

2008

**NASA Range Safety
Annual Report**

**This 2008 Range Safety Annual Report
is produced by virtue of
support from the following:**

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A. AGENCY RANGE SAFETY TRAINING 2008 UPDATE

To date, 490 students have taken part in 19 Range Safety Orientation Courses. Breaking participation down by course subject, 83 students participated in 5 Flight Safety Analysis courses, 65 students participated in 4 Flight Safety Systems courses, and 18 students participated in 3 Range Safety Operations courses. The schedule for all courses in 2009 is depicted in Figure 1 below.

For more background and information on Agency Range Safety Training, [click here](#).

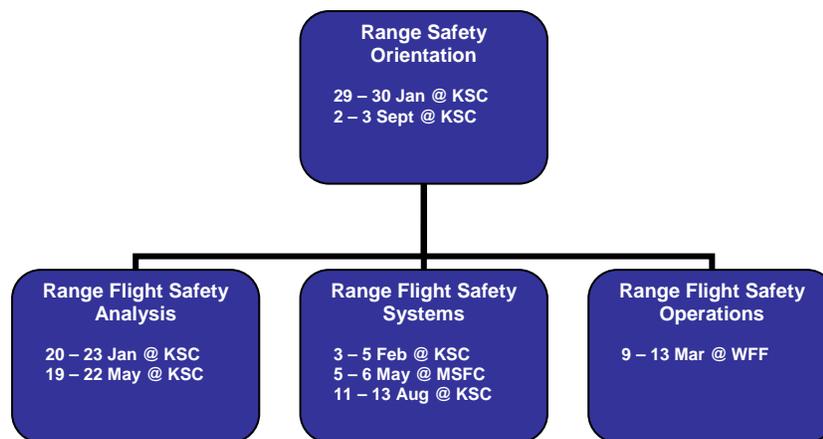


FIGURE 1: 2009 COURSE SCHEDULE

1. Range Safety Orientation Course

The Range Safety Orientation Course, as outlined in Figure 2, is designed to provide an understanding of the range safety mission, associated policies and requirements, and NASA roles and responsibilities. It introduces the students to the major ranges and their capabilities, defines and discusses the major elements of range safety (flight analysis, flight termination systems, and range operations), and briefly addresses associated range safety topics such as ground safety, frequency management, and unmanned aerial systems (UAS). The course emphasizes the principles of safety risk management to ensure the public and NASA/range workforces are not subjected to risk of injury greater than that of normal day-to-day activities.

It is designed to inform the audience of the services offered by the Range Safety organization, present timeframes that allow adequate interface with range safety during Program/Project startup and design in an effort to minimize potential delays and costs, and recommend ways of

making the working relationship with Range Safety beneficial for the range user. This course includes a visit to Range Safety facilities at CCAFS/KSC and will normally only be presented at the Eastern Range. If you wish to discuss presenting the class at your location, please contact the NSTC staff.

Target Audience:

- Senior, program, and project managers
- Safety, Reliability, Quality, and Maintainability Professionals with an interest in Range Safety activities

2. Range Flight Safety Analysis Course

The Range Flight Safety Analysis Course is designed to give the student a detailed understanding of range safety analysis. As depicted in Figure 3, it includes NASA, FAA, and DoD requirements for flight safety analysis; a discussion of range operation hazards, risk criteria, and risk management processes; and an in-depth coverage of the containment and risk management analyses performed for expendable launch vehicles (ELVs) at the Eastern Range. Although the course is based on ELVs at the Eastern Range, the overall analysis process and concepts are also applicable to other vehicles and other ranges. The course concentrates on debris hazards and analyses but also includes an overview of toxic, blast, and radiation risks and analyses. The course includes a class exercise that covers the entire analysis process.

Prerequisite: Prior attendance at NSTC Course 074, *Range Safety Orientation*, or equivalent experience.

Target Audience:

- NASA, FAA, and DoD Range Safety Analysts
- Range Safety personnel in other disciplines
- Program/project managers and engineers who design potentially hazardous systems to operate on a range

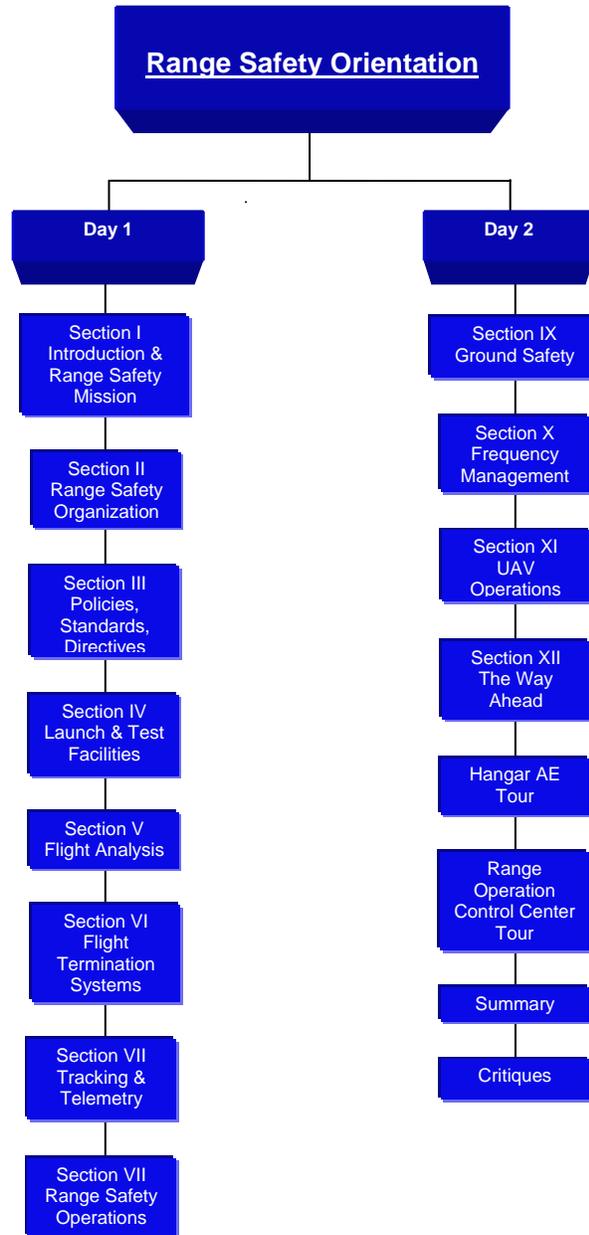


FIGURE 2: ORIENTATION COURSE OUTLINE

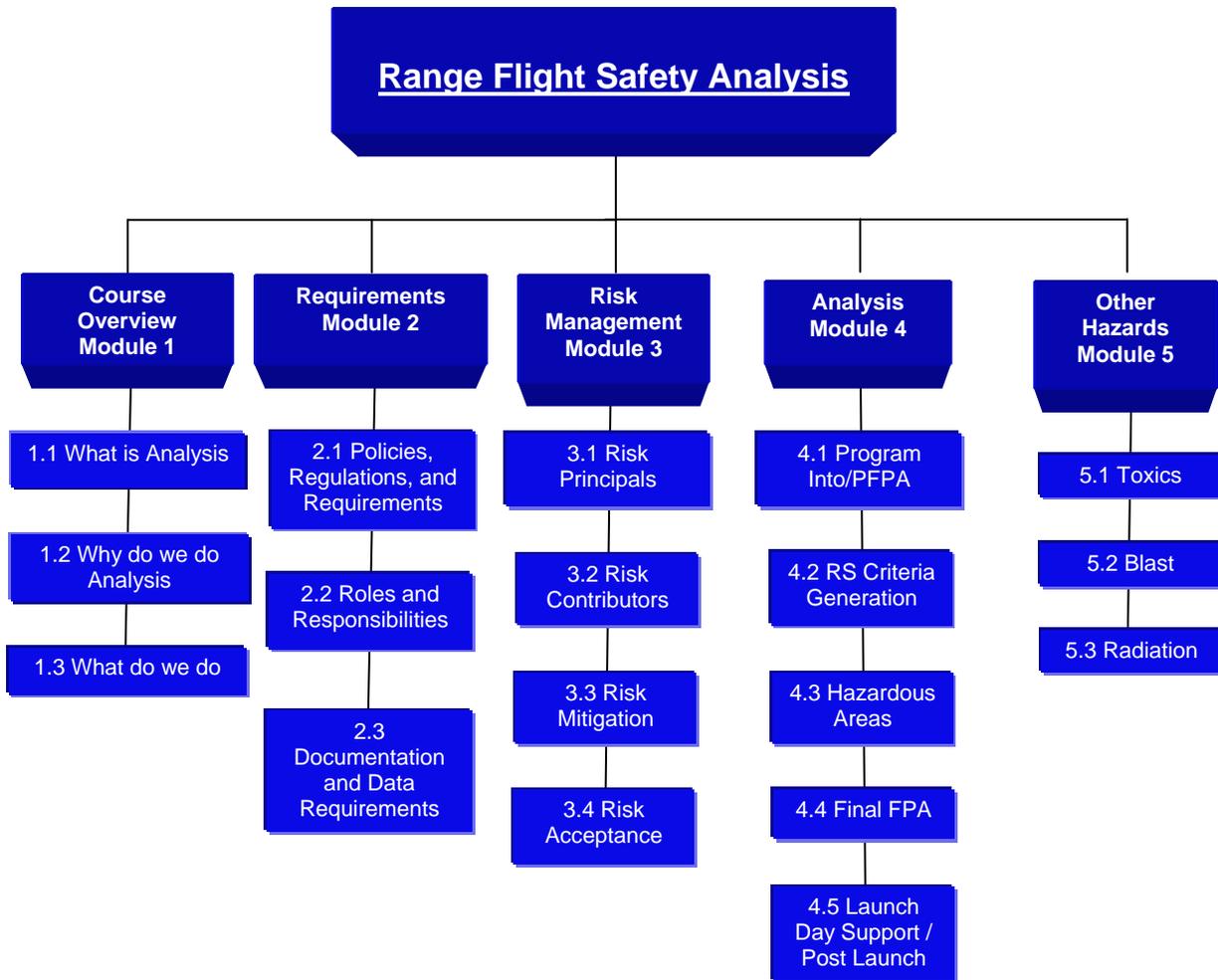


FIGURE 3: RANGE FLIGHT SAFETY ANALYSIS COURSE OUTLINE

3. Range Flight Safety Systems Course

This course describes required safety responsibilities and Flight Termination System (FTS) procedures and plans. It also includes FTS component design, performance, test, and subsystem pre-launch requirements (see Figure 4). The course then transitions to the applicable FTS ground support and monitoring equipment, FTS analysis, and component test history. The course continues with a review of unmanned aerial systems (UAS) flight termination systems, balloon universal termination packages, and the Enhanced Flight Termination System (EFTS). The class concludes with a description of the Autonomous Flight Safety System. The course size at KSC is limited due to tours we conduct at the Navy Trident trainer facility (located on CCAFS.)

Prerequisites:

- Completion of NSTC 074, *Range Safety Orientation*, or equivalent level of experience or training, is required
- Completion of NSTC 002, *System Safety Fundamentals*, or NSTC 008, *System Safety Workshop*, is recommended

Target Audience:

- NASA, FAA, and DoD Range Safety Personnel working Flight Safety Systems issues
- Range safety personnel in other disciplines
- Program/project managers and engineers who design potentially hazardous systems to operate on a range
- Personnel who conduct hazardous operations on a range

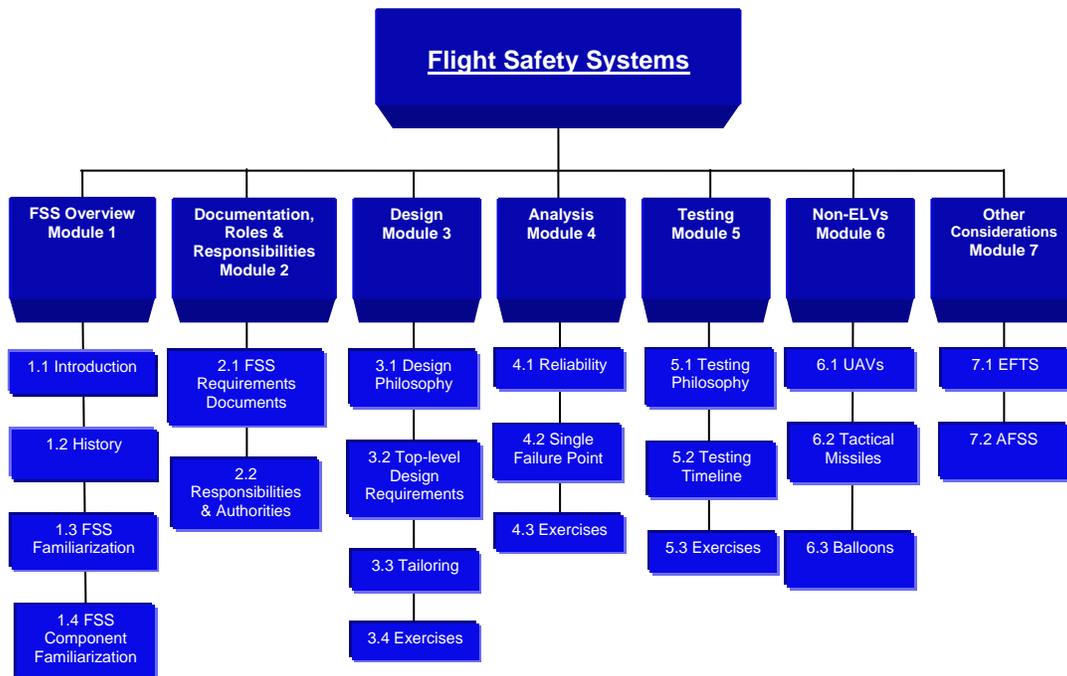


FIGURE 4: RANGE FLIGHT SAFETY SYSTEMS COURSE OUTLINE

4. Range Safety Operations Course

To ensure mission success and the safety of operations for the Range, a formal process has evolved within the range community to provide Range Safety operations. This course addresses the roles and responsibilities of the Range Safety Officer (RSO) for Range Safety operations as well as real-time support, including pre-launch, launch, flight, re-entry, landing, and any associated mitigation. Mission rules, countdown activities, and display techniques are presented. Additionally, tracking and telemetry, along with vehicle characteristics and sortie/range generation and checkout, are covered in detail. Finally, post operations, lessons learned, and the use and importance of contingency plans are presented. Those participating in the course receive hands-on training and exercises to reinforce the instruction. It is important to note that this course is only presented at WFF (Wallops Flight Facility) and is limited to six participants. The course centers on the topics shown in Figure 5 below.

Prerequisites:

- NSTC course 074, *Range Safety Orientation*, or equivalent experience and/or training, and a background in range safety.

- NSTC-0086; *Range Flight Safety Analysis*, or equivalent experience and/or training.
- NSTC-0096; *Flight Safety Systems*, or equivalent experience and/or training

Target Audience:

Persons identified as needing initial training for future/current jobs as RSOs with NASA or RSO management.

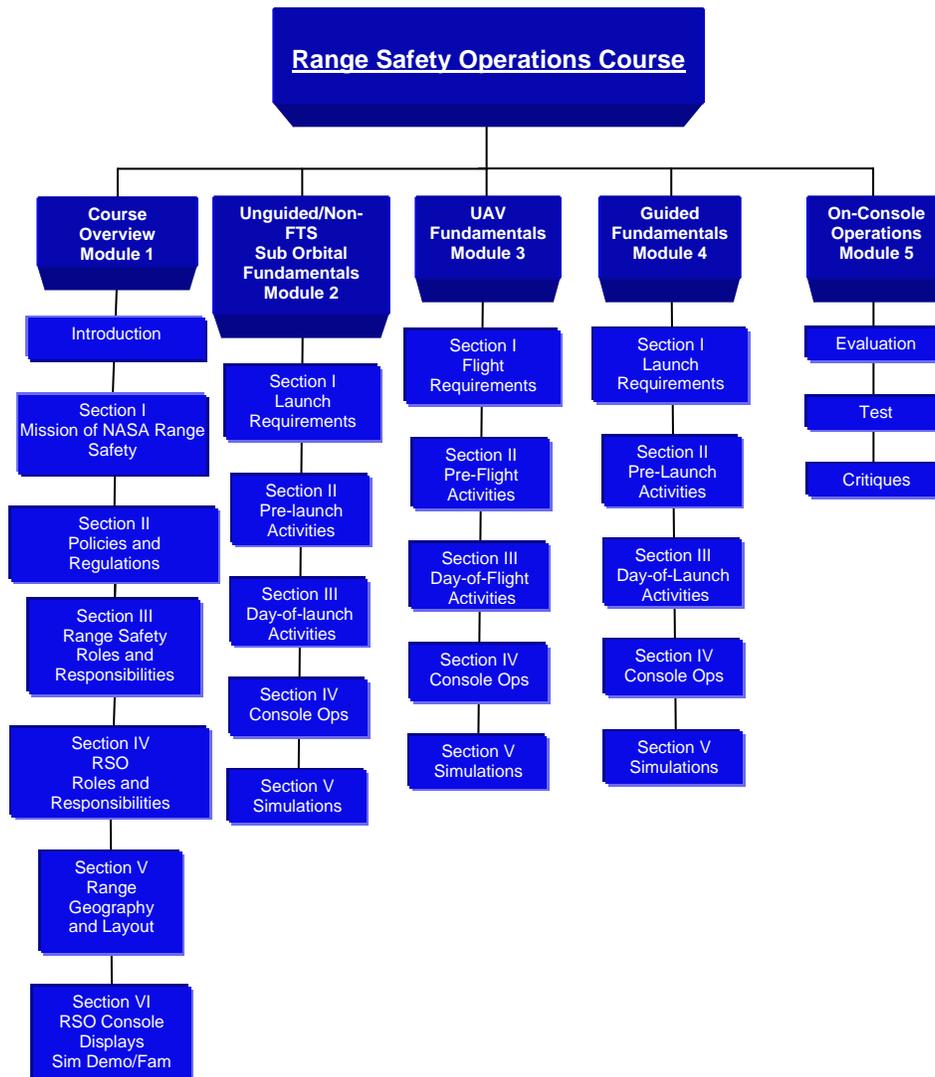


FIGURE 5: RANGE SAFETY OPERATIONS COURSE

If you wish to attend any of the courses offered, please contact your Center training manager, or refer to the NSTC web site course catalogue located at:

<https://saturn.nasa.gov/elms/learner/catalog/>