



'Observe & Report'

*Quarterly Magazine of
Sky Watch Civil Air Patrol*

Winter/Spring 2013

Providing Air Search and Air Observation to Save Lives



In This Issue:

**Annual Report
Around the Units
FLIR Camera Trial**



LOTTERY FUNDED



**Volunteers in
Civil Protection**

'Observe & Report'

Official Journal of Sky
Watch Civil Air Patrol

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having a civil
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'Observe & Report'

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Cover Picture:

G-AVEC, a Cessna F172H of Essex Civil Air Patrol

Chairman's Annual Report to the President

Once again, we have moved from one year to the next and we have the opportunity to look back on the previous 12 months and look forward to the New Year. In 2011 the target was to double the number of operational units, those that are on the 'front line' from 6 to 12 and we almost got there with 11 operational units at the beginning of 2012. However, circumstances have changed, yet again and the trend is now to follow the example in Scotland, where there are 2 units



covering almost the whole of the country, and to have larger units covering a whole region. A good example of this is in East Anglia where Norfolk and Suffolk have combined and the whole of East Anglia is covered by Norfolk & Suffolk Civil Air Patrol, Essex CAP and the newly formed Cambridge CAP. As was mentioned in my last report the earlier numbering system for individual units has been dropped and the more obvious name of the area, plus the words Civil Air Patrol, are used to describe each operational unit. At the beginning of 2013 we have, starting in the far north, the following units:

Highland CAP

Lowland CAP

Durham & Northumberland CAP

Northern Ireland CAP

Cumbria CAP

Yorkshire CAP

Norfolk & Suffolk CAP

Cambridge CAP

Essex CAP

Solent CAP

South West Peninsula CAP

FUNDING

As the Civil Air Patrol becomes more successful then, as may be expected, funding becomes a much bigger issue. It is quite unreasonable, we may agree, for a pilot and an observer to provide their time and skills free of charge, to provide an aircraft, in private ownership, at no charge and then expect the crew to pay for their own fuel when flying a CAP mission. At the beginning of the year the Trustees had high hopes for a new, independent trading company, a community interest company (CIC), to be the vehicle for raising funds. Sadly, the idea of a CIC became something of a mirage and it was soon realised that UK Air Search CIC was actually costing money rather than raising money. Unfortunately, the principle director of the CIC was also our webmaster and when the CIC was wound up we also lost the website! The closure of the CIC and the loss of the website were both a major issue but, fortunately, the Trustees were quick to overcome both setbacks. A professional internet service provider was identified and the national website is now administered by the company, 'Computer Insight'. Also, after taking advice from the Civil Aviation Authority the Department for Transport (DfT) were approached with a request to extend one of the exceptions to the Air Navigation Order (ANO) to include the Civil Air Patrol so that pilots belonging to the Charity could be reimbursed from Charity funds for their direct (fuel) costs when engaged in CAP missions. The possibility of using this easement to the ANO, for the Civil Air Patrol, was confirmed in a letter from the DfT dated 23 August 2012. For the present and in the absence of a major sponsor the funds to pay for fuel must be raised locally from supporters and generous benefactors. Nevertheless, there have been donations from other sources and a grant from the Big Lottery Fund has been used to promote the Civil Air Patrol at three major events, the Light Aircraft Association Rally, the Emergency Services Show and the British Microlight Association Rally, 'The Flying Show' at the NEC, Birmingham. The Lottery Fund grant was also used to fund the publication and the distribution of our house magazine, 'Observe & Report' and to pay for publicity material, leaflets, posters etc.

FLYING HOURS

In 2011 the total number of recorded flying hours, by all the operational units was just short of 200 and in 2012 the number is almost the same with a total of 195 hours. Once again, it was Scotland, where the CAP has a very good relationship with the police, that led the way with a total of just under 70 hours. As always, a proportion was used for training and for some trials with Airwave radio and with the VHF marine band but, in addition, the two units in Scotland completed 24 searches for missing persons. The Highland CAP flew two sorties in support of the Olympic Torch relay and also flew a search mission to locate wreckage from two military aircraft involved in a mid-air collision. In addition to thirteen searches for missing persons the Lowland CAP flew four sorties on

behalf of a project for St Andrew's University. The Northern Ireland CAP flew almost 26 hours and, again, searches for missing persons took priority and one of the ten searches for missing persons involved the use of a drone.

In England and Wales the total number of hours flown were just short of 99 with a noticeable emphasis on training missions although in East Anglia a number of sorties were in response to serious flooding where air to ground photographs were forwarded to the Environment Agency. The South West Peninsula unit which has the only CAP float plane, a Kitfox, completed a coast search for a missing yachtsman. On the south coast the Solent CAP has a total of six aircraft at its disposal with its main base at Lee on Solent. This relatively new unit now has 10 pilots, 6 observers and one ground supporter. Again, the main emphasis has been on training, both in the air and on the ground, and, as may be expected, there is a good relationship with Solent Coastguard. One search was for a missing person in Portsmouth Harbour and another followed the sighting of a red flare.

Two high profile missions were flown for missing children, one for Ian Bell, 8 years, whose body was recovered from the River Wear in County Durham and the other for April Jones, 5 years who is still missing in mid-Wales. In the case of Ian Bell the Durham CAP searched the river with two aircraft and subsequently directed the police to a position three miles downstream from the point where the boy fell into the river. In the case of April Jones, who went missing in October, the CAP worked with Dyfed Powys Police to search for over 6 hours along the River Dovey from Machynlleth to Cardigan Bay. A local man was subsequently charged with abduction, murder and perverting the course of justice although, sadly, the body of April Jones has still not been found.

COMMUNICATIONS

Radio communications and sometimes the lack of them continue to remain a concern although the Durham Constabulary, together with the Radio Amateur Network (RAYNET) have organized a workshop for all the members of the voluntary sector in County Durham. Meanwhile, in Scotland, it has been shown the emergency services radio, Airwave/Tetra, work perfectly well in a light aircraft and permits direct two-way communication between the aircraft and people on the ground. Another possibility, when it's available, is to use a link call via HM Coastguard integrated communication system using the shared airband frequency of 132.65 MHz. However, although not ideal, the most reliable method, in the absence of a two-way conversation on the aircraft VHF airband is to use a mobile telephone with a 'bluetooth' connection to the aircrew headset.

Fortunately, one of the strong points of the voluntary sector is that people involved, who provide their time and their skills free of charge, also bring with them a very wide range of expertise. A case in point is a new recruit in Cumbria who, as well as owning and flying his own autogyro, is an expert in many forms of digital communication, including voice and imagery. Although his current expertise is land based he believes that there are a number of possibilities that will enhance our current capability including what, to the CAP, has become the 'Holy Grail'. The transmission of live images from a camcorder mounted in the aircraft to a person on the ground, via an internet connection.

A SERIOUS ISSUE

The famous politician and statesman, Mahatma Gandhi, once said that any new idea goes through a number of stages before it become universally accepted. First, it's ignored, then it's laughed at, third it's opposed and then you win! This would now seem to be the case with the Civil Air Patrol in the UK. In Scotland the CAP is generally accepted by both the police, who have a responsibility for land search & rescue, and by HM Coastguard who have the same responsibility at sea, including inshore waters. Sadly the police in England & Wales and, to some extent in Northern Ireland, are still at stage 3 where they continue to oppose the CAP despite their responsibility for, "Coordinating the role of other agencies including specialist support from the voluntary organizations" – 'Search and Rescue Framework for the United Kingdom of Great Britain and Northern Ireland'. The much quoted problem from some senior police officers, and members of police air support units, is that the Air Navigation Order, Article 13 states that an aircraft 'in the service of the police' must be operated in the public transport category and in accordance with a police air operator's certificate. These rules, to regulate police aviation in the UK, were written in the 1980's, well before the Civil Air Patrol was formed, and it's most unlikely that it was ever envisaged that the police would try to apply the rule to aircraft in the private category flown by volunteers. It must be remembered that the CAP has no contractual obligation to assist the police, to search for a missing vulnerable person for example, and its services are provided free of charge. In Scotland the view, by the police, is quite different and it's generally accepted that a volunteer cannot be in the service of a chief constable.

This disagreement between the police, who are Category 1 responders (Civil Contingencies Act 2004) and the Civil Air Patrol who are in the voluntary sector is most unfortunate. The Category 1 responders are supposed to 'engage' with the voluntary sector. The problem was recently exacerbated in a letter sent to a member of the Scottish Parliament by a senior official at the Department for Transport (DfT). In the letter, dated 18 December 2012, the official stated, "They (the CAP) must not respond to police requests." This statement, by a senior member of the Government, is contrary to the advice given in the Civil

Contingencies Act 2004 and to the 'framework agreement' for the provision of a search and rescue capability in the UK. The latter document is published by the Maritime and Coastguard Agency which is part of the Department for Transport! An exchange of views with the DfT is ongoing and it's hoped that a resolution will be achieved in the very near future.

PUBLIC RELATIONS

Like any charity the Civil Air Patrol has to promote itself if it is to attract new members and to secure funding from both individuals and corporate sponsors. Nevertheless, this can quickly become a case of spending money to make money and it was fortunate that in 2012 the majority of PR funding came from a grant from the Big Lottery. This grant paid for the attendance at 3 major events, the Light Aircraft Association (LAA) Rally, the Emergency Services Show (ESS), the British Microlight Aircraft Association (BMAA) Rally and also covered the cost of the publication, printing and the distribution of the house magazine, 'Observe & Report'. In addition colleagues in Scotland attended the Scottish Aero Club annual meeting at Perth and the RAF Air Show at Leuchars. Colleagues in Northern Ireland attended a number of events as did members of the units in England.

It is hoped that similar funding will be provided by the Big Lottery in 2013 but, even if this should become available, the Trustees will have to make sure that we target the correct events. The Emergency Services Show is certainly a worthy event and the CAP has already been invited to Aero Expo at Sywell, 31 May-1 Jun. Other events that are high on the list of 'worthy events' are the LAA Rally, 30 Aug – 1 Sep which coincides with the AGM at the Aviator Hotel, Sywell Aerodrome, the Scottish Aero Club annual rally at Perth and the RAF airshows at RAF Leuchars and RAF Waddington. It is anticipated that other, local events including those in Northern Ireland, will also take place. Nevertheless, and despite the importance of attending public events the main conduits for publicity are the house magazine, 'Observer & Report' together with the national and unit websites.

PRIORITIES FOR 2013

The priorities for 2013 remain the same as in 2012:

National and local fund raising.

The provision of operational and financial support to frontline units.

The development of operational protocols with the police in all parts of the UK.

THANKS

At the beginning of another year it gives me great pleasure to thank my fellow Trustees, the Regional Coordinators, the Editor of 'Observe & Report' and our new website manager, Mr Andy Rogers for their overwhelming support. Also, my grateful thanks must be extended to the unit chief pilots and the members of the operational units, together with our ground supporters and those who support the Charity with professional advice and financial contributions.

James A Cowan

Chairman

Around the Units

Durham & Northumberland CAP

Exercise Perthshire, a multi-agency exercise organized by the Durham and Darlington Civil Contingencies Unit (CCU) first came onto the 'radar' in January 2012 at one of the quarterly meetings of the Volunteer Emergency Liaison Group (VELG) which was attended by the unit chief pilot of the Durham CAP, Paul Moore.

In 2011 the annual exercise had been combined with the national response to serious flooding, Exercise Watermark but this year the scenario involved a serious incident at a chemical unit on the trading estate in the town of Newton Aycliffe which is between Durham and Darlington. Other 'players', in addition to the staff of the CCU and an aircraft belonging to the Civil Air Patrol included the fire service, the police, the ambulance service, the British Red Cross and St John Ambulance.

For the Civil Air Patrol the main aims were to provide air to ground imagery of the scene in a timely manner and to test radio communications between the aircraft and the ground. In 2011 the aircraft used was a Cessna 182 and on this occasion it was decided to use a low-wing Robin DR400 to confirm that an aircraft with a low-wing may be used for air to ground photography with the pictures taken from inside the aircraft canopy.

A week before the exercise in March the CCU was provided with a Civil Air Patrol Exercise Instruction using the same template as the previous year. This is a two page document which confirms the location of the incident using the OSGB grid, communications, callsigns, aircraft to be used, altimeter settings

etc. Weather limits for a day VFR flight and the minimum search altitude of 1,000 feet msd are also included.

For the CAP team the exercise went like 'clockwork' as the aircraft circled the scene of the incident to complete the required photography with a digital camera, a Panasonic Lumix DMC-FZ7 with a 12x optical zoom and image stabilisation. Communications with the ground were first established by using a mobile telephone connected to the aircraft intercom using an in-line amplifier. However, the communications were much improved after a call to HM Coastguard Maritime Rescue Coordination Centre (MRCC) 'Humber Coastguard' on the aircraft's VHF radio with a request for a 'connect call' to a mobile telephone at the scene of the incident.

On this occasion the aircraft circled the incident to practice air to ground photography but had the incident been for real the aircraft would have stayed up-wind and provided an assessment of the drift of any noxious gases towards housing in the vicinity of the incident. After landing a sample image was sent to the incident commander as an attachment to an e-mail and then a further 45 images plus an 8cm DVD from a camcorder were sent by courier to the offices of the CCU. Altogether, this was a very useful exercise which proved, yet again, the value of a light aircraft for air to ground observation and air to ground photography and, yes, a low-wing aircraft is acceptable for this particular mission and, with the correct setting on the camera, the cockpit canopy isn't a problem.

Tony Cowan

Regional Co-ordinator

East Anglian CAP

During the summer it was rain and high winds and now it is snow and ice, all these natural elements conspiring to keep our aircraft on the ground. Our East Anglian Units, Essex, Norfolk / Suffolk and Cambridgeshire have had countless Exercises cancelled or postponed since September so we are hoping for a change in our fortunes in the coming year.

Nonetheless we have been busy on the Airshow circuit which. Early September we set up our display at Sywell Aerodrome for the LAA Rally. In charge of the display was our intrepid Round Britain Rally pilot Bill Scott, who spent 3 days living it up in the local hotels and of course keeping the display looking splendid. A lot of interest was generated and I believe that our Membership Secretary Bryan Harper is happy. A number of notable personages attended the stand and our Chairman Tony Cowan together with Ann did a stalwart job helping to man the stand.

Shortly after this, on Sun 9 Sept Bill once again rose to the occasion and drove the Control Vehicle to Seething Airfield where we had been asked to set up a stand at the annual airshow. Here we were given a choice location for the public to visit us and for us to enjoy the show. Many thanks to the rest of the crew, Ray and Anita Osborne, Roger Foreacre, Phil Fisk and Neil Anderson who, as usual, were kept busy talking to interested punters.

The show season finished for us in early December where we attended the Flying Show at the NEC Birmingham. Bill Scott together with Ray and Anita Osborne, plus Tony and Ann Cowan managed the Stand and reported that the Show was not as populated as in previous years.



On 18 November 2012 we organized and carried out a successful Exercise from our base at Raveningham. It was well attended and enjoyable.

On 29 November 2012 we launched two aircraft to photograph flooding in the Peterborough/ Northampton areas. The aircraft, a CT flown by John James with Kevin Duffy as Observer from the Norfolk and Suffolk Unit and a Piper PA 28 flown by Graham Broome with Jeremy Curtis as Observer from our new Cambridgeshire Unit took 85 geotagged photographs which were passed to the Environment Agency for their records. A couple of examples of these are to be seen on the national website gallery.



We would like to extend our best wishes and speedy recovery to two of our members, Anita Osborne and Terry Powley, both of whom have suffered recent illness.

Graham Broome is currently recruiting members for his Cambridgeshire Unit and would like to hear from past Members and potential new Members in that County. Whilst on the subject of recruiting Kevin Duffy, Coordinator for the East Anglian Region would similarly like to hear from any persons in the Lincolnshire Area where, we would like to form a Unit in the near future. Application details can be found on the Sky Watch website.

Kevin Duffy

Essex CAP

After the excitement in Clacton of the August Bank Holiday lion hunt it has been a quiet time for us in Essex for the remainder of 2012. While many areas suffered extreme flooding in what has been the second wettest year since records began in the UK we have been relatively lucky in Essex.

Like much of the Eastern Region there are many low lying areas within Essex dependent on sea and river defences – for example urban Canvey Island (population of roughly thirty seven and a half thousand people) is 10 feet below

mean high water level protected by a sea wall. Consequently, flooding is very high on the community risk register for Essex both from tidal surges along its coastline and from rain entering and overwhelming the capacity of the counties river systems.

During a dry spell in the periods of high rainfall we were able to mount a mission out of Earls Colne airfield using a Cessna F172H to photograph local areas where the Environment Agency had issued a Flood Warning (Flood Warning - Flooding is expected. Immediate action required) in Essex. In Essex CAP we are very fortunate in having access to a good quality well drained hard runway at Earls Colne; this enables us to operate when many other grass strips in the region are water logged and unusable.

Through our close co-ordination within the Eastern Region we were able, as result of the work of the Suffolk and Norfolk CAP, to badge with the Skywatch logo and geotag the photographs from the mission before sending them on. While we took the photographs primarily to give to the Environment Agency for their historical archive we also provided them to local voluntary and resilience groups. One of the Essex photos was used in a weather webcast by Simon Keeling (<http://www.weatherweb.net>) when discussing flooding. A representative from a charity supporting communities at risk of flooding was kind enough to say about the photos we provided “Many thanks for these, quite spectacular! “.

Going forward we clearly need to learn as much as we can from the mission to photograph flooded areas, and feed this learning through into the development of the voluntary services Essex CAP can provide for its home county.

Stephen Furner

Highland CAP

The first Scottish unit (Highland) was formed in 2007 with members based across the north of Scotland. Highland went on to sign agreements with Grampian Police and Northern Constabulary and in due course with the British Red Cross. Since that time, further agreements have been reached with Moray Council and Scottish Environment Protection Agency (SEPA); additionally Sky Watch units are now listed as an additional asset at the Aeronautical Rescue Co-ordination Centre (ARCC) at Kinloss Barracks.

In 2008 a second Scottish unit (Lowland) was formed with members based in Perth and Fife and they now have agreements with Tayside, Lothian & Borders Police and Fife Constabulary.

The first search operation flown by the Highland unit was in support of HM Coastguard and involved surveillance during the rescue of an Elgin solicitor trapped in a small loch. Other typical tasks have included photographing an oil slick north of Aberdeen and searching for a stolen boat taken from Cullen harbour.

Sky Watch humanitarian support for Police operations has increased in recent years resulting in Sky Watch regularly being used to search for missing persons when they are believed to be in open country. Sky Watch pilots use aerial photography and thermal imaging to enhance these searches. Additionally Sky Watch is also included in national flood plans and practises this task by supporting the British Red Cross at events such as the Kindrochit Quadrathlon on Loch Tay, where they provide surveillance of the rescue boats and direct them to swimmers in trouble if required. In the last two years, two competitors have been rescued as a result of this activity.

The aircraft used are all agile, single engine light aircraft, including small autogyros. The minimum crew is one pilot and one observer, however some aircraft carry a second observer if required. Typical cruise speeds are 100 knots with a range of 300 nm, although some aircraft have a range of 650+ nm. A typical surveillance operation will have one aircraft on task for up to two hours before being replaced.

A key issue, particularly in Scotland, is de-confliction with military low level activity. The ARCC are always briefed on Sky Watch flights to enable coordination between other search assets, in particular SAR helicopters. Many unit pilots are ex-RAF, with a sound understanding of military low flying activity, and the importance of effective lookout.. The unit pilots also use aircraft lighting and manoeuvring to increase conspicuity. Additionally Sky Watch pilots make every effort to make use of LARS provision and remain clear of restricted airspace. Finally, Sky Watch maintains dialogue with other airspace users including the military to aid mutual understanding.

More information is available through the Highland unit website, www.highlandcap.org.uk.

Peter Macintosh

South West Peninsula CAP

Membership & Equipment:

A further 2 members have joined SW Peninsula Civil Air Patrol in 2012. Numbers now stand at 17 pilots / observers, one support member and 9 aircraft. GPS equipped.

An informal trial has been carried out with a thermal imaging camera kindly loaned by Richard Wallis of ID Dynamics. IDD is an agent for FLIR a US firm manufacturing covert surveillance equipment.

(A full report on the FLIR camera will be found on Page 18. Editor).

Documentation & Liaison:

Unit SOPs have now been up dated.

Liaison with local Councils has been limited –due we suspect to the influence of D&C Constabulary. More liaison is required with Devon and Cornwall Police, if we are to be recognised by them. A personal letter addressed to the D&C Chief constable did not receive a reply or even an acknowledgement. Some progress has been made with the Dartmoor Farmers Association in respect of sheep survey in 2013. Contact has been made with Dartmoor National Park with an offer to patrol during potential gorse fire periods.

Fund Raising:

Now the unit has a good core membership I will be asking for someone to take on the role as fund raiser.

Training and Operational Activities:

In-house exercises and observer training has continued and is on-going, but poor weather again this year has kept flying hrs low.

One search for missing persons carried out, and offers to the coast guard on two other occasions offers not taken up. Others may have autogyros but SWCAP Peninsula CAP boasts an amphibian based in westernmost Cornwall and flown by an active member of the SWCAP unit!

Strategy for 2013

Continue liaison attempts with Devon and Cornwall Police, Dartmoor Rescue Groups and consolidate SW Peninsula CAP in the southwest.

John Doswell

Membership Matters

Congratulations and thanks to those stalwarts who have now been members of **Sky Watch Civil Air Patrol** for 10 years

Martin Dovey	Mem.No. 021
Colin Rule	Mem No. 026
Bob Welfare	Mem No. 029
John Parkins	Mem No. 037
Graham Whitehead	Mem No. 038 (our esteemed Journal Editor)
Tim Harvey	Mem No. 039
Lee Haunch	Mem No. 047

Apologies to anyone missed out from this list who joined in 2003 but records are a little vague

The fall in membership (185) in early 2012 was reversed as the year progressed despite the economic situation and the appalling flying weather. Expansion mainly at units in Cumbria, Peninsula and Durham helped to bring the membership to 205 and with the hoped for formation of a Gloucester unit this total should improve.

The end of our subscription year **31 March 2013**, is fast approaching. Those intent on continuing membership for 2013/2014- please forward cheques early if possible.

The use of the Standing Order (s/o) method of payment really does keep the admin load down –reducing the reminders and postage costs. I would ask all cash/chq paying members to consider paying by s/o. Forms available from Memsec. **Please note: members who choose to resign but omit to cancel their annual bank standing order(s/o) prior to 01 April will incur a £1.50 admin charge- if a refund is requested.** Sorry but postage and cheque costs are rising!

The period of grace for members to pay their subscription has been reduced – no further reminders will be sent out.

If you intend to resign- thanks for your previous support.

I would ask all members to update their flying hours/licence detail./addresses- the data base is only as good as the info you provide. This is particularly important in respect of e-mail and home address.

We are most grateful for those members who are not attached to units but continue to carry out "Observe and Report" during their routine flying.

Bryan J Harper

Membership Secretary

memsec@ukcivilairpatrol.co.uk

An Important Date for your Diary!

Sky Watch Civil Air Patrol - Annual General Meeting 2013

Saturday 31st August 2013

Aviator Hotel, Sywell Aerodrome

Commencing at 1500hrs.

Thermal Imaging - FLIR Camera Trial

BACKGROUND

Thermal imaging camera operation is based on *infrared thermography* principles; the science of using electronic optical devices to detect and measure heat radiation being emitted from an object establishing a "heat signature". Humans are able to detect infrared radiation through the nerve endings in the skin and some animals can find warm blooded prey in total darkness. Typically a desert snake whose heat sensors detect prey (like rats) in total darkness.

"Infrared" refers to the wavelength that is within the visible and microwave portions of the electromagnetic spectrum. As early as 1800 the German scientist Herschel discovered that by passing sunlight through a prism the temperature of the visible colours varied with higher temperatures at and beyond the dark red area. This (infrared or past red) area heat is recognised as electromagnetic radiation.

Herschel and others developed the principles and in 1880 an American scientist was able to detect body heat from a cow at over 1000ft /300m using a bolometer that measured the change in electrical resistance related to the change in temperature. Development continued at an increasing pace as thermal imaging technology expanded to meet a growing number of military

applications. It was in the 1960s that thermal imaging (TI) was first applied to non military purposes when industry used the then cumbersome equipment for the inspection of large electrical transmission and distribution systems-often prone to overloads generating heat. Further developments for the military resulted in the production of hand portable thermal imaging cameras for security and law enforcement applications.

THERMAL IMAGING- V- IMAGE INTENSIFICATION

Thermal Imaging (TI) cameras need no light and can see through light fog and smoke and are equally capable in darkness and daylight. As the TI camera relies on heat emission from an object, a person hiding in light foliage or camouflaged will in most situations be clearly visible as a thermal image –if in range of the equipment. Bright light will not detract from the ability of the TI camera to detect.

Image Intensification(I2) requires and greatly amplifies small amounts of visible and reflected light so that objects are presented as visual images at night. Starlight can produce an image although any form of overcast reduces effectiveness. Similarly bright light can overwhelm the system. An object, say a person standing in foliage or camouflaged is unlikely to be seen with I2 and can easily hide in shadow.

Where the I2 equipment may hold an advantage is in a long range situation where an object may be visible to the human eye but not project a sufficient thermal signature to allow detection by the TI camera.

FLIR THERMAL IMAGING CAMERA

Equipment. A FLIR BHS Series camera was kindly loaned by **ID Dynamics (Richard Wallis)**. The camera uses a bolometer sensor (see above) to view or produce high quality thermal images, either still (JPEG) or video(AVI), which are captured on an internal SD card for transfer to a PC. The weight at 998g and size (see illustration) make it easily useable in a light aircraft. **Note it will not operate through glass/Perspex but it is ideal in open cockpit, for example in an autogyro, or in an aeroplane where the POH permits the door to be removed.**

The BHS camera package includes rechargeable batteries giving an operating time of around five hours, USB and Video output cables and up to three different lenses, 35mm, 65mm and 100mm focal length. The camera is robust, useable in wet conditions and simple to operate. Additional features on the camera include focussing ring, display brightness, x2 and x4 magnification modes and a standby power setting to conserve battery life.

CAMERA TRIAL

Due to appalling weather from November 2012 to January 2013 it was impossible to fly the camera in the SW Peninsula CAP area, however the high tors of Dartmoor provided sufficient elevation differential to permit an assessment of equipment capability. The stated detection capability of the trial BHS camera with a 65mm lens is, for a man (1.8M) some 1650m, with a recognition distance of 440m -subject to environmental conditions.

Using compliant sheep, Dartmoor ponies and walkers/hikers as targets it was possible to detect objects at a minimum of 1500m and differentiate between subjects viewed at over 500m. Sheep and ponies are designed by nature to contain body heat in cold weather and this limits the thermal signature presented to the TI sensor. Their image at range is diffuse except for head and legs. Humans on the other hand, particularly walkers struggling over the rugged terrain produce a bright vertical image easily distinguishable from the four legged inhabitants of the moor. Interestingly it was possible to discern dogs supposedly with walkers but more interested in chasing sheep. Farmers note!

While this rather informal trial was limited by conditions and the inability to get airborne I believe that the FLIR series of TI cameras- widely used in the security and law enforcement industry- could be a useful addition to SWCAP unit aerial observation equipment. In particular it would be useful in detecting the start of fires in woodland, heath and moorland thus contributing toward countryside conservation. In open areas and where there is broken or light foliage or tree cover the equipment could identify humans (live) and differentiate them from free roaming animals. The development of a practiced search technique could possibly be useful on low level coastal patrols where cliffs and rocks could be easily scanned and reports made to MRCC or NCI lookouts. Unit members could no doubt develop other uses with practice.

Other FLIR Equipment

The **BHS** (binocular) model tested is the top of the range FLIR model however a less expensive monocular version the **HS-307** with similar detection and recognition potential using the 65mm lens would be suitable for civil air patrol unit use. It is slightly lighter and smaller than the BHS model.

The **HS- 307** comes in two versions: **Standard** and **Pro**. The Pro version allows image and video storage with a time recorder, the Standard version has no recording capability and is less expensive. The latter model can subsequently be upgraded if required..

A new addition to the FLIR range, the **LS-Series** comes in two versions: **The LS32 and LS64** Weighing less than 350grams this monocular model includes a laser pointer and digital zoom giving detection distance of over 1000m for the **LS64** with a 35mm lens or 640m for the **LS32** with 19mm lens . Ideal for the small cabins/cockpit of microlight aircraft.

HOW MUCH

As in all things you get what you pay for. This equipment is not cheap but the options available within the model range allow a fair amount of selection to fit purpose.

The Standard version of the **HS-307** fitted with a 65mm lens is **£5331 plus VAT**. The Pro model allowing image and video storage is **£5942 plus VAT**.

The FLIR LS64 including accessories (with 1000m detection range) is **£4023 plus VAT**.

The **FLIR BHS Series** whilst more than adequate for the SWCAP role is considered to be beyond the financial affordability of the charity.

SUMMARY

The role of Sky Watch Civil Air Patrol (SWCAP) is **Observe and Report**. Operating in daylight and in essentially VMC conditions the role can generally be achieved by visual means. The Mk 2 Eyeball (that's the trained version) is the primary tool but in some circumstances the assistance of available technology can enhance the probability of achieving a successful mission. Thermal imaging (TI) equipment has the potential to enhance the mission capability of the uk civil air patrol beyond the visual observe and report level. With training and practice TI could add a further dimension to the SWCAP role.

Whilst the initial cost of TI equipment may appear high the potential for improving SWCAP humanitarian support to the civil population is in my opinion worth careful consideration.

MORE INFORMATION

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Bryan J Harper

SWCAP Radio Officer

FLIR CAMERAS *(see article on page 18)*



LS Series



HS Series



BHS Series



Example of Thermal Imaging

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