

AIRCRAFT WIRING PROGRAM STATUS REPORT

Rex Beach
Naval Air Warfare Center
Aircraft Division
Indianapolis, Indiana

56-33
107
p. 6

PROGRAM OVERVIEW

- NAWC AD Indianapolis is the technical arm for the NAVAIR Aircraft Wiring Program
- Primary Functions include:
 - Component Engineering
 - Qualification and Evaluation
 - Specification Development and Maintenance
 - Systems Engineering
 - Lead Maintenance Activity for Aircraft Wiring

Component Engineering Activities

General Activities:

Implementing Secretary of Defense Perry's initiatives on use of commercial specifications and standards for NAVAIR's aircraft wiring program

- Conversion of specifications to performance specification
- Cancellation and supersession of many critical military standards
- Technical input for DoD specifications and standards surveys being conducted by NAWC AD Lakehurst on all NAVAIR prepared specifications and standards

Establishing procedures for QPL/QML manufacturers to utilize SPC and inprocess data in lieu of endproduct QC testing

Establishing procedures to utilize ISO-9000 series or other appropriate commercial quality and reliability audit approvals as an alternative to military unique quality and reliability audit requirements (such as MIL-STD-790 and MIL-45208)

Evaluating other procedures to reduce costs of qualification and retention of qualification testing for manufacturers with superior process controls and quality systems

Component Engineering Activities

Wire and Cable Activities:

- Published MIL-W-22759/80-92 for PTFE/Polyimide insulated "hybrid" insulation wires
- Published MIL-STD-2223 test methods 3006 and 3007 for Dry and Wet Arc Track Propagation Resistance
- Beginning to reference MIL-STD-2223 for insulated wire test methods and MIL-C-29606 for stranded conductor requirements in military wire specifications
- Planning revisions of MIL-C-86485 filter line cable and MIL-W-22759 wiring specifications and working with the Air Force and DISC to update MIL-C-27500 aerospace cable specification
- Finalizing test report on Thermo-Gravimetric Analysis (TGA) as a possible means to determine temperature ratings on aerospace wires

Component Engineering Activities

Other Component Activities:

- Completed testing of metal/plastic composite connectors exposed to SO₂ Salt Spray
- Planning revisions of MIL-C-6015 circular and MIL-C-81659 rectangular connector specifications and MIL-C-85049 connector accessory specification
- Planning conversion of MIL-C-5909 thermal circuit breaker specification from QPL to QML
- Working with SAE-AERC1 to write a nongovernment standard with a military QPL for molded components

System Engineering Activities:

- Maintenance of MIL-W-5088 aerospace vehicle wiring installation specification
- Providing support for F18E/F program including wiring system inspections
- V-22 conventional and Organized Wiring System (OWS) support
- Joint Advanced Strike Technology (JAST) aircraft program OWS study
- Fiber optics support including F-22 and RAH-66 issues

Aircraft Wiring Lead Maintenance Activity:

Determining the extent of remaining insulation life for MIL-W-81381 polyimide insulated wires in many Navy aircraft including the S-3 Viking and EA-6B Prowler

Actively participating with the Naval Vehicle Wiring Action Group (NAVWAG)

- **Maintenance procedures to extend thermal circuit breaker life by cycling**
- **Developing portable heat guns for maintenance on fueled aircraft**
- **Evaluating wire marking systems (Excimer laser, Ink jet, hot stamp, etc...)**
- **Developing improved wire strippers for all wire types in Navy aircraft inventory**

Continuing to compile aircraft wiring maintenance data from Navy field activity databases. Wiring systems are one of the top systems for maintenance actions on most Navy and Marine aircraft.

NAVAIR/NASA Interface:

NAVAIR is the preparing activity of many specifications used by NASA. NASA is designated as a custodian of some NAVAIR specifications and standards and can submit essential comments

NAWC AD Indianapolis aircraft wiring program will continue to share knowledge and expertise with NASA and other agencies and contractors involved with space vehicle wiring

NAWC AD Indianapolis wiring component and installations specification writing and testing expertise can be utilized by other military or federal agencies or by commercial activities in support of government programs

Base Realignment and Closure (BRAC) Commission Recommendations:

NAWC AD Indianapolis has been recommended for closure by no later than 1999 by the BRAC Commission and the DoD; However

**Original recommendation is to move about 60 % of the jobs primarily to NSWC Crane, IN and secondarily to NAWC China Lake, CA and NAWC AD Patuxent River, MD
The BRAC Commission and local government are voicing strong support for a partial or full privatization plan that might keep many of the jobs after the closure at the same geographic site at Indianapolis**

It is anticipated the NAVAIR Aircraft Wiring Program will be an ongoing program under any of the various BRAC scenarios

The closure/move/privatization issue for NAWC AD Indianapolis may not be resolved for some time yet

NAWC AD INDIANAPOLIS
WIRING TEAM SPECIFICATIONS

SPECIFICATION	ITEM	REQUIRES QUALIFICATION BY NAWC	PROJECT AREA
MIL-STD-104	Insulation Color Limits		100
MIL-STD-704	Aircraft Electrical Power Characteristics		117
MIL-STD-1344	Connector Test Methods		101
MIL-STD-1646	Service Tools, connectors & contacts		102
MIL-STD-1651	Inserts M5015 & MS22992		103
MIL-STD-1653	Power Cable Assemblies		104
MIL-STD-1671	DC Power Connector Schematic		105
MIL-STD-1672	Connector, Umbilical, insert		106
MIL-STD-1674	Connector, Insert M85028		107
MIL-STD-2223	Wire Test Methods		116
MS3493	Connector Plug & Cap, ground		79
MIL-B-3990	Bearing, Roller, Needle, Airframe	Q	48
MIL-B-4523/14	Switch, Boot		113
MIL-C-5015	Circular Connector	Q	01
MIL-W-5086	Polyvinyl Chloride Insulated Electric Wire	Q	13
MIL-W-5088	Wiring, Aerospace Vehicle		53
WS5127	Backpanel (1-layer / .1 & 2 in. ctr)		66
MIL-F-5372	Fuse, Current Limiter Type, Aircraft	Q	23
MIL-F-5373	Fuseholder, Block Type, Aircraft	Q	49
MIL-S-5594	Toggle Switch		34
MIL-S-5676	Splicing, Cable Process		110
MIL-T-5683	Terminal, Tie Rod, Threaded		83
MIL-C-5756	Power Cable and Wire	Q	14
MIL-C-5809	Circuit Breaker	Q	35
MIL-B-6038	Bearing, Bellcrank (No QPL)		32
MIL-C-6100	Connector, Receptacle		84
MIL-R-6106	Electromagnetic Relay (Engineering only)		36
WS6118/6119	Wire Wrap/Process (.1 & .2 in. ctr)		67
MIL-W-6370	Wire, Antenna		85
MIL-N-6748	Nipple, Electrical Terminal		92
MIL-R-6749	Aircraft Power Rheostat		20
			21
			22
MIL-S-6852	Electric Conductor Splice		11
MIL-W-7072	Aluminum Electric Wire	Q	15
MIL-C-7078	Electric Cable, Aerospace (Canceled)		62
MIL-E-7080	Electric Equipment Selection		109
MIL-T-7099	Crimp Style Terminal	Q	09
			42
MIL-T-7928	Lug and Splice Terminal	Q	10
MIL-B-7940	Bearings, Ball, Airframe, Antifriction	Q	54
MIL-A-7965	Antenna, Components		86
MIL-C-7974	Cable Assemblies	Q	37
MIL-R-8903	Variable Resistor		24
MIL-B-8914	Bearing, Self Aligning	Q	56

SPECIFICATION	ITEM	REQUIRES QUALIFICATION BY NAWC	PROJECT AREA
MIL-B-8952	Bearing, Rod End	Q	40
			38
MS14135	Drawer Assembly, Rack Mounted		115
WS15660	Vertical Door Buses/connectors		68
MS17155-57, 72	Terminal Studs		82
MS18029	Cover Assembly for MS27212		76
MIL-F-21608	Shield Terminating/Ferrule	Q	12
MIL-C-22520	Crimping Tool, Terminal	Q	30
MIL-C-22529	Plastic Grommet (First Article)		25
WS22749	Backpanel (2-layer/ .1 in. ctr.)		65
MIL-W-22759	Fluoropolymer Insulated Electric Wire	Q	16
MIL-C-22909	Crimping Tool, Hydraulic		58
MIL-J-23013	Junction, Box		93
MIL-S-23053	Insulation Sleeving, Electrical Heat Shrinkable		111
MIL-S-23190	Cable Straps and Clamps	Q	26
MIL-W-25038	High Temperature Electrical Wire	Q	17
MS25064-67	Ferrule, Flexible conduit, RF & Accessories		73
MS25226	Link, Terminal Connecting		78
MIL-C-25516/24	Connector, Coaxial		94
MS27212	Terminal Board Assembly Molded-in Stud		77
MIL-C-28754	Electrical Modular Connectors	Q	61
MIL-C-28859	Electrical Backplane Connectors, Printed Wiring	Q	60
MIL-A-28870	Assemblies, Backplane	Q	74
MIL-C-29600	Connector, Composite Circular	Q	64
MIL-W-29606	Conductor, Stranded		114
MIL-C-38999	Circular Connector (Series 4)	Q	02
MIL-C-39029	Electrical Connector Contact	Q	04
MIL-T-55155/29-32	Terminal, Stud		75
MIL-W-81044	Electrical Wire	Q	18
			39
MIL-T-81306	Tools, Forming, for strap	Q	52
MIL-W-81381	Polyimide Insulated Electric Wire	Q	19
MIL-T-81490	Cable, Transmission Coaxial		108
MIL-C-81511	Circular High Density Connector	Q	05
MIL-M-81531	Marking of Electrical Insulation		88
MIL-C-83538	Connector, Umbilical, MIL-STD-1760	Q	112
MIL-I-81550	Insulating Compound, Silicon		95
MIL-S-81551	Switch, Toggle, Hermetic		55
MIL-C-81582	Bayonet Coupling Electrical Connector	Q	06
MIL-M-81594	Hot Stamp Printing Foil		27
MIL-S-81619	Switch, Solid State Transducer		89
MIL-C-81659	Rectangular Electrical Connector	Q	07
MIL-C-81703	Circular Electrical Connector	Q	08
MIL-T-81714	Terminal Junction System	Q	29
MIL-I-81765	Insulating, Molded, Heat Shrink		90
MIL-C-81790	Aircraft External Power Connector	Q	41

SPECIFICATION	ITEM	REQUIRES QUALIFICATION BY NAWC	PROJECT AREA
MIL-W-81822	Solderless Wrap Wire (First Article)		63
MIL-S-81824	Environmental Splice	Q	45
MIL-T-81914(AS)	Tubing, Plastic		81
MIL-I-81969	Tool, Installing & Removal	Q	43
MIL-C-83413/4, /5, /8	Connectors & Assemblies, Electrical, Aircraft Grounding	Q	33
MIL-T-83507	Tool Kit		46
MIL-C-85028	Rectangular Electrical Connector		28
DoD-C-85045	Fiber Optic Cable		31
MIL-C-85049	Connector Accessory	Q	44
MIL-I-85080/2	Insulation Sleeve, Non-heat		96
MIL-S-85242	Switch, Stepping		91
MIL-C-85485	Cable, Filter Line	Q	51
MIL-S-83519	Shield Termination, Solder Type	Q	57
MIL-C-85528	Connector Mounting Device (Canceled)		03
MIL-F-85731	Fastener, Positive Locking	Q	59
MIL-S-85848	Sleeving For ID Mark, Heat Shrink		80
#2465230	Ribbon Cable		71
#3202740	Connector (Type II-Type II)		70
#5932026	Laminated Bus Bar		69
	Special Evaluations (Non-QPL Work)		50
	Special Evaluations (Trident)		72
			47
			87
			97
			98
			99