

What is an F-16 EWIS?



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F-16 Technical Coordination Group (TCG)
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Agenda

Introduction of InterConnect Wiring

What is EWIS?

How is EWIS Similar to the Human Body Circulatory System?

History of EWIS

F-16 EWIS Structure

F-16 EWIS Types

F-16 EWIS Problems

Solving and Managing F-16 EWIS Problems

Contact Information

Introduction of InterConnect Wiring

- Founded: 1993 (28 Years Ago)
- Location: Fort Worth, Texas
- CAGE Code: 0WW63
- Employees: 150 Employees

Licensee of F-16 Electrical Products for
LOCKHEED MARTIN



- Facilities
 - 42,000 Square Feet Manufacturing & Administration
 - 250 Assembly Tables
- Manufacturer of F-16 Wiring Harnesses, Modification Kits and Electrical Panels
- The #1 F-16 Wiring Harness and Electrical Panel Company Worldwide!



What is EWIS?

Electrical Wiring Interconnect System



What parts make up the EWIS?

1. Wiring Harnesses
2. Electrical Panels
3. Clamps
4. Connectors
5. Wire
6. Backshells
7. Splices
8. Terminals
9. Contacts
10. Braid
11. Switches
12. Many Other Components

Aircraft electrical wiring should be viewed as a “System”.

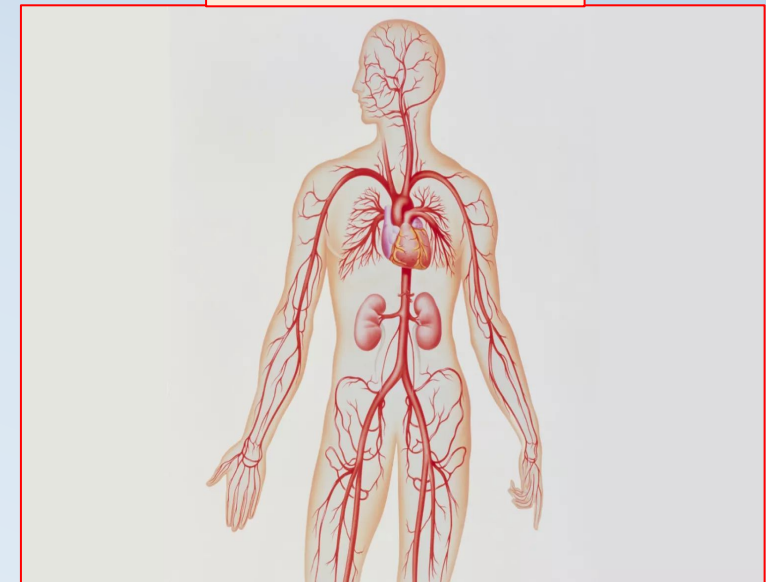
Other “Systems” include Communication, Navigation, Radar, Weapons, etc.



How is EWIS Similar to the Human Body Circulatory System?

- Human Body Has The Circulatory System, made up of Arteries and Veins.
 1. Veins Carry Blood to the Heart.
 2. Arteries Carry Blood Away from the Heart.
 3. The Condition of Veins and Arteries is *Extremely* Important to the Well-Being of a Human Body.
 - a. New Versus Old
 - b. Open Versus Blocked
 - c. Firm Versus Deteriorated Walls
- F-16 Body Has Electrical Wiring Interconnection System.
 1. Aircraft Wiring Similar to Veins and Arteries in Human Body.
 2. Aircraft Wiring is the Life-Blood of the Aircraft.
 3. The Condition of the EWIS is Extremely Important to the Well-Being of the F-16.
 - a. New Versus Old
 - b. Open Versus Blocked
 - c. Firm Versus Deteriorated Walls

Human Veins and Arteries



F-16 "Veins and Arteries"

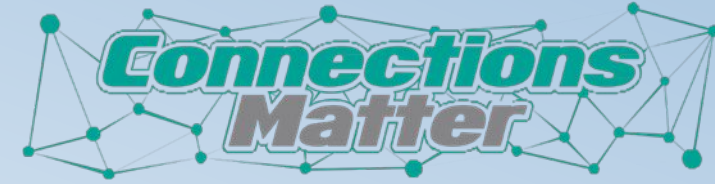


As important as a human body's veins and arteries: F-16 veins and arteries = the electrical wiring!

History of EWIS

- TWA Flight 800 (Boeing 747) crashed in 1996 due to wiring problems.
- Swissair Flight 111 (MD-11) crashed in 1998 due to wiring problems.
- Due to These Two Crashes:
 1. Aircraft Wiring Viewed as System (The EWIS System.)
 2. Safety Concerns About Wiring Systems in Airplanes Brought to Forefront of Public Attention
- Investigations of those accidents and later examinations of other airplanes showed a collection of common problems.
 1. Deteriorated Wiring
 2. Corrosion
 3. Improper Wire Installation and Repairs
 4. Contamination of Wire Bundles with metal shavings, dust, and fluids, which provides fuel for fire.

F-16 EWIS Structure



- Wiring Harness Break Down Information

No	Type	F-16 A Model	F-16 B Model
1	Trunk	195	208
2	Panel	79	97
3	Coax	43	48
4	Power Feeder	27	27
	Total	344	380
	Type	F-16 A Model	F-16 B Model
	Flight Control	32	34

- F-16 A Model (Block 15)

1. Wire Count: 14,418
2. Length: 77,442 feet
3. Miles: 14.7
4. Number of Conductors: 20,092

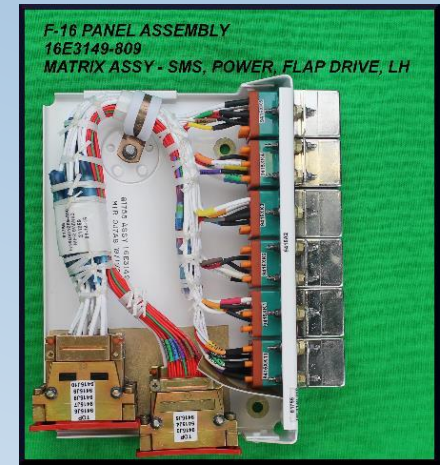
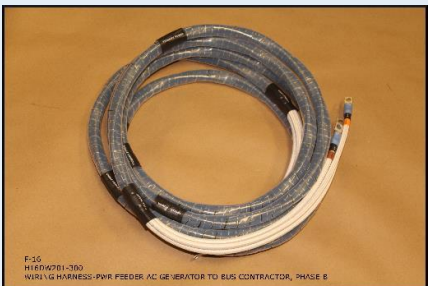
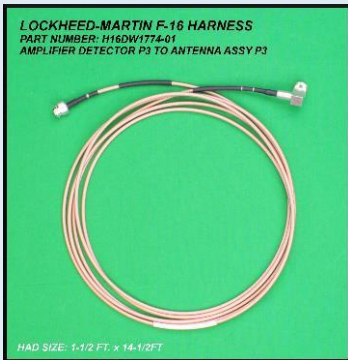
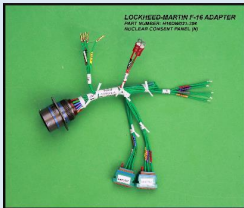
- F-16 B Model (Block 15)

1. Wire Count: 15,687
2. Length 77,121 feet
3. Miles: 14.7
4. Number of Conductors: 21,380



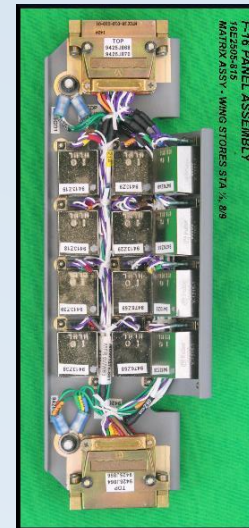
F-16 EWIS Harness Types:

1. Trunk Harness
2. Panel Harness
3. Coaxial (Coax / Radio Frequency)
4. Power Feeder



F-16 EWIS Panel Types:

1. Cockpit
2. Relay
3. Multiplex (Mux)
4. Power Distribution (Circuit Breaker)



F-16 EWIS Problems

1. F-16 Blocks 15, 30, 40, and 50 manufactured with Kapton insulated wiring.
2. Kapton has many documented problems.
3. The problems are much worse when the Kapton insulation is repeatedly flexed such as the wiring harnesses connected to the exterior 3308 panel.
4. Kapton degrades over time.
 - a. If nicks exist in the wire's insulation, then intermittent problems will result.
 - b. Arc-tracking is a huge issue, potentially resulting in fires.
 - c. These are major "Safety of Flight" Issues.
 - d. *Lockheed Martin* and *Hill AFB* have documented many instances, including numerous fires due to this problem.

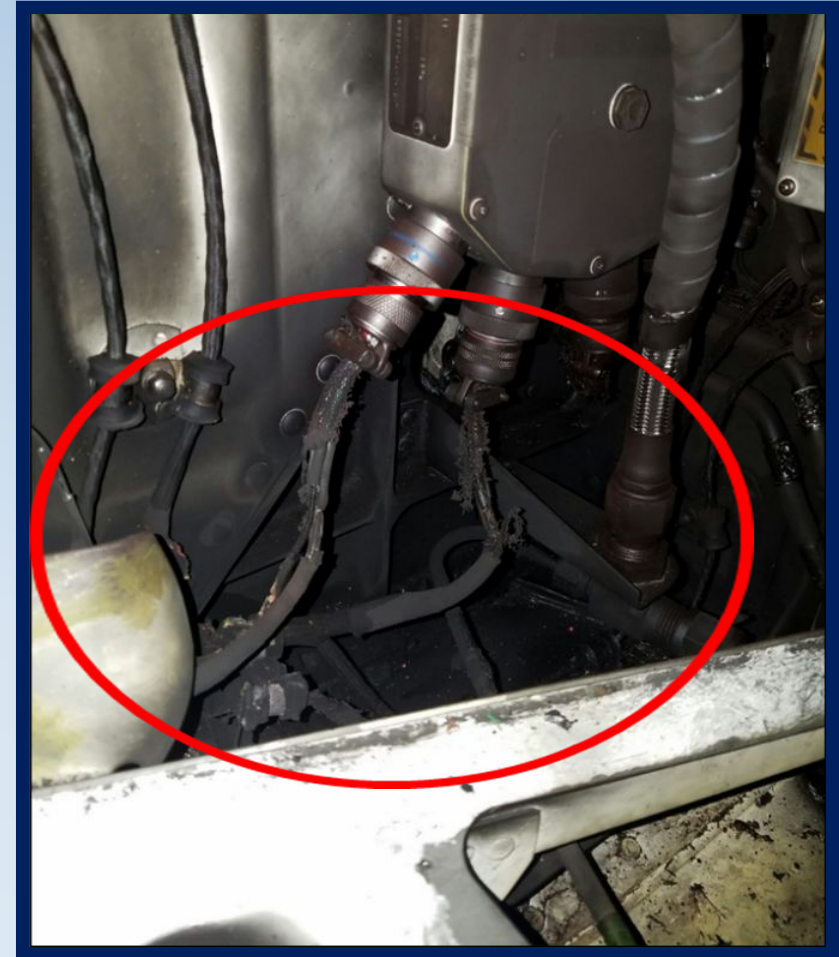
F-16 EWIS Problems (Continued)

- USAF 2019
 1. Number of USAF Aircraft That Caught Fire in 2019: 20
 2. Number of 2019 “Repeat Offender” Wiring Harnesses Burned: 4
 3. Number of 2019 Different Wiring Harnesses Burned: 20
- USAF 2020
 1. Number of USAF Aircraft That Caught Fire in 2020: At least 8
 2. Wiring Harnesses Burned: H16DW2602, H16DW2609, H16DW678-300, Centerline Pylon Adapter Harness, H16DW1716, H16DW684, H16DW2305, H16DW1712, H16DW1705, H16DW7725-602, H16DW2702
 3. Number of 2020 “Repeat Offender” Wiring Harnesses Burned: At least 2
- Impact
 1. Estimated Cost Impact Per Aircraft (Excluding Air Force Unit’s Downtime Cost: \$100,000)
 2. Manhours to Replace “Repeat Offender” Harnesses Alone: 160
 3. Downtime Per Aircraft: 22 Months

F-16 EWIS Problems (Continued)



F-16 EWIS Problems (Continued)



Solving and Managing F-16 EWIS Problems



1. Evaluation: Complete Analysis of Condition of Your Fleet's EWIS:

- a. Review Kapton throughout Aircraft
- b. Review Condition of the Wiring in the Seven (7) Main Areas of F-16:
 1. Forward Avionics
 2. Cockpit
 3. Mid Fuselage
 4. Engine Bay
 5. Landing Gear
 6. Wings
 7. Fuel Cell Area



2. Replacement Plan: Replace Wiring Harnesses with TKT Insulation for 7 Main Areas.

3. Management Going Forward: Continually Monitor and Test the Status of the EWIS System for the Life of the F-16.

Contact Information



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Final Quiz

Which phrase did you see randomly placed throughout this briefing?

What does it mean?



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