

CENTRIC

Centre of Excellence in Terrorism,
Resilience, Intelligence and
Organised Crime Research



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ABOUT US



FOREWORD

John Parkinson OBE

Chair of the CENTRIC Advisory Board

“CENTRIC’s innovative approach to applied research provides them with a clear opportunity to address the security challenges of today and tomorrow”

It is with great pleasure that we present to you this report on the Centre of Excellence in Terrorism, Resilience, Intelligence and Organised Crime Research (CENTRIC) activities to date. This report coincides with the seventh anniversary celebrations of CENTRIC and is an appropriate moment to reflect on the outstanding achievements of the team over the past seven years and to set out the ambitions for the future.

The publication of this report is timely given that it is set against a background of conflict, insecurity and the resurgence of violence both at home and abroad. For the United Kingdom, like many other nations, we remain under constant attack from all manner of hazards including terrorism, organised crime and cyber-related threats that, if left unchecked, can cause untold harm to citizens, communities, public services, businesses and the wider economy.

In recognising these challenges, the innovative approach to research by CENTRIC brings together practitioners, private industry, academia and the public to focus on applied research in the security domain. This multidisciplinary approach seeks to inform operational policy and practice as well as putting tangible products in the hands of those who need them most. In doing so, CENTRIC strives to make positive contributions towards citizen safety in all corners of the world and push professional practice beyond the current state-of-the-art.

This report showcases the contribution of CENTRIC across the landscape of policing and security, highlighting pioneering research, the development of high quality software platforms, and the publication of practitioner focused handbooks which address a range of contemporary security challenges. CENTRIC has quickly established itself as a dynamic, progressive and innovative centre of excellence, priding itself on making a difference through its unique collaborative approach.

May we take this opportunity to thank all of the CENTRIC team for their energy and enthusiasm, and wish them continued success in the future. We are delighted that CENTRIC continues to develop its capacity and capability, ensuring that all in authority are better informed today to meet the security challenges of tomorrow.



PREFACE

Professor Babak Akhgar
Director of CENTRIC

“CENTRIC is at the forefront of providing solutions to tackle some of Europe’s most pressing contemporary security challenges”

On behalf of the CENTRIC board, it is my pleasure to present to you this report taking stock of the accomplishments of CENTRIC over the past seven years and looking towards the exciting challenges that lay ahead.

The ability of law enforcement agencies to keep citizens safe and secure around the world has never been more keenly tested. Police, governments, and other security services now require innovative, and often technological, solutions to help them face the security challenges of the future. The multidisciplinary approach of CENTRIC has shown that we are well placed to work with such organisations to help them embrace and overcome these challenges.

Over the past seven years CENTRIC’s research and development portfolio has increased rapidly owing to many successfully completed projects and innovative collaborations. CENTRIC’s mandate has always been to bridge the gap between the operational reality of policing and security and the original research and expertise brought by academia. Through CENTRIC, practitioners, policy makers, software developers, and researchers have been given a clear platform for collaboration enabling us to undertake exceptional applied research in the security domain. As CENTRIC has grown these collaborations have continued to flourish, providing the solid foundations that CENTRIC is built on today.

Much of CENTRIC’s research is tailored towards making a real impact on the everyday activities of those with whom we collaborate. The underlying goal of our work has always been to bring research to reality and as more partnerships continue to prosper, with the likes of the International Organisation for Migration and the work around the Open Source Intelligence Hub, the outlook for CENTRIC continues to stay bright.

CENTRIC’s success can be attributed to the hard work and dedication of its team, external collaborators and advisors, and the efforts of the board itself. It is upon these relationships that a successful foundation and a future for CENTRIC is built and, while the achievements over the last seven years have been nothing less than exceptional, I am even more excited about the what the future holds.

DOMAIN EXPERTISE

CENTRIC collectively hosts individuals with expertise and passion for research and innovation around a broad range of contemporary security issues.



Counter terrorism and radicalisation



Community policing



Crisis management and disaster resilience



Cybercrime and cyberterrorism



Humanitarian actions



Intelligence management



Open source intelligence investigation



Serious and organised crime

CORE CAPABILITIES

In order to tackle the challenges existing in these domains, CENTRIC endeavours to bring cutting-edge breakthroughs in research and technological development to ensure that society, and those mandated with its safeguarding, are best equipped to prepare, respond to and recover from the threats faced by society on a daily basis. CENTRIC's research team holds specialist skills in fields such as knowledge management, situational awareness, mobile application development, data mining, analytics and visualisation, virtual and augmented reality, and serious games training.

AIMS

CENTRIC brings together stakeholders from the government, academia, public and private sectors who collectively undertake applied research across the security and intelligence domains. CENTRIC's overarching research mandate is to develop end-user driven technologies to support law enforcement agencies and other practitioners in their operational activities, whilst working in close collaboration with a broad spectrum of security professionals to improve the development of their professional skills.

Current projects



This project has received funding from the European Commission Horizon 2020 research and innovation programme under grant agreement No 653590.

AUGOMED

June 2015 - May 2018

AUGGMED

Automated serious game scenario generator for mixed reality training
<http://www.auggmed-project.eu/>

“The work being done by CENTRIC as part of the AUGGMED project is helping to put the promise of emerging technologies, such as augmented and virtual reality , into the hands of domain practitioners, providing them with immersive training opportunities like never before.”

Laurence Marzell,
Serco UK.

Fortunately, major incidents such as terrorist attacks and explosions are relatively rare, but LEAs, first responders and other emergency services must train to ensure their response to such incidents is near impeccable so as to minimise the impacts of such events. The opportunities to practice such responses are usually limited to paper-based and table-top exercises with occasional live-play simulations. These exercises are often costly to organise, requiring extensive coordination, and offer few chances to analyse, review and then repeat the scenario in order to implement the lessons learned.

AUGGMED is developing an immersive serious game platform to enable individual and collaborative training of law enforcement and first responders to react effectively in major incidents.

This training takes place using mixed virtual and augmented reality environments coupled with multi-modal interfaces and cutting edge haptic feedback and control systems. The platform generates non-linear scenarios tailored to suit the needs of individual trainees with learning outcomes that will improve emotion management, analytical thinking, problem solving and decision making skills. Meanwhile, the environments utilise large-scale artificial intelligence

to formulate realistic crowd behaviour enabling them to react authentically to fire, explosions, exit choke points, and smoke inhalation. The project currently features three environmental scenarios including an airport, train station and a marine port delivering a fully immersive, adaptable and realistic training experience which can be suited to the needs of specialised trainees responding to a variety of terrorist and organised crime threats.

Within the AUGGMED, project CENTRIC’s main role is in providing the trainer tools and interfaces. These tools enable trainers to configure scenarios to match their specific training needs, observe multiple trainees live within a simulation and, if required, ‘step in’ to change parameters within the simulation. On top of this CENTRIC contributes to the development of the pilot assessment metrics, live demonstration, and the gathering of end-user requirements.

Virtual Reality can bring life to training scenarios by creating an immersive experience that mimics the pressure of decision making in complex crisis environments.



This project has received funding from the European Commission Horizon 2020 research and innovation programme under grant agreement No 740543.



MINDB4ACT

Mapping, identifying and developing skills and opportunities in operating environments to co-create innovative, ethical and effective actions to tackle radicalization leading to violent extremism.

The radicalisation of European citizens toward violent extremism is a potentially devastating process, not only for the individual and their family, but also for wider society, the state, and the international community. During the radicalisation process an array of observable behavioural traits may develop including changes in attitude, aptitude, beliefs and norms, choice of company (and, equally, choice of isolation) which can be red flags and warning signs of radicalisation. As well as these observable behaviours, a variety of risk factors that indicate vulnerability to radicalisation have been identified which not only impact violent extremism but also other key aspects of health and wellbeing (e.g. social marginalisation, identity crisis, significant experiences of loss). Identifying and recognising these traits early in the process may lead to more successful interventions and subsequent reintegration into the community.

MINDB4ACT aims to improve current counter-violent extremism policies through the collaborative use of innovative, open, participatory and user-centred environments aimed at co-designing such interventions as research actions, exchanges, strategic-policy exercises, training courses and pilot projects based on social innovation and civic engagement schemes.

MINDB4ACT will focus on four key priorities.

- 01** Systematising the available knowledge and expertise to support strategic decision-making
- 02** Enhancing interdisciplinary fieldwork on terrorists' recruiting grounds, socialisation and techniques

03 Utilising big data in order to analyse the information related to the communication practices of violent radicalisation

04 Improving existing links between academia including non-EU researchers, policy-makers and other stakeholders

MINDB4ACT will deliver policy recommendations extracted from validated results obtained from four kinds of interventions arising from five specific domains: prisons and the judiciary system; migration hotspots and asylum centres, schools, cities and the internet and media.

CENTRIC is leading a work stream which aims to provide new insights for knowledge on violent extremism through the identification of deficits in knowledge transfer and the provision of new opportunities for researchers on radicalisation. We will coordinate the development of surveys of the main actors involved in national action plans on radicalisation and investigate how to improve current research and innovation infrastructures by systematising and collecting current data, analysing how empirical evidence is transferred, or not, into policy frameworks and practices used by LEAs and front line practitioners operating in the field.

Radicalisation does not happen overnight, interacting factors and behaviours present themselves over time meaning early identification may lead to more successful interventions.



This project has received funding from the European Commission Horizon 2020 research and innovation programme under grant agreement No 740593.

RO **BORDER**

May 2017 - April 2020

ROBORDER

Autonomous swarm of heterogeneous robots for border surveillance

<http://www.roborder.eu/>

Border authorities and LEAs across Europe face important challenges in terms of how they patrol and protect the borders. Their work becomes more problematic given the heterogeneity of threats, the scope of the area to be surveyed, any adverse weather conditions and the wide range of terrains to be negotiated. The technological development surrounding unmanned vehicles provides opportunities to patrol such areas remotely, thus improving efficiency and allowing human patrols to focus on specific targeted areas. Although there are several research tools and works targeting these areas independently for border surveillance, currently border authorities do not have access to an intelligent holistic solution providing all the aforementioned functionalities.

ROBORDER seeks to develop and demonstrate a fully-functional, autonomous border surveillance system utilising unmanned mobile robots including, aerial, water surface, underwater and ground vehicles, capable of functioning both standalone and in swarms. Using data from multimodal sensors attached to the

robots, in conjunction with pre-existing static sensors, border authorities will be provided with a complete and detailed situational awareness picture of the area under their command. ROBORDER will have the capacity to detect threats such as criminal activities and hazardous incidents as well as supporting command and control teams in their operational activities and decision making.

Within ROBORDER, CENTRIC will contribute to the development of models and processes to fuse the incoming data from the sensors deployed on unmanned vehicles. We will support the creation of a CISE compliant data model and create advanced visual analytics that can be utilised by command and control operators to identify border threats, anomalies and risk models.

Drones and robots can go and see places border patrols could never reach; combining them with human-in-the-loop command and control operations can vastly increase threat detection.



This project has received funding
European Commission Horizon 2020
research and innovation programme
under grant agreement No 700024.



September 2016 - August 2019

TENSOR

Retrieval and analysis of heterogeneous online content for terrorist activity recognition

<http://www.tensor-project.eu/>

“The research undertaken in the TENSOR project will play an important part in working to increase the capability of law enforcement agencies to prevent and detect the use of the internet by terrorists and increase community safety.”

Drew Harris

Deputy Chief Constable, Police Service of Northern Ireland

LEAs across Europe face important challenges in terms of how they identify, gather and interpret terrorist generated content online. They must limit its spread and detect who is accessing and creating such content. In addition to traditional sources, such as forums and social media, the dark web presents additional challenges due to its ephemeral nature and alternative mode of access. Given that undetected terrorism-related material can contribute to the advancement of violent extremism and radicalisation, LEAs must also try to remove such content from the web. To facilitate these tasks, automated tools which tackle the challenge of extraction and analysis of meaningful and relevant content hidden in huge amounts of online data must be developed in order to assist LEAs in their investigations and reduce the strain on their resources.

TENSOR aims to provide a powerful terrorism intelligence platform offering LEAs fast, reliable planning and prevention functionalities for the early detection of terrorist activities, including radicalisation and recruitment. This will assist LEAs in the challenges that they face in identifying, gathering and interpreting online-based terrorist generated content. TENSOR considers both the surface and dark web and will develop appropriate tools to facilitate the searching, crawling, monitoring and gathering of this content. The TENSOR platform will extract text and multimedia, provide categorisation, filtering, analysis, summarisation and visualisation functionalities

supported by robust, automated audit trails that encompass privacy by design and data protection principles. Ultimately, the TENSOR platform will bring significant advantages to LEAs' operational capabilities in identifying terrorist generated content and activities.

CENTRIC is the technical coordinator of the TENSOR project and has responsibility for the overall technical development and creation of the TENSOR platform. Our expertise is utilised in the modelling of the terrorism domain realised through the creation of terrorism taxonomy and subsequent ontology. We are applying our knowledge of web crawling and scraping to content from the surface and dark web as well as social media platforms and ensuring that such sensitive data is stored and accessed both efficiently and securely. We are also creating a repository of indicators for misinformation and disinformation spread within different aspects of the terrorism field. Our knowledge of the data mining technique Formal Concept Analysis is used to cluster and group elements within the data to highlight key patterns and insights that can be utilised by law enforcement investigating terrorism offences.

The spread of terrorism related material fuels radicalisation and violent extremism, the rapid identification and analysis of such content will improve LEAs response to these threats.



This project has received funding from the European Commission Horizon 2020 research and innovation programme under grant agreement No 653729.



May 2015 - April 2018

UNITY

Strengthening the connection between the police and their communities

<http://www.unity-project.eu/>

Notwithstanding their varying social, cultural, geographic and ethnic differences, communities across Europe have common and shared values in their requirements for their own safety, security and wellbeing. However, the very organisations that strive to provide these services are struggling to connect with the communities they serve and this lack of engagement will only get worse as the strain on police resources continues to grow. Concurrently, we are living in an age of increasing technological connectivity but LEAs are yet to utilise such tools to their full potential when considering how to engage effectively with those residing in their local community. Both communities themselves and LEAs are missing out on opportunities to enhance their own community cohesion as well as the access to information that may help to ensure their safety.

Unity is creating a new, community-centred approach to community policing by developing new tools, procedures and technologies that put people at the heart of identifying policing priorities and ensuring that citizens are an integral part of informing sustainable solutions within their own community. Unity achieves this by capturing the best practices, developing technologies, and delivering training and awareness raising activities that enhance cooperation between police and the communities they serve.

As a result of the Unity project six key pillars of community policing have been identified.

01 Building trust and confidence

02 Collaboration

03 Preventing crime

04 Information sharing and communication

05 Accountability

06 Addressing local needs

In Unity, CENTRIC has developed a complementary mobile application to the Unity portal for the use of both citizens and LEAs. The application provides citizens with the opportunity to keep up-to-date with their local community, engage in discussion with the police in an informal manner, and organise meetings and events. Through the use of such features the app is able to influence improved participation and engagement between citizens, LEAs and other statutory and non-statutory organisations. We are also conducting an evaluation of how successfully each of the above six pillars are addressed using the technology and strategies for conducting community policing activities. As an added-value to the project, we are utilising our serious games expertise to develop a simple adventure game which aims to educate community members on ways of addressing key local issues through pro-active engagement with LEAs.

Community policing enables the police and their communities to work together to proactively solve the problems that affect them directly.



International Organization for Migration (IOM)

Over the past 18 months, CENTRIC has been collaborating with IOM (International Organisation for Migration - the UN Migration Agency) on a number of technology innovations which support IOM's vision to ensure the orderly and humane management of migration for the benefit of all.

SCAAN

Security Communications and Analysis Network

“With security challenges increasing worldwide, the safety of staff working in hostile conditions is essential. Working with CENTRIC in developing this state-of-the-art tool means that any staff member facing danger can instantly alert us with detailed information enabling a rapid response.”

William Wairoa-Harrison, Global Head of Security at IOM.

As a large organisation, with staff distributed across the world (often in zones of conflict or humanitarian crisis), the ability of IOM to monitor and ensure their staff's safety is of utmost importance. By collaborating with IOM's staff security centre, CENTRIC has developed a digital platform and mobile application designed to provide more efficient communications and assistance to field staff during a crisis. SCAAN enables users to send information directly to the staff security team, receive real-time news relevant to their current mission, and alert their security team if they are in serious danger.

SCAAN provides a mobile reporting application for both iOS and Android devices in order to connect field staff with their security focal points and their overarching staff security unit via the SCAAN Dashboard. SCAAN enables high-level situational awareness and management of staff involved or near major incidents and events through the following key features:

- 01** Mobile tracking
- 02** In case of emergency alarm
- 03** Status requests and head counts

04 Bi-directional communication between the field and communications centre

05 Contextual incident alerting and broadcasting

Taken together the SCAAN Dashboard and SCAAN App provide an online digital situation room for agency headquarters and relevant offices with real time visualisation of security incidents across the globe. One of the key components to the SCAAN project is the exploitation of commodity and ubiquitous technology in order to deliver fast and agile results to the industry. SCAAN is a bespoke software development project which is being adapted directly to the evolving needs of the organisation.

Mobile technology can be a lifeline in emergencies providing advanced warning of impending disasters and allowing staff to report their status in a timely and secure manner.



IOM·OIM

“The security of our 10,000+ staff worldwide is of paramount importance and remains a priority for me and the organization.”

William Swing, Director General of IOM

ATLAS

Advanced Training, Learning and Strategy Simulator

Recently CENTRIC has expanded its serious games capability by developing a training scenario for field operatives working for IOM based on a project independent framework, ATLAS. ATLAS will enable the rapid development of serious games scenarios. Whilst the project is in the early stages of development, the current platform aims to train IOM staff members on how to react during a siege attack on a convoy in Sudan. The future vision for ATLAS is to provide a platform to create highly customisable bespoke virtual reality training scenarios for a range of security-based application domains.

IAAM

I am a migrant

<http://www.iamamigrant.org/>

‘I am a migrant’ is IOM’s platform to promote the diversity and inclusion of migrants in society. The web platform hosts testimonials from migrants who publish their story of migration. CENTRIC has developed a mobile application which integrates with the existing IAAM web platform to allow users to upload personal stories containing text, images, audio and video about their journey as a migrant. This application aims to raise awareness of migration and increase accessibility, and provide a community and support network for migrants.

Community Response Map

<https://communityresponsemap.org/>

Stemming from an initial project called SPEAK, and organised around assisted voluntary returns and reintegration and the app created for IAAM, it was recognised that the mobile application could be further developed and generalised to integrate with IOM’s existing and larger platform: community response map. Community Response Map (CRM) was developed by IOM to bridge the gap between the aid givers and receivers. It provides an easy-to-use workflow that facilitates direct feedback from beneficiaries. Once a project is underway, CRM helps track and analyse the feedback being collected and visualises these responses making it easier for stakeholders to identify and respond to issues and alerts as they arise. CENTRIC has developed the mobile application and associated web services to collect this feedback. Community Response now supports multiple projects campaigns and is used internally by IOM.

TOGETHER

Respect, safety and dignity for all

<https://together.un.org/>

TOGETHER is a United Nations campaign that promotes respect safety and dignity for refugees and migrants. Launched in September 2016, its aim is to counter the rise in xenophobia and discrimination. It is a growing coalition of Member States, private sector, civil society representatives and individuals committed to change negative narratives on migration and to strengthen the social cohesion between host communities and refugees and migrants. CENTRIC is in the process of developing the public facing app which aims to engage the public in the activities of the UN agencies.



The CENTRIC OSINT Hub is a joint venture between academia, next-generation research and law enforcement aiming to assist local, regional and national law enforcement agencies with open-source investigations through the development of OSINT investigative capabilities and automated technologies.

CENTRIC OSINT
Hub

OPEN SOURCE INTELLIGENCE HUB

“The OSINT Hub brings years of collaborative research to operational reality. Providing capacity and capability beyond existing OSINT investigative tools, the OSINT Hub provides a breakthrough innovative solution at the cutting edge of contemporary criminal investigation.”

Andrew Staniforth

Head of West Yorkshire for Innovation, Office of the Police and Crime
Commissioner for West Yorkshire

The current climate brings forward unprecedented challenges for the modern policing of crime and terrorism. The inescapable prevalence of the internet presents both the greatest challenge and opportunity for countering serious and organised security threats. The OSINT Hub will lead the way in terms of dedication to intelligence quality, situational awareness, investigative techniques, bespoke technological innovations, and an adept understanding and awareness of the continually evolving UK and EU legal directives, regulations, and best practices. Our unique positioning within academia enables the OSINT Hub to provide world-class services, tailor-made to specific operational needs, at a fraction of commercial competitor prices.

EXPERTISE

The CENTRIC OSINT team consist of a group of security-vetted former police officers, academic and industry researchers, and qualified investigators with a diverse background of knowledge and experience in criminal investigations, radicalisation, terrorism, serious and organised crime, human trafficking, and cybercrime supported by a robust legal and ethical understanding of the associated legislation. The foundations for the hub have been built alongside support from Home Office CAST (Centre for Applied Science and Technology), West Yorkshire, South Yorkshire, and Nottinghamshire Police forces.

SERVICES

Targeted Investigations. We undertake bespoke and targeted investigations carried out by the accredited in-house OSINT specialists who bring leading best practice approaches in areas such as data capture, auditing, and protecting lines of evidence. These investigations also support the discovery and validation of new approaches and the development and deployment of training to domain practitioners.

Situational Awareness. We can support the proactive monitoring of potential threats maximising the potential of open source data such as that from social media, surface and dark web. These investigations utilise the modelling, capture and analysis of crime indicators and can be conducted at a regional, national and international level.

OSINT Training. We are currently developing an OSINT training course for individuals working as part of, or, alongside law enforcement. Please get in touch for further information and to discuss your organisations specific requirements.

OSINT can be another vital tool for law enforcement. The evidence obtained from information available online can make a crucial difference to an investigation's outcome.



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January 2017 - December 2019

ISM-KA

International Security Management
Knowledge Alliance

<https://www.ism-ka.eu/>

Reacting to and preventing security threats are activities which demand joined-up and collaborative security solutions across a wide range of stakeholders. Developments such as natural hazards, mass immigration, terrorism and the growing interdependencies within critical infrastructure have brought home the message that security management has exceeded the local level. Yet, clear conceptualisations, structures and mind-sets for a truly European security system are still missing.

ISM-KA addresses this issue by creating sustainable and concrete resources and structures to foster international security collaborations. The ISM-KA undertakes horizon scanning to identify forthcoming security threats, and brings together this knowledge in a platform for public and private security experts, a multi-disciplinary accredited MSc curriculum and a set of security related online education programmes to deliver these outcomes to the wider public. The project will employ guiding principles such as multi-stakeholder involvement, evidence-based management, co-creation, and policy-practice

alignment, all taken from an international perspective. ISM-KA will establish an international learning, teaching, and knowledge-sharing environment which contributes to the development and professionalisation of leadership, innovation and operational proficiency in the field of international safety and security.

CENTRIC is designing and developing a number of modules for use within the MSc programme, these modules range from cybercrime to public order, and from open source intelligence to counter-terrorism.

A trial run of the programme is expected to run from late 2018, if you, or your organisation, wishes to enrol or discuss your requirements for such a course please contact the CENTRIC team using centric@shu.ac.uk.

A course delivering a comprehensive understanding of the security domain to future leaders in law enforcement, local government, and security policy.

Past projects



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement No 313220.

athena

December 2013 - November 2016

ATHENA

Empowering citizens, protecting communities

<http://www.projectathena.eu/>

“To protect citizens, emergency services must act quickly and accurately assess new threats to deliver a rapid, co-ordinated and effective response. Athena uses intelligence on the ground combined with analytics to deepen insight into ongoing incidents, supporting emergency services in delivering a faster, more streamlined response and creating closer collaboration with the citizens they work to protect. From simulated earthquakes in Turkey to hypothetical mudslides in Slovenia, the prototype Athena solution continues to show great promise.”

Charles Senabulya,
Vice President for SAS UK & Ireland.

With the advent of smart mobile devices and social media, the world and the people within it have never been better connected. During a major crisis event the public are under-utilised crisis responders, as they are often first on the scene and vastly outnumber emergency first responders. They can be creative and resourceful, self-organise into voluntary groups, adapt quickly to changing circumstances, and emerge as leaders and experts to perform countless life-saving actions. The combination of this willingness to help and the power of mobile technology can be used to dramatically improve situational awareness and enable LEAs and first responders to resolve the current crisis.

Athena aimed to develop a holistic solution for utilising citizens and social media in the midst of a crisis situation. The two main outputs for the Athena project were a set of best-practice guidelines for first responders and citizens in the use of social media and mobile communications in crisis situations; and a situational awareness platform which realised and validated the use of social media and mobile communications for crisis response across a number of live, simulated crisis events.

As part of the Athena project, CENTRIC developed a real-time situational awareness platform to support communication between first responders, citizens, and command and control during a crisis situation. The platform leverages data sent from a mobile application as well as ingesting data obtained from social media. Command and control can access the dashboard through a web-based interface that allows them to monitor discussion around the crisis, receive information from citizens, collate and view media, message mobile application users directly, visualise and analyse crisis information, and disseminate it to the wider public through social media.

Social media can be a life-line in a crisis; bringing victims, citizens and first responders together through technology enhances situational awareness for all.



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement No 607949.



COURAGE

May 2014 - April 2016

COURAGE

Cybercrime and cyberterrorism European research agenda

<https://www.courage-project.eu/>

“CENTRIC has made a major contribution to helping people in many organisations understand the risk, threat and harm from cybercrime. Their ability to flex their intellectual prowess and work with industry and law enforcement sets them apart. Their creativity and ability to look across cultures and countries helps to maintain a broad understanding of cyber issues. As a consequence, real and practical guidance, support and analysis has been produced by CENTRIC that is well respected and of considerable value. I am proud to have worked with them to make cyber activity safer”

Stuart Hyde QPM.

The pace of change within the area of cybercrime makes it difficult to identify long-term future research challenges which can be utilised by researchers and policy makers to improve the safety of citizens, critical infrastructure, and support cybercrime investigators. The development of an overarching, definitive research agenda for cybercrime will help deliver the long term strategic goals of the EU in tackling the threat of cybercrime.

In order to develop the research agenda, the COURAGE approach builds on three primary pillars.

- 01** Utilise a user-centric methodology to identify gaps, challenges and barriers based on real-world needs and experiences of those at the forefront of cybercrime investigation;
- 02** Take an analytical and semantic approach for delivering a taxonomy of cybercrime and use it to create a common understanding of the subject with all stakeholders;
- 03** Undertake a competitive and market analysis to foster practical implementations of the proposed countermeasures to cybercrime and cyberterrorism.

The outputs from COURAGE bridge the gap between research and the operational front-line of cybercrime investigation. The multidisciplinary research of COURAGE constitutes a major innovation in policing research to tackle the most pressing contemporary security challenges.

In COURAGE, CENTRIC led the facilitation of more than 10 expert end-user training workshops across Europe aiming to elicit and train end users on the challenges posed by cybercrime and cyberterrorism facing society and the subsequent priorities in terms of research and development initiatives. We assisted and led the implementation and development of qualitative research frameworks, the reporting of scientific results and internal project coordinator activities related to the conduction of empirical investigations. We also served on the project's Security Scrutiny Committee and undertook the role of Scientific and Technical lead on the project.

The delivery of long term strategic goals for law enforcement and research to tackle cybercrime together provides a blueprint for effective and innovative investigation strategies



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement No 312651.



January 2013 - December 2015

ePOOLICE

Early pursuit against organized crime using environmental scanning, the law and intelligence systems

<https://www.epoolice.eu/>

Organised crime is becoming more diverse in its activities and methods as groups across Europe begin collaborating and operating internationally. Facilitated by freedom of movement throughout the EU, a diversification in the types and combinations of illicit activity, and a growing dependency on the use of the internet to coordinate activities, law enforcement requires new situational awareness tools to identify threats at an early stage through the use of environmental scanning.

The ePOOLICE solution was a system for the scanning and analysis of a variety of information streams including open source social media, public and government databases as well as making use of internal law enforcement data whilst analysing their reliability and relevance. The project was able to identify stakeholder needs in relation to the processes and tools required for understanding emerging organised crime threats. This led to the development of an efficient and effective environmental scanning system for detecting early warning signs of organised crime, utilising dynamic scenarios based on end-user needs and requirements to validate real-world performance (drugs and human trafficking), and evaluate trends and factors driving “future crime” in order to identify potential “weak signals” in emerging organised crime trends.

In ePOOLICE, CENTRIC undertook two key roles. Firstly, as the lead team focused on the development and implementation of unsupervised data extraction, filtering and classification through the utilisation and adaptation of industry standard text mining products provided by SAS. We employed named-entity and relation extraction methods, natural language processing and other approaches to extract, structure, and classify pertinent information related to organised crime threats from a range of heterogeneous unstructured data sources, such as the web and social media. We then took the lead on visualising the identified weak-signals and indicators on a map-based dashboard interface. Secondly, we undertook a range of activities focused on end-user engagement, assisting in the organisation and facilitation of focus groups aimed at aligning the projects development with the real-world requirements of industry and public-sector stakeholders, including EUROPOL, and regional law enforcement.

Organised crime happens in the shadows; connecting the dots between seemingly disparate events can uncover long-term organised crime threats that might otherwise go undetected.



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement No 218237.



November 2008 - April 2011

ODYSSEY

Strategic Pan-European Ballistics Intelligence Platform for Combating Organised Crime and Terrorism

LEAs recognise the investigative challenge brought about by the variety of data systems in operation across Europe resulting from individual Member States having the autonomy to choose their own ballistics data system. It is not possible to collectively analyse ballistics data extracted from the heterogeneous systems currently in use.

The Odyssey consortium acknowledged that there was no interoperable process to analyse ballistics data taken from these separate systems used in each Member State to tackle organised crime and terrorism. Odyssey sought to provide a platform in an attempt to resolve these challenges by the development of interoperable data and systems. The project utilised technical (non-personal) ballistics data and crime information but could also be extended in scope to incorporate additional data sources. Odyssey automatically combined data from disparate high volume data repositories for cross-correlation and

automated analysis using this to extract intelligence using advanced semantic knowledge and data-mining to facilitate appropriate, fast and responsible decision making and alerts.

The Odyssey project was the catalyst for the creation and formalisation of CENTRIC as an independent research institute within Sheffield Hallam University. The tools and techniques within Odyssey provided CENTRIC with a clear platform for future research and many of the themes explored within the project have evolved in line with our core capabilities.

Innovation around crime and security is held back by a lack of interoperable data sets and unwillingness to share data for the greater good. In this increasingly digital age the more organisations learn to collaborate the better results they will achieve.



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**TRANSVERSAL
BRIDGE**

November 2013 - May 2016

TRANSRAD

Transversal bridge

<https://www.agenformedia.com/international-projects/transversal-bridge>

Whilst much attention is paid to the increasing threat of Islamic radicalisation, the growing threat of violent and political extremism emerging from both right and left wing factions cannot be ignored. As many of these factions cannot exist alone, they form alliances across Europe to strengthen and amplify their message; but, such alliances often exist under the radar meaning those who deliver counter-radicalisation programmes are not aware of such coalitions and they play little part in their anti-radicalisation approaches.

Transversal Bridge addressed the emerging threat of transversal terrorist alliances for European nations and communities. TRANSRAD aimed to detect and profile the emerging threat of transversal European radical groups and raise the awareness of institutional bodies and civil society about the risks potentially connected to these “radical bridges”. The research within TRANSRAD comprised of several counter-radicalisation case studies enabling the identification of new and emerging transversal threats and the connections among the different groups, individuals and narratives.

CENTRIC’s role in the project including providing threat assessments from a UK perspective, captured from a series of interviews with experts from

government and academia. From these reports and those from other European nations such as Greece, Spain, and Italy we developed a training package to support institutional bodies, statutory organisations and NGOs. Following this, we developed a series of detailed word clouds to form an analysis of the multi-faceted key informant interviews undertaken by various partners. These included 16 key interviews with various members of radical and extremist groups across Europe. The interviews were represented in an interactive training package allowing end users to place it into an awareness and education raising exercise. Additionally, we created a virtual, 360-degree interactive radical ‘crime scene environment’. This provided an engaging platform for people to look for root causes and potential indicators of radicalisation in the home.

Developing effective counter radicalisation programmes across all forms of violent extremism required in-depth understanding of the links and synergies between different radical groups.



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September 2014 - August 2016

UINFC2

Engaging users in preventing and fighting cyber crime

<http://www.uinfc2.eu/>

As the online world continues to grow and evolve, LEAs often struggle to keep pace with the level of technological enterprise that criminals employ when conducting illegal activity online. In particular, the distribution of illegal content on easy to access sites is an increasing concern and one that LEAs cannot tackle simply on the basis of manpower alone. New automated tools and techniques are required to assist LEAs in identifying such content and then sharing this information with colleagues across Europe to reduce duplication of work and improve their ability to 'connect the dots' between crimes committed in the online and offline worlds.

UINFC2 aimed to build and strengthen the capabilities of LEAs, citizens and EU bodies to strategically combat cybercrime. In order to achieve this, UINFC2 designed, developed and pilot tested a multi-lingual, online platform for automatically detecting online illegal content from social media, blogs, and underground communities and used this to determine investigative priorities. The project made use of the latest technological innovations in the areas of data mining, intelligence, correlation, fuzziness, classification, automatic monitoring, and decision making, to produce clear but comprehensive reports that can be used by LEAs in their day-to-day roles in preventing,

investigating and fighting cybercrime. In particular, UINFC2 focusing on online Child Sexual Exploitation (CSE) and facilitated the formal exchange of compiled information, produced by intelligent analysis of online intelligence in order to enhance collaboration and effectively counteract cybercrime, supporting the mission of the recently founded European Cybercrime Centre (EC3, EUROPOL) by producing reports on cybercrime trends and emerging threats in order to provide comparable statistics among Member States.

In the project, CENTRIC undertook the role of supporting the coordinating organisation KEMEA in providing academic and end-user focused security expertise. We ensured the project's engagement with end-user LEAs and NGOs, such as the international network of InHope hotlines, and alignment with their respective real-world requirements through the organisation and facilitation of focus and working groups.

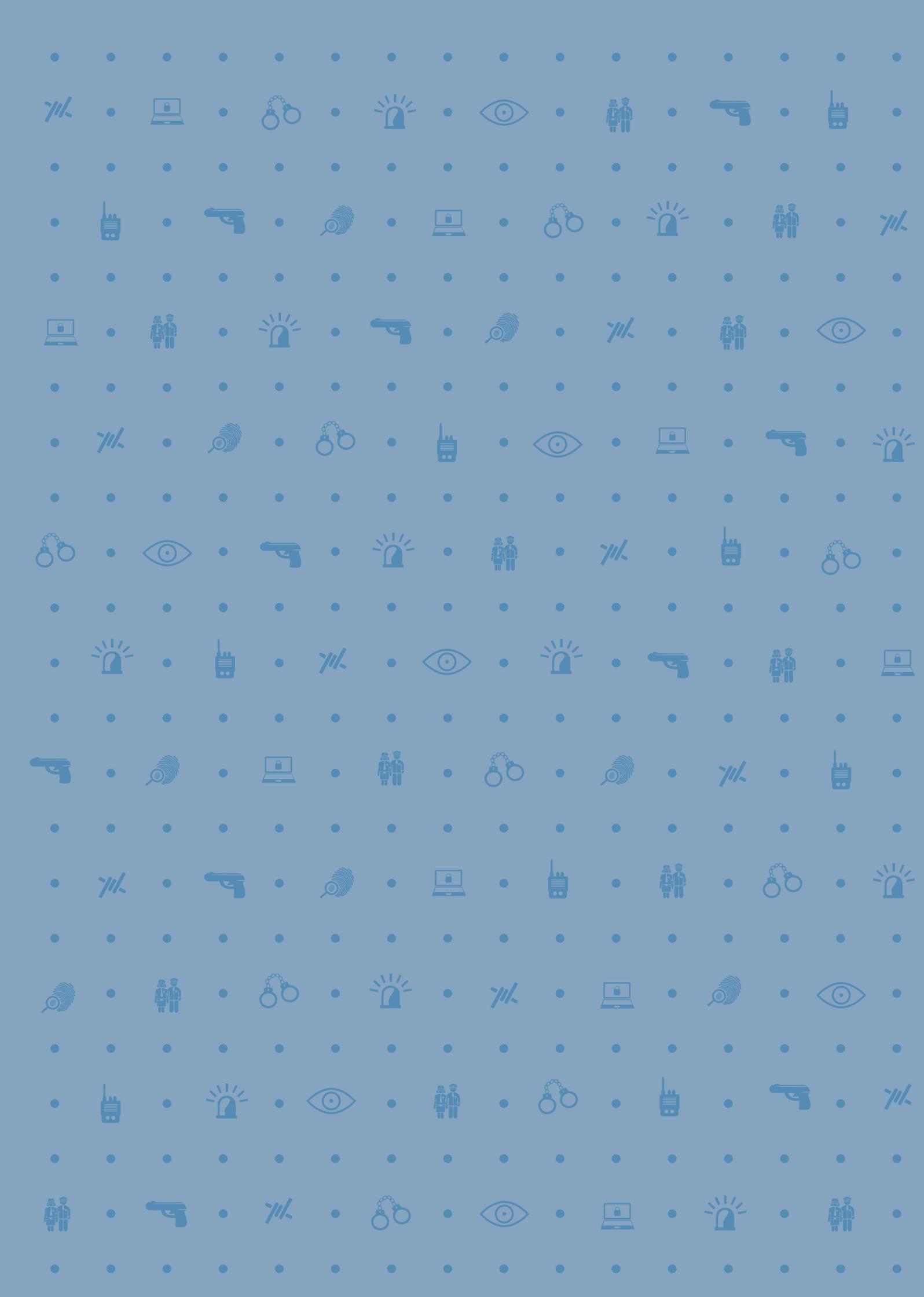
Facilitating multiagency alliances between all organisations involved in combatting child sexual exploitation is the only way that LEAs can effectively counteract such crimes.

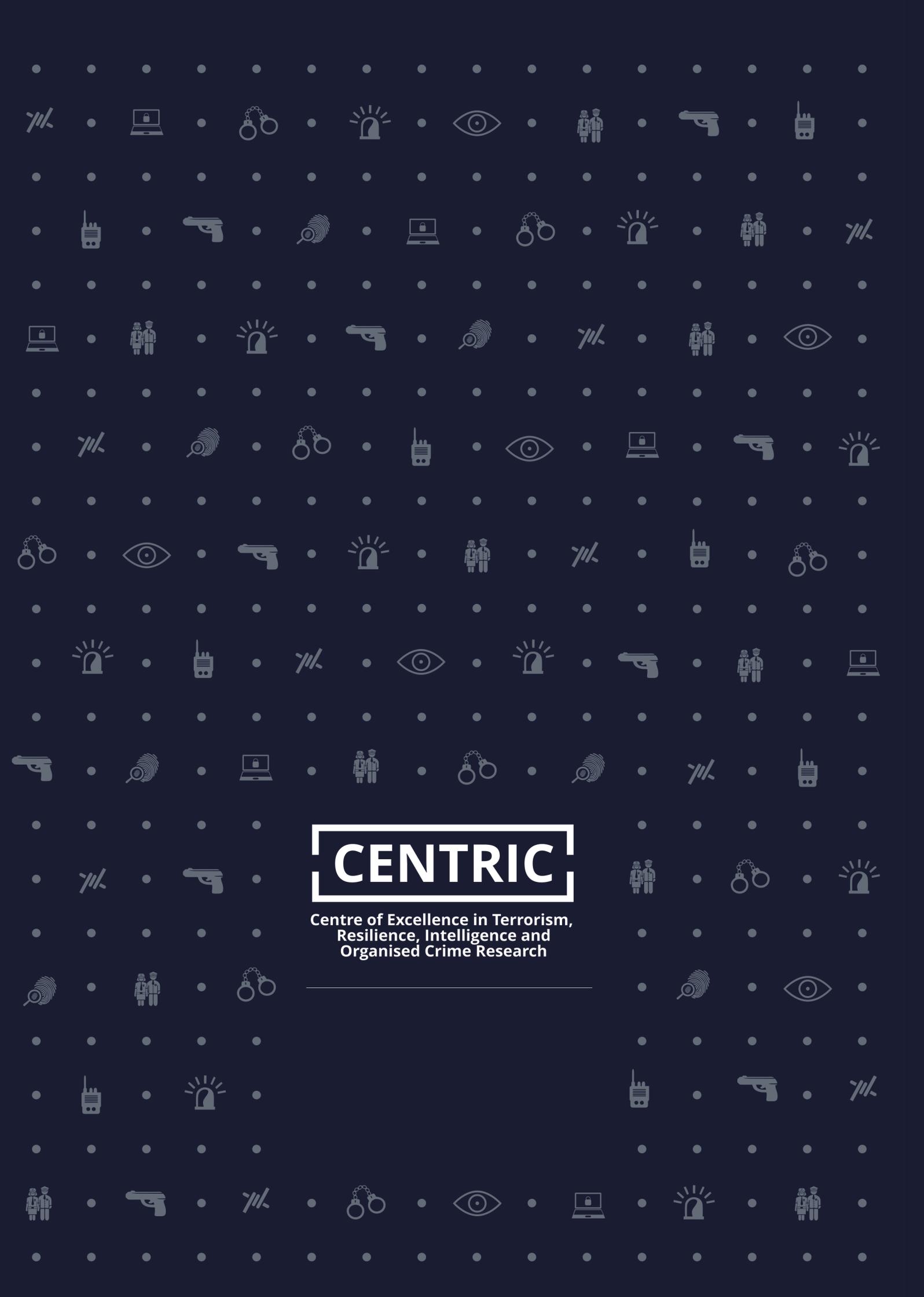
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