University of Southern California
Aviation Safety and Security Program
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Los Angeles, CA 90045
310-342-1345

http://viterbi.usc.edu/aviation

Aviation Safety + Security Program

SAFETY MANAGEMENT FOR REMOTELY PILOTED AIRCRAFT COURSE
EXPANDED ACCIDENT LAB & CRASH SITE
PRACTICAL SMS IMPLEMENTATION
APPROVED FOR VA BENEFITS
MESSAGE FROM THE DEAN

Our cover photo of this unmanned aircraft system reflects the fact that the future of aviation safety is growing ever brighter. At USC we have contributed significantly to the progress of manned aviation. Now, we aim to lead the field of unmanned aviation. USC’s own unmanned aircraft, the A160 Hummingbird, offers unparalleled educational benefits as the newest addition to the aircraft accident laboratory in Los Angeles. In a sense, it acts as our ambassador to the world of unmanned aviation.

While there is much talk in the media about unmanned aerial vehicles (UAVs), or drones, we are only in the developmental stage of this aviation technology. Developing reliable and safe drones capable of operating as safely as typical civilian flight remains years away.

At USC, though, we aim to change that. We are becoming a leader in this emerging field, which is the reason why our Systems Safety Certificate program has become increasingly relevant and important in the world of drones.

Our program’s global outreach continues to expand with classes in Trinidad, Morocco, South Korea, Tunisia, Netherlands, Canada, and Dubai this year alone. We continue to be actively engaged with international organizations such as the United Nations World Food Program, Canadian Aeronautics and Space Institute (CASI), the International Society of Air Safety Investigators (ISASI) and Aero Safety World. We do so to build a more collaborative safety regime throughout the world for the betterment of all aviation.

We continue to celebrate the growth of our USC Aviation Safety & Security Program Accident Investigation laboratory, which offers practical knowledge in the ongoing journey for accident investigations.

Safety Management Systems (SMS) are now an integral feature of most aviation enterprises. Indeed, the International Civil Aviation Organization (ICAO) has issued SMS Standards for aircraft operators, airports and air traffic services internationally. While these standards exist, industry implementation has not kept up with the requirements, reflecting a lack of understanding of what an SMS provides or how it works. In an effort to bridge this gap, we now offer two courses focusing on the practical application of such programs: Aviation Safety Management Systems (ASMS) and SMS for Managers (SMS-MGRS).
The USC Viterbi School of Engineering combines sophisticated research and excellent teaching to address real-world problems. The Aviation Safety and Security Program deepens and enhances USC Viterbi’s international presence.

The University of Southern California is the school of choice for future world leaders. The Aviation Safety and Security Program has enhanced the school’s international reputation and will continue to do so for years to come.

Yannis C. Yortsos, Dean
USC Viterbi School of Engineering
USC AVIATION SAFETY AND SECURITY PROGRAM

In 1952, USC established the first Aviation Safety Program at a major research university. Since then the program has gained a highly respected reputation nationally and internationally, with more than 25,000 aviation professionals from over 70 nations having completed its courses.

The program was originally developed by a project team of faculty from three disciplinary areas: engineering, management and psychology. The courses they developed integrated appropriate subject matter from these areas into a comprehensive systems approach to safety.

There are 23 different courses available, with approximately 56 total sessions scheduled each year. Courses are scheduled consecutively to permit out-of-state and international students to complete a sequence of courses or an entire certificate program in one stay. Contract courses are conducted in addition to the scheduled courses at locations worldwide.

The Certificate Program in Aviation Safety and Security, which requires an individual to complete a series of courses, has been completed by over 1800 students.

A brief list of organizations with employees who have attended includes:

- International air carriers recognized for their outstanding safety records including Air New Zealand, Virgin Atlantic, SAS, Singapore Airlines, Korean Airlines, and JAL;
- U.S. government agencies managing air safety and accident investigations and recommendations — the FAA and the National Transportation Safety Board, the FBI and the equivalent agencies of Canada, France, Great Britain, Italy, Japan, Singapore, New Zealand, Trinidad/Tobago, South Africa, Taiwan, and Brazil;
- The U.S. Army, Air Force, Navy, Marines and Coast Guard;
- All U.S. major air carriers and aircraft manufacturers;
- Other international air carriers including Air Canada, Alitalia, El-Al Israel Airlines, Egypt Air, Kenya Airways, Royal Jordanian Airlines, Saudi Arabian Airlines and Yemen Airways;
- International aircraft manufacturers including Airbus, Eurocopter, Embraer, and Bombardier;
- International military organizations including the Royal Netherlands Air Force, the Royal Air Force, the Irish Air Corps, the Navy of Mexico, the Colombian Air Force, the Royal Danish Air Force, the Republic of Singapore Air Force and the Canadian Defense Forces;
- Aviation elements of the United Nations.

Continuing Education Units (CEU’s) are available upon request. One CEU is awarded for every 10 hours of instruction.

More information can be accessed on our website, http://viterbi.usc.edu/aviation.

AVIATION SAFETY AND SECURITY CERTIFICATE PROGRAM

Individual courses are designed to provide the student with expertise in a particular subject area. While each course is constructed as a whole and taught independently of the others, those interested in preparing for a full-time career in aviation safety should consider a program of courses that provides broad knowledge. We award the University of Southern California’s USC Aviation Safety and Security Certificate to those successfully completing the required program. It certifies completion of training in several multidisciplinary areas including Aviation Safety Management Systems, Accident Investigation, and Human Factors.

Students satisfying the four categories below will be awarded the USC Aviation Safety and Security Certificate. There is a 7-year time limit for completion of the certificate program.

1. One of the following:
   - Aviation Safety Management Systems (ASMS)
   - Safety Management for Aviation Maintenance (MAINT)
   - Safety Management for Remotely Piloted Aircraft (RPSM)
   - System Safety (SSC)

2. One of the following:
   - Aircraft Accident Investigation (AAI)
   - Helicopter Accident Investigation (HAI)
   - Gas Turbine Engine Accident Investigation (GTAI)
3. One of the following:
   Human Factors in Aviation Safety (HFH)
   Human Factors in Aviation Maintenance (HFMX)
4a. Two of the following:
   Accident/Incident Response Preparedness (AIP)
   Legal Aspects of Aviation Safety (LEGAL)
   Photography for Aircraft Accident Investigation (PHOTO)
   Role of the Technical Witness in Litigation (TWW)
   Incident Investigation/Analysis (IIA)
   Threat and Error Management (TEM)
   SMS for Managers (SMS-MGR)
   Or
4b. One of the following:
   Aviation Security Program Management (AVSEC)
   Software Safety (SFT)
   One additional management course from #1
   One additional accident investigation course from #2

Either Gas Turbine Engine Accident Investigation (GTAI) or Helicopter Accident Investigation (HAI) will be considered the equivalent of two short courses when accompanied by another investigation course.

**SYSTEM SAFETY CERTIFICATE PROGRAM**

The USC Aviation Safety and Security Program also offers a certificate program in System Safety. This certificate is designed to address the needs of engineers and project managers with responsibilities for system safety. The principle method of system safety analysis and the extension of this program plan are taught in the flagship class of the certificate program — System Safety. The emphasis is on complex, high technology programs.

Today’s systems are highly dependent upon software to operate and monitor. Software requires special attention in system planning, architecture, design and test. The Software Safety Course teaches software design principles which are fault tolerant and acceptably safe.

System safety analysis of engineered systems must often deal with the possibility of human error leading to adverse conditions. Therefore, human error probability evaluation is an essential element in system safety analysis.

The three courses: System Safety (SSC), Software Safety (SFT), and Human Error Analysis for System Safety (HEASS) form the three core courses of the System Safety Certificate Program. Additionally, in order to complete the requirements of the System Safety Certificate, two short elective courses are necessary.

Students have 7 years from the start of their first course to complete the System Safety Program certificate requirements. The program certificate can be completed with 4 or 5 courses, depending on the courses chosen to attend. All courses are Monday through Friday, 8:00 AM to 4:00 PM, unless stated otherwise. A course listed with a half-day ends at noon on the last day of the course.

To complete the program certificate individuals must meet the following requirements:

1. Complete one of the following 3 required courses:
   System Safety (SSC)  9.5 day course
   Software Safety (SFT)  4 day course
   Human Error Analysis (HEASS)  2 day course

2A. Two of the following courses:
   Damage Assessment for System Safety (DASS)  3 day course
   Hazards: Effects and Control Strategies (HAZSS)  2 day course
   Mathematics for System Safety Analysis (MATH)  3 day course
   Or

2B. One of the following courses:
   Advanced System Safety (ADVSS)  4.5 day course
**VETERANS ADMINISTRATION / GI BILL EDUCATIONAL ASSISTANCE**

We are proud to be an education provider for service members and their families, through acceptance of GI Bill assistance in cooperation with the Veteran's Administration. If you have questions regarding VA education benefits and how they're applied to our program, please contact us directly at 310-342-1354 or e-mail us at Pchuong@usc.edu. Further information be found by visiting the GI Bill website at www.gibill.va.gov.

**Covered Programs:**
- Chapter 30 Montgomery GI Bill for Active Duty
- Chapter 31 Voc Rehab
- Chapter 32 VEAP
- Chapter 33 Post-9/11 GI Bill
- Chapter 35 Survivors' and Dependents' Educational Assistance Program
- Chapter 1606 Montgomery GI Bill for Selected Reserve
- Chapter 1607 REAP (Reserve Educational Assistance Program)

**AVIATION SAFETY AND SECURITY CERTIFICATE PROGRAM SERIES**

For individuals interested in completing the Aviation Safety and Security Certificate Program entirely in one continuous time frame, we are offering the following series:

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Each course in a certificate program series must be registered for individually. You may list up to 5 courses on one registration form.

The USC Aviation Safety and Security Certificate Program has been accepted by the FAA Aviation Maintenance Technical Award Program to assist in qualifying for awards in that program. Portions of the training requirements for each of the award levels can be satisfied using training received in this program. Reference [http://www.faa.gov/avr/afs/safety/AMT.cfm](http://www.faa.gov/avr/afs/safety/AMT.cfm) for further information. CEU's earned while attending classes in the USC Aviation Safety and Security Program may be used towards receiving the FAA's highest award, the William (Bill) O'Brien Aviation Maintenance Award, given to eligible technicians and their employers [please see FAA Advisory Circular (AC) 65-25E for eligibility requirements].

In addition, the International Federation of Air Line Pilots’ Association (IFALPA) recognizes recipients of the USC Aviation Safety Certificate as experts in Aviation Safety.

### CONTRACT COURSES

Contract courses are courses from the USC Aviation Safety and Security Program that are offered at locations other than our Los Angeles classroom facilities. Any course in the catalog may be offered as a contract course. Courses may be conducted at international locations or at a location within the United States. Frequently, organizations striving to provide aviation safety or systems safety education to significant numbers within their organization choose to arrange for a contract course at their own facility.

In the recent past, numerous contract courses have been provided at international locations in Asia, Europe, Oceania, Africa, and the Caribbean. Within the United States the USC Safety and Security Program has conducted training for the Federal Aviation Administration. Typically, civil aviation authorities, airlines, and other government organizations require contract courses when they have a large number of students interested in education.

Organizations such as Japan Airlines, Air New Zealand, Korean Airlines, the CAA of South Africa, the CAA of Trinidad and Tobago, the FAA, the U.S. Navy, and IFALPA have arranged contract courses.

The contract course can provide an organization with an economical vehicle for providing aviation safety or system safety education to a large number of employees within a relatively short amount of time. Inquiries regarding contract courses should be made to the USC Aviation Safety and Security Program Director, or the Contract Course Coordinator at avsafe@usc.edu.

### AVIATION SAFETY MANAGEMENT SYSTEMS (ASMS)

A Safety Management System (SMS) is now a requirement for international commercial aircraft operators, international airports, and air traffic services. The standards and implementing procedures for SMS have been established by the International Civil Aviation Organization (ICAO). All 191 countries that are members of ICAO have established or are establish-
ing regulatory requirements for the implementation of SMS. This course teaches how organizations can establish a SMS within the context of their current safety system that meets the basic international standards of ICAO. The SMS Framework serves as a central foundation for this course.

SMS is a safety system by which an organization takes a more active role in the identification, analysis and mitigation of safety issues that occur in the normal operation of their organization. SMS requires that organizational management take responsibility for the company’s safety program. The SMS approach requires the safety/quality team be educated in their duties and responsibilities. This course will provide you with the essential skills needed to manage an organizational Safety Management System (SMS). Emphasis is placed on management skills. The attendee will be able to manage a Safety Management System that includes risk management, audits, data collection, analysis, and incident investigations.

This course is designed for the individual responsible for planning or directing an aviation Safety Management System program. Fundamentals in systems organization and structure provide the individual with the essential skills and methodology needed to plan and manage an effective program. Emphasis is placed on understanding the principles of risk management, identifying program development strategies, audits and applying the knowledge toward effective management systems and interoperability with Quality Assurance.

**Objectives:** To provide the individual with the skills and practical methods to plan, manage and maintain an effective Aviation Safety Management System (SMS).

**Who Should Attend:** Individuals responsible for planning, directing or managing an aviation safety management program and supervisors who are required to supervise an accident prevention/risk management program. This includes airline, commuter, corporate, fixed base operator, government, insurance, hospital emergency medical service, law enforcement and airport management.

**Course Outline**

1. Safety Management Systems (SMS)
   - Accident Prevention Concepts/Methods
   - Safety Systems
   - Safety Risk Management

2. Communication Skills
   - Perception
   - Meaning/Language/Jargon
   - Information Overload
   - Managing Conflict
   - Listening

3. Medical Issues
   - Fatigue Risk Management Systems
   - Sleep and Fatigue
   - Stress

4. Ramp/Maintenance Safety

5. Legal Aspects
   - Official Investigations & Civil Litigation
   - FAA Enforcement
   - International Aviation Safety and Legal Issues

The Failure Modes and Effects Analysis (FMEA) Process
- Human Factors
- Root Cause Analysis
- International Procedures
- Interaction with Quality Assurance
- Education and Training
- Corporate Safety Culture
- Motivating Safe Behavior
- Role of Management
- Safety Climates/Management Styles
- Cost of Accidents
- Risk Identification
- Incident Investigation
- Change Management Process
- Risk Management and Risk Assessment
- Report Writing
- Airfield Safety
- Accident Response Planning
- Audits
- Safety Analysis
- Aviation Safety Advisor Duties
- SMS Framework
Legal Rights of Pilots and Other Aviation Professionals
ICAO Annexes 6 and 14
ICAO Doc. 9859
FAA Advisory Circulars, NPRM’s

6. Practical Applications/Case Study

Course Duration: 9.5 Days

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AIRCRAFT ACCIDENT INVESTIGATION (AAI)

The course is designed for individuals who have limited investigation experience. All aspects of the investigation process are addressed, starting with preparation for the investigation through writing the final report. It covers National Transportation Safety Board and International (ICAO) procedures. Investigative techniques are examined with emphasis on fixed wing investigation. Data collection, wreckage reconstruction and cause analysis are discussed in the classroom and applied in the lab.

The new USC Aircraft Accident Investigation lab serves as the location for practical exercises. Eight aircraft wreckages form the basis of these investigative exercises. An actual crash site in the LA area is visited. The crash laboratory gives the student an opportunity to learn the observation and documentation skills required of accident investigators. The wreckage is examined and reviewed with investigators who have extensive actual real-world investigation experience. Examination techniques and methods are demonstrated along with participative group discussions of actual wreckage examination, reviews of witness interview information, and investigation group personal dynamics discussions.

Anyone who participates in an Aircraft Accident Investigation may be called upon to communicate with a wide range of individuals including: investigators, regulators, industry representatives, lawyers, and the media. The communication portion of the AAI class provides students with the tools necessary to address those diverse audiences. This is a specialized skill that will prove to be highly valuable in aircraft accident or incident situations.

Objectives: To provide concepts and practical techniques on aircraft investigation methodology, and prepare an individual to participate in an aircraft accident investigation.

Who Should Attend: Persons associated with aircraft accident investigation including manufacturers, operators, associations, insurers, air carriers, government agencies, law enforcement and military.

Course Outline

1. Investigations
   - Introduction and History
   - Authority and Theory
   - Principles of Investigation
   - Initial Actions
   - Site Safety
   - On-Scene Investigation Procedures
   - Investigation of Aircraft Fires
   - Reciprocating Engines and Propellers
   - Gas Turbine Engines
   - Systems Investigation
   - In-flight Breakup and Midair Collisions
   - Technical Assistance
   - Analysis and Report Writing
   - Flight Data Recorders
   - Cockpit Voice Recorders

2. Technology
   - Types of Material Failures
   - Metal and Composite Materials
   - Identifying Failures in the Field
   - Understanding Aircraft Stability
   - Aerodynamics — Accident Cause or Contributor

3. Human and Biomedical Factors
   - Human Factors
   - Casualty Identification
   - Aeromedical Role in Investigation
4. Aircraft Accident Communication Techniques

5. Media Relations
   - Overview of Strategy
   - Message Development and Thought Process
   - Interactive Exercises to Illustrate Techniques
   - Critique and Analysis of Potential Situations
   - The Role and Reality of Media in Accident Investigation

6. Accident Investigation Laboratory
   (conducted in a separate facility with actual wreckage)
   - Wreckage Observation/Familiarization
   - Wreckage Examination/Documentation
   - Investigation Organization at Accident Site
   - Accident Site Hazards and Safety
   - Investigative Group Interactions

**Course Duration:** 9.5 Days

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<td>30 – 11 Dec 2015</td>
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Aircraft Accident Investigation Course (AAI) has a four hour accident investigation laboratory on the Saturday morning between weeks 1 & 2 from 8:00AM to 12:00 PM.

**HELIICOPTER accident invesTigation (HAI)**

The course is designed both for investigators who seek advanced knowledge of helicopters, and for those safety professionals seeking a fundamental understanding of the hazards of helicopter operations and factors specific to helicopter accident investigation. The course addresses rotor systems, controls, performance variables, flight hazards and material characteristics involved in helicopter operations and accidents. Although Aircraft Accident Investigation (AAI) is not a prerequisite, it is assumed that the attendee has had some exposure to investigative processes. The subject matter is addressed from two perspectives. The first is accident investigation through the application of operational insights and helicopter accident case studies. The second provides a more technical perspective of helicopter flight performance, engineering principles and component failure. The course is presented by two instructors specialized in helicopter operations, with considerable experience in helicopter accident investigation. The course includes two field trips. In the first, attendees participate in a “hands on” laboratory examination of helicopter wreckage from an accident involving aerodynamic and crew causation, while in the second, students visit a manufacturer.

**Objectives:** To provide concepts, practical techniques and methodologies essential to rotary wing aircraft accident investigation.

**Who Should Attend:** Persons associated with rotary wing accident investigation including manufacturers, operators, associations, insurers, law enforcement, military and governmental agencies.

**Course Outline**

1. Accident Investigation & Analysis:
   - Assessing Indicators of Accident Causation
   - Data Collection
   - Investigative Tools
   - Risk and the Operating Environment
   - Pre-Investigative Planning
   - Operational Procedures
   - Technical Data
   - Accident Scene Documentation
   - Fluid Sample Analysis
   - Inventory of Aircraft Wreckage
   - Diagrams: Plan, Profile, Polar, Base Line, Witness, Photography
   - Impact Force Determination
   - Rotor System Examination
   - Fire Investigation: Source and Temperature
   - Composite Materials Overview
   - Powerplant Investigation: Turbine and Reciprocating Engines
   - Instrument Examination
   - Maintenance Record Evaluation
   - Reviewing Pilot Records
   - Human Factors and Witness Interview
   - Crashworthiness
Meteorological Investigation
Communications
Various Case Studies

2. Helicopter Fundamentals and Material Factors
Material Failure Analysis
Rotor System Characteristics
Hover and Low Speed Operations
Tail Rotor/Anti-Torque Performance Variables
Downwind Operations
Forward Flight Operations
Mast Bumping
Height/Velocity Variables
Dynamic Stall
Compressibility Effects
Autorotation Variables
Vortex Ring State
Dynamic Rollover
Ground Resonance
Air Resonance
Rotor Divergence
Energy Attenuation Systems/Crashworthiness

Course Duration: 4.5 Days

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<td>9 – 13 Nov 2015</td>
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GAS TURBINE ENGINE ACCIDENT INVESTIGATION (GTAI)

This specialized accident investigation course is directed to fixed wing turbojet and turboprop as well as turbine powered rotary wing aircraft. The course examines specific turbine engine investigation methods and provides technical information in the related area of material factors. This is a fundamental accident investigation course. Individuals with many years of engine investigations may find this course too basic. It is assumed that the attendee has a basic understanding of jet engines.

Objectives: To provide the participant with the basic skills and knowledge to effectively examine the involvement of a turbine engine in an aircraft accident.

Who Should Attend: Individuals with responsibility for the post-accident examination of gas turbine engines and individuals responsible for integration of engine information into the total accident investigation.

Course Outline
1. Aviation Gas Turbine Engine Accident Investigation
   Types of Gas Turbine Engines
   Mounting of Turbine Engines
   Major Components
   Controls and Accessories
   Related and Interfacing Aircraft Components
   Engine Operating Characteristics
   Potential In-Flight Engine Occurrences
   Role of the Investigator
   Best Practices in Investigations
   Documentation of Physical Evidence
   Investigation of Incidents
   Investigation at the Accident Site
   Engine Disassembly Investigation
   Engine Operation Speed at Terrain Impact
   Engine Uncontained Components
   Engine Fire
   Documentation

2. Material Factors
   Investigation Procedures
   Basic Metallurgy of GT Materials
   Failure Analysis – Fundamentals and Mechanical Factors
   Failure Analysis – Fracture Mechanisms
   Engine Component Investigation Examples

3. Case Study

Course Duration: 4.5 Days

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HUMAN FACTORS IN AVIATION SAFETY (HFH)

Humans design, build, operate and maintain the aviation system. It is no wonder that the majority of aviation accidents and incidents have roots in human factors. With this realization comes the conclusion that quality human factors training is effective in improving safety. This course presents human factors information in a manner that can be readily understood and applied by aviation practitioners. Emphasis is placed on identifying the causes of human error, predicting how human error can affect performance, and applying countermeasures to reduce or eliminate its effects. The course content follows the subjects recommended in FAA Advisory Circular 120-51E. The course also addresses some of the topics recommended in the International Civil Aviation Organization’s Human Factors Digest No. 3: Training Operational Personnel in Human Factors. The emphasis is from the pilot’s perspective, but is applicable to all phases of aviation operations. The course relies heavily on participation, case studies, demonstrations, self-assessment and practical exercises.

Objectives: To provide class participants with human factors knowledge and practical tools that can be readily applied to improve safety within their respective organizations.

Who Should Attend: This course has been carefully designed to appeal to a wide-spectrum of professionals actively involved in aircraft operations. There is special emphasis for safety managers, training, flight department and maintenance managers and supervisors, pilots, air traffic controllers, dispatchers and schedulers.

Course Outline
1. Overview of Human Factors and Recent Advances
   - Human Error
   - Systems Approach to Aviation Safety Improvements
   - Cases of Aircraft Accidents Due to Human Error

2. Introduction to Human Error Accident Reduction Training
   - Reason Model
   - SHEL Model
   - Human Factors in Automation
   - Corporate Culture
   - Engineering a Safety Culture
   - Threat and Error Management

Fatigue and Alertness Management
Communications
Workload Management
Monitoring and Cross-checking
Decision Making
Leadership/Followership
Information Processing
Managing Stress
Judgment Exercises
Case Studies

Course Duration: 4.5 Days

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HUMAN FACTORS IN AVIATION MAINTENANCE (HFMX)

This course is designed to provide knowledge and understanding of human factors in the realm of aviation safety with a focus on the role of the maintainer. It presents human factors issues as conditions/hazards that must be managed. Specific issues such as fatigue management, deviations for approved procedure, situation awareness and the Dirty Dozen are presented. Data collection methodologies such as MEDA and LOSA are examined as viable methods of safety information and as hazard identification tools in an organization’s SMS. This course satisfies the Human Factors Course requirement for the USC Safety & Security Certificate.

Objectives: To create a comprehensive understanding of the factors affecting an individual’s performance in aviation maintenance. To understand how the management of human factors play a central role in an organization’s safety program.
**Who Should Attend:** This course is designed for supervisors, managers and staff officers who have responsibility for the oversight of aviation maintenance.

**Course Outline**
1. History of HF
2. ICAO / EASA / FAA HF Requirements
3. Error Theory
4. Individual HF Performance Issues
   - Dirty Dozen
5. HF and Risk Management
   - Situational Awareness
   - Hazard Recognition
   - Risk Assessment Development
   - Risk Management (Matrix development)
6. HF specific industry problem areas
   - Human Factors Justification / Cost Benefits
   - Fatigue Management
   - Turnover Briefings
   - Failure to follow procedures / Deviations from proper maintenance
7. Communication
8. SMS overview
9. Pillars of SMS Program
10. Safety Policy Development
    - Risk Management
    - Safety Assurance / Monitoring / Data
    - Safety Promotion / Culture
11. Importance of Data Collection
    - Recognition of hazards for data collection
    - Methods – LOSA(M)(R)
    - MEDA brief
    - Importance for future design implementations
12. HF and Leadership
13. How leadership affects individual performance
    - Communication traits
    - Communication Conflicts
    - Stress, Pressure, and Teamwork traits
    - Individualism versus organization performance
    - How leadership affects culture – organizational performance
    - Leadership Styles & Conflicts
    - Decision Making Traits
    - Leadership and Safety Culture
    - Case Study

**Course Duration:** 4.5 Days

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**SAFETY MANAGEMENT FOR AVIATION MAINTENANCE (MAINT)**

This course provides supervisors with aviation safety principles and practices needed to manage the problems associated with aircraft maintenance operations. In addition, it prepares attendees to assume safety responsibilities in their areas of operation. It does not teach aircraft maintenance and assumes the attendee has a maintenance background.

**Objectives:** To provide the individual with maintenance safety principles and guidelines for the development of effective maintenance safety programs.

**Who Should Attend:** Aircraft maintenance supervisors at all levels.

**Course Outline**
1. Safety Program Administration
   - Definitions
   - Safety Risk Management
   - The Failure Modes and Effects Analysis (FMEA) Process
   - Major Problems in Prevention
     - Prediction
     - Communication
     - Influencing Management
Safety Program Organization
- Overall Responsibility
- Organization
- Role of Management
- Motivating Safe Behavior
- Safety Climates/Management Styles
- Time Management
- Safety Meetings/Committees
- Administrative Procedures
- Reporting Systems
- Education and Training
  - New Mechanics/Safety Personnel
- Accident Response Planning
- Inspections/Audits/Surveys
  - Purpose
  - Self-Inspections
  - Compliance
  - Management
  - Contractor Provided Services

2. Flight Line Safety

3. Aircraft Maintenance Safety

Course Duration: 4.5 Days

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<td>10 – 14 Aug 2015</td>
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SAFETY MANAGEMENT SYSTEMS FOR REMOTELY PILOTED AIRCRAFT (RPSM)

This Safety Management for Remotely Piloted Aircraft (RPSM) course is intended for students who have knowledge of remotely piloted vehicle operations or are looking to understand the current operational conditions for RPA. Experts from the fields of RPA Human Factors, RPA Safety Management Systems, and RPA Piloting introduce students to the theory and application unique to unmanned aircraft. By addressing the characteristics that differ between manned and unmanned air vehicles, the course applies the latest approaches to accident investigation and Safety Management. Students come away with a working knowledge of the safety field pertaining to Remotely Piloted Aircraft which they can apply to their own organization’s operations and future planning.

Objectives: To provide the individual with the skills and practical knowledge to plan, manage and maintain an effective Safety Management Strategy in the operation of Remotely Piloted Aircraft in a variety of environments.

Who Should Attend: Individuals responsible for planning, directing or managing an aviation safety program and supervisors who are required to supervise an accident prevention/risk management program that may work with or operate Remotely Piloted Aircraft. This includes all classifications and sizes of Unmanned Systems throughout the world — military, civilian, and public-use.

Course Outline

1. Human Machine Interface Theory and Problems
   - Crew Communication Conditions & Technological Implications to Communications
   - How Maintenance Responsibilities differ between Manned and Unmanned aviation
   - Understanding the Unique Characteristics with RPA Operational Environments
   - Automation and Flight Planning

2. ASMS Theory & Practice
   - Data Acquisition & Analysis
   - Organizational Risk Management for RPA
   - Risk Mitigation & Analysis
   - International Organization Standards & Participation
   - SMS Requirements & Guidance
   - Developing Hazard Identification Processes for RPA
   - Organizational Risk Management for RPA
   - Operations Management

3. Basics of Investigation
   - Special Considerations for RPA Investigation
   - Accident Investigation Techniques for RPA
   - Using UAS for Accident Investigation
4. Regulatory and Operational Environment
   Basic Types & Applications — components, systems, etc.
   FAA Regulations & Legislation for RPA
   International Organization Standards & Participation
   Certificates of Authorization and Special Certificate of
   Airworthiness — Process and Function
   International Regulatory Framework and Development
   RPA Roadmap for Integration

Course Duration: 5.0 Days

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<td>16 – 19 Nov 2015</td>
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ACCIDENT/INCIDENT RESPONSE PREPAREDNESS (AIP)

This course is designed for individuals who are involved in either preparing for an accident or responding to one as a representative of their organization. It is based on the premise that accidents are relatively rare events and organizations may have little experience in dealing with them. While the situation is usually complex, challenging, and stressful, the impact on individuals or an organization can be reduced by preparation and developing an effective response plan.

Objectives: To provide information on the effective preparation for an accident including organizational policy and planning. To provide organizational representatives with the knowledge and skills to function effectively during post-accident activities and situations. To provide the attendee with the knowledge required to write an effective company response plan.

Who Should Attend: Management and safety personnel involved in planning, response or recovery from accident/incident situations.

Course Outline
1. Communications and Media Planning
   Communication Reality and Strategy Development
   Aviation and Crisis Communication Principles
   Message Development and Responding on Aviation Issues

Getting It Right and Getting It Wrong — Lessons Learned
Interview Guidelines
Parties to an Investigation and Their Communication Styles
The International Element and Differences in Cultural Styles of Communication

2. Family and Victim Assistance in Aviation Accidents
   Family Assistance Plans: Requirements and Standards
   Understanding the Three Phases of Family Assistance:
   Initial Response
   Site Operations
   Long Term Considerations
   Preparing and Implementing a Family Assistance Plan
   Practical Skills for Working with Families

Course Duration: 3.0 Days

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<td>12 – 14 Oct 2015</td>
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LEGAL ASPECTS OF AVIATION SAFETY (LEGAL)

This course is designed to provide information on the legal risks inherent in aviation operations and an overview of the legal system as it relates to aviation safety. The judicial process, current litigation trends, legal definitions and procedures will be covered.

Note: This course is paired with the Role of the Technical Witness in Litigation course (TWW). The TWW course provides practical application of the concepts presented in the LEGAL course.
Objectives: To provide the participant with a working knowledge of the legal processes and trends affecting aviation safety.

Who Should Attend: Individuals in aviation safety who may be involved in aircraft accident investigation.

Course Outline
1. Aviation Accident Litigation
   - Civil Litigation
   - How a Case Is Structured
   - Discovery
   - Deposition
   - Trial
   - Damages/Insurance factors
   - FAA/TSA/DOT Regulations
   - Sources of Law
   - Legal Terminology

2. Legal Aspects of Accident Investigation
   - Jurisdiction of Federal Agencies
   - Investigative Power vs. Private Rights
   - NTSB Probable Cause Safety Investigations
   - FAA Role
   - Accident Reports and Litigation
   - Witness Statements
   - Legal Issues of Accident Response Planning
   - Private Accident Investigations – Work Product Protection
   - Accident Liability
   - Comparative Fault
   - Airline, Air Taxi, Corporate and G/A Accident Issues
   - ICAO

3. Pilot's Duty of Care and Legal Aspects of Selected Safety Regulations
   - Role of Governmental Agencies in Enforcing Aviation Safety Regulations
   - FAA Enforcement Alternatives
   - Administrative/Criminal Action
   - Compliance with Safety Regulations
   - Deviation and Non-Compliance

Affirmative Defenses, Waivers and Mitigating Factors
- Aviation Standards of Care: FAR's, Advisory Circulars
- Special Legal Doctrines Involving Aviation Safety
- Case Study – Analyzing Legal Issues
- Burden of Proof, negligence
- FAA's Emergency Orders
- Accident/Incident Reports

4. Product Liability
   - Strict Liability in Tort
   - Basic Elements
   - Persons Liable

5. Current Issues
   - FOQA & ASAP
   - Voluntary Disclosure
   - Criminal Liability
   - Safety in Conflict with Legal Rights
   - Employer vs. Employee Issues
   - Avoiding Legal Exposure for Safety Managers

Course Duration: 2.0 Days

Course No. Dates Tuition
LEGAL 15-1 18 - 19 Aug 2014 $1025
LEGAL 15-2 26 - 27 May 2015 $1025
LEGAL 16-1 17 - 18 Aug 2015 TBA

ROLE OF THE TECHNICAL WITNESS IN LITIGATION (TWW)

Most evidence in litigation is introduced through the use of technically-qualified “expert” witnesses. The judgments rendered are dependent on the quality of the witnesses and the evidence presented. This course is designed to improve the quality of technical testimony. Attorneys and experienced technical witnesses teach the course to provide a balanced presentation.

Objectives: To provide practical instruction and demonstration in the skills and techniques needed by individuals who serve as technical consultants or witnesses in litigation.
**Who Should Attend:** This course is particularly valuable to any aviation professional who may give testimony in hearings, deposition or trial as well as consultants, investigators, safety managers, representatives of professional pilot associations and managers whose responsibilities may involve them in the legal process. Experienced expert witnesses will find the course both challenging and informative to help them enhance their role as an expert/technical witness. Also individuals who may wish to enter this profession or, because of their job, may become involved in litigation from accidents will find this course beneficial.

**Course Outline**

1. **The Litigation Process**
   - The United States Legal System
   - Origins of U.S. Common Law
   - The Federal and State Systems
   - Sources of Law
   - Structure of U.S. Courts
   - The Legal Profession
   - The Jury System
   - Pre-Trial Discovery
     - Objectives/Forms of Discovery
     - Overview of Related Theories of Liability

2. **The Rules of Evidence**
   - Admissibility of Evidence and Testimony
   - Rules Pertaining to Experts

3. **The Role, Qualifications and Characteristics of the Technical Witness**
   - Scope of Activity
   - Responsibilities
   - The “In-House” Expert/Consultant
   - Formulation of Opinion
   - Research
   - Pre-Accident/Litigation Activity
   - Post Accident/Pre-Litigation Activity
   - Legal Requirements
   - Qualifications

4. **Ethical Considerations**
   - The Privilege of Expert Testimony
   - The Pressures on Experts
   - The Responsibilities

5. **Consultant as a Technical Witness**
   - Getting Started
   - Agreements with Law Firm (Client)
   - Investigation
   - Deposition/Trial Preparation
   - Development of Communication Skills

6. **Deposition and Trial**
   - Oral Depositions
   - Trial
   - Mechanics of Trial
   - The Expert at Trial

7. **Accident Case Study**
   - Students assume roles from an actual NTSB accident investigation case
   - Experienced aviation trial attorneys instruct on depositions
   - Simulated trial – direct and cross examination

**Course Duration:** 2.0 Days

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PHOTOGRAPHY FOR AIRCRAFT ACCIDENT INVESTIGATION (PHOTO)

This specialized course in accident investigation is designed to assist the investigator to improve photographic documentation of an accident site. Course participants will take photographs of components and critique them as a class. This course assumes that the investigator is not a professional photographer.

**Objectives:** To provide the aircraft accident investigator with basic accident photographic and video techniques.

**Who Should Attend:** Individuals involved in aircraft accident investigation.

**Course Outline**
- Digital Photography
- Basic Photographic Equipment
- Lenses and Camera Controls
- Electronic Flash
- General Techniques
- Macro Photography
- Lighting
- Picture Identification
- Specialized Photographic Techniques
- On-Site Photographic Priorities
- Student Practice Session
- Critique of Student Photographs
- Videography
- Basics in Videography
- Uses of Video in an Aircraft Accident Investigation

**Required:** Each student should bring a Digital SLR camera or digital camera equipped with a Macro (close-up) lens feature, if available, and a flash. A limited number of cameras are available to be checked out from the USC program; please coordinate beforehand to determine availability.

**Course Duration:** 2.0 Days

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SYSTEM SAFETY (SSC)

Instruction is given in both system safety engineering and management with emphasis on complex, high technology systems. Engineering methods are illustrated with practical, numerical examples. The principal system safety analysis method is taught with classroom and homework problems. Preparation of a system safety program plan and management of the system safety process in all phases of the system life are examined in depth. A classroom project provides students with the opportunity to apply system safety management and engineering methods while working as a team. Enrichment lectures in special areas of knowledge essential to the system safety process will also be presented. Each student should bring a calculator with statistical functions.

**Objectives:** To provide a level of knowledge of system safety sufficient to manage a system safety program and to perform associated system safety engineering tasks.

**Who Should Attend:** Individuals who have safety responsibilities in the design and operation of complex systems in which an accident can cause substantial loss. Emphasis is upon military projects and contracts.

**Course Outline**
1. Quantitative Methods
   - System Safety Fundamentals
   - Set/Probability Theories
   - Bernoulli Process and Binomial Distribution
   - Poisson Analysis
   - Series/Parallel Networks
   - Fault Tree Analysis
   - Event Tree Approach
   - Boolean Algebra
   - Failure Data Analysis
   - Decision Theory
   - Risk Ranking

2. Management
   - System and System Safety Life Cycle
   - Hazard Analysis Techniques including:
     - Logic/Change Analysis
     - Energy/Trace
FHA/FMECA
FTA
SCA
Hazard Analysis Types including
PHA/SSHA, SHA and O & SHA
System Safety Order of Precedence
Amelioration
System Safety Management Tasks
Objectives/Life Cycles
System Safety Program Plan
Types of Risks/Assumption of Risks

Prerequisite: Attendees should have an engineering or hard science background.

Course Duration: 9.5 Days

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Who Should Attend: System managers and engineers, system safety engineers and software engineers who are involved with developing systems that possess major software components and are responsible for the safety of such systems. Attending the System Safety Engineering course and some understanding of software beforehand is highly recommended.

Course Outline
1. Software
   - Safety Overview
   - Definitions and Concepts
   - Design Requirements
   - Software Regulations/References
   - System Safety Team Organization
   - Risk Processing/Management
   - Risk by Agency
   - Hazard and Security
   - Catastrophic
   - Probability of Occurrence
   - Reliability Issues
   - Probability
   - Hazard Consideration/Analysis
   - Risk Assessment and Risk Levels
   - Program Documentation
   - Software Reliability/Risk
   - Software Engineering/Requirements
   - Software Safety Life Cycle Goals
   - Security Engineering
   - VDHL Synthesis
   - Error Classification and Types
   - Software Safety Requirements Traceability
   - Petri-Net Modeling
   - Software Safety Checklist
   - Preliminary Hazard Analysis
   - Software Language Analysis
   - Fault Tree Analysis
   - Formal Mathematical Models
   - Software Safety Testing
   - Testing Schemes/Strategies
   - Software Safety Reliability/Maintenance

SOFTWARE SAFETY (SFT)

Software requires special attention in system planning, architecture, design and test. This course presents philosophies and methods of developing and analyzing software and highlights managing a software safety program. Software design principles will be taught to create programs that are fault tolerant and acceptably safe. Several software hazard analyses methods will be evaluated, including Fault Tree/Soft Tree, Software Sneak Analysis and Petri Nets.

Objectives: To provide an understanding of the nature of software hazards, root causes, and the methods by which these hazards may be prevented or discovered. The course will also provide instruction in administrative methods and documentation needed to establish and manage a software safety program. Providing evidence for a safety case or proof will also be covered.
2. References
Joint Software Systems Safety Engineering Handbook, 2010 version
Generic Software Systems Safety Program Plan
NASA Dryden Flight Research, FAA Software Safety, Office of Secretary of Defense Safety websites
Mishap reports: Ariane 5, NASA Mars Climate Orbiter and Mars Polar Lander, Lauda 767
MIL STD 882-E
Java Safety Guidelines
Software Reliability Newsletter

Course Duration: 4.0 Days

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<thead>
<tr>
<th>Course No.</th>
<th>Dates</th>
<th>Tuition</th>
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<td>SFT 15-1</td>
<td>26 – 29 Aug 2014</td>
<td>$1500</td>
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<td>SFT 15-2</td>
<td>28 Apr – 1 May 2015</td>
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<tr>
<td>SFT 16-1</td>
<td>25 – 28 Aug 2015</td>
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INCIDENT INVESTIGATION/ANALYSIS (IIA)

This course is designed for managers and supervisors who may be required to investigate, implement or review safety findings and recommendations resulting from aviation incidents. The course presents the principles of Management, Investigation and Analysis. It will explain how incidents are discovered, investigated, and reported in writing. The student will learn the techniques of data collection and analysis. There is considerable overlap with the AAI, MAINT and ASMS courses. It is not recommended that students who attend these courses attend the IIA presentation.

Objectives: To provide concepts and practical knowledge to be used in incident investigation and trend analysis programs.

Who Should Attend: Supervisors who will investigate incidents, part time safety advisors, Quality Assurance, and ATC supervisors. This a good course for personnel responsible for the data analysis program. There is considerable overlap with the AAI, MAINT and ASMS courses. It is not recommended that students who attend these courses attend the IIA presentation.

Course Outline
1. Investigations:
   - Basis for Incident Investigation
   - Reporting Criteria
   - Reporting Methods
   - Investigation Techniques
   - Analysis, Root Cause Analysis Techniques,
   - Safety Risk Management
   - The Failure Modes and Effects Analysis (FMEA) Process
   - An overview of Data Programs (FOQA)
   - Report Writing
   - Recommendations
   - Safety Management System Integration Concepts
   - Implementation
   - Organizational Management, Accountability and Responsibilities

2. Human Factors:
   - Stress
   - Fatigue
   - Decision Making
   - Human Reliability and Error Analysis
   - Judgment Chain
   - Attitude
   - Behavior
   - SHEL Models, HFACs

2. Classroom Exercises

Course Duration: 3.5 Days

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<td>20 – 23 Oct 2014</td>
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<td>30 Mar – 2 Apr 2015</td>
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<tr>
<td>IIA 16-1</td>
<td>19 – 22 Oct 2015</td>
<td>TBA</td>
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This course is designed for individuals responsible for managing and implementing aviation security measures at medium to small size aircraft operators, all airports and Indirect Air Carriers (IAC’s). The course stresses program management of aviation security. As an integral part of the USC Aviation Safety and Security curriculum this course demonstrates how to apply the SMS principles in the aviation security environment. This course recognizes the necessity to achieve full compliance with TSA requirements and ICAO standards, and integrates this priority into a system that reflects organizational values and mission accomplishment. Note: This is a non-SSI course.

Objectives: To provide individuals with the knowledge and skills to institute an aviation security management system within an organization that is compliant with Federal requirements, International Standards and reflective of organizational needs.

Who Should Attend: Individuals responsible for implementation of aviation security requirements in medium to small size aircraft operators, all airports and Indirect Air carriers. This course would also be of interest to those individuals and managers who are seeking to apply a systems management approach to aviation security within their particular areas of jurisdiction. Individuals involved in the design and integration of security measures into airport environments would find benefit in this course. This course would be beneficial to government agencies responsible for aviation security.

Course Outline
1. Primary Lessons of Aviation Security
   Evolution of the Threat
   Evolution of the Response
   Development of Countermeasures

2. Legal Programs as Countermeasures
   ICAO
   U.S. Regulations
   TSA Enforcement Actions, ICAO measures

   Positive Leadership Culture
   Data-based Decision Making
   Involvement of Management

4. Audits and Inspections
   Internal Audits
   Risk Assessment Matrix
   Synergy with ICAO and National Requirements and Inspections

5. Practical Applications
   Best Practices
   Proper Handling of Sensitive Security Information (SSI)
   Non-regulatory Security Practices that Make Sense and Diminish Risk
   Operating in Unfamiliar Environments

6. Security Technologies
   Cost Benefit
   Emerging Technologies

7. Threats
   Threats to Aircraft
   Threats to Airports

8. Case Studies and Practical Exercise
   Audit of Aviation Entity
   Application of SMS Principles

Course Duration: 4.0 Days

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<tr>
<td>AVSEC 16-1</td>
<td>25 – 28 Aug 2015</td>
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SAFETY MANAGEMENT SYSTEMS FOR MANAGERS (SMS MGR)

SMS has dramatically changed how safety programs are conducted and managed. Its success or failure is dependent on management understanding and support. ICAO has established it as a standard for airports, commercial aircraft operators and air traffic providers. SMS is being implemented throughout the aviation industry. A key feature of Safety Management Systems (SMS) is the active involvement at all levels of management in the safety process. This course is designed to explain the fundamentals of the SMS process to managers and supervisors. It focuses on the particular functions and responsibilities that managers have within a SMS. The particular benefits of an SMS are detailed. Additionally, potential issues which may cause friction as a result of an SMS are discussed.

This course is an introductory level course. It is not intended as a substitute for the full length SMS courses: Aviation Safety Management Systems (ASMS), Safety Management for Aviation Maintenance (MAINT), or System Safety (SSC). The ten hour format is primarily designed for presentation to managers. It will conducted both at USC and via on-site contracts.

Objectives: To provide managers and supervisors an understanding of the principles of an SMS and a clear vision of the role of the manager.

Who Should Attend: Managers and supervisors of aviation operations and aviation related organizations including aircraft operators, airports, and air traffic control facilities.

Course Outline
Overview of SMS
Management Roles and Responsibilities
Management Accountabilities
Program Document
Goals and Objectives
Risk Assessment
Change Process Management
Audits and Safety Reviews
Motivating Safe Behavior
Safety Action Groups
Safety Culture and Climates
Education and Training
Just Reporting System

Latent Conditions/Active Errors
Accident/Incident Costs
Mishap Investigation
Data Analysis
Obstacles to SMS

Course Duration: 1.5 Days

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<td>23 – 24 Nov 2015</td>
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THREAT AND ERROR MANAGEMENT DEVELOPMENT (TEM)

Threat and Error Management (TEM) Development is being implemented by operators throughout the world. This course is designed to train those who wish to develop a TEM program within their own organizations. Taught by a leader in TEM development, this course provides an applied, practical approach to explaining TEM principles. Attendees will gain sufficient knowledge to implement a TEM program and LOSA program for their respective organizations. In addition Line Operational Safety Audit (LOSA), a tool for collecting data on successful and unsuccessful human performance, will be explained.

The course begins with an introduction to “threats,” which are those things that can increase operational complexity and if not handled properly, can decrease safety margins. Flight operations examples include black hole non-precision approaches, white out conditions and low light conditions, icing, improper use of automation, weather, terrain, mechanical malfunctions and distractions. Maintenance examples are fatigue, poor lighting, unclear work directives, time pressures and uncompleted work that is handed over to another shift. Examples pertaining to cabin crew members are cabin fires — both hidden and overt, command interruptions, disruptive passengers, rushing and malfunctioning cabin equipment.

At the heart of an effective LOSA program is the non-jeopardy systematic assessment of normative performance by flight crews, maintenance personnel, or any number of departments involved in aviation. The course will detail the training and performance of LOSA observers and the nuts and bolts of creating a LOSA program.
Objectives: To provide class participants with sufficient knowledge to develop a TEM program and a LOSA program within their respective organizations. To provide participants with the knowledge to effectively add TEM and LOSA to an organization’s Safety Management System.

Who Should Attend: This course has been designed to appeal to those who are responsible for developing a Threat and Error Management program and/or a Line Operation Safety Audit program within their organization. It will also provide a detailed understanding of TEM to those who wish to improve their professional skills through greater knowledge of TEM and LOSA.

Course Outline
1. Introduction to Threats and Errors
   - Threats and Threat Recognition
   - Error Avoidance and Trapping
   - LOSA and the expected training benefits
   - Personnel Performance during a LOSA
2. ABCD’s of Threat and Error Management
   - Assessing Threats and Acknowledging Errors
   - Barriers to Error and How to Effectively Build Them
   - Communications and its Relationship to Threat and Error Management
   - Distraction and Interruption Management
   - SOPs and Their Role in Threat and Error Management
   - Sensibility Check and Ensuring Situational Awareness
   - The Need for Well Trained LOSA Observers
   - The Effective Application of LOSA Data in Training Curriculum
3. Case Studies and Class Exercises
4. TEM / LOSA Applied to All Divisions within an Organization
5. TEM Toolkit for Incident and Accident Analysis
6. TEM Applied to Automated Aircraft
7. TEM as an Integral Part of a Safety Management System (SMS)
8. Overview of LOSA data collection and analysis methodologies.

Course Duration: 2.5 Days

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<td>TEM 16-2</td>
<td>14 – 16 Dec 2015</td>
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ADVANCED SYSTEM SAFETY ANALYSIS (ADVSS)

This course is a continuation of System Safety course focused on engineering aspects of the course. The objective is to address advanced issues in system safety analysis and broaden the trainees’ perspective on system safety issues. Engineering methods addressed in the System Safety course are reviewed briefly and special advanced topics are addressed. Additional methods for system safety analysis are addressed focusing on the application of these methods.

Objectives: To provide an advanced level of knowledge of system safety analysis methods.

Who Should Attend: Individuals who desire to gain a broad perspective of system safety analysis.

Course Outline
- Special Topics in FMEA / FMECA
- Special Topics in Fault Tree Analysis
- Common Cause Failure Analysis
- Event Tree Analysis
- Cause Consequence Analysis
- Hazard and Operability Analysis
- Special Topics in Decision Theory

Prerequisite: Attendees should have completed the System Safety Course.

Course Duration: 4.5 Days

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**DAMAGE ASSESSMENT FOR SYSTEM SAFETY (DASS)**

Sophisticated mathematical models and methods have been developed to estimate the level of impact of a hazardous condition. This course is intended to provide an overall understanding of these methods to help managers and system safety analysis reviewers understand the analysis conducted and results obtained by the experts in the field. Specifically, methods for modeling the impact of fire and explosion, debris distribution from an explosion, and toxic gas dispersion are discussed.

**Objectives:** To provide an overall understanding of the methods and models used to estimate the damage extent caused by hazardous conditions.

**Who Should Attend:** Individuals who desire to gain a broad perspective of system safety analysis.

**Course Outline**
- Fire and explosion phenomena and modeling
- TNT Equivalents
- Debris field caused by a vessel explosion or missile explosion in the air
- Hazardous Material (liquid) Spill and Evaporation
- Toxic Gas Dispersion
- Expected casualty computation for space and missile applications

**Prerequisite:** Attendees should have an engineering or hard science background.

**Course Duration:** 3.0 Days

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**HAZARD EFFECTS AND CONTROL STRATEGIES (HAZSS)**

System safety analysis requires a clear understanding of sources of harm (hazards) inherent to a system. System safety analysis should identify the energy sources within the system, target the attack and the barriers that reduce the risk. The purpose of this course is to understand hazard effects and control strategy methodologies. The discussions are focused on underlying physical, chemical, and biological characteristics and effects, and hazard control strategies. The following hazards are specifically addressed: electrical hazards, electrostatic discharge, toxicity, kinetic hazards, ionizing and non-ionizing radiation, thermal hazards, noise, fire and explosion, high pressure, etc.

**Objectives:** To familiarize class participants with the underlying physical, chemical, and biological phenomena of and control strategies for various hazards.

**Who Should Attend:** Individuals who intend to conduct or review system safety analyses.

**Course Outline**
1. Overview of Hazards
2. Specific discussions on each hazard type that includes:
   - Physical Properties
   - Chemical Properties
   - Biological impact
   - Barriers that can limit the level of harm
3. The following hazard types will be addressed:
   - Electrical hazards
   - Electrostatic discharge
   - Toxic gases and liquids
   - Kinetic energy hazards
   - Ionizing radiation hazards
   - Non-ionizing radiation hazards
   - Thermal hazards
   - Noise levels
   - Fire and explosion phenomena
   - High pressure

**Prerequisite:** Attendees should have an engineering or hard science background.

**Course Duration:** 2.0 Days

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<td>HAZSS 16-1</td>
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<td>TBA</td>
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</table>
HUMA N ERROR A L YA NALYSIS FOR SYST E M SAFETY (HEASS)

System safety analysis of engineered systems must often deal with the possibility of human error leading to adverse conditions. Hence human error probability evaluation is an important part of system safety. This course presents a summary of the methods and underlying theory for estimating human error probabilities. The course begins with a discussion on human factors and its influence on human error possibility. The various methods for estimating human error probabilities under different conditions are presented. For each method, their background, underlying theory, advantages and disadvantages will be covered. Typical human error probability values used in various industries will be provided.

Objectives: To familiarize class participants with the human error probability evaluation process.

Who Should Attend: Individuals who intend to enhance their understanding and capabilities in system safety analysis.

Course Outline
- Overview of human factors
- Major events caused by human error
- History of human error probability evaluation
- Performance shaping factors
- THERP method
- ASEP method
- Other methods
- Modeling dependencies among human actions

Prerequisite: Attendees should have completed the System Safety Course.

Course Duration: 2.0 Days

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<th>Course No.</th>
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<td>HEASS 15-1</td>
<td>30 – 31 Mar 2015</td>
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<td>HEASS 16-1</td>
<td>Spring 2016</td>
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MATHEMATICS F OR SYST E M SAFETY A NYALYSIS (MATH)

This course is focused on the mathematics used in system safety. The purpose of this course is to provide the trainees with a working understanding of the mathematical theories underlying system safety analysis. From this course, the trainees will be able to properly interpret the results of a system safety analysis and use it in their intended applications. The course will begin with the fundamentals of probability theory and will cover the uses of that theory for solving various system safety problems. Statistical methods will also be covered in relations to establishing equipment failure frequencies. System safety examples will be used throughout the course. Each student should bring a calculator with statistical functions.

Objectives: To provide a level of understanding of the mathematical concepts used in conducting system safety analyses.

Who Should Attend: Individuals who intend to take the system safety course or would like to enhance their understanding of the fundamental mathematical theories used in system theory,

Course Outline
- Probability Theory
- Permutations and Combinations
- Bernoulli Process and Binomial and Multinomial Distributions
- Normal Distribution
- Poisson Process and Distribution
- Boolean Algebra
- Statistics and Failure Data Analysis
- Uncertainty Analysis Using Bayesian Method

Prerequisite: Attendees should have an engineering or hard science background.

Course Duration: 3.0 Days

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Please visit http://viterbi.usc.edu/aviation for the most current information.
Program Information

Director  
Thomas Anthony  310-342-1349

Financial Manager  
Aileen Hongo  310-342-1350

Registrar  
Raquel Delgadillo  310-342-1348

Accident Lab/Automation  
Dan Scalese  310-342-1345

Logistics  
Oscar DeJesus  310-342-1351

Contract Courses  
Harrison Wolf  310-342-1352

Veterans Administration  
Poly Chuong  310-342-1354

FAX  
310-417-3808

Program Email  
aviation@usc.edu

Contract Course Email  
avsafe@usc.edu

Web Site  
http://viterbi.usc.edu/aviation

Class Hours:
Class hours may vary slightly with each course, but are normally from 8:00 AM to 4:00 PM.

Aircraft Accident Investigation Course (AAI) has a four hour accident investigation laboratory on the Saturday morning between weeks 1 & 2 from 8:00 AM to 12:00 PM.

Certificate/Attendance:
Students are expected to attend all class sessions. Certificates of Completion will only be granted to those who attend at least 90% of a specific class.

Tuition:
A 50% deposit is required for each course. The balance of the tuition payment is due on the first day of class in order to continue the class. For individuals being sent by the U.S. government or corporations contracting with the University, a training document or purchase order is required. Checks should be made payable to the University of Southern California. Tuition fees include all course materials, certificates, audio-visual presentations, and lab time when applicable. Transportation, housing and meals are not included. VISA, MasterCard and Discover may be used. Credit for classes is dependent upon full payment of tuition.

Discounts:
Discounts are offered to organizations sending three or more participants to an individual class.

Registration:
All registrations must include an Email address and fax number to assure written confirmation of space in classes. Registration must be made with a hard copy or scanned PDF copy.

Cancellation and Refund Policy:
Participants must inform the program’s administrative office of cancellation at least two weeks prior to the course start date. If cancellations are made by phone, a written statement must follow within ten working days of the call in order to receive the refund. Cancellations of confirmed registrations received less than two weeks prior to the start of the course are subject to 50% of the tuition fees. If a course is cancelled, enrollees will be notified no less than 10 days prior to the scheduled course opening. USC is not responsible for any airfare penalties incurred in the event of course cancellation. USC has the right to cancel courses and/or substitute faculty when necessary.

Transfers and Substitutions:
If you are confirmed in a course but unable to attend, you may send a substitute or transfer your registration one time to a future course within the same academic year. The academic year is from July to June. Tuition that is unused within a given academic year will be refunded. Funds are not transferable to other individuals. Individual transfer of funds are valid only in the same academic year.

Parking:
Reduced parking rates are available at the Crowne Plaza Hotel. Long term parking is also available please see USC Aviation staff for details.

Housing:
Sheraton Gateway Hotel
6101 Century Blvd., Los Angeles
Telephone:  310-642-1111
Toll-free:  800-820-3408
*$139 + tax/Traditional Room (includes hot breakfast buffet in the Brasserie Restaurant)
*$159 + tax/Club Level (Club Lounge includes continental breakfast and hors d’oeuvres)
Corporate Set# 378854 for USC Rate
Parking – $13.20 self and valet $24.00
E-mail: peter.muema@sheratonlosangeles.com
www.sheratonlosangeles.com
Crowne Plaza Hotel and Resort
5985 Century Blvd., Los Angeles
Adjacent to the USC Aviation Safety Program offices
Telephone: 310-642-7500
Toll-Free: 888-315-3700
Fax: 310-342-7010
*$129.00 – Standard Room Rate – single/double occupancy
*$159.00 – Executive Level Room Rate – single/double occupancy
Rates include breakfast buffet. Ask for breakfast vouchers at time of check in.
Only Non-Smoking Rooms Offered
Parking – $8.00 self & $28.00 valet
E-mail: denise.lowe@ihg.com
www.crowneplaza.com/lax.intlapt

Marriott LAX
5855 Century Blvd., Los Angeles
10 minute walk from Aviation Offices
Toll Free: 800-228-9290
Telephone: 310-665-5946
Fax: 310-337-8084
E-mail: melissa.ayala@marriott.com
*$179 + tax/Single/Double Occupancy
Parking – $30.00 overnight
E-mail: Joanne.Wildenhain@marriott.com
www.marriott.com

Four Points Hotel/Sheraton
9750 Airport Blvd., Los Angeles
Complimentary shuttle to/from USC LAX campus.
Telephone: 310-645-4600
Toll Free: 800-529-4683
Fax: 310-645-7489
*$109/single & $149/double – Standard Room
Rates include Full Breakfast Buffet
Reduced parking at $8.00 per day
Rates listed are net, non-commissionable, and do not apply to group bookings. These rates may be booked by your travel agency by calling the hotel direct at (310) 645-4600, or calling Four Points’ central reservation line at (800) LAX Hotel and requesting the corporate rate for USC Aviation Safety.
E-mail: ferdinand.castro@fourpointslax.com
www.fourpointslax.com

Residence Inn by Marriott
1700 N. Sepulveda Blvd., Manhattan Beach
Manhattan Beach/3.5 miles from LAX
Telephone: 310-546-7627
Toll Free: 800-331-3131
Fax: 310-545-1327
USC Aviation rate from $133 to $152 depending on dates/duration of stay.
Hot breakfast buffet daily; Light dinner with beer, wine, & soft drinks.
Free parking.
E-mail: mary.anderson@ihrco.com
www.residenceinn.com

Crowne Plaza Resort, Redondo Beach
300 N. Harbor Drive, Redondo Beach
Telephone: 310-318-8888
This is a waterfront hotel for students with rental cars. It is adjacent to a marina and fishing pier. It is located approximately 8 miles south of our LAX classrooms. Shuttle and bus is not available. Rates vary per season. Contact hotel directly.

Reservations should be made three (3) weeks in advance to assure accommodations. To receive the special room rates, you MUST contact the hotel directly and request the “USC Aviation Safety Program” when making your reservations.

*These rates are subject to change by individual management
## USC Aviation Safety and Security Program Schedule

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## USC AVIATION SAFETY AND SECURITY CLASSES

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| JULY 2015 | | | |
| NO COURSES | | | |
The USC Aviation Safety and Security Program offices are conveniently located near Los Angeles International Airport (LAX), the arrival point of most of our attendees, and adjacent to a number of hotels that provide accommodations within easy walking distance to our classes.

Our address is 6033 West Century Boulevard, Suite 920.

Mail or Fax to:
University of Southern California
Aviation Safety and Security Program
6033 W. Century Boulevard, Suite 920
Los Angeles, CA 90045
Telephone: 310-342-1345 Fax: 310-417-3808

REGISTRATION VALID ONLY WITH AUTHORIZED SIGNATURE.

*A fifty percent (50%) deposit is due prior to the course. The balance of the tuition is due by the end of the first day of class or the student will not be allowed to continue the course. If other payment arrangements have been made, i.e., purchase orders, wire transfers, etc., please note this on your registration form or contact us so that we may update your records.*