



56 Squadron – Home of the Firebirds

Fellow Firebirds

This is now our third newsletter and I am delighted to confirm that we are receiving very positive feedback on its production. I value it as a mechanism to share our progress and challenges with you, but also to keep you feeling part of the 56 Sqn family.

The Sqn remains busy in the face of COVID and the last few months have seen us immersed widely in our core Test & Evaluation activities, but also continuing to support the National effort with Military Assistance to Civil Authorities. With both tasks running in parallel, we have been challenged and it will come as no surprise to hear that the Firebirds have met our commitments head on and without complaint. These tasks have seen our people employed in tasks as wide ranging as: supporting P-8 Poseidon in Northern Scotland, flying Rivet Joint sorties over the Black sea, managing the effects of Windfarms on our Air Defence Radars and coordinating vaccination activities in the North west; it has been a truly remarkable time and I am proud of their efforts and the distinguished way in which they serve our Sqn.



Looking back over the last few months, it is easy to reflect on how defining moments in our history have shaped our future. One of those recent milestones was the retirement of our last aircraft type the Tornado F-3 before we finally reached our current status as a C2 ISR Test and Evaluation Sqn (TES). From my perspective, I feel like we are approaching one of those



key junctions that will be remembered as a pivotal point in our history. For those who are unaware, I am pleased to confirm that our Sqn is reclaiming some of our rich flying heritage as we have begun the process of transitioning to a whole aircraft TES. This means that we will be flying and operating aircraft again soon and it will be a proud day for all of us when we are able to hear the Firebird callsign used again overhead Lincolnshire and the UK. Although it is too early to forecast accurately, I have an aspiration that our first flight will occur on the Shadow aircraft toward Mar/Apr 22 with subsequent sorties to occur across all our types P-8 Poseidon, E-7, Rivet Joint, Protector. It is an exciting time and I am sure you all share my enthusiasm for our transition.

In other news, the recent Integrated Review placed great emphasis on technology and experimentation and this bodes extremely well for our lodger, 216 Sqn as we continue developing swarming drone capability. It also enables us to continue our great work in areas such as Space exploitation, satellites and Intelligence systems. The team are also focussed on remaining abreast of the latest capabilities to address the increased use of commercially available UAS and we continue our important work with our colleagues within Defence and





across Government. Sadly, the review also announced the retirement of the Sentry E-3D, an aircraft that has played an important part in our history and will continue to do so until its final flight later in the year. I am pleased to confirm that several members of 56 Sqn are presently deployed on operations with 8 Sqn and it is fitting that we will continue to play an important role until the very end.

Finally, I am happy to announce that we have decided to proceed with the Association Dinner this year at the Assembly Rooms, Lincoln on 1 Oct 21. Despite a number of setbacks due to COVID and the unfortunate cancellation of last year's event, we have decided to press on; albeit, later than traditional. As always, the event is open to all Association members and guests and it would be lovely to see you all then. Please reserve the date in your diary.

Best wishes and stay safe.

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Wg Cdr
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Air & Space Warfare Centre

7 Jul 21



Firebirds Take to the Skies

In the last newsletter we hinted at the concept that 56 Sqn was returning to the business of flying aircraft in its own right. This is alongside our current work testing the aircraft mission systems, Remotely Piloted Air Systems, Air Defence Radars and Command and Control systems, not to mention the Intelligence, Space and other areas we look at. This is not going to be an easy process, nor one we're going to rush, but it is worth a few thoughts about why we are going down this route, and some of the hurdles to be tackled on the way.

Currently, Test and Evaluation of the Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) aircraft fleet is a game of two halves. If the task involves looking at the performance of the sensors or onboard mission systems, then it is comfortably within 56 Squadron's remit with our teams of 'rear crew' specialists looking after the back end Sentry, Rivet Joint, Shadow and so on. However, for tasks relating to the airframe itself, or within the flight deck environment normally occupied by the pilots of this world, then we have had to defer to our colleagues based at Brize Norton on 206 Sqn (formally the Heavy Aircraft Test Squadron, or HATS). They have the Test Pilots, Flight Test Engineers and supporting specialists to allow them to conduct the more safety focused trials and although they don't have their own fleet of aircraft, they do have the processes and authorisations to allow them to borrow from the front-line units and carry out both continuation training sorties and dedicated trials events.



Figure 1 - RAAF E7-Wedgetail Landing at RAF Waddington



Figure 2 - UK P8 on exercise with the Royal Navy

This has led over time to a rather disjointed approach to testing of ISTAR aircraft. Our aim now, is to bring both aspects together under the 56 Sqn banner. This should have the direct benefit of allowing integrated testing of platforms such as the P-8 Poseidon as the UK resumes maritime flying, or the E-7

Wedgetail as a replacement for the Sentry.

The first stage of this change will bring the Sqn within the command chain of the Chief Test Pilot (CTP), who as a Delivery Duty Holder in charge of the Air and Space Warfare Centre's Flying Division can provide the high level supervision and risk ownership required to allow us to conduct complex T&E. Whereas most of our flying at the moment is conducted under the oversight of Waddington or Lossiemouth, CTP governance will enable us fly higher-tariff trials,



Figure 3 - Future Protector

for example using new weapons, or changing safety critical parts of the aircraft. We will then need to bring in personnel with the right qualifications and experience to both operate the aircraft and conduct flight deck focused testing. This should take the form of graduates from Empire Test Pilots School (ETPS) or equivalent, some of whom are already gaining qualifications on the ISTAR ac fleet. It is highly

likely that, for all but the smallest of the platforms, 56 will need to reverse the current arrangements and will augment our teams with personnel from other front-line units to make up a crew complement. Therefore, demonstrating that we can operate safely with other units under quite different governance and rules will be a real challenge as we move forward.

The next stage will be to get some aircraft. Before becoming too excited about seeing shiny new platforms in 56 Sqn colours, we should manage expectations. The ISTAR fleets are all very small and spend most of their time on live operations. Therefore, I am sorry to say that we aren't going to see 56 Sqn receiving dedicated aircraft parked outside the OC's window. Instead, there will be a process of allotting airframes to us on a 'chock-to-chock' basis, so the engineering responsibility stays with the host unit, but the aircraft becomes a 56 Sqn platform for each sortie (with a promise to return it in a good state shortly after landing). The first few times we exercise this process will likely be just for routine training flights, in order to keep crews current and refine the administrative actions, before then moving onto trials activity. We would then expect to have 56 Sqn operations flying out of Waddington and Lossiemouth on a regular basis. There are plenty of challenges ahead, trying to instigate change in a resource strapped world, but hopefully by next summer we'll regularly be having to decide whether to go flying as 'Firebird' or 'Phoenix'. Not the worst choice in the world as we rise from the ashes!



Figure 4 - RAF Rivet Joint on Exercise Red Flag

Continuing the Integration of US Platforms into RAF Service

One of the many benefits of the AIRSEEKER (AS) Programme is that the capability is in constant refresh through routine cyclic updates to the Rivet Joint (RJ) mission system and sensors. This ensures that the three UK aircraft remain at the cutting edge of ISTAR technologies. Following the latest upgrade in Mar/Apr 21, which took place in Greenville, Texas, this period has seen the return of airframe ZZ665 to the UK fleet, at the latest baseline standard. This upgrade work provided the opportunity for the AS team to begin the process of conducting the Test and Evaluation of the new platform capabilities and provide an Operational Assessment (OpAssess) of the upgraded and enhanced mission system, prior to its re-employment on operations. Prior to delivery of ZZ665 back to the UK and to facilitate an early 'first impression' of the RJ platform at the latest standard, three personnel from the AS team deployed to the USA for a period of 6 weeks.

Here the AS team were able to witness first-hand the development of several emerging ISTAR capabilities. The involvement of the AS team at this developmental stage, allows 56 Sqn to be at the forefront of providing evidence and advice to the Front-Line that downstream enhances the effectiveness of the AS system. The next phase of activity involved a visit to Offutt Air Force Base, Nebraska, the main operating base for USAF RJ and the home of the Advanced Capabilities Mission Evaluation (ACME) team, the AES TEF sister organisation within the USAF RJ programme. The purpose of this visit was to reignite the collaborative links with our partner T&E organisation that had suffered owing to COVID travel restrictions. During this visit, plans were made for in-depth collaborative Test and Evaluation events in late 2021, where the AS team will be maintaining a high level of presence in the USA to support various exercises and experimental capability demonstrations. This symbiotic collaboration relationship allows both ACME and the UK AS team personnel the opportunities to develop their Test and Evaluation skill sets, realise mutual flying opportunities and ensure they continue to provide effective Test and Evaluation output for 56 Sqn and the Air and Space Warfare Centre.



Figure 5 - The fifth RAF P8 arrivals at RAF Lossiemouth

The second element of AES TEF, the Maritime team, have continued to balance deployments to RAF Lossiemouth against the ever-changing COVID work and travel restrictions. Where opportunities have presented themselves, the team have continued the evidence collection activities that will support the assessment of the capability provided to the UK by the RAF's newest fleet, the Boeing P-8A Poseidon MRA Mk1. With the assistance from the ASWC's

Operational Analysis staff, the team studied recorded mission data, providing in-depth analysis to support qualitative observations and conclusions. The team continues to undertake the Poseidon OpAssess that will provide the Programme Sponsor with a comprehensive picture of the aircraft's capabilities at the next Interim Capability Milestone, currently scheduled for spring next year.

56 Sqn Support in the Formation of 216 Sqn

In February 2019 the Defence Secretary announced that the UK would develop a swarming drone sqn, in July of the same year CAS announced that 216 Sqn was to be reformed on 1 Apr 20. 216 Sqn currently resides under 56 Sqn to rely on our inherent RPAS and Test and Evaluation experience, with early intent that it will eventually move to sit under Combat Air Force Headquarters once certain milestones are achieved.

Tasked with developing and operating the RAF's first autonomous swarming drone Sqn, we have been busy not only with the swarm, but also establishing the Sqn from a blank slate. We have been dealing with everything from strategy meetings with Air Command and writing up orders to sorting through the furniture and setting up the IT. With five regular Service personnel and seven Reservists, it is still early days, but things are swiftly picking up pace.

The team has recently been busy getting the Sqn's infrastructure up to scratch. Situated in Hangar 1 at RAF Waddington, the new signs outside welcome visitors to a re-decorated and re-designed workspace, that will allow the Sqn to operate and train effectively. 216 Sqn was one of 16 capabilities represented at this year's Air Combat Power Visit, held at RAF Brize Norton in May. This gave us an opportunity to present our current and conceptual capabilities to a tri-service audience, who were keenly interested in the possibilities and potential that autonomous swarming drones have.



Figure 6 – Combined 56Sqn/216 Sqn Team

216 Sqn have been working alongside the Rapid Capabilities Office (RCO) to drive forward the autonomous swarming drone project, with both parties using their expertise and knowledge to help deliver the Squadron's future drone platform. The concept for the Sqn to operate is to use minimal personnel to deploy and operate a larger number of drones in a swarm. These drones will each carry a single payload, however a variety of payloads may exist within the swarm. Eventually the swarm will communicate with each other initially for safe separation, but we hope to grow the level autonomy to allow the swarm to self-assign drones to tasks achieving optimal performance with human oversight as opposed to direct control.

A key idea for the swarm is for the drones to be expendable. The loss of one or some of the drones will not affect the swarm's ability to finish the mission as the remaining platforms will still be able to operate. This, coupled with the low cost of each drone, allows us to conduct missions in disputed airspace, without the fear of losing an expensive modern fighter jet. The 216 mission statement is to:



Deliver a cooperative drone capability to understand, shape and influence the battlespace, whilst providing support to Operations as a force multiplier.

As for what is on the horizon for 216 Sqn, we anticipate that the tempo of events will increase significantly over the next 12 months. With trials and training already scheduled, the Sqn will be continue to focus on exploring the ways and means of how to operate, as well as pushing the boundaries of swarm autonomy. This unique and formidable technology allows us to question the traditional working practices, opening up opportunities to deliver a specialised effect in a specialised and highly efficient manner.

Finally, it is just for us to say that we are all excited to be a part of 216 Sqn and appreciate all the support and help we are receiving from within 56 Sqn. We look forward to where the future will take us.



E-3D Sentry Drawdown

The surprise announcement, following the Integrated Review, that the Sentry Out of Service Date (OSD) would be brought forward to before the end of the current year, 2021, has changed the focus of 56 Sqn support to the Sentry Component.

56 Sqn have been heavily involved with the Test and Evaluation and capability development of Sentry for many years, since the days when the unit was known as the Air C2ISR OEU. The unit were instrumental in the delivery of a CHAT capability on the Sentry, a vital Theatre Entry Requirement for a current Airborne C2 platform, the design of which is still based on a 56 Sqn Technology Demonstration. More recently, 56 Sqn have been working with ISTAR FHQ on several innovative solutions to ensure



Figure 7 - UK E3D in formation on exercise

Sentry could meet its operational requirements right out to the planned OSD in 2023. These activities have now been curtailed due to the early OSD, however, 56 Sqn continues to support the Front Line in maintaining the capability and providing personnel to fulfil operational crew requirements.

56 Sqn Airborne C2 personnel are all qualified and highly experienced Sentry mission crew. Wherever possible, all retain their Operating Category and flying currency during their time on 56 Sqn and Sqn personnel have always deployed with the Front-Line (FL) Sqn on any



Figure 8 - 56 Sqn personnel support to 8 Sqn

operational deployments over the years. They contribute to the Component's Force Element at Readiness and assist with the manning burden on the FL; whilst at the same time maintaining key skills and ensuring their specialist knowledge remains current and relevant. This has taken on even more importance over recent months in supporting and maintaining FL capability during the draw down of Sentry in preparation for the transition to the E-7 Wedgetail.

Currently, several members of the Airborne C2 Team are deployed on operations with 8 Sqn in the key digital crew positions of Link Manager and Radar Technician, as part of the whole force effort to ensure the success of Sentry's final operational deployment in RAF service. This critical support has ensured the Component can man sufficient crews to fully meet its operational tasking, providing a significantly enhanced Airborne C2 and surveillance capability to deployed UK and allied forces.



Assessing the Effects of Wind Farms on the UK's Air Defence

The ABM Sensors Team have been inundated with requests to support Windfarm (WF) related trials work in recent years to document WF effects on Air Defence (AD) radars. It is widely known that WFs cause unwanted primary returns and can reduce the Probability of Detection of aircraft in the vicinity, but as we look to the future, offshore WF installations are set to significantly increase in size, in terms of footprint and individual turbine dimensions, and it is anticipated that these increases will exacerbate the already known issues.



Figure 9 - Assessing the impact of windfarm growth

Current trials work is in progress to assess the Beyond Radar Line of Sight effects Hornsea 1 is having on our AD radars. The recently completed installation is further out to sea and is a Next Generation WF. It is currently the largest WF in the world, with 174 turbines, standing 190m above sea level, spread over an area of 407km².

The effects of offshore WFs on AD radars has been well documented in numerous trials reports, but despite MOD objections, no feasible solution has been identified. It is now recognised that should HMG wish to meet their renewable energy commitment of producing 40GW of electricity by 2030 (40% of the UK electricity requirement), and 75 GW by 2050, from offshore wind, a strategy is required to be put in place that allows the AD surveillance systems and WFs to co-exist.



Figure 10 - Measuring the effect on air defence

In 2019, Defence Equipment & Support led a Paper Based Feasibility Study that was funded by the Offshore Wind Industry Council (OWIC), looking for technologies that may offer effective solutions. The study saw expertise being brought in from the wider Sqn to assess and grade the proposals as part of the MOD panel. Following that work, the ABM Sensors Team were tasked to execute a series of WF mitigation Concept Demonstrations in support of the Joint MOD - OWIC Task Force. The 56 Sqn-led demonstrations were originally planned for 2020, however, C-19 impacted that plan and

we are now on track to trial the systems later this year at RRH Staxton Wold. The activity will provide evidence to inform the MOD, Department for Business, Energy and Industrial Strategy and other government agencies of the viability of offshore WF mitigation solutions.

The Concept Demonstrations are currently in the advanced stages of planning and will offer some exciting new insights into cutting-edge WF mitigation technologies. The 56 Sqn assessment of the potential future solutions will be key in formulating a strategy to achieve co-existence and move forward the Government target for Net Zero. I look forward to updating you on progress in future newsletters.



Adapting to the Digital Age

ISX TEF continued working mostly from home on recently issued MODNET Laptops to deliver Trials activity and consultative input to a broad range of customers requiring Int and Space capabilities. TEF trials helped prepare F-35 ahead of its first long cruise aboard the Queen Elizabeth carrier this year, reviewed feed quality for Reaper analysts and supported the continuing mission in Northern Ireland. The Space Team have been a key voice guiding the development of the UK's next generation of small satellites, ensuring the capabilities being delivered meet Defence needs for the next decade. Meanwhile the Int team have investigated the integration of new data exploitation technologies (such as AI) into existing and emerging fields to automate some of the mandraulic tasks analysts are currently required to complete, increasing their capacity to apply higher level thinking and improving response times.



Figure 11 - F35 landing on Aircraft Carrier QEII

One area that the ISX team have been actively investigating over the last six months is how the move from 'raw' or analogue collection sensors to processed or digitized, effects the way in which we collect, transfer and analyse information to still satisfy the Intelligence Requirements (IR) of defence customers. One practical application of this is the move away from traditional imagery analysis using legacy 'wet film' photography to utilizing existing in-service optical sensors and video. This has required the team is gain a deep understanding of how video is collected and the effects of platform movement when there is little or no control



Figure 12 - Exploiting imagery in new ways

over the parameters that are adjustable with conventional photography. Also, understanding how the video is processed, transported and displayed was key to maximising its potential as a source of information that can satisfy the IR that has been set. This work has enabled an existing in-service capability to fill the gap left by the retirement of a dedicated reconnaissance platform and 56 Sqn ISX team have been at the forefront in this activity.

56 Sqn Association Dinner

It gives me great pleasure to announce that after a year hiatus, this year's 56 Sqn Association Dinner is planned to be held at the County Assembly Rooms, Bailgate, Lincoln, LN1 3AR on **Friday 1 Oct 21**.

Guests are invited to wear No5 Uniform for serving members, and Black Tie/Evening Gown for Association members and guests. The dinner will follow a more traditional RAF Dinner format and offers welcome refreshments, a three-course meal and a chance for association and serving Sqn members to reminisce over the Sqn history and unwind over your favourite tippie!



Figure 13 - Lincoln Assembly Rooms



Figure 14 - The Ballroom

Arrival refreshments will be held in the Oval room from 1830 and attendees are to make themselves present for a 1915 'gong'. Attendees will then be invited to find their seat in the Ballroom for the meal, for which the menu is attached. The bar will be open 'Till Late' which all attendees are encouraged to take full advantage of.

Serving members are invited to complete the spreadsheet on MODNet and Association members are invited to return the proforma provided to the Association Secretary on secretary@56sqnfirebirds.org.uk prior to 1 Sep 21 when the book will close.

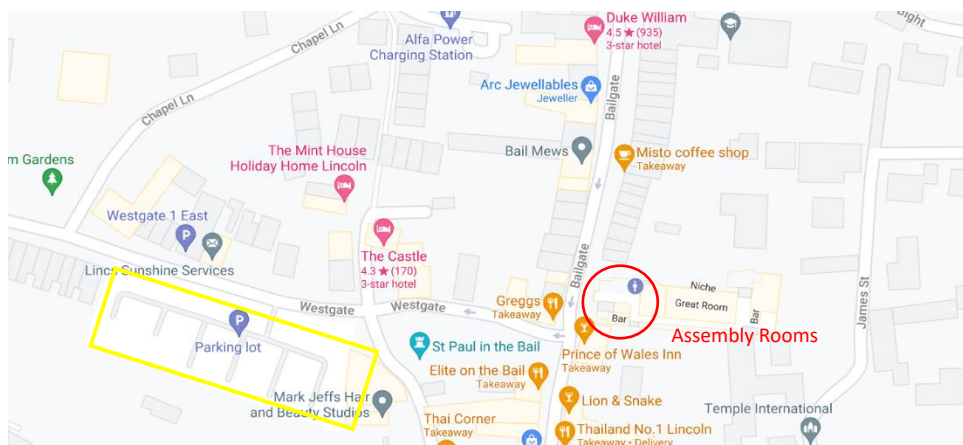


Figure 15 - The Assembly Rooms location and nearby parking

A Testing Time

As the Squadron prepares for a new era and awaits the arrival of its first test pilots it is worth reflecting on the Squadron's time in the operational evaluation of the Supermarine Swift back in 1954/55, when it was equipped with the Meteor.

After the Second World War the assumption was made that there would be no major conflict for several years, so there was no immediate requirement to purchase new aircraft. However, the developing Cold War and the Korean conflict put paid to this concept and it was quickly identified that there was a particular need for more advanced fighters. This requirement was considered to be so urgent that orders were placed "off the drawing board" for two fighters; one of which became the Swift whilst the other became the Hunter.

Although there were concerns about the Swift's performance as a fighter at high altitude, the aircraft was given an initial Release to Service by Boscombe Down, limiting it to 25,000 feet altitude and Mach 0.9 in speed. Meanwhile the Air Fighting



Figure 16 - The Swift F.1

Development Squadron (AFDS) of the Central Fighting Establishment at West Raynham undertook evaluation of the Swift as a fighter and in the rush to get the aircraft into service the decision was made to equip a squadron in Fighter Command with the aircraft.

It was no surprise that 56 Squadron was chosen to be the first Swift squadron. As one historian has noted, at that time the Squadron had achieved the highest flying rate in the whole of Fighter Command. The first Swift F.1 was delivered to the Firebirds at Waterbeach in February 1954. The first challenge for the Firebirds was the fact that there were no two-seater Swifts! A team from Supermarine was on hand to provide advice but a pilot's first solo was also his first flight; though whilst one pilot described the Swift as a simple aircraft to fly it was relatively sophisticated compared to the Meteor, having swept wings and powered controls. The Squadron Commander was Squadron Leader 'Twinkle' Storey and he established A Flight as the Swift Flight whilst B Flight continued to operate the Meteor.

It was a very testing time for A Flight. In early May, Twinkle failed to recover from a spin and had to eject. Though his ejection was successful he had an unusual welcome from a farm worker when he landed in a field. Having ascertained that Twinkle was alright, he left him to his own devices and went back to his labours. Sadly, this was not the only Swift loss. Later that month Flying Officer Neil Thornton, a first tourist, suffered an aileron problem on take-off and the aircraft crashed before he could eject and he was killed. As a consequence, the Swift was grounded for two months.



Figure 167 – The Swift F.2

Flying resumed in August, the same month that the Swift F.2 arrived on the Squadron, but the F.2 also proved to be just as unserviceable as the F.1. It was in late August that Flying Officer John Hobbs experienced an undercarriage problem. Rather than opt for a wheels-up landing he elected to eject. He also landed in the countryside but unlike Twinkle he had a more friendly reception, being lent a bicycle by a farm worker to cycle to the nearest main road.



In spite of all these setbacks, the Squadron did its best to exploit the Swift within the operating limitations. When B Flight went on Armament Practice Camp with the Meteors, A Flight accompanied it. Though the Swift was not cleared for gunnery, A Flight took part in some target tracking exercises. Whilst not cleared for aerobatics, the A Flight pilots managed to display the aircraft impressively at various RAF displays, whilst a formation of 5 Swifts flew over London on Battle of Britain Day.

Eventually it became obvious that the Swift did not have a future as a fighter and the government made the decision in March 1955 that all Swift flying should cease, though the aircraft would subsequently go on to be employed in the low-level reconnaissance role. The Firebirds reverted back to being a Meteor squadron but two months later re-equipped with the Hawker Hunter. As for the Swift pilots of A Flight, on the Squadron they were referred to as the test pilots!

