The Air League Newsletter

Issue 1: January/February 2014

TYPHOON UPGRADE GETS NEARER

Eurofighter has been undertaking flight tests with new weapons and other upgrades to bring the Typhoon closer to its full potential as a multi-role combat aircraft. For the RAF this is particularly important as the drawdown of the Tornado GR4 fleet will result in a significant shrinkage in overall attack capability after 2019. The remaining 100+ Typhoons will be required to continue to act in the air defence role as today, as well as providing the attack and close support role presently shared with the 100+ Tornados. Eventually the Typhoon Tranche 2s selected for upgrading, together with the 40 Tranche 3 aircraft, will all have a full swing-role capability. The most urgent need is to equip them with Storm Shadow cruise missiles, as carried by the Tornados, and this is planned to take place from 2015. This is essential to give the Typhoon a long-range stand-off attack capability. Tests were underway in Sardinia in November with an Italian Typhoon carrying the missile. In addition, the first flight trials on Typhoon IPA5 of the Selex ES Captor-E active electronically scanned array radar will take place in 2014. Re-equipping Typhoon with an AESA radar is long overdue and will dramatically expand its performance in identifying, tracking and attacking multiple air and surface targets. Although not yet ordered into production, development of the radar has continued on an industry-financed basis for some years. The existing Typhoon radar already has an impressive capability and it was always intended to move to the AESA upgrade, but the absence in operational service of a next-generation radar is becoming a serious disadvantage in international sales campaigns as competing rival fighters all have such systems. The RAF Typhoon is also due to have upgrades to its electronic warfare suite and target tracking and designator systems, and will integrate the MBDA Meteor ramjet-powered beyond visual range air-to-air missile as an eventual replacement for the current AMRAAM. There is also pressure to integrate onto Typhoon the highly effective Duel Mode Brimstone lightweight air-to-ground missile, which can be carried on the Tornado GR4. The Typhoons rolling off the BAE Systems Warton assembly line now have built-in provision for most of these equipment and system upgrades, and also will be able, if required, to carry large conformal fuel tanks, in two fuselage mounted blisters, increasing patrol endurance or unrefuelled ferry range, or freeing up two wing pylons for Storm Shadow carriage. The squeeze on defence funding has delayed all these improvements, but there is now an increasing sense of urgency to boost the operational capability of the Typhoon before all the Tornados go out of service.

BELOW - A seasonal portrait of an Austrian Air Force Eurofighter Typhoon flying over the Alps. (Eurofighter photo)

In this issue...

HERITAGE TRAIL

In 1933 my eminent predecessor, Air Commodore J.A. Chamier, Secretary General of the Air League, proposed throwing open all civil and military airfields for one day of the year, preferably Empire Day, during which the public could see the entire working of aerodromes and not just be spectators in enclosures. The Air Ministry, Society of British Aircraft Constructors, airlines, flying clubs and the Empire Day movement endorsed the idea and, with the support of the League's magazine Air Review, the proposal moved a big step forwards in encouraging air-mindedness in the British public.

The first Empire Air Day - forerunner of the RIAT at Fairford - was held at airfields across the country on 24 May 1934. It was a huge success. Total attendance was 139,866, and the proceeds of £2,561 3s 1d were given to the RAF Benevolent Fund. The 1935 Empire Air Day was bigger than the year before. Attendance was up 50%, contributions to the RAF Benevolent Fund were almost £5,000, and Empire Air Days were held in South Africa and Australia, where first-class mail would arrive from Britain within a week for no more than a penny ha'penny per half-ounce, another Air League achievement.

The Air League was everywhere, with membership leaflets included in every model aeroplane kit. By 1939, the last Empire Air Day made a net profit of £35,000, most of it going to the RAF Benevolent Fund and the Guild of Air Pilots and Air Navigators (GAPAN). Not that GAPAN was forever grateful. Two decades later the Air League of the British Empire commissioned Lynn Chadwick to produce a memorial to commemorate the R34 airship for Heathrow airport. Unfortunately, although approved by the Committee in July 1958, it aroused the fury of GAPAN among others. The strong opposition was led by Lord Brabazon of Tara who dubbed Chadwick's work 'a diseased haddock 'and succeeded in forcing its withdrawal. The sculpture was cast in bronze in an edition of four: one is sited at Spoleto and another at the Colby College Bixler Art and Music Center, Waterville, Maine.

On a cold misty 2 July 1919 at 0142hrs, the airship R34 and her intrepid crew of 8 officers and 22 men, one stowaway, two carrier pigeons and a kitten called 'Wopsie' had set off from RNAS East Fortune, East Lothian, on the first direct flight between Britain and the United States. To commemorate an event which included the first feline to fly across the Atlantic, the Air League of the British Empire erected a memorial at East Fortune in 1957 with an identical plaque being placed at Mineola, Long Island, where R34 arrived in the United States.

There must be other examples of the Air League's legacy and heritage around the world. If readers know of any more, can they please tell us so that we can compile a record for posterity?

Andrew Brookes

ABOVE: The R-34 airship, which in 1919 made the first direct crossing of the Atlantic from Great Britain to the USA (photo via FAST Archive)

COMMENTARY *by Aeronautica*

THE NUMBERS JUST KEEP RISING

This time last year the Air League Newsletter noted that nearly 900 orders had been received for each of the new Airbus A320 Neo and Boeing 737Max models. Since then there has been more frantic activity as the world's civil aircraft manufacturers continue to increase production to meet more and more delivery demands. The number of orders involved and their value is quite astonishing by any standards. Airbus alone now has eight years' worth of backlog to deliver, involving no less than 5,400 aircraft of all family types. Adding to the growing production flow of familiar commercial aircraft will soon be more newcomers, three of which made their first flights during 2013 – the Airbus A350, the Bombardier C Series and the Boeing 787-9.

Russia with its Sukhoi Superjet and MC-21, and China with the Comac C919, have promising new aircraft coming forward, but in each case there is no sign of any serious sales breakthrough into the mainstream Western airline market. The A320 and B737, now being upgraded with new engines, avionics and aerodynamic improvements, seem utterly immovable as leaders in the 150-seat market, at least until radically advanced replacement designs emerge, offering breakthrough technology. That now seems a long way off, and these two mega-sellers are likely to continue in production through this and probably the next decade.

Looking at the monthly levels of aircraft production is mind boggling. More individual types are being produced each month than used to be built in a year in earlier years of jetliner production. Airbus delivered 58 aircraft in November bringing its year-to-date figure of deliveries to 562 for 90 customers. By the end of November (i.e. just 11 months' worth) it had taken net orders for 1,314 aircraft during the year, and that didn't include all the Dubai announcements. As well as delivering 45 A320 family aircraft that month, it also delivered nine A330s and four A380s. The giant A380 had seen a quiet start to the year, but it received a boost in June when Doric Lease ordered 20 aircraft, and again at the recent Dubai Air Show, Emirates ordered another 50, taking its A380 orders to 140 and the sales total for the type to over 300. Meanwhile Etihad Airways ordered 50 A350s, taking the total sales to date of Airbus's newest widebody jet to over 814 - not bad when the first machine only flew last June. An order for 31 A350s + 25 options from Japan Airlines was a major sales breakthrough into this previously Boeing-dominated market. Over 2,500 new generation A320Neo aircraft have already been sold ahead of first flight, and during the year the 1000th delivery of an Airbus A330 widebody was made. So for Airbus, the immediate future looks assured, which is excellent for all those in the UK working throughout a significant supply chain, not least in the supply of all the wings for all models.

For arch-rival Boeing, 2013 saw a successful fight back after a miserable incident – prone introductory period for its showcase 787 Dreamliner. By the end of the year, Boeing had secured enough launch commitments and orders to finally give the go-ahead to a major revival of the best-selling 777 in the form of the 777-8X and 777-9X. The new series was launched by announcing total commitments for 250 aircraft worth $95 billion. The total Boeing civil backlog is now worth $415 billion. These new 777-X variants will feature new engines and an all-new wing, offering a combination of high capacity, long range and a claimed 20% improvement in fuel efficiency. Airlines had been calling for a 777 upgrade for years and the recent success of the Airbus A350-1000 served to increase pressure on the US planemaker to come up with a suitable alternative. There can be little doubt that the 777-X pair, supplementing and replacing the 777-200ER and -300ER, will represent a popular development with airlines and passengers, building on the reputation of the current aircraft for ultra-high reliability.

ABOVE - The Airbus A350 is now engaged in flight development and is selling very well.

The new Bombardier C-Series is now engaged in a catch-up development programme that seems to be going well, with more development aircraft joining the prototype in the air. There is a considerable UK content in this aircraft, especially the advanced wings that are produced in a large purpose-built assembly facility at the former Shorts airport at Belfast. This 110-140 seat aircraft is newer and lighter than the A319 and A320 and could have special appeal on routes where a highly efficient new-generation airliner can operate more profitably. It is also possible that a 150 seat capacity configuration could become available for busy short haul sectors. Another attractive proposition could be internal UK and European routes such as those out of London Docklands Airport, where the C-Series will be able to fully exploit its performance. Currently these routes are dominated by BAE 146s and RJs, and Embraer EMB 170s and 190s. Bombardier is co-operating with Comac to introduce maximum cockpit commonality between the C-Series and C919.

With Airbus forecasting sales of nearly 30,000 new aircraft needed over the next 20 years as replacements and to handle traffic growth, the only big question facing the UK is - where are all the extra movements going to operate from? Air traffic demand is continuing to grow, and at an increasing rate once again. With that growth comes not only an environmental and technological challenge, but an enormous opportunity to exploit the UK's leading role in the global civil aviation sector, creating thousands of new skilled jobs and generating wealth to cascade through the economy. Isn't this what the government says it is trying to encourage? The recent announcement of a national infrastructure plan somehow managed to totally ignore new runway capacity, arguably the single most urgent national infrastructure issue awaiting resolution, so sadly this chance to speed up the glacial pace of the Davis Report was passed over yet again.

MAINTAINING A UK LEAD IN AIR INT

On 26 November, Richard Daniel, Managing Director Defence at Raytheon UK, delivered a presentation in the House of Commons to the Air League in Parliament with an audience of MPs, members and guests. The subject provided a highly topical look at the unique capabilities provided by UK air intelligence and reconnaissance air assets and how these might be carried forward in the future.

Richard Daniel's presentation was in the form of a PowerPoint presentation and this is a summary of the main points that emerged.

The speaker started with an introduction to RAF Waddington as the UK Air ISTAR Hub, and the RAF base where Raytheon UK maintains a training and support facility relating to the operation of the Sentinel R1.The base is also home to the RAF's fleet of E-3D Sentry Airborne Early Warning, Command and Control aircraft and has recently taken delivery of the first of three RC135W electronic reconnaissance aircraft. RAF Waddington is also now the UK operations centre for the RAF's Remotely Piloted Air Systems (RPAS) aircraft and directly controls the Predator/Reaper aircraft flying in Afghanistan, or wherever they are required to be.

Richard Daniel pointed out that the RAF, as the customer, now has a wide range of specialist air platforms and equipment suppliers to deliver the optimum solutions for each level of the required intelligence, surveillance target acquisition and reconnaissance information. The whole capability

ABOVE - The King Air Shadow R1 provides key signals intelligence. (Raytheon image)

is layered and extends from relatively simple mini-Unmanned Air Systems, through to a more localised tactical ISR platform, equipped with electro-optical and infra-red sensors aboard a light aircraft, to a tactical RPAS such as Watchkeeper to provide direct support to ground forces, and may be an organic asset of ground forces, up through the Shadow R1 which is a manned, fix-wing, medium altitude turbo-prop platform giving a more capable signals intelligence capability. Next comes the medium altitude Reaper RPAS, which can act as an ISR asset and also a light attack platform. The Sentinel R1 is a high altitude, wide area surveillance and reconnaissance multi-intelligence air platform that has shown its outstanding capabilities in Afghanistan, Libya and Mali since entering service in 2008.

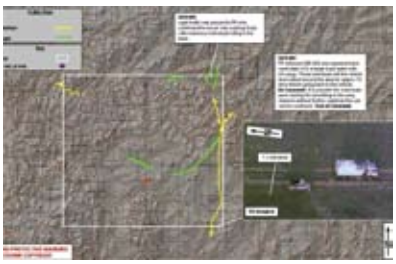
These many different aircraft types have been providing, or will provide, very specific electronic surveillance capabilities that are essential in giving force commanders maximum situation awareness, so they can take appropriate informed decisions based on the best and most timely data available. But these aircraft fleets are very small. The Air ISTAR Optimisation Study (AIOS)

ABOVE - The Boeing RC-135W Rivet Joint is a conversion from a KC-135 tanker and is the replacement for the Nimrod R1. (L3 image)

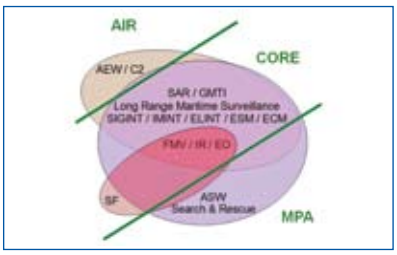
ABOVE - The Sentinel R1 and its crews have been in continuous demand since the aircraft entered service. (Crown Copyright MOD/RAF 2013 photo)

has been looking at the future of Air ISTAR Collect capability and what the key roles and potential courses of action for the UK may be and how they may be filled by existing or new platforms. While some overlapping roles might be covered by a core multi-mission platform there will still be some highly specialised roles that require more specialised platforms and it is unlikely that any one could successfully fulfil all the mission capability needed. A new Multi-Mission Aircraft might emerge that would incorporate key features and integrated system capabilities to include a comprehensive defensive aids suite, secure datalinks, advanced surveillance radar, an EO/IR turret, and COMINT and ELINT systems. But existing platforms could also expand their capabilities to take on a wider range of missions.

In the meantime, The Sentinel R1 has shown, time after time, that even a small fleet can provide critical persistent wide area surveillance capability. In the Mali operations in 2013, some 66 sorties were flown totalling 697 hours, with 100 intelligence reports disseminated. These covered ten areas of operational interest across a vast remote area the size of the UK. The information collected and distributed showed where significant activity occurred in the crisis and where insurgent groupings were most prevalent. Such information is key to being able to generate pattern of life data that can then be used to identify major changes in tactics and actions. In Mali, this pulled through a number of lessons from previous operations where the pattern of life surveillance allowed operational and tactical leaders to best deploy their limited forces. The Sentinel's Ground Moving Target indicator showed clearly where vehicles are moving to highlight where changes of patterns are occurring either as a reaction to movements of friendly forces or against previous patterns of movement. This helps to identify enemy pressure points or groupings, for further action. This can then be used to aid leadership decisions or to cue other ISR or strike assets to a point of interest. Synthetic Aperture Radar imagery can provide a broad swathe of images to be collected and then either subject to onboard imagery analysis or transmitted to the ground, or via use of the SAR spot mode, a point of interest can be focused on.

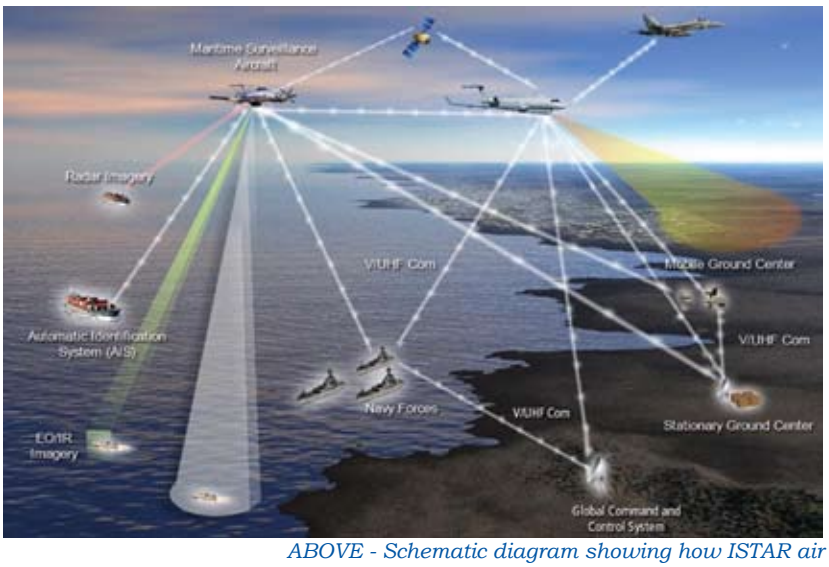


ABOVE - Enhanced wide area surveillance makes the Sentinel an essential ISTAR asset. (Raytheon image)



ABOVE - Diagram showing the overlap in ISTAR capabilities. (Raytheon image)"

In summary, nation states face many diverse threats and require protecting at long and short range necessitating a mix of ISR capabilities. Protection has to be affordable, cost effective and tailored to the most likely threats. The solutions must be based on end-to-end information requirements and not just aircraft types. This means the solutions have to be based on reliant, low cost, commercial airframes with integrated bespoke mission systems, offer a real opportunity for Airborne ISTAR Capability and, Mr Daniel suggested, strong UK brands support exports.



ABOVE - Schematic diagram showing how ISTAR air assets provide network connectivity. (Raytheon image)

In the air

Helicopters from HMS Illustrious arrived in the Philippines in late November to deliver aid, people and equipment to small Philippine islands devastated by Typhoon Haiyan. The Portsmouth-based helicopter and commando carrier arrived in the region to the north of Panay and immediately began surveying nearby islands to assess their needs. Recce teams were sent to three islands – Calagnaan, Canas and Bayas – and found extensive damage to homes and local infrastructure with little in the way of long term food supplies. Using her Sea King and Merlin helicopters (see above) HMS Illustrious sent engineering teams of around 50 people to Bitoon in the south of Calagnaan to repair damage to a local school, clear routes of fallen trees and help repair battered fishing boats. (Crown Copyright MOD/RN 2013)

• On 9 December, Rolls-Royce welcomed a decision by Kuwait Airways to order ten Airbus A350-900 aircraft, powered by Rolls-Royce Trent XWB engines. The new A350s will be the first Trent-powered aircraft to go into service with the airline. The XWB, specifically designed for the A350 XWB, is the largest-selling Trent engine ever, with more than 1,600 already sold. It powered the A350 XWB to its first test flight in June. In November Rolls-Royce won a $5bn order from Etihad Airways for Trent XWB engines to power 50 Airbus A350 XWB aircraft. The order includes long-term TotalCare® support. Etihad Airways, the national airline of the United Arab Emirates, has ordered 24 A350-900 Regional, 16 A350-900 and 10 A350-1000 aircraft. The order takes the total number of Etihad A350 aircraft on order to 62, all powered by the Trent XWB. The airline also has 28 A330 aircraft in service powered by Trent 700 engines and 11 A340s in service powered by Trent 500 engines. Etihad has also ordered Trent 700 engines to power one Airbus A330 freighter aircraft.

• The Boeing 787 Dreamliner received its 1,000th customer order on 17 November when Etihad Airways announced an order for 30 787-10 Dreamliners, valued at $8.7 billion at list prices. With this order, the Dreamliner family reached this sales milestone faster than any other widebody airplane in aviation history. Including the latest announcement, the 787 has accumulated 1,012 orders from 60 customers worldwide. Boeing forecasts that airlines in the Middle East will require 2,610 new airplanes over the next 20 years, worth an estimated $550 billion. While one-third of that demand – 900 airplanes – will replace today's fleets, 66 percent of the demand is expected to be driven by the rapid fleet expansion in the region.

ABOVE: Now in its tenth year, the FAST Museum at Trenchard House, Farnborough has been awarded the highest level of national recognition by the Arts Council as a fully accredited museum. This follows three years of preparation to meet the very high standards demanded under the national museums and galleries accreditation scheme, which is now administered by The Arts Council. Supported in its application by the Science Museum, Rushmoor Borough Council and Hampshire County Council, the FAST Trustees have made significant improvements in recent years at the museum, while at the same time carrying out major projects, including a new artefact storage building and the highly popular Cody Statue which is now in full public view on Farnborough Road. Picture taken at the FAST Museum shows from left to rt: Brian Luff, Museum Manager, Richard Gardner FAST Chairman and Dr Graham Rood FAST Secretary.

Pictured at Brooklands Museum on 27 November, the Centenary of the Sopwith Tabloid, which went on to win the Schneider Trophy for Great Britain in 1914, can be seen a new full-size replica of the aircraft, with Tommy Sopwith (left), son of the famous Sopwith/Hawker designer, with Allan Winn, Museum Director at Brooklands. The Tabloid replica has been built by a team of volunteers at the museum over several years, and is now on public view in the main hangar.

LEADING EDGE *update*

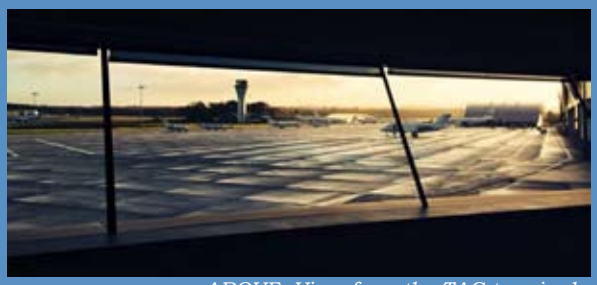
2014 Preview

Our recent Leading Edge Panel meeting was a great opportunity to catch up, take stock of the events we undertook this year and to start planning some excellent events for 2014. Some highlights of the last year included the visits to Brize Norton, Cranwell and Waddington, experiencing the simulators and safety and emergency procedures training at British Airways and the annual Youth in Aviation Flying Day convened by the Air League. Our most recent visits to the AAIB and TAG Farnborough are outlined by Leading Edge members Hollie Rosier and Alex Jefferies below. 2014 is already packed with events and Panel members of the Leading Edge are busy preparing trips such as a return visit to experience airside ops at London City Airport, a visit to RAF Coningsby, a tour of BA's Engineering Facilities and we are also currently planning a unique event and joint social with our colleagues at GAPAN in the Spring. The breadth of activities for Leading Edge members is enormous and it's down to the hard work of Panel members that these events take place. If you'd like to help out by assisting with a trip or even running one of your own then let us know by contacting the Air League office. The Leading Edge is what you make of it, so get involved! ….Looking forward to seeing you at an event in 2014.

Scott Pendry, Chair of the Leading Edge

TAG Farnborough – a fascinating insight into business aviation

TAG Farnborough offered us an amazing opportunity to have a guided tour of what is arguably the hub of business aviation in the UK, if not Europe. We were met in the foyer of the airport terminal by CEO Brandon O'Reilly who gave us an overview of how the airport's operations have developed and what the plans were for the future. The overwhelming impression was that of a business that knew their market extremely well and were focused on delivering an exceptional service within that market. The tour started with a look around their modern, purpose built terminal, set-up exclusively for business aviation; where some simple but clever ideas such as a 'drive-through' customs all combined to create an efficient service for their clients – where time wasted is money lost. We were then shown around the six large hangars filled with a range of business jets, it was an excellent



ABOVE: View from the TAG terminal.

facility which was clearly maintained to a high standard. The tour continued with an very intriguing look at how the air traffic control at Farnborough operates, it was interesting to hear the lengths that the airport has gone to in order to minimise their noise impact – installing steeper than normal approaches and displacing their runway thresholds. I am grateful to both the Air League and TAG Farnborough for organising and hosting the visit, it was a fascinating and thoroughly enjoyable day!

Alex Jefferies

The AAIB – A humbling experience

On the 20th of November, a group of Leading Edge members were fortunate enough to visit one of the most remarkable places in the world of aviation – the Air Accident Investigation Branch (AAIB). Throughout the day, we were looked after by two AAIB staff members; Bob Vickery, a chartered engineer with an extensive background in the Royal Navy; and Andrew Blackie, a senior inspector, human factors specialist and commercial pilot with a great amount of experience on various aircraft types. We were given a very informative presentation, detailing the methods of Air Accident Investigation, covering all aspects, from technical understanding to the complex legalities.

ABOVE - The Leading Edge group during their AAIB visit.

We were then shown around the hanger; a very sobering, yet fascinating experience. Numerous aircraft wreckages were reconstructed throughout the hanger for investigation, including light aircraft, gliders, microlights and a helicopter. Many of these aircraft had also recently appeared in the media; Augusta A109E that stuck a crane in Vauxhall, London; British Airways A319 engine cowling's that tore away at LHR, the few remains of a Cirrus that disappeared in the Channel and more recently, the twin engine light aircraft that crashed in Hawarden airport. Although tragic, from each of these incidents, there were lessons to be learned, which emphasises the purpose and importance of the AAIB:

"The fundamental purpose of investigating accidents is to determine the circumstances and causes of the accident with a view to the preservation of life and the avoidance of accidents in the future; it is not to apportion blame or liability."

Personally, I found the visit exceptionally interesting and educational, from both an engineer's perspective and also as a private pilot, and should the opportunity to visit arise again, I would thoroughly recommend it. On behalf of the Air League, I would like to extend a sincere thanks to the members of the AAIB for their time and for a very enjoyable day.

Hollie Rosier

REDS OVER DUBAI

ABOVE - Seen flying over Dubai's landmark hotel are the RAF's Red Arrows who recently completed a five week tour of the Middle East, displaying at the Dubai Air Show and at prestige locations throughout the region.

(Crown Copyright MOD/RAF Photo 2013)

New Members

Individual Members: Charles Baker, Sarah Beasley, Robert Brownbill, Alec Burns, Lily Chubb, Luke Clayton, Ailsa Collie, Joel Cooper, Rowan Corney, Sam Davies, Jack Donovan, Alexander Down, Ben Duff, Harry Dunsford, Harry Fawbert, Aaron Feathers, James Flanagan, Richard Gilbert, Duncan Glasby, Daniel Goldman, Naomi-Ruth Green, James Griffiths, Lewis Haldenby, William Hall, John Hawkes, Cicely Hill, Benjamin Marsden, Robert Melvin, Roger Milroy, Joseph Molyneux, Christian Mowatt, Iain Nelson, Jack Oakley, Fiona Old, Callum Parker, Mathew Reid, Craig Richardson, Alan Robinson, Arran Rodgers, Sidar Sevdiren, Martin Shannon, Rahul Sharma, Ryan Smith, Robert Taylor, Kathryn Trebilcock, Alex Watkins, Christopher Weeks, Louis Weston, Zoe Wilson-Chalon, Jonathan Woolley

2014 Subscriptions

Revised subscriptions with effect from 1 January 2014 were approved at the Air League AGM held on 13 June 2013. The new rates will be:

Corporate Membership Category	Rate (Direct Debit)	Rate (Cash)
RED	£4,000 & above	£4,000 & above
WHITE	£1,250-£4,000	£1,250-£4,000
BLUE	£650-£1,250	£660-£1,250
GREEN	£200	£220
Individual Membership Category	**Rate (Direct Debit)**	**Rate (Cash)**
Full (over age 22)	£67	£70
Retired (over age 65)	£47	£50
Intermediate (age 22-27)	£47	£50
Student (under age 22)	£35	£38

1. Subscriptions are revised annually.
2. Individual Life membership £900.00.

Diary Reminders

20 May 2014: Annual Reception
11 June 2014: AGM

For up-to-date information on all our activities please visit our website at **www.airleague.co.uk** where you can register for changes to be sent to you by email as they are announced.

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