

A Guideline for Aerospace Platform Fiber Optic Training and Awareness Education
Aerospace Fiber Optics Installer Knowledge Competencies

RATIONALE

The Aerospace industry has always required the highest standards of workmanship to be maintained. To ensure that the Aerospace fiber optics industry adopts these same high standards, it's essential that minimum training and certification requirements be established. This document outlines the minimum training requirements for all personnel working as aerospace fiber optics installers in accordance with aerospace industry best practices.

1. SCOPE

This document establishes training guidelines applicable to fiber optic installer technical training for individuals involved in the manufacturing, installation, support, integration and testing of fiber optic systems. Applicable personnel include:

Managers

Engineers

Technicians

Trainers/Instructors

Third Party Maintenance Agencies

Quality Assurance

Production

2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

ARP5061 Guidelines for Testing and Support of Aerospace, Fiber Optic, Inter-Connect Systems

AS50881 Wiring Aerospace Vehicle

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2.2 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

- ANSI Z136.1-2007 American National Standard for Safe Use of Lasers
- ANSI Z136.2-1997 American National Standard for the Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources
- ANSI/TIA-440-B-2004 Fiber Optic Terminology

2.3 IEC Publications

Available from International Electrotechnical Commission, 3, rue de Varembe, P.O. Box 131, 1211 Geneva 20, Switzerland, Tel: +44-22-919-02-11, www.iec.ch.

- IEC 60825-1 Laser Safety Equipment Classification (Safety of laser products)
- IEC 60825-2 Safety of Optical Fibre Communication Systems
- IEC 60825-4 Laser Guards

2.4 NASA Publications

Available from NASA, Documentation, Marshall Space Flight Center, AL 35812, www.nas.nasa.gov.

- NASA-STD-8739.5 Fiber Optic Terminations, Cable Assemblies, and Installation

2.5 NAVAIR Publications

Commanding Officer, Naval Air technical Data and Engineering Service Command, Naval Air Station, North Island, P. O. Box 357031, Building 90, Distribution, San Diego, CA 92135-7031

- NAVAIR 01-1A-505.4 INSTALLATION AND TESTING PRACTICES AIRCRAFT FIBER OPTIC CABLING

2.6 U.S. Government Publications

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, <http://assist.daps.dla.mil/quicksearch/>.

- FED-STD-1037C Glossary of Telecommunications Terms
- MIL-PRF-29504B TERMINI, FIBER OPTIC CONNECTOR, REMOVABLE, GENERAL SPECIFICATION FOR
- MIL-PRF-29504/4D TERMINI, FIBER OPTIC, CONNECTOR, REMOVABLE, ENVIRONMENTAL RESISTING, PIN TERMINUS, SIZE 16, REAR RELEASE, MIL-DTL-38999, SERIES III
- MIL-PRF-29504/5D TERMINI, FIBER OPTIC, CONNECTOR, REMOVABLE, ENVIRONMENTAL RESISTING, SOCKET TERMINUS, SIZE 16, REAR RELEASE, MIL-DTL-38999, SERIES
- MIL-DTL-38999K CONNECTORS, ELECTRICAL, CIRCULAR, MINIATURE, HIGH DENSITY, QUICK DISCONNECT (BAYONET, THREADED, AND BREECH COUPLING), ENVIRONMENTAL RESISTANT, REMOVABLE CRIMP AND HERMETIC SOLDER CONTACTS GENERAL SPECIFICATION FOR

2.7 Aeronautical Radio, Inc. (ARINC) Publications

Available from Aeronautical Radio, Inc., 2551 Riva Road, Annapolis, Maryland 24101-7435, www.arinc.com

ARINC Report 805-1 Fiber Optic Test Procedures

ARINC Report 806 Fiber Optic Installation and Maintenance

2.8 Other Applicable References

Understanding Fiber Optics, Jeff Hecht, ISBN 0-13-956145-5

Fiber Optics Installer and Technician Guide, Bill Woodward, ISBN 0-7821-4390-3

3. HOW TO USE THIS DOCUMENT

This document is intended to be used as a guideline for all persons conducting aerospace fiber optics installer training. This training document is broken into 16 major categories. Each category contains detailed training competencies. The detailed training competencies describe the level of knowledge each student should have about that particular item.

1. INTRODUCTION TO AEROSPACE FIBER OPTICS

1.1 Explain the historical evolution of fiber optic technology

1.2 Explain the harsh environments of fiber optic technology in aeronautical and space applications

2. PRINCIPLES OF FIBER OPTIC TRANSMISSION

2.1 Describe the basic parts of a fiber optic link

2.2 Describe the basic operation of a fiber optic transmitter

2.3 Describe the basic operation of a fiber optic receiver

2.4 Describe how the decibel is used to compare relative power levels (dB)

2.5 Describe how the decibel is used to measure absolute power (dBm)

3. SAFETY AWARENESS

3.1 Explain personnel and platform safety issues including foreign object damage (FOD) and equipment damage

3.2 Describe the best practices associated with the safe handling of fiber materials and hand tools

3.3 Describe how to properly dispose of fiber optic waste

3.4 Explain how to properly handle hazardous materials and the purpose of a material safety data sheet (MSDS)

3.5 Describe emergency procedures

4. BASIC PRINCIPLES OF LIGHT

4.1 Compare wavelength and frequency, and demonstrate how to calculate one when the other is known

4.2 Explain light wave and light particle theory