Mobility, circulation, and homeomorphism: data becoming risk information

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WALKING THROUGH THE corridors of a Fire and Rescue Service (FRS) headquarters in the north-east of England, you encounter an array of posters showing charts, graphs, and tables containing a variety of different information pertaining to fire emergencies. Affixed to walls, multi-coloured scattergraphs indicate the age of those most vulnerable to fire. Adjacent, a bar chart shows which fire stations have attended the most fire incidents on a month-by-month basis. A few further steps along, a map purports to show the distribution of fire incidents year on year. These posters boldly sit on the walls of the FRS headquarters as signs of how the dangerous but quotidian event of fire is captured, known, and articulated through analytics and the information it generates.

Although constructed through data on past events, the posters are attempts also to make sense of fire as a potential event, as a risk. The posters represent a specific logic to interpreting emergencies, one that underpins the enactment of what Stephen Collier and Andrew Lakoff (2015: 22), commenting on Michel Foucault's lectures on security (2007), refer to as 'population security'; in which past events accrue under the analytical gaze of those that govern them, and data sourced from these events are deployed to make projections concerning their probable and possible recurrence in the future. The posters in turn represent information which becomes actionable in its ability to shape, to mould, and to justify interventions in the present, but which are designed to attend to emergencies which will take place in the future. This emphasis on the ability to know, and to intervene upon, fire in anticipation of its occurrence represents a substantial shift in the wider operational and organisational priorities of the FRS, one which has been witnessed since the start of the twenty-first century (Department of Communities and Local Government 2012). Since the Fire and Rescue Services Act of 2004, the FRS strategic approach to governing fire has been one that has of course retained the importance of response to fires as and when they occur. But equal significance has been laid on building capabilities to prepare for, to prevent, and to protect from fire risks of the future.

The posters embody the importance of risk information to the FRS whilst also implying the centrality of anticipatory modes of governing to these authorities. Ultimately, however, they are but surface products that emanate from a multitude of institutionally situated, day-by-day, organisational processes constantly taking place in the FRS that engage data and digital technologies in different ways. In recent times, much work within critical security studies and within social science goes under the veneer of the information found in graphs and the like to inquire into how operable security information is generated from organisational processes. Laurent Bonelli and Francesco Ragazzi (2014), for instance, show the ongoing importance of paper-based memos to the functioning of French domestic intelligence services. Louise Amoore (2013; 2014) explains the ways in which information about the world is spun out by continual and emergent negotiations between human bodies, sense, cognition, and data. Martin Dodge and Rob Kitchin (Dodge and Kitchin 2005; Kitchin and Dodge 2011), alternately, trace the ways in which digital codes instantiate themselves ubiquitously across the everyday life of organisations and, indeed, whole cities. These data-based processes, as Daniel Neyland (2015) argues, speak of a broader trend by which technologies based on algorithmic rules, and algorithmic thought in general, come to structure organisational life at the same time as being deployed in these organisations.

It is no surprise that this literature has developed simultaneously with the risk ever-deepening embeddedness of digital technologies and data-based processes within security organisations. Software and data are now integral to the deployment of all aspects of a broad security apparatus that includes intelligence agencies, emergency responders, border security, and a host of other authorities (Amoore 2009; Bigo 2014; Chamayou 2013; O'Grady 2014). The everyday life of the FRS in no way escapes this fact. A whole digital infrastructure composed of software, hardware, code, human operators, and the processes that develop around these now underpin the governance of fire. For the purposes of this chapter, this infrastructure works to generate information on fire risk. It does so through transforming data into information that facilitates strategic decision-making on how potential fire emergencies can be prevented.

This chapter contributes to the literature cited above by taking a closer look at the risk information generated for the purposes of facilitating the enactment of anticipatory governing measures on fire emergencies. Drawing on ethnographic observation of a Fire and Rescue Service and its digital infrastructure, the chapter looks at how information is generated through, or rather out of, data gathered on fire. I focus on two crucial processes taking place in the FRS digital infrastructure here. Concentrating on the role of Quality Assurance Officers who verify the data that the FRS source from fire incidents, I offer an account firstly of how data moves through the FRS. Present at the scene of fires, the Incident Recording System (IRS) extracts data as fire incidents unfold in real time. This

data are then circulated to the Quality Assurance Officer to verify. Upon verification, data are mobilised to different analysis software across the FRS. The capacity of data to transform into information relies, I argue, on its capacity to move and how this movement is conditioned within the broader digital infrastructure in which it moves.

To appropriately conceptualise the movement of data, however, a more nuanced and distinct definition of what movement is needs to be outlined. Thus, I outline three forms of movement which bring data to life and purpose in the FRS. Firstly, I discuss data as an entity which can be described by its circulation. Circulation allows us to conceptualise the broad systems of flow that characterise the life of data in the FRS. The movement of data, secondly, is cast as one that is mobilised. Mobility brings into play how the flow of data is structured according to different interventions made, for instance, by data export functions or human operators. The capacity of data to become mobile and to circulate is not just a matter of anthropological and technological conditioning, however. Rather it is entangled in what, as a third category of movement, I call the transmission of data. Transmission describes how data are processed from one site to the next in becoming information. I argue that transmission is always accompanied by, and inseparable from, the homeomorphism of data. Homeomorphism refers to how data changes form as it moves across space or as it is transmitted. Transmission and homeomorphism refer overall then to how data accounts for a set of material entities whose form changes as it is processed through different organisational stages on its trajectory towards becoming information that can lead to the instantiation of anticipatory governance.

The transmission and homeomorphism of data capture is part of, and embedded in, the second organisational process the chapter focuses on. Here, I look at how mobilised data are analysed through software called Active. A risk-mapping software, Active receives data from IRS and analyses it to calculate the spatial distribution of future fire risk. In turn, Active facilitates what is called resourcing to risk; wherein the resources at the FRS's disposal are deployed according to the future possibility of fire. It is in this process of analysis that mobilised data transforms into actionable risk information. Drawing on empirical material on the generation of risk information through Active software, I argue that the process of transmission and homeomorphism are important to consider for two reasons. Firstly, it furthers our understanding of the mobilisation of data because it informs us as to who and what intervenes to make data move and become operable in the FRS. And secondly, I show how decisions around what data is mobilised actually affects how risk appears. The politics of transmission, mobility, and circulation, in other words, affects what will come to appear as fire risk on those posters affixed to walls in FRS headquarters

across Britain and, ultimately, how fire emergencies are governed before their occurrence.

Movement, mobility, and circulation

Understanding digital entities by their capacity to move has for some time been a matter of crucial significance in work across the social sciences. According to Scott Lash (2006: 323), 'the global information order', within which the security apparatus undoubtedly operates, 'seems to be characterised by flow'. It is through movement and flow that the technologies to which security agencies are now so indebted are brought to life (Simon and de Goede 2015; Lash 2006). Through studying its liveliness, we can grasp how, to where and with what licence data moves across the global security apparatus. Even the manifestation of data as material (Hayles 2005; Parisi 2013) in some way is underpinned and actualised through movement. Following Manuel Castells (2001), furthermore, Adrian Mackenzie (2011) suggests that even the supposedly static elements of a digital network are actually always enfolded in systems of movement, forming nodes and connection points to facilitate movement.

But the generic signifier 'movement' is far from sufficient for explaining the deployment of data and, later still down the line, how this data becomes actionable information that opens up future emergencies to governance in the here and now. As recent literature in geography (Adey 2006; O'Grady 2014), sociology (Urry 2007) and critical approaches to security (Salter 2013) shows, movement needs to be treated in more refined, nuanced, and distinct ways if we are to properly appreciate its importance to wider practices of governance in a world of informational ordering. Movement can, for instance, be split between mobility and circulation (Adey 2006; Salter 2013). On the one hand, circulation captures the broad systems of flow that consolidate as normal over time. One might think here, for instance, of the processes of normalisation that Foucault (2007) claims orients interventions made under modalities of power he calls security. Rather than being posited and prescribed as in disciplinary modes of governance, norms under the security apparatus emanate from within the population governed. A primary force of articulation of normalisation in populations is the serialised circulation of things, people, diseases, and other events over time.

Mobility, on the other hand, provides conceptual and critical purchase from which to name the conditions of possibility enabling, regulating, and making things move in specific ways. In recent literature, the role of 'the mobiliser' has been attributed to the border agent and their material devices (Amoore 2009; Salter 2013), or the layout of the airport (Adey 2009) itself. Although distinct on the spectrum of movement, mobility and circulation are reciprocally bound to one another. Circulatory flows are characterised by the conditions by which things get mobilised. What gets mobilised, in turn, organises broader systems

of circulation. This might mean, to return to Foucault (2007) and his example, how miasma are mobilised according to the roads and walkways embedded in town plans. Conversely, that which gets mobilised affects broader systems of circulation. According to Foucault and his example of diseases, broader systems of circulation will be disrupted if diseases become mobile.

I want to apply this nuanced distinction between mobility and circulation to data. For me understanding the movement of data as split between circulation and mobility is crucial. Circulation can capture the wider technological ‘fixities’ (Urry 2003: 138) that act as conduits for the massive flows of data across and indeed beyond an organisation like the FRS. In a way equally important, mobility allows us to highlight the different conditions and interventions that act as traffic lights for data; letting data move, making data stop. This dichotomy between circulation and mobility allows us thus to highlight two things. Firstly, with circulation, we can speak of broad normative routines that underpin the movement of data. That is, we can conceptualise the set of repeated daily activities that mould and are manifest in the movement of data in its day-to-day existence. As a brief example, at every fire incident the FRS attends, data is captured in real time and will enter into the wider normative routines of data circulation found in the FRS. To come to the second point: for these normative circulatory curves to exist, however, conditions are put in place to regulate how data is mobilised. Data captured from incidents moves through import and export functions that connect software at the scene of the emergency to software in the FRS headquarters. The distinction between circulation and mobility, rather than simply allowing us to account for the broad systems of flow that characterise the life of data, points to the array of agents that condition this flow.

We might inquire beyond export and import functions to understand what supports the mobilisation of data and how this mobilisation is conditioned. The codification of data might be thought of as technological support for the mobilisation of data. Codification refers to the process by which data on a specific event is articulated in a language legible to the software in which they are integrated. In being codified, data becomes amenable to the operations of the wider digital technologies in which they exist. It is through codification, as Katherine Hayles (2005) reminds us, that data takes on material form. Through codification, data appears, for example, as geographical coordinates, temporal units, or equipment identifiers. Gaining the material status it acquires through codification, data are simultaneously granted the capacity to become mobile. It is through codification that data can be made to move to different software. Geographical coordinates, once codified as such, will be able to travel to risk-mapping software, for example.

But in its facilitating and conditioning of movement, codification furthermore can hint at the different agential forces complicit in the mobilisation of data within wider circulatory flows. These agencies are not necessarily confined to inorganic technological components like the import and export functions

already described. To return to Hayles (2005: 59): 'code implies a relationship between human and intelligent machines in which the linguistic practices of each influence and interpenetrate the other'. As a process that supports the mobilisation of data, codification does not only reinforce the fact that the mobility of data is moulded through technological interventions but suggests that the mobilisation of data is in part organised through human interventions. In relation to codification, this might mean how human beings write algorithms upon which software is based, perhaps what data are sorted into what category within software once sourced, even perhaps which data are accepted in analysis and which are not.

Both mobilisation and circulation work together to co-produce actionable security information from data. This is apparent in how data enters wider data circulation conduits in the FRS. What codification suggests additionally is that this movement is underpinned by data taking shape and materialising. Movement of data is thus inseparable from the formation and transformation of data. In the next section, I probe this relationship between movement and transformation more deeply through the concepts of transmission and homeomorphism.

The transmission and homeomorphism of data

Circulation and mobility present nuanced and distinct modes of movement by which data travel on their path towards becoming actionable information that shapes and legitimates the actions of security agents. Circulation reflects and effects a normal system of data movement whereas mobility enables and regulates the movement of data within this wider system. Interventions take place to mobilise data. These interventions might be bound exclusively to the realm of the inorganic as is the case with the briefly mentioned import and export functions. Codification, on the other hand, is a process emblematic of the interventions that human operators make in the mobilisation of data. But codification not only exemplifies a process by which data becomes mobile. Implicit rather within codification are issues surrounding the form that data takes, its material manifestations and the entangling of this matter of form with movement. In this section, I suggest that the dynamic movement of data and the emanation of information from this movement is intimately interwoven with how data changes form in generating information.

Tiziana Terranova, in her book *Network Culture* (2004), encapsulates in some ways the reciprocity between movement and the changing form of digital entities such as data and information in describing the process of transmission. Transmission for Terranova is the process by which information is communicated within and across a network of digital technologies. This process of transmission is characterised by entropy. Entropy, initially, serves to indicate the finite set of connections through which information might be communicated from one place to

another. The mobilisation of information for Terranova, just as is the case with data, is always undertaken within specific conditions, whether this conditioning is anthropocentric, technocentric or most likely a mixture of both. But entropy here suggests that with the conditioning of movement comes the reduction of possibilities of what information can actually mean. Terranova (2004: 20) claims, then, that 'the transmission of information implies the communication and exclusion of probable alternatives'. In the act of transmission, in the act of moving information from one place to another, the significance and meaning to which information might be attributed is reduced. Transmission is thus organised by entropy; the refinement and reduction in the possibilities of what data might mean.

Taking the work of Dodge and Kitchin (2005) as an example, transmission and entropy can be spread amongst the different digital entities seen to move through coded spaces and that feature in organisational processes. For instance, the authors map out a spectrum of forms that feature in the processing of barcodes. Barcodes are affixed to different objects. These barcodes allow the identification of one object from another but also enable the generation of swathes of data on these objects. By the instantiation of data generated from barcodes in local organisational contexts, these data elements become what are known as *capta*. *Capta* are the end results once data has been sifted and selected according to its relevance for a specific task. These *capta* become information after they have been subjected to different forms of calculative processing. With every stage in this process, entropy becomes more prominent because the stuff moving continually decreases in volume and the possible meaning and significance of that which is produced declines.

The spectrum of transmission presented here suggests that alongside the process of entropy through which refined information arises from data are processes by which data changes its form. Data becomes *capta* which in turn becomes information. As data move across space its form changes towards information. Calling forth the twentieth century's conceptualisation of information as the thing which mediates between 'living organisms and physical systems', Terranova (2006: 286) claims that information needs to be understood primarily as that which gives shape and form to matter. Reiterating this point, Alexander Galloway (2012) describes information as a point of coherence and beauty amidst the chaotic, self-fulfilling operations of the digital world. If we were to apply this to the spectrum Dodge and Kitchin have developed, information combines scattered data to create meaning. As John Law (2002) and James Ash (2014) have noted, data are characterised by homeomorphism wherein they change form and meaning as they are processed.

Transmission thus describes the movement of data from one place to the next. In transmission, as with codification, it is evident that data bears upon it both the human and technological hands that condition its movement and a

homeomorphism where data changes shape and form on the road to becoming information. With transmission too, however, the conditioned movement and homeomorphism is inflected by a process of entropy, whereby the quantity of data reduces as it becomes information. A homeomorphic attribute of data in its mobilisation and its becoming information is thus that it reduces in quantity as its meaning changes. In the next section, I show how data becomes actionable information in the FRS in a way characterised by conditioned mobility, transmission, and homeomorphism. I argue that it is through conditioned mobility and transmission that data from previous fires can morph into fire risk information. However, these processes that enable the generation of information are shaped by a number of interventions which, in conditioning the movement of data, also affect how fire becomes understood as a risk. The risk information generated, for all its coherence and beauty that Galloway and Terranova lavish it, only affords a skewed and partial perspective on the future reality it purports to represent.

IRS and the selection of data

Since its introduction in 2009, the Incident Recording System (IRS henceforth) has been the seminal data repository for the FRS in Britain. The IRS stores data on all incidents attended by the FRS. From its mainframe in regional FRS headquarters throughout Britain, the IRS includes data import and export functions to two key sites of fire governance that submit data as fire incidents unfold. The IRS is connected, firstly, to local FRS control rooms, which oversee and coordinate response by communicating with the public and operative FRS response personnel. Control rooms generate for the IRS what are called narrative logs; a recording of all data communicated to the control room as an emergency unfolds. By recording the time of public 999 calls, data includes the time at which the FRS was alerted to fires. Tracking the time fire engines were mobilised and their arrival at the scene of the incident, the response time of the FRS is recorded. Any resources requested by the FRS as they respond to fires, such as the need for the police, or ambulances for injured people, are also captured. Secondly, the IRS collects data from operative staff responding at the scene of the incident. This data comes in the form of pro forma reports that offer a retrospective account of the incident attended. These reports include data, for instance, on the damage caused by a fire and what resources and personnel were used at the scene of the incident. These forms also include data recorded through narrative logs, such as that relating to injuries caused by the incident.

Both the narrative log and pro forma report are transmitted via export and import functions to the mainframe of the IRS in the FRS headquarters. Collated together, the data relates to 197 different variables concerning fire incidents. Along with those mentioned above, these variables might include whether the incident was considered accidental or motivated by malicious intent, whether

the fire took place in a building or outside or, for example, if anything formed an obstacle to the FRS response. Appearing at the moment of interface with the IRS as different categories, these variables serve to classify and order the data accrued from an incident. In this moment, data are sifted and moved into its relevant category depending on what variable it can be said to represent. Through sourcing, transmission, and ordering, data are mobilised in a way co-produced between human operators and automatic export and import functions. In responding to the incident, FRS staff at the scene or in the control room choose what data represents in relation to the incident and where and how it should be categorised. In turn, export functions transmit the data to the IRS mainframe and to the category chosen.

On first encounter, the incorporation of both pro forma reports and narrative logs would appear to offer the most comprehensive, thorough, and efficient form of data collection at the FRS's disposal. Rather than one data sourcing technology, the FRS doubles its data collection capabilities by having two accounts of the same fire. In reality, this double-handed process of data sourcing is potentially problematic. Along with accruing large volumes of data, the pro forma reports and the narrative logs can offer two different renditions of the single incident attended by the FRS. Collated together, as I show, the two reports are rife with contradictions where they overlap and report on the same variable concerning the fire. They offer a rendition of a single fire but from completely different spatial perspectives and temporal positions. Whereas the pro forma report gives a retrospective account of a fire from the scene, the narrative log records data as the fire incident unfolds in real time, but from the detached position of a control room.

Accommodating for contradictions in the different data-based renditions of the same incident, the data mobilised are subject to quality assurance once it arrives at the IRS mainframe within the FRS headquarters. This assurance role, played by a human operator, serves two key roles according to its protagonist. Firstly, the role identifies and eliminates discrepancies between the two different sites of data collection, making sure the right data appears in the right categories. It was stated by the Quality Assurance Officer that, for instance, the narrative log generated from the control room perspective regularly overstated the number of injuries. In contrast, the pro forma produced retrospectively at the scene of the incident would be correct in accounting for injuries. Data from the pro forma report would be incorporated into the IRS rather than data from the narrative log. This judgement on behalf of the Quality Assurance Officer was underpinned by a normative claim deriving from experience of both monitoring the IRS and previously fighting fires. Taking precautions deemed necessary, this contradiction in data will have been generated when operative staff responding to a fire have called for resources for dealing with casualties but have not used them once it is confirmed that the fire has not caused any casualties. The call for resources,

however, would appear on the control room narrative log. The pro forma, being produced after the incident, would show that no injuries were accrued in the incident. By choosing data from the pro forma report over the narrative log, to return to Terranova, the Quality Assurance Officer enacts an entropic process by which large volumes of data are reduced and refined.

But the Quality Assurance Officer is not only a role confined to that of adjudicator. Instead, the Quality Assurance Officer supplements the IRS with additional data that could not be acquired during or in the immediate aftermath of the incident. The Quality Assurance Officer defined his role here as ‘filling in the gaps’ left by attempting to record data in real time. Possessing very high stakes which could lead to criminal prosecutions, the cause of fire, for instance, is frequently omitted from both pro formas and narrative logs. In such cases, the Quality Assurance Officer will consult the Fire Investigators who examine the wreckage a fire has inflicted to determine the cause of the fire. Alternately, the Quality Assurance Officer described a situation in which the name of someone killed by a fire was omitted from the IRS database. The victim was identified not through queries in the FRS digital infrastructure but by a local newspaper article.

Conceptually speaking, the processes of data mobilisation, transmission, and homeomorphism are all components that in the case of the IRS are inseparable and rolled into one another. Along with being a data storage and sourcing device, one of the IRS’s key functions for the FRS is its ability to mobilise and transmit data. The IRS itself is a technology that is scattered, appearing simultaneously in control rooms, on the frontline at the scene of the incident, and in the FRS headquarters. It is only through this disparate configuration that IRS can source data from two crucial sites of fire governance and export data back to the FRS headquarters. The mobilisation and transmission of data are conditioned by software in the form of export functions, and also by human operators. As I have suggested, this can be seen through decision-making processes about what data properly reflects the incident and what data does not. These processes themselves are the subject of reappraisal when data are subject to quality assurance. But in the mobilisation of data and its transmission from the site of response to the FRS headquarters, homeomorphism on the register of the continuum outlined earlier by Dodge and Kitchin is also evident. As data are categorised it is simultaneously reduced and selected for specific variables, variables that, as we shall see, are considered pertinent for particular kinds of analysis. In this process, data are selected for specific purposes and, as such, transform into *capta*. How data, in the form of selected *capta*, are analysed, thus extending processes of homeomorphism up until the point where risk information is produced, is a matter I turn to in the next section.

Turning data into information

The IRS does not only function to mobilise data it has acquired from the scene of an incident and to transmit data to the FRS headquarters. To reiterate, it is instead a key repository for all data used by the FRS. Once data are sourced, transmitted, and ordered, the IRS serves to mobilise data to different analytic software that plays a part in generating the risk projections through which the FRS enacts anticipatory modes of governance on fire risk. As data advance into the capillaries of the digital infrastructure of the FRS, it is further conditioned by those export and import functions mentioned above. The IRS can be imagined as a hub emanating from which are multiple conduits to different software. The IRS transmits data to this software automatically, with no more than a simple request for human sanctioning.

Active software is one site to which data from the IRS are transmitted. Active is supplied to the FRS by Total Software Solutions Ltd (TSS). A software developer based in the United States, TSS sells programmes to organisations across the world. According to promotional literature, their 'products and services are proven in the market to enable operators [to] increase revenues, reduce costs and increase operational efficiencies'.¹ Once acquired, tailored, and customised for the purposes of the FRS, Active is deployed with the hope of both bringing down costs and making operations more efficient. Active makes risk projections on the type and frequency of fires at different places within regions of Britain. By doing so, Active, as noted in the Chief Fire Officer Association's (CFOA) *Comprehensive Spending Review* (2010), aids the FRS in resourcing to risk, wherein decisions on resource allocation are made according to what can be calculated concerning the future occurrence of fire emergencies. Active contributes to a crucially importance process wherein budgets for different elements of emergency response are decided upon.

Active makes its risk projections spatially through mapping analysis. On first opening the Active programme on a computer desktop, a map of the region in which the FRS operates appears. Drawing on data sourced from the Ordnance Survey, visualised on the map are the circuits of transport running through the region, and clusters representing areas of dense human population are rendered, within which buildings of significance such as hospitals, schools, and major industrial sites rise forth. The towns and cities fade into brownfield sites, gradually turning into green rural areas. The natural topography and terrain of the region underpins this data, indicating areas such as valleys and hills, which, in the case of the region studied, lead out to the north-east English coastline.

Up to this point the map described has no special distinguishing features that would suggest a map used by the FRS. What appears on the computer screen, in other words, is a generic map of the region holding no special significance to fire risk. The map is customised for the specific purposes of the FRS when Ordnance Survey data are integrated with data from the IRS. Export functions from IRS

automatically transmit data on all fire incidents that have unfolded in the region over the last three years. This data is uploaded by geographical distribution and superimposed onto the map. Past incidents of fire appear as flame symbols across the space governed. The data uploaded does not just show the location of fire incidents, however. Within the flame symbols across the map, rather, is a plethora of data on each fire. Selecting an individual fire symbol would reveal, for instance, data on whether the fire occurred within or outside a building, what resources were used to respond to the fire, if any casualties were caused by the fire, or the damage the fire caused to the wider environment. Relating back to the previous section, in other words, flame symbols include all data checked, verified, and indeed modified by the Quality Assurance Officer. The hand of the Quality Assurance Officer in deciding both what data to mobilise and what data should become capta for the purposes of analysis thus affects what appears on the map and what does not.

A number of different geographical boundaries are also imposed on the map. Visualised as red lines, boundaries are shown indicating the different areas of responsibility for FRS stations. Further boundaries cut across these boundaries. These additional lines indicate the areas of responsibility for other emergency responders. Regularly incorporated into Active risk maps used by the FRS, for instance, are 'police beats', which delineate the specific areas in the region patrolled by local police stations. The mapping of a distributed security apparatus through the spatial boundaries Active visualises is of interest in itself. But what is of primary importance in this chapter is how Active is used by the FRS to tailor the resources at their disposal to particular types of fire risk prevalent in specific areas of responsibility for different fire stations. The first step involves identifying where fires happen most frequently. By the initial integration of fire location data onto the map, areas of high fire frequency are apparent. However, a further level of granularity can be realised by zooming in on any area. Upon zooming in, the flame symbols grow larger. As the process of zooming is repeated, the symbols blur into each other until they collectively form one large, multi-coloured symbol. The symbol overall remains red in colour but different gradations of red appear within it. The centre of the symbol is dark red and the strength of the colour fades as moves away from the centre are made. What these grades of red indicate are the areas of highest fire frequency in the centre and the decline in fire frequency over space.

It is not only the number of fires which occur in each area that the FRS wants to access through Active. Rather the FRS wishes to use Active to tailor resources present in individual fire stations to the particular types of fire incidents prevalent in different areas. To do so, analysts in the FRS must collate together different variables found in fire incidents. A lasso function inbuilt in Active is used to draw circles around all fires occurring within a specific area. All incidents captured within the lasso tool's span are then

transmitted onto an Excel spreadsheet. Once transmitted, what is called a V-lookup function in Excel is deployed. This function allows analysts to group together the same variables present across fire incidents. Across the span of different fires, what now appears together are variables such as what casualties were caused by the fire and how long the service took to arrive at the scene of the incident.

Data on the same variable has been selected and integrated. Ultimately what is accessed by analysts is information regarding what kinds of variable are most prevalent at fires occurring in a specific fire station's area of responsibility. The same graphs and charts found affixed to walls in the FRS headquarters are generated through the Excel spreadsheet to show, for instance, how many casualties result from fires in specific areas, what resources have been heavily used in response to fires or if fires happen more frequently inside or outside buildings. In regard to the function of Active risk mapping, the information found here becomes actionable information when it shapes, facilitates, and conditions decision-making on what resources are needed to anticipate and mitigate fire risk in specific areas. From the analysis it performs, Active might influence the types of equipment invested in for specific fire stations. Alternatively, it might lead to an escalation in preventative home fire safety checks wherein firefighters work with residents in an area to plan evacuation routes from potential fires. In some cases, the information generated by Active could lead to a wholesale relocation, or even withdrawal altogether, of fire stations.

This chapter, however, is less about the decisions made from the information generated and more instead about how data transforms into specific kinds of information on fire risk. Rather than being about how information is actioned it is about how and what kinds of information become actionable through data-based organisational processes. As I have argued above, the emergence of specific forms of information on fire risk is entangled in the issue of how data is mobilised, the kinds of data that are transmitted from one place to the next, and how, in its movement, data morphs into information. The sources for IRS data are, as noted, both the narrative logs derived from FRS control rooms and the proformas completed by operative staff at the scene of an incident. They represent two different data renditions of the fire incident from the perspectives of two crucial sites of fire governance. The role of the Quality Assurance Officer is to make decisions as to which data generated from the two sources properly accounts for the incident and is pertinent for analysis and which is not. Judgements over the pertinence of different data are enacted in what data becomes mobilised within broader systems of data circulation and what data does not. As Terranova notes, the judgement made by the Quality Assurance Officer follows the logic of an entropic process, whereby the volume of data is decreased as it becomes more refined and mobilised for the purposes of analysis. By deciding what data

is mobilised, the Quality Assurance Officer ultimately influences what kind of information can be generated on fire risk.

The effect of quality assurance decision-making on information generated about fire risk can be exemplified if we return to the recording of casualties and what resources were called upon to deal with these casualties. As noted, narrative log renditions of fire incidents will include casualties that were indicated due to the deployment of resources to deal with casualties. In the pro forma report, casualties will only be recorded if the resources deployed were actually used. If data from pro forma reports rather than narrative logs is transmitted to Active, as is common practice, the fire incidents described in Active will only record resources used and not resources deployed but not used. Although a detailed account of fire incidents is afforded in Active, the messy, often mistake-laden aspects of FRS response to an incident, captured in narrative logs but not in pro forma reports, are eliminated. The rendition of fire risk generated by information from Active is thus skewed by the process of entropy, which underpins decision-making as to what data should be mobilised and, ultimately, what data turns into information.

Conclusion

The information security agencies now continually generate facilitates and is a symptom of the fundamental changes in the actions that they take, the interventions they make, and how they legitimate and rationalise their existence. But information is far from where the story starts in enacting and facilitating the types of risk-based governance that are now central to authorities such as the FRS discussed in this chapter. As a combination, an ordering and a comprehension of scattered flows of data, information is only a surface product. To furrow underneath this information and ask from whence it derives is to encounter a plethora of minute and intricate, organisationally situated, and locally instantiated data-based processes. These processes cannot be conceived as merely everyday laborious chores that bored workers undertake in a mundane routine. Generating the very material by which different agents of the security apparatus come to decisions about how to intervene, these techniques are part of the very mechanisms by which security is enacted and practised nowadays.

Issues concerning movement exist in the midst of these processes. In this chapter we have seen how movement has characterised, instigated, and influenced a variety of processes such as data sourcing, selection, integration, and analysis. But as our gaze on such processes becomes ever more minute, revealing the complexity of the manoeuvres and different stages that comprise them, the statement that 'organisationally situated processes by which information on risk emerges are characterised by movement' becomes increasingly obsolete of meaning. Instead, the generic signifier of movement needs to be broken down

and compartmentalised into different modes. In this chapter, I have drawn on the dichotomy between mobility and circulation established in other literature (Adey 2006; O'Grady 2014; Salter 2013) and applied it to the case of how data becomes actionable information. If circulation designates and accounts for broad normalised systems of data flow, mobility conceptualises the conditions of possibility by which data are moved. Through the language of mobility, not only have the techniques prevalent in creating information been identified, but their inner workings have been documented. On the one hand, the conditions of mobility are automatic and self-regulating, embedded in hardware and enacted through software commands. On the other, they operate through incorporating human-based decision-making.

But what happens to data as it is mobilised? I have argued here that, on its way to becoming actionable information, the mobilisation of data is inseparably entangled with its material transformation. The transmission of data from one place to the next is accompanied by the homeomorphism of data. What homeomorphism allows us to think of is the multiple form shifts which data undergoes in becoming information. In an age of Big Data, it might be expected that the amount of data used in the FRS would enlarge in volume and variety as it travels further and deeper into the bowels of the FRS digital infrastructure. In fact, the opposite is witnessed. Rather than growing, the mobility of data is organised by a process of entropy. Through its transmission and in its becoming information, the volume of data shrinks and becomes more refined to suit the specific analytic purposes of the software to which it moves. As icons of the minute processes discussed, the posters affixed to the walls in the FRS testify to this process of entropy. The posters are the result of a continual downsizing of the digital entities that the FRS accrue and deploy. It is the generation of small, discrete actionable information, and not the generation of Big Data that, at least for the time being, matters to the FRS.

But if this process of entropy has told us anything, it is that the transmission and homeomorphism of data are bound to one another in a way that bears the trace of the different conditions mobilising data in the first place. In mobilising data, as shown in relation to IRS, human operators do not just face the task of making sure the right data are categorised and moved to the right places. Instead, this act of mobilisation shapes and conditions what things are made accessible to analysis, to knowledge, and what are not. It influences heavily what information can be generated and also mediates how this information reflects the future to which the FRS increasingly orients itself strategically.

NOTE

- 1 www.totalsoftware.com (accessed October 2015).

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