2017 MMC Program

Mechanical Maintenance Conference

November 7-9
Cleveland, Ohio USA

An ARINC Document
Prepared by AMC
Published by SAE ITC
16701 Melford Blvd., Suite 120
Bowie, Maryland, 20715 USA

AMC Reference 17-110/MSG-338
August 31, 2017

The Mechanical Maintenance Conference (MMC) is an aviation industry activity organized by ARINC Industry Activities, an SAE-ITC Program, to assist aviation interests in cooperating to develop shared technical solutions and to establish technical standards.

The Mechanical Maintenance Conference contributes to increased reliability and maintainability, which results in reduced operating costs for the airline industry. These contributions are achieved through the Mechanical Maintenance Conference (MMC) and development of technical standards.

The first Mechanical Maintenance Conference will be led by the AMC Steering Group in accordance with the Terms of Reference (TOR) approved by SAE ITC. The AMC consists of representatives from the technical leadership of the air transport avionics maintenance community.

ARINC
INDUSTRY ACTIVITIES℠
An SAE ITC Program

2017 MMC Program

Welcome to the 2017 MMC in Cleveland, Ohio! We are certain that your attendance at the MMC will prove enlightening and beneficial to your organization.

The MMC Program is organized into two major sections. The General Information section contains the information that you will need to get the most benefit from this unique aviation meeting. It includes the schedule of events and abstracts of the technical symposiums that are planned. The MMC Questions by Topic – the most important part of the program – presents the 141 Discussion Items submitted by airlines that will be discussed at the MMC.

MMC Reminders

The 2017 MMC officially begins with the MMC EXPO from 1500-1900 on Tuesday, November 7, 2017. The technical conference will be 0830-1630 on Wednesday and Thursday, November 8-9, 2017.

Bring an up-to-date business card when you register. Your name and company will be used in the attendance list in the MMC Report.

Business Casual is the appropriate dress for all AMC and MMC events.

All participants are urged to attend the entire program. Every effort will be made to keep the discussion on schedule. However, it is not always possible to accurately predict the amount of time the various subjects will generate.

MMC GENERAL INFORMATION

2017 MMC Questions by Topic

2017 MMC Keynote Speaker

Marijan Jozic
AMC Chairman & ad-interim MMC Chairman
Development Leader at KLM Engineering & Maintenance
KLM Royal Dutch Airlines

Marijan Jozic has been the Chairman of the AMC for the past six years, and has chaired three AMC Working Groups:

- Standard for Cost Effective Acquisition (SCEA)
- Modification Status Indicators (MSI)
- Obsolescence Management Guidance (OMG)

Marijan earned a Bachelor's of Science degree in Aerospace Technique from the Higher Aerospace Technology school in Croatia, and a second Bachelor's of Science degree in Electronics and Telecommunications from the Amsterdam University of Applied Sciences. He has shared his avionics knowledge with the industry as an author of two books and numerous articles in PlaneTalk magazine. His writing stimulates us to ask: are we doing the right thing, or is there another way?

Welcome to the 2017 MMC!

Marijan Jozic
AMC Chairman & ad-interim MMC Chairman

My name is Marijan Jozic. I have been the AMC Chairman for the past six years, and now have the pleasure to be the first chairman of the Mechanical Maintenance Conference (MMC). I have been involved in ARINC Industry Activities (ARINC IA) over the last 20 years.

For the first time in the history of aviation, we will meet at the Mechanical Maintenance Conference. The MMC has been a topic of discussion within the avionics community for some time. Mechanical engineers were asking: “Why? Why don’t we have an event like the Avionics Maintenance Conference (AMC) for mechanical systems?”

It is a magnificent formula. Airline engineers from all over the world submit their questions to ARINC Industry Activities. The questions are shared with OEMs and airframers and are issued in the program for the conference. Everybody involved can study the questions and prepare answers. At the conference, we handle all those questions and count success stories.

The AMC Steering Group used this formula in the creation of a new mechanical conference: the MMC. The MMC is an air transport industry activity serving the promotion of mechanical systems, equipment reliability, and performance. It is the medium for the exchange of information among users, repair facilities, installers, suppliers, manufacturers, and designers of avionics systems and components.

But there is more to the MMC besides the open forum, where we answer the submitted questions. Just like the AMC, this activity is supported by additional pylons. One such pylon is education through seminars.

Last year, the AMC held a seminar about Parts Manufacturer Approval (PMA). We recruited the best experts in the industry to talk about PMA parts. To maintain objectivity, we looked at the topic from different angles. Legal people are familiar with the Latin phrase, *audiatur et altera pars*, which means, let’s hear the other side! To comply with this concept, presenters represented the FAA (regulatory authority), Delta Air Lines (operator), and HEICO (manufacturer). Of course, everybody is free to ask questions during the seminar and discuss every bit of the PMA subject. The seminar was such a success that we are going to repeat it for the MMC engineers at the first MMC.

The final pylon of ARINC Industry Activities is the design of technical standards. Yes, we produce standards, too! ARINC Industry Activities has 544 standards in circulation. It is not because it is easy, but because it is hard and it is necessary.

Let me explain! ARINC Industry Activities has three activities (and now, with the introduction of the MMC, four). These activities are:

- AEEC (Airlines Electronic Engineering Committee)
- AMC (Avionics Maintenance Conference)
- FSEMC (Flight Simulator Engineering and Maintenance Conference)
- MMC (Mechanical Maintenance Conference)

Each of these activities organizes working groups, which come together to design standards. Together, we update or issue about 40 standards each year. These standards are necessary, and it is hard work to create and maintain them.

Airlines who are not a member of AMC, AEEC, FSEMC, or MMC must either accept our standards or reinvent the wheel for themselves. That means that they are not leading like we are, but following. Believe me, it is better to lead than to follow.

That is what we do: we lead and point the way. We want you to go home from the MMC with a satisfactory solution to your problem, a lot of energy, and new knowledge. If you are not satisfied with answers given at the open forum, just make it loud and clear that you want to leave the item open and OEMs can work on delivering a satisfactory answer after the conference. We want you to report back to ARINC IA when the problem has been solved so we can close the question before the next conference.

Other things, like obtaining new knowledge and meeting OEMs and airlines, are in your hands. I have only one piece of guidance about that: The more you put into it, the more you gain. Make a short list of subjects you want to discuss with peer engineers or OEMs. Plan your work at the MMC, and work your plan. That is how you will win.

At the next conference (I am sure that you will come back!) you will tell me, “Mr. Chairman! I am winning so much at the MMC that I can’t take it anymore.” I will tell you, “No, we are not stopping! We have to win more to make our industry safe, cost effective, and extremely reliable.”

See you in Cleveland!

Marijan Jozic
MMC Chairman

2017 MMC Schedule of Events

Tuesday – November 7
1400 – 1900 MMC Registration
1500 – 1900 MMC Reception and EXPO

Wednesday – November 8
0730 Registration Opens
0830 Opening Session
1000 Coffee Break Sponsored by TBD
1020 MMC Open Forum Discussion
1200 Lunch
1330 MMC Open Forum Discussion
1500 Coffee Break Sponsored by TBD
1520 Symposium – *Parts Manufacturing Authority*
1630 Recess

Thursday – November 8
0735 Registration Opens
0830 Industry Session
0930 MMC Open Forum Discussion
1000 Coffee Break Sponsored by TBD
1020 MMC Open Forum Discussion
1200 Lunch
1330 MMC Open Forum Discussion
1500 Coffee Break Sponsored by TBD
1520 MMC Open Forum Discussion
1630 Recess

Event Locations

Tuesday - Thursday	Registration	Ballroom Pre-Function
Tuesday 1500-1900	MMC Reception	Founders Ballroom
Wednesday – Thursday	MMC Conference	Amphitheater

Coffee Breaks ***Coffee breaks will be provided daily at 1000 and 1500***

2017 MMC Opening Session

Wednesday November 8, 2017 0830

Welcome, Introductions, and Keynote

AMC Chairman	Marijan Jozic	KLM Royal Dutch Airlines
AMC Vice Chairman	Anand Moorthy	American Airlines

2017 MMC Industry Session

Thursday November 9, 2017 0830

Session Overview

AMC Chairman	Marijan Jozic KLM Royal Dutch Airlines

Aviation Committees Leadership and Steering Overview

AMC Exec. Secretary	Sam Buckwalter ARINC Industry Activities, SAE ITC

ARINC Industry Activities Overview

Executive Director	Michael Rockwell ARINC Industry Activities, SAE ITC

2017 MMC Symposium

Wednesday, November 8, 2017 – 1020

Parts Manufacturing Authority (PMA) Process

Speakers:	Mike Rennick	Delta Air Lines	Airline
	Ian Lucas	FAA	Regulator
	Patrick Markham	HEICO	MRO/Aircraft Component Repair
Moderator:	Marijan Jozic	KLM Royal Dutch Airlines	

This is becoming a very important topic in modern aviation. The AMC Conference has held two PMA symposia with great success.

There are two reasons: first, our audience expressed the wish to elaborate a bit more on the subject; the second reason, maybe the most important one, is that PMAs are going to play a major role in lowering the repair costs of MROs and airline shops. We cannot think about modern aviation and ignore PMAs. The AMC and MMC Conference participants are convinced that there is a need for sharing and spreading knowledge about PMA parts.

Therefore, the AMC Steering Group took the lead to organize the PMA seminar to provide as much information as possible about the subject. Sooner or later, every engineer will face PMA questions and therefore need to get as much knowledge about PMA as possible. The AMC Steering Group is extremely happy to announce that they have collected the leading experts in PMA. The audience will be able to ask questions and discuss this subject with leading experts in PMA environment. This PMA knowledge will certainly help to judge what is the best way to go for your own shop and your own company.

2017 MMC Symposium Speakers

Panel Speaker: **Mike Rennick**
Delta Air Lines
General Manager,
Operations Support Engineering

Michael Rennick is the general manager of Operations Support Engineering at Delta Air Lines. This includes responsibility for engineering support for the flying fleet, airframe structural repair, component repair, Delta's material and process equivalency programs, fatigue analysis, and advanced technology development. From 2008-2016, Michael led the Component Engineering team, which develops repairs and reliability projects in all ATAs and for all of Delta's fleet types. The Component team is also responsible for all PMA approvals at the airline, with the exception of cabin interiors. Michael is the Modification and Replacement Parts Association (MARPA) Airline Committee Co-Chairperson. 2016 also saw Michael take on temporary duty as manager of powerplant repair development.

Prior to joining Component Engineering and his new engine team, Michael was an airframe structural engineer in Delta's Liaison Engineering group. Michael has a degree in Aeronautical and Astronautical Engineering from Purdue University.

Panel Speaker: **Ian Lucas**
Federal Aviation Administration

Ian Lucas attended Pennsylvania State University where he earned a BS in Engineering Science and an MS in Engineering Mechanics. After graduating, Ian worked for the US Army, both as a Structural Aerospace Engineer in the Aviation Engineering Directorate, and a Mechanical Engineer for the Redstone Test Center. In 2012, Ian transferred to the FAA to work as a Structural Engineer in the Boston Aircraft Certification Office. In 2016, Ian moved to the Design Certification Branch of AIR-100 in Washington, DC where he now serves as the PMA rule and policy focal.

Panel Speaker: **Patrick Markham**
HEICO
VP, Technical Services

Patrick Markham received his BS in Mechanical Engineering (Aerospace) from Worcester Polytechnic Institute, and his MS in Mechanical Engineering from Purdue University. Pat worked on PW4090 and PW4098 certification programs and F119 development programs while at Pratt & Whitney.

In 1997, Pat joined HEICO to work on PMA compressor blade certification programs. Pat is currently Vice President of Technical Services for HEICO, with technical oversight responsibility for HEICO's PMA activities, including HEICO's PMA ODA.

The MMC Symposiums are intended to be interactive. Following the conclusion of the presentations, questions and discussions are strongly encouraged, as time permits.

2017 MMC Leadership (interim)

AMC Steering Group

Marijan Jozic
AMC Chairman
KLM

Anand Moorthy
AMC Vice Chairman
American Airlines

Sam Buckwalter
AMC Executive Secretary
ARINC Industry Activities

Kazuyoshi Kanno
Japan Airlines

Prewitt Reaves
Southwest Airlines

Roger Kozacek
Delta Air Lines

Ted McFann
FedEx

Dean Conner
United Airlines

Dan Ganor
El Al Israel Airlines

Sven Biller
Lufthansa Technik

Ozgur Arayici
Turkish Airlines

Ricardo de Azevedo e Souza
Linhas Aéreas Brasileiras

For the first MMC Conference, leadership has been provided by the AMC Steering Group.

The MMC Conference invites ARINC Industry Activities Airline Member Organizations (AMOs) to participate in the MMC Leadership team. More information will be available at the MMC Conference. Contact Sam Buckwalter, MMC Executive Secretary, if you have questions.

The AMC Steering Group plans, organizes, and directs AMC activities including the annual AMC conference, publication of PLANE TALK®, establishing and monitoring standard setting activities, and acting on behalf of AMC in matters related to AMC activities or to industry interests in avionics maintenance. The AMC Steering Group will authorize the AMC technical work program and rule on the adoption of proposed ARINC Standards and supplements to existing ARINC Standards.

The AMC Steering Group shall be comprised of 11 voting representatives of the AMOs elected to the AMC Steering Group and a non-voting secretariat provided by ARINC IA. AMOs represented on the AMC Steering Group shall be elected by the AMOs.

To ensure global representation, the AMOs elected to the AMC Steering Group should include at least one AMO from each of the following regions: North America; Caribbean, Central, and South America; Europe; Africa and Middle East; and Asia Pacific. AMOs will be attached to a specific geographical region according to the ICAO definitions.

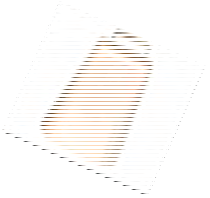
The MMC Leadership Committee will be in roughly the same structure as the AMC Steering Group.

For more information, contact Sam Buckwalter, AMC Executive Secretary.

2017 MMC Guidelines

Agenda – This program is the main document for the MMC. It is provided on the MMC website several weeks in advance of the meeting.

Please bring a copy with you to the meeting.

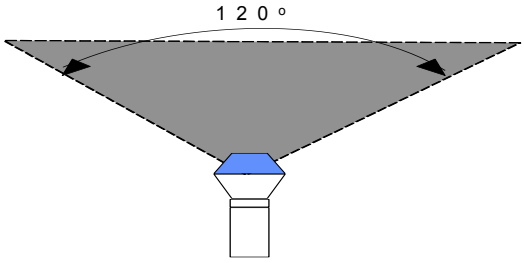


Promptness and Courtesy

- Please be prompt for the start of each session. Pay careful attention to the start times published in the MMC Schedule of Events.
- Persons arriving late for the MMC Opening Session are asked to refrain from entering the ballroom during keynote remarks.
- Persons with cellular phones are requested to turn off the ringers for these devices during the meeting sessions. Use of these devices is not permitted in the meeting rooms.

Meeting Conduct – Anyone wishing to comment on a discussion item or raise a question during the discussion, please observe the following procedure:

1. Hold up the place marker to obtain the microphone. Wait to be recognized by the moderator.
2. When recognized by the moderator, state your name and organization.
3. Speak clearly and distinctly into the microphone.



The Conference Microphone System is activated by pressing the button on the base of the microphone unit. The microphone will illuminate a red ring on the “stalk” when activated. The person speaking should be 8 to 20 inches away from the microphone stalk and within the shaded area in the diagram. When finished speaking, pressing the button on the base will deactivate the microphone, and the red ring light will extinguish. The microphones on the floor stands are similar, except the button is on the actual microphone.

If a microphone is left open (red light illuminated) without a person speaking into it, please press the button to turn off the microphone unit. This will prevent unwanted sounds in the audio system and allow other speakers to be heard clearly.

Manufacturers are requested to follow the agenda when a discussion item they are planning to answer is being introduced and to move to a microphone so as to be ready to respond. This will significantly help to keep the meeting flowing smoothly.

2017 MMC Guidelines

Language and Terminology – The MMC is conducted in the English language. Since English is not the native language for many MMC participants, please keep the use of slang, vernacular, or colloquial expressions to a minimum and speak slowly. If something is said that you do not understand, please wave your hand and the moderator will ask the speaker to repeat the comment.

MMC discussions typically generate a large amount of technical jargon and acronyms. Please keep the use of acronyms to a minimum. Use only widely accepted acronyms. For example, "INS" is generally well known as the acronym for the Inertial Navigation System; however, "GBL" probably is not used to denote "Gyro Bearing Lubricant" in many organizations.

Since the MMC is all about communication and is an international meeting, the AMC Steering Group encourages all attendees to participate. The person sitting next to you at the MMC may have that one bit of magic information that will solve your problem or offer a new perspective. Take time to meet that person, listen to what they have to say, and thank them for participating.

The moderators take additional care to ensure the use of these guidelines. Participants are encouraged to inform the moderator if you do not understand the discussion due to a language barrier.

For cases where the moderator feels that the question or response is not clear, the moderator will ask the respondent to repeat the response more slowly. In addition, manufacturers should be willing to restate a question to ensure a clear understanding for everyone.

Discussion Item Procedure

- The moderator will direct your attention to each new item number. If the question is complex, a brief summary may be made.
- When it appears that a group of operators have similar problems, the moderator may ask for a show of hands to avoid redundant comments and to expedite discussion.
- Airlines and suppliers are encouraged to provide concise verbal responses, preferably not to exceed one minute.
- A copy of written responses should be given to the MMC Executive Secretary.
- All written responses must be read by the submitter to be included in the report.
- If solutions must be worked out after the conference, please send a copy of the appropriate documentation to the MMC Secretary at ARINC IA. This information will be published in PLANE TALK®.

NOTE: For delegates that are not native English speakers, it is imperative that discussions on the conference floor be spoken clearly, without colloquialisms, and loudly for all to hear.

2017 MMC Guidelines

Information for Manufacturers – New information related to improvements to existing equipment or new designs may be of interest to users. Manufacturers who wish to include such information in MMC discussions are asked to make prior arrangements with the chairman. Manufacturers are asked to concentrate on technical aspects of the information and refrain from giving a "sales pitch" during AMC presentations or discussion items. Sales related comments are appropriate during breaks, at the MMC Reception and EXPO, or in hospitality suites.

AMC Report – The MMC Report will be prepared following the meeting and will be available at:

http://aviation-ia.com/amc/reports/index.html

2017 MMC Networking Events and Sponsorships

The MMC Conference has several networking events throughout the conference, starting with the Tuesday evening MMC Reception and EXPO, continuing with other hospitality events hosted on Wednesday and Thursday.

Tuesday Evening Reception and EXPO

Example of an Evening Suite at the FSEMC

Vanessa Mastros, ARINC IA Business Manager, coordinates exhibits, breaks, and other arrangements for the hospitality offered at the MMC. Organizations who wish to be included as a sponsor of the Exhibit/Reception should review the information in the MMC Exhibit, Activity Sponsor, and Organization Highlight Options Package and return a completed form to:

Vanessa Mastros
Business Manager
Office: 240-334-2575
Fax: 301-383-1231
Email: vanessa.mastros@sae-itc.org
www.aviation-ia.com

MECHANICAL MANAGEMENT AND PHILOSOPHY

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
1	**HoloLens Technology**		**All**	**All**		**THY**

Are OEMs/Airline Manufacturers planning to develop trainings using HoloLens technology from Microsoft or other vendors?

Moreover, do you also think to integrate such technologies into CMM and IPC pages for maintenance purposes so that any operator can reach the exact part and figure more precisely?

Airlines, Airbus, Boeing, and OEMs, comment please!

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
2	**Vibration Test**	**Several**	**UTAS**	**B787**	**21**	**AFR/KLM**	**KLM**

Ref: CMM's 21-54-12, 21-53-43 and 21-55-01

KLM's shop found the CMMs for the B787 G4 liquid cooling pumps prescribing an ESS (vibration) test whenever one or more of the electronic boards are replaced with a new one. KLM feels the ESS test (vibration test) is only mandatory for qualification of components and not a regular CMM test. It seems **illogical** that a new, fully certified and thoroughly tested electronical board must undergo a destructive test like ESS when installing it in its next higher assembly. Also, Boeing's position is that ESS testing is not appropriate for return to service testing and should not be included in the CMM unless it is absolutely necessary.

KLM has requested UTAS to revise the ref. CMM's accordingly, but to no avail. Meanwhile, UTAS issued two SBs for the PECS pump where electronic boards are replaced, but surprisingly, no ESS test is required there.

- UTAS is requested to remove the ESS testing from the applicable CMMs, or at least make them optional.
- If that is not possible, KLM requests UTAS explain why.
- KLM likes to know if and how other operators are experiencing the above issue.

Operators, UTAS, OEMs and Boeing please comment.

MECHANICAL MANAGEMENT AND PHILOSOPHY

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
3	**I/W Philosophy**	**Several**	**UTAS**	**B787**	**21**	**AFR/KLM**	**KLM**

ATA 21 of the B787 knows many problems on several subjects. These are counterattacked by numerous Component Service Bulletins, most of them still under warranty. However, the interchangeability of the new component is almost always “ONE-way forward,” even when technically/operationally speaking, a TWO-way I/W is very much possible with no problems. It seems that on the B787, there is a different “I/W philosophy” than on other Boeing types.

For operators, this “One-way policy” creates a burden on spares investments and a huge pressure to implement the SBs as soon as possible (not on attrition), which means another financial burden and workload.

- If technically/operationally possible, KLM suggests the Boeing SBs indicate a TWO-way I/W, and let the operator decide for themselves if, how, and in what tempo they will perform the SB.
- Also, KLM would like to know from Boeing (and/or UTAS) the philosophy behind the ONE-way I/W policy. It might have something to do with warranty.
- KLM would like to know how other operators are experiencing the above issue.

Operators, OEMs, and Boeing comments please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
4	**Warranty**	**Several**	**Several**	**B787**	**21**	**AFR/KLM**	**KLM**

KLM has a long experience of OEM-shops or other Repair shops too easily denying Warranty repairs due to Customer Induced Damage (CID), Not Normal Wear and Tear (NNWT), or similar.

In many cases, these shops are providing reasons that cannot be substantiated or proven and long-dragging warranty discussions are the result. This takes a lot of manpower on the operator’s side.

KLM’s opinion is that when a warranty is denied, the denying party (NOT the operator!) must provide a solid proof of CID or NNWT, supported by clear pictures and explanation. And if in any doubt, the repair station should grant warranty or, in some cases, come to some sort of agreement with the operator.

KLM would like to have some formal “NNWT Definition – Regulations Document” that can and shall be used world-wide by all Repair shops and operators alike.

- Operator experience with this issue? Operators, MROs please comment!
- Any operator/repair shop in favor of such a document? Please provide your opinion!

MECHANICAL MANAGEMENT AND PHILOSOPHY

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
5	**MGSCU ACT-MLG String Lock**	**7586000-4 3042000-1 6150000-1002**	**Parker**	**B777**	**32**	**JAL**

Japan Airlines (JAL) has experienced 14 removals of Steering Lock Actuators due to EICAS Message “Main Gear Steering” since 2014. 50% cases of shop inspection results for these were No Fault Found.

Parker advises these were operating per design, but modifying MGSCU Part Number from 7586000-4 to -5 per SB 7586000-32-002 will be the countermeasure to suppress those EICAS messages/Maintenance messages by enhancement of the fault detection and reporting capabilities. It may true that the SB reduces removals, but so far, JAL has not applied this SB because of cost.

On the other hand, JAL thinks that a greater understanding of the detailed logic to causing the EICAS Message/Maintenance messages to appear would be better to accomplish the appropriate fault isolation for the aircraft mechanics and to get a better opportunity to accomplish precaution and preventative maintenance. Basically, the message logic for recent aircraft is maintained by the software and becoming difficult to see in detail. Moreover, Parker also does not have the software specification document.

Can the technical document explaining detailed EICAS Message/Maintenance Message Logic be provided to operators/vendors? It will help the operators/vendors understand the failure mechanism, and will be useful when considering next measures.

1. JAL would like to ask if other operators who are using MGSCU 7586000-5 have experienced Lock Actuator removal.
2. JAL would like Boeing to be open to the public about detailed EICAS Message/Maintenance Message logic.

Comments from other operators, Boeing, and vendors would be appreciated.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
6	**Aging Fleets**	**Several**		**B767 A340 MD11**		**LHT**

Aging or sunset fleets like B767 or even A340 are becoming more and more challenging for maintenance organizations, especially in terms of maintenance capabilities and the necessary piece part supply. For example, on the B767 rotary actuator (PN 256T3210, PN 256T3250, PN 256T6110, and PN 256T6310) an alert bulletin (SB 767-27A0229) with FAA AD 2014-22-09 was released (30 years after model introduction) that is now causing removals and the replacement of gear (Rotary Actuator Fixed Ring Gear PN 256T3216-(), PN 256T3255-(), PN 256T6120-(), or 256T6320-()). Unfortunately, some of these parts have lead times exceeding 250 or more days.

- Do other operators also struggle with these topics?
- Airframer: How are you supporting airlines and corresponding maintenance organizations to handle this issue?
- Airframer, OEM: What about setting a timespan/minimum fleet size at which production data for piece parts are provided to the operators for remanufacturing purpose free of charge?

Airlines, airframers, and OEMs please comment.

MECHANICAL MANAGEMENT AND PHILOSOPHY

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
7	**Nameplates**			**All**	**Several**	**LHT**

For Engine Related Components, a suffix or prefix is added to the serial number on nameplate of the unit. For several units, the OEM is providing information on how to decrypt the SN. CFMI gave out following quality statement:

> *"A check character (checksum) has been added beside the serial number. […] The dash and the checksum are not part of the serial number and therefore are not required on the M.S. documents." Therefore, units are shipped with the following nameplate and corresponding certificate:"*

AUTHORIZED RELEASE CERTIFICATE
FAA Form 8130-3 , AIRWORTHINESS APPROVAL TAG

1. Approving Civil Aviation Authority/Country: FAA/United States
3. Form Tracking Number: 16-E47418
4. Organization Name and Address: General Electric Company, GE Engine Services Distribution, LLC, 1600 Dresden Road, Erlanger, KY 41018, FAA Production Certificate #108
5. Work Order/Contract/Invoice Number: E47418

6. Item	7. Description	8. Part Number	9. Quantity	10. Serial Number	11. Status/Work
1	VSV ACTUATOR	351-704-802-0	1	DG010407	NEW

12. Remarks: EXPORT AIRWORTHINESS APPROVAL - THIS ARTICLE MEETS THE SPECIAL REQUIREMENTS OF GERMANY

13a. Certifies the items identified above were manufactured in conformity to: ☒ Approved design data and are in a condition for safe operation. ☐ Non-approved design data specified in Block 12.
14a. ☐ 14 CFR §3.5 Return to Service. Certifies that unless otherwise specified in block 12, the items identified above were accomplished in accordance with Title 14 CFR Part 43 and the items are approved for return to service.
HAM CHLSCWT0 16.09.16 16:04 T
13b. Authorized Signature
13c. Approval/Authorization No.: ODA-600080-NE
14b. Authorized Signature:
Certific. Sticker: 308 609502
13d. Name (Typed or Printed): SCHIPPER, WILLIAM
13e. Date (dd/mmm/yyyy): 13 Sep 2016
14d. Name (Typed or Printed):

User/Installer Responsibilities

It is important to understand that the existence of this document alone does not automatically constitute authority to install the aircraft engine/propeller/article.
Where the user/installer performs work in accordance with the national regulations of an airworthiness authority different than the airworthiness authority of the country specified in Block 1, it is essential that the user/installer ensures that his/her airworthiness authority accepts aircraft engine(s)/propeller(s)/article(s) from the airworthiness authority of the country specified in Block 1.
Statements in Blocks 13a and 14a do not constitute installation certification. In all cases, aircraft maintenance records must contain an installation certificate issued in accordance with the national regulations by the user/installer before the aircraft may be flown.
*Installer must cross-check eligibility with applicable technical data.

FAA Form 8130-3 (02-14)
MSN 0052-00-012-9005

MECHANICAL MANAGEMENT AND PHILOSOPHY

This procedure is proving to be difficult, especially in terms of equipment identification during logistics. As different MRO facilities are certifying the SN (Field 10) in different ways, it becomes more and more challenging to ensure lifetime documentation in an IT system for the correlated equipment.

How do other operators and MRO handle this issue?

Airlines, airframers, and OEMs please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
8	**ID Plate**	**All**	**Honeywell**	**All**		**AFR/KLM**	**AFR**

AFR/KLM has some difficulties purchasing ID plates from Honeywell. Some of them are not available (no quotation) and others can be purchased but only already engraved. The request process is excessively long and does not match the requirements of our repair process.

AFR/KLM requests to Honeywell provide ID plates not engraved?

Honeywell and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
9	**SRU Limitations**		**All**	**All**		**LHT**

For many units, storage limits are defined. This is applicable for SRUs as well as LRUs. Nevertheless, in some cases it is doesn't make sense in cases where an SRU has a storage limitation, but the next higher assembly does not. Following this logic and the resulting procedures, the SRU is supposed to be checked if it is stored on-shelf after 24 months, but if it is installed in the NHA, it does not need to be checked in any way.

For these cases, either the storage limit should be revoked or inherited to the NHA.

Airframers, OEMs, and operators, please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
10	**Actuator Hydraulic Component**		**Safran Messier**	**A320 Fam A330 A340**	**32**	**AFR/KLM**	**AFR**

Torque value in almost all of Safran's CMM are note noted (on actuator scope and ATA 32); there is only a reference link with Standard Practice M-DLPS1002-1.

This DLPS provides 11 different tables to choose among them the correct torque value and could cause a safety issue because this is complex research for technician: it could be a source of mistakes.

- Could Safran add the torque value directly in the CMM for best comprehension?

Safran and other operator comments, please.

MECHANICAL MANAGEMENT AND PHILOSOPHY

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
11	**C of C**	**Any**	**Any**	**Any**	**Any**	**LHT**	**DLH**

LHT (mainly operating under EASA regulations) repeatedly encounters spare parts which are delivered with some CofC document and no release to service certificate (EASA Form1/FAA 8130). Neither the OEM nor the supplier specified in the CMM is capable to issue a release to service certificate.

Typical Scenarios:

- Special parts (like seals or connectors) of specialized suppliers listed with their P/N, reference number, and source/supplier in the CMM (Example: Trelleborg Seal P/N: S33121-222-5 used on B767 Rudder Actuator 282900-100X Series).
- Subassemblies of components were supplied from different OEMs and have their own CMM. Both Suppliers do not provide EASA Form1/FAA 8130 (Example: CRJ700 ACMP P/N: 66195-01 (Parker) and AC Motor Subassy P/N: 9050422 (Hamilton Sundstrand).

The correct original parts are available – but without the legally required certificates.

- For standard parts (in general, NAS O-rings or NAS screws, for example) the CofC would be acceptable.
- For other parts, the question arises whether the supplier standard can be considered a standard and thus the CofC acceptable.
- In case the specification mentioned in the CofC is available, the CofC can be acceptable. But the CofC's often only refer to "all applicable specs" or specific Specs are of intellectual property.
- In some cases, a third-party FAA DAR creates an FAA 8130 but without referring to design specifications.

Comparing with FAA regulations, this does not appear to be an issue in the FAA world.

Our Question:
How do other MROs operating under EASA regulations experience and handle the reception of non-standard-aircraft-parts supplied with CofC only?

Our Intention:
There must be a clear and legally compliant way in the EASA world for the acceptance of original intended spare parts delivered without release to service certificates.

Regulator, supplier, and other operator comments, please.

MECHANICAL MANAGEMENT AND PHILOSOPHY

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
12	AMM	AMM	Airbus	A319/A320	Any	UAL

In various places in the Airbus Aircraft Maintenance Manual (AMM), the detailed instructions of the procedures have been deleted. Instead, the AMM refers to service bulletins. For example, in AMM 27-44-51-220-004-A, Step 4 Procedure, the AMM states: “Do the detailed visual inspection, refer to the latest revision of ISB 27-1164”, and there is no detail instruction of how to do the inspection given in the subject AMM.

There are three issues with this:

1. The maintenance department may not or does not have access to service bulletins.
2. The service bulletins are not appropriate documents for maintenance to follow to perform the specific job as some service bulletins contain multiple maintenance tasks and provide more information than needed. It will cause confusion to maintenance, create work stoppage and introduce error. Furthermore, in many service bulletins, it requires reporting to Airbus (immediately) if defect is found. However, our airline protocol is to have maintenance contact Engineering. After investigation and confirming the defect, UAL Engineering will contact Airbus. By doing so, Engineering keeps track of issues and not to be blindsided. Engineering is also to ensure the reporting is done correctly and corresponding corrective actions are taken.
3. Another serious issue is that the AMM states “refer to the latest revision of ISB xx-xxxx.” Very often, there are ADs lock us in to a certain revision of the service bulletins; or there are AMOCs allow the operators to use the later revision of the service bulletin, but our Airlines is not necessarily going to adopt that AMOC, which means for our AD compliance plan, a certain revision of the service bulletin needs to be used, and not necessary the latest. To use the latest service bulletin may put the operators out of AD compliance.

The solution: United Airlines requests Airbus to restore the detailed procedures in AMM and stop referring to service bulletins as the work instruction.

Airbus and other operator comments, please.

TEST SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
13	**B737-800 APU Starter/Generator**	**28B545-7**	**Honeywell**	**B737-800**	**24**	**DAL**

Delta Air Lines is trying to bring the B737-800 APU generator repair capability in house. We submitted a tooling request for all the tooling and test equipment. Honeywell supplied all but the Resolver test panel assembly, PN 1031249-1. Despite repeated attempts and even a visit to their Tucson repair facility, they have refused to provide any kind of assistance or technical help. We began to collect the tooling and test equipment in 2013 and are still no closer to testing this unit.

Honeywell and other operator comments, please.

GROUND SUPPORT EQUIPMENT & SPECIAL TOOLING

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
14	**Noise Reduction in Hangar**	**n/a**	**Boeing**	**B787**	**21**	**AFR/KLM**	**KLM**

During hangar maintenance checks, maintenance personnel experience nuisance and often hindrance from the airflow from air exhausts located forward of the B787 wheel wells. When working in the wheel wells, personnel is directly in the airflow. Additionally, a high noise level is present, measured to be around 90 dB(A) at 1 meter from the air exhausts.

KLM is thinking of developing a box-like muffler-device to cover the exhaust opening, which seals against the airplane skin adjacent to the outflow valve using foam, and which guides the airflow toward the hangar floor.

- Are there any operators that have designed similar or other ‘muffler’ devices to reduce hangar noise?
- How is Boeing dealing with this phenomenon?

FLIGHT CONTROLS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
15	Trimmable Horizontal Stabilizer Actuator (THSA)	47145-Series	UTC Aerospace Systems (UTAS)	A320 FAM	27	DAL

The THSA for the A320 FAM has a number of ADs tied to it due to wear and installation. EASA and the FAA have countered the wear and reliability issues with inspections and life limits, yet new aircraft are delivered with components that suffer the same problems as previous units. This product puts an onerous burden on the operator to generate complicated maintenance plans simply to keep the unit serviceable.

UTAS and Airbus have recently introduced a new -268 version that incorporates an Electrical Load Sensing Device (ELSD) to determine if the Secondary Load Path has been engaged due to the failure of the Primary Load Path. The installation of a non-ELSD is not allowed on an A320 FAM aircraft which has the ELSD modification. This creates an undue financial burden on the carrier to maintain multiple configurations of spares, driven by a design problem in the original component and its mounting system.

UTAS and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
16	THSA	47172-() 47175-()	Goodrich Actuation Systems	A340	27	LHT

Many Trimmable Horziontal Stabilizer Actuators (THSA PN 47172-() and 47175-()) of the A330/340 fleet have reached their (first) defined end of life. For the A340-300/-400, a renewal task has been introduced to double the current life. Unfortunately, for THSA PN 47175-() (A340-500/600), a renewal maintenance action is not available; furthermore, the unit is out of production.

OEM, Airframer, are you planning to add a renewal task for the A340-500/600 THSA? Could you please provide a timeframe? What is your general approach to cope with life limit parts of ageing fleets?

Airlines, airframers, and OEMs please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
17	Switch	V3-601	Honeywell	MD88 MD90	3100	DAL

Delta Engineering issued a modification to replace the micro switches for flap handle position in the pedestal due to reliability issues causing ODI (Operational Difficulty Index) events. During accomplishment of the modification, 10 of the new switches were found to be faulty out of stock and 2 failed during the checkout after the modification was accomplished.

Operator and supplier comments, please.

FLIGHT CONTROLS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
18	Rod Assy LWR/UPR	170-33227-901 170-33228-901 170-03779-901 170-03778-901	Embraer	ERJ170	57	JAL

JAL (J-Air) experienced both IB OB Flap Rod Assy Bend/Broken. To avoid delay/cancellation, we performed the repeat inspection by 120 FH (2+ weeks!).

Table 1 shows the defects after started repeat inspection as mentioned above.

Table 1: Defects List

Date	Reg	Phase
13-Feb-13	JA215J	During INSP
27-Feb-13	JA215J	During INSP
13-Jun-14	JA214J	During INSP
07-Jun-15	JA211J	Departure Check
19-Nov-15	JA225J	During INSP
20-Jun-16	JA225J	During INSP
09-Jul-16	JA221J	During INSP
09-Jun-17	JA215J	During INSP

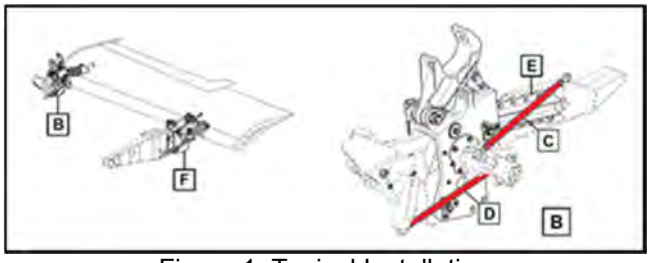


Figure 1: Typical Installation

It seems the inspection works fine. We know that these components have a function as a mechanical fuse. For each defect, we are checking the condition which gives excessive load to the wing. But for now, there is nothing like hard landing, or hard turbulence.

Based on the operator's point of view, there are 2 possibilities.

1. The quality of these rods is NOT stable.
2. These rods are TOO WEAK.

JAL would like all the airframers to provide comments on this matter.

FLIGHT CONTROLS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
19	**Side Stick Unit LH**	**FE392000102**	**Airbus**	**A350**	**27**	**LHT**

Airbus is requiring an annual check of PN FE392000102 to ensure that the desiccant bags are still in the desired condition (also refer to technical clarification 80254232/008). The CMM defines clearly the storage condition (refer to CMM 27-92-81 Subtask 27-92-61-530-001-A01).

LHT believes that this should be ensured by the storage conditions instead of performing a mandatory annual maintenance action.

Airbus, why is this requirement in place? What are the reasons that this cannot be ensured by defined storage conditions?

Airlines, airframers, and OEMs please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
20	**Side Stick Transducer Unit**	**321000M03**	**Fly By Wire**	**A330** **A340**	**27-92-13**	**AFR/KLM**	**AFR**

It has been noticed that following FUMIGATION of A330/A340 plane, several SENSOR FAULT error messages have appeared that concern the Side Stick, the Side Stick Transducer Unit (SSTU), and the Throttle Command Unit (TCU).

It has been identified that the CIMEX HCN of UUDS product is a corrosive acid when it is in contact with moisture. This acid may interfere with the electrical and mechanical connections the SSTU and the TCU.

Since 2014, Airbus took the commitment to analyze the root cause of this failure to fix it. Please Airbus, present the results of this analysis and solve it?

Airlines please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
21	**Inboard Aileron Electrohydraulic Actuator (EHA) Assembly**	**CA67001-017**	**Moog**	**A350**	**27**	**LHT**

Moog released a service bulletin CA67001-27-03, which introduced a new electronic module for PN CB84067-001. Though there is a TFU referring to this SB, Moog states that this SB is not related to any reliability improvement or in-service faults. Following this argumentation, Moog charges the SB to A350 operators and is refusing to have the old electronic module PN CB84067-001 refitted at no additional cost.

OEM, please state the clear purpose of the SB CA67001-27-03.

OEM, please explain, if a reliability improvement is not being incorporated, why is the old modification standard no longer acceptable in field?

Airbus, please comment.

Airlines, airframers, and OEMs please comment.

FLIGHT CONTROLS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
22	737-900ER Elevator Feel Computer	CA27977-001 CA27977-003	Moog	B737-900ER	2731	UAL

B737-900ER Elevator Feel Computer (MOOG P/N CA27977-001/-003) continues to cause operational disruptions due to reliability. The -003 has been an improvement however UAL continues to see failures. -003 failures seem to result more from failed solenoids than from other failure modes.

UAL would like to share troubleshooting techniques developed with Moog to identify failed solenoids on-wing and would like to request that Boeing make the solenoids an LRU (similar to the 757-300 elevator feel computer).

Moog and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
23	Flight Control Cables	BMS7-265	Boeing	B737NG	27	SWA

SWA has had several aircraft experience relaxation of flight control cables shortly after installation, which results in out of service time for heavy flight controls. Boeing has released various Service Letters through the years on certain blocks of aircraft recommending a re-tensioning (737-SL-27-265, 737-SL-27-249, etc.). Boeing has also recently added Maintenance Planning Data Spec 27-235-00 to re-tension flight control cables every 6600FC/3 years.

SWA is currently trying to find the optimal interval to re-tension flight control cables after installation, whether from the Boeing factory or during non-routine maintenance.

SWA would like an update from Boeing regarding flight control cable relaxation and re-tension recommendation after replacement.

SWA would like input from other operators on their best practices for flight control cable re-tensioning intervals.

Boeing and other operator comments, please.

FLIGHT CONTROLS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
24	Multi-Function Spoiler PCU	51200-11	UTAS (Goodrich Aerospace Canada)	CRJ700 CRJ900 CRJ1000	27	LHT

CMM 27-62-02 is missing maintenance instructions for the attached servo valve, PN 51215-3. However, UTAS seems to have repair and adjustment capabilities. Please provide maintenance details, such as an individual CMM including acceptance test procedure, spare parts list and maintenance, to allow maintenance on the servo valve.

Other MROs and UTAS please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
25	Rudder PCU	390500-1009 390500-1011	Parker Hannifin	Q400	27	LHT

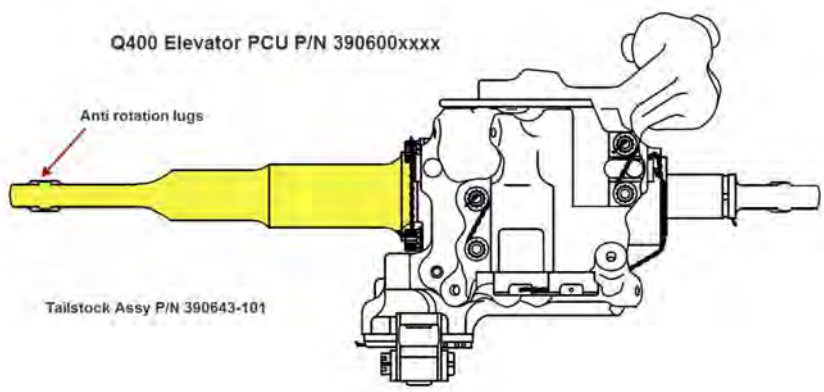
CMM 27-21-04 is missing maintenance instructions for the attached servo valve, PN 74160-01 (390599-1003). Please provide maintenance details, such as an individual CMM including acceptance test procedure, spare parts list, and maintenance, to allow maintenance on the servo valve.

Other MROs and Parker Hannifin please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
26	Elevator PCU	390600-1009	Parker	DHC-8-402Q	27	LHT

LHT experienced several cases where the anti-rotation lugs of the tailstock show some wear marks. Total Time of most of the Elevator PCUs was below 20,000 FH

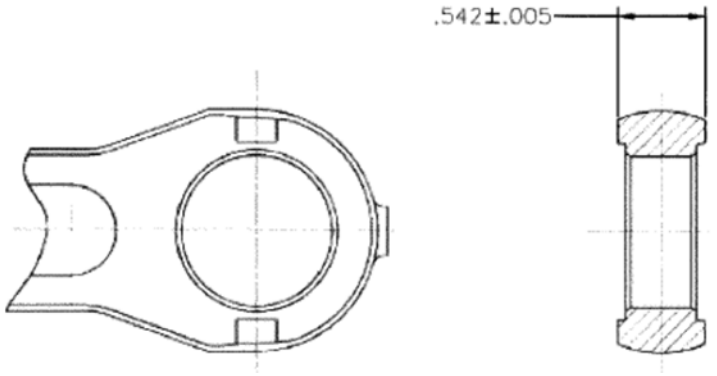
FLIGHT CONTROLS



Since there is no specific inspection criteria in the CMM, LHT contacted Parker about the omissions.

Parker came up with following instructions:

1. Perform visual inspection of anti-rotation lugs for scuffing, damage and measure 0.542 +/- 0.005
2. Replace tail stock P/N 390643-101 if the above anti rotation lugs dimension is below 0.537 inches.



Following these instructions (basically, Parker provided manufacturing dimension), LHT stated that most of the tailstocks were beyond these limits and had to be replaced. Actual wear exceeds the minimum limit of 0.537 inches by 0.01 inches Parker stated they consider evaluating the possibility of an in-service wear limit, but this will be a “longer term project.”

Question to other MROs:
Have you experienced similar findings on the Elevator PCUs?

Question to the OEM (Parker):
When can we expect to have a final solution for this problem? Is there an interim approval to use a minimum limit of 0.527 inches as an in-service wear limit?

Parker and other MRO comments, please.

HYDRAULIC POWER

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
27	**Pressure Transducer for Hydraulic System**	**PTX300-8009-3**	**GE**	**B777**	**29**	**JAL**
			Druck	**B737-800**		

Japan Airlines (JAL) has experienced 6 each of Pressure Transducers failure due to broken/damaged/deformed silicon diaphragm since 2015.

Date	Serial Number	Hours Since New
2015/12/9	4322154	1,124 hours
2016/8/19	10181321	2,055 hours
2016/9/5	10232838	1,211 hours
2016/10/13	4301671	3,611 hours
2017/2/28	4100274	4,316 hours
2017/4/27	10181320	3,420 hours

As listed above, operating hours are not so long.

Despite being in the warranty period, GE/Druck did not accept as a no charge repair, and advised that the failures were caused by external forces being applied to the pressure sensing module (e.g., pressure pulses, mechanical shock). GE/Druck also advised that the inner bond wires were deformed and also found one with a broken bond wire at the heel on the silicon slice.

JAL believes this pressure transducer is selected as the model which is able to provide sufficient resistance against considerable pressure force in the hydraulic systems designed by Boeing.

Furthermore, for all of above cases, Airplanes did not indicate any other hydraulic system failures, except transducer fail. Also, there was no evidence of abnormal pressure in the flight data.

JAL suspects this is just an un-even outlier result of production reliability, and the transducers removed within warranty periods should be covered by warranty repair.

Comments from other operators who have same experiences, Boeing, and vendors would be appreciated.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
28	**Pump Motor Package**	**51154-04** **51154-05**	**Parker**	**A320**	**29**	**LHT**

Parker's Pump 51154-04/-05 is showing low reliability over the whole A320 fleet. Due to design failure, the pump is only showing reliability of 28,600 FH. With the EIS of A320neo, Parker has created a new design of the correlated pump, which is supposed to be utilized only on the A320neo fleet. This new pump design is supposed to be significantly more reliable than the old design. Unfortunately, so far there are no plans to offer this pump as a retrofit for A320ceo. Regardless of the new SB 51154-29-497, a retrofit option might be interesting.

OEM, airframer: Are there any plans for a retrofit of this pump?

Do any other operators encounter similar issues with this pump?

Airlines, airframers, and OEMs please comment.

HYDRAULIC POWER

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
29	Hydraulic Fluid Transfer	BMS3-11	Boeing	B737NG	29	SWA

SWA has had several aircraft experience hydraulic fluid transfer from B System to A System and, to a lesser extent, A System to B System. This has been verified through Aircraft Health Management (AHM) data and Boeing Engineering. The most likely source of this transfer is via brake shuttle valves; however, the investigation is still ongoing.

SWA would like an update from Boeing regarding hydraulic fluid transfer root causes and proposed corrective actions.

SWA would like input from other operators on their experiences with hydraulic fluid transfer and common corrective actions.

Boeing and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
30	Power Transfer Unit (PTU)	4101002-11	Triumph	A320	29	AFR/KLM	AFR

Shoes and control piston guides are part of the PTU IPL (CMM 29-11-17 revision 11). Despite several requests for quotation by AFR, no answer from Triumph.

- Can a quotation be provided by Triumph in compliance with their commitments?

Triumph and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
31	Pump, Hydraulic	849589	Eaton	B737 CFM56	29	AAL

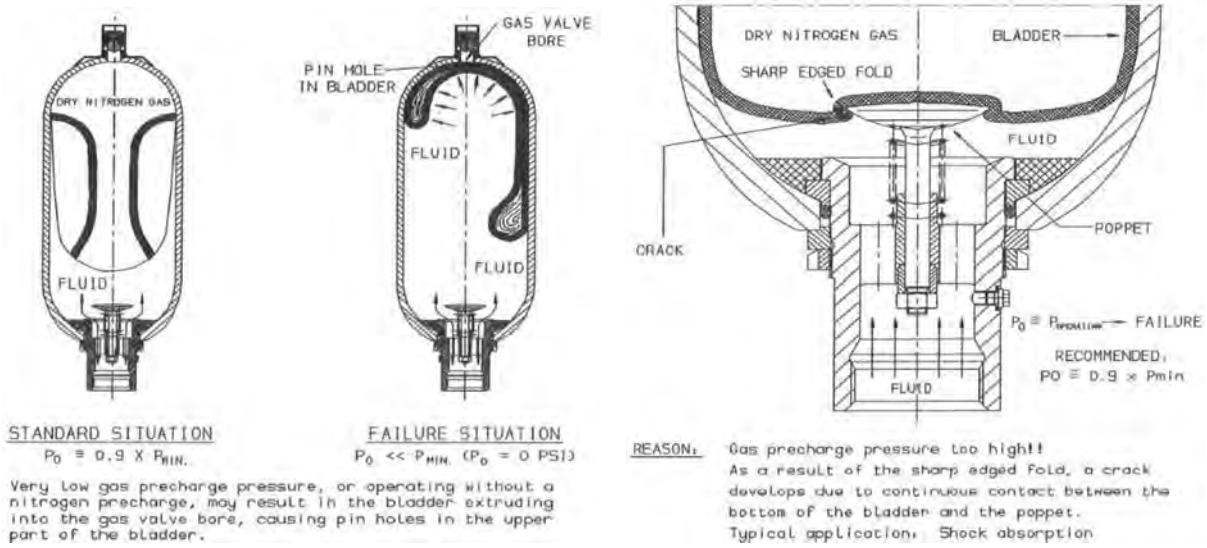
Engine driven pumps have been coming into our repair shop with excessive heat damage. Support documentation to be submitted at a later date.

Eaton and other operator comments, please.

HYDRAULIC POWER

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
32	Hydraulic Accumulators	SB209L1A1	Hydac	A320	29	LHT

LHT frequently receives hydraulic accumulators from service with damaged bladders. Hydac claims those damages being a result of either under or overfilling situation as shown in the figures below and therefore rejects warranty adjudication, even if the accumulator is with in warranty period. Operators on the other side can prove that all maintenance interval acc. to AMM were met and reject abnormal wear and tear.



Other MROs, Hydac, and Airbus please comment if those damages are considered damages due to normal operation or abnormal wear and tear. Please also comment if the present maintenance intervals are considered sufficient.

HYDRAULIC POWER

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
33	**Engine Drive Pump (EDP)**	**3032793-002**	**Eaton**	**A380**	**29**	**AFR/KLM**	**AFR** **QFA**

The springs of the clutch make an erosion on the mounting flange. There are no tolerance limits in the CMM 29-10-60 to assess the maximal wear of the mounting flange.

- Can a limit tolerance be studied by Eaton to assess the admissible wear of the mounting flange?
- If a limit tolerance cannot be studied, does a repair procedure can be added in the CMM to avoid the replacement of the mounting flange?

After the final test bench, the EDP must be disassembled to control the wear of the cylinder block and Seal static face, then another test bench has to be performed. On other EDPs, instead of this inspection during the final test bench, an additional test, including a paper on drain circuit, allows the check of wear of cylinder block, thanks to a paper with case control of pollution.

- Could this additional test with paper be studied by Eaton to come after disassembly, inspection, and a second test?

We often observe an important wear on the shoe of the pistons; consequently, the replacement of the pistons shoes assembly is necessary; a lap of the shoe is not enough to remove the wear erosion.

- This wear of the shoe is very much more important than all the other pumps, so what is the feedback of Eaton or airlines on this topic?

Eaton and other operator and supplier comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
34	**Accumulator**	**088259-04644**	**Olaer**	**A330** **A340**	**29**	**AFR/KLM**	**AFR**

Almost all removals of accumulator are due to a burst of the bladder.

- Can Olaer study a new design to prevent the burst/drilled/detached bladder installed in the accumulator?

Furthermore, a scotch brand adhesive is installed around the identification plate to hold it on the accumulator. This material is not referenced in the CMM 29-11-42 and Olaer does not provide specification or reference about it.

- Could this reference be added into the CMM?

Olaer and other operator comments, please.

EQUIPMENT/FURNISHING

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
35	**Door Strike**	**AR4704-2/-6 AR4726-1/-5**	**Adams Rite**	**B747 B777**	**25**	**DAL**

The Boeing widebody Door Strikes have a 9-year discard requirement, due to the CMRs. Delta has requested the discard requirement be changed to an overhaul requirement.

Delta requests that Boeing and Adams Rite work together to certify that an overhauled unit passes the requirements.

Additionally, the 9-year requirement does not take into account the actual usage of the components, which is what would lead to the failure of the internal solenoid.

Boeing, Adams Rite, and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
36	**Overhead Bin Deflector**	**C715039-1 C715039-2 C715039-3**	**Zodiac**	**MD90**	**25-26**	**DAL**

The Overhead Bin Deflectors on the R/H side of the aircraft are always getting damaged or broken because of baggage. Is it possible to have them installed on top of the bin like the B717s?

Zodiac and other operator comments, please.

EQUIPMENT/FURNISHING

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
37	Trash Compactor	3210-005DB-0XX	Zodiac	B777	25-30-17	AFR/KLM	AFR

AFR has corrosion on the bottom of the side panels of the cabinet of the trash compactors (500159-103/ 500159-105). CMM proposes to replace the bottom panel of the cabinet but not the side panels. Customer has to replace the full cabinet if a side panel is corroded.

Can Monogram:

1. Propose a repair to replace the panels (and make that the panels are procurable)?
2. Improve the corrosion resistance of its panels using treatment of aluminum before assembly of the honeycomb (Chromic Acid Anodizing, for example)?

Airframers and airlines please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
38	Toilets, Trash Compactor, GDWU, Slide	All	Zodiac	All	25 38	AFR/KLM	AFR

Lead times for spares parts should be respected (NHA: Toilets, Trash compactor, GDWU, slide).

For example, AFR requested several trash compactor cabinets (500159-105). Contractual lead time is 15 days, delivery time is 11 months (cabinets are bought several times per year).

Can Zodiac provide an action plan to respect lead time?

Airframers and airlines please comment.

PNEUMATIC

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
39	**High Stage Regulator**	**107484-7**	**Honeywell**	**B737**	**36**	**AFR/KLM**	**KLM**

As a B73N Component Systems Engineer, I support KLM and its many customers with technical data and analyses of the components on their fleet. For some of our customers, the High Stage Regulator is a troublesome component. Therefore, we perform many of the recommended SBs on this component. These improvements have shown a slight increase of the MTBUR over the last few years, but is still far from the desired level.

Last year, we evaluated SB 107484-36-1916 Revision 00 and SB 107484-36-1916 Revision 01 to be performed, but with SB 107484-36-1916 Revision 02, that changed.

Table 5 from Revision 00 and 01:

Check Table 5 from Revision 02 and 03 of SB!

We can imagine that over the course of one year time, the price of materials can change (normal escalation index). But we cannot imagine that the total cost of performing this SB increases by +1200% whilst the new price of the whole High Stage Regulator (P/N 107484-7) is just a little bit bigger than a kit price (Boeing Part Page, August 1st 2017).

We noted that on November 21, 2016, a third revision was released, with the same price table as in SB 107484-36-1916 Revision 02; thus, with that extreme high increase.

To my question, “Could you please explain what the cause of this price increase is?” Honeywell replied the following:

> *Would like to advise yourself and KLM that the initial price communicated when this Modification and Service Bulletin was released was in fact a mistake. During an internal review, we have captured this pricing error and have therefore corrected the price where it should have been initially. Not what you were expecting to read I’m sure, but that is the real reason in all transparency.*

In our judgement, the present price is unrealistically high and therefore we think that price increase of 1200% in such a time frame is totally out of proportion.

Can Honeywell review this SB once more and improve the price?

How do other operators deal with these such changes?

Operators and Honeywell please comment!

PNEUMATIC

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
40	Pre-Cooler Control Valve (PCCV) Sensor	129666-3	Honeywell	B737	36	SR Technics	JAL

The accumulation of dirt in the valve section of the PCCV Sensor has caused Air Turn Back events for JAL and is the primary cause for one half of removals (excluding NFF) on SR Technics-supported fleets. This failure mode is random in nature and appears to be the result of dirt being released within the engine bleed system. The source is unknown.

Please can Boeing help to identify the source of this contamination, and support the development best maintenance practices?

Photo showing dirt build-up on the ball-valve of a disassembled PCCV Sensor.

Boeing and other operator comments, please.

PNEUMATIC

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
41	**Temperature Control Valve**	**39808-2** **398908-3** **398908-4** **398908-5**	**Honeywell**	**B737**	**21**	**AAL**

The B737 Temp Control Valve has for some time not performed satisfactorily for the needs of the aircraft. Honeywell issued service bulletins to convert the -3 valve to the -4 valve, without success in increasing the reliability. Subsequently, additional service bulletins were released to convert the -3 valve to the -5 valve, or the -4 valve to the -5 valve.

A vital part in the upgrade of these valves is the (actuator) switch, part number 2047168-8. While it seems to operate better than the old switch, part number 67620694-1, its performance is still lacking. The new switch exhibits signs of blinking or flickering on the test panel and Honeywell has revised the CMM (21-51-94) to state that this is not a confirmation of reason for removal or rejection.

AAL has experienced some switches that must be cycled several times before making contact. These are switches that have not been in service for an extended time. Some failures have occurred within 500 hours. We would like to see an improvement or a redesign to this switch.

Questions:
1. Boeing/other operators – Have you seen the above switch failures as well?
2. Will Honeywell look at a re-design of this switch?

Honeywell, Boeing, and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
42	**Temperature Control Valve**	**957A0000-01** **957A0000-02** **1394A0000-01**	**Liebherr** **Intertechnic**	**A330** **A340**	**21**	**AFR/KLM**	**AFR**

No quotation available for the Engraved Based (PN 777-237/-359) from the NHA Actuator parts PN 9069A1018-01/9069B1002-01 (CMM Liebherr 21-62-04 rev 3 Dec 01/14, vendor of the part is Intertechnic vendor code V0553).

The solution to repair the Temp Control Valve PN 957A&B (CMM 21-53-53 rev 05 dated May 01/12 LIEBHERR) when the Engraved Based is damaged is to buy the complete actuator.

Same case for the TCV 1394A0000-01 (CMM 21-53-55-R rev 0 dated May 01/15) with his Actuator PN 9069B1002-01 (CMM Liebherr 21-62-04 rev 3 Dec 01/14).

We request that Liebherr/Intertechnic offer the possibility to purchase the sub part only and not necessarily the NHA.

Liebherr, Intertechnic, and other operator comments, please.

PNEUMATIC

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
43	**Starter**	**3505468-X**	**Honeywell**	**A330**	**80**	**AFR/KLM**	**AFR**

To improve safety and reliability for starters, AFR requests several times a year to the Honeywell shop (Tempe, Arizona) a Root Cause Analysis Report, but it is very difficult to follow if our requests are under process or realized due to no feedback from Honeywell concerning the progress of these reports.

Can Honeywell take our needs and put in place a reliable process to be sure that the level of analysis requested by AFR/KLM is taken into account?

Honeywell and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
44	**Air Turbine Engine Starter**	**3505448-5-1** **9281M79P03** **9281M79P01** **3505448-3-1**	**Honeywell**	**B767**	**80**	**AAL**

The air turbine engine starter “rotating assembly incorporates an axial containment ring with twelve equally spaced tungsten carbide cutter pins. Should the turbine wheel move axially, following a thrust bearing failure, the cutter pins will cut the rim from the turbine wheel and the cut rim shall be contained with the area of the containment ring.” CMM 80-11-11, page 3.

AAL has experienced many starter failures where the cutter pins have failed to cut the rim from the turbine wheel. In some instances, the heat has become so intense that the turbine wheel shaft has become distorted or even melted.

The axial containment ring that is currently available is part number 3500685-2. The cutter pins are installed from the back (flat side) of the axial containment ring by the manufacturer. The problem that is occurring is that the cutter pins are moving away from the turbine wheel, both by vibration or by impact. When the containment ring fails in its purpose to slow/stop the turbine wheel or to cut the rim from the turbine wheel, the turbine wheel continues to spin at a high rate, often causing a more catastrophic failure than necessary. The previous axial containment ring (part number 3500685-1) cutter pins were installed from the side facing the turbine wheel, thus eliminating any possibility of the cutter pins exiting the axial containment ring.

Questions:

1. Boeing/other operators – Have you seen the above failures as well?
2. Will Honeywell redesign the axial containment ring or return to the previous part (part number 3500685-1)?

Boeing, Honeywell, and other operator comments, please.

PNEUMATIC

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
45	**HP Regulating Valve** **Anti-Ice Pneumatic Shutoff Valve**	**6763C080000** **FYLB-52145-1** **FYLB-52145-2** **FYLB-52145-3**	**Liebherr** **UTAS**	**A330**	**36** **30-21-15**	**AFR/KLM**	**AFR**

Problems of vibration on engine CF6-80E1, which causes heavy damages on HP REGULATING VALVE and ANTI ICE PNEUMATIC SHUTOFF VALVE. The vibrations seem to continue despite the modification by addition of links (VSB GE CF6-80E1 72-0472 and AIB A330-71-3029).

1. MTBUR of the HP regulating valve (20 000 for MAY 2016 and 6925 for MAY 2017) decreases since end of 2015 after realization of modification. The main removal reasons (not open/HPV fault/not closed) are due to many important damages (actuator repair/heavy damage) declared per OEM, 12 heavy damages for 2015-2016 for AF-KLM fleet.
2. Regarding FYLB-52145, the heavy vibration level of CF80 engine has a real impact on the reliability of the valve. A VSB FYLB-52145-30-177 (upgrade from PN FYLB-52145-2 into -3) was implemented with no positive results on the reliability (on A330 fleet). The same valve installed on A340 fleet has a MTBUR 3x higher than the one installed on A330 fleet.

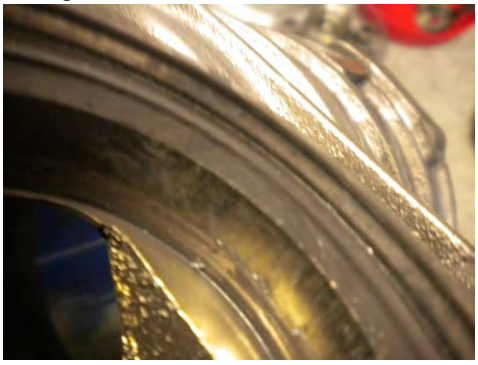
Will AIB, GE or LBH, and UTAS provide a new solution to improve the reliability of both components?

Please airlines, comment.

Examples of damages due to the vibration of engine, caused by the wear of the link on HP regulating valve:

Piston

Actuator housing



PNEUMATIC

Link damaged

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
46	Trim Air Valve	1380221-X 1380224-X	UTAS	A380	21	AFR/KLM	AFR

Data is missing on CMM 21-63-19 Rev.13 concerning the tools to perform the disassembly procedure of the Butterfly Assembly from Valve Housing. Currently, when we remove the rivets of butterfly by drilling process, we damage this part and others.

AFR/KLM requests UTAS to design fixtures and process to perform the disassembly of the Butterfly Assembly.

UTAS and other operator and supplier comments, please.

PNEUMATIC

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
47	**Rotary Actuator**	**R4232M-2/R4232M6-2 (Whippany)** **1380162-7/-8 (Hamilton Sundstrand)**	**Whippany Actuation Systems**	**A380**	**21**	**AFR/KLM**	**AFR**

No quotation and provisioning available from the Rotary Actuator spare parts (CMM 21-52-42 Rev.06 UTC Aerospace Systems).

Currently, we do not have the possibility to repair this actuator alone. The current solution to repair the NHA (Trim Air Valve PN 1380221-X/1380224-X) is only by a standard exchange of an actuator assy or sending the NHA to Hamilton for repair.

Same case for the Rotary Actuator PN 1380155-5 (CMM 21-52-37 Rev.04 UTC Aerospace Systems) with NHA Temperature Control Valve PN 1380214-X.

AFR/KLM requests to have the possibility to purchase the parts needed to repair the rotary actuators according to the related CMM.

Whippany and other operator and supplier comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
48	**Torque**	**810351-X** **810349-X** **810615-X**	**Hamilton**	**B777**	**21** **36**	**AFR/KLM**	**AFR**

The torque motors listed are part of the following NHA:

FCV PN 810204-4 (CMM 21-35-01)
PRSOV PN 810229-x (CMM 21-35-02)

ACMM 36-00-01 is available for these torque motors but it is not possible with this document to perform calibration, repair, or overhaul. A complete CMM is not available from Hamilton.

AFR/KLM requests to have access to a complete CMM to repair in-house these torque motors.

UTAS and other operator and Boeing comments, please.

AIR CONDITIONING SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
49	Humidifier Pad Assy	411-028-04 411-029-01	CTT	B787	21	AFR/KLM	KLM

The B787 has two humidifiers for Flight Crew Rests. The Pad assembly are expensive and have to be replaced regularly. This costs the operator a lot of money on a yearly basis.

KLM would like to urge the humidifier OEM CTT to redesign their two Humidifier pad assemblies to make it possible to simply replace the pad-core into the Humidifier pad assembly. Preferable on-wing, but at least in a shop.

Also, KLM would like to challenge any PMA manufacturer to look into this issue and investigate the feasibility of a complete redesign which contains a line-replaceable humidifier pad.

- CTT to comment.
- Any PMA manufacturer to comment.

Other operators comment please?

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
50	FCAC Pump Assy	7010615H02	UTAS	B787	21	AFR/KLM	KLM

FCAC servicing

One of KLM's customers experienced internal leakages to the electrical area of the FCAC Pump, damaging and contaminating it with pinkish residue (dried up cooling liquid).

According to UTAS, the cause was internal overpressure due to overfilling the FCAC system during or after servicing. Obviously, an overfill is likely to happen now and then during maintenance.

If overfilling is indeed the root cause of the seen damage, KLM feels that there should be some kind of overfill protection feature provided either in the FCAC pump or in the aircraft's FCAC system to prevent that damage.

- Has any other operator experienced this kind of contamination/damage?
- UTAS to comment please.
- Boeing to comment please.

AIR CONDITIONING SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
51	PECS Pump Package FCAS Pump Package ICS Liquid Cooling Pump Package	7110170H01, H02 7110615H01 7111038H01	UTAS	B787	21	AFR/KLM	KLM

Unlike their predecessors, the G5 PECS, FCAC, and ICS Pump Packages of the Boeing 787's Liquid Cooling system have line-replaceable Motor Controllers (MCs). However, if a pump package mechanically fails, the whole pump package (i.e., with MCs) needs to be replaced on the aircraft.

All G5 PECS, FCAC, and ICS Pump Package CMMs 21-55-28, 21-54-18, 21-53-92 prescribe that prior to the pumps performance test, the motor controller(s) need to be removed and tested with their own CMM. This requirement is deemed to be an unwanted cost driver, for had there been any issue with the MC, it would and could have been replaced on wing as is an LRU. Even if the MC has a malfunction and enters the maintenance shop as part of the pump package, a well set up performance test of the pump package should be able to detect that flaw.

Rumor has it that UTAS is aware of this unnecessary requirement and is planning to remove it from the CMMs. If true, KLM would like to have this rumor confirmed by UTAS. If false, KLM would like to hear other operators and MROs opinions and positions.

KLM would like to hear other operators and MROs opinions and positions.

KLM requests UTAS to remove the MC test requirement from the G5 PECS, FCAC, and ICS Pump Package CMMs (If not already in progress).

UTAS and other operator and supplier comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
52	NGS Pack Air Filter Replacement	7012013H04	UTAS	B787	47	AFR/KLM	KLM

Nitrogen Generating System – air filter/ozone converter. This filter is expensive and is discarded every 6,000 hrs.

KLM would like to see

a. Some kind of CMM cleaning/regeneration method for the filter/Ozone converter or,
b. The possibility to replace its filter-element.

Also, KLM would like to challenge any PMA-manufacturer to look into this issue and investigate the feasibility of a replacement filter assy.

- UTAS to comment.
- Any PMA manufacturer to comment.

Other operators comment please!

AIR CONDITIONING SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
53	Supplemental Cooling Unit	7011015H02 7011015H03	UTAS	B787	21	AFR/KLM	KLM

Per CMM 21-53-18, a run-in procedure is prescribed for the units scroll compressor after the compressor was repaired (Ref.: Subtask 21-53-18-700-026-A00 step 10). This run-in will take 3-5 hours (!) of test rig time on top of the normal performance test time of approx. 2.5 hours.

KLM deems this run-in test undesirable and unnecessary, for the normal performance test will provide enough time to verify smooth operation of the scroll compressor. This KLM concern was brought up to UTAS previously. The UTAS response was that the run-in will take care of the more than normal initial wear of newly installed compressor parts.

Oddly enough, the compressor is not flushed or disassembled after run-in to remove wear debris, leaving the wear debris in the refrigeration system.

NOTE: The run-in procedure is also prescribed for the two compressors of the P/N 7010629H01 Cargo Refrigeration Unit (CMM 21-54-11).

KLM would like to hear other operators and MROs opinions on the run-in procedure.

KLM requests UTAS either to:

- Remove the run-in procedure
- Develop an alternate (less costly) run-in procedure.
- Develop compressor parts that provide a smoother initial run and less wear.
- Provide pre-un-in compressor parts.

UTAS and other supplier and operator comments, please.

AIR CONDITIONING SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
54	**Supplemental Cooling Unit**	**7011015H02** **7011015H03**	**UTAS**	**B787**	**21**	**AFR/KLM**	**KLM**

Like all other refrigeration systems in the world, the SCU is equipped with a filter dryer. However, unlike the (within the aviation industry) commonly used bolt-on type, the SCU uses a braze-on type filter dryer. KLM deems this braze-on type filter dryer undesirable, for it is common practice to replace the filter dryer each time the (actual R134a) refrigeration system is opened. Replacing a bolt-on type filter dryer is 5 min job. Replacing the SCU's braze-on type filter dryer will take approx. 1 hour.

This KLM concern was brought up to UTAS previously. The UTAS response was that the braze-on type filter dryer will be less susceptible to leakage. 25+ years of KLM experience with refrigeration systems did not ever reveal bolt-on type filter dryers as the no.1 root cause of leakage.

Sadly enough, the no.1 root cause of SCU replacements is a clogged filter dryer. UTAS also deems a recently added filter dyer test procedure (Subtask 21-53-18-700-031-A00) to be helpful and desirable during maintenance, where a slight redesign of the filter dryer valve assembly would have been the only sensible thing to do.

Furthermore, when flushing a refrigerant system, the filter dryer needs to be removed, or else flushing will do more harm than good as all the dirt in the system will automatically accumulate in the filter dryer. Again, the braze-on type filter dryer proves to be an undesirable hindrance during maintenance.

An SCU with a braze-on type filter dryer will increase KLM costs annually on undesirable and unnecessary maintenance. NOTE: The same braze-on type filter dryer is also used on the P/N 7010629H01 Cargo Refrigeration Unit (CMM 21-54-11).

KLM would like to hear other operators and MROs opinions and positions.

KLM requests UTAS to consider redesign of the filter dryer valve assembly.

UTAS and other supplier and operator comments, please.

AIR CONDITIONING SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
55	Supplemental Cooling Unit (SCU)	7011015H02	UTAS	B787	21	SR Technics	ETD

Etihad Airlines have experienced several SCU removals, resulting in a lower than expected reliability. The main failure is a clogged Valve Assembly Filter/Dryer, which is responsible for causing 11 out of 20 SCU removals in the past 12 months.

UTAS has mentioned that the current operating temperature/pressure/speed within the SCU is causing a significant pressure drop across the Filter/Dryer, and a software improvement is planned to militate against this issue, referencing Boeing 787-FTD-21-16005, which also includes operating guidelines on the cooling system.

Please can UTAS confirm the root cause of the Valve Assembly Filter/Dryer failures from the Etihad fleet? Also, can UTAS advise the expected release date of the software upgrade, if there has/will be in-service testing results that can be shared, and if this be offered to operators on a FOC basis?

The sharing of other operator's experience, particularly with regard to operating practices on the cooling system, will be appreciated.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
56	Exchanger – Dual Heat	810208-9	Hamilton Sundstrand	B777	21	JAL

JAL has 2 major problems regarding Dual Heat Exchanger:

1. JAL has experienced many cases of cracking at ram outlet box, V-notch, and closure bar on Heat Exchanger. 18 Heat Exchangers were removed for cracks in 2016 (MTBUR = 15,359 hrs.). Also, we sent the Heat Exchanger to UTAS for cleaning every 12,000 hours for hard-time requirement. Shop findings on the removed units show a high number (over 95%) of crack at ram outlet box and/or closer bar on Heat Exchanger.

2. JAL has also experienced a "bulging" at the core thread. If the "bulging" was found at core thread, UTAS replaced the dual core assembly, due to repair procedure not being described in the CMM.

Questions:

- JAL would like UTAS to improve the material of above parts to suppress the crack problem.
- Does UTAS intend to add the repair procedure for "bulging" to the CMM?
- JAL would like to hear about other operator's experiences of these issues.

Comments from other operators, UTAS, and Boeing would be appreciated.

AIR CONDITIONING SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
57	**eFlow Control Valve** **Pack Flow Temp Control**	**63396754-1/-2** **51090248-002/-003**	**Honeywell** **Boeing**	**B737NG** **B737MAX**	**21-50**	**SWA**

SWA has had several aircraft experience constant cabin rate of climb fluctuations at cruise with the introduction of the eFlow system (B737NG Line# 5684, 5759, and on). SWA's corrective actions on these aircraft have varied from PRSOV sense line replacement, PRSOV replacement, TCV replacement, and other leaks checks throughout the system. Teleconferences with Boeing indicates that other B737NG operators have had similar experiences.

SWA would like enhanced troubleshooting procedures from Boeing and/or Honeywell for future issues.

SWA would like an update from Boeing and/or Honeywell regarding design changes to correct this issue.

SWA would like input from other operators that are experiencing this issue on how they troubleshoot the system.

Honeywell, Boeing, and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
58	**Temperature Control Valve (TCV)**	**398908-3** **398908-4** **398908-5**	**Honeywell**	**B737**	**21**	**SR Technics**	**Multiple**

In Jul 2005, Honeywell released SB 2740028-21-2781, which introduced the 2740028-2 series 2 switches to address the reliability issues that were already addressed in Feb 2004 (Boeing 737NG-FTD-21-04002). Despite this modification, reliability issues remained with TCV 398908-3 [ref. SB 398908-21-1616 C.(1) and C.(2)].

In 2012, Honeywell issued SB 398908-21-1616 to address these issues and introduced TCV 398908-4. As is widely known, the reliability of this part has proven to be rather poor and, therefore, Honeywell introduced TCV 398908-5 (ref. SB 398908-21-1635), which again uses the 2740028-2 series 2 switch.

Nowadays, many of our customers consider the -3 and -5 as equally reliable. Also, SR Technics reliability data shows only a minor difference (17kFH vs. 15kFH), which is assumed to be driven by the age difference of units. To conclude, the newly introduced -5 still has the same reliability as the -3 as it was introduced 12 years ago by SB 2740028-21-2781.

Please can Honeywell reveal their plan to improve reliability on the -3/-5?

Honeywell and other operator comments, please.

AIR CONDITIONING SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
59	Forward Cargo Trim Air Valve	600700-00-500 600700-00-501	Nord Micro	A320F	21-43	AAL

Of AAL's 392 Airbus A320F aircraft:

- 49 aircraft have Forward Cargo Heat
- 180 aircraft have Aft Cargo Heat
- 163 aircraft do not have Cargo Heat

Current 12-month MTBUR for the Hot Air Trim Valve (P/N: 600700-00-501) on aircraft equipped with Forward Cargo Heat is 3,708 FH. Current 12-month MTBUR for the same part number on aircraft equipped with Aft Cargo Heat is 16,360 FH.

On the 49 aircraft (delivered between July 2013-May 2014) with FWD Cargo Heat, AAL has experienced 41 valve removals and 20 Cargo Heat Controller (P/N: 600611-00-600/-601) in the 12 months ending in May 2017. Based on our shop reports, the valves are experiencing over a 90% failure rate and the Controllers are closer to a 30% failure rate. Due to the over 90% failure rate, AAL believes there is a design issue with the Hot Air Trim Valve.

AAL is working with both Nord Micro and Airbus on the reliability issues with the valve, but have yet to receive a fix for our FWD Cargo Heat Faults.

Are other operators equipped with FWD Cargo Heat experiencing the same issues?

Can a fix and a timeline please be provided?

Nord Micro, Airbus, and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
60	Air Cycle Machine	2206400-1 2206400-2	Honeywell	B737NG	2100	UAL

UAL continues to experience high removals of the B737NG Air Cycle Machine (2206400-1/-2). No product improvements have been made for many years.

Are other operators similarly experiencing high ACM removals? Is Honeywell planning any reliability improvements?

Honeywell and other operator comments, please.

AIR CONDITIONING SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
61	**Cabin Air Compressor Outlet Check Valve**	**7010105H01**	**Hamilton Sundstrand**	**B787**	**21-51-91**	**AFR/KLM**	**AFR**

AFR requested IP for this valve. IP is not available since the valve should be redesigned (FEV 2016). Will Hamilton either:

- Redesign the valve and when this one will be available?
- Provide quote and parts to repair the actual valve?

Airframers and airlines please comment.

NACELLES & THRUST REVERSERS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
62	Thrust Reverser System	N/A	Boeing	B777-200 Trent 892	78-34	AAL

AAL is experiencing an increase in flight deck messages (EICAS Thrust Reverser and Interlock messages) to our crew on our B777-200 aircraft. A review of these events shows that the typical fix is replacing components. The most commonly replaced components are the reverser interlock actuators, directional control valves, and the EEC.

The problem for AAL stems from the fact that the troubleshooting process is often long and convoluted; mechanics are attempting to follow the FIM and will usually arrive at the correct component, but only after multiple components have been replaced after being directed to them by the FIM.

Do other operators report similar troubles while trying to follow FIM 78-34? Does Boeing have any FIM improvements in work to help address TR fault codes and flight deck messages and decrease troubleshooting time?

Other operator and Boeing comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
63	Thrust Reverser	LJ76610 LJ76611 LJ76612 LJ76613	UTAS	B757	78-31	AAL

The B757/RB211-535 thrust reversers (post SB 78-9722) have been experiencing corrosion issues on the upper beam (LJ76501/502 or LJ76942). This surface corrosion leads to pitting which has been found to be quite extensive on some units. When the upper beam is removed, there is no good way to measure how much material is remaining. UTAS has provided the beam's original thickness, but has yet to provide an effective way to measure the material that remains. Without being able to measure the remaining material, the unit can be forced to be scrapped at a large cost to the airline.

AAL believes UTAS must design and publish a reliable and accurate way to measure the beam's thickness. This measurement is required due to a design flaw that is resulting in the corrosion in the first place.

Other operators, Boeing, and UTAS comments please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
64	Thrust Reverser Actuator	2U2202 2U2203	Woodward	ERJ190 ERJ195	78	LHT

Woodward, please provide contact details for ordering spare parts in order to maintain these Thrust Reverser Actuators IAW CMMs 78-30-21, -22, -23, and -24.

Other MRO, Woodward, Embraer comments, please.

NACELLES & THRUST REVERSERS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
65	Fan Cowls	314W5200-XXX	Boeing	B777-200 Trent 892	71-11	AAL

Boeing SB 777-71-0073R3 was published for the GE90-powered B777 fleet back in 04/26/2016 regarding fluid ingression into the fan cowls. It was AAL's understanding that after testing the SB on the GE90 fleet, a similar SB would be released for our Trent 892-powered B777 fleet. The fluid often freezes and expands at altitude, resulting in disbonds in the cowl panels, which lead to operational impacts and to extensive repairs.

AAL has not received any updates on the service bulletins effectiveness, nor a target date for the Trent 892 SB. Could Boeing please provide an update?

Other operator and Boeing comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
66	Isolation Control Unit	TY1915-21A	UTAS	A320	78-30-13	LHT

With the revision 13 of CMM 78-30-13, UTAS deleted several subparts of the Isolation Control Unit in the CMM. Mainly effected is the filter assembly P/N CH251144, IPL item 2-10. All internal items, IPL item 2-60 to 2-140 and 2-190 to 2-320, needed for the repair of this sub component are set in the IPL of revision to deleted. Therefore, a repair of this subassemblies will not be possible anymore and the complete subassemblies has to be changed and scrapped.

LHT engineering wants to know why UTAS deleted these parts and stopped the repair of the subassemblies Filter Assembly?

UTAS and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
67	Hydraulic Control Unit	TY1203-Series TY2090-Series	Goodrich Actuation Systems (UTAS)	A320 Fam	78-31-53	LHT	DLH
	Primary Door Latch	TY2091-Series			78-31-56		

In the above-mentioned CMMs, a fire blanket is shown in the CMM IPL as individual part with P/N CH2013A0009 or P/N CH2091A0004. Units received for maintenance are frequently delivered without this fire blanket from the customer.

Questions:
Does the OEM consider the fire blanket part of the LRU? In consequence, does the OEM consider a missing fire blanket mishandling?

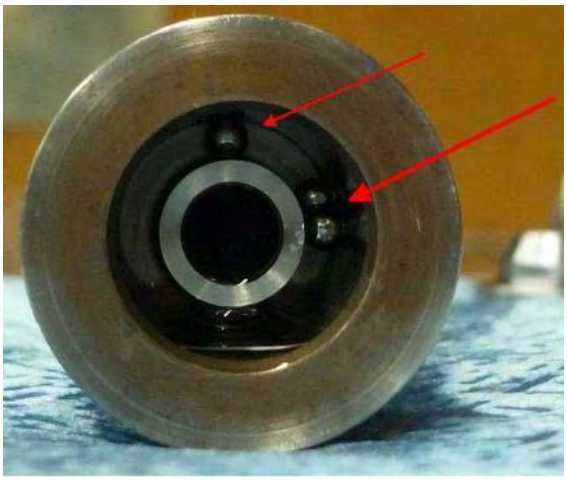
Operator and supplier comments, please.

NACELLES & THRUST REVERSERS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
68	Hydraulic Control Unit Lower Locking Actuator	TY1540-Series TY1542-Series	Goodrich Actuation Systems (UTAS)	A320 Fam	78	LHT	DLH

LHT frequently receives Hydraulic Control Units P/N TY1540-Series and Lower Locking Actuator P/N TY1542 from Engine V2500 with loose balls inside resulting from ball bearing IPL Item 2-280 inside the actuator.

PN TY1540-20 – SN 1855



PN TY1540-24 – SN 3217

PN TY1542-50 – SN 5697

PN TY1542 – SN 5697

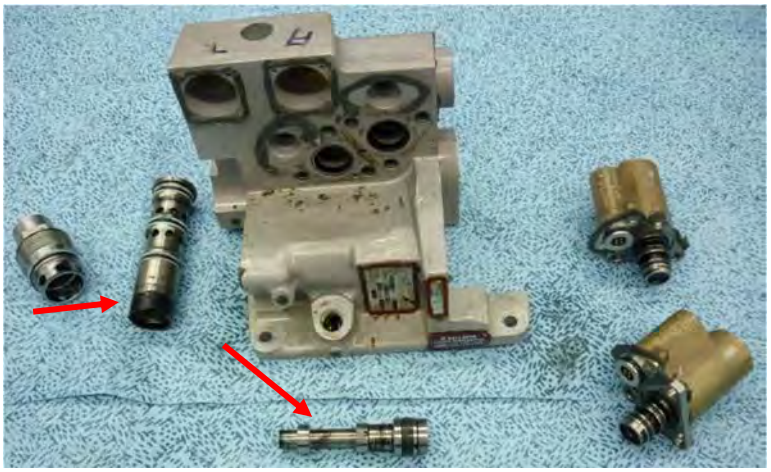
Question:
Is this problem known to other operators/MROs?

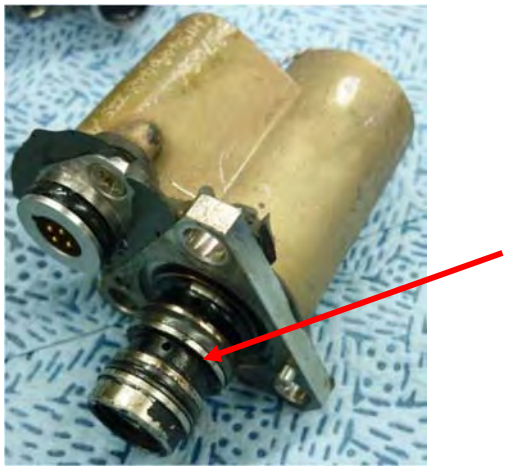
Other MROs and OEMs, please comment on the evaluation that this situation is considered abnormal wear and tear. Is it possible to identify a root cause? OEMs please comment.

NACELLES & THRUST REVERSERS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
69	Hydraulic Control Unit	TY1540-Series	Goodrich Actuation Systems	A320 Fam	78-31-51	LHT	DLH

LHT frequently receives Hydraulic Control Units due to overheat situations. Examples are shown on the pictures below. The black oil coal cannot be removed and the units are usually beyond economical repair. In discussion with affected operators and the component OEM, no root cause could be isolated so far.





Question:
Is this problem known to other operators/MROs?

Other MROs and OEMs, please comment on the evaluation that this situation is considered mishandling. Is it possible to identify a root cause? Possibly related to the engine? OEMs please comment.

NACELLES & THRUST REVERSERS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
70	Hydraulic Control Unit	TY1540-Series	Goodrich Actuation Systems (UTAS)	A320 Fam	78-31-51	LHT	DLH

Kynar Sleeve P/N CRN3-32-6 is listed in IPL of CMM 78-31-51 as IPL Item 5-380. Purchase request for this part placed at UTAS with the answer that the part is now obsolete and alternative P/N RNF-100-3-32-6 can be ordered.

Alternative part is not listed in CMM. No documents were provided to support the use of the alternate P/N. The CMM 78-31-51 revision for HCU TY1540 completion target date is July 2017. No CMM Revision received until today.

Question:

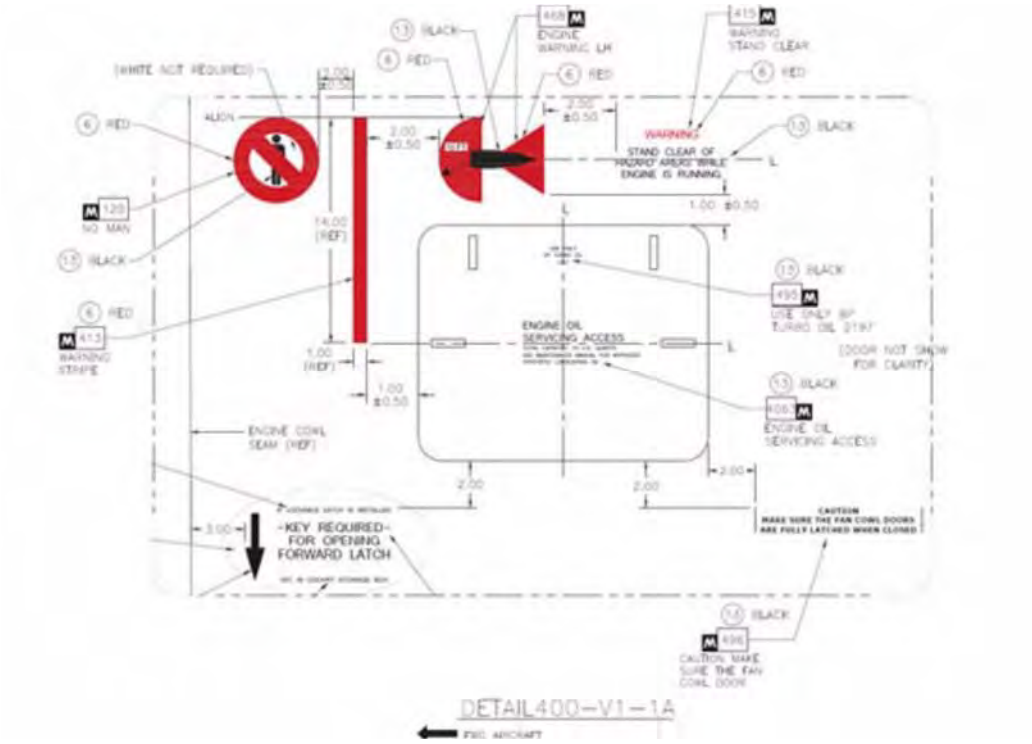
Can the CMM be revised to reflect the alternative P/N, or can other approved data be provided to allow usage of the alternate P/N? OEMs please comment.

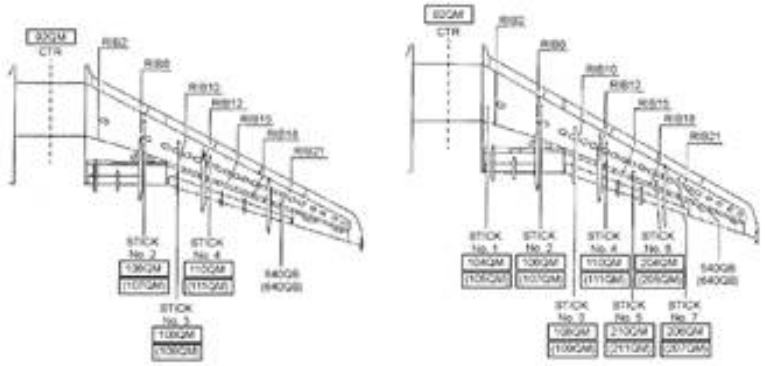
Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
71	Engine Nacelle Decals	FlyMark 6	UTAS Airbus	A321	11-00	AAL

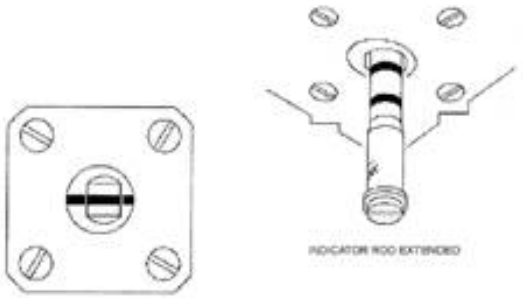
AAL is facing early erosion of engine nacelle decals. AAL has experienced decal/label erosion on newly delivered aircraft with an average life of less than 1,000FH. Please see pictures for details.

We would like to know if any other operators are facing similar missing decal/eroded decal issues past accepting A320 delivery from Hamburg and/or Mobile, AL.

NACELLES & THRUST REVERSERS







Other operator, supplier, and airframer comments, please.

ENGINE SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
72	Health Checks	Several	Honeywell UTAS Others	B737-800	36	JAL

To avoid the flight interuptions, such as Air Turn Back or Diversion, JAL carries out the health check of the pneumatic system on B737-800 in accordance with AMM 36-11-700-801 when the bleed pressure differ or low , which are caused by the bleed trip off, and when are noticed in the previous flight. Although JAL replaces the related components to isolate the root cause of the bleed pressure differ or low, the trouble confirmation rate of the related components which are removed by the health check is low. The same problem recurs in a short time, and it takes a lot of time and labor for our aircraft mechanic to have to carry out the health check again.

Since aircraft mechanics, shop repairmen, and engineers are considering improving the accuracy of the health check at JAL, JAL would like other operators' comments, especially in the following points of view:

1. When and how to carry out the health check.
2. Trouble confirmation rate of the related components.
3. Special knowledge to isolate the root cause during the health check.

JAL is carrying out the retrofit to new pre-cooler control valve from old one to improve the total performance of the bleed system and so 24 positions of the total 100 positions have been converted in JAL. Although the hours of the new pre-cooler control valve to use have been short, the trouble has not been occurred yet.

Comments from other operators, vendors, Boeing are appreciated.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
73	Integrated Drive Generator	729825M	UTAS	B757 B767	2411	DAL

The IDG component has exhibited historically poor reliability over the years on the B757 fleet. Unscheduled removals have been causing an operation impact for DAL resulting in delays and unscheduled aircraft out of service. Occasionally, the component shop cannot replicate the condition seen on-wing.

DAL would like to request further testing instructions to better troubleshoot the IDG when it is removed from the aircraft/engine. Additionally, DAL is requesting UTAS suggested overhaul intervals and instructions to maximize the reliability of the component.

UTAS and other operator and supplier comments, please.

ENGINE SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
74	Integrated Drive Generator	729825M	UTAS	B757 B767	2411	DAL

The B757 IDG Pump and Motor assembly is often the root cause of multiple unscheduled removals for Delta's fleet. Failure of the pump and motor assembly leads to broken pistons and damaged ceramic inserts which can cause extensive damage to the IDG. UTAS has developed bare bore block assemblies in place of bronze coated bores, which decrease the reparability of the blocks in the event of a piston failure.

Is UTAS developing repairs for the bare bore blocks? What is the general reliability of the bare bore blocks vs traditional?

Delta requests that UTAS examine improved piston designs to improve the reliability of the pump and motor assembly. In addition, Delta requests that UTAS evaluate the use of an alternate material for the ceramic inserts on the wobbler plates which when damaged becomes impregnated into other metal components inside of the IDG compromising many more components than the pump and motor.

UTAS and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
75	Valve – High Pressure Shutoff	802170 Series	UTAS	B767	36	JAL

JAL has experienced failure of the "close position switch" (P/N 774564-16) 4 times in 2017. All 4 failure modes are missing switch plunger. Usage hours for failed switches were not so long (4566, 1119, 7385, 5913 hours). All 4 switches were installed in the PRV (Pressure Regulating Valve) position, but there are no correlation of engine type, batch, and time. This failure mode directly affects dispatch reliability.

JAL asked UTAS about improvement for the switch, but they do not have any plans/ideas for now.

Comments from airframers, UTAS, and other operators who have similar experiences. Countermeasures and special knowledge will be appreciated.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
76	Controller – Pressure Regulating	792755 Series	UTAS	B767	36	JAL

JAL has experienced some Reject Take Off and Ground Turn Back due to EICAS message "X ENG PRV" appearing when engine start was caused by in-operative PRVC (Controller - Pressure Regulating) Solenoid (P/N 808633-3) at high temperature. JAL is performing Heat Soak Test in accordance with the CMM; however, similar problems happen. This is considered a random failure (no correlation of the time).

Comments from other operators who have experienced a similar failure of PRVC solenoid will be appreciated.

Comments from other operators, vendors, and airframers about countermeasures/special knowledge to isolate the solenoid failure will be appreciated.

ENGINE SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
77	**Engine Air/Oil Heat Exchanger**	**17622-000**	**Ametek**	**B777**	**79**	**JAL**

JAL experienced oil leakages from the core area of the Heat Exchanger many times. Since 2015, JAL has started to replace the Heat Exchanger with an improved type, according to SB15622-79-00, to improve external surface corrosion protection. However, oil leakage from the core area is still occurring on Post SB Heat Exchanger and reliability is lower than the old one.

(PN: 17622-000: Removal Data)

- SN:0566 TSN/CSN: 1445 hrs/948 cyc: Leak
- SN:0472 TSN/CSN: 4369 hrs/2409 cyc: Leak
- SN:0394 TSN/CSN: 2430 hrs/1393 cyc: Leak

OEM explains that the cause of leakage is corrosion at parting sheet area and cause of corrosion is cleaning chemical using engine wash by operator. However, we do not use any chemicals to wash the engine and JAL only uses “water” for engine wash. Therefore, JAL cannot understand the cause of corrosion.

- JAL would like AMETEK to clarify the cause of corrosion at parting sheet area.
- JAL would like to know if other operators are experiencing the same issue.

Ametek and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
78	**APU Bleed Air Valve**	**3291214-2**	**Honeywell**	**B737-800**	**49**	**JAL**

JAL has experienced some troubles for diaphragm (P/N 3179505-1) rupturing caused by broken diaphragm retainer (P/N S9408-28).

Operators, please comment about similar experiences.

Honeywell, please comment about the plan of countermeasures of this failure (example: adding the washer between spring (P/N 3180680-1) and diaphragm retainer).

ENGINE SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
79	**Hydromechanical Unit (HMU)**	**1853MXXPXX** **442008** **442026** **442098** **442124** **442238** **442317** **442326** **442335** **442355** **442369** **442597** **442598** **442652** **442653**	**CFM International**	**B737NG**	**73**	**SR Technics**

Regarding the operation of a CFM56-5(B) engine (A320Fam) with TS-1 fuel, EASA issued AD 2012-0123. This directive prescribes, amongst others, a HMU overhaul with replacement of the delta-p pilot valve all 10,000 FH (CFM56-5 S/B 73-0182 and CFM56-5B S/B 73-0122).

In regards to the operation of a CFM56-7B (B737) engine with TS-1 fuel, CFM56-7B S/B 73-0138 highly recommends a cleaning all 10'000FH/1stSV and an overhaul all 20'000FH/2ndSV. However, there is no mandatory requirement to implement this limit and some operators may not have this limit in place.

In concern to the operation of a CFM56-7B (B737) engine with TS-1 fuel:

1. Is CFMI aware of any FAA/EASA plans to issue an AD connected to CFM56-7B S/B 73-0138?
2. Does CFMI have any information on how the reliability of a HMU (e.g., 442597/1853M56P14) is lowered when using TS-1 fuel and not having S/B 73-0138 implemented?
3. Do CFMI or the audience have any information about additional damages which can be expected from a CFM56-7B HMU operated with TS-1 (e.g., additional corrosion, contamination, seizure)?
4. Is CFMI or the audience aware of any issues that TS-1 fuel may cause to other CFM56-7B LRUs?

CFMI and other operator comments, please.

FUSELAGE

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
80	Seal-Wing to Fuselage Fairing	D5323185320000 D5323130020000 D5323029920000	Airbus	A320F	53-25	AAL

Wing to Fuselage Fairing Seals (common to the 197GB and 198GB fairings) are often found damaged on the belly of the aircraft. This is likely due to leaking hydraulic fluid that can cause the seal to become “wavy,” similar to bacon. SRM 53-25-11-300-021 allows for the application of high speed tape to be applied over the seal. AAL’s issue with this SRM is that it requires a daily inspection which is a scheduling burden.

AAL believes a better seal should be developed that would better hold up the environment where this seal is installed. AAL has experienced 18 delays due to wing to fairing seal damage in the past 12 months plus the added labor of replacement/daily inspections when it is found damaged.

Other operator and Airbus comments please.

DOORS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
81	**Latch Operated Sequence Valve**	**FA151175-401**	**Triumph**	**B787**	**52**	**AFR/KLM**	**KLM**

For repair capability development, we requested pricing and lead times of piece parts listed in the IPL multiple times. There was no response at all, which is very frustrating. We feel that this is not the way to do business.

Triumph, please provide piece part pricing and lead times.

Other operators and Boeing, please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
82	**Pull-In Operated Sequence Valve**	**FA15177-501**	**Triumph**	**B787**	**52**	**AFR/KLM**	**KLM**

For repair capability development, we requested pricing and lead times of piece parts listed in the IPL multiple times. There was no response at all, which is very frustrating. We feel that this is not the way to do business.

Triumph, please provide piece part pricing and lead times.

Other operators and Boeing please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
83	**Power Pack Assembly**	**FA100078-201**	**Triumph**	**B787**	**52**	**AFR/KLM**	**KLM**

For repair capability development, we requested pricing and lead times of piece parts listed in the IPL multiple times. There was no response at all, which is very frustrating. We feel that this is not the way to do business.

Triumph, please provide piece part pricing and lead times.

Other operators and Boeing, please comment!

DOORS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
84	Unit – Hydraulic, Large Cargo Door Hinge	FA151178-101	Triumph	B787	52	AFR/KLM	KLM

For repair capability development, we requested pricing and lead times of piece parts listed in the IPL multiple times. There was no response at all, which is very frustrating. We feel that this is not the way to do business.

Triumph, please provide piece part pricing and lead times.

Other operators and Boeing please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
85	Actuator-Flight Lock	904800-01	Meggitt	B777	52	JAL

JAL has experienced EICAS Status Message “DOOR FLT LOCK XX” caused by Flight Lock Actuator P/N 904800-01 many times.

After replacement of Flight Lock Actuator, aircraft operated normally. However, more than 50% of Flight Lock Actuators removed in last 3 years were not verified the problem. JAL suspects that the high NFF rate is caused by intermittent failure of the Motor of Flight Lock Actuator.

JAL would like to know the other operators’ experiences, world-wide reliability data, NFF rate, and suspected causes.

Comments from other operators, Meggitt, and Boeing are appreciated.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
86	Hydraulic Actuator	E20000	Sitec	A320 Fam	52	AFR/KLM	AFR

52% of removals are due to corrosion wear on the outside diameter of the cylinder and around the identification plate. The corrosion is often too important to be removed; consequently, the cylinder has to be scrapped.

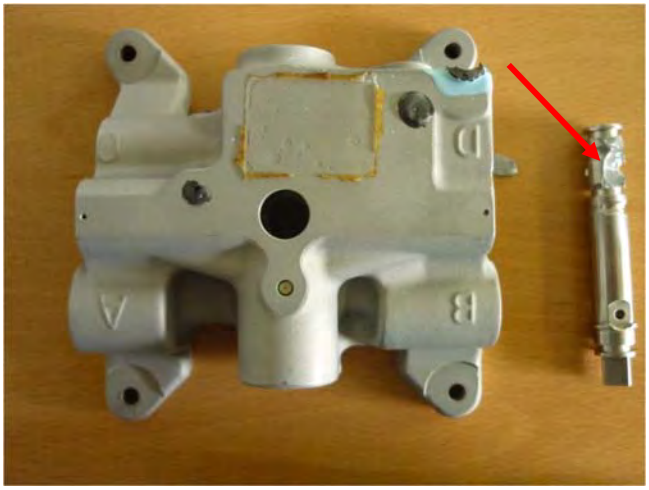
- What is the feedback of Sitec on this topic?
- Could Sitec propose a solution to prevent corrosion around identification plate?

Sitec and other operator comments, please.

DOORS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
87	Manual Selector Valve	S4-3400900-01 1567A0000-01	Liebherr	A320 Fam	52-30-13 52-30-16	LHT	DLH

LHT frequently receives units with broken/sheared flange. OEM refers to such cases as mishandling. Operators confirm normal use of manual selector valve handle in service. Until today, only TFU REF: 52.36.00.008 and A/C SB A320-52-1160 are in place, but no component VSB has been issued.



Question:
Is this problem known to other operators/MROs?

Other MROs and OEM, please comment on the evaluation that this situation is considered mishandling. Is it possible to identify a root cause and provide a long-term solution with VSB? OEM, please comment.

FUEL SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
88	**Refuel/Defuel Coupling Cap**	**0727504**	**Eaton Aerospace**	**A320FAM**	**28-25**	**DAL**

Delta has experienced reports of missing Refuel/Defuel Coupling Cap (MPN 07275040) on the A320FAM. During a 12-month period, we experienced 162 reports of “Missing Cap” on a total fleet of 136 aircraft. Details about the background are available via Airbus TFU 28.25.41.001.

Delta reviewed the Refuel/Defuel Coupling Cap installation identified the following items:

- Cable assembly chain to be broken at the chain attachment lug.
- Cable assembly ring to be missing.
- Damage to the Refuel/Defuel Coupling Cap due to interference between the chain attachment lug and the fuel cap handle.

Delta agrees that the current design/installation is subject to failure due to human factors. This creates a risk of FOD originated by Refuel/Defuel Coupling Cap separating from the aircraft due to incorrect installation. However, the design should be improved to adapt to the operational environment. Therefore, Delta is requesting the following:

- Eaton/Airbus to evaluate the relocation of the chain attachment lug.
- Eaton to modify Fuel Cap to increase strength of the retaining cable assembly.

Eaton, Airbus, and other operator comments, please.

FUEL SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
89	Refuel Defuel Panel	FIN 800VU FIN 801VU	Airbus UTAS	A319 A320 A321	28-25	AAL

Several reports of fuel distribution errors during A320 aircraft refueling have been brought to engineering's attention. Airbus' recommended method of refueling is the AUTOMATIC mode; however, station visits and refueling observations reveal fueling being conducted manually or using Manual mode.

Questions:

1. Are any other operators experiencing refueling inaccuracies/issue during refueling in AUTO mode?
2. How are operators ensuring the 3rd party vendors (refueling) use the AUTO mode?
3. Are there any mods or means that operators have used to encourage AUTO refueling (example: installation of safety wires on refuel valve switches)? If yes, then how were the results post mod?

Airbus, UTAS, and other operator comments, please.

FUEL SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
90	APU Fuel Control	3883600-2	Honeywell	MD90	49-31	DAL

Delta has experienced several fuel leaks on the fuel filter bowl caused by bent studs, which resulted from excessive wear/damage to the fuel bowl attachment slots (See attached photos).

Over time (repeated removal and installation) or with excessive torque, the slot can spread open and the contact surface wear unevenly, causing the attachment stud to pull over and bend when the nut is tightened. There are no specific rejection criteria in the CMM for these conditions. It is subjective to the technician working the part. One of the photos is an example of a serviceable part received from Honeywell that clearly shows the need for defined inspection criteria.

Delta would like Honeywell and Boeing to add specific inspection and rejection criteria for the studs and lobes on the fuel filter bowl in the CMM, AMM and other associated publications.

We would also like Honeywell to develop a repair to restore the damaged area to a parallel surface and add that repair to the CMM.

The fuel filter bowl has two lobes with slots (180 degrees apart).
These slots engage the attachment studs.

FUEL SYSTEMS

Over time (repeated removal and installation) or with excessive torque, the slot can spread open and the contact surface wear unevenly, causing the attachment stud to pull over and bend when the nut is tightened. There are no specific rejection criteria in the CMM for these conditions. It is subjective to the technician working the part.

Other operator comments?

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
91	**MOV Actuator**	**MA30A1001**	**ITT Corporation**	**B737 B757 B767 B777**	**2822**	**DAL**

The MOV Actuators PN MA20A1001-1, MA30A1001, MA20A2027, and MA30A1017 have been the subject of numerous ADs beginning in 2008. There have been various inspections and AWL changes to address unsafe conditions caused by these actuators in various positions on several Boeing fleets.

AD 2013-05-03 addressed B777 inspections for MOV PN MA20A1001-1. AD 2015-19-01 followed to incorporate a new AWL on the B777 aircraft affected. AD 2016-04-20 addressed B737, B757, B767, and B777 inspections for MOV Actuator PN MA20A1001-1 to prevent electrical energy from entering the fuel tank through the fuel valve actuator shaft.

NPRM FAA-2017-0127 now prohibits the use of MOV Actuator PN MA30A1001 in certain positions on the B737, B757, B767 aircraft.

Will there be additional MOV Actuator installation changes on the B777 fleet?

Has the MOV PN MA30A1017 addressed all the potential unsafe situations for all other positions on the aircraft?

Will there be a recommendation or requirement to replace all other MOV actuators with the newest configuration MA30A1017?

Other supplier and operator comments, please.

FUEL SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
92	Boost Pump	5006003D	Hamilton	B767	28	DAL

There have been several instances when we have needed to order piece parts and the lead time is shown as 7 days on the OEM website as well as Aero Exchange. When we try to order the part, it will have a lot longer lead time – sometimes 180 days. Our reorder points are based on the published lead time supplied by the vendor.

Why is there such a discrepancy?

Hamilton and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
93	Boost Pump	39-001-1x00	Eaton	B787	28	AFR/KLM	AFR

All the removals of fuel boost pump are caused by a failure on the motor housing assy. This sub assembly part is always replaced during repair.

- What is the root cause of the replacement of the motor housing assy?
- Does Eaton have feedback on reliability of the last design of motor housing assy P/N 39-0001-1019, this one introducing the last design of boost pump P/N 39-0001-1500?
- Furthermore, the evolution of fuel boost pump are not followed by VSB or SIL. Can Eaton issue a VSB to follow this modification?

Eaton and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
94	APU Boost Pump	P93A19-203 P93A19-204	Zodiac Aerospace	A330 A340	28	AFR/KLM	AFR

The electrical motor PN 1P93-xxx/2P93-xxx is the root cause of removal of the boost pump. In the previous revision of the CMM, it was a repairable part. Since the last revision of the CMM, it becomes expandable. This decision is not understood by AFR.

- What is this reason or the goal of this change?
- Could Zodiac study the possibility to introduce once again the repair of the electrical motor?

Zodiac and other operator comments, please.

FUEL SYSTEMS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
95	**Float Valve**	**9508175**	**Eaton**	**A319 A320 A321**	**28-10**	**AAL**

Fuel Spill from wing NACA duct during/after refueling in AUTO

- Fuel Spill presents a fire hazard in the vicinity of the aircraft, passengers and crew.
- Potential disruption to the airline and airport operations.

12 such fuel spills ranging from 10 gallons to 20 gallons of fuel from wing/NACA duct have been observed just in July 2017 and, due to Fire department involvement/EPA involvement, these events often result in extended flight delays and/or cancellation.

AAL did contact Airbus on these spill events and they have responded with “operational or fueler” error as being the root cause. Airbus also highlighted that a failed float valve could contribute to fuel spills. AAL has discussed this issue previously with Eaton and Eaton is releasing a SB to upgrade float valves 1st QTR 2018.

However, AAL wanted to get operators/OEMs input on these fuel spill events.

Questions:

1. Have any other operators experienced an increase in fuel spill events on the A320 family?
2. What were the root cause and were there any steps taken to prevent future events?
3. In additional to the high-level light on the fueling panel are there any other triggers/alerts added by operators to alert refuelers of fuel high level/overflow level being reached?

Airbus, Eaton, and other operator comments, please.

FUEL SYSTEMS

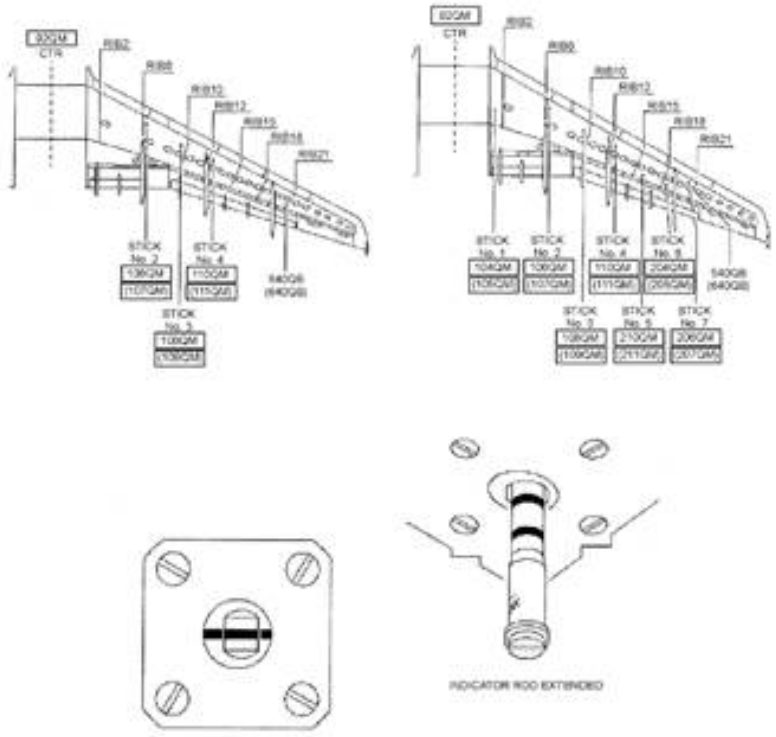
Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
96	FQI Probe	20146-0109 20146-0107 20146-0110	UTAS Airbus	A321	28-40	AAL

INOP fueling procedures for A321 aircraft requires operators to use Magnetic Level Indicators for getting manual FQI readings (stick readings) and provides charts for reference to get fuel quantities. Most A321 aircraft have 7 MLIs and the charts list the 7 MLIs.

However, some new aircraft have only 3 MLIs but require operators to use the previously provided 7 MLI chart. This is confusing as with the reduction in MLI quantities, with the 3 MLI A321 aircraft, the maximum fuel quantity that one could obtain through MLI charts is 1847 gallons. Note: the full tank capacity of A321 is 2050 gallons (Difference of approximate 200 gallons).

Questions:

1. How is an operator to read a fuel quantity using MLI and the charts provided when the fuel uploaded on A321 aircrafts wing tank is between 1847 and 2050 gallons on an A321 aircraft?
2. Can Airbus provide a corresponding 3 MLI chart for aircraft that have only 3 MLIs installed?



Airbus, UTAS, and other operator comments please.

LANDING GEAR

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
97	**NLG Upper Bearing**	**00-200-1485**	**Safran Landing Systems (SAS)**	**A320FAM**	**32**	**DAL**

Reports of grinding noise generated during taxing and steering have been issued on the new A321. Airbus confirmed the phenomenon occurs more likely on brand new NLG, and then the likelihood decreases with the upper bearing Airflon coating wear. The noise is caused by air escaping from the porous Airflon coating of the upper bearing. As mitigation, Delta has issued a task that includes the lubrication of the upper bearing with Shock Absorber fluid (MIL-H-5606) at the Prior to Service (PTS) and at the first A Check of the aircraft (750 FH).

Airbus TFU 01.40.00.001 provides a background. This TFU also states, as a solution, that a new NLG Upper Bearing has been developed with a new liner material (NMB PN MJ136A-601: Teflon/Cotton L-1320). However, the TFU describes the test results and the increase on wear with the newly designed NLG Upper Bearing. And as a consequence, Airbus and Safran Landing Systems decided to not introduce this new NLG Upper Bearing on in-service aircraft. Contemplated In Service Evaluation (ISE) of this new NLG Upper Bearing is therefore cancelled.

Additionally, Airbus and Safran Landing Systems have launched an activity to improve existing production mitigation (lubrication) and to define a solution avoiding noise. However, the last update to the TFU was completed on 30-SEP-2016.

Delta would like to request Airbus to provide and update on the solution definition, as well as a timeline for implementation.

Airbus, Safran Landing Systems, and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
98	**NLG Door Actuator**	**S4-3300955**	**Liebherr**	**A330** **A340**	**32**	**TAP**

TAP Portugal registered four events of NLG Door Actuators P/N S4-3300955 not extending correctly during the Manual LG Door Opening on ground. For all cases, the NLG door failed to fully deploy (not achieving fully open position). The replacement of the actuators solved the issue without any other adjustment. The manual LG door opening is performed every week during the weekly inspection, and whenever access to the landing gears wells is needed.

Units were sent to the OEM (Liebherr) and results were the following:

- All four actuators involved had accumulated around 60,000 FH since new;
- Bench Check after removal was NFF for all four units functional test;
- OEM disassembled units and related finding are: End Gland (2-200) corroded in the internal diameter, as well as Wear Ring (2-180) swollen and with damaged surface (refer to attached ‘Shop Analysis’ of P/N S4-3300955, S/N TP16-188).

TAP would like to know:

- Does any other operator experience this kind of failure in aircraft? Is this issue known?
- Are there any previous studies and conclusions to understand why these actuators failed to fully deploy on free fall conditions?
- We will inspect all removed actuators with TSN>50,000 FH at first opportunity. What kind of additional workshop procedures or aircraft tests could be implemented to mitigate this issue?

Note: Find in attachment the ‘Shop Analysis’ issued by Liebherr after detailed inspection of Actuator P/N S4-3300955, S/N TP16-188.

LANDING GEAR

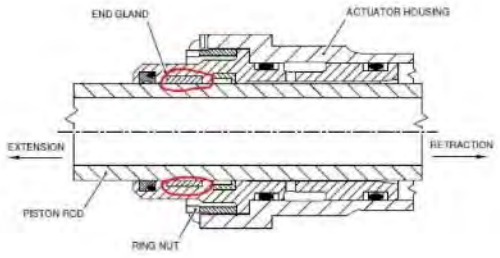
S4-3300955 S/N TP16-188

Repair Order 8022237 analysis

LIEBHERR

S4-3300955 S/N TP16-188

- Reference CMM 32-31-19-R
  - Incoming test passed; no deviations from specified limits = NFF
  - To enable further investigation the actuator was dismantled with the following main findings:
    - End Gland (Fig 2-180) corroded:



LANDING GEAR

S4-3300955 S/N TP16-188

- Wear Gland Ring (Fig 2-200A) worn/aged:

200A	E4-6002190	RING, WEAR GLAND SUPSD BY 200B
– 200B	4769-2622-0890	RING, WEAR GLAND (V5F573) OPT TO 9077A0021-01 MADE BY (VD9893) SUPSDS 200A

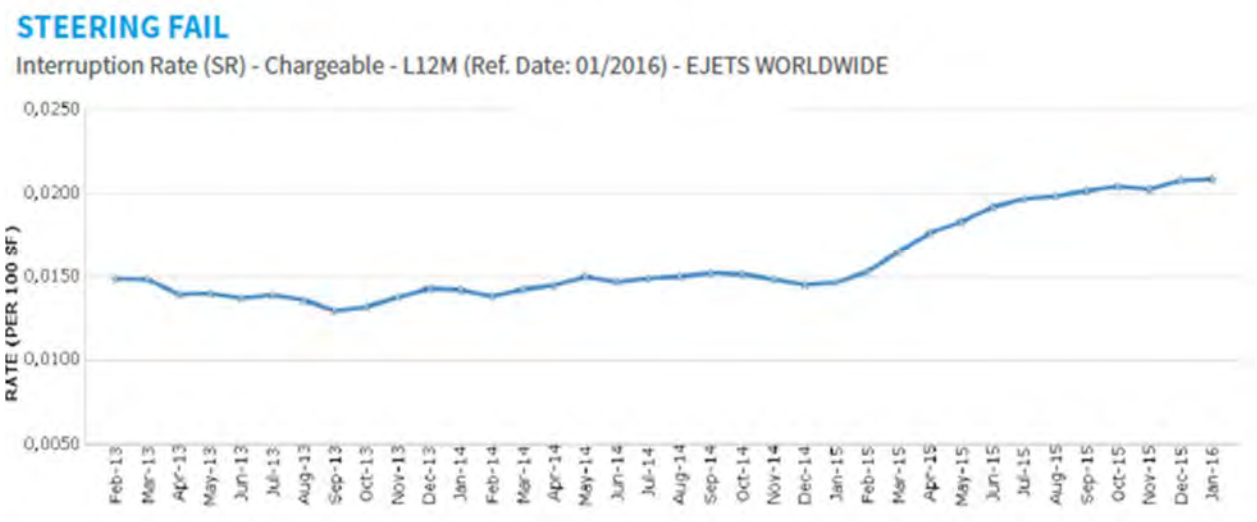
Note: The wear gland ring 200A was superseded with the introduction of -200B in 2006

Liebherr and other operator comments, please.

LANDING GEAR

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
99	Nose Wheel Steering Control Module	1855A0000-06	Liebherr	E190	3251	AAL

Since entry into service at American Airlines, the Nose Wheel Steering Control Module (NSWCM) and its associated steer fail fault have been a reliability issue. Upgrades over the years have provided a reduction in steer fail faults as well as provided the ability to reset off gate (resets help move the aircraft, but are not the real fix). While these upgrades have had a positive impact in delays and cancellations, the rate is still an issue at AAL and other operators.



The chart above from Embraer highlights the increase in EJETS worldwide since February 2013 and the increase in February 2015. Despite the improvements in the NWSCM software, AA and other operators are still experiencing reliability issues.

What are the next steps for Embraer and Liebherr?

Are complex towing situations (PHL and DCA) the reason for increase in steer fails?

Embraer, Liebherr, and other operator comments, please.

LANDING GEAR

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
100	**Nose Wheel Assy**	**3-1596**	**Safran Landing System**	**A330**	**32-41-89**	**AFR/KLM**	**AFR**
	Main Wheel Assy	**3-1546**	**UTAS**	**A340**	**32-41-75**		

For the stated wheels, calendar limitations have been introduced in the respective CMM regarding the interval between two overhauls (added inspections): “If the time since the last ADDED INSPECTIONS is more than 2 years, do the ADDED INSPECTIONS now.”

This limitation is very restrictive regarding wheels (new or overhauled) that are stored in outstation for a relative long time. The number of wheels to be returned “Not Used” in shop for an overhaul hugely increases, as well as the logistic issues.

Regarding the SPM 32-09-01, the first inspection that is recommended after a “long” storage of a wheel is after two years, and it is only a visual inspection and a grease replacement.

Questions:

- Could Safran Landing System/UTAS explain the reason of this calendar limitation for added inspection? The number of landings or tire changes, as the reference for the overhaul interval, should be enough to perform an effective maintenance.
- Could Safran Landing System/UTAS be more coherent between intervals for Overhaul and shelf life?
- Could Safran Landing System/UTAS remove the calendar limitation from the CMM (keeping only the amount of landings or tire changes as the reference), or at least increase the interval up to 4 years as for some other Programs?

Airframers and operators comment please.

LANDING GEAR

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
101	**Nose Wheel Assy** **Non-Braked Main Wheel Assy** **Braked Main Wheel Assy**	**2616505-2** **2616571-2** **2615101-3**	**Honeywell**	**A380**	**32-45-34** **32-45-91** **32-45-51**	**AFR/KLM**	**AFR**

For the stated wheels, since 2011, AFR has encountered corrosion on the bearing bore under bearing cups. Initially, these cups were removed because of wear. Because of the systematic detection of corrosion of the Hub under these removed cups, AFR decided to implement a sampling program to determine the amount of impacted wheels (whereas the bearing cup condition).

A non-negligible rate of corroded bearing bore has been found for each kind of wheel.

For the Nose Wheel, Honeywell has provided a SB (2616505-32-0001) to perform an ultrasonic testing of each half wheel Hub. The aim of this SB is to detect indication of cracks without removing the bearing cup. This SB is applicable prior to accumulation of 2,000 landings.

Questions:

- Will Honeywell provide such SB for Main Wheels (Braked and Non-Braked)?
- What happens after 2,000 landings? No more risk of cracks or corrosion?
- AFR detected corrosion and performed “preventive repair.” The aim of the SB is to detect crack and, if possible, to perform “curative repair.” Does it mean that corrosion is allowed in this area (Hub, under the Bearing Cup)? Because if the Ultrasonic test is “passed,” it means that there is no crack but there is maybe corrosion.

Airframers and operators comment please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
102	**Wheel Landing Gear**	**2616571** **2615101**	**Honeywell**	**A380**	**32**	**AFR/KLM**	**AFR**

AFR must apply primer MIL-P-23377 type 1 Class C on A380 wheel (CMM 32-45-91/32-45-51) after overhaul according to SPM 5.N -1 to -4. AFR cannot use this paint because it is compound of barium chromate. The use of paint with chrome is now prohibited.

The SPM states in this chapter following:

“Operators are free to select a paint system that will provide abrasion and corrosion resistance. The paint system must be compatible with airplane hydraulic fluid. For Skydrol fluid compatibility, a phosphate ester resistant topcoat is required. Operators should with paint suppliers for hydraulic fluid and primer/topcoat compatibility.”

AFR may use a chromate free primer of their choice that meets standards on all areas under AFR engineering authority and risk. AFR cannot validate equivalence MIL-P23377 type 1 Class N.

Question:
Can you confirm that AFR can use the primer MIL-P23377 type 1 Class N instead of MIL-P23377 type 1 class C?

Airframers and operators comment please.

LANDING GEAR

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
103	**Main & Noise Landing Gear**	**Several**	**Boeing**	**B737NG** **B767** **B777** **B787**	**32**	**JAL**

Boeing AWL refers some drawings to specify Life Limited Parts (Mainly Landing gear components). Timely evaluation for revision of the drawing is mandated by regulatory agency, but Boeing does not send notice of revision. If Boeing notices the revision, it is helpful for all operators.

Example:

Ship Type	DWG for MLG	DWG for NLG	DWG for Attaching Point between MLG and Wing
737NG:	161A0002	162A0002	115A0007
767:	160T0002	160T0002	160T0002
777:	161W0003	162W0002	161W0003
787	510Z0001	520Z0001	126Z0007 & 151Z0000

To operators:

1. Does your local regulatory agency mandate timely evaluation for revision of the drawing?
2. How do you detect revision of the drawing?

To all airframers:

1. Could you publish a Service Letter or some document to notice revision of the drawing?

Comments from other operators and airframers are appreciated.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
104	**MLG Retract Actuator Assy**	**273A2101-101**	**Boeing**	**B737NG**	**32**	**JAL**

We have experienced several cases of crack on the Cylinder Barrel outer surface under the ID Plate. The crack caused hydraulic fluid leakage and flight dispatch delay/cancel. The cracked Cylinder Barrel was investigated at Boeing, and we had been notified that the root cause of crack was that the cracks were generated as a result of corrosion-related pitting on the outer surface of the Cylinder Barrel. Boeing also informed us that Boeing believes the corrosion pit under the ID plate issues are not a B737NG fleet-wide issue. However, we already experienced six cases of crack on the Cylinder Barrel outer surface under the ID Plate in MLG Retract Actuator Assy, 273A2101-101, since 2015, as below. We would like to know other operator’s experience of crack on the Cylinder Barrel outer surface under the ID Plate.

LANDING GEAR

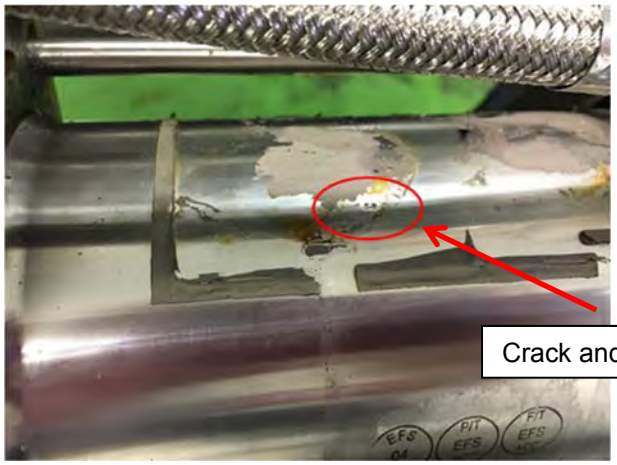


Photo 1: Cylinder Barrel Outer Surface Under the ID Plate (ID Plate Removed)

Serial No.	Total Time	Total Cycle
2101/6631A	13671	11309
2101/7177A	15530	12368
Unknown	17190	13724
2101/6830A	18518	14947
2101/6823A	18518	14947
2101/7863A	16687	13126

Comments from other operators, vendors, Boeing are appreciated.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
105	**MLG Carbon Brake Assy**	**C20225508** **C20225509** **C20225510**	**Safran Landing Systems**	**A319** **A320**	**32**	**TAP**

MLG Brake Assy CMM requires Carbon Disks to be released with a pressure above 135 Psi. TAP usually is not able to achieve this test requirement even when springs are within compression test limits. If test is not accepted, pistons need to be disassembled and assembled back with new springs. Test bench is calibrated yearly.

Question to Safran:

- What is the fundament for 135 psi release pressure?
- Is this a test procedure or test bench issue?

Question to operators:

- Do you have such a difficulty?
- What kind of measures did you implement to mitigate this?

Safran and other operator comments, please.

LANDING GEAR

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
106	MLG Flexible Hose	201042821	Safran Landing Systems	A319 A320	32	TAP

TAP had 3 incidents of Hydraulic Leakage from MLG Flexible Hose in 2017. Leakages were observed next to the unions of the flexible hoses. Hoses manufacturer as both TITEFLEX and AEROQUIP. TAP is looking to find a pattern and/or maintenance procedure to avoid these incidents.

Question to Safran:

- Have you ever received reports about any similar events?
- How many events have been reported?
- Were the reported events mostly with TITEFLEX or AEROQUIP hoses?
- Is there any failure pattern (i.e., Accumulated FC? More than 10 years?)?

Question to Operators:

- Do you have such failures?
- What kind of maintenance schedule/repair did you implement to mitigate this?

Note: Please see attached figures.

Safran and other operator comments, please.

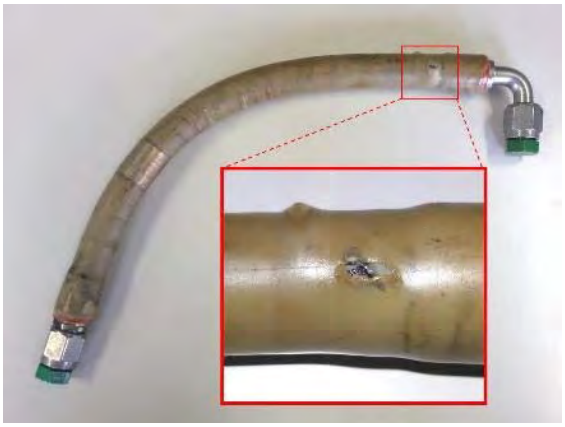


Figure 1 – TITEFLEX Damaged Hose

Figure 2 – TITEFLEX Label

LANDING GEAR

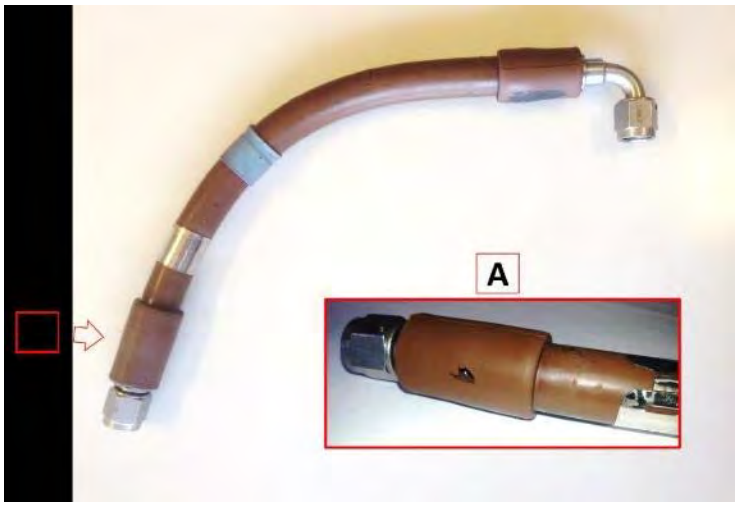


Figure 3 – AEROQUIP Damaged Hose

Figure 4 – AEROQUIP Label

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
107	**Wheels/Brakes**	**Nose – 3-1559** **Main – 3-1674** **Brake – 2-1740-1**	**UTAS**	**B737NG** **B737MAX**	**32-45** **32-41**	**SWA**

In conjunction with UTAS, SWA is investigating means to track landing gear wheels and brakes with RFID. Due to the high volume and large movements of these components, manual tracking is very time consuming. RFID would allow for much greater tracking abilities for location, times, and reliability.

SWA would like input from any RFID vendors that are currently supporting tracking of aircraft wheels and brakes.

SWA would like input from other operators that track wheels and brakes (or other components) via RFID.

Other operator and vendor comments, please.

LANDING GEAR

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
108	**Parking Brake Control Valve**	**C24703001/3-series** **C24703002-series**	**Safran Landing Systems**	**A320 FAM** **A330** **A340**	**32**	**TAP**

TAP Portugal had suffered some events of Brakes Residual Pressure on A320 Fam and A330/340 fleet during last years. This kind of issue used to be identified by Triple Indicator visualization and by “Residual Pressure” warning on ECAM after releasing the Parking Brake.

TAP Components Workshop and Safran Landing Systems joint work concluded that an out of tolerance internal leak at Upper and/or Lower Valve area (due to material wear/damage) could lead to pressure buildup in the brake line, triggering the Residual Pressure ECAM warning (Leak is acceptable until 1 cm^3/min).

TAP would like to know from worldwide fleet experience:

- Do any other operators suffer from the same failure?
- What kind of additional Workshop or Line Maintenance procedures are being implemented to mitigate this issue?

Note: Please find attached a PBCV internal description.

Safran and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
109	**Parking Brake Selector Valve**	**C24703001** **C24703002** **C24703003**	**Safran Messier**	**A320 Fam** **A330** **A340**	**32**	**AFR/KLM**	**AFR**

90% of unscheduled removals are due to failure on actuator assembly. The VSB C24703-32-3297 and C24703-32-151 have been issued to solve the failure. Since 2010, AFR started to embody these VSB on the actuator assembly and then does not demonstrate any efficacy. Reliability observed on the components pre VSB is 22,600 Hrs; Reliability observed on the components post VSB is 13,050 Hrs.

- What is the feedback of Safran on this topic?
- Is an improved design being studied by Safran?

Safran and other operator comments, please.

LANDING GEAR

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
110	Electro Hydraulic Block	C24856000-x	Safran Messier	A330 A340	32	AFR/KLM	AFR

Almost all the Electro hydraulic blocs are removed due to drift of nose wheel steering. To solve this problem, VSB C20327-32-058 was issued. Air France has embodied the VSB; however, it does not increase the reliability.

- What is the feedback about this topic from Safran and operators?
- Is Safran working to improve the design of the EHSV (root cause of the failure)?

The Solenoid Valve P/N C24782000-x presents cracks, Safran has identified that this defect appears during molding of the Solenoid. Consequently, the Solenoid is sensible to water infiltration.

- Is Safran working to improve the design of the Solenoid Valve?

Safran and other operator comments please.

LANDING GEAR

MMC Discussion Form attachment

Parking Brake Control Valve P/N C24703001/3-series and C24703002-series

Internal description and details

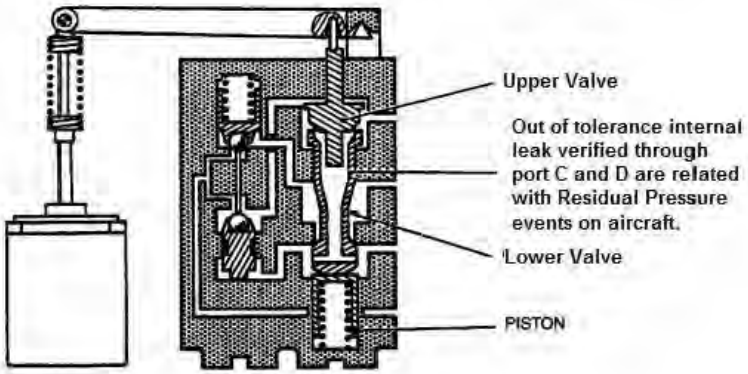


Figure 1 - PBCV functional Schematic

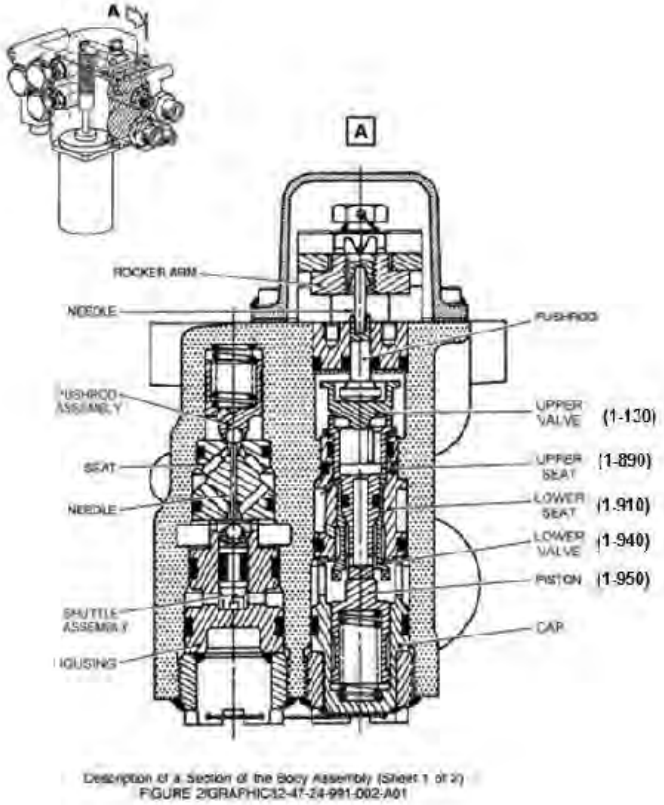


Figure 2 – Description of internal subparts

LANDING GEAR

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
111	Landing Gear Shock Leakage, Main	161T1100-(Various)	Boeing	B767	3211	DAL

In 2013, the DAL B767 fleet suffered a very high volume of MLG seal events, with several low time occurrences happening after overhaul, or a repack. The initial onset problem noted by Line Maintenance is typically a scraper ring extruding on the forward side, and the subsequent leakage. A repack is typically required, as the use of spares has not been found beneficial. No root cause was ever clearly found, and the issue disappeared.

In 2017, this issue returned. DAL has been contacted by other operators that are suffering in the same way, as well as their MRO respective support facilities. We are attempting to determine if there is a process errantly applied, or if other causes are contributing to this condition.

Recent removals have been found with a significant amount of brass in the fluid, and one example of a lower bearing showed significant ID chatter. Access inhibits the ability to see the leak path, so it is not known if leakage is occurring through the static or dynamic seals, but dynamic seals have been found with nibbled contact edges in some cases. Samples have been retained for evaluation.

Rare occurrences of a backup ring being installed upside down have been found, but this is also not a consistent finding.

One aircraft out of service for repeat dual strut leakage was found with an out of round condition on the pistons with weight on wheels. One piston measured 0.006 and the other 0.009 out of round, measuring smaller in the Fwd-Aft direction. This out of round condition disappeared when the aircraft was jacked. This amount of out of round is sufficient to eliminate the clearance between the piston and lower bearing, creating a binding and friction condition. Both parts had been overhauled within the previous 12 months. They were subsequently removed and completely stripped to have any ladder cracks remapped for verification that the parts were within structural limitations. Data was submitted for these two parts, and determined acceptable in accordance with Boeing correspondence. These parts are on hold pending further discussion.

Actions taken to date:

- DAL has been attempting to determine contributing factors, and has developed a checklist to assist with troubleshooting
- DAL Engineering has evaluated several internal overhaul processes to determine how to better produce these parts.
- DAL Engineering and at least one Landing Gear Overhaul facility are planning a joint process review for assembly of our next shipset of B767 gear to determine if there is an opportunity for sharing of best practices. First opportunity will present itself at DAL, 31 August. Boeing is welcome to attend.

The gear and/or pistons in question have varied service life, and quantity of overhaul cycles.

Question:
Would Boeing consider initiating a WTT inclusive of MROs and airlines to determine best practices that can resolve this issue? DAL has seen leakage on gear that assembled with both the old style and new style bearing, and has reviewed the Service Bulletins and Service Letters that are applicable to this issue.

Question:
Would Boeing consider that the out of round condition found could cause sufficient interference and friction to generate heat and degrade seals? Are the Ladder Cracks noted in Ref /C and /D/ sufficient to allow for this amount of ovalization?

Question:
The Ref /A/ CMM requirements for refinish call for a generous chrome plate runout of 0.09/0.15 inch at the upper end of the working OD, without callout for a transition that would accommodate an interference free seal installation.

LANDING GEAR

This can create an issue during assembly as significant loads are generated when assembling and installing the lower bearing/seal retainer, inclusive of the scraper and seals. Is it more appropriate to have the chrome plate runout at the upper end be restricted more tightly to the 1.47/1.57-inch transition radius, and/or dressed to match that radius to ensure a smoother transition for these seal components?

Question:
Along with the industry recognized ladder cracking condition that this fleet suffers from, the bearing chatter and piston out of round observations have brought into question how heat may be a factor in this problem. If there is sufficient heat to cause ladder cracks, what temperatures must the strut reach for that to occur, and does that exceed the design threshold for the seals? Is it realistic for this to occur early in the overhaul cycle, or within a short interval from repack?

Question:
There was a requirement incorporated for chrome parts to have a primer wipe applied following finish grind. The intent was to fill the minor surface cracks inherent in chrome plate in an attempt to inhibit the onset of corrosion at the root of those voids. These minor cracks have also filled the role of holding fluid that allows for some lubrication of the seals. If the primer, once cured, inhibits this lubricity, could this also contribute to nibbling on the dynamic seal? With a robust primer wipe maintenance program DAL considers that elimination of this practice may improve seal performance on this platform.

Boeing and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
112	**Hydraulic Fuse Unit and Manifold Assembly**	**71178-x** **71179-x**	**Eaton**	**A330** **A340**	**32**	**AFR/KLM**	**AFR**

Corrosion is often observed between manifold and valve assy on both transfer holes. This corrosion seems due to galvanic corrosion or fretting corrosion.

- Would Eaton and Airbus consider implementing a repair procedure of the manifold and the valve assy to solve this problem?

Eaton, Airbus, and other operator comments, please.

WATER & WASTE

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
113	**Actuator Discharge Valve**	**7700198**	**Monogram**	**B737NG** **B747-4**	**38**	**AFR/KLM**	**KLM**

Several individual components are no longer procurable due to certifying problems by the requirements of EASA and FAA 8130 tags. Monogram has removed these items from their spares catalog. Here is the list:

Q7800116-007	Q7800116-008	Q7800116-015	Q7800116-018	Q7800116-026	Q7800116-027
Q7800116-029	Q7800116-030	Q7800116-036	Q7800116-042	Q7800116-043	Q7800116-044
Q7800116-045	Q7800116-050	Q7800116-055	Q7800116-059	Q7800116-070	Q7800116-072

Monogram states these components are used in actuator 7800116, but they are also mentioned in the IPL of manual 38-31-03. Therefore, we as an MRO are no longer capable to repair the subject part number actuator. It is obvious that, due to Monogram's actions, we are forced into additional costs. They offer two possibilities:

a. Outsource to Monogram or
b. Buy the new Actuator assembly p/n 7700198

Both solutions are unacceptable for us as repair shop; therefore, the following questions:

1. What solutions does Monogram have to deliver these parts again to their customers?
2. If Monogram is unable to fix the problem, can they authorize a sub-supplier to deliver parts direct to operators?
3. Can Monogram release the specification and drawings to enable us to fabricate or source the parts elsewhere?
4. Are there more shops/MROs having the same problems with Monogram?

Operators and Boeing please provide your comment!

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
114	**Water Separator**	**14401-085**	**Zodiac**	**A320F**	**38-30**	**AAL**

AAL experiences consistently high MEL rates for the vacuum toilet system, with a MEL rate of .20 per 100 departures over the last 12 months. The top drivers of these MELs are waste tank quantity indication and vacuum generator availability on the ground. Both of these failures are a direct result of water separator failure. Waste water from the tank is being sucked into the vacuum generator and reducing its service life as well as contaminating the LLT to the point it cannot transmit an accurate indication of waste level in the tank. AAL currently replaces the water separator every 24 Months (730 Days) or 7,500 FH or 5,000 FC, whichever occurs first. A reduction of replacement time to 750 FH to align with the A check is too aggressive and out of scope for the work being done. AAL would like Airbus/Zodiac to investigate an improvement to the water separator MPN 14401-085 and similar such that the unit can last at minimum 7,500 FH without contaminating the liquid level transmitter and vacuum generator.

AAL is aware of Airbus SIL 38-020.

Other operator, Zodiac, and Airbus comments please.

WATER & WASTE

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
115	**Vacuum Generator**	**77000-003-201**	**Zodiac**	**B787**	**38**	**SR Technics**

SRT has observed low Vacuum Generator reliability, with a current 12 month MTBR of 5,700 flight hours, which caused by power board failures and/or control board failures in over 70% of removals. Zodiac has addressed this issue by introducing a hardware modification to the boards and a software upgrade (reference SB 77000-003-38-003). This modification is being implemented on SRTs units and reliability has improved; however, it is too early to determine its success and board failures of post modified units have occurred.

Please can Zodiac provide industry wide reliability figures of SB 77000-003-38-003 post modified units, and inform if any issues with it has been observed?

Please can other operators share their experience?

Zodiac and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
116	**Toilet Flush Switch**	**OYE3100A01G01** **OYE3100A09G01** **OYE3100A09G09**	**Jamco**	**B777**	**38**	**AAL**

AAL has experienced several issues with toilet flush switches on our B777 toilet assemblies. When the switch fails, the system may not flush at all, or other times it becomes stuck and the system continuously flushes.

When this switch fails, AAL is forced to MEL the whole lavatory INOP.

Have other operators seen this issue?

Can Jamco and Boeing find a fix and provide a timeline?

Jamco, Boeing, and other operator comments, please.

WATER & WASTE

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
117	Toilet Assembly All Boeing Except B787	15800-0xx-series 7900xxx-series 14320-series 14330-series	Zodiac Aerospace Water & Waste	B777 A320	38	AFR/KLM	AFR

Boeing: The Classic SFE “Vacuum toilet Assembly” can be replaced by new approved design “Revolution Vacuum Toilet” in accordance with Zodiac VSB: 15800-995-38-001.

Does Boeing give to the airline the possibility to access to “Revolution Vacuum Toilet” as SFE for the aircraft in Yield production?

Does Boeing have in progress a SB to give an easy solution to the Airline to realize a fleet retrofit in accordance with OEM VSB?
Document in relation: Zodiac VSB: 15800-995-38-001 Rev2, Dated of MAY 19/2017

Airbus: The Classic SFE “Vacuum toilet Assembly” can be replaced by new approved design “Revolution Vacuum Toilet” in accordance with Zodiac VSB: 14330-004-38-003.

We know also that the “Revolution Vacuum Toilet” are available for aircraft in Yield production by customer choice.

Does AIB have in progress a SB to give an easy solution for the airline to envisage a Fleet retrofit in accordance with OEM/VSB?

Document in relation: Zodiac VSB: 14330-004-38-003 Rev 2 Dated of Oct14/2016

Airframers and airlines please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
118	Valve – Motor Operated	77000-685 77000-695	Zodiac	B787	38-17-14	AFR/KLM	AFR

AFR/KLM requested OEM to give quote for 2 tools "38100-257+Test box and can bus control PC" including the software "B787 shop monitor" V1.9 PN 38100-257 (CMM 36-17-11).

After one year, we still do not have any quote and any detailed content of what is contained is these P/Ns.

Can Zodiac send the quote and the detailed content of the test box part number?

Airframers and airlines please comment.

WATER & WASTE

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
119	**Water and Waste**	**77000-028 77000-600 77001-040 77000-685 77000-695**	**Zodiac**	**B787**	**38**	**AFR/KLM**	**AFR**

AFR/KLM has requested training on Zodiac Water and Waste System (ZWWS) components. ZWWS is not able to provide training.

Reason is that “The FAA requires that in order for PMA to flow down from and LRU to its components, the PMA holder has to have drawings on file for each of the components…” that ZWWS has not.

ZWWS does not provide any alternative solution.

Can Zodiac supply training on overhaul of components as described in PSAA?

Airframers and airlines please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
120	**Module Assy Faucet Control**	**AFUT000200A0002**	**Jamco**	**B787**	**38**	**AFR/KLM**	**AFR**

We found several low TSI components with internal leakage (MTBR 40 000).

Is this leakage a failure found by other airlines? Do you know what are the root causes and how to fix them?

Is a modification being developed to improve reliability of the faucet control module and stop leakage?

Airframers and operators comment please.

WATER & WASTE

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
121	Potable Water Pump	77000-600	Zodiac	B787	38-17-14	AFR/KLM	AFR

AFR/KLM requested tool drawings, which should be supplied according to PSAA: “8.6.3 Special GSE Drawings - Upon request, Seller shall provide, free of charge, to Customer or Boeing, and at fair and reasonable terms and charges to Customer Designee, Special GSE drawings including, but not limited to sketches of “shop aid” type equipment, in sufficient detail to permit the manufacture and support of Special GSE, for Customer, Customer Designee or Boeing own use only and not for resale.”

Zodiac’s position is that the requested drawing are related to GSE and not "Special GSE" and the supplier is supposed to provide only Special GSE drawings, according to PSAA.

Our understanding is that tools are related to Special GSE chapter because they are completely manufactured to support the related specific product and cannot be used for any other usage. That is, according to us, the definition of special GSE:

Special GSE	GSE designed solely to support specific Products, typically having little or no commercial value except to support those Products.

How can airlines get tool drawings from the OEM?

Airframers and airlines please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
122	Grey Water Interface Valve	77000-575	Zodiac	B787	38-37-26	AFR/KLM	AFR

During the study of the CMM 38-37-26, corresponding to this equipment, we observed that we need to build a test bench (GWIV Function Test) for performing a leak test on the equipment. However, this test bench includes a Programmable Logic Controller (PLC) ZEN-20C1DR-D-V2 (listed on page 1002 of the CMM). The rest of CMM explicitly shows the wiring of the installation but does not explain the logic to program the PLC.

We would like to know if Zodiac can send this programming logic (Grafcet or other) in order to realize a test bench conforming to the CMM?

Airframers and airlines please comment.

WINGS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
123	**Sharklet**	**D573569030000**	**Airbus**	**A321**	**57-30-00**	**DAL**

Two LH sharklets have suffered in-service lightning damage which ultimately caused the parts to be scrapped. The damage sustained exceeded the restrictive repairable limits in the SRM. The damage and lightning path for each sharklet were very similar and DAL believes this has the potential to be a recurrent problem.

DAL pursued repair procedures for the damage by contacting Airbus and presenting the damage. The solutions offered by Airbus required extensive disassembly and replacement of large skin panels. Total cost of replacement parts exceeded $200K per sharklet, with minimum lead times of 90 days with zero stock likely to exceed the minimum lead times, disassembly labor, collateral disassembly damage, reassembly labor, and overall time to return to serviceable condition made repair of the sharklets not desirable. The replacement cost of each sharklet far exceeded estimated repair – but the replacement sharklets were available for purchase.

Replacing sharklets was the path chosen based on knowns and availability instead of investing heavily in a repair path with extensive time requirements, high unknowns, and high costs. DAL would like to have more feasible permanent repair options for lightning damage to sharklets which can be accomplished on-wing while not requiring extensive disassembly of the sharklet and replacement of large scale skin panels.

Airbus and other operator comments, please.

CARGO

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
124	Cargo Door Panel Seals	ABS0305LB ABS0398A01 ABS0399A	Airbus	A320F	53-22 53-42	AAL

AAL has experienced 36 delays due to cargo panel seal damage in the past 12 months. These seals (ABS0305LB, ABS0398A01, and ABS0399A) appear to be easily prone to tearing and due to geometry often protrude above the adjacent panels where they are overly exposed to cargo. AAL would like to see an improvement in the three subject seals, such as a material or geometry change, that would allow sufficient durability to last between heavy maintenance visits. The ABS0399A seal has an especially high replacement rate among all of the seals and as such, AAL would like to see a focus on this specific seal.

Reference FAIR Item: 14.0145

Other operator and Airbus comments please.

OXYGEN

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
125	**O2 Mask**	**MF20-003**	**Intertechnique**	**B777 B737-8**	**35**	**JAL**

Crew O2 Mask Model MF20-003 with "MXH74-20G" harness is installed on the B737-800 and B777 of JAL Aircraft.

For the MF20-Series, the improved harness "MXH74-30G" had been introduced by SB MF20-35-35. But it has no effect for MF20-003.

JAL understands Zodiac and Boeing are on-going to issue another SB to modify the Mask from -003 to -004 by installing improved harness “MXH74-30G.” But until the release process is completed, operators must continue to keep in stock the old type harness “MXH74-20G.” Furthermore, Zodiac is no longer manufacturing the old type harness “MXH74-20G.”

1. JAL would like Zodiac to keep manufacturing the old type harness for the time being.
2. Please accelerate the SB preparation.
3. JAL hopes Boeing and Zodiac will carefully adjust the transition schedule of discontinuing of old product and release of new SB in the future.

Comments from other operators, Boeing, would be appreciated.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
126	**Crew O2 Mask**	**MF20 Series**	**Zodiac**	**B737 B777 A320F**	**35**	**AAL**

AA uses the Zodiac MF20 series masks cross fleet and between legacy AA and US Air fleets. In the past few years, increasing reports of supply/communication hose failure at the mask attachment have been reported. Zodiac has been informed of the failures and our concerns but contends that the failures are caused by mishandling. We are working with Zodiac to implement a “do not pull” label. Also, the inflatable harnesses are not lasting for the estimated 5-6 years before failure with required usage cases.

Questions:

1. Boeing/Airbus/other operators – Have you seen the above supply/communications hose failures as well?
2. Will Zodiac look at a re-design of this connection or a return to the previous sleeve?
3. Boeing/Airbus/other operators – For your masks, has harness life falling short of expectations with normal usage?

Zodiac, airframers, and other operator comments, please.

OXYGEN

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
127	**Regulator Assembly**	**RMC1000-series** **RMC2000-series** **RMC3000-series**	**Zodiac**	**Multi**	**35-13-XX**	**AFR/KLM**	**AFR**

For the stated regulator, a “Test of altitude compensated oxygen enrichment” as to be performed IAW the CMM. This test has to be performed at a specific simulated altitude. The resulting “compensated oxygen enrichment” that we have to measure is strongly dependent of the simulated “altitude chamber pressure” that is set for the test. Whereas the tested value is closely tolerance, no indication is given in the “testing tables” of the CMM regarding the tolerance of the “altitude chamber pressure.”

Furthermore, the higher value of the interval of tolerance given for the “compensated oxygen enrichment” is equal to the requested “altitude chamber pressure.” So, this interval does not take into account the precision of the altitude regulation system of the testing bench and the precision of sensors for each measure.

As a result, a significant number of RMC Regulators are rejected due to “out of tolerance” values for this specific test, while they are known as “conform.”

Question:
Could Zodiac improve the setting parameters of this test, including:

- More accurate interval of tolerances for each significant parameter (set and measured)
- Homogenization of measuring units (oxygen enrichment rate in “%O2” seems to be more accurate than an “equivalent pressure in hPa”)

Airframers and operators comment please.

OTHER

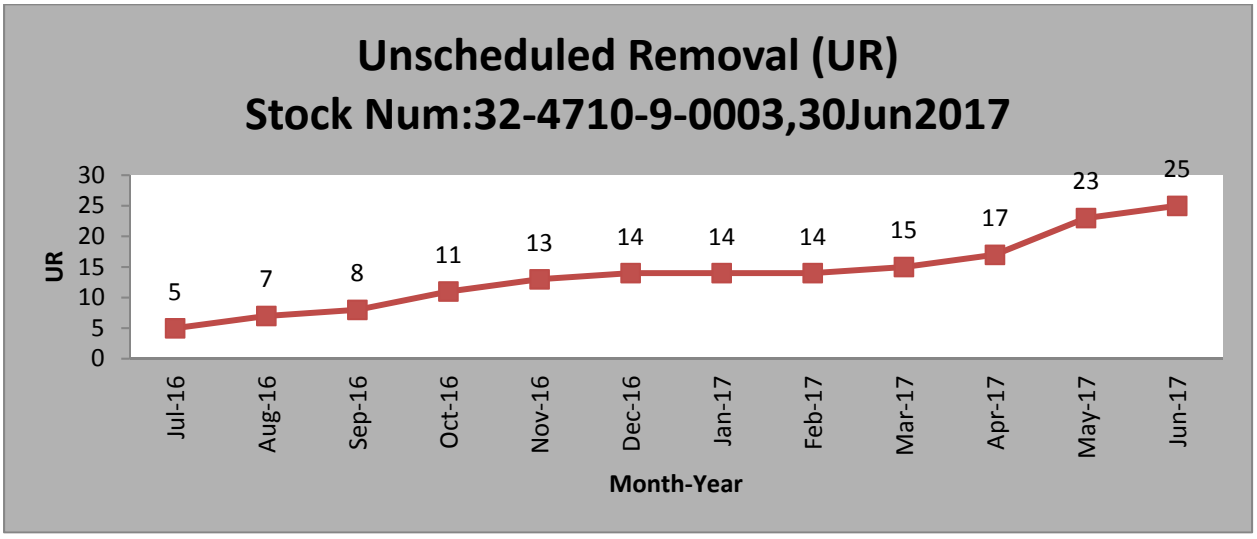
Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
128	Converter Output Transformer Assembly	1B190-2 1B190-3	Honeywell	MD-90	24	DAL

The Converter Output Transformer Assembly (COTA) 1B190-2 on the MD-90 was replaced with the -3 configuration. Reliability data (provided by Honeywell) shows that the -2 configuration is more reliable than the later -3 configuration. Honeywell has refused to restart production of the -2 configuration and has failed to explain why, after 18+ months of discussions with Delta.

Honeywell and other operator comments please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
129	Air Separation Module (ASM)	2060017-101 2060017-102 2060017-103	Parker	A320 FAM	47	DAL

Delta has seen 30 removals in the last 18 months, for Fuel Inerting system maintenance messages and other faults. This is trending in a similar way to the B737NG Air Separation Module (ASM).



Other supplier and operator comments, please.

OTHER

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
130	Air Separation Module	2060017-102 2060017-103	Parker	A319 A320 A321	47-10	AAL

ASM MPN 2060017-102 had an AD mandated life limit of 27,000 FH when the FTIS system was installed. In April 2017, this life limit was reduced from 27,000 FH to 17,000 FH with very little communication or discussion with the operators. This change in life limit has resulted in early projection of spending on ASM replacements, tracking changes, and coordination with the OEM.

Questions:
1. Why was the life limit reduced from 27,000 FH to 17,000 FH on P/N 2060017-102?
2. Why was the life limit on P/N 2060017-103 pro-rated if it is being transferred from a High Temp System to Low temp system? It is very confusing from a configuration point of view for operators.

Parker and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
131	Air Separation Module	2060017-() 2030157-()	Parker Honeywell	Airbus and Boeing Fleets	47	LHT

Due to legal requirements, the Nitrogen Generation System (NGS) is mandatory for all commercial fleets. LHT is seeing many problems during maintenance on NGS. The air separation modules PN 2060017-() from Parker and PN 2030157-() from Honeywell are showing a low reliability and furthermore, the ASM is more or less not repairable. So far, LHT has seen many removals with around 12.000 to 14.000FH whereof 95% has been scrapped due to missing repairs.

1. OEMs, what are your plans to improve reliability?
2. What is your plan to enable repairs on this technology?

Other operators, OEMs, and airframers please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
132	Air Separation Module	2030157-()	Parker	B737	47	LHT

LHT observed several Air Separation Modules PN 2030157-() that have been contaminated by fuel. Our root cause analysis revealed that this problem might be caused only if a B737 is operated on “long range.” The contamination is caused only if the center tank is fully filled, what might cause a spillover into the NGS. Furthermore, this contamination is directly causing the ASM to be irreparable.

Do any other operators witness the same issues? Is this problem limited to B737 NGS design, or do other platforms also show this pattern of damage?

Airframers, OEMs, and operators please comment.

OTHER

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
133	Espresso Beverage Water Heater Steam Oven	4671-XXXX-XX 4660-XXXX-XX 4651-XXXX-XX 4323500-XX-6600	B/E Aerospace	B787	25-33-44 25-35-11 25-35-15 25-35-52	AFR/KLM	KLM

AFR/KLM has requested several times all the tool drawings to have new repair capability.

Our PSAA says: Boeing 787 SFE tooling…of which in accordance with PSAA D6-81852 Rev. C, their drawings should be provided to the aircraft customer or customer designee.

Please note that the letters addressing KLM as customer designee were previously sent out to B/E Aerospace.

We understand that B/E Aerospace protects Intellectual Property Rights, but we are following the PSAA procedure and we are authorized to get the data.

We need these drawings to perform maintenance and calibration on the Test equipment.

We see this happening with other OEMs, too.

Boeing and other operators, please comment. How can the airlines and designees get the drawings?

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
134	Variable Frequency Starter Generator	7001330H03	UTAS	B787	24	AFR/KLM	KLM

We found several low TSN components with internal leakage because the center housing is cracked (around pump housing).

Is cracking of the center housing a failure that's found by other airlines? Is a modification being developed to improve reliability of the center housing and stop this type of failure?

Airframers and operators comment please.

OTHER

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
135	Fuel Metering Unit	8061-638 8061-639 8061-640	Woodward	A318 A319	73-28-06	LHT

The V2500 Fuel Metering Unit (FMU) suffers from poor reliability due to internal fuel leakages of the EHSVs. SBC 83724-73-0223 introduces a new PRSOV servo valve (Pre-Mod. Part is obsolete) with an improved electrical coil. Former electrical faults are now eliminated, but fuel leakage occurs at low flight time (>5.000 OPHRS). Also, the FMV and the TOS EHSV suffer from fuel leakages. EHSVs are the major cost driver during component maintenance.

1. OEM: What is your plan to improve reliability of the EHSVs, especially in regards to fuel leakage issues?

Other operator, OEMs and airframers please comment.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
136	BLG Steering Manifold	2144A4700	UTAS (Goodrich Aerospace Canada)	A380	32	LHT

UTAS, please comment why you are unable to provide some piece parts for the A380 BLG Steering Manifold. The parts are listed in the CMM 32-50-04 IPL and are not marked as “Not Procurable,” so these should be available for an MRO to buy. Please also comment when and how we can procure the material.

The piece parts in question are:

- IPL item 1-285, PN 2144E4748-1 (Gasket)
- IPL item 1-315, PN 2144E4747-1 (Gasket)
- IPL item 1-550, PN 4270R004010060 (Back-up Seal)

Other MROs, please comment if you experienced similar cases.

OTHER

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
137	**Reservoir Assembly Used on Boeing 777 Off-Wing Ramp/Slide Assembly**	**4A3795-1**	**UTAS**	**B777-300**	**25-65-11**	**AFR/KLM**	**AFR**

Reservoir must be conformed in case of evacuation. Since 2010, we have received many reservoirs for low pressure. After exchange with UTCAS, the process was modified to correct this defect:

- In Dec 2014, SNL 25-241 was issued to correct this defect (major evolution torque values/40.7 – 45.2 Nm of cartridge assy.),
- In Feb 2017, CMM 25-65-11 was modified (major evolution torque values/53.1 – 54.2 Nm of cartridge assy.).

In 2017, we experienced 5 units for low pressure. The internal process is to send this component to UTAS for analysis if the removal reason was low pressure. We have informed Boeing in reference to the Service Request number 3-3799997441.

Note: the low pressure is detected during the application of MPD item number 25-65-02-200.

This is a safety item. That is why, we kindly request the OEM and Boeing to propose a definitive evolution to correct the low-pressure defect?

Airframers and operators comment please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
138	**Integrated Drive Generator**	**761574B 1706903 772292**	**UTAS**	**B737NG A320NG**	**24-11**	**LHT**

There are several different approved oils for all IDGs used on aircrafts like A320 and B737. LHT made the experience that some oils start to degrade very quickly at certain flight conditions (high humidity and short flight cycles). This is caused by the usage of different additives used by the oil manufacturers which significantly differ in their performance. Aircraft with long oil and filter change intervals (B737NG at 1,600FH) especially suffer from oil degradation and filter plugging due to a bad combination of oil brand, environmental conditions, flight routes, and mechanical bronze wear inside the unit.

LHT engineering would like to know if other operators and MROs made the same experience. Should there be a restriction in usage of some oil brands?

Oil analyses show the condition of the oil by values like TAN, water content, viscosity, sediments, and contamination (e.g., fuel, cleaning solvents, etc.).

LHT recommends collecting oil samples on wing for laboratory analyses as an optional task for operators with above mentioned problems.

Other operator and supplier comments please.

OTHER

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From
139	Conditioned Service Air Controller	3959A0000K06	Liebherr	A319 A320 A321	21-58 (47-00)	AAL

A new controller 3959A0000K07 has been introduced via Airbus MOD 158943. Installation of this controller modifies the Fuel Tank Inerting System to a “low temp” system.

Is Liebherr going to introduce an upgrade VSB to introduce the 3959A0000K07 on in-service aircraft? Majority of the FTIS that are being operated have the K06 controller installed and AAL will be interested in standardizing all it FTIS installations to a LOW TEMP system.

High Temp system (K06 controllers) have limitations introduced via ALS part 5 Rev 4 variation 4.2 and AAL would like to standardize and eliminate any such operational limitations.

Liebherr and other supplier and operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
140	Surface Treatment Chrome Plating		All Safran Landing System	Airbus Boeing		AFR/KLM	AFR

AFR/KLM would like to know if OEM has already developed any alternative to hard chrome plating? And, less specifically, to all chrome-involved surface treatments?

- For rods or external axis, there is HVOF.
- For the chrome plating of internal small bores, we would like to know if you can consider the Ni-W plating as an alternative?

AFR/KLM has attached to this request the technical data of the Ni-W plating solution. Some OEMs seem to have adopted it as an alternative to the chrome plating.

This request was sent to Safran Landing System on June 13, 2017 (Safran Landing Systems ref: 00169258), but the request is asked to all OEMs, independently of each other.

Please comment.

OTHER

Nickel-Tungsten 5711

INTRODUCING NICKEL-TUNGSTEN

SIFCO ASC is continuously developing and refining new deposits and coatings, providing the highest quality surface enhancement materials that meet industry's ever changing requirements.

SIFCO ASC's Nickel-Tungsten deposit is the perfect green alternative to chromium for repair and OEM applications that require exceptionally hard plating. The deposit was developed for aerospace, automotive, oil and gas, and any other industry where the hardness of the surface is critical.

APPLICATIONS

For OEM or dimensional repair applications that require the enhancement of localized areas to improve surface properties including hardness, wear resistance and coefficient of friction.

Composition	60% Ni; 40% W
Structure	Micro-cracked
Corrosion Resistance	>500 hours with a 0.0005" thick copper preplate
Coefficient of Friction	0.35 – 0.55
Average Hardness	660 – 690 VHN as plated 835 VHN (heat treated at 375° F for 23 hours) 1060 – 1150 VHN (heat treated at 923° F for 2 hours)
Wear Resistance (Taber)	14
Hydrogen Embrittlement (ASTM F 519)	Passes without bake
Maximum Thickness	0.007"
Plating Rate	0.002"/hour

REV 9/13

WHY NICKEL-TUNGSTEN?

- Free of hexavalent chromium
- One of the hardest chromium alternatives available today
- Ten times lower wear rate than hard chromium
- Meets the hydrogen embrittlement characteristics of ASTM F519 without a relief bake

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OTHER

Nickel-Tungsten 5711

A COMPARISON OF EHC and Ni-W PROPERTIES
(Electrodeposited Hard Chrome, Nickel-Tungsten)

	Test Method	Applicable Standard	EHC	Ni-W
Appearance	Microscopy		Micro-cracked	Micro-cracked
Microstructure	XRD			Nanocrystalline (crystallite size 2 nm)
Hardness	Vickers Microhardness	ASTM B578	800 – 1200 VHN 790 VHN (375° F/20 hour)	660 – 690 VHN 835 VHN (375° F/23 hr) 1060 – 1150 VHN (heat treated 932° F/2 hr)
Adhesion	Bend	ASTM B 571	Pass	Pass
Ductility	Bend Test	ASTM B 489	<1%	<1.6%
Wear Volume Loss	Pin-on-disc	ASTM G 99	$9 - 11 \times 10^{-6}$ mm^3/Nm	5.0×10^{-7} mm^3 /Nm
Wear Abrasive	Taber	ASTM D 4060	3 – 6	14
Coefficient of Friction	Pin-on-disc	ASTM G 99	0.7	0.35 – 0.55
Pin Wear	Pin-on-disc	ASTM G 99	Severe	Mild
Corrosion Resistance	Salt Spray	ASTM B 117 ASTM B 537 Rating	Protection Rating 2 (1000 hr salt spray)	> 500 hours with a 0.0005" thick preplate
Hydrogen Embrittlement	Notched Bar	ASTM F 519	Pass with bake	Pass without bake
Fatigue	Axial	ASTM E 466	Significant debit	Debit
Thermal Stability	Air Oven		400° C	500° C
Internal Stress	Bent Strip			12 – 16 kpsi tensile
Current Efficiency			15 – 35%	35 – 40%
Deposition Rate			0.0005" – 0.001"/hr	0.002"/hr
Process Stability using Insoluble Anode			Good	Good

OTHER

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
141	**ICS Pump Package**	**7111038H03 (G5 Pump)**	**UTAS**	**B787**	**21**	**AFR/KLM**	**KLM**

Recently, UTAS has partly denied warranty on an ICS pump assy because one of the bolt-sleeves for a captive bolt was found migrating from the Motor controller chassis. It was noted as ‘Customer Induced Damage’ (CID), for a simple migrated/damaged sleeve-like insert. Root cause for migrating still unknown.

A CMM repair for these sleeves is not available in the related UTAS CMMs (21-53-92 and 21-54-25). One of the advantages of the G5 pump is the line replaceable Motor Controllers (MC). These MCs are attached by four ‘captive bolts’ to the Pump chassis. Since these are LRUs, it is very likely that in the future, damage to the bolt sleeves will be seen more often by frequently (re)moving captive bolts during maintenance.

- KLM is hereby urging UTAS to include a repair for the captive bolt sleeves in CMM 21-54-25.
- Are there any operators that already have experienced these migrating sleeves?

LATE QUESTIONS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
L1	Fuel Valve Single Motor Actuator Reliability	D97C00-624 D97C00-654 D97C00-682	Zodiac	A330	2821	DAL	HAL

HAL was experiencing poor reliability with Single Motor Actuator (SMA) MPN D97C00-624 and instituted a fleet campaign to replace all SMAs on all aircraft with -654's, which was completed in the first quarter of 2016. An improvement was noted for a short period of time, but failures are once again on the rise with ATA 2821 at the top of the reliability index. Current experienced MTBUR is 33,541, which is far below the GMTBUR of 70,000 currently listed on the Airbus heatmap.

With Airbus FAIR item 15.0082 open for so long and still no clear identification of root cause, will Zodiac be providing operators replacements for early failure units?

Airbus, Zodiac, and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
L2	Fire Detection Pylon Detector	7101-52	Meggitt	A330	2611	DAL	HAL

Due to ETOPS operating requirements, HAL has experienced several operational disruptions due to failed pylon fire detectors. In the last 12 months, 6 pylon detectors have been replaced, but in the same time period, only 4 detectors have been replaced for all other positions.

Has Airbus or Meggitt identified why the pylon detector fails more frequently than any other position and designed a more robust detector for that position?

Airbus, Meggitt, and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
L3	Pneumatic Pressure Regulator Valve (PRV)	6764B040000	Liebherr	A330	3611	DAL	HAL

HAL has experienced 18 PRV removals in the last 12 months with an MTBUR of 11,340. An improved valve is expected this year, but HAL would like to know if the current valve failure modes have been identified and if the improvements address all of them. If so, what MTBUR is expected, and if not achieved, will they be replaced?

Liebherr and other operator and supplier comments, please.

LATE QUESTIONS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
L4	**Hydraulic Fluid Leaks at all 3 HP Manifolds**	**F2911047000000** **F2911187600000** **F2911086602600**	**Airbus**	**A330**	**2921**	**DAL**	**HAL**

HAL has experienced several operational disruptions due to hydraulic leakage from several components. 5 of those occurred at the HP manifolds (2-Blue, 2-Yellow, and 1 Green) due to failed fitting o-rings. Several mitigation tasks have been implemented, including increased inspections and torque checks, but the failures continue.

Has Airbus investigated o-ring failures at these components (5103JM, 6103JM, and 7103JM) and identified the root cause?

Airbus and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
L5	**Wheel Speed Tachometer Bearing Failure**	**C20105100-1**	**Messier Bugatti Airbus**	**A330**	**3246**	**DAL**	**HAL**

HAL has experienced a sudden increase in brake-released ECAM messages, causing operational disruptions due to aborted takeoffs. Troubleshooting has revealed failed wheel speed tachometer drives as the cause of most of the events, with rough or contaminated bearings noted on 4 of the past 7 removals.

Airbus FAIR item 16.0299 states the brake released message will be suppressed in the next FWC update scheduled for 4Q-2018, but HAL is not satisfied with this timeframe and requests accomplishment be accelerated.

Since message suppression does not address the root cause, has an investigation of the bearing and or seal reliability been completed and an improvement made available?

Airbus, Messier Bugatti and other operator comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
L6	**Coffee Maker Reliability**	**4510-22UF00**	**BE Aerospace** **Airbus**	**A330**	**2536**	**DAL**	**HAL**

Coffee makers have been #1 on the HAL component performance index for years. In the last 12 months, they have had 109 confirmed failures with an experienced MTBUR 7517. Most of the failures are for the liquid level sensors and/or ventilation valves.

What is being done to improve reliability of this highly used, but often deferred, necessary flight equipment?

BE Aerospace, Airbus, and other operator comments, please.

LATE QUESTIONS

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
L7	Toilet Leakage	TA9115-00 TA9125-00	Apparatebau Gauting GmbH	A330	3831	DAL	HAL

HAL has experienced several toilet leakage events causing operational disruption and damage to flooring. The leaks have occurred at all lav positions, but most notably at the center positions. Many of these leaks are due to cracking of the exit elbow between the bowl and flush control valve, part number 9110-000000-02A.

Has an investigation been performed to determine the cause of exit elbow failure and a fix made available?

Apparatebau Gauting and other operator and supplier comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
L8	Waste Separator Excessive Discharge	G540DA72	Apparatebau Gauting GmbH	A330	3834	DAL	HAL

Excessive overboard discharge and fuselage staining has been noted on several HAL aircraft. Further investigation has revealed fuselage skin corrosion beyond serviceable limits. Reoccurrence of excessive discharge has been noted in as little as two weeks after replacement of separator. There have been 7 confirmed water separator failures in the last 12 months with an MTBUR of 22,670, but the GMTBUR per Airbus heatmap is 160,000.

Has an investigation into poor reliability been performed and a root cause of early failure been determined? When can we expect an improved design?

Apparatebau Gauting and other operator and supplier comments, please.

Item	LRU Name	LRU PN	Vendor	Aircraft	ATA	From	If MRO, the Associate Airline
L9	Door Sill Anti-Rollout Latch Causing Door Damage	402100-1	Tellair	A330	2551	DAL	HAL

For three years, HAL has been plagued with operational disruption due to cargo door damage caused by the door sill anti-rollout latch failing to return to the up position. The root cause given by Tellair is wear of the cadmium plating of pivoting components, allowing corrosion to form which leads to sticking and/or binding. The fix reported by Tellair, which is still unavailable, will be improved plating. No mention of lubrication, servicing, or inspection changes has been received.

What type of analysis and testing has been performed that makes Tellair feel that a plating change alone is the final fix for this problem? When will these improved latches be available?

Tellair and other operator and supplier comments, please.