Orbiter

The Official Newsletter of the Aerospace Medicine Student and Resident Organization

Message from the President

by Alex Garbino, President

I wish you all a successful 2010. The year promises to be a busy one for aerospace. The US Space Program is poised for major changes, commercial space access is rapidly coming over the horizon, suborbital flights are planned for the near future, and the first "commercial astronauts" are undergoing training. The aerospace community has been debating various FAA regulatory changes, in particular fatigue management measures in cockpits. Last year, for example, the FAA began allowing pilots to nap in cockpits started last year following a series of incidents in which pilots fell asleep. This topic promises to be a topic of discussion at AsMA's Annual Meeting.

This year's meeting will be in Phoenix, Arizona, on the 9th -13th of May. I encourage all of you to attend, and AMSRO will be having a table to welcome all of you – more details in the next issue. This year had a great turnout in scholarships – a total of five scholarships were available this year to students and residents. This is thanks to our increased visibility at the meetings and council – when organizations hear about us, they are happy to help. This means that we really need to make ourselves seen and heard in Phoenix this year! As always, check www.amsro.org for the most up to date list of scholarships (none are limited exclusively for travel to the Annual AsMA meeting).

Finally, we are also ramping up our Mentorship Program to help connect students and residents with various specialists in the field. The AsMA website already has a database in which you can input your information and interests. The database automatically attempts to connect you to a mentor. Additionally, AMSRO is working with mentors and mentees on a case-by-case basis, to connect you to a particular mentor or specialty you are interested with. Regardless of which approach you take, we ask that you keep us updated on your mentor and what you have

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found that works and does not work, so we can use it to help all AMSRO members get the most out of their involvement. To get started, or to discuss an ongoing mentorship, please contact me via the AMSRO mailing list: amsro@googlegroups.com or at garbino@bcm.edu.

See you in Phoenix!

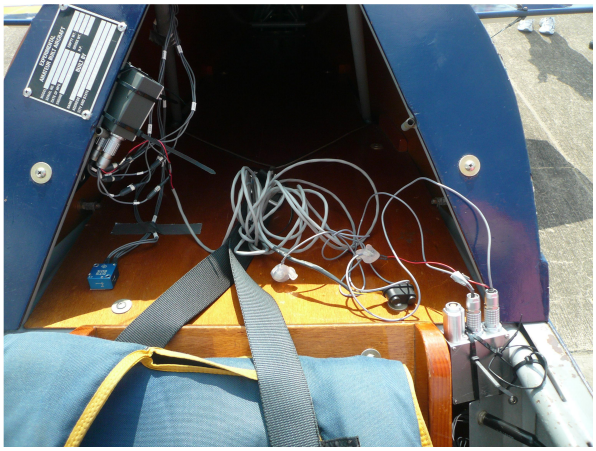
Acceleration Research at the 2009 US National Aerobatics Championships

by Leigh Lewis, M.D.

Accelerometer data is currently being collected in a variety of venues. The automotive industry developed much of the instrumentation currently in use during impact testing. With time, accelerometers have decreased in size and are now so compact that they can be contained within plastic-molded ear plugs. In-ear accelerometers have been used to measure accelerations experienced at head-level in racecar drivers, football players, and boxers, for example. Drs. Sharmila Watkins and Charles Mathers, of UTMB, first measured the accelerations and angular rates experienced by rough stock riders. Building on their research, I decided to evaluate the forces experienced at head-level of aerobatic pilots using the tri-axial accelerometers and angular rate sensors owned by UTMB.

Ear-plug sensors with data recorder

Aerobatic pilots are subjected to large linear and angular accelerations. Although in-flight accelerations are not derived from impact, at times these forces can cause neurovestibular symptoms. Gray-out, black-out, and G-induced loss of consciousness can occur from exposure to high positive G's. Feelings of vertigo or gait abnormalities may represent G-induced vestibular dysfunction or 'the wobblies.' This condition seems to be correlated with negative G's in the z-axis, but has not been



Example of set-up in plane

fully characterized. While G-tolerances have been studied in centrifuges, the actual forces experienced at head level during aerobatic flight are unknown. The specific aims of this study were to: 1) measure the magnitude of linear accelerations and angular rates experienced at head-level by aerobatic pilots and 2) compare data obtained at head-level to that of the plane.

My research team was formed and data was collected at the 2009 US National Aerobatic Championships. Dr. Charles Mathers, Dr. Kathleen Samsey, Pat Puzzuto, and his wife Sherry Puzzuto all traveled to Sherman, Texas, to execute the project. Five pilots were fitted with an ear-plug in each ear, one containing tri-axial linear accelerometers and one with tri-axial angular rate sensors. A second tri-axial accelerometer and angular rate package was fixed to the plane. For each subject, data were collected from the two synchronized devices during a 10-minute practice session.

Subject wearing sensors

Data analysis is still ongoing, but preliminary data has lead to several observations. The maximum and minimum values obtained from the sensors measuring linear acceleration and angular rates from the pilot and the plane were well-correlated. The Gz accelerometer values of the pilot and the plane correlated very closely with the plane's G-meter. The pilots' linear accelerations and angular rates showed more extreme values than those of the plane. In summary, aerobatic pilots experience a large range of positive and negative accelerations, which often exceed those experienced by their aircraft. Data can be successfully collected and correlated using tri-axial accelerometers and angular rate sensors. Future work in this field may involve clinical modeling of G-effects based on head-level accelerations and angular rates.

As a member of the combined residency program in internal medicine and aerospace medicine at UTMB, I have the unique opportunity to work closely with NASA Flight Surgeons, astronaut candidates that are graduates of our program, and leaders in the aviation industry. This research was conducted as part of my Masters of Public Health requirements. For those of you who are interested, this research along with that of Dr. Charles Mathers will be presented at the 2010 Aerospace Medical Association meeting.

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Research in this area will also be ongoing at UTMB thanks to funding by the NSBRI.

For any additional questions feel free to contact me at leelewis@utmb.edu. Anyone who may be interested in learning more about the residency programs offered at UTMB can obtain more information at http://www.utmb.edu/pmr/.

I own many thanks to my research team.

Pictured above: Patt Puzzuto, Sherry Puzzuto, myself, and Dr. Charles Mathers
(Not pictured Dr. Kathleen Samsey)

The New Guard – Executive Director and Editor in Chief

AMSRO welcomes our new AsMAExecutive Director, Jeff Sventek, and Editor in Chief, Fred Bonato.
Col. Sventek replaces Dr. Russell Rayman, who is retiring after 17 years of service to AsMA. Dr. Rayman has always been a strong supporter of AMSRO, and always went out of his way to accommodate students and residents. We extend him our warmest thanks. He will be missed. We welcome Col. Sventek (USAF, Ret.), who has already reached out to AMSRO and promises to support student and residents in flourishing in the organization.

Dr. Bonato has started as the blue journal's 10th Editor in Chief, replacing Dr. Sarah Nunneley, who leaves after 8 years of service.

Both have volunteered to assist after the handover in an advisory role for AsMA.

Fee Increases Averted: November Meeting Report

The November AsMA Council Meeting in Alexandria, Virginia, was a good example why student and resident presence at AsMA meetings is fundamental. Prior to the Alexandria meeting the AsMA Executive Committee decided that, as part of a widespread effort to increase revenues, yearly memberships and meeting registration fees would be adjusted. Although a $25 decrease for student membership was enacted, the package also included a $50 increase in registration fees and $75 in membership fees for residents. Although the organization does need to ensure its economic success, we believed it should not be at the expense of its most junior members. Fortunately, a majority of Council members agreed, and a motion to overturn the changes

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passed. This near miss shows that it is important for students and residents to remain active and involved, but more importantly highlights the strong support that we students and residents enjoy throughout the organization. Indeed, I encourage all of you to be involved not only in AMSRO, but also at all levels of AsMA and its constituent organizations.

On the Horizon

Aerospacefest 2010
April 30-May 2, 2010, Concord, NH
http://www.starhop.com/aerospacefest/

American Occupational Health Conference
May 2-5, 2010, Orlando, FL
http://www.acoem.org

AsMA Annual Meeting
May 9-13, 2010, Phoenix, AZ
http://www.asma.org

58th Int'l Congress of Aviation and Space Medicine
October 10-14, 2010, Marina Bay Sands, Singapore
http://www.icasm2010.com

Member News

AMSRO Members Alex Garbino and Derek Nusbaum recently published "Cell Phones as a Mobile Medical Platform" in the January Science and Tech Column of the Blue Journal.