

Taylor Downing tells the story of the Central Interpretation Unit at Medmenham, Buckinghamshire, where the RAF's aerial photo interpreters played a critical role in Britain's wartime struggle.

SPYING FROM THE SKY

One of the most famous aerial photographs of the Second World War was taken from 30,000 feet at 8.30am on May 17th, 1943, only hours after the Dam Busters raid. The water from the reservoir is still gushing through the 200-foot breach in the Möhne Dam, causing mayhem in the valley below. Mudflats appear as the water level drops above the dam. The pilot, Flying Officer Jerry Fray, was overcome by the scale of destruction he could see below.

A cartoon from *Evidence in Camera*, the wartime publication of the Central Interpretation Unit.

On April 1st, 1941 an entirely new component of British wartime intelligence opened for business. The Central Interpretation Unit (CIU) brought most of the RAF's aerial photo interpreters (PIs) for the first time under a single roof in a rambling country house on the banks of the Thames between Marlow and Henley. As was the custom for RAF bases, it was named after the nearest village and so was called RAF Medmenham. It would be a vital part of the intelligence war until peace came in 1945. It was often claimed that 80 per cent of all intelligence came from the analysis of aerial photos.

RAF Medmenham was similar in many ways to the great code breaking centre run by the Secret Intelligence Service at Bletchley Park. Both were based at country houses near to a main rail link into London. Both became filled with an eclectic mix of academics, eccentrics and mavericks who helped to invent a new science. At both locations the grounds slowly filled with Nissen huts and outbuildings as more and more people were packed in to the limited space available. At Medmenham there were archaeologists (the entire Archaeology Department from Cambridge University was recruited), geologists,

mathematicians and a variety of other scholars and specialists. The prime minister's daughter, Sarah Churchill, worked there. Later in the war so did President Roosevelt's son, Elliott. It was an elite of sorts that operated in total secrecy. Photo interpreters working in one area had no idea what colleagues in the next room were up to. But together they devised ways to

measure the smallest details on photographs with incredible accuracy and to 'read' aerial photographs three dimensionally. They could calculate the speed of ships or monitor aircraft production, ship building and arms manufacture of the enemy's war machine. They could follow the development of new aircraft and new weapons and by maintaining regular coverage of any part of occupied Europe they could monitor buildings or factories being constructed. There was very little of any

significance to the German war effort that took place without being seen by the spies in the sky.

A forgotten skill

During the First World War a great deal had been learned about how to run an effective intelligence operation using aerial photos. Trench maps showing



"He told me not to mention it to anyone else—but I know, dear, I can trust you"



Photo interpreters at work. Many were Women's Auxiliary Air Force officers. One of the most famous PIs, Constance Babington Smith, whose team found the V1 flying bomb launch sites, is in the foreground left. The men working behind her are American.



the detail of enemy positions were printed in vast numbers from mosaics of aerial photos. And in the Middle East aerial photography was used to chart parts of Palestine and Syria that had never been mapped before. But in the interwar years most of this knowledge was forgotten and, as is the way with many military skills, once lost it proved difficult to relearn. By 1939 the RAF was flying the wrong planes, using the wrong cameras with the wrong lenses and had completely lost the techniques for detailed interpretation of information of military significance from aerial photos. As the cameras suffered from condensation at altitude, most of the pictures, when the pilots managed to get them back home, were unusable. Of 89 missions in the first four months of the war, 44 failed to produce any usable pictures. Furthermore crews in slow-flying Blenheim bombers were sitting ducks for fast enemy fighters. In the same period 16 Benheims were shot down and their crews lost. All in all this was an unacceptable rate of loss and a hopeless failure for so much risk.

Advice at a price

It took the efforts of an Australian maverick, Sidney Cotton, who was brought in by the RAF because he had a particular expertise with aerial photography,

Group Captain Francis Cator. He tried to impose military discipline on a base known for its eccentric, academic atmosphere.

to persuade the Air Ministry that they had it all wrong. Cotton had himself carried out clandestine flights over Germany, and the Middle East before the war, photographing military installations. He argued that the RAF must use only the fastest aircraft available, stripped of their weapons and armour plating to make the most of the potential speed. The Spitfire was the only aircraft suitable for aerial reconnaissance, he believed. But Spitfires were in desperately short supply in early 1940. Moreover Cotton argued that the RAF had to use modern devices for enlarging and measuring photographs, where often the most significant information would appear as only a tiny dot. Some of the greatest feats in photo interpretation during the war came from identifying and measuring something that on a print was often no more than a millimetre in size.

The RAF finally accepted Cotton's recommendations but couldn't bear the thought of working with the bullying Australian know-all. Cotton was fired but his ideas were taken on board. The realisation of the vital importance of aerial photography resulted in the opening of RAF Medmenham at the beginning of April 1941. The wits joked that such an important part of the intelligence operation was opening on April Fools Day.

Phases of interpretation

Brave Spitfire pilots flew for hours on end, alone and entirely without weapons, across occupied Europe to photograph a single factory, airfield or shipyard. From the autumn of 1941 they were joined by the two-man crew of the photo-reconnaissance Mosquito, the fastest aircraft of the pre-jet era. Their only chance of escape, if they were intercepted, was their speed and their daring. When they returned, the photographs were subjected to a sophisticated, three-tier process of interpretation to extract maximum intelligence from a given picture. There was First Phase interpretation, carried out quickly on the airfield where the photographs were developed. Intelligence of an immediate tactical nature was identified and passed on. Was a ship still in harbour? Had that Panzer unit deployed? Had the target factory been hit in the overnight bombing raid?

Then the photographs were taken to the Central Interpretation Unit at Medmenham where they were logged in and the location of each plotted. Within 24 hours a team of Second Phase interpreters found answers to a further set of questions. How had the numbers of tanks changed? Is that airfield now serviceable? Is that ship ready to sail? Often this involved some sort of measuring. Could a tank cross that bridge? What is the storage capacity of that group of buildings? How many aircraft are ready to fly on this airfield? Every day the Second Phase interpreters completed a summary intelligence report of all that had been learned.

After this, the specialists of the Third Phase at Medmenham went into even further detail to extract strategic intelligence from the same photographs. In many ways this was the most remarkable part of the whole operation. Railway specialists could tell from



Photo interpreters from the Second Section pose on the steps of Danesfield House, RAF Medmenham, towards the end of the war. It was their job to assess all aerial photographs on arrival at Medmenham and produce from them a daily intelligence report. The mock Tudor mansion faced with white chalk and overlooking the Thames was built by Robert William Hudson, heir to the Sunlight Soap fortune, at the beginning of the century. By the end of the war there were 3,500 men and women based there and the grounds were full of huts to cope with the overflow from the main house.

A photo interpreter with all the tools of the trade. Note the stereos that enabled PIs to view matching photographs in 3D. This helped them to measure the height of objects with remarkable accuracy. This PI is comparing two covers of a BMW engine factory with a plan of the works. As well as the aerial photos and the stereos, there is the standard equipment of dividers for measuring, an anglepoise lamp as well as boxes of additional photographs.



the fact that the enemy had gathered a particular type of truck in rail yards whether they were about to transport fuel, weapons or military vehicles of one sort or another. Aircraft experts could see that a new prototype was undergoing trials and over time could calculate when it would be ready for deployment. One of the most famous photo interpreters of the war, Constance Babington Smith, was able to spot that jet aircraft were about to go into operation by identifying the tiny burn marks on the grass made by the engines as they started up. Shipping experts were able to identify the laying down of keels for new U-boats or other vessels in the shipyards and so could predict the exact strength of the German navy up to a year ahead. Other specialists could deduce whether a mast was a radio aerial, a radar tower, or a telegraphic transmitting station. A department of sculptors and artists began to turn aerial photos into large terrain models of up to 20 square feet. Made with incredible care and accuracy, these were used to brief bombing crews before a mission or commandos before a raid. More than 1,400 different models were produced at Medmenham during the war.

Work for women

It was found early on that women were particularly good at much of this type of work. Uniquely in Britain's wartime effort Women's Auxiliary Air Force

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Richard Weight charts how the threat from Hitler galvanised opinion-formers into embracing a past they had previously scorned.

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Photo interpreters working in one of the grand rooms at RAF Medmenham. The marble fire place is almost obscured by mosaics of aerial photographs, the top one of which appears to show the line of a beach.

(WAAF) officers worked alongside male officers and often in command of a team of men. There was an equality in photo interpretation that was not found elsewhere in war work where women tended to be the typists or drivers and more generally subordinated to men.

The photo interpreters at Medmenham were a creative bunch. As well as scholars and specialists, there were many musicians, composers, artists and entertainers. Sarah Churchill had been an actress before the war to the concern of her parents who did not think it was a suitable career for their daughter. She had many contacts on the London stage and often invited performers to Medmenham. Dirk Bogarde, one of the great movie idols of the postwar era, was an army interpreter who worked at Medmenham before transferring to a mobile photo interpretation unit in Normandy and Belgium. The shows put on by the photo interpreters were considered to be of a very high standard, often with words and music written by the staff themselves. Another interpreter, Frederick Ashton, who later founded the Royal Ballet, sometimes did the choreography for these entertainments. A magazine was produced by the unit called *Evidence in Camera*. It was distributed to RAF stations to promote aerial photography to flight crews. Such was the range of talents available that there were three cartoonists from national



newspapers working at Medmenham, who were able to contribute to the publication.

Not surprisingly, with so many specialists recruited from the universities, a number of those who worked at Medmenham recall an academic feel about the place. When one newly recruited young photo interpreter arrived, the first person he saw was his college botany tutor. And, because in the RAF there was no requirement for months of square bashing, the Air Ministry was able to recruit specialists, put them straight into uniform and get them working. Consequently many of the photo interpreters were a little older than average for an RAF station. The teams worked hard for long hours at a time. But the tension between the relaxed atmosphere created by the boffins and the fact that Medmenham was a military establishment occasionally came to the surface.

When Group Captain Francis Cator took command in 1943 he decided the place needed more military discipline and order. The photo interpreters tended to carry on working, into the small hours if necessary, until they had completed whatever they were doing. Then, if the workload was lighter the next day, they would come in later to compensate for the late night. But Cator wasn't having any of this. He called in the dons and experts and lectured them on punctuality. The RAF police on the main gate were instructed to take the names of any latecomers who had to report to him in person. At one point he ordered a parade – standard practice at most RAF stations but unheard of at Medmenham. For the army and navy officers this posed no challenge. They had all been through basic training. But it threw into a panic many of the RAF photo interpreters who had never learned drill. When the day came the parade turned into a fiasco. One group marched down the wrong drive and crossed the other group right in front of their station commander, who was standing on a dais and had to take the salute from front and back at the same time. Cator was furious. But, fortunately, parade ground prowess was not a requirement for PI skill and the outstanding intelligence work continued despite the station commander.

Transatlantic assistance

At the time of Pearl Harbor at the end of 1941 the United States army and navy had run down their own photo interpretation systems. There was not a single photo interpreter in the entire US Navy. It was soon realised that in Britain's Central Interpretation Unit a world-class specialist team was already in existence. The chiefs in Washington took the sensible view that instead of slowly developing the skills to operate their own system they would throw in their lot with the RAF. Americans started to arrive at Medmenham to learn the science of photo interpretation and the CIU became a multinational operation. The growing numbers of Americans in their smart brown uniforms added to the glamour of the place. In May 1944 the CIU was officially renamed as the Allied Central Interpretation Unit.

As the war progressed two distinct types of intelligence emerged to be drawn from aerial photographs.



A photo reconnaissance Spitfire with two F-52 cameras in the foreground. The cameras were located in the fuselage of the aircraft and the long 40 inch lenses enabled pilots to photograph objects from a height of about 30,000 feet. Each 8½ by 7 inch photo covered an area of about a square mile with sufficient detail to identify a vehicle on the ground.

Commanders in the field wanted tactical intelligence about where and how the enemy had deployed in front of their positions. Initially sceptical army officers soon grew to be 'air minded'. Huge amounts of information were passed on by photo interpreters, either operating out of forward bases or in regional interpretation centres, about the location of enemy trenches and artillery, along with detailed estimates of the number of troops they were likely to be up against. The Germans, of course, knew they were being observed. At one point a German regimental commander in Italy issued this extraordinary order to his men:

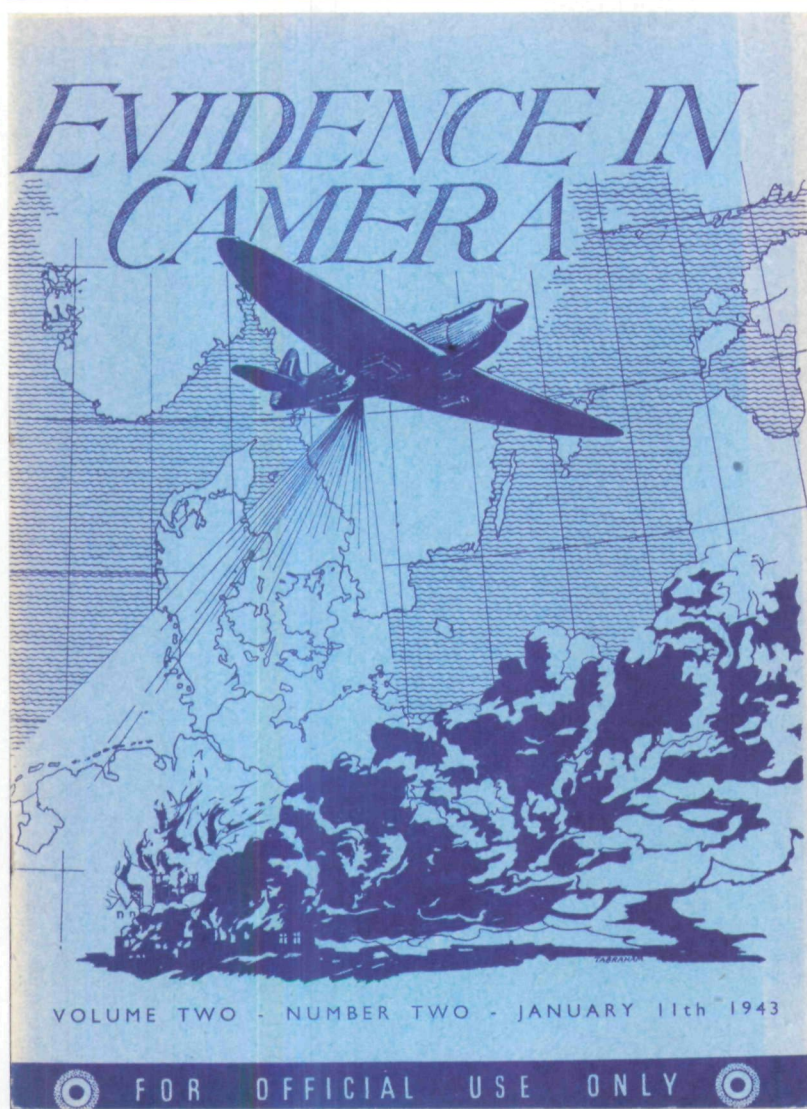
The enemy are taking air photographs every day so that they know as much about our positions as any one of us. To reduce this leakage of information you must avoid ... exposing your bare backsides during the daytime as they would be clearly visible on the photographs and might pinpoint our positions.

Strategic intelligence

Back in Medmenham, the specialists concentrated on extracting strategic intelligence from the aerial photos. Bomber Command needed not only to identify key industrial targets but also to have detailed damage assessment reports after a raid. These became so precise that photo interpreters could assess how much of a factory had been damaged and how long it would take to get key parts functioning again. They could advise on the optimum point to bomb the site again after maximum effort had been put into rebuilding the factory before it resumed production. Some of these

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photos, like the aerial images of the damage to the Möhne and the Eder Dams, are among the most iconic images of the era and helped to make the Dam Busters raid probably the most famous of the Second World War.

In the run up to D-Day aerial photos were used firstly to help the selection of which beaches to land on. Then the details of the Atlantic Wall defences were recorded in minute detail. Every obstruction, every gun emplacement, even the steel bars across fields to prevent gliders from landing, were noted down. The angles of the beaches were measured and assembly points were calculated. The routes off the beaches were plotted and the strength of enemy defenders was carefully observed. The key radar stations picking up Allied movements in the Channel were identified and more than a hundred sites were destroyed. Every landing craft commander was given oblique photos of the section of beach on which he was expected to land. Nevertheless things still went horribly wrong. The wind blew landing craft off course. The bombers failed to destroy the defences on Omaha beach. But never before in history had an invading army possessed so much information about its enemy, his strengths and dispositions, than on the morning of June 6th, 1944.

Evidence in Camera, the magazine produced at RAF Medmenham to promote aerial photography. It was circulated to all RAF stations.

The greatest intelligence coup of the war

Photo intelligence worked alongside all the other forms of intelligence, including reports from the Resistance, prisoner interrogations and the code breaking of enemy communications. In Operation Bodyline of summer 1943, and later Operation Crossbow, aerial intelligence was alerted to the existence of rocket and jet experimentation taking place at Peenemünde on the Baltic coast and then to the building of vast launch sites in northern France for some sort of new secret weapon. Putting together the pieces of this particular jigsaw proved to be especially challenging as the scientists advising the government could not agree what form of new technologies the German scientists were developing. The photo interpreters eventually identified the V-1 flying bomb and worked out how it was launched in one of the greatest intelligence coups of the war. By estimating its range at about 130 miles and assuming the target was London, they looked at an arc across northern France and Belgium with a radius of 130 miles of the capital and identified 96 separate launch sites under construction. Every one of them was then targeted and destroyed. Had the V-1 campaign started months earlier and on the scale Hitler had hoped, it could have caused extensive disruption to Operation Overlord and, according to Eisenhower writing later, possibly even to its cancellation. In this achievement alone Medmenham had justified its existence.

Time for recognition

Since the mid-1970s when the first stories of the extraordinary achievements of code breaking at Bletchley Park became public an immense amount of attention has been rightly concentrated on this remarkable story and the people working there. Along the way they laid the foundations for the postwar computer industry. But the other, partner, intelligence organisation, where an equally oddball mix of some of the most brilliant minds of the day came together to do their bit for the war, has largely been forgotten. Theirs is an equally dramatic story of inventiveness, adaptation and genius. In July 2011 the Queen unveiled a monument to the code breakers at Bletchley Park. Now it is time to recognise the achievement of the photo interpreters in wartime intelligence and their contribution to final victory. They too deserve a museum and a monument to their memory.

Taylor Downing's new book on RAF Medmenham *Spies in the Sky: The Secret Battle for Aerial Intelligence in World War II* has just been published by Little, Brown.

Further Reading

- Roy Stanley, *V Weapons Hunt* (Pen & Sword, 2010)
- Constance Babington Smith, *Evidence in Camera* (Chatto and Windus, 1957)
- Chris Going and Alun Jones, *Above the Battle: D-Day The Lost Evidence* (Crecy, 2004)
- Roy Conyers Nesbit, *Eyes of the RAF: A History of Photo Reconnaissance* (Sutton, 2003)



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