

lssue 53 **Spring 2024**



A decade of innovation

Read how the National Trust has built creative web-based, mobile and desktop GIS solutions to help it achieve strategic priorities

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Smarter infrastructure management

Discover how organisations including Airedale General Hospital are using GIS to simplify the maintenance of large estates **PAGE 4**

A new approach to reducing emissions

Learn how gas distributor Cadent uses GIS to help it detect and halt methane leaks from underground pipelines

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Challenges and opportunities to create the world we want to see

"For every challenge that we face, there is an opportunity that we can pursue to create a better world"

writes Peter Wilkinson, Esri UK's managing director.

Our world is changing-and changes inevitably bring challenges.

Changes in climate can bring increased risks of flooding, storms, and drought; political changes and global conflicts can bring supply chain uncertainty; and changes in land use can bring traffic congestion or habitat loss.

All of these challenges—and more besides—are being addressed, all around the world, through the use of Esri's geographic information system (GIS) technology, ArcGIS. In the UK specifically, hundreds of organisations are using ArcGIS in imaginative ways to understand relationships between people, places, human activity, infrastructure, habitats and risks and respond to new challenges as they emerge.

One particular challenge, faced by many of Esri UK's customers, is that of infrastructure and property management, and there is a particular focus on this complex issue in this edition of ThinkGIS. In a feature on **page 4** you can read how Airedale General Hospital is using GIS to deal with the challenge of treating patients in buildings constructed with Reinforced Autoclaved Aerated Concrete (RAAC). Meanwhile, a separate article on **page 5** shines a light on how the gas distribution business Cadent is using GIS to maintain its pipeline infrastructure more proactively and address the challenge of methane emissions.

We shouldn't only focus on using GIS to address challenges though. For every challenge that we face, there is an opportunity that we can pursue to create a better world. GIS enables us to see new possibilities for effective conservation, sustainable economic development, improved healthcare and social justice like better access to green spaces, housing and community services. The Greater London Authority (**page 5**) is using GIS to help it accelerate house building in London, while Amey (**page 9**) has used GIS to plan more sustainable bus services that will meet the future needs of people in Plymouth.

Most organisations are simultaneously both addressing challenges and pursuing opportunities for a brighter future, and there is no better example of this than the National Trust. In our lead story on **page 3** you can read how the National Trust is using GIS to address the challenges of climate change whilst also using GIS to explore new opportunities to make its property more accessible to everyone. Its vision is for a future that is more resilient to risks and more equitable – and I commend it for that.

The changes that are occurring in our natural world are creating enormous challenges and presenting opportunities that we cannot afford to overlook. That's why I'm particularly proud of the work that is being carried out with GIS in the conservation sector by organisations like Fauna & Flora (**page 6**) that are studying the challenging impacts of habitat loss and acting upon opportunities to protect endangered species. Organisations across other sectors too are doing their bit, including the University of Warwick (**page 10**), which has created a digital twin to help it identify opportunities to manage its campus more sustainably.

Our changing world brings many challenges, but also many opportunities. And it's the opportunities we seize with GIS that will help us create the world we want to see.

Peter Wilkinson Managing Director, Esri UK

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A new look for ThinkGIS!



Esri UK's customer publication has been redesigned with sustainability in mind.

Regular readers of ThinkGIS will immediately spot that this issue has a brand new look. Previously published in a glossy magazine format, ThinkGIS has been redesigned as a newspaper. It is produced using FSC-certified, 100% recycled paper, from post-consumer waste, without the use of optical brightening agents. The paper is also manufactured in accordance with ISOcertified standards for environmental, quality and energy management.

This is the 53rd issue of ThinkGIS, and over more than two decades, the publication has changed design several times. Throughout this period, however, ThinkGIS has maintained its focus on showcasing the achievements of Esri UK's customers. Esri UK hopes that readers will pass this issue on to their colleagues or keep it for future reference, but when it is no longer required, it is 100% recyclable.

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Find out more >



The National Trust celebrates a decade of innovation

For ten years, Europe's largest conservation charity has been making extensive and creative use of ArcGIS to help it achieve its strategic priorities.



National Trust decided to implement a single, enterprise-wide, GIS platform. This strategic decision proved to be the catalyst for innovation and, today, more than 2,150 employees, as well as partners and volunteers, use ArcGIS-based solutions to help protect historic properties and ancient monuments, as well as enrich natural environments. The charity has an array of creative web-based, mobile and desktop GIS solutions, which help it to achieve strategic priorities, including preparing for climate change and ensuring everyone feels welcome.

It was in 2014 that the

Taking action on climate change

Recognising the growing risks arising from climate change, the National Trust has created an ArcGIS Hazards Map of the UK. This enables individual property managers to understand the specific climate challenges that pertain to their properties - such as flooding, higher temperatures or sea level rises - and mitigate risks. In another initiative, the National Trust has used ArcGIS together with remote sensing technology to help it protect its land and properties from the heightened threat of wildfires.

Many of Britain's river catchments have been adversely affected by climate change, as well as intensive farming and development. ArcGIS research is now helping the National Trust to plan its most ambitious river catchment regeneration project yet, to mitigate the impacts of climate change and create a more sustainable future for species that depend on stream and river environments. In Devon, for example, the organisation is working to reconnect streams with the floodplain, allowing the wider landscape to absorb the effects of flooding and creating better habitats for wildlife.

Making everyone welcome

The National Trust is increasingly using mobile ArcGIS apps and GPS data to gather information about what people enjoy doing, and it uses this insight to improve the visitor experience. For example, at Flatford in Suffolk, data from GPS devices was analysed in ArcGIS Pro to understand where visitors walk and spend most time. This information was then used in the 'experience design' process to help develop robust cases for future investments.

To widen access to its special places, the National Trust has undertaken ArcGIS-based studies to better understand the proximity of properties and green spaces to people living in urban areas and, in particular, areas of deprivation. The organisation has also used ArcGIS to engage more effectively with volunteers through crowd sourcing. In a pilot project in the Peak District, it has equipped

volunteers with ArcGIS mobile apps, enabling them to collect data on the condition of archaeological features on National Trust land and have a very positive and rewarding experience volunteering for the Trust.



An analysis of visitor movements at Flatford in Suffolk, conducted with ArcGIS Pro to help enhance the visitor experience.

Achieving smarter infrastructure management

Managing, maintaining and developing infrastructure within properties, across estates and throughout the country can be dramatically simplified with ArcGIS.

Many organisations need to manage existing infrastructure, ranging from underground pipes and street lights to individual buildings and commercial facilities. Some need to maintain or upgrade aging infrastructure like rail networks, healthcare facilities or sewers. Others are planning new infrastructure for the future, including new bridges, houses and networks of electric vehicle charging stations.

In all these scenarios, organisations can use ArcGIS to develop a smarter approach to infrastructure management. ArcGIS can be the foundation stone of a digital twin that provides clear visibility of the locations, condition and composition of assets. Mobile apps can be created with ArcGIS to improve the efficiency of infrastructure inspections and site surveys, while web apps, dashboards and StoryMaps can be used to share insight into

maintenance issues, management plans and proposed new projects. Organisations can, therefore, transform the way that they manage, maintain and optimise their infrastructure investments whether they are responsible for single structures, large estates or networks of assets covering huge geographic areas.

Airedale General Hospital, West Yorkshire

Managing infrastructure risks

Opened in 1970, Airedale General Hospital was constructed with RAAC. 83% of the floors, walls and ceilings contain RAAC, so continuous inspections and remediation works are required to ensure that the building remains safe and operational. Staff use a mobile app, built with ArcGIS Field Maps, to regularly inspect the 20,000 RAAC

planks that are at risk of degradation and crumbling. They use the app to record warning signs such as cracks, deflection and moisture, collecting information, photographs and location data that is instantly visible to colleagues. This ArcGIS inspection process is 50% more efficient than the organisation's previous paper-based approach and delivers far more accurate and reliable information about changes in the overall risk profile of 52 hospital departments. Internal and external stakeholders have improved access to data and reports, enabling them to take appropriate and effective action to reduce risks, when necessary.



Heathrow Airport Optimising the use of space

The property team at Heathrow, the largest, busiest airport in Europe, manages a portfolio of on-airport properties including 1.4 million square metres of commercial accommodation for more than 280 tenants. Using ArcGIS Online and ArcGIS Indoors Information Model, the team has linked data from its property management system to a floor aware map of the 26,000 spaces across the airport. Called Space Manager, this foundational digital twin of Heathrow's commercial property is enabling the team to navigate and understand complex spaces. Space Manager Explorer is a data viewer built using ArcGIS Experience Builder that provides operational staff such as asset managers with new insight into the airport estate. The property management team has access to new dashboards to help it monitor and report on commercial spaces at the airport. With a more accurate, up-to-date inventory of its properties, the organisation now has a single version of property information to make faster, better decisions about the use of space around the airport, providing a better experience for employees, airlines and ultimately passengers.

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Cadent adopts new approach to reducing emissions



Committed to reducing its environmental impact, the UK's largest gas distribution business is using ArcGIS to help detect and halt methane leaks from underground gas pipelines.

Cadent aims to reduce the quantity of methane that leaks from its network by more than 30% by 2030. The organisation has responsibility for a staggering 131,000 km of pipes, so finding the sources of emissions has long been an enormous challenge. Now, however, Cadent has worked with its partner Picarro to fit scientific environmental monitoring instruments in survey vehicles that can accurately detect methane emissions within a 200 metre radius.

This emissions data is transferred seamlessly from Picarro to ArcGIS Online, where it is presented visually, overlaid onto digital maps of the gas network. Consequently, staff at Cadent can, for the first time, see focus areas with high levels of emissions and implement proactive maintenance to precisely target these locations. In one particular area, this ArcGIS-driven strategy has already reduced emissions by 90%.

Significantly, Cadent is using the insight from ArcGIS to help it make better-informed decisions about which mains to replace first, as part of its statutory duty to upgrade aging pipes. In this way, it expects to increase the abatement of emissions by 40%. Data from ArcGIS Online is also being used in conjunction with artificial intelligence to calibrate a new predictive model for leakage across the entire network, which will facilitate better emissions reporting and target-setting.



The Cadent Network Emission Management Dashboard showing the location of methane emissions (with fictional data).

Greater London Authority gives house building a boost

In an ambitious initiative aimed at accelerating house building in London, the Greater London Authority (GLA) has consolidated and enriched planning data from 35 planning authorities.

Building more genuinely affordable homes to buy and rent is one of the Mayor of London's top priorities. Yet, developers operating in the capital often found it hard to find relevant planning information, as it was locked away in documents, spreadsheets and disparate systems, not just within the GLA but also



GLA's Planning DataMap, powered by an ArcGIS web service.

within 33 London boroughs and two additional planning authorities.

To completely remove this obstacle and help speed up the delivery of new homes, the GLA standardised and consolidated around 3,500 separate datasets from the 35 organisations, using ArcGIS Enterprise. It then created a series of ArcGIS web map services to serve up the datasets, making it far easier for anyone to find, view and download the planning information they need. Developers, landowners and local authorities can therefore now see all available planning information

within and across all London boroughs, all in one place.

The GLA anticipates that the ArcGIS web map services will play a key role in supporting the UK Government's commitment to prioritising brownfield developments. Planners in commercial businesses and local authorities alike can use the data served up by ArcGIS to identify brownfield opportunities more easily. They can put together well-informed planning applications that are less likely to be turned down, as constraints have been properly accounted for, and therefore accelerate the house building process in London.

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Fauna & Flora empowers people to save nature

The international nature conservation charity is empowering employees, partners and communities alike with the insight they need to protect threatened species.





Cao Vit Gibbon (Nomascus nasutus) female.

Fauna & Flora's Vietnam team and rangers undertaking fieldwork.

Fauna & Flora operates around the globe, helping to protect all kinds of threatened species - from pygmy hippos and leatherback sea turtles to ancient magnolia trees and seagrass meadows. Since implementing ArcGIS organisation-wide, the charity has increased its GIS usage by 580% and completely transformed the way that it analyses, visualises and communicates its conservation priorities.

175 employees across 20 countries now use ArcGIS to analyse geospatial data,

collect data efficiently in the field and share information. As a result, staff at the charity are empowered with a deeper understanding of the challenges of climate change, pollution, deforestation and habitat loss and can use this insight to inform conservation projects. They can visualise landscapes and monitor patterns across time and location to clearly identify where conservation activities are most needed and plan effective interventions.

Fauna & Flora also uses ArcGIS to empower local communities and partners to work collaboratively and make better decisions about how to protect nature near where they live or operate. The charity uses ArcGIS StoryMaps, web apps and dashboards to share its insight in visual, interactive and meaningful formats with a wide range of stakeholders, from national authorities and multinational organisations to small, local community groups. In this way, it builds support for its conservation projects and helps everyone to understand the urgent need to safeguard nature and wildlife.

Product in the **SPOTLIGHT**

ArcGIS StoryMaps

Incredibly versatile and easy to use, the ArcGIS StoryMaps app enables organisations to share information in an attractive, interactive and engaging format.

ArcGIS StoryMaps can be highly effective for conveying complex data, raising awareness of issues and engaging the interest of communities. Whatever the story they want to share, storytellers can use the ArcGIS StoryMaps app to:

- Select from a variety of design themes and layout options and create visually appealing, professional-looking content
- Embed interactive ArcGIS web maps and apps, alongside text, photos and videos to highlight trends and build understanding
- Directly add simple maps with the 'express maps' tool and include points, pop-ups and arrows to convey key messages

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• Share your stories securely with internal audiences or publish them externally to communicate with partners, communities and other stakeholders

Explore StoryMaps online Find out more >

ArcGIS StoryMaps make it easier for employees, partners and local communities to understand conservation priorities, focus their efforts on the ground and work collaboratively to make a difference."

Harriet Branson Technical Specialist, Remote Sensing and GIS, Fauna & Flora



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Introducing our latest GIS Heroes

Esri UK is continuing to acknowledge the achievements of the UK's most innovative and inspiring GIS professionals. In organisations all around the UK, there are some exceptional people who are using GIS to make a real difference to people's lives, restore our natural world and drive innovation in business and public service. Esri UK is shining a bright light on the work of these inspiring individuals through its ongoing 'GIS Heroes' programme. The GIS Heroes section of the Esri UK website currently showcases the stories of fourteen GIS professionals, all of whom have used Esri's ArcGIS technology in creative ways or made a notable contribution to the GIS community. Working in not-for-profit organisations, police forces, commercial businesses, conservation groups and rescue services, they have demonstrated

their ability to apply their GIS skills to an array of industry, environmental and societal challenges.

The first GIS Heroes were acknowledged in 2020 for the many innovative ways in which they were using GIS to address the urgent and unprecedented challenges of the COVID pandemic. Early GIS Heroes included Stuart Hill from Scottish Water, who developed a GIS approach to supporting vulnerable customers during lockdowns, and Stuart Lester from Transport for West Midlands, who used ArcGIS to analyse and identify essential transportation services for key workers. Today's GIS Heroes face different pressures, but are making an equally positive impact on the world.

James Coles

For nearly thirty years, engineer James Coles has been pulling on his boots day and night, in storms and blizzards, to search for people lost and injured in remote mountainous areas of Scotland. As the team leader for the Moffat Mountain Rescue Team near Lockerbie, he has used GIS to develop a unique planning system to support complex life-saving rescue operations.

Claire Wood

In a self-initiated project, Claire Wood, a scientist at the UK Centre for Ecology & Hydrology (UKCEH), has used GIS to digitise and enrich archived paper records from decades-old field studies. Consequently, data from the 1950s, 1960s and 1970s can now be easily compared with recent surveys to improve understanding of climate change and biodiversity loss over time.





If you have a colleague or a partner who you believe is worthy of recognition, let us know!

Email your GIS Hero nomination to marketing@esriuk.com

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Visit the Esri UK website to read James' and Claire's stories. Find out more \rangle

Creating a truly **Sustainable** organisation

All kinds of organisations are increasingly turning to ArcGIS to help them become more sustainable - environmentally, socially and economically. Organisations today are well aware of the importance–and indeed urgency - of improving their sustainability. However, operating sustainably doesn't just mean protecting natural resources. Alongside conserving the environment and enriching biodiversity, sustainable organisations also have a responsibility to consider social and economic factors, such as reducing risks to public health, offsetting carbon emissions, ensuring transparency and traceability across global supply chains, delivering equitable access to services and reducing waste.

Environmental sustainability

Nature conservation organisations like Natural Resources Wales have long been using ArcGIS to monitor environmental changes and gain insight to inform new habitat restoration programmes. Now, however, corporate and public landowners, such as NHS Fife, are adopting ArcGIS to help them understand habitats across their estates and manage their land in a more sustainable way. With the introduction of new legislation on Biodiversity Net Gain, housing and infrastructure developers are also employing ArcGIS to understand the environmental impacts of their projects. Many of Esri UK's customers, including Anglian Water, already make effective use of ArcGIS visualisation tools to demonstrate biodiversity improvements over time. Meanwhile other customers are using ArcGIS to collaborate effectively with partners and not-for-profit organisations on joint carbon offsetting projects like tree planting and peat bog restoration.

Social sustainability

A wide variety of organisations are using ArcGIS to understand impacts on society, promote equity and help people live better, more sustainable lives. As Fera Science has demonstrated, ArcGIS can be used to help decision makers balance the needs of agriculture and the environment, so they can plan more effectively to protect food security. Equally, housing associations, such as Thirteen Group, use ArcGIS to better allocate their resources and help make their communities sustainable, safer and healthier. The City of London Corporation has used ArcGIS to model sea level rises along the Thames and better understand the risks for local communities and businesses. Whatever their sustainability story, organisations can use ArcGIS Story Maps, maps and dashboards to publicise their goals and achievements in an engaging way and promote the integrity of their brand.

Economic sustainability

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Partly through legislation and partly through consumer pressure, organisations now face greater scrutiny and need to contribute to an economy that is prosperous but neither unfair nor harmful for the environment. Esri UK has many customers in the energy sector, like Statkraft UK, that are using ArcGIS to accelerate the transition to clean energy and facilitate the UK Government's net zero ambitions. Other organisations are reducing their carbon footprint. Doncaster City Council, for instance, has reduced unnecessary litter collection journeys with insight from ArcGIS. A critical part of sustainability is improving business resilience and insurers including Willis Towers Watson are using ArcGIS to share global threat intelligence with corporate clients so they can mitigate future risks to their business operations.

The ultimate goal is to drive a collective ambition for sustainable operations - a harmony of all three of these pillars of sustainability. Using ArcGIS in so many different ways, Esri UK's customers are moving towards this future and becoming truly sustainable organisations.

Amey reveals fresh insight from big data

The sustainable infrastructure company has used ArcGIS to turn big data into a valuable transport planning tool.

Working with big data can be enormously challenging, as Amey discovered when it began to analyse anonymised mobile phone data and study changes in demand for bus services, on behalf of Go Ahead Group, the operator of Plymouth CityBus. Amey's dataset of people movements included five million observed trips undertaken in Plymouth in a single month and extended to tens of millions of rows of data.

Amey successfully processed and analysed all this abstract data with ArcGIS, gaining a far deeper understanding of journeys within the city. Using powerful tools in ArcGIS Pro, it built links between journey origins and journey destinations. It then leveraged spatio-temporal data, to reveal when people travelled, by time, day of the week and school term or school holiday period, learning from the movements of thousands of mobile devices.



To add value for its client, Amey subsequently visualised the findings of its geospatial analysis on a series of ArcGIS Dashboards, creating a versatile transport planning tool. These dashboards display mobile network data for 850,000 daily journeys on interactive maps, making it easy for Go Ahead Group to identify patterns in journey types. Transport planners can, therefore, now make evidence-based, data-driven decisions about the future of bus services in Plymouth and plan bus routes in the right locations, by time and season, to capitalise on demand.



Amey's ArcGIS Dashboard allows users to easily understand trip patterns for any time period, considering mode, type of day and holiday period.

The project was technically challenging due to the enormous volume of data to process, but ArcGIS enabled us to remove the complexity and make millions of rows of data understandable to everyone."

Kieran Fitzsimmons GIS National Lead, Amey

Product in the SPOTLIGHT ArcGIS Dashboards

This no-code app builder, available with ArcGIS Online and ArcGIS Enterprise, makes it easier than ever for organisations to understand their dynamic data.

Dashboards are simple to configure and can include interactive maps, charts, lists and gauges to make data easy to understand. The dashboards can be tailored to any audience, typically employees, partners or members of the public, to help people visualise trends, monitor the status of situations in real-time and find answers to questions.

Dashboards can be:

- Strategic Helping executives to track key performance indicators and make better-informed decisions
- **Tactical** Allowing business managers to understand dynamic situations and plan responses
- **Operational** Enabling staff to more precisely monitor the progress of projects, programmes of work and events
- Informational Sharing information in a meaningful way with audiences including stakeholders and customers

Learn more on ArcGIS Dashboards online Find out more >



University of Warwick builds a 'Digital Campus'

To improve campus management, this leading university has created a 3D digital twin of its 200+ hectare estate.

As part of a bold vision entitled 'Warwick 2030', the University of Warwick aims to create an energy-efficient, 'green' campus, rich in biodiversity. Initially, its plans to manage its estate more sustainably were hampered by siloed data, but it has now consolidated critical information on natural and man-made assets, from wildlife species to streetlights, in a digital twin of the entire estate.

Known internally as the Digital Campus, this 2D and 3D interactive mapping solution makes it far easier for the university's Estates Team to visualise opportunities for improving efficiency and sustainability. For example, an interactive 3D campus map clearly shows where solar panels have been installed over time, and how each individual building contributes to the university's carbon saving targets. Meanwhile a dashboard shows all species sighted across the campus, such as hedgehogs and grass snakes, and is used to inform biodiversity improvement projects.

The university developed the Digital Campus with ArcGIS technology accessed through a Chest Agreement for the education sector. As usage of the Digital Campus expands, the Estates Team anticipates that it will deliver significant improvements in operational efficiency. Already, the team has used the digital twin to combine and analyse data on trees and underground services, to quickly pinpoint locations where roots may be causing damage and then facilitate efficient, targeted repairs.

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Higher Education Domore with GIS

Over 120 universities in the UK use ArcGIS to teach geospatial thinking across a range of subjects from archaeology to zoology - but they could be doing so much more.

Jisc's Chest Agreement enables universities and colleges to license software such as ArcGIS at a significantly discounted rate, enabling them to use the software expansively across both teaching and research. However, they don't always realise that this licence can extend their use of ArcGIS beyond their lecture theatres and classrooms.

With a site licence, universities and colleges can use ArcGIS-at no additional cost-to help them run their campuses or develop their operations. Digital mapping can be highly effective for identifying ways to improve the student experience, manage sustainability or plan the expansion of facilities. Equally, geospatial analysis can provide insight into student applications and be used to inform more targeted and successful marketing strategies.

For more information about how to optimise the use of GIS in higher education, contact **highered@esriuk.com**. ArcGIS provides the ability to view lots of information, understand and question campus performance and make quick analyses of situations, which leads to better strategic decisions."

Jo Bishop Head of Estates Information and Systems, University of Warwick



Buildings are colour coded according to energy consumption in the University of Warwick's 3D Digital Campus.

Esri UK Annual Conference

14 May 2024 | QEII Centre, London

Esri UK's Annual Conference is the UK's leading GIS event, providing seasoned GIS professionals and newcomers to the industry with an unequalled opportunity to learn more about the power of geospatial technology.

Make the most of the day

The event features presentations from Esri UK customers, who share their experiences and explain the benefits they gain from using ArcGIS. It also includes a partner exhibition, an industry zone, a technical showcase, training workshops and talks from ArcGIS product experts. Whether you are attending the conference in 2024 or considering registering for next year, the below information should help you make the most of the day.



Esri UK Annual Conference | 14 May 2024 | QEII Centre, London

Agenda

To ensure you get the maximum value out of your day, please take some time to plan the sessions you want to attend in advance.



