Aviation Safety + Security Program

NEW FLIGHT DATA COURSE
CYBER SECURITY IN AVSEC
INDUSTRY LEADING ACCIDENT INVESTIGATION LAB
PRACTICAL SMS IMPLEMENTATION
SMS FOR UAV’S
MESSAGE FROM THE DEAN

Innovation and technology. These are two words that capture the inherent dynamism of aviation. They also capture the focus of our program’s two newest courses: 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. In our newest course, DATA, we teach 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 such monumental advances. But such rapid technological advances can also result in unanticipated hazards. This fact underlies our course Safety Management for Remotely Piloted Aircraft. SMS must be applied to all facets of aviation from the largest A380 to the smallest drone for the system to remain safe.

Last year I wrote of the Viterbi School’s involvement in global outreach. That initiative continues with the World Food Program’s Humanitarian Air Service. It is our vision that the knowledge and safety expertise we have developed in the last seven decades be shared with those in the most challenged areas of the world. In this, I believe we are taking an unprecedented leadership role for academic institutions.

Leadership has characterized our program since it 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 strives to be the university of choice for future leaders from all over the world. The USC Aviation Safety and Security Program is a strong contributor to this effort, now and in the years to come.

Yannis C. Yortsos, Dean
USC Viterbi School of Engineering
# TABLE OF CONTENTS

Message from the Dean 1  
USC Aviation Safety and Security Program 4  
Aviation Safety and Security Certificate Program 5  
System Safety Certificate Program 6  
Veterans Administration / GI Bill Educational Assistance 8  
Aviation Safety and Security Certificate Program Series 8  
Contract Courses 11  
Courses

- Aviation Safety Management Systems (ASMS) 12  
- Aircraft Accident Investigation (AAI) 15  
- Helicopter Accident Investigation (HAI) 17  
- Gas Turbine Engine Accident Investigation (GTAI) 19  
- Human Factors in Aviation Safety (HFH) 20  
- Human Factors in Aviation Maintenance (HFMX) 23  
- Safety Management for Aviation Maintenance (MAINT) 25  
- Safety Management Systems for Remotely Piloted Aircraft (RPSM) 27  
- Data for Aviation Safety Management (DATA) 28  
- Accident/Incident Response Preparedness (AIP) 30  
- Legal Aspects of Aviation Safety (LEGAL) 31  
- Role of the Technical Witness in Litigation (TWW) 33  
- Photography for Aircraft Accident Investigation (PHOTO) 35  
- System Safety (SSC) 36  
- Software Safety (SFT) 38  
- Incident Investigation/Analysis (IIA) 40  
- SeMS Aviation Security Management Systems (AVSEC) 41  
- SMS for Managers (SMS MGR) 43  
- Threat and Error Management (TEM) 44  
- Advanced System Safety Analysis (ADVSS) 46  
- Damage Assessment for System Safety (DASS) 47  
- Hazard Effects and Control Strategies (HAZSS) 48  
- Human Error Analysis for System Safety (HEASS) 49  
- Mathematics for System Safety Analysis (MATH) 50  
Program Information 52  
Schedule 56  
Class Calendar 2017 – 2018 58  
Location 60  
Registration  IBC
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 24 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 2150 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, Nigeria, 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, 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, http://viterbi.usc.edu/aviation.

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**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)
   Data for Aviation Safety Management (DATA)
   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. Advanced System Safety (ADVSS) 4.5 day course

Please visit http://viterbi.usc.edu/aviation for the most current information.
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 310-342-1345 or e-mail us at aviation@usc.edu. Further information can 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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PHOTO 18-1 12 – 13 Oct 2017
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RPSM 18-1 30 Oct – 3 Nov 2017

Series 18D
TEM 18-1 06 – 08 Sep 2017
ASMS 18-1 11 – 22 Sep 2017
AAI 18-1 25 Sep – 6 Oct 2017
HFH 18-2 09 – 13 Oct 2017
IIA 18-1 16 – 19 Oct 2017

Series 18E
AIP 18-1 09 – 11 Oct 2017
IIA 18-1 16 – 19 Oct 2017
HFMX 18-1 23 – 27 Oct 2017
RPSM 18-1 30 Oct – 3 Nov 2017
HAI 18-1 06 – 10 Nov 2017

Series 18F
PHOTO 18-1 12 – 13 Oct 2017
IIA 18-1 16 – 19 Oct 2017
HFMX 18-1 23 – 27 Oct 2017
RPSM 18-1 30 Oct – 3 Nov 2017
HAI 18-1 06 – 10 Nov 2017

Series 18G
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HFMX 18-1 23 – 27 Oct 2017
GTAI 18-1 30 Oct – 3 Nov 2017
ASMS 18-2 06 – 17 Nov 2017

Series 18H
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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 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.
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
   Official Investigations & Civil Litigation
   FAA Enforcement
   International Aviation Safety and Legal Issues
   Legal Rights of Pilots and Other Aviation Professionals
   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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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 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 new USC Aircraft Accident Investigation lab serves as the location for practical exercises. Ten aircraft wrecks 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. Therefore, the communication portion of the AAI class applies to any student in this class as everyone in the aviation industry is required to communicate with one audience or another as a reality of their profession. This part of the 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
   - 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

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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<td>AAI 19-2</td>
<td>03 – 14 Dec 2018</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.

HELICOPTER ACCIDENT INVESTIGATION (HAI)

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. 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

   CEU: 3.2

   Course Duration: 4.5 Days

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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. 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
   - Judgement Exercises
   - Case Studies
CEU: 3.2

Course Duration: 4.5 Days

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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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<td>22 – 26 Oct 2018</td>
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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

PLEASE VISIT HTTP://VITERBI.USC.EDU/AVIATION FOR THE MOST CURRENT INFORMATION.
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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<td>MAINT 19-1</td>
<td>06 – 10 Aug 2018</td>
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</table>
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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<td>RPSM 19-1</td>
<td>29 Oct – 02 Nov 2018</td>
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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
- Cases Studies
- International Regulatory Standards
- Relationship to SMS
- FOQA, ASAP, ASRS
- Cockpit Voice Recorders
- Video Data
- Technical Standards and Performance
- Recovery of CV’s and FDR’s
- Air Traffic Control Data
- Components with Non Volatile Memory
- Commercial Safety Data Services
- Animation of Flight Data
- ADS-B Practical Exercise

CEU: 3.2

Course Duration: 4.5 Days

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<td>DATA 18-3</td>
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<td>06 – 10 Aug 2018</td>
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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. **Internal Organizational Planning**
   - Date Bases and Document Retention
   - Informal Communications Discipline

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

3. **Accident / Incident Response Plan Development**
   - The Challenge of Planning for and Responding to Aviation Accidents
   - Response Planning Benefits and Problems
   - Air Carrier / Aircraft Operator Planning Process
   - Response Plan Development – Putting It All Together
   - Other Aviation Related Response Plans
   - Effectively Interacting with Government Investigations
4. Preparing for Litigation
    Understanding Administrative, Civil and Criminal Actions
    Identify 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: 2.4

Course Duration: 3.0 Days

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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
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

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
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

CEU: 1.4

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

PLEASE VISIT HTTP://VITERBI.USC.EDU/AVIATION FOR THE MOST CURRENT INFORMATION.
Electronic Flash
General Techniques
Macro Photography
Lighting
Picture Identification
Specialized Photographic Techniques
On-Site Photographic Priorities
Student Practice Session
Critique of Student Photographs
Videographic
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.
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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<td>21 – 24 Aug 2017</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 course. It is not recommended that students who attend AAI 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. Incidents
   Case Studies
   Review of Incident Reports
   Development of Incident Investigation Protocol

3. Aircraft Accident Investigation Lab Exercise

**CEU:** 2.5

**Course Duration:** 3.5 Days

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**SeMS AVIATION SECURITY MANAGEMENT SYSTEMS (AVSEC)**

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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<td>13 – 17 Aug 2018</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

CEU: 1.0

Course Duration: 1.5 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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<td>17 – 19 Dec 2018</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.
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: 3.2

Course Duration: 4.5 Days

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CEU: 2.1

Course Duration: 3.0 Days
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

**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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*PLEASE VISIT HTTP://VITERBI.USC.EDU/AVIATION FOR THE MOST CURRENT INFORMATION.*
### PROGRAM INFORMATION

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<th>Role</th>
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<tr>
<td>Director</td>
<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>
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<tr>
<td>Accident Lab/Automation</td>
<td>Dan Scalese</td>
<td>310-342-1345</td>
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<td>Logistics</td>
<td>Oscar DeJesus</td>
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<td>Contract Courses</td>
<td>Holly Inaba</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.

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
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, CA 90045
Telephone: 310-642-1111
Toll-free: 800-820-3408
(room rates include Club Lounge access and free in-room internet)
Use CORP-SET #378854
*$179 + tax/Traditional Room
*$199 + tax/Executive Suite
*Rates will increase effective 7/1/17. Contact for updated rates.
Parking – Valet $22.00 + tax
POC: Darryl Stewart, ph: 310-642-4874
E-mail: Darryl.stewart@sheratonlosangeles.com

**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

*$164.00 – Standard Room Rate – 3/1/17 to 8/31/17
*$159.00 – Standard Room Rate – 9/1/17 to 6/30/18
*$204.00 – Executive Level Room Rate – 3/1/17 to 8/31/17
*$199.00 – Executive Level Room Rate – 9/1/17 to 6/30/18

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: Dinara Baimuldina, ph: 310-318-7708
E-mail: dinara.baimuldina@ihg.com
www.crowneplaza.com/lax

Marriott LAX
5855 Century Blvd., Los Angeles, CA 90045
10 minute walk from Aviation Offices
Telephone: 310-665-5946
Toll-Free: 800-228-9290
Fax: 310-337-8084

USC Corporate code for use on www.marriott.com is UNC
Or click on the link: Book your corporate rate: USC Aviation - LAX Marriott

*$192.00 + tax/Single/Double Occupancy
Parking – $34.10 overnight self-parking, Valet $45.10

www.marriott.com
POC: Brandon Taba
E-mail: brandon.tabab@marriott.com, ph: 949-613-2188

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, 2017 – May 31, 2017
*$160.00 + tax for Standard Deluxe Rooms June 1, 2017 – December 31, 2017
*$150.00 + Taxes – Standard/Deluxe Rooms
Extending Rate/September 1, 2017 – December 31, 2017 - $150.00 + Taxes – Standard/Deluxe Rooms

Rates include Wifi in guest rooms and public spaces, breakfast buffet for 1 person 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.
Please Contact: Arlene Marcia
E-mail: arlenemarcia@fourpointslax.com, ph: 310-649-7074
www.fourpointslax.com and use SET# 378854

Residence Inn by Marriott
1700 N. Sepulveda Blvd., Manhattan Beach. CA 90266
Manhattan Beach/4.0 miles from LAX
Telephone: 310-421-3100
Fax: 310-421-3111
*$169.00 + tax/Studio suite (1-6 consecutive nights) - 4/2017 - 9/2017
*$158.00 + tax/Studio suite (7+ consecutive nights - 4/2017 - 9/2017
Hot breakfast buffet daily; Light dinner with beer, wine, & soft drinks. Free parking. Kitchen/kitchenette in all rooms. Ocean express shuttle. To make a reservation, click on ‘Book your corporate rate for USC Aviation and Safety,’ enter your dates, and complete the reservation or contact POC.
POC: Misty Grayson, Director of Sales
E-mail: mistyg@residenceinnmb.com, ph: 310-421-3102
www.marriott.com/LAXMH and use Corporate Code UNC

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 will increase effective 7/1/17. Contact for updated rates.
Rate includes hot cooked-to-order breakfast, evening beverage reception & WiFi
POC: Steve Hellmers, Assistant Director of Sales
Email: steve.hellmers@interstatehotels.com, ph: 310-568-7720
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. Use CORP-ACCT NO: 0560035945

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

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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.
REGISTRATION

FIRST NAME          M. I.          LAST NAME

DOB               EMAIL ADDRESS

POSITION/TITLE      EMPLOYER

EMPLOYER ADDRESS

CITY     STATE/PROVENCE   COUNTY     ZIP/POSTAL CODE

DAYTIME PHONE      FAX NUMBER

COURSE(S)      DATE(S)      TUITION*  

____________________________________________________________________

____________________________________________________________________

☐ 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.