AARGnews

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Cover photo:
The 2018 maize maze at Milton, Cambridge with the unicorn perhaps symbolic of particular UK problems at that time.

Photo © Rog Palmer: 20180710_064-4
Happy birthday
…to AARGnews, 60 today, which means I have edited the thing for 30 years and ‘suffered’ under 10 Chairmen. If anybody else wants their turn as editor, let me know.

AARGnews was preceded by a handful of cyclostyled notes that Vicky Fenner and Adrian Olivier produced but these were irregular so after some discussion with Chris Musson, then chairman, AARGnews 1 was completed, printed by the Department of Engineering, Cambridge, and was distributed to members in September 1990 at that year’s meeting in York. The first paragraph of the Editorial set out the aims which were:

‘… that AARGnews would be a cheaply produced newsletter on matters archaeological and aerial. I hoped it might contain shortish notes, not necessarily formal papers, on current research, problems, thoughts, views and reviews, and other frivolities – plus notice of forthcoming events. Printing would allow for drawings but not photographs, and thus hopefully direct contributors to consider archaeological problems rather than those more relevant to botany.’ (AARGnews 1, 3).

Early issues tended to keep to the newsy aspect but the content gradually became ‘heavier’ so perhaps there is a limit to the amount of ‘news’ that fewer than 100 members of a small group can generate or want to tell their mates about. By September 1995, Engineering were able to scan images and drop them into pages as required and the quality of our photographic content was much improved, as demonstrated by the editorial stereo pair (AARGnews 11, <3). Five years later they acquired an improved machine that could print direct from digital originals of text and illustration and AARGnews 20 (March 2000) was the first issue printed in that way. This was used up to the date when the committee decided to change to digital format (AARGnews 35, September 2007). This led to the indignant resignation of one member from Norfolk.

Newsy items are interesting and useful for us to be able to keep track of new developments in equipment, technology and in projects, but a point of concern was raised by Dave Cowley about the possibility of people pinching ideas if notes and news were published about them before a definitive publication emerged. This may be a valid point although I have always seen the purpose of publication as one where ideas (etc) are shared in the hope that someone may read them and kick them about, either to improve or disprove them. But perhaps things have changed in the modern competitive world that some people occupy?

Flying in Germany
Following publication of the second part of my conversation with Darja Grosman, I was sent an email by Roland Linck saying that there is still some targeted aerial photography being done in Bavaria by Klaus Leidorf who is still flying 100 hours per year for the State Department.

Smithsonian’s Open Access
Just as I was chatting with Steve Davis about the possibility of an AARG 2020 session on open access aerial images I was sent notice of 2.8 million images and 3D models that the

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Smithsonian have just given to the world, encouraging them to make whatever use they like. Which is just the thing we need to encourage our archaeological archives to do (some hope!). Just to make use of one, here’s an ‘aerial view’ of Paris, c1855. The metadata includes: ‘Media Usage Statement: This media file is in the public domain (free of copyright restrictions). You can copy, modify, and distribute this work without contacting the Smithsonian.’ You can find the other 2,799,999 pics at https://www.si.edu/openaccess

Declassified U2 photographs
At a workshop in Cambridge in February I met Jason Ur whose work in the Near East using Corona photographs I have long admired. We were chatting about problems of transforming Corona when he said, “If you think Corona is good, wait until you see the U2 images.” And a week later I received a link to a paper by Emily Hammer and him that explains how to locate declassified U2 images and gives some case studies (this issue, Books and papers of interest?). There were literally hundreds of U2 missions of which 11 covered his Near East area and provided about 46,000 frames – so there are plenty left at NARA for anyone with the time and tenacity to find.
Modern times
Most of the chatty editorial above was written, as I usually do, as things occurred in the six months between issues. In what some of us may think of as the ‘Normal Era’ before Covid-19 changed the way we live, work and interact. While self isolation has been fairly normal for me for at least 25 years I can appreciate that it is a shock to most people’s daily life—those who go out to work, meet friends for pints, and so on. It has had some effect on the annual life of AARG in that we had the foresight to convert our March committee meeting from in-person to virtual when it was becoming clear that ease of travel was changing. At that meeting we decided it would be foolish to try to organise the planned September 2020 meeting in Trondheim. Fuller explanations are left to the Chairman’s Piece that follows.

How, I wondered, may C-19 and the lockdown affect aerial work? Once the UK lockdown was announced it cut off external access to our analogue photo libraries which were closed for reasons of personal safety. Access to web- or cloud-held digital copies should be possible as is suggested by Helen Winton’s note in this issue. Perhaps this is the time when we finally kick off the burden of low-altitude oblique detail and learn to accept that satellite images are adequate for future recording. Judging by the quiet skies above my house, which is close to the flight path for Cambridge airport, there may be no flying this summer unless restrictions are lifted by June-July so perhaps alternative plans are in place for satellite capture if summer 2020 is dry. I expect all relevant and rich archaeology organisations got these actions firmed up after 2018 and it is just a matter of giving a date and an OK.

This issue
Includes notes on how some UK organisations have changed, or not, the way they work to adapt to the present lockdown situation which may affect us for some months to come. I make no excuse for concentrating on the UK in this because that is where the majority of national archive collections of archaeologically relevant images are held. Our continental colleagues tend to keep them in their offices, or nearby, and presumably have digital copies they can use at home, where they may now be working. After those comments is a longer piece written by Chris Cox that notes what she has done to adapt the running and earning capacity of Air Photo Services to lockdown. This is more or less in the layout as written as, for me, it includes emotions and determination. Although Chris and I started APS together (AARGnews 1, 9), it is now completely Chris’s business—I’m an idle OAP who is occasionally consulted and helps with some training. In contrast to those who have jobs and whose main inconvenience may be to find space to work at home, APS provides the income for Chris and her staff and is a business that she has built up during the past 30 years. We were looking forward to celebrating its 30th birthday in April 2020.

AARG now has a trio of trustees. Read all about them on page 8. There is a contribution resulting from a contact made by Bas Kreuger asking about images of New Guinea from which I commissioned a nice adventure story. Back to aerial discoveries with a spectacular group of Roman buildings that were first photographed in April 2019. Why at this date? Read the reasoning in a short piece by Roland Linck and others. I’ve included my review of a day workshop in Cambridge about ‘computational approaches’ that included some interesting and relevant papers. We also have some 1973 ‘tree marks’. There are also a few Covid-19 diversions to take your minds off any current problems. And a giant heap of brief notes on new papers. I wish people would stop writing for a while, but now they have some spare time there may be even more on the way.
Chairman’s Piece

Steve Davis¹

It seems at the moment like global events have overtaken us all, including the world of archaeology and of course aerial archaeology. Almost all field archaeology projects scheduled for the summer have been postponed for 2020, as have meetings and conferences, including our own autumn conference. Even the drones that have proved so valuable in the last few years are increasingly difficult in our current locked-down state: in Ireland we are limited to a radius of 2 km from home and in some areas (e.g. northern Italy) this is even less. For now we are just waiting until we can all get through to the other side and hopefully return to some degree of normality.

While it is unfortunate that we had to postpone our meeting in Trondheim, the committee felt that even at this stage we would be distributing a call for papers when it was unclear whether we would be able to meet. We intend to try again in September 2021 in the same venue, and we are grateful to Ole Risbol and the Museum in Trondheim for their patience. It may well be that in a post-COVID world conferences might never be quite the same again. Given the concerns many of us have about flying in an age of global climate change, the newfound confidence many of us (myself included) have in online technologies for teaching and collaboration may find a use in our near future. While this is not something we are currently considering the idea of entirely or partially online conferences is not so far away as it seemed at the turn of 2020. As we will be unable to meet in person this September we will have to organize our Annual General Meeting electronically: we will update you as we make arrangements in the coming months but we will provisionally timetable this for 10th September 2020.

While we are on lockdown there are still ways in which we can engage with aerial archaeology. Although some of us are still chained to our GIS there are a great many data sources available for the armchair archaeologist, including significant bodies of open lidar data, satellite data and aerial image archives. We welcome your suggestions of these and we are happy to share them through the AARG website and social media network. In recent years open lidar has become much more available, extending to whole national coverage in many places. These datasets are rarely captured with heritage in mind and while specific areas of data are used for a range of heritage applications there are clearly some geographic areas that have seen little or no concerted study. Combined with the excellent visualization packages, especially the Relief Visualization Toolbox and open source GIS there is plenty here to keep armchair aerial archaeologists busy for a long lockdown.

In Ireland we are only just beginning to move towards open data through the Open Topographic Data viewer (https://data.gov.ie/dataset/open-topographic-lidar-data) and in the North through the Department of Communities open data archive (https://www.opendatani.gov.uk/). In 2018 Martin Isenberg listed Finland, Holland, Denmark, Sweden, England, Estonia and Spain as having open data (see links below). While in some of these the dataset is far from complete (e.g. UK; Spain) they offer an enjoyable diversion for

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aerial archaeologists as well as an opportunity to learn: while this is certainly not an opportunity to jump on the ‘you should leave lockdown with at least one new skill’ bandwagon for anyone who has wanted to familiarize themselves with these methods this is as good a time as any to learn.

For now, all we can do is wait. We will get through this and we will meet again in Trondheim 2021. By then we should hopefully have a new committee in place: in the last few months we have appointed three new trustees – Darja Grossmann, Chris Cox and Włodzimierz Rączkowski, who will replace the outgoing trustee Dave Cowley (to whom we are most grateful). We hope that Darja, Chris and Wlodek will help guide AARG in the coming years and work with the committee for the benefit of the organization. As we have already suggested in our emails we are actively seeking applications for positions on the committee, in particular Chair, Treasurer and Secretary. Please do get in touch if you are interested in any of these roles.

Danish geodata portal: https://download.kortforsyningen.dk/
Estonia: https://geoportaal.maaamet.ee/eng/Spatial-Data/Elevation-data-p308.html
Germany (Thuringia): https://www.geoportal-th.de/de-de/
Italy (Trentino): https://siat.provincia.tn.it/stem/
Latvian data: https://download.kortforsyningen.dk/
Netherlands: https://www.ahn.nl/
Scotland: https://remotesensingdata.gov.scot/
Slovenia: http://gis.arso.gov.si/evode/profile.aspx?id=atlas_voda_Lidar@Arso
Spain: http://centrodedescargas.cnig.es/CentroDescargas/locale
Meet the Trustees

As a Registered Scottish Charity, AARG is required to have at least three Trustees. After many years of Dave Cowley doing it by himself he read the rules and three were appointed early in 2020. Many AARG members will already know them, but in case you don’t there follow a few words from each.

Chris Cox, Air Photo Services Ltd, England

In 2020 I was really quite humbled to accept the offer of a Trustee position at AARG. I vividly remember my first AARG meeting in Cambridge UK, with my tutor Derrick Riley from the University of Sheffield, in 1983. There I gave my first ever paper presentation which was followed by a rather testing question and answer session. After various archaeological jobs, Rog Palmer and I eventually went on to form our company, Air Photo Services, in 1990. I’ve been privileged to work as an aerial archaeologist and archaeological consultant ever since.

I live and work between Wiltshire UK and Normandy in France, where my personal commitment is to provide training and development within and for our specialism, and to keeping our UK work, research and development very firmly in touch with Europe and the wider world.

I’m looking forward to working with Darja and Wlodek, to help them steer AARG through challenge, change and development and need to learn how to best to perform my role as a Trustee and work closely with the Committee to assist their aims.

Darja Grosman, University of Ljubljana, Slovenia

This year, at the end of my professional road, I was suddenly offered a new challenge. To be an AARG trustee. It sounded very serious, intimidating, but also a chance to stay closely connected to the group.

I teach different courses in methodology at the Archaeological Dept., University of Ljubljana. An unusual choice of topic, most of the colleagues commented some decades ago. My involvement in archaeology and the direction I chose relate to a set of coincidences that occurred during the second year of my studies. At an excavation I was confronted with a new technique of using vertical stereo pairs for recording. To put the hole we were digging into a larger context, somebody brought vertical aerial photos, regarded as military secrets, meaning hush, hush. I suddenly realised I am familiar with this view at the landscape, because I already had at that time several flying hours under my wings. Archaeology from the air became incredibly photogenic though totally untouchable at that time. I knew at once what I wanted to pursue.

It took me more than a decade and some hard freelance years in an unfriendly system to get there, and yet it was all worth it. To this new assignment I hope I can bring some experience and enthusiasm that might come handy when it is needed.
Włodzimierz Rączkowski, Adam Mickiewicz University, Poznań, Poland

My name is Wlodek vel Włodek vel Włodzimierz (try to pronounce it correctly! 😊). My first contact with aerial archaeology people was in 1994 (Kleinmachnow) at the conference where I presented my paper with the thesis that… aerial photographs were not very useful for my studies. Since then I have changed my opinion and believe that remote sensing archaeology (including aerial archaeology) is and has a future.

I have been an AARG member since 1996 (?) and try to be active as much as I can. It was my privilege to be a member when AARG opened for continental Europe and initiatives of summer/ground schools became one of the vital activities. It was my pleasure to attend the schools in Siofok (Hungary), Leszno (Poland) (as co-organiser), Rosia/Siena (Italy)…… European projects like European Landscapes. Past, Present and Future (2004-2007) and ArchaeoLandscapes Europe (2010-2015) gave AARG platforms for spreading ideas across the whole of Europe (and beyond). It was not just about ‘taking photographs’ but a critical approach to using a variety of remote sensing data and thinking about its nature and impact on research. So, education and self-reflection on landscape studies using remote sensing methods were my main fields of activities within AARG and at Adam Mickiewicz University in Poznań.

By chance, I was elected AARG Chairman in 2008 and with the help of other members of the Committee I tried to continue widening topics of AARG interests. Will my experience be useful when playing the role of Trustee? I have my own visions based on past experience but time changed, context changed, challenges are different…. Working with Darja and Chris and of course AARG’s Committee I will try to do the best for AARG community.
AARG 2020

Our annual meeting was planned, with the local assistance of Ole Risbøl, to be in Trondheim this September but Covid-19 has forced us to postpone this for (at least?) a year. We are hoping to be able to confirm a date in September 2021.

We are, however, legally obliged to hold an AGM and this can be done virtually, probably using Zoom which we tested on our virtual committee meeting in February. We are proposing considerable changes to our constitution which will need to be voted on as well as the usual run of reports from the Chairman and committee members. An AGM requires a quorum of members so we hope that half a dozen or more of you will think it is worth sparing some of your time to attend when the date and time is confirmed.
AARG notices

AARG’s news and information in other formats

Twitter account: @AerialArchRG
Facebook page: https://www.facebook.com/aerialarchaeologyresearchgroup/
And we are working on an AARG members’ newsgroup list

The Derrick Riley Bursary

The Derrick Riley Bursary still exists. It is £500 a year, usually a single award, but sometimes is split and given to two people.

There is an application form at the link below on the Sheffield Archaeology Department website and a Riley Bursary page on the Sheffield website where potential applicants will be able to find information and download the application form.

https://www.sheffield.ac.uk/archaeology/derrick-riley-fund

Please apply for this even though it is not used only for conference attendance. AARG has limited funding and access to the Riley Bursary extends this amount to something more useful. No whinging about lack of money if you don’t apply.

ISAP Fund

ISAP have a fund to provide support of up to £1000 to assist with members’ projects [membership costs less per year than AARG does] that ‘further the objectives of the Society’.

Guidelines and application form from the ISAP web site:

http://www.archprospection.org/isap-fund

Information for AARGnews contributors

AARGnews is published at six-monthly intervals. Copy for AARGnews 61 (October 2020) needs to be with me no later than September 30, 2020. Editorial policy (for want of a better word) tends to be that if I am sent interesting contributions they go in unless there’s a danger of an issue overflowing. Instructions for contributors are no longer on the AARG website, but this issue may serve as a guide or more information can be sent on request.

Please do not use any ‘clever’ formatting and avoid footnotes.
Good-quality jpegs are suitable for illustrations. Tiffs are for archives.
Address for contributions: rog.palmer@ntlworld.com
Search for a B-25H-5 of the 418 Night Fighter Squadron
USAAF 5th Air Force in New Guinea (West Papua)

Bas Kreuger¹

The past
Early in the morning of 27 July 1944, four B-25H bombers of the 418 Night Fighter Squadron (NFS) took off from the Allied airfield at Wakde for an anti-shipping mission around the Vogelkop Peninsula of (then) Netherlands New Guinea. The B-25H with the s/n 43-4422 was flown by 1st Lt. Ira M. “Herky” Barnett, navigator F/O Thomas R Wright, radio operator Sgt. Peter P Whipland and tailgunner Sgt. Harold A Tantaquidgeon. Flying over Mac Cluer Gulf, some 300 kilometres from his base, Barnett spotted a Japanese barge and the four B-25’s formed an attack pattern, with Barnett being the last of the four.

They all swooped in very low over the water. The first three B-25’s missed the barge. Barnett did hit it with a 100 lbs demolition bomb, Tantaquidgeon reporting from his tail position that “kindling was flying all over the place”.

B-25 aanval op Japanse schuiten (in Dutch) is a similar attack on Japanese barges in 1943 by another US squadron. So, not from this story but very similar in what it must have been in July 1944.

¹ Leiden, The Netherlands, bas@kreugerinkultuur.nl  https://www.airwarnewguinea.com/
Two of the B-25’s were hit by Japanese AAA fire from the barge. One B-25 had to make a crash landing at Wakde, having just made the airfield. The B-25 of Barnett was hit in the right engine and rudders and couldn’t make it back to base or to Biak, the nearest Allied base. Because of Japanese shipping in the area and the nearness of the Japanese airbase at Babo, he decided to crash land at an open area he had spotted inland on the Vogelkop, some 60 kilometres from the coast. He succeeded in putting his plane in the sago swamp in one piece, unfortunately hitting a tree in the last metres of his landing. This swung the plane to the left and broke the fuselage just behind the wing. Pete Whipland and Harold Tantaquidgeon, sitting in the rear of the plane, were thrown from the plane. Harold with minor injuries, but Pete with a serious gash in his right leg. Their wingman, Lt Sorbo, flying the fourth B-25 of the 418th, had followed Barnett and noted his position.

Upon return of Lt Sorbo to Wakde, 5th Air Force decided on a rescue mission. As the B-25 had landed too far from a major river to be able to land a Catalina flying boat, they had to put together a team to get them out overland. Because of the location in Dutch New Guinea and with likely friendly Papua’s in the area, command of the team was given to the Dutch 2Lt Louis Rapmund with a group of Royal Netherlands East Indies Army soldiers as interpreters and security force. Also four Australian jungle survival specialists under a Captain William Gillespie were flown in and a 5th AF survival specialist, Staff Sgt Donald C. Brickner. Rapmund wanted to have some more firepower as he suspected sizable Japanese forces in the area, got a detachment of eight men from the 41 Infantry Division (The Jungeleers) under command of M/Sgt Victor J Krause to accompany the rescue.
This US, Dutch, Australian, Indonesian team then was flown in by Catalina’s of the 2 Emergency Rescue Squadron (2ERS) to the mouth of the Kais river where Rapmund arranged canoes and rowers from the local Papua village. The team set out for the upper reaches of the Kais where they knew the B-25 had landed. Arriving in kampong Baroe (“new village” in Malay), Rapmund heard rumours that substantial numbers of Japanese troops were coming from the north, ironically troops from barges that had been sunk by US bombers earlier and had swum to shore. Maybe even soldiers from the barge Barnett had sunk. Rapmund decided to split the team and himself to stay in kampong Baroe with half the team (the infantry men) while sending the other half onwards to the wreck. The men in Baroe ambushed numerous Japanese soldiers arriving in the village and killed most of them. Four of the captured Japanese were send to Biak by Catalina. En route to Biak, they tried to overwhelm their guards on board the Catalina, but were thwarted and one them was shot and thrown overboard from the blister of the Catalina. Only three arrived in Biak.

Meanwhile the rescue party that had to go into the swamp to find the crew, now commanded by Captain William Gillespie (Australian Army) and including US 5th AF Staff Sgt Donald Brickner, proceeded up the river and after some four days reached a small village from where they moved inland through marshes and swamps to reach the crew. The crew had been provided with supplies almost daily and also walkie talkies so they could speak to both their squadron mates flying over them and the rescue team. They were also fortunate in having Native American Harold Tantaquidgeon (“The Chief”) with them who had so much bush craft that they never feared to starve. He had improvised cooking utensils from sheet metal from their plane, kapok from a life jacket and high octane fuel from the tanks. Under guidance from Tantaquidgeon, the crew hunted for frogs and cooked some meals of frog legs during their stay.

B-25 crew plus rescue team names is the whole crew plus rescuers in kampong Baroe on 18 August 1944 just before they left for Biak after the rescue. Paulus, age 15, was a rower in one of the canoes.
After reaching the men, it took them again four days to canoe back to Baroe where they were met by their CO, Major Smith of the 418th. After singing the National Anthems of the various countries and eating a big festive meal, the crew was flown to Hollandia by Catalina on 18 August 1944. The rescue team wrapped up matters with the local people and then canoed back to the mouth of the river to be picked up by a Catalina.

The present
In late 2017 I learned of this story because I had been researching the story of Louis Rapmund, who had a very interesting wartime career in itself. As a friend of mine is living in New Guinea (now West Papua in Indonesia) and we had been on an expedition to search for aircraft wrecks earlier in our lives, we decided to see if we could find the wreck of this B-25 and uncover its remarkable story of survival.

The research went (and is going) through two tracks: a historical one to search for the children and grand children, archives and historians. The other track is to see if we can find aerial pictures of the wreck and its location. We know a lot of those pictures must have been shot as the rescue team had its own photographer added to the team. This sergeant Charlie Denzel Crow of the 25th Photographic Reconnaissance Squadron, stayed in Biak but flew with the Catalina’s and B-25’s on supply missions and fire support missions and took pictures of the surrounding area to help the rescue team find the wreck and its crew.

2ERS (2nd Emergency Rescue Squadron) searching for downed crew using Catalina flying boats. They did a lot of search and rescue work in the South West Pacific. Their blisters (gun turrets) gave them excellent photo opportunities.
As there was no GPS obviously, pictures of the nearest river and landmarks (difficult in that sea of green jungle and swamp) had to give some reference to the team on the ground. In all their reports and the letters written by the team members, we read lines on “showing pictures”, “using pictures”, “looking at the pictures we brought along”, so they must have played an important role in the rescue operation. Unfortunately, we have been able to find only one of the crash site, a picture that came from the collection of the navigator Tom Wright. His children only had one of those pictures. It shows the wreck of the B-25 in the swamp and gives a good impression of the area in general, but is not taken far away enough to show a reference point on the river bank to help us find the wreck.

Another line of research is finding suitable aerials taken of New Guinea after WW2 and satellite pictures of a more recent date. In the Bronbeek Museum in Arnhem, there is a huge collection of aerials taken by both the Allies during the war and by the Dutch from 1945 – 1962 (the date of the hand over to Indonesia). This collection has some 30,000 pictures. Only one flight was made in the area where the B-25H had come down, in January 1945, some six months after the crash landing. There is an oblique which shows the area, but from such height and distance it is impossible to discern an aircraft wreck.

Lufo, 27 January 1945 (luchtfoto is Dutch for aerial photo) of the area in which the B-25 landed. It must be in the picture just a little bit top left of the middle. Unfortunately the resolution is too poor to see it.
The SpyMeSat app (by OrbitLogic) on the iPad has satellite pictures of the area taken in early January 2019 at 30 cm resolution. These are in true colour and again it is impossible to find an aircraft wreck in them, although we know it should be there somewhere.

SpyMeSat image (30 cm resolution) dated ‘1 January 2019’.

Radar images could help us find it as these will have a metal aircraft stand out in the surrounding swamps. These are for sale but will cost $2,800 which is far above our budget.

So, the search continues, both for the relatives of the rescue team (we have found relatives of all crew members) who also might have pictures or documents in the collections of their fathers, grand fathers or uncles, and in the archives of the USAF, RAAF, Australian Army etc where reports and pictures of the rescue might still be available.
In January 2019 with a small team, we went to West Papua and searched for the B-25 wreck in the swamp. Because of the extremely difficult situation on the ground, in the swamp, we haven’t been able to find it. On our way down river, we did however meet the last surviving Papua who had been a member of the rowers in 1944. He, Paulus, had been 15 in 1944 and a rower in the canoes. He was not able to tell us anything about the rescue.

In 2021 we plan to go back a second time, this time with a helicopter and a magnetometer slung under that machine and hopefully, pictures from 1944 showing the location or good satellite images with the aircraft in them.

Any suggestions to help us with this project will be more than welcome.

Further details and more pictures can be seen at our website:

https://www.airwarnewguinea.com/
Beech bark disease and ancient fields in Marden Forest, West Sussex, UK

Précis by Rog Palmer

Towards the end of 2019, Dave Cowley sent me a page from a forty-year old issue of *Nature* that he had been given after a lecture and thought it may be of interest to members. It would be – but reuse of articles from *Nature* is now handled by Springer whose automatic permission for reuse of this one page was £1142.58. After asking nicely, they reduced their fee to £306.05 so I’m going to summarise the main points below. Copies of the original article can be bought and downloaded or you could ask Dave or I for a copy.

The paper by Lonsdale, Pratt and Aldsworth, ‘Beech bark disease and archaeological crop marks’, was written about bark disease (first two authors) and the archaeological features are background information which may have some relation to the disease. The site is on chalk geology and vertical aerial photographs were taken in 1973 when trees in the area were 25 years old. Photo examination by staff at the Forest Research Station detected spatial patterns of bark disease, possibly caused by insect and/or fungus, which was visible as foliar chlorosis (yellowing of the leaves). However, the same symptom can also be caused by nutritional deficiency which, in thin calcareous soils, could result in beeches having an inadequate iron supply. The aerial photograph showed blobs of disease that tended to form linear bands, which is where the archaeological information may be relevant.

The text seems to suggest that the chlorosis on the aerial photographs led to the archaeological field investigation which identified and mapped a series of scarps, up to 1.4m high, that remain from a prehistoric or RB field system. Figure 1 is based on that map. Other than those flanking the modern track, occurrences of bands of diseased trees were immediately downslope of the field scarps on land which, from past ploughing, would have shallow soil that could be conducive to nutritional chlorosis. One conclusion of the foresters was that plant pathologists may gain useful knowledge by knowing where past soil modifications may affect their trees.

Google Earth and Bing images of the area are not as informative as the 1973 image used in the original article, but traces of chlorosis can be seen and are indicated in Figure 2. ALS tiles of 1m resolution DSM were downloaded from the Defra web site (2020), loaded into QGIS and given a basic hillshade visualisation. The result was archaeologically informative and showed that the scarps mapped on the ground in the 1970s were part of an extensive field system, presumably further identified during research for the *Secrets of the High Woods* project (Southdowns 2020). The Forestry people knew what they were doing with vertical APs and published their image extract and the accompanying map with south to the top. Something I am pleased to continue in the illustrations for this précis.

References (web links accessed January 2020)

Defra 2020. Data services platform. [https://environment.data.gov.uk/](https://environment.data.gov.uk/)

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Figure 1. Sketched indications of field-mapped scarps (green) and areas of chlorosis (yellow) as identified on a 1973 aerial photograph. Based on Lonsdale, et al. 1979, fig 2 and hillshade model below from which contours at 5m vi were derived.

Figure 2. Similar area from Google Earth 2001 with possible chlorosis areas outlined.

Rotated ALS tile SU8113, Im DSM with original hillshade at 135°, azimuth 35° to show an area of ancient fields. The rectangle shows the approximate area of Figure 1.
The benefit of continuous aerial archaeology flights over decades in Bavaria

Dr. Roland Linck¹, Stefan Kluthe and Klaus Leidorf

The Bavarian State Department for Monuments and Sites (BLfD) has been executing continuous aerial archaeological surveys over the whole of Bavaria since 1980. Hence, in the last 40 years, more than 35,000 archaeological sites were documented in over 800,000 images. The BLfD therefore owns one of the largest archives for aerial archaeology worldwide. Nevertheless, previously unknown sites have been detected as recently as 2019. One outstanding example of a Roman villa rustica shall be presented here.

The Noerdlinger Ries, the impact location of the famous meteorite, is among the best-studied archaeological regions in Bavaria, as several thousands of monuments are mapped there. This area is among the most fertile soils in Bavaria and has been inhabited continuously since Palaeolithic times. Hence, the BLfD notes there monuments of the complete Bavarian history. However, in April 2019, Klaus Leidorf, the current aerial archaeologist in Bavaria, was able to document a large group of Roman stone buildings in the subsurface in an area near the small village of Wörnitzostheim (Lkr. Donau-Ries), where before only prehistoric settlement activity was known (Fig. 1). The reason that negative crop marks occurred so early in spring

![Fig. 1: Oblique aerial photograph of the discovery of the Roman villa rustica near Wörnitzostheim acquired from a Cessna airplane. Bavarian State Department of Monuments and Sites – Aerial Archaeology Archive, Inventory date: 25/04/2019, Photographer: Klaus Leidorf, Archive-Nr. 7128/219-2 Image 55R59316.](image-url)

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is that in Bavaria the previous months, especially in 2018, had been much drier than average and even during the winter the precipitation was not enough to fill the lack of the previous year (Fig. 2). Whereas the Bavarian farmers worried for their harvest, it was big luck for aerial archaeologists, as the grain already suffered from a lack of water in April, drought stress occurred and the plants developed clear traces of the buried Roman walls. As this discovery was outstanding, some months later in June and July Stefan Kluthe documented the villa rustica another time with his multicopter drone. He utilized a self-constructed multicopter based on a Mikrokopter flight control with a Sony Alpha 6000 camera (24 MP resolution) to acquire high-resolution oblique views of the archaeological remains. Unfortunately the drought stress was less obvious at this time due to the huge amount of rain in May, but the archaeological remains are still quite clearly visible. The June series of photos comprises over 230 single images of different altitudes and viewing angles. Hence, this data set offers the great possibility to generate a photogrammetric and georeferenced orthophoto for mapping the archaeological remains in a GIS environment (Fig. 3).
The aerial views in Fig. 1 & 3 clearly show the remains of a typical Roman villa rustica, i.e. an ancient farm site mostly run by veterans of the Roman armies in the hinterland of the Limes boundary. Besides the bigger main building, a minimum of 10 further subsidiary farm buildings and parts of a surrounding wall can be identified. It is really luck that nearly the whole site is located under a single modern agricultural field. Therefore, a comprehensive map can be drawn. The main building has a size of 33 x 26 m and is oriented towards the south with two typical risalite of 7 x 6 m flanking the entrance portico. The south-western risalite and two adjacent rooms still have preserved floors that indicate for hypocaust heating in these parts of the building. The further interior division of this building can only be identified by some traces of inner walls. In the surrounding courtyard, four smaller, single-room stone buildings are visible. They have a size of 4 x 5 m, 8 x 6 m, 7 x 6 m and 10 x 5 m. Two larger subsidiary farm buildings were erected in the north-eastern corner of the villa area. They measure 11 x 17 m and 12 x 20 m and apparently were located along the surrounding stonewall, of which parts adjacent to these buildings are visible. Another part of this wall is preserved west of the main building. The southern part of the Roman villa consisted of three further farm buildings of 13 x 15 m and 12 x 22 m size for two of them. The last one measures 13 x min. 17 m, as the southern end of this structure is situated outside of the field and cannot be mapped from aerial photographs. The whole Roman villa covered a settled area of more than 150 x 110 m. Another quite prominent building in the centre of the courtyard is
a small bath of 11 x 8 m, which is divided into several rooms. Again three of them show remains of preserved Roman floors and hypocaust installations. In total, a comprehensive overview of the layout of this Roman farmstead has been gained.

Once more, the new discovery of a Roman villa rustica even in an intensively studied area shows the importance of continuous flying in aerial archaeology. Otherwise this new monument would have remained undetected due to the extensive rain some weeks later in May and possibly it would have disappeared for ever.

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Computational approaches to archaeological site detection and monitoring: a brief review of a workshop held in Cambridge, 29 February 2020

Rog Palmer

Cameron Petrie, a lecturer at Cambridge with research projects in South Asia, has had at least three PhD and post-doc students working with him who have made use of automatic detection for some aspects of their work (noted in recent past papers of interest) and it was he/they who organised this one-day workshop. Two problems were noted in the introduction by Hector Orengo, one of Cameron’s co-workers. The first was that there were problems detecting sites with what he called ‘no shape’ and his gestures indicated that to mean ‘of no simple geometric shape’ – ie the majority of levelled archaeological sites. Secondly, detection work often was isolated and not integrated with a general project.

The following is based on my understanding and notes from the meeting, both of which may be far from the speakers’ intent but which still may give an idea of current work towards automated detection.

Geert Verhoeven started the invited talks and suggested that there was a current fashion for using machine learning methods, or some methods, much as we have seen in the recent past with use of GIS, ALS, UAV in every project regardless of its usefulness.

Athos Agapiou told us there were 31 active EO sensors with 44 more on the way and he noted those with good resolutions and sensor wavelengths. Some work had been done fusing output from different sensors – eg Landsat 8 and Sentinel 2, and mixing optical and radar – although I don’t think we were presented with any results or comments about their usefulness. (See also this issue: Books and papers of interest?)

Bjoern Menze and Jason Ur discussed their work in the Near East, noting that questions come before method. Their site types are mounds or scatters visible by colour and/or texture and they were looking for patterns that persist in time. Thus an indication of archaeological sites are those parts of fused temporal images that do not change. After training they had results that were 80% correct [sorry, I didn’t note what method/algorithm was used]. In this landscape, such auto-detection is significantly faster and less subjective than visual searching.

Rachel Opitz, has been working with Dave Cowley, to create learning sets for searching ALS. However, archaeological ‘sites’ are based on human visual recognition and classes are not always clearly defined. If these are passed to the machine it’s going to have problems! Useful theoretical background, however I got lost about 2/3 of the way through. [In a pers. comm. after the meeting, Iris Kramer, who has been the AI brain behind the project, told me that it is far from straightforward using mapped sites (vectors) to train a machine that will be searching image data for pixel differences.]

Karsten Lambers presented a PhD project by four of his Leiden students who are using R-CNN (which defines regions within an image) to detect barrows, charcoal kilns and celtic fields. Field checking is done in collaboration with a citizen science group and shows a way

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of using and teaching willing volunteers. The project also amalgamates text-based site detection from grey literature.

Dave Cowley spoke about HES’s Arran survey which has been presented at AARG and published in more than one place (eg, AARGnews 55, 19-25; 57, 40). The new news was that Rachel Opitz and he will be supervising a PhD which looks at the integration of AI into archaeological landscape interpretation. [https://www.gla.ac.uk/schools/humanities/latestnews/headline_712059_en.html](https://www.gla.ac.uk/schools/humanities/latestnews/headline_712059_en.html)

Louise Rayne has been using the random forest algorithm and Google Earth Engine to identify changes in vegetation, urban extent and damage as part of the ENEMA project.

Arnau Garcia-Molsosa skimmed through parts of a major project in South Asia (see recent Books and papers of interest?) that has used a multitude of sources – MS Landsat, Sentinel 2, SAR, old one-inch maps from which machine learning has identified ‘sites’. For example, in the Indus Valley (I think that’s where this example was) there were a previous 302 sites known, now there are 2421. They have also been using UAV to study artefact scatters (I think that’s also been noted in a recent Books and papers of interest?).

Also part of the South Asia research project was the work of Francesc C Conesa in the Cholistan desert where he used Sentinel 1 SAR and Sentinel 2 MS sources and trained the computer to distinguish anthropogenic mounds from natural from irrigated fields. Location was one of the factors that helped distinguish these and could chuck out non-archaeological features because they were in the wrong place.

Philippe De Smedt gave the only geophysical lecture I have ever heard through which I maintained an interest from start to finish. He did not say ‘anomaly’ once but was talking about the archaeological features that had been detected. His work involved taking in-situ measurements of soil characteristics which make a robust guide to interpretation. He noted that he used the roundness of pits as a guide to whether they were archaeological or natural – something that is also done by many of us when interpreting aerial photos. He called for large area geophysics to be integrated with major projects rather than used as stand-alone surveys.

Philip Verhagen gave the last paper about predictive modelling. An initial phase could show where to survey after which came ‘how’ – which method to use. I think he went on to suggest that headlands were too irregular for auto-detection on ALS.

The meeting, including all breaks, was in the McDonald Institute for Archaeological Research where it was concluded by an hour or so of wine and nibbles which gave everyone a chance to go around and ask questions or continue discussions from the meeting. I suggested to the AARG committee that this is something we should consider at future September meetings.

Did any of the day convince me that we were getting useful results from auto-detection? While a huge amount of research is using machine methods I still have to be shown that it can help with anything beyond simple shapes. And we’ve been doing much the same thing, maybe with different algorithms, for at least 10 years now, 20 if you go back to Sam Redfern’s work in the late 1990s. Show me that it works on those sites with ‘no shape’ and I’ll begin to believe.
Working round the Covid-19 lockdown

Collated by Rog Palmer

The following are notes from the main UK heritage organisations in response to me asking if they were managing to continue working without access to archive photographs. In general, adaptation to the new regime seems good and rapid. From the rest of the world, only Martin Gojda answered my request for information although I have snippets from others in electronic communications, usually from teachers complaining of problems associated with virtual classes and their inability to clip offenders round the ear – or the PC version of that.

From Dave Cowley (Historic Environment Scotland):

Things have been a little busier as our offices closed, and we have moved as much of our work as possible to home offices. This is now settling down in a little bit more of a routine. We are trying to maintain connections to all systems for as many staff as possible, with access to our database, digital photographs (which includes scans of all the analogue images) and ALS allowing the basics of work to continue. All field work and flying has ceased in line with Government guidance. The UK Civil Aviation Authority’s general aviation policy, probably similar to that in other countries, is at: https://www.gov.uk/government/publications/coronavirus-covid-19-recreational-general-aviation/coronavirus-covid-19-recreational-general-aviation

Also in line with Government advice all our offices and search room, as well as Properties in Care, have closed (https://www.historicenvironment.scot/about-us/news/coronavirus-covid-19-update/). Access to our online Canmore database (https://canmore.org.uk/) remains unaffected, and that includes low resolution versions of all our born-digital imagery (since 2005) and scanned analogue imagery (including all our oblique aerial imagery back to 1975). Our Archive/Public Services are continuing to process orders and enquiries where possible, acknowledging that there may be delays in accessing material. Both the National Collection of Aerial Photography (NCAP – mainly the ‘verticals’ and the world-wide collection; https://ncap.org.uk/contact-us) and the rest of our Collections are no longer processing new orders for not-yet-digitised imagery. However, existing digital imagery from NCAP and on Canmore will continue to be accessible for order (https://canmore.org.uk/content/buying-images).

From Helen Winton (Historic England):

Due to the Covid-19 outbreak and in line with government advice the Historic England Archive is closed to all - staff and external enquirers. Those working on aerial investigation and mapping (AIM) projects (formerly called National Mapping Programme (NMP)) are mainly relying on the now extensive digital sources available for our survey work. This includes those working on Historic England grant-aided projects and staff. However, this is only possible in the short-medium term as the hard-copy aerial photographs supplied by the Historic England Archive remain the core source for our mapping projects.

All flying activities are on hold until the Government advice changes on social distancing measures. In the meantime archive preparation of recent images continues. We are also working on making our digital aerial photographs available via an online map. So far we have an internal version that is being tested.

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We have been able to take IT equipment home with us so have the software to transform and map. Historic England staff are concentrating on digital-only tasks such as reconnaissance recording or data cleaning to prepare all NMP/AIM data so that it can provided online as a single national map. We are also report writing and carrying out research on recent discoveries and just completed AIM projects in support of planning, listing and management cases. Our grant-aided projects are in a similar situation and some may need to take a pause but our Heritage Protection Commissions Programme are open for business as usual.

We have set up various WhatsApp groups (we have one for our floor of the office) that are having virtual tea-breaks (ours is on Thursday afternoon) and to generally stay in touch. All those working on HE funded aerial projects are part of a Knowledge Hub - an online area for sharing documents, photos, questions and technical issues so we are used to keeping in touch digitally.

I don’t mind working at home but I miss the team and seeing people in the office....and going to the pub! ......but I realise that this is important and that we are fortunate that we can mostly continue to work.

**From Toby Driver (Royal Commission on the Ancient and Historical Monuments of Wales):**

CHERISH and Royal Commission aerial survey had been patchy during the winter and spring 2019-2020 anyway due to an intense period of stormy weather in the west with few flyable days, coupled with some temporary operational issues in the spring at Haverfordwest Airport (our only operator of Cessnas in Wales).

The Royal Commission offices closed on 20th March with an end to all non-essential travel and fieldwork in line with Government advice. Across the CHERISH Project ([http://www.cherishproject.eu/en/](http://www.cherishproject.eu/en/)), the four partners in Wales and Ireland have also seen their offices closed and fieldwork cease. This means budgets set aside for flying and fieldwork will be moved back into the autumn or next year. Haverfordwest Airport closed at about the same time with only medical evacuation charter flights unaffected.

Although the shutdown has occurred just as we approach prime fieldwork season for accessing offshore islands, spring excavations and aerial survey - all of which are now cancelled - in some ways the enforced homeworking is allowing the entire CHERISH Team at the Royal Commission to focus on long overdue tasks such as completion of fieldwork reports, completion of Best Practice guidance documents and papers, and first-level cataloguing of ground and aerial photographs to their site NPRNs.

To this end folders and files can now be shared over the network by SharePoint and OneDrive to homeworkers, while online GIS resources like the Historic Wales Portal ([https://historicwales.gov.uk/](https://historicwales.gov.uk/)), combining the heritage data of all Welsh agencies together with access to online PDF reports and aerial photographs, allows desk-based work to continue reasonably seamlessly. The CHERISH Team in both nations can now hold regular meetings via Zoom (image attached) rather than face to face. The only thing one is missing at home is access to the processing power of the big Alienware computer in the office for Agisoft Metashape and other programmes like the full Adobe suite, but we will hopefully have access to these in time.

Let’s see what the rest of 2020 holds...
From Martin Gojda (Prague, Pilsen and Warsaw) on 8 April 2020

Frankly, I cannot complain about current limitations caused by the pandemic. There are no obligations connected with my life in the “normality”, i.e. travelling between my offices in Prague, in Pilsen and Warsaw (although I have to be in an on-line contact with my students in Pilsen and Warsaw twice a week or so, the time saved in the current regime is huge). Having been tied to my home since three weeks ago I have, at last, relatively a lot of free time to sit and write. During this period I managed to produce most of the text to a book (well, God knows whether the publisher, for obvious economic reasons, will be able to publish the volume before the end of this year); and a chapter for a collective book on 16\textsuperscript{th}–19\textsuperscript{th} cents. field fortifications (to be published in English by an eastern Bohemian university Press, which seems to be safely produced – unlike the previous private publisher). Normally, such a job would take me much longer time, maybe till mid-summer or later. In addition, beautiful early spring weather in Prague allows me to use (almost daily) my bike and go around local parks – well, with the mask over my mouth. Almost as living in the Garden of Eden. In any case, a perfect rehearsal of my retirement (which, believe me or not, I find quite pleasant).

Elsewhere, the US NARA collection is also closed although there are a few other US sources of historical images, sometimes by state (as noted in a long-past issue of \textit{AARGnews}), and the larger digital and online resources, such as already-scanned Corona film strips and modern high resolution satellite sources, both archival and with the potential to take and distribute new images. Modern high-resolution satellite images can be viewed on screen at low resolution and, for those of you with flying money now to spend, can be bought at high resolution on the basis of date and absence of cloud cover (for example, those taken over the UK between 17 June and 17 July 2018). The Maxar website (\url{https://www.maxar.com/}) allows this [and thanks to Chris Cox for asking me the question that led me to this].
Air Photo Services in the Time of Covid-19

I’d always said that the greatest risk to our work, our business continuity and our training programme at Air Photo Services would be complete closure of the UK Historic England and other Air Photo Archives. Unthinkable and unlikely??

On 17th March 2020, this email from Lindsay could have been the end of APS as we know it. Except it isn’t actually that disastrous, in the big scheme of things.........

Dear Chris,
In light of the revised government advice yesterday evening and reduced staffing levels, I’m afraid we are now closing our Public Search Room and Library and suspending all our services until further notice.
We’ll be reviewing the situation regularly and we will update our web page.
Best wishes,

Lindsay
Lindsay Jones
Archive Services Manager
The Historic England Archive, The Engine House, Fire Fly Avenue, Swindon, SN2 2EH

The whole world is in this. We are not alone!
Nurses, doctors, carers and other essential workers are risking their lives daily to help others. I’ve been in close virtual contact with family, colleagues and friends locked down in Rome, Yerevan, Kuala Lumpur, Marbella, Gothenburg, Vimoutiers, Kentucky and of course Cambridge where the daughter of a dear friend is working as a front line NHS doctor on ICU.
I never thought I’d live through pandemic ‘plague’, experience fatal disease at first hand and isolate myself, my family and APS so totally, calmly and unconditionally.
With no access to the archive which sustains most of our fee-earning work this could have destroyed the business we have built so carefully over the past decades.
In my former world, pandemics look like this.....

Or more horrifically this, where the Riley family buried their own dead whilst self-isolating at Eyam in 1665
And yet the supposed ‘end of the world as we know it’ does not, from my self-isolated desk at home this sunny quiet morning, seem at all that awful from a work perspective. It’s tough, but not impossible.

It’s our 30th birthday this month too. Rog and I started APS in 1990 as a self-employed partnership, on the back of the liberation we felt at the inception of Planning Policy Guidance Note 16. A wonderful moment when proper commercial archaeology was born in the UK. Competitive tendering had never felt so good. Our aim was to ensure we could both work solely as aerial archaeologists (or ‘air photo archaeologists’ as Rog prefers to call us), for ourselves, and develop aerial archaeology as a recognised and powerful non-intrusive investigation and assessment technique. Back then we probably didn’t use those words, but that was quite a long time ago.

**We’ve come a long way since 1990**
A very long way indeed...
So I sat down, had a 5 minute think, and bashed out our ‘APS in Lockdown Covid-19 statement’, which can be found at http://www.airphotoservices.co.uk/coronavirus_statement.htm

I did this quietly, while everyone else moved mountains of computers, miles of ethernet cables, enough screens to do a credible impression of NASA mission control, a secret stash of hand sanitiser, an aptly named cleaning substance called Dettox, the white box of tricks known as our NAS drive, the stereoscopes, my picture of Derrick Riley, our plants and of course themselves, out of the office to the safety of our own homes.

Whilst wearing hideous plastic gloves we used in the HE archive the week before.

But we still do the same things, just differently, and on the INTERNET.
And we are still here

Probably because, some years ago, we diversified and grew APS, quite considerably.

And in early 2020 had just opened Air Photo Services EU too, as a new micro enterprise in Normandy, France.

AND - we don’t just do this anymore......
We do this....

And this....

And a lot of this.....
And I do Legal Expert Witness work using date-authenticated aerial photos – sent to me by searching agencies online, and sometimes date-stamped Lidar data for topographic issues. True, not all archives are open, but the online sources can be surprisingly comprehensive. They are also expensive, but willingly bought by my clients as essential evidence for their cases.

I have three cases just now and am relieved to have received the material I need this week from Rachel at Air Images Ltd so I can write my reports. I’m all set to discuss with my legal team and opposing expert via Zoom in May and appear in court personally as and when we can do so.

And fee-earning NVQ assessment
I’ve also got two CfA NVQ candidates to assess, including our own GIS manager, Adam Jarvis. NVQ assessment work is enjoyable, and I’ve set it up to be all online a long time ago, including meeting my candidates via Skype, then Zoom, and watching them doing practical work if necessary. This is a huge help to me at a time like this and am very grateful to be able to assess candidates in GIS, API and Lidar visualisation and interpretation skills.

So – just what CAN we still do??

Lots actually...

‘Overview’ archaeological assessment from aerial photographs using
- All the timelines at Google Earth – including many from the very dry summer of 2018
- Images displayed at Bing.com, the National Library of Scotland, Soilscapes etc
- Images that have been digitised by NCAP — available to register and browse online at ncap.org.uk
- Private providers and archives
- And other sources dependent on the location, timescale and budget — you might get lucky at Bluesky International or getmapping.com.

Can anyone else add to this list? It’s by no means complete or exhaustive.

**Consult HERs**
Most are open and working from home to provide database searches, and in some cases NMP data for baseline assessment which can all be transferred electronically.

Some, such as Norfolk, offer online portals to open-source historic mapping.

Use of heritage gateway is easy, but often not up to date and is not accepted for planning purposes.

**Download process and use Lidar data**
From the Environment Agency — free and online.

**Yes we can...**

*Offer* our ‘overview aerial imagery and Lidar assessment’ routinely to our clients, which can be done now, with full quotation for use of the HE Archive at a later stage.

**Assess NVQ Candidates**

**Undertake Legal Expert Witness work** from available photographs bought by clients and supplied via the internet.

I can print for stereo viewing as have brought all my equipment home (amazingly remembering inks and papers), where it dominates our front room which has been turned into an APS office by day and a film sound studio for my son, Richard, by night. We’re working double shifts here.

I’ve had a lot of positive responses and am currently tendering for a large project, hopefully for immediate start with an overview assessment programme between April and June 2020. Wow. Marketing was not meant to be quite this immediate and am very thankful indeed.

This tender is to a client for whom we have just delivered a remote sensing project around a major UK airport, and a similar long cable route project in Humberside. If we are appointed, and this waits to be seen, I’ll be able to bring my team back from Furlough where they await, on 100% salary with 80% assistance from the Government Jobs Retention Scheme.

The Overview work is specifically designed to be achievable from the safety of our homes using the high spec laptops we prepared and took home. We bought two in February as an
insurance which was a wise move in the face of a looming pandemic and close communication with friends in Rome. We even had time to test them and the important link to our cloud-based server. What I didn’t reckon with is the daytime wobbliness of the internet as global home working strains MS Teams and information portals to their limits. The overview projects also bring the ‘stage 2’ full assessment component, so the idea is to have full-spec work to return to as and when the main archives reopen.

However... there’s a major downside

The downside for our work just now is that we have had of course to curtail our recruitment for a new analyst and halt our training programme indefinitely.

Business protection and full concentration on our own home-working fee-earning projects means that we cannot continue the training to which we are committed, and that in 1993 I promised Derrick Riley I would do as APS grew and progressed.

We’ve also had to cancel our work experience programme. Rog has kindly offered to provide some work online for a local 6th form student who was due to be at Inquiry with me and then assisting Rebecca Bennett and I to deliver a public Lidar course from our training room at APS with me in May, which we have also postponed.

Business protection!

As a Company Director, I’m working closely with our HR advisor and Accountant. The pandemic has led directly to the cancellation of some large legal projects for me when AP supply was not guaranteed and personal appearance at Inquiry was still necessary. As a ‘vulnerable person’ due to asthma (and selective short patience!) I am isolating completely with the full support of my adult children. Life and health are more important than work. Other projects have been put on hold by clients unable to service the need to physically consult archives and keep teams together. I have also worked extremely hard to finish and invoice ongoing projects, as cashflow is incredibly uncertain at these times. Payment of our salaries is crucial, and was and is seriously threatened.

APS, alongside many other businesses, is re-calculating cashflow, gratefully implementing the Jobs Retention Scheme which carries HR negotiation and documentation responsibilities, and has applied for and been accepted to receive a business grant as we are in receipt of business rates relief. I have also gone through all our accounts and reduced or cancelled anything that’s not necessary – there’s not a lot of that though – to get through an indefinite time of severely restricted work opportunities. Our accountant has also ensured that our bookkeeping and accounts right up to date and we will benefit from VAT and CT deferral until next year, when ongoing and unaccustomed debt will be a stinging reality for us and many other companies. The prospect of recession is also very real and we really hope this is not compounded by ongoing government aspirations to leave the EU, where in my opinion we firmly belong.
And in the end....

It is always telling how very swiftly things can fall away to nothing almost overnight.

I have some very different experience of this, as in 2011 I had to unexpectedly take a whole year out of work due to a medical issue. I sort of know what to do, and am thankfully experienced in negotiation, accounting for business and dealing with banks, HR and financial issues. However, nothing makes this time easy, and for me it has been really hard work. For others, there is nothing to do but wait, whilst our essential workers, medical staff and carers risk their lives daily at work.

On a personal note, I have found this time, whilst deeply unnerving, to be quite calm, ordered and productive. It would have all been so much different without Government support, a private clean house of our own to stay in during isolation and the support of our team. I have friends who are doctors, nurses and pharmacists. One who is a carer has moved into the dementia care home with his colleagues where he normally works days, in order to shield their clients from bringing the illness which means certain death to the frail and medically compromised. I’ve also noted, and so much appreciate, the kindness of neighbours, colleagues, friends and clients. In addition to a huge evidence bundle and a pile of stereo pairs, one client for whom I am assessing an accessway which is essential to their garden centre business continuity, posted me a package of seed potatoes for our garden veg patch.

And to finish on a clean and hopefully sanitary note, Mike Glyde, who was one of the first students to whom we taught API at the University of Sheffield many moons, ago posted me this amazing ‘Who Gives a Crap’ designer bogroll in return for a package of baking yeast. I intend to keep it as a memento to the generosity of other aerial archaeologists and some light relief from the reality of living and working through a terrifying pandemic.

Chris Cox, tired Director, Air Photo Services Ltd, 4th April 2020 and counting
Covid-19 diversions

In these troubled times (as they say) we offer a few diversions from endlessly peering at Google Earth or looking through your old maps and aerial photographs. Publishers have offered more open access books than usual, some university course teaching has become open access and I hope that our major archives are kicking themselves for not making digital copies of historical aerial photographs. Below is a sample of open access stuff (at the end of March 2020) that may include some interesting diversions, not all of which are archaeological.

**University of British Columbia**

https://digitalarchaeologyweb.wordpress.com/2020/03/18/teaching-history-and-archaeology-online-the-response-to-a-global-pandemic/?fbclid=IwAR1yfWUaggmA-9J-Xe6TNv6KMfWhArh5zjCQq92EVED0-6HDV7NathecM

**Project Gutenberg** – not new, but has some interesting old books (eg *Just William*)

http://www.gutenberg.org/wiki/Main_Page

**Class Central university courses** – may include some useful computer courses

https://www.classcentral.com/report/new-courses-october-2018/?fbclid=IwAR4WfUbVHzf1QL02ybxLXfDfXSONObwCe4W4WhMoe4-wKdizeOYMDE8s8

**JSTOR resources** – open access papers and books

https://about.jstor.org/covid19/?utm_source=jstor&utm_medium=display&utm_campaign=dsp_jstor_home_right_covid19_03_2020&fbclid=IwAR3zmzOYVZn9MLskMc5c-9w5ZfSvF1jr1FU23LBkHhuM8Wh-AzEwo3k

**Colouring books** from museum collections for you and your children

http://www.openculture.com/2019/02/download-free-coloring-books-from-113-museums.html?fbclid=IwAR2WfUbVHzf1QL02ybxLXfDfXSONObwCe4W4WhMoe4-wKdizeOYMDE8s8

**NASA collection**

http://www.openculture.com/2019/02/download-free-coloring-books-from-113-museums.html?fbclid=IwAR2WfUbVHzf1QL02ybxLXfDfXSONObwCe4W4WhMoe4-wKdizeOYMDE8s8

**Cambridge Core** – they are a bit mean

https://www.cambridge.org/core/what-we-publish/textbooks?fbclid=IwAR26_aomKu1H_vtnrVNUN_MD_7iK0Ie6PBTrxRgA2ojxuTf0D9WtZ2a4bY

**Council for British Archaeology** – quite a long list, Brittocentric

http://blog.archaeologyuk.org/2020/03/24/archaeology-resources-hub/?fbclid=IwAR1PEFxsZhVXFhDvBFrU8M86oxgDNdWzCsnDwYDyTwsCsmO5YDmE1w2TzaE

**The Ancient World Online** – focused on the Near East, but a mixture of everything else too.

http://ancientworldonline.blogspot.com/2015/12/alphabetical-list-of-open-access.html

And, as usual, *Antiquity* and *BAR* (Archaeopress) include some open access stuff.

*Please let us know if you find others of interest.*
Cropmarks

Harvested by Rog Palmer

(web links were accessed on various dates between November 2019 and mid-April 2020)

Operation Sandstone

A Cold War survey of Britain’s beaches in case of a Russian invasion. Archive collection includes aerial and ground photos plus maps. Aerial photos held in National Archives.  
https://blog.nationalarchives.gov.uk/operation-sandstone-surveying-britains-cold-war-beaches/?unapproved=62262&m=62262

Ireland, maps, heritage and writing on the ground

This first link is a geoportal to Ireland that includes a range of old and new maps and orthophotos from 1995 onwards that allow viewing at scales up to 1:2500. Archaeological content includes date from the National Monuments Service and other sources. Second, Eire signs shows maps and aerial images (old, new, vertical, satellite, drone) of a series of EIRE signs that were marked on the ground during WW2. Searching the site takes you to historic APs and a USAF map that marked the Eire signs and includes (somewhere) a list of neutral airfields suitable for landing a four-engine bomber (in emergencies only, of course). Fantastic site where you can while away many hours, if not days.  
http://heritagemaps.ie/  
http://eiremarkings.org/  
(thanks to Pat Reid)

ESI high resolution images

Maxar has increased the availability of 30 cm products. 30 cm HD is available for View-Ready (OR2A) and Map-Ready (ortho) Products. Data sheet from the link below.  

Use of satellites

Not for archaeology but for pipeline monitoring. If they can do it we ought to be able to make more use of satellite sources than we do. Maybe the C-19 era will give people time to check this out (as I’ve said for the past 20+ years).  
https://www.youtube.com/watch?v=HkZ3dMkP_s&t=1s  
(thanks to Chris Cox)

Phase One 280MP Aerial Solution

Reads their website headline introducing their new 4-band (RGB+NIR) distortion-corrected aerial camera. The basic camera has dual 90mm lenses that offer 10cm resolution from an altitude of 7853 feet where each frame covers about 2km wide by 1km high. Not bad. For an additional fee, users can add a 50mm lens and 3-band colour IR capture. Their brochure doesn’t make it clear whether the necessary controller, GNSS/IMU receiver, gyro-stabilised mount and flight planning and management software are to be bought separately or are part of the kit components. But if you’ve got a spare $455,000 you probably won’t care. Further info, brochure and downloadable image samples from the website below.  
https://industrial.phaseone.com/Aerial_System_280MP_System.aspx

1 rog.palmer@ntlworld.com
ALS can confuse you (or me)
An over-excited journalistic article showing that ALS can illustrate a big earthwork. The conflicting ‘up and down’ illustrations in the article show the need for either a sun point or a caption note describing the light direction.
https://lidarmag.com/2020/02/05/lidar-sheds-light-on-architecture-of-18th-century-british-fort/?fbclid=IwAR0UabGBg0Y1crASuREeqGSAFhXdXsXx-QncALSiDweDRKJJN77vLZKKHo

(thanks(?) to the AARG facebook page)

SpyMeSat
Orbit Logic’s SpyMeSat app for mobile devices allows on-demand access to satellite imagery archives, and the ability to request new tasking. The free resolution is c30m but perhaps adequate to see if you are in the right field?

There are also some user comments: ‘Most of the free layer is apple maps which I think we can get to online. The opportunity to purchase imagery from specific dates and resolutions etc. is useful though, it’s definitely easier to navigate than other sites I’ve seen, although its how it transfers between the phone app and a proper PC for interpretation and mapping that could prove interesting.’

(thanks to Bas Kreuger for the original link, Charlotte Willis and Adam Jarvis for user info)

AI review
Thoughts from various computer gurus that AI may not be all some hope it is, or perhaps it will take a while to get where we would like it to get. Maybe my complaints about our use of it to find circles or circles or circles were right?
https://www.bbc.co.uk/news/technology-51064369

Arty aerial photos
Photos by bloke with a lot of money to spend on helicopter flights to make some interesting viewpoints and impressions. A must for box lovers everywhere.
https://www.bernhardlang.de/

Machine learning
Those of you with an interest in machine learning/AI/etc may be inspired by this result which has apparently found more geoglyphs in the Nasca desert, Peru. Maybe archaeology needs more collaboration with the big software companies? I can’t find the reference to the ‘scientific paper’ on this which is noted as Sakai et al. 2019.
Books and papers of interest?

Rog Palmer

*There is so much relevant or vaguely-relevant stuff being churned out now that the following are usually little more than titles, links, and bits of the published abstracts.*


I imagine this bloke has just finished, or is about to complete, his PhD as he has been churning stuff out lately and there are more of his papers somewhere below. He believes in machine intelligence to solve out problems and in this paper he argues that: ‘... the progression of automated computational approaches is limited by distinct geographic imbalances in where these techniques are developed and applied. Here, I investigate the degree of this disparity and some potential reasons for this imbalance. ... one solution is to increase collaborations between research institutions in addition to data sharing efforts.’


*From the abstract:* In contrast to currently popular trends in archaeological remote sensing that seek to employ either automated, machine learning-based approaches, or alternatively, crowd-sourced approaches to assist in the identification of ancient sites and features, this paper argues for systematic, intensive, and expert led “brute force” methods. Results from a project that has sought to map all sites and related features across a large study in the northern Fertile Crescent illustrate how an expert-led analysis may be the best means of generating nuanced, contextual understandings of complex archaeological landscapes.


Additions to a group of kites in South Africa identified from ALS data and further illustrated by drone surveys. The paper is more about kites, their date and use of micro topography than the means by which they were first identified as the authors extend these forms of site and their use away from the Near East.

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A move to re-direct interest away from tombs to the prehistoric nomadic settlements in the Siberian landscape. The project mixes use of satellite images, surface collection, topographical survey (including use of UAV) and geophysics to characterise sites and their context. This is a brief report of their 2018 ‘scoping exercise’.


The author, from Cyprus University of Technology, has applied a range of image analyses to seek archaeological information from fusing Landsat and Sentinel 2 images and claims the results help identify archaeological features on a site that has been extensively excavated. The illustrations make me wonder if they would have been found if they were not known…

*From the abstract:* The use of medium resolution, open access, and freely distributed satellite images, such as those of Landsat, is still understudied in the domain of archaeological research, mainly due to restrictions of spatial resolution. This investigation aims to showcase how the synergistic use of Landsat and Sentinel optical sensors can efficiently support archaeological research through object-based image analysis (OBIA), a relatively new scientific trend. Initially, the fusion of a 30 m spatial resolution Landsat 8 OLI/TIRS Level-2 and a 10 m spatial resolution Sentinel 2 Level-1C optical images, over the archaeological site of “Nea Paphos” in Cyprus, are evaluated in order to improve the spatial resolution of the Landsat image. Various known fusion models are implemented and evaluated, namely Gram–Schmidt, Brovey, principal component analysis (PCA), and hue-saturation-value (HSV) algorithms. In addition, all four 10 m available spectral bands of the Sentinel 2 sensor, namely the blue, green, red, and near-infrared bands… were assessed for each of the different fusion models. On the basis of these findings… the study focused on the image segmentation process, through the evaluation of different scale factors. The segmentation process is an important step moving from pixel-based to object-based image analysis. The overall results show that the Gram–Schmidt fusion method based on the near-infrared band of the Sentinel 2 (Band 8) at a range of scale factor segmentation to 70 are the optimum parameters for the detection of standing visible monuments, monitoring excavated areas, and detecting buried archaeological remains, without any significant spectral distortion of the original Landsat image. The new 10 m fused Landsat 8 image provides further spatial details of the archaeological site and depicts, through the segmentation process, important details within the landscape under examination.


This includes examples of what geophysical people do with aerial information – chuck everything at it, make some 3D models, write 3 paragraphs in ‘methods’ and barely mention it again. It’s not quite that bad because there is a bit of discussion about their experiments with aerial thermography and I noticed that analysis of geophysics results switches between
‘anomalies’ and ‘archaeological features’, so perhaps geophysicists are beginning to understand what they are finding.


Full of technology, graphs and equations and more about the ability of the sensors to detect buried features on different, and not always suitable, dates than about the archaeological interpretation of the resulting images.

From the abstract: Two archaeological sites in the East Midlands U.K. that differ in age and topography were selected for survey using multisensor imaging from a fixed-wing UAV. The aim of this study was to determine optimum methodology for the use of UAVs in examining archaeological sites that have no obvious surface features and examine issues of ground control target design, thermal effects, image processing and advanced filtration. The information derived from the range of sensors used in this study enabled interpretation of buried archaeology at both sites. For any archaeological survey using UAVs, the acquisition of visible colour (RGB), multispectral, and thermal imagery as a minimum are advised, as no single technique is sufficient to attempt to reveal the maximum amount of potential information.


An example of ‘bash it with everything and we may find the answer’.

From the conclusion: The combined use of orthophotos, satellite multispectral imaging, SfM-derived digital elevation models and systematic ground surveys helped us to cross-validate the doubtful anomalies using data from independent sensors and reduced the number of false positives due to the presence of artefact related to data collection.


Detailed notes about declassified photographs from the U2 programme between 1956 and 1965, its cameras and films. The missions produced stereo near-vertical and oblique cover of an approximate 15km swathe with a best ground object resolution between 30 and 50cm at nadir. Great stuff, but... the declassification did not include easily-accessible flight plans and the text describes ways in which people seeking U2 images in areas away from the Near East (the authors’ area of interest) may be able to recreate flight tracks and find images during a visit to NARA. Examples are given from 11 missions over parts of the Near East. Finding and copying U2 images is laborious and the paper notes the processes devised by the authors. They have generously provided links to their own online resources to help users find Near East cover – but there remains the rest of Soviet Union and many ‘elsewheres’ over which hundreds of mission were flown which will need to be painstakingly sought by future
researchers. The paper closes with three case studies: kites in Eastern Jordan, water management in Northern Iraq and 20th century marsh communities in Southern Iraq. Web map links are given to two of those which show the incredible amount of detail and ancient remains that can be identified on those U2 photographs. My one (anticipated) complaint is that images are displayed to provide height inversion.


This is the editorial to the second special issue of papers concerning means and methods of finding stuff from above plus some results (the first noted in AARGnews 59, 41). Facts and figures are given concerning the success of the first volume and an overview of papers that will be collated into the second.


Little more than a demonstration that UAV can be used to photograph known sites which may then be viewed through a variety of visualisations. The authors’ discussion and conclusion includes the comment that UAV survey is faster than making a measured ground survey. Yes, but it doesn’t mention its ability to answer some of the questions regarding superimposition and relative chronology that may only be identified and solved on the ground. (Dave Cowley did a field test that, I think, included such comparisons and may have been published in Opitz, R.S, and Cowley, D. C. (eds), 2013. Interpreting Archaeological Topography: 3D data, visualisation and observation. Oxbow, Oxford.)

From the abstract: ...results of UAV surveys conducted at four diverse archaeological earthwork sites situated in interfluvial southwestern Amazonia, in the state of Acre. [and] ...visualizing the resulting digital elevation models, specifically the Red Relief Image Map.


A new use for those famous balloon photographs of an excavation in the 1930s.


Of possible interest to droners for the information given about survey methods and resolution achieved and perhaps also demonstrating that you don’t need thousands of photos to get a good result.
This book results from the Iron Age Danube Project that spans Austria, Croatia, Hungary and Slovenia that follows from the European Cultural Heritage Strategy for the 21st Century. This strategy ‘introduces two sets of principles – the first aims at putting people and democratic values at the centre of each action, and the second proposes an integrated approach with the holistic vertical-horizontal intervention logic aiming at achieving synergic effects from the policy measures in different sectors and administrative levels that are expected to contribute to the well-being of Europeans and to the protection of the environment.’ (p13). So now you know… The bulk of the book, Part II, begins with a useful section on practical considerations and legal framework for various kinds of work in the countries involved includes lists of websites and contacts for obtaining permits. This is followed by summaries of a few pages each of the range of methods used for archaeological research. In a way, this is a more detailed version of the relevant part of Renfrew and Bahn with specific reference to the countries involved in the project. Remote sensing methods, both active and passive (ie collecting new data or using archival stuff), form part of this section.

The concluding two-page summary and outlook notes that the book should help researchers make the right choices to undertake their work, and stresses that: ‘We must keep in mind, however, that only the right combination of methods can result in high-quality data. Moreover, high-quality data is essential for us since we need and must use the best possible results from research, for the continuing protection and promotion of archaeological landscapes and our cultural heritage in its broadest sense.’ (163).


From the abstract: A review of 47 peer-reviewed and grey literature publications covering the Middle East and North Africa (MENA) region examined: (i) the type of satellite data used; (ii) properties of looting features utilized as proxies for damage assessment; (iii) image processing workflows and (iv) rationale for validation. The aim was to highlight: (i) the complementarity of HR multispectral data and VHR SAR with VHR optical imagery, (ii) usefulness of spectral profiles in the visible and near-infrared bands, and (iii) applicability of methods for multi-temporal change detection.

Commonalities between the different image processing methods were examined, alongside a critical discussion about automation in looting assessment, current lack of common practices in image processing, achievements in managing uncertainty in looting feature interpretation, and current needs for more dissemination and user uptake. Directions toward sharing and harmonization of methodologies are outlined, and some proposals are made with regard to aspects that the
community working with satellite images should consider, in order to define best practices of satellite-based looting assessment.


A real paper book among the deluge of digital papers… This heavyweight and beautifully-produced volume has 400+ pages written in French with 400+ pictures – which means that my comments are based largely on the pics. After the expected introductory parts – history, geology, methodology – the book is presented in a series of chronological chapters of which those illustrating Celtic and Roman remains are largest. There is a degree of ‘artistic’ layout – ie lots of white space – but as the pics have been zoomed or cropped to their archaeological content (no control points) this works well and it means that a novice should have no difficulties identifying each site. Post-Roman sites, range from moats and mottes in varying states of preservation to old villages, towns and their religious structures and on to later stately homes and their estates. The last chronological chapter shows post-1939 structures and landscapes and echoes what is now familiar in many landscapes throughout Europe with new roads, quarries, expanding urbs, schools and factories, some ugly but many having their own grace and elegance. A final short few paragraphs seems to be asking if we – aerial work – has reached a crossroad, perhaps a theoretical one in which we need to overcome the tensions between modernity and enlightenment. This may relate to a theme that is sometimes discussed at AARG comparing the use of new technology as technology or the use of new technology to help solve archaeological problems.

Perhaps not surprisingly, the French seems to have written their own image transformation program, *Aerophoto,* which may be the source for several of the maps and plans in the books. Others are derived from excavation plans. One advantage of a book covering 30 years research is that it gives occasions to include comparative photos of crop-marked sites in cultivated land and the same site under excavation. Some of those examples also have illustrated sections and reconstruction drawings which are informative additions.

Regardless of the fact that this book provides an overdose of aerial photographs it is good to see that something has been going on in France, not only going on but pursuing what must be a fairly systematic and recurrent survey of one particular 34,000 sq km area. We know that there is interest in other parts of France and it would be a useful project to try and open AARG to these efforts.


From a quick whiz through this, they seem able to use AI to find wiggly roads and patches of vegetations, so maybe there is hope for non-circular archaeological features to be detected?

*From the abstract:* This study presents the results of the first remote sensing survey of hollow ways in Southern Mesopotamia between Baghdad and the Persian Gulf, primarily using the imagery in Google Earth. Contextual and morphological evidence of the hollow ways indicate that they are likely the archaeological manifestation of ethnographically attested “water channels” formed through the dense reeds of marshlands in southern Iraq, not formed by traction overland like other known hollow ways.


*From the abstract:* The absence [on aerial photographs] of longhouses from the Bronze Age is presently explained as a consequence of age and dimensions. ... it is suggested that the method of classification used to interpret longhouses on aerial photographs is of crucial significance with respect to the virtual absence of Bronze Age examples. The typological problems associated with visual classification are outlined, after which the possible latent presence of Bronze Age longhouses in the aerial photograph database is investigated. The problems are addressed via a series of principal component analyses (PCAs), employed as a classification tool. The PCA classification of the longhouses is based exclusively on the arrangement of the internal roof-bearing posts. The analysis uses data from 203 excavated longhouses, which are compared with 120 longhouses recorded on aerial photographs. The analysis identified 14 longhouses that could potentially be from the Late Bronze Age, both with respect to internal roof-bearing construction and visual appearance on aerial photographs.


Examines whether ALS from drones represents and improvement in terms of detection success and whether it can also increase the quality [accuracy] of documented archaeological features. Comparative material came from two conventional ALS surveys and tabulated results show differences. Dense vegetation affects drone and ‘conventional’ ALS survey although the higher number points/m² attainable from drone can be an advantage. There is also some useful discussion comparing drone with ‘conventional’ ALS survey that includes cost, area surveyable, etc.

From the summary: The first stage of a research program we have launched three years ago in order to understand better the topography of the Roman Brigetio is closing to an end. ... In the present paper, we wanted to highlight how archive data can provide valuable source of information even in a disadvantageous situation. The final outcome of our research is going to be a complete catalogue and evaluation of all topographical items, following the methodology of the well-known research of Carnuntum and Novae.


From the abstract: The main purpose of this paper is to present a cost-effective approach providing reliable and accurate 3D documentation of the deserted medieval settlement of Hound Tor, a complex site consisting of preserved stone building walls and field system remains. The proposed procedure integrates ALS data with structure from motion (SfM) photogrammetry into a single data source (point cloud). Taking advantage of the benefits of both techniques (reclassified ALS data documents the hinterland, while SfM records the residential area in high detail), an enhanced 3D model has been created surpassing the available ALS data and reflecting the actual state of preserved features. The final outputs will help with the management of the site, its presentation to the general public, and also to enrich understanding of it. As both data sources are currently easily accessible and the proposed procedure has only limited budget requirements, it can be easily adopted and applied extensively (e.g., for virtual preservation of threatened complex sites and areas).


Use of historical photographs/images and other remotely sensed data to examine the impact of rising sea levels on archaeological sites in the Pacific Ocean.

From the abstract: ... review [of] recent efforts to document archaeological sites across the islands of Polynesia using geospatial technology, specifically remote sensing, high-resolution documentation, and the creation of archaeological site geodatabases. I discuss these geospatial technologies in terms of planning for likely future impacts from sea level rise; a problem that will be felt across the region, and based on current evidence, will affect more than 12% of all known sites in New Zealand (Aotearoa).

Jean A. Doumit, 2018. From Drones to Geospatial Data. Scientific edition polygraph Center Kuban State University. No ISBN. https://www.academia.edu/keypass/eTR0MjJkV05aY1E4bUtNcnHBhbkRCOGw5d3ZmEjMVUdU1abkdBcld1bDdla29tLWVVbi0weGw0d1B
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43EJV/resource/work/38339864/From_drones_to_geospatial_analysis?email_work_card=vieW-paper

A general survey of drone types, software, photogrammetry, image processing and geospatial analysis in 100 pages. Not specifically about archaeology and out of date.

There’s a chronology to this paper, as Academia told me about in 2020, publication date is 2017 but the photographs it uses appear to have been taken in 2004, or earlier. As such, the paper gives us a snapshot of how things were, especially in the light of the deluge of subsequent technical papers from the first author. What we are not told is when the images were analysed – so this may be an example of early use of Photoscan (now called Something Else) to create relief models and orthophotos, and analysis of LRM (Local Relief Models) to demonstrate that crop height can help visualisation of archaeological evidence.


A second paper from what I think was a meeting organised by an Italian aerial group that publishes occasionally and glossily. This was listed by Academia in 2020.

*From the abstract:* Selective achievements of an aerial archaeological perspective are reviewed, highlighting the huge impact of this approach on known site distributions and landscape understanding. These advances pose several challenges to traditional aerial survey, questioning the continuing effectiveness of observer-directed reconnaissance in the face of changing climate and land use, and considering the representivity of the information it produces. Looking forward to an approach fit for the 21st century a shift in emphasis towards area-coverage imagery and a serious engagement with a computational approach to feature detection is advocated.


It is easy to get cross with 18 pages that play all sorts of trendy enhancements with an image in order to find what looks like a recent field boundary that could be seen clearly on the original. Some people ought not to be allowed anywhere near aerial information.


One of the interesting things to emerge since use of UAVs became commonplace is the variety of archaeological remains that are now being visualised in places other than Britain and mainland Europe.
Based on the abstract: Amerindian settlements in the Caribbean have mostly been identified through scatters of artefacts although settlement patterns may be identifiable topographically. In northern Hispaniola, recent foot surveys have identified more than 200 pre-colonial sites of which several have been mapped in high resolution. A photogrammetric approach using UAS can provide fast and reliable data collection and precise results on a local scale. Results provide an overview of site size, and distribution of mounds and flattened areas that define likely zones of habitat and the actual dimensions and density of living space. Understanding the relation of the mounds and adjacent flat areas within their environment allows a discussion on how, and for what purpose, the settlement was founded at a particular location, and provides clues about its spatial organization.


As notified by Academia, this links to what seems to be a draft text with illustrations. The paper includes details of cameras, photographic and cartographic techniques that may interest historians of aerial photography.

From the abstract: The aerial photographs taken by the Istituto Geografico Militare [Italy] of Ethiopia between 1935 and 1941 have recently been discovered, scanned and organised. These APs consist of 8281 assemblages on approx. 50 cm x 20 cm hardboard tiles, each holding a label, one nadir-pointing photograph flanked by two low-oblique photographs and one high oblique photograph. The four APs were exposed simultaneously and were taken across the flight line. The high-oblique photograph is presented alternatively at left and at right. There is approx. 60% overlap between subsequent sets of APs. One of Santoni’s glass plate multi-cameras was used, with focal length of 178 mm and with a flight height of 4000-4500 m a.s.l., which resulted in an approximate scale of 1:11,500 for the central photograph. As of 1936, the APs were used to prepare topographic maps at 1:100,000 and 1:50,000 scales. To re-process the imagery using novel techniques, procedures using digital image-based modelling have been developed.


Old, but it provides a demonstration that used Photoscan (or whatever it is now called) to produce an ortho-mosaic covering 25 sq km from 9 vertical and 18 low oblique APs. Control came from Google Earth discussion includes the pros and cons of that as well as the problems of using old and buckled prints. It all depends on the accuracy we will accept.


Old, but listed by Academia in mid-December 2019. This thesis includes a history of aerial work in USA as well as Bitely’s use of Photoscan on historic aerial images and her
identification of archaeological (and other) sites. I wasn’t able to download a pdf version but the whole thesis can be viewed through the web address above.


Notes describing work done from light aircraft or balloons in 1972 including use of a three-camera rig in UK that was flown at Chaco Canyon and with John Hampton at the time he was running his multi-spectral experiment (Hampton, J.N., 1974. An experiment in multispectral air photography for archaeological research. *Photogrammetric Record* 8(43), 37-64). Also work done at using balloons in Lebanon, Hasanlu (Syria) and various sites in Greece. https://www.penn.museum/sites/expedition/balloons-flying-mattresses-and-photography/


Of possible interest to historians of aerial cameras and photography, this brief and copiously-illustrated note runs though mainly WW1 equipment, methods and problems. This is the first of a two-part publication and part 2 appears only to be available for those who pay to view through the Springer rip-off site. The author wrote several other papers about aerial photography c.1920.

**Special section – use of AI to find (mostly) round things**


Application of AI on Corona photographs.

*From the abstract:* Since 2012 ... a breakthrough has been made in the field of image recognition through deep learning. We have tested the application of deep convolutional neural networks (CNNs) for automated remote sensing detection of archaeological features. Our case study is the qanat systems of the Erbil Plain in the Kurdistan Region of Iraq. The signature of the underground qanat systems on the remote sensing data are the semi-circular openings of their vertical shafts. We choose to focus on qanat shafts because they are promising targets for pattern recognition and because the richness and the extent of the qanat landscapes cannot be properly captured across vast territories without automated techniques. Our project is the first effort to use automated techniques on historic satellite imagery that takes advantage of neither the spectral imagery resolution nor very high (sub-meter) spatial resolution.

Ben Jones and Simon H. Bickler, 2019. Multi-Scalar and Semi-Automatic Approaches to Detect Archaeological Features in NZ Using Airborne LiDAR Data. *Archaeology in New...*
A test of the ‘…usefulness of different algorithms and approaches.’ in a small (32 sq km) area in Waikato Region, N Island, New Zealand. Algorithms include template matching and crater identification. Results are difficult to appreciate in the illustrations in this publication as ‘finds’ have been boxed or identified by putting a spot on each. However, ‘… it has the potential to not only add significantly to the catalogue of archaeological sites found in New Zealand but also provide the basis of much more comprehensive and systematic heritage management of those sites.’


Two similar papers demonstrating use of four different methods of AI to identify circular object on ALS data.

*From the abstracts:* Many extant, yet unidentified, archaeological mound features continue to evade detection due to the heavily forested canopies that occupy large areas of the region, making pedestrian surveys difficult and preventing aerial observation. Object-based image analysis (OBIA) is a tool for analyzing lidar data and offers an inexpensive opportunity to address this challenge. Using publicly available lidar data from Beaufort County, South Carolina, and an OBIA approach that incorporates morphometric classification and statistical template matching, we systematically identify over 160 previously undetected mound features.


As the title says, this is a review of published work over the past 15 or so years with tables illustrating who did what, where, when and why, plus advances made and limitations identified. He divides research goals into four categories – identification, preservation/monitoring, mapping and analysis of populations, social organisation, settlement patterns, etc. – of which the first shows 28 publications while the remaining three categories total 13 papers. The author suggests several future directions (one of which is published in his JAS article, above) and concludes that OBIA has been shown to be a useful tool that will ‘expand our understanding of the archaeological record’.

Almost a beginner’s guide to finding circles, in this case charcoal kilns (which are a bit like disc barrows with a raised interior) in a 54 sq km area in the Gävle municipality of Sweden.


*From the abstract:* Recent LiDAR survey in Tonga has documented a dense and complex archaeological landscape, particularly on the principal island of Tongatapu. [including] a profusion of earthen mounds, most of which are associated with residence, sporting, or burial in the period 1000-1850 CE. For identification and mapping of the mounds we use and evaluate two automated feature extraction techniques, object-based image analysis and an inverted pit-filling algorithm. … results indicate that continual and iterative fine-tuning is required. Successful mapping of some 10,000 mounds on Tongatapu reveals a distinct spatial structure that relates to traditional land division and tenure.
The Aerial Archaeology Research Group

AARG sees the aerial perspective as integral to the pursuit of key questions in archaeology and heritage, including landscape character, long term landscape change, human ecodynamics, and the experience of place. We are a community of heritage professionals, researchers, students and independent scholars dedicated to education, research and outreach initiatives involving the acquisition and application of data from airborne platforms. AARG provides opportunities for networking, mentorship, and exchanges of ideas on theories, methods and technologies related to aerial archaeology. The organization supports an annual conference, workshops, training schools, and publications.

Membership is open to all who have an interest or practical involvement in aerial archaeology, remote sensing and landscape studies.

AARG is a registered charity: number SC 023162.

AARG homepage.  https://a-a-r-g.eu/

Membership/subscription rates:

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Student scholarships. AARG has a limited number of student scholarships for attendance at its annual meeting. These are aimed at supporting bona fide students and young researchers who are interested in aerial topics and may wish to attend.

Anyone wishing to apply should write to AARG’s Chairman (aargchair@gmail.com) with information about their interests in archaeology and aerial archaeology, as well as their place of study. The annual closing date for applications to the annual AARG conference is mid-May. Other meetings for which scholarships may be available will be advertised on an ad hoc basis. Support for conference attendance may also come from the Riley Fund (see elsewhere, this issue).