Information and Communication Technologies in the Fire and Rescue Services in England

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Approach

Mixed Methods

Started October 2018 with data collection in 2019.

Co-production

Methodology: Survey

- Developed from earlier study exploring Police ICT Infrastructures (a degree of comparability)
- Co-developed with colleagues from the Home Office and FRS and was piloted in two FRSs to ensure that the wording of the questions and the choice of technologies was appropriate.
- Delivery, Key Areas of Challenge
- Areas of focus: Control Infrastructure; Call Handling; Workforce Management; Shared Control Infrastructure; Fireground / Incident Management; Remote Working; Understanding Data on the Fireground; Partnering Systems; IP Communications; Records Management; Surveillance; Securing Fire Service Systems; Analysis and Mapping; Internal and External Use of Social Media; Delivery of Systems.

Methodology: Survey

- Explored:
  - Condition
  - Significant change over the next 3-5 years
  - How high a priority (currently)
  - Change due to the implementation of ESN
- Sent to CFO: 40 of the 44 services contacted (e-mail, paper and responses taken via phone)

Methodology: Qualitative

- Semi-Structured
- 22 interviews (17mins to 1 hour 30 mins).
- To reach a more in-depth understanding of technological infrastructure examined in the structured survey;
- To enrich the quantitative data with additional information on individual Fire and Rescue Services and their readiness for and perceptions of the ESN;
- To investigate the connections between different Fire and Rescue Services and, where appropriate, other public sector agencies; and,
- To complement the quantitative results.

Findings

Areas of challenge

Heterogeneous FRS ICT Infrastructure with significant ICT challenges most notable amongst these being the management of legacy systems.

	Areas of Challenge (Challenging/Very Challenging)	Priority (High / Very High)
Enterprise Content Management	31% (n=13)	45% (n=19)
Management of legacy systems	52% (n=22)	62% (n=26)
Information governance	45% (n=19)	88% (n=37)
Ability to effectively search information held	38% (n=16)	74% (n=31)
Maintaining data and information in a secure manner while using IT more intensely	33% (n=14)	88% (n=37)
Procurement of technology	29% (n=12)	40% (n=17)
Ability to use analytics to gain insight from information held	29% (n=12)	76% (n=32)

46830 Firefighters in London FRS , 245 Firefighters in Oxfordshire FRS. Four over 900 Firefighters.
https://www.statista.com/statistics/877562/leading-fire-brigades-by-firefighter-numbers/

Areas of Challenge: Comparison

Police Key Areas of Challenge	Areas of Challenge (Challenging/Very Challenging)	Priority (High / Very High)
Enterprise Content Management	65%	60%
Management of legacy systems	47%	60%
Information governance	64%	52%
Ability to effectively search information held	84%	53%
Maintaining data and information in a secure manner while using IT more intensely	73%	44%
Ability to use analytics to gain insight from information held	80%	58%

FRS Areas of Challenge	Areas of Challenge (Challenging/Very Challenging)	Priority (High / Very High)
Enterprise Content Management	31% (n=13)	45% (n=19)
Management of legacy systems	52% (n=22)	62% (n=26)
Information governance	45% (n=19)	88% (n=37)
Ability to effectively search information held	38% (n=16)	74% (n=31)
Maintaining data and information in a secure manner while using IT more intensely	33% (n=14)	88% (n=37)
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*Police Data collected in 2016 any comparison must be treated with a degree of caution

Condition

Two technologies were identified as up-to-date in at least 90% of services (Automatic vehicle location (for management of resources) and Automatic Call Distribution.

Area of Work Activity	Technology	Condition (Up-to-date)
Location Services	Automatic vehicle location (for management of resources)	93%
Call Handling	Automatic Call Distribution	92%
Securing Fire Service Systems	Encryption	83%
Remote Working	Mobile Office (e.g Laptop, mobile device)	83%
Call Handling	Call Line Identification (e.g. EISEC)	79%
Remote Working	Laptop with access to personal information management systems & data processing	78%
Workforce Management	Computer Aided Dispatch	78%
Securing Fire Service Systems	Data Governance	73%
Call Handling	Quality monitoring of call handling	71%
Records Management	Integrated GIS	71%
Partnering Systems	Communication with partners through voice (e.g. Police, Public Health)	71%

The Annual Assessment of Fire and Rescue Services in England

“However, some services have been slow to exploit opportunities for more productive ways of working presented by technology. Nearly half the services we inspected were using broken, dated or unreliable IT systems and had inefficient paper-based systems. Many computer systems that services rely on are slow and don’t work together. This was a common source of frustration among staff we spoke to.” (HMICFRS 2020)

HMICFRS (2020) State of Fire and Rescue – The Annual Assessment of Fire and Rescue Services in England 2019 Her Majesty’s Chief Inspector of Fire and Rescue Services site visited 1/09/2020 https://www.justiceinspectorates.gov.uk/hmicfrs/wp-content/uploads/state-of-fire-and-rescue-2019-2.pdf

Areas of Expected Change

The areas identified by at least 75% of FRS as facing significant or transformational change were Data Capture (e.g Video, pictures and updating critical systems), Image management software (e.g. video, CCTV, pictures, person mounted cameras) and Person mounted cameras (i.e. Body Worn Video).

Area of Work Activity	Technology	Expected Change (Significant / Transformational)
Incident Management	Data Capture (e.g Video, pictures and updating critical systems)	79%
Records Management	Image management software (e.g. video, CCTV, pictures, person mounted cameras)	79%
Surveillance	Person mounted cameras	76%
Workforce Management	Computer aided dispatch	74%
Remote Working	In-Vehicle Mobile Data Terminal	74%
Analytics	Analytic software	71%
Records Management	Broadband wireless access in vehicles (e.g. LAN, MDT, mobile)	71%
IP Communications	Routing of IP Communications (text, audio, video) from first responders to control or peer to peer	71%
Partnering Systems	Communication with partners through data (e.g. Police, Public Health)	71%
Understanding Data	Location information visualisation	71%

Priority

FRS also place emphasis on technologies that support operational work and which maximise workforce performance, only four areas were identified as a priority or high priority by at least 80% of the FRS (Remote Recording of Data, Data Governance, In-Vehicle Mobile Data Terminals, and Encryption).

Area of Work Activity	Technology	Priority Level (High / Very High)
Analysis and Mapping	Remote Recording of Data	83%
Securing Fire Service Systems	Data Governance	83%
Remote Working	In-Vehicle Mobile Data Terminal	83%
Securing Fire Service Systems	Encryption	81%
Remote Working	Command Support Unit	71%
Workforce Management	Workforce management systems (Control)	69%
Workforce Management	Computer aided dispatch	69%
Securing Fire Service Systems	Identification and Access Management	67%
Analytics	Predictive Modelling	67%
Remote Working	Smartphone/PDA	64%
Location Services	Automatic Vehicle Location (for Management of Resources)	64%

Understanding of the Emergency services mobile communications programme (ESMCP) and ESN

Respondents were very sceptical about the benefits of ESN products to the FRS. Indeed, the benefits of and motivation to engage with, ESN products, was seen as being, at best, ambiguous.

“Not, I would say risk averse, but we are conscious that if we take risks people normally die. So we are not in an industry that would wish to do any leading edge technology in the fire ground - we would prefer to use proven technology and reliable technology that has been proven over time.” (Interview 140230)

Influence of ESN

Only five areas were identified by at least 60% of services as areas of significant of transformational change: Communication with partners through data (e.g. Police, Public Health), Data Capture (e.g Video, pictures and updating critical systems), Service Access Node (SANH) or similar, Broadband wireless access in vehicles (e.g. LAN, MDT, mobile), In-Vehicle Mobile Data Terminal. The area of most consensus (identified by 67% of FRS) was Communication with partners through data.

Area of Work Activity	Technology	Expected Change (Significant / Transformational)
Partnering Systems	Communication with partners through data (e.g. Police, Public Health)	67%
FRS Incident Management	Data Capture (e.g Video, pictures and updating critical systems)	64%
Control Infrastructure	Service Access Node (SANH) or similar	64%
Records Management	Broadband wireless access in vehicles (e.g. LAN, MDT, mobile)	60%
Remote Working	In-Vehicle Mobile Data Terminal	60%
Remote Working	Smartphone/PDA - Access to fire service systems	57%
IP Communications	Routing of IP Communications (text, audio, video) from first responders to control or peer to peer	55%
Remote Working	Command Support Unit	55%
Workforce Management	Computer Aided Dispatch	50%
IP Communications	Communication with partners through voice (e.g. Police, Public Health)	50%
IP Communications	Routing of IP Communications (text, audio, video) to first responders	50%

Heterogeneous response

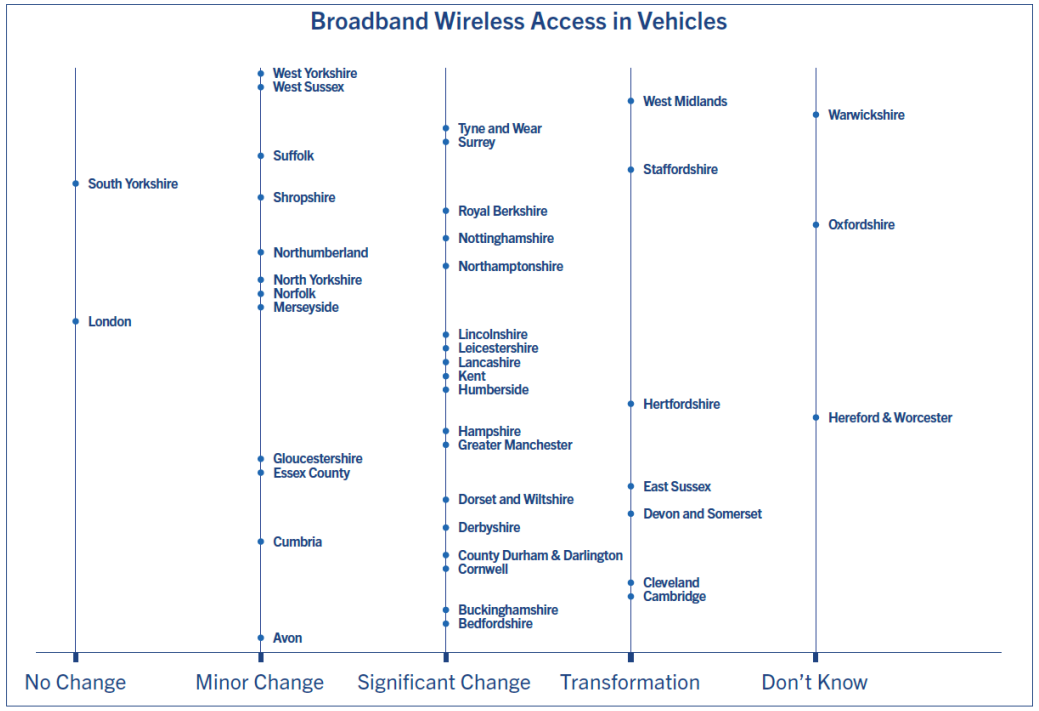

Diagram 9: To what extent do you believe that broadband access in vehicles will change due to the implementation of ESN?

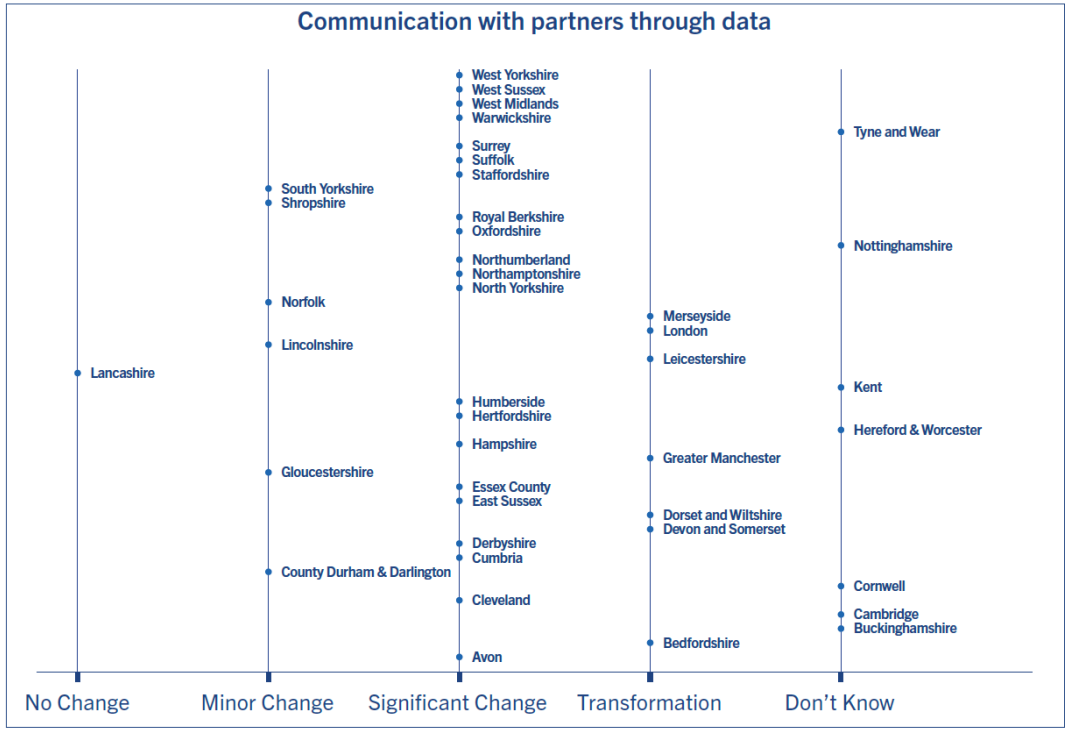

Diagram 6: To what extent do you believe that the use of communication with partners though data will change due to the implementation of ESN?

Governance of FRS

Analysis of the interviews indicated that the governance of FRS had a significant influence on the capability of the services to engage with, or implement, complex and large scale ICT projects while maintain existing systems. The results suggest that smaller FRS which are an integral part of a council as a county or unitary FRS may lack the necessary resource, capacity and capability to fully engage with large scale national projects while maintaining routine service delivery.

"….well in effect we are just a separate department within the council. So we are a county fire and rescue service -so our IT department is really the county council IT department, and our link into that is that we have one person we link into in the county council and everything is escalated through that department via that one person". (Interview 100302)

Governance of FRS

- Police, Fire and Crime Commissioners: ‘Small fish in a big pond’, parallel systems (security) not gaining economies of scale.
- County Council: Single points of contact between the council ICT and the FRS

- *“It has been quite horrendous for the council …they just haven’t been able to balance the books. Now we have had some really restrictive spending situations the last couple of years imposed upon us. And it has really affected the ability to develop our systems within fire and rescue.” (Interview 110205)*

FRS ICT Capability

Scale of IT services, skills within the services, existing ICT infrastructure.

“Its a difficult one for me to answer because a) I am not techy and b) in fire we are just part of the county council and they tend to just form the IT strategy…” (Interview 140226)

Collaboration

- FRS and Police Services are collaborating in the development of ICT infrastructure the key areas of collaboration seem to be between FRS's.
- Shared Control Centres are present these were with other Fire and Rescue Services (46%) and in 5% of cases these were shared with the Police.
- We noted both the fluidity and diversity of collaborative relationships between services and the negative impact of this on the provision of IT services.

	Reliance (High/Very High)	Priority (High / Very High)
In-house systems development	48% (n=20)	57% (n=24)
Collaboration in systems development with other fire services	38% (n=16)	50% (n=21)
Collaboration with other public sector bodies	29% (n=12)	45% (n=19)

FRS Development of Systems

FRS levels of preparedness and capacity to engage with ESN

- The interviews indicated that FRS levels of preparedness and capacity to engage were not based on geographical co-location. Equally, key infrastructures may be shared by services outside their geographical area for ESN indicating key dependency between FRS that are not co-located.
- FRS within regions are in the process of or have just concluded the renegotiation of collaborative agreements, abandoned existing agreements or created new relationships for the delivery of core IT infrastructure.

Understanding of ESN

- Respondents indicated that a lack of clarity about ESN was restricting innovation by suppliers, increasing costs and leading to inertia and inability to plan. A number of services indicated that they would continue to develop and deploy services using commercial bearers on the assumption that they could simply transition to ESN when it became available.

Understanding of ESN

- The case for data over ESN, beyond that provided to fire tenders, was unclear to many respondents. A number of services do not know how communication with partners though data will change due to the implementation of ESN.
- Many felt that the capability offered by ESN Connect was already provided via commercial networks. The significance of the fire tender as either the point to which information was delivered or a nodal point for data connectivity (e.g. to create a Wi-Fi ‘bubble’ around the tender) was mentioned by a number of respondents in the interviews and its importance was stressed in responses to the questionnaires.
- Only 60% of services indicated that Broadband wireless access in vehicles (e.g. LAN, MDT, mobile) would change due to ESN. Services noted a low condition for IP Communications and, given ESN is an IP based system, a surprising low expectation that this will change due to implementation of ESN.
- Advanced potential capabilities of ESN in relation in Call Handling were not recognised.

Understanding of ESN

- Respondents were concerned about voice and network coverage in rural areas and in-buildings. While ESN Assure will help understand coverage it does not resolve issues related to the cost and speed with which these can be resolved. Equally, it was unclear to respondents how this will be paid for and who would pay for it.
- Interviewees indicated that NATS testing is a significant barrier to innovation and transitioning of existing apps onto ESN. Table 30 demonstrated that while just under a quarter of FRS had a high or very high reliance on cloud computing, more than 60% of FRS placed a high or very high priority on Software as a Service.

Understanding of ESN

- The ambiguity of the potential costs of ESN to FRS were raised by most respondents.
- Some services noted that because ESN had been delayed they felt they would be tied into devices and a network which have already been superseded and would rapidly become obsolescent. Many of the forces were already using 4G networks and providing devices with greater capability (they indicated) than the ESN Connect device.
- The qualitative data gathered indicated that the provision of resources to support ESN and manage Airwave contracts in parallel with ESN has proved very problematic to justify and resource by smaller FRS.

Recommendations

Recommendations

- Multiple governance structures and variable levels of capability and capacity seem to be significant impediments to system wide change. Strategic review of governance and collaboration requires strategic review. Consideration should be given to providing further resource for county or smaller unitary FRS to obtain internal technical support for delivery of ICT infrastructure
- The heterogeneous nature of the FRS ICT landscape in terms of ICT capacity, ICT capability, condition of ICT infrastructure and priorities indicates that any support provided needs to be on service by service basis. The findings, do, however, also identify common areas where co-ordinated activities may be particularly helpful.

Recommendations

- The Policing and Crime Act 2017 places a statutory duty on fire and rescue authorities, police forces, and ambulance trusts to collaborate where it does not endanger public safety and improves efficiency or effectiveness. The fluidity and diversity of collaborative relationships is reported as leading to inefficiencies and will inevitably lead to less effective use of resource. It is clear that it negatively influences the delivery of a national programme for ICT or national infrastructure. There is opportunity for the Fire Services governed by the Police Fire and Crime Commissioners (PFCC) to access resource, however, they will require clarity and guidance to enable the joint implementation of ESN and underlying infrastructures.

Recommendation

- Many services noted that they are using commercial bearers to provide data services to FRS tenders. Some services noted that their staff were using untested and insecure commercial applications to communicate with colleagues for work related purposes (e.g. WhatsApp). 76% of FRS used Instant Messaging Service often or very often for internal communication and 31% used file sharing services (such as Dropbox) often or very often. There is an assumption that this will continue either because they will continue to use a parallel infrastructure of 4G networks and devices or because they will use ESN for data only via the Fire Tender.

Conclusion

- To address the disparities in governance, we recommend that the Home Office review existing FRS governance structures across England.
- To address the ICT infrastructure, capability and capacity challenges, we recommend that FRSs receive further investment in skills and infrastructure to fully engage with the opportunities ESN and Next-Generation networks offer.