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AARGnews

The Newsletter of the Aerial Archaeology Research Group

Issue 70: April 2025

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aarg Aerial Archaeology Research Group 1983-2025

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AARGnews is the bi-annual newsletter of the Aerial Archaeology Research Group and is the only regular open access periodical dedicated to aerial archaeology. It is a diverse and open forum for the discussion and exchange of new (and old) ideas related to aerial archaeology, remote sensing, and landscape studies.

We welcome articles of any length and format. You can write about your research, methods, techniques, case studies, reviews, opinions, or anything else that might interest our readers. We would particularly welcome the inclusion of photographs, images, maps, plans, or other illustrations to support your article.

If you are not sure whether your idea is suitable for *AARGnews*, please get in contact and we will be happy to assist you in shaping or fine-tuning your contribution for a forthcoming issue.

Browse our public Zotero library at:
https://www.zotero.org/groups/5029136/aarg_news/library

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Cover picture: 1982 satellite photograph of an enigmantic feature comprising two broadly parallel banks extending over 1,500m near the village of Rusalivka, Ukraine. The feature is the subject of Rog Palmer's *Wazzat? Number 4* article on pages 13-18 of this issue. KH-9 HEXAGON image courtesy of the US Geological Survey. Entity ID:D3C1217-100073F025.

Editorial

Martin Fowler [1]

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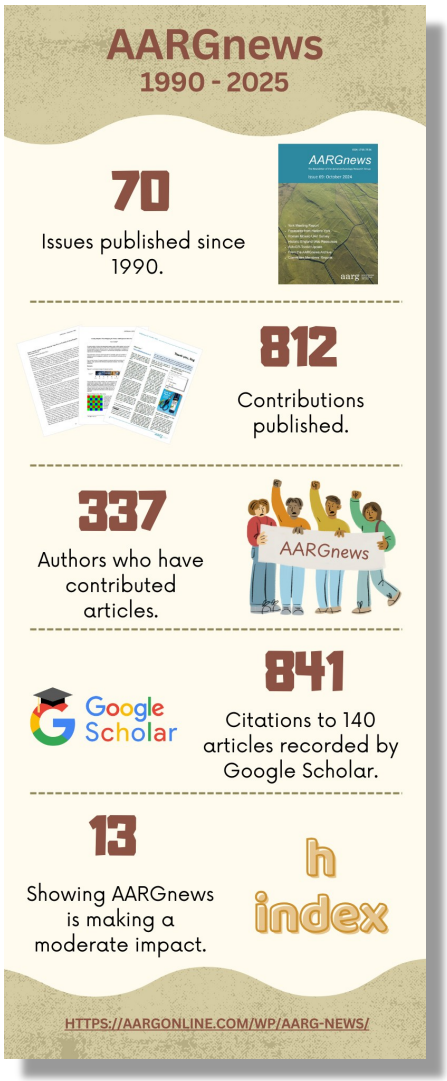
Welcome to the latest issue of *AARGnews*. We hope that you will enjoy reading its varied and interesting content.

AARGnews is 70!

Well, not quite. This is the 70th issue of *AARGnews* to appear since the first edition in September 1990. Originally a paper product envisioned to be a *cheaply produced newsletter on matters archaeological and aerial* [2], *AARGnews* has since evolved into a digital PDF periodical that includes full-colour illustrations. Publishing a mixture of news, commentaries, and peer-reviewed technical and research articles, it is positioned in the middle ground between an informal group newsletter and a formal academic journal.

As shown in the infographic, over the past 35 years *AARGnews* has published over 800 articles written by over 330 different authors. From the citation analysis reported on pages 34-36 of this issue, 140 articles have been cited in the literature a total of 841 times, leading to an estimated h-index, a measure of a journal's quality, of 13. Whilst the index is by no means as high as top-tier journals such as *Antiquity* or *Archaeological Prospection*, it does



suggest that *AARGnews* is a credible publication making a moderate impact on the subject of aerial archaeology. So do please consider contributing something to our pages!

Reader engagement

While we know that *AARGnews* is being downloaded and cited, the low response rate to reader feedback surveys suggests there is room for improvement in engaging with you, our readership. Indeed, we don't really know whether you are thoroughly engaging with the content or merely skimming through it. Or are you just downloading an issue and saving it for future reference (or for a rainy day)?

To try and address this issue, the editorial team is working on enhancing our communication and outreach efforts. We are issuing regular *Spotlight* emails to draw attention to *AARGnews* content and are raising awareness of the publication to university libraries in order to better engage with academia. We are also looking to raise the profile with professional bodies, such as the various working groups of the *Chartered Institute for Archaeology*. We hope that these initiatives will help to bring you interesting and varied content in the future.

If you have any suggestions how to improve *AARGnews*, please consider contacting us either directly or through the readership survey on the next page.

Now with added hyperlinks!

Starting with this issue, hyperlinks have been introduced on the contents page that take you directly to the relevant article. You can then return back to the table of contents page by clicking on the top left hand corner of any page as shown below.

We hope that this will help with navigating to articles published within this and future issues.

But an epic fail ...

Following a reader's suggestion, we had hoped to include a section in this issue that reported on recent publications of interest. Unfortunately,

[2] R. Palmer 1990, Editorial. *AARGnews* 1, 3.

time and external factors conspired against us, but we do hope to include the section in the next issue. If you are interested in helping as a *Publications and Books Editor*, please let us know.

In this issue

In his Chair's Piece, Łukasz Banaszek touches on the recent publication of the European Archaeological Council's Lidar guidelines, the forthcoming AARG 2025 conference in Trondheim, and applications to the AARG Fund. The *In the News* section brings you a selection of news items that may be of interest. Rebecca Bennett reports on the 26th annual meeting of the European Archaeological Council and includes a call from Łukasz Banaszek for a representative from AARG to co-chair the Remote Sensing for Archaeology Working Party. If you are interested in becoming involved, please contact the AARG Chair before the end of May 2025 to discuss.

The passing of Gordon Maxwell, a pioneer in the development of aerial reconnaissance in Scotland, is marked by a formal obituary by Bill Hanson along with memories of him from Cathy Stoertz and Rog Palmer.

The AARG Ukraine Working Group summarise some of their findings of the three-year landscape survey of part of Ukraine using open source satellite imagery. Initiated during the COVID-19 pandemic, a total of 10,608 features have been recorded in an area of 110 × 60km, of which 7,639 are considered to be archaeological.

Archaeological studies are increasingly multidisciplinary in nature and this is reflected in the next two articles. Roland Linck and Florian Becker describe the use of aerial photographs, resistivity and ground-penetrating radar prospection, and *Structure-from-Motion* imaging to investigate the remains of the medieval monastery of Münchsmünster, Bavaria.

Andreas Stele, Ilyas Yanbukhtin, Azamat Zakirov and Roland Linck use aerial photographs and magnetometer surveys to investigate a circular ditch enclosure (or 'rondel') at Sulzheim, Germany. In both cases, the different non-invasive techniques complement each other to provide a greater understanding of the archaeology than when used separately.

Reviving the *Wazzat?* feature that last appeared in *AARGnews* 62, where the interpretation of features captured on aerial images remain a puzzle, Rog Palmer describes an enigmatic feature from Ukraine and seeks readers' thoughts on what it could be.

A short article by your editor attempting to answer the question *Does Anyone Read AARGnews?* is followed by *Lookalike ...* that takes a leaf out of *Private Eye* to compare two images of (possibly) the same subject.

From the AARGnews Archive looks back at what was topical 10, 20, and 30 years ago.

Finally, an illustration from the late 1940s depicting a plan to try and detect more of the *Mildenhall Treasure* from the air has recently surfaced on Facebook. What do you think of this intriguing story? Could there be a grain of truth in it?

AARGnews 71

AARGnews 71 is scheduled for publication in October 2025 and we welcome contributions to the issue. The closing date for submissions is **15th September 2025**, but please get your contributions in earlier if you can as that will help with the production of the issue (and will also help ensure that your contribution is included in the publication!).

Reader feedback ...

We value your feedback! So please consider completing this short reader feedback survey on the content of this issue: ***AARGnews* 70 reader survey**. It is totally anonymous and will only take a minute, but your replies will help us to improve future issues of *AARGnews*. Thank you!

Chair's Piece

Łukasz Banaszek [1]

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The last couple of months brought some exciting news to our community as we have seen the publication of the *Guidelines for the use of Airborne Laser Scanning (Lidar) in Archaeology* launched by the European Archaeological Council (EAC). Many of our members contributed to the delivery of this volume, which came to fruition under the editorial oversight of Rebecca Bennett and Dave Cowley.

The publication builds on a project led by Chris Gaffney and Rachel Opitz, co-chairs of the EAC Remote Working Interest Group, and a sector survey done by AARG, outcomes of which are presented on our YouTube channel. I would like to thank everyone involved in the production of the guidelines which demonstrate AARG's commitment to connect researchers and professionals across Europe, as well as our group's position in the wider archaeological and heritage landscape. I encourage you to read Rebecca's report from the EAC Conference in Gdańsk where the book was premiered. If you are interested in learning more about the guidelines, feel free to join us for a virtual book launch happening in early May 2025 with details of the event on page 7 of the *In the News* section.

In April 2025, we opened the Call for Papers for the AARG 2025 meeting in Trondheim. The main networking event for aerial archaeologists and experts in archaeological remote sensing is taking place on 11th-13th September 2025 at an accessible and modern venue on the city's waterfront. We all remember that initial plans to host the AARG annual conference in Norway were put on hold by the COVID-19 pandemic, but good things come to those who wait. Ole Risbøl, our host, has persevered and produced an attractive social programme. In addition, Ole secured financial support from Trøndelag County Municipality, NTNU University Museum, Department of Archaeology and Cultural History, and the Norwegian Archaeological Society, which together with the cheaper Norwegian Krone reduces the conference fee and costs for international presenters.

Some may argue that this is the only benefit of having Donald Trump at the wheel of the USA, but who knows? The recent change of the European Archaeological Association (EAA) meeting's form from in-person to digital-only, as an unintended result of protests in Serbia, is another reason to join us in Norway to make the most of the lively discussions during the scientific and social events. Mind that the extended Call for Papers closes on 15th May 2025 and we will have the preliminary programme ready on the event website before registration kicks off in early June. I look forward to seeing many of you in Trondheim!

The AARG Ukraine Working Group recently submitted their second report to the Ukrainian journal *Arheologia* thus concluding the work of the group in its current form. I would like to thank Rog Palmer and the team for their amazing work, which is summarised in this issue. The group is going to discuss their future soon, so if you would like to throw in your ideas and possibly join the group's future incarnation, feel free to contact Rog or me and I will relay your message.

Earlier this year, the Working Group received support from the AARG Fund to set up an ArcGIS Online account which will be used to host the findings over the next few years. As a result of the Winter 2025 AARG Fund round, the Committee decided to support another project investigating archaeology in Ukraine by Kseniia Bondar, Roman Kozlenko, and Vlad Kozak. The application from Kseniia, a long-standing member of ISAP, and the team demonstrates that our cooperation with our sister organisation is working well and I remind our members that you are eligible to apply for ISAP Fund. You can read more about the most recent AARG Fund projects on page 7 of this volume and as a Committee we are glad to see a great response to the most recent funding call which closed in April 2025.

Looking to the months ahead, the Committee will be working primarily on delivering the event in Trondheim and planning for a major remake of our Constitution. Those who joined the last year's AGM will remember that we have found ourselves in a bit of trouble, but after sorting the most concerning issue in York, we are moving towards presenting a new version of the Constitution for consultations.

As per usual, remember that neither AARG nor *AARGnews* can function without members' contributions!

In the News

Compiled by the *AARGnews* Editorial Team [1]

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A selection of news items that may of be interest to readers.

AARG 2025

AARG's 2025 International Aerial Archaeology Conference will take place in Trondheim, Norway, on 11th – 12th September 2025, with a field trip on 13th September. Organised by Ole Risbøl as the Conference Secretary, together with financial support from Trøndelag County Municipality and the Norwegian University of Science and Technology University Museum, Department of Archaeology and Cultural History, the conference will include presentations and posters aligning with the following themes:

- Aerial Archaeology of the High Latitude Landscapes.
- Aerial Approach to Identifying Heritage Threats, Site Monitoring, and Recovery.
- Citizen Science.
- Technical Developments.
- Open Call.

Further details can be found on page 12 of this issue and on the conference website.

Joint AARG/ISAP committee meeting

On 6th February 2025, the AARG committee met with their counterparts from ISAP, the International Society for Archaeological Prospection. One of the outcomes of the meeting is to try and improve communications through the European Association of Archaeologists (EAA) channel, including advertising the AARG conference and *AARGnews*.

As mentioned in the last issue, both committees have agreed to jointly cover the EAA Annual Membership expenses for the member of one or both groups chairing the meetings of the EAA Archaeological Prospection Community. It is hoped to provide leaflets and/or a stand at the upcoming ISAP conference in Ghent, 15th-20th September, 2025 (see the *Forthcoming Conferences and Meetings* box on the next page) to raise the awareness of AARG among the archaeological community.

AARG Committee and Trustees Meeting

The AARG committee met with the Trustees on 26th February 2025 to update them on their respective areas of responsibility. It was agreed that organising future training is a priority for the next meeting in June, including identifying someone who could take on this role and to explore how to approach a new training school.

AARGnews Zotero Library

Following the resolution of a technical issue, the *AARGnews* Zotero library has now been updated to include the contents of all issues published to date. For articles published from *AARGnews* 67 onwards, hyperlinks are provided to directly download the issue containing the article, so you don't need to go to the AARG website to access these issues. We hope to progressively extend this functionality to earlier issues in due course.

AARG supports drone magnetometry project

A bid to the AARG Fund by Dr Kseniia Bondar of the Institute of Geophysics at the Polish Academy of Sciences for a trial of a drone-based magnetometer has recently been approved by the AARG Committee. The project covers the use of the *MinesEye* drone-based system to survey two Roman forts in the Mykolaiv region of southern Ukraine, one of which was recently identified using

satellite imagery. If successful, it has the potential to add a new capability to aerial prospection. We look forward to providing more about the project in a future issue of *AARGnews*.

Other recent recipients of support from the AARG Fund include:

- 2024 The AARG Ukraine Working Group to host the results of their survey as a freely accessible web application using ArcGIS Online. See pages 13-18 of this issue for more information
- 2023 Martin Gussone, Agnes Schneider and Martin Fowler to cover the cost of scanning declassified KH-9 HEXAGON satellite photographs of al Hira, near Najaf in present-day Iraq. See *AARGnews* 67, 52-66 (2023) for more information.
- 2022 The AARG Ukraine Working Group for the cost of scanning HEXAGON satellite photographs of their survey area.

Details of how to apply to the AARG Fund for support for projects can be found on the AARG website https://aargonline.com/wp/grants-scholarships/.

AARG is now on Bluesky

Following ethical concerns with the platform, AARG has now paused activity on *X* (formerly known as *Twitter*) and has set up a *Bluesky* account. With nearly 400 followers so far, the *AARG Bluesky* account can be accessed here. You can also follow us on our Facebook and YouTube channels.

EAC LiDAR Guidelines published

March saw the publication of the much anticipated *Guidelines for the use of Airborne Laser Scanning (LIDAR) in Archaeology* by the European Archaeological Council. Edited by Rebecca Bennett and Dave Cowley, it represents a significant contribution to the field of Airborne Laser Scanning in archaeology/heritage studies. Compiled by 49 experts, most of whom are AARG members, from over 30 countries in Europe, it builds on the EAC/AARG/ISAP sector survey undertaken a couple of years ago and is available for download free of charge.

A virtual book launch will take place on Zoom on Wednesday 7th May at 5.30pm (BST) hosted by AARG. If you are unable to attend, the launch will be posted on the AARG YouTube channel.

Forthcoming Conferences and Meetings

2025

4th International Conference of Aerial Archaeology, 20th-23rd May 2025, Rome, Italy. Conference website: https://www.archeologiaaerea.it/icaa.html

Prehistoric Society Europa Conference 2025: Landscape connectivity in Prehistory, 7th June 2025, Reading, UK. Conference website: https://www.prehistoricsociety.org/events/2025-06-07

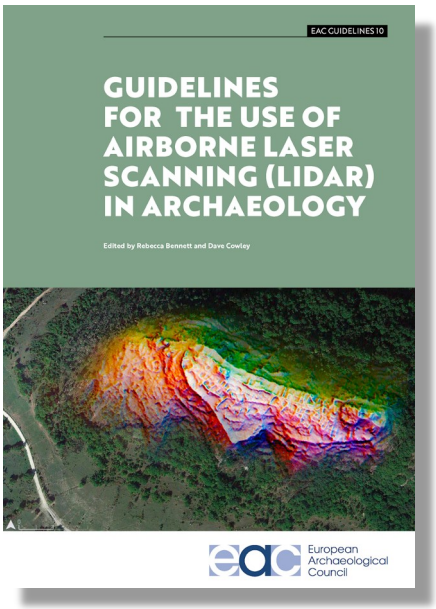
31st European Archaeological Association Annual Meeting, 3rd-6th September 2025, fully online. Conference website: https://www.e-a-a.org/eaa2025

AARG 2025, International Aerial Archaeology Conference 11th-13th September 2025, Trondheim, Norway. Conference website: https://aargonline.com/wp/events/aarg2025-trondheim/

16th International Conference on Archaeological Prospection, 15th-20th September, 2025, Ghent, Belgium. Conference website: https://www.prospect.ugent.be/icap2025/

6th Training and Research in the Archaeological Interpretation of Lidar (TRAIL) meeting, 28th-30th October, 2025, Postojna, Slovenia. Meeting website: https://trail.zrc-sazu.si/

Conference on Cultural Heritage and New Technologies (CHNT), 3rd-5th November 2025, Vienna, Austria. Conference website: https://chnt.at/



TRAIL VI, 2025

Žiga Kokalj writes: The 6th Training and Research in the Archaeological Interpretation of Lidar (TRAIL) meeting, will focus on heavily cultivated, mainly lowland, landscapes where archaeological remains have been flattened and largely removed and will consider the

role of ALS data in studying farmed landscapes of all periods.

TRAIL Meetings bring together an international, interdisciplinary group of scientists, professionals, and post-graduate students for interactive workshops, case studies, poster sessions, and roundtable discussions, emphasizing hands-on learning with a high student-to-teacher ratio. These residential events foster community and collaboration through shared accommodations, meals, and a vibrant social program including an international potluck.

The meeting will be in Postojna, Slovenia, 28th–30th October, 2025.

Ukraine landscape survey complete

The survey by the AARG Ukraine Working Group of a 6,600 sq km area of Ukraine (~1% of the total area of the country) using open source satellite images is now complete and an article describing the findings has been submitted for publication in the Ukrainian journal *Arheologia*.

Report from the EAC Conference, Gdańsk

Rebecca Bennett [1]

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A report on the 26th annual meeting of the European Archaeological Council and a call for a representative from AARG to co-chair the Remote Sensing for Archaeology Working Party.

On the 27th and 28th of March 2025 the European Archaeological Council convened in Gdańsk, Poland for their annual meeting, preceded by the hybrid meeting of the EAC Remote Sensing for Archaeology Working Party. Chris Gaffney and I attended in person to launch the *EAC10 Guidelines for the use of Airborne Laser Scanning (Lidar) in Archaeology*, with co-chair Rachel Opitz dialling in from the US.

The main topics discussed in the remote sensing working party meeting were:

- promotion of the ALS guidelines (look out for an AARG virtual book launch (see page 7 of this issue), introductory slide pack, and session at the forthcoming TRAIL event in the Autumn).
- lessons learnt from the collaborative process used to develop the guidelines.
- details of the forthcoming project to update and refresh the *EAC Guidelines on Use of Geophysics in Archaeology*, led by Armin Schmidt.
- the schedule for repeating the "profiling the profession" surveys.

The rather magnificent surroundings of the Artus Court. Photo: Rebecca Bennett.

The theme of the main conference was the value of archives, their accessibility and re-use for heritage management. In addition to a programme of excellent papers from across the continent, members participated in interactive workshops looking at future priorities for the EAC. These focused on four areas: Heritage Crime, Sustainability, Landscape, and Citizen Science and were an engaging start to the meeting.

The representation of specialists in the field of remote sensing at these discussions, in the main meeting programme and via the production of the guideline documents, is key to raising the profile of airborne and ground-based techniques in the broader heritage management community and I would encourage AARG members to get involved.

AARG & EAC

Łukasz Banaszek adds: After four years of acting as co-chair of the EAC working group, Rachel has let us know that she will be stepping down and the AARG Committee would like to extend our grateful thanks for her work to represent the group.

The Remote Sensing for Archaeology Working Party is a pro-active group which does much to raise the profile of our expertise and special interest in the wider European heritage management community, and is well regarded and supported by the EAC. We believe that it is beneficial both to EAC and AARG for the representatives of the latter to be sitting at the table of the former. If you are interested in becoming involved as co-chair to represent AARG, please contact the AARG Chair by the end of May 2025 to discuss. As an organisation, we will support you in this role and we can work out the details as and when.

Gordon Stirling Maxwell: 1938 – 2024

William S. Hanson [1]

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Gordon Maxwell was a pioneer of aerial reconnaissance in Scotland. In this piece, Bill Hanson, his friend and colleague, gives a brief overview of his life and work.

Gordon Stirling Maxwell was a pioneer in the development of aerial reconnaissance for archaeology in Scotland, discovering over a dozen Roman forts and fortlets, twice that number of Roman temporary camps and numerous Iron Age settlements. A true Scot with a wry and somewhat mischievous sense of humour, he took particular pleasure in choosing place names for some of his Roman discoveries that his English colleagues might find more difficult to pronounce, such as the forts at Drumquhassle, near Drymen, and Inverquharity, near Kirriemuir.

Born in Edinburgh in March 1938 and brought up near the flightpath to Turnhouse aerodrome, Gordon developed an early passion for aircraft and flying, a theme that was to play such a prominent part in his later life. As a schoolboy he joined the air cadets and experienced his first flight in a Tiger Moth. Despite suffering from severe air sickness, which he endured throughout his life, his enthusiasm for flying remained undimmed. Though he read Classics at the University of St Andrews, he fostered his interest in archaeology and developed his experience by volunteering on various Roman excavations.

Gordon thrived at St Andrews and enjoyed university life to the full. In his third year he took the opportunity to combine his love of Scots with his love of Greek by persuading one of his lecturers, the poet and prominent Scottish Nationalist, Douglas Young, to translate Aristophanes' comedy *The Frogs* into Scots verse. Gordon both produced and appeared in the première of the resulting play, *The Puddocks*, as well as co-designing the cover of Young's self-published text. In his final year he was so busy masterminding the entertainment at the autumn ball that he neglected to find a partner for himself. A friend stepped in and, via his own girlfriend, found one for him, Kathleen King, a Londoner reading French. This blind date proved so successful that they were married two years later in 1961 after she too had graduated.

Following a year at Moray House College of Education, Gordon taught Classics at Madras College, St Andrews. Here he was able to fulfil his love of archaeology in his spare time and began to undertake his own excavations during the vacations, first at Crawford Roman fort in Lanarkshire and then at

Gordon Maxwell addressing a Roman army re-enactment group (probably the Ermine Street Guard) at Newstead in 2000. Photo from his slide collection.

Drumcarrow Iron Age settlement near St Andrews.

He joined the Royal Commission on the Ancient and Historical Monuments of Scotland as an Investigator in 1964. Here he played a key role in the production of the traditional, magisterial accounts of archaeological sites, the so-called Inventories, for Argyll and Lanarkshire. He continued that work on later Inventories, but in an increasingly editorial capacity as he rose in seniority, being appointed Head of Archaeology for the Commission in 1991.

Each autumn for many years Gordon had accompanied J.K.S. St. Joseph to help with the ground checking and selective minor excavation of new discoveries made during CUCAP's regular reconnaissance flights in lowland areas of Scotland. He was thus well qualified by the time he was able to establish the Royal Commission's own comprehensive programme of aerial survey in 1976. This he continued to direct until his early retirement in 1995.

Gordon made so many important new discoveries that his personal impact on the archaeological record, particularly for the prehistoric and early historic periods, was dramatic, completely transforming our understanding of Scotland's lowland heritage. This was rightly celebrated by the dedication to him of a volume of papers entitled *From the Air. Understanding aerial archaeology* and, subsequently, the conferring of an honorary professorship by his *alma mater*.

Gordon not only found new sites, but put them into their wider academic context. A Romanist at heart, he is particularly well known for his co-authorship of what still remains the standard text on Rome's most northerly frontier, the Antonine Wall, published in 1983. This was followed in 1989 by a more general book on the Romans in Scotland and a detailed consideration of the evidence for the famous battle of Mons Graupius in 1990.

He is universally remembered by colleagues as an erudite and very kindly gentleman, who made staff feel valued no matter how junior their position. He was particularly helpful to those in the early stages of their careers, whom he fostered and trained. A simple query addressed to him would often end up as a master class in aerial photographic interpretation.

Gordon Maxwell on the occasion of the presentation of the book 'From the Air: Understanding Aerial Archaeology' dedicated in his honour. Photo: Becky Jones.

In his spare time he was a dedicated and accomplished gardener. Having identified a semi-derelict half-acre plot of land in the picturesque village of Aberdour in Fife in the 1970s, Gordon and his wife Kathleen set about building a home for themselves and their two daughters, Amanda and Rebecca. Many happy weekends were spent slashing and burning, while the children ran about, hidden by the remaining undergrowth. Large bonfires were needed, whose sites eventually became the foundations of three herbaceous island beds. Every pathway they created led you further around this magic garden with something of interest to see throughout the year. The garden had its own website and was deemed sufficiently impressive to be opened to the public for a few days each year to raise funds for charity. It even featured on BBC Scotland's *The Beechgrove Garden* in 1999.

Gordon remained passionate about archaeology long after he had retired. He continued to undertake aerial surveys for a short time and opened some new areas of investigation. He recognised that the supposed frontier earthwork in Perthshire, the Cleaven Dyke, lacked the expected regularity of a Roman work. Subsequent survey and excavation, in which he played an important part, proved it to be the best-preserved Neolithic bank barrow in Britain.

He was always very active in his local community. He played Santa at Christmas parties for the youth club and famously featured as the BT yellow mascot, Buzby, at the front of a village sports day parade. Meanwhile, he continued to share his passion for archaeology through lectures, community talks and school visits.

In his final years, Gordon lived with the effects of dementia, which he managed stoically and with typical derogatory humour until his death on 19th November 2024 aged 86. He is survived by his wife and their two daughters.

Memories of Gordon Maxwell

Cathy Stoertz [1]

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Cathy Stoertz remembers an immensely learned, eloquent but modest leading light of aerial archaeology.

Gordon Maxwell was one of the first senior figures I encountered when I joined the world of aerial archaeology nearly 50 years ago. He proved to be one of the most accessible of the field's leading lights: immensely learned, eloquent but modest – and one of the kindest people I've ever met. In the late 1970s I was still fairly new to Britain, and found the world of British academia and "official" archaeology much more formal and hierarchical than the American university from which I had recently graduated. But, at a time when the divide between professors and students, managers and staff, old and young could seem very rigid, Gordon was always welcoming, easy to talk to and genuinely happy to share his knowledge and exchange ideas about archaeology, photo interpretation and much more besides.

Our paths crossed most often at conferences and AARG meetings, where Gordon's lectures were always a treat, delivered apparently effortlessly and illustrated with wonderful photos. My fondest memory of his skills as a speaker comes from AARG 1998. In a session called *Images of History*, Gordon spoke on *Impulse of Delight: aerial enlightenment and archaeology in Scotland*. The expected bravura performance flowed forth – elegantly informative, stunningly illustrated, and delivered without recourse to notes. At the end of his allotted 45 minutes (we were very generous in those days!), without having to be given the "time's up" warning from the chair, he concluded with a charming flourish and left the stage. Only when I glanced at his carousel of slides did I see that it was still half full. Gordon had only got through half of his selected images, so had quite possibly only delivered half of his talk – and yet what we'd heard had been clear and entertaining, made perfect sense and finished exactly on time.

Rog Palmer [2]

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A great storyteller doesn't get his lunch!

Gordon was a great storyteller who I possibly first met when I was invited to join the CBA's 'Aerial Archaeology Committee'.[3] We used to have occasional phone chats in the early days of AARG and in one of those I told him that in a recent chat with St Joseph, he referred to 'young Maxwell'. His reply - "He calls you 'young Palmer' too". On another occasion, CUCAP had disposed of copies of old six-inch maps that the OS had given St J way back in prehistory. Chris Evans had grabbed the Cambridgeshire ones before I could get at them, but I grabbed Hampshire-Wiltshire (for old times' sake) and Northumberland as I was doing a project for Clive Waddington around Milfield at the time. On one of those maps was a pencil note 'good teas' in St J's handwriting. I mentioned that to Gordon who responded with memories of his first field trip with St J. At that time, Gordon was probably working for RCAHMS but, more importantly, he had transport (as St J didn't drive). Off they went and Gordon was beginning to feel hungry when St J said, "Shall we stop for lunch?". Good, thought Gordon, his mental map coming into play working out where the nearest pub may be. "Pull in here" said St J, pointing at a wider part of the road, and then proceeded to bring out a box of sandwiches and munch his way through them while Gordon sat and rumbled. The point being - said Gordon - that it was very unlikely that St J would have written 'good teas' on a map of anywhere as he always carried his own!

[3] See: D. R. Wilson 1990, 'CBA Aerial Archaeology Committee' *AARGnews* 1, 7.

*** Call for Papers ***

International Aerial Archaeology Conference
Trondheim, Norway, 11th-13th September 2025

Organised by the Aerial Archaeology Research Group (AARG) and the Department of Archaeology and Cultural History, Norwegian University of Science and Technology

The AARG Committee and the Department of Archaeology and Cultural History, Norwegian University of Science and Technology, are pleased to invite the submission of papers for the 2025 International Aerial Archaeology Conference to be held on 11th and 12th September 2025 at the Dokkhuset, Trondheim, Norway with a field trip on 13th September 2025.

We invite proposals for oral presentations (20 mins) and posters (A1 portrait) aligning with the following themes:

Aerial Archaeology of the High Latitude Landscapes. The theme will feature papers on aerial archaeology and remote sensing primarily in the Nordic countries but also across the circumpolar and subarctic regions. Papers may include airborne and spaceborne prospection of prehistoric and medieval landscapes covered with tundra, taiga, or boreal forest as well as examples of research investigating modern industrial or military heritage.

Aerial Approach to Identifying Heritage Threats, Site Monitoring, and Recovery. Processes such as rising sea levels, more frequent and powerful storms, and accelerating desertification on the one hand side as well as urban sprawl, intensive farming, military conflicts, and mass tourism on the other are affecting even more communities and heritage. This theme will encompass how aerial techniques are being used to monitor and study archaeological sites and landscapes in fragile areas including coastal environments, conflict zones, and where unsustainable development takes place to provide means for safeguarding heritage and help with recovery.

Citizen Science. This theme explores the transformative role of citizen science in aerial archaeology, highlighting how drones, satellite imagery, and airborne lidar empower individuals to uncover and document hidden heritage. Papers responding to this theme may cover examples of collaboration between professionals and enthusiasts, accessible tools, crowd-sourced discoveries, and community-driven research.

Technical Developments. New prospection methods, data sources, algorithms, and approaches constantly strengthen aerial survey. This theme may include papers on novel sensors as well as the growing popularity of UAVs. It will also encompass presentations on the use of Artificial Intelligence for big data and large-scale analysis including feature detection. Other papers may showcase improvements to archaeological practice such as improved data visualisation techniques and processing workflows.

Open Call. We invite proposals for the presentations which can cover a wide range of archaeological questions and different research approaches demonstrating strong aerial components. Papers accepted for the open call will be grouped by theme.

To submit your proposal, including title and abstract, please visit the conference website.

The closing date for all proposals is Thursday, 15th May 2025.

The conference is organised with financial support from Trøndelag County Municipality and NTNU University Museum, Department of Archaeology and Cultural History.

A Landscape Survey in Ukraine Using Open-source Satellite Images:

Results of AARG's Ukraine Working Group

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We summarise some results of AARG's Ukraine Working Group (2022-2025) with examples of habitation sites and mounds plus one of the case studies we produced to show results of interpretation and mapping in small areas. In addition, there are examples of 'recent archaeology' – former collective farms and abandoned villages, of which some have damaged or destroyed earlier features.

Introduction

This note is to report on a three-year project that was undertaken by a Working Group of AARG and begun as a response to Putin's aggressive war on Ukraine. It also marks the (probable?) end of the Ukraine WG.

The project aimed to examine an area of land with mixed soils that covers 110 × 60km and is mainly in Cherkasy Oblast (Figure 1). Our source data were Google Earth (GE) images (2007 to 2022), supplemented by photographs taken in 1982 by the now declassified HEXAGON satellite. Some earlier CORONA photographs were also available. Not all image dates showed buried or levelled archaeological information clearly or at all. Our aim was to identify and broadly classify types of archaeological features and to create a basic dot distribution map and accompanying database. This may have both archaeological value to Ukrainian archaeologists and also demonstrate some ways in which aerial or satellite images may benefit research in that country.

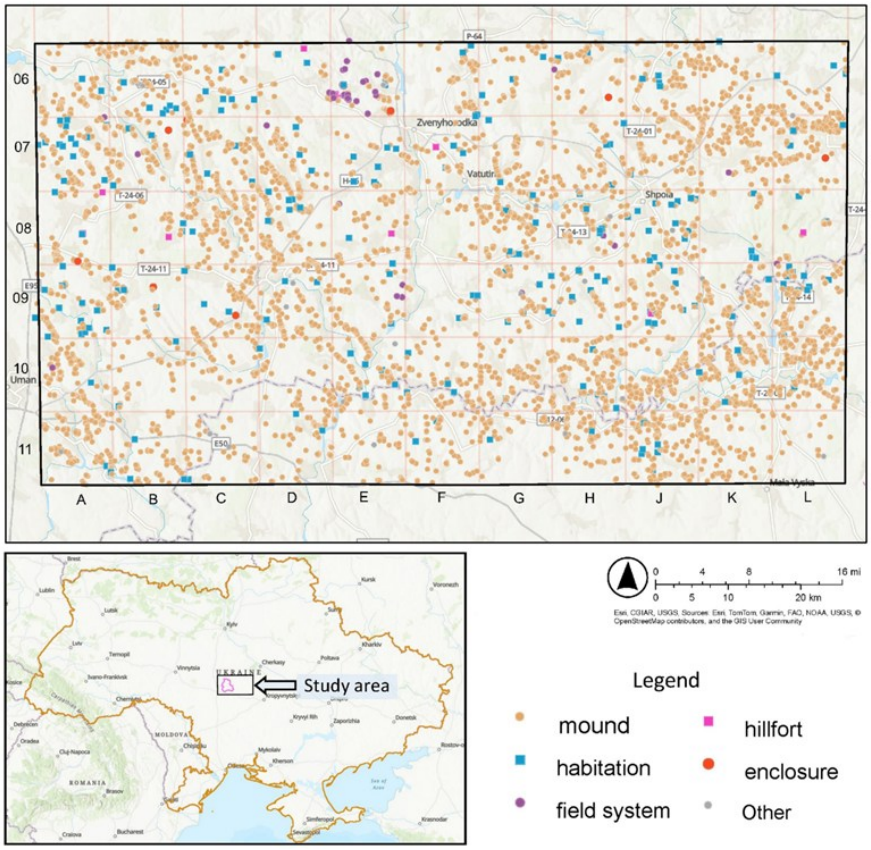

Figure 1. Location of the 110 x 60km survey area with the distribution of archaeological features shown in the upper map.

Data preparation and collection was carried out in QGIS and Google Earth and later converted for use in an ArcGIS Online web application that offers scope for interactive questioning by ourselves and future users. Our

survey recorded 10,608 features of which 7,639 are considered to be archaeological (Table 1). A further 447 features were recorded from the Soviet era which are now abandoned or destroyed but as 'recent' structures they may have played a part in destroying or damaging older archaeological sites. Finally, some 2,522 non-archaeological features have been identified, many of which have the potential to be confused with archaeological features when viewed from an airborne perspective.

A first report was published in the Ukrainian journal *Arheologia* (Palmer *et al*, 2023) and we have recently submitted a second from which some parts of the following have been summarised.

Feature Type	Number
Mound	7196
Mound with satellite	101
Habitation	236
Hillfort	12
Smaller enclosure	15
Field system	35
Other	44
Total	7,639

Table 1. Archaeological features identified in the survey area from Google Earth and HEXAGON imagery.

Archaeological features

Habitation sites

We have used the term 'habitation' to cover a wide range of forms from the purposely planned Neolithic Trypillia megasites to the clusters known as 'ash heaps' which occur from the LBA.

Trypillia

Our area includes several sites of the Trypillia culture which often consist of two to four concentric rows or 'circuits' of houses around a central area. The largest (megasite) may approach 450ha. Many were previously known and subjected to geophysical survey and/or excavation. A database prepared by Marco Nebbia (2017a; b) listed 499 Trypillia sites of which 60 are within our survey area. Locations of some were approximate but we were able to accurately locate of some of those sites. However, many of the small ones, less than 0.3ha, were not visible on our image set and even three of the large megasites were not seen. We identified two potential megasites of which the concentric rows at Tarasivka cover about 100ha (Figure 2).

Ash heaps

A predominant and widespread type of habitation site is known as 'ash heaps' or 'special ash deposits'. Their composition and forms are debated but it is agreed that they form a component of habitation sites of LBA and later dates. Under the right conditions, they show as light patches on satellite images.

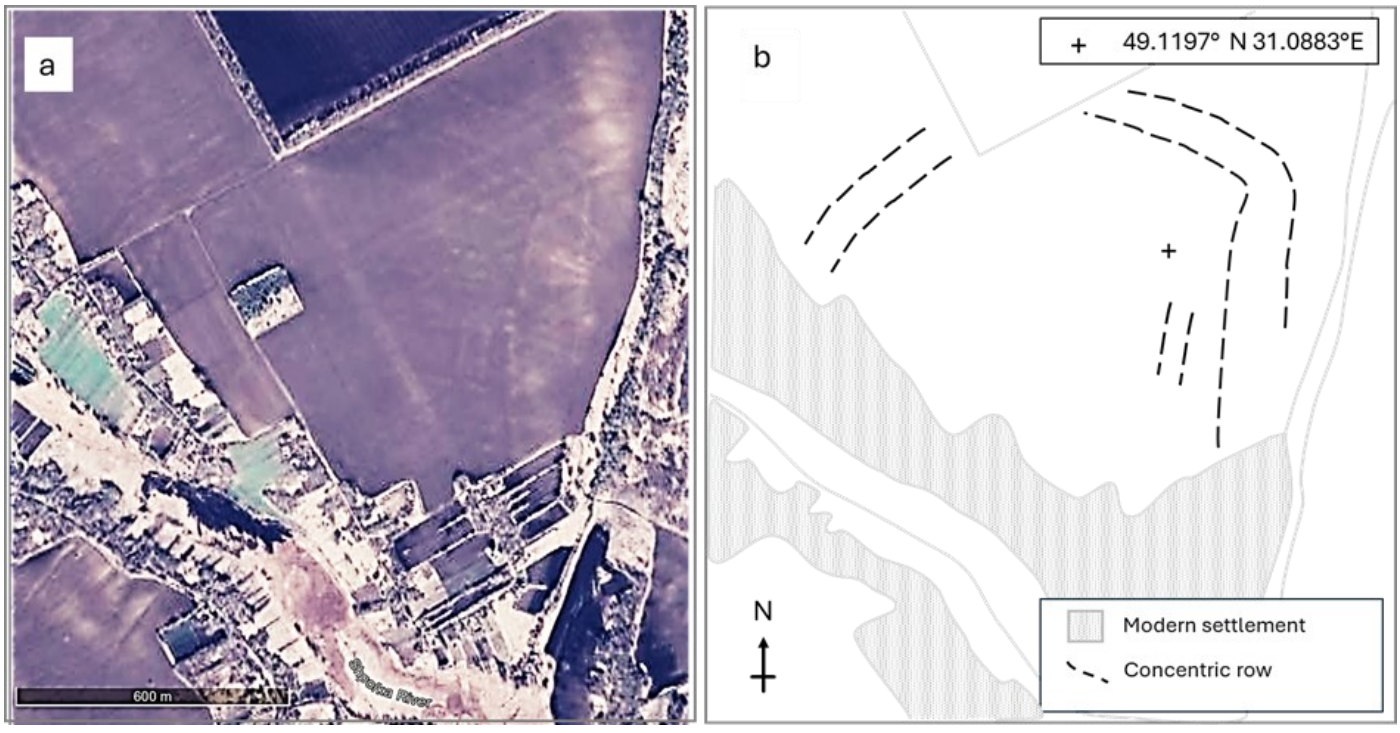

Figure 2. A potential Trypillia site 2.5km South-East of Tarasivka (G06_076[5]) that may cover more than 100ha and probably extends under an abandoned modern settlement. Seen as: a) densely concentric rows of light-coloured patches on GE image (13 March 2019), b) interpretation drawing using diagrammatic rows of houses.

[5] One of our feature numbers. They can be further searched through the database and using the web application.

Figure 3. A levelled habitation site, visible as a small cluster of ash heaps, within, but not necessarily of the same date as a 20ha enclosure (D08_002). These features are on the southern bank of a watercourse between Kobrynove and Kobrynove Heblya and 2km east of Antonivka. a) as recorded on GE 5 May 201, b) interpretation resolved this as a small group of 6+ ash heaps of c.16-24m in diameter covering 4.7ha.

In our area, they occur in groups of between five and 70 individual ash heaps with diameters between 10 and 35m, sometimes of consistent size within a group, sometimes variable. Our ash heaps occur in a range of locations including hillslopes and hilltops and are often adjacent to water courses. One small group of ash heaps near Antonivka lies within a 20ha circular enclosure although satellite evidence does not enable us to establish contemporaneity (Figure 3).

Mounds

One advantage of examining a large area is that elements of prehistoric landscape design become apparent as, for example, in the rows of mounds that follow the grain of the land and often lead to (or from) confluences of rivers. These patterns can be seen in Figure 1 and are more apparent using the web application. What we now see as a single line of mounds could have resulted from several processes that range from a rapid phase of construction of a line, to use of spaced marker mounds with later infilling. Creation of a line of mounds, be it over a short or long timescale, requires an open landscape and this is supported by environmental analysis from some excavated megasites (Makarewicz *et al*. 2022).

Several mound rows end at promontory locations where there had been Trypillia settlements which probably predate mounds by some 500-1000 years. Could these coincidences be deliberate? Abandoned Trypillia sites with burnt houses were likely to have left visible traces that could easily be recognised by people who were used to reading the ground and it is possible that folk memory may have retained the significance of those former settlements.

Mounds were often conspicuously placed to serve as sightlines that may indicate territory and may also be used as landmarks for navigation – and this also implies an open landscape with clear sightlines. Some mounds were clearly built with respect to natural formations. One example, a group of mounds north-west of Shaulykha (Figure 4), may have been clearly skylined from below and from the west while themselves appearing to be placed around a natural escarpment hollow as if the view to the west was itself of significance. We do not know whether this landform has been changed by quarrying. However, to give a sense of proportion, a hand-dug quarry can be seen in the lower-right of the figure and there may be another covered by a clump of vegetation low on the slope in the hollow but it seems unlikely that the profile at the top of the 450m wide depression has been significantly changed.

Case study: Myzynvika (Figure 5)

Our report included three case studies with maps that were interpreted and drawn in QGIS and text that allows some of the thought and story-telling that is possible using satellite sources. One of these is shown in Figure 5 where, in the north-west, are traces of banks and lynchets that suggest a former field system of unknown date. In the same illustration are two curvilinear(ish) ditched enclosures and, towards the south-east, the remains of a hillfort. The topography on the map can be used to suggest access routes from each of the three enclosures to the fields. From the hillfort a route could follow a former

palaeochannel on its west side, going first to the North and then following its turn to the West and the fields. The latter part of this route could also serve the enclosure in the north-centre of the figure while a walker from the third enclosure may have been guided by the three mounds.

A second case study is the focus of *Wazzat? Number 4* on pages 32-33 in this issue.

Recent features

Our recording included recent features of which many were active in 1982 but had been abandoned by the earliest GE dates. As well as becoming 'lost' features themselves, they could affect the integrity of older archaeological contexts. Our database identified collective farms, abandoned villages, mining (from huge open-cast extents to smaller hand-dug quarries which often were later used for dumping rubbish), pipelines, abandoned railways, and so

Figure 4. Mounds NW of Shaulykha outlining a natural basin in a West-facing scarp in a manner that suggests their deliberate placement around a natural feature. The original vertical view has been tilted to create an 'oblique view' for this illustration. Source: GE: 18 September 2014.

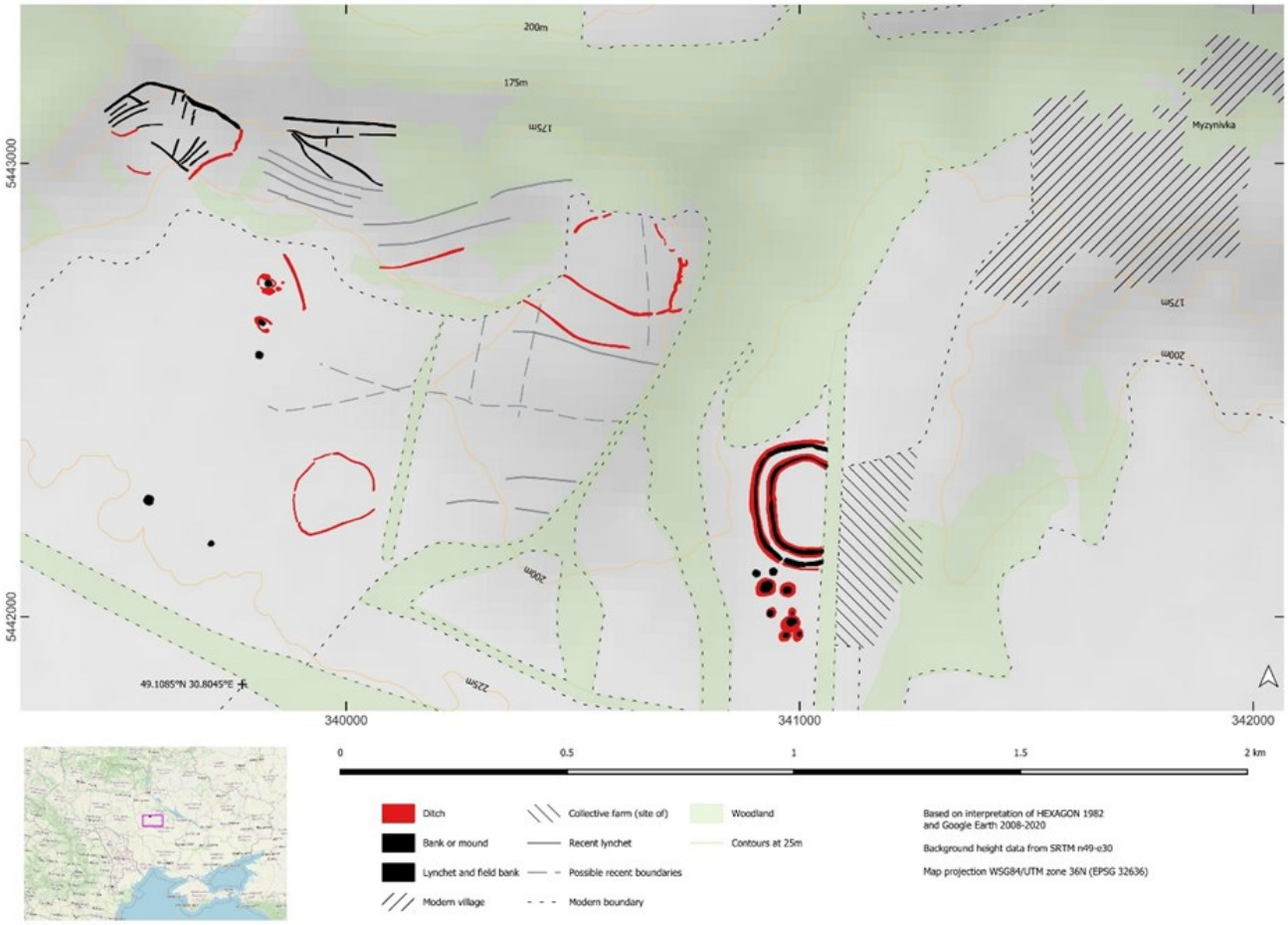

Figure 5. Interpretation of features in the Myzynivka area has identified a possible field system in the North-West part of the map that may be associated with nearby enclosures that include a hillfort. Note that the hillfort in the south-east part of the map is partly overlain or destroyed by a belt of trees and a former collective farm.

Figure 6. Collective farm (F11_073) at the SW end of Pokrovka that was operational in 1982 (left) but abandoned with collapsed sheds and scrub infestation by 2010 (right). HEXAGON image courtesy of the US Geological Survey. Entity ID: D3C1217-100073F027. GE image 8 June 2010.

Figure 7. At Pastyrske, a village (or villages – L08_35, 48-49) was active in 1982 (left) and effectively covered a multi-period fortified site (L08_068 – see text below). By 2007 (right) the village had been abandoned, possibly due to flooding. Part is now a nature reserve. HEXAGON image courtesy of the US Geological Survey. Entity ID: D3C1217-100073F025. GE image 29 June 2007.

on. Similar recent changes – and their effects on older archaeology – are likely to be familiar to those of us who peer at above-ground images. Some we identified in Ukraine are briefly described and illustrated below.

Collective farms (Figure 6)

These were commonplace in the Soviet era, with usually at least one collective located on the periphery of a contemporary village. The archaeological interest is in their decline. Most are shown and identified on the Soviet map of the mid-1970s and on HEXAGON in 1982 they were thriving with rows of sheds for livestock, a small number of paddocks, tracks all over the place and heaps of manure or other farm muck that sometimes expanded beyond the farm boundary. We recorded some smaller collectives with only one long building that were identified on the Soviet map as poultry farms. An unexplained curiosity was the occasional presence of a single livestock shed set some distance from the main farm and linked to it by a track. A suggestion is that these may have been set aside for birthing – but that is unconfirmed.

By the earliest GE images almost all of them had been abandoned and colonised by scrub. Some had been left to fall apart and others cleared to foundation/footing level. Occasionally a single shed remained in use, more rarely a modern farm replaced the collective. They remain as abandoned plots on the most recent GE images for which one reason may be that no one is quite sure who owns that land.

Abandoned villages (Figure 7)

Sometimes whole villages, occasionally smaller parts of larger settlements, were

noted as abandoned or shrunken (where a few houses seemingly remained in use). Many of these villages appeared on the mid-1970s Soviet map, sometimes named, and most appeared to be fully occupied in 1982 with each house having a strip field at its rear (the opposite side to the access road/track). In most cases abandonment had taken place by the earliest GE date although at some the processes of leaving seemed to take longer. Where village locations survived, we could observe the disappearance of houses through GE dates and in most cases their strip fields had been combined into larger parcels of which many remained in use in the most recent GE images.

Often the reason for abandonment was obvious. Some villages had been gobbled up by mining and many were abandoned because of damp or flooding caused by damming rivers. But there remained some for which no apparent reason for their abandonment was identified from above.

Effects of recent changes on earlier features

All of the recent types noted above can damage or destroy features of earlier date. We have GE sequences that show mounds being eaten by quarrying and of pipelines cutting through, or very close to, earlier features. There is now considerable pre-development archaeological examination in Ukraine[6] but there remains the fact that sites need to be known before any threat to them may be identified. This may have been of lesser concern during Soviet times as evidenced by the placing of a collective farm over one side of a hillfort (see Figure 5) although in other locations we are able to suggest there may have been avoidance of archaeological features.

One example of superimposition by a village can be seen in Figure 2, another will be a case study in our forthcoming second report. There, at Pastyrske (Figure 7), is a multi-period fortified settlement that was twice excavated but which was almost invisible on the images we examined because there was a village covering it. No such village was shown on the 1872 map and one report about the site noted that it was demolished in the early 20th C which may have been when the village was founded. The HEXAGON photograph shows parts of the village to be actively occupied with houses and their strip fields visible. By 2007, many houses had been demolished with their fields merged and that state appeared to remain until 2009 but by 2011 the village was uninhabited. At this location, the fortified settlement was barely visible on the satellite images and we located it by matching an undated hachure plan with the few parts that remained visible.

The future?

In Ukraine, maps and aerial photographs have been 'secret' for many years and the opportunities they bring have yet to be fully appreciated and used by archaeologists there. Might our work have stimulated further interest? Our survey covered about 1% of (the full-sized) Ukraine and we look forward to local archaeologists beginning to deal with the remainder.

A final thought is the hope for a post-war training workshop in Ukraine. AARG ran many of these in Europe between 1998 and 2013 and it would be valuable if there could be a resurgence of similar teaching that lets us share our specialist expertise with others.

Access

Our web application will remain online for at least five years and the survey data will be permanently lodged at Zenodo.

Acknowledgements

We thank AARG for a grant to purchase the HEXAGON satellite photographs and for generously funding five years of online availability for the web application resulting from our project. Thanks also go to members of AARG's photo reading WG who helped to clarify thoughts about some of the features discussed above.

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From Air and Ground: Integrated Non-destructive Prospection at the Remains of the Former Monastery in Münchsmünster (Bavaria, Germany)

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The medieval monastery of Münchsmünster is nowadays completely destroyed. Consequently, alongside archaeological excavations, non-destructive approaches like aerial archaeology and geophysical prospection provide the only means to document the buried remains. In addition, preserved features, such as the portal of the former church, which was relocated to a new site, can be mapped by photogrammetry. Such integrated projects provide valuable information for heritage protection, as well as archaeological and historical research.

Introduction

Several hundred medieval and early modern monasteries exist in Bavaria today. However, many more were dissolved and subsequently destroyed, particularly during the Peasants' Wars in the first half of the 16th century and during/after the secularisation in 1803. As a result, they now only survive as buried remains. The Bavarian State Department of Monuments and Sites (BLfD) has geophysically investigated several of these sites in recent decades. Others have been documented through aerial archaeology.

The monastery of Münchsmünster (Lkr. Pfaffenhofen, Upper Bavaria, Germany) belongs to a special group known as the 'Huosi' monasteries, founded in the Early Middle Ages by the Bavarian dukes of the Agilolfinger dynasty. Similar sites of this category have been investigated at Wessobrunn (Lkr. Weilheim-Schongau, Upper Bavaria; Linck & Becker, 2020), Tegernsee (Lkr. Miesbach, Upper Bavaria; Linck & Becker, 2021) and Schlehdorf (Lkr. Bad Tölz-Wolfratshausen, Upper Bavaria; Linck & Becker 2013; Linck & Pietsch 2013).

Measurements at deserted monastic sites have also been documented from other regions in Germany e.g., Ihlow (Lower Saxony; Brüggler & Schweitzer, 2005), Waldkirch (Baden-Württemberg; Haasis-Berner, 2015), Tennenbach (Baden-Württemberg; von der Osten-Woldenburg, 2019) and Corvey (North Rhine-Westphalia; Coolen *et al.*, 2021). In other European countries, similar studies have been carried out e.g., in Slovakia (Wilken *et al.*, 2011), Great Britain (Linford *et al.*, 2023) and Austria (Löcker *et al.*, 2023).

In this paper we present an integrated research project through mapping the subsurface building remains of Münchsmünster via aerial archaeology, resistivity prospection and ground-penetrating radar (GPR), as well as the documentation of the partly preserved Romanesque portal of the church by *Structure-from-motion* (SfM). GPR and resistivity proved to be the most suitable method for this type of monument as the buildings primarily consisted of stone walls, which are well -resolved by these techniques. In addition, they are insensitive to external technical interference and can be applied near settled areas.

The archaeological excavations at the former monastery of Münchsmünster in 1992/93 and 2011/12 by the BLfD focused on the area to the west of the demolished church, where a new kindergarten was built (Jandejsek, 2003; Erlacher, 2023). However, the monastery complex originally included other areas to the north and east of the church. Since 1980, various aerial photographs have repeatedly revealed further wall features as negative, linear vegetation marks on the agricultural fields inside the moated

Figure 1. Aerial photos of the archaeological remains at Münchsmünster as crop marks: (a) Overview over the site from north (BLfD Aerial photo archive, Photographer: Klaus Leidorf, Date: 09.04.1993, Archive-no. 7338/056 1623-08), (b) Romanesque church from west (BLfD Aerial photo archive, Photographer: Otto Braasch, Date: 10.07.1981, Archive-no. 7338/056 6841-18), (c) Northern part of the site from east (BLfD Aerial photo archive, Photographer: Otto Braasch, Date: 11.05.1981, Archive-no. 7338/056 1356-32), (d) Southern part of the site (BLfD Aerial photo archive, Photographer: Otto Braasch, Date: 30.04.1982, Archive-no. 7338/056 2134-19).

area (Figure 1). An opportunity was taken in 1994 to investigate the area of the monastery church more closely using resistivity prospection. In addition, the still accessible 1.5ha meadow area within the moat was surveyed with GPR in 2020 in order to record further wall structures in the surrounding of the church. These results have helped to correct previous misinterpretations of the resistivity data published by Erlacher (2023).

As the former Romanesque entrance portal is the only preserved part of the medieval monastery due to its transfer to the main cemetery in Landshut (Lower Bavaria, Germany), we documented this important relic using SfM in 2024. Beside providing a high-resolution 3D-model for further art-historical analysis, this method provides insights into the architecture and potentially damaged areas.

Location and geology

Münchsmünster is a small village 20km east of Ingolstadt on the southern side of the Danube River. The medieval monastery can be found at the northeastern outskirts of the modern village on a moat-surrounded trapezoidal plateau of six hectares, measuring 300m north-south and 150-250m in east-west direction (Figure 1a).

The monastery was constructed on a post-glacial terrace composed of gravel and sand, overlain by alluvial clay soil and Gleyic Fluvisol (LfU, 2025). Northeast of the monastic site, remains of refilled paleomeanders of the Ilm River, incised into the gravel terrace in the Pleistocene era, can be detected (see later, Figure 3). The dominant clay soil is not an ideal geological conditions for a successful GPR survey. However, due to the extremely low rainfall in summer 2020, the soil was completely dry at the time of the prospection. This is reflected by an in-situ measured soil moisture content of just 11vol%. The conductivity of the soil, another important factor influencing the data, was also low at 0.11dS/m. Consequently, meaningful results were still achievable.

Historical background

The big monasteries in Southern Bavaria depict some of the most important monastic landscapes in the Early

Medieval Central Europe, as the Bavarian dukes of the Agilolfinger dynasty used them as an instrument of power politics in the context of their independence endeavours. The region of the Danube plain, where Münchsmünster is situated, was especially relevant as it formed the frontier between their reign and the Carolingian-Franconian area of influence (Erlacher, 2023). Duke Tassilo III probably founded the first monastery at Münchsmünster in the second half of the 8th century AD as a Benedictine Abbey (Freilinger, 1977; Drexler-Herbold & Wegener-Hüssen, 1992; Jandejsek, 2003). However, this hypothesis remains unproven as the oldest archaeological remains date to the 9th century AD (Erlacher, 2023).

In the early 10th century AD, Duke Arnulf I and the Hungarian Raids destroyed the abbey for the first time. Shortly afterwards, it was reconstructed as a canonical convent that existed until the early 12th century AD, when Bishop Otto of Bamberg suspended it once more and re-established a Benedictine Abbey that flourished in the 14th and 15th century AD (Freilinger, 1977; Jandejsek, 2003; Erlacher, 2023). In 1556, the Benedictines finally left Münchsmünster during the Protestant Reformation and in 1589, the Jesuits from Ingolstadt took over the monastery buildings (Freilinger, 1977; Jandejsek, 2003; Erlacher, 2023). It was then used as a convent of the Order of Malta from 1783 to 1814, when the monastic buildings were completely demolished in the context of secularisation (Freilinger, 1977; Drexler-Herbold & Wegener-Hüssen, 1992; Jandejsek, 2003; Erlacher, 2023). Today, except for the buried foundations, only small parts have survived. The former entrance gatehouse was repurposed into a forestry office and later converted into a residential house. The church's Romanesque portal experienced a secondary use as a cemetery gate and some small cut stone fragments are nowadays stored in the Bavarian National Museum (Erlacher, 2023).

Only a few sources describe the former layout of the Münchsmünster monastery buildings. There are some late 17th/early 18th century copper engravings, including one by Michael Wening (1701). This one shows the monastic site during the Jesuit convent period. Looking from the west, it illustrates the church as a single-aisle structure (Figure 2a). Hence, the two side aisles, mapped with geophysics and aerial archaeology (see below, Figure 5), seem to have been demolished in the post-Benedictine era. The same single-aisle layout is mapped in the first Bavarian topographical map of 1813 that shows the monastery in the western part of the moat-surrounded area (Figure 2b).

Results of the non-destructive surveys

Aerial archaeology

The aerial photographs of the remains of Münchsmünster Abbey in the BLfD archive span the period from 1980 to the initial excavations in 1992/93 and document the site in 113 images. In addition to the clearly recognisable massive wall remains of the church, in particular the three eastern apses and the adjoining walls (Figure 1b), several further wall foundations can be identified on the site. For example, a partially skewed structure is visible in the northern area near the modern access road (Figure 1c). At least the northwest-southeast oriented section appears to belong to another structure measuring 40 × 11m, of undetermined age. A post-monastic phase seems most reasonable, as the area north of the church was not overbuilt before the end of Medieval times (Jandejsek, 2003; Erlacher, 2023). There are also indications of internal subdivisions. The linear wall to the north could represent the remains of an enclosure wall, to which another small building, measuring 7 × 3m and having a preserved screed, was attached on the outside. In the southern part of the area within the moat, some rectangular features can be attributed to additional building remains in connection with the

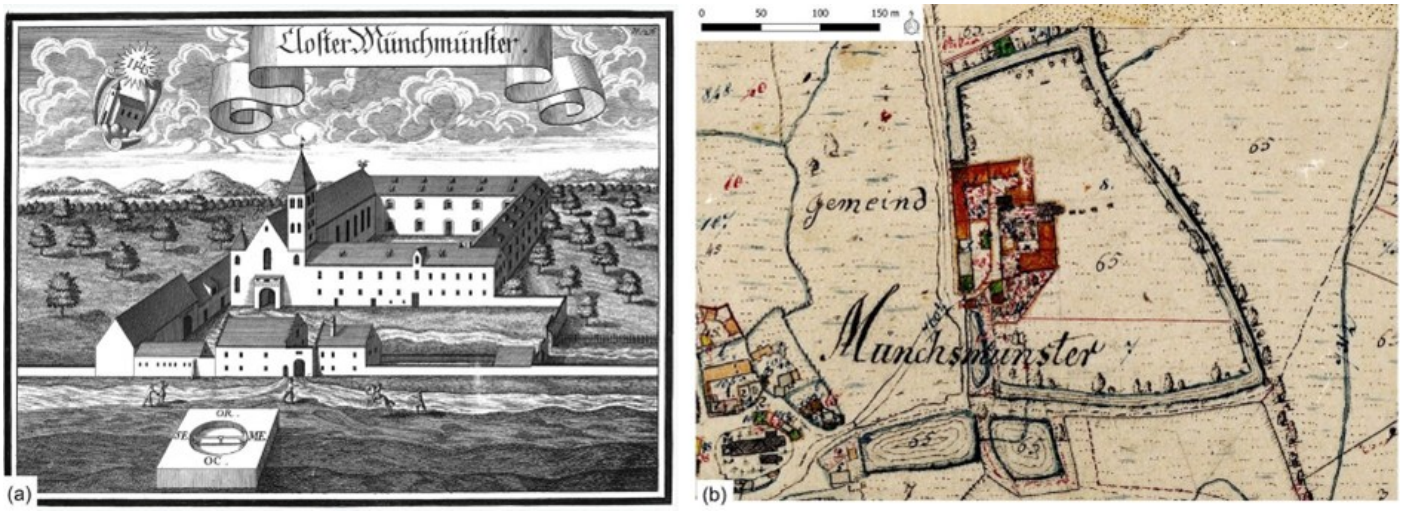

Figure 2. Historic visualisations of the former monastic site of Münchsmünster: (a) Copper engraving by Michael Wening (around 1701) showing a view from the west (© Bayerische Vermessungsverwaltung, License: CC BY-ND 4.0), (b) Section of the 'Uraufnahme' topographical map (1813) (© Bayerische Vermessungsverwaltung, 2025).

agricultural use of the undeveloped area already in monastery times. For example, one building of 20 × 30m size with an internal subdivision into three rooms is interpreted as stable or another type of farm building by Erlacher (2023) (Figure 1d).

Resistivity mapping

The resistivity survey of 1994 used a newly procured Geoscan RM15 in a 40 x 80m test grid. For this reason, the sample interval of 1 × 1m was relatively coarse, and the survey concentrated on the area around the church. Nevertheless, the primary structure of the Romanesque three-aisled monastery church, including its three semi-circular apses, is identifiable in the southern part of the grid (Figures 3 & 5). In total, the eastern part of the church can be traced over a length of 22m. Additional diffuse anomalies are evident in the northern part of the survey area, but these cannot be clearly assigned to specific building structures due to the insufficient data density. Therefore, the interpretation map by Erlacher (2023) contains inaccuracies and requires revision based on the GPR data below.

GPR survey

In order to record the features in the area of the monastery church at a higher resolution and to obtain any verification of the aerial crop mark features located further away, the accessible area was surveyed in 2020 over an area of 220 × 160m using a GSSI SIR-4000 with 400MHz antenna. Only a relatively large mound of excavated material from the new kindergarten construction had to be excluded from the survey. The archaeological features are situated at depths ranging from 20-230cm below the modern surface, spanning a vertical range of 210cm. This variation results from remains spanning multiple phases: from the monastic period through its later use as a Jesuit college to its time as a Maltese convent.

The eastern apses of the Romanesque church, known from the resistivity survey, are clearly visible at a depth of 80-240cm (Figure 4). The massive foundation of still preserved 160cm height is governed by the fact that a former vaulting of the church must be assumed and the subsoil in the Danube floodplain is relatively unstable. The roughly east-west orientated Romanesque church had three naves with semi-circular apses (Figure 5). The width of the main nave measures 9m, and the two side aisles are 4m. Within the apses, remnants of the former supporting pillars are discernible in the depth slices. From the resistivity and GPR data, it can also be deduced that

Figure 3. Resistogram of the eastern part of the Romanesque church at Münchsmünster. Geoscan RM15 in dipole-dipole-configuration, sample interval 1 x 1m, interpolated to 25 x 25cm, high-pass-filtered and destriped data. The orthophoto of 2020 in the background shows the refilled palaeomeanders in the northeast. Project-No. Moe19r (Geophysical data: Jörg W.E. Fassbinder & Roland Linck, BLfD; Orthophoto: Bayerische Vermessungsverwaltung, 2025).

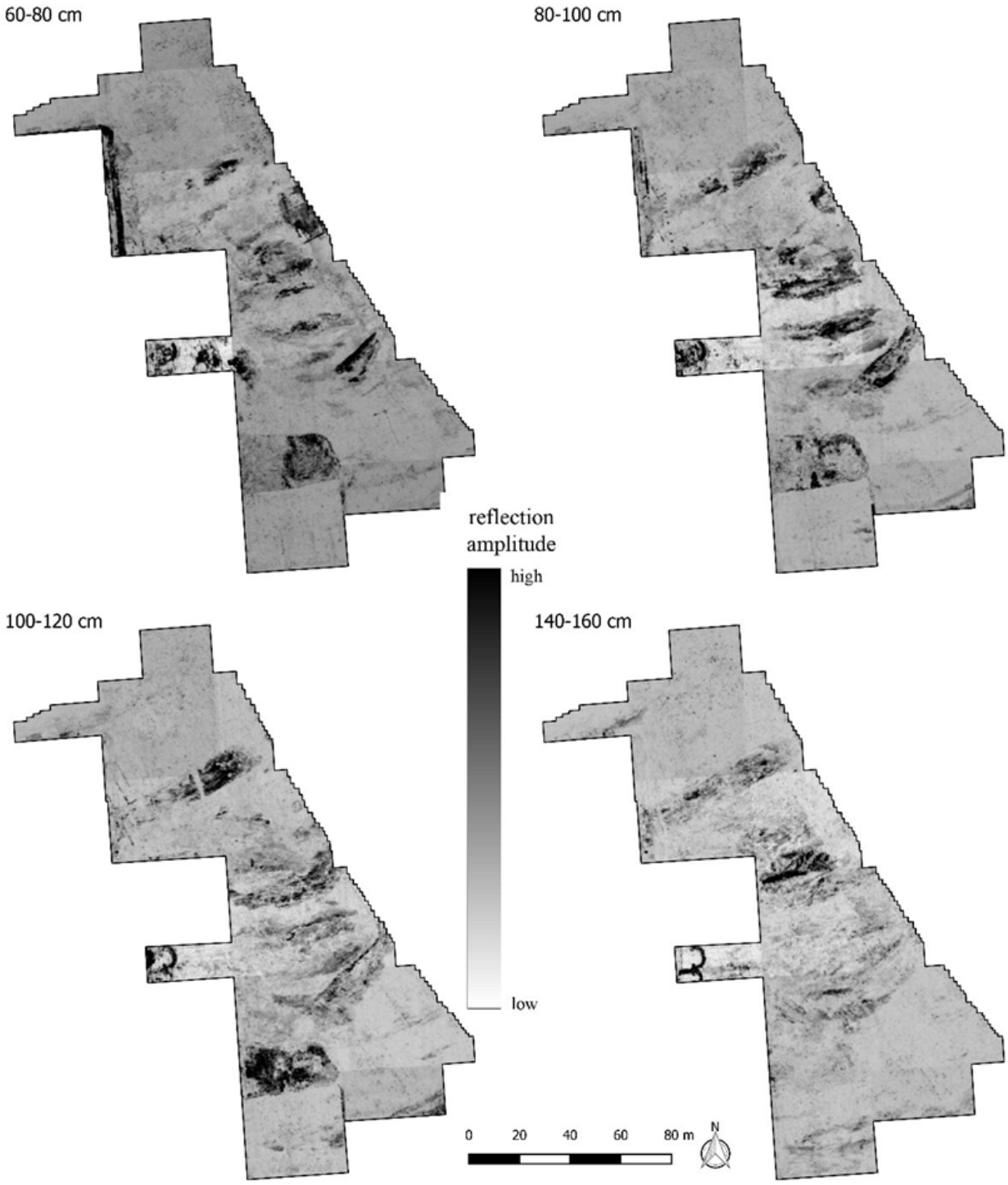

Figure 4. Selection of GPR depth slices between 60cm and 160cm below the modern surface. GSSI SIR-4000 with 400 MHz antenna, sample interval 6 x 50cm. Project-No. Mue20rad.

continuous strip foundations for supporting the pillars once separated the single naves.

In addition to the foundations of the church, a number of other wall features can be recognised, particularly in the northern part of the survey area. They match the negative crop marks described above in the aerial photographs (Figures 1, 4 & 5). However, a chronological classification and a functional assignment must remain open. Another previously unknown, small, square building can be found on the eastern limit of the survey area, directly on the edge of the moat. It is roughly orientated towards it, has a size of approximately 7.5 × 7.5m, and was divided into at least two rooms. These features are overlain at a depth of 40-80cm by another rectangular building with a different orientation and measuring 20 × 9m. The walls of the longer sides retract inwards by 50 cm after a length of 14 m from the southeast. The northwestern closure is

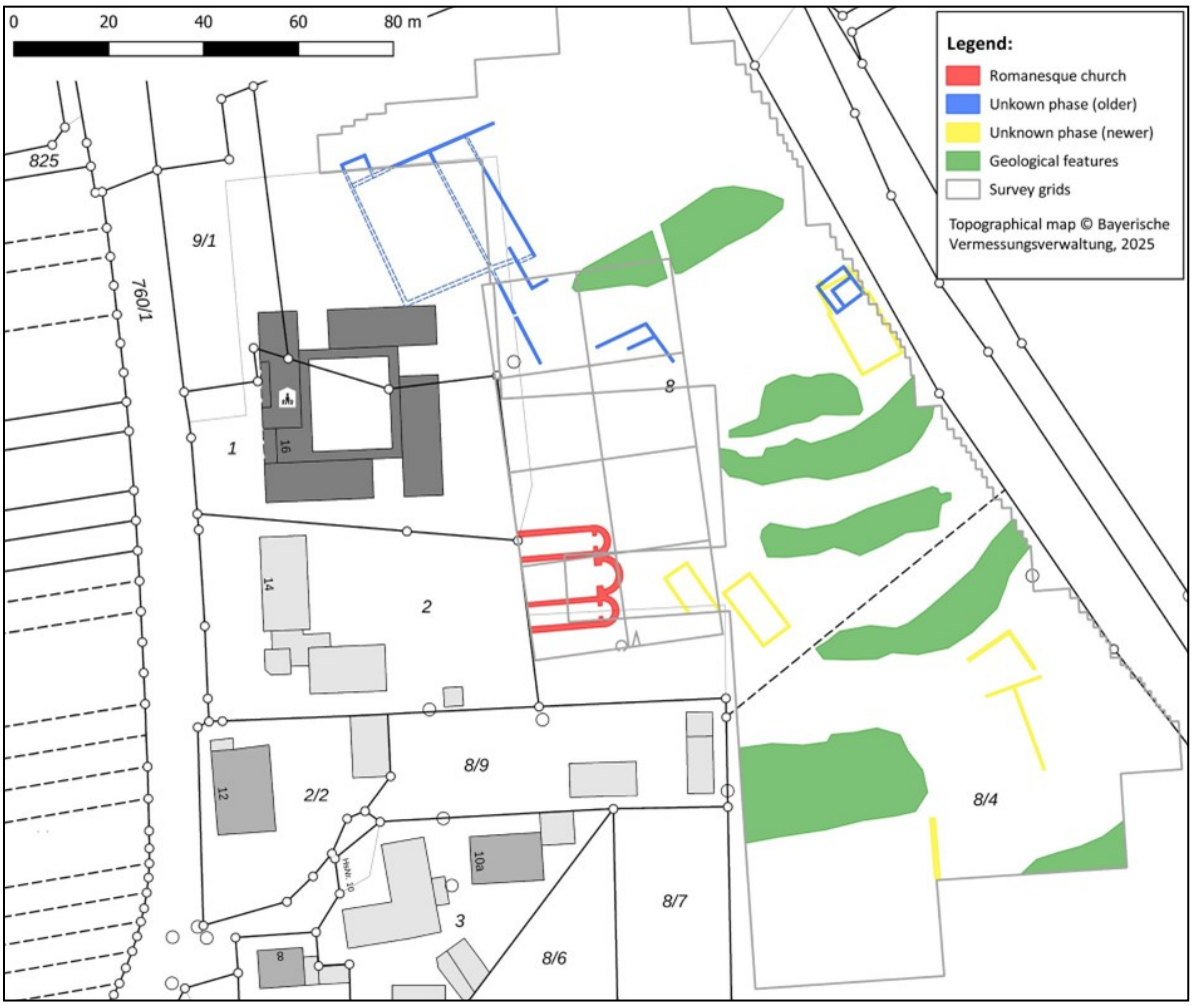

Figure 5. GIS-based interpretation map based on the geophysical data showing all detected subsurface features. GIS-Plan-No. 7336/056.

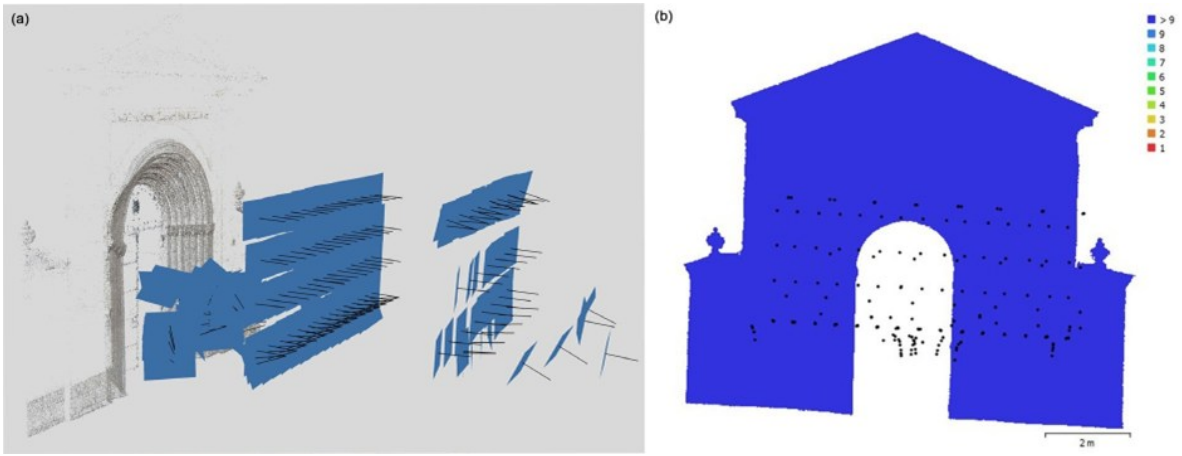

Figure 6. (a) Camera positions used for reconstructing the 3D model of the Romanesque portal. (b) Resulting overlap of the single photos for the SfM-survey proving that a high overlap in all regions is achieved.

formed by two massive pillars, which again are offset by 50cm. There are no indications of an internal division in the survey data. Once more, the dating and purpose of usage cannot be determined purely based on the GPR data. However, due to the shallower depth than the church foundations, a dating to the post-monastic period seems likely. It can also be assumed that other walls to the south and two small rectangular buildings to the east of the church date to this later period due to their comparable depth.

In addition to archaeological features, several geological structures are evident in the radar data (Figures 4 & 5). These can be interpreted as several paleomeanders at a depth of 60-140cm. Backfilling with gravel seems likely, as the structures are highly reflective. They continue to the east on the other side of today's moat as negative vegetation features in the modern orthophoto (Figure 3). In the northernmost geological feature visible in the depth slices, an interruption by an earth bridge can be identified. It is, therefore, possible that the associated depression was not yet completely refilled during the monastic times and a bridge was constructed as a transition.

Structure-from-Motion

After the secularisation, the former Romanesque church portal from Münchsmünster was transferred to Landshut, where the local main cemetery, founded in 1805, was newly immured in 1819/20. In this context, the portal was partly reused as an entrance gate.

The SfM survey was conducted using a standard Panasonic GX-800 camera with 16MP resolution and 20mm focal length, mounted on an extendable monopole reaching up to 7m in height. With this measurement setup, a fast mapping of the portal is possible within 25 minutes and without the necessity of further aids such as ladders or scaffolding. A detailed 3D model of the structure was produced utilising 184 single photos, taken from two different directions and at seven parallel lines of varying height. Additional photos were then manually added to cover all undercuts (Figure 6a). This configuration ensured an overlap of more than ninefold at each position (Figure 6b).

The 3D model in Figure 7 shows the layout of the 5.7 × 4.5m huge semi-circular portal. In addition, the extremely high resolution of the model of 1mm/pix enables the identification of even small details like, for example, the faces of the decoration. These data can be used in heritage protection for an objective, fast and easy damage detection even in the higher parts of the portal. From the presented documentation of the layout of the portal, a stylistic analysis becomes possible. Comparable entrance gates can, for example, be found nearby at the Romanesque churches in Tolbath (Lkr. Eichstätt, Upper Bavaria) (Figure 8a) and Ainau (Lkr. Pfaffenhofen, Upper Bavaria) (Figure 8b) (Landsberg, 1917; Erlacher, 2023). More famous stylistic influences originate from the so-called 'Schottenportal' (Regensburg, Upper Palatinate) (Figure 8c) (Erlacher, 2023; Linck & Bittner, 2023) and the cathedral portal at Freising (Upper Bavaria) (Figure 8d) (Karlinger, 1924; Erlacher, 2023). In summary, the portal of Münchsmünster can be dated to the early 13th century AD.

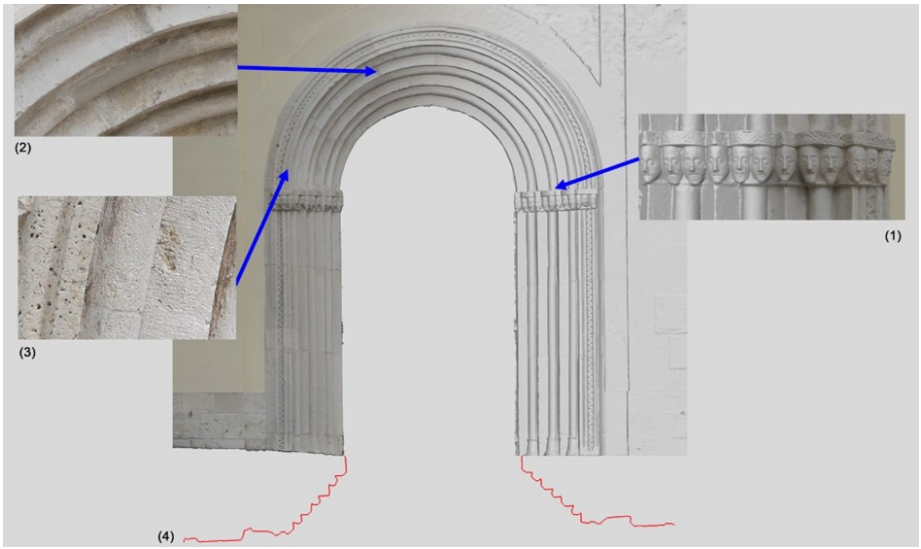

Figure 7. Distortion-free 3D model of the Romanesque portal (left: textured, right: raw model). The zoomed views visualise some details like faces (1), as well as renewed (2) and damaged areas (3). Below a cross-section (4) through the model is shown.

Figure 8. Stylistically comparable Romanesque portals at (a) Tolbath (© Heinrich Stürzl / Wikimedia Commons / CC BY-SA 4.0), (b) Ainau (© Christoph Quentin / Wikimedia Commons / CC BY-SA 3.0), (c) Regensburg (SfM-Orthoview: Roland Linck, BLfD) and (d) Freising (© Zairon / Wikimedia Commons / CC BY-SA 4.0).

Conclusion

Geophysical investigations and aerial archaeology have contributed to a partial clarification of the monastery church's interpretation. Further insights into the site's usage and development have been obtained. Notably, geoarchaeological features such as palaeomeanders were identifiable in the data, facilitated by the nature of backfilling and the exceptionally dry soil conditions during the survey. Such features are rarely detectable in Bavaria using active methods such as GPR. As all methods employed were non-invasive, the archaeological remains have been preserved *in situ* allowing for future research using emerging technologies.

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A further Neolithic 'rondel' in Franconia?

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This study examines the circular ditch enclosure ('rondel') at Sulzheim, exploring its structural features through aerial photographs and magnetometer surveys. While a definitive Neolithic dating cannot be confirmed, the combination of key indicators – such as the enclosure's location, structural dimensions, palisade remains, and entrance alignment with a prehistoric settlement – strongly suggests a Neolithic context. Further comparative analysis with other sites in Bavaria, as well as across Europe, supports this hypothesis.

Introduction

The Neolithic circular enclosures known as Kreisgrabenanlagen (KGA), 'rondels', or 'Woodhenges' in popular literature, are a remarkable and enigmatic part of our archaeological heritage. Scholars continue to debate their true function, with prevailing theories suggesting they served as gathering places, solar observatories, calendar structures or ritual and performative architectures. Over 150 such roundels have been identified across the greater European region, with a notable concentration in south-eastern Europe. In Bavaria, these rondels are primarily clustered to the south of the Danube River in Lower Bavaria, where 12 circular ditches have been recorded. Across the main Central European watershed, their presence diminishes significantly toward the northwest. In

Figure 1. Sulzheim. The two aerial photographs were taken around the time of the earthworks' discovery in the mid-1990s. Sources: 1a) BLfD aerial photo documentation, acquisition date 12/03/1995, photographer Klaus Leidorf, Archive No. 6126/246-1, Slide No.7253-12; 1b) BLfD aerial photo documentation, acquisition date 29/06/1998, photographer Klaus Leidorf, Archive No. 6126/246-1, Slide No.7934-12

Lower Franconia, south of the Main River, only two rondels have been documented to date: at Hopferstadt and Ippesheim (Literski & Nebelsick, 2012; Schier, 2023).

Examining the Middle/Late Neolithic circular enclosures in Bavaria, it becomes evident that all are situated in predominantly flat loess landscapes, which today are heavily shaped by extensive agriculture. Most of these structures were discovered through aerial photography, which provided the first clues to the possible presence of circular enclosures. Rondels located on agricultural land are at risk of plough erosion and are visible in aerial photographs as soil or vegetation marks. Additionally, their detection on loess soils is often challenging due to the high degree of soil coverage as well significant water retention capacity, which makes it difficult to distinguish vegetation marks.

Unlike other circular enclosures in Bavaria, the presented rondel in Sulzheim, located around 80km north-west of Nuremberg, stands out as it is not located within the typical loess deposit areas. Instead, its underlying geology consists of gypsum stones, on which regosols and vertisols have developed. Nevertheless, the site is situated at the periphery of a settlement hotspot in the Middle Neolithic landscape, the so-called Franconian Main triangle in Northern Bavaria (after Suhrbier (2017) from Schier & Gebhard (2023): Figure 1).

The aerial archaeologist, Klaus Leidorf, first documented the new discovery presented in this article in 1995 and 1998 (Figure 1). Detailed aerial photographs reveal segments of a nearly perfect circle, with positive crop marks suggesting the presence of a buried circular ditch (Figure 1b). However, these aerial photographs are not sufficient to determine whether the ditch has interruptions or palisade remnants, which would be typical for Neolithic rondels. Due to the limitations of aerial photography, the site was initially inventoried as a "circular ditch of prehistoric date" and classified as a "circular earthwork/ditch".

We wanted to increase our knowledge about the earthwork and document this monument before it is further eroded. Our main interest was to determine whether the circular enclosure had interruptions and whether any structures could be identified that might indicate the presence of a palisade. To investigate this, we employed a proven method for the further examination of prehistoric earthworks: high-sensitivity caesium magnetometer survey.

Results of the survey

An international team, including the Bavarian State Department for Monuments and Sites (BLfD, Munich, Germany) and the Center for Advanced Technologies (CAT, Tashkent, Uzbekistan) conducted the magnetometer survey on July 30th and 31st, 2004. The archaeological interpretation of the survey results was discussed with Prof. Dr. Wolfram Schier and Dr. Kirsten Gebhard (both from the Free University of Berlin, Institute of Prehistoric Archaeology) as well as Prof. Dr. Jörg W. E. Fassbinder (Ludwigs-Maximilians-University in Munich, Department of Earth and Environmental Sciences). The resulting magnetogram reveals an earthwork with a distinct circular ditch, ranging from 1.2 to 2.2 metres in width. The circular ditch forms a nearly perfect circle, with an outer diameter of approximately 67 metres and a 7.5-metre-wide opening to the south (Figures 2 & 3). This passage leads toward a settlement of prehistoric and protohistoric origin located about 500 metres away, although the precise dating of the settlement has yet to be established.

The circular ditch exhibits relatively low variation in magnetic intensity values, indicating a largely homogeneous backfill. However, a notable exception is observed in the

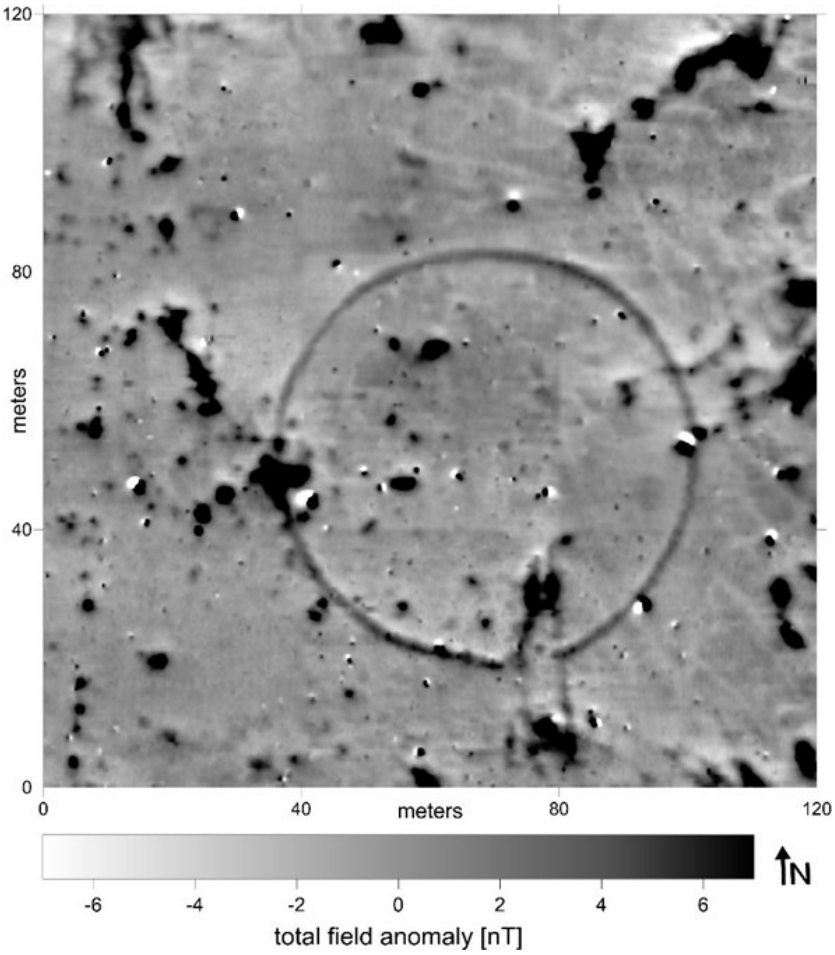

Figure 2. Sulzheim. Results of the magnetic survey with the circular enclosure in the centre. Geometrics G858 caesium magnetometer in duo-sensor configuration. Measurement point density: 15 x 50 cm, interpolated to 25 x 25 cm, in 256 grayscale levels, Project No. Sul24a.

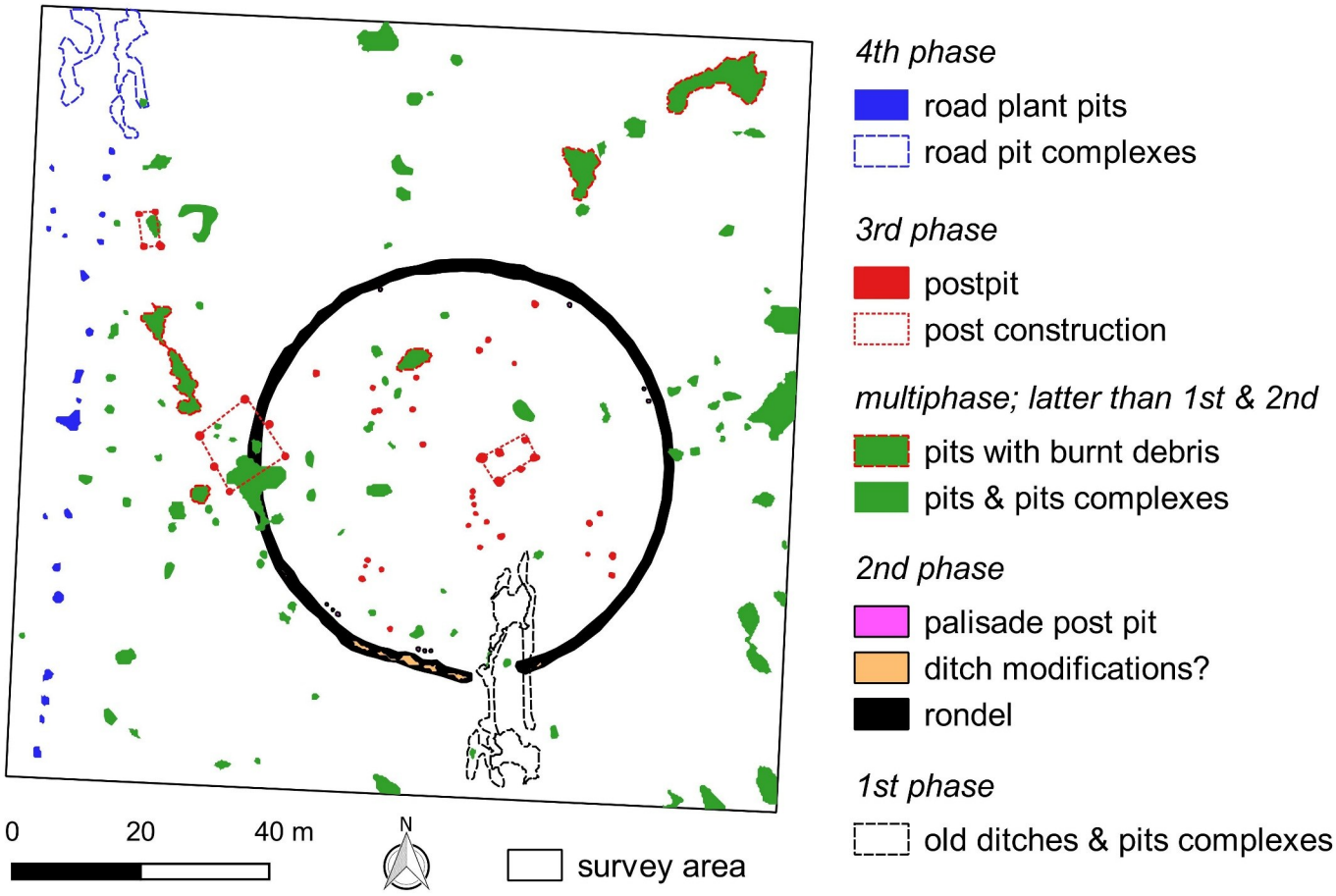

Figure 3. Sulzheim. Interpretation plan with designated time phases, derived from magnetic survey, magnetostratigraphy, aerial photographs, and historical maps. GIS Plan No. L 6126/246.

south-south-western section of the ditch, as well as at its ends near the southern opening/earth bridge. In these areas, the intensity values fluctuate significantly, reaching peaks of up to eight nanotesla. This variation may be attributed to subdivided ditch modifications introduced later within the existing structure, possibly as part of reconstruction or performative activities. Such phenomena are frequently discussed in the literature on Neolithic rondels (Schier, 2023). Several examples of multiple ditch modifications or reconstructions have been documented, particularly in Bavaria (e.g., Schmotz, 2007), in southeastern rondel clusters (e.g., Němecová-Pavúková, 1995), as well as in Austria (e.g., Sauter *et al*., 2023) and numerous other sites across their distribution range.

Regarding the ditch modifications, particularly at the southern opening of the rondel, a phenomenon known as magnetostratigraphy can be observed. This refers to the overlapping of magnetic anomalies, allowing us to determine which anomaly-producing feature lies stratigraphically deeper.

The circular ditch intersects older trench structures, which may represent the remains of an earlier Neolithic house, along with associated longitudinal pits and pit complexes. These features appear to belong to the earliest phase of the site (see 1st phase in Figure 3), while the overlapping rondel ditch, along with its modifications, represents the site's second phase.

Numerous posthole anomalies of varying sizes and magnetic intensities can be identified both inside and outside the circular ditch. While most of these post alignments do not appear to form a meaningful archaeological context, some run parallel to the ditch, suggesting the possible presence of a former palisade within the structure. We assume that the rondel, the remains of the palisade, and the modifications in the southern sections of the circular ditch can be broadly assigned to the same time phase. The absence of most palisade posts suggests significant site erosion over time.

Based on the identified postholes, three possible layouts of post-built structures can be reconstructed or discussed. Inside the circular ditch, there is a six-post structure measuring approximately 8 × 4 metres, oriented east-northeast to west-southwest. In the northwest of the surveyed area, a four-post structure measuring 5 × 2 metres is aligned in a north-south direction. At the western edge of the circular ditch, a larger post structure measuring 11 × 10 metres is visible, with its longer side oriented north-northeast to south-southwest. This substantial structure consists of six posts, which were likely once quite large, and may be associated with the pit complex to the south. Both

structures overlap the circular ditch, indicating that they must be of a later date. According to W. Schier and K. Gebhard, this large post-built structure could potentially be interpreted as a Late Bronze Age building.

Both inside and outside the circular ditch, several extensive pit complexes can be identified, some reaching up to 62 square metres in size. The thermoremanent anomaly characteristics of certain pits suggest they were filled with burnt debris. Assigning these structures to a specific phase remains challenging. However, since some of the pits overlap the rondel or features from the second phase, we assume they postdate both the first and second phases.

The fourth and most recent phase consists of remnants of an early modern path, up to 8 metres wide, cutting across the magnetogram from south to north in the west. This appears as a linear sequence of round anomalies of varying sizes, resembling planting pits. It is highly likely that this path once took the form of an avenue. The remains of this former avenue can be clearly traced further north outside the magnetogram in orthophotos and aerial images (Figure 1a). Additionally, a historical map refers to the adjacent northern field as "Hochstrasäcker", meaning "fields along the high road", further supporting this interpretation. The coarse-grained ceramic finds collected during the survey likely belong to this later phase, whereas no Neolithic pottery was found yet.

Initial conclusions and outlook

The detailed, non-invasive investigation of earthworks often begins with aerial archaeology. Experience has shown that such features often only become visible in aerial photographs when they are eroding and at risk of destruction – as is the case here. For this reason, we have now documented the circular enclosure using geophysical methods. Although the Sulzheim rondel cannot be reliably dated, current investigations offer valuable insights into its possible stratigraphic sequence and historical use. The analysis of magnetic anomalies reveals multiple phases of construction and occupation, ranging from a possible (early?) Neolithic settlement to an early modern road.

With this knowledge, we can now conduct a comparative analysis of the site. For the interpretation of the circular enclosure, the first three phases - along with specific characteristics of the second phase - are particularly relevant. Key indicators such as an outer diameter of 67 metres, remains of a palisade ring, an entrance aligned with a prehistoric settlement 500 metres away, and overlapping Bronze Age features all point to a Neolithic circular ditch enclosure. A true-to-scale comparison with similar rondels in Bavaria in Figure 4 shows that the greatest similarities in terms of size exist with the Ippesheim architecture, also located in the Main triangle approximately 43km to the south of Sulzheim (Fassbinder & Nadler, 1998; Schier & Gebhard, 2023). However, there are also clear differences between the two rondels, such as the number of entrances. Additionally, the circular ditch in Ippesheim is not a perfect circle.

The perfectly circular ditch shape and largely homogeneous ditch filling of the Sulzheim rondel are comparable to those of the Neolithic circular ditch enclosure of Schmiedorf (II) in the Lower Bavarian cluster (Figure 4). However, it should be noted that only half of Schmiedorf was recorded using magnetometry (Becker, 1990; Schmotz, 2007). Since the ditch in its northern section evidently underwent as little modification as that of Sulzheim, it was chosen as a reference for comparison. The Neolithic rondel in Bochum-Harpen (North Rhine-Westphalia), which is likely intensively modified and features multiple entrances, exhibits a similarly perfect ring to those at Sulzheim and Schmiedorf (II), with a diameter of 46

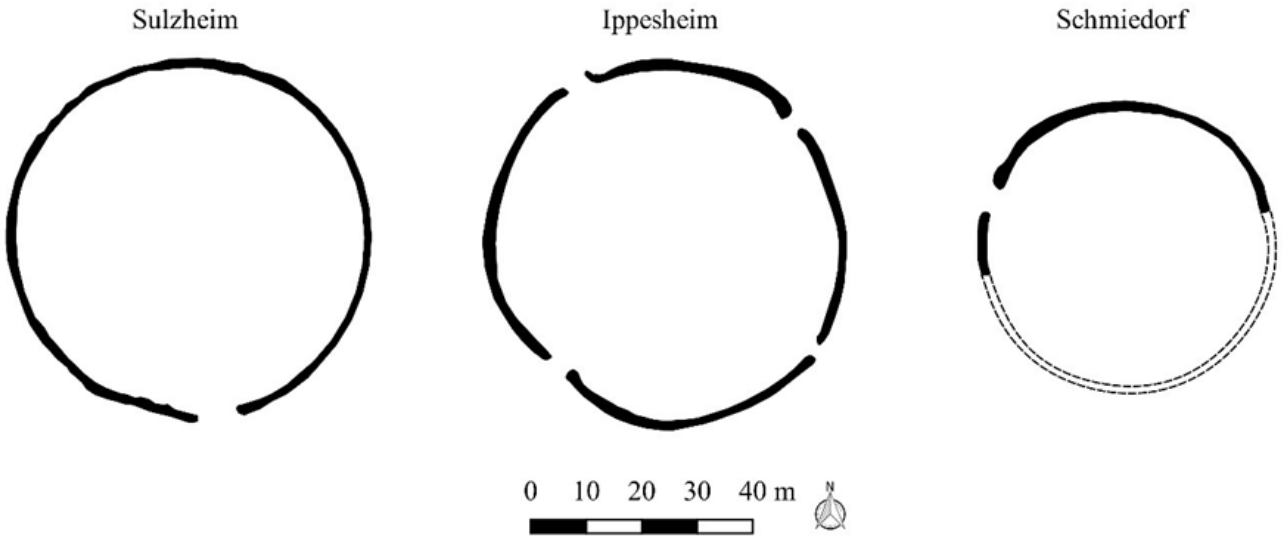

Figure 4: Comparison of the Sulzheim rondel (this study) with the circular ditch enclosures from Franconia (Ippesheim) and Lower Bavaria (Schmiedorf).

metres (Scharl et al., 2023). Structural features of Neolithic circular ditch complexes comparable to Sulzheim can also be found outside Germany, such as the roundels of Krpy and Želizy (Nos. 41 and 51 in Literski & Nebelsieck, 2012) in the Czech Republic, or the circular ditch complexes of Karnabrunn and Rosenburg (Nos. 78 and 94 in Literski & Nebelsieck, 2012) in Lower Austria.

In summary, although it cannot be guaranteed that comparable rondels across Europe confirm a Neolithic dating for the circular ditch of Sulzheim, the combination of the sum of other mentioned key indicators at least suggests a strong suspicion. Therefore, we will focus our future investigations on confirming the proposed dating by conducting a more detailed analysis of the ditch structure. Additionally, we consider a systematic survey of the geophysically-recorded area for the recovery of further surface finds to be worthwhile.

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Wazzat? Number 4

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In a revival of the 'Wazzat' series of questions to readers about features observed on aerial images, Rog Palmer describes an enigmatic feature from Ukraine. Any thoughts would be appreciated.

The archaeological landscape of our small patch of Ukraine (Palmer, *et al.* 2023; Palmer 2024) is dominated by mounds. These mostly are on higher ground, some form lines and groups and some of the groups match the appearance of known settlement sites elsewhere in Ukraine. To be indecisive, or better so as not to impose our western background on foreign archaeology, we call those sites habitation. There is also mostly bare soil evidence for a handful of promontory defences, a couple of likely hillforts and a few very small, embanked enclosures that mostly abut small watercourses and appear to use those as part of their perimeter. And there is the thing illustrated here that we are calling Rusalivka, after a nearby village. It was discussed in a photo reading group session on 7 March 2024 with no resolution and it has become a 'wazzat?' that we pass to a wider audience with Figure 1 providing context for the feature.

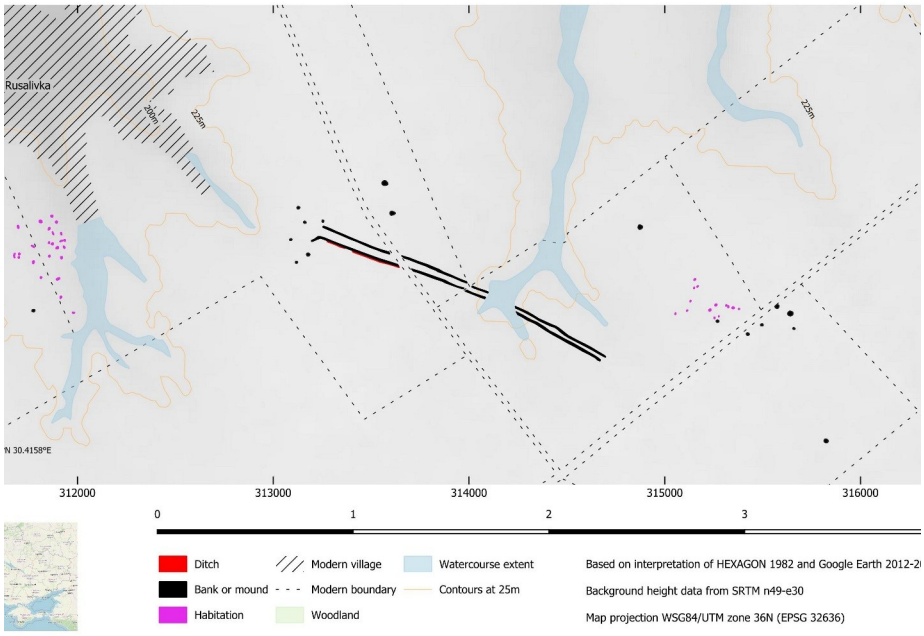

Figure 1. The parallel banks at Rusalivka are among the 'unknowns' that have arisen during our survey. The map shows them in their topographical, archaeological and recent context but doesn't provide an obvious explanation for them.

Appearance on satellite images

The feature was first noted during routine pinning and was visible on HEXAGON (18 May 1982) and all high-resolution Google Earth (GE) images that include the site (27 April 2012, 14 and 28 March 2014, 19 April 2017 and 14 October 2019). A later check was made on the freely-available CORONA photographs and it was visible on 6 October 1964 and 6 April 1971. On all dates it is visible predominantly as a string of light features – presumably banks or other hard material that shows plough damage – and there is a hint of an external ditch near the NW end of the western length on HEXAGON. Most of the breaks in the alignment are caused by recent field divisions and its form is unclear near its central point where is crosses or is crossed by a small watercourse. There seems to be an angled turn at the NW end, seen most clearly on HEXAGON and possibly masked on later dates by small boundary changes. The HEXAGON image is reproduced here (Figure 2) and should you want to check it in GE it is at: 49.1246°N 30.45056°E.

Thoughts

To a Western eye the first impression is of a small cursus – it has a length of

Figure 2. Hexagon photograph showing the feature and adjacent mounds at the NW. Image courtesy of the US Geological Survey. Entity ID: D3C1217-100073F025.

about 1500m and a maximum width between the banks near its NW end of 47m that narrows to 15-18m in its southern part. It changes direction slightly where it crosses the watercourse near its centre. However, it seems an unlikely candidate for a cursus which seem firmly to occur only in Britain and Ireland despite crop-marked candidates being claimed in mainland Europe (Kenny Brophy, email 26 September 2023). Eileen Kerhouant (a member of the photo reading WG) questioned if it may mark a route for stock through the area.

Are there parallels? Not really. Alex Kariaka had earlier discovered a parallel 'way' that appears to lead to or from the large Scythian mound at Ohuz (46.8746°N 34.4352°E some 390km SE of Rusalivka) and although recorded as parallel banks is otherwise dissimilar to our feature. The width between banks is about 50m and it has the appearance of a processional way that is 850m long.

Closer to our feature, to the South at Buky (49.1059°N 30.4720°E), are another pair of parallel light features – again possible banks or hard material. The photo reading WG thought these were of different character – short and sharp that appeared to be more recent in date and possibly related to the dammed rived to its west.

Questions

What may it be? We do not know its date and the proximity of its west end to a small group of mounds may or may not be of relevance to that. Figure 1 shows two small undated habitation sites we have identified – may it run between those? The majority of modern land use is arable and none of the images suggest boggy ground that a embanked route could have marked. Any thoughts?

References

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Does Anyone Read *AARGnews*?

Martin Fowler [1]

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Evidence indicates that AARGnews is downloaded and cited, confirming it is a credible publication having a moderate impact on aerial archaeology. However, low response rates to feedback surveys suggest a need to better engage readers.

Since taking on the mantle of leading the *AARGnews* Editorial Team, I've naturally wondered whether our publication is making the impact we desire. Initially planned as part of the editorial, this article tackles the issue by addressing two questions:

- Does anyone read *AARGnews*?
- Is it having an impact on the field of aerial archaeology?

We can try to answer these questions using evidence from three primary sources:

- Download statistics of recent issues from the AARG website.
- Responses to readership surveys.
- Article citation analysis.

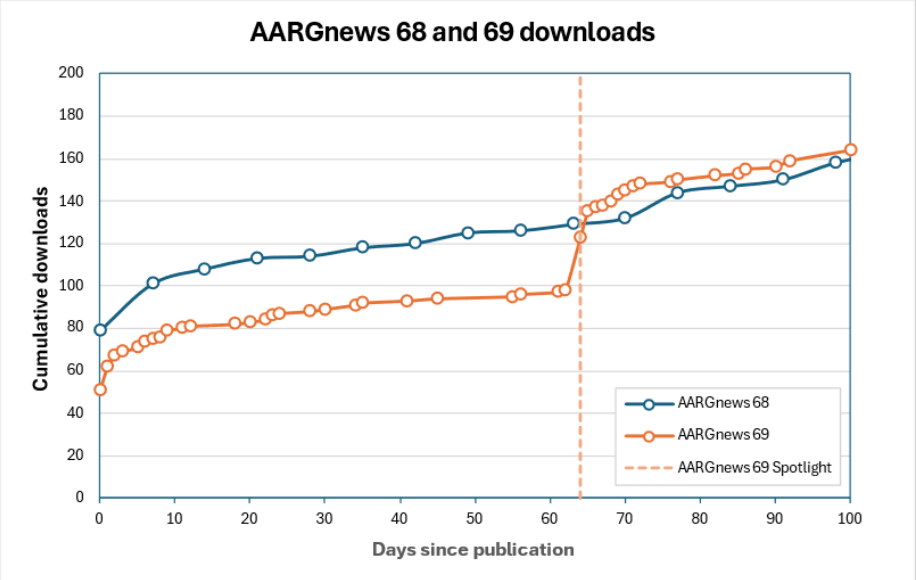

Figure 1. AARGnews 68 and 69 downloads.

Downloads

The download statistics for the past two issues tell an interesting story. On the day AARG members received the April 2024 email announcing publication of *AARGnews* 68, there was an immediate spike in interest, with 79 PDF downloads (Figure 1). Downloads climbed to 115 within a month of publication and continued to rise slowly, reaching about 160 by the 100th day.

In contrast, *AARGnews* 69, appearing six months later, had a different trajectory with 51 downloads on its release date, increasing to 89 within 30 days. A *Spotlight* email, sent about a month later, prompted a second surge in downloads, eventually matching *AARGnews* 68's download numbers 100 days post-publication. The reason for the slow post-publication uptake remains unexplained. It is possible that the publication announcement email may have been missed by a significant portion of our readership, or it may have become lost in the vastness of the internet. Anyway, the *Spotlight* email successfully drew attention to the publication of the new issue and copies were downloaded.

Surprisingly, the download figures for both issues by 100 days after publication mirrored our group's membership, which was 160 in August 2024. Unlikely to be a mere coincidence, the download spikes after the publication and *Spotlight* emails suggest most downloads were by AARG members. After 100 days, downloads levelled off at three or four per week, probably from new members and/or website visitors.

While it's encouraging to see that *AARGnews* is being downloaded, the question remains: are readers thoroughly engaging with the content or are they merely skimming through it? Or are they just downloading an issue and saving it in a folder for future reference?

Survey Responses

Readership surveys should provide a more direct measure of engagement with *AARGnews* content than download figures. However, our attempts to gauge readership engagement through such surveys have met with limited success. AARG's April 2022 survey to guide the

future of *AARGnews* had a disappointing 20% response rate (Fowler 2024). In the same vein, mini-surveys included in issues 68 and 69 yielded feedback from a mere 8 and 5 respondents, respectively. Given that engaged audiences typically yield a 40% response rate in online surveys (Wu, Zhao, & Fils-Aime 2022), our response rates are surprisingly low.

The cause of these low response rates remains unclear. Readers may be overwhelmed by the sheer volume of information available from various sources. Or the PDF might be harder to read than a printed copy, so people might have missed the requests for feedback.

Citation analysis

According to the *Publish or Perish* app (Harzing 2007; 2011) which uses Google Scholar to determine citation statistics[2], 140 articles published in *AARGnews* have been cited 841 times since 1990 (Figure 2). Whilst the increase in the total number of citations is broadly linear over time, some years show noticeable peaks when highly cited articles were published (see Table 1).

A well-known way to judge research is the h-index (Hirsch 2005), which measures both the quantity (number of papers) and quality (impact or citations) of publications. The most cited articles listed in Table 1 give *AARGnews* an h-index of 13 over the period 1990 to 2024; i.e., 13 articles have been cited at least 13 times each. While the index isn't as high as top-tier archaeological journals like *Antiquity* (estimated h = 159 over the same time period) or *Archaeological Prospection* (estimated h = 65), it is closer to popular monthly archaeology publications such as *Current Archaeology* (estimated h = 19) and *British Archaeology* (estimated h = 21)[3].

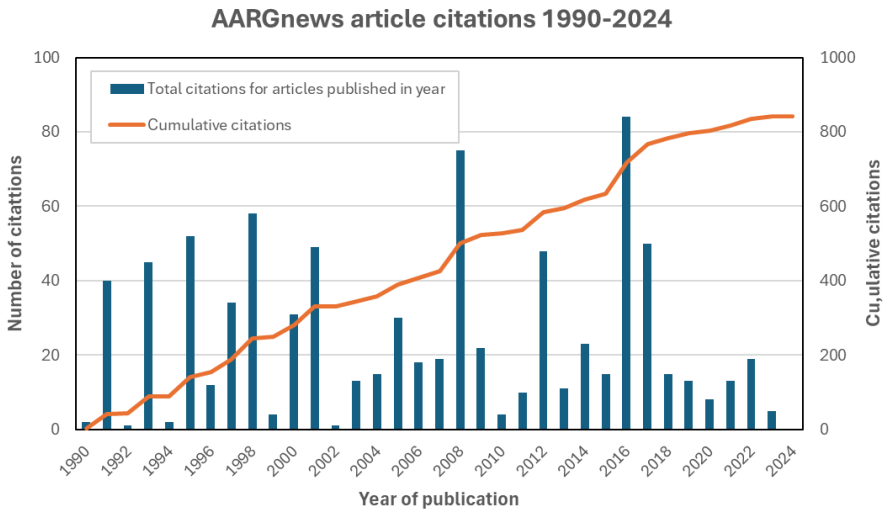

Figure 2. Citations to AARGnews articles recorded by Google Scholar. For each year in which the article was published, the number of citations to date are shown along with the cumulative number of all citations. The information cut-off date is 6th March 2025.

Rank	Authors	Title	Year	Cites
1	DC Thomas, *et al.*	The archaeological sites of Afghanistan in Google Earth	2008	63
2	A Traviglia, D Cowley & K Lambers	Finding common ground: Human and computer vision in archaeological prospection	2016	43
3	G Verhoeven	The reflection of two fields–Electromagnetic radiation and its role in (aerial) imaging	2017	40
4	MJF Fowler	Detection of archaeological features on multispectral satellite imagery	1995	36
5	A Traviglia & K Lambers	Automated detection in remote sensing archaeology: a reading list	2016	23
6	JGB Haigh	A new issue of AERIAL–Version 4.20	1993	23
7	I Scollar	AirPhoto–a WinNT/Win95 program for geometric processing of archaeological air photos	1998	21
8	D Motkin	The assessment of LIDAR for archaeological use	2001	17
9	N Holden	Digital airborne remote sensing: the principles of LIDAR and CASI	2001	16
10	M Doneus	Vertical and oblique photographs	2000	14
11	S Redfern	Computer assisted classification from aerial photographs	1997	14
=12	D Mlekuž	Messy landscapes manifesto	2012	13
=12	K Millican	Contextualising the cropmark record: the timber monuments of the Neolithic of Scotland	2006	13
=12	W Rączkowski	Dusty treasure: thoughts on a visit to The Aerial Reconnaissance Archives at Keele University (UK)	2004	13

Table 1. The most cited articles in AARGnews (1990-2024).

Comments

From this analysis it is clear that *AARGnews* is being downloaded and cited, and that it is a credible publication

[2] The advantages of using Google Scholar over citation databases like the Thomson ISI *Web of Science* or Elsevier's *Scopus* are that it is free and more comprehensive in its coverage (especially for the *grey literature*).

[3] The use of Google Scholar gives estimated h-indices for *Antiquity* and *Archaeological Prospection* that are higher than those reported by *Resurchify* (89 and 46 respectively); h-indices for *Current Archaeology* and *British Archaeology* are not provided by *Resurchify*.

making a moderate impact on aerial archaeology. However, the low response rate to reader feedback surveys shows that there is room for improvement in engaging our readership. The editorial team is working to enhance our communication and outreach efforts including raising awareness to libraries and issuing regular *Spotlight* emails to draw attention to its content. If you have any suggestions to improve engagement, please contact us with your ideas.

Ultimately, we are critically dependent on contributions from you, our readers, to make *AARGnews* a success. So do please think about writing something to tell others about your projects, work and interests in aerial archaeology.

Acknowledgement

Thanks to the AARG webmaster, Andrea Devlahović, for providing the data on *AARGnews* downloads used in this article.

References

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Harzing, Anne W. 2007. "Publish or Perish." https://harzing.com/resources/publish-or-perish.

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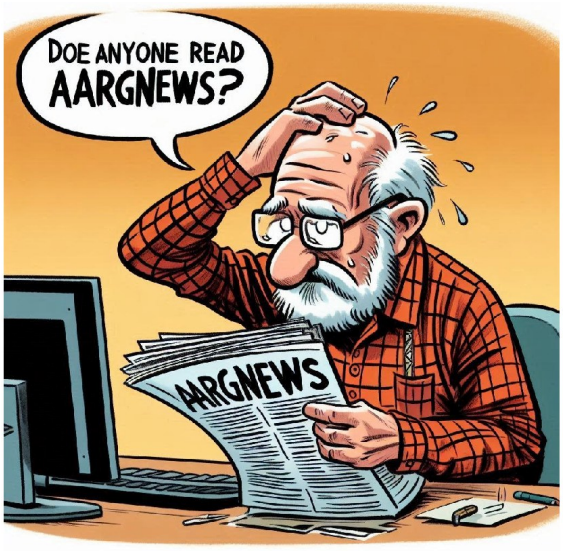
Hirsch, J. E. 2005. "An Index to Quantify an Individual's Scientific Research Output." *Proceedings of the National Academy of Sciences of the United States of America* 102 (46): 16569–72. https://doi.org/10.1073/pnas.0507655102.

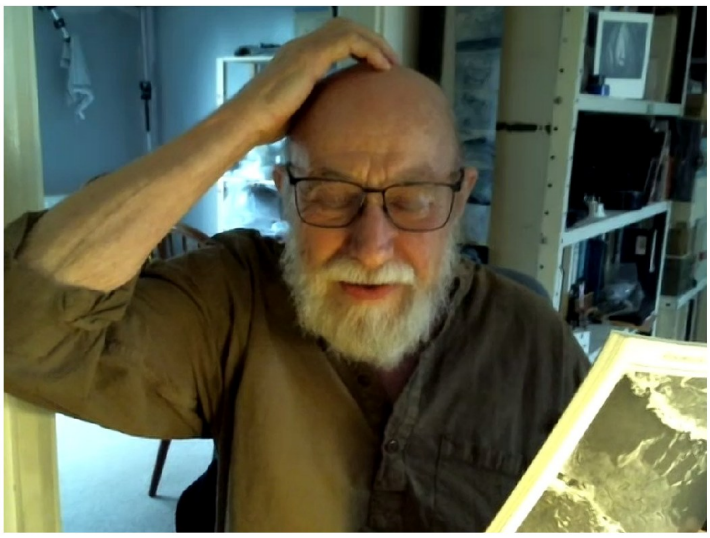
Wu, Meng Jia, Kelly Zhao, and Francisca Fils-Aime. 2022. "Response Rates of Online Surveys in Published Research: A Meta-Analysis." *Computers in Human Behavior Reports* 7 (May). https://doi.org/10.1016/j.chbr.2022.100206.

Lookalike ...

When Microsoft Copilot was asked to generate a cartoon of the editor wondering *Does anyone read AARGnews?*, the resulting image showed a remarkable similarity to the former editor, Rog Palmer, captured during a recent Zoom meeting[1]. What do you think?



Rog Palmer



AI generated image of the *AARGnews* editor

[1] Following the tradition of *Private Eye*, the captions have been reversed—Ed.

From the *AARGnews* Archive

April 2025

Martin Fowler [1]

[1] editoraargnews@gmail.com

The online AARGnews archive represents a valuable resource on Aerial Archaeology that spans over 30 years. Here we look back at what was topical in AARGnews 10, 20, and 30 years ago.

10 years ago (Issue 50, 2015)

This bumper 58-page issue opens with an editorial by Rog Palmer blending reflections on AARG 2014 held in Dublin with a tribute to the late Arnold Baker, one of AARG's Honorary Members. He considers how critical sharp eyesight is for air photo interpretation and even questions if regular vision tests should become standard for full-time interpreters.

The incoming chair, Rachel Opitz, wonders who can be relied upon to read the archaeological record in the landscape captured in an aerial image. She also highlights initiatives like the forthcoming AARG *Flying Circus,* a programme designed to inspire community groups to use aerial imagery to discover and understand their local environments.

The issue is further enriched by contributions from AARG 2014 and budding student researchers. Notably, Heater Papworth's article, in which she employs archival stereo-aerial photographs to reconstruct digital surface models of archaeological earthworks, and which earned her the prize for best student/young researcher contribution in 2014.

Olivia Mavrinac tackles broader themes, reflecting on the theory of field

survey, the allure – and potential pitfalls – of high-resolution imagery, and the challenges posed by emerging methods such as predictive or semi-automated mapping in the context of her fieldwork at Qa' Shubayqa in eastern Jordan.

On the technical front, Willem F. Vletter details a workflow for the semi-automatic extraction of roads and paths from Airborne Laser Scan data in forested terrains, while Mikolaj Kostyrko summarizes insights from the 2014 *LiDAR visualization and interpretation workshop* in Esslingen, Germany.

Looking ahead, Dave Cowley, Rachel Opitz, Axel Posluschny, and Armin Schmidt unveil plans for the launch of *ArchaeoLandscapes International* (ArcLand) that builds on the momentum of the EU-funded project *ArchaeoLandscapes Europe*. Rachel also provides notes on the last *ArcLand Europe* project meeting which convened in Frankfurt in February 2015.

Finally, in preparation for the AARG 2015 meeting in Santiago de Compostela later in the year, the committee provides some practical travel advice to prospective attendees including: ***Point 3***. *When booking flights make sure you check all dates carefully*.

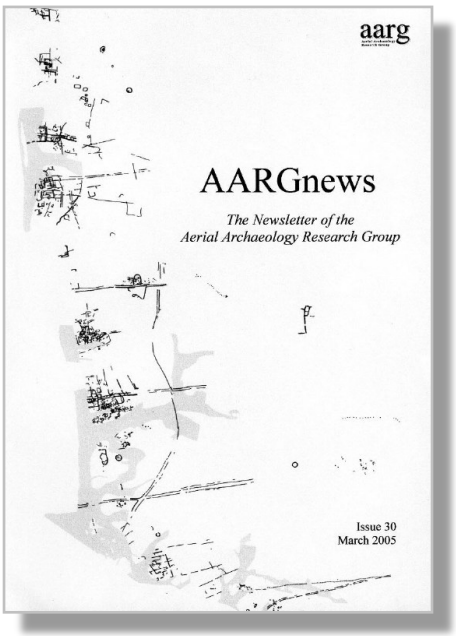
20 years ago (Issue 30, 2005)

The Editor pays homage to the late Jim Pickering – the intrepid amateur archaeologist aviator photographer who kept other members from stagnating too much with his firmly-held views.

Some thoughts are given on the future of *AARGnews* as it was considered by some that *AARGnews looks old-fashioned and as scruffy as its editor*. Should it be split into a six-monthly digital newsletter and an annual printed 'journal', or should it go totally digital? In the end, the first all-digital issue emerged two and a half years later in September 2007 with Issue 35 retaining the previous paper-like layout that broadly endures to this day.

In his Chairman's Piece, Toby Driver considers the Anglo-centric composition of the AARG committee compared with the breadth of AARG's membership. His Chairman's Pictures shows views of Radnorshire (central Wales) in the snow.

Martyn Barber recounts the ballooning escapades of the Reverend John McKenzie Bacon in the late 1800s. Indeed, Bacon may have been the first person to *fail* to take an aerial



photograph of Stonehenge. More than a century later and over 7,000km away, Karl Ryavec details his modern survey work in the ancient Tibetan kingdom of Guge, combining high-resolution *Quickbird* satellite imagery with field investigations of abandoned agricultural fields.

Irwin Scollar explains the correction of radial distortion in images taken with wide-angle lenses, while Peter McKeague introduces the *airphotofinder* website, which once granted remote access to the indices of the Royal Commission on Ancient and Historical Monuments of Scotland's aerial photographic collections. Today, this functionality has been adopted and expanded by Historic Environment Scotland's National Collection of Aerial Photography.

Tessa Poller and Rebecca Jones report on the *Cropmarx* session held during the Theoretical Archaeology Group's annual meeting in Glasgow and which aimed to demonstrate the potential of the application of theory to aerial archaeology. Continuing the meeting theme, Włodek Rączkowski and Martin Gojda report on the *International Conference on Remote Sensing in Archaeology* held in Beijing, China.

Finally, a detailed outline of the roles and responsibilities of the AARG Committee members serves as an informal invitation for applications to the role of AARG Chairman (*sic*).

30 years ago (Issue 10, 1995)

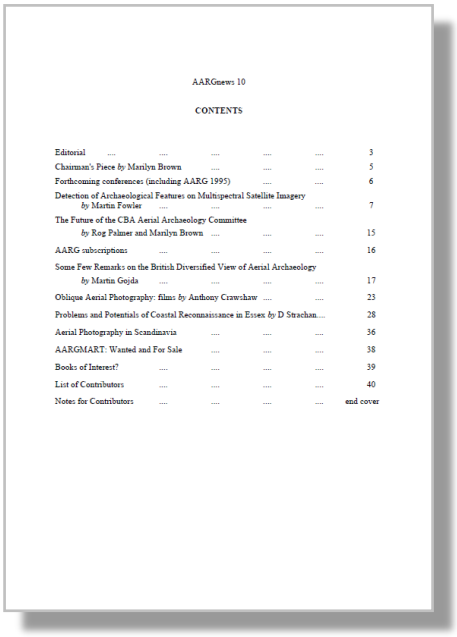
The editorial laments the lack of a written record in *AARGnews* of the *Aerial Archaeology in Central and Eastern Europe* meeting held in Kleinmachnow, Brandenburg, the previous September where AARG acted as a 'European Partner'.[2] The meeting provided the opportunity to meet archaeologists from the more distant parts of Europe who were new to aerial archaeology. Books were exchanged in preference to being sold (except by those who ran out of beer money!).

AARG Chair Marilyn Brown looks back at AARG 94 held in St Ives, Cornwall (my first AARG meeting!), and which had an emphasis on the application of aerial reconnaissance within a specific locality, in this case that covered by the Cornwall Archaeology Unit. The meeting included two thematic sessions, one concerned with small enclosures in Western Britain and Ireland, and the other with the recording of small islands.

In an article based on a poster presented at AARG 94, I describe a study of SPOT Panchromatic and multispectral LANDSAT Thematic Mapper imagery covering the environs of Stonehenge. Surprisingly, this is the 4th most cited article from *AARGnews* to date, despite the poor quality of its graphics.

Rog Palmer and Marilyn Brown report on the winding down of the Council for British Archaeology *Aerial Archaeology Committee* due, in part, to the success of AARG as a nationally representative group with specialist aerial interests. And in a piece that looks at the British view of aerial archaeology, Martin Gojda provides some thoughts about what we were doing and why?

[2] The papers presented at the meeting subsequently appeared in Kunow, J., (ed). 1995. *Luftbildarchäologie in Ost- und Mitteleuropa (Aerial Archaeology in Eastern and Central Europe).* Forschungen zur Archäologie im Land Brandenburg **3**. 1995. ISBN 3-910011-08-X.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CONTENTS

Films for oblique aerial photography are the subject of a technical article by Anthony Crawshaw. From the viewpoint of 30 years on, it provides a useful historical summary of what was being used at the dawn of the digital age.

Davie Strachan describes the problems and potential of aerial reconnaissance of the constantly changing inter-tidal zone of the Essex coast and notes that discovery and recording from the air must be seen as a primary stage of survey on the coast.

Moving away from the UK, Rog Palmer provides a translation by Ellen Wang of an article about aerial-archaeological investigation in Norway that appeared in the November/ December 1994 issue of *Magasinet SAS Norge*, the local version of Scandinavian Air Service's inflight magazine.

Finally, the first of what would become a short-lived series (i.e. two) of *AARGMART*, billed as 'an opportunity for exchange or barter', is followed by *Books of interest?*

Noticeboard

Compiled by the *AARGnews* Editorial Team [1]

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Useful information about AARG membership, the resources available to members, and various sources of funds for your studies.

AARG Membership

Membership is open to all who have an interest or practical involvement in aerial archaeology, remote sensing, and landscape studies. By becoming an AARG member, you become part of the community with its network, resources, and information. You also get a chance to share your ideas and research with other members.

As a member, you are eligible for participation in the different AARG Working Groups and the AARG Photo reading meeting, that take place once a month. You will also benefit from reduced conference fees and immediate access to the latest issues of *AARGnews* sent by email. You are also eligible to apply for the various AARG scholarships.

AARG members are kept informed via email of the annual conference, publication of new issues of *AARGnews* and occasional papers, as well as the occasional day schools which are arranged for the discussion of specialized topics.

Membership of AARG is open to individuals and institutions at following rates:

- Individual (£15 / €17).
- Student (£10 / €12).
- Institution (£25 / €29).

You can easily apply online for membership via the Membership page of the AARG website.

AARG YouTube Channel

AARG's YouTube channel is now live and operational! Currently, the channel showcases videos of presentations from the 2023 conference held in Zagreb and the 2024 conference held in York.

We encourage you to explore the channel, watch the videos, and subscribe to stay updated on future uploads. Your support and engagement are vital in promoting our group's research outcomes and fostering a collaborative academic community.

To access the Aerial Archaeology Research Group's YouTube channel, please go here: Aerial Archaeology Research Group - YouTube.

Facebook and Bluesky

Don't forget to regularly visit the AARG pages on Facebook and on Bluesky to keep up to date with what's happening.

AARG Google Group

The AARG Google Group is a virtual place where members can interact with each other, exchange ideas, share new finding or even advertise job opportunities and vacancies. You can join the group here. You must be an AARG member to join the group, so do join AARG if you are not yet a member.

AARG Fund

Since 2021, AARG has offered funding for its members and Working Groups for projects that further the objectives of the Group. Originally, applicants were required to have been members of AARG for at least two consecutive years or an employee of an organisation that has AARG corporate membership. However, in 2023 the Committee recognised that the requirement to be an AARG member for two consecutive years in order may not be achievable for most young researchers. Therefore, to include early career/masters students it was decided that the requirement could be waived if their supervisors would take responsibility for the quality of the project.

Funding for project work will preferentially be awarded to applications that demonstrably advance knowledge and understanding within the field of aerial archaeology. By this, we mean projects in support of one or more of the following broad purposes: field or desk-based work, publication (excluding journal publication costs), public engagement, collection of airborne remote sensing data, education and training (of an individual or a group).

Applications will be considered three times a year. The closing dates for bids to the AARG Fund are 15th of February, June, and October.

More information on who can apply, the scope of the Fund, as well as commitments expected of the successful candidate can be found on the Grants page of the AARG website.

AARG Student Scholarships

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

If you wish to apply for a scholarship, you should send an email to aargchair@gmail.com with information about your interests in archaeology and aerial archaeology, as well as your place of study.

The annual closing date for applications to the annual AARG conference is 31 May. Other meetings for which scholarships may be available will be advertised on an *ad hoc* basis.

ISAP Fund

The International Society for Archaeological Prospection 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.

Derrick Riley Bursary

The Derrick Riley Fund was established in 1994 to foster and support the study of aerial archaeology by young scholars. It provides grants to undergraduate and postgraduate students in the UK and overseas to fund research and further training in aerial archaeology. The fund is administered by the Department of Archaeology at the University of Sheffield. Further information can be found here.

AARGnews 71

AARGnews is published twice a year. It is a diverse and open forum for the discussion and exchange of new (and old) ideas related to aerial archaeology, remote sensing, and landscape studies.

Contributions for *AARGnews* 71 (October 2025) need to be with the Editorial Team no later than **15th September 2025**. Brief notes for contributors can be found on the next page.

And finally ...

Rog Palmer has drawn our attention to this image that was recently posted on the BAJR - UK Archaeology Facebook page. According to the post, the image was found on another site (now forgotten) and shows: *An artist's impression of an 'Airspeed Consul' in 1946, which was to be loaded with electronic divining equipment in a crackpot hunt for buried treasure in the Mildenhall area following the discovery of Roman silver at West Row during WW2.*

The illustration has the look of a drawing dating from the 1940s and close inspection confirms that the aircraft shown is indeed an Airspeed Consul, a twin-engine civilian aircraft converted from the military Airspeed Oxford. The area depicted also corresponds to the area of Suffolk where the Mildenhall Treasure was discovered in 1942, supporting its authenticity.

As for the *electronic divining equipment,* depicted in the illustration as a spiral between the aircraft and the ground, this may refer to possible ground-penetrating radar or metal detection technologies. However, 80 years ago such equipment was extremely rudimentary compared to today. Air-to-ground radar in the 1940s, e.g., the H2S ground-mapping radar used for bomber navigation, was still in an early stage of development and it would take another 50 years before a synthetic aperture radar flown on the Space Shuttle would detect archaeologically–related sub-surface features from an overhead perspective (albeit in the hyperarid conditions of the Sahara desert rather than the moist soils of Suffolk).

Back in the 1940s, airborne Magnetic Anomaly Detection (MAD) sensors were designed to detect targets the size of submarines, not small items of 'buried treasure'. And anyway, being a non-ferromagnetic metal, silver does not create a strong magnetic anomaly on its own. Thus, a MAD device would struggle to detect buried silver unless it was accompanied by ferromagnetic materials, like iron objects, which could provide a magnetic signature.

So, what do you think of this intriguing story? Could there be a grain of truth in it? Or was it a crackpot idea?

A reverse image search has so far failed to identify the original source of the image, so if you have seen it before, please let us know!

AARGnews – Notes for Contributors

The *AARGnews* Editorial Team [1]

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AARGnews is the bi-annual newsletter of the Aerial Archaeology Research Group. It is a diverse and open forum for the discussion and exchange of new (and old) ideas related to aerial archaeology, remote sensing, and landscape studies. Past issues can be found at https://aargonline.com/wp/aarg-news/.

We welcome articles of any length and format. You can write about your research, methods, techniques, case studies, reviews, opinions, or anything else that might interest our readers. We would particularly welcome the inclusion of photographs, images, maps, plans, or other illustrations to support your article. If you have any questions or suggestions, please feel free to contact us.

Other than the requirement for contributions to be in English*, there are no strict instructions for contributors, although there are some preferences which will help with the production of an issue as detailed below.

Format. Send your contribution as a .docx file with your last name and a short title in the filename (e.g., Jones-The dial of destiny.docx).

Articles should be up to a maximum of eight A4 pages in length including illustrations. For information, a typical page of text equates to approximately 700 words. Shorter informal contributions of three or four pages in length are also welcome. Longer contributions can be fitted in, if necessary, but may have to be held over to the next issue.

Please keep your formatting simple as we will edit your article to the *AARGnews* style. A single column of text on each page with figures and tables included where you would like to see them would be ideal. Footnotes should be kept to a minimum and certainly **not** used for references. They have to be manually inserted when setting up pages in Publisher and are a pain to manage. That said, authors' contact details (i.e., email address) are usually footnote 1.

Abstract. Please include a short abstract for articles longer than 3-4 pages. Three or four lines should suffice.

References. Include a list of references at the end of the article in alphabetical order using the Chicago Manual of Style format, e.g.,

> In the main text: Jones (2023).
>
> In the list of references: Jones, I., 2023. "Remote sensing and the search for the Dial of Destiny" *AARGnews* 67: 1-3.

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