

All in for safety & security

Wanting to feel as safe as possible, society is averse to unwanted events. Whether they are attributable to incidents (safety) or malicious intent (security), unwanted events can be caused by technical imperfections, (unintended) human actions, or a combination of factors. Promoting safety & security therefore is an area of research that greatly benefits from interdisciplinary collaboration between technical, social, and humanities disciplines. New developments must also be swiftly and skilfully translatable into practice, in which various public organisations and government institutions play a significant role. We posed five questions to some of these partners of the TU Delft Safety & Security Institute, focusing on their perspectives and insights in the field of safety & security. First, an introduction of the interviewees and their specific field of work.

text Merel Engelsman



Annemieke de Vries

Director of Science and Technology at the Netherlands Forensic Institute (NFI)

The NFI, the Dutch knowledge and expertise centre for forensic research, contributes to truth-finding in (inter)national criminal investigations through applied research, knowledge transfer, and innovation. Scientific investigations include DNA and fibre analysis, decoding digital information, and many other things. Innovation encompasses technological advancements that can enhance forensic research as well as developments in other knowledge domains that can be of value to the forensic process. Moreover, innovation is not only initiated in response to past and current events, but also aimed at developing forensic techniques for tomorrow's pressing issues. The team of Annemieke de Vries coordinates, aligns and supports the innovation efforts both within the NFI and with external partners.

Sven Hamelink

Head of Science & Technology at the Staff of the National Police Services Agency, co-chair of the 'Programmaraad Rijks Innovatie Community', and Chair of the European Clearing Board

The Police uphold the law, maintain public order, provide aid, and conduct criminal investigations. Crime prevention is on their list of tasks as well. The Dutch police are world class in some areas of expertise, such as cybercrime and encrypted messaging (EncroChat and SKYECC, for instance). The department of Science & Technology keeps a close eye on relevant technological developments. What are the potential threats and opportunities related to these developments and how may these impact the organisation? These assessments are made internally as well as in close collaboration with European agencies, knowledge institutes, and partners in the chain in other countries. An important secondary appointment of Sven Hamelink therefore is his chairmanship of the European Clearing Board – which focuses on developing and exchanging tools and methods for crime investigation.



Jaco Westra

Coordinator Safe and Sustainable by Design at the RIVM

Jaco Westra is Coordinator Safe and Sustainable by Design within the Environmental and Safety domain at the Dutch National Institute for Public Health and the Environment (RIVM). The research he coordinates focuses on safety and sustainability, covering both scientific and policy aspects. It is strongly prevention oriented; the goal is to prevent that the development of new (chemical) substances and materials may increase the safety risks for humans and the environment. Next to substances, it also applies to new processes, installations, and systems. Rather than assessing individual substances, the focus lies on developing widely applicable instruments, such as a toolbox that companies can use for early-stage assessment of the harmfulness of a substance or material under development. This research aims to prevent health risks similar to those caused by substances such as PFAS and chromium (VI).



Marjolein van Asselt

Director of the Rotterdam Court of Audit

The Rotterdam Court of Audit is an independent scientific research institute at the municipal level. It conducts qualitative research into the policies pursued by the Rotterdam municipal council – which includes the responsibilities related to promoting safety & security. In recent years, the Court of Audit has conducted investigations into topics such as subversive crime, traffic safety, and the use of algorithms. The research also extends to the risks of public policies on the energy transition and climate change (such as water safety and heat stress). The research is mostly evaluative in nature, but the reports always provide forward-looking recommendations. It is then up to the municipal council to determine how the executive board of Mayor and Aldermen should act.



QUESTION

NFI

Annemieke de Vries

Subversive crime – criminal activities that aim to undermine or destabilize established institutions, systems, or governments – is a major challenge. Drug-related crime poses a challenge for the Netherlands in particular as we play a significant international role in drug trafficking, and now also as a drug producing country. We need to seriously consider new approaches for drug crime investigation and invest in developing new methods. Digitisation is key, but it comes with several challenges: in storing, sharing, securing, searching, and utilizing data. How to do that safely and ethically? At the same time, it opens up huge opportunities as these data may provide a wealth of information.

National Police

Sven Hamelink

Technology advances at lightning speed: smart cameras, image recognition, sensors, Wi-Fi tracking, mixed reality, drones, self-driving vehicles, quantum encryption and decryption. It is too much and too impactful and needs to be assessed in a structured way. What are the opportunities and potential threats? What ethical aspects (such as privacy) come into play? Proportionality is important too. Should we, for example, use camera's to scan for someone throwing litter from a car? We need to define our position.

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What is the greatest
safety & security challenge
in your domain of expertise
or organisation?

Rotterdam Court of Audit

Marjolein van Asselt

Security challenges often involve illegal activities, making them difficult to investigate. But a more general challenge is that safety & security has become an umbrella term. We must critically assess whether a topic really is a safety & security issue, why that is the case, and if such labelling helps to clarify and solve a problem. The label determines how the municipal council will act on our report's findings. If we label something to be a security issue then, for the time being, the council will treat it as such. When researching algorithm use, for instance, we approached this from a risk perspective. We could have approached it from an efficiency standpoint as well.

RIVM

Jaco Westra

The idea of prevention that is behind Safe & Sustainable by Design is so logical, it hardly needs explaining. The biggest challenge is to make it work. It takes a wealth of technical knowledge to be able to assess the potential hazards of a chemical substance. We need to bring all this knowledge from various disciplines together and improve on it where necessary. How to manage this and who will be the knowledge holder? At the same time, this preventive approach also requires a system change. We'll need to convince companies that this is a good idea. They may readily assume it will hinder innovation, while I believe it will help promote a more constructive discourse on innovation.

Annemieke de Vries

Most of our efforts are reactive in nature; we become involved only after a certain crime has occurred. I would like to see our focus shift more towards early detection and even prediction. By using intelligent data analysis (forensic intelligence) to look for patterns in the drug market, for instance. Do we observe changes in the cutting agents used to lace drugs, and can law enforcement intervene sooner by following the (digital) traces of those agents? Close collaboration between various parties is key if we want to achieve this. The recently formulated National Forensic Research Agenda helps set the stage. It is a fantastic initiative in which the entire forensic field – police, the public prosecution service, judiciary, TNO, universities, universities of applied sciences, NFI, and more – have joined forces. I can't wait to see what research collaborations this will bring forth.

NFI

Marjolein van Asselt

In the academic world, safety & security are two largely separate topics, with each their own researchers, conferences, and scientific journals. This is problematic for assessing safety & security risks, and very inconvenient for the Court of Audit which is very much practice-oriented. We need to find the right expert for each specific safety & security issue. It would help us a lot if this could be organized in a more interdisciplinary manner. We can then enter into a partnership with a single interdisciplinary academic research institute for any topic that touches on safety & security – such as subversive crime, digital security, or climate safety.

Rotterdam Court of Audit

Sven Hamelink

Eisenhower said that "what is important is seldom urgent and what is urgent is seldom important." I believe it to be important for our organization to have the space of mind, time, and budget to think about what creates value for tomorrow and the day after. Rather than being reactive in our response, we should be proactive in addressing the opportunities and threats that come our way. And even though the Dutch National Police is known for being quite innovative, only a fraction of all technological innovations make it into actual practice. I would like to see that change. This doesn't mean (even) more collaboration, but smarter collaboration with other relevant parties – such as academia, research institutions, and companies.

National Police

Jaco Westra

In an ideal world, preventive consideration of the potential safety risks posed by new substances and materials is deeply ingrained in society. It wouldn't only be a priority for the government, but also for the parties that develop the substances and bring them to market. This is not to point the finger at industry; the world has evolved the way it has. But we already know so much about chemical substances, and we already have various models for that. Preventive consideration is no fantasy, it is very much feasible. Next to technical aspects, universities also play an important role regarding the social scientific aspects. Take governance, for instance – what are the roles and responsibilities in a system that prioritizes prevention?

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What would you like
to achieve in the field
of safety & security?

QUESTION

QUESTION

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What is the role of technology in safety & security, both as a solution and as a risk?

Annemieke de Vries

An important non-digital development is that we can analyse ever smaller traces, both in the lab and on location. And there are many indispensable advancements in the digital realm as well. We successfully apply AI in practice, and we keep an eye on up-and-coming technologies such as the role of quantum computing in data security. Recent events in the Netherlands – with AI – have shown that we shouldn't put blind faith in technology. It is therefore essential that we carefully consider how new developments are incorporated into the criminal justice system. Moreover, a prosecutor, judge, and lawyer need to understand how we conducted our research. A key task for NFI researchers therefore is to clarify new developments, such as how we (will) prove that a certain video is not a deepfake.

NFI

Marjolein van Asselt

The challenge with technology is that positive expectations always outpace acknowledgment of the associated risks. First the promises and only much later – and often to the surprise of technology developers – the risk debate. But you can't have one without the other. The fire-retardant properties of asbestos were undisputed, but it came with enormous health risks. When I worked at the Dutch Safety Board, we didn't wait for automation in road traffic to lead to major accidents. Rather, we scrutinised research into near accidents and indicated that risk assessment was inadequate. And at the Court of Audit, in the report on the use of algorithms, we specifically examined whether organisation of the risk side matched that of the promises.

Rotterdam Court of Audit

Sven Hamelink

The exponential growth and convergence of technology creates new domains. Take, for instance, the convergence of developments in nano-, information-, bio-, and cognitive technology. In addition, some technology that used to be reserved for state actors is now accessible to everyone. It not only brings us new ways of working, but it also presents new threats, depending on how these new technologies influence criminal practices. If we want to fully capitalise on the opportunities offered by digitisation, I believe that the we – and the safety & security domain as a whole – need to make another step when it comes to our willingness and ability to change.

National Police

Jaco Westra

The approach of Safe & Sustainable by Design can be applied at various levels of abstraction – including emerging technologies such as nanotechnology, advanced materials, or synthetic biology. At the moment, however, it is primarily being developed for chemical substances. A key technological advancement is the use of AI to make predictions – based on existing knowledge – about substances with (slightly) differing chemical structures. Companies use this to understand the characteristic properties and potential harm of a substance. Focussing on safety, the latter is of particular importance to us. We want to understand this knowledge development so that we, as a government, can assess the working of these AI models and the reliability of the outcomes they produce.

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QUESTION

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How do you view (future) collaborations with academic and non-academic stakeholders in promoting safety & security?

NFI

Annemieke de Vries

We have a large (inter)national network with universities and universities of applied sciences, with organizations such as TNO, the WODC (Research and Documentation Centre), and with our partners in the criminal justice system. This variety of partnerships has led to significant progress in forensic research. We already have a strong collaboration with TU Delft in the fields of AI and data science. We are also jointly developing innovative methods for crime scene analysis, such as a biometric model for complex falls. But our interests and questions are broadening: how to apply these and other new technologies in a safe and responsible manner? Technical and ethical research can go hand in hand as TU Delft has expertise in both areas. Additionally, the National Forensic Research Agenda will significantly boost collaboration with both academic and non-academic stakeholders.

National Police

Sven Hamelink

We can't do everything ourselves, even though we are one of the largest employers in the Netherlands. It is our goal to determine who are the knowledge owners, how we can participate, and how we can make it applicable in our context. Together with research institutions and peer organizations in other countries, we have developed a Science & Technology agenda as a guiding framework in support of this goal. The required tools and solutions will be developed in labs, hubs, and pilot projects. And rather than continually entering negotiations on issues such as intellectual property rights and confidentiality, we are now establishing collaboration frameworks for these partnerships. The one with TU Delft has just recently come into effect.

Rotterdam Court of Audit

Marjolein van Asselt

Many universities appear not to realise that there are Courts of Audit that house excellent researchers doing similar work. We may be small in size, but our research does make the headlines. Moreover, city councils have the statutory duty to discuss it and the executive board must come up with a response. Put simply, societal impact is intrinsic to our work and valorisation is a core product. And where academic researchers may spend months negotiating for access to data, we simply put in a request. These aspects make it highly interesting to collaborate with a Court of Audit for any academic researcher whose knowledge is relevant to a specific municipality, major cities, and beyond. In return, we get easy access to scientific journals.

RIVM

Jaco Westra

Tremendous progress has been made in the field of chemical substance hazards. As a scientific government institute, we need to be informed about these developments. That is not something we can do on our own, nor should we want to. We therefore collaborate with numerous academic partners, such as TU Delft, Wageningen University & Research, and Leiden University, as well as many international knowledge partners. The questions and perspectives of industry and other societal partners are important too. All this shared knowledge is needed to come up with an effective prevention approach. Their contribution is also essential in bringing about a system change towards a new safety mindset.

Annemieke de Vries

Innovation at the NFI is mostly driven by forensic practice and by the developments we or our partners observe in the outside world. The NFI is furthermore firmly grounded in the natural sciences. It means that we need scientists – including engineers – to translate the needs and developments regarding a topic such as organised crime into new approaches and innovation projects. And to subsequently develop the new tools. But I do believe that we, as an organisation, could engage more in collaborations with researchers from other domains. We can benefit from the social sciences, such as criminologists, just as much as the Outbreak Management Team for COVID-19 benefitted from putting behavioural scientists next to medical expertise. This may foster refreshing new insights for the significant challenges we face.

NFI

Sven Hamelink

As mentioned before, we have been closely collaborating with universities and knowledge institutions that are rooted in the applied sciences. And the insights from experts such as data scientists and engineers are especially valuable when it comes to technology. Furthermore, the rapid societal developments will transform our work processes. That is a major driver for us to increase overall “tech awareness”. It means that, next to even more engineers, we also need other scientists who are tech-savvy and who have an affinity for ICT. To me, diversifying our expertise is a prerequisite.

National Police

Marjolein van Asselt

I often describe myself as an experienced researcher-administrator. And I enjoy research that not only is of benefit to society, but that is essential to society. With my background in engineering, I have an above average interest in technology, which comes in handy in safety & security matters. But it's certainly not only engineers at the Court of Audit. Sociologists, anthropologists, historians, public administration specialists, criminologists – you can pretty much have any scientific background and work at the municipal Court of Audit.

Rotterdam Court of Audit

Jaco Westra

I studied physical chemistry and then entered the field of safety of hazardous substances. This involved both substantive work and policy work. In my current role, I no longer need to fully understand all the technical details. But to effectively manage the research, I need to grasp the main concepts. It helps to have a background in the exact sciences as it prevents one from getting lost in the world of toxicologists and chemists.

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QUESTION

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Engineers have excellent technical-analytical capabilities. How is the engineering mindset reflected in your daily work, and how does it relate to other necessary expertise?

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Today's grand challenges can no longer be solved with a single perspective or approach

Aukje Hassoldt

Dean TU Delft Faculty of Technology, Policy and Management

progreSSIon

On the occasion of 10 years TU Delft Safety & Security Institute

SAFETY &

SECURITY IN

A CHANGING WORLD

Safe by Design

“Engineers must learn to talk about ethics”

Field perspective

All in for safety & security

Opinion

We need an inclusive approach to flood risks

Road, air, rail

Safety & security in a transport sector on the move

Discussion

Are sustainability and safety incompatible?

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