

The background of the cover is a dark blue space scene. At the top, there are several bright, multi-pointed stars. Below them, a complex network of glowing blue lines and circles represents orbital paths or data connections. In the center-right, a realistic image of Earth is shown, focusing on the North American continent. To the left of the Earth, there is a stylized, low-poly blue structure that resembles a space station or a complex orbital system. The bottom right corner features a grid of small, light blue squares.

NASA Safety Training Center Featured Courses

Fiscal Year 2015

Table of Contents

Memorandum to NASA Safety Training Center Students.....	3
NESC Featured Courses.....	4
SMA-SAFE-NSTC-0051, Explosive Safety Management and Engineering	4
SMA-SAFE-NSTC-0002, System Safety Fundamentals.....	5
SMA-SAFE-NSTC-0008, System Safety Workshop.....	5
SMA-SAFE-NSTC-0040, System Safety Engineering.....	6
SMA-SAFE-NSTC-0001, Facility System Safety.....	7
SMA-SAFE-NSTC-0026, Control Team/Crew Resource Management.....	8
SMA-SAFE-NSTC-0011, ISS Payload Safety Review and Analysis.....	9
SMA-SAFE-NSTC-0034, Situational Awareness.....	10

Memorandum to NASA Safety Training Center Students

The NASA Safety Training Center (NSTC) was established in May 1991 by the NASA Headquarters Office of Safety and Mission Assurance to provide up-to-date, high quality, NASA-specific safety training on location to NASA Centers, or simultaneously to multiple Centers over the Video Teleconferencing System (ViTS). Since that time, this team has been actively developing and presenting courses to meet NASA needs.

We are eager to continue to meet your safety training needs in the most cost effective manner possible. As our customer, your expectations are important in defining our future training capabilities. Please let us know if there are training needs that we are not adequately meeting or any modification we can make to better serve your needs. Likewise, reinforce us when we are properly meeting your requirements.

Our desire at the NSTC is to forge and maintain a strong, lasting working relationship whereby we can help fulfill your safety training needs to assist you in the pursuit of the ultimate goal of safe operations.

NESC Featured Courses

SMA-SAFE-NSTC-0051, Explosive Safety Management and Engineering

(3 Days)

This course covers the requirements for NASA explosive safety programs and their management as defined in NASA-STD-8719.12, "Safety Standard for Explosives, Propellants, and Pyrotechnics." It also covers basic explosive safety engineering principles, concepts, and requirements in TM5-1300/NAVFAC P-397/AFM 88-22, "Structures to Resist the Effects of Accidental Explosions", and DOD 6055.9-STD, "Ammunition and Explosives Safety." The course includes hands on demonstrations of software currently available to calculate explosive overpressures, fragment velocities, quantity distance calculations, etc., and exercises to try out tools and techniques discussed. A calculator and a laptop computer will be required for this class. Course topics include: What are the effects of an explosion? What are the effects of fragments? How can personnel/facilities be protected from explosive effects? How do I site my facilities to reduce the effects from an explosion? How do I build my facilities to reduce the effects from an explosion? What types of tools are available to perform the job?

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals
- Engineers with responsibility for designing new or modifying existing explosives, propellant, or pyrotechnics storage, manufacturing, and test facilities
- Managers of explosives, propellant, or pyrotechnics storage areas, supervisory personnel managing the storage and handling of explosive devices
- Anyone working with explosives, propellant, or pyrotechnics

CEUs: 1.8

SMA-SAFE-NSTC-0002, System Safety Fundamentals

(4-3/4 Days)

This course instructs the student in the fundamentals of system safety management and hazard analysis of hardware, software, and operations. Basic concepts and principles of the analytical process are stressed. The student is introduced to NASA publications that require and guide safety analysis, as well as to general reference texts on subject areas covered. Types and techniques of hazard analysis are addressed in enough detail to give the student a working knowledge of their uses and how they are accomplished. Skill in analytical techniques is developed through the use of practical exercises worked by the students in class. This course establishes a foundation for the student to pursue more advanced studies of system safety and hazard analysis techniques while allowing students to effectively apply their skills to straightforward analytical assignments. Note: this course is a combination of SMA-SAFE-NSTC-0008 (System Safety Workshop) and SMA-SAFE-NSTC-0015 (System Safety Special Subjects). Students who have taken either of these classes should discuss taking this class with the NSTC management staff.

Target Audience:

- Supervisors
- Any Technical or Non-Technical personnel who perform safety analysis and/or manage system safety programs

CEUs: 2.8

SMA-SAFE-NSTC-0008, System Safety Workshop

(3 Days)

This course teaches the fundamentals of hazard recognition and analysis for hardware and operations. Basic hazard concepts and the basics of the analytical process are stressed. The student is introduced to NASA publications that require and guide safety analysis, and to general reference texts on subject areas covered. Types and techniques of hazard analysis are addressed in enough detail to give the student a working knowledge and provide a basis for continued refinement of analytical skills. Extensive use of in-class workshops and group exercises allow hands-on practice in techniques discussed. Note: students who have attended SMA-SAFE-NSTC-0002 should not attend this course.

Target Audience:

- Technical Interns
- Supervisors
- Any Technical or Non-Technical personnel who perform safety analysis or who are interested in making their hardware safe

CEUs: 1.8

SMA-SAFE-NSTC-0040, System Safety Engineering

(5 Days – 3 and 4 day versions also available with prior coordination).

System Safety Engineering is an engineering discipline requiring specialized professional knowledge and skills in applying scientific & engineering principles, criteria, and techniques to identify & eliminate hazards, or reduce the risks associated with hazards. This training course builds on the knowledge of the safety professional or the engineering supervisor/manager, to advance their skills in techniques supporting hazard discovery, assessment and control. The course includes descriptions of methods for establishing and managing a system safety program. It also provides techniques in hazard analysis and reliability calculations. This course begins with a brief review of fundamental safety risk management concepts, but is designed primarily to provide an in-depth understanding of all aspects of system safety. Topics discussed include:

- Concepts In Risk Management
- Identification of System Safety Requirements and Implementation of a System Safety Program.
- Working With A Risk Assessment Matrix
- Preliminary Hazard Analysis (PHA)/Preliminary Hazard List
- Failure Modes And Effects Analysis (FMEA)
- Fault Tree Analysis (FTA)
- Event Tree Analysis (ETA)
- Cause-Consequence Analysis (CCA)
- Operating and Support Hazard Analysis/Writing Procedures
- Introduction To Sneak Circuit Analysis
- Introduction To Software Safety
- Human Factors

Included in this class is a series of practical exercises of increasing complexity to test the student's understanding of the concepts being presented.

Target Audience: Recommended for Managers and Engineers whose work involves recognizing and managing system safety risks

CEUs: 3.0

SMA-SAFE-NSTC-0001, Facility System Safety

(2 Days)

This course is designed to provide attendees with an understanding of how system safety applies to facility acquisition, modification, and operations. It is based on NASA Standard 8719.7, the NASA Facility System Safety Guidebook. The guidebook will be provided to the students as part of the course material. The purpose of the course is to provide guidelines for personnel with facility safety responsibility to assist them in identifying and eliminating or controlling hazards throughout the facility life cycle. The course provides the logical framework necessary for implementing facility system safety as required by NPR 8715.3. The course also addresses facility system safety issues both from a management and engineering perspective. Topics of discussion include: a quick review of System Safety and Hazard Identification, Assessment, and Control Concepts (in the facility context); the NASA facility acquisition process and integration of system safety into it; Safety activities during facility/equipment integration & testing; and Safety management during facility/equipment operations. An in-class group exercise will be included to demonstrate facility system safety principles. Since system safety concepts will only be briefly reviewed, a prior understanding of system safety is necessary. The student should have prior system safety experience and/or have taken one of the following NSTC courses (or the equivalent):

Course Prerequisites (one or more of the following):

- System Safety Workshop (SMA-SAFE-NSTC-0008)
- System Safety Fundamentals (SMA-SAFE-NSTC-0002)
- System Safety Engineering (SMA-SAFE-NSTC-0040)

Target Audience:

- Personnel with facility safety responsibility
- Professionals involved in managing, performing, or reviewing of facility acquisitions, plans, designs, safety analyses, & operations

CEUs: 1.2

SMA-SAFE-NSTC-0026, Control Team/Crew Resource Management

(2-1/2 Days)

This training directly addresses the human factors issues that most often cause problems in team and crew interaction. No one who works in a team or on a crew, especially in high stress activities, is immune to these effects. The Control Team/Crew Resource Management course deals with interpersonal relations; but does not advocate democratic rule or hugging your fellow team members to improve personal relations. Rather, this course provides awareness of the human factors problems that too often result in mishaps and offers recommendations and procedures for eliminating these problems; with an emphasis on safety risk assessment, crew/team coordination, and decision-making in crisis situations. The two versions of this course are applicable both to those in aircrew-type operations and also to personnel operating consoles for hazardous testing or on-orbit mission operations. It is preferable that a "team" experiences the course as a group if possible. One and two-day versions of this course are also available - check with the NSTC to determine which version of the course is most applicable to your operations.

Target Audience:

- Safety Reliability, Quality, and maintainability Professionals
- Managers, Engineers, and Technicians who work in a team environment and who must coordinate with, and depend on, others to accomplish work objectives and goals
- All who desire to work more efficiently, effectively, and understand the dynamics of working with others

CEUs: 1.5

SMA-SAFE-NSTC-0011, ISS Payload Safety Review and Analysis

(4 Days)

This course is designed as a guide to the ISS payload safety review process for payload program safety and management personnel. The student will gain an understanding of payload safety as it relates to the overall ISS payload integration process, how the ISS payload safety review process works, and the roles and responsibilities of the various players in the ISS payload safety review process. In addition, the student will be instructed in the hands-on fundamentals of payload hazard analysis, identification of technical safety requirements, hazard documentation, and presentation of analyses to the Payload Safety Review Panel. The course will include a mock presentation to the Payload Safety Review Panel. Those with only support or supervisory responsibilities in payload safety should attend NSTC course 016, ISS Payload Safety Process and Requirements.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals
- Additional duty safety personnel and engineers who perform hazard analyses on ISS payloads and who must meet the safety review requirements of current ISS payload safety documents

CEUs: 2.4

SMA-SAFE-NSTC-0034, Situational Awareness

(2-1/2 Days)

Throughout NASA there are many hazardous operations including hazardous test operations that involve operator control over systems in which component failure or operator error can threaten the safety of involved or surrounding personnel. Examples include such varied operations as hazardous testing, propellant transfers, aircraft operations, and on-orbit EVA mission operations. For such operations where extreme danger can result from system failure or operator error, a body of knowledge, called situational awareness, has been developed to promote safe outcomes from potentially hazardous events. Situational awareness involves combining an awareness of what's going on in the operations environment, knowledge of system failure design criteria, and an understanding of expected outcomes from system failures to avoid hazardous situations and develop safe responses to unsafe conditions that may realistically be expected to arise. This course instructs students in the basic tenets and practices of situational awareness, and how they apply to hazardous operations in NASA in order to promote the best proactive safety techniques in practice. This course may be presented in conjunction with Control Team/Crew Resource Management.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals
- Those involved as test/operations team members in hazardous operations
- Anyone designing, writing procedures for, or supervising those working in hazardous test or mission operations

CEUs: 1.5

NSTC courses are listed on SATERN in the SMA domain. The most current course descriptions will be in SATERN. All NSTC classes will be scheduled in the SMA domain using SATERN and all students will be required to sign up for classes in SATERN in order to receive credit for course attendance. For further information, please contact:

Elmer R. Johnson, NASA

Lead, Program Assessment Team

JSC Safety & Mission Assurance

elmer.r.johnson@nasa.gov

Johnson Space Center

2101 NASA Parkway

Mail Code: NS211

Houston, TX 77058

