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SUSNAP: 10 Years and Still Going Strong...

It may come as a surprise to some of you, but this year marks the 10-year anniversary of SUSNAP. Back in April of 2000, we published our first *SUSNAP Journal* issue, with LCDR (ret) Brian "Trout" Swan at the helm and CDR Mike "Chow" Prevost as journal editor. At that time, many critics didn't think SUSNAP would survive past the first year. But after a decade, I think it's safe to say those critics were flat wrong. Not only has SUSNAP survived, but we've flourished, publishing a highly successful journal and participating in a wide range of professional activities.

Our organization's stated mission is to "advance the science, art, and practice of aerospace physiology." Or, more simply, our mission is to serve as the professional organization for the Naval Aerospace/Operational Physiologist who may not have the two or three hundred dollars necessary to join, right out of the gate, one of the larger, more established societies, like the Aerospace Medical Association (AsMA).

For me, however, SUSNAP is more than just another professional organization; it's a *community of practice*, a place where individuals with a common goal come together to better themselves and mentor those newcomers hoping to become "full members" in the profession. From this perspective, then, SUSNAP is about continuous personal and professional improvement, mentorship, and lifelong learning. It's through communities of practice like SUSNAP that new members begin to learn the history, traditions, and standards-of-practice of a unique community whose culture lies at the intersection of Navy Medicine and Naval Aviation.

But being a member of a community of practice like SUSNAP is about more than just reading a few journal articles written by other physiologists. Sure, you can learn something by reading the *SUSNAP Journal*, but you can learn a heck of a lot more by coming up with an article idea, researching the topic, putting together several drafts, and submitting the article for peer review by other physiologists. As a new or mid-grade officer, you can also learn a ton by serving as a SUSNAP officer (or an officer in another community of practice) or organizing a community event, such as the Navy luncheon at the annual AsMA conference. My point here is that becoming a full member in a community of practice like ours requires much more than passive learning; it requires active participation. Therefore, I encourage all physiologists—but particularly our junior officers—to become fully engaged in SUSNAP and any other communities of practice that relate to our job as professional aerospace/operational physiologists. Through active participation in SUSNAP, you not only help our organization, but you greatly improve our collective ability to provide world-class service to the joint warfighter.

As a thriving community of practice, SUSNAP has accomplished a lot over the last 10 years, thanks to the hard work of our active members. In my mind, the members of our most recent Board of Governors represent some of our most dedicated members, and so I would like to thank them here for their service and ask that they continue to lead and contribute in meaningful ways. In particular, I would like to thank CDR Matt "Ratboy" Hebert for his leadership as our President over the past year. I would also like to acknowledge and thank our previous *SUSNAP Journal* Editor, LT Mike "Freak" Tapia, for publishing yet another outstanding volume. Having served as the journal editor in 2002, I know first-hand the challenges (and countless hours) associated with compiling a well-thought-out journal. As Ratboy so aptly observed in a previous issue, "the journal is a labor of love," and the journal editor is the primary provider of that love.



I would also like to introduce this year's leadership. It's a distinguished group of officers, many of whom have personally mentored me over the last 13 years. I look forward to their advice, their contributions, and their continued leadership.

Vice President: LT Tom "Vegas" Jones

Secretary-Treasurer: LT Kim "Pinto" Maryman

Historian: LT Cheryl "Clark" Griswold

Emeritus Member: CAPT (ret) Ryan "Pitbull" Eichner

Members-At-Large: CAPT Jeff "Woody" Andrews, CDR Jim "Jimmy-Mac" McAllister, CDR Sue "Cyclone" Jay, and LCDR Paul "Doogie" Hauerstein

Chief Editor: LCDR Andy "Lurch" Hayes

Webmaster: CDR Matt "Ratboy" Hebert

In closing, I would like to reiterate the notion that SUSNAP is a community of practice that can prosper only if we all commit to active participation. Alone we can do good things, but together we can truly *master* the science, art, and practice of aerospace physiology.



LCDR Tony "Gu" Artino, MSC, USN
Assistant Professor, Uniformed Services University of the Health Sciences



The Beginning (and the Future)

As the first President and kind of co-founder of SUSNAP, I was asked to dig back into my ever devolving brain and shed some light on the dark corners that surrounded the beginnings of our Society. So here it goes, as best as my mind can put it together...

First off, the *idea* of a society for Naval Aviation Physiologists is not new. Back in 1985, when I was an Ensign at APTD Miramar, senior members of our specialty were talking about the need for one. The primary “parties of interest” were those who out of “principle” refused to pay the high cost of an AsMA membership in order to join the AsMA-endorsed Aerospace Physiology Society (AsPS). Additionally, at that time, the AsPS was heavily dominated by USAF physiologists, and a number of “us” didn’t really feel comfortable participating (please remember, that was 25 years ago – a LOT has changed since then). But no one was either willing – or able – to get the idea of a non-AsMA Navy society together.

Also, the idea of a “journal” is not new. CDR Bill Little published his *Fishwrapper* from the Model Manager office, and *Navy Physiology* (aka the *PNL – Physiology News Letter*) was started by CDR Jerry Patee and ran for roughly 4 years. But as there was never a designated billet to keep a journal functioning, previous attempts cycled down when their Editors moved on (actually, Jim Norton took over the *PNL* when Jerry Patee left Miramar for DC and kept it going for a few more years).

Then in 1999, CAPT Wayne Dickey declared that there *would* be a Navy society, and he tasked CDR Bill Little with making it happen. Bill did all of the leg work, sending info out via the MILPHYS message board (anyone else remember that?), drafting a “provisional” set of by-laws, and calling for volunteers to be on a ballot to serve as the first “officers” of the as-yet-to-be-named society. The first meeting was held in the NAS North Island AIRPAC Auditorium on February 7, 2000 with the primary agenda item being the election of officers. There were 60 Active Duty Aerospace Physiologists in attendance, and the first Board of Officers was elected:

President – LCDR Brian Swan

Vice President – LT Dave Hanley

Treasurer – LTJG Brian Bohrer

Secretary – LT Mike Prevost

Historian – LT Mike Kavanaugh

Members at Large – CDR Bill Little, CDR Jim Norton, CDR Jeff Clark,

LT Orlando Olmo, and LT Tony Artino

During that first year the Board voted on the Society’s name (the alternate was the Naval Aerospace Physiologist Society), the dues structure was set, the official by-laws were established, the official logo was selected, the Journal was chartered, the Hank Caruso artwork project was launched, a first run of “SUSNAP merchandise” was produced, and active participation in the AsMA Navy Luncheon was established. Not bad for one year.



In my opinion, one of the greatest successes of that first year was the establishment of this Journal. Due to a HUGE effort on the part of the first Editor (Mike Prevost), Volume I, Issue 1 was published in April 2000. Quoting from my “From the President” column published in November 2000: “Early on in this endeavor, one cynic said to me ‘I applaud your efforts, but you will never make it past the second issue of this journal. The physiology community has a long history of not responding to calls for articles’. Well, to that cynic I say – we made it to number 3!” And *now* to that cynic I say – we made it to 30! This success is due directly to all of the members who have submitted articles over the years (and to the under-thanked Editors who have pulled it all together). I’m not quite OCD enough to actually count, but my guess is that we’ve published over 700 pages of Journal over the years. Not only does this demonstrate “buy-in” from the community, but serves an extremely important function of preserving our Program’s heritage. Folks such as Hal Pheeny, Tom Cooper, John Greear, Jerry Patee, Bob Basin, Glen Armstrong – among many others – who were my first mentors, have since retired; many of their experiences, anecdotes, and recollections have gone with them. I only wish that I had as detailed a program history dating back to my winging in 1985 – and before!

I am posing a challenge to all of my fellow Emeritus Members in the Society. So that we can retain as much program history as possible, I would like to see a column titled “My Life as an Aerospace Physiologist” (or whatever the Editor deems appropriate) started. The articles in this column would be authored by you, the Emeritus Members, and would contain anything in particular that you would want to pass down to future generations of Naval Aerospace/Operational Physiologists; tours of duty, specific accomplishments, programs created, humorous anecdotes, etc. I will volunteer to answer my own call and submit an article for publication in the next issue of the Journal. I also encourage those of you who are in contact with other retired Physiologists who may not be regular SUSNAP members to ask them to provide articles as well; the way I see it, we should be able to harvest experiences that go back through the 70s – possibly even the 60s!

In closing, I would like to say Happy 10th Birthday SUSNAP; your first decade was great. Here’s too many more!



Brian D. Swan, M.Ed., CAsP

Instructional Systems Specialist, Naval Survival Training Institute



I Believe...At Least I...Did

By: LT Michael "Freak" Tapia
MAG-39 AMSO

How many times as a physiologist have you pushed the "I believe" button and regurgitated physiology information even though you were uncertain of its accuracy? There are possibly even times you have made statements that you believe to be untrue, however, you made the statements simply because the information was in a NASTP or SME brief. After all, no one has the time or the resources to look up every fact from all the topics about which we are expected to be experts. We often go back to what we were taught as SNAPs or refer to our bible – DeHart's "Fundamentals of Aerospace Medicine" – to confirm our facts. We expect the authors of these secondary sources have done their homework to provide us with accurate information, and we assume that those preparing the slides have done the same. We all have stated at one time or another that the time of useful consciousness at 18,000 ft is 20-30 min, but are you sure of this? This is what is written in the DeHart textbook, but have you read the primary sources? So we push the "I believe" button and move on until someone questions you on your facts.

I have been a CFET instructor at ASTC Lemoore for a little more than two years. During this time I have seen hundreds of students spin in the centrifuge and have read a lot about the topic. I like to think I am knowledgeable about the physiological effects of +Gz forces. However, there are a few things that I continued to brief during my Acceleration class even though I had my doubts. One of these topics is the five second oxygen reserve everyone has when exposed to sustained +Gz. It makes perfect sense that there is enough oxygen in the nervous tissues and local blood to maintain metabolism in the brain for five seconds. Anecdotally, I don't recall any of our students succumbing to G-LOC in less than 6-8 seconds in the centrifuge. Yet, I had a crusty old Colonel in one of my classes raise the BS flag during my brief and argued vehemently that this could not be true. He apparently had a friend G-LOC during a break that lasted only a few seconds. After a little tap dancing, redirecting, and quick explanation of physiological variability, I completed the brief, exited the room gracefully, and sprinted back to my office to confirm my information. Sure enough, DeHart reads that we have 4-6 seconds of oxygen reserve. Case closed; time to

move on. The only problem was the seed of doubt was planted.

In the months following the discussion with the Colonel about oxygen reserve, I read other textbooks and journal articles, which corroborated what was written in the DeHart textbook. Interestingly, many of these sources referenced a study by Rossen, Kabat and Anderson that was published in 1943. I was content with this information and felt little need to read the 1943 article. That was until I found a passage that briefly described the study. Apparently this study was conducted using 126 normal males and 11 schizophrenics. Oxygen reserve was determined by inflating a cervical pressure cuff to 600mmHg and recording the length of time it took the subjects to lose consciousness. That did it, my curiosity was piqued...I had to read the original study.

This study was conducted using a newly devised technique with a Kabat-Rossen-Anderson apparatus which allowed for rapid inflation of a cervical cuff to 600mmHg within one-eighth of a second (you gotta love the originality of these scientists with the naming of their device). Both the subject and the researcher could control the deflation of the cuff by means of removing their finger from a "jet" at their discretion. The subjects were 126 apparently healthy male "volunteers" taken from the inmate populations at either the Minnesota State Reformatory in St. Cloud or the Minnesota State Prison in Stillwater. The volunteers were instructed to move their eyes rhythmically from side to side while tracking the examiner's moving finger or a freely swinging pendulum. The time from occlusion of the cervical vessels to fixation of the eyes at the midline was measured objectively within one-half second by means of a stop watch. Loss of consciousness occurred between one-half to one second after fixation of the eyes. The results indicate the average time to fixation of the eyes was 5.9 seconds (s) while unconsciousness occurred at 6.8 s. The time for fixation of the eyes ranged between 4.0 and 10.0 s and, although not stated, it is implied that loss of consciousness did not occur until at least 4.5 s for all subjects. Therefore, it is concluded that we all have approximately five seconds of oxygen reserve. Yep, checks out...But more on this later.



For academic purposes, I digress for a paragraph to address the other part of this study that wasn't really discussed in any other sources I read - the 11 schizophrenic patients. Of these 11 volunteers, at least two were catatonic and had not spoken for a long time. The purpose of this part of the study was to assess the effects of prolonged arrest of cerebral circulation in patients with mental disease. These volunteers were subjected to repeated bouts of occluded cerebral circulation by means of cervical cuff inflation for up to 100 seconds at a time (sounds a little like childhood growing up as the youngest of 4 boys). Following cuff deflation, reflexes were assessed to determine the areas of the brain that were affected by anoxia and how the brain recovers. Interestingly, the authors remarked, "...in some subjects behavior was more nearly normal for several minutes after recovery of consciousness" and the two catatonic patients "...responded rationally to questions for several minutes after recovery." However, these positive effects were short lived. So much for cerebral anoxia as a treatment to cure schizophrenia - I'd be willing to bet that they could have cured them if they just went a bit longer. The researchers did note that there were neither positive nor negative permanent effects of several prolonged hypoxia exposures on their subjects.

Let's get back to the question of the five seconds of oxygen reserve. The methods used by Rossen, Kabat and Anderson were interesting and entertaining, but does it truly reflect the dynamics of cerebral blood flow and oxygen delivery experienced during sustained exposure to high +Gz forces? To address this question, Beckman et al. (1954) examined the human tolerance to high G loads applied at a rate of 5 to 10 G per second. Their subjects were 9 male volunteers ranging in age from 20-36 years. The subjects wore no G suit and were instructed to stay relaxed and not "fight" the accelerative force. The exposures consisted of runs at 6, 8, 10, 12, and 15 G with onset rates varying from 3.5 to 9.6 G per second, depending on the peak G load. The time at each peak was lengthened by 0.25 - 0.5 seconds until subjective or objective evidence of unconsciousness or cerebral confusion was obtained. During the exposures, subjects were requested to respond to light or buzzer signals as quickly as possible and the point of unconsciousness was determined by the failure of the subject to respond to light and/or buzzer signals for a significantly long

period of time. Since the 8 G load most closely approximates the max load in the F/A-18 Hornet, I will focus on those results. Results were reported as the time above 3 G, 4 G, and 5 G and the time at peak load until unconsciousness was achieved. The average time above 3 G was 4.33 s and ranged from 3.6-4.8 s. However, probably the most appropriate period to examine is the time above 5G, since it is at this load when there is likely a cessation of circulation and the oxygen reserve can truly be assessed. The average time for this group above 5 G was 3.7 s and ranged from 3.1-4.1 s. The difference between these results and those of Rossen, Kabat and Anderson suggests that oxygen reserve is reduced to a greater extent by exposure to sustained +Gz forces compared to cervical cuff occlusion because some of the oxygen rich blood is rapidly drained from cerebral circulation during exposure to high +Gz.

The bottom line is the Colonel was right; chalk one up to experience. If one subject in this small group of 9 lost consciousness in 3.1 seconds, then it definitely is possible for someone to G-LOC in the aircraft as a result of a strong short pull lasting only a few seconds. The lesson I learned from this is that I have to be careful throwing out the numbers that we take for granted in our briefs as absolutes. I am sure they all come from past research, but as we try to simplify information for general consumption in our briefs, some of the details and accuracy are lost in the translation. So there are times when we can't just push the "I believe" button; we need to question the facts and verify. Now, how many of you believe that the absolute and relative incapacitation periods following a G-LOC truly last for approximately 25-30 seconds?



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The Mishap That Will Kill You



By: Capt Shawnee Williams
Mr. Brian Johnson
Kirtland AFB, New Mexico

What if I told you I knew, almost without a doubt, what flight parameters will set up a pilot for a fatal mishap? You would probably think I am either misinformed or over confident. After analyzing 10 years worth of Air Force Safety Center (AFSC) data, we have identified what kills pilots more than anything else. So, what is the major cause of Class A mishaps over the last decade?

Spatial disorientation (SD) was responsible for 11% of all aviation Class A mishaps over the last 11 fiscal years (see figure 1); however, of the fatal mishaps, 42% were attributed to SD. Even more striking is the fact that 65% of the fatal SD mishaps occurred in fighter aircraft (see figure 3). Spatial disorientation is an incorrect perception of one's linear and angular position and motion relative to the plane of the earth's surface. Specifically in the flight environment, SD is an erroneous perception of any of the parameters displayed by aircraft control and performance flight instruments (AFMAN 11-217 Vol 1, Ch. 17).

The erroneous perception is due to a mismatch between the visual and vestibular systems. The visual system is dominated by conscious thought while the vestibular system is controlled subconsciously. Pilots become disoriented when their vestibular system becomes the dominant means for orientation. When your attention is focused on something other than maintaining attitude and altitude or channeled on a specific task, this is the time when the vestibular system takes over, often giving unreliable and incorrect inputs putting aviators at risk for unrecognized Spatial disorientation or Type I SD.

So which flying communities does this apply to and what portions of the mission leaves a pilot more susceptible to SD? It is important to note that pilots of multi-place aircraft and helicopter pilots can and will experience spatial disorientation, but pilots of "high performance, single seat fighters" have a higher propensity for SD. More specifically, in the USAF, it is aviators with an average of 2500 flying hours in the F-16, F-15 and A-10 communities. 34% of the SD mishaps occurred in the F-16C/J communities with the F-15E/A-10A airframes comprising another 17% (see Figure 2). Now that you know the physiological parameters for SD and in which airframes it most commonly occurs, let's address flight parameters.

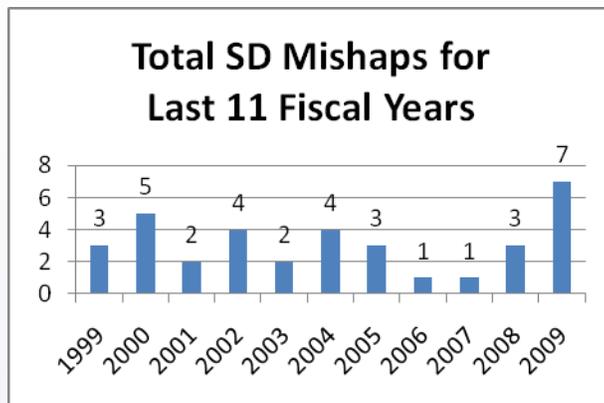


Figure 1: Class A Aviation SD Mishaps
(Oct 1999 to Sept 2009)

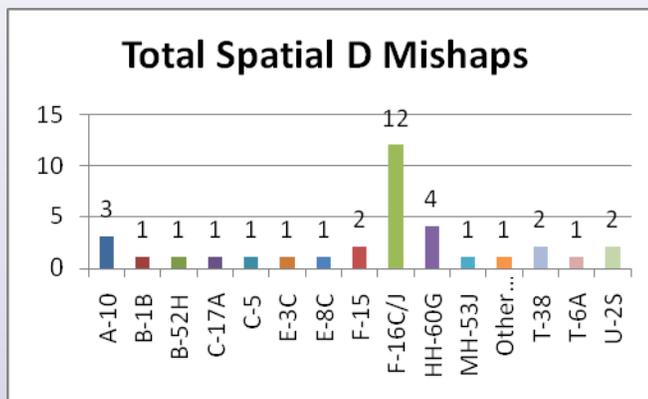


Figure 2: SD Class A Mishaps by Airframe
(Oct 1999 to Sept 2009)

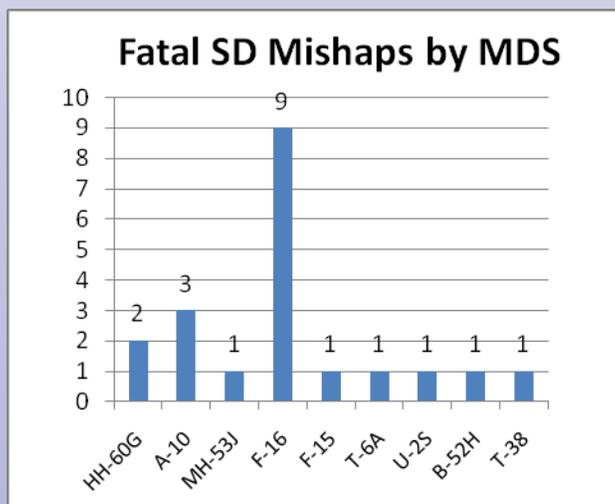


Figure 3: Class A Fatal SD Mishaps by MDS
(Oct 1999 to Sept 2009)



Most aviators assume that the setup for Type I SD is in the weather. However, recent AFSC analysis shows exactly the opposite. While experiencing Type I SD, in the weather, is dangerous it will most likely not lead to a fatal mishap. Rather, task intensive parts of the mission at night, low altitude, low to moderate Gs, slight bank and tactical employment are what will put you at the highest risk for Type I, unrecognized SD which is the most dangerous type of SD.

The question at hand is does your preflight brief state "Caution: if you experience SD, recover on the round dials and declare a knock it off"? Does it also include the threats of weather and SD? As stated before, if you believe weather is your greatest hazard to SD you are not capturing the real threat.

The human factor threat arises when aviators lose track of the fundamentals. Pilots must be informed of the compounding effects during their entire sortie. The combination of flying at night, under moderate Gs while performing maneuvers such as Tactical Intercept (TI), surface attack tactics (SAT) or strafe creates the perfect environment for Type I SD. This information must be applied throughout the entirety of your brief. For example: capture the times during tactical employment that your 2/4 ship is at risk for Type I SD and how to mitigate.

One TI example, consistent with the SD setup, is radar work while flying the doppler notch. While in the notch, you are focused on the radar warning receiver, and flying at a moderate 2-3 Gs. You are now set up for Type I SD and are now in an inadvertent overbank due to a recognition sub-threshold roll and/or the G-excess illusion. Was this part of your mission brief? Did you brief on where you expected to get task-saturated, how a sub-threshold roll can increase your risk for spatial disorientation? The vestibular system has a threshold of 2 degrees per second. That means in a slow roll while distracted for 10 seconds, you can enter a 20 degree overbank and not feel it until you bust through the floor. On the other hand, were you simply focused on not "gimbaling" a sensor and staying in the weapons employment zone? These are the elements of the mission that should scare you.

The same guidance applies during SAT. A good setup during SAT is the "safe escape maneuver." Again, you are at moderate Gs (i.e. 2-3) turning at a low altitude, visually clearing ground fire, and employing chaff and flare. Where are you looking during this process? Are you looking back to

ensure there are no adversaries/ground fire vs. looking at the path of flight. You are now in the envelope for the unrecognized illusion called the G-excess effect which causes an inadvertent overbank. Just as a reminder, these scenarios occur during clear day or night flights with no suspected threats.

Just as TI and SAT missions can impose risks in the sub-threshold zone so can strafe missions. The hazard with this is the distraction that can occur while "putting eyes on target." When you are focused on the target, taking the shot and lose track of the attitude, altitude, etc this is the point where too many pilots have experienced a controlled flight into the terrain.

How can you "Recognize, Confirm, and Recover" when you never even recognize the threat? Specifically, inattention, distraction and channelized attention were present in 78% of the Type I SD mishaps. These three human factors precipitate SD by keeping the pilot from maintaining an effective instrument crosscheck (AFMAN 11-217, Vol 1, Ch.17). What this means is the pilot needs to be aware of the most hazardous parts of the TI, SAT and strafe missions.

When experienced pilots operate in task intensive situations, they must understand what part of their environment is going to set them up for Type I SD and incorporate these elements throughout the mission brief.

You won't recognize, confirm, and recover from Type I SD. The only way to save your life from a leading killer of fighter pilots is to prevent it. So will you take the challenge and consider tactical events that set you up for unrecognized disorientation, brief that threat, and fly like your life depends on it... because it does.



Research Update:

In-Flight Hypoxia Events in Navy TACAIR: Characteristics and Symptoms

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Introduction: Hypoxia continues to be a significant threat in military aviation. To counter the hypoxia threat, U.S. Navy and Air Force aviators receive periodic training using a low pressure chamber (LPC) or a reduced oxygen breathing device (ROBD). Results from previous research indicated the hypoxia symptoms reported by aviators trained on the LPC or ROBD are similar but not identical (1). These findings raised concern that the hypoxia symptoms experienced during training (LPC or ROBD) might also differ from those encountered during actual in-flight hypoxia events (2). This study explored the characteristics of in-flight hypoxia events among tactical jet aviators and compared the reported symptoms to those experienced by aviators during normobaric (ROBD) hypoxia training.

Method: An anonymous survey was administered to aviators prior to naval aviation physiology training. The survey queried participants about their previous encounters with in-flight hypoxia and the symptoms they experienced.

Results: Of the 566 aviators who completed the survey, 112 (20%) reported experiencing hypoxia symptoms in a tactical jet aircraft. Among these reports, 45 (40%) occurred in the F/A-18, 38 (34%) occurred in the EA-6B, and the remaining 29 (26%) occurred in other platforms. Altogether, the reported hypoxia incidents occurred at an average altitude of 25,064 ft mean sea level (SD = 8,433 ft), and 64 aviators (57%) indicated that they were not wearing the required oxygen mask when the incident first occurred. The three most commonly reported in-flight hypoxia symptoms were tingling (54%), difficulty concentrating (32%), and dizziness (30%). Chi-square analyses revealed significant differences between mask-on and mask-off symptom percentages. Additional chi-square analyses revealed differences between the symptoms encountered during actual in-flight mask-on events and those experienced during ROBD training.

Discussion/Conclusions: These results provide insight into the characteristics of in-flight hypoxia events. The following conclusions are particularly salient:

- Other studies have examined hypoxia events from Hazard Report (HAZREP) data; however, our study reveals only 21% of hypoxic events are reported in HAZREPs. This finding suggests hypoxia is considerably under-reported in Navy TACAIR.
- Our study reveals 57% of hypoxia events occur with the oxygen mask off. Naval Flight Officers reported the majority of these mask-off events (58%). This result suggests mask-off hypoxia is more common than previously described (3). Efforts to increase mask use compliance should be complemented with training directed at operational realities.
- The high prevalence of both mask-off and mask-on hypoxia events supports the periodic use of both LPC (mask-off) and ROBD (mask-on) training modalities.
- Mask-on hypoxia has a similar overall symptom profile to ROBD, but significant differences exist between individual symptoms. These differences should be further assessed to determine potential training implications.
- Realized improvements in hypoxia training will more effectively equip aviators who experience acute hypoxia to recognize it, recover from it, and return home safely.

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Earmold Impression Scanning



By: LCDR Andy 'Lurch' Hayes
MAG-29 AMSO

Prior to his departure in 2009, LT Heath Clifford took the time to place a mass order of the Communication and Ear Protection (CEP) hardware he distributed 40 pairs to each of the 14 local squadrons between MAG-26 and MAG-29. Flight equipment shops then installed this hardware into the pilot and aircrew HGU-84 aviator helmets. Since that time I have been offering custom earpieces to replace the foam CEP earpieces for optimal speech intelligibility and hearing protection. There has been a steady demand for custom earpieces here at MCAS New River, NC with 9 of the 14 squadrons (VMMT-204, VMM-263, VMM-264, VMM-266, HMT-302, HMH-366, HMH-461, HML/A-167 and HML/A-269) resulting in 456 earmold impressions taken so far. Ordering custom earpieces has been a learning experience for me as I needed to understand what paperwork is necessary for MALS-26 and MALS-29 to justify such an expense, however local Aviation Supply Officers have been financially supportive.

Additionally, three local squadrons (VMA-542, VMM-266, and HML/A-467) from the 26th MEU were selected by NAVAIR and were outfitted with the new Flight Deck Cranial from Aegisound to include custom earpieces. A team of local AMSOs and AMSCs from 2nd MAW took 314 earmold impressions in support of this effort to reduce noise-induced hearing loss on flight decks such as the USS Kearsarge (LHD 3).

What can you do to help a deployed pilot when they lose or damage their earmolds? What if your shipment of earmold impressions are lost in the mail? Taking a second earmold impression is time consuming to you and the pilot. There is a better way. Scanning earmold impressions at the time they are taken would allow electronic orders to be placed by uploading directly to the manufacturer. There are numerous scanners in the market today and have been available for many years.

This spring, NAVAIR and Westone Laboratories Inc. researched and tested multiple scanners and have selected one. The 3Shape ScanIt Legato 2 desktop impression scanner creates accurate digital three dimensional replica of single or dual earmold impressions. The supplied ScanIt software is used to verify, preview and digitally send the scan, and order, to a manufacturer in a secure encrypted format. Two

high-resolution digital cameras and a laser provide an ultra accurate scan of the impression, all controlled by three independently driven axes (rotational, swing and liner). Patented adaptive scanning techniques ensure the entire impression surface is fully captured. Once an earmold impression is converted into an electronic file, all future orders can be fabricated based on such a file. In other words, the pilot could notify the AMSO from a remote location and request a replacement pair without having to take new impressions. The AMSO would simply locate the pilot's file and order a replacement.



Figure 1: ScanIt Legato 2 with earmold impression loaded in scanner

I have received this scanner and laptop on loan from Westone. Their technical support team arrived the first week in July to make this technology possible. We successfully scanned 9 pairs of earmold impressions and directly uploaded them to Westone through a File Transfer Protocol (FTP). An FTP is a standard network protocol used to copy a file from one computer to another computer. The whole scan and order process is handled automatically within a few minutes - gone are the days of shipping or taking repeat earmold impressions!

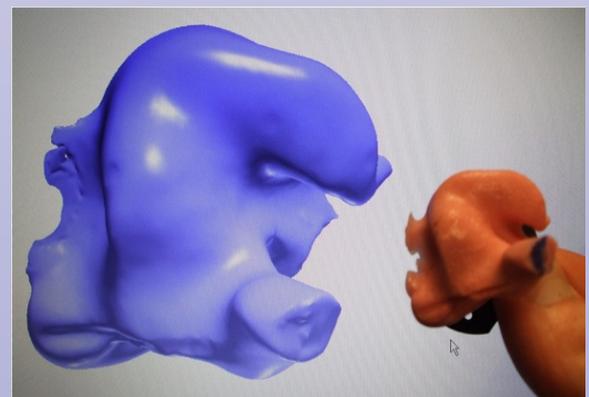


Figure 2: A digital scan (left) of a physical earmold impression (right) held against a monitor



Credentials and Networks

By: T.J. Wheaton CDR MSC USN (ret)

I've long enjoyed membership with professional groups like Aerospace Medicine (AsMA), the Aerospace Physiology Society and SAFE. I'm asked about the value of membership, pricey dues, and the time and duties that follow. I answer with two words, "credentials and network," which are both important to cultivate in a professional life.

Good science is inquiry. Few mortals master the sum of human knowledge, even within aerospace physiology. You know what you don't know but educated inquirers know to pore through references, to develop data by scientific methods, and properly interpret results. Serious practitioners cling to their books for good reason, and the network is a living library.

A professional network manifests experience. You meet, work with, are exposed to and read the works of countless associates. Your network can make you look good, and even save you. Superiors are impressed by the ability to reach out for expertise vital to the command's mission. The early Marine Corps AMSO program earned the nickname "AMSO Mafia", [in the Musashe Era], for unprecedented cooperation and information exchange. The network's worth was a tribute to our leaders but more importantly it proved the worth of the USMC AMSO Program.

The net is the perfect arena to gain conversational proficiency in your vocation, and it's as easy as being friendly. The apprentice tests himself among learned elders. [Yes, it still works that way.] Mentors are challenged and energized. Professional conferences are ways to introduce yourself. Classes and schools are fertile beds to grow a network. Stay in touch with past reporting seniors, for both apprentice and mentor cherish good mentorships.

Join and participate in professional groups like AsMA, the AsPS, SUSNAP, or SAFE. There are others depending on your other interests; Aircraft Owners and Pilots Association (AOPA) or the American Society of Exercise Physiologists (ASEP), for example, and they are more than mere clubs. Professional groups provide a readily accessible concentration of like-minded individuals, are the voice of the profession, and offer credentials or certification.

The Aerospace Physiology Society, for example, encourages and advances the practice of aerospace physiology. The Society establishes and maintains cooperation with other disciplines, and stimulates investigation, the study and the dissemination of valuable scientific knowledge. The AsPS was the inspiration for Board Certification in Aerospace Physiology, and whole-heartedly supports it.

Some professions demand credentials and continuing education while others maintain unspoken credential requirements. It's OK to "get tickets punched." Education, degrees, JPME, resident and non-resident War College programs, Navy schools and courses constitute your curriculum vitae and credentialed resume. Board Certification in Aerospace Physiology (CAsP) is valued and recognized inside and outside our ranks. It's conferred by AsMA's Executive Council to encourage the study, improve the practice, and elevate the standards in aerospace physiology. Certification recognizes excellence against a high standard. It is a professional milestone and a good self-test that promotes the stature of individuals and the profession.

I strongly encourage full participation in your professional groups. They embellish your credentials and resume. Professional groups provide added opportunities for leadership, cooperation with other services and institutions, and are a vital part of any good working network.



CDR Thomas Wheaton receiving the Special Recognition Award during FAILSAFE 2010



My Dear Fellow Physiologists,

I want to thank each and every one of you for making my time in the Navy one of the great highlights of my life. In order to have the privilege of serving in the Navy for nearly 24 years a person has to have assistance.

In my humble opinion you need these as starters:

1. Friendship: thank you to a number of persons, the list is too long to print here and I might forget someone (to that end, I apologize), but three persons have always been my compass and have always had my six: "Jimbo" Norton, "Lip" Service, and "Zul" Luz.
2. Mentors within the Av Phys community: Zul, Lip, Jimbo, Ray Koetter, Pat Powers, Mike Larr, Killer, Hypo, Mad Dog and several line officers whom I won't name.
3. Great staffs, associates, and peers that make your job easy and allow you to look good: outstanding Chiefs, First and Second Class Petty Officers, most of whom have gone on to have outstanding careers. Smart, reliable, and honest preceptors and JOs: Ivan, Wood, Meat, Jimmy Mac, Mikey Hunt, Tuna, "Surf" Biles, Gu, Jumpin, Chunky, Pyro, Michels, Jam, Murdoch, Bumbles, Prevost, Crystal, Poop.
4. A great family for support.

It's been a great ride but its time to get off and let others have the fun.

Thank you from the bottom of my heart.

- Duke

CAPT Mitch 'DUKE' Dukovich, , PhD (Aerospace Physiologist #156)

Officer in Charge, Naval Expeditionary Medicine Training Institute (NEMTI)



NAVAL AEROSPACE PHYSIOLOGY PROGRAM AWARD RECIPIENTS 2010

Outstanding Aerospace Physiologist.....LCDR Thomas Murphy
Special Recognition Award.....CDR Thomas Wheaton
Bob Graham Senior Enlisted Award.....HM1 Troy Juarez
Jim Janousek Jr Enlisted Award.....ND2 Michael Collier
Outstanding Civilian Award.....Mr. Robert (Bob) Johnson
Mr. Neal West

2010 Charles R. Loar Literary Award.....LCDR Jim Balcius



SUSNAP Coins are now available for \$10.00.

Contact CDR Matt 'RATBOY' Hebert for ordering information.



Farewell Retirement Address

By: CDR T.J. Wheaton

11 June 2010, NAS Corpus Christi



This is a great Navy Day. Ladies and gentlemen, Capt Crabbe, Capt Pheeny, Capt Kelly of the Naval Health Clinic, friends, family and honored guests, shipmates and all of the CNATRA staff, I thank you sincerely for attending. I also wish to acknowledge the presence of a good friend and mentor CDR Jeff Clark and his wife Fran. Thank you.

Before my remarks I want to thank John Minners Commander US Navy retired, Command Master Chief retired Dave Watson, AWC Paul Hercl, all the sideboys, ushers, the Naval Health Clinic color guard for making this a grand show.

It's been a great ride but this day is not about me. I have so many people to thank. I accomplished nothing or completed no mission without the men and women with whom I served and who stood at my side.

First, I give thanks to my family; my beloved wife Laura, my son Ryan and his wife Heather, and my granddaughter Kiley. My daughter Jennifer could not be here today for she just blessed us with another granddaughter Eleanor. My father-in-law Ted Grove is here, and I know my blessed and recently passed mother-in-law Norma Jean is with us in the ranks today in spirit. Thank you for being here.

Ryan and Jennifer grew up Navy Brats, and we were a Navy family. Often was the time I was deployed, off on one of my crazy adventures, and gone from home. You were uprooted from homes, schools and friends. But I could not have done this without your sacrifice. Travel was your education. More importantly, life as a Navy family drew the four of us close together, and we knew always had each other regardless of where in the world the Navy sent us, and that bond lasts to this day. God Bless you. Thank you for your forbearance, love and support.

I was blessed to serve on a great Navy Marine Corps team, impressed by the talent, motivation, intelligence and dedication of our young Sailors and Marines. I thank every Blue Jacket or Leatherneck for making me look good. Behind every FITREP bullet stood a sharp Petty Officer or hard charging Devil Dog who did the heavy lifting or said, "Yes sir, we can do that." It was my honor to serve with you.

I am most grateful for God's gift of Navy Chiefs and Marine Gunnery Sergeants. The Navy has an uncanny knack for selecting and developing great natural leaders. I learned about the Navy under the thoughtful, sometimes nurturing and sometimes tough guiding hand of The Goat Locker. Their names were Garcia, Kelly, Eddleman, Clark, Craig, Wren or Sibley, but I knew them as Gunny, Chief, Senior or even Master as though I spoke a sacred proper name.



The commissioned officers of the Navy and Marine Corps are truly America's best and brightest for talent and genius. I was touched by the decency and integrity of leaders named Armstrong, Cooper, Owen, York, Herrington, Nyland and more. Some of my mentors, CDR Clark, and Capt Pheeny are with me today. Thank you for your example and encouragement. I could take hours detailing the lessons I learned from them all. It was interesting to be a mere mortal in the presence of men who stepped out of the pages of history; men who led ground troops in Desert Storm, who flew into the dark heart of Baghdad, pulled men from the Beirut Barracks or flew the Space Shuttle.

I never saw the ocean before I joined the Navy. Words can barely describe the feeling of standing on the deck of an American capital ship and seeing the sunrise on a calm sea; or the awe of being camped in a foreign land to see my nation's colors raised. The Navy sent me and my family to places I never would have gone on my own; and the Marines sent me on great adventures, the stuff of sea stories. It's tough to love something that can't love you back but God help me, I love this Navy. My oath is good for a lifetime, and I will always be Navy.

But as I said, this day is not about me. My story is really about the one who made this possible. This power is known in many lands by many names. Earth Mother. Saint Laura, patron of children and small animals. There are literally thousands of Marines who, to this day, know the legend of The Church Lady of Iwakuni. Her face could adorn Navy Commissary grocery bags. "Navy Wife, The Toughest Job in the Navy." On Thanksgiving or Christmas you could find her house full of stray Sailors and Marines. Her kitchen was the center of social life when I was a Department Head and OIC. If an old shipmate or fellow Physiologist was in the area they were welcomed to her table. She is a true Christian by her example of love and mercy as a healer and Registered Nurse, serving in the Emergency Room trenches for almost 30 years. She selflessly gave her life to mine, and subordinated her own aspirations to the needs of her children and my Navy career. Laura followed this fleet around for 28 years, moving her house some 13 or 14 times, and never once complained or longed for another life. When duty took me from home, she stayed strong and raised our children. I never realized how difficult it was to be home alone until she started tending to her ailing and be-sainted mother. Laura, I thank you with all my soul. You are the finest human being I know, and my gift from God. None of this would be possible without you. God Bless you Laura. I love you so.

I say good-bye to active duty. Next week I have the luxury of sleeping in. No longer will I know the joy of strapping into a high performance aircraft. I'll stress over selecting coordinated clothes instead of a uniform. I must deal with a closet full of Navy and Marine Corps uniforms and I will wear funny hats no more. Most of all I will miss the people. It's always been about the people, which is why I stayed Navy until the end.

I thank the Navy for making me a part of something bigger than myself, for the privilege of wearing this uniform, and for an amazing life. God Bless the United States Navy. God Bless the United States.

