



Volume XXVIII, Number 2

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Notice

The material in *Plane Talk*® is meant only as general information. In all cases no maintenance action published in *Plane Talk*® should be taken that is not in consonance with your particular company's operating and maintenance procedures, your approved maintenance manuals, or your certification agency's directives.

<http://www.aviation-ia.com/amc/>



2017 MMC

Mechanical Maintenance Conference

ARINC Industry Activities invites you to the Mechanical Maintenance Conference (MMC). Building on the successful model of the AMC, the MMC is dedicated to all things not avionics (mostly).

The MMC welcomes discussion items from the aircraft ATA Chapters, plus three additional topics:

- Maintenance Philosophy
- Test Systems
- Ground Servicing Equipment and Tooling

For those of you who have attended the AMC, share your experiences with your peers and colleagues that do not work on avionics or electrical systems.

The success of the AMC open forum to discuss chronic or difficult engineering and maintenance topics will finally be available to the rest of the aircraft systems.

The industry has asked for this, so please spread the word. Make the first MMC the best conference ever!

2017 MMC
Plan Now!
November 7-9
Cleveland, Ohio

**2017 MMC
November 7-9
Cleveland, Ohio**



**InterContinental Hotel Cleveland
9801 Carnegie Avenue
Cleveland, Ohio 44106
tel +1 216 707-4100**

*"It's your
conference, it's
what you make
of it!"
-R.S. Goldberg*





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MMC Symposium — (PMA) Parts Manufacturing Approval

The MMC will hold a Technology Symposium on Wednesday, November 8, 2017, at 1520 hours. The symposium will be moderated by an airline representative.

PMA is the Way of Life: PMA is Here to Stay!

Moderator: Marijan Jozic KLM Royal Dutch Airlines

Speakers: Mike Rennick Delta Air Lines
 Ian Lucas FAA
 Patrick Markham HEICO

This symposium will look at acceptability and traceability requirements for repair shops and what average shops require, keeping in mind that shops want to use PMA parts and DER repairs. PMA regulations and parts acceptance might differ in the U.S. and other countries that do and do not accept them.

Multiple points of view will be presented and some examples of experiences will be discussed during the symposium. The audience is welcome to ask questions and to openly discuss the subject.

Ask yourself:

How is your airline or maintenance organization managing PMA parts?

If you are interested in participating on the symposium panel, contact sam.buckwalter@sae-itc.org

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MMC Exposition, Refreshment Breaks, and Other Brand Recognition Opportunities

The MMC Exposition (EXPO) will take place on Tuesday, November 7, from 1700 to 2000. The MMC EXPO will be held at the InterContinental in the Ballroom. MMC equipment suppliers, system integrators, Non-Destructive Testing (NDT) providers, Ground Support Equipment (GSE) suppliers, and others will have an opportunity to demonstrate their products and services to the aviation maintenance community. Expo booth locations will be reserved on a first come, first served basis.

If you are interested in the EXPO, sponsoring a refreshment break, or looking to increase your brand recognition through our other brand recognition opportunities such as the MMC Mobile App, please contact Vanessa Mastros.

Vanessa Mastros
Business Manager
Office: +1 240-334-2575
Email: vanessa.mastros@sae-itc.org

The MMC EXPO is a great way to show your products and processes to engineering professionals from airlines and MROs.

MMC EXPO Reception

Tuesday
November 7, 2017
1700-2000 hours

MMC Booths remain Open

Wednesday-Thursday
November 8-9, 2017
Refreshment breaks
and Lunches



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2017 AMC in Milwaukee!

The 2017 AMC was held May 1-4 at the Wisconsin Convention Center in Milwaukee, Wisconsin. There were 681 registered attendees from 23 countries.

Category of Organization	Organizations
Airframers	4
Airlines	32
Manufacturers and Others	159

The 68th AMC Conference was held in Milwaukee, Wisconsin.

In addition to the daily technical meetings at the AMC and AEEC, there were nightly social activities for conference attendees to discuss technical solutions and to view new products and services of the avionics vendors.

The AEEC-AMC Opening Session

The AMC Chairman, Marijan Jozic, KLM Royal Dutch Airlines, and AEEC Chairman James McLeroy, UPS, officially opened the 2017 joint AEEC | AMC Conference.



**Marijan Jozic, KLM
AMC Chairman**



**James McLeroy, UPS
AEEC Chairman**

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2017 AMC in Milwaukee!

The Keynote

Kris Bauer, Senior Vice President of Technical Operations, United Airlines, delivered the keynote speech.



The Roger S. Goldberg Award is awarded to an individual that embodies the spirit of the AMC – A lifelong proponent.

The Roger S. Goldberg Award

Dean Conner, United Airlines, presented the Roger S. Goldberg Award to:

Marijan Jozic
KLM Royal Dutch Airlines



Dean Conner, United Airlines
Marijan Jozic, KLM Royal Dutch Airlines



2017 AMC in Milwaukee!

The AAI Volare Awards

Ray Frelk, AAI President, presented the AAI Volare Awards to:

Ron Parpart, Rockwell Collins

Volare Award – Avionics Product Support

Mike Weigel, Delta Air Lines

Volare Award – Avionics Maintenance

Marshall Dormire, Teledyne Controls

Volare Award – Avionics Manufacturing

Bob Semar, United Airlines

Pioneer Award – Avionics Engineering

AMC Industry Session

Starting Tuesday morning, the AMC reconvened and began the Industry Session, including briefings on the past year's AMC standards activities.

Future Concepts for Maintenance Subcommittee Activities

Aircraft Support Data Management

Yigit Selcuk, Delta Air Lines, Chairman

Obsolescence Management Guidance

Marijan Jozic, KLM Royal Dutch Airlines

Test Program Set

Ted Patmore, Delta Air Lines

Field Loadable Software

Rod Gates, American Airlines

This was AAI's 50th year in presenting the Volare Awards.

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2017 AMC in Milwaukee!

2017 AMC Symposiums

Global Aircraft Tracking

Monday – May 1

**Moderators: Sven Biller, Lufthansa Technik
Jessie Turner, The Boeing Company**

Following the moderators' opening, presentations were provided by:

Chuck Adler	The Boeing Company
Mike Garcia	Aireon
Alan Schuster-Bruce	Inmarsat
Claude Pichavant	Airbus

Chemicals Under Control

Tuesday – May 2

Moderator: Marijan Jozic, KLM Royal Dutch Airlines

Following the moderator's opening, presentations were provided by:

Rachel Becker	GE Aviation
Nel Verstoep	KLM Royal Dutch Airlines
Gary May	The Boeing Company

Nuisance Fault Messages

Wednesday – May 3

Moderator: Anand Moorthy, American Airlines

Following the moderator's opening, presentations were provided by:

Rod Gates	American Airlines
Ron Parpart	Rockwell Collins
Dan Nguyen	The Boeing Company
Sven Biller	Lufthansa Technik

**The AMC
Symposiums
have quickly
become the
industry's
premier
technical
events.**



2017 AMC in Milwaukee!

AMC Working Groups

The Aircraft Support Data Management Working Group finalized the draft **ARINC Project Paper 675: Guidance for the Management of Aircraft Support Data**. The Field Loadable Software Working Group finalized the draft **Supplement 2 of ARINC Report 667: Guidance for the Management of Field Loadable Software**. The standards were adopted by the AMC Steering Group May 1, 2017.

Special Thanks

On behalf of the AMC Steering Group, we gratefully extend our thanks and acknowledge the efforts of those organizations and individuals that made the AMC a success.

We also wish to offer special thanks to Carlisle IT for hosting the Spouse Tours.

The AMC develops standards that provide guidance to airframers, airlines, and component repair organizations.



Everything you Wanted to Know about Repairs (but were afraid to ask)

By: Marijan Jozic
AMC Chairman

Aviation has always been a special business. Modern aviation is even more special. As we all know, aviation is very well organized and regulated. Especially the regulated part. When we (or a pilot) discovers that an LRU is not performing, the technician removes the LRU from the aircraft and sends it to the shop.

The shop in an aviation environment is known as a Part 145 organization. That means that the LRU must be repaired according to Component Maintenance Manual (CMM). Here is the first dilemma. We are talking about “repairs” and then using a Component Maintenance Manual. So, is it a repair or simply maintenance?

Well, what we call repair is actually maintenance. By means of the CMM, we restore the LRU to its original approved and working condition. If you send the LRU to the shop and you receive it with a regulatory certificate (FAA 8130 or EASA F1) you would normally say it is repaired in the shop. And that makes it a bit confusing because the shop actually restored it. Even if a piece part is replaced by a new working part, it is still restoration.

When we talk about real repairs, it is something different than restoration or changing parts. It is an action what we call: “fill and drill.”

For example!

Part of a printed circuit board is burned due to high current through a broken resistor. The technician cuts the burned Printed Circuit Board (PCB) area, fills and glues it with PCB material, drills holes, installs the new resistor, applies conformal coating, and then tests the unit. That is the repair.

The repair is sometimes not described in the CMM but in the Standard Practices Manual. Every technician must be aware of those standard practices and the Standard Practices manual must be available in the shop and revision-controlled. Every component supplier has it and they use it every day. You as a Maintenance Repair Organization (MRO) can decide to issue your own Standard Practices Manual and make it part of your quality system. In that case, you will be responsible for its content and revision service.

**Aircraft
component
repairs have
differing levels
of maintenance
capabilities.**



Everything you Wanted to Know about Repairs (but were afraid to ask)

There is, of course, more than one way to skin a cat. Some of us decided to issue additional pages and add them to CMM. Some call these pink pages, some blue, and some green. Color does not matter as long as you can identify them and see that they are different than CMM pages. By means of those additional pages, you can add information to your CMM. It can be just something trivial and easy.

For example:

Gray paint for the light plate is in cupboard 25A

The voltage at pin 5 is 500A is typo! It should read 500mA

Heat the flat touch keyboard by fan before peeling off

Remove potting by heating it with fan and digging it with flat screwdriver

The pages with a contrasting color are additions that an airline or component repair organization has created.

As you can see such a system opens a whole new area of repairs. Suddenly, you can do much more as long as:

The repair is part of your quality system.

Your repair is within the specification of the LRU.

Your actions are prescribed and part of your quality system.

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Everything you Wanted to Know about Repairs (but were afraid to ask)

The easiest way of performing maintenance is just to replace PCBs or the whole assembly or module. You will immediately find out that you are throwing money down the sewer. This is the absolute most expensive method of maintenance. Therefore, to work effective you should accomplish maintenance to the smallest degree possible. Call it repair if you want. Level 3 of maintenance is described in several ARINC standards.

ARINC Report 663: *Industry Guide for Component Test Development and Management* defines Component Maintenance Level (CML) 3.

Maintenance operations with an end result of restoring a LRU or a subassembly to serviceability. Maintenance includes repair of the LRU and or its subassemblies by any and all repair processes, including but not limited to, replacement of defective Basic Parts such as processor chips, transistors, or chassis mounted parts. CML-3 embodies those activities necessary to:

- *Fault isolate to the Basic Part level*
- *Replace/repair such parts*
- *Return the LRU or subassembly to service*

This level (3) includes all programming, calibrations, alignments, tuning, etc., necessary to return the LRU/SRU to service.

ARINC Report 623 is currently being updated by the Test Program Set (TPS) Working Group.

This is good stuff to know. Actually, technicians of every Part 145 organization should dream about it every night and use it in everyday business.



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Everything you Wanted to Know about Repairs (but were afraid to ask)

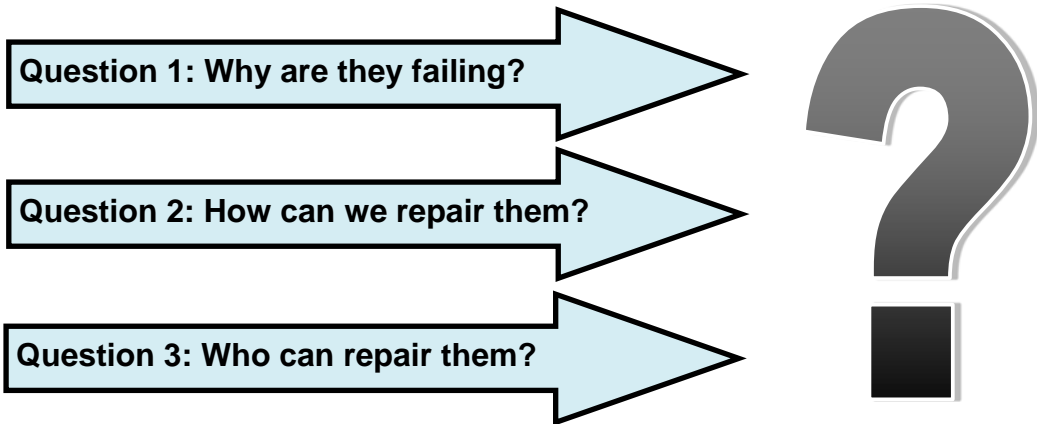
One step further is a repair which is not classified as standard practice nor described in the CMM. You might say it is not repairable! But!

Here is one important BUT! This “but” is about money, honey! It can happen that the part is very expensive or it can be a case where that part is relatively inexpensive but fails a lot.

At a recent AMC, I bumped into an engineer who told me: “I love parts that are very expensive or are cheap but failing very often.”

Those parts are the target for investigation. Here are the questions to ask in an investigation:

Repair investigations leave no stone unturned. All possible ideas are explored.



You might have noticed that I purposely did not ask: Can it be repaired? That is because I am convinced that everything can be repaired. It all depends on how much are you planning to spend for repair and how expensive the new part is.

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Everything you Wanted to Know about Repairs (but were afraid to ask)

Here's a nice story: At home, I have a different problem. I am convinced that many engineers have the same problem: I can fix everything. Well, in last 35 years, I have fixed everything. The other side of the story is that my wife blames me that we only have old stuff. Even if the parts are obsolete, I simply redesign it and it can be used again for many years. She hates our 35-year-old washing machine (and dishwasher, and vacuum cleaner, and mixer, and hairdryer, and radio, and...) .

Therefore, I am convinced that everything can be repaired. But there is a limit. If the repair is more expensive than a new LRU, scrap it! But make sure that you are certain that repair cannot be done cheaper.

At home is different story. I can spend 2 days repairing our dish washer simply because I enjoy it. But if you add the engineer's hours of labor into equation, you can easily buy a new dishwasher. That example does not make sense.

Back to those three questions. If you cannot repair the part and you still think that it can be fixed, submit the question to the AMC or MMC and simply ask the other 400 engineers in the room. You can also come to AMC or MMC and check very thoroughly if somebody can either repair or design a repair for you. The best place to talk about that is during the AAI reception. Everybody is there and there is an immense amount of brain power in the area. The chances are good that one of those few hundred engineers can give you the golden secret. And that will save you a lot of money.

My golden secret is actually very similar to when you go shopping in Amsterdam: You can buy the best stuff in the smallest shops.

One of my bean counters used to say: "The money lays on the ground! You just have to bend over and take it."

That works also with repairs in aviation. If you are too lazy to bend, it is too bad for you!

- MJ

Repairing older appliances takes skill, knowledge, and a fearless attitude.



AMC Standards Activities

Future Concepts of Maintenance (FCM) Subcommittee

The objective of the FCM Subcommittee is to foster the development of maintenance concepts for digital avionics equipment and to promote the use of Built-In Test Equipment (BITE) and central maintenance concepts.

This includes the development of test equipment system standards that will allow airlines to achieve commonality of test programs and transportability of test programs between avionics, airframe, and airline Avionics Test Equipment (ATE).

A priority is to minimize the impact of No Fault Found (NFF) and to reduce the cost of routine maintenance. This is achieved through the development of maintenance tools and improved avionics maintenance strategies.

Active Projects:

Obsolescence Management Guidance (OMG)
Test Program Set (TPS)

More information on these working groups can be found here:

<http://www.aviation-ia.com/amc/projects/index.html>

Contact a member of the AMC Steering Group To suggest a standardization activity.



Obsolescence Management Guidance (OMG) Working Group

Project Goals

Goal: ARINC Report 662: *Strategies to Address Electronic Component Obsolescence in Commercial Aircraft* is a first-generation report defining guidance in combating obsolescence in the air transport industry. The update will ensure accuracy and consistency with evolving industry practices.

Issues to be worked: The update is intended to ensure the continued viability of ARINC 662 with incursion of the new development strategies to support proper handling of obsolescence. Besides electronics components, the standard will also provide awareness that there are also different fields of obsolescence which can impact maintenance of electronics components.

A review of ARINC 622 indicates that enhancements may be necessary to bring the document into line with existing practices and to improve readability:

- Changes due to technological evolution of aircraft components.
- Installation of references to other ARINC Standards.
- Obsolescence impact in related areas
- Guidance to minimize obsolescence in design phase of components
- Guidance how to detect and proceed if obsolescence is detected

The next OMG meeting is tentatively scheduled for November 28-30, 2017, in Hamburg, Germany. The meeting announcement will be available soon with information about the next meeting.

For more information about the OMG Working Group, please see the ARINC IA website:

<http://www.aviation-ia.com/amc/projects/omg/index.html>

Obsolescence affects every facet of aircraft reliability, efficiency, and operational readiness.





Test Program Set (TPS) Working Group

Project Goals

Goal: Original Equipment Manufacturers (OEMs) often deliver a Technical Support and Data Package (TSDP) that contain a cornucopia of documents. The relevant Test Specification data is obscured and difficult to ascertain within the large amount of data that is not relevant to the Test Specification. The aim of the Test Program Set (TPS) Working Group is to update ARINC Report 625 in order to emphasize the importance that the OEM provides a Test Specification that is intelligible, unobscured, and as complete as possible.

The role of the TSDP is to provide the minimal amount of data required to fully understand and implement the Test Specification. Only data that is pertinent to the Test Specification should be provided. It should be separate and independent of all non-pertinent data.

Issues to be Worked:

To clearly state the Test Specification requirements so that it will be delivered on time, in a clear un-obscured format, and banishing the IP concern.

Clarifying differences between Test Specification (TS) and Test Specification Data Package (TSDP).

Defining the responsibility of the repair facility is to verify the conformance of the test implementation.

Defining a component manufacturer's production test specification is written to support factory production acceptance tests.

A subset of this production test specification forms the TS used to develop the Return-To-Service (RTS) test procedures provided in the CMM.

The next TPS Working Group meeting is scheduled for September 12-14, 2017, in Wixom, Michigan.

More information about the TPS including meeting reports, working papers, and meeting announcements will be available on the TPS webpage of the ARINC IA website:

<http://www.aviation-ia.com/amc/projects/tps/index.html>

The TPS Working Group intends to update ARINC 625 to provide guidance for industry about accurate and adequate maintenance instructions.

**2018 AMC
April 23-26
Dallas, Texas**



**Sheraton Dallas Hotel
400 North Olive Street
Dallas, Texas 75201
tel +1 214 922-8000**

*"It's your
conference, it's
what you make
of it!"
-R.S. Goldberg*



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Dean Conner
United Airlines



Dan Ganor
El Al Israel Airlines



Sven Biller
Lufthansa Technik



Ozgur Arayici
Turkish Air



Ricardo de Azevedo e Souza
Azul



ARINC IA Activities Partial Calendar

Test Program Set (TPS) Working Group	September 12-14	Wixom Michigan
MMC Conference Hotel Reservation Cutoff	October 18	Cleveland Ohio
MMC Conference	November 7-9	Cleveland Ohio

Plus **MANY** more events in the next few months!
This list is not all-inclusive of ARINC Industry Activities events.

For more information, see:

<http://www.aviation-ia.com/events/index.html>

**2017 MMC
November 7-9
InterContinental Hotel Cleveland
Cleveland, Ohio**

Mark the date and make your plans now!

<http://www.aviation-ia.com/amc/mmc/upcoming/index.html>

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"Another Success Story!"

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