ROYAL AERONAUTICAL SOCIETY
Loughborough Branch

Minutes of the Annual General Meetings held on Tuesday 15th April 2014 (including notes on lecture which followed the AGM)

No. attendees – 30.
Apologies for absence – These were received from Goff Tearle and Michael Y K Leung.

1 Minutes of AGM held on 23rd April 2013

These were approved.
Proposer – Mac Maccabee, Seconder – John Hodgkinson.

2 Matters Arising

There were none.

3 Secretary's Report

See Appendix 1 (Secretary's Report to the 2013/14 Season AGM held on Tuesday 15th April 2014).

The Secretary's Report was approved nem con.
Proposer – Mac Maccabee, Seconder – Barry Jacobson

4 Treasurer's Report

See Appendix 2 (Treasurer's Report to the 2013/14 Season AGM held on Tuesday 15th April 2014).

The Treasurer stated that the amount of grant to be requested from the RAeS would be reduced from that awarded for the year 2014 because of the surplus of income over expenditure during the 2013/14 season.

The Tresurer's Report was approved nem con.
Proposer – Graham Kitto, Seconder – Vipran Kannan

5 Election of Officers

5.1 The following committee members indicated that they were willing to stand for re-election for the 2014/15 Season:

Branch Chairman	:	**John Ollerhead**
Branch Secretary	:	**Colin Moss**
Branch Treasurer	:	**Mac Maccabee**
Meetings Secretary	:	**Karpaga Vipran Kannan (Vipran).**
Committee Members	:	**Ivor Amos, Mike Hirst, Barry Jacobson, Daniel Nutt, Goff Tearle.**

5.2 In addition **Michael Y K Leung**, undergraduate student at Loughborough University studying BSc Air Transport Management and **Chris Drury**, Chairman of the Loughborough Students' Flying Club, were standing for election as a Committee Members.

N.B. Philip Littlehales, past Chairman of the Loughborough Students' Flying Club, was not standing for re-election.

All those standing for election were elected nem con.

6 Any Other Business

There was none.

Colin Moss MRAeS, Branch Secretary

1. Review of the 2013/14 Lecture/Visits Programme

1.1 Lectures

In all a total of nine lectures were planned for the 2013/14 programme (see Table 1 below). N.B. In each case the "Report on the Lecture" is a copy of the notes written for the RAeS Loughborough Branch website.

TABLE 1

Date	Lecture/Lecturer	Attendance	Report on the Lecture
15th Oct. 2013	**Early Flight Testing of the F-35B JSF** by Graham Tomlinson, former BAE Systems Senior Test Pilot	**130**	This lecture introduced a substantial amount of background knowledge as well as providing a comprehensive insight into the flight-test programme. Graham had joined the then JSF project in 2002 to evaluate and develop the short-take-off and vertical landing (STOVL) properties of the aircraft. He outlined the scale of the programme, with 2,400 aircraft in prospect for the US forces, and over 600 additional airframes expected to be in service worldwide. A delivery rate of 240 aircraft annually is planned. There are three variants: 1. **F35A** - conventional aircraft developed mainly for the US Air Force 2. **F35B** - the STOVL variant, designed specifically for on-ship operations, and destined to be in service with the US Navy and Marines and the Royal Navy (when the latter's Queen Elizabeth class carriers enter service (probably 2017) 3. **F-35C** - a conventional version for the US Navy that embodies arrestor and catapult modifications, and a stronger landing gear for carrier flight-deck operations. He detailed the similarities of all the types. They are externally identical: and consistent in terms of aerodynamic shape, stealth properties, and internal weapons carriage capability. He presented considerable detail of the cockpit which embodies a solid-state main display measuring 20 x 8 in (500 x 200mm) on which 'windows' can be displayed that correlate to mission phases, a helmet-mounted sight (HMS) – there is no head-up display – and considerable innovation in the way the fly-by-wire (FBW) system integrates with the pilot, through stick and throttle, in the vertical-horizontal transition modes during STOVL operations. It was this aspect on which the lecture focused most attention.

TABLE 1

Date	Lecture/Lecturer	Attendance	Report on the Lecture
			 Eleven doors are required to engage the J-35B vertical take-off'/landing systems. These are associated with the rear exhaust and the vertical fan mounted aft of the cockpit. In the configuration shown, 20,000lb thrust is from the fan, 16,000lb from the exhaust and 4,000lb from wing-mounted thrusters. He detailed the similarities of all the types. They are externally identical: and consistent in terms of aerodynamic shape, stealth properties, and internal weapons carriage capability. He presented considerable detail of the cockpit which embodies a solid-state main display measuring 20 x 8 in (500 x 200mm) on which 'windows' can be displayed that correlate to mission phases, a helmet-mounted sight (HMS) – there is no head-up display – and considerable innovation in the way the fly-by-wire (FBW) system integrates with the pilot, through stick and throttle, in the vertical-horizontal transition modes during STOVL operations. It was this aspect on which the lecture focused most attention. He presented a thoroughly-enjoyable review of VTOL aircraft evolution, with videos of the UK projects that started with the Rolls-Royce 'Flying Bedstead' and the Short SC.1, and film of several RAF Harrier incidents (some leading to aircraft write-offs). These emphasised the dexterity needed to juggle the conventional stick and pedals, throttle and nozzle lever, as the impact on attitude and flight vector can require careful judgement of the relative position and combination of rates of change of these controls. In the late-1980s the UK RAE installed a re-programmable flight control system (FCS) in a two-seat 'vectored-thrust Aircraft Advanced Control' (VAAC) Harrier. This introduced the engine throttle and nozzle controls, as well as control surfaces and 'puffer' jets, into the FCS algorithms, and aimed to make the transition

TABLE 1

Date	Lecture/Lecturer	Attendance	Report on the Lecture
			process more instinctive in the way it blended the use of a minimised set of controls to maintain attitude and control throughout the transition.  The refinement of techniques developed in the VAAC Harrier fed into the F-35B, making the control systems simple to use, and rendering the cockpit conspicuously simple compared to the Harrier. Note the sidestick (right side) and the single throttle control (left side) which are common across all F-35 variants. Graham described the FCS 'blend' over the range 0 to 250kts. The command regime is thus: • throttle position commands acceleration and deceleration in all modes or flight: • backwards/forwards stick position commands vertical velocity in the hover or pitch rate in conventional flight - with a blend between the two • side-to-side stick position commands roll rate in the hover, or bank angle in conventional flight - again with a blend between the two. If the stick is centred, at any time, the aircraft returns to wings level • pedal position commands yaw rate in the hover and sideslip in normal flight He showed film of Yak-38 (Forger) operations from the 1970s, as this used a similar configuration to the F-35B, but did not have advanced FCS. It was much quicker to compromise a pilot than Harrier, with rapid loss of stability. In one remarkable film the aircraft disappeared over the carrier-deck nose and the pilot was ejected: reappearing over the deck and collected in the arms of his deck crew within the space of a few seconds.

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			The flight test programme for F-35 commenced in 2006, and the first F-35B was flown in 2008. Initially it was flown in conventional flight and the 11 doors (excluding landing gear doors) were exercised. When the fan doors was open the aircraft exhibited more loss of stability than has been expected, and the intake door actuator needed to be strengthened. The first in-flight conversion from 5,000ft/210kts to vertical landing was conducted in January 2010, and a full investigation of transition options was achieved during spring 2010. He commented that the transition is easy, and does not require the rigorous training that Harrier experience might have led one to expect. He did stress that the configuration is liable to some severe failures, and he showed film from a simulator of a fan-failure, which pitched the aircraft nose-down rapidly. The aircraft will be inverted within 0.6 seconds, so they have adopted the Russian technique of automatic ejection. There was considerably more detail in his presentation, of the aircraft weapons systems, sensors and electrical power systems for example, and he was asked questions for over 20 minutes from an audience of around 130, whose interest was clearly as broad as the topics he had covered. Colin Moss offered the vote of thanks for what had been a most enjoyable beginning to this year's Branch activities programme. *Notes written by Mike Hirst*
5th Nov 2013	**The Lost Lancaster – Two Came Home** by Laurie Tillen, RAeS Loughborough Branch Friend	**130**	A strong personal note was embedded in this tale RAF's Avro Lancaster Mk 1, serial L7547, conducting its final mission on February 14/15th, 1943. The aircraft was the 21st aircraft off the Avro production line, and having been built as a twin-engine Manchester it was returned to the factory and converted to a Lancaster before entering full service. By February 1943 the aircraft was with 207 Squadron, and based at Langar in Nottinghamshire. The speaker detailed the aircraft's history, including some engine unreliability in the days before its fateful mission. He also outlined the seven-man crew arrangement, showing internal arrangements of crew positions, the parachute stowage positions and escape routes with a memorably accurate and precise description of the apparently spacious fuselage as being "like a Tardis in reverse." He provided also much more information relevant to the background of

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			Bomber Command's operational demand on crews, particularly stressing the high mortality rate and the young age of the people involved on typical operations. His pre-mission briefing to the audience brought everyone as close as possible to feeling that they knew the crew. We learned their names, backgrounds: nationalities and flying experience – with log-book extracts – and particularly the pilot, New Zealander John Whyte, and British flight engineer Stanley Eyre. Slides illustrating the commencement of the mission were accompanied by a reconstruction of engine start-up, and as the cacophony was extinguished his commentary was "that is what they had to expect for the next 10 hours." The aircraft was part of a bombing raid on Milan, which necessitated a 1,860 mile return journey, carrying a substantial bomb load. The aircraft routed over eastern France, dog-legging to Milan south of Switzerland, cruising at 200mph at 16,500ft altitude. The aircraft's recalcitrant outer starboard engine made the crew cautious to descend to 8,000ft to drop their bombs, so they conducted a high-level drop before turning for home. Near Dijon in France, and unexpectedly, it was the port outer engine that started to fail and emit flames, and the events that led to the aircraft being evacuated by the whole crew was explained in detail. Eventually the aircraft crashed on woodland near a farm, 'Les Merlins,' with the pilot and flight engineer having been the last people to escape. The aircraft had circled beforehand and all previous crew members had landed close by, but these were the unfortunate five, and the pilot and engineer became the 'two came home' crew members. Laurie's account was very detailed, and profusely illustrated (an estimate of 100 or so slides used overall in 90 minutes – but this was not overkill: he attained a remarkable level of completeness in his descriptions). We learned that the bodies of the five crewmen who perished were all recovered by local people, and despite German-occupying forces demanding they were buried without any ceremony, they were allocated a grave, and honours as fit to purpose as the village of St Brisson could muster – this included finding Union Jacks for each coffin. Thankfully the German forces did not send an attendee to this ceremony. At this point we learned that one of the five men, the navigator Frank Tillen, was the speaker's cousin, and that he had visited the five-plot grave in 2006, and so began his research into the two survivors.

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			 The commemorative plinth at the crash site with the family of the pilot, one of two survivors, in attendance F/Sgt John WHYTE, RNZAF - Pilot F/Sgt Stanley EYRE, RAF - Flight Engineer The grave in St Brisson commemorating Sgt Frank TILLEN, RAF - Navigator F/Sgt Thomas STRONG, RAF - Obs/Bomb Aimer F/Sgt Athol GRAINGER RAAF - Wireless Op/AG Sgt Henry BONE, RAF - Air Gunner (MU) Sgt Kenneth WHITE, RAF - Air Gunner (R)  source: 207 Squadron web-site This narrative has to be much more terse than the presentation. Remarkably, the two airmen met in the forest and hid in a cabin. They were found after only a few hours by an 18-year old logger, Andre Bouquin, who had followed their tracks. Within the day – as exciting in detail as any thriller – Bouquin accompanied the men through the forest, then on bikes to a monastery where they were secreted while a priest forged false paper for them. Placed in the hands of the Marquis (the French 'resistance' movement) they were transported by rail to Paris: deliberately a journey that took them away from the escape routes they might have been expected to use. They were hidden there for some time before travelling to Berne, again by rail, and under the eyes of German-occupying forces. On one railway journey, a German officer even sat next to pilot John Whyte for three hours. They were in a safe haven, but Switzerland was accumulating UK crews, and had to despatch as many as possible, so after some six months in Berne they were to be put at risk of capture again when they took a train to Perpignan in SW France, then climbed through the Pyrenees mountains to enter Spain, where they faced a long journey, principally via Madrid, to reach Gibraltar. The two crew men were separated, with John Whyte leaving first, but he was injured as he crossed the mountains. Near Barcelona he gave himself up to Spanish authorities (under a

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			new false ID), received hospital treatment, then absconded and travelled unattended to Gibraltar. Stanley Eyre had a less eventful journey – if one can adopt nonchalance in a description of what was a heart-stopping series of events. They both flew out of Gibraltar to the UK on RAF transport aircraft and arrived in the UK in February 1944: one year after the crash. Both men were awarded a DFC, and both returned to active service in Bomber Command. They survived the war and lived full and active lives. Whyte returned to New Zealand, and Eyre spent more time in the RAF before entering civilian life. Question and answers time was slow to start, but discussion followed in abundance, and the vote of thanks was from 'Mac' Maccabee. This was a unique lecture for the branch, and almost unanimously amongst some 130 attendees the immediate response was that it was amongst the finest of presentations. This was a lecture in which an aircraft was implicit and the most fascinating content was humanitarian. *Notes written by Mike Hirst*
19th Nov 2013	**Early Military Flying in the UK and the Building of a replica of British Army Aeroplane No. 1** by David Wilson, Volunteer at Farnborough Air Sciences Trust.	**100**	The speaker was a Farnborough apprentice in the early 1950s. He could look back on a distinguished career in aviation, and since its inception over a decade ago has been a very active member of the Farnborough Air Sciences Trust (FAST). It was his knowledge of the early days of British knowledge of military aviation, until about 1913, and especially in the Farnborough area, plus the work conducted in 2006-08 to construct a replica aircraft that formed the basis of this two-part presentation. British Army interest in air-based elements in warfare started in 1865 when a team of UK soldiers investigated the use of balloons in the US Civil War. They reported their finding and stimulated interest that lead to a Royal Engineers (RE) Army balloon unit being formed at Woolwich Arsenal in 1878. They used hydrogen-filled balloons with spherical envelopes, made of stretched cow-gut (with the distinguished name of 'goldbeater's skin'). This was enclosed by a mesh, from the lower portions of which was suspended a basket for an artillery/troop-movement observer. A more suitable site for the manufacture and operation of balloons was Chatham, where operations started in 1882, and a balloon training school was formed nearby, at Lidsing, in 1886. Between 1890-92 these two units were moved to Aldershot, and by 1906 had

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			acquired a landing ground by combining the Farnborough and Cove Commons and taking the adjacent cleared stretch of woodland that was called Laffan's Plain, and thus establishing the basis of what would become Farnborough Aerodrome. Initially it was planned to support the building and testing of dirigible airships. In August 1902 the Army was visited by to the most flamboyant figure in early British aviation history, Samuel Franklin Cody. His surname was Cowdery but his style was that of 'Buffalo Bill' Cody, and he relished the idea that he was regarded as that adventurous cowboy. His ability to embellish and to seek publicity has served history, as he invariably ensured that a photographer was present at significant events thus ensuring many useful photographs are available. Cody demonstrated a man-carrying kite system (several kites linked) to the Army. He proposed that, compared to a balloon, it was less sensitive to the effects of wind, and easier to transport (balloons were carriage-hauled once inflated). The Army took little heed, and were to be assailed by Cody until in 1907 when he assisted in the design and build of an airship 'Nulli Secundus' (second to none) which in October 1907 he flew from Farnborough to London, although he failed to complete the return journey against a headwind. His interest remained with the development of his kites into aeroplanes.

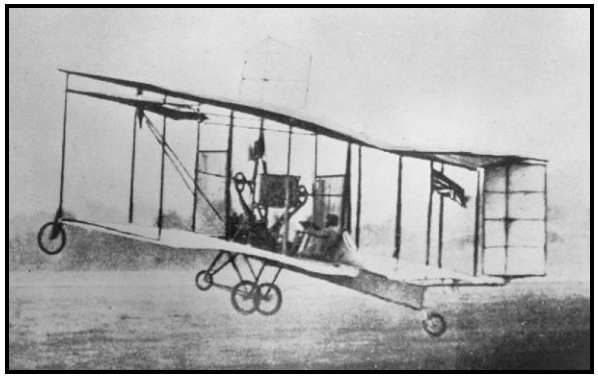
TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			 *Nulli Secundus over St Paul's Cathedral, London* On 16 October 1908 Cody flew his British Army Aircraft No 1 at Farnborough, and became the first man to successfully fly an aircraft in Britain: an accolade that is highly contested, but that the speaker regarded as true, as the only contender (Verdon-Roe) - later to form the AVRO company - had no evidence of his claim. As ever, a photographer had taken a picture of Cody on his first flight, when he covered 1,390ft in 27 seconds.  *Cody's first flight – 16 October 1908*  *The replica British Army Aircraft No.1 in the newly erected FAST hangar at Farnborough*

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			Again, Cody's attainment did not win the accolade he expected, as no Army order was forthcoming. The Army created its own aircraft design capability (the Royal Aircraft Factory) at Farnborough, and Cody was allowed to stay on site but had to be content to design and fly aircraft for other uses. The lecturer illustrated the types he did build: from No.1C to No.6. On 7 August 1913 he was flying a version of No.6 aircraft when a structural failure occurred, at about 300ft altitude. He and his passenger – neither was strapped in – were catapulted from the aircraft, and died on impact with the ground. Cody was buried with full military honours in the Aldershot Military Cemetery, his funeral drawing around 100,000 mourners. To conclude his lecture, Mr Wilson described how, in late 2006, the FAST Air Museum volunteers asked him to lead a project to create a non-flying replica of Cody's No.1 Aeroplane. Latest completion was to be 16 October 2008, the centenary of its first flight: but then it was decided to exhibit it at the biennial Farnborough Air Show, some three months earlier still. His project timeline (hand-drawn and with humorous annotations) illustrated the tremendous challenge this task presented. He showed examples of the drawings that were prepared, the procurement of wood (" you cannot get 26ft spars from B&Q': so they were used wood rejected by a ladder-builder), the jigging of what is a sizeable structure, the 'seamstress' team that clothed the airframe, and an ingeniously-crafted replica engine. It showed what dedicated volunteers, with an incentive to commemorate a notable first can often achieve. Goff Tearle presented the vote of thanks to an appreciative audience of about 100 people: which included members of the Loughborough University Alumni. *Notes written by Mike Hirst* *Joint lecture with Loughborough (University) Alumni*

APPENDIX 1 - Report on the 2013/14 Season - AGM held on Tuesday 15th April 2014

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
10th Dec 2013	**The Kegworth Air Accident – Safety Lessons Learned** by Mike Bromfield and Prof. Mike Blundell, Faculty of Engineering and Computing, Coventry University	**230**	The speakers started their presentation by showing video of a 'breaking news' story on BBC television on the night of the accident. Many people in the audience could remember what they were doing when they saw this broadcast, reinforcing that as well as being one of the most significant accidents in recent UK aviation history, it had a great impact in this locality. The British Midland operated Boeing 737-400 crashed during an approach to East Midlands Airport on 8 January 1989, and of 118 passengers and 8 crew on-board, 47 became fatalities, 5 people 'walked away' and all other 74 survivors were rescued: a large proportion of them with serious injuries. The aircraft had diverted, having commenced a flight from Heathrow to Belfast and suffered an engine failure at 29,000ft. The flight crew correctly completed the procedure for an engine shut-down, but inadvertently shut-down the wrong engine, and almost illogically the damaged engine was still providing what seemed to be normal power. While on approach to East Midlands Airport, and as it passed over Kegworth, the damaged engine was commanded to increase power but it failed catastrophically. The aircraft impacted several hundred metres short of the runway, then cut through trees before it crossed the M1 and rammed into the western embankment, adjacent to the runway approach lights, at a speed of around 100kts (115mph). The undersides of the fuselage tail and nose sections were damaged in the two impacts, and the fuselage broke in two places in the course of the rapid 22-26g deceleration sustained during the final impact. After describing these events the speakers concentrated on the conclusions of the UK Air Accident investigation Branch (AAIB) report on the accident, reviewing in depth the contribution of human factors, the survivability aspects of the aircraft and post-crash events, and referring to Coventry University research to illustrate lessons learned from the accident. The most significant contribution to the accident was the engine failure, and the decision by the crew to shut-down the wrong engine. The presentation showed instrumentation changes between Boeing 737-300 and 737-400 and commented on the lack of a UK-located flight simulator for 737-400 for crew competence checks (it was a relatively new model of the widely-used 737 airliner) and the way that air-conditioning system configuration changes introduced cues leading to the crew's misidentification of the correct engine to shut-down.

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			Also, passengers and cabin crew saw the left-hand engine emit flames (as the engine fan failed the engine surged, and the damaged fan continued to rotate, with vibrations) but this was not reported to the flight-deck. Crew 'fixation' and 'laterality' preferences led to the crew making the wrong decision. These human factor aspects were illustrated with a film and a vision-test that invited audience participation and responses were indicative of the tendency for people concentrating on a given task to miss a significant event (fixation) and for left-handed and right-handed people to make opposing judgements of the same situation (laterality). The failure to communicate vital information from cabin to flight-deck at Kegworth also led to Cockpit Resource Management (CRM) training in airlines worldwide – aimed at promoting the sharing of information between the pilot in command and the monitoring pilot, whatever their position or rank – being re-modelled as 'Crew' rather 'Cockpit' related, and promoting improved communication between all commercial aircraft crew members. In reviewing the wider aspects of the findings, reference was made to the Swiss Cheese Model (introduced by James Reason and used widely now in aviation), which refers to causal influences as lining up – like holes in slices of Swiss Cheese – and used a four element model, bringing together 17 aspects of organisation, supervision, environment and personnel together with the errors and violations that arose from an analysis of the accident events. Survivability at Kegworth was governed mainly by what protection was available for the occupants. The presentation reviewed how relatively crude computer-based modelling of impact effects was available then, and how it has improved considerably throughout the ensuing years. A neatly illustrated paradox showed that while the low-wing Boeing airliner's passengers survived in the centre section (above the wing root) the failure of a high-wing airliner's fuselage in a drop test resulted in least survivability in that same region. Drop-tests have been used to calibrate computer models – but one test with a helicopter fuselage was reported to require 300,000 Euros of funding, and only one adequately equipped facility is now available in Europe – at CIRA, near Naples, in Italy. Real-time and slow-motion footage of tests, and comparable results from modelling were shown. These included examples of impact with restrained (seat-belt) occupants in a helicopter, and the same test with airbag protection for the pilot. These showed how more confidently a design can be assessed using computer-based

TABLE 1

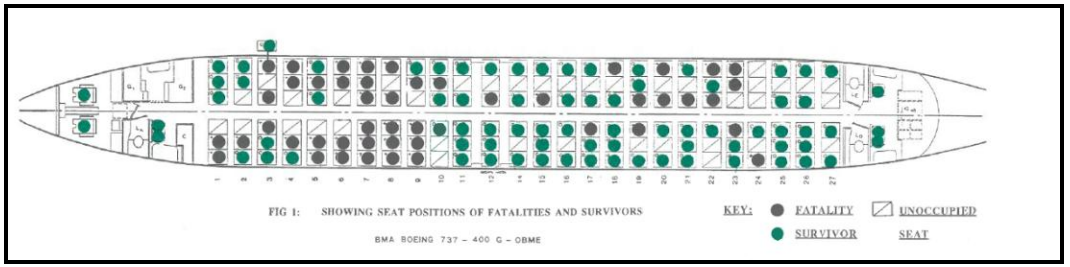
Date	Lecture/Lecturer	Attendance	Report on the Lecture
			tools to improve protection for passengers and aircrew in modern airliners. As well as restraint protection, there was consideration of seat attachment and the susceptibility to structural deformation. Of 52 triple-seat units in the Kegworth aircraft, 21 remained full-attached; 14 of these were in the over-wing section and 7 were in the aft fuselage. Attention was devoted also to seat design, with the protection of passengers in the brace position or with airbags discussed, and the implications on seat design of the fact that 69 passengers suffered lower limb injuries – mostly incurred through impact with the seat in front - as their legs flayed in the sudden deceleration.  Illustration of survivor and fatality distribution in the cabin is from the AAIB report on the Kegworth accident. The speakers summarised their review of how accident investigation and the implementation of lessons learned has contributed to improvement in the accident rate (per flight) in international airline operations, citing ICAO statistics that showed a 75% decline from 1989 to 2008. Tools and techniques to minimise impact-related injuries remain in development, and the human factors base analysis of accidents and incidents is still contributing to operational performance improvements. Ivor Amos presented the vote of thanks to an appreciative audience of about 230 people which included residents of Kegworth village near to the crash site. *Notes written by Mike Hirst* *Joint lecture with the IMechE*

TABLE 1

Date	Lecture/Lecturer	Attendance	Report on the Lecture
21st Jan 2014	**The Airbus A380, taking a 21st Century Flagship from Concept to Reality** by Huw Davies, A380 Chief Engineer's Team, Airbus UK	**200**	There were four reasons for building the A380; the growth in air travel, congestion (both in the air and on the ground), the environment (older aircraft are not environmentally friendly) and finally airline economics. Historically air traffic has been growing at a rate of 4.7% per annum. This growth is predicted to be even steeper in future leading to a doubling in air traffic over the next 15 years. Hence the need for a larger aircraft operating between major hub airports throughout the World (37 in all with 7 in Europe and 7 in the US). The A380 design requirements, as defined by potential customers, were: 1. 20% reduction in operating costs compared with existing in-service aircraft; 2. Lower environmental impact; 3. Improved performance; 4. Range of 8,000 miles. In all 14 different concepts were considered as potential designs to meet the above requirements. The final concept, the one which was developed into production, is shown in Fig. 1. It incorporates a 2 deck fuselage capable of accommodating in excess of 800 economy class passengers or a lesser number in a combined economy/business/first class configuration. The design makes extensive use of new materials including GLARE (a carbon fibre/aluminium laminate), thermo plastics, carbon fibre and laser welded stringers. The aircraft also incorporates 5,000 psi hydraulics, interactive cockpit with electronic manuals, variable frequency electric power generation from the engines and modular avionics. It was the first aircraft to be developed using a full digital mock-up. This allowed the separate design teams to work in a fully integrated manor and will facilitate modular maintenance.  **Fig. 1 – The final concept for the A380**

TABLE 1

Date	Lecture/Lecturer	Attendance	Report on the Lecture
			A pyramid approach was adopted for the development test programme. Initially small items were tested. This was followed by the testing of sub-components and, finally by full scale aircraft. The testing included wing loading (5 m end of wing deflection under ultimate load conditions), fatigue testing (3 x design life), landing gear testing (must deploy under own weight) and engine tests. Aerodynamic testing was carried out in wind tunnels located throughout Europe. 5 flight test aircraft were built and they were used to conduct 3,700 hours of flight testing. This included minimum velocity for unstick, i.e. minimum velocity at which aircraft can become airborne, landing on water logged runway (water trough test – Fig 2), hot/high altitude take-off (46°C, 2130 m), low temperature take-off (-26°C), long endurance flights, maximum energy rejected take-off velocity (190 mph), crosswind landing and take-off (42 knots cross-wind), and airport compatibility trials throughout the World. The first test flight was on 27th April 2005. The test flights confirmed that the A380: 1. Emits significantly less hydro carbons than a Boeing 747; 2. Achieves a significant reduction in noise footprint compared with earlier in-service aircraft (46% landing noise footprint reduction was measured at Los Angeles airport); 3. Requires 17% less runway on take-off than a 747 and 11% less on landing; 4. Has a 4,000 ft higher cruise altitude than a 747 and the same cruise Mach No..  **Fig. 2 – The water trough test** Type certification was obtained on 12th December 2006. A crucial factor in obtaining certification was the requirement to be able to evacuate the aircraft in 90 seconds in an emergency. A full size mock-up of the aircraft was used for this test. 853 tourist class

TABLE 1

Date	Lecture/Lecturer	Attendance	Report on the Lecture
			passengers comprising a mix of male and female, young and old were successfully evacuated from the aircraft in 78 seconds in a dark environment. The Airbus factories are located in Germany, France, Spain and the UK. There are 2 factories in the UK, one at Broughton near Chester, and one at Filton near Bristol. Of these, Filton is the development site. The A380 wings are manufactured in Broughton's West Factory. This is a dedicated building, dimensions 400 m x 200 m, constructed specifically for the construction of A380 wings. The A380 tail section is manufactured in a similar dedicated Airbus factory at Hamburg, north Germany. Final assembly is at the 490 m x 250 m A380 Airbus factory in Toulouse, France. A separate A380 customer acceptance building is also located at Toulouse. The use of multiple manufacturing sites presents a considerable logistics problem as the sub-assemblies are too large to be transported in Airbus' A300 based Beluga transport aircraft. The solution has been to use a combination of river barges, a dedicated ro-ro ferry and finally specialist road vehicles for the final leg of the journey to Toulouse. The latter involves the removal of road furniture including signs and lamp posts in the numerous village en route. It also involves some 29 gendarmes. The A380 delivery rate of 4 each month means these disruptions occur on an almost weekly basis along the roads between the French coast and the Toulouse factory (Fig. 3).  **Fig. 3 – The road convoy to Toulouse** Overall 29,000 new passenger aircraft are estimated to be required by the World's airlines over the next 15 years. Over the last 12 years Airbus has consistently manufactured more aircraft than each preceding year. This trend is expected to continue for the foreseeable future. The A380 currently constitutes 6% of Airbus' deliveries in terms of aircraft numbers but 16% in terms of value. The latter is expected to increase to 20%. Each aircraft has a book price of

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			£450M. Currently Airbus has received 304 firm order for the A380. This compares with Boeing only receiving approx. 100 orders for its latest version of the 747, the 747-8. The first A380 aircraft was delivered to Singapore Airlines on 25th October 2007. British Airways received its first A380 during 2013 and it is now being used on their London Heathrow to Los Angeles and Hong Kong routes. The A380 order book now includes an order for 50 aircraft from Emirates Airlines received at the end of 2013. A further 32 aircraft are due to be delivered during 2014.  **Fig. 4 – A380 in flight over the Alps** There were numerous questions at the end of the lecture which confirmed the audience's interest in the topic. This audience of some 200 persons confirmed their appreciation by a rousing round of applause. The vote of thanks was given by Mac Maccabee, RAeS Loughborough Branch Treasurer. *Lecture notes by Colin Moss*
4th Feb 2014	**Airfix: Scaling Down Reality** by Simon Owen, Hornby Hobbies Ltd.	**140**	In a lively and entertaining lecture, Simon began with a review of the history of the Company which eventually incorporated Airfix from its origin in 1939. Started by an Hungarian called Nicholas Kove, the Company first manufactured airbeds and Li-Los, before beginning its injection moulding of plastics to make combs in the mid-1940s. The first model toy, in 1948, was a one-twentieth scale model of a Ferguson tractor, followed by one of the "Golden Hind" ship in 1952. The first aircraft model – perhaps unsurprisingly – was a Spitfire, at what became the standard 1/72 scale, in 1953. Airfix as a distinct Company was inaugurated in 1957. Nicholas Kove died in 1958, the same year as the next model, of an Avro Lancaster, appeared, marking the

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			beginning of a rapid expansion in "boom years" for Airfix. Its first catalogue came out in 1962; 170 new kits were marketed between 1963 and 1970. Further expansion through the 1970s included the purchase of Meccano and the Dinky Toy brand, while Airfix increased output to 20 million plastic kits per year in 1975. Various transactions subsequently changed the Company's status – Meccano was discontinued in 1979, production moved to France in 1981, and then the Company was sold to Humbrol in 1986. Co-operation with Heller in 1995 preceded a change in Airfix's fortunes through the 2000s, with UK sales showing a five-fold growth by 2007. Airfix became part of the Hornby Hobbies Group (also including Corgi and Scalextric). Military aircraft models were now also frequently themed around historical events to give extra interest, and backed by the Airfix Club and Magazine, plus interaction on Facebook, and Roadshows at which young (in age and spirit) enthusiasts could enjoy examining the range of kits. One of the aspects which most surprised the audience was the long period of planning involved in producing a new addition to the range – up to five or even ten years in initial appraisal, and then often as much as three years in active development through research, design, prototype, and finally full production. The choice of a new model type was preceded by a look at the competition in the market: in one of the many flashes of humour in the lecture, Simon said it was rather dismaying to find that Revell, the German-owned company, was producing the best Lancaster kit, "so we made the best Dornier". A great deal of work was done in order to ensure that every detail was correct. When the research was complete, development of the designs and tooling for the moulds used computer-aided design as a standard approach. It was nice to hear that all four designers – "working individually, committees don't work" – were Loughborough graduates. Production has now shifted to China or India.

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			 **Fig. 1 – Airfix 1/24 scale model of a Hawker Typhoon Fighter** Simon's own position as a researcher in the Company formed the background to the major part of the talk, with an extensive illustrated discussion of his work done in preparing for the introduction of a 1/24 scale model of a Hawker Typhoon fighter (from the later years of World War Two) as shown in Fig. 1.

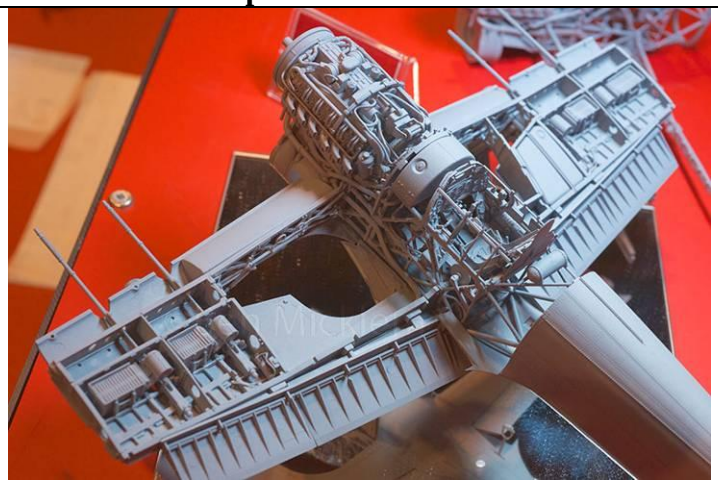
TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			 **Fig. 2 – Airfix 1/24 scale model of a Hawker Typhoon Fighter under construction (showing detail of "under the skin features"** The 1/24 scale Typhoon model (Fig. 2) shows an incredible degree of detail, with "under the skin" features such as fuel tanks, cannon-feed mechanisms, etc., included. The Napier Sabre engine has such detailed representation of the fuel, oil and electrical systems that the cowling cannot actually be closed (because of the stiffness of the plastic) – but the model is complete for those who like to see "the full works". Great care was also taken in preparing all the literature and packaging (Fig. 1) associated with the kits, with a very high standard of illustration. The overall impression was of a highly professional organisation, with a small team responsible for the whole product development, in the age range 23 to 28 years old. Simon's command of his subject, as shown both in the lecture and in response to the questions afterwards, was extremely impressive and laced with humour and a light touch throughout. It was greatly enjoyed by the audience of about eighty, age range probably ten to ninety. *Lecture notes by Francis Maccabee*

TABLE 1

Date	Lecture/Lecturer	Attendance	Report on the Lecture
18th Feb 2014	**Operating the A318 at London City** by Captain Tony Payne, British Airways	**180**	Captain Payne presented a detailed overview of the planning and execution of a unique and fascinating operation that has taken on the leading British Airways flight designations BAW001 to BAW004. These call signs have been 'reserved' for daily return flights between London and New York throughout the airline's history. Recently they have been applied to the most sophisticated and smallest capacity of the airline's services.  *A British Airways A318 at London City Airport (LCY)* Twice daily on weekdays, and once each Sunday, a return schedule is operated between London (City) Airport (LCY) and New York (Kennedy) Airport (JFK), using BA's two Airbus A318 aircraft. These are an adaptation of the nominally 90-seat short-haul A318 airliner. The BA configuration provides seating for 32 long-haul business (club) class passengers. In addition the BA variant of the A318 is relatively over-powered, having 25,000lb thrust CFM56-6 engines. Crucially these engines have a lower idling thrust than the engines normally fitted to this

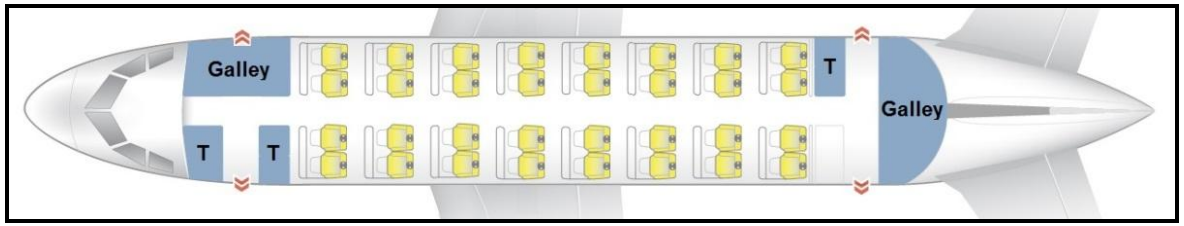
TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			aircraft. The operation has several unique and demanding characteristics that arise from using the London City runway. Capt Payne outlined the crew pre- flight processes, showing the flight-plan and fuel management aspects, weather briefing and North Atlantic Track System (NATS) in which operations take place. The aircraft cruises at Mach 0.78 (compared to Mach 0.82+ for most other traffic) and tends to use flight level FL390 (39,000ft) within the airspace. The London City 1,508m runway limits the maximum take-off weight, as restrictions imposed by the aerodrome licence restrict the useable take-off run to 1,199m. This in turn restricts the fuel load to 4.5 tonnes when carrying a full complement of passengers. This amount of fuel is adequate to reach Shannon, on Ireland's west coast, where the aircraft can refuel. Aircrew (from Heathrow) and cabin crew (from Gatwick) assemble at London City Airport as passengers arrive in the departure terminal. This is located close to London's financial quarters and also provides a short process time (check-in 15 minutes with no hold baggage, 20 minutes otherwise). The crew completes formal checks on a dedicated stand, and passengers arrive from a dedicated lounge (or late-arrivals are escorted) and embark quickly. There is no push-back and the aircrew complete start-up and taxi-out time is minimal. Extra diligence is required to manoeuvre such a relatively large aircraft on the available paved surfaces. Video and slides were used to illustrate the brisk acceleration, and climb-out. The aircraft turn north (to Brookmans Park) and then proceed either west (to Compton) or more northerly, staying below most other local traffic until clear of the London area.  *Plan of the cabin showing the 'bed' seat layout. There are 2 cabin crew members.*

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			The 75-inch pitch seats offer comfort, but there is no in-flight entertainment. Instead, an IPad is distributed to each passenger, and there are on-board data services which they can access using their own equipment. A voice-link is not provided, hence distraction is minimised. The ambience BA aim to provide in the cabin is equivalent to that of an executive jet. The refuelling stop at Shannon could be a nuisance, instead it offers a benefit for passengers in the form of pre-clearance through US Customs. This formality is completed during the short time it takes to refuel the aircraft (around 30 minutes). The aircrew is changed since this ensures that, in the case of delays, there is less chance of flight-time limitations being exceeded. With a typical fuel load of 18 tonnes (the maximum is 19.5 tonnes) the aircraft is soon heading directly towards New York. The customs pre-clearance means that the aircraft is a 'domestic' arrival, ensuring quick processing of passengers at New York. It also means that, if necessary, the aircraft can divert to any local US non-customs airport. The presentation gave the audience a clear understanding of the approaches to JFK, especially runways 22L and 13L. The latter has a curved approach from the Cansarie waypoint. This approach has strobe run-in lights in the suburbs close to the runway to guide the crew. Captain Payne showed video of a visual night-time approach. The eastbound flight is direct, overflying Shannon, as a tailwind is usually assured. The planning of this journey is often possible with 17 tonnes fuel load but, as westbound, up to 19.5 tonnes can be planned. A subtle consideration is that US Jet A fuel has a lower freezing point than European Jet A1 (-40°C against -47°C), and the aircraft wing tanks, being less deep than larger airliners, can suffer a critical amount of cold soak. This means that the track or altitude will occasionally be changed to minimise fuel viscosity risks. ETOPS (extended twin operation) requirements can also affect the track choice since it is necessary to ensure the proximity to diversion airports, which can be as far south as Lajes (Azores) or as far north as Keflavik (Iceland)). The culmination of the eastbound flight is the most challenging operational process, as the short runway at LCY requires a steep (5.5^{o}) approach path. The presentation outlined the use of spoilers (No.3 and 4 on each side), these being extended to 30° after full-flap was set, to ensure

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			a stabilised approach path. Procedures used are Cat 1 compatible, and require a 500ft decision height (DH) – this is relatively late on the approach (about 1nm from touchdown) - and diversions are rare, but preferred diversion airport is London (Gatwick). A video of an approach onto runway 09 at LCY, turning over London, manoeuvring onto the final approach at about 5nm, and starting the steep descent around 3n.m. from the runway provided a compelling view of the challenges, and illustrated the satisfaction it must provide for a crew. The vote of thanks from Goff Tearle complemented Capt Payne for a wide-ranging presentation that had held the attention of everyone present. The audience of about 180 fully agreed.  *A flight-deck view approaching runway 27 at LCY (Canary Wharf is visible left of the centreline)* *Lecture notes by Mike Hirst*

TABLE 1

Date	Lecture/Lecturer	Attendance	Report on the Lecture
11th March 2014	**Airbus to AirTanker 'Voyager'** by Geoff Winterbottom, AirTanker Services Ltd	**150**	The speaker provided a comprehensive background to the RAF's refuelling aircraft developments from 1982 onwards. These included the staff requirements and the more recent 'Future Strategic Tanker Aircraft' (FSTA) requirement. In March 2008 the latter resulted in the award of a contract to the 'Air Tanker' consortium (jointly owned by Airbus (formerly EADS), Rolls Royce, Cobham, Thales and Babcock) for 14 Multi-role Tanker Transport (MRTT) aircraft, i.e. tanker, passenger and freight aircraft. The contract assures the Royal Air Force aircraft availability over 24 years, as if they were service owned and operated. This capability is provided by a unit at RAF Brize Norton run by Air Tanker Services, and is jointly operated by Air Tanker and RAF personnel. In terms of scale, it is equivalent to the 11th largest airline in the UK. This comparison is apt when one realises that the aircraft are both civil and military registered, and may be hired to civil operators.  *The Airbus A330-200 'Voyager' is delivered as a standard 291-seat airliner, is then converted to a multi-role configuration, and put into service as an MRCOA (military registered civil owned aircraft)* Photograph courtesy of Air Tanker Services Ltd The baseline aircraft is the Airbus A330-200. The aircraft is assembled at Toulouse and treated throughout as a civil airliner. The 14 aircraft are a part of the 1,300 or so A330/A340 airframes that have passed through the Airbus production system. They are a standard variant with the normal A330-200 tankage (this is tip-to-tip integral wing tanks, and includes the centre tank

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			from the A340 variant): it provides a 111 tonne fuel capacity. The aircraft have Rolls Royce Trent 700 engines, which means that 45 per cent by value of the aircraft is UK-originated. Each aircraft is assembled as a certifiable airliner by Airbus, and delivered as such to Air Tanker complete 291-seat cabin with galleys, toilets and a simple in-flight entertainment (IFE) system. The first task is to militarise the airframe. This is conducted at Gefafe, near Madrid in Spain over 9 months, and requires 100,000 man-hours of effort. One of the first tasks is stripping out of the cabin, then the airframe is jacked across nine points to relieve stress in the fuselage and wings, and access panels are removed. Conversion includes additional tank plumbing for flight-refuelling usage, the fitting of two underwing hose-carrying pods (attached at the same location as the A340's outboard engines), and insertion of a large hose-reel unit in the rear lower cargo hold, with a tunnel through the fuselage skin that allows a centre-line hose to be streamed behind the fuselage. This creates a three-point flight-refuelling tanker capable of greater transfer capacity at any equivalent range than could be achieved by two of the recently retired VC-10 tankers. Additionally the aircraft is equipped with military communication systems, an array of external cameras, formation lights for night-time refuelling operations and a comprehensive defensive aid suite (DAS). The systems are all controlled from a console aft of the flight deck, and integrating the operation with the flight-crew. There is room for supernumerary crew members, but care has been taken to ensure that the basic two-place workstation concept of the Airbus A330 is embedded and remains unchanged. Each aircraft has a military and civil registration allocated to it but only one is active at any one time. To change between from the military to the civil register each aircraft has to go through a 'role change' which involves removing all military equipment. When going from a civil to a military registration the reverse is the case. A typical example is the change from operating aircraft as tankers to a 291-seat passenger-carrying capability. Under the auspices of military-registered civil-owned aircraft (MRCOA) regulations the aircraft is approved by military and civil authorities, and is useable on either military or civilian operations. To any air traffic management unit it is a standard A330-200, and can operate so

TABLE 1

Date	Lecture/Lecturer	Attendance	Report on the Lecture
			under a UK civilian registration (G-VYGA to N allocated), or military (ZZ330 to ZZ343 allocated). The two registrations are carried on each aircraft, and can be taped-over/revealed as appropriate. Detailed other changes also take place: for example in civilian use the underwing pods are removed but the centre unit remains below the cabin. In principle, and under increasingly likely conditions as the full fleet is introduced into service, the airliner variant can be leased to commercial airlines. By March 2014 there were 8 of the 14 aircraft in service, with expectation of the full fleet by September 2016. The Brize Norton base is self-contained, with a two-bay hangar, all supporting technical facilities, administration and training capability. The latter includes a full A330 flight-simulator.  *Tanker clearance has been achieved with Tornado and Typhoon (shown here in formation with a 'Voyager'), C130 Hercules, and E-3 Sentry. Forthcoming clearances will include F-35 Lightning II, F/A-18 Hornet (Spanish AF) and Airbus A400M* The speaker answered a wide-range of question for the audience. About 150 people attended, and Ivor Amos, acknowledging the speaker's presentation style, and the quality of the slide and video material he used, offered a vote of thanks. *Meeting notes by Mike Hirst*

APPENDIX 1 - Report on the 2013/14 Season - AGM held on Tuesday 15th April 2014

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
15th April 2014	**Chasing the Morning Sun** by Manuel A J Querioz	**140**	This was not a lecture, but more than just a presentation, as the speaker had a tale of endeavour, borne from a desire that grew from personal adversity after a battle with cancer in 1999. He started to fly in 1990, enjoyed it, and in 2006 set out to prove that, departing from his 'home' airport, he could fly solo around the world in a home-built light aircraft, and also break records on the way. The Vans RV-6, one of the most popular home-build aircraft of recent years, is hardly a classic long-range record-breaker. He started his presentation by showing how his example was modified. He cited a gross mass of 900kg, and some 450 litres fuel capacity. The equivalent basic aircraft weighs 726kg and has a fuel capacity of 140 litres. Much of the extra fuel was in tanks on the right-hand side of the cockpit. His panel included standard blind-flying instruments, a prominent GPS map display, autopilot, with VHF and HF radio (the latter linked to an antenna that stretched between both wing tips, via the fin top). The aircraft also had an up-rated engine configured solely for single-pilot operation. On 28th February 2006, Manuel took-off from Gloucestershire/Staverton airport and landed at Malta's Luqa airport 7hr 59min later, just before nightfall. He had by then completed 1,375 st.m of what was to be a 25,442 st.m journey. To save space this report uses two maps to show the route he took, and to present basic data. (Please refer to his web-site at http://www.chasingthemorningsun.com if you are inspired to read his tale in fuller detail). This report quotes what he recalled to his audience.

TABLE 1

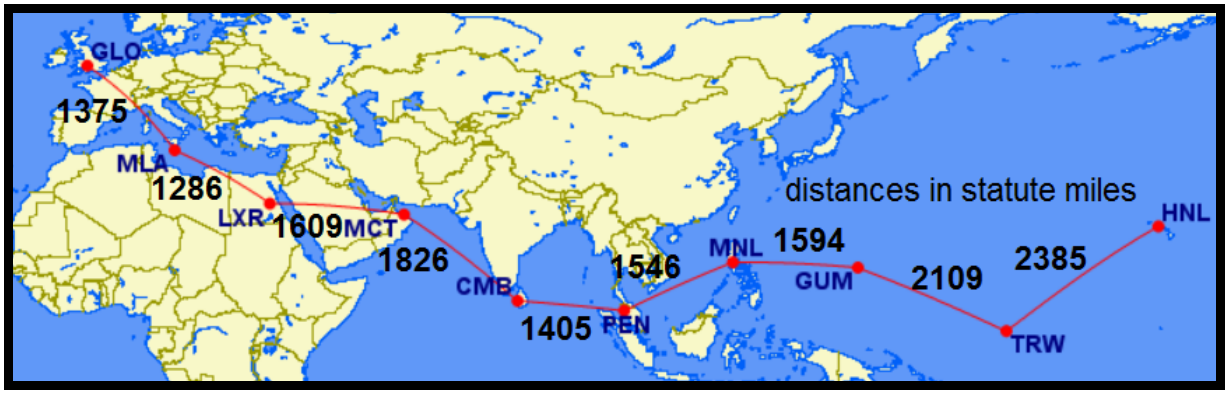
Date	Lecture/Lecturer	Attendance	Report on the Lecture
			  All data on these maps were taken from the speaker's web-site During the stage to Luxor, ATC vectoring thwarted his desire to view antiquities on the River Nile. The following day he was in awe of the scale and extent of mountains in the Arabian desert. In order to circumvent Indian bureaucracy, he took a route through Sri Lanka and on into SE Asia. A panorama across Indonesia's Banda Aceh, where the 2004 Tsunami originated and devastated Sri Lanka within 2hrs, wasn't seen until he had flown for 6 hours from Columbo. This part of his journey was tinged with an example of the power of natural

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			phenomena rarely seen. In Manila he witnessed the depravity of the trafficking of young girls to tourists. He felt humiliated and desired to move on quickly. His spirits were soon concentrated on the Pacific Ocean. He hopped between islands, but the two major sectors were great distances taking 16hr 18m (Kiribati-Honolulu) and 15hr 28m (Hilo-San Jose). The durations suggest that end of flight fuel quantities would have been incredibly low, but these are side lines to the adrenalin-punch that appealed to him. He feared a GPS receiver failure (that never happened), but had time to explain his alternative navigation strategies. American hospitality delighted him, and he crossed from California through Texas, Georgia and Maine, before launching across the North Atlantic from Halifax in Nova Scotia. An artificial horizon failure created a hold-up, and then the replacement failed too – he pressed on. Through the Azores he routed to a small airport near Lisbon, the city of his birth, and his homeland family's hospitality was a little too welcoming as it included a bout of food poisoning. He pressed on to refuel at La Rochelle in France, and then 2hr 50min after departing there he was back at his home base. The joy of completing the journey, and yet also the sadness of knowing it was never to be like that again raised emotions he willingly acknowledged, but there was time for them to quell on the long taxiway from Staverton's runway to the apron, and it was a composed Manuel that met his family and friends. This was a well-planned and well-executed undertaking. He had often to take-off in the dark, watch the sun rise (the pictures were magnificent – his feelings were profound) and land late in the day, or even in the dark again. In such a small aircraft, and often in under-stated conditions – watching condensation on the canopy dripping through the structure above his instruments as the static from thundery clouds lit the droplets - he cheerily spoke of his trust in the aircraft and the people who had helped him to make this journey possible, over 39 days, and with 18 stops in 12 countries. In 2007 Mr Queiroz was honoured by the Royal Aero Club with the award of the Britannia Trophy, which was presented to him by His Royal Highness the Duke of York.

TABLE 1			
Date	**Lecture/Lecturer**	**Attendance**	**Report on the Lecture**
			 Manuel Queiroz's Vans RV-6 The lecture was attended by about 140 people (taking attendance figure for the 9 meetings this year to around 1,400). The vote of thanks from Barry Jacobson testified to the presenter's inspiration, and the response left no doubt that this was a unanimously held feeling amongst everyone present. N.B. For anyone who wishes to know more about this adventure, Manuel Queiroz's book, "Chasing the Morning Sun", can be acquired from good book shops and is also also available in electronic form from the likes of Amazon. *Meeting notes by Mike Hirst*

The above table confirms that, without doubt, the Loughborough Branch has had another excellent season.

Our lectures have covered all aspects of aerospace - historical, the present and the future; reminiscences and modern technology. The average attendance for the **2013/14 season was 156. 2 of the lectures were joint lectures with other organisations.**

1.2 Visits

There were no visits during the 2013/14 season.

2. Review of the 2014/15 Lecture/Visits Programme

2.1 Lectures

The following lectures shown in Table 2 below have been planned for the 2014/15 Season:

Table 2		
Date	Lecture	Lecturer
23rd Sep 2014	**Flying the Lockheed SR-71 "Blackbird" Strategic Reconnaissance Aircraft**	Col Richard Graham USAF Retd.
4th Nov 2014	**Apache Helicopter Operations**	Staff Sgt Chris Phipps, Qualified Helicopter Instructor, Defence Helicopter Flying School, RAF Shawbury.
18th Nov 2014	**The Story of the Merlin Engine** *Joint lecture with the Loughborough (University)Alumni*	Peter Maynard, Aeronautical Historian with a lifetime of engine experience both with the RAF and British Airways.
9th Dec 2014	**Development of Heathrow's Airport Capacity** *Possible joint lecture with the Loughborough Students Flying Club* .	Captain Jock Lowe, ex British Airways Concorde pilot
20th Jan 2015	**100 years of world-class aircraft from Kingston-upon-Thames** (from Sopworth Pup to Harrier Jump Jet) *Possible joint lecture with I. Mech. E. and RAeS Loughborough Branch Prestige Lecture?*	Speaker from Kingston Aviation Air Trust
3rd Feb 2015	**Rolls-Royce Future Projects**	Ric Parker, Director, Rolls-Royce Research and Technology
17th Feb 2015	**Melton Mowbray's Aviation Services to the World during WWII**	Dr Ray Flude
10th March 2015	**Lightning II (F-35), the UK's Joint Combat Aircraft**	AVM Graham Farnell
28th April 2015	**AGM +** **70 Years of Training Flight Test Professionals**	Cdr. Mark Macloed RN, Commanding Officer, ETPS
11th June 2015	**Loughborough University MEng Final Year Aircraft Design Projects – 4 short lectures**	----------

1.2 Visits

Date	Visits
May and August /September 2014	**Rolls-Royce Heritage Trust Museum and Rolls-Royce Technology Centre**
March 2015	**Agusta-Westland Production Line, Yeovil** and the **Naval Aviation Museum , Yeovilton** (This will be a 2 day visit involving an overnight hotel stay. Participants will be required to use their own cars.)

.

APPENDIX 2 - Report on the 2013/14 Season - AGM held on Tuesday 15th April 2014

STATEMENT OF ACCOUNTS FOR 2013/14 SEASON (23/04/2013 TO 15/04/2014)

	£ 2013/14	£ 2012/13
A. INCOME AND EXPENDITURE ACCOUNT		
INCOME		
1. Grant from RAeS Headquarters	2250.00	2750.00
2. Subscriptions from Branch Friends@ £10 each	810.00	775.00
3. Donations (collections) at lectures	341.06	512.37
4. Rebate from I.Mech.E. (shared lecture)	nil	71.50
TOTALS	**3401.06**	**4108.87**
EXPENDITURE		
1. Lecture expenses (travel, accommodation and hospitality)	791.90	1018.95
2. Room Bookings	672.00	756.00
3. Use of audio-visual aids	240.00	420.00
4. Secretarial and publicity, including programmes	373.14	102.99
5. Branches' conference and forum	492.90	85.82
6. Website renewal fee	8.38	nil
TOTALS	**2577.42**	**2704.76**
SURPLUS ON YEAR	**823.64**	**1404.11**

B. STATEMENT OF BANK BALANCES AT 15/04/2014

Brought forward balances from 2012/13 season:

Current account at 23/04/2013	5539.86
Capital account at 23/04/2013	2.34
TOTAL	**5542.20**
Plus surplus on year, from above	823.64
TOTAL	**6365.84**

Giving present balances:

Current account at 15/04/2014	6363.50
Capital account at 15/04/2014	2.34
TOTAL	**6365.84**

Francis Maccabee, Hon. Treasurer, 15 April 2014