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E-BOOK SERIES

Introduction to Aircraft Wiring Harness Diagrams, Engineering Design, and Disconnects

Written By:

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April 23, 2019

InterConnect's Why: Why Do We Do What We Do? Because the only thing better than saving a project in danger is doing it right in the first place!

Start with InterConnect.

A publication of InterConnect Wiring.

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Introduction

Introduction to Aircraft Wiring Harness Diagrams, Engineering Design, and Disconnects

This eBook is the 8th in a series developed by InterConnect Wiring. It aims to provide engineering and technical personnel unfamiliar with wiring harness design insight into some of the process steps required to design an Electrical Wiring Interconnect System (EWIS) for combat aircraft such as the F-15 or F-16 as well as air vehicles like the UH-60.

For many years EWIS design was almost an afterthought. It was pieced together at the last minute after the structural and system designs were completed. Wiring was often installed using a "just make it work" approach. But modern tactical aircraft systems are more and more dependent on the EWIS, and its reliability can be as important as the aircraft structure itself. This eBook presents some important concepts regarding the process for designing a modern, maintainable EWIS.

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Chapter 1

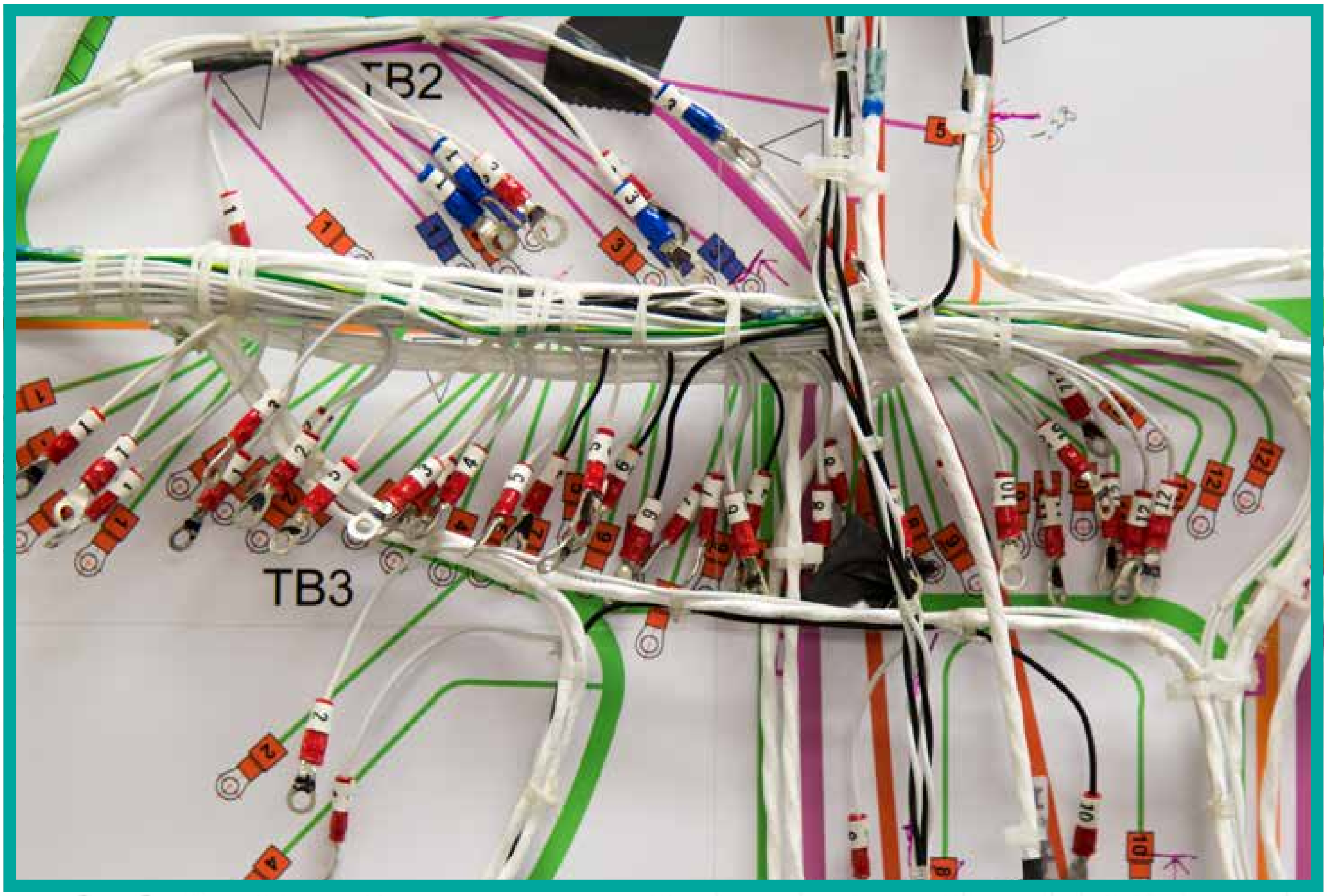
WIRING DIAGRAMS

What is a wiring diagram?

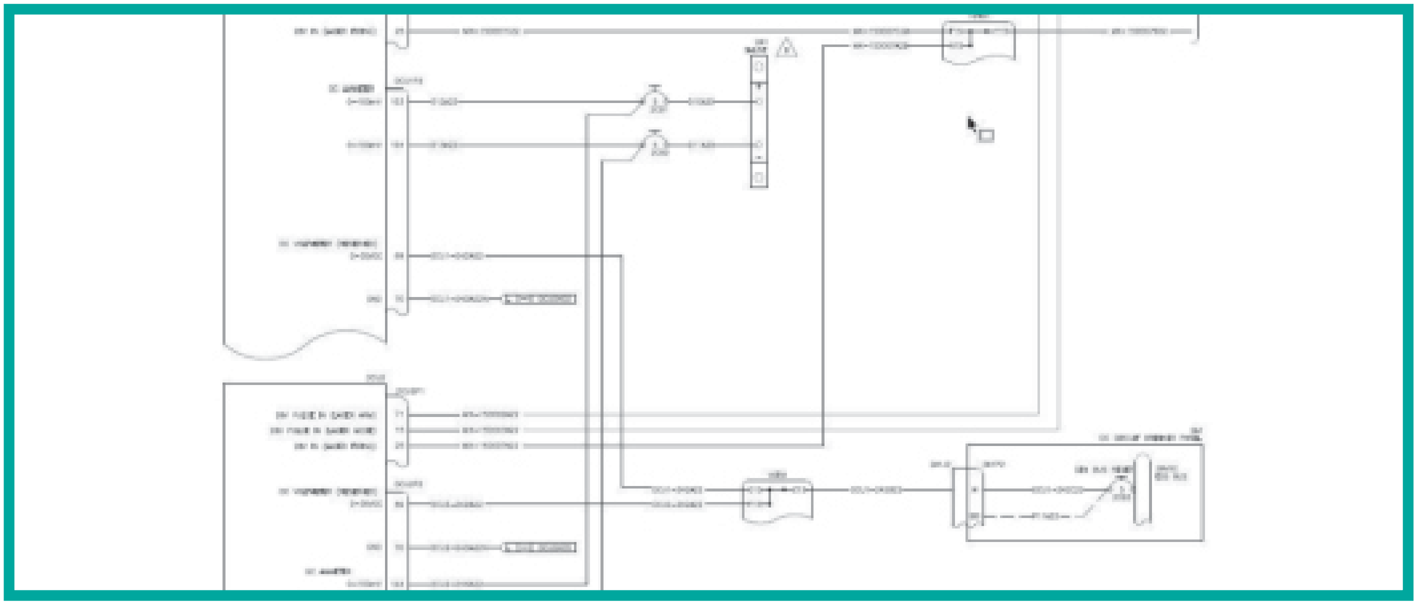
A wiring diagram is a simplified conventional pictorial representation of the physical connections and physical layout of an electrical system or circuit. Wiring diagrams show how the aircraft wires are connected and where they should be located in the electrical system, as well as the physical connections between all the components. This makes a wiring diagram useful in manufacturing or troubleshooting an electrical system or circuit for various aircraft including the F-16, F-15, V-22, and UH-60.

The difference between a wiring diagram and schematic is the schematic only shows the plan and function for an electrical circuit, but is not concerned with the physical layout of the wires.

At InterConnect Wiring, we frequently use wiring diagrams to generate a Routing List (a point-to-point termination database). Once the terminations are in a database format we can extract Reference Designator Lists, Work Instructions for assembly, Batch Files for laser wire and Ref Des ID marking as well as many other valuable pieces of aircraft electrical harness and circuit breaker production data.



What is a system diagram and how is it used during wiring harness design?



A system wiring diagram is exactly what it sounds like – a diagram of the wiring required for a system. During the design phase of any aircraft, a wiring diagram is developed to show how the electrical wires are interconnected between the various components in each system. Modern combat aircraft like the F-16, F-22, F-35, UH-60, V-22 and many others, contain hundreds of "systems". A system is a collection of components designed to perform a specific task such as Landing Gear, Flight Control, Weapons, Environmental Control, etc.

A system wiring diagram (example shown above) forms the starting point for harness design because it contains the signal paths and at least some information about the wire types (such as wire gauge) necessary to electrically connect components in the aircraft. In more advanced engineering systems, the wiring data from the diagram is linked to a database. This database can then be merged with other data such as the 3D airframe model within a harness design software package. The wiring harness designers then use this data in consultation with mechanical/structural engineers to determine acceptable routing paths inside the airframe. Once these paths are determined, the wires in the system wiring diagram can be "routed" and the harness geometry determined. Since system components are located all over the aircraft, an airframe wiring harness will nearly always contain wires from multiple systems.

If you have any questions about a wiring diagram or system harness design, please contact us.

What is an equipment location diagram and how is it used during wiring harness design?

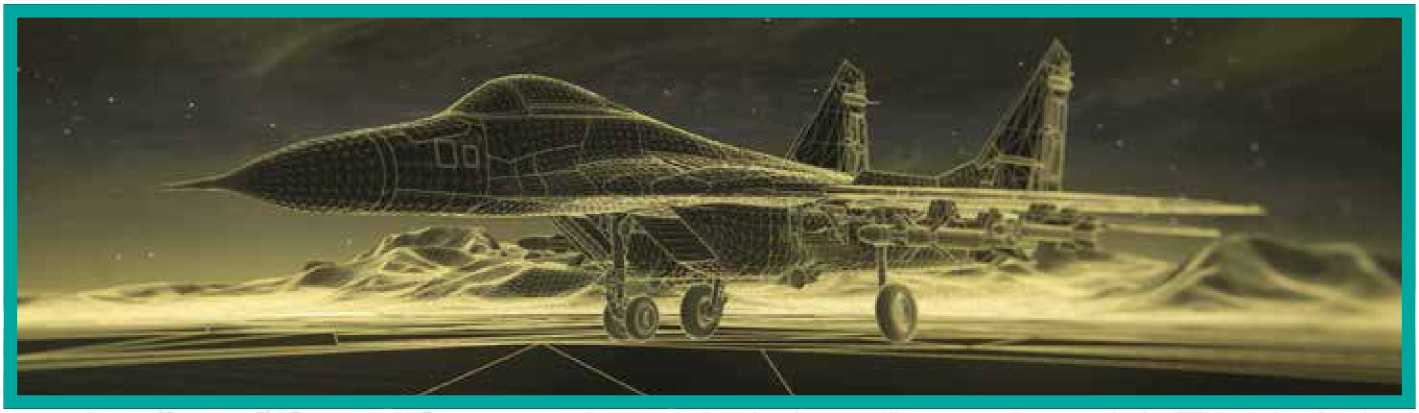
In the Aerospace Industry an equipment location diagram details the physical location of equipment installed in an aircraft. These diagrams typically show the location of equipment with respect to an aircraft (station) coordinate system. Did you know that this XYZ system was originally developed for boats and is comprised of a fuselage station (X-axis), water line station (Z-axis), and butt line station (Y-axis)? Modern combat aircraft like the F-16, F-22, F-35, F-15, UH-60, and V-22 contain multiple systems, and each of those systems necessitate the use of an equipment location diagram. A system is a collection of components designed to perform a specific task such as Landing Gear, Hydraulics, Weapons, Lighting, etc.

An equipment location diagram is critical for harness design because combined with airframe data, it helps establish the harness geometry necessary to electrically connect components in the aircraft. In today's advanced engineering systems, the airframe and equipment data will be stored as a 3D model within a harness design software package. The harness designers then use this data in consultation with mechanical/structural engineers to determine acceptable routing paths inside the airframe. These routing paths along with the electrical wiring diagrams for each system can then be used to develop the data for each harness that will be installed in the aircraft.

At InterConnect Wiring we have invested in and utilize various harness design software including Solid Works, Catia, Enovia, HarnesSys, AutoCad, and CEEDS (Common Electrical Electronic Data System) as it relates to schematics, wiring diagrams and harness assemblies. If desired, InterConnect can create preliminary block diagrams, wiring diagrams and detailed cable assembly "Product Definition Packages" (PDPs) using SAE AS50881 and proven practices. In other words, using system level functional architecture and input from system information, InterConnect Wiring can develop interface block and wiring diagrams to be used to produce cable assembly BTP (Build to Print) packages.

After InterConnect develops the BTP package, our highly experienced assemblers can then assemble the wiring harnesses or cable assemblies as required for your aircraft.

CONTACT US to receive more information or a quotation.



Chapter 2

WIRING HARNESS DESIGN

What is SAE-AS50881 and how does it relate to wiring harness design?

Over the years InterConnect has seen many different companies call-out 'SAE-AS50881' as the standard for manufacturing wiring harnesses. When InterConnect's engineers and planners see this note they get a smile on their faces and chuckle because SAE-AS50881 is not a standard for manufacturing wiring harnesses. This specification does relate to wiring harnesses, but it is not as a manufacturing standard. So, what is SAE-AS50881? Glad you asked…

SAE-AS50881 is an abbreviated name. It really stands for 'Society of Automotive Engineers (or SAE) Aerospace Standard (or AS) number 50881'. So why does this standard mix automotive design and aerospace design? That is an interesting story. SAE-AS50881 originally was a military standard called MIL-W-5088. The MIL-W-5088 title was "Wiring, Aerospace Vehicle". About 25 years ago, the US military decided to reduce the number of military standards. They preferred to go to commercial standards which used former military standards as a basis for new designs. At that time, the US Navy controlled the military standards. The US Navy had a large organization to write, release, and update military standards. To save money, the US military started finding organizations to take over and control standards while still allowing military personnel to be involved. This is what happened to MIL-W-5088. Back on December 9, 1992, MIL-W-5088 was transferred to SAE-AS50881 and the organization that controlled it was the Society of Automotive Engineers.

Now that you know this story, for the remainder of this blog we will omit the SAE part of the name and just call it AS50881. People who have not read it or are unfamiliar with it think it is a wiring harness manufacturing standard because of its title, however it is not. AS50881 is a standard that mostly describes design requirements (especially) for installation of wiring harnesses into military aircraft. Besides installation requirements, AS50881 also provides the methodology for deciding on wire numbers for every wire throughout an aircraft. Soon, InterConnect will release a blog that will discuss aircraft wire number methodology.

Feel free to read AS50881 anytime, however, if you want standards that address manufacturing and repair of aerospace wiring harnesses, InterConnect recommends the following:

IPC/WHMA-A-620: Requirements and Acceptance for Cable and Wire Harness Assemblies
IPC-A-610: Acceptability of Electronic Assemblies
IPC J-STD-001: Requirements for Soldered Electrical and Electronic Assemblies
NAVAIR 01-1A-505-1: Harness Installation and Repair Practices for Aircraft Electric and Electronic Wiring.

This standard is a combination of the former US Navy standard with the same name as well as the former US Air Force Standard T.O. 01-1A-14 and former US Army standard TM 1-1500-323-24-1.

InterConnect manufactures our wiring harnesses to these standards as well as standards developed by large aerospace design companies such as: Lockheed Martin, Boeing, Airbus, BAE, Northrop Grumman, Honeywell, Sikorsky, Bell, and L3.

What do wiring harness design engineers want in a software package?

Well obviously, Everything!

But what exactly is "Everything"?

Modern military aircraft like the F-16, F-22, UH-60, C-130, B-1B and F-35 are all designed either fully or partially using 3D CAD models. In the case of the F-35, an even more complex approach was taken from the onset – the creation of a "digital twin". Basically, a fully modeled 3D "twin" of the actual physical aircraft.

So, what does this have to do with wiring harness design software? The answer is, A LOT. Wiring harness design is one of the few areas where disparate data must be pulled together to generate a "digital twin". In the case of wiring harnesses, or more correctly, the Electrical Wiring Interconnect System (EWIS), the two main datasets are (1) the electrical wiring required to connect the equipment together, and (2) the physical aircraft structure that the wiring must route through. Below is a basic list of desired data and features:

1. Electrical design data such as signals, signal type, load, function and EMI sensitivity.
2. Wiring data such as conductor types, connector part numbers, connector pinouts including shield terminations, and reference designators.
3. A 3D model of the aircraft structure and equipment, with acceptable wire routing paths identified.
4. Environmental, vibration and EMI data for the routing paths (needed to ensure the harnesses are designed to function in the areas they are routed).
5. A software tool the designer can use to route the wiring harnesses in the airframe, assign clamping stations, disconnects, equipment mounting structures, etc. This is the most difficult function to achieve as electrical and structural data must be merged.
6. A software tool the designer can use to "flatten" the routed wiring harness into a 2D configuration so it can be manufactured.

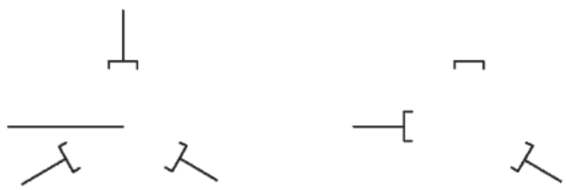
Fortunately, InterConnect Wiring engineers are experts on all the above aspects, so if you have any questions about software packages for wiring harness design and EWIS, please contact us.

Why is connector polarization important in wiring harness design?

When designing aircraft wiring harnesses, or, in fact, any wiring harness, the main purpose of a wiring harness is to transmit signals or electrical power between components in a system. However, this cannot be achieved unless the wiring harness can physically connect to these components. There are several ways to make these connections but probably the most common is the mating of two connectors.

One of the characteristics of an electrical connector is called its "polarization". During manufacturing, a connector is polarized by fabricating a series of keys around the perimeter of the insert in a specific pattern according to its polarization designator. Therefore, two connectors will not be able to mate unless their polarizations are the same and the keys line up.

Let us consider two connectors that are built exactly the same except that one has polarization designator "A" – all the keys are 120 degrees apart and the other has polarization designator "B" – one of the keys is 120 degrees from the main key and the other is 270 degrees from the main key. Refer to image below.



Now let us suppose we are designing a wiring harness for a customer that needs to connect an amplifier in their audio system to a left and a right speaker as in the example shown below.

The customer wants to use the same part number for the connectors at reference designator (ref des) P1 and P2 but they also want to make sure that the signals from the amplifier go to the correct speaker. In order to achieve this they install the connector with polarization "A" at P1 and the same connector except with polarization "B" at ref des P2. The connector installed at ref des P3 will not be a factor since it is a totally different size and shape than those installed at ref des P1 and P2 and will be located several feet away.

The InterConnect wiring harness design that connects the customer's amplifier to its speakers might look something like the drawing below in red.

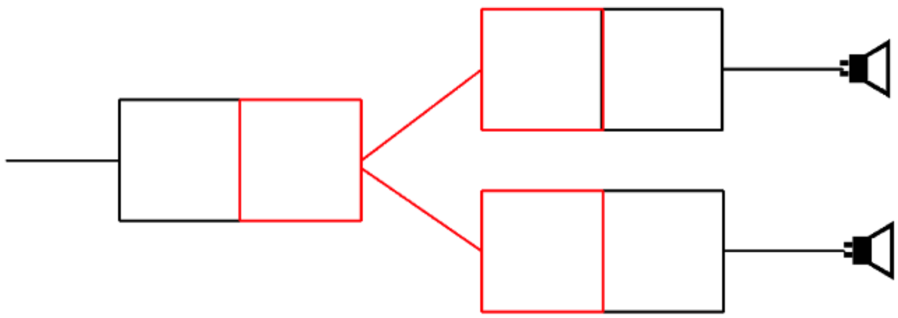
Why is connector polarization important in wiring harness design? (continued)

When one designs the wiring harness it is very important to pay close attention to the polarization designator in the part number of the connector when choosing the part number for the mating connectors. Often, the only difference between these part numbers is one letter!

Suppose we assign the connector with polarization "B" to be installed at ref des J1 instead of the connector with polarization "A". Now when the customer tries to mate our harness with their product they will not be able to connect any of the speakers. They may also damage the connectors trying to mate them.

There could be any number of reasons why the customer chooses to use connectors with different polarizations in their systems. It is up to InterConnect, as the wiring harness designer, to choose the mating connector with the correct polarization to make sure the customer is satisfied with the results.

InterConnect prides itself of wiring harness design and our engineering department. If you would like assistance designing your aircraft wiring harnesses, please let us know.



Four methods to separate flight control wiring harnesses in an aircraft.

The F-16 like many aircraft is a "fly by wire" aircraft. Instead of cables and pulleys, the aircraft is controlled by electrical signals. The electrical signals tell the flight control surfaces how to move and how fast to move. There are 5 flight control surfaces on the F-16: (1) leading edge flap, (2) trailing edge flaps (also called flaperons), (3) horizontal tail (also called a taileron), (4) rudder (also called a vertical tail), and (5) speed brakes. Each of these structures move during flight and thus control the F-16. Actuators are attached to the light control surfaces to move them in-flight. Actuators receive electrical signals (instead of cables and pulleys). The electrical signals are sent from computers (and the pilot) via electrical wiring harnesses. Thus, the wiring harnesses are important and play a huge role in the safety of the aircraft. The wiring harnesses that contain these electrical signals are called "Flight Control Wiring Harnesses".

The F-16 has a quad-redundant flight control system. So, what does quad redundant mean? Quad redundant means that there are four different systems (labeled A, B, C, and D) which work together to maneuver the aircraft in-flight. Each of these systems are designed to work independently from one another. The wiring harnesses that contain A system wires are purposely separated from the other three systems (B, C, and D) so that if one of the systems has a problem (such as a short circuit or fire) it will not affect the other ones. Altogether there are four methods to separate these signals. The four methods of separations are by: (1) wiring harness bundles, (2) cable clamps, (3) installation paths, and (4) connectors.

The first method of separation is by wiring harness bundles. What this means is that the wires for the A system should not be included in the same bundle as the B, C, or D system. Likewise, the B system wires should not be in the C, D, or A. Each wire in the four systems should be in their own wiring harness bundle.

The second method is to separate by cable clamps. When flight control wiring harnesses are installed they are held in-place inside the airframe using cable clamps and standoffs. To help maintain separation between the four redundant systems, different cable clamps should be used for each system. In most cases, the distance between cable clamps is ½ inch or so but at least there is some distance between cable clamps.

The third method is to separate by installation paths. This is like the second method but in this method, the bundles for each system should be separate from one another. In most cases, the wiring harnesses for each system are run parallel to one another and are separated by at least ½ inch. The wiring harness bundles should not touch one another.

The fourth and final method is separation by a connector. What this means is that the wires from the A system should not go into the same connector that has a B, C, or D wire. Each connector that has flight control wiring should only have one system in it. If there is a computer that needs signals from each of the four systems, there should be four different connectors to that computer. Neither A, B, C, nor D wires should go into the same connector.

In truth, it is difficult to use these four methods throughout an aircraft because of space constraints. These methods are "best design and installation practices". They should be adopted as best that they can in all fly by wire aircraft.

If you would like more information about separation of flight control wiring harnesses, please let us know.

Additionally, if you are curious to find out how many flight control wiring harnesses there are in an F-16, please read this blog.

How far should flight control wiring be separated?

Many considerations go into determining how to route wiring inside of an aircraft. Each system's wiring must be routed separately to maintain control of the vehicle under normal and emergency conditions. Flight control wiring should be kept separate from all firing and control circuits associated with ordnance and explosive subsystems. Control wiring passing through high-temperature areas must be properly shielded and insulated to prevent damage.

Flight control wiring should be separated from other wiring harness bundles (and properly clamped) a minimum of 0.5 inches. This separation is maintained throughout the entire range of motion in areas containing moving parts to prevent possible damage or loss of control systems.

Flight control wires should be kept separate from wires and cables carrying heavy current loads and their associated aircraft Electrical Wiring Interconnect System (EWIS) components. Physical separation and electrical isolation are necessary to prevent damage or interference under normal and fault conditions.

Reference "Wiring, Aerospace Vehicle" document number AS50881 for more details. This specification covers all aspects of wiring aerospace vehicles, from the selection to the installation of wiring and wiring devices. Aerospace vehicles include airplanes, helicopters, lighter-than-air vehicles, and missiles.

To learn more about AS50881, read this article

When designing your aircraft's EWIS, don't forget to separate your flight control wiring. To learn more about flight control systems in aircraft, refer to, "Four Methods To Separate Flight Control Wiring Harnesses In An Aircraft" or call InterConnect Wiring at +1.817.377.WIRE [9473].

13 ways to design a wiring harness poorly for manufacturability.

So, you want to design a wiring harness. Here at InterConnect Wiring, we have had the pleasure of not only designing aircraft wiring harnesses for our customers, but also seeing thousands of other companies' Build-To-Print (BTP) wiring harness drawing packages. As expected, we have seen some really good drawings & designs and frankly, some really bad ones, which has prompted me to write this article.

As the General Manager of InterConnect Wiring and having been here for most of the 25+ years our company has been in business, I know exactly what a company should and should not do when they create wiring harness drawings. It is important to keep some considerations in mind during the planning phase. Here is a list of the Top 13 things to do **TO POORLY DESIGN A WIRING HARNESS:**

1. Make a Harness Assembly Drawing (HAD) requiring a table more than 4 feet wide. (Assemblers cannot reach the middle of the table to do terminations.)
2. Create a wire bundle too large to fit through the backshell opening.
3. Make one splice location for multiple splices; not staggering the splices.
4. Have splice locations on the drawing that are too small. (Engineering requirements make it impossible to stagger splices in a small area.)
5. Make Reference Designators too close together.
6. Make Reference Designator breakouts too short. (Assemblers cannot terminate solder sleeves or splices without removing wire ID's.)
7. Make your HAD have a small line but require a huge number of wires. (If many small lines are close to each another then the bundles lay on top of one another.)
8. Have too many daisy chains in an area.
9. Don't accommodate for the bend radius of wires in larger bundles.
10. Stack round connectors on top of each other.
11. Use contacts with pins for a socket connector and socket contacts for a pin connector.
12. Make your braid stops too close to the backshell prohibiting the use of insertion and extraction tools.
13. Use parts and materials that do not have the ability to function satisfactorily in the environments to be encountered.

If you do the above on your wiring harness design engineering drawings, I guarantee, you will make the harness unable to be manufactured. I realize that the intelligent, well-versed engineer will read the 13 items above and say, "This is crazy. No one would really do those things!" Unfortunately, I have to say, yes, they do. It is important to take the time to think about reasonable manufacturability before releasing a drawing for a wiring harness. I promised you, the people reading the drawings and especially assembling them will thank you.

If you desire a quote from InterConnect to design your wiring harness or use your BTP to manufacture your wiring harnesses, please complete this form.

Chapter 3

AIRCRAFT WIRING DISCONNECTS

What are disconnects and why do aircraft have them?

A question I get asked often is "How many electrical wiring harnesses are in a single F-16?" The exact number is dependent on when the F-16 was assembled and what country is flying the F-16. So, what does that have to do with disconnects? It has to do with aircraft maintenance and safety. The more disconnects within the aircraft, the easier it is to replace the harnesses and equipment inside the aircraft.

An aircraft is broken up into many sections. It may be composed of the forward section, the aft section, the cockpit, the fuselage, the wings, the landing gear, the engine, etc. Every section of the plane connects to at least one or more sections. Instead of having holes with wires everywhere, connectors are placed in the firewalls or bulkheads of the aircraft to provide connecting points. It is similar to electrical plugs and phone plugs in your homes and offices.

At the end of 2015, InterConnect Wiring was asked by a company to get them out of a jam. They had a contract to deliver 2 aircraft per month to their customer. This company was installing the wiring in the aircraft a single wire at a time. Working 24 hours per day, 7 days a week, they could wire one aircraft every 6 – 8 weeks. This did not meet their tight schedule. InterConnect sent a team in to design and then build electrical wiring harnesses that allowed them to meet their schedule.

InterConnect designed the wiring harnesses based on the aircraft wiring diagrams and maintenance desires of the customer. Harnesses were taken from the main components to different firewalls and areas within the aircraft. The customer wanted to be able to perform quick maintenance by pulling out a wiring harness or line replaceable unit (LRU) and swapping it. Can you imagine the aircraft without any disconnects? Maintenance performed would require the removal of all of the wires in a section or perhaps the entire aircraft. Talk about your maintenance nightmare!

To put it in layman's terms, it would be like having to replace all the wiring in your house or office whenever your computer or computer cord became defective. That sounds preposterous, but that is what aircraft maintenance would be without disconnects.

By the way, the answer to the question I mentioned at the beginning of this blog is, "On average, there are approximately 300 wiring harnesses in an F-16 aircraft, and InterConnect has the ability to supply each and every one."

How should signal types be separated when designing aircraft disconnects?

Modern combat aircraft like the F-16, F-18, F-22, F-35 (and some newer F-15's) are all fly-by-wire aircraft. This means loss or degradation of the electrical system could result in the pilot being unable to control the aircraft even if the propulsion system is still operable. This makes it very important that the Electrical Wiring Interconnect System (EWIS) design is robust and resistant to: 1) crosstalk, 2) common mode failures, 3) EMI, and 4) environmental and maintenance hazards.

Typically EWIS design criteria require wiring to be routed in the airframe to mitigate these issues, but what happens when a disconnect is needed? Competing for bulkhead space, weight and structural considerations often means disconnects are congested with many types of signals from a multitude of systems. Here are some guidelines:

1. Redundant signals still have to remain separated. To reduce the number of disconnects, this may require the use of connectors that contain more than one contact size within the same connector.
2. If redundant signals can't be routed through separate disconnects, keep them as far from each other in the connector as possible so that an overcurrent event is less likely to affect more than one of the signals.
3. In general, power carrying conductors should be routed through different disconnects than data or other low-level signals.
4. For power circuits, try to keep "like" signals (low power vs high power, AC vs DC, etc) routed together.
5. Try to keep data signals with similar EMI and RFI sensitivity in the same disconnect. Keep Ground shields on each side of the disconnect; either through the connector backshell or a ground point on the airframe. Avoid running shield conductors through the connector pins if possible.
6. Signals known to have a sensitivity to electromagnetic or RFI coupling should also be run in separate connectors, or sufficiently shielded/grounded/separated in the disconnect pinout as much as possible.

Should you have any further questions, please contact InterConnect Wiring at 817.377.WIRE (9473).

How many empty contact cavities should a disconnect have?

Connectors are used on electrical wiring harnesses or panels… and installed in aircraft. Connectors can be round (e.g. D38999 Series), flat (e.g. 16VE0490 Series) or rectangular (e.g. M83733 Series). They're used to permit connection or disconnection of single or multiple electric circuits to facilitate communication, control, calibration, troubleshooting, replacement of parts and equipment. Connectors have various contact cavity configurations and designs. Solder type connectors come with pre-molded contacts and complete environmental sealing – this type of connector does not have empty cavities. Crimp type connectors come with empty cavities and accept crimp type contacts. To prevent moisture, dirt, etc. from entering the back of the connector (which can result in an electrical problem) all unused cavities should not be left empty. Connector contact cavities should always have filler plugs installed. Additionally, filler contacts (a contact with no wire crimped inside it) can also be installed. Filler contacts can make future installation of added wires easier because the contact is already in the connector, hence, the user doesn't have to research and locate the correct contact size and part number.

Question: How Many Empty Contacts Cavities Should a Disconnect Have?

Answer: None.

For more information about Contact Cavities, please see our blog: What is a Contact Cavity? For more information about Aircraft Disconnects, please see our blog: What are disconnects and why do aircraft have them?

Factors to consider when choosing backshell disconnects.

The process for choosing the correct backshell at an electrical component or disconnect whether it be for the F-16, F-15, F-22, B1-B, Cobra, Huey, or any new aircraft, follow the same basic guidelines.

The key to successful backshell selection begins with identifying the application. To do this, a complete description of the backshell's intended use is required. The more complex the application, the more detailed the questions become.

The following are basic application requirements:

- Connector type; size and shape
- Cable or wire bundle diameter, including detailed description of cable make-up
- Environment of intended use
- Performance required; strain-relief, water-tight, moisture-resistant, shield termination, working room, repairable, potted or molded, light, medium or heavy duty product performance per MIL-C-85049 or a MS product required
- Shielding requirements

Using the following information as a guide will help determine the correct backshell for the application.

Environmental: Will be used where harsh environment will be present (e.g. dust, dirt, moisture, fluids, salt, temperature extremes.) Most common military specification cylindrical connectors are designed so that they will be environmentally sealed once the backshell or strain relief is secured.

Non-Environmental: Will be used where no harsh environment will be present. Suitable for an inside the box/climate-controlled room application or where there is a requirement for additional space between the rear of the connector and the strain relief to allow for cable service loops, jumping, filter networks, etc. Size, shape or cable routing restrictions.

Environmental EMI/RFI: Will be used in a harsh environment susceptible to the reception of Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI). EMIs and RFIs originate from coils, electromagnets, electric motors, transformers, fluorescent lighting, high power radar, broadcast stations and other communications circuits.

Non-Environmental EMI/RFI: Will be used in an area susceptible to the reception of EMI and RFI where no harsh environment will be present.

InterConnect has designed wiring harnesses for various aircraft. If you want to learn more about backshells and aircraft disconnects, refer to this article, "How Should Signal Types Be Separated When Designing Aircraft Disconnects?" For more information about InterConnect designing your aircraft wiring, Contact Us and we will initiate an NDA.

What are connector disconnects and why are they needed?

There are many types of Connector Disconnects in use today in the aircraft industry, from blade to plug and socket. From here they split into even more types based on their class, size, contact arrangement number and style. Depending on the combination of these variations, they can effectively send and receive data, signals and voltages without interference from EMI and RFI sources, vibrations, moisture, heat and other environmental and mechanical conditions.

Aircraft today are made up of hundreds of electrical systems and subsystems traveling from wing tip to wing tip and nose to tail. These Connector Disconnects allow for ease of installation. Can you imagine stringing one wire at a time from wing to wing and tip to tail? What a huge hassle! Using a connector disconnect during installation, modification, replacement, or repair of the aircraft electrical wiring interconnect system (EWIS) substantially decreases aircraft "down time". Additionally, connector disconnects for the EWIS as well as subsystems or components not only allow work to be done expeditiously, but they also maintain the integrity of the data, signals and voltages traveling through them.

To learn more about EWIS, you can check out this site. To learn more about Disconnects check out this article.

THANK YOU

A publication of InterConnect Wiring.

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