Science & Technology in Policing

NPCC

SCIENCE AND TECHNOLOGY STRATEGY

Version 1.0

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CHAIR OF THE NPCC

"All forces are embracing a range of technologies because they transform our ability to capture evidence and keep the public safe."

Over the last decade, science and technology has become integral to policing's ability to deliver an effective and efficient service. All area of our business rely on research and analysis to understand the challenges and find better ways of working. All forces are embracing a range of technologies such as body worn video, digital automation and drones, because they transform our ability to capture evidence and keep the public safe.

Science and technology is pivotal for other reasons. First is the 20,000 officer uplift and the role that technology is playing in unlocking workforce potential. It provides the tools to get the job done efficiently and to the standards that the public expects. Indeed, today's workforce, seeing what is possible in industry and commerce, expect policing to operate this way. And so do the public that we serve.

Second is our need to keep up with the rapidly changing nature of criminality. As is evident from the growth in digital fraud, the technologies being exploited by criminals restructure how, where, and when crimes take place. This requires new methods of investigation and seamless working across force and national boundaries. We continue to seek to understand and anticipate this evolving threat. And we continue to evolve our ability to respond with technologies of our own.

It is this complex nature of opportunities and threats that motivates our first Science and Technology Strategy. The strategy commits to a science system. A system that enables the ambitions set out in domain specific strategies such as the joint Association Of Police And Crime Commissioners and National Police Chiefs' Council Digital Strategy. A system that allows us to benefit from collaborations with industry and academia and makes working with policing easier and more rewarding for partners.

Critically, the science system promotes the values of integrity and professionalism that we expect of all areas of policing. We recognise the need to balance the investigative opportunities provided by technologies with the right to privacy and the highest ethical standards. Public trust and confidence depend on this. We will seek to do so by developing science and technology in collaboration with the public, being transparent about our intent and actively soliciting and being responsive to public views. Science and technology can and should play a proactive role in supporting the operational performance the public expects.

Given this context and ambition, it will come as no surprise that in the NPCC Strategic Plan 2021 2025, science and technology is central to our delivery of a world class police service. This strategy sets the foundation for how we will deliver upon that pillar of the strategy plan.

Martin Hewitt QPM
Chair, National Police Chiefs' Council

FOREWORD
CHIEF SCIENTIFIC ADVISER

"The advances that have got us to today, will not do us for tomorrow. This strategy is born from NPCC's recognition that we must step up and catalyse on our foundation of excellence."

As articulated in the NPCC Strategic Plan 2021 2025, science and technology is central to our delivery of a world class police service. It enables better crime prevention and detection, safeguards victims, protects our workforce, increases privacy and transparency, and delivers fair justice.

To be an effective science-led service, we cannot stand still. The rapid growth of technology has put pressure on policing as it seeks to sustain the cutting edge and get ahead of new forms of crime. The advance that have got us to today, will not do us for tomorrow. This strategy is born from NPCC's recognition that we must step up and catalyse on our foundation of excellence.

To develop this strategy, we consulted over 950 researchers, innovators and users of science and technology from NPCC forces, the National Crime Agency, the College of Policing, and the wider community. I'm grateful to everybody who contributed via our survey, focus groups, interviews, expert working group, and #WeCops session.

You provided an informative and remarkably consistent account of what policing must do to deliver the value that science and technology offers us. This strategy encapsulates your view.

The first purpose of this strategy is to **set out a science system** that makes clear how we understand, commission, and use science and technology within policing. We wish to catalyse an inclusive, collaborative community that has the functions and structures required to move from initial idea to deployed solution in an ethical, transparent, and lawful way.

The second purpose of this strategy is to set out **how we will prioritise** what we do. We cannot invest in every opportunity so a systematic prioritisation of our efforts is needed, one that balances today's needs with building for tomorrow.

Our approach affords the advantages of national direction and 'doing things once,' without stifling our world class local innovation.

The third purpose of this strategy is to **set the conditions for success.** We will increase science literacy across policing and ensure our science specialists are valued and given the opportunity to develop. We also commit to open science, confident that doing so will advance cross sector engagement, allow ideas to move quickly across forces, and give the public the means to understand and evaluate what we are doing.

It is a privilege to lead science and technology in policing at this decisive time. I look forward to working with the many brilliant people who together deliver policing's science advantage.

Professor Paul Taylor
Policing Chief Scientific Adviser

OUR VISION AND MISSION

Our vision

... is to deliver the most science and technology led police service in the world.

Our first strategy sets out how we will catalyse an inclusive community that will identify, develop and embed outstanding science, technology, analysis and research (STAR) in all areas of policing.

Our mission ... is to **engage** widely, **evolve** strategically, and **embed** the best S&T in a way that is trusted by the public.

ENGAGE

We will grow a **vibrant and connected** community, engaging all sectors and collaborate by default.

We will be **clear about our needs** and how to work with us, seeking new ideas, innovations, and forms of delivery.

EVOLVE

We will **prioritise and conduct high quality S&T** that deliver what policing needs now and in the future.

We will enhance and diversify **scientific expertise** across policing to underpin growth and improve resilience.

EMBED

We will establish mechanisms to ensure **great ideas can rapidly scale and embed** into policing practice.

We will **evaluate S&T's impact** on policing outcomes, building an evidence base for future investment decisions.

What this strategy does for you

Policing: It sets out the strategic vision for STAR in forces, NCA and the College of Policing; it clarifies the science system and the role you can play; it outlines skills and career pathways; and it defines our transparency and ethical standards.

Government: It provides a view of how policing's S&T will evolve, to facilitate policy development and capability development; it defines clear routes for engagement so that we can collaborate on shared objectives.

Academia/research: It will help you understand our priorities and the mechanisms available to support collaboration, from basic research to embedding knowledge and technology at local, regional and national levels.

Industry: It outlines our commitment to collaboration; it seeks to deliver a strong demand signal through our S&T priorities; it proposes new commercial models that will allow us to co-create solutions with you while protecting your commercial interests.

PART 1

WHY WE NEED AN S&T STRATEGY

Science & Technology in Policing

WHAT'S HAPPENING TODAY?

Demand management: With industry partners, Lancashire Constabulary is using voice to text and natural language processing to understand, categorise and manage the force's annual 1.2m 999/101 calls. By end of 2021, the system had categorised 730,000 calls, which would have taken the review team ~68 years to process manually.

Preventing harm: South Yorkshire and Humberside Regional Organised Crime Unit are working closely with Adult Services Websites and their communities to build a risk assessment tool that supports investigators in their efforts to identify user profiles and adverts that are fronts for victims being forced to deliver sexual services.

Automation: Eastern region forces and the NPCC Lead for Police National Computer (PNC) are piloting an automated process to support Vetting enquiries. This tool, which automates procedural PNC record checks, passing key information to a vetting officer for assessment and decision, has real potential to introduce efficiency for all forces.
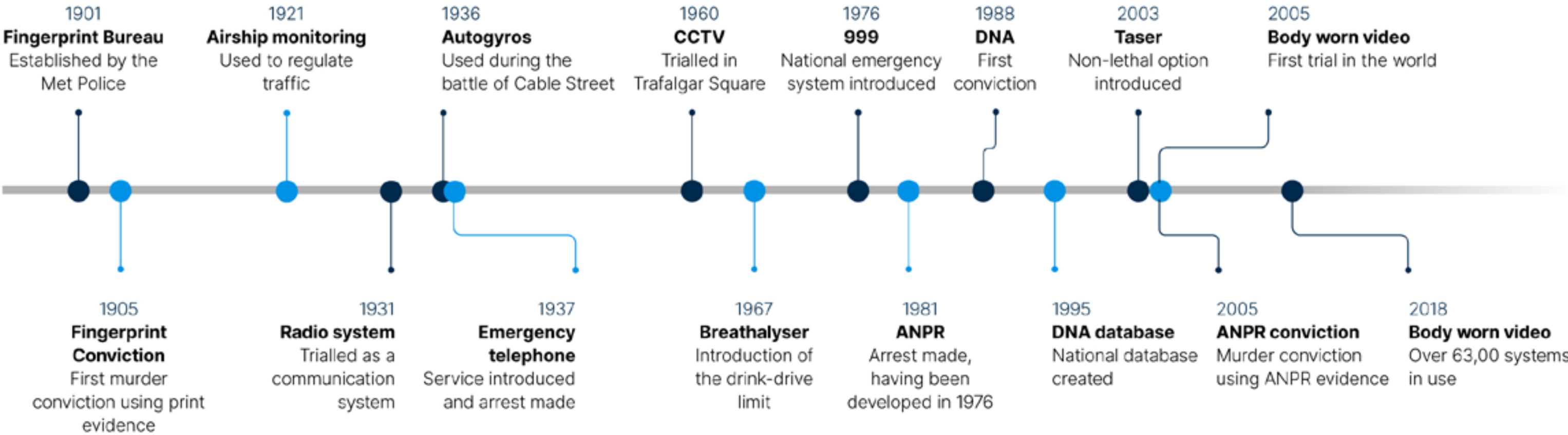
Tackling crime: Home Office Digital, Data and Technology (DDAT) and forces are collaborating on pilots that utilise Automatic Number Plate Recognition data to identify and proactively target high harm County Lines offenders. Applying automated data analytics tools and policing techniques has already proven highly successful in identifying suspicious travel.

A SCIENCE-LED SERVICE

The UK's unparalleled record of pioneering scientific answers to policing challenges has put science at the heart of today's Service.

Across the UK, forces and national enablers rely on science to deliver core investigative and operational capabilities, research new opportunities, challenge existing practices, and innovate to create new solutions. We use all the sciences and social sciences, caring as much about the psychology of bystanders and leaders as we do the mathematics of forensics and data science. And, we recognise the need to invest in and to enable a specialist workforce the science profession.

Much of this landscape is set out in force and national strategies, such as the National Policing Digital Strategy, the Forensic Science Strategy, and the Counter Terrorism Policing S&T Strategy. This strategy complements their delivery ambitions by focusing on the science system in which each sits. It outlines our collective ambition for how S&T will underpin success and it describes a science system that is designed to accelerate, not stifle, local innovation and user focused delivery.

1901		1921		1936		1960	1976	1988	2003	2005
Fingerprint Bureau Established by the Met Police		**Airship monitoring** Used to regulate traffic		**Autogyros** Used during the battle of Cable Street		**CCTV** Trialled in Trafalgar Square	**999** National emergency system introduced	**DNA** First conviction	**Taser** Non-lethal option introduced	**Body worn video** First trial in the world

1905	1931	1937	1967	1981	1995	2005	2018
Fingerprint Conviction First murder conviction using print evidence	**Radio system** Trialled as a communication system	**Emergency telephone** Service introduced and arrest made	**Breathalyser** Introduction of the drink-drive limit	**ANPR** Arrest made, having been developed in 1976	**DNA database** National database created	**ANPR conviction** Murder conviction using ANPR evidence	**Body worn video** Over 63,00 systems in use

A WORLD CLASS HERITAGE

Among our successes are world firsts such as:

Setting the global standard in DNA.

In 1984, after the academic discovery of DNA profiling, we were the first to exonerate a suspect and later convict a suspect using DNA evidence. The national DNA database, created in 1995 and currently holding ~5.7m individual records, remains a global leader.

Tracking offenders with Automatic Number Plate Recognition (ANPR).

Developed in 1976 and first used for detection in 1981, ANPR allows tracking of vehicles at scale across the UK's road networks. Integrated into wider intelligence platforms, ANPR opens up important lines of enquiry and provides evidential images to secure prosecutions.

Supporting the frontline with body worn video.

Introduced in 2005, body worn video (BWV) is a relatively recent adoption, but one that has positively impacted local policing by helping officers to efficiently record information to evidential standards. Research shows that BWV contributes to reduction in the need for Taser use and in public complaints.

SEIZING THE OPPORTUNITIES...

Our pedigree notwithstanding, a consultation with over 950 individuals in policing, government, industry and academia revealed a common view that policing S&T would benefit from an approach that:

1. **aligns current functions** to work seamlessly together, eliminating fragmentation and enabling public and private sector organisations to collaborate;

2. **empowers leaders** with the knowledge to make informed decisions, so that **good S&T can rapidly scale** and embed in a resilient way;

3. operates a robust prioritisation method that delivers a **unified view of our S&T requirements**, thus providing a clear 'demand signal' to academia and industry;

4. **reduces the focus on 'quick win' problems** at the expense of game-changing innovations. Thus getting 'up-stream' to address policing's long-term needs;

5. addresses the view that funding dispersed between forces means there is no clear strategic direction and no **efficient way to develop and deliver** national-level S&T capabilities.

These opportunities drive our strategy's focus on a collaborative end-to-end system, where the journey from horizon scanning to deployed solution is ethical, transparent, and efficient. At its heart is a robust, repeatable mechanism for prioritising S&T investment and a recognition that we must demonstrate value, fail and learn, and strategically quit when necessary.

"National guidance and scientific advice should underpin the implementation and use of science & technology to ensure it is applied correctly and in an unbiased way."

– Survey respondent

"Start innovating for tomorrow's problems, rather than developing technologies that look to solve yesterday's issues."

– Survey respondent

The three biggest barriers to using S&T in policing

Sharing local learning

Delivering national capabilities

Collaborating with industry

The three top areas for investment in the next 3 years

Developing new S&T

Applying existing S&T

Sharing local learning

Does policing have a clear S&T prioritisation strategy?

- 1%
- 7%
- 44%
- 32%
- 16%

- ■ Strongly Agree
- ■ Agree
- ■ Neutral
- ■ Disagree
- ■ Strongly Disagree
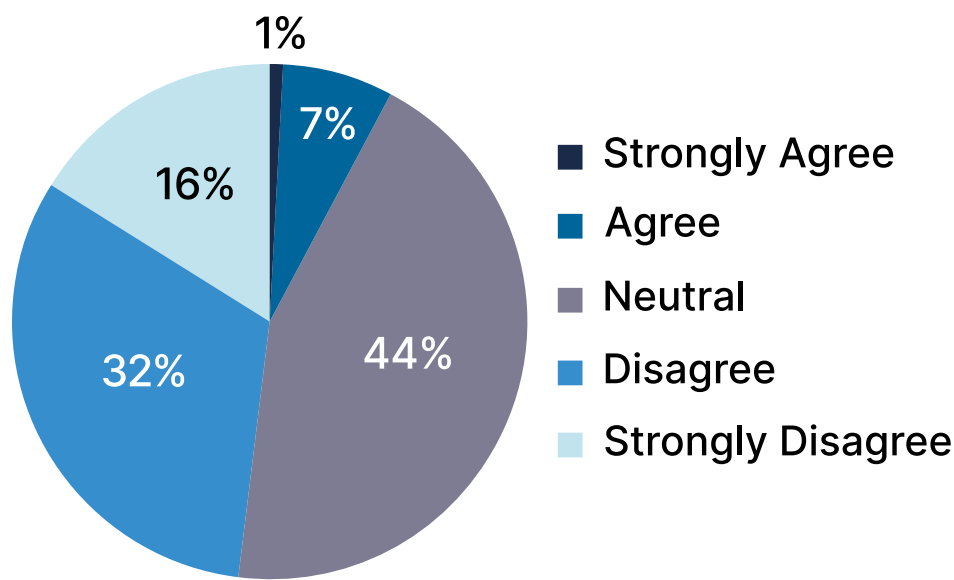
...NOW AND IN THE FUTURE

Is it possible policing has too much opportunity? Certainly the accelerating pace of change, the interdependencies across technologies, the growth of data and information, the greater automation, the lower barriers to entry, and the issues of ethics and human rights created by new capabilities, makes for a complex landscape.

Our approach to marshalling this opportunity is to consider S&T not in the traditional way of a capability (e.g., face recognition) but in terms of service lines — what problem is the S&T seeking to solve?— and horizons — how far away, in best guess terms, is the solution from mainstream adoption?

The graphic below outlines the service lines and some current activity. It highlights the balance of efforts and opportunities across policing's challenges. While only a guide, since horizons change, our optimal state is to have activity at each horizon for each service line, to ensure steady and balanced growth.

Service Lines	HORIZON 0 (Present)	HORIZON 1 (1 - 5 years)	HORIZON 2 (5 - 10 years)	HORIZON 3 (10+ years)
Crime prevention - The ability to understand and respond to drivers and inhibitors of crime, including crowd management, public trust, mental health and wellbeing	Neuroscience Behavioural Science What works	Combating AI bot New crime prevention		Predictive modelling
Personal Safety - The ability to protect our workforce and members of the public through e.g., body-worn equipment, location resilience, less lethal weapons	Body armour Body worn video Welfare screening	Advanced detection Area denial Quantum detection	Body worn sensors Next-gen. less lethal	Generation after next novel materials
Mobility - The ability to move to/from locations quickly to prevent, detect, or respond; access difficult locations safely to maximise intelligence and minimise risk	RNSS/GPS Drones (UAVs) Augmented reality	Advanced wearables Autonomous vehicle Electric mobility	4D printing Immersive VR Novel power source	Collaborative robotics Human augmentation Quantum sensing
Identification & Tracing - The ability to trace, attribute, and confirm the identity of a person, location, activity, etc., to evidential levels, such as tracing missing persons	Biometrics recog. Digital forensics Forensic sciences	Deepfake detection Digital fingerprinting Blockchain tracing		
Surveillance & Sensing - The ability to lawfully monitor and collect data from people, activity, movements, behaviours, objects and data overtly and covertly	Video analytics Dark web tracing Open-source int.			
Analytics - The ability to synthesise information to draw insights that can lead to actionable decisions, often in combination with other information and at scale	Data integration Data science Cybersecurity	Data fusion AI, e.g., redaction Open data	Quantum computing Image processing at scale	Singularity/ General AI Supercomputing
Interconnectivity - The ability to pass information quickly, accurately, and securely, and the ability to intercept or disrupt communications of others	Blockchain Encryption Mobile/Cloud/5G	Quantum cryptography	6G Meta-materials	Human-machine interface

Landscape of Policing Science and Technology by Service Line and Example Activities
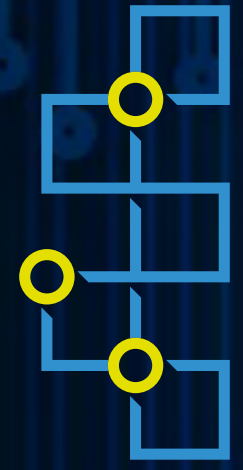
PART 2

A COMPREHENSIVE SCIENCE SYSTEM

AN END-TO-END SCIENCE SYSTEM

Our mission is to engage widely, evolve strategically, and embed the best S&T in a way that is trusted by the public. This requires a system that catalyses each step of the science journey—an end-to-end S&T system, structured around the pillars Engage, Evolve and Embed, which each deliver a range of activities that progress the seed of an idea to a widely used solution. This we will do as a science community, allowing all those who wish to contribute to do so.

All stages of the system will exemplify core policing values. We will be ethical, transparent and proportionate in our development of S&T, and we will implement mechanisms to give the public confidence that this occurs. We will embrace diversity and invest in our people, championing S&T literacy across all of policing. We will work jointly with end users, academia and industry to ensure S&T development is fit for purpose and has a pathway to delivery.

ENGAGE a vibrant, accessible, diverse and multidisciplinary community, collaborating by default

EVOLVE with partners high-quality, ethical S&T that delivers for the user now and in the future

EMBED and support S&T solutions so the gains to policing are made rapidly and are maintained

Communicate → Explore → Prioritise → Research → Innovate → Build → Source → Deploy → Evaluate

Communicate across policing, industry, and academia to build awareness of policing challenges and catalyse a shared sense of effort.

Explore S&T threats and opportunities using horizon scanning tools, considering public support, fairness, ethics, and legal and regulatory environments.

Prioritise using a robust process, on what S&T we will lead, collaborate and follow, and decide, based on available resources, where we will invest our efforts.

Research using systematic, multidisciplinary investigation issues and possible solutions, to improve our knowledge.

Innovate by working with industry and academia to turn knowledge into solutions that create benefit, such as new tools or better processes.

Build complete solutions that encompass workforce, policy, legal and public accountability, and are designed to last.

Source S&T using effective commercial models. For S&T that is commercially available, this is where the journey for the solution starts.

Deploy the solution, train people to use it, and operate it, including maintaining it and ensuring there is sufficient resilience.

Evaluate existing S&T to drive further development, assess the value being added, and to identify and address any unintended effects.

ENGAGE
COMMUNICATE

Communicate with all to build awareness of policing challenges.

The growth of an efficient science system starts with a recognition that our science community extends far beyond the NPCC, and that success depends on collaboration. We will engage widely across police forces and with industry and academia, to build communities and create partnerships, all the time seeking to increase the diversity of those contributing.

Making it Simple

We will use science.police.uk as a single point of entry for policing S&T. The website will help those wishing to partner in research and innovation, those wishing to learn about our capabilities and research findings, those seeking information to inform best practice, and those keen to attend training events and public consultations. We will signpost community channels such as #WeCops and the _Inside Policing_ podcasts.

Communicating our Needs

To help partners understand and solve our challenges, we will publish Areas of Research Interest (ARI). We will promote these ARIs widely, update them regularly, and engage the community to understand their views and refine our ambitions based on their feedback.

We will work actively to help UK Research and Innovation (UKRI), government, and others align relevant funding opportunities. We will run innovative challenges around key areas, inviting industry and academics to help craft solutions, as we do with the Accelerated Capability Environment.

Brokering Partnerships

We will run regular engagement events within policing networks, through the Knowledge Transfer Network and with trade associations such as techUK, ADS Group, and the British Security Industry Association. Our scientists will attend conferences and public science events, and we will draw on and promote existing networks, through social media and on our online platforms.

We will work closely with Government co-creation initiatives such as NSTIx to co-locate and develop and test new ideas rapidly. We will engage with the growing network of UKRI national centres and explore the potential for policing co-creation. We will work actively in international science networks and draw on the international expertise of the Science and Innovation Network.

Local innovation in policing is world class. Our website will celebrate the quality and diversity of what is occurring, raise public awareness, and ensure others across policing and beyond can benefit from our efforts.

Public Engagement

By engaging widely and early, we will gain the best understanding of how S&T can affect different communities, and what solutions may be possible. This is core to our ethical approach, and our commitment to open and transparent action. Our public engagement will use many channels, from local community engagement to national conversations with charities and lobby groups. The CSA will be a balanced and honest voice around policing S&T so that the public can understand what we are doing and judge fairly its merit.

ENGAGE
EXPLORE

Understand S&T opportunities using horizon scanning, considering public support, fairness, ethics, and legal and regulatory environments.

We will explore current and potential S&T to consider future opportunities and threats, their level of maturity, and the speed that they will emerge. Our approach will be holistic, considering the knowledge and capabilities most needed in service lines, and the ethical, legal, and public confidence implications of any solution.

Horizon Scanning

Effective discovery requires diversity of thought and a multidisciplinary outlook. We will deliver this through horizon scanning activity across policing at the College of Policing, at the National Crime Agency, and at NPCC through joint work with the Defence Science and Technology (DST) and the Defence Science and Technology Laboratory (DstI) who will examine the work done for Defence through the lens of policing's needs.

A lead for science futures will be appointed to help conjoin this activity with that occurring in forces and across academia and industry. The lead will also strengthen links with the Government Office for Science Foresight team, and the Home Office Innovation and Research InSight Unit team. This diversity of perspectives will offer a rich foundation for action.
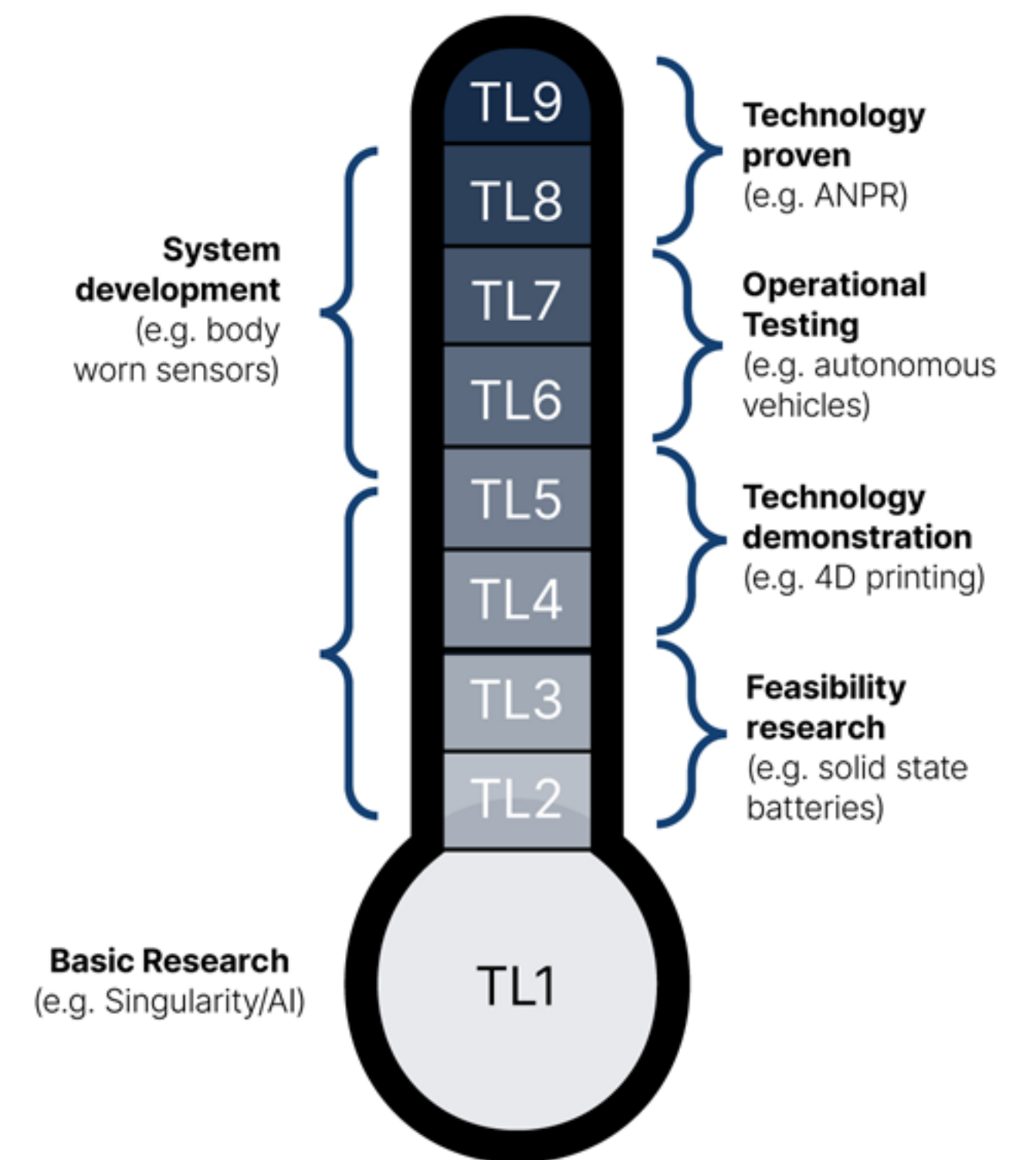
From Thought to Action

Our science system places 'Explore' next to 'Prioritise' so that discovery directly informs how we invest. We will also draw future thinking into current considerations through Policing Futures activities, and by contributing 'tomorrow's world' at the Strategic Change and Investment Board.

We will be attentive to how we balance the servicing of today's S&T with the need to develop for tomorrow. As the cost of servicing rises, so achieving this balance will require hard choices about what we must quit in order to make room for investing in future solutions. Over time, we will shift the balance of investment toward the future. We will seek to get further upstream in the development lifecycle, so that exploration is shaped by policing needs and capabilities at the outset.

TECHNOLOGY READINESS LEVELS

It is useful to understand a technology's maturity through technology readiness levels (TRL). The stages of development along with some example technologies are shown below.

System development (e.g. body worn sensors)

TL9 / TL8 — Technology proven (e.g. ANPR)

TL7 / TL6 — Operational Testing (e.g. autonomous vehicles)

TL5 / TL4 / TL3 — Technology demonstration (e.g. 4D printing)

TL2 — Feasibility research (e.g. solid state batteries)

Basic Research (e.g. Singularity/AI) — TL1

PRIORITISE

A repeatable, robust mechanism for prioritising S&T investment.

Policing cannot lead work in every relevant area of S&T. Nor should it. Often it is more effective to collaborate with others, or to follow partners who are better placed to lead. By prioritising we will maximise delivery. Without it, our capable S&T workforce risk doing interesting but incomplete work whose sum is less than the parts.

To aid decisions across NPCC, we will use a robust, repeatable process. As shown below, this takes our Explore insights and defines what policing

must lead and on what it can collaborate, follow, or monitor. It then prioritises each S&T using key criteria, and these are assessed in the round to define a Strategic Investment Portfolio (SIP).

We will ensure that our priorities echo wider government priorities for investment, as set out in the Integrated Review and the UK Innovation Strategy. We recognise the important role we play in delivering the UK's science superpower agenda.

Stage 3: Assess priority on three criteria

1. DESIRABLE
- Fit with strategic priorities and policing capabilities.
- High impact for multiple organisations.
- Solves a cross-sector problem, leveraging wider funding.
- Strong end-user support and a plan for pull-through.
- Funding identified for implementation.

2. FEASIBLE
- Technical credibility.
- Ethically robust considering diversity and potential bias.
- Practically implementable (aligned with operational reality, codes of practice).
- Innovative, not duplicating.
- Risks understood and a plan to mitigate.
- Expertise of delivery team.
- Effectiveness (solves the problem).

3. VIABLE
- Cost-effectiveness and value for money.
- Upfront investment will bring sustained benefits.
- Clear delivery plan with reasonable timelines.
- Relevant standards/ regulations considered.
- Resources available to deliver and maintain.
- Senior-level sponsorship
- Promotes diversity and inclusivity, e.g., disability accessibility.

1 Horizon Scanning — Explore current and potential S&T across four time horizons

2 Define Police Approach
- **LEAD** We will lead when it is critical to policing and the area will not be developed without our leadership
- **FOLLOW** In established markets, we will buy 'off the shelf' equipment and capabilities that are effective and VfM
- **COLLABORATE** Where others are investing, we will collaborate to influence development and adapt the outputs
- **MONITOR** Where the impact is uncertain and/ or the technology immature, we will 'watch and wait'

Prioritise — Desirable · Feasible · Viable

3 Subject-matter experts assess each S&T on three criteria. Compute a 'prioritisation score' from the weighted average of assessment scores

4 Agree Investment Choices — Portfolio balanced to ensure investment in S&T across different horizons and approaches

STRATEGIC INVESTMENT PORTFOLIO Led by Police CSA with oversight from National Science Council

EVOLVE
RESEARCH

Transparency will ensure public trust and allow frictionless collaboration.

Research is ubiquitous in policing. From national programmes, to force led studies of local issues, to PhDs completed for personal development, research supplies evidence to inform our decisions. We will nurture ethical, problem led research across all ranks and areas of policing.

Force Research and Innovation Leads

The appointment of Research and Innovation Leads (RILs) in forces provides a focal point for local activity. The CSA will work with the RIL network to disseminate best practice, national opportunities, and resources. We will assist the RIL community in growing its peer support and ability to share learning rapidly across policing.

National Resource and Leadership

The College of Policing and the National Police Library lead policing's strategic efforts to access, distil and make use of research. We will grow this capability and promote its use, so our practices are grounded in the latest and best knowledge. Our national enablers, such as the Forensic Capability Network, NABIS, and NPAS, lead in their technical domain by consolidating what is known and by agreeing strategic direction for research and innovation activities within their communities.

The UK's national labs, particularly Dstl, are core to policing's ability to deliver long term research programmes. We will continue and deepen our close partnerships.

Partnerships with Academia

We will continue to seek partnership opportunities with academia and industry both locally (e.g., Lancashire Forensic Science Academy), regionally (e.g., N8 Policing Research Partnership) and nationally (e.g., Turing). We will support new partnerships by providing researchers clear ways to access advice and to propose joint projects. We will foster and play an active role in research communities, such as the Society of Evidence Based Policing.

Partnership with UKRI

Much of the research supporting policing is funded by UK Research and Innovation, Horizon Europe, the national academies, and other national trusts. The CSA will work closely with these bodies to support and coordinate activity, acting as the voice of policing.

ETHICS AND INTEGRITY

Policing expects high standards of integrity, professionalism, and compassion in its actions and S&T is no exception. All that we do will be lawful, ethical, and absent of unintended discriminatory effects. We will support established force level ethics boards by providing independent specialist advice on research and data ethics. This service will work in lockstep with other processes, such as university reviews, but give focused consideration to the unique position of policing.

We are accountable to the standards outlined in the UK Research Integrity Concordat as well as the national standards for data and public services (e.g., Data Ethics Framework). The CSA will publish an annual report on how well policing is fulfilling the Concordat obligations and we will actively address shortcomings. The Police Science Council will provide oversight and additional scrutiny.

We are committed to transparency and Open Science. We pursue five standards, ensuring we pre register our research (Preregistered), make our materials, data and findings free to access (Open data, Open materials, and Open access), and engage the community when prioritising and assessing work (Citizen science). We will make resource available to forces seeking to meet these pillars and we will review our performance annually.

EVOLVE
INNOVATE

We will take risks and learn from our failures.

Innovation transforms the opportunity created by research into new products or services that benefit policing. We will increase our work with small and medium sized suppliers to benefit from their agility and development pace. With partners, we will run exploration events to engage all those with novel solutions who have not traditionally worked with policing.

Driving Innovation

We believe in bottom up and top down innovation. We will continue to invest in force initiatives because these are an effective way to uncover good ideas rooted in first hand experience of a problem. The College of Policing's Innovation network will provide tools, resource, and space to help this community and its efforts thrive.

At the national level, the Home Office S&T Commissioning Hub will lead the delivery of innovation that addresses the national priorities of the Strategic Investment Portfolio. We will review the need for new structures and ways of working with S&T communities, developing these where needed to ensure that all can contribute.

Working Together

The UK has a mature innovation system that policing will increasingly utilise and support in its delivery. We will be an active member of the cross Government National Security Innovation Exchange, using its co-creation centres to engage multi sector teams to develop solutions at pace. Where appropriate, we will commission the Defence and Security Accelerator to deliver open innovation through their networks, and the Accelerated Capability Environment to undertake agile sprints with start ups and academia on specific challenges. We will work with Joint Security and Resilience Centre to support their testing of solutions that impact on policing.

Intellectual Property (IP)

New companies can find it hard to engage in activities where their IP may be at risk. Equally, policing must be able to assess how an innovation works to be confident that it is lawful, proportionate, and fair. We will work with the right experts and organisations to develop collaborative models that protect IP while removing barriers to effective partnership (e.g., contracts based on the SBRI scheme).

Our collaborative ethos means that we will be alert to opportunities that enable technology transfer from within policing to outside innovators to benefit growth.

Local innovation in policing is world class. Our website will celebrate the quality and diversity of what is occurring, raise public awareness, and ensure others across policing and beyond can benefit from our efforts.

EVOLVE
BUILD

Evolving S&T to a deployable product or service needs investment of time.

Accounts of innovation often use the term 'valley of death' to describe the challenge of moving from innovation to deployable solution. The scale of controlled and 'in service' testing required to give sufficient assurance takes time and effort, but it is essential for our workforce and the public to have confidence in the S&T we deploy.

Supporting New Innovations

Policing has always been forward leaning in testing new solutions. We will build on this appetite with strategic investments that support partnerships and reduce the cost of testing on volunteering forces. Where valuable, we will provide opportunities for 'next desk' working and controlled access to our systems. We acknowledge our role as early adopters and customers, helping a start up to iterate their idea, tailor it to the market, and seek end user feedback.

What we cannot contribute in funding, we often redress by helping industry see the value proposition first hand. We will engage with private equity investors and investment funds (e.g., NSSIF, UKI2S) and give a clear, early market signal, some assurance of repeat demand, and clarity over procurement routes and funding mechanisms. We will actively find new ways to support the testing and development of early stage technologies within the policing context.

Supporting Dual Use

Policing can profit from innovations developed in other markets, and, equally, innovation born in policing can reach viability when the advantage to other industries is recognised.

We will be clear about the level of our needs and work closely with the CSA network and innovation partners to identify opportunities to unlock progress from dual use propositions.

UK Policing S&T as an Export

The UK Police Service is often asked by overseas partners to share its best practice and ways of working. We will promote S&T as one such 'export,' supporting countries wishing to develop their scientific delivery and fostering growth of the international security market. We will actively seek to partner with countries, co-developing and sharing resource wherever possible.

A COLLABORATIVE ENDEAVOUR

Tackling serious violence is not only the responsibility of the police. It requires the involvement of the widest range of partners across different sectors, working together effectively through their local structures.

The Violence Reduction Unit at Thames Valley Police enjoys such a partnership, with local social care, children's services, prisons and probation, schooling, community safety, and the health service. They deliver a connected service.

Central to their work is a multi agency data sharing and analytic platform. This brings together data from each of the partners so that risk and causation factors, and the protective measures that are in place, can be considered holistically and action taken.

The result is an evidence based, public health approach to violence reduction, which ensures people receive the right care and that the system can take a strategic approach to addressing needs.

SOURCE

Agile commercial models will allow us to source the best S&T in a timely manner.

In its advisory role, the Office of the Chief Scientific Adviser will support forces in their procurement decisions by providing expert scientific assessments and evidence to inform business cases.

A Single View of the Market

In the absence of central knowledge about S&T solutions, forces often source science and technology without full knowledge of available options and their merits. We will develop a catalogue of 'S&T cases' that summarise a solution's scientific, policy, legal and value for money case. These can be searched by decision makers to learn about projects and solutions developed elsewhere in the country; acting as a one stop shop for S&T sourcing akin to how crime reduction best practice is collated in the Crime Reduction Toolkit. Over time this system will promote rapid national adoption of the most successful local innovations.

Agile Commercial Models

Led by BlueLight Commercial, we will create commercial models that make it easy for start ups, SMEs, academics and industry to work with policing at pace. Where a great solution can be adopted rapidly, we must have the mechanism in place to act quickly.

We will use Other Government Commercial Frameworks where appropriate, including Dstl Commercial Frameworks to commission research and promote collaborations.

National Procurement

Police forces run their own procurement, sometimes together in consortia: there are also S&T being procured nationally for key capabilities, such as body armour, protective shields and other equipment necessary for public order policing. Where it is beneficial to do so, we will develop national procurement models for S&T that benefit all forces and represent better value for money.

Commercial Off the Shelf Solutions (COTS)

Policing has long shed its reliance on self built S&T and we benefit greatly from the cost, speed and quality values of commercial solutions. To encourage pull through, we will create novel testbeds and trialling frameworks that allow us to assess the value of a solution in an agile, quick and lawful way.

POLICE SCIENCE COUNCIL

The Police Science Council (PSC) is a publicly appointed, independent expert committee whose members bring world leading science and social science expertise from academic and industry. PSC is one the 'Scientific Advisory Council' network across government.

PSC acts as a critical friend to help policing deliver the very best service to the public and its workforce. It does this, for example, by providing independent, objective, and timely scientific advice to policing; by helping policing access, interpret, and apply the best relevant scientific knowledge from all disciplines; by advising on the balance, strength, and appropriateness of policing's science and technology development and implementation; and by supporting development of the science and technology professions, as well as wider 'scientific literacy' of science across policing.

Everyone in policing is encouraged to access PSC, whether it be for independent review of mature solutions or to help with crystallising fledgling ideas. PSC members often form subgroups to support policing teams with strategic, collaborative work.

EMBED
DEPLOY

We will set the conditions for successful deployment.

Often procurement and deployment of new S&T can be too slow, piecemeal, and done without consideration of long term sustainability. As a community we will work jointly to set the right conditions and expectations to ensure the pull through of S&T, at the pace and scale needed.

The speed of technological development has placed pressure on the science system to identify, evolve and embed tooling for digital forensics at pace.

Resilient Deployment from the Outset

Many in policing can identify a time when they have been handed an S&T solution that is not interoperable or misaligns with existing processes. Still more can think of solutions that were not retained because insufficient thought was given to the training and resources needed to keep it active.

For new and evolving S&T, we will address this issue by expecting both end user engagement and senior level sponsorship (e.g., from NPCC national leads) for the proposed work. By engaging with our Communications activity, researchers and innovators will be able to secure additional interest and support.

We will support large strategic S&T initiatives, develop S&T adoption plans and set out how they will be scaled and adopted by the police. This will include considerations of policy, standards, training, and public consultation. It may also consider the value proposition; how the solution will be scaled and brought to market.

These plans will mature into the resilience risk assessment undertaken by our current national science enablers. The overall resilience of policing S&T will be reviewed annually by the CSA.

Accessing Expertise

Policing often depends on external experts, but access to them is typically organic and dependent on local networks. We will curate the expert registries within policing and provide a single access point for forces at the NPCC strategic hub. We will work with similar capabilities across government, such as the ISTA register, so that Chief Officers and operational teams have seamless access to world-class expertise.

Of course, much of the best expertise sits within policing. As part of our development of the science profession, we will curate an understanding of available expertise across forces (as has been achieved in specialist areas), encouraging engagement across regions to maximise the value of our workforce expertise.

EMBED
EVALUATE

We will evaluate S&T's impact on policing outcomes, building an evidence base for future investment decisions.

Evaluation will be a cornerstone of our S&T portfolio. By evaluating technologies and evidence based policies, we will provide quality assurance and accountability to the public, as well as learn, in a structured way, how to improve our delivery.

Evaluation also supports a rigorous system of benefits management. Led by the CSA, we will capture S&T benefits across value for money, efficiency gains, and workforce experience, building an evidence base for future investment decisions. The CSA will work with HMICFRS in designing and utilising the outputs of the evaluation programme.

Evaluation as Business as Usual

We will shift our appetite for evaluation from 'occasional' to 'commonplace.' This means expecting evaluation to be part of most S&T programmes, with clear expectations on what constitutes 'success' and dedicated funding to support the work.

We will grow a culture of thinking about evaluation from the outset. Early consideration can enable evaluation to be 'built into' a project at little extra cost and effort. It encourages measurement of the 'baseline' prior to the S&T being introduced, which is essential for showing the benefits. It also encourages assessment during implementation to identify and address unintended consequences.

Responsibilities for Evaluation

We will promote an evidence based approach to improving our S&T processes, by commissioning independent evaluation of initiatives directly, and drawing on published research, models and frameworks to develop our approach to evaluation and monitoring, including benefits tracking and metrics for S&T development and adoption.

An evaluation can be instigated in many ways. It may be undertaken by a force or service line, often using the College of Policing's Evaluation Toolkit. It may be undertaken by the Home Office as it seeks to benchmark policing against international comparators. It may be initiated by the CSA and undertaken by academia, Dstl, and other partners. Or, it may be undertaken by The Police Science Council as part of their 'deep dives' into areas of relevant S&T. Where possible, the CSA will collate and publish evaluations and policing's response, opening up our work to scrutiny and allowing others to learn from our experience.

EVALUATING RAPID VIDEO RESPONSE (RVR)

In 2021, Kent police ran a Randomised Control Trial to evaluate whether an immediate video call with a frontline officer, compared to a scheduled physical response, improved their service to consenting victims of domestic abuse (where the offender was not present).

The trial shows how RVR delivers an immediate response (an average of 3 minutes compared to 14 hours and 51 minutes) and faster referrals to partner agencies who support victims. It shows how RVR increases officer efficiency, reducing the investigative time needed by about one third. And, it shows how RVR improves service, reducing call backs from victims awaiting attendance, and increasing satisfaction for many victims.

This evaluation gives us evidence of the value of RVR and also affords an opportunity to learn lessons about how it is safely and most effectively deployed.
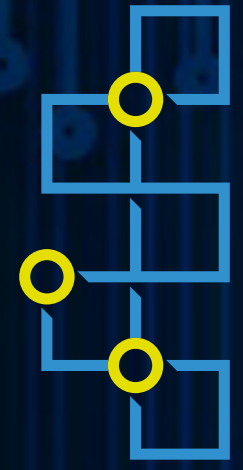
Science
& Technology
in Policing

PART 3

CREATING THE CONDITIONS FOR SUCCESS

THE SCIENCE PROFESSION

To fully exploit S&T, policing needs access to the right skills.

At the heart of our science ambition is an enabled workforce with the right skills and expertise. It is a workforce that includes natural scientists, data scientists, behavioural and social scientists, engineers, technologists, analysts, and many others.

The Science Profession

We will introduce a national police science profession to give coherence, voice and support to the scientific workforce and the communities that exist. The Profession will be a channel for identifying and addressing the needs of those delivering S&T, and a focal point for offering career opportunities and personal development.

We will encourage our scientists to join the Government Science and Engineering Profession so that they benefit from its rich support network. We will examine the diversity of our science workforce and will act to increase this. We will introduce secondments and attachments between policing, academia and industry that promote cross-sector understanding and joint working. We will celebrate success and recognise excellence. We will explore ways to enable officers and staff with science backgrounds in non-science roles to contribute, should they wish to do so.

Recruiting for the Future

The demand for S&T specialists from public and private employers creates a recruitment and retention challenge for policing. We will identify the S&T skills needs of policing now and in the future, and act to best position policing as an attractive employer. This will include determining what we need 'in-house' and what we can best access elsewhere. It will recognise that the traditional 'job for life' expectation is obsolete and that mechanisms to engage our alumni are essential to a vibrant wider community.

Science Literacy

A science-led Service needs everyone to be able to absorb and utilise S&T safely, ethically, legally and with minimal burden. It also requires leadership that understands the potential of S&T and actively champions and drives it at all levels. The CSA will work closely with the College of Policing to integrate scientific understanding and evidence in relevant curricula, including in the Strategic Command Course.

Inspiring the Next Generation

Policing already leads STEM outreach activities with schools, colleges and communities. We will continue to do so, seeking new opportunities to offer relevant work experience and rewarding careers.

Our ambitions for S&T depend on workforce growth at a time when STEM skills are in high demand. We will work with academia and industry to inspire the next generation, encourage wider participation in STEM subjects, and promote careers in police S&T.

Many of our Special Constables have science and technology expertise that can benefit policing. We will encourage and seek ways for them to contribute should they wish to.
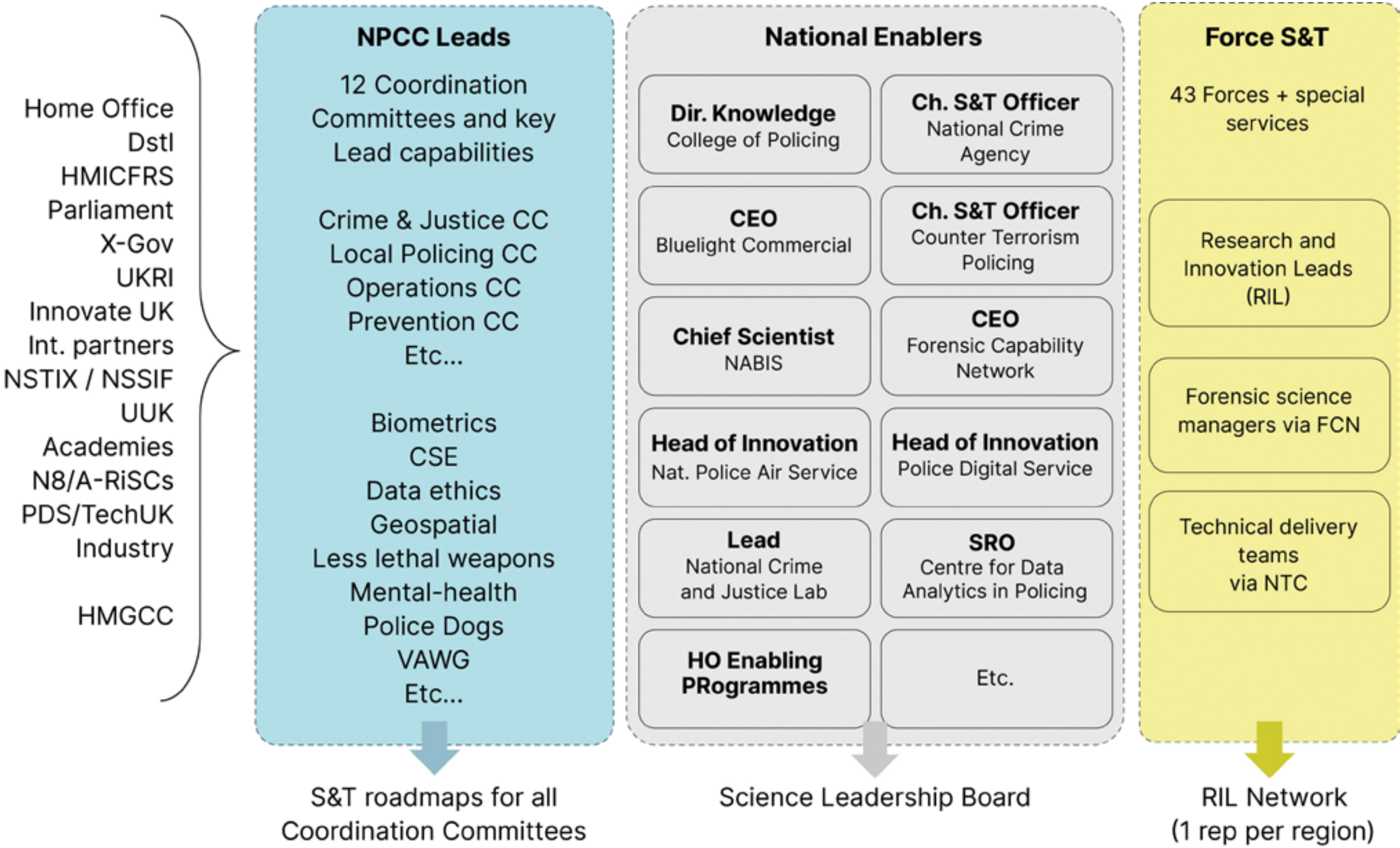
GOVERNANCE AND STRUCTURES

A visible, connected science estate.

The science estate is complex, set across many organisations with different responsibilities and lines of governance. We will bring a joined up approach to this landscape by structuring S&T activity in three channels:

○ **NPCC Coordination Committees and Portfolios.** Each committee has an S&T roadmap, linked to our strategic prioritisation, and curated by our Police Science Advisers. Engagement is via the existing meetings.

○ **National enablers.** Leaders of programmes delivering S&T nationally, come together to address common opportunities and challenges (e.g., science profession, ethics)

○ **Force S&T**. Led by the force Research and Innovation Lead, this channel enables strong communication across force initiatives. The CSA supports RILs working together on common interest.

Alongside Chief Constables' Council, the CSA is subject to oversight from (a) the Police STAR board, which engages police stakeholders including Chief Constables, PCCs, DGs and representatives from the community. It reviews all areas of S&T but particularly the investment portfolio; (b) The Police Science Council, which comprises independent members who consider the strategic growth and health of policing S&T and report annually to the NPCC Chair and the Government's Chief Scientific Adviser.

Home Office
Dstl
HMICFRS
Parliament
X-Gov
UKRI
Innovate UK
Int. partners
NSTIX / NSSIF
UUK
Academies
N8/A-RiSCs
PDS/TechUK
Industry

HMGCC

NPCC Leads

12 Coordination Committees and key Lead capabilities

Crime & Justice CC
Local Policing CC
Operations CC
Prevention CC
Etc...

Biometrics
CSE
Data ethics
Geospatial
Less lethal weapons
Mental-health
Police Dogs
VAWG
Etc...

S&T roadmaps for all Coordination Committees

National Enablers

Dir. Knowledge College of Policing	**Ch. S&T Officer** National Crime Agency
CEO Bluelight Commercial	**Ch. S&T Officer** Counter Terrorism Policing
Chief Scientist NABIS	**CEO** Forensic Capability Network
Head of Innovation Nat. Police Air Service	**Head of Innovation** Police Digital Service
Lead National Crime and Justice Lab	**SRO** Centre for Data Analytics in Policing
HO Enabling PRogrammes	Etc.

Science Leadership Board

Force S&T

43 Forces + special services

Research and Innovation Leads (RIL)

Forensic science managers via FCN

Technical delivery teams via NTC

RIL Network (1 rep per region)

Schematic Representation of the Governance Channels that Cohere Policing Science and Technology

ROLES AND RESPONSIBILITIES

A mature S&T system needs clear roles and responsibilities.

Developing S&T is a 'team sport'. It needs a complex range of organisations, with their different leadership, funding, and incentives, to work together. All organisations have a role in the system, but it is more efficient if each focuses on what they are best placed to deliver.

The Office of the Chief Scientific Adviser will play a more direct role in earlier parts of the system. Police forces, national organisations like the Police Digital Service, and, for some national capabilities, the Home Office, will lead delivery later in the system.

To make this work will require regular, effective communication and collaboration, alongside clarity about the roles and responsibilities of each partner. As the system matures over time, we will work together to ensure the right interfaces, hand-offs and shared responsibilities for delivery are in place. This won't happen immediately, but we will work over several years to ensure that all the different organisations who need to be part of the system can work effectively together.

Roles of organisations within a mature science and technology system

KEY
- Own
- Deliver
- Collaborate

	ENGAGE widely with a diverse S&T community			EVOLVE the right S&T to deliver policing capabilities			EMBED S&T to make it a reality		
	Communicate	Explore	Prioritise	Research	Innovate	Build	Source	Deploy	Evaluate
Police CSA	ARI	Futures prog.	STAR board	Fund	Collab.				Eval. Prog.
Home Office / xGov			STAR board		Fund	Fund			
NPCC & APCC	Engage public		STAR board				Invest	Deliver	
College of Policing	Innov. Network	Futures prog.		RD&I	What works			What works	Eval. Prog.
HMICFRS			STAR board						Thematic
National S&T services	Collab.	Collab.	Serv. Strategy	Collab.	Collab.	Fund			
Force RD&I programmes	Collab.	Collab.	Force strategy	Fund	Fund	Fund	Invest	Deliver	
Bluelight commercial							Invest	Standards	
Academia	Collab.	Collab.	RD&I	RD&I					
Gov Labs (e.g. Dstl)	Collab.	Futures prog.		RD&I	RD&I	RD&I			
Accelerators (e.g. ACE)	Collab.	Collab.			RD&I	RD&I			
Industry	Collab.	Collab			RD&I	RD&I	RD&I		

MEASURING SUCCESS

Achieving success together.

We will measure success annually against qualitative and quantitative measures, underpinned by a theory of change that seeks to deliver *"a police service that is trusted to use world-leading science, technology, analysis and research in its delivery of a fair, just and safe society."*

All our work will uphold the high professional standards expected of policing. We will deliver an approach that has ethics, integrity and transparency at its heart, and which seeks public buy in and consent at all times.

ENGAGE WIDELY

1. A diverse and multidisciplinary community that is active across our S&T priorities, and which proactively champions equality and inclusion.

o Widespread awareness of and engagement with our priorities and Areas of Research Interest (ARIs).

o A diverse and maturing S&T profession, with rewarding career pathways and an educated leadership who understand how to use S&T.

o Clarity over roles and responsibilities and how people work together in the system.

EVOLVE STRATEGICALLY

2. A frictionless way to allow initial ideas to grow into mature and resilient innovations.

o A robust method of prioritising strategic S&T that responds to new requirements, and has in place the appropriate funding streams.

o New approaches to joint working with industry and academia, so that we can rapidly explore, develop and test innovations.

o Central visibility of all policing S&T that is open to public scrutiny and available for re-use by other scientists in policing, academia and industry.

EMBED THE BEST

3. Use of new S&T in an efficient and effective way that is supported by the public.

o Better procurement of S&T and recognition of value.

o Improved access to advice from expert community on S&T in Policing.

o Evidence based approaches using evaluation and research to improve.