COMBINED EFFECT: A New Approach To Resilience

The case for a Capability and Consequence-based approach to Resilience and Emergency Planning

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Introduction

This White Paper represents the latest development in two projects which have, over the past twelve months, come together to complement and support one another: the ongoing interoperability research stream within the National Security and Resilience Department of the Royal United Services Institute (RUSI) and Project SECURE, a cross-Government and cross-Industry initiative[1] led by Serco and the Centre for the Protection of National Infrastructure (CPNI). SECURE has itself grown out of the St Pancras Project and CNI Scan, initiatives designed to meet the government's call for a better and shared understanding of the risks to which our national infrastructure, essential services and communities are exposed. RUSI and SECURE both call for greater collaboration between agencies involved in security and resilience in the public and private sectors.

There has long been recognition that such collaboration needs to be improved; numerous reports and reviews into major incidents that have occurred in recent years highlight the failure of organisations to work together during the planning, response and recovery phases. For example, in the 2006 RUSI report *Communications Inter-Operability in a Crisis* by Dr Sandra Bell and Rebecca Cox[2], the authors listed a series of recurring communications failures that have persisted across two decades, affecting major incidents such as the King's Cross Underground fire of November 1987, the Hillsborough football stadium disaster of April 1989, the collapse of the World Trade Centre's Twin Towers following the terrorist attacks of 11 September 2001, and the 7 July 2005 terrorist attacks on the London mass transport system. While it is easy to identify lessons from such incidents, it is more of a challenge to turn them into lessons learned; the reasons for this are explored in an excellent recent paper *Lessons Learned or Lessons Forgotten*[3] by Joe Scanlon of Carleton University.

Between August and December 2009, RUSI built on the research previously carried out by Bell and Cox to ask why successive reviews into UK resilience capability, and the reports that follow UK major incidents, identify a consistent set of issues without appearing to address them. In short, why do lessons identified consistently fail to become lessons learned?

The answer to this question is complex and it is fully recognised that there is no simple answer. Nonetheless, an interim research paper[4] published by RUSI in January 2010 highlighted that the main challenges relate far more to human factors than to technology. Unless challenges are approached collectively by the entire end-user community a complete solution is unlikely to be found and solutions that are suggested are unlikely to be successful. These interim findings were confirmed in the final report, *Interoperability in a Crisis 2: Human Factors and Organisational Processes*[5] published in June 2010. Statistics gathered between the interim and final reports showed that the biggest perceived barrier to organisational interaction is 'silo' thinking, cited by 62 per cent of respondents. Only 17 per cent perceive there to be technological barriers.

These findings are consistent with research carried out in other sectors: academia widely uses the Levels of Conceptual Interoperability Model (LCIM)[6], in which there are six levels ranging from technical (the lowest) to conceptual interoperability. In the defence sector, the Comprehensive Approach and the work carried out on the Defence Lines of Development also recognises that collaboration needs to go beyond technical integration: investment considerations now proactively include Training, Equipment, Personnel, Infrastructure, Doctrine and Concepts, Organisation, Information and Logistics (TEPID OIL) in addition to equipment procurement. Equipment alone makes a small contribution to the overall ability of organisations to work together: more important to the outcome is a shared understanding of the various contributions made by each player. Civilian resilience can and should be approached in the same way.

The RUSI research identified a number of challenges faced by the civilian sector and catalogued a number of case studies for potential further research but unearthed little that was new or unexpected. In fact, a more striking aspect of the early stage research was how widely recognised the issues are,

how often they are raised in internal and independent reviews, and how frustrated the practitioners are that so little ever seems to be done to address them.

The final report concluded that the single greatest challenge to joining up resilience in the UK, and to truly achieving interoperability, is the lack of a single responsible owner - be this an individual or a Government department. This mirrored the findings of the original Bell and Cox report, in which the authors observed that:

> *"Within the current UK emergency and disaster context, there is no single body with ownership of the joint response. This has resulted in … incoherent strategy … in a timeline extending well beyond 18 years".*

The UK resilience community is fragmented, consisting of agencies that sit under a number of different Government departments, each with its own Minister, with significant resources and capabilities residing in the private and voluntary sectors. Each organisation carries out its own planning, has its own operational procedures and responds in its own way. Frameworks to encourage closer working exist, such as the Cabinet Office publication *Emergency Response and Recovery*[7], but this comprises non-statutory guidance which can be, and often is, ignored. The Local Resilience Forums raised by the Civil Contingencies Act 2004 are under-resourced, undervalued and have little if any legal powers. They are, however, generally popular (in principle, if not in practice) with Category 1 and 2 responders[8]. The opportunities they offer for joint planning, ideas sharing and knowledge transfer cannot be understated, bringing planners and responders out of their silos to think collectively about the task in hand and the resources required.

After all, our emergency services and resilience planners are far from incapable of working together. On a small scale, they do so regularly and efficiently - an example would be the response to a road traffic accident requiring firefighters to free victims from the wreckage, paramedics to treat them and transfer them to hospital, a police officer to question what might have caused the accident, CCTV operators to examine footage and the Highways Agency to clear away the debris and provide warnings of the accident to other drivers. It is only when the situation becomes more complex that the ability to respond collectively starts to break down.

An increased drive towards a more collective approach and ownership of large scale, collective risk is essential to meet the challenges of the twenty-first century. The challenges facing a fragmented community not only impact on operational effectiveness - in a worst-case scenario putting lives at risk - they also result in inefficiencies and duplications that are hard to identify and hard to improve, let alone remove. Natural disasters, industrial accidents and deliberate attacks do not recognise geographic or organisational borders and the weakness at these interchanges might themselves present weaknesses and vulnerabilities that can be exploited. Risks that appear to be no-one's responsibility have the potential to impact everyone.

The interdependent nature of our National Infrastructure and the communities they support, often described as a "system of systems", is well understood by the resilience and security communities. It should, therefore, also be clear that the requirement to make appropriate risk assessments needs to be a coherent and integrated process involving all sectors, agencies and organisations, and which includes the ability to prioritise the risks identified. Such an approach would, for example, enable a collective assessment to be made not only of which risks are greatest, but which risks might be acceptable and which are not, with procurement within and between organisations made, or at least discussed on this basis. Such an approach would also ensure that procurement and investment during the lifetime of a project is made on the basis of current risk assessments, not those that were in place when the initiative began and which might since have evolved or changed.

This paper proposes that we need to think of interoperability as an enabler, working towards an outcome we have chosen to call 'Combined Effect'. How Combined Effect works, and how can it take our current understanding of interoperability forward, is discussed on the following pages. Combined Effect has the potential to be the framework into which a new approach to collective planning and joint working can be fitted, resulting in a more modern, inclusive approach to resilience. Doing so need not be expensive and, in fact may well be the opposite: it will identify overlaps and redundancy as well as capability gaps and will highlight where resources can be shared.

Combined Effect will support a single, coherent, common and more compatible approach across boundaries and organisations to support change based on collective output rather than individual input. To use an analogy: one can employ the best builder, carpenter, electrician and plumber, but unless the design is good, the project will struggle to succeed. Resilience should not just be about measuring the expertise of individual organisations. While success is dependent on individuals being highly competent in their own roles, they also need to understand the roles of other team members and know how to employ their own abilities in conjunction with those others. The focus needs to be on the assessment of the *effect* of their *combined* efforts, scoring the team as well as the individual players.

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[1] Partner agencies in SECURE include the CPNI, Serco, DfT/Transec, the Cabinet Office CCS, Gold Standard, RISC, the Office for Security and Counter Terrorism (OSCT) in the Home Office and MoD CT Centre.

[2] *Communications Inter-operability in a Crisis*, Sandra Bell and Rebecca Cox, Royal United Services Institute (2007), See < www.rusi.org/publications/whitehallreports/ref:O459D3C8297AAE/>

[3] *Lessons Learned or Lessons Forgotten,* Joe Scanlon, Director Emergency Preparedness Unit, Carleton University, see <www.iclr.org/images/The_Canadian_disaster_experience.pdf>

[4] *Communications Interoperability in a Crisis: Human Factors and Organisational Processes Interim Report*, Jennifer Cole, Royal United Services Institute, (January 2010), see < www.rusi.org/downloads/assets/INTEROPERABILITY_InterimReportJan2010.pdf>

[5] *Interoperability in a Crisis 2: Human Factors and Organisational Processes*, Jennifer Cole, Royal United Services Institute (2010), See < www.rusi.org/publications/occasionalpapers/ref:O4C2CC38D725EE/>

[6] Applying the Levels of Conceptual Interoperability Model in Support of Integratability, Interoperability, and Composability fo System-of-Systems Engineering, Tolk et al, Systems, Cybernetics and Informatics Vol.5 No 5, see <http://www.iiisci.org/journal/CV$/sci/pdfs/P468106.pdf>

[7] *Emergency Response and Recovery, Non Statutory Guidance Accompanying the Civil Contingencies Act 2004, Version 2* (July 2009), HM Government, see < www.cabinetoffice.gov.uk/media/238642/err-guidance-120809.pdf>

[8] In RUSI's recent interoperability research, LRFs received the highest score (61%) to the question "Which initiatives have contributed to, or will contribute to, greater interoperability", and more than 50% of respondents would like to see their powers strengthened.


ALDGATE STATION
POLICE
PARAMEDIC
DOCTOR
DOCTOR

Combined Effect:

towards a more inclusive language for joint working

Setting a joint lexicon and shared language for the resilience community is both a challenge and a necessity. 'Interoperability' is a well-established term. It is important to acknowledge this and to make clear that we do not propose to replace it with 'Combined Effect' but to ensure that the latter is seen as the intended outcome of the former. At the same time, we do believe that interoperability as a generic term for 'all responder agencies working together' has inherent difficulties, due to its basic etymology and how it is usually interpreted in this context.

When referred to by the resilience community, interoperability is most often used to describe ICT systems: the ability of one organisation to speak to another over shared radio and computer networks. It refers to the interoperability of the technology, not necessarily of the people using it. Programmes such as the Ambulance Service HART programme, Fire and Rescue's New Dimension, the Emergency Planning College and Gold Standard do not immediately spring to mind as examples of interoperability as readily as the Airwave network and the National Resilience Extranet. The latter are tools to enable interoperability: they are aiming to produce a Combined Effect. Likewise, organisations and individuals may have perfectly adequate technology at their disposal, yet completely fail to interoperate due to non-technical human factors. Other organisations, with fewer resources, may find that "where there's a will there's a way", regardless of what tools they have.

In etymological terms, *inter-* is defined as:

'A prefix meaning between, or among.'

International relations are the dealings between one nation and one or more others; inter-disciplinary research refers to research that is conducted by academics from more than one specialist subject area or who are working within more than one university faculty. Implicit in this definition is the notion that the individual players largely retain their own individual identities and characteristics while, in certain situations, using an external tool to enable them to work alongside one another more easily.

Interoperability between the police, fire and ambulance services draws lines of connection between three different services with the interoperability enabler at the centre of the diagram (see Fig 1), similar to the 'Zero' of a military communications net.

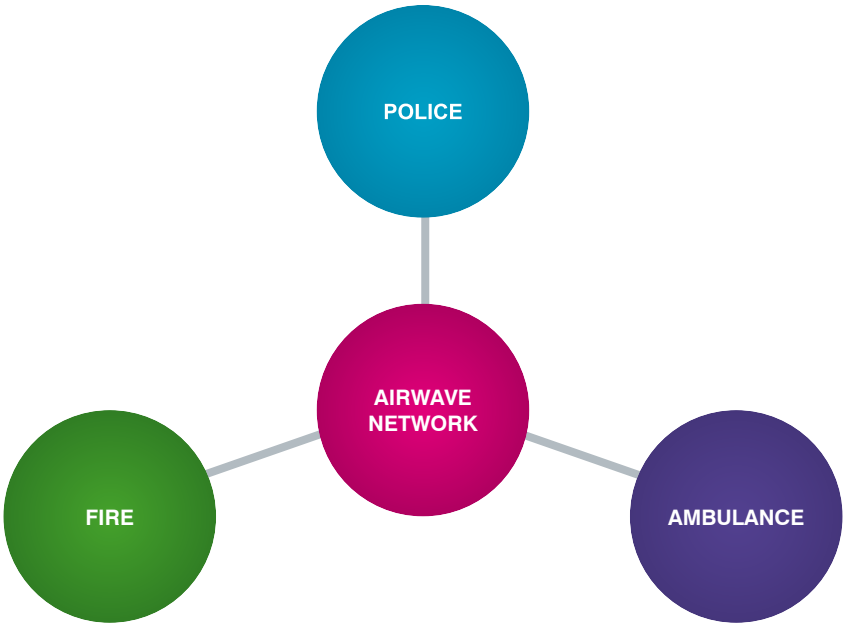

Fig 1: Joining the dots for interoperability

In order to truly bring together the resilience community and to enable it to function in the most effective and efficient way, interoperability needs to go beyond this, to something more akin to our understanding of *intra*- rather than *inter*-.

The etymology of intra, from the Latin 'intra', is defined in the dictionary as '*Within, on the inside*'. Unlike *inter*, it implies a cohesive, single whole in which individual elements take on a new, collective identity, wherein the component parts form a greater whole.

It is this notion of *intraoperability* that we see embodied in Combined Effect. Such an approach to operations is required by C1 and C2 responders in the wake of major incidents if fire, police and ambulance services are to become a seamless team of 'first responders' - each retaining their own specialist skills, but nonetheless functioning as cogs in a bigger and better oiled wheel.

At present, a Venn diagram of the C1 responders has relatively small overlaps (fig 2):

The shared 'resilience' space in the middle is small, and the majority of day-to-day operations fit outside of its overlap, carried on by each organisation in silos. Around the outside of the spheres, there are considerable and extensive gaps, where resources may be needlessly duplicated, may not exist at all and, in the worst-case scenarios, where the problem space may not even be recognised until it is too late.

There are of course some duties that are only, and should remain only, the responsibility of one organisation: arresting criminals, for example, is a role for the police; dousing fire is the duty of the fire service. Nonetheless, the framework into which these duties fit should be fully understood by all organisations. Where it is appropriate for duties and resources to be shared, such understanding enables them to be shared: where it is not, the same understanding enables all parties to know and accept what needs to reside in a discrete space and why.

Should another organisation need to map on, for example St John Ambulance (denoted in Fig 3 by the smaller purple circle), the tendency is for it to map on as closely as possible to the organisation it directly supports - in this example, the ambulance service. Training, ICT systems, equipment and qualifications will be shared with other responder agencies where the Ambulance Service also shares them, remaining otherwise siloed in the Ambulance Service's discrete space.

Fig 2: Present situation

Fig 3: Additional organisation


CCTV ZONE

Towards Combined Effect

Fig 4: Combined Effect: an increase in resilience

Fig 4a: Combined Effect: mapping on to Combined Effect

Intraoperability - taking interoperability forward to enable a Combined Effect - will help to push the circles together and ensure that it is the shared space, not discrete space, that fills the resilience landscape. As the shared space develops, the easier it will be for new developments to emerge from it, encouraging it to grow and expand while the discrete spaces diminish.

As the circles come closer together, redundancy and duplication can be more easily identified, leading some agencies to realise that certain capabilities they currently hold may be more appropriately held by or shared with another, with robust mutual aid agreements in place. Capability gaps will be more easily recognised and better understood as solutions will be sought within the shared space, not assumed to exist in one of the border areas outside of it. Around the edge of the spheres, there will be fewer gaps and therefore a smaller space in which unpredicted problems are likely to occur.

None of the individual capability spheres will reduce in size - i.e. none will lose capability or resources available to them - but duplication and redundancy are reduced, creating a more efficient model for all, with greater ability to work together. The size of the resilience space has been increased significantly and any new organisations mapping on are more likely to find the majority of their resources located in the shared space, making it easier to integrate them smoothly. Formal qualifications, levels of security clearance, knowledge (if not ownership) of technology and operational procedures will become easier to standardise and the requirements for using them clearer. Development of a shared lexicon, common data standards and common language will both enable this and also help to drive it forward.

Combined Effect in action:

a capability and consequence-based approach to resilience

Combined Effect encourages a consequence-based approach to resilience whereas at present, emergency planning, training and exercising all tend to focus on the cause of the incident, placing ownership of the response with the agency considered to be most responsible for preventing, or mitigating the effect of, that particular cause. For example, this is the police in the case of terrorist attacks, the Environment Agency in the case of flooding. Such an approach distracts from thinking holistically about the full consequences of such events, hampers knowledge transfer and makes sharing experience difficult.

How Combined Effect will work in practice can be demonstrated by using the example of the stakeholder community - a Local Resilience Forum, for example, or the security professionals responsible for protecting a major public venue - planning to respond to a major incident caused by a single risk on the National Risk Register or a Community Risk Register, such as a Vehicle Borne Improvised Explosive Device (VBIED).

When planning how to respond, it is important to remember that a VBIED is not itself a scenario, nor an event, instead it is the cause of the incident. The incident itself could be anything from a lone car exploding in an empty car park (causing no casualties, no damage to infrastructure and very little disruption to day-to-day activities), to an explosion in the Dartford Tunnel, causing a tunnel collapse that traps many motorists underground.

Responding to the former scenario is straightforward and mainly a role for the police alone. Responding to the latter, however, requires a Combined Effect from many agencies. Reaching and extricating victims from the scene will require extensive Urban Search and Rescue capabilities from the Fire and Rescue Service, and Disaster Victim Identification (DVI) capabilities from the police. The resulting gridlock on the M25 (which may make it extremely difficult for emergency services to reach the incident site) will require planning and management involving the Department of Transport, the Highways Agency and several Local Authorities through which the M25 passes; humanitarian aid centres may be needed to shelter motorists who cannot travel home; and there may be a requirement to understand what vehicles, carrying what potentially hazardous loads, may still be trapped in the tunnel. Such an event would result in long-term disruption to infrastructure, bringing with it a host of additional challenges.

Organisations involved in planning the response to such an event should ask not what capabilities they have (in terms of personnel and resources), but what effects need to be achieved? To what extent does this capability exist within the responding community, and if it does not, can it be obtained from elsewhere? What role does the private sector play? What role is there for the voluntary sector? If local residents will need to take some responsibility for themselves, who is responsible for communicating this to them, and through what channels - in advance of the incident, so that they can be prepared, as well as in the immediate aftermath? The resilience community will need to work together to identify resources, allocate them to the task in hand and manage the Combined Effect response.

Such a consequence-based approached, focusing on issues such as ‘tunnel collapse’, ‘stranded motorists’, ‘mass casualties’, rather than a ‘VBIED scenario’ would therefore encourage all agencies to discuss together what needs to be achieved. It would help to identify whose responsibility it is to provide that capability, and would enable the allocation of the appropriate resources within an agreed management structure. This would help to identify if there are any consequences for which there is no lead agency, unclear responsibilities, or a poor understanding of the resources required.

In doing so, the scenario planners are more likely to focus not so much on the VBIED, but on issues such as:

- *Who provides structural engineering advice on what damage has been caused to the buildings close to the explosion?*
- *Who is responsible for ordering the evacuation or lockdown of potentially damaged or at risk buildings?*

» *How are evacuation messages sent out and who is responsible for ensuring they have been received?*
» *Who is responsible for providing food and overnight shelter to stranded commuters and displaced homeowners?*
» *Who is responsible for removing abandoned cars from the scene? Where are they stored and how are those that are damaged beyond repair disposed of?*
» *Where are the bodies taken to, and is a temporary mortuary needed? If so, where will it be erected?*

Adopting a consequence-based mindset for planning, training and exercising will lead to practitioners being more likely to discuss collectively questions such as what has led to the event, and how will we plan our journey back to normality from it? What different routes might we take, what obstacles might we encounter, and how can we overcome or circumvent these? Issues such as evacuation, environmental monitoring, damaged transport networks and so on, are more likely to be discussed in depth. Their management and coordination remains the same no matter what the cause of the incident so that, in planning for this scenario, the group has also planned for several others. Once consequences are considered and planned for holistically, the individual that holds the capability to respond can be better understood and duplication and gaps can be more easily identified.

Focusing the emergency planner's mindset on consequences also means that they will be more likely to seek out reports and reviews of any event - be it severe flooding, an industrial accident at a chemical plant, or a terrorist attack - as a potential source of lessons identified. Issues such as poor interoperability of ICT systems; poor handling of the media; confused messages to the public; difficulties in gaining situational awareness and building a common recognised information picture; and inconsistent operating procedures recur across reports and across time. The more responders are encouraged to think, plan and review collectively, the more aware they will become, that very similar lessons are often identified from very different events and that 'fixing' them for one will help to fix them for all eventualities.

The Pitt Review into the 2007 Summer Floods[9], made the observation that:

"...recommendations should be led nationally, down through the regions to local level, to ensure consistency and development across the board. The big question now is whether there is the political will to enforce these..."

Combined Effect, seen as an outcome of interoperability, can help to drive this will forward.

RUSI's 2007 research project into potential models for UK community resilience used a number of case studies to show how collective planning and holistic understanding of consequence management have helped to improve resilience across the board. For example, the oil tanker crash in San Francisco that caused severe damage to critical transport infrastructure but was recovered from quickly and efficiently using plans in place for earthquake response[10]. The final report of the research project made the following observation[11]:

"A community that is well-educated, trained and exercised in providing a response to a regular, recurring threat … can, once in place, be adapted to cope with most other threats".

The more holistic the approach to planning, the more holistically the capabilities required to respond will be identified and understood. In doing so, a shared and collective view of the mutual threats and risks faced and the collective capabilities necessary to optimise security and resilience planning and response, is achievable.

Capability based outcomes can make more efficient and effective use of existing resources, structures and knowledge, if applied by resilience stakeholders across a mutual area of interest or an identified 'system of systems'. They can deliver practical differences to support Community Resilience and the idea of 'Big Society': supporting local people, organisations and communities with the tools and knowledge they need to help themselves. Shared knowledge will save money through eliminating duplication of research, sharing experience and resources, and supporting a more effective private sector contribution to security and resilience. Combined Effect will help all resilience stakeholders to work together in a more compatible, efficient and effective way.

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[9] *Leaning Lessons from the 2007 Summer Floods: An Independent review* by Sir Michael Pitt, Cabinet Office (June 2008), <See http://archive.cabinetoffice.gov.uk/pittreview/thepittreview/final_report.html>

[10] See also: *Rebuilding the MacArthur Maze: repair and recovery*, Lana MacGill, *RUSI Homeland Security and Resilience Monitor,* Vol 6, No. 6, July 2007

[11] *Emergency Response and Civil Defence*, workshop report, December 2007, p9, editor Jennifer Cole

Conclusion

Combined Effect aims to take interoperability to the next level. By focusing on consequence-based thinking rather than scenario-based planning, it will drive forward greater efficiencies. It will encourage joint training and exercising, improve effectiveness by addressing overlaps and identifying gaps, and will define and encourage a truly inclusive way of planning for, responding to and recovering from major incidents. The roles and responsibilities of each organisation will be mapped out, understood and clearly identified. Lessons identified from exercises and actual events will be communicated to the entire community rather than left in silos so that they may be learned before they are allowed to have the same effect again.

This is the direction RUSI's research has identified is needed and the outcomes that the SECURE team seeks in its cross Government cross industry project. To maintain momentum, we seek comment or contribution from interested parties to help shape the future of Combined Effect.

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