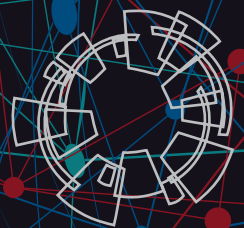


ACE

Accelerated Capability Environment

ANNUAL REVIEW 2018/19



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ACE is a vital part of our response to these challenges

Foreword by Richard Alcock CBE, OSCT Chief Operating Officer

The online environment, enabled by various new technologies and applications, is being exploited by those wishing to commit crime and do harm. This environment is evolving rapidly, presenting our law enforcement and security agencies with constantly-changing and highly complex challenges.

The Accelerated Capability Environment (ACE) is a vital part of our response to these challenges. It plays a key role in the development of capabilities that will help bring people to justice and reduce harm. This includes equipping our police and security officers with the tools and technology to detect internet crime, keep children safe from online predators, and disrupt terrorist threats to the public and our national infrastructure.

Digital investigative capabilities are essential in tackling serious and organised crime, which costs the UK economy an estimated £37bn a year. They are essential on countering the terrorist threat and enabling a very broad array of other law enforcement activities. National services, such as the Communications Data and Lawful Intercept partnership, deliver vital tools that enable operation partners to protect the public.

The Accelerated Capability Environment is a model of successful partnership between government, industry and academia. It does exactly what its name suggests; it accelerates the delivery of the capabilities that are required in a fast-changing threat landscape. Its work in developing mission-led solutions to digital and data challenges is part of a wider innovation ecosystem within the Office for

Security and Counter-Terrorism (OSCT). The Joint Security and Resilience Centre (JSaRC) in OSCT works closely with industry and academia to drive delivery of a broader array of solutions whilst also supporting the growth of the security sector.

At the heart of ACE is the Vivace industry and academic community, whose organisations and individuals are essential to delivering mission impact to those on the front line. There is plentiful evidence of that impact. Internet-enabled investigations, reducing the harm from child sexual exploitation and abuse, tackling the insider threat in critical national infrastructure, the future national platform for communications data and internet connection records, to name a few.

Beneficiaries of ACE innovation include not only the Home Office but organisations such as the National Crime Agency, GCHQ, the Metropolitan and other police forces, the Department for Transport, and national policing's Cyber Specials & Cyber Volunteers programme.

Whenever I visit the ACE Space at Tintagel House I am always struck by the energy and dynamism of the teams that are taking forward various initiatives. It is a place where things get done well; government and a wide range of partners working together to make a real difference.

The ACE is now a proven model for solving difficult problems. It stands ready now to tackle a wider set of challenges.



SOLVING FAST-MOVING FRONTLINE CHALLENGES



**ACE is a
digital factory
for innovation,
collaboration
and creation**



Introduction by Toby Jones, Head of ACE

As we forge into our third year, I am immensely proud of what we have achieved in building ACE. We have created something special, something unique.

ACE was established in response to the need for a different way to understand, situate and respond to the digital world around us and, in doing so, to match the blistering pace of technological change.

The result is, effectively, a digital factory where we innovate to find the best solutions to digital and data challenges that arise in our security and safety mission front line – the community that works to keep us all safe.

We exist to accelerate new capabilities into the hands of frontline officers. To do that, we need to be creative and innovative.

Our mission is to drive understanding of a fast-moving external environment, identify the problems, find solutions and press them into service quickly.

Rather than merely reacting to these powerful external forces, we harness them by bringing the brightest minds that are advancing that digital and data environment across industry and academia into our innovation community.

Within our digital factory you will find people from multiple disciplines with an instinct for problem solving in common. You will find a set of technologies that encourage collaboration. You will find commercial arrangements that allow us to very quickly and fluidly build and deliver new solutions, while reducing costs.

As the future capability for national security and policing develops, ACE's vision is for our approach and experience to become baked into the ways of working across policing, security, national agencies and Whitehall.

I want to see ACE powering forward solutions relating to data-enabled investigatory powers, to allow policing and security agencies safe, compliant, ethically sound and responsive use of data.

Our first customers were in the Communications Data / Lawful Intercept (CD/LI) Service Partnership and our work on their mission challenges made clear how the value derived from ACE can be maximised by providing it as a scalable platform to all sorts of different security and safety challenges.

Across national agencies, government departments and policing, everybody is struggling with how best to respond to the pace of change in the world around us.

Traditional approaches deliver solutions in months and years. ACE innovates at the speed of the problem to create mission impact in weeks.

And so ACE is growing, the ACE Space expanding and our reach is extending.

What we do

The Accelerated Capability Environment (ACE) solves rapidly-changing digital challenges facing law enforcement and national security agencies. We bring together expertise from industry and academia to innovate collaboratively and create mission impact at pace – typically weeks and months, rather than the months and years typical of large delivery programmes.

ACE is a Home Office capability that was founded by the Office for Security and Counter-Terrorism (OSCT) in March 2017. ACE's original priority was to solve front line challenges in the areas of communications data (CD) and lawful intercept (LI). As ACE has grown, it has been able to apply its approach of industry-led innovation and co-creation more widely, addressing public safety and security challenges.

We have successfully delivered solutions in the fields of online child sexual abuse and exploitation, counter-terrorism, the insider threat to critical national infrastructure, implementation of the Investigatory Powers Act, desistance and disengagement of extremists, cybercrime, and national policing's cyber specials & cyber volunteer scheme.

ACE is powered by Vivace, a community of multi-disciplinary organisations and experts drawn from industry and academia who collaborate to deliver highly innovative solutions at pace. The Vivace community now numbers more than 150 members, from individual subject matter experts, through to SMEs and large multi-nationals.

Vivace makes it simpler for small and medium-sized companies to work with government customers. And it makes those customers more responsive by providing access to agile, cutting-edge skills and capabilities that had previously been out of reach. ACE has created an environment for collaborative innovation, with the ACE Space at Tintagel House providing a place for co-location of people and with technology that makes it easy to develop solutions and work with data securely.

In addition to delivering solutions for our customers, ACE has identified five campaign areas where we proactively seek to innovate and identify opportunities to apply previously successful solutions to fresh challenges:

- Reducing the harm from Online Child Sexual Abuse and Exploitation
- Mainstreaming the Internet in Investigations
- Smarter Data for Smarter Operations
- Attribution Despite Anonymity
- Closing the Digital Skills Gap



Reducing insider threats to airport security and air travel

Government and law enforcement agencies are working hard to manage and respond to a constantly-evolving and complex insider threat at UK airports.

The challenge presented to ACE was to test the concept of having a single secure system to enable quicker and more efficient airside security checks in order to ensure early compliance with strict new EU legislation – coming into force in 2020.

The new system had to receive and merge data from different systems and multiple airports and be future-proofed in order to evolve with the changing threat landscape. It also had to enable insider threats to be addressed more quickly.

ACE quickly defined the scope and engaged early with user groups to understand their ways of working. This included visiting over 20 airports, collecting data and asking end users how they wanted to access and use a single secure system.

Our innovative approach meant a beta version of a secure system was quickly delivered from a proof of concept, with the ACE solution close to

what an end product would look like. The system enables a variety of users to access information, demonstrating that it is possible to receive data from multiple sources and airports and share it to interested parties, quicker and more efficiently. This impactful work was delivered at pace through 4-week agile sprints.

The next steps are to build resilience into the system, explore additional capabilities, develop a roadmap to a sustained live service, and future-proof the system for other services – while continuing engagement with the end users and stakeholders who remain at the heart of ACE's work.

The ultimate goal is to deliver a step-change in the ability of UK government and law enforcement agencies to identify and manage aviation insider threats.

Future iterations of this single system could apply to other domains such as maritime or rail, further strengthening and protecting the UK's Critical National Infrastructure.



A modern, modular replacement for a mission-critical national platform

The UK's system for managing lawful intercept data is coming to the end of its useful life, and a modern, flexible replacement is required which is fit for the digital age as well as being adaptable to the challenges of tomorrow.

ACE was asked to explore the art of the possible with a complex stakeholder community, and to shape and define the technical requirements for the system's replacement.

The challenge was to scope a state-of-the-art and responsive future-proofed system that allows law enforcement agencies to store, manage, analyse and disseminate lawful intercept data at speed and with ease, while fulfilling all the needs of recently strengthened statutory oversight.

This included designing a framework of applications, APIs and data structures which combine to replace existing functionality, and creating an extensible solution which allows future capability requirements to be added. A key requirement was excellent user experience and workflow management suitable for hundreds of operational users.

ACE delivered the technical framework for a sustainable, modular architecture that uses cutting-edge technology, an intuitive user experience that reduces the training burden and a flexible solution that can adapt to future mobile and technology innovations.

As part of this project, ACE used a cloud-based proof of concept demonstrator to de-risk the exploration of new and alternative technology. We created substantial improvements on existing technology, based on contemporary technologies that are easier to adapt and extend. We also delivered governance, acquisition, transition and sustainment approaches.

Using ACE's unique ways of working, this project fused knowledge, skills and expertise from a variety of industry partners – the majority of them SMEs – and was delivered at pace within 22 weeks and £195k under budget. The senior sponsor said that ACE's work had meant this critical system would be replaced at least 12 months sooner than otherwise would have been possible.

Cutting through the data chaos for policing

Police currently face a chaotic flow of data which is constantly changing and delivered to them in a variety of formats.

Sanitising data into priority order is resource intensive and time consuming, leading to demanding backlogs and with sequential analysis requiring significant manual effort in order to identify trends and flag incidents for further investigation. As new data is added, there is a risk that analysis can be lost and work duplicated, threatening the operational tempo.

The challenge for ACE was to explore ways to ingest data and make it robust for queries by operational end users, which could be presented to them via an intuitive interface.

ACE engaged stakeholders early and throughout the commission. An accelerated agile delivery enabled innovation at pace with a focus on re-using applicable approaches and solutions from other commissions. This way of working offered demonstrable value for money when compared to a traditional Waterfall development approach.

We delivered a polished MVP of the user interface in six weeks with a first demo in three days, which included prioritised and targeted information in both UI and UX, a workflow tool to provide auditable intelligence, as well as data ingest capabilities, entity disambiguation and reduction of false positives.

The work was delivered on time, 39 per cent under budget and at a tenth of the cost quoted via traditional frameworks.

As part of delivering this ACE solution, customers and suppliers aligned on the value of the ACE way of working and agile delivery, while operational users drove development and saw immediate benefit.

We also proved that a new, better way of exploiting data is possible for policing, and blended supplier options presented to the Home Office, with wider team involvement in down selection driving greater buy-in.

Maximising the potential of data-enabled policing

The challenge presented to ACE by UK law enforcement was to make it faster and easier to work with large, complex datasets through automated image analysis, and natural language querying, that eliminates the need for users to have technical skills. The aim was to significantly reduce the time it takes to ingest, process and exploit existing data to help law enforcement agencies be more responsive in tackling serious and organised crime.

ACE was asked to help understand the possibilities across three prioritised challenges: natural language querying; extraction of text from images and extraction of features from images.

ACE delivered significant improvements for working with existing police technology to extract text from images and intensive literature review of existing natural language query options. We also made substantive progress on the capabilities of a cutting-edge tool that could be used to further enhance global use of natural language skills.

This project was delivered at pace, with notable innovation including state-of-the-art artificial intelligence development that has global applications, and substantial improvement on existing technology.

Harnessing new internet data for law enforcement

To keep up with the evolving threat landscape, law enforcement must keep pace with technological innovation. Finding ways to maximise the potential for using the internet in investigations is becoming an increasingly urgent need.

ACE was asked to bring to life how new communications data sets, including Internet Connection Records (ICRs) available under the Investigatory Powers Act 2016, could be usefully, proportionately and affordably used as crime-solving tools.

This included exploring how new types of communications data are captured, processed and stored, how they could be accessed and disclosed by telecommunications operators, and the challenges involved in gathering useful evidence and operational intelligence. The priority was bringing these opportunities to life for investigators, with a focus on making future internet-enabled investigations even more impactful, affordable and practical as data volumes grow, by exploring the cutting-edge techniques and tools with the most potential. It also had the aim of informing future research angles, as well as policy-making for future statutory regulation.

ACE delivered working vendor demos explaining how core parts of the problem could be solved, as well as in-depth research to help scope and define the future requirements of a new data platform that adapts, innovates at pace, and adds value as soon as an opportunity or risk is identified. We

also explored advances in techniques, tools and tradecraft to allow investigators to answer the 'who', 'where', 'when', and 'how' of investigations based on perpetrators' internet use.

Innovations included developing detailed investigative scenarios which explored how ICRs from a selection of devices could be proactively used in a missing person case and reactively to seize the suspect in a violent county lines knife crime. These immersive environments brought to life how different technologies and devices generate ICRs and made real how the investigator might request, receive, and analyse the data available in order to prevent and detect crimes in the future.

In only twelve weeks, ACE built a demonstration and experimentation platform to help police officers explore and shape the early thinking in ICR system architectures and to identify the consequences of future technological disruptors on data, and how this data can drive better mission impact. ACE produced a blueprint to highlight the likely implications for law enforcement agencies in terms of organisational change and performance. Senior Investigating Officers praised the pace, engagement, creativity and clarity of the findings from this work.

**Our purpose is
to deliver the
greatest possible
impact for our
customers**



The power of a growing, collaborative community by Simon Christoforato, Vivace CEO

The ACE and Vivace model has proved itself a true partnership that is offering a new way for government and industry to work collaboratively.

Our collective purpose is to deliver the greatest possible impact for our mission customers. And so the year ahead will see the Vivace community continue to grow and evolve in ways that make us ever more effective in achieving that.

At the heart of our successful approach is the industry community represented by large primes, academia and, importantly, SMEs which comprise 70% of our 150-strong membership and bring an incredible breadth and diversity of capabilities to bear on customers' mission challenges.

We are actively developing our 'network of networks' to embrace even more of the digital landscape, working through organisations such as ADS, techUK and the Digital Catapult, to brief their networks and reach new domains and capabilities.

Vivace facilitates the blending of this body of industry expertise and knowledge with government customers.

There are several ways we do this. Firstly, we have created a collaborative environment at Tintagel House which allows mission users and industry to work together in the same place. This is supplemented by regular community events that enable operational challenges to be explored but also connections to be made.

The other element is the technology and data environment we've created. As well as Office365 team-working tools we have PodDev, our unique secure cloud innovation environment which creates safe spaces in which people can experiment and develop solutions while taking care of the policy and legal aspects of data.

It means that for suppliers who are new to working in this domain, they can have access not only to customers, but also to some of the underpinning data in a way that hasn't been possible before.

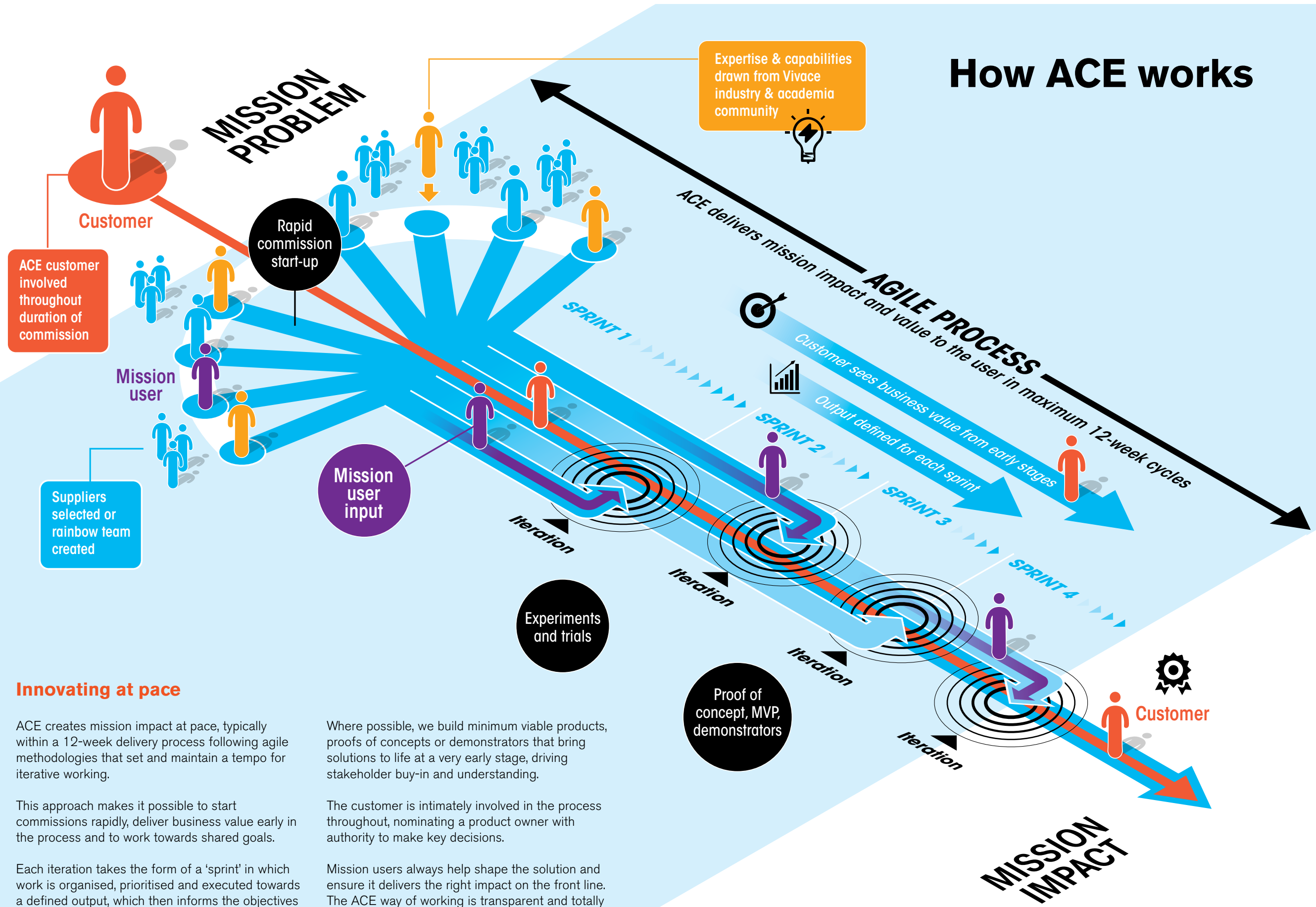
Crucially, Vivace brings an agile mindset and way of working into the law enforcement mission challenge space. We enable ACE to offer a more responsive alternative to traditional monolithic programmes that take many years to deliver something that is often, by then, out of date.

Instead, we take a start-up approach that lets us de-risk the problem up front, creating minimum viable products, trialling them, evaluating and moving forward to a point where they can transition into sustained live service.

We're expanding the ACE Space at Tintagel House to provide more accommodation for co-location and collaboration.

As we grow, we will make sure we keep the overarching sense of community that makes Vivace so effective and valuable.

How ACE works



Innovating at pace

ACE creates mission impact at pace, typically within a 12-week delivery process following agile methodologies that set and maintain a tempo for iterative working.

This approach makes it possible to start commissions rapidly, deliver business value early in the process and to work towards shared goals.

Each iteration takes the form of a 'sprint' in which work is organised, prioritised and executed towards a defined output, which then informs the objectives of the next sprint, and so on.

Where possible, we build minimum viable products, proofs of concepts or demonstrators that bring solutions to life at a very early stage, driving stakeholder buy-in and understanding.

The customer is intimately involved in the process throughout, nominating a product owner with authority to make key decisions.

Mission users always help shape the solution and ensure it delivers the right impact on the front line. The ACE way of working is transparent and totally customer focused.

Driven by technology

Technology and data underpin everything we do at ACE. It is fundamental to the innovative solutions we deliver for mission customers and it powers the way we work to deliver those solutions.

We have created a game-changing environment for collaboration and co-creation, where industry and customer can come together and develop solutions in completely new ways.

Traditionally, working for government customers in the law enforcement and security space has required development infrastructure compliant with Official Sensitive security standards, often excluding all but the biggest suppliers.

We have brought the startups and SMEs within the Vivace community into this space by providing modern, accessible collaboration tools around which we have built enhanced security to meet these standards.

We make Bring Your Own Device possible and provide Office365 tools with hardened security that meets Official Sensitive accreditation, backed with additional security policies and processes.

It means suppliers can work in ways that are familiar without the friction that can be characteristic of engaging with government procurement frameworks.

Our Pod-based secure development and information handling environment (PodDev) similarly revolutionises the way solutions to mission challenges are developed.

It uses AWS commodity cloud services within a secure wrapper to create a private capability within the public cloud that is low cost and readily available.

It is considered to be the most secure commodity cloud-based solution in the UK valid for threat actors up to Secret.

The result is a trusted, safe place to develop, run and test solutions, run trials, and use sensitive data. Development environments are quick to set up and need exist only as long as required.

PodDev was developed in the same way as ACE delivers for customers – it started out with a minimum viable product and has been built out iteratively to the fully-functioning environment it is today.

As with all ACE technology, it is the product of the wealth of technical talent we have within the team. It is this expertise that enables the delivery of successful solutions for customers and offers valuable thought leadership to help define mission problems and challenge entrenched thinking.

Naturally, we also use our technical and data science capabilities to analyse and optimise the way we work internally, constantly measuring and iterating to optimise performance and value for money.



A game-changing environment to develop solutions in completely new ways

Futures + Insight

Foresight is an essential component of ACE's remit. Selecting the optimal mix of expertise to meet mission challenges requires a shrewd understanding of where innovation stops and futures begins, keeping us sighted on emerging technologies and digital disruptors. Our Futures & Insight team achieves this by working with subject matter experts inside and outside the Vivace community, while maintaining a robust in-house research and analysis capability.

We have active horizon scanning projects touching on all areas of the data-enabled investigatory powers landscape, from carrier technology, new business challenges for communications service providers and user device futures through to privacy narratives, legislation and the mission opportunities which will drive tomorrow's demand.

Enterprise technology futures depend on shifts in culture and behaviours as much as on platform innovation, so we look hard at commercial disruptors and transforming businesses, seeking out new models and approaches to data that may transfer into law enforcement. Similarly, new threats – and new opportunities to disrupt crime – will be presented by future technology-enabled operating models for criminality, so we engage

Industry engagement

ACE takes a highly proactive approach to market engagement, leveraging networks into the worlds of industry, technology, venture capital and academia as well as established connections throughout government, law enforcement and security.

We also host a comprehensive programme of events to allow Vivace members to meet each other and representatives from the customer community, and to build the relationships that drive success.

Keynotes, pitches and pop-up exhibitions allow for knowledge sharing and showcasing of capabilities.

We host many of our events in the ACE Space, bringing community, customers and other stakeholders together at the heart of our collaborative environment.

with academic communities operating at the interface between criminology, cyber research and management science.

ACE's Futures & Insight outputs include our weekly ACE Insights email, which contextualises breaking events and innovative research for law enforcement technology and transformation communities – with a special focus on investigatory powers – and a series of deeper-dive reports produced for OSCT partner organisations. We have devised various formats to enable insight to be corralled from our community, including calls-for-insight collaboration hubs, "baseline" trackers for fast-moving areas of concern, and co-created reports where subject matter experts work with our internal analyst team to turn their expertise and concerns into futures narratives.

Where we can, we produce futures material at Official so that as many users as possible can benefit: forward-looking scenarios should be less sensitive than information about current investments or deficiencies, and they should also serve a wide variety of strategic uses. Articulating futures scenarios to a structured format so that they can form an accessible repository is part of delivering a genuinely collaborative, networked foresight capability.

ACE also attends and contributes to major industry events and conferences, including ICDDF, IFSEC, and Security and Policing where, this year, we staged an immersive experience simulating an unfolding international crime scenario that showcased capabilities from the Vivace community.

ACE works in partnership with the Joint Security and Resilience Centre (JSaRC) within the Office for Security and Counter-Terrorism (OSCT). ACE's innovation network includes organisations such as ADS, techUK, Digital Catapult, and Innovate UK, as well as government bodies and departments including the Defence and Security Accelerator (DASA), the Department for Business, Energy and Industrial Strategy (BEIS), and the Department for Digital, Culture, Media and Sport (DCMS).



Horizon scanning touches on all areas of data-enabled investigatory powers

ACE IN NUMBERS 2018/19

£18.3m

Value of work through ACE

15

Organisations brought problems to ACE, including police forces, law enforcement agencies and government

All figures relate to FY19 unless otherwise stated

156

Organisations in Vivace community

77%

of them are SMEs

33

Commissions delivered

53

Organisations winning contracts

195

People who regularly collaborate using ACE Space

699

Current subscribers to ACE Insights

3 days

Fastest delivery from a commission

£1.5m

Quantified cash savings

600

Delegates attending conferences, seminars and workshops run by ACE

2500+

Unique visits to ACE Space

203

Contracts placed

62%

of them with SMEs



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