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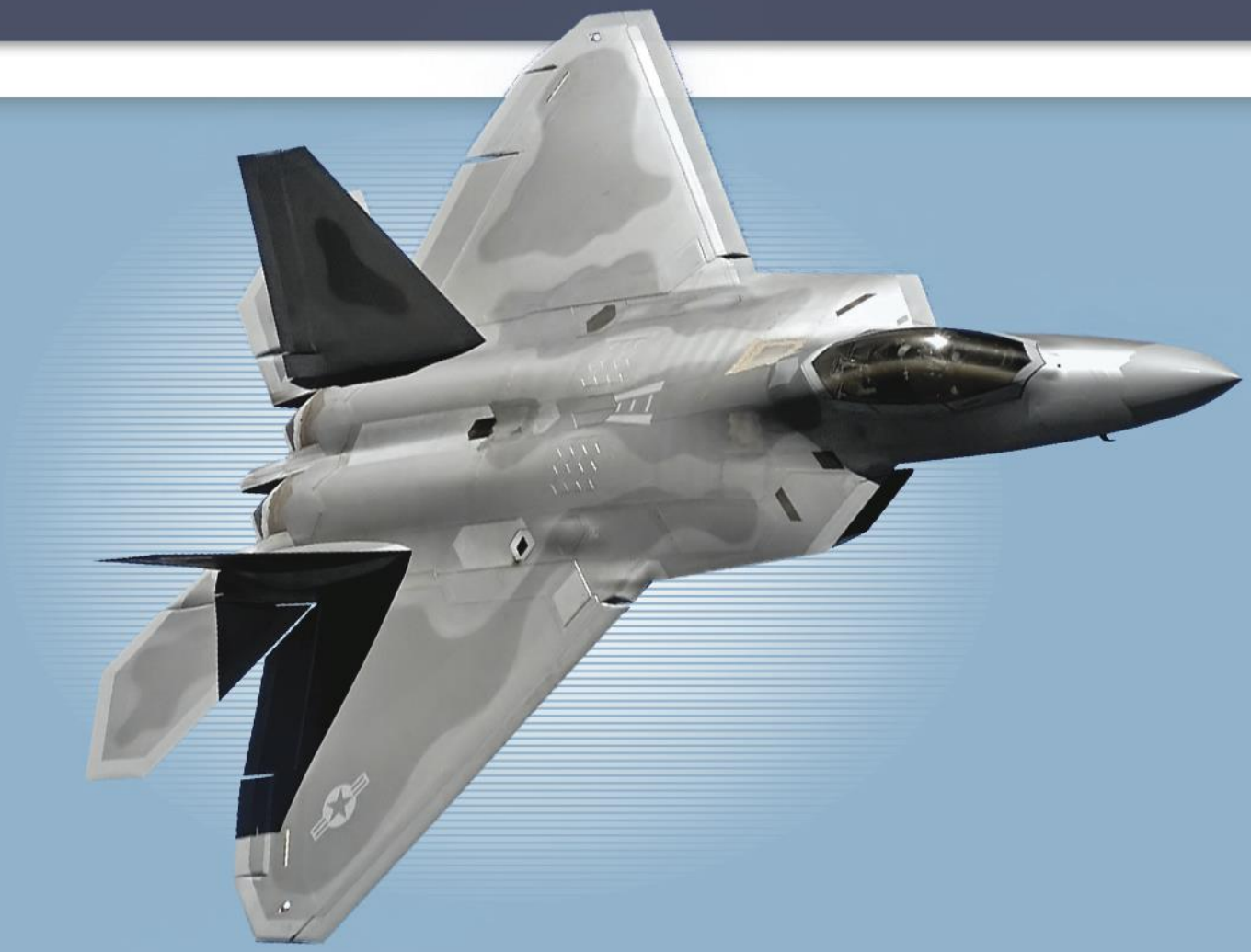

Aerospace Lessons-Learned

MAKE YOUR CAREER SOAR

Course Description

The Aerospace Lessons-Learned (ALL) short course provides participants with the key knowledge, understanding and insight required to effectively apply a myriad of hard-won lessons-learned gleaned over the last half-century of aerospace history.

Professionals in the modern global aerospace market ply their trade in an era that demands that they do more, in less time and with fewer resources than preceding generations. With optimistic schedules and tight budgets, today's programs cannot tolerate even minor deviations from the plan without facing the threat of cancellation. Ignorance of past lessons-learned leads to unwise decisions and unacceptable reinventing-the-wheel excursions. As such, an awareness and retention of hard-won aerospace lessons-learned is absolutely vital for success.

This valuable course stresses the critical importance of learning and retaining knowledge gained through past endeavors. Material focuses on significant historical events and mishaps; special emphasis is placed on what worked, what did not work and why.

Learning is accomplished through the medium of case history presentations which consider the background, root causes and abiding lessons-learned pertinent to a host of historically-significant events. These vital lessons-learned are technical, managerial, operational and cultural in nature. For added knowledge integration, each major case history presentation is followed by a class discussion.

Key Course Topics

- **Hubble Telescope Flaw**
- **Galileo HG Antenna Anomaly**
- **Submarine Thresher Loss**
- **Gimli Glider Incident**
- **X-43A Launch Vehicle Mishap**
- **Apollo 13 Cryo Tank Explosion**
- ***USS Forrestal* Fire**
- **X-2 Speed Mission Mishap**
- **Nedelin Disaster**
- **X-15 Reentry Mishap**
- **Apollo AS-204 Fire**
- **Space Shuttle Challenger Disaster**
- **Space Shuttle Columbia Loss**
- **Concorde Airliner Disaster**
- **Mars Climate Observer Loss**
- **Genesis Entry Vehicle Mishap**
- **XB-70A Valkyrie Collision**
- **Palomares Broken Arrow Incident**
- **NF-104A Zoom Flight Mishap**
- **Delta II Launch Vehicle Explosion**

Course Outline

The Aerospace Lessons-Learned (ALL) short course consists of a diverse collection of case studies, each of which focuses on a historically significant mishap or event.

The formal presentation of each case study is followed by a class discussion period. This unique presentation-discussion format maximizes knowledge transfer within and interaction between the group of course participants. The three-fold objective of this course is to help each participant (1) become aware of, (2) retain and (3) in the future, apply critical aerospace lessons-learned.

Aerospace Lessons-Learned Mishap Categories and Case Format

Mishap Categories	Civil Aviation	9 Cases; includes Air Canada 143, BOAC 781, Aloha Airlines 27, Air NZ 901 Loss
	Military Aviation	6 Cases; includes USAF NF-104A; B-52H Clear Air Turbulence Event, M-21/D-21 Loss
	Experimental Flight	12 Cases; includes USAF X-2 Loss; XB-70A Crash; NASA M2-F2 Accident; X-43A Loss
	Maritime Vessels	4 Cases; includes USS Thresher Incident; RMS Titanic Sinking; Loss of USS Scorpion
	Launch Vehicles	5 Cases; includes USN Trident D5 Loss; NASA Skylab 1 Mishap; Nedelin Catastrophe
	Manned Spaceflight	6 Cases; includes Apollo 204 Fire; Challenger Disaster; Columbia Accident
	Robotic Spaceflight	7 Cases; includes NASA Genesis SRC Crash; Hubble Telescope Flaw; Loss of MCO
	Demonstration Aviation	7 Cases; USAF B-52G Air Show Training Crash; Thunderbirds Opposing Solo Mishap
Case Format	Background	This section both introduces the topic and provides context for a given study. Course participants are placed in the historical setting of what preceded the mishap or event to better understand the associated when-where-how-why aspects of same.
	Mishap	This section provides a factual and objective description of the mishap or event. Where possible, a chronology or timeline detailing the sequence of sub-events is provided. Key elements and participants are identified and explained as well.
	Causes	The causes of the mishap or event are explicitly identified. These include proximate, contributing and root causes. To the maximum extent possible, reference is made to the official mishap investigation report if such exists.
	Lessons-Learned	This is the “punch line” or “take-away message” portion of the case study. Enduring lessons-learned are summarized and explained. Lessons-learned are technical, procedural, operational, managerial and cultural in nature.
	Summary	Provides an overall wrap-up of the topic considered. Summarizes the long-term and historical ramifications of the mishap or event. As appropriate, *lessons-not-learned* and *lessons-forgotten* are identified as well.