



2015-2016

ANNUAL REPORT

ROYAL AERONAUTICAL SOCIETY HAMBURG BRANCH e.V.

In its eleventh year of existence, the activities of the Branch continued to attract more aviation enthusiasts to the activities of the Hamburg Branch and to ensure future growth.

Lectures

At Hamburg, there is a close cooperation between the DGLR, VDI and the RAeS to organise lectures and to mutually publicise events. The lectures listed below were organised and facilitated by the RAeS Hamburg Branch. Together with the DGLR and VDI we normally put on around 20 lectures and events per year.

Most lectures were held in the lecture theatre of the "Hochschule für angewandte Wissenschaften" (University of Applied Sciences) which is at no cost to us. On the few occasions where this was not possible we use the facilities of the Gästehaus der Universität (University Guest House) which costs around 200 Euros per event. However this was not necessary in this season.

With 8 lectures this season we put on normal number but our colleagues at the DGLR and VDI were again down on their normal number. However the high quality was maintained.

The previous season had ended with our named lecture on 15 July 2015 when we staged the 2nd Annual Gerhard Sedlmayr Lecture given by **Andrew Warner**, Chief Test Pilot, Airbus Helicopters. He spoke to us about "**Safety Priorities in Helicopter Flight Test & Operation**". The lecture was held in the Airbus Conference Centre and Andrew gave an excellent lecture which kept his audience enthralled throughout. He included many anecdotes and practical cases to illustrate the talk and there were many questions from the audience of around 100.

We would also like to thank Airbus for their support and providing drinks and snacks both before and after the lecture.

The first lecture of the annual year 2015-2016 organised by the Branch took place on 19 November 2015. This was "**Aircraft Conservation - the Dornier Do17**" by **Darren Friday**, Manager, Conservation Centre RAF Museum Cosford. He gave an excellent and interesting talk on recovering a Dornier Do17 from the Goodwin Sands and its on-going restoration to an audience of about 40. The challenges of this project were huge and many times it was on the point of failure mostly due to the vagaries of the weather but the huge enthusiasm and dedication of the people involved finally overcame the difficulties

The second lecture was held on the 03 December 2015 and was presented by Prof. **Michael Bagshaw**, Visiting Professor of Aviation Medicine, Kings College London on "**The Cabin Environment and Crew Performance**". This is of course a controversial subject but the message of Michael is that the Aerotoxic Syndrome is not caused by toxic elements in the air but by hyperventilation.

After the lecture there was much discussion amongst the 60 people present

The third lecture on 28 January 2015 was by **Sandra Bour-Schaeffer**, NEO Project Flight Test Engineer, Airbus and entitled "**A320neo Flight Testing**". Of course this was a very popular lecture for Hamburg and Sandra gave us an excellent and understandable overview of the flight testing process of a derivative aircraft. She showed that many systems were impacted by the relatively small changes incorporated and therefore had to be tested all leading to an extensive flight test programme. A large audience of 150 attended and an interesting and long discussion developed.

The fourth lecture on 03 March 2016 was given by Prof. Dr.-Ing. **Lorenz Tichy** Direktor, Institut für Aeroelastik, DLR Göttingen who spoke to us about "**Neue Technologien im Flugzeugbau - Herausforderungen für die Aeroelastik**". Herr Tichy gave us a good overview of this highly complex subject both from the practical and theoretical side. We had an audience of about 60 people who posed many questions.

The fifth lecture was held on 07 April 2016 and given by **Peter Rostek**, Airbus Operations GmbH, Hamburg. His lecture, given in German, was entitled "**Hybrid Elektrische Antriebe – Paradigmenwechsel für den Flugzeugentwurf?**" Peter gave us a very interesting lecture showing future possibilities for electric propulsion. However the message was that for large aircraft this was very much in the far future but for small aircraft there were interesting nearer-term possibilities. An audience of 90 attended and there were several questions afterwards but several people stayed on after the lecture to have more personal discussions with Peter.

The sixth lecture of the season was held on 14 April 2016 and entitles "**The Birth of the Tornado**". It was given by Group Captain **Jock Heron**, RAF (rtd). The lecture itself was very good and Jock Heron gave an excellent overview of the circumstances leading up to the start of the MRCA/Tornado programme. Of course he concentrated on the customer/operator viewpoint rather than the technical side but it was fascinating to see the complex picture with different national projects and requirements which finally lead to the aircraft as it is today. Much of this was new to me or had been forgotten. Jock Heron is a great guy with much flying experience and he had an interesting exchange of stories with Rainer Stadelmann, our Starfighter pilot. We had an attendance of about 80 people.

The seventh lecture was given on 09 June 2016 by **Heinz Frick**, Chief Test Pilot (rtd) who gave us a talk on being "**A Lucky Aviator – Test Flying for the RAF, Rolls-Royce and BAe**" about his life flight testing many aircraft. Heinz gave us a light-hearted about his flying career and the many and various aircraft which he had tested. He interspersed his talk with stories about incidents and near accidents he had been involved in and emphasised that he was "a lucky aviator" The disappointingly small audience at about 30 much enjoyed the talk and asked many questions afterwards.

The eighth and final lecture was our Third Gerhard Sedlmayr lecture this year also celebrating the 150th anniversary of the RAeS. The lecture was given by Capt. **David Owens**, Senior Director, Flight Crew Training Policy, Airbus who spoke to us about "**Training for Resilience**". The lecture was followed by a panel discussion on the topics raised in David's lecture.

Other Events

Annual Christmas Dinner

As every year, the Branch also held a Christmas Dinner on the evening of Tuesday 24 November 2015 at the Anglo-German Club. Our Guest of Honour this year was Capt. **David Owens**, Senior Director, Flight Crew Training Policy, Airbus.

He gave us a fascinating and informative talk on "*Training for Resilience*". This could in fact be counted as our sixth lecture of the season and was much enjoyed and excellently presented.

A most enjoyable evening was had with usual excellent food provided by the Anglo-German Club and we were so impressed with David's lecture that we decided to invite him back to give us a fuller version of it at the next Named Lecture.



David Owens being thanked by our Chairman Richard Smyth at the Christmas Dinner



The assembled guests at the Christmas Dinner

Visit to Dresden

17 people participated in a visit on Friday 6 November 2015 to Dresden. Participants travelled on Thursday staying the night at the Ibis Hotel to meet on Friday morning at 9:30 at the airport prior to visiting EFW Elbe Flugwerke. There we were given a comprehensive introduction the plant and its history. After this we were then shown around the maintenance and modification facilities which are mainly aimed at P2F conversions. In addition we saw some of the historical aircraft located outside. After a quick lunch we walked to the airport to be shown the fuselage display of the (Baade) 152 located there.

We then took the S-Bahn back to the city to visit the Verkehrsmuseum for a guided tour by Götz Ulrich Penzel who is responsible for the aeronautical and marine collections. We were given an excellent tour of this "Klein aber fein" exhibition with many exhibits relating to the products of the DDR including the 152. We were all very impressed by the quality of the collection made that much more interesting by Herr Penzel's explanations.



The group in front of an IL-4P built in Dresden and operated by Deutsche Lufthansa/Interflug

Branches Committee Conference

There was no representation of the Branch at the conference this year which was held at Hamilton Place.

Membership

During the ninth year of its existence membership is currently 72 including 28 who are members of the Main Society.

The members of the Executive Committee were:

Chairman: Richard Smyth
Secretary: Alexander Moerchel
Treasurer: Laura Huesmann

The Financial Auditors were:

1st Auditor: Markus Pahler
2nd Auditor: Roland Fuhrmann

The members of the Non-Executive Committee were

Membership Secretary: Jörg Fuchte
Programme Secretary: Richard Sanderson
Promotion and publicity: Marion Gretenkord
Susanne Altstaedt
Jo Wenzel
André Herbst

There were 8 Meetings of the Committee between 14.06.2015 until 17.06.2016.

Conclusion

The Branch had an excellent tenth year of its existence with eight lectures, our Christmas Dinner and a visit to Dresden and lots of interesting discussions related to aerospace. This was made possible thanks to the dedication and most appreciated contribution by its ordinary and Committee members, its company sponsors as well as through the support provided by the Society's headquarters.

Together with our colleagues from the DGLR and VDI whose lectures and events are primarily in German we are offering a top-class programme for the aviation community in Hamburg.

It is particularly rewarding and encouraging to see that our lectures are attended by many young aviation enthusiasts and students of the University. Our committee has now also been refreshed with some younger blood!

The Chairman wishes to thank everyone who has contributed to this success but in particular expresses his sincere appreciation for the enormous contributions made by the Branch's Programme Secretary, Richard Sanderson. Without his continued support, the Branch would not have been so successful.

Special thanks should also go to Heiko Froehlich, who has continued to develop a very professional web site for the Branch.

We would also like to welcome Dr Martin Spiek as new Bezirksleiter DGLR and look forward to a fruitful cooperation with him.

Finally the Branch wishes to thank the “Hochschule für angewandte Wissenschaften“ (Hamburg University of Applied Sciences) and Prof. Dieter Scholz for continuing to allow us to use their excellent lecture facilities. This most appreciated support is at no charge to us, which enables us to use the money saved to finance other activities.

Hamburg, 21st June 2016

A handwritten signature in black ink, appearing to read 'R Smyth', written in a cursive style.

Richard Smyth
Chairman

APPENDIX

HAMBURG BRANCH, EVENT & LECTURE PROGRAMME

A) 2015/16 SEASON

B) PREVIEW 2016/17 SEASON

Addresses: Anglo-German Club, Harvestehuder Weg 44, 20149 Hamburg
 Hochschule für angewandte Wissenschaften (HAW), Berliner Tor 5 (Neubau), Hörsaal
 01.12, 20099 Hamburg

** Cooperation with DGLR, VDI & HAW

DATE	TOPIC	LECTURER	COMMENTS
19.11.2015**	Aircraft Conservation - the Dornier Do17	Darren Friday, RAF Museum Cosford	Attendance: 40 in HAW. Interesting talk on historic aircraft preservation
06.11.2015	Visit to Dresden – EFW and Verkehrsmuseum		Attendance: 17. Both visits were much enjoyed despite travel problems due to rail strike
03.12.2015**	The Cabin Environment and Crew Performance	Prof. Michael Bagshaw, Visiting Professor of Aviation Medicine, Kings College London	Attendance: 60 in HAW. Interesting talk on controversial subject. He put forward a realistic view
24.11.2015	Annual Christmas Dinner and Lecture " Training for Resilience"	Capt. David Owens, Senior Director, Flight Crew Training Policy, Airbus	Attendance: 35 in AGC. Always popular and much appreciated event. Excellent lecture!!.
28.01.2016**	A320neo Flight Testing	Sandra Bour-Schaeffer, NEO Project Flight Test Engineer, Airbus	Attendance: 150 in HAW. Popular subject in Hamburg. An excellent and much appreciated lecture
03.03.2016**	Neue Technologien im Flugzeugbau - Herausforderungen für die Aeroelastik	Prof. Dr.-Ing. Lorenz Tichy, Direktor, Institut für Aeroelastik, DLR Göttingen	Attendance:
07.04.2016**	Hybrid Elektrische Antriebe – Paradigmenwechsel für den Flugzeugentwurf?"	Peter Rostek, Airbus Operations GmbH, Hamburg	Attendance: 90 in HAW. Good overview of the potential. Yes for small aircraft. Very long term for large aircraft.
14.04.2016**	The Birth of the Tornado	Group Captain Jock Heron, RAF (rtd).	Attendance: 80 in HAW. Interesting lecture on the background to the MRCA/Tornado beginnings
09.06.2016**	A Lucky Aviator – Test Flying for the RAF, Rolls-Royce and BAe	Heinz Frick, Chief Test Pilot (rtd)	Attendance: 30 in HAW. Light-hearted but interesting talk about flying and testing many different aircraft
05.07.2016	Ordinary General Assembly and Third Gerhard Sedlmayr Lecture - Training for Resilience	Capt. David Owens, Senior Director, Flight Crew Training Policy, Airbus	Attendance:

Aircraft Conservation – the Dornier Do17

Darren Priday,
Manager, Conservation Centre
Royal Air Force Museum
Cosford



Lecture
followed by discussion
Entry free!
No registration required!

Date: Thursday, 19th November 2015, 18:00
Location: HAW Hamburg
Berliner Tor 5, (Neubau), Hörsaal 01.12



The lecture covers the known history of Dornier Do17z – 5K-AR shot down during the Battle of Britain. Having spent 70 years on the Goodwin Sands before being rediscovered, the Royal Air Force Museum set out on its recovery. The story of the recovery, its transportation and the on-going conservation is covered in-depth.

Darren Priday joined the RAF in 1979 as an Airframe Technician working on VC10, Phantoms, Hawks and Jaguar in various roles including Team Leader and Trade Manager. He spent 2 years working in Oman as the RAF liaison and mechanical specialist for the RAF Oman Jaguar upgrade project.

He left the RAF in 2005 after 26 years service and joined the RAF Museum's Michael Beetham Conservation Centre (MBCC). In 2009 he was promoted to Deputy Manager MBCC and in 2013 to Manager MBCC.

He is responsible for the upkeep of the RAFM large 3D collection (planes, vehicles, aero engine, missile etc) and his work area covers RAFM sites at Cosford, Hendon and Stafford (RAFM Reserve Collection) and objects on loan to other Museums.

*He is responsible for the Volunteers working on the large 3D objects
The RAFM runs a national award winning heritage apprenticeship scheme and along with the Apprentice Manager, he has responsibility for their development*

Flight Testing the A320neo

Sandra Bour-Schaeffer,
NEO Project Flight Test
Engineer, Airbus



Lecture
followed by discussion
Entry free!
No registration required!

Date: Thursday, 28 January 2016, 18:00
Location: HAW Hamburg
Berliner Tor 5, (Neubau), Hörsaal 01.12



The A320neo (new engine option) is the newest aircraft variant of Airbus, due to enter service in late 2015. Its first flight took place on the 25th September 2014. Sandra Bour-Schaeffer was on board as a Flight Test Engineer, second from right in above photo. Sandra will speak about the rigorous flight test programme of the A320neo and the upcoming flight test programmes of the A321neo and A319neo.

Hybrid Elektrische Antriebe – Paradigmenwechsel für den Flugzeugentwurf?

Dipl.-Ing. Peter Rostek
Airbus Operations GmbH, Hamburg



Lecture
followed by discussion
Entry free!
No registration required!

Date: Donnerstag, 07 April 2016, 18:00
Location: HAW Hamburg
Berliner Tor 5, (Neubau), Hörsaal 01.12



Hybrid elektrische Antriebe sind in bestimmten Marktsegmenten nichts Neues. Sie kommen bereits zur Anwendung bei PKW's, LKW's, Bussen oder Schiffen. Die große Herausforderung besteht darin, diese Technologie in den Luftfahrtmarkt zu übertragen.

Die Kombination von Verbrennungskraftmaschinen und elektrischen Komponenten sowohl mit hoher Energie- als auch Leistungsdichte wäre die Grundlage für zwei wesentliche Veränderungen:

- Eine hybride Architektur würde zu einer Verbesserung des Gesamtwirkungsgrades der Antriebskette beitragen.
 - Synergien zwischen Technologiebausteinen würden zu einer Erweiterung des Flugzeugentwurfsraumes beitragen
- Dieser Vortrag liefert allgemeine Informationen über das Potential hybrid elektrischer Antriebe in der kommerziellen Luftfahrt und über aktuelle Entwicklungsaktivitäten im Rahmen von Clean Sky 2.

Peter Rostek arbeitete nach seinem Abschluss an der TU Berlin 1999 für fünf Jahre dort als wissenschaftlicher Mitarbeiter im Institut für Leichtbau. Seit 2004 hat er in verschiedenen Positionen für das FPO bei Airbus in Hamburg gearbeitet, speziell im Bereich Rumpfauflegung und Nutzlastintegration. Seit Mitte 2013 konzentriert er sich inhaltlich auf neue langfristige Konzepte. Seit 2014 ist Herr Rostek Technology Product Leader Novel Energy

The Cabin Environment and Crew Performance

Prof. Michael Bagshaw, FRAeS
Visiting Professor of Aviation
Medicine, Kings College London



Lecture
followed by discussion
Entry free!
No registration required!

Date: Thursday, 3rd December 2015, 18:00
Location: HAW Hamburg
Berliner Tor 5, (Neubau), Hörsaal 01.12

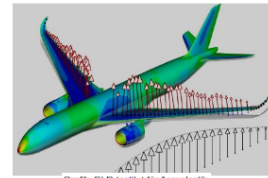


In December 2010, an A319 operated an early morning flight from Vienna to Cologne. The aircraft was new and had just entered service. While turning on to base leg following descent the crew noticed a strong smell on the flight deck. The smell persisted so the two pilots donned their oxygen masks and declared an emergency. The crew reported that they subsequently felt miserable and described their state as nauseous, light headed and not able to concentrate. There were no reports from passengers or flight attendants. The aircraft landed safely, but after landing the co-pilot was unable to walk down the aircraft stairs unaided and required assistance to help him disembark. Medical examination revealed nothing of significance and both crew members subsequently recovered without treatment. The aircraft was fully examined by the airline technical department, but no faults were found and it was released back into service with no further reported problems. In-flight fume events involving a range of aircraft, particularly in Europe and the USA, have led to a range of reported symptoms and signs amongst a small number of crew, giving rise to the concept of the so-called 'aerotoxic syndrome'. This lecture will explore the physiology and pathology of the condition and examines the possible association with jet engine bleed air.

Michael Bagshaw is Visiting Professor of Aviation Medicine at Kings College London and a visiting professor at Cranfield University. He was previously Head of Medical Services at British Airways, prior to which he worked in the NHS as a Consultant in Neurology at St Georges Hospital London and as a family practitioner in Berkshire. This followed a career in the RAF as a medical officer, flying instructor and test pilot. He spent 6 years as Senior Medical Officer Pilot at the Institute of Aviation Medicine, before retiring from the RAF in 1986. He holds an Airline Transport Pilot licence, flies his own Twin Comanche and remains a flight instructor and examiner. Prof Bagshaw has contributed to textbooks of aviation and travel medicine and published more than 90 scientific papers. He has been the recipient of many international honours and awards and in 2005/06 served as President of the Aerospace Medical Association and the Airlines Medical Directors Association.

Neue Technologien im Flugzeugbau - Herausforderungen für die Aeroelastik

Prof. Dr.-Ing. Lorenz Tichy
Direktor, Institut für Aeroelastik,
DLR Göttingen



Lecture
followed by discussion
Entry free!
No registration required!

Date: Thursday, 03 März 2016, 18:00
Location: HAW Hamburg
Berliner Tor 5, (Neubau), Hörsaal 01.12



Das Fachgebiet der Aeroelastik behandelt die Wechselwirkung von Aerodynamik mit Elastizität und Trägheit der Struktur, auch im Zusammenhang mit der Flugmechanik und Flugregelung. Aufgrund des extremen Leichtbaus und der großen aerodynamischen Kräfte ist diese Wechselwirkung im Flugzeugbau besonders stark, sie kann von Vorteil sein, aber kann im Extremfall auch zum Versagen der Struktur führen. In jedem Fall müssen aeroelastische Wechselwirkungen zur Sicherstellung eines optimalen Entwurfs berücksichtigt werden. Im Vortrag sollen hierfür anhand einiger Beispiele derzeitige Herausforderungen für die Aeroelastik aufgezeigt werden.

Nach 15jähriger Tätigkeit in der Flugzeugentwicklung bei Airbus in Bremen ist Prof. Tichy seit 2007 Direktor des DLR Instituts für Aeroelastik in Göttingen, wo er bereits nach dem Studium des Maschinenbaus und der Luft- und Raumfahrttechnik an der TU Braunschweig als Wissenschaftler tätig war und 1992 zum Dr.-Ing. promovierte.

The Birth of the Tornado

Group Captain Jock Heron,
RAF (rtd.)



Lecture
followed by discussion
Entry free!
No registration required!

Date: Thursday, 14th April 2016, 18:00
Location: HAW Hamburg
Berliner Tor 5, (Neubau), Hörsaal 01.12



The lecturer will describe the origins of the RAF requirement for low altitude all weather strike and attack, after cancellation of the TSR2, and the subsequent studies within the Ministry of Defence in London. He will go on to describe the negotiations with his German and Italian counterparts which led to the MRCA project with its headquarters in Munich.

Jock Heron joined the RAF in 1955 as a officer cadet at the RAF College Cranwell. After graduation he flew many types of aircraft including Hunter, Lightning and Mirage 3 and during an exchange with the US Airforce, F-105 Thunderchief and F-86F Sabre.

In 1967 he returned to the United Kingdom to take up an appointment in the Ministry of Defence (MoD) Operational Requirements branch as a Squadron Leader staff officer on the Tomado project. During a second posting to Germany he commanded the operations wing at RAF Gutersloh where he flew both the Harrier and the Wessex helicopter. In 1984 he was posted to the Falkland Islands to command RAF Stanley for four months.

He retired from the RAF in 1987 and joined Rolls-Royce in Bristol as its Military Affairs Executive. He retired finally in October 1998 but maintains his Service links through the RAF Historical Society, where he is Vice Chairman. At Filton he is Chairman of the Bristol Branch of the Rolls-Royce Heritage Trust and a trustee of the Bristol Aero Collection.

A Lucky Aviator – Test Flying for the RAF, Rolls-Royce and BAe

Heinz Frick,
Chief Test Pilot (rtd.)



Lecture followed by discussion
Entry free!
No registration required!

Date: Thursday, 09 June 2016, 18:00
Location: HAW Hamburg
Berliner Tor 5, (Neubau), Hörsaal 01.12

Hochschule für Angewandte
Wissenschaften Hamburg
Hamburg University of Applied Sciences
Praxis Seminar Luftfahrt

The lecturer will take us on a journey through his flying career as an RAF fighter pilot and test pilot. There are lots of stories some funny some very serious. In his flying career he flew a wide variety of aircraft and will relate many lessons learned about flight safety from design to engineering and the importance of team work by all concerned.

Heinz began his career in the RAF in 1959 and after flying training was posted to 20 Sqn based in Singapore, flying Hunters. Then followed 2 tours on Lightnings before attending the Empire Test Pilots School. Following that he spent 4 years on the fighter test squadron at Boscombe Down. He left the RAF in 1972 to join RR at Filton and got involved in engine testing on many aircraft including Harrier, Jaguar, HS125, Vulcan and VC10. In 1978 he joined Hawkers at Dunsfold to develop the Harriers and Hawks and became Chief Test Pilot. After retiring in 1990 he pursued a career in civil aviation.



Annual Gerhard Sedlmayr Lecture and RAeS 150th Anniversary Event

Training for Resilience

Captain David Owens FRAeS, Senior Director, Flight Crew Training Policy, Airbus

Date: Tuesday, 5 July 2016, 18:30
Location: Auditorium „Hugo Junkers“, Haus 23

Main Entrance / Osttor, Airbus, Kreeslag 10, 21129 Hamburg

Hochschule für Angewandte
Wissenschaften Hamburg
Hamburg University of Applied Sciences
Praxis Seminar Luftfahrt

David Owens will describe the changes in flight crew training which he feels necessary to generate such "Resilience" defined as "the ability to recognise, absorb and adapt to disruptions". David emphasises that the basis of such qualities starts with careful candidate selection and goes on to describe possible scenarios during simulator training. To ensure that the correct standards apply across the industry, he considers that crews should be trained to the aircraft manufacturer's Standard Operating Procedures – this will become essential in future when it is estimated that 15,000 newly qualified pilots will be required each year worldwide

The lecture will be followed by a round-table discussion. Participants are:
David Owens, Airbus
David Learnmount, Consulting Editor FlightGlobal
Chris Parsons, Chief Engineer, Technical Authority Air Safety, Atkins
Lt. Col. Helmut Henk, Gemeinschaft deutsche Transportflieger (GdT)
Capt. Manfred Müller, Flight Safety Research, DLH
Capt. Nils Bartling, Director Flight Ops., TUfly

PREVIEW 2016-2017 SEASON



Preview 2016 - 2017 Season

The following lectures and events are confirmed

01.09.2016	Corporate Jet Cabin Evolution <i>David Veluppillai, Marketing Director, Airbus Corporate Jets</i>	(ZAL)
01.10.2016	Toulouse visit	
03.11.2016	Potential of Aerodynamic Design in a Constrained Environment <i>Gerd Heller, Airbus</i>	
22.11.2016	Christmas Dinner <i>Guest??</i>	
26.01.2017	Flugerprobung A350 <i>Martin Scheuermann, Experimental Test Pilot, Airbus</i>	
16.03.2017	Remembering the TSR2 <i>Brian Mann</i>	
06.04.2017	Perspektiven der Luftfahrtforschung <i>Prof. Rolf Henke, Vorstand für Luftfahrt, DLR Köln</i>	(ZAL)
22.06.2017	The RAF Harrier in the Cold War <i>Group Captain Jock Heron, RAF(rtd.)</i>	
04.07.2017	Gerhard Sedlmayr Lecture	(ZAL)
xx.xx.2017	The Hybrid Air Vehicles Airlander Project Waiting for confirmation	
	Pfalz-Flugzeugwerke (PFW) - von 1913 bis heute <i>Holger Krüger, Airbus</i>	