Aviation Safety + Security Program

NEW ADVANCED SOFTWARE SAFETY COURSE
NEW SMS FOR GROUND OPERATION SAFETY COURSE
NEW SRM-SMS FOR AIRPORT MANAGERS COURSE
FLIGHT DATA ANALYSIS COURSE
INDUSTRY LEADING ACCIDENT INVESTIGATION LAB
CYBERSECURITY ADDED TO AVSEC
MESSAGE FROM THE DEAN

The striking image of aviation being used to safeguard lives, property and the environment is a dramatic reminder of what I call The Three C’s — Convergence, Connectedness and Culture. There are few phenomena as powerful and dynamic as the wildfire being fought in this photograph; but it is the convergence of technology, innovation and operational flexibility such as are depicted by this CAL FIRE OV-10 Air Attack Platform that allows us to address these challenging and dangerous situations. The multiple organizations that must all work as one point out the necessity of connectedness. Finally, culture. A quotation ascribed to Peter Drucker is “Culture eats strategy for breakfast.” At the Viterbi School of Engineering we recognize that our culture is what establishes the organizational environment that allows us all to succeed in responding to the critical needs of our professions and the broader needs of society.

I am proud of the standing of our Aviation Safety and Security Program as an internationally recognized leader in aviation safety and system safety education. It shares this global reputation with the Viterbi School overall, recognized for education, research and innovation leadership in engineering, computer science and technology. Innovation and technology are inherent and inherently coupled within the culture of the Viterbi School. They also highlight two of the newer course that have been added to the Aviation Safety and Security Program’s curriculum: Data for Aviation Safety Management (DATA) and Safety Management for Remotely Piloted Aircraft (RPSM). Today’s aircraft have become a rich source of data that can be used to improve safety, productivity and the longevity of aircraft. DATA teaches the skills necessary to collect, analyze and communicate data in order to best utilize rich sources that are available. Remotely Piloted Aircraft have also developed as a result of this data revolution. It is only through advances in micro-processing — and high energy lithium batteries — that the UAV/drone industry has been able to experience its monumental advances. But such rapid technological advances can also result in unanticipated hazards. It is upon this fact that our course Safety Management for Remotely Piloted Aircraft is based. SMS must be applied to all facets of aviation from the largest A380 to the smallest drone for the system to remain safe.
Another exciting development that reflects our evolving technological environment is the course Advanced Software Safety (ADVSFT). This course was offered this year for the first time for the US Navy. One only needs to review the world’s current events to recognize the need for software safety and security. As a result, a block of instruction on cyber security has been added to the Aviation Security Program Management course (AVSEC).

Leadership is a mantle that we have worn proudly since our program began in 1952 with the United States Air Force. From the initial research in aviation human factors and physiology to the current courses in data and drones we strive to forward the ideas that improve aviation safety. It is through efforts such as these that our program is recognized as the gold-standard for aviation safety education.

We continue to offer a unique hands-on experience with our aircraft accident investigation courses. Aircraft Accident Investigation, Helicopter Accident Investigation, Gas Turbine Accident Investigation and Aviation Security Management Systems provide students the opportunity to examine actual aircraft wreckage in our extensive accident investigation lab. Eleven aircraft or portions of aircraft serve as the foundation for our accident investigation courses.

The University of Southern California Viterbi School of Engineering strives to be the university of choice for future technology leaders from all over the world. The USC Aviation Safety and Security Program has made strong contributions to this effort, and will continue to do so in years to come.

Yannis C. Yortsos, Dean
USC Viterbi School of Engineering
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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 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 27 different courses available, with approximately 54 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 2270 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, US Customs and Border Protection, 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, and Saudi Arabian Airlines;
International aircraft manufacturers including Airbus, Airbus Helicopters, 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, https://aviationsafety.usc.edu.

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 Ground Operation Safety (SMS-RAMP)
   SRM/SMS for Airport Managers (SRM-SMS)
   SMS for Managers (SMS-MGR)

   Or

4b. One of the following:
   Aviation Security Program Management (AVSEC)
   Software Safety (SFT)
   Data for Aviation Safety Management (DATA)
   Advanced Software Safety (ADVSFT)
   One additional management course from #1
   One additional accident investigation course from #2

**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 and a fundamental part of the curriculum. 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 each 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. Complete 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
   - Advanced Software Safety (ADVSFT)  4 day course

Please visit https://aviationsafety.usc.edu for the most current information.
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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<td>Series 19D</td>
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<tr>
<td>RPSM</td>
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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 for numerous members of 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 establishing 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). 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
   - 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
2. Communication Skills
   Perception
   Meaning/Language/Jargon
   Information Overload
   Effective Safety Meetings
   Listening

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

4. Ramp/Maintenance Safety

5. Legal Aspects
   ICAO Annexes 6, 14, 19
   ICAO Doc. 9859
   FAA 14 CFR 5

6. Practical Applications/Case Study

**CEU: 6.7**

**Course Duration: 9.5 Days**

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<td>ASMS 20-2</td>
<td>11 – 22 Nov 2019</td>
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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 Civil Aviation Organization (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 USC Aircraft Accident Investigation lab serves as the location for practical exercises. Ten aircraft wrecks form the basis of these investigative exercises. 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.

**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
   Overview of Strategy
   Message Development and Thought Process

5. 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

CEU: 6.7

Course Duration: 9.5 Days

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The course examines the investigation of helicopter accidents to include processes used to determine the cause. The course includes interactive lecture, various case studies, examination of component wreckage in the classroom and helicopter wreckage examination in a laboratory. The course includes examination of helicopter 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 either completed AAI or has some previous experience in aircraft accident investigation.

**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
   - Power plant 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

CEU: 3.2

Course Duration: 4.5 Days

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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 and metallurgical failure investigation. 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 Gas Turbine Materials
3. Case Study

CEU: 3.2

Course Duration: 4.5 Days

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<td>28 Oct – 01 Nov 2019</td>
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**HUMAN FACTORS IN AVIATION SAFETY (HFH)**

Humans design, build, operate and maintain the aviation system. Consequently, data shows 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 *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 a theoretical and practical knowledge of the application of human factors principles and techniques in aviation maintenance. To provide knowledge about human performance issues, including why we make errors and violate procedures. To provide strategies for individuals, leaders, and organizations that can be used to prevent errors/violations. To clarify the relationship between maintenance human factors, risk management, and Safety Management Systems.
Who Should Attend: This course is designed for supervisors, managers and staff officers who have responsibility for the oversight of aviation safety.

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

CEU: 3.2

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

CEU: 3.2

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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

CEU: 3.2

Course Duration: 4.5 Days

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SAFETY MANAGEMENT SYSTEMS FOR REMOTELY PILOTED AIRCRAFT (RPSM)

This Safety Management for Remotely Piloted Aircraft (RPSM) course is designed to apply the proven safety procedures of SMS to the operation of UAV’s/RPA’s. 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. SMS 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

CEU: 4.0

Course Duration: 5.0 Days

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DATA FOR SAFETY MANAGEMENT (DATA)

The analysis of digital flight data collected from actual flights is resulting in tremendous steps forward in aviation safety. It is no longer necessary for an accident or incident to occur in order that safety hazards are revealed. Flight Data Analysis provides a wealth of safety critical information that can utilized to identify trends, issues and potentially dangerous practices. All modern commercial and business jet aircraft are equipped with flight data recorders that serve as the initial collection devices for flight data analysis. This course will present the basics of flight data analysis based upon real-time flight information. It will present opportunities to analyze collective flight data as would be utilized by a commercial aircraft operator. The course will present animation software that depicts flight profiles and examine other sources of data including video and air traffic control data that may be used in creating a data-based safety case.

Objective: To provide first-hand experience in the collection and analysis of safety critical flight data. To create an understanding of the basics of Flight Data Analysis, how Flight Data Analysis contributes to a SMS, and how Flight Data Analysis can result in positive improvements in aviation safety performance.
**Who Should Attend:** Individuals from aviation enterprises that are involved in or wish to be involved in the collection and analysis of safety related aviation data.

**Course Outline**
- Flight Data Recorders, types, capabilities and history
- Evolution of Flight Data Analysis
- Relationship to Aircraft Accident Investigation
- Relationship to SMS
- FOQA, ASAP, ASRS, ADS-B
- Cockpit Voice Recorders
- Video Data
- Recovery of CVR’s and FDR’s
- Air Traffic Control Data
- Components with Non Volatile Memory
- Commercial Safety Data Services
- Animation of Flight Data

**CEU:** 3.2

**Course Duration:** 4.5 Days

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**ACCIDENT/INCIDENT RESPONSE PREPAREDNESS (AIP)**

This course is designed for individuals who are involved in either preparing emergency response plans or responding to incidents and accidents 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. The aftermath of an accident or serious incident typically involves complex, challenging, and stressful situations. An organization can significantly reduce the negative impact of these events with preparation and the development of an effective response plan.

*This updated course has been extended to four full days to integrate communications in the digital age.*
Objectives: To provide information on effective preparation for accident/incident response, including organizational policy and planning, operational and technical aspects, and humanitarian considerations. To provide the knowledge needed to function effectively during post-accident activities and situations. To provide the skills required to write an effective company emergency response plan.

Who Should Attend: Management and safety personnel involved in planning for, response to, or recovery from incidents and accidents.

Course Outline
1. Accident / Incident Response Plan Development
   - The Investigation Process
   - Air Carrier / Aircraft Operator Planning Process
   - Effectively Interacting with Government Investigations
   - Informal Communications Discipline
   - Databases and Document Retention
   - Emergency Response Planning

2. Aviation Disaster Victim and Family Assistance
   - Fundamental Needs of Families and Survivors
   - Requirements, Standards, and Best Practices
   - Roles and Responsibilities: Operators, Stakeholders, and Partner Organizations
   - Response Phases and Milestones
   - Practical Skills for Working with Families and Survivors
   - Responder and Organizational Resilience
   - Resources for Plan Development, Training and Exercises

3. Communications
   - Effective Practical Communication Techniques
   - Understanding the Media’s Needs
   - Dealing with Digital and Social Media

4. Preparing for Litigation
   - Understanding Administrative, Civil and Criminal Actions
   - Identifying How Organizations Can Become Involved in Litigation
   - Identifying Evidence and Developing an Evidence Preservation Plan
   - Reducing Exposure of the Organization and Personnel
   - Working with Counsel, Experts, and Insurance Carriers

CEU: 3.2
Course Duration: 4.0 Days

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<td>26 – 29 Aug 2019</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. It is recommended that they be taken as a complementary pair.

**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
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

CEU: 1.4
**Course Duration:** 2.0 Days

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**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. 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
2. 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
   Evidence of Experience
   Resumes
   Characteristics of a “Good” Expert
   Communication Skills
   Personal Style

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
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.
CEU: 1.4

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.  

**CEU:** 6.7  

**Course Duration:** 9.5 Days  

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**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.

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 (SSC) 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

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

CEU: 2.8

Course Duration: 4.0 Days

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ADVANCED SOFTWARE SAFETY (ADVSFT)

This course builds upon the skills learned in the Software Safety (SFT) course. It is presumed and highly recommended that the student has achieved an understanding of the importance of software safety in the planning, analyses of architecture, design, and code and the testing of automated systems. The course expands upon those skills and presents opportunities to apply them in class in diverse situations using a small unmanned aerial system (sUAS) that is also weaponized.

Objectives: To develop practicing skills in writing a Request for Proposal (RFP) for a safety critical system. To develop the practical use of a Safety Assessment Report (SAR). To develop practical skills in deriving requirements and functions leading to a Functional Hazard Analysis (FHA) and Requirements Hazard Analysis for unmanned sense and avoid. Discus-
sion of how to compose a safety argument using results of many analyses of NASA autonomous aerial systems software that was performed using open source tools. Building confidence with your developer’s tools, looking into why and what to consider in tools, and how to review your story in your SAR. To develop these skills in a team based working environment.

**Who Should Attend:** System managers and engineers, system safety engineers and software engineers who have attended SFT or have a solid understanding of the basic software safety principles. Principals for Safety (PFS) or Safety Leads who must present to Review Boards. Practicing System Safety and Software Safety Engineers who are lining up a professional trajectory into autonomous systems. Future follow-on courses will cover deeper safety and security issues, autonomous systems, and machine learning models.

**Course Outline**

1. Advanced Software Safety
   - Basic Safety Overview
   - Definitions and Concepts
   - Goals
   - Small Unmanned Aerial System (sUAS) overview
   - ArduCopter and NASA ICAROUS and DAIDALUS software
   - Concept of Operations (CONOPS) for safety
   - Missions and Functions
   - Payloads and Hazards
   - Best Safety Practices in Request for Proposal (RFP)
   - Performing a Functional Hazard Analyses
   - Partitioning and pitfalls
   - Declaring Software Safety Functions
   - Setting Levels of Rigor (LOR)
   - Work Responsibilities for others...
   - Plans
   - Architecture Analyses, starting with Systems of Systems (SoS)
   - Assessing code, COTS, GOTS, and what to do
   - Code Analysis
   - Software Fault Tree (SFTA)
   - Tools and their use for safety
   - What does all this mean?
   - Final Safety Assessment Report (SAR)
   - You missed your Level of Rigor (LOR) so what now?
   - What about the Review Board?
2. References

Joint Software Systems Safety Engineering Handbook, 2010 version
MIL STD 882-E
Joint Weapons Safety Review Guide
FAA Software Safety and National Airspace Requirements
FAA Unmanned Airworthiness 8130.34D
MIL-HDBK-516C, unmanned systems chapter
US Army small unmanned systems RFP
Generic Software Systems Safety Program Plan
Generic Safety Assessment Report (SAR)
NASA Langley Research and software
Office of Secretary of Defense Jointly with FAA, Safety guidance
USC Software Engineering Center

CEU: 2.8

Course Duration: 4.0 Days

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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 course. 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.
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

3. Classroom Exercises

CEU: 2.8

Course Duration: 4.0 Days

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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 applies the fundamentals of SMS (hazard identification, risk assessment and mitigation of risk) to the field of aviation security. It demonstrates how to conduct a risk-based security program that builds upon national and international standards and requirements. The course presents the PRIFISE operational risk assessment tool as a framework for meeting emerging security threats. As cyber security has become a more important issue this course has course been extended to include a half-day on cyber security. Note: This is a non-SSI course.

Objectives: To provide individuals with the knowledge and skills to develop a SeMS based aviation security management system 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
   SeMS
   U.S. Regulations
   Positive Leadership Culture
   Data-based Decision Making
   Shared Framework with SMS

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

5. Practical Applications
   PRIFISE operational risk assessment tool
   Non-regulatory Security Practices that Make Sense and Diminish Risk
   Operating in Unfamiliar Environments

6. Security Technologies
   Cost Benefit
   Emerging Technologies
   Cyber Security

7. Threats
   Threats to Aircraft
   Threats to Airports

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

**CEU:** 3.2

**Course Duration:** 4.5 Days

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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

CEU: 1.0

Course Duration: 1.5 Days

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SAFETY RISK MANAGEMENT AND SAFETY MANAGEMENT SYSTEMS FOR AIRPORT MANAGERS (SRM-SMS)

This course is designed for airport supervisors and managers as well as businesses that are involved in airport construction and construction management. The FAA requires that the Safety Risk Management process and the Construction Safety Phasing Plan processes be integrated into most significant airport construction projects. SRM is the heart of an airport’s Safety Management System. How to conduct an SRM and CSPP and how these fit into a SMS is the core objective of the course.

Objectives: To provide students with the ability to conduct, participate in or oversee an SRM and/or CSPP process. To provide students with an understanding of how SRM and CSPP perform vital functions within an airport SMS.

Who Should Attend: Airport supervisors and managers as well construction and engineering personnel who have the responsibility to conduct, participate in, or oversee an SRM, CSPP or SMS.

Course Outline
1. The Standard – ICAO SMS
   - Annex 19
   - Annex 14
   - ICAO Safety Management
2. The Framework
   ICAO + FAA
   NPRM FAA 2010-0997 (Proposed rule Part 139)
   14 CFR 5

3. Types of Requirements
   Laws, Standards, Regulations, Approved Programs, Advisory
   Circulars, Orders, Notices, SAFOs, Emergency Amendments

4. FAA Directives (all LOBs) on SMS and SRM
   8000.369B
   8040.4A

5. Airport Pilot Studies
   ACRP Synthesis 37 – Lessons Learned

6. Airport Specific Guidance on SMS, SRM
   AC 150/5200 – 37
   FAA Order 5200.11 (change 3)
   AC 150/5370 – 2, Implementing CSPP
   FAA JO 7400.2

7. Exercises
   CSPP
   FMEA
   SRA

CEU: 2.1

Course Duration: 3.0 Days

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SAFETY MANAGEMENT SYSTEMS FOR GROUND OPERATION SAFETY (SMS-RAMP)

This course presents practices and methodologies for the identification and mitigation of hazards that occur in all phases of airport ground operations. Ground operations are often the environment in which numerous costly incidents resulting in damage or injury occur. Ground mishaps cause cancelled flights, alienated customers, increased personnel costs, injured personnel and a wide range of direct and indirect negative consequences. This course teaches best practices on how to identify and mitigate ground damage and injury mishaps before they happen. The course shows how to integrate these ground safety practices into an airport’s overall SMS.

Objectives: To provide airport, air carrier and ground service company supervisors and managers with practices that will reduce ground operation mishaps to personnel and equipment. It provides an understanding of how ground operations safety management is an essential part or an airport’s or air carrier’s SMS.

Who Should Attend: Managers, supervisors and safety officers with responsibility for airport ground operations.

Course Outline
1. SMS Framework Review
   Safety Policy and Objectives
   Safety Risk Management
   Safety Assurance
   Safety Promotion

2. Ground Operations Safety Key Stakeholders
   Airport Rescue and Fire Fighting (ARFF)
   Airport Operations
   Law Enforcement
   Federal, State, and Local Agencies – Mutual Aid
   Airlines/Tenants/General Aviation
   Military

3. Airport Operational and Security Areas
   FAR Part 139 Areas – AOA, Aircraft Movement Area, Non-Movement Area
   49 CFR 1542 Areas – AOA, Secure Area, SIDA, Sterile Area
4. Airport Ramp Services
   Under-Wing Operations
   Above-Wing Operations

5. Ground Operation Hazards
   Jet Blast
   HAZMAT
   Aircraft Operations
   First Responder Access
   Construction
   Pedestrians
   Noise
   Weather

6. Accident and Incident Response
   Off-Airport Property
   On-Airport Property
   Communication
   After Action Reports/Improvement Plans

7. Documentation
   Current FAR Part 139 Documentation Requirements
   SMS Documentation Requirements

8. NPRM Review

CEU: 1.8

Course Duration: 2.5 Days

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**THREAT AND ERROR MANAGEMENT (TEM)**

Threat and Error Management (TEM) 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.
The course begins with an introduction to “threats,” which are conditions that 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.

**Objectives:** To provide class participants with sufficient knowledge to develop a TEM program within their respective organizations. To provide participants with the knowledge to effectively add TEM 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

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)

**CEU:** 1.8

**Course Duration:** 2.5 Days

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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.
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.

CEU: 2.1

Course Duration: 3.0 Days

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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

**CEU:** 1.4

**Course Duration:** 2.0 Days

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**HUMAN ERROR ANALYSIS FOR SYSTEM 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.

**CEU:** 1.4

**Course Duration:** 2.0 Days

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**MATHEMATICS FOR SYSTEM SAFETY ANALYSIS (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.

CEU: 2.1

Course Duration: 3.0 Days

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### PROGRAM INFORMATION

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<td>Thomas Anthony</td>
<td>310-342-1349</td>
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<tr>
<td>Office Manager</td>
<td>Jamie Kidder</td>
<td>310-342-1350</td>
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<tr>
<td>Registrar</td>
<td>Raquel Delgadillo</td>
<td>310-342-1348</td>
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<tr>
<td>Accident Lab/Automation</td>
<td>Dan Scalese</td>
<td>310-342-1345</td>
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<tr>
<td>Logistics</td>
<td>Oscar DeJesus</td>
<td>310-342-1351</td>
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**Class Hours:**
Class hours may vary slightly with each course, but are normally from 8:00 AM to 4:00 PM. Any course that shows a half-day will end by 12:00 noon on the final day of the course.

**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 E-mail address to assure written confirmation of space in classes. Registration must be made with a hard copy, scanned PDF copy, or via the website: https://aviationsafety.usc.edu/registration/.
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, CA 90045
Telephone: 310-642-1111
Toll-free: 800-820-3408
(room rates include Club Lounge access and free in-room internet)
*$179 + tax/Traditional Room
*$189 + tax/Club Level Room
*$209 + tax/Executive Suite
*Rates may increase effective 7/1/18. Contact for updated rates.

Parking – Valet $26.00 + tax
7+ Nights Stay Receives Complimentary Valet Parking and Suite upgrade upon arrival
Room rates includes Breakfast Buffet, Club Lounge Access, High Speed Internet Access and every other Wednesday a Happy Hour reception from 5:30pm to 7:00pm.
Crowne Plaza Hotel and Resort  
5985 Century Blvd., Los Angeles, CA 90045  
Adjacent to the USC Aviation Safety Program offices  
Telephone: 310-642-7500  
Toll-Free: 888-315-3700  
Fax: 310-649-4035  
*$159.00 – Standard Room Rate – September 1, 2017 to June 30, 2018  
*$199.00 – Executive Level Room Rate – September 1, 2017 to June 30, 2018  
Room rates include hot breakfast buffet for 1 guest in Landing Restaurant, complimentary WiFi, transportation to/from LAX airport  
Self-Parking – $12.00/day  
POC: Janice Funes, ph: 310-258-1302  
E-mail: janice.funes@ihg.com  
www.crowneplaza.com/lax

Renaissance Los Angeles Airport Hotel  
9620 Airport Blvd., Los Angeles, CA 90045  
10 minute walk from Aviation Offices  
*$179.00 + tax/Single/Double Occupancy  
POC: Brandon Taba, Account Executive, ph: 949-613-2188  
www.marriott.com

Four Points Hotel/Sheraton  
9750 Airport Blvd., Los Angeles, CA 90045  
Telephone: 310-645-4600  
Toll-Free: 800-529-4683  
Fax: 310-645-7489  
*$150.00 + tax for Standard/Deluxe Rooms January 1, 2018 – May 31, 2018  
*$200 + tax for Jr. Suite Rooms January 1 – December 31, 2018  
Rates include Wifi in guest rooms and public spaces, breakfast buffet for 1 guest per room each day, and LAX shuttle 24/7  
Reduced parking of $15.00 per car/night  
Weekly hosted Best Brews and BBQ on Wednesdays from 5:00 pm to 6:30 pm (Subject to change without notice)
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.

POC: Arlene Marcia
E-mail: arlenemarcia@fourpointslax.com, ph: 310-649-7074
www.fourpointslax.com and use SET# 378854

La Quinta Inns & Suites
5249 W. Century Blvd., Los Angeles, CA 90045
Telephone: 310-645-2200
Telephone: 1-800-531-5900
*$171.00 + tax (June 1 – September 2, 2018; Sunday – Thursday)
*$163.00 + tax (June 1 – September 2, 2018; Friday – Saturday)
*$135.00 + tax (September 3 – December 31, 2018; Sunday – Thursday)
*$127.00 + tax (September 3 – December 31, 2018; Friday – Saturday)

To make a reservation, use website www.lq.com with use of promo code USCAC or call 1-800-531-5900 and reference the promo code.

Embassy Suites LAX North
9801 Airport Blvd., Los Angeles, CA 90045
Telephone: 310-215-1000
Fax: 310-417-8968
*$175.00 + tax/ King Suite or 2-Queen bed Suite
*Rates may increase effective 7/1/18. Contact for updated rates.

Rate includes hot cooked-to-order breakfast, evening beverage reception, complimentary parking for 1 vehicle & WiFi

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 or access the website: http://www.laxembassy.com/ and use Corporate Account 0560035945.

POC: Katrina Banzon, Complex Director of Sales
Email: katrina.banzon@interstatehotels.com, ph: 310-568-7721

*These rates are subject to change by individual management
Homewood Suites LAX
6151 W. Century Boulevard
Los Angeles, CA 90045
Telephone: (310) 431-4720
E-mail: steve.hellmers@interstatehotels.com
POC: Steve Hellmers, Complex Director of Sales
$173.00 + tax (April 22 – May 31, 2018) and (August 26 – December 31, 2018)
$193.00 + tax (June 1 – August 25, 2018) Summer Season Rate
These rates include daily hot breakfast buffet, WiFi, 24-hour airport shuttle service and complimentary self-parking.
To reserve, please go to www.HomewoodSuitesLAX.com and click on Reservations. Enter code 0560035945 in the third field labeled Corporate Account under the section Special Accounts and Rates.

H Hotel LAX (Curio Collection by Hilton)
6151 W. Century Boulevard
Los Angeles, CA 90045
Telephone: (310) 431-4720
E-mail: steve.hellmers@interstatehotels.com
POC: Steve Hellmers, Complex Director of Sales
$189.00 + tax (April 22 – May 31, 2018) and (August 26 – December 31, 2018)
$219.00 + tax (June 1 – August 25, 2018) Summer Season Rate
These rates include WiFi, 24-hour airport shuttle service, complimentary self-parking, and access to rooftop fitness center and sky deck lounge.
To reserve, please go to www.HHotelLosAngeles.com and click on Reservations. Enter code K1 in the second field labeled Group Code under the section Special Accounts Rates.
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### USC AVIATION SAFETY AND SECURITY PROGRAM CALENDAR

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<td>20-2</td>
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<td>11 – 15</td>
<td>HFMX</td>
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## DECEMBER 2019

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<thead>
<tr>
<th>Date</th>
<th>Course</th>
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<tr>
<td>4 – 5</td>
<td>SMS-MGR</td>
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<tr>
<td>9 – 20</td>
<td>AAI</td>
<td>20-2</td>
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</table>
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.
<table>
<thead>
<tr>
<th><strong>REGISTRATION</strong></th>
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<tbody>
<tr>
<td><strong>FIRST NAME</strong></td>
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<td><strong>DOB</strong></td>
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<tr>
<td><strong>POSITION/TITLE</strong></td>
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<tr>
<td><strong>EMPLOYER ADDRESS</strong></td>
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<td><strong>CITY</strong></td>
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<tr>
<td><strong>DAYTIME PHONE</strong></td>
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<td><strong>COURSE(S)</strong></td>
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- Bill my credit card for $________
  - Mastercard
  - Visa
  - Discover
  - CARD#  EXP. DATE
  - AUTHORIZED SIGNATURE  DATE
- Company PO# __________________________
- Company check or cashiers check enclosed

**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.*