their stuff" in the public work force in a way that will make employers stand up and take notice of this qualified, talented human being that stands now before them.

We at the Wing are a privileged group. We have had careers which have given us skills and confidence. We lead a comfortable lifestyle which is not shared by a large portion of our society. My personal need was to be able to give back to this community, these

women, who have nurtured spouses and children, taken wrong paths or been abused or just made bad decisions. They deserve second, third, even fourth chances to make their world right. It is such a feeling of empowerment to encourage them to go forward and meet these challenges with the confidence and professional skills of a professional woman.

## Meet Nonja Bisgard

Nonja grew up in Cincinnati, OH, before attending Northwestern University where she obtained both her undergraduate and master's degrees in chemistry. It was there that she met her husband, Cris, in Dr. Perry's religion class. Dr. Perry married them in the University's chapel, but being an absent minded professor, he was an hour late for the service. Says Nonja, "The women came to see if I had shown up and the men checked on Cris, while the organist went through her repertoire several times. Cris's grandmother had a stroke and went to the ER. She did well, but we went to the hospital after the ceremony and missed the reception." A memorable wedding to be sure!

The Bisgards currently live in Seattle, WA, which Nonja says is their 26th move. Their youngest daughter, Erika, moved there first, then when Cris retired, he and Nonja followed. Says Nonja, "We love the scenery, the weather and the relaxed life style. We have the same amount of rain as in Chicago. We just have misty days instead of deluges."

"We have two daughters. Erika is an inside sales rep for Philips ultrasound equipment here. Our other daughter, Kirsten, works in marketing for Avaya in New Jersey and has three children, Alexa, Noah, and Josh. We have a Siamese/mix kitty, Quiggs. He was a rescue and we never changed his name.

"I have been a research chemist and a teacher of chemistry and physics. My favorite job was teaching at San Francisco State University. I have also been a real estate agent. Now that I am retired I can indulge my interest in watercolor painting.

"I have been a member of the Wing for many years. Helen Lestage and I did membership in the 80's. I was treasurer for 2 years and did arrangements for the Atlanta meeting in 1996. I truly enjoy seeing people at the meetings and maintaining friendships over the years. Wing members have the luxury of having friends all over the world."



Nonja Bisgard and Jennifer Faulkner in Alaska.



## Join the Wing!

Dues are \$20 per year. For further information, contact:

Judy Waring, 4127 Kenyon St.,  
Seattle, WA 98136; (206) 933-0884; e-mail:  
judywaring@comcast.net

Send information for publication on this page to: **Corporate News**  
**Aerospace Medical Association**  
320 S. Henry Street  
Alexandria, VA 22314-3579

## NEWS OF CORPORATE MEMBERS

### ETC Announces NASTAR Center

Environmental Tectonics Corporation (ETC) has recently expanded the Tactical Flight Simulation and Aviation Training and Research Center capabilities to include space tourist and traveler training. The Center has been renamed the National AeroSpace Training and Research (NASTAR) Center. It will open in January 2007 and will offer a complete range of aviation training and research support as well as space training services. The NASTAR Center will provide world-class aviation training and research support for military and civil aviation and space travel / tourism.

The Center will offer state-of-the-art equipment and professional instructors to train military and commercial pilots and crews in how to cope with the effects of tactical flight operations (military air crews), high G exposure (military fighter and aerobatic pilots), altitude exposure, spatial disorientation, aircraft upsets and recoveries, night vision and night vision goggle operations (military and paramilitary aircrew), and loss of situational awareness. For space travelers, the NASTAR Center will offer training in how to cope with the effects of sustained elevated G exposure, altitude exposure, and spatial disorientation. Unlike air travel today, space travelers/tourists will need to be physiologically screened and will further need specialized training to help them cope with the physiological stress that they will encounter.

The NASTAR Center will house such aerospace training and research equipment as the ATFS-400 Authentic Tactical Flight Simulator; GYROLAB GL-2000 Advanced Spatial Disorientation Trainer; a hypobaric chamber; and a night vision and night vision goggle training system.

#### Focus on Corporate Member:

### SpecPro Becomes Corporate Member of AsMA

SpecPro, Inc., an Alaskan Native corporation with over 16 years of professional service specializing in Engineering and Technical Services, Information Management Services, and Environmental Services, recently became a Corporate Member of the Aerospace Medical Association (AsMA). They provide survivability and vulnerability analysis and systems engineering to government and private industry. SpecPro's staff have a wide range of technical and academic credentials with numerous industry and government professional registrations and certifications. Their goal is to always maintain positive customer and community relations while emphasizing the "SpecPro Advantage." SpecPro's current clients include the U.S. Army, Air Force, Navy, Drug Enforcement Agency, Department of Energy, Environmental Protection Agency, U.S. Army Corps of Engineers, and Department of Agriculture.

SpecPro's parent company is Bristol Bay Native Corporation (BBNC), which was

### ETC's ADMS to be Demonstrated at AsMA Conference

ETC Simulation's Advanced Disaster Management Simulator, ADMS, will be demonstrated at the AsMA Conference on Wednesday, May 17th from 9 a.m. to 5 p.m. every hour on the hour. Room location info will be posted at registration.

ADMS simulates emergency incidents such as terrorist acts, Weapons of Mass Destruction, hazardous material spills, multi-vehicle road accidents, fires, and natural disasters. ADMS simultaneously trains entire response teams in the four C's of disaster management: Command, Control, Coordination, and Communication. ADMS authentically simulates the dynamic elements of the environment (people, vehicles, threats) that are significant in a disaster situation, and the outcomes of actions taken provide authentic feedback, resulting in real skill building. For over a decade, ADMS has been in use at U.S. Airports and major fire-fighting and emergency response training facilities worldwide, and is an industry-proven and mature solution for optimal emergency preparedness. For more info, visit [www.ADMSTraining.com](http://www.ADMSTraining.com).

**About ETC:** For more than 37 years, ETC's pioneering technologies have created training solutions for the most rigorous stresses encountered during high performance aircraft flight including effects of altitude exposure, high G exposure, spatial disorientation, and escape from a disabled aircraft. ETC will now provide solutions for travel into the next frontier...space.

formed under the Alaska Native Claims Settlement Act of December 18, 1971. It is made up of 7,300 shareholders who are Eskimo, Indian, and Aleut. The Bristol Bay region is 150 miles southwest of Anchorage, AK, and is 40,000 square miles in size.

SpecPro, along with TerraHealth Inc., won the Department of Defense's (DoD) Nunn-Perry Award in 2005 for their achievements in the Mentor-Protege Program. The team was also selected to give a presentation entitled "Elements of a Successful Agreement" during the March Mentor-Protege conference held in Orlando, FL. The Nunn-Perry Award recognizes mentor and protege companies that achieve cost efficiencies, enhance technical capabilities, and increase small business opportunities for DoD prime contracts and subcontracts.

### Lockheed Martin's Undersea Systems Wins DoD Award

Lockheed Martin's Undersea Systems business, in Manassas, VA, and M & M Technical Services, Inc., of Woodbridge, VA, have been named joint-recipients of the Department of

Defense Mentor-Protégé Program's 2006 Nunn-Perry Award. The Mentor-Protégé Program encourages large defense contractors to develop the technical capabilities of small, disadvantaged businesses and to enable organizations employing the severely disabled to compete more effectively for defense-related work. The Nunn-Perry Award, honoring former U.S. Sen. Sam Nunn and former Secretary of Defense William Perry, recognizes outstanding mentor-protégé teams which excel in technical developments and cost efficiencies, as well as increase business opportunities for small, disadvantaged firms.

Lockheed Martin and M & M Technical Services began their Mentor-Protégé relationship in 2003. M & M Technical Services is a small business that provides a variety of information systems and engineering services. Initiated in 1991, the Department of Defense's Mentor-Protégé Program has served hundreds of large corporations and small businesses as a positive, constructive, and useful means for building stronger business relationships, elevating small business firms to a higher level, transferring technology, and fulfilling the supply needs of the nation's military. The Nunn-Perry Award recognizing mentor-protégé teams was first presented in 1995.

#### About Lockheed Martin

Headquartered in Bethesda, MD, Lockheed Martin employs about 135,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services.

### AOPA Works for General Aviation Tax Exemptions

AOPA is working with lawmakers in four states to show them that an exemption from sales and use taxes for aviation-related services, sales, and equipment is a good idea—not only for pilots and aircraft owners, but also for the states' economies. State officials in Connecticut and Illinois are considering bills that would exempt aircraft and parts from sales and use tax. Meanwhile, in Kentucky, a measure would exempt personal aircraft from local property taxation as well as the state's sales and use tax. AOPA is working with legislators in Mississippi to extend a sales tax exemption on repairs and services to general aviation (GA) aircraft. The bill originally applied to all aircraft, but an amendment restricted it to those used for foreign or interstate transportation.

#### About AOPA

With a membership base of more than 400,000, or two-thirds of all pilots in the United States, AOPA is the largest, most influential aviation association in the world. AOPA has achieved its prominent position through effective advocacy, enlightened leadership, technical competence, and hard work. AOPA provides member services that range from representation at the federal, state, and local levels to legal services, advice, and other assistance.

## Baxter Commences Phase II Adult Stem Cell Trial in U.S.

Baxter Healthcare Corporation recently announced that it has initiated the first human Phase II adult stem cell therapy trial in the U.S. designed to investigate the efficacy, tolerability, and safety of blood-derived selected CD34+ stem cells to improve symptoms and clinical outcomes in patients with chronic myocardial ischemia (CMI), a severe form of coronary artery disease. CMI is a serious heart condition that involves narrowing of coronary arteries and results in limited blood flow to the heart, affecting hundreds of thousands of new patients each year. This prospective, randomized, double-blind, placebo-controlled, multi-center study will involve approximately 150 adult patients who are currently on maximal medical therapy and are not suitable candidates for conventional procedures to improve blood flow to the heart, such as angioplasty, stents, or coronary artery bypass surgery.

Douglas Losordo, M.D., chief of cardiovascular research at Caritas St. Elizabeth's Medical Center in Boston, is the principal investigator of his institution's Phase I trial. While data from this multi-center trial have not been fully analyzed, researchers are encouraged by preliminary anecdotal patient reports. Of the 24 total study subjects, 16 reported feeling better with reductions in chest pain and improved exercise capacity during the early stage of the trial. Though not sufficiently powered to demonstrate efficacy, these promising results led directly to Baxter's decision to sponsor the Phase II trial. Dr. Losordo will be the lead investigator of the Phase II study.

### About Baxter Healthcare

Baxter Healthcare Corporation is the principal U.S. operating subsidiary of Baxter International Inc. Baxter International Inc., through its subsidiaries, assists healthcare professionals and their patients with treatment of complex medical conditions, including cancer, hemophilia, immune disorders, kidney disease, and trauma. The company applies its expertise in medical devices, pharmaceuticals, and biotechnology to make a meaningful difference in patients' lives. For more information about Baxter, please visit [www.baxter.com](http://www.baxter.com).

## Mayo Collaboration Discovery in How Cell Sorting Works

Mayo Clinic researchers, with collaborators from Utah, have identified the workings of a new component in the protein-sorting system — the system that determines which cellular proteins are saved, recycled, or destroyed. These outcomes profoundly impact cell growth and behavior, and possibly the infection process from retroviruses such as HIV. Knowing where the missteps can occur in the cell's regulation of sorting is the first move toward designing new and better therapies that can prevent or reverse diseases as diverse as cancer, heart disease, and AIDS.

Optimal cell surface conditions promote correct functioning, efficiency and productivity. When cells function correctly they maintain health; when they malfunction they create errors that can lead to disease. The Mayo Clinic team has now identified the role of a

previously poorly understood player in a key sorting process cells use. This player is called Vta1. The Mayo Clinic discoveries were made with the use of an increasingly common "model organism" in molecular biology labs: the single-celled yeast, which has the same basic compartmented cell structure as human cells and also shares some key genes with humans. The Mayo Clinic collaboration discovered the following aspects about the role of Vta1 in cell sorting events:

Vta1 acts on Vps4 to promote proper removal of a group of proteins — called ESCRT — late in the protein-sorting process. To activate Vps4, Vta1 works via an identifiable region located at the end of its structure — which acts as sort of an accelerator for the sorting process. Moreover, these accelerator regions for Vps4 are found not only in yeast, but also in organisms as diverse as a member of the mustard plant family, in rats and in humans. Vta1 performed these sorting and activating roles using purified protein in a test tube and in living organisms. This is important because it shows that findings in isolation in a tube translate into the complex biology of the whole organism. In cell cultures, the team performed experiments in which Vta1 was deleted and compared those results to experiments when Vta1 was intact. Defective cell sorting resulted when Vta1 was deleted but proceeded normally in the presence of Vta1.

### About Mayo Clinic

Mayo Clinic is the first and largest integrated group practice in the world. Doctors from every medical specialty work together to care for patients, joined by common systems and a philosophy of "the needs of the patient come first." More than 2,500 physicians and scientists and 42,000 allied health staff work at the original clinic in Rochester, Minn., and newer clinics in Jacksonville, Fla., and Scottsdale/Phoenix, Ariz. Collectively, the three clinics treat more than half a million people each year.

## UTMB Researchers Probe Insect Flight Muscles

Using an instrument able to manipulate single molecules with unprecedented precision, researchers at the University of Texas Medical Branch at Galveston (UTMB) have made the first direct measurements of the mechanical properties of the muscle proteins that help insects fly. UTMB associate professor of neuroscience and cell biology Andres Oberhauser and UTMB graduate student Tzintuni Garcia collaborated on the research with scientists from the University of Oxford, the universities of Heidelberg and Muenster, and the European Molecular Biology Laboratory.

The insect proteins, dubbed "projectin" and "kettin," are members of a protein family known as the titins, which includes proteins found in human muscle. Tiny defects in human titins, caused by mutations at single points in their genetic code, have been linked to congenital heart and kidney disorders. Recent studies have shown that the titins are also capable of sensing forces applied to the body and releasing signals that affect genes linked to muscle growth.

The UTMB researchers probed projectin and kettin with a custom-built atomic force microscope. The device uses a gold-coated

glass tip about 2,000 times smaller than the point of a pin to pick up single protein molecules. It then stretches and compresses them like miniature springs to directly measure tiny changes in elasticity that correspond to the unfolding and refolding of different parts of the protein. Information gained from this and similar experiments may greatly advance scientists' understanding of the basic problem of protein folding—the process by which a linear chain of hundreds or thousands of amino acids spontaneously assembles itself into the proper shape to do a specific job in a living organism.

Single-molecule studies of titin proteins could yield critical insights into the way genetic mutations alter protein shapes to produce such disorders as hypertrophic cardiomyopathy (excessive thickness of the heart muscle), polycystic kidney disease, and tibial muscular dystrophy, as well as titin's role as a force-sensitive signaling "switchboard" for cells. Beyond titin, Oberhauser said, the technique holds promise as a tool for studying protein misfolding disorders like Alzheimer's disease and mad cow disease. It could also serve as a source of crucial data for computer models of protein folding, a key tool for rational drug design.

### About UTMB

The mission of UTMB at Galveston is to provide scholarly teaching, innovative scientific investigation, and state-of-the-art patient care in a learning environment to better the health of society. UTMB's education programs enable the state's talented individuals to become outstanding practitioners, teachers, and investigators in the health care sciences, thereby meeting the needs of the people of Texas and its national and international neighbors. UTMB's comprehensive primary, specialty, and sub-specialty care clinical programs support the educational mission and are committed to the health and well-being of all Texans through the delivery of state-of-the-art preventive, diagnostic, and treatment services.

Want to see Your  
Company's News  
Printed Here?

Become a Corporate  
Member of AsMA!

#### Benefits include:

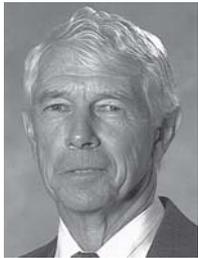
- Link from our website to yours
- Subscription to AsMA's Journal
- Special news section in this journal
- Advertising discount in journal
- Exhibit space discount at AsMA's Annual Scientific Meeting
- Registration discount at Annual Scientific Meeting

For information on becoming a Corporate Member, please call Gloria Carter at (703)739-2240, ext. 106, [gcarter@asma.org](mailto:gcarter@asma.org); or Dr. Marian Sides at [mb-sides3@myexcel.com](mailto:mb-sides3@myexcel.com)

Send information for publication on this page to: **News of Members**  
**Aerospace Medical Association**  
**320 S. Henry Street**  
**Alexandria, VA 22314-3579**  
**pday@asma.org**

**In Memoriam**  
**John W. Frazier**

John W. Frazier, Wilmington, OH, died in March at the age of 69, after a short battle with cancer. Mr. Frazier was an active member of AsMA and was instrumental in nominating our association to the Aviation Hall of Fame in 2004. He was a true friend to the Association and we will miss seeing him at our annual meetings.



Mr. Frazier was a 1954 graduate of Wilmington High School and a 1971 graduate of Wilmington College. He began a distinguished 43-year career with Wright-Patterson AFB, OH, in 1956. By the time he had retired, John had had some level of involvement with nearly every centrifuge experiment run at WPAFB during a 40-year period, including the selection of the original project Mercury astronauts in the 1950s. An expert in the field of flight physiology, John authored or co-authored more than 60 publications in the area of acceleration and its effects on pilot performance and safety.

Mr. Frazier's research with acceleration protection equipment, especially the anti-G valve, resulted in improvements to this ensemble, which helped save pilots' lives. His pioneering research in human performance and restraint systems in the multi-acceleration axes environment helped establish safety criteria for life support equipment for U.S. Department of Defense and space applications. Many of his research findings are being used today around the world to better protect high performance aircraft pilots and astronauts. In addition to being a world class researcher, Mr. Frazier also served as a test subject in numerous centrifuge experiments including being tied for the record for highest G level exposure at 16.5 Gx, longest G exposure (3 Gz for 1 hour), and an exposure to 3 Gz for 60 minutes to define long term duration tolerance to gravity effects on physical performance. In 1993, he collaborated with University of Texas researchers in collecting the first known full body motion data on a revolving centrifuge for mathematical modeling applications.

He was a Fellow of the Aerospace Medical Association, a member of the Aerospace Physiology Society, Space Medicine Branch, Aerospace Human Factors Association, Life Sciences and Biomedical Engineering Branch, and a Chapter past president of SAFE.

Highlights of John's distinguished career include receiving the Armstrong Laboratory highest scientific honor in 1989—the Harry G. Armstrong Award; the Aerospace Physiology Society's Paul Bert Award, also in 1989; the SAFE Chapter Senior Scientist and President's Awards; the 1996 Eric Liljencrantz Award for his 40 years of contributions in the field of

**Journal CME/MOC Notice**

Beginning this summer, AsMA will begin a new feature that accredits certain articles published in *Aviation, Space, and Environmental Medicine* for Continuing Medical Education (CME) and Maintenance of Certification (MOC). Three articles will be selected every issue for which there will be questions. Physicians desiring CME/MOC must answer the questions on a form and submit it with payment to the Home Office. The Home Office will grade the questions and archive CME/MOC credit. This means a physician can accumulate a maximum of 33 hours of CME/MOC each year. (Because the March issue contains only abstracts of the Annual Scientific Meeting, only 11 issues will have questions.) Specific instructions will accompany each accredited article.

**Russell B. Rayman, M.D.**  
**Executive Director**

sustained acceleration research for high performance aircraft and spaceflight; and a final retirement acknowledgement letter from President Bill Clinton.

Following his "retirement," John was active in the community as a tennis coach and part time professor at Wilmington College, a driver for Wilmington City Cab, a consultant on various aerospace projects, and as coach of the Stacey's softball team.

**Obituary Listing**

**Andres I. Karstens, M.D.**, College Place, WA, passed away on March 16. He joined AsMA in 1950. He became a Fellow in 1961. He was an aviation medical examiner and was certified in Aerospace Medicine.

**New Members**

- Andrews, Bruce, CPT, USA, DeLeon Springs, FL
- Bowen, Thomas W., Yuba City, CA
- Bradford, John P., Burlington, ON, Canada
- Butcher, Janus D., M.D., Daluth, MN
- Campbell, Rebekah A., Paris, TX
- Coupe, George H., D.O., P.A., Clearwater, FL
- Dillon, Jade E., M.D., Denver, CO

- Elkins, Amanda N., B.S., Clemson, SC
- Evans, James R., M.D., Arlington, VA
- Higgins, Dianne L., M.D., M.P.H., Minden, NV
- Hirayanagi, Kaname, Ph.D., Tokyo, Japan
- Kovats, Peter B., Lt.Col., USAF, MC, San Antonio, TX
- Mann, William F., M.D., Pensacola, FL
- Mantell, Susan K., MAJ, MC, USA, Sidney, IL
- Mejia, Alexandra, Captain, M.D., Houston, TX
- Moffitt, Gary L., M.D., Lowell, AR
- Moye, Stanley J., M.D., Albany, GA
- Peterson, John E., D.O., Blue Springs, MO
- Piotrowski, Anastasia M., 2LT, USA, MC, Grovetown, GA
- Porcher, Carole G., R.N., League City, TX
- Porges, Carlos R., Psy.D., ABPP, Orlando, FL
- Rettig, Laurae D., M.D., South Bend, IN
- Rivero, Luis R., MAJ, MC, USA, Pensacola, FL
- Seoane, Sergio, M.D., Bartow, FL
- Stroud, Kenneth J., Ph.D., Seabrook, TX
- Woltz, John W., D.O., Logan, OH
- Wong, Jason D., LCDR, MC, USN, Jacksonville, FL
- Wright, Kurt A., M.D., Ann Arbor, MI

**Remember!**

AsMA Council Meetings and Business Meetings are open to all members of the AsMA. The next Council meeting will be on May 14, 2006, in Orlando, FL.

The Annual Business Meeting will be May 16, 2006, in Orlando, FL. Lunch is optional.

Your input and attendance at both meetings are always welcome. Please come and participate in your Association.

Want to see Your News Printed Here and Online?  
 Send an e-mail to  
**pday@asma.org** or  
**rtrigg@asma.org**

This publication is available in microform from ProQuest

ProQuest  
 300 N. Zeeb Rd, PO Box 1346,  
 Ann Arbor, MI 48106-1346.  
 www.proquest.com

**INDEX TO ADVERTISERS**

Aerospace Medical Association  
 Corporate Members . . . . .572  
 Information for Authors . .Cover III  
 Membership Application . . . . .ii  
 ETC . . . . .Cover IV

## Corporate and Sustaining Members of the Aerospace Medical Association



*The financial resources of individual members alone cannot sustain the Association's pursuit of its broad national goals and objectives. Its 77-year history is documented by innumerable medical contributions toward flying health and safety that have become daily expectations by the world's entire flying population—commercial, military, and private aviation. However, support from private and industrial sources is essential. The following organizations, who share the Association's objectives or have benefited from its past or current activities, have affirmed their support of the Association through Corporate Membership.*

Aeromedic Innovations	International Federation of Air Line Pilots Associations
Air Canada	Japan Airlines
Aircraft Owners and Pilots Association	Korean Air Force Safety Center (AFSC)
Air Line Pilots Association	Lockheed Martin Corporation
AirSep Corporation	Martin-Baker Aircraft Company Ltd.
American Airlines	Mayo Clinic Aerospace Medicine
Autoflug Libelle GmbH	MedAire, Inc.
Aviation Medicine Center at the University of Texas Medical Branch	Pilot Medical Solutions
Baxter Healthcare Corporation	Sanofi-Aventis Pharmaceuticals
Carleton Life Support Systems Inc.	SpecPro, Inc.
David Clark Company, Inc.	United Airlines
Education Enterprises, Inc.	United States Aviation Underwriters
Environmental Tectonics Corporation	Universities Space Research Association (USRA)
Essilor of America/Varilux	Harvey W. Watt & Company
Gentex Corporation	Wyle Laboratories, Inc.