Navigation Instructions

This version of the course is designed for use with screen readers. The course has on screen text and graphics and is accompanied by an audio transcript. The first item on every slide is the audio transcript followed by the text on screen and graphics descriptions. Each screen reader software suite is different so your experience may vary.

Please contact the STEP Help Desk with any issues you have reading this document.

Phone (440) 962-3033
Email: NASA-STEPHelp@mail.nasa.gov
Introduction to the Safety and Mission Assurance Technical Excellence Program (STEP)

SMA-OV-WBT-100

v3.0
Welcome to the Safety and Mission Assurance Technical Excellence Program (STEP)!

This course explains:

- What is STEP?
- Why was STEP developed?
- Why should I participate?
- What can I learn?
- How do I get started?
- Where can I go?
What is STEP?

Safety and Mission Assurance Technical Excellence Program (STEP)

- Voluntary training program for SMA professionals
- NASA Headquarters initiative
- Led by:
  - Technical Excellence Office
  - NASA Safety Center
  - Cleveland, Ohio
  - [http://nsc.nasa.gov/](http://nsc.nasa.gov/)
Introduction to STEP

What is STEP?

STEP

• Focuses on SMA disciplines through multiple curricula
• Courses are presented in a variety of formats:
  – Instructor-led
  – Video-based
  – Web-based
  – Self-learning
• Participants progress through the program at their own pace
Why was STEP developed?

**STEP responds to critical SMA needs**

- Agency-wide SMA professional development path
- More rigorous, documented SMA career program
Introduction to STEP

Why was STEP developed?

Message from Bryan O’Connor

Click the image to start a video segment featuring Mr. Bryan O'Connor, former Chief, Safety and Mission Assurance Office, discussing the SMA Technical Excellence Program.
Why should I participate?

Participation is strongly encouraged

- All SMA Professionals
- Any NASA employee
- Anyone with a SATERN account
Why should I participate?

**Benefits of participation**

- Supports NASA missions
- Provides technical discipline support and guidance
- Positively influences safety culture within NASA
- Increases and sustains domain knowledge
- Helps safety engineers and specialists grow professionally
Why should I participate?

Continuing Education Units

- STEP courses earn CEUs recognized by IACET
- Helps maintain your certifications
Introduction to STEP

What will I learn?

- SMA Leadership
- System Safety
- Reliability and Maintainability
- Cross-Discipline
- Software Assurance
- Quality Engineering
- Operational Safety
- Aviation Safety
What will I learn?

Aviation Safety

Aviation Safety is designed to ensure mission success and preserve human and material resources by preventing damage and injury through the elimination and/or mitigation of hazards.

Included in the Aviation Safety discipline are two specializations: the Aviation Safety Officer (ASO) and the Aviation Safety Engineer (ASE). The ASO is a member of the Flight Operations Department and is responsible for focusing on safety and mission assurance throughout the entire lifecycle of an aviation-based technology project. The ASE is a member of the SMA organization and is responsible for assuring safety and mission success for the design, development and implementation of any aviation-related technology project.
What will I learn?

**Operational Safety**

Operational Safety focuses on the prevention of operations-related safety hazards by:

- Assuring mission success
- Protecting the public as well as flight, ground, laboratory and underwater personnel
- Protecting the environment
- Protecting aircraft, spacecraft and payloads
- Protecting facilities, property and equipment
What will I learn?

Quality Engineering

Quality Engineering is the SMA engineering discipline that deals with the analysis, principles and practices of the quality of the design, compliance and fitness-for-use of products and services. As part of the overall Quality Assurance effort, it serves to provide confidence that SMA and technical requirements are met.
Reliability and Maintainability

Through design evaluation, (probabilistic) modeling and analysis, and testing, the Reliability & Maintainability discipline helps establish the necessary confidence that the system and its components function as required when needed.

This discipline has two parts:

**Reliability** involves the set of activities aimed at assessing and improving systems’ reliability during their missions.

**Maintainability** consists of assessing and verifying system design characteristics to minimize maintenance downtime.
What will I learn?

Software Assurance

Software Assurance is the planned and systematic set of activities that ensure that software lifecycle processes and products conform to requirements, standards and procedures. For NASA, this includes the roles of Software Quality, Software Safety, Software Reliability, Software Verification & Validation (V&V), and Software Independent Verification & Validation (IV&V).
What will I learn?

System Safety

System Safety Engineering is a disciplined, systematic approach to understanding and assessing safety risk to support decisions throughout Program and Project lifecycles. It specifically addresses the identification, analysis and control of system risks resulting from hazards that can affect humans, the environment and mission aspects.
What will I learn?

Cross-Discipline Curriculum (Level 2)

The Cross-Discipline curriculum offers an overview of the fundamental SMA disciplines at Level 2. Rather than focusing on one discipline at this Level, the curriculum provides training on key concepts in Operational Safety, Quality Engineering, Reliability & Maintainability, Software Assurance, and System Safety.

The Cross-Discipline curriculum is for you if:

• Your job requires broad SMA training
• You are unsure which discipline you eventually want to pursue
• You are in a supervisory position that oversees multiple disciplines
• Or you are on a leadership track that requires a technical component of training.

The Cross-Discipline curriculum retains all the Qualification Elements of a traditional STEP curriculum; however, more discipline training hours are required, there are Reading Materials for each discipline, and OJT is particularly challenging as tasks must be completed in all five disciplines.
What will I learn?

SMA Leadership Curriculum (Levels 3–4)

The SMA Leadership curriculum is open to all SMA professionals and is intended for participants with a desire to pursue leadership development. The curriculum builds on NASA’s Leadership Model and incorporates the SMA leadership attributes of influence and persuasion, understanding cross-functional teams, and critical thinking and problem solving. This curriculum is for you if you are pursuing a leadership role including the positions of influence leader, team leader, first-line supervisor or manager.

The SMA Leadership curriculum retains all the Qualification Elements of the other STEP curriculums and also features curriculum flexibility with an 80/20 split between required and elective coursework in Discipline Training. This gives you the flexibility to supplement the required coursework with additional leadership courses or discipline-specific electives from the respective Level. Discipline-specific electives give you the opportunity to gain a greater understanding of the technical work you may be leading.
### What will I learn?

Within STEP levels are:

<table>
<thead>
<tr>
<th>STEP Level</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope of STEP Training Experience</td>
<td>Awareness</td>
<td>Understanding</td>
<td>Application</td>
<td>Experience</td>
</tr>
<tr>
<td>Objective</td>
<td>Provides an introduction to all the SMA disciplines.</td>
<td>Focuses on the concepts and applications of the discipline or alternate curriculum you decide to pursue. Requires on-the-job training.</td>
<td>A more rigorous, discipline-specific curriculum that requires you to apply the principles and procedures of your discipline to a given problem. Requires on-the-job training and a comprehensive exam.</td>
<td>Highly personalized curriculum. Requires significant on-the-job training and presentation to a Peer Review Panel.</td>
</tr>
</tbody>
</table>

Curriculum escalates in difficulty and complexity through each Level, as do the expectations.
What will I learn?

Within STEP levels are:

- Core Training
- Discipline Training
- Domain Training
- On-the-Job Training
- Enrichment Experience
- Reading Materials
- Years of Experience
- Other Requirements
How do I get started?

Level 1 Curriculum

• Same across all disciplines and alternate curricula
• Total of 26 academic hours
  – Course length averages 1 hour
• Summary quiz at the end of most courses
• Self-paced
• Entirely web-based via SATERN
• Available on-demand
How do I get started?

Level 1 Curriculum

Introduction to STEP
SMA-OV-WBT-100

START

YOU ARE HERE

SMA Center Overview

Center Specific SMA
Organization Overview
SMA-OV-WBT-102-110, 125

1. Introduction to STEP
SMA-OV-WBT-100

2. SMA Overview
   - NASA SMA Program Implementation
     SMA-OV-WBT-101
   - Overview of Mishap Investigation
     SMA-002-07

3. Core Topics
   - Risk Management Overview
     SMA-OV-WBT-111
   - Decision Analysis Overview
     SMA-OV-WBT-112
   - Systems Engineering Overview
     SMA-OV-WBT-113

4. Domain Topics
   - Human Exploration and Operations Mission Directorate Overview
     SMA-OV-WBT-114
   - Space Technology Mission Directorate Overview
     SMA-OV-WBT-126
   - Science Mission Directorate Overview
     SMA-OV-WBT-116
   - Aeronautics Research Mission Directorate Overview
     SMA-OV-WBT-117

5. Discipline Topics
   - Basics of Aviation Safety
     SMA-AS-WBT-100
   - Basics of Operational Safety
     SMA-OS-WBT-100
   - Basics of Software Assurance
     SMA-SA-WBT-101
   - Basics of Reliability & Maintainability
     SMA-RM-WBT-100
   - Basics of Quality Engineering
     SMA-QE-WBT-100
   - Basics of System Safety
     SMA-SS-WBT-100

6. Case Studies
   - Apollo 1 Case Study
     SMA-OV-WBT-118
   - Apollo 13 Case Study
     SMA-OV-WBT-119
   - Challenger Case Study
     SMA-OV-WBT-120
   - Columbia Case Study
     SMA-OV-WBT-121
   - X-31 Case Study
     SMA-OV-WBT-122
   - NOAA-N Prime Case Study
     SMA-OV-WBT-123

7. FINISH
Introduction to STEP

Where can I go?

STEP Developmental Paths

Level 1

ALL CURRICULUMS

CROSS-DISCIPLINE CURRICULUM

Level 2

DISCIPLINE-SPECIFIC CURRICULUM 80/20

SMA LEADERSHIP CURRICULUM

Level 3

DISCIPLINE-SPECIFIC CURRICULUM 80/20

SMA LEADERSHIP CURRICULUM

Level 4

DISCIPLINE-SPECIFIC CURRICULUM 80/20

Discipline Expert/Technical Fellow

Supervisor/Manager

Team Lead

Product/Mission Assurance Manager

Performing Role
Where can I go?

Levels 2-4 Curricula

• Increasingly challenging and curriculum-specific
• Based on an 80/20 model
  – 80% prescribed by your curriculum
  – 20% electives
  – Allows you to tailor STEP training to your specific job needs
• Pass course exam to get credit
• Go to https://nsc.nasa.gov/STEP/CurriculumDocuments to see your curriculum’s course of study and other requirements
Qualification

- Advancing from one STEP level to the next
- Must complete all requirements for that level
- Qualifying Authority approves qualification at that level
- Receive certificate signed by SMA Director and NASA Chief of Safety
- Contractors must meet same criteria as Civil Servants
## Where can I go?

<table>
<thead>
<tr>
<th>STEP Qualification Elements</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Training</td>
<td>3</td>
<td>24</td>
<td>24</td>
<td>N/A</td>
</tr>
<tr>
<td>Discipline Training</td>
<td>19</td>
<td>100</td>
<td>137</td>
<td>137</td>
</tr>
<tr>
<td>Domain Training</td>
<td>4</td>
<td>40</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Academic Hours</td>
<td>26</td>
<td>164</td>
<td>161</td>
<td>137</td>
</tr>
<tr>
<td>On-the-Job Training</td>
<td>N/A</td>
<td>180</td>
<td>360</td>
<td>360</td>
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<tr>
<td>Enrichment Experience</td>
<td>N/A</td>
<td>20</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Total OJT/Enrichment Hours</td>
<td>N/A</td>
<td>200</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>Minimum Years of Experience</td>
<td>N/A</td>
<td>1</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Reading Material</td>
<td>N/A</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Level Completion Requirements**

<table>
<thead>
<tr>
<th></th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive Level Test</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
<td>N/A</td>
</tr>
<tr>
<td>Peer Review Panel</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>Qualification Board</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Where can I go?

Equivalence and Certifications

• Receive credit for:
  – Professional certifications
  – Previous training courses or programs
  – Previous work experience

• Initiate through My STEP
Where can I go?

**Role of Your Supervisor**

- Organizational line manager who oversees your training
- Assists in creating and approving your Individual Development Plan (IDP)
- Approves the requirements you need for Qualification
**Summary**

**STEP Support**

- Technical Discipline Team Leads
- Technical Discipline Fellows
- Technical Excellence Office Center Representatives
- STEP Website
Introduction to STEP

Summary
Complete Course

You have completed the Introduction to STEP Course.

CONGRATULATIONS!

In order to receive credit within SATERN for completing this course, please click Complete.