TENTATIVE PROGRAM
2012 SAFE SYMPOSIUM
OCTOBER 22-24
GRAND SIERRA RESORT and CASINO
RENO, NEVADA

The SAFE Board of Directors extends a cordial invitation for you to join us at the **50th Annual SAFE Symposium**. We encourage you to begin making your plans now - this year's symposium promises to be our best ever!

We have two dynamic speakers lined up this year that you won't want to miss:

Monday: Mr. Joseph J. Angello, Jr., Office of the Under Secretary of Defense (Personnel & Readiness), Director, Operational Readiness & Safety, Pentagon, Washington, DC (see page 20 for additional details)

Wednesday: Melchor J. Antuñano, M.D., M.S., Director of the U.S. Federal Aviation Administration (FAA) Civil Aerospace, Medical Institute (CAMI) in Oklahoma City, OK (see page 37-38 for additional details)

The Symposium is your opportunity to participate in the presentation and discussion of all of the current research and technologies in SAFE's fields of interest. You will also be able to examine state-of-the-art displays and hardware in our exhibit hall, attend product demonstrations, and be part of a dynamic, professional association.

Any changes to this Tentative Program will posted on the SAFE website at www.safeassociation.com, and will be reflected in the final program which is given to all attendees at registration. Check periodically for the latest information! See you in October!

TECHNICAL PRESENTATION INFORMATION for 2012 SAFE SYMPOSIUM

Presenters should bring their final, formatted MS Power Point presentation, electronically saved on appropriate media (memory stick, CD, etc.) directly to their session at least fifteen minutes prior to the scheduled start. **Do not send your technical submission in advance to the SAFE Office, the AV team nor the Technical Chair. Bring it with you to Reno!**

All authors are encouraged to attend the morning Author's Coffee to meet and coordinate with the SAFE Technical team, your moderator, and session co-presenters. This morning meeting will be held from 7:00 AM – 7:45 AM in the Grand Salon near the SAFE registration area and signs will be posted. **The morning author's coffee is for that day's presenters and moderators only.**

If you are unable to attend the meeting and are having problems with your presentation, or if you have any other technical issues, please contact your moderator (as listed on your session scheduling letter and in the program) or the SAFE Technical Chair at your earliest opportunity and certainly prior to the beginning of your session. We will do our best to resolve any issues. There is not always enough time between sessions to correct presentation issues immediately before the session begins, so please plan accordingly. This has always been the most troublesome error presenters make, i.e., they wait until nearly the start of the session to find out if their presentation will work.

Due to the complexity of hardware and drivers for embedding video and voice files into MS Power Point, all authors should ensure their presentation runs from saved media (memory sticks, CD's) on other computer platforms prior to arriving at SAFE. Remember when you embed an AV file into your PPT it will be linked to a folder on your machine and once your presentation is loaded onto the Symposium laptop and will have to be re-linked. This was the second most common issue in the past. If you have any problems or concerns, consult your own local IT experts to ensure your presentation is saved to electronic media properly, and will run on multiple platforms.

Before you begin lay-out of your materials, please look over the Presentation Guidelines which were provided with your scheduling letter. These guidelines represent the advice of experienced presenters and attendees and it is extremely important that you follow them.

ALLOTTED TIME FOR EACH PAPER - The time allotted for the presentation of each paper is 20 minutes (unless otherwise arranged in advance through abstract submittal and approval). Following the presentation, there will be an approximate period of 5 minutes for questions and answers. This time also applies to Briefings, Panels, and all other Technical Presentations. Therefore each time slot is normally 25 minutes.

Your presentation will not be pre-loaded by the SAFE AV team, so it is up to you to bring and load your presentation before the session begins by working with the session moderator and staff.

SPECIAL NEEDS OR CHANGES - We understand that things change. We are here to help. If you have special needs or changes, which affect a paper session, contact your moderator, the SAFE Office, or the Technical Chair immediately via e-mail, telephone or by message through the SAFE Office. Do not wait until the show or the author's coffee to begin this process. This is especially true if you need to cancel your presentation for any reason. The earlier we know, the better we can accommodate others in your time slot or make adjustments in schedule.

AUDIO VISUAL EQUIPMENT
The following equipment will be available for all technical sessions:

- A laptop, LCD projector and screen (exception: co-locating groups provide their own lap top)
- Podium Microphone
- Lighted Pointers
- Applicable microphones

If you need additional equipment, please inform the SAFE office at least three weeks prior to the Symposium, or contact the AV Desk at the Symposium no later than 24 hours before your scheduled presentation time.

Call for Moderators - 2012

We are seeking moderators to serve for technical sessions during the forthcoming SAFE Symposium, October 22-24 at the Grand Sierra Resort and Casino, Reno, Nevada. Below are the guidelines for session moderators. Our moderators often tell us this is a very rewarding experience so we hope you consider serving! Send an e-mail to Jeani Benton (safe@peak.org) if you are interested. **Include your area of expertise so we can match you to your interests.**

GUIDELINES FOR SESSION MODERATORS

PRIOR TO THE MEETING:

The SAFE office will provide the Moderator with contact information of the session speakers, the text of their abstracts, and presentation technical requirements.

The Moderator will contact the speakers before the meeting to ensure that the speakers:

- Are attending the meeting and contact safe@peak.org immediately if they cannot
- Are aware of and comply with the required format for presentations, including videos
- Will meet the moderator at the author's briefing at 7:45 AM the morning of their presentation

AT THE MEETING:

The Moderator will

- Notify the Symposium staff if there are problems with the equipment in the session room (laptop, laser pointer, audio visual)
- Meet with the presenters 20 minutes before the session begins and load and test the presentations.
- At the beginning of the session, make the following announcements:
    - ✓ Remind the audience to turn off their electronic devices
    - ✓ Explain how the session will be conducted (*i.e.,* the amount of time per presentation and when the question/ answer periods will be held).
- Before each presentation, provide a short introduction consisting of the title, the authors' names and the presenter's affiliation. Do not read the speaker's biography.
- Keep speakers on time, typically 30 minute slots including 5 to 10 minutes at the end reserved for questions.
- Prepare at least one question for each presentation to stimulate discussion from the audience as needed.
- Remind attendees with questions to rise and identify themselves.
- Fill out the Moderator's Summary Form (to be provided prior to symposium and/or during the author's morning briefing) and leave it on session table for the Symposium staff to collect.

Join Us in Reno!

DATE: Sunday, 21 October 2012

START TIME: 15:00

LOCATION: Hidden Valley Regional Park

Course Map on SAFE website

ON-LINE REGISTRATION: Now Open

Pre-Registration is highly recommended for a race shirt in your size.

AWARDS RECEPTON: Awards for top finishers and much more.
Race shirts and reception for all participants.

Event Details posted on SAFE Association website:
www.safeassociation.com and on Facebook: SAFE Association

Open to SAFE Symposium Attendees, Friends and Spouses.

To become a sponsor and/or volunteer contact:
Marcia Baldwin at: mkbaldwin@coresurvival.com

REGISTRATION POLICIES

GENERAL POLICIES:

All persons attending the Symposium, including technical presenters, and general participants pay the applicable registration rate.

No telephone registrations are accepted and no pre-or post-symposium invoicing will be done.

Receipts in advance of the symposium are not provided. They will be available at the registration desk, along with program materials, including attendee badge. You may, however, e-mail the SAFE office (safe@peak.org) to verify receipt of your registration.

One day registration will be $225.00 and will be accepted in advance and/or at-the-door.

All paid registrants, including exhibitors are invited to attend the Get-Acquainted Cocktail reception on Sunday, October 21st and the Awardees Reception on Monday, October 22nd.

International visitors registering by check or money order must provide payment in U.S. funds. No bank transfers are accepted. A $25.00 service charge will be required to cover the collection fee of non-U.S. funds.

Chapter membership does not entitle registration at the SAFE member rate. You must be a member of the headquarters organization to obtain the member rate.

Please do not FAX, e-mail and mail your registration! Duplication of registration causes unnecessary paperwork and confusion.

PRE-REGISTRATION:

To qualify for the pre-registration rate, registrants must pay in advance on or before the deadline of September 21st. Registrations received after the pre-registration deadline will be charged the at-the-door rate.

Pre-Registration will be accepted via mail, FAX or on-line at www.safeassociation.com.

Pre-Registration payment may be made by cash, check, money order, credit card or Pay Pal. SAFE accepts Visa, Master Card, and American Express. See registration and credit card form on bottom of page 6. Payment by Pay Pal does not require a personal account to use. It does, however, protect your credit card information better than submission via e-mail.

Mailed funds which are not received prior to the pre-registration deadline will have to pay again at-the-door. Their original mailed funds will be refunded after the symposium.

FAX REGISTRATION:

FAX registrations with payment will be accepted. FAX registrations received without credit card or Pay Pal information will be treated as at-the-door registrations and applicable rates will apply. SAFE accepts Visa, Master Card, and American Express. See registration and credit card form on Page 6.

AT-THE-DOOR REGISTRATION:

At-the-door registration is available by credit card, check or cash. At-the-door registration fees shown on Page 6.

Pre-Registration will be accepted via mail, FAX or on-line at www.safeassociation.com.

2012 SAFE SYMPOSIUM REGISTRATION

Pre-registration deadline is September 21st

1st line on attendee badge will be

TITLE : (Mr. Ms., Rank etc). _____

and FULL NAME _____

2nd line on attendee badge will be:

COMPANY OR ORGANIZATION _____

3rd line on attendee badge will be:

City _____**State/Country** _____ **Zip**_____

Phone_____

E-Mail _____

_____ **SAFE Member $350.00 (At-the-Door $400.00)**

_____ **Non-Member $450.00 (At-the-Door $500.00)**

_____ **All U.S. personnel assigned to a military organization/installation holding a valid Active Duty Military or Department of Defense I.D/CAC card - $80.00 – covers all 3 days**

_____ **All foreign military active duty personnel - $80.00 – covers all 3 days**

_____ **Spouse Registration - $100.00 – covers all 3 days. Name:** _____

_____ **One Day Registration $225.00 per day Circle Day Attending : (Monday, Tuesday or Wednesday)**

_____ **Golf Tournament $85.00 Handicap** _____

Total Amount Paid $_____

NOTE TO EXHIBITORS: PLEASE DO NOT USE THIS REGISTRATION FORM. EXHIBIT PERSONNEL CAN REGISTER ON-LINE AT WWW.SAFEASSOCIATION.COM UNDER THE SYMPOSIUM LINK. ON-LINE REGISTRATION IS ALSO AVAILABLE FOR GENERAL ATTENDEES.

IF REGISTERING BY FAX, PLEASE COMPLETE CREDIT CARD FORM BELOW AND FAX ALONG WITH THIS REGISTRATION FORM. IF REGISTERING BY MAIL WITH A CHECK, THE REGISTRATION FORM ABOVE CAN BE USED AND SENT WITH YOUR CHECK.

THE SAFE ASSOCIATION ACCEPTS VISA, MASTER CARD AND AMERICAN EXPRESS. SHOULD YOU WISH TO USE THIS FORM OF PAYMENT, ALL INFORMATION BELOW MUST BE LEGIBLY COMPLETED:

Check one: Visa _____ MasterCard _____ American Express _____

PRINT NAME ON CARD _____

ACCOUNT NUMBER _____

EXPIRATION DATE_____AMOUNT $ _____ _____

PAYMENT FOR_____

SIGNATURE _____

PHONE #_____

ROOM RESERVATIONS & HOTEL INFORMATION:

Sleeping Room Reservations: When calling the hotel for reservations, please identify yourself with SAFE Association to confirm a room under the SAFE block and to receive the negotiated group rate. All symposium attendees except government employees and members of the military should tell the reservations clerk that the group code for SAFE is: **SAFE 12.**

Government employees and members of the military should tell the reservations clerk that the group code for SAFE is: **SAFE 12G**.

Room reservation number is: (800) 648-5080.

SAFE holds a room block over the dates of October 18 – October 29.

Hotel is linked at www.safeassociation.com or you can use the following URL for direct reservations:

https://resweb.passkey.com/Resweb.do?mode=welcome_ei_new&eventID=8328610

General information number for the hotel is: (775) 789-2000.

Room Reservation Deadline: September 18, 2012. This deadline is established by the hotel and cannot be changed by SAFE.

Sleeping Room Rates: Per diem rooms are available at the prevailing government per diem rate. Per diem rates are subject to change. **Important**: See correct room code above when making reservations.

General Room rate: $89.00 Single/Double occupancy.

Summit Tower Room rate: $109.00

All rooms must be secured with the first night's deposit + tax when making reservations.

Additional persons over two (2) occupying the same room will be charged an extra $20.00 per person, per night.

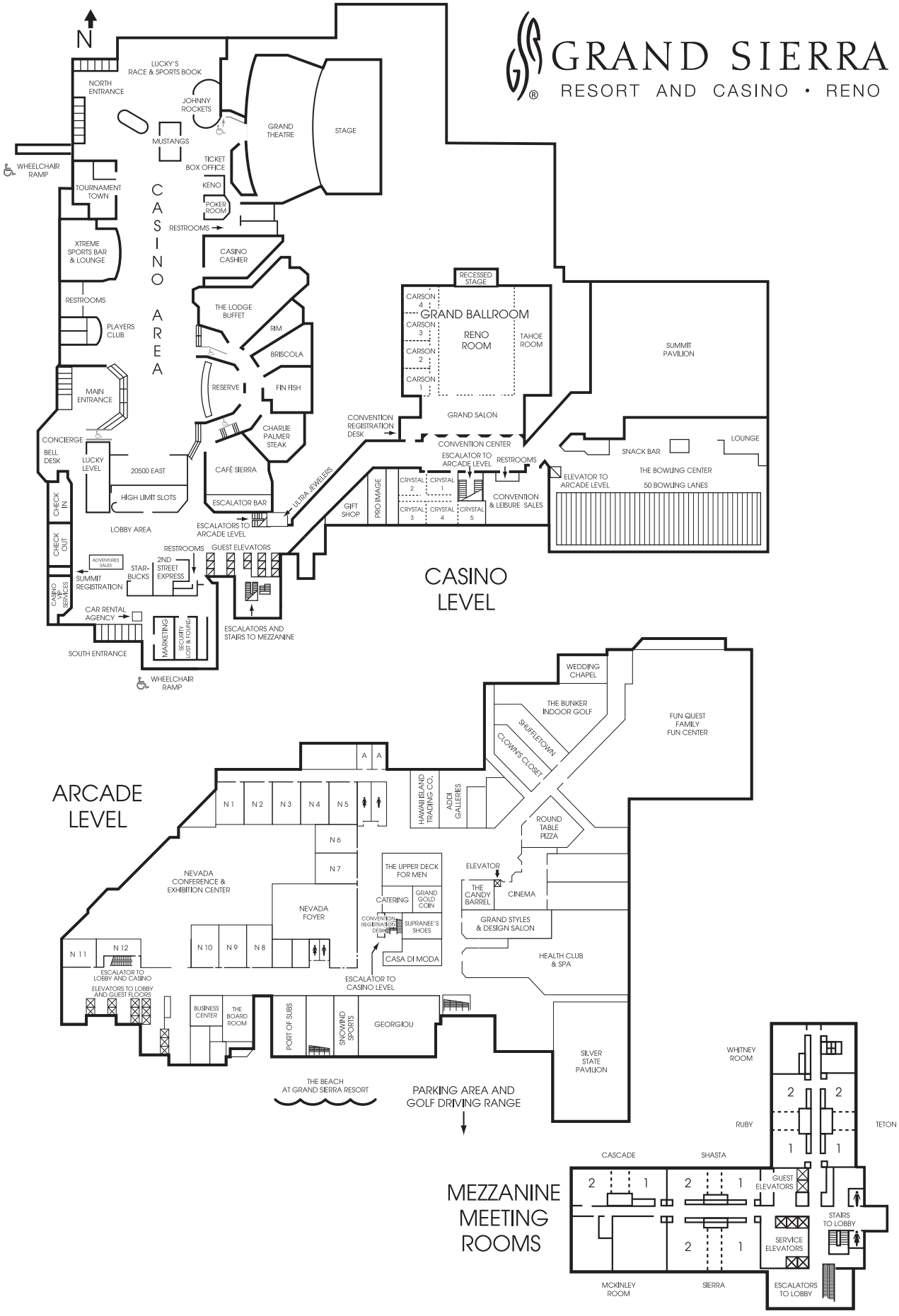
Special Note: We understand that companies offering to provide individual rooms or small room blocks at less than SAFE contracted rates have been in contact with several of our corporate members and exhibitors. While the SAFE room rate may be a few dollars more than the rates quoted by these companies, this is due to the fact that SAFE negotiates with the hotel to obtain no rental fees for our meeting and exhibit space. This negotiation results in a huge savings which is passed along to our SAFE attendees in the form of lower registration and exhibit space rates. The hotel recovers a small percentage of this rental by adding a few dollars to the negotiated room rate. It is important to understand that this slight room increase does not come close to covering the astronomical per square foot per day rates the hotel normally charges for meeting room and exhibit space rental.

SAFE is financially liable for all contracted rooms, whether the hotel sells them or not. This is why we ask that you always book your rooms under the SAFE block. We work diligently to give all attendees the best overall experience at our annual Symposium and ask for your continued support.

Notice of Housing Scam - If you are contacted by a company called "Exhibition Housing Services," "Convention Housing Services" or a housing service by any other name and they tell you they are the "official" housing service for the 2012 SAFE Symposium, please do not do business with them. SAFE never utilizes a sleeping room housing service.

Management at the Grand Sierra Resort has been advised and will start an investigation into this issue. When it happened in 2011, we were advised by the hotel not to utilize any housing service as this is a common scam in Nevada. Their service is NOT generated by Grand Sierra Resort and they will take your deposit and run!

GRAND SIERRA
RESORT AND CASINO • RENO



OVERVIEW OF SYMPOSIUM SCHEDULE

EXHIBIT HALL HOURS:

Monday, 10/22	1:00 PM – 5:00 PM
Tuesday, 10/23	10:00 AM – 5:00 PM
Wednesday, 10/24	10:00 AM – 3:00 PM

The exhibit hall will remain open during the lunch hour on Tuesday and Wednesday. Hall is closed Monday lunch hour.

SUNDAY, OCTOBER 21st

7:00 AM – 10:00 PM	Exhibitor Set-up
9:00 AM	Golf Tournament
10:00 AM – 6:00 PM	Registration Open
3:00 PM	5K Runner
7:00 PM – 9:30 PM	Get – Acquainted Reception (Exhibits Closed)

MONDAY, OCTOBER 22nd

7:00 AM - 7:45 AM	Author's Coordination Briefing
8:00 AM - 5:00 PM	Registration Open
8:30 AM – 10:00 AM	Special Presentation Speaker
10:00 AM – 10:30 AM	Refreshment Break
10:30 AM – Noon	Technical Sessions
Noon - 1:00 PM	Lunch (Exhibits Closed)
1:00 PM	Exhibits Open
1:00 PM – 2:30 PM	Technical Sessions
2:30 PM – 3:00 PM	Refreshment Break
3:00 PM – 4:30 PM	Technical Sessions
5:15 PM – 6:30 PM	SAFE General Membership Meeting and presentation of 2012 SAFE Awards
5:00 PM	Exhibits Close
7:00 PM – 9:30 PM	2012 Awardees Reception

TUESDAY, OCTOBER 23rd

7:00 AM - 7:45 AM	Author's Coordination Briefing
8:00 AM - 5:00 PM	Registration Open
8:30 AM – 10:00 AM	Special Presentation Speaker
10:00 AM	Exhibits Open
10:00 AM – 10:30 AM	Refreshment Break
10:30 AM - Noon	Technical Sessions
Noon - 1:00 PM	Lunch (Exhibits Open)
1:00 PM – 2:30 PM	Technical Sessions
2:30 PM – 3:00 PM	Refreshment Break
3:00 PM – 5:00 PM	Technical Sessions
5:00 PM	Exhibits Close

WEDNESDAY, OCTOBER 24th

7:00 AM - 7:45 AM	Author's Coordination Briefing
8:00 AM - 5:00 PM	Registration Open
8:30 AM – 10:00 AM	Special Presentation Speaker
10:00 AM	Exhibits Open
10:00 AM – 10:30 AM	Refreshment Break
10:30 AM – Noon	Technical Sessions
Noon - 1:00 PM	Lunch (Exhibits Open)
1:00 PM – 2:30 PM	Technical Sessions
2:00 PM	Raffle (Exhibit Hall)
2:30 PM – 3:00 PM	Refreshment Break
3:00 PM	Exhibits Close
3:00 PM – 9:00 PM	Exhibitor Tear-Down

EXHIBIT AREA ACCESS POLICY, SET-UP AND TEAR-DOWN TIMES

The Symposium Committee has developed the exhibit area set-up and access policies to protect the exhibitors and their products from unauthorized access and theft. We appreciate your cooperation and understanding in this matter.

Set-up for exhibitors will be Sunday, October 21st from 7:00 AM – 10:00 PM. We urge you to have your exhibits set early in order that you enjoy the social that evening. Persons who are not setting booths should not be in the exhibit area and security will be enforced for the protection of our exhibitors.

Tear-down for exhibitors will be Wednesday, October 24th beginning at 3:00 PM. Tear-down must be completed by 9:00 PM on Wednesday evening. We ask that you not commence your tear-down prior to 3:00 PM as this is disruptive to your neighboring exhibitors who may still be conducting business.

GOLF TOURNAMENT PRIZES AND GIVE-AWAYS – See enclosure for additional tournament information including participation.

The 2012 SAFE Golf Tournament will be held on Sunday, October 21, 2012, at the Resort at Red Hawk (Lakes Course) 6600 N. Wingfield Parkway, Sparks, NV 89436.

Entry fee will be $85.00 – See enclosure for additional information

New this year: Due to past financial losses caused by player/team dropouts and late or non-payment, only players who have registered and paid in full will be placed on teams and participate in the tournament. No exceptions!!

Give-Aways, Prizes, etc: The golf committee is asking corporate members to consider providing give-a-ways in the form of golf balls, towels, tees, cash, etc. to be used as tournament prizes. Contributions will be most appreciated and appropriate credit will be given in the SAFE Symposium Program as well as posted in the exhibit area. Should you wish to make a cash contribution, please make your check payable to SAFE with Golf Tournament Contribution on the memo line, and mail to SAFE, Attention: Golf Tournament Chair. We are looking for companies to sponsor certain prizes this year. If your company would be interested in sponsoring certain prizes (1st Place, 2nd Place, Long Drive, closest to the pin, etc.), please contact Ebby Bryce for details. If you are interested in providing golf give-a-ways (tees, balls, towels, trophies, etc.) please contact Jeani Benton in the SAFE Office at (541) 895-3012; e-mail safe@peak.org or Ebby Bryce, (757) 927-2461, e-mail ebryce@ced.us.com.

GET-ACQUAINTED RECEPTION:

Our 2012 Get-Acquainted Reception will be held on Sunday, October 21st from 7:00 PM – 9:30 PM.

There will be complimentary food. We will provide free non-alcoholic beverages, and all attendees will have the option of purchasing alcoholic beverages.

We urge all attendees to join us. The Exhibits Hall will not be open during this time.

SAFE GENERAL MEMBERSHIP MEETING AND AWARD PRESENTATIONS

The 2012 SAFE General Membership Meeting and presentation of the 2012 SAFE Awards will be held on Monday, October 22nd from 5:15 PM – 6:30 PM.

We urge all attendees to join us. The Exhibits Hall will not be open during this time.

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AWARDEES RECEPTION

Our 2012 Awardees Reception will be held on Monday, October 22nd from 7:00 PM – 9:30 PM.

There will be complimentary food. We will provide free non-alcoholic beverages, and all attendees will have the option of purchasing alcoholic beverages.

We urge all attendees to join us. The Exhibits Hall will not be open during this time.

PHOTOGRAPHY POLICY

No in-session photography is permitted except photos taken by the official SAFE photographer.

The taking of photographs inside the Exhibit Hall IS NOT permitted except by those photographing their own booth, booth visitors, and displays after the Exhibit Hall opens on Monday. To photograph anything inside the Exhibit Hall or area other than previously explained, you must receive prior informed consent of the individual and/or owner of the subject matter. Photographs may only be taken during normal exhibit hours with the consenting individual present at the time the photographs are taken.

No photography is permitted in the Exhibit Hall or area prior to opening and after closing. All attendees are expected to comply.

Official SAFE photos will be taken by an authorized photography service which is sanctioned and controlled by the Symposium Committee. If you see any suspicious photography-related activity, please report it immediately.

Members of the press are welcome at any time but must be accompanied by a member of the SAFE Board of Directors. This can be arranged through the Symposium Chair or Co-Chair.

REMINDER DATELINES

Room Reservation Deadline – Wednesday, September 18th

Pre-Registration Deadline – Friday, September 21st

Golf Tournament Sign-Up Deadline – Friday, September 21st

5k Runner Pre-registration Sign-Up Deadline – Friday, September 21st

50th ANNUAL SAFE SYMPOSIUM

OCTOBER 22-24, 2012
GRAND SIERRA RESORT & CASINO – RENO, NEVADA
SUMMIT PAVILION

EXHIBIT SPACE RESERVATION FORM

NOTE: ON-LINE EXHIBIT RESERVATION AVAILABLE @ WWW.SAFEASSOCIATION.COM

Exhibit booths are 10 x 10. The exhibit fee includes three (3) complimentary registrations per booth, 24-hour security, draping, booth identification sign, and clean-up.

Four guest passes per exhibitor (not per booth) per day will be available at the registration desk. These passes are for visiting customers of the exhibitor; not spouses, friends, employees or consultants or anyone else employed by that exhibitor. Use of guest passes will be monitored.

No exhibit space will be assigned unless the order is accompanied by a deposit of $100.00 per booth space. SAFE accepts credit cards – use form at bottom of page 6. Per-booth fees are shown below:

Cost of each 10 x 10 Booths:

( ) SAFE Corporate Members, Universities & Military $1,400.00

( ) All Others $2,000.00

Final booth balance due on or before September 24, 2012

Number of spaces required? _____

From the attached floor plan, please indicate your first four choices of exhibit space numbers below. If all indicated choices have been reserved prior to receipt of this application, we will call you regarding an assignment.

_____ 1st choice _____ 2nd choice

_____ 3rd choice _____ 4th choice

Enclosed is our check (or credit card information) in the amount of: $ _____

Return completed application to:

SAFE Association
Post Office Box 130
Creswell, OR 97426-0130
(541) 895-3012
FAX: (541) 895-3014

Company Name: _____

Address: _____

_____

_____

_____

Individual to contact regarding application: _____

Telephone: ( ) _____

E-Mail (Mandatory) _____

Signed _____ Date: _____

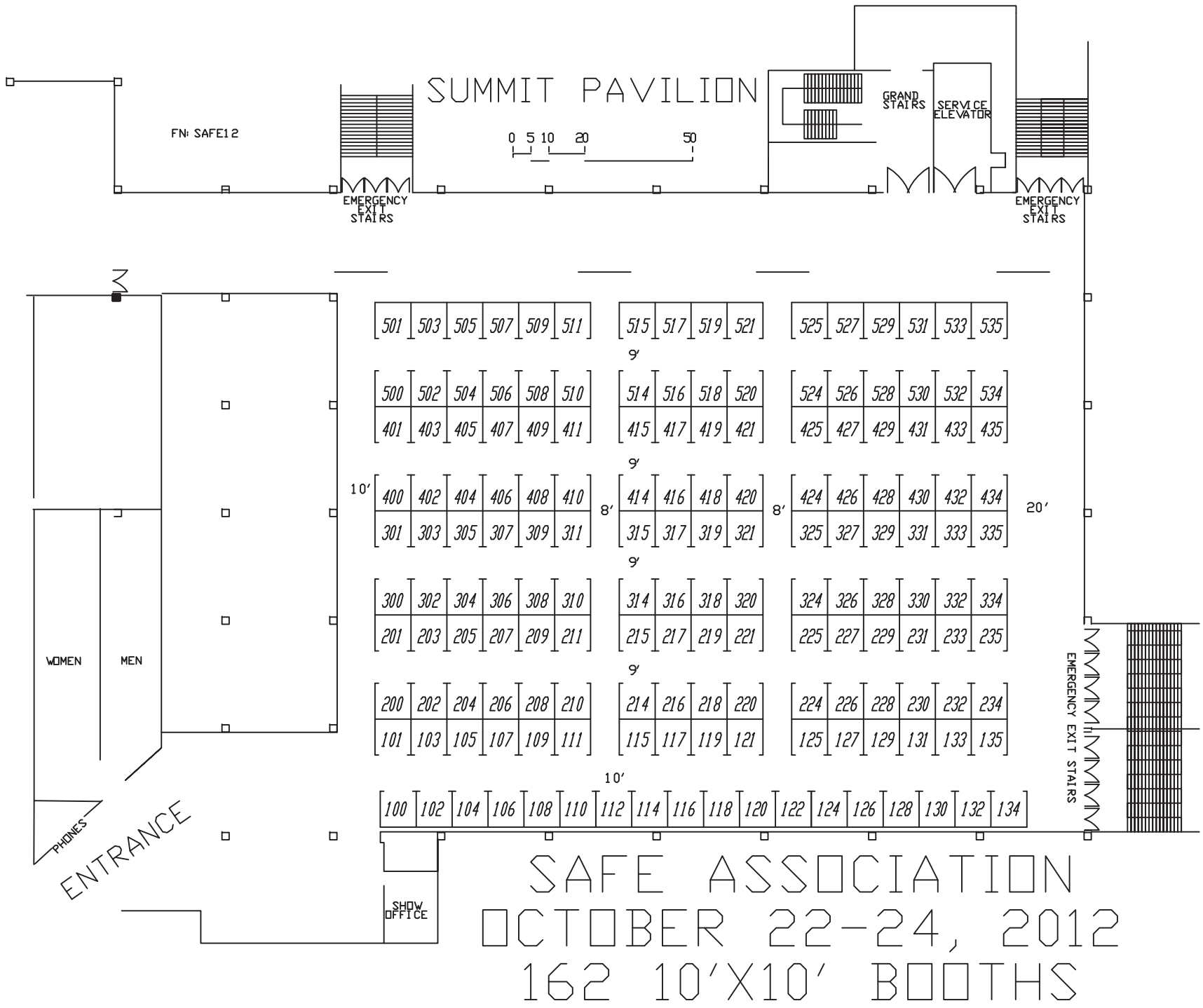
2012 SYMPOSIUM EXHIBITORS

The following exhibitors will be in attendance at this year's symposium. SAFE would like to thank them in advance for their participation and support of the SAFE Association and we encourage everyone to stop by each of these booths during the symposium:

Booth #	Exhibitor
201	A.A.I. (Aviation Artifacts, Inc.)
426	ADS, Inc.
419 & 421	AdvanTac Technologies
108	Aegisound
407, 409 & 411	Aerial Machine & Tool Corp.
208	Aeroflex
501 & 503	Aerostar Division of Raven Industries
325	Air Cruisers Company - Zodiac Aerospace
410	Air Liquide Advanced Technologies
115	Air Techniques International
121	Airborne Systems Group
124	Aircrew Performance Branch - Attn: Randy Hill
306 & 308	AmSafe, Inc.
326	ARINC/AVION
310	AVOX Systems, Inc.
215 & 217	B/E Aerospace Systems GmbH
106	BAE Systems
103	Bally Ribbon Mills
314	Bose
110	Cartridge Actuated Devices, Inc. (CAD)
319, 321, 418 & 420	Chemring Energetic Devices
224, 225, 226, 227, 228, 229, 230 & 231	Cobham Mission Systems
235	David Clark Company, Inc.
207	Dayton T. Brown, Inc.
120	Drifire
126	Eagle Picher Technologies
101 & 200	East/West Industries, Inc.
400	Elbit Systems SAR and Data Links - Elisra, Ltd.
135	Engineered Arresting Systems (ESCO)
131	Ensign-Bickford Aerospace & Defense Company
425	Epilog Laser
300 & 302	Essex Industries
404 & 406	FXC/Guardian Parachute
109	General Dynamics C4 Systems
331, 333, 335, 430, 432 & 434	Gentex Corporation
Continues next page	

Booth #	Exhibitor
334	Gibson & Barnes
205	Honeywell Aerospace
405	Infoscitex Corp.
511	JBC Corp.
408	Katadyn North America
209	Kistler Instrument Corporation
116 & 118	Life Support International, Inc.
132 & 134	LiteFighter Systems, LLC
100, 102 & 104	Martin-Baker Aircraft Co., Ltd.
304	Massif Mountain Gear
127	Momentum Interactive LLC
114	Nammo Talley
112	Networks Electronic Company
125	Oregon Aero, Inc.
309 & 311	Pacific Scientific Energetic Materials Company (PSEMC)
111	Para-Gear Equipment Co., Inc.
203	RINI Technologies
324	RMI Laser, LLC
105	S.O. TECH - Special Operations Technologies
327	Sandel Avionics
317	SECUMAR Bernhardt Apparatebau GmbH u. Co.
117	Signal Engineering, Inc.
129	Spacesaver Corporation
301, 303, 305 & 307	SSK Industries, Inc. - Systems Technology, Inc. - Butler Parachute Systems Group
202, 204 & 206	Stratus Systems
401, 403, 500 & 502	Survitec Group
414 & 315	Switlik Parachute Co., Inc.
214, 216, 218 & 220	Teledyne Electronic Safety Products
107	Tex-Shield, Inc.
122	U.S. Air Force - 846th Test Squadron
415, 417, 514 & 516	UTC Aerospace Systems
119	Viking Life-Saving Equipment
518 & 520	W. L. Gore & Associates, Inc.
219, 221, 318 & 320	Wel-Fab, Inc.
210	Westone Laboratories, Inc.
424	Wiley-X, Inc.
316	Wolf Technical Services
211	WS Technologies, Inc.

Floor Plan on Next Page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SAFE ASSOCIATION
OCTOBER 22-24, 2012
162 10'X10' BOOTHS

2012 PORTFOLIO SPONSORS

SAFE would like to thank the following advertisers for their contribution to the 2012 Symposium portfolio promotional item:

A.A.I. (Aviation Artifacts, Inc.)

Aegisound

Aeroflex

Air Liquide Advanced Technologies

AmSafe, Inc.

AVOX – Systems – Zodiac Aerospace

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B/E Aerospace

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David Clark Company, Inc.

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Elbit Systems SAR and DataLinks – Elisra Ltd.

Ensign-Bickford Aerospace & Defense

Essex Industries, Inc.

Gentex Corporation

Honeywell Aerospace

Kistler Instrument Corporation

Mustang Survival, Inc.

Networks Electronic Company

COMPANY / ORGANIZATION

Oregon Aero, Inc.

Para-Gear Equipment Company

RMI Laser, LLC

Secumar / Bernhardt Apparatebau GmbH u. Co.

Stratus Systems

Survitec Group

Switlik Parachute Co., Inc.

Teledyne Energetics

Tex-Shield

Tulmar Safety Systems

Vinyl Technology, Inc.

W. L. Gore (Gore Military Fabrics)

SAFE RAFFLE

WEDNESDAY, OCTOBER 24, 2012
TIME: 2:00 PM START - IN THE EXHIBITS AREA

RAFFLE PROCEDURES FOR 2012

Our raffle will be held in the Exhibits Hall at 2:00 PM on Wednesday. Prizes will include gifts from our exhibitors and corporate members.

If you wish to contribute special prizes to our raffle, they can be delivered to SAFE in two ways (1) co-ordinate with Jeani Benton in advance of the symposium (safe@peak.org) (2) On-site the prizes must be delivered to the SAFE Registration Desk no later than Noon on Wednesday, October 24th with a business card taped to the prize/gift for corporate recognition. There will be no exceptions to this deadline. Any prizes delivered after this time will go into a general pool or grab bag prize (s) and the source may not/cannot be identified

Each attendee's registration packet will contain five dual raffle tickets. The attendee will retain one half and place the other into any one of the many prize pool containers located on display in the raffle area after 1:00 PM. Attendees may also purchase more raffle tickets at a $1.00/each. One ticket from each pool will be pulled until a winner is identified as present. Winners take the entire pool of prizes. The more gifts and prizes we have the more pools will be created and the more chances to win. There is no limit as to which pool an attendee places tickets in or how many you purchase. SAFE reserves the right to collect prizes into pools and to pull all winners.

Remember – you must be *in attendance* at 2:00 PM Wednesday to win!

SCHEDULE OF EVENTS

SUNDAY, OCTOBER 21st

SUNDAY – 10:00 AM – 6:00 PM
REGISTRATION OPEN
LOCATION: GRAND SALON – CASINO LEVEL

SUNDAY – 7:00 AM – 10:00 PM
EXHIBIT SET-UP
LOCATION: SUMMIT PAVILION - EXHIBIT HALL - CASINO LEVEL

SUNDAY IS AN EXHIBIT SET-UP DAY ONLY. BADGES ARE NOT REQUIRED FOR SUNDAY SET-UP.

THE EXHIBITS AREA IS NOT OPEN TO GENERAL ATTENDEES. PLEASE ALLOW OUR EXHIBITORS TO SET-UP FOR ON-TIME OPENING BY NOT ENTERING THE EXHIBIT HALL UNLESS YOU ARE AUTHORIZED TO BE THERE.

SECURITY WILL ASK ANYONE TO EXIT THE AREA WHO IS NOT SETTING A BOOTH.

NO EXCEPTIONS!

SUNDAY - START TIME: 9:00 AM - SHOTGUN START
LOCATION: RESORT AT RED HAWK, LAKES COURSE - SPARKS, NEVADA

See enclosure with this mailing for further details and information. Also see page 10 for prize / give-away details.

SUNDAY – 3:00 PM
5K RUNNER
LOCATION: HIDDEN VALLEY REGIONAL PARK – RENO, NEVADA

See page 4 for further details and information

SUNDAY – 7:00 PM – 9:30 PM
GET-ACQUAINTED RECEPTION
LOCATION: RENO/TAHOE BALLROOM – CASINO LEVEL

Our 2012 Get-Acquainted Reception will be held on Sunday, October 21st from 7:00 PM – 9:30 PM.

There will be complimentary food. We will provide free non-alcoholic beverages, and all attendees will have the option of purchasing alcoholic beverages.

The Exhibits Hall will not be open during this time.

MONDAY, OCTOBER 22nd

MONDAY - 7:00 – 7:45 AM
AUTHOR'S COORDINATION AND BRIEFING
LOCATION: GRAND SALON – CASINO LEVEL

The morning author's coffee is for that day's presenters and moderators only. We ask that all others use the coffee shop facilities within the hotel.

MONDAY - 8:00 AM – 5:00 PM
REGISTRATION OPEN
CARSON 1 & 2 – CASINO LEVEL

MONDAY – 1:00 PM – 5:00 PM
EXHIBITS OPEN
LOCATION: EXHIBIT HALL - SUMMIT PAVILION - CASINO LEVEL

Monday Technical Program begins on next page

MONDAY – 8:30 AM – 10:00 AM
LOCATION: RENO BALLROOM – CASINO LEVEL

Special Presentation Speaker – Mr. Joseph J. Angello, Jr.
Office of the Under Secretary of Defense (Personnel & Readiness)
Director, Operational Readiness & Safety
Pentagon, Washington DC

Welcome to Attendees and Introduction: Allen "Al" Loving, 2012 SAFE President

Biography: Since 1995, Mr. Angello has served as the Director, Operational Readiness and Safety in the office of the Under Secretary of Defense for Personnel and Readiness. His portfolio includes policy and assessment of military readiness issues with the objective of ensuring ready and responsive military forces. Mr. Angello also serves as the Executive Secretary of the Defense Safety Oversight Council.

Mr. Angello develops and oversees policies and programs to ensure U.S. forces stand ready for all missions as assigned by the President and the Secretary of Defense. He leads major DoD-wide initiatives that include the development of a real-time readiness reporting system, and the implementation of the Secretary of Defense's 75% mishap reduction goal.

Mr. Angello's portfolio also includes the management of several senior level DoD policy forums including the Defense Safety Oversight Council (DSOC), operations and personnel tempo analysis, unit readiness analyses, injury reduction initiatives and measurement systems, and formal military risk assessment.

Mr. Angello also serves as a task force chair that is developing a force risk reduction system. This system is designed to give commanders and supervisors actionable data for injury prevention and mitigation -- a first for the Department.

Mr. Angello has championed the development and implementation of the Defense Readiness Reporting System (DRRS) in accordance with the DRRS concept of operations, program schedule, and guidance from the DRRS Executive Committee. He is responsible for reporting on the accuracy and suitability of Service-provided authoritative data in the DRRS enterprise for use in Global Force Management.

Mr. Angello is also responsible for the creation and management of the Defense Suicide Prevention Office (DSPO). This office develops and recommends policy, programming and planning actions and strategic guidance for suicide prevention for Military Departments, DoD agencies, field activities, and Combatant Commands. (continues)

Mr. Angello also oversees the Drug Demand Reduction Program to meet requirements for reducing drug abuse in the force. The program is restructuring the Department's drug testing policy to make the program more efficient while maintaining a viable deterrence.

From 1990-1995, Mr. Angello served on the staff of the Director, Program Analysis and Evaluation. His responsibilities included defense acquisition issues, force structure alternatives, peacetime readiness measures, and the management of the DoD infrastructure. He also served as a senior analyst for the OSD Cost Analysis Improvement Group.

Prior to joining the Office of the Secretary of Defense, Mr. Angello held various positions as an active duty Air Force officer.

MONDAY – 10:00 AM – 10:30 AM
REFRESHMENT BREAK
LOCATION: GRAND SALON AREA – CASINO LEVEL
(NEAR REGISTRATION)

MONDAY – 10:30 AM – NOON
BRIEFING - TRI-SERVICE AIRCREW SYSTEMS DEVELOPMENT ACQUISITION UPDATE
LOCATION: RENO BALLROOM – CASINO LEVEL
MODERATOR: John A. Plaga, Senior Research Aerospace Engineer,
Human Performance Integration Directorate,
711th Human Performance Wing, Wright-Patterson AFB, OH

Summary: This panel provides an update from each service on current and future aircrew protection equipment development and acquisition programs. A question and answer session will follow after each service presentation.

Further information on this briefing will appear in the final program.

MONDAY – NOON – 1:00 PM
LUNCH BREAK
EXHIBITS ARE NOT OPEN AT THIS TIME

MONDAY – 1:00 PM – 5:00 PM
EXHIBITS OPEN
LOCATION – EXHIBIT HALL – SUMMIT PAVILION - CASINO LEVEL

Monday technical sessions begin next page

MONDAY – 1:00 PM – 2:30 PM
INSTRUMENTATION
LOCATION: CRYSTAL 3 & 4 – CASINO LEVEL

MODERATOR:

Paper and Briefing – ACES Enhanced Digital Recovery Sequencer Program Update – Mr. Jeff Benjamin, Project Engineer, ACES Program; Mr. Dave Harrington, Electrical Engineer, Analysis; Mr. Kevin Mueller, Project Engineer, Analysis, Goodrich Corporation, Colorado Springs, CO and Mr. Layne Peterson, Engineer, CAD/PAD, Hill AFB UT

Abstract: The ACES Ejection Seat Enhanced Digital Recovery Sequencer (EDRS) is an upgrade to the Digital Recovery Sequencer (DRS) which was previously developed by Goodrich in 2002 as a replacement for the aging Analog Recovery Sequencer. The EDRS program was a pre-planned product improvement program that was undertaken by Goodrich to increase the safety and reliability of the fielded Digital Recovery Sequencer (DRS) by removing the analog environmental sensor, which operates on a system of mechanical bellows and switches to sense airspeed and altitude. The design of the EDRS features on-board, triple redundant digital circuitry that directly measures, processes, and records environmental data. The EDRS program began with concurrent analysis, simulation, and verification of the ejection environments to develop pressure data processing.

Additional efforts were required to gather and analyze all platform requirements to derive a single set of EDRS requirements. The project is currently undergoing a full qualification program to verify performance for use on all fielded platforms. The program is progressing through the qualification phase with the successful completion of environmental testing and the majority of system testing. The EDRS processing has proven to be highly accurate with an improved accuracy in airspeed and altitude measurement compared to the legacy ACES environmental sensor. This presentation reviews the EDRS program status, and discusses the results of the qualification testing.

Briefing & Demo - Compact Data Recorders and Sensors for Crew Safety Testing, Warrior Exposure and Incident Recording – Mr. Michael Beckage, Vice President / Principle Engineer, Diversified Technical Systems, Inc., Seal Beach, CA

Abstract: This briefing will provide an overview of recent advances in data acquisition and sensing technology for dynamic test environments, warrior exposure and incident recording applications. Product introductions will include DTS' family of autonomous incident recorders and new SLICE PRO mega-sample data acquisition systems for high energy testing applications. Application focuses include: blast, shock & vibration, biomechanics, missile/fuze and vehicle "black box" recorders.

Briefing - AN/URT-44 406 MHz Beacon First Alert and False Alert Notification System – Mr. Bill Street, WS Technologies, Inc., Kelowna, British Columbia, Canada

Abstract: The Cospas Sarsat 406 MHz emergency beacon technology employed in the AN/URT-44 PLBs has saved thousands of lives and is a well-defined and effective system. However, there are many components to the system including the search and rescue satellites, local user terminals (LUTs), mission control centers (MCCs), and rescue coordination centers (RCCs). These systems can cause delays between a beacon activation and deployment of search and rescue assets. In the case of false alerts, the system can become over- burdened causing further delays and costly diversions of SAR resources. A new device recently developed by WS Technologies Inc. monitors line-of-sight coverage and reports beacon alerts back to the user immediately. If it is determined to be a false alert then you can be proactive and notify the authorities immediately, before expensive SAR resources are utilized. If it is not determined to be a false alert then it can be considered a first notification of a distress situation and you have a head start to take appropriate action at the local level.

The WS Technologies Inc. FBM200 Beacon Monitor is a high gain receiver connected to a network or a computer. All Cospas Sarsat 406 MHz burst transmissions are received (including live-coded bursts and self-test bursts) and stored in a log. If a live-coded burst is detected, many levels of alarms can be triggered including the ability to instantly send email alerts or SMS messages to predetermined recipients. Numerous FBM200 devices can be con-

nected via the Ethernet extending the coverage area. Each networked device can be remotely controlled using secure communications. All ports, airfields, installation facilities, and repair facilities should be monitored with a Beacon Monitor

MONDAY – 1:00 PM – 2:30 PM
ENVIRONMENTAL HAZARDS – HYPOXIA
LOCATION: CRYSTAL 1 & 2 – CASINO LEVEL

MODERATOR:

Paper/Briefing - Design, Integration, and Testing of Prototype F-22 Helmet Mounted Pulse- Ox System – Mr. Michael R. Sedillo, Program Analyst, and Mr. Gregory M. Burnett, Engineer, Air Force Research Laboratory/ 711th Human Performance Wing, Wright-Patterson AFB, OH

Introduction: While investigators worked to resolve a suspected breathing air anomaly on the F-22, a requirement for a reliable means to measure pilot blood-oxygen saturation levels developed. Commercial medical finger sensors are inaccurate when used in dynamic flight environments. To address deficiencies in the finger monitoring form factor, a helmet mounted pulse-oximeter (HMPO) solution was designed, fabricated, tested, and qualified for flight on the F-22. This report chronicles these efforts including initial flight test results of the prototype HMPO system.

Methods: Research engineers at the Air Force Research Laboratory performed a system engineering modeling approach supported by qualitative measurements and performance based evaluations to develop an integrated helmet mounted pulse-oximetry system. Before HMPO was granted safe-to-fly certification, numerous tests including centrifuge, windblast, cockpit capability, hanging harness, and night vision compatibility were conducted. Additionally, a 100+ flight hour comparison was conducted to assess the accuracy of the HMPO to existing finger mounted pulse-oximeter systems.

Results: Operational F-22 squadrons were outfitted with the HMPO providing pilots an accurate unobtrusive means to monitor their SPO2 levels in flight.

Discussion: Although the HMPO was developed to address an urgent need in the F-22, the HMPO could become a ubiquitous, safe means to guard against hypoxia in flight.

Paper – Hypoxia Protection System - *A mask mounted system for tracking Physiologic Episodes* – Mr. David Dashevsky, Mr. Andrew Kobyjanec, Matthew Birch Ph.D, and Mr. Aaron Rood, Lead Physiologist/Program Manager, Orbibal Research, Inc., Cleveland, OH and Daniel Dietrich, Ph.D., NASA Glenn Research Center, Cleveland, OH

Introduction: Hypoxia and hypoxia-like-symptoms are a current and real concern within the aviation community. Hypoxia is a condition in which there is an overall lack of oxygen content within the body's tissue and vital human organs. Hypoxia is insidious because it impairs cognitive and physical performance, sometimes without the flight crew realizing anything is wrong. When these physiologic changes of hypoxia are uncontrolled, breathing difficulty, mental confusion, poor judgment, loss of muscle coordination, unconsciousness, dizziness, fatigue, visual impairment, nausea, tingling and numbness can result.

Methods: A Hypoxia Protection System (HPS) has been developed which features mask- mounted sensors to monitor physiological episodes based on the condition of the pilot. The HPS is a portable, air craft independent monitoring solution which allows pilot status to be tracked with flight and OBOGS profiles. This presentation describes those developments. The HPS has collected data in a hypobaric chamber, in normobaric hypoxia, and in a centrifuge.

Results: Physiologic metrics collected from the HPS during the performance tests are presented. (continues)

Discussion: This HPS works and results provide evidence that a hardware/software system that provides non-platform-specific hypoxia monitoring can address the need for better in cockpit monitoring and decreased incidents of aviation mishap.

Paper - Determination of the Time Complex Cognitive Performance Degrades During Exposure to 18,000 and 25,000 Foot Normobaric Hypoxia – Barry S. Shender, PhD, Senior Scientist, Carla W. Mattingly, Michelle B. Warren, Stephen M. Coleman, Gregory K. Askew, Amber L. Tucker, Naval Air Warfare Center Aircraft Division, Patuxent River, MD

Introduction: The number of mishaps related to hypoxia has increased over the last ten years in USN and USAF high performance aircraft. In order to develop cockpit warning system, it is necessary to determine the relationship between physiologic and cognitive decrements.

Methods: Four female (39±4yr, 164±7cm, 64±18kg) and 28 male (34±8yr, 182±6cm, 87±9kg) volunteers gave their informed consent and trained on the SYNWIN multitask battery (Ver. 1.2.39, Chula Vista, CA) until achieving proficiency in short term memory, math, visual and auditory monitoring tasks. A composite score (CS) and individual task responses and reaction times (RT) were determined every 20s. Subjects continually performed the battery while exposed to a simulated altitude profile (5min at sea level (baseline), 10min at 10,000 ft (10K), up to 20min at 18,000 ft (18K) (climb rate 1,000 ft/s), and 10min recovery at sea level (SL). This was followed by 10min at 10K, up to 20min at 25,000 ft (25K) (climb rate 1,000 ft/s), and 10min recovery at SL. The profile was repeated on two separate days. Normobaric altitudes were simulated using a Reduced Oxygen Breathing Device (Series 6202, Environics®, Tolland, CT). Pulse oximetry (SpO2) at the finger (SpO2f, Respironics) and forehead (SpO2h, Nonin model 9847), respiratory function (VivoMetrics® LifeShirt® or the Equivital™), and heart rate were compared to SL. Relative regional cerebral tissue oxygenation (rSO2) was also measured in fifteen subjects. Volunteers also reported the occurrence of hypoxia symptoms and rated them using a 7 point scale. Exposures were terminated and 100% O2 administered if SpO2f = 60%.

Results: The following results are based on responses to 45 exposures at 18K and 44 exposures at 25K. Mean time before reaching termination criteria was 1,096±225s (18K) and 292±156s (25K). Subjects received 50±23s of 100% O2 after their 25K ft exposure was ended. Using the mean change in CS from baseline, regression models were developed to predict the time performance dropped during 20 min exposures from 10K to 18K and from 10K to 25K. These times and the corresponding mean ± one standard deviation SpO2 and percent change in rSO2 relative to SL (%DrSO2) are shown in the tables that follow:

% drop in CS	Time (s) 10-18K exposure	$SpO2_f$	$SpO2_h$	%ΔrSO2
10	28	89.5 ± 3.5	85.1 ± 4.6	9.1 ± 4.9%
25	487	75.6 ± 5.8	71.9 ± 8.5	20.1 ± 3.3%
33	907	72.5 ± 7.5	70.1 ± 9.1	21.6 ± 3.0%

% drop in CS	Time (s) 10-25K exposure	$SpO2_f$	$SpO2_h$	%ΔrSO2
10	11.3 (during ascent)	91.0 ± 2.9	89.6 ± 3.8	7.1 ± 3.1%
25	73	77.5 ± 6.0	71.4 ± 7.5	17.4 ± 5.2%
33	109	72.0 ± 5.7	66.5 ± 8.7	21.2 ± 4.1%
50	170	67.4 ± 4.4	61.9 ± 6.3	24.0 ± 4.3%

For the 18K exposures, the subject pool reported 423 incidents of symptoms (38 incidents at 10K): 56% noticeable to mild cognitive (confusion, difficulty concentrating, lightheadedness, dizziness, tired), 4% noticeable to mild emotional (anxiety, euphoric), 14% noticeable to mild respiratory, 16% mild to moderate visual (blurry, tunneling), 14% noticeable to mild discomfort, and 15% noticeable to light muscular (twitches, tingles, tremors). The

first symptoms reported at 18K occurred after 20s and were fairly distributed throughout the plateau. For the 25K exposures, the subject pool reported 270 incidents of symptoms (29 incidents at 10K): 51% noticeable to mild cognitive, 4% light to moderate emotional, 20% light to moderate respiratory, 17% noticeable to mild visual, 12% noticeable to moderate discomfort, and 21% noticeable to mild muscular. The first symptoms reported at 25K occurred during the first 20s with a sharp rise after 40s. There were only 3 reports of muscular symptoms at 10K.

Discussion: The results of this study help to better define the relationship between complex cognitive performance and physiologic response measured at two sites on the body. These data will aid in the development of a physiologic-based hypoxia warning system.

MONDAY – 2:30 PM – 3:00 PM
REFRESHMENT BREAK
LOCATION: EXHIBIT HALL - SUMMIT PAVILION - CASINO LEVEL

MONDAY – 3:00 PM – 4:30 PM
ESCAPE / CRASH 1
LOCATION: CRYSTAL 1 & 2 – CASINO LEVEL

MODERATOR:

Paper - Avoiding Controlled Flight into Terrain – Mr. Jerry Henry, Director of Sales, Sandel Avionics, Vista CA

Introduction: Helicopters demand disciplined operations because many missions operate close to challenging terrain, involve off-airport landings and takeoffs, and produce distractions from pilot flying tasks. There is abundant exposure to hazards not encountered in fixed-wing flying. Among helicopter operations, medical rescue, law enforcement, utility surveillance, oil rig transportation, and firefighting, are by their nature non-routine and may terminate in landing sites that have not been optimized or even analyzed for terrain, obstacle, and wire clearance considerations. Therefore the utility of on-board Terrain Awareness and Warning Systems (TAWS) protection is very high for helicopters. For these reasons, qualification of helicopter TAWS, known as "HTAWS" Minimum Operational Performance Standards (MOPS) [Ref 2], was created separate and distinct from fixed-wing TAWS.

Meeting the HTAWS requirements provides reasonable protection for helicopter operations during cruise. Sandel Avionics recognized that this is not sufficient for many helicopter operations and set out to create more comprehensive protection that could be used in all types of helicopter mission without concern for false or nuisance alerts. This paper describes the basis for the Sandel design and the operational reasons why those decisions were made. Taken together, the improvements over a conventional HTAWS system are shown to clearly distinguish the Sandel system and warranting the distinctive name "HeliTAWS™".

Briefing - Full-Scale Crash Testing of Transport Rotorcraft – Mr. Martin S. Annett, Aerospace Engineer, NASA Langley Research Center, Hampton, VA

Abstract: A series of full-scale crash tests of CH-46 airframes is planned between 2013 and 2015 at NASA Langley's Landing and Impact Research Facility (LandIR). Full-scale crash testing at LandIR provides the capability to represent all of the critical interactions between the airframe, seat, and occupant in a controlled environment. The primary objectives of the crash tests are to study the crash performance of large transport-category helicopters and to demonstrate, through retrofit of the baseline configuration, the performance of composite energy absorbing subfloors subjected to combined vertical and horizontal impact velocities. In addition, novel systems under development such as energy absorbing side-facing troop seats, crash sensors, and crash resistant cargo restraints can be evaluated. Advanced Anthropomorphic Test Devices (ATD's), such as the THOR-K, are proposed for use in the crash tests to assess their response adequacy against conventional ATD's. (continues)

A full suite of data, including accelerations, strains, kinematics derived from photogrammetry, and occupant loads will be collected during testing. Details of the proposed testing will be discussed, and further suggestions for enhancing this test effort will be solicited.

Briefing – EMASMAX – Minimizing the Risk Following Runway Overruns – Mr. Mark Slimko, Business Development Leader, Engineered Arresting Systems Corporation, Logan Township, NJ

Abstract: Statistics compiled and studied by the Flight Safety Foundation's Runway Safety Initiative show that the global commercial aircraft industry averaged 30 runway excursions per year over the last 15 years. In the last 10 years, runway excursions have accounted for 29% of all aircraft accidents and over 50% of commercial aviation fatalities including 83% of all fatal runway safety accidents. Likewise, the statistics were similar in the preceding 25 years, leading to the development of, and continued need for, a means to stop aircraft that overrun the runway end during excursions. This need was fulfilled by Engineered Arresting Systems Corporation's (ESCO) Engineered Material Arresting System (EMAS). EMAS has been recognized both nationally and internationally by transportation safety boards as a viable solution to alleviate the negative consequences following an overrun.

EMASMAX is the latest, most durable version of ESCO's field-proven EMAS, developed with and approved by the FAA. It is composed of blocks of lightweight, crushable concrete designed to safely stop airplanes that overrun runways. Nearing 75 systems worldwide, ESCO's EMAS has safely arrested all eight aircraft that have engaged it, ranging in size from a Cessna Citation to a Boeing 747 and saved the lives of 235 passengers/crew members.

MONDAY – 3:00 PM – 4:30 PM
VISION & HEAING
LOCATION: CRYSTAL 3 & 4 – CASINO LEVEL

MODERATOR:

Paper – A Novel Tool for Assessment of Visual Performance When Using NVD – Mr. Will Serle, Senior Scientist, Smart Technologies, QinetiQ, Farnborough, United Kingdom, Dr. D. Connolly, QinetiQ and City University, London; and Professor J. Barbur, City University, London

Abstract: Aircrew have to complete complex visual tasks in challenging environments, demanding good visual acuity, luminance contrast sensitivity and colour vision. When using a Night Vision Device (NVD) for night flying, aircrew are immersed in and become adapted to an unnatural visual environment from which they must switch their gaze to view in-cockpit controls and instruments.

A novel functional test of assisted night vision, developed in collaboration with City University, London, has been based on existing, high specification, vision testing software, including the Colour Assessment and Diagnosis (CAD)[1,2] and Contrast Acuity Assessment (CAA)[3] tests. The equipment comprises two high definition displays configured to simulate the photometric characteristics and geometry of a NVD and an in-cockpit instrument panel (IP) display, simulating the "look-down" behaviour used by aircrew when scanning their instrument panel. The displays are spectrally calibrated and driven by bespoke software to present visual stimuli to probe the functional mechanisms important in night flying, including low contrast acuity, colour discrimination, visual search and reaction time. Visual performance can be measured using a "static" mode on a single display or a "dynamic adaptation mode", with timed switching and testing needed to maintain visual adaptation to either the IP or the NVG tasks. The system simulates the full NVD output luminance range and chromaticities and cockpit light levels experienced under night flying conditions, from low photopic levels into the high mesopic range.

Research conducted using this approach could be used to optimise visual performance in a dynamic context in relation to cockpit lighting, symbology design, optimisation of use of colour within displays, eyepiece-injected symbology for NVDs, and design of Head-Up Displays.

Paper - NVG's: FOM and Lense Classification are on the Beginning – M. K. Walsh, Sales Manager Pilot Equipment, Transaero, Inc., Melville, NY

Introduction: As a purchaser of a new NVG device you have done enough homework to know that your application calls for ANVIS-9 aviator goggles with Class C lenses, a FOM rating of 1600 and must be Auto-gated as well. What you might not know is that the most critical, and often times most over-looked, part of your successful deployment of your NVG device is the training on proper use of the devices. A true understanding of the abilities and *limitations* of the devices will allow you to safely and effectively use these most expensive investments in the most beneficial manner. Quirky facts like why desert pilots prefer class A lenses over class B but city pilots prefer B lenses and would be uncomfortable using A lenses will be touched on.

Methods:

- Basic outline of technical workings of NVG devices: how they work in laymen's terms
- Pictures of shadows that hide threats when viewed with naked eye vs. same view through NVG's
- Picture of night view with IR lights on with naked eye vs. same view with NVG's
- Picture of cockpit that is not NVG ready vs. cockpit that is NVG compatible viewed through NVG's

Results/Discussion: A brief discussion tying together how they work and how they work best: right NVG for the right application

Briefing – Hearing Loss Prevention - Ms. Shawna Graddy, Human Factors Engineer/ Senior Consultant, Booz Allen Hamilton, Colorado Springs, CO

Abstract: Noise is present in most military systems and excessive noise is causing many injuries among system users. If the cost of healthcare was considered in the system lifecycle, it would constitute a major portion of the total cost of operation. For instance, a University of Connecticut study in 2010 found that a "nominal noise-exposure case yielded a total expected lifetime cost of $13,472 per sailor. A decrease of 50 percent in exposure level or duration would yield cost savings of approximately 23 percent."

The most common response to excessive noise is to provide users with hearing protection; however, this will only protect personnel to a certain extent. Studies have shown that even the most technologically advanced hearing protection is not enough to prevent hearing impairment. Noise requirements need to be a top priority for Program Managers, in order to reduce degradation in mission capability. SURVIAC supported DSOC by developing a reference guide for Program Managers which contained noise-specific language and recommendations for where in acquisition documents the language should be included. The US is known as the top fighting force on the planet and in order for this to remain true, excessive noise levels need to be reduced/prevented.

MONDAY – 5:00 PM – Exhibits Close

MONDAY – 5:15 PM – 6:30 PM
2012 SAFE GENERAL MEMBERSHIP MEETING
and
PRESENTATION OF 2012 AWARDS
LOCATION: TAHOE ROOM – CASINO LEVEL

The 2012 SAFE General Membership Meeting and presentation of the 2012 SAFE Awards will be held on Monday, October 22nd from 5:15 PM – 6:30 PM.

We urge all attendees to join us! The Exhibits area will not be open during this time.

MONDAY – 7:00 PM – 9:30 PM
SAFE AWARDEE RECEPTION
LOCATION: RENO/TAHOE ROOM – CASINO LEVEL

Our 2012 Awardees Reception will be held on Monday, October 22nd from 7:00 PM – 9:30 PM.

There will be complimentary food. We will provide free non-alcoholic beverages, and all attendees will have the option of purchasing alcoholic beverages.

We urge all attendees to join us! The Exhibits area will not be open during this time.

TUESDAY, OCTOBER 23rd

TUESDAY - 7:00 – 7:45 AM
AUTHOR'S COORDINATION AND BRIEFING
LOCATION: GRAND SALON – CASINO LEVEL

The morning author's coffee is for that day's presenters and moderators only. We ask that all others use the coffee shop facilities within the hotel.

TUESDAY - 8:00 AM – 5:00 PM
REGISTRATION OPEN
CARSON 1 & 2 – CASINO LEVEL

TUESDAY - 10:00 AM – 10:30 AM
REFRESHMENT BREAK
LOCATION: EXHIBIT HALL - SUMMIT PAVILION -
CASINO LEVEL

TUESDAY – 10:00 AM – 5:00 PM
EXHIBITS OPEN
LOCATION: EXHIBIT HALL - SUMMIT PAVILION - CASINO LEVEL

TUESDAY – 10:30 AM - NOON
ESCAPE / CRASH 2
LOCATION: CRYSTAL 1 & 2 – CASINO LEVEL

MODERATOR:

Paper – Crashworthy Crew and Troop Seat Design: Automatic, Passive Adaptation to Occupant Weight - Mr. Stuart B. Nightenhelser, Program Manager, Wolf Technical Services, Indianapolis, IN

Abstract: There is continuing recognition that existing crew seats and troop seats in military aircraft do not adequately protect occupants in crashes. Many seats employ no form of energy absorption (EA). Most seats that do employ energy absorption use a simple device that applies a constant load to a stroking seat. Questions immediately arise about the effectiveness of the EA across the range of crash pulse widths and peak heights and across the range of occupant weights. Existing EA devices are insensitive to the varying tolerance to spinal and neck loading injury that is seen across the full anthropometric range of seat occupants. For this reason the devices may increase the risk of injury to occupants in crash situations. The inclusion of additional gear, such as combat vests, packs on the back, or helmets and night vision goggles on the head, complicates the assessment of EA performance.

Wolf has developed and tested an EA system for crew seats and troop seats that automatically adjusts both its point of release and its load (attenuation) level according to the weight of the occupant. Thus both the 5% female and the 95% male experience attenuation loads matched to their spinal tolerance, and make the most efficient use of the full stroke of the seat.

Briefing – Canopy Fracturing Initiation System (CFIS) - Mr. Brent Felton & Mr. Ed Phillips, JPATS Program Engineering, ATK Allegany Ballistics Laboratory, Rocket Center, VA

Abstract: ATK Tactical Systems Company produces a qualified mechanically actuated laser initiator firing system in accordance with cartridge actuated device (CAD) requirements in MIL-C-83124. The device is a two-action percussion fired mechanism that is used to initiate an emergency escape system. The system consists of three canopy fracturing initiation units.

The internal laser initiator provides the option, from within the cockpit, of canopy fracturing without ejection. This unit contains a two-action turn and pull mechanism. The handle requires a 90° CCW turn followed by a vertical pull. The handle remains attached to the unit after the pull stroke.

The external laser initiator provides the option, from outside the aircraft, of canopy fracturing without ejection. This unit contains (within the main body) a coiled length of stainless steel cable which releases from the device after full extension. The handle is retained in place by the emergency access cover. When the handle has been pulled to reach the cable's extended 10-foot length, 15-25 pounds of tension will stimulate laser initiation.

The Seat Movement Detector Laser is pinned to the seat by an actuation link and fractures the canopy during ejection. The actuation link flies away with the seat after actuation. The device is fully redundant and contains independent laser systems. A vertical pull of 30-50 pounds tension initiates redundant laser systems for canopy fracturing.

Laser energy is transmitted via a fiber optic harness to laser initiated detonators on the aircraft canopy. This system successfully completed design verification testing (DVT), service release testing (SRT), and sled testing for the T-6A, Texan II primary training aircraft in 1999. Currently in excess of 500 systems have been fielded year to date.

Briefing - Ejection Back Injury Risk for an Expanded Aircrew Population – Mr. Jim Tulloch, Senior Project Engineer, Goodrich Corp., Colorado Springs, CO; Mr. Chris Perry, Mr. John Plaga, USAF 711th Human Performance Wing, Wright-Patterson AFB, OH and Mr. Bob Billings, AirCrew Escape Services, Tipp City, OH

Abstract: With the advent of an expanded aircrew population and smaller aircrew in ejection seat aircraft the number of major back injuries (fractures) is going to increase significantly in coming years. The legacy requirement to limit back injuries to less than 5% is the Dynamic Response Index (DRI) of 18 but it is really only applicable to a legacy male population and puts small aircrew at a considerable risk of injury. The background to the original DRI requirement is detailed in this paper.

There is a significant amount of published ejection injury data that highlights a high risk, up to 30% for some aircraft, of a back injury for a legacy male aircrew population during the catapult phase of the ejection. For an expanded aircrew population this back injury risk will be significantly higher. This paper covers a review of published data on ejection back injuries for different aircraft and different seats. The key factors driving a high back injury rate are discussed.

A new DRI limit of 14 for the expanded aircrew population is presented along with the required conditions for compliance. The testing required to validate a DRI of 14 as a new ejection seat requirement is also covered in this paper.

TUESDAY – 10:30 AM - NOON
LIFE SUPPORT
LOCATION: CRYSTAL 3 & 4 – CASINO LEVEL

MODERATOR:

Briefing - Integrated Aircrew Ensemble – Status – Mr. Arthur D. Schwope, Vice President, TIAX LLC, Lexington, MA and Mr. Carl Medeiros, IAE Program Manager, Aircrew Performance Branch, Wright-Patterson AFB, OH

Abstract: The Integrated Aircrew Ensemble (IAE) will increase the performance, protection, and comfort of USAF aircrew. These objectives will be achieved by combining state-of-the-art, multi-functional materials with a design that reduces bulk and increases mobility. The product will be configurable to mission needs with all parts integrated for functionality and reduced thermal burden as well as for compatibility with aircraft. IAE is a flight equipment item.

The initial focus is pilots of ejection-seat aircraft; non-ejection seat fixed-wing and rotary wing IAE variants will follow. The project is in its Critical Design Review phase. Prototypes have three layers: Integrated Flight Layer (IFL), Environmental Protection Layer (EPL), and Chemical/Biological/Radiation Layer (CBRL). The IFL is modular, consisting of an always worn coverall and optional survival vest, chest counter pressure breathing vest, and full-coverage G-pants. The EPL and CBRL are worn underneath the IFL for over water immersion, cold environment and Chem/Bio configurations.

Early Design Testing and Evaluation has included cold water immersion, centrifuge, windblast, and human factors assessments with pilots at Nellis, Edwards, and Tinker AFB and Vermont ANG as well as in the laboratory. Preliminary results suggest significant improvements in bulk, weight, mobility, and thermal burden, particularly with the EPL and CBRL solutions.

Briefing – LOX Systems for Today and Tomorrow – Mr. Russ Jacobsmeyer, Vice President, Engineering, Essex Industries, St. Louis, MO

Abstract: Historically, logistical availability at remote/forward locations has limited the application of LOX for life saving missions. Essex Industries has minimized that logistical difficulty by developing the Oxygen Generator & Liquefier (OGL) that allows for point-of-use liquid oxygen generation.

The OGL is a portable, computer-controlled, oxygen generating and liquefaction system. This mini, portable LOX generator is capable of producing 93% USP gaseous oxygen or LOX from atmospheric air. The OGL stores up to 40 liters of LOX in a cryogenic vessel with zero ("bleed-off") loss for transfer to other portable LOX life support devices. This allows users to benefit from extended duration transports, and smaller, lighter, refillable liquid oxygen supply vessels, while packing less equipment (bottle gas). The OGL also supports the ability to fill high-pressure oxygen bottles.

The OGL is simple to use and easy to maintain. The ruggedized design allows it to withstand the harsh conditions of remote deployment & transportation. The OGL runs on standard 208-240 VAC, single phase, 30 Amp power and has been environmentally tested to MIL-STD-810.

The OGL is part of a complete Family of Systems designed to meet the requirements of rugged/remote life support and medical evacuation missions.

Briefing – Alcohol Won't Solve Your Problems (or How to Clean an Oxygen Mask – Mr. Jerry Reid, President & CEO, SkyTexus International, LLP, Forney, TX

Introduction: Alcohol continues to be the chemical of choice to clean aircrew oxygen masks, and has been for so over 100 years. It may be time to evolve. A state of optimum health of aircrew is essential for the optimal opera-

tion of aircraft. Equipment that comes in close contact with the crew, particularly the face, must combine excellent design for function with maximum hygiene to prevent infectious disease. Currently the processes of cleaning and maintenance deploy chemical agents, such as alcohol, that may damage the apparatus or only partially sanitizes the equipment; a new hygiene technology may address this problem. Methods: Detailed microscopic inspection using SEM comparing cleaned and new components of an industry standard US Navy Oxygen mask illustrate the degradation through cleaning and use. Plates and swabs were incubated highlighting the increased potential for microbial contamination following conventional hygiene protocols. The current mask cleaning technical order T.O. approved process was compared with a new generation residual micro-biocide. Results: Following treatment of both old and new components with water based powerful, residual antimicrobial technology. Tested swabs and plates demonstrated a significant reduction in both damage and microbial colonization potential. Discussion: As an alternative to alcohol, new and simplified hygiene protocols could be deployed to both reduce damage to aircrew hardware.

TUESDAY – NOON – 1:00 PM
LUNCH BREAK
EXHIBITS WILL REMAIN OPEN DURING THIS TIME

TUESDAY – 1:00 PM – 5:00 PM
EXHIBITS OPEN
LOCATION: EXHIBIT HALL - SUMMIT PAVILION -CASINO LEVEL

TUESDAY – 1:00 PM – 2:30 PM
INJURY 1 – HEAD & SPINE
LOCATION: CRYSTAL 1 & 2 – CASINO LEVEL

MODERATOR:

Paper – Helmet Impact Test Standards – What They Tell Us About Helmet Performance and Protection – Mr. Paul Parker, Senior Engineer, Human Sciences; Dr. Charlotte Meeks, QinetiQ, Farnborough, United Kingdom and Mr. Fred Brozoski, and Ms. Katie Logsdon, Injury Biomechanics Branch, USAARL

Abstract: One of the key requirements of an aircrew helmet is to provide impact protection in the event of an accident. The impact performance an aircrew helmet affords is influenced by the test standard to which it is designed. Generally, helmet test standards use a relatively small range of tests, and as a result, the extent of protection a helmet affords in an accident cannot be fully understood by reference to the test standard alone. This presentation summarises some recent collaborative work between the UK Ministry of Defence and the US Army Aeromedical Research Laboratory in the area of aircrew helmet impact protection standards and test methodologies. The study highlighted how impact testing across a wide range of potential impact scenarios was required to gain a complete understanding of a helmet's protective performance. The results of this work will provide knowledge and insight beneficial to future test standard development, accident investigation and equipment development. **(**This work was funded by the UK Ministry of Defence).

Briefing - Helicopter Service-Related Back Pain and Injury, Study & Analysis – Hon. Richard F. Healing, P.E., Sr. Partner, R³ Consulting, Washington, D.C.

Abstract - R³ Consulting has completed a Phase 1 report concerning the problem of high incidence of back pain and injury among military helicopter crewmembers. This problem costs the taxpayers a – conservatively estimated – quarter of a billion dollars every year that it is not fixed. With more than 85% of currently active helicopter crewmembers reporting pain to the point of distraction while flying, there is no doubt that safety is compromised every day, almost every flight. Inspired by a 2010 Navy funded survey of approximately 1800 Navy and Marine Corps helicopter crewmembers, the Office of the Secretary of Defense contracted with R³ Consulting to conduct an

expanded survey that would include other military branches (including the US Coast Guard). Nearly 10,000 personnel completed the combined surveys, providing a very large database for analysis. Significant conclusions can be drawn, pointing to solutions that are available with expanded consideration of ergonomic design criteria, sophisticated engineering techniques and state of the art materials. R³ identifies advanced seating system solutions that are used in operating environments that are equally challenging to military helicopters and operations – solutions that can reduce both cost and weight while increasing operational effectiveness and safety.

Paper - Physiotherapy Led Typhoon Aircrew Conditioning Programme – Flight Lt. Ellen Slungaard , Royal Air Force, Center for Aviation Medicine, United Kingdom

Abstract: The introduction of Eurofighter Typhoon into RAF service marks a significant advancement in aircraft design and technology. Extensive medical literature exists to describe musculoskeletal conditions associated with operating highly agile aircraft, and the career prevalence of neck pain is around 70-90% in fast jet pilots. A limited survey conducted at RAF Coningsby early in 2007 suggested that 80% of Typhoon aircrew had suffered neck pain during their flying careers. Pain had been experienced flying Typhoon, sometimes with a performance impact.

Following this survey, an aircrew conditioning programme was delivered to all aircrew coming through the Operational Conversion Unit at RAF Coningsby. Unfortunately this programme was deemed to be inadequate for the rigours of high +Gz flying. As a result, a periodised and structured conditioning programme which met these aims was required. A programme has now been developed and following six months of trials and adjustments, has now been instigated.

TUESDAY – 1:00 PM – 2:30 PM
ENVIRONMENTAL HAZARDS – THERMAL
LOCATION: CRYSTAL 3 & 4 – CASINO LEVEL

MODERATOR:

Briefing - Overwater Mission Hazards: Rotary-Wing Aircrew Egress & Survival – Mr. Jason Leggatt, Vice President Research & Development, Mustang Survival, Burnaby, British Columbia, Canada

Abstract: Whether executing a rescue or an assault, overwater missions are extremely hazardous. A ditched rotary-wing aircraft can quickly invert and sink, plunging the disoriented occupants into frigid waters. This briefing addresses critical factors for surviving a rotary-wing aircraft ditching and new test and evaluation methods in state-of-the-art performance standards for aircrew flight equipment. In particular, the application of the Mustang buoyancy and egress assessment trainer (the "BEAST") for ensuring successful escape from the submerged aircraft fuselage will be discussed.

Paper – The Design Approach to Cold Weather Clothing Systems – Mr. Paul Oliver, Chief Designer, Survitec Group, United Kingdom

Abstract: Cold Weather Clothing has been in use by Pilots since the advent of manned flight to protect the pilots from the extreme cold that can be experienced in the flying environment. Materials and garment designs have evolved over time commensurate with new technologies. This presentation is an overview of some of the unique design considerations and challenges required when designing Cold Weather Clothing for use in aviation scenarios including post aircraft evacuation, escape and evasion. The presentation will briefly explore the development process from material selection to garment design considerations and the necessary qualification testing to clear garments for flight.

Paper - The New Modified 18-segment Salloum Model: A Validation Study Using Pilots with Simulated Tasks Under Different Low Ambient Temperatures - Xiujuan Wang, Hua Peng, Lei Zou, Haibin Jiang, Haibo Zhang, Avic Aerospace Life-Support Research Institute /Industries, Ltd., PR China, and Faming Wang, Empa, Swiss Federal Laboratories For Materials Science And Technology, Laboratory For Protection And Physiology, St. Gallen, Switzerland (continues)

Abstract: In this study, we modified the Salloum model to an 18-segment model. These 18 segments include head, neck, shoulders, chest, abdomen, left upper arm, right upper arm, left forearm, right forearm, left hand, right hand, left thigh, right thigh, left calf, right calf, left foot and right foot. In contrast to the Salloum model, 3 additional sections were introduced in this modified model: viz. left shoulder, right shoulder and neck. The reason for the introducing these three new introduced segments is that the structure of these segments is quite difference with other 15 body segments and in particular, in low ambient temperature environments. Thus, separating them from the previous model may enhance the prediction accuracy. Second, we integrated this modified Salloum model with a multi-layer clothing model to predict body core temperature (i.e., the rectal temperature) and mean skin temperature changes at different scenarios. The initial condition and boundary conditions were also described. Finally, the results were validated on 6 pilots through extensive human trials. The results showed that predictions are good, i.e., the experimental data are in well agreement with the predicted data (differences are below 10%). Therefore, this modified human-clothing model may be used as a useful tool in predicting human physiological responses under different scenarios.

TUESDAY – 2:30 PM – 3:00 PM
REFRESHMENT BREAK
LOCATION: EXHIBIT HALL - SUMMIT PAVILION - CASINO LEVEL

TUESDAY – 3:00 PM – 4:30 PM
MODELING & SIMULATION
LOCATION: CRYSTAL 1 & 2 – CASINO LEVEL

MODERATOR:

Briefing - Implementation of Verification and Validation in Certification by Analysis from a Regulatory Perspective - Joseph Pellettiere, PhD., Chief Scientific and Technical Advisor for Crash Dynamics, Federal Aviation Administration, Dayton, OH

Abstract: Historically, physical testing has been required to certify that safety products meet regulatory requirements, which can impose a significant cost burden. Modeling and simulation (M&S) is increasingly used in research and development. Several government agencies now allow M&S to be used within the certification process for safety products. Some examples are: the Federal Aviation Administration with aircraft seats, the Federal Highway Administration with roadside safety structures, and the Food and Drug Administration with some medical devices. The use of analytical tools has the potential to reduce costs and improve the development process for DoD safety systems, such as ejection seats, restraints, and helmets. The physical testing requirements can be deterministic, limiting not only the data available for comparison in validation, but also the degree of uncertainty quantification possible. Verification, validation (V&V), and certification from a regulatory perspective in a deterministic testing world presents unique challenges. Many V&V documents focus on the modeler. This leads to recommendations and explanations based on the needs of the modeler. Usually, only cursory attention is given to the decision maker, who is typically considered to be the customer. For a model with less than ideal performance, the customer can either accept the current performance or increase the funding to allow for improvements. For regulators, neither is an option. Requirements must be defined before there is even knowledge of the specific system, and these requirements must be universally applied. This can lead to many issues, such as how to differentiate between new software and off the shelf software which does not provide tangible code verification. Regulators may also have a different interpretation of validation metrics when considering one-sided pass-fail criteria or determinations of worst case scenarios. Another issue is that certification testing is conducted to a passing condition which will be the basis for the model, leaving the ability of the model to predict failure and anomalies unknown. One of the biggest issues related to a deterministic certification reality is the lack of repeated testing, which limits the quantification of uncertainties. Physical testing is conducted to show compliance; once that is met, testing is completed. Without bounding the uncertainty in testing, the confidence in the M&S to replicate reality can be difficult. This issue is made more challenging because M&S is usually a streamlining initiative with the intent of reduc-

ing the number of physical tests. These are just some of the issues that must be considered when guidance and regulations are developed to implement M&S into the certification process.

Paper - An Update to the Dynamic Response Index (DRI) Model for Use in Assessing Seat Performance in Military Ground Vehicles – Mr. Robert T. Lynch, Senior Engineer, ARCCA, Inc., Penns Park, PA

Abstract: The Dynamic Response Index (DRI) was introduced over 50 years ago to study the correlation of spinal injuries to accelerations during seat ejections in helicopter crash events. The DRI is representative of the maximum dynamic compression of the spinal column and is calculated by describing the human body in terms of an analogous single degree of freedom mass-spring-damper model. Given a vertically applied acceleration-time profile as an input to the model, the model predicts the compressive response of the spinal column with the DRI as an indicator of injury potential. In recent years, the DRI model has found use in assessing military ground vehicle seat performance to withstand vertical accelerations from IED blasts. The DRI model parameters in use today were defined, mainly through the work of Stech and Payne, to represent a pilot about to eject from a crippled airplane. However, these model parameters may not accurately represent human body behavior to an unexpected IED blast. This paper sets out to define alternative parameters to the DRI model for use in assessing seat performance in military ground vehicles.

Paper - Respiratory Model Predicts 20 second Decompression to 45k in Subjects Using Oxygen – Robert P. Garner, Ph.D., President, Odyssey II Solutions, Southport, N.C.; Jeurgen Wenzel, M.D., Ph.D., Matthew B. Wolf, Ph.D.

Abstract: In support of new transport aircraft guidance and safety, rapid decompression testing was conducted by the German Aerospace Center (DLR). The chamber profile consisted of decompression from 8,000 ft to 45,000 ft in 20 sec. Supplemental oxygen delivery was started at 2 sec. The individuals tested were divided into two groups designated N (n=6) and H (n=4) based on their anticipation (i.e. hyperventilation reflected in physiological data) of the decompression. Responses (blood oxygen saturation (SaO_2), end tidal oxygen pressure) were averaged over 2 sec intervals. A previously developed respiratory model mimicking profile, oxygen delivery, and breathing characteristics was run for comparison. The SaO_2 of the N group reached a minimum of ~72% as a result of the decompression. In contrast, the H group SaO_2 only dropped to ~87%. The findings are similar to previous investigations where hyperventilation occurred. However, the lower SaO_2 values in the N group were still consistent with sustaining consciousness at 45k using oxygen. The model accurately predicted both of these situations without modification to the underlying controller or response algorithms. Only adjustment to population characteristics was required for accurate prediction.

TUESDAY – 3:00 PM – 4:30 PM
POOLSIDE LIVE WATER DEMONSTRATION OF SAFETY EQUIPMENT
LOCATION: Swimming Pool, South Side Of Building. Access Via Arcade Level. Pool Entrance Is Right Next to the Port Of Subs Sandwich Shop
(Hotel will have directional signs posted)

POOL COORDINATOR: Greg Yerkes, Life Support International

SAFE Corporate Sustaining Member and Exhibitor Life Support International (LSI) will be coordinating a multi-vendor water demonstration of safety equipment in the hotel pool. **All symposium attendees are welcome to view this demonstration.**

We will present a non-biased introduction of your presenter, followed by the demonstration. Each demonstration will be limited to ten (10) minutes including introduction of the company, product(s) and product demonstrator(s). More than one product is allowed so long as it is within the ten (10) minute time frame. This is a wonderful opportunity to get your products noticed with the end-group users present. (continues)

One note that we would like to make clear: If you are planning on using a person in the pool to demo your product, you are responsible for providing that person! There will be highly trained Safety Swimmers in the water at all times.

Demonstrations include:

Life Support International, Inc. - Even submersed in water, the HOOK2® CSAR AN/PRC-112G®Transceiver can still acquire a GPS signal. We will demonstrate the ability to communicate and extract information from the AN/PRC-112G while it is under water.

Switlik Parachute Co., Inc. will be showcasing the U-Zip-It Aircrew Anti-Exposure Dry Suit (UZI) with a donning demonstration and water entry. The Switlik designed and manufactured Inflatable Single Place Life Raft (ISPLR) will also be featured with a live firing into the pool. The various features will be demonstrated by live entry into the raft by a swimmer wearing the UZI Suit. A variety of Switlik Life Preservers will also be on display. Larry Farmer, Marcia Baldwin, Anthony Florio and Michael Dilts will be conducting the presentation on behalf of Switlik.

Other demonstrations to be added

TUESDAY – 5:00 PM – Exhibits Close

WEDNESDAY, OCTOBER 24th

WEDNESDAY - 7:00 – 7:45 AM
AUTHOR'S COORDINATION AND BRIEFING
LOCATION: GRAND SALON – CASINO LEVEL

The morning author's coffee is for that day's presenters and moderators only. We ask that all others use the coffee shop facilities within the hotel.

WEDNESDAY - 8:00 AM – 5:00 PM
REGISTRATION OPEN
CARSON 1 & 2 – CASINO LEVEL

WEDNESDAY – 10:00 AM – 3:00 PM
EXHIBITS OPEN
LOCATION: EXHIBIT HALL - SUMMIT PAVILION - CASINO LEVEL

WEDNESDAY – 8:30 AM – 10:00 AM
LOCATION: RENO BALLROOM – CASINO LEVEL

Special Presentation Speaker - Melchor J. Antuñano, M.D., M.S.
Director of the U.S. Federal Aviation Administration (FAA) Civil Aerospace Medical Institute (CAMI) in Oklahoma City, OK

EMERGING TECHNOLOGIES IN AEROSPACE TRANSPORTATION

Welcome to Attendees and Introduction: Allen "Al" Loving, 2012 SAFE President

Dr. Antuñano's presentation on "Emerging Technologies in Aerospace Transportation" will include a discussion of ongoing technological developments and innovations in civil aviation and manned commercial space transportation, including new types of general aviation aircraft, technically advanced aircraft, homebuilt and light sport aircraft, personal flight devices, very light jets, commercial aircraft (narrow and wide body), silent aircraft, electric

aircraft, unmanned aerial vehicles, next generation lighter-than-air vehicles, supersonic and hypersonic vehicles, manned commercial space vehicles (suborbital and orbital), commercial space stations, and commercial spaceports. I will discuss some of the challenges of promoting operational safety while supporting the implementation of new technologies in aerospace transportation.

Biography: Dr. Antuñano was born in Mexico City and is a graduate of the National Autonomous University of Mexico School of Medicine. He completed the Residency Program in Aerospace Medicine at Wright State University in Dayton, Ohio. He was awarded a post-doctoral research associateship by the U.S. National Research Council of the National Academy of Sciences at the USAF School of Aerospace Medicine in San Antonio, Texas.

Dr. Antuñano is currently the Director of the U.S. Federal Aviation Administration (FAA) Civil Aerospace Medical Institute (CAMI) in Oklahoma City. He provides executive direction and is responsible for the oversight of FAA Office of Aerospace Medicine's programs in Medical Certification, Medical Education, Medical Research, Human Factors Research, and Occupational Health Services. These include: 1) a program to fulfill the aeromedical certification needs of approximately 600,000 holders of U.S. pilot certificates, 2) a program for the selection, designation, training, and management of about 3,500 Aviation Medical Examiners (AMEs) appointed to conduct physical examinations and issue FAA medical certificates to U.S. pilot certificate holders throughout the U.S. and in 93 countries worldwide, 3) aeromedical education programs in aviation physiology, global survival, and aviation human factors for FAA flight crews and civil aviation pilots, 4) aerospace medical publications and other didactic materials used to disseminate medical information to promote aerospace safety, 5) a highly specialized library system in support of a broad range of aerospace medical and aerospace safety reference/research programs, 6) an integrated program of field and laboratory performance research in organizational and human factors aspects of aerospace work environments, 7) an applied research program to identify human tolerances, capabilities and failure modes (physiological, psychological, and performance) both in uneventful flights, and during civilian inflight incidents and accidents, 8) an occupational medicine program to improve the safety of FAA employees at the FAA Mike Monroney Aeronautical Center (MMAC), and 9) a medical clinic that provides health services to employees and students at the MMAC.

Dr. Antuñano is credited with 591 professional presentations and invited lectures at national and international conferences in aerospace medicine in 37 countries, and with 57 scientific publications covering a variety of aerospace medicine topics. He is Fellow and Past-President of the U.S. Aerospace Medical Association, Past-President of the Space Medicine Society, Past-President of the Iberoamerican Association of Aerospace Medicine, member and Chancellor of the International Academy of Aviation and Space Medicine, and member of the International Academy of Astronautics He is an Honorary Member of the Austrian, Brazilian, Colombian, Greek, Mexican, Slovanian and Turkish Societies of Aviation/Aerospace Medicine. He is an Associate Professor at the University of Texas Medical Branch in Galveston, Assistant Professor at Wright State University School of Medicine, and Adjunct Professor at the National University of Colombia School of Medicine.

Dr. Antuñano has received 72 awards and recognitions for his academic, administrative, and research achievements including: *"DOT Secretary's Award for Meritorious Achievement: Silver Medal"* granted by the Secretary of the U.S. DOT; *"Outstanding Manager Award"* granted (3 times) by the FAA Office of Aerospace Medicine; *"Arthur S. Flemming Award"* granted by the George Washington University; *"Louis H. Bauer Founders Award"* granted by the Aerospace Medical Association for the most significant contribution in aerospace medicine; *"Eric Liljencrantz Award"* granted by the Aerospace Medical Association for excellence as an educator in aerospace medicine; *"John A. Tamisiea Memorial Award"* granted by the Aerospace Medical Association and the Civil Aviation Medical Association for unique contributions to the aviation medical examiner activities through the introduction of innovative and creative teaching procedures for AMEs; *"Young Investigator Award"* given by the Space Medicine Society for authorship of the most outstanding paper by a young investigator; *"Congressional Certificate of Recognition for Contributions to Improve Aviation Safety in Colombia through Continuing Medical Education"* granted by the House of Representatives of the Republic of Colombia, *"Honorary Federal Air Surgeon"* granted by the Director General of the Civil Aviation Authority of the Dominican Republic.

WEDNESDAY - 10:00 AM – 10:30 AM
REFRESHMENT BREAK
LOCATION: EXHIBIT HALL - SUMMIT PAVILION - CASINO LEVEL

WEDNESDAY – 10:30 AM - NOON
INJURY 2
LOCATION: CRYSTAL 1 & 2 – CASINO LEVEL

MODERATOR:

Briefing – Development Process of Injury Risk Curves – Joseph Pellettiere, PhD., Chief Scientific and Technical Advisor for Crash Dynamics, Federal Aviation Administration, Dayton, OH

Abstract: Operation in dynamic environments has inherent risks to the occupants. Whether these risks are associated to whole body injury from an ejection seat or to the neck for a passenger seated in a side-facing aircraft seat, mitigation techniques must be developed. The first step in developing the safety equipment to protect these occupants is to quantify the associated risks. Oftentimes this is through the application of risk curves that relate the probability of injury to a specific body region to some quantifiable input that can be measured during a test to replicate the necessary conditions. These risk curves then become directly connected to the injury criteria and because of this, there is process that is followed in their development. This rigorous process involves seven different steps: defining the injuries, defining the environment, the input energy, specific testing, regression analysis, conduct specific testing, and verification. The resulting injury criteria can then be used to assess the safety of a system and used for conducting trade studies. How each of these steps applies to the development of neck injury criteria including tensile loading and lateral loading demonstrates the effectiveness of this methodology.

Paper – Characteristics and Assessment of Human Vibration Exposure Aboard Military Rotary-Wing and Tilt-Rotor Aircraft – Suzanne D. Smith, PhD, Senior Biomedical Engineer, Human Effectiveness Directorate, Air Force Research Laboratory, Wright-Patterson AFB, OH

Introduction: This paper summarizes the characteristics of the unique higher frequency multi-axis vibration transmitted to the occupants of rotary-wing and tilt-rotor aircraft and includes the assessment of comfort and health risk (ISO 2631-1). Methods: Triaxial acceleration data were collected at several occupant locations and flight conditions in the UH-1H Huey, AH-1Z Super Cobra, and CV-22 Osprey. Unweighted and ISO weighted spectral data were generated and compared. The ISO weighted data were used to identify the potential risks associated with the exposures. Results: A small acceleration peak was observed below 10 Hz corresponding to the propeller rotation frequency (PRF). Higher multi-axis peaks were observed at the blade passage frequency (BPF) (# blades x BPF) and multiples of the BPF. Weighting of the acceleration spectra significantly reduced the contribution of horizontal axis vibration and higher frequency components. Regardless, the majority of exposures would be considered "fairly uncomfortable". Level flight exposures were associated with the potential for health risk in as little as 2 -3 hours. Discussion: Current assessment methods and guidelines may not be adequate for these types of exposures. Aircrew should be periodically monitored by health care professionals for reports of discomfort, numbness, and pain in the back and lower extremities.

Briefing - Advancements in Life-Saving Hemorrhage Control Devices: How to Treat Bleeding that Will Not Stop – John Croushorn, MD, FACEP, President, Compression Works LLC, Birmingham, AL

Issue and Importance: The lethality of the modern battlefield is mitigated by advancements in modern body armor and casualty care treatment modalities. What has yet to be accomplished is a device that can effectively stop bleeding from wounds in the regions where the torso joins the extremities and head/neck complex without surgical intervention. Even with the fielding of augmented ballistic protection and advanced hemostatic agents the mortality from these injuries is high due to the large vessels running through these regions on the body.

Overview of Briefing: The briefing will detail two research projects studying a novel hemorrhage control device called the Abdominal Aortic Tourniquet (AAT). The number one capability gap identified by the Institute of Surgical Research for medical care on the battlefield is pelvic junctional hemorrhage. This is a problem that is not effectively treated with current extremity tourniquets or hemostatic dressings. It generally defines a wound in the pelvis, groin or proximal leg. An animal study and human study will be discussed demonstrating the safety and effectiveness of a device that compresses the aorta stopping all blood flow to the pelvis and legs. The device was chosen as one of the 10 inventions of the year by Popular Science for 2012 and has received approval by the FDA. It will be fielded by the military this fall.

WEDNESDAY – 10:30 AM - NOON
TEST & EVALUATION
LOCATION: CRYSTAL 3 & 4 – CASINO LEVEL

MODERATOR:

Briefing - Adapting Egress Tests to the Modern Test and Evaluation Process - Mr. George Ayers, Project Manager, 846th Test Squadron, Holloman AFB, NM

Abstract: Modern Test and Evaluation (T&E) initiatives emphasize the need for T&E to be efficient, realistic, and to provide meaningful results that are broadly applicable and can be trusted. The authors propose to bring these initiatives to bear in egress T&E through the adoption of improvements to and better configuration control over test hardware; the implementation of experimental design strategies that can extract the most information from egress test campaigns while more efficiently using scarce test resources; the development of egress models and simulations that can enhance understanding of egress physics and test results; and the implementation of policy to facilitate egress knowledge-sharing across the DoD. There are many facets of egress test enterprise that all can agree need to be improved. Some items need discussion and consensus. Some items require imposition of policy. The authors welcome the other members of the egress test community in the exploration and implementation of these improvement efforts. These efforts need to be done with this end in mind: improving the warfighter's chances of not only surviving an egress event, but landing safely and ready to escape, evade or fight.

Briefing - Experimental Design for Egress Testing – Dr. Michelle Zeisset, Operations Analyst, 746th Test Support Squadron, Holloman AFB, NM

Abstract: Appropriate experimental design can reduce the effect of differences between the planned and accomplished test point parameters, allow the test program to be resilient to the effects of cancelled tests, determine an appropriate number of tests (linking this number to the confidence in the test results with mathematical rigor), and allow the more effective integration of modeling and simulation results into the experimental campaign. The benefits of a carefully designed test campaign can include determining a more efficient test matrix than has been used in the past. This would be an appropriately sized test design with an appropriate and objective level of confidence linked to the results. This test matrix will be adaptable to practical considerations and resilient to the effects of changes in the test conditions (e.g. deviations from the planned test points). The results of such a test campaign would support a model that is robust, objective, and rigorous.

Paper – Development of a Modular, Low-cost, Frangible ATD for Use in Blast Testing - Mr. Stuart B. Nightenhelser, Program Manager, Wolf Technical Services, Indianapolis, IN

Abstract: Currently, no appropriate anthropomorphic test device (ATD) for blast testing is available. The most commonly used ATD for research purposes is the Hybrid III, which was designed to examine human body dynamics in vehicular accidents. Although these devices are well instrumented, they are limited in the information they can provide in evaluating injuries from a blast incident. The cast aluminum and steel bone surrogates do not behave as their human counterparts and do not display failure upon impact, and the vinyl skin is impenetrable to flying debris. Wolf Technical Services, Inc. is developing a low-cost modular ATD with frangible bones and visual indications of injuries caused by acceleration and loading. Wolf considered the top three injury mechanisms and the top four significant regions of injury to design the ATD. Wolf's cost-effective, modular ATD has the following features: a frangible skeletal system, a representation of blunt trauma, human-like construction, Instrumentation to measure loading and acceleration, and reusable instrument packages.

WEDNESDAY – NOON – 1:00 PM
LUNCH BREAK
EXHIBITS WILL REMAIN OPEN DURING THIS TIME

Wednesday technical sessions continue next page

WEDNESDAY – 1:00 PM – 2:30 PM
PANEL - 6th Generation Escape Technologies
LOCATION: CRYSTAL 1 & 2 – CASINO LEVEL

MODERATOR: Mr. Jerry Reid, SKYTEXUS, Forney, TX

Information on this panel will be in final program.

WEDNESDAY – 1:00 PM – 2:30 PM
BRIEFING - GUARDIAN ANGEL WEAPON SYSTEMS REQUIREMENTS UPDATE
LOCATION: CRYSTAL 3 & 4 – CASINO LEVEL

PRESENTER: Mr. Bryan Bailey, ACC Guardian Angel Weapon Systems Team Program Element Manager (PEM), Langley AFB, VA

GUARDIAN ANGEL (GA) is an Air Force non-aircraft weapon system made up of a Family of Systems (FoS) - based in both human and equipment capabilities - formulated to prosecute the ground phase of Air Force Personnel Recovery (PR) across the full spectrum of military operations. GA forces provide expertise in both the planning and execution of PR through the following phases: Prepare, Report, Locate, Support, Recover & Reintegrate. Established by the Air Force Chief of Staff in 2003 and officially captured as a an AF Major Weapons System, in AFPD 10-9, Mar 2007, the GA FoS is employed by three distinct Air Force specialties; Pararescue (PJ), Survival-Evasion-Resistance-Escape (SERE), and Combat Rescue Officer (CRO). The presentation will address the equipment that makes up the FoS. The presentation will explain the GA requirements process used to modernize the weapon system and discuss current efforts where equipment is being procured or upgraded. It will identify potential areas where modernization is planned for new equipment or upgrades to enhance currently fielded equipment to resolve capability gaps which currently exist.

WEDNESDAY – 2:00 PM – Raffle in Exhibits Area – See Page 17 for information

WEDNESDAY – 2:30 PM – 3:00 PM
REFRESHMENT BREAK
LOCATION: EXHIBIT HALL - SUMMIT PAVILION - CASINO LEVEL

3:00 PM - EXHIBITS CLOSE & EXHIBITOR TEAR-DOWN BEGINS (3:00 PM – 9:00 PM) – TECHNICAL SESSIONS CONTINUE!!!!

WEDNESDAY – 3:00 PM – 4:30 PM
SAFETY
LOCATION: CRYSTAL 1 & 2 – CASINO LEVEL

MODERATOR:

Briefing – Effects-Based Human Systems Integration – Ms. Lisa Kaminski, Human Systems Analyst/Associate; Booz Allen Hamilton, Wright-Patterson AFB, OH and Major Mike Luby, Human Systems Analyst, 711 HWP/HP, Wright-Patterson AFB, OH (continues)

Abstract: Effects-Based Human Systems Integration (EB HSI) is derived from the Joint Targeting Cycle concept. Targeting supports the process of linking desired effects with actions. The purpose of EB HSI is to develop a standardized process to target HSI within system design and development. (continues)

The process allows for targeting of HSI domain critical nodes, by applying a human-related risk perspective during decision making activities.

The EB HSI cycle can be used for a specific program or system to identify high-driving HSI and domain elements to be targeted. The EB HSI is comprised of six phases: Required Capabilities, Requirements Definition, Capability Analysis, Decision, Acquisition, and Assessment. Through this process CONOPS and CONEMPS are identified; human-related KPPs, KSAs, and OSAs are developed; HSI-related risks and tradeoffs are identified through network mapping and mitigated; and critical nodes are targeted. HSI recommendations are provided to program managers for action and assessments are performed to identify lessons learned and best practices for future implementation.

By approaching HSI through an effects based targeting process, the effects of decisions are linked to HSI domains. The goal of EB HSI is to identify trade-offs early and minimize life cycle costs by identifying domain network connections.

Briefing – Safe Separation and Collision Avoidance for UAS in Nextgen – Ms. Ranae Contarino, CEO, R³ Engineering, Lusby, MD

Abstract: R³ Engineering has developed a "Space Based" separation and collision avoidance system called AWSAS (All Weather Sense and Avoid System) that has the ability to enable safe airspace integration in any "controlled airspace", where all aircraft are required to participate in the air traffic management system. The FPGA designed dual band radio, AWSAS, is fully compatible with "NextGEN" – the FAA's transitioning, space-based, air traffic management system, for which ADS-B (Automatic Dependent Surveillance – Broadcast) technology is the backbone. AWSAS has embedded self-separation and collision avoidance algorithms for on-board processing and an open architecture for non-cooperative sensor inputs. The briefing will detail results of UAV, fixed wing and helicopter flight testing that has been performed in a variety of venues, including scripted "encounters" where piloted (manned) aircraft intentionally flew patterns that would cause warnings of potential mid-air collisions. The briefing will also discuss findings and planned next steps that will demonstrate why an RF-based system is the logical choice, and how it works to ensure safe separation and collision avoidance.

Briefing – Safety Culture in High Reliability Organizations - Hon. Richard F. Healing, P.E., Sr. Partner, R³ Consulting, Washington, D.C.

Abstract - This briefing describes High Reliability Organizations (HROs), including the 5 important practices and key characteristics of HROs. It traces the evolution of military organizations (Navy) from "risk taking" to "risk managing", and offers examples of the differences in performance over time, including specific examples of how leadership can make a difference. The briefing includes two brief video clips – one showing a strong safety culture at work in a hazardous environment, and another showing a risk taking culture getting caught. Emphasis is on how organizations with strong, committed leaders are more likely to have a strong safety culture and the benefits derived from safe performance.

WEDNESDAY – 3:00 PM – 4:30 PM
BRIEFING - *"THAT OTHERS MAY LIVE FOUNDATION"* - CELEBRATING 10 YEARS OF SUPPORTING THE USAF RESCUE FAMILY
LOCATION: CRYSTAL 3 & 4 – CASINO LEVEL

PRESENTER: Ms. Laura Lerdall, Deputy Executive Director for Operations, That Others May Live Foundation, Hahira, GA

This briefing will provide information on the support That Others May Live Foundation has provided USAF rescue warriors and their families since 2002, the year it was founded. In addition, we will discuss the way the mission statement has evolved to widen the net of support and the latest monumental milestone of achieving national/international participation status for the Combined Federal Campaign. We will show a video detailing the team that comprises rescue and the faces and families of the fallen since 1996.

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