SAFE News

Dedicated to Ensuring Personal Safety and Protection in Land, Sea, Air, and Space Environments

SAFE Association – Our 66th Year | Volume 26 | Number 2 | Spring 2023

President's Message

By Kevin "Dumpster" Divers, 2023 President

The year, 2023, marks the 65th anniversary of the SAFE Association, an incredible feat for any organization! To clarify the 60th coin given at the Symposium last year was honoring 60 years of SAFE Symposia. At our upcoming 61st Symposium we have the great honor of being co-located with the United States Air Force Aircrew Life Support / Aircrew Flight Equipment Veterans and Retirees Group's 70th Anniversary. A lot to celebrate, but more importantly a lot to honor as the core of our membership have been impacted so much by these individuals and their Service sisters and brothers with the Navy and Army.

Let's honor them with a reenergized membership and growth in our Local Chapters that goes far beyond 2023. This is about advancing our Association, our mission, and our community. To that goal … the Board has planned a great Symposium for 2023! But, it takes all of us to bring that many more from within Industry and from the Governments of our membership's Nations and respective Customers in and out of Government. Let's bring in all of these industrious groups from the emerging Civilian Space sector, advance civilian aerospace research and development, and other groups who can find great long-lasting relationships with our current membership.

The SAFE Association begins this year with a great plan and agenda as well as an 11-year Strategic Plan (yes, ours goes to eleven) being generated to secure our Association's long-term future. We want to advance our lifesaving mission globally. We want to grow our Affinity Groups such as the Dinosaurs and other focus groups that make up the diversity of our membership while expanding the inclusiveness of the organization as a whole. An organization dedicated to the preservation of Human lives.

As you all know and will find again in this newsletter, we are moving out to understand how we can be better. Over the next week, months, and year, we will be seeking your feedback in helping us define our future. So, I must ask then, "What do you believe is the most pressing issue facing our association, and how do you think we can address it?"

My belief is that this question encourages members to reflect on the current state of "OUR" association and identify areas that may require attention or improvement. It also invites members to contribute their own ideas and insights on how to address these issues, promoting a collaborative and inclusive approach to problem-solving within the organization. By gathering responses from all members, we can gain a more comprehensive understanding of the challenges and opportunities facing the SAFE Association and work together to chart a course for the future. It is not very long before we meet at the 2023 SAFE Association Annual Symposium! This year we descend on Virginia Beach, Virginia for the 10th through 12th of October. We expect to build on the success from our 2022 event in Mobile. Registration opens soon for Sponsors, other details are now available through SAFE emails, website, and newsletters. Mark your calendars and check the SAFE Association website regularly for updates.

In addition, our membership renewal and entry costs change on 1 April. We thought long and hard on what we needed to do to help grow the SAFE Chapters

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Vice President's Message

By Steven Bromley, 2023 Vice President

Few moments present an opportunity to reflect on the path that one walks in life. As I write this, I am humbled and greatly appreciate your vote of confidence in my continued involvement in our SAFE Association. Serving as Treasurer for the past 4 years has been a great and rewarding experience and I look forward to continuing on as Vice President and Finance Committee Chairperson.

SAFE has weathered quite a storm since the days of sequestration and a global pandemic. Despite these unprecedented obstacles, SAFE continues to strengthen and grow. This is due to the steadfast support of our membership and corporate sponsors, without whom we would surely struggle. I never had the opportunity to attend a SAFE Symposium while on active duty, there always seemed to be something going on that precluded my attendance. As busy survival and flight equipment professionals, please take a little time to both expand your involvement in, and promote, our community. Share with us your frontline experiences, they are vital to enhance and improve everything we do. Through your membership and support, SAFE will continue to provide the life-sustaining community access to a network of government, industry, and academic professionals with the singular vision to protect human life.

As we look forward to our 61st Annual Symposium in Virginia Beach, I am filled with anticipation ahead of what is shaping up to be our biggest and best event yet! I look forward to seeing old and familiar faces and hope to meet new ones as well. Until then, keep doing all those great things you do and, most of all, stay safe!

"President's Message" Continued

as well as what we bring to a Symposium and this meant adjusting the long standing membership dues (both for the individual and the corporation). We truly believe that you will see the value received from these changes and our corporate membership should grow as we wanted to make corporate membership open to the smallest of companies and start ups who value being a part of an Association with such an important mission.

We have and will always value your membership, and we encourage you to remain part of our community and reap the exclusive benefits of registration for the Annual SAFE Symposium Meeting with access to professional publications, global networking opportunities, and so much more. We want you to see the growth in the Chapters and what they bring to our members in continuing education and networking.

We want to be with a person's career from student through their long and distinguished career and this takes providing highly visible value and advantage to our membership. Thus, expect to see work with Fellowship structure and Board Certification opportunities to advance SAFE Association membership as a true value to a member's own personal growth in their respective area of the Industry and/or Government.

On behalf of SAFE's Board of Directors, I wish you all a continued healthy and productive 2023!

UPCOMING MEETING

MEETING
SAFE Association
61st Annual Symposium

DATE
October 10 - 12, 2023

LOCATION
Virginia Beach, VA

Like us on Facebook

https://www.facebook.com/SAFEAssociationUSA

SAFE Association Treasurer's Report

We have closed the financial books for 2022. Last year was a good year for the SAFE association. We saw growth in our membership, added a new Rocky Mountain SAFE Chapter, published the technical journal, and the 2022 Safe Symposium was both successful and well attended. I want to say a special thanks to our SAFE Symposium financial sponsors because without their financial support, we simply could not provide all that we do at the symposium and still balance our income and expenses. As the Treasurer for the SAFE Board of Directors, I saw firsthand the financial impact these sponsors made to the association in 2022 and I want to personally thank our sponsors for their financial support to enable us to bring our industry together annually to drive safety advances for all our global commercial and military users.

East/West Industries, Inc. (Diamond Level Sponsor)

Gentex Corporation (Diamond Level Sponsor)

Martin-Baker Aircraft Company, Inc. (Platinum Level Sponsor & Stage Sponsor)

Butler Parachute Systems, Inc. (Platinum Level Sponsor)

Eaton (Platinum Level Sponsor)

Nammo Defense Systems, Inc. (Platinum Level Sponsor)

Safran Aerosystems Evacuation (Platinum Level Sponsor)

SSK Military Industries,Inc. (Platinum Level Sponsor)

Survitec Group, Ltd. (Platinum Level Sponsor)

Switlik Parachute Co., Inc. (Platinum Level Sponsor)

Omni Defense Technologies, Corp. (Gold Level Sponsor & Outdoor Demonstration Sponsor)

Dayton T. Brown, Inc. (Gold Level Sponsor)

TIAX, LLC. (Gold Level Sponsor)

Massif (Silver Level Sponsor)

Wing Group (Silver Level Sponsor)

Applied Energy Technology (Coffee Kiosk Sponsor)

The majority of the SAFE Association income and expenses are associated with the symposium. With our increased attendance and outstanding sponsorship, our association financials moved in the positive direction as we closed the 2022 calendar year. A few symposium invoices continued to come in during January 2023. However, a preliminary look at the numbers through January 2023 indicates we likely will have an overall positive gain in our financial position compared to a year ago.

I wish all of our members a fantastic, healthy, and "SAFE" 2023 and I look forward to seeing everyone in Virginia Beach this fall.

Best regards,

John Hampton

Board of Directors Treasurer
SAFE Association

SAFE Association Benefits!

INDIVIDUALS

- Quarterly SAFE Newsletter
- Proceedings from the SAFE
- Annual Symposium
- All Symposium-related Mailings
- Reduced Symposium registration cost.
- Access to members only area of the SAFE Association website
- Voting privileges for your SAFE Board of Directors
- Submission information for our Annual Awards Program

CORPORATE MEMBERS

- Quarterly SAFE Newsletter
- Proceedings from the SAFE Annual Symposium
- All Symposium-related mailings
- Reduced Symposium registration cost.
- Access to members only area of the SAFE Association website
- Voting privileges for the SAFE Board of Directors
- Submission information for our Annual Awards Program
- Corporate listing and description of products and services on SAFE Association website with link to company website.
- Reduced registration and exhibit space fees for the SAFE Annual Symposium
- Free use of the SAFE Newsletter to deliver news releases - such as personnel changes, new products, new office locations, and contact information
- Corporate Membership includes a Primary and Secondary Corporate Representative

2023 CALL FOR PAPERS

By Casey Pirnstill

61th ANNUAL SAFE SYMPOSIUM • OCTOBER 10th – 12th, 2023

VIRGINIA BEACH CONVENTION CENTER • VIRGINIA BEACH, VIRGINIA

The SAFE Association's Annual Symposium is the premier international showcase for unparalleled discovery including technical sessions, extensive exhibits, product demonstrations, workshops, technical debates, panel sessions, and networking opportunities. Areas of interest include, but are not limited to, the following:

- Accident Investigation
- Aviation Escape Systems
- Biodynamics and Physiology
- Crash Safety
- Directed Energy Protection
- Energetic Materials
- Extreme Environments
- Ground Vehicle Protection
- Hearing Protection
- Human Factors
- Individual Flight Equipment
- Life Support Systems
- Modeling and Simulation
- NBC Protection/CBRN PPE
- Ocular and Night Vision Systems
- Occupant Crash Protection
- Oxygen Systems/PBE
- Personnel Recovery
- Search and Rescue
- SOF Equipment
- Survival Equipment and Aids
- Test and Evaluation
- Technology Transfer
- Training and Simulation
- Troop Protection
- Windblast Protection

Abstract Calls Open NOW

Deadline for Abstract Submission is July 14, 2023

SUBMISSION GUIDELINES

Briefings, Panels (consisting of 2 or more Briefings) Demonstrations & Workshops (specify).

Submit a 300-word abstract (electronically using the online abstract submission portal) to the SAFE Office through the SAFE website at www.safe-association.com. Abstracts should be typed in 9pt Verdana font. A template is available for download on the website.

Just as the abstract submission process was last year, this year abstracts are to be submitted via a digital entry form through the SAFE website, rather than the traditional e-mailing of the abstract in MS word format to the organization. Once submitted a compiled abstract, as described above, is generated and e-mailed to the main author and automatically

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"Call for Papers" Continued

forwarded for consideration to the symposium.

Technical Paper abstracts should include Introduction, Methods, Results, and Discussion sections.

Panels, Briefings, Demonstrations, and Workshops should contain a paragraph outlining the safety issue to be presented, followed by a description of the program or product and how it is used to address the issue.

Panel sessions should outline the topic or scope, number of presenters by name and affiliation, and the panel chair. When planning a panel, bear in mind that session blocks are 90 minutes. Panel sessions may list "tentative" speakers or papers for acceptance but these must be finalized before the deadline.

You will be notified when your submission is accepted, rejected, or if revisions are required for acceptance. If your submission is rejected, you may resubmit with corrections and/or changes. Your paper will be scheduled based on the type of paper and content.

AUDIO-VISUAL PRESENTATIONS

Presenters are to bring their presentation, formatted in MS Power Point (wide-screen 16:9 is preferred), electronically saved on appropriate media (memory stick, CD, etc.) directly to their session at least 20 minutes prior to the scheduled start. The program allocates time between sessions to accommodate uploading the session's presentations to available presentation equipment immediately before the start. Each presentation will be allotted a total of 30 minutes (20 minutes for presentation time followed by 10 minutes of Q&A). If presentation time exceeds 20 minutes, Q&A time will also be shortened to account for the time difference. For example, if the presentation is 26 minutes, only four minutes will remain for Q&A.

All authors are required to attend the Author's Briefing to meet and coordinate with the symposium Technical Team, the session moderator, and session co-presenters. Any technical issues or needs will be addressed at that time.

The following presentation equipment will be available for all technical sessions:

- A laptop computer, projector, and screen
- Podium and wireless microphone
- Laser pointer

PUBLICATION IN SYMPOSIUM PROCEEDINGS

- A "static" printable version of the presentation (MS PowerPoint or Adobe PDF) will be required for publication in the Proceedings.
- All technical presentations, including papers, panels, workshops, demonstrations, etc., presented at the Symposium are eligible for inclusion in the Proceedings. It is the responsibility of the author to obtain clearance from their organizations. Presentation materials will be collected at the Symposium. The proceedings are published to the SAFE website and are available to SAFE members via their member login.
- Materials not collected at the Symposium may be submitted electronically for publication in the Proceedings to arrive at the SAFE office no later than two weeks following the final day of the symposium. Submit earlier if possible.
- It is the responsibility of the submitting author(s) to ensure that all material, printed or otherwise, that is presented at the SAFE Symposium or in the SAFE Proceedings has been screened through the submitting organization's public release process and has been approved for Unlimited Distribution.

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SAFE
Association

2023 Safe Association Awards Program: *Call for Nominations*

By Mark Jones

ATTENTION:
Corporate, Individual, Military, and Academic Members of SAFE

This is a great opportunity to recognize the achievements of your colleagues by nominating them for a prestigious SAFE award! If you don't recognize them, who will?

Since SAFE was founded 50+ years ago, one of our key goals has been to provide an opportunity for participants in our field to be formally recognized for their contributions. Each year the SAFE Board of Directors announces the recipients of our industry recognition at our annual Symposium.

The SAFE Association Awards Committee is now accepting nominations for the following awards, and we need you to help us identify deserving candidates. We invite you to review the criteria for each award and nominate a worthy colleague or team.

All nominations should be submitted by close of business, Friday, 18 August 2023.

Nominations should follow the guidelines provided on the SAFE Association website, see https://safeassociation.com/.

Once received, the Board of Directors will evaluate each nomination based on relevance to the award criteria and the detail of the supporting information provided in the submission. This ensures the awards go to the most deserving recipients.

To identify the most deserving recipients, we need your nominations! We all know of individuals across our industry with significant accomplishments over the past year or their entire career. Project and Program Teams that have made recent major contributions are also prevalent in the military, in new product development, contract service providers, and academic research communities.

The Award categories are:

MICHAEL R. GROST CAREER ACHIEVEMENT AWARD
Recognizes the career of a deserving individual for their significant contributions to the field of safety or survival.

GENERAL SPRUANCE INDIVIDUAL ACHIEVEMENT AWARD
Honors an individual who has made a recent outstanding contribution in the safety field through leadership toward or significant advancement of, safety and survival improvements. This contribution can be made through education, knowledge, science, application of investigative techniques, or engineering.

TEAM ACHIEVEMENT AWARD
Acknowledges the recent accomplishments of a team in the field of safety or survival through an advancement in the education, knowledge, science, application of investigative techniques, or engineering associated with a significant improvement in safety or survival.

MERITORIOUS SERVICE AWARD
Is presented to the person or persons, civilian or military, who have demonstrated a recent outstanding contribution to the preservation of human life through an action of courage.

MURRAY P. KOCH INDUSTRY AWARD
Distinguishes a member of industry who has made recent significant contributions in the advancement of technology or hardware for safety and survival applications.

We encourage you to reflect upon a person or team who is deserving of recognition by the industry we serve. Take the time now to write up a nomination and submit it to SAFE as soon as possible but no later than Friday, 18 August 2023.

Go to https://safeassociation.com/, click on the AWARDS tab and access the nomination form. Complete the form and submit it either through the website, via fax, or mail to the SAFE Association.

Specific criteria for each award can be found on our website.

The person or team being nominated can be either a current Member or Non-Member. However, all nominations must be submitted by a current SAFE member.

Recognizing our deserving colleagues is an important way for us to acknowledge their career achievements and set the bar for our younger colleagues. Again, the deadline for submissions is close of business on Friday, 18 August 2023.

The SAFE website will open for nomination submissions on 1 April 2023. For other questions please email the SAFE Administrator at admin@safeassociation.com or call (541) 895-3012.

SAFE ASSOCIATION AWARDS COMMITTEE

Nominations for SAFE Board of Directors

By Ebby Bryce

Greetings to SAFE Members,

The SAFE Association was built, has thrived and been sustained by the dedication and volunteerism of our members. Stepping up, pitching in, and collaborating with other like-minded volunteers to carry out the association's goals and objectives is the engine that continues to drive SAFE's success. Each year a new board comes together to build on the lessons learned and accomplishments of the board that came before it.

The process for fielding candidates for the membership to consider and elect as officers to the SAFE Association board of directors is an annual requirement under the constitution and bylaws. Nominations for elected board positions are due to the Nominations Committee not later than July 1, 2023. Our goal is to have a vetted and board-approved slate of nominees no later than Friday, July 14, 2023. This targeted end date would ensure adequate time for the preparation of the online ballot and voting process. The results will then be presented at the last board meeting before the 2023 Symposium in October 2023. The 2023 SAFE Association election is set to open on August 1, 2023 and end on September 1, 2023.

Candidates are being sought for the following elected board positions:

- **PRESIDENT-ELECT** – Prerequisite: Eligibility for nomination and election to the office of President-Elect shall require two years of continuous active membership in the Association and a minimum of one term as an elected or appointed member of the Board. The President-Elect shall ascend to the office of President upon the close of the 2024 SAFE Symposium. In the interim, the President-Elect shall be a member of the Board and performs such duties as delegated by the sitting President. Additionally, the President-Elect shall familiarize himself or herself with the duties of the office of President. In the event both the President and Vice President are incapacitated or otherwise unable to act, the President-Elect shall perform the duties of the President during the period of such incapacity or inability to act.
- **VICE PRESIDENT** – No Prerequisite. The Vice President shall be a member of the board. The Vice President will familiarize himself or herself with the activities and duties of the President and will act as the Chairperson of the Finance Committee. If the President is not available to officiate, the Vice President will act during the vacancy. In the event the President shall become permanently unable to perform the duties of the office, the Vice President shall become the acting President.
- **SECRETARY** – No Pre-requisite. The Secretary shall assist the association administrator or other board member as directed in accordance with the procedures established by the constitution and bylaws, and shall assure the written record of the association is maintained and available to the members.
- **TREASURER** – No Pre-requisite. The Treasurer shall oversee the association's financial records in accordance with the procedures established by the constitution and bylaws and shall assure the issuance of at least one financial statement annually.

To be approved, each candidate must be a current member in good standing to run for office.

We encourage you to consider volunteering your talents to be a candidate by stepping up and pitching in with your creative, thoughtful and collaborative energies. Your participation clearly helps further the viability of the SAFE Association in its role of supporting, protecting and saving the lives of those who intentionally go out into harm's way.

SAFE members who have any interest in pursuing an elected office, questions regarding the nominations process, or any other matter pertaining to the elections, please contact the SAFE Administrator, Stacy Stuber at admin@safeassociation.com or one of the following Nominations Committee members:

Ebby Bryce – Chair Person
Email: ebryce@ced.us.com
Mobile: (757) 927-2461

Edgar "Ted" Poe – Committee Member
Email: edgar.poe@tedgarconsult.com
Mobile: (808) 594-9245

Jerry Reid – Chairperson
Email: jerry.reid@skytexus.com
Mobile: (972) 839-6911

The Nominations Committee thanks you in advance.

Ebby Bryce
SAFE Association
Nominations Committee Chair

SAFE Association Members Urged to Help Define Future

By Edgar A "Ted" Poe III

As members of the SAFE Association, we all share a common goal: to preserve human life. It is through our dedication and passion that we have been able to build a strong and vibrant community of professionals from various fields, including equipment manufacturers, distributors, engineers, health professionals, management, government, and military personnel. Together, we have created a safe and supportive space for the exchange of ideas, information, and best practices. We can celebrate 60 plus years of making a difference.

Now, as we look to the future, it is more important than ever that we come together as a community to help define the direction of the SAFE Association. As a member of this association, a past president, as a chair of membership and the symposium for several years and now our organizational strategist... I have seen firsthand the power of collaboration and shared vision. It is only through the collective efforts of all members that we can continue to grow and evolve, and ultimately achieve our goals.

At the heart of our association is the annual SAFE Symposium, where we come together to share our knowledge and experiences in the fields of safety and survival. This event provides a unique opportunity to connect with like-minded professionals from around the world and gain valuable insights into the latest developments in our field. However, the Symposium is just one aspect of what we do as an association.

As members of the SAFE Association, we all have a stake in the direction and future of our organization. We need to work together to identify new opportunities for growth and to develop strategies to overcome the challenges that lie ahead. By doing so, we can ensure that our association remains relevant and effective in the years to come.

One way that we can achieve this is by taking an active role in the planning and development of future events and initiatives. This means volunteering our time, sharing our expertise, and contributing to the ongoing discussion about the direction of our association. Whether it's through attending chapter meetings, participating in online forums, or simply sharing your thoughts and ideas with fellow members, every contribution counts.

We also need to be mindful of the importance of diversity and inclusion within our association. Our members come from a wide range of backgrounds and specialties, and it is through this diversity that we are able to bring fresh perspectives and new ideas to the table. We need to ensure that all members feel valued and heard, and that we are working together to create an inclusive and supportive community.

In conclusion, the future of the SAFE Association is in our hands. As members, we all have a role to play in defining the direction of our organization and ensuring its continued success. Let's come together as a community to share our knowledge, experiences, and ideas, and work towards a brighter and more sustainable future for the SAFE Association. Together, we can make a difference and continue to advance our shared goal of preserving human life.

We look forward to hearing from you all in the months ahead.

Respectfully ,

Edgar A "Ted" Poe

Share with us!

The SAFE Information Management Team is looking to hear from you!

If you have anything you want to share with the SAFE community, you can email it to **lauren@proflightgear.com** or tag us on your post with these handles:

@SAFEAssociationUSA

@SAFEAssociation

@safeassociation

Safe Association

Anti-Exposure "What Worked but Didn't Get Out"

By David DeSimone

As said many times, we always are fighting the last war. "Those who ignore history are doomed to repeat it." I have been in the Life Support business for 62 years. I started at the Crew Equipment Laboratory at the Philadelphia Naval base in 1959 and moved to the Naval Air Development Center in Warminster PA in 1973. I left government service (didn't retire) in 1990 and have consulted in the Technology Development business since that time with a variety of companies and technologies.

I was working problems after Korea and before Vietnam. The harsh Winters of Korea and difficult SAR conditions was the birth of the "Poopy" suit. The Mk-IV was a green neoprene coated nylon with a "tunnel" entrance tube rolled up for a waterproof seal, along with rubber neck and wrist seals. Inflatable rubber boots completed the ensemble. A bulk insulation under garment provided insulation. The Mk-5 was an International Orange neoprene coated stretch fabric with a waterproof shoulder-to-hip slide fastener entrance with neoprene neck and wrist seals. A bulk insulation coverall and waffle weave underwear provided a heat retention layer. The inflatable rubber boots were retained but often not used in flight. The Mk-5 was somewhat less bulky, but the weak features were the neck and wrist seals subject to tearing and the wear at the elbows and knees which with time leaked. Wetting of the insulation undergarments nullified their ability to retain body heat. Testing for leakage was not always done in a timely fashion.

The enemy in a cold environment is time! Body heat dissipates over time. The general routine is immersion after descending in a parachute, followed by boarding of a life raft, single or multiple man, depending on the aircraft type. Immersion is punishing, life rafts can be insulated but constant cold air and wind win the battle over time. Extensive human testing in a cold chamber (at 20 degrees F air, and water at 32 degrees F, and wind at 20 MPH with Mk-5, insulated raft, protection following immersion) resulted in 3 hours of time to hyperthermia. Downed aviators had to be picked up in less than 3 hours or face frostbite in the hands and feet - never returned to duty or ultimately death. Distance from the fleet and type of rescue aircraft were the determining factors unless alternate land based, or surface or subsurface rescue was available. I witnessed and participated in testing with Louis Santamaria, physiologist and volunteer corpsmen Navy subjects at the Philadelphia Crew Systems laboratory and the Naval Air Development Center.

Development efforts to improve the dry suit concept did not improve durability but did improve comfort through the use of different materials. The Ventile suit from the UK and Frankenstein corporation (no kidding) was softer long staple Egyptian cotton that swelled and sealed when wetted. A U.S. "Gortex" substitute with better insulation undergarment followed. The time factor did not improve, testing revealed.

Enter the wet suit! Neoprene rubber foam suit enable water sports athletes to ignore cold water. A ground swell of fleet enthusiasm for an in-cockpit wet suit demanded a serious investigation. Protection was improved by a 1/4-inch foam suit but mobility was compromised by the closed cell foam fabric. Crewman heat buildup in the cockpit was unacceptable. The mk-5 used a suit air circulation system to cool in the cockpit as was the case for Pressure Suits. The wet suits were made acceptable by using a sharkskin 1/8-inch neoprene foam (less bulk), patterned knees, and elbows to be bent, and a spacer fabric air-cooling distribution system. The protection was equal to the Mk-5 and the durability problem was solved. AIRPAC wanted the wet suit and AIRLANT refused it and wanted a dry suit. The dry suit and improved materials won out and is used to this day. The time factor has not changed; battle theatre scenarios put survivors at the extreme range from fleet rescue aircraft. Air refueling for the E-2D, now a battle manager, extends flight times to eight (8) hours. Fleet stand off from the theatre (anti-ship weapons) makes rescue from the sea a problem.

Faced with the undeniable facts of the situation, we concluded in the early 1980's that "Poopy" suits in the cockpit cannot be made sufficiently comfortable and durable. Suits and insulated rafts are not going to provide a satisfactory level of protection for old or new scenarios. Retention of body heat is insufficient over the long haul and downed aviators were not going to survive in any harsher conditions than tested in some potential theatres of operation.

The answer was not a new suit, but rather an insulated life raft and quicker rescue time. How to eliminate the suit system and provide

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"Anti-Exposure" Continued

lifesaving heat in the survival environment was the objective. First, we can generate heat easily on land but how in a life raft at sea? Batteries and heating elements were too short lived (much better now), although distribution over the body is easy to accomplish. New technology was required! The Gemini pressure suits had a liquid loop suit with capillary tubing throughout for the distribution of cooling liquid. We thought this could be adapted for the distribution of warm water/liquid if we had any. We had to develop a heat source for the ILC Dover liquid loop suits we procured. In cooperation with Sanders Associates of Nashua New Hampshire, a heat source was developed using thermoelectric modules combined with water heat absorbing manifolds surrounding a catalytic combustion chamber using propylene as fuel to generate electricity to power a circulating pump. The challenge was to make it a size, shape and weight to fit into the rigid seat survival kit.

The result was the DAPS Downed Airman Power Supply: Volume - 100 cubic inches, fuel for 3 hours 20 cubic inches, and a 12v power outlet for a survival radio. Testing showed that a survivor in a life raft (sweating) was comfortable for as long as fuel was available. A shape was configured to fit into the survival kit. Heat output was 125 watts thermal. Two 20 cubic inch containers of fuel would last 6 hours. A large system for a multiplace life raft was envisioned but not built. Units were belt mounted for ground troops and were distributed to the Army in Alaska and tested for guard duty in the cold. Bulky garments could be shed to the amazement of the participants. Reports were written, a paper delivered at SAFE, and success was declared!

Added to the system to further enhance the game changing approach was a concept examined by the USAF and Bendix corporation, Davenport IOWA but discarded; an "Encapsulating Life raft". To make it work we had to find a way to control sequencing inflation. We did this with one-way check valves. The raft tube deployed along the back of a descending aviator first and then a second tube swept under the feet and enclosed the occupant. Immersion was eliminated! The bulk of two rafts had to be reduced to fit into rigid seat Survival kits (RSSK). Two things enabled this tight fit. Heat sealing a light-weight fabric by using ultrasonic adhesion and putting seams in shear vice peel as was the case with the current 6 oz coated urethane fabric that was die sealed reliably with a heavy coating to enable coating imperfections to exist. The light fabric was half the weight and the sewing machine style sealing enabled strong seams in shear. Strict material coating quality control and inspection was required. This same technology was used by David Clark Co to make light weight G-suit bladders.

Contracts were let to David Clark Co. Worcester Mass. and East/West Industries, Ronkonkoma LI,

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Human Factors Activities Elsewhere

By Steve Merriman

SAE and HFES Link: SAE International, G-45 Human Systems Integration (HSI)Committee and the Human Factors and Ergonomics Society, Liaisons and Representatives Committee have initiated an effort to establish an alliance focusing on the development and improvement of standards in the areas of Human Factors Engineering and HSI.

SAE G-45 HSI Committee: The HSI committee completed a draft revision to the SAE6906 Standard Practice for Human Systems Integration. The draft will now be reviewed by the whole committee and submitted to the Systems Management Council for approval. The official update is expected around the end of the calendar year.

DoD Human Factors Engineering Technical Advisory Group (DOD HFE TAG): The 75th meeting will be held in Dahlgren, VA on 8-16 May 2023. In addition to general plenary sessions, more than a dozen sub groups will meet on topics including: Extreme Environments, System Safety/Health Hazards/Survivability, Design Tools and Techniques, Technical Society/Industry, and Modeling and Simulation. HFETAG – DCTO(S&T)

[Please contact Steve Merriman for additional information]

"Anti-Exposure" Continued

NY for quantities for jump testing at NAS, El Centro over the Salton Sea an inland body of water in the California Desert. The rafts were packed into Rigid Seat Survival Kits (RSSK) and 40 jumps were successful in as much as occupants landing in a forward direction, and a most ideal backward direction, were not immersed! The total problem was solved, and anti-exposure casualties would be a thing of the past! NO! There were declared failures in as much as a very tall occupant had to lift his feet for the sweeping tube to complete the encapsulation. This could not be avoided because a larger raft would not fit in the kit. A failure was declared and therefore OPTEVFOR the approving authority failed the system for fleet use. The logic offered was that the unconscious man would not be encapsulated if too tall!!! Ninety five percent of the population would not be too tall! But, even if "too tall," the aviator would be in half a raft and drier than the current system since he certainly would be unable to climb into the current one -man raft if unconscious.

The whole "Modular Anti-exposure System" was deemed unacceptable for introduction into the fleet! As an aside, the Coast Guard came to us for a ship escape system for the Great Lakes vulnerable commercial single hull Ore ship traffic. We adapted the encapsulating raft into a survivor package using a backpack deployment with a jungle penetrator lowering device (reel attached to a harness with a gradual Kevlar fine cord payout). The crewman/passenger attached a carabiner hook to a rail and jumped overboard and, while in a gradual descent, the encapsulating life raft deployed. The system was not accepted because it was deemed more advantageous to have all the survivors together in an escape capsule rather than have scattered individual rescuees. I thought I would like to have my individual system as a sure thing if the ship is going down, no matter what! We got a patent but no distribution for use. Since then, there have been Cruise ship mishaps and there are potential warship scenarios that would benefit from the NADC Ship Escape System.

As with other things that 'worked" but didn't become operational, the systems were "too good to be true" for the decision makers and cast aside as too exotic, prone to failure, and less than believable. I think the system concepts could be resurrected and improved with the new technologies available today (batteries and materials) and have game changing military and civilian applications. Anybody want to try?

Other systems that "Worked" but didn't make it; Maximum Performance Escape System (MPES), Inflatable Body and Head Restraint (IBAHRS), Advanced Technology Cockpit, Liquid-filled Anti-g Suits, Glide Parachute for enhanced escape and evasion, Full Pressure Suit, Clam shell and full Dome helmets eliminating face masks and others will be the subject of additional articles. KEEP THE FAITH!

Dave DeSimone

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An Introduction to New and Emerging Military System Requirements for System Safety and HSI – and How They Affect Force Protection and Survivability in the DoD

By:
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Department of Defense (DoD) program managers and engineers use the systems engineering process to influence system designs during all stages of the defense acquisition life cycle, especially to improve human performance and to mitigate identified risks, issues and hazards.

DoD Directive (DoDD) 5000.01, The Defense Acquisition System (DAS) (OUSD(A&S) September 2020) states: "Human systems integration planning will begin in the early stages of the program life cycle. The goal will be to optimize total system performance and total ownership costs, while ensuring that the system is designed, operated, and maintained consistent with mission requirements." (DoD Directive 5000.01)

The associated instruction, DoDI 5000.02, Operation of the Adaptive Acquisition Framework (OUSD(A&S) January 2020) states: "The AAF supports the DAS (Defense Acquisition System) with the objective of delivering effective, suitable, survivable, sustainable, and affordable solutions to the end user in a timely manner." (DoDI 5000.02)

Better identification of HSI in system requirements is needed to implement HSI, as directed. This article will introduce the HSI-related requirements from the Joint Capabilities Integration and Development System (JCIDS) process to inform requirements managers; introduce the identified and derived HSI requirements in functional DoD policy; describe the contributions of the HSI discipline to the DoD, the governing policy and guidance for HSI; and identify resources for the workforce to implement HSI within systems engineering with a focus on improved operational effectiveness, suitability and survivability.

Two disciplines critical to the delivery of military systems are System Safety (SS) and Human Systems Integration (HSI). Both disciplines are managed within the OUSD(R&E) SE&A portfolio. HSI and SS engineering processes apply to both hardware and software within the system or its associated system of systems (SoS) to achieve DoD goals. In this first article of a two-part series, we will focus on the contributions of the HSI discipline to the DoD, the governing policy and guidance for HSI, and identify resources for the workforce in implementing HSI within systems engineering with a focus on improved operational effectiveness, suitability, and survivability.

The goal of HSI is to ensure that human performance is optimized to increase total system performance (TSP) and minimize total system ownership costs (TOC). Incorporating HSI early in system design promotes more successful and effective transition of capability to the warfighter.

The HSI discipline is integral to the delivery of safe and survivable military systems. HSI is "the System Engineering process and program management effort that provides integrated and comprehensive analysis, design, and assessment of requirements, concepts, and resources for human factors engineering, manpower, personnel, training, safety and occupational health, force protection and survivability, and habitability" (DoDI 5000.95).

In DoDI 5000.88, Section 3.6 [SPECIALTY ENGINEERING], references paragraph "d. Human Systems Integration. The Lead Systems Engineer will:

(1) Working for the PM, use a human-centered design approach for system definition, design, development, test, and evaluation to optimize human-system performance.

(2) Conduct frequent and iterative end user validation of features and usability for identifying, communicating, and visualizing user needs under defined operational conditions and expected mission threads.

(3) Working for the PM, ensure human systems integration risks are identified and managed

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"Emerging Military" Continued

throughout the program's life-cycle.

Also, "For MDAPs, ACAT II, and ACAT III programs, the SEP will contain these elements, unless waived by the SEP approval authority: (t) Specialty engineering and architectural factors as described in Paragraphs 3.6. and 3.7., and any additional applicable design considerations as described in the Defense Acquisition Guidebook" (DoDI 5000.88). In the case for HSI, the DoD HSI Guidebook should be used to apply the appropriate HSI design considerations.

There are seven domains of the HSI discipline defined by the DoD. A domain in this context is defined as a constituent discipline or one of the factors determining the outcome of a process, in this case, comprising the HSI discipline. The domains are also "tenets" - principles, beliefs, or doctrine(s) generally held to be true, especially one held in common by members of an organization or profession, such as the HSI profession. Under the umbrella of HSI are domain activities, which stem from domain-specific system requirements. Domain-specific system requirements are system specification or technical requirements impacting the humans (e.g., operator, maintainer, supporter, trainer, or other type of user) associated with the system, to the extent that human performance, mission effectiveness, and/or the HSI domain design and implementation considerations may be affected.

These HSI domains are interrelated and interdependent and must be among the primary drivers of effective, efficient, affordable, and safe system designs. HSI integrates and facilitates trade-offs among these domains and other systems engineering and design domains but does not replace individual domain activities, responsibilities, or reporting channels.

According to the JCIDSs manual,

"The Force Protection (FP) KPP [sic one of the four mandatory KPPs] is intended to ensure protection of occupants, users, or other personnel who may be adversely affected by the system or threats to the system. Although the FP KPP may include many of the same attributes as those that contribute to System Survivability (SS), the intent of the FP KPP is to address protection of the system operator or other personnel against kinetic and non-kinetic fires, CBRN, and environmental effects, rather than protection of the system itself and its capabilities." The FP KPP is applicable to CDDs addressing manned systems or systems designed to enhance personnel survivability.

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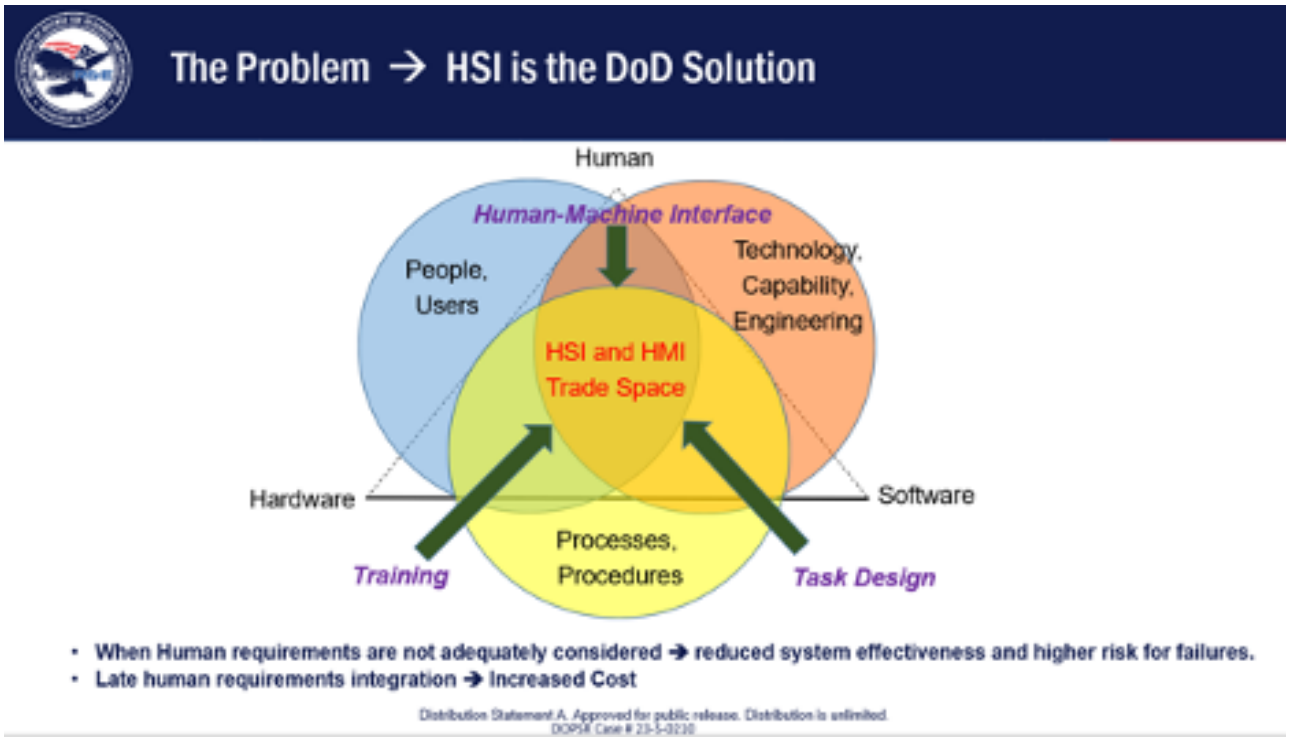

"Emerging Military" Continued

"System Survivability (SS) KPP (mandatory KPP). The SS KPP is intended to promote the development of critical warfighter capabilities that can survive kinetic (i.e., traditional, non-traditional, and CBRN (including EMP)) and non-kinetic (cyber and EMS)) threats across domains and applicable environments including space." [EMP = electromagnetic pulse]

Other System Attributes Section of the CDD or Update for requirements: "Human Systems Integration (HSI) considerations that have a major impact on system effectiveness, suitability, and survivability. The HSI Force Protection and Survivability domain contributes to the Force Protection KPP by defining requirements for personnel force protection and personnel survivability. The HSI Safety and Occupational Health domain contributes to the Force Protection KPP by defining requirements for personnel and system safety. DOTmLPF-P analyses should identify and address HSI." [DOTmLPF-P = Joint Doctrine, Organization, Training, materiel, Leadership and Education, Personnel, Facilities, and Policy]

During Development of a Joint Urgent Operational Need (JUON), "discuss any impacts to safety, survivability, personnel, training, logistics, communications, etc".

Of importance to the SAFE Association community is the increased awareness being paid by the DoD to requirements in areas of SOH, FP&S, and Habitability. System Safety (SS) interacts with HSI predominantly in the Safety and Occupational Health (SOH) domains of HSI, which will be discussed in the second part of the series.

The FP&S domain addresses the characteristics of a system than may reduce fratricide, detectability, and the probability of being attacked; and minimize system damage and user injury. FP&S requirements should be included for any manned system or system designed to enhance personnel survivability when potentially employing the system in an asymmetric threat environment. Survivability (combat) is the capability of a system or its crew to avoid or withstand a man-made hostile environment without suffering an abortive impairment of its ability to accomplish its designated mission (DAU Glossary). According to Booher (2003), survivability is the ability to exist and function through and after exposure to hostile situations or environments. This can apply to both personnel and equipment. Personnel survivability, the integration of the survivability of the individual user and how the system affects the user's survivability (in situations where individual users continue to be the focus of a close fight, and as crew members of manned weapons systems), should be addressed through dedicated measures of evaluation as well as the potential operational impact of such casualties on the ability of the platform (i.e., System Survivability) to accomplish its mission after a threat engagement, when appropriate. It must also be addressed even in cases where the platform cannot survive. Personnel Survivability addresses the characteristics of a system that can reduce fratricide, as well as reduce detectability of the user, prevent attack if detected, prevent damage if attacked, minimize medical injury if wounded or otherwise injured, and reduce physical and mental fatigue. It also includes those factors (combat ensemble, training, or combat equipment) that enable users to withstand or avoid adverse military action or the effects of natural phenomena that would result in the loss of capability to continue effective performance of the prescribed mission

The capability documents should include applicable FP&S parameters to meet warfighter needs in protection, defense, and egress, which may include requirements to eliminate significant risks of fratricide or detectability or to be survivable in adverse weather conditions and the Chemical, Biological, Radiological, and Nuclear (CBRN) battlefield. CBRN survivability, by definition, encompasses the instantaneous, cumulative, and residual effects of CBRN weapons upon the system, including its users. It may be appropriate to require that the system permit performance of mission-essential operations, communications, maintenance, resupply, and decontamination tasks by suitably clothed, trained, and acclimatized personnel for the survival periods and CBRN environments required by the system. The consideration of FP&S should also include system requirements to ensure the integrity of the crew compartment and rapid egress in cases where the system or platform is damaged or destroyed. It may be appropriate to require that the system provide for adequate emergency systems for contingency management, escape, survival, and rescue. FP&S requirements would be included under the System Survivability KPP.

The habitability domain addresses the characteristics of systems focused on satisfying personnel needs that depend upon the physical environment, such as comfort, berthing and hygiene. Habitability is one of several

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important factors included in the overall consideration of warfighter mission readiness, elements of personnel survivability, and effective human performance. A Habitability KPP should be included for any manned system where optimal working or living conditions are critical to warfighter performance. According to the JCIDS Manual (2021), habitability requirements should be incorporated under the FP KPP for "endorsement which is applicable to all CDDs addressing manned systems, or systems designed to enhance personnel survivability."

For systems in which habitability is less critical, creating Key System Attributes (KSA) or Other System Attributes (OSA) for Habitability may be more appropriate. According to DoDI 5000.95, in conjunction with DoD Component HSI SMEs and HSI practitioners, the Component capability developer or PM will work with Habitability domain representatives to establish habitability requirements. While engineers should not design the facility or service solely around optimum habitability factors, these factors cannot be systematically traded off in support of other readiness elements without eventually degrading mission performance.

In the next article, we will discuss the System Safety Engineering discipline and how it connects to and within the HSI domains. For more information or to connect with the Office of the Undersecretary of Defense for Research and Engineering, Systems Engineering and Architecture office that manages HSI and SS equities, please visit our websites:

https://ac.cto.mil/hsi/
https://ac.cto.mil/sse/
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Joint Doctrine Library (jcs.mil)

Reminder to All SAFE Members

It is important that the SAFE Association has your current contact information so we can contact you and distribute SAFE products, such as the Newsletter. Periodically, please go to the "Member Login" at the top, right corner of thae SAFE Association web page. When the SAFE Directory appears, click on **"Update Your Profile"** at the top, left. Please review your personal information and, update anything that needs to be changed, and click on **"Save Profile"** at the bottom of the page. Your efforts are much appreciated!

Some Thoughts on the Current Search and Rescue Environment.

By David DeSimone

The USAF is recognizing the requirement for long-term survival requirements dictated by the projected battlefield of today. See Defense News of 7/1/22 Rethinking Combat Rescue - Better SERE training, longer term survival, less rescue risks, unmanned aircraft.

There is consideration of the use of DRONES to be the rescue vehicle to eliminate rescue personnel casualties. The discussion is still of rotary wing aircraft. This is not practical without refueling and time expenditure due to range considerations/requirements in the same predicted combat environment. A fixed wing long range DRONE such as the STINGRAY aerial refueling carrier-based aircraft is more realistic if the survivor acquisition/ pickup can be effected. Survivor pick up by a fixed wing aircraft was accomplished in the Vietnam era. A balloon was launched with a tether to the harnessed survivor and a trapeze assembly on the nose of the aircraft snatched the tether and picked up the survivor. This was featured in a "James Bond" movie. It can be done! This same approach would be easier if the snatch was mid-air. Glide parachutes/sport chutes would keep the ejectee in the air for a time dependent on altitude, the forward to decent is 5/1. Even better with propulsion, also commercially available in small packages. There was a flyaway escape project in the distant past! Being 10 miles from the crash site is an advantage as proven over and over in Vietnam. If at sea rescue can be effected by DRONE surface USV or subsurface UUV vessels, duration can be extended hours by employing encapsulating life rafts and liquid loop heat suits invented for this purpose, but never put into service use. Survival devices can be much improved with little development since there is an active Survivor community that has fostered products for any disaster/apocalypse situation.

The USAF postulates a take down rifle in the survival kit for fire power, when a commercial 9mm large capacity weapon would suffice. There are commercial take down 9mm rifles that fit in backpacks. Note that weapons were thrown away in Vietnam to minimize execution when captured! There are technical solutions, but there are no programs with SAFE industry members participating to my knowledge. I am aware of a PJ program enhancement, but the approaches listed above are part of the dead programs of the past not implemented because of faint hearts. "Too good to be true", "What about the unconscious man", "Insufficient reliability", "What does the Admiral think." Battle plans include acceptable loss assessment.

SAFE is in the business of eliminating those losses as unacceptable. SAFE members must become proactive in convincing Congress and DOD that we have answers to this formidable problem. I tell Congressmen that they are the only hope since the system has different priorities than SAFE! I have participated in lobbying and budget plus ups for clients effectively but most of this is done by the Primes and other big guys. This is a mistake, the cost is equivalent to a newly hired senior engineer! Where is the interest and funding? Do we wait until overwhelmed by POWS as in Vietnam!

Limb restraint for high speed ejection alone would have made a big impact, but the aviators said they would slow down for ejection, however most ejections occurred above 400 knots! So much for their input! Post Vietnam studies showed several mistakes were made and simple solutions overlooked or ignored. For example, a survival equipment backpack instead of a packed rigid seat survival kit would have enabled a downed escapee to get out of dodge. The USAF had such a program! Getting away from the crash site was paramount!

I was a co-chairman in The Navy Biomedical, Human Effectiveness, Life support RDT&E workshop of 1979 sponsored by OPNAV and BuMed, where we had POWS giving us guidance to outline future projects and assess weaknesses of the current gear supplied. Most of the new projects were those listed above that didn't make it through the gauntlet of critics. We can do better if we try!

Let's be proactive! Keep the faith! I have not yet fallen down and can't get up, so there is hope for all of you!

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