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Responding to terrorism: dealing with fragmentation

Master Thesis

Written by: Jorn Boers

Supervisor: Dr. J. J. Wolbers

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Leiden University

Faculty of Governance and Global Affairs

Institute of Security and Global Affairs

Schouwburgstraat 2, 2511 VA Den Haag

Title:	Responding to terrorism: dealing with fragmentation
Student name:	Jorn Boers
Student number:	s2233002
Master:	Crisis and Security Management
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Institute:	Leiden University
Faculty:	Faculty of Governance and Global Affairs
Date of admission:	02-06-2019
Supervisor:	Dr. J.J. Wolbers
Second reader:	Dr. L.D. Cabane
Word count:	17001 (including in-text references)
Email:	jorn_boers@hotmail.com
Telephone:	0614741339

Content

Chapter 1. Introduction

On 13 November 2015, Paris was struck by terror when a coordinated attack took place in multiple places. The attack featured both explosions and mass shootings, taking the lives of 130 people and injuring many others (BBC, 2015; The New York Times, 2016). A similar coordinated firearm and explosion attack occurred in 2008 in the city of Mumbai in which 174 people lost their lives (Chamberlain, 2008; D'Souza, 2019). Governments faced challenges during the response operations of these attacks, since they took place at multiple sites at once and the safety of their own personnel was in question as well at the sites due to the possibility of secondary attacks. Therefore, governments around the world adapted their protocols for dealing with these coordinated firearm attacks. Particularly in the United Kingdom a protocol was developed after the Mumbai attack to deal with such incidents and to structure ways to safely operate. This so called: 'PLATO' protocol provides the police with additional firearm support and it structures the emergency response in a 'hot', 'warm' and 'cold' zone structure. The 'hot zone' is the area in which terrorist are active and only specially trained armed personnel are allowed to enter in order to apprehend the terrorists. The 'warm zone' is an area that has no active terrorist presence, yet absolute safety cannot be guaranteed and a threat still remains. Non-police first responders with protective gear are allowed to work in a warm zone. The 'cold zone' is the area where no terrorism threat is present. In addition, all emergency services are to be notified of the declaration of PLATO (The Kerslake Report, 2017, p. 27).

The response to terrorist attacks requires a swift coordinated first response from various emergency services due to the complex nature of an attack and the possible danger of follow-up attacks. The practice of coordination in this sense refers to *"a temporally unfolding and contextualised process of input regulation and interaction articulation to realize a collective performance"* (Faraj & Xiao, 2006, p. 1157). For a single emergency service organisation, realising a collective performance or collaborative action between different task-oriented groups is challenging. Still, members of such an organisation share a common identity, a similar expectation of the work, routines and have knowledge about the various interdepended tasks. In addition, emergency services have often standardised their response procedures to be able to tackle various scenarios and are rehearsed in a manner in which they can adapt to changing circumstances (Bigley & Roberts, 2001; Bechky & Okhuysen, 2011). These factors make it easier to coordinate a response to an unexpected incident (Bechky & Okhuysen, 2011).

Yet, large scale emergencies, such as a terrorist attack, require a response by a multitude of organisations. Moreover, these types of incidents are often characterised by extreme complexity and ambiguity. One in which various stakeholders with different demands and interests operate under severe time pressure in difficult to oversee and possibly unsafe situations where fast decision making is necessary (Comfort, 2007; Faraj & Xiao, 2006; Wolbers, Boersma, & Groenewegen, 2018). Coordinating a swift collaborative action between first responders from different professional backgrounds in such an ambiguous situation is very difficult. Existing coordination procedures may fail due to unforeseen incidents, making it difficult to determine the structure of authority and the next course of action. Multiple sometimes conflicting interpretations of the situation could emerge and multiply, making it difficult to make sense of a situation collectively and as a result limiting the possibility of a collaborative action, resulting in discontinuity (Martin, 1992; Wolbers, Boersma, & Groenewegen, 2018). When collective sensemaking and collaborative action breakdown, *fragmentation*[1] of the emergency response operation occurs, creating a situation characterised by *ambiguity* and *discontinuity* during the coordination process.

The Manchester Arena bombing in 2017 features an example of fragmentation of the response operation: the fire department during the operation arrived two hours after the explosion, while medical and police services were lending aid at the scene from the start. The reason for this was that the fire department was not sure that the area was safe to enter due to their perception that an active shooter was present. The situation was *ambiguous*, multiple interpretations existed and their contribution to the operation *discontinued* (BBC, 2018; Chakraborti, 2018; The Kerslake Report, 2017)

There is no real consensus between scholars on the exact impact of fragmentation. One the one hand, scholars view integration as the ideal during coordination efforts (Okhuysen & Bechky, 2009). This comes from the idea that coordination is about to the integration of organizational work into a collaborative action in a situation characterized by interdependency between tasks and uncertainty of outcomes (Okhuysen & Bechky, 2009). They argue that fragmentation is to be avoided due to its negative impacts such as miscommunication and a lack of collaborative action. Additionally some scholars believe that these fragmentation issues could be prevented through proper operational design, such as the use of Incident Command

[1] This study is part of a larger research project on fragmentation in which multiple students study fragmentation using cases on terrorist attacks in Europe. If applicable, the results from these studies will be used by Dr. Wolbers and others to further unravel the origins of fragmentation and how first responders cope with the phenomenon.

Systems (Moynihan, 2009) and various protocols (Bharosa, Lee, & Janssen, 2010). On the other hand, scholars view that fragmentation during emergency response operations is altogether unavoidable and could even provide opportunities for improvisation and rapid action (Wolbers, Boersma, & Groenewegen, 2018). In order to fully understand the fragmentation phenomenon, its impact and how actors deal with it, further research is needed. This shows the scientific relevance of the study. Societal relevance of the study is clear since emergency response organisations may benefit from further knowledge into the fragmentation phenomenon they regularly face during their operations. This knowledge may improve response operations in the future and is therefore beneficial for society as a whole.

This study tries to unravel how coordination processes of emergency response operations unfold under conditions of fragmentation. In order to do so, two different cases are studied from this perspective in a comparative case study. The cases that will be used are the "7/7" London bombings in 2005 and the Manchester Arena bombing in 2017. The latter featured a suicide bombing attack which occurred inside the Foyer area of the Manchester Arena after a concert by Ariana Grande. The attack sprung a large amount of societal outrage, since a total number of 22 people were killed including a large number of children (The Kerslake Report, 2017). This attack turned out to be the deadliest attack on UK soil since the "7/7" bombings in 2005, which featured three explosions in the underground and one in a bus, resulting in 52 fatalities and over 700 injured (Greater London Authority, 2006).

The United Kingdom, much as in other countries, institutionalised their emergency response in reaction of the new types of coordinated terrorist attacks (The Kerslake Report, 2017). The 2005 attack occurred when these types of procedures, particularly the PLATO protocol, were not institutionalised yet. Therefore, a comparison could be made as to how fragmentation unfolds and how actors dealt with fragmentation during a case with these protocols in place (Manchester 2017) and a case without them (London 2005). The differences in impact of fragmentation on the process of emergency response coordination are important to grasp in order to gain further insight in the way emergency responders deal with ambiguity and discontinuity. In order to do so, this exploratory study focusses on the processes of emergency response coordination in the two cases conducted by first responders from the police, medical services and the fire department. This leads to the following research question:

How were the emergency response operations of the London 7/7 bombings and the Manchester Arena bombing coordinated by first responders under conditions of ambiguity and discontinuity?

This thesis is structured in the following way. After the introduction, the body of knowledge section follows in which the main themes and concepts are discussed. Hereafter follows a methodology section in which the cases are described, the motivation for using them is given and the methods of data collection and analysis are explained. Next, the analysis chapter follows in which the cases are analysed on the basis of the central themes of the study. The thesis closes with a discussion and conclusion section.

Chapter 2. Body of knowledge

2.1 Coordination

Coordination is defined by Faraj and Xiao (2006, p. 1157) as: *"a temporally unfolding and contextualised process of input regulation and interaction articulation to realize a collective performance".* This definition encompasses the contemporary focus of coordination literature on the process and practice of coordination and the focus on the emergent nature of coordination (Faraj & Xiao, 2006; Kellog, Orlikowski, & Yates, 2006; Okhuysen & Bechky, 2009). This definition is used in this study due to its connectedness to the modern literature and due to the focus on the emergent aspect of the coordination process, which is a realistic outlook when studying emergencies such as terrorist attacks.

Early coordination theories were focussed on the designable aspect of coordination as opposed to its emergent form. These were created in a time where large scale production work in factories was a major focus of research. These factories were relatively complex in that a multitude of tasks needed to be performed and coordinated in order to create an end product (Okhuysen & Bechky, 2009). An important concept of the early coordination literature is scientific management. This meant that work should be designed into its most basic forms in order to increase specialisation and decrease waste (Taylor, 1916). Later scholars (Fayol, 1949) argued that, in order to create maximum efficiency it was necessary to have a properly designed management system where centralisation and a clear command structure were paramount. All these early coordination scholars had in common that they focussed on the design aspect of coordination.

In the contemporary world, a lot of work has become far less measurable and difficult to monitor compared to the days of the scientific focus on large scale factories (Okhuysen &

Bechky, 2009). This is partly due to the increasing complexity of the work that is performed due to for example the increasing focus on services as opposed to physical products and due the increasing use of communication technologies (Davis, 2003; Okhuysen & Bechky, 2009). Yet, coordination did become more important due to the dynamic nature of the organisational environments and the focus on multi-disciplinary teams (Child & Mcgrath, 2001; Faraj & Xiao, 2006). In these diffuse and complex work environments, designed coordination did not suffice due to unexpected events that may occur, resulting in what Donaldson (2001) called 'ad-hoc coordination'. Modern coordination researchers therefore view coordination as being both designed and emergent in nature (Okhuysen & Bechky, 2009).

In addition, the integration aspect of coordination is often mentioned in modern coordination literature. In this sense, coordination is a process in which different mutually dependent workflows are integrated to realise a collective action (Faraj & Xiao, 2006; Kellog, Orlikowski, & Yates, 2006; Wolbers, Boersma, & Groenewegen, 2018). According to Okhuysen and Bechky (2009), modern integrative coordination theories share that in order to coordinate properly, actors need to be integrated in terms of having similar expectations of work; clear assignment of roles; and knowledge of each other's tasks. These aspects are rooted in three conditions that create integration: *accountability, predictability,* and *common understanding.* The *accountability* condition refers to the notion that the different responsibilities of all stakeholders need to be clear. This is for example done in a designed fashion through regulations and jurisdictions, or emergent parties are made responsible for their actions during an operation. *Predictability* refers to the notion that the different actors need to be able to anticipate their own tasks and the tasks of others that need to be collaboratively performed during an operation. Finally, a *common understanding* of the situation is necessary because the different actors need to have a shared perception of what is going on and what needs to be done in order to perform their tasks (Okhuysen & Bechky, 2009).

The modern emerging nature of coordination is well illustrated by Faraj and Xiao (2006) in their research on fast-response organisations, such as medical trauma teams. Workers in these types of organisations face a very complex and dynamic work environment, since they face tremendous time pressure and require swift decision making with large uncertainty of outcomes. The trauma teams they researched did use integrative approaches of coordination such as procedures, information sharing and structured roles. Yet, Faraj and Xiao (2006) noted that during some fast-paced emergency type of situations, unexpected events occurred. As a result, actors abandoned expected workflow, broke protocols and made sense of the situation

on the spot in order to be able to meet certain demands. Coordination during these situations occurred and unfolded on the spot through dialogue, rather than through existing procedures (Faraj & Xiao, 2006).

Actors engaged in these types of situations overcome their differences and try to reintegrate their workflows either on the spot or during the work process (Faraj & Xiao, 2006; Wolbers, Boersma, & Groenewegen, 2018). This shows that when actors who try to coordinate through integration are faced with unexpected events, achieving integrated action becomes very difficult. The reason for this is that in coordination situations, multiple mutually depended actors are responsible for different actions. Then, if something unexpected occurs, it becomes uncertain how these different actions will affect the outcome (Carlile, 2004; Jarzabkowski, Lê, & Feldman, 2012). This often results in different actors having a different perception of the situation, resulting in misunderstandings and ambiguity (Bechky, 2006). During emergencies, response organisations are often confronted with such unexpected events, where differences in understanding are hard to overcome, resulting in miscommunication, a difficult to oversee the situation, and in multiple co-existing interpretations of the situation.

This means that emergency responders often face ambiguity and equivocality during their operations where it becomes unclear which course of action should be taken, resulting in what Wolbers et al (2018) call ‘action ambiguity’. This corresponds with the notion by Martin (1992) that a situation is ambiguous when it is unclear which course of action should be taken and what the consequences might be for each possible action.

2.2 Sensemaking

The process by which actors try to understand these unexpected, confusing and through multiple interpretations explainable occurrences is called *sensemaking* (Maitlis & Christianson, 2014). There is no single shared definition of sensemaking, yet according to Brown et al (2015), an emerging consensus exist that sensemaking is essentially a set of processes in which people attempt to understand ambiguous and equivocal events or situations. When actors experience equivocality, they try to derive and interpret cues from the environment in order to understand what is going on by actively making sense of these cues (Brown, Colville, & Pye, 2015).

Sensemaking as described by (Weick, 1993) occurs through a process of social construction of a rationale for the actions that people undertake. During this process, signals from the environment are interpreted through several frames of reference. Sensemaking is about actively connecting these signals and frames in order to grasp what is going on (Maitlis &

Sonensheim, 2010; Weick, 1993). Sensemaking is more than just interpretation, because it involves a process of both interpretation or discovery of cues as well as the construction or invention of frames of understanding. This means that the actors themselves play an active role in shaping and framing the environment they try to understand (Maitlis & Christianson, 2014; Brown et al., 2015; Weick, 1995). Moreover, past experience plays an important role in sensemaking because it often provides actors with a frame of understanding on what might be going on. In other words, linking certain cues to a familiar frame of reference might lead to a situation where actors expect the current situation to be similar to the previously experienced situation (Colville, Pye, & Carter, 2013; Weick, 1995).

In practice, sensemaking usually occurs through three sets of interwoven processes: the perception and noticing of cues, making interpretations and meaning from those cues and engaging in action (Maitlis & Christianson, 2014). Action is a vital part of sensemaking because through action, individuals gain more cues by learning about an ambiguous situation and by testing previous sensemaking attempts. Moreover, actions alter the environment, meaning the same actions to make sense of the environment could actually change the perceived reality and as a result change the environment that required sensemaking in the first place, resulting in more equivocality (Brown, Colville, & Pye, 2015; Maitlis & Christianson, 2014; Weick, 1995).

This shows that sensemaking is an iterative and continuous process of making sense of an ambiguous situation where the sensemaking process itself could lead to more ambiguity and equivocality. This is a challenge that emergency services regularly face. In their operations, the emergency responders do not only produce their own sensemaking, but must partake in collective sensemaking as well because an emergency operation requires a coordinated response from a multitude of actors. Collective sensemaking is described by Maitlis and Sonenshein (2010) as the effort of multiple parties to produce a shared understanding of the situation and of the coordinated action that is to be taken (Maitlis & Sonensheim, 2010). This shows that the process of sensemaking is essentially interwoven into the process of coordination.

During emergency response, collective sensemaking between the different first responding originations is often needed for coordinating the response. When all parties develop a shared understanding of the situation it is easier to perform a collaborative action (Wolbers & Boersma, 2013). Yet, producing a shared understanding and lessening ambiguity is particularly difficult in emergency response operations due to the physical distance between actors and the severe time pressure those actors endure (Wolbers, Groenewegen, Molle, & Bim, 2013). Time

pressure creates a dilemma for first responders during the sensemaking process. On the one hand, actors want to gather as much information as possible before making any decisions, on the other, swift decision making is often necessary during emergencies. This creates a situation where first responders must often act with only limited information available (Maitlis & Christianson, 2014). In addition, information sharing, communication and coordination have proven to be difficult for emergency response organisations during operations (Bharosa, Lee, & Janssen, 2010; Comfort, 2007; Wolbers & Boersma, 2013). The organisations all have different backgrounds, expertise, cultures, professional languages, command structures and information systems and need to coordinate their efforts across organisational and authoritative borders (Comfort & Kapucu, 2006).

2.3 Protocols and procedures

In order to attempt to overcome the difficulties in coordination and sensemaking, pre-designed tools and protocols are often used. These are rooted in the aforementioned integration conditions described by Okhuysen and Bechky (2009). Good examples of protocols that attempt to improve multi-party coordination are Incident Command Systems. These systems are temporary common organisational structures for coordinating and integrating equipment, personnel, procedures and communication for multiple first response organisations. This type of clear command protocol is particularly used during emergency response organisations in the United States (Bigley & Roberts, 2001; Jensen & Thompson, 2016; Moynihan, 2009). According to Bigley and Roberts (2001) these systems offer both a clear command structure and leave room for flexibility and adaptivity. Similar systems are used in other countries. The U.K for example uses a 'bronze' (operational), 'silver' (tactical) and 'gold' (strategic) command system. Which entails that each individual agency is structured in the same way during an emergency. In short, a Gold commander would set out the overall strategy in dealing with a specific incident and has overall command. Silver commanders translate parts of the strategy in tactical plans and assign Bronze Commanders. The Bronze commanders are then responsible of making operational decisions in order to execute the tactical plans (HM Government, 2013).

An often-used tool for improving situational awareness and thus helping in sensemaking efforts is a common operational picture. This operational picture is created by an information management system in which information is collected and shared between organisations. Yet, as Wolbers and Boersma (2013) have shown, different actors attribute different meanings to sets of information and sometimes even forget to share information altogether. This makes collective sensemaking and as a result coordination of collaborative action difficult (Wolbers

& Boersma, 2013). Even when management structures such as Incident Command Systems are in place, commanders are still faced with unexpected events, which cause action ambiguity and sometimes discontinuity (Rimstad & Sollid, 2015).

During emergency response operations in the past, these difficulties led to a breakdown of collective sensemaking, creating a situation in which the different actors have different operational pictures and there is no clear oversight over what everyone is doing (Wolbers, Boersma, & Groenewegen, 2018). The Breivik attack in Oslo and Utøya shows an example of this. The sheer complexity of actors involved responding to the Oslo bomb and the inability to analyse rapidly evolving events led to the inability to prevent the shooting at Utøya. This happened due to a clear lack of oversight and an inability to switch between localized and strategic coordination structures for the police. These differences between centralized and localized actors partially led to a delayed response to the shootings (Bye et al., 2019).

2.4 Fragmentation

This breakdown of collective sensemaking and collaborative action during coordination efforts is referred to as *fragmentation* of the emergency response organisation, creating a situation characterised by ambiguity and discontinuity during the coordination process (Wolbers, Boersma, & Groenewegen, 2018). This breakdown could be caused by or could lead to action ambiguity, when it is unclear which actions, if any, should be taken and it is uncertain what the outcomes might be of these actions (Martin, 1992). When multiple parties work in an emergency response operation characterised by action ambiguity, a multiplicity of interpretations emerges. If more and more interpretations emerge, this leads to a flux in which separate pockets of actors form around these interpretations of the situation (Martin, 1992). This means that the parties are unable to make sense of the situations collectively and a cohesive coordinated action becomes difficult, possibly leading to a breakdown of collective sensemaking and collaborative action. This breakdown then in turn leads to more action ambiguity. This shows that fragmentation is not a simple cause and effect relationship, rather it is an iterative occurrence without a fixed beginning or ending (Wolbers, Boersma, & Groenewegen, 2018).

There is no real consensus between scholars on the exact impact of fragmentation and conditions of ambiguity and discontinuity on the emergency response. Some scholars (Bye et al., 2019; Rimstad & Sollid, 2015) point to the negative effects of fragmentation, such as

miscommunication and disruption of work. This school of thought on fragmentation uses the aforementioned coordination perspective mentioned by Okhuysen & Bechky (2009) which states that coordination requires integration of actors and actions. They view integration as the ideal and therefore view fragmentation as highly undesirable and to be avoided at all costs. In addition, the importance of properly designed emergency response coordination is stressed, since they believe it could prevent fragmentation (Bharosa, Lee, & Janssen, 2010; Jensen & Thompson, 2016). Other scholars have a different view on fragmentation and note that the phenomenon could also enhance flexibility and increase the ability to improvise (Kendra & Wachtendorf, 2003; Mendonca & Wallace, 2004; Wolbers, Boersma, & Groenewegen, 2018). This perspective is derived from studies on resilience of organisations, which refers to the ability to adapt to and recover from unforeseen disturbances (Comfort, Boin, & Demchak, 2010). Fragmentation is seen by these scholars as an unavoidable outcome of crisis response situations, yet they argue that fragmentation may also stimulate resilience, as it enhances improvisation and creativity (Williams et al., 2017; Wolbers, Boersma, & Groenewegen, 2018). The response to the World Trade Centre disaster shows an example of how the emergency responders had to abandon procedures and come up with creative solutions in order to respond to highly unexpected events (Kendra & Wachtendorf, 2003). Another reason why fragmentation could be beneficial is that in some situations, actors tend to stick to certain frames of reference, even when confronted with evidence to the contrary. During the Stockwell shooting in London for example, the police stuck to a certain frame in which a running individual was believed to be a suicide bomber, while he was actually trying to catch a train. This resulted in the shooting of an innocent man (Cornelissen, Mantere, & Vaara, 2014). A breakdown of sensemaking was necessary here, because it would have challenged the frame of reference of the police officers.

2.5 Fragmentation versus integration

In order to grasp the fragmentation perspective properly and its role during the coordination process, it is necessary to understand the relationship between integration versus fragmentation. Traditionally, the emergency response is organised on paper by striving to integrate designed and emergent coordination efforts (Okhuysen & Bechky, 2009; Wolbers, Boersma, & Groenewegen, 2018). Moreover, as mentioned before, the three conditions of integration: *accountability*, *predictability*, and *common understanding*, are rooted in many designed emergency management protocols (Faraj & Xiao, 2006; Okhuysen & Bechky, 2009). *Integration* as opposed to *fragmentation* is the traditional goal in these protocols. Yet as

mentioned before, integration is often difficult in situations characterised by time pressure, unexpected events, changing circumstances and difficult to oversee situations. As a result, ambiguity and discontinuity are unavoidable circumstances (Wolbers, Boersma, & Groenewegen, 2018).

Crisis response operations are very dynamic and unexpected issues are likely to occur. These events do not correspond with the existing procedures and therefore actors tend to *work around procedures*, or even break procedures in order to come up with creative solutions for the unexpected issue. Faraj and Xiao (2006) noted that the trauma teams they studied switched to alternative approaches when faced with unexpected issues. When looking at integration, these practices decrease the *predictability* condition of integrated coordination because it alters from the expected workflow. Yet, as Faraj and Xiao (2006) show with medical teams and Bechky and Okhuysen (2011) show with SWAT teams, fast response organisations are often trained in a manner in which they become familiar with each other's preferences and create routines together through rehearsal and exercises. In these tightly coupled systems, a shift in one part of the system leads to a predictable shift in another (Maitlis & Christianson, 2014). Thus, predictability is preserved even during emergent coordination and even when protocols are broken due to the familiarity these actors have built with each other (Okhuysen & Bechky, 2009). Yet, as Colville et al. (2013) have shown, even experienced teams could suffer a breakdown of predictability when faced with unexpected occurrences that do not match with existing routines. In addition, for emergency response operations in which multiple parties operate who are not as well rehearsed to coordinate as singular teams, working around procedures creates a situation in which normal workflow has been interrupted. In these loosely coupled systems, a shift in the system leads to unpredictable shifts in other parts of the system (Maitlis & Christianson, 2014). This increases the *multiplicity of interpretations* (Martin, 1992) leading to a fragmented coordination process (Wolbers, Boersma, & Groenewegen, 2018).

As crisis response operations become ambiguous and difficult to oversee, incident commanders tend to *delegate tasks* (Wolbers, Boersma, & Groenewegen, 2018) in order to be free of task specifics and acquire an overview of the situation. Otherwise, they would be overwhelmed by the sheer complexity of factors (Yanow & Tsoukas, 2009). In tightly coupled systems, task responsibilities often remain clear due to dialogic coordination and on the spot sensemaking (Faraj & Xiao, 2006). Yet, even in tightly coupled systems, different meanings could be attributed to the current situation (Colville, Pye, & Carter, 2013) making it difficult to determine who is responsible for what. In loosely coupled systems, such as most multi-party

emergency response operations, task delegation could lead to a situation in which the commanding officer loses overview of which actor is responsible for performing which task (Maitlis & Christianson, 2014). As a result the accountability condition of integration is not met, increasing equivocality and the multitude of interpretations (Martin, 1992). Eventually this could lead to what Wolbers et al. (2018, p. 1538) call '*separate pockets of control'*, meaning different fragmented functional areas emerge when leaders try to regain control. Interdependencies between actors becomes unclear when this occurs. Yet sometimes this is necessary in order to be able to act and decide swiftly, without having to deliberate everything with other depended actors (Genschel, 1997; Lamont & Molnár, 2002; Wolbers, Boersma, & Groenewegen, 2018).

Sometimes crisis situations are characterised by an uncertainty of for example the nature of the threat and whether that is going to change. This leads to uncertainty on the safety of the situation, while safety is often the priority for first responders (Wolbers, Boersma, & Groenewegen, 2018). Yet, there is little time during emergencies to deliberate and fully make collective sense of the situation, since swift action is needed (Maitlis & Christianson, 2014). In these situations, actors *demarcate expertise.* Meaning those who have the expertise ascertain the responsibility to handle the situation. For example, in situations where a threat exists of a follow-up attack by terrorists, the police have the expertise and often assume responsibility as opposed to the fire department or the medical services. This practice decreases *common understanding* condition of integration, since other actors engaged in the emergency do not have the same information as the one who has expertise. This creates a knowledge boundary and increases the possibility for multiple interpretations (Martin, 1992), creating fragmented coordination and possibly also leading to separate pockets of control. Yet, demarcating expertise is often necessary in order to act swiftly without having to consult other actors (Wolbers, Boersma, & Groenewegen, 2018).

To sum up, the complexity of the crisis situation and the occurrence of unexpected events often causes a fragmented response coordination characterised by ambiguity and discontinuity. The iterative and continuous process of sensemaking occurs when actors try to make sense of these ambiguous environments by actively extracting and interpreting cues from the environment. This shows that the process of sensemaking is essentially interwoven into the process of coordination. Yet, as information discrepancies endure, collective sensemaking can break down, leading to a multiplicity of interpretations, which further fragments coordination efforts. Emergency services cope by practicing coordination in certain ways, such as working

around procedures, which causes the possibly already fragmented response operation to fragment further. This shows that during multi-party coordination in dynamic environments, integration is less feasible and fragmentation is the reality. Still, these practices are sometimes necessary to work effectively in such complex situations, meaning fragmentation is both unavoidable and sometimes even beneficial. The question beckons how emergency responders deal with the reality of the fragmentation in practice.

Chapter 3. Methodology

3.1 Case selection

This study will compare the coordination and sensemaking practices of the emergency response operation of two terrorist attacks that occurred in the United Kingdom from a fragmentation perspective: the *7/7 London bombings* in 2005 and *the Manchester Arena bombing* in 2017.

The theory section shows that inter-agency coordination and sensemaking could be very difficult in dynamic emergency type of situations. This research is focussed on the central theme about how first responders of two cases of emergency response operations after terrorist attacks deal with the fragmentation conditions of ambiguity and discontinuity. In order to meaningfully compare emergency response operations on the merit of how they coped with fragmentation conditions, it was necessary to set scope conditions that allowed comparisons to be made (Rohlfing, 2012).

The first scope condition was that both cases needed to feature emergency response operations of terrorist attacks in Europe. This scope conditions comes from the overarching research project that is focussed on fragmentation and how actors deal with it when looking at European terrorist attacks in modern history. The population of cases that fit in this scope is fairly large. Examples of attacks in Paris in 2015 (BBC, 2015), the attack in Norway in 2011 (Bye et al., 2019) and the attacks on the London and Westminster Bridge in London in 2017 (Anderson, 2017) are part of a wave of terrorism that has struck Europe in the past decades. Further scope conditions were needed to be able to pick two comparable cases.

The second scope condition features a further important part of the research question in that both cases needed to show clear signs of ambiguity and discontinuity. As shown the literature section, many first response efforts of terrorist attacks showed signs of ambiguity and discontinuity due to the complex nature of these incidents (Bye et al., 2019; Kendra & Wachtendorf, 2003).

The third scope condition was that both cases needed to be set in the same country. Using the same country means that the different branches of emergency services in both cases share similar ways or organising, professional cultures, experience and professional languages. This makes the cases well comparable in terms of comparing coordination and sensemaking practices, because analysis could now be focussed on the fragmentation issues instead of having to take into account the vastly different ways of organising and country specific cultures which would become apparent when comparing two cases from entirely different countries. The

specific country that was chosen is the United Kingdom, because various terrorist attacks took place in that country in modern history, meaning there were enough cases to choose from. At first, it was considered to compare the London and Westminster Bridge attacks and the Manchester Arena attack in 2017 (The Kerslake Report, 2017) after deliberations in the overarching research project. However, the London and Westminster Bridge attacks showed no clear sings of ambiguity and discontinuity during the emergency response. Therefore the London "7/7" attack in 2005 was chosen to compare to the Manchester Arena attack. These two cases did meet all the scope conditions, as is shown below.

The Manchester Arena bombing case shows examples of breakdown of collective sensemaking following in a lack of collaborative action. The attack featured a suicide bomb attack in the Foyer area of the Manchester Arena on 22 May 2017. First responders from the police and medical services were swiftly at the scene to provide aid. Yet, the fire department arrived two hours later at the scene, because they thought that the site was unsafe to enter due to the possibility of a secondary attack. This difference in interpretation and the delay of the fire department show that ambiguity and discontinuity were clearly present in this case (Chakraborti, 2018; The Kerslake Report, 2017).

The 7/7 London bombings was in itself a more complex situation than the Manchester Arena bombing. The reason for this is that the London bombings featured a series of bombs instead of one. In addition, the location of the blasts made the situation very ambiguous because they were underground. To make matters worse, one hour after the three explosions, a fourth bomb went off inside a bus on a busy square. This further increased the complexity of coordinating the response. One example that illustrates this added ambiguity is that the emergency services were for a long time under the impression that more than three bombs had exploded in the London Underground. The reason for this was that the bombs went off between separate stations, which meant that survivors started emerging from both ends of the tunnel, this led to various breakdowns of collective sensemaking and collaborative action throughout the morning. The medical services were for example in numerous occasions delayed (Greater London Authority, 2006; Hallet, 2011). This shows that the conditions of ambiguity and discontinuity that may trigger fragmentation were clearly present in this case as well.

Another reason why these particular cases were chosen relates to the notion that protocols could play an important role during emergency service operations. The United Kingdom has developed certain protocols to deal with so called Marauding Terrorist Firearm Attacks, after the brutal coordinated terrorist attack in Mumbai in 2008 (Chamberlain, 2008; D'Souza, 2019).

Specifically, the PLATO protocol was developed in response of this attack (The Kerslake Report, 2017). This protocol was in place and played an important role in the crisis response operation of the Manchester Arena bombing. Yet, this protocol did not exist during the crisis response operation of the 7/7 bombings. It is interesting to pinpoint the moments within the processes of coordination which show discontinuity and ambiguity and how the different partners dealt with these conditions for a case that has used extensive protocols and a case that lacks these protocols. In this way one could find out how the PLATO protocol might affect ways to deal with fragmentation.

3.2 Data collection

This exploratory comparative study uses secondary source data derived from incident reports, newspaper articles and scientific journals. These secondary sources were used to construct a detailed depiction of key moments during the emergency response processes of each case in order to reconstruct the crisis response operation of that day. The incident reports paint a rich picture of the events of each case. Rich enough to develop an accurate reconstruction of the response operation to analyse the response to conditions of fragmentation. The official investigations that led to the reports were conducted by independent research committees. In the case of Manchester, the Kerslake Report (2017) features an independent review of the events of the Manchester Arena bombing, commissioned by the mayor of Manchester. In the case of London, the Report of the 7 July Review Committee (2006) was tasked by Greater London Authority to *"identify the successes and failings of the response to the bombings"* (Greater London Authority, 2006, p. 1). For both cases, UK governmental reports are used to describe the various procedures and protocols of the crisis response operations that are part of the Joint Emergency Services Interoperability Principles (JESIP) (JESIP, 2016). In the case of Manchester, an important JESIP procedure was operation PLATO which is a protocol on how to deal with a Marauding Terrorist Firearms Attack (MTFA). The original JESIP MTFA document was not directly viewed due to it being classified.

In qualitative research, reliability is considered to be important aspect. Reliability in qualitative research is often described as the trustworthiness of the study (Seale, 1999). In this study, the reliability aspect comes down to the trustworthiness of the research reports that have been used to base the analysis on. The reliability of the reports is strong because they are both conducted by research committees who were independent from the emergency services. In addition, the researchers from both reports conducted a wide range of interviews with many first responders across all actors that were involved during the response operations. This means that their

judgements are based on valid sources and observations. Yet, it was still necessary to remain critical when collecting the data and to use other sources to crosscheck certain statements. In the case of Manchester, documentaries and interviews conducted outside the Kerslake research committee were used as sources to strengthen the trustworthiness of the data. Examples are the BBC documentary "the night of the bomb" (Phillips, & Roberts 2018), and an interview with the Chief Fire Officer, who was critical of the Kerslake report in that it blamed the fire department for its delay while he believed that the police was to blame (Chakraborti, 2018). In the case of London, several media outlets were used in a similar manner when applicable. In addition, a Coroner's Inquest report into the London 7/7 bombings (Hallet, 2011) also discusses various parts of the crisis response operations. This report was mainly used to crosscheck the data and to not be reliant on one source alone.

3.3 Data analysis

After collecting the data from the various reports, the data needed to be analysed to reconstruct if conditions of fragmentation were present. *Process tracing* was used as an exploratory method to perform this analysis of the two emergency response operations. Studies often focus on cause- effect relationships by singling out dependent and independent variables. This study focussed on the *process* of coordination during emergency response operations. In order to unravel such a process, a cause and effect strategy was not feasible, since cause and effect are difficult to single out in complex response operations that are likely to contain circular process traces. Instead, the goal was to unravel the flow of different coordination and sensemaking processes by reconstructing the course of events, choices and activities within a set time frame (Langley, 1999). The time frame that was focussed on in this study is essentially the time between the start of the crisis response operation (the attack) and the first moments of downscaling. In other words, it is the process between the start of the emergency and the end of the emergency. For the case of the Manchester Arena bombing, this means the time between the first police officers arriving at the scene to the eventual arrival and later downscaling of the fire department. In the case of the London 7/7 bombing, this means the time between the first noticing of the bombs towards all the scenes being cleared of injured people.

Various strategies to process tracing exist. Langley (1999) describes various strategies in terms of their *accuracy*, *simplicity* and *generality*. She states that strategies with higher accuracy are less general and simple, meaning they remain as true as possible to the raw data, yet sacrifice the possibility for the theory to be applicable to other situations. The simplicity in this aspect refers to the number of events and relationships in the theory. A simple theory might

explain something better than an overly complicated one (Langley, 1999). For a comparative case study with two cases, a balance between accuracy and generality is the best option. The reason being that it is both necessary to be able to be general in order to compare the two, and to be able to accurately describe the process in order to meet the goals of the study.

Therefore, several strategies of process tracing were used in this study. First of all, *Narrative Strategy* was used. Narrative Strategy means essentially that different storylines within the full process are accurately reconstructed and compared. Langley (1999) mentions that Narrative Strategy generally serves two separate goals for researchers depending on the objective of the study. First, for mainly naturalistic studies the narrative description of the full process in all its complexity and detail is the goal of the research (Lincoln & Guba, 1985). Secondly, narrative stagey is used by other studies to chronically structure the data in order to reconstruct the process. The strategy is mainly used in this approach as a preparatory step before analysis could begin instead of the reconstruction being the end product (Langley, 1999). The second approach has been used in this study. This means that narrative strategy was used as a structuring method of the raw data derived from the incident reports. The process of each case was chronically reconstructed by describing the main events in detail, mainly focussed on different storylines that describe the actions of the three key emergency services: the police, medical services and the fire department[2]. The use of narrative strategy has increased the accuracy of this study.

In addition to an accurate reconstruction, a timeline of major events was created before the full reconstruction of events in order to already have a sense of the chronical events of the processes. These timelines now serve as a visual representation of the emergency response processes and are viewed in the reconstruction sections.

As a second step after the narrative reconstruction, *temporal bracketing* was used to analyse the processes. Temporal bracketing means that a process is chronologically structured and divided in phases or 'brackets' in which moments and events during the process are depicted. On the borders of the brackets certain events occur that create discontinuity while within the brackets a certain continuity can be observed. Qualitative data was structured in this way in which the necessary events, triggers and activities became visible. Using multiple strategies like this means that the process tracing analysis is both accurate enough to depict the process properly and general enough to be able to compare the two cases (Langley, 1999). In

[2] The reconstructions can be viewed in appendix 1 and 2.

this way a coordination process during emergency response was depicted and analysed by pinpointing moments where fragmentation conditions become apparent and how actions of different partners reacting to these moments were viewed.

Dividing the processes in phases provided the opportunity to delve deep into certain events in order to uncover fragmentation conditions and how actors dealt with them. In practice this meant that three phases of the coordination process were selected per case on the basis of the reconstruction and were analysed in depth. These phases were selected by coding the full reconstruction on the basis of the themes of this study. This made clear at which points the vital moments within the processes of each case resided and which moments required further analysis. In these phases, several conditions of fragmentation during the crisis response process became clear.

3.4 Operationalisation

The analysis was based on the themes and concepts of this study. As mentioned in chapter 3, the main themes of the study were *Coordination* and *Sensemaking* because these two themes are embedded in the fragmentation perspective. The concept of sensemaking is interwoven in the concept of coordination, since during the coordination process actors are constantly trying to make sense of the situation (Colville, Pye, & Carter, 2013; Weick, 1995). Yet, they have been separated in the coding scheme (Table 1) in order to create a structured analysis system. A few subthemes have been identified through which the analysis took place. Analysing emergency response processes through these subthemes, or 'indicators' eventually showed the conditions of fragmentation during the operation and it showed how these actors have dealt with these conditions. A coding scheme was created from these indicators, which is viewed in Table 1. Using a structured analysis like this made it possible to analyse both cases in exactly the same manner. The indicators are defined at it is shown how they are coded in the next paragraphs. Using a consistent operationalisation is important because it increases the measurement validity of the study (Neuman, 2014). In this way, indicators derived from theory are defined in order to make sure that the same type of event is measured with each indicator between the two cases. Yet, this being an exploratory study, other practices may come up than those derived from theory. It was therefore important to leave room for these other practices.

Atlas.ti was used to code the data using the coding scheme from Table 2. The motivations of using these indicators is given below.

Table 1: Coding Scheme

Themes	**Code**
Coordination	
Working around procedures	WaP
Demarcating expertise	DE
Delegating tasks	DT
Separate pockets of control	SPoC
Discontinuity	Disc
Other practices	OP
Sensemaking	
Extracting cues	Ext C
Interpreting cues	Int C
Multiplicity of interpretations	MoI
Collective sensemaking	Col S

3.4.1 Coordination

Three themes under the coordination theme, *working around procedures, demarcating expertise* and *delegating tasks* are indicators of coordination practices actors may undertake when they are faced with fragmentation (Wolbers, Boersma, & Groenewegen, 2018).

Working around procedures refers to the coordination practice that actors deviate from procedures when they are faced with an ambiguous situation where the procedures or protocols are insufficient for the unfolding reality (Faraj & Xiao, 2006; Wolbers, Boersma, & Groenewegen, 2018). *Working around procedures* was not used an indicator in this study to indicate moments where actors unknowingly fail to follow their procedures. Instead the indicator was used in this study when it was clear that an actor had deliberately deviated from the predesigned procedure or that an actor had broken from the procedure altogether as a reaction to the procedure not fitting the reality of the situation. A section of the reconstruction was for example coded with "WaP" when the police commander chose to not evacuate the medical services at the scene of the Manchester Arena bombing and in doing so he was working around the PLATO protocol. In addition, moments of deviation from expected workflow such as improvisation were coded with "WaP" as well, because they too show signs of deviating from predetermined procedures.

Demarcating expertise refers to the coordination practice of ascertaining the responsibility of the situation of the actor that has specific expertise when faced with a situation where swift decision making is necessary. This could for example occur where the nature of the threat and whether that is going to change is ambiguous (Wolbers, Boersma, & Groenewegen, 2018). This specific practice was not coded in the reconstruction because there was no clear mention of its occurrence in the data.

Delegating tasks is a practice of coordination that occurs when incident commanders are faced with such complexity and ambiguity that they tend to delegate tasks in order to be free of the specifics and are able to ascertain situational understanding (Wolbers, Boersma, & Groenewegen, 2018). This specific practice was not coded in the reconstruction because there was no clear mention of its occurrence in the data.

This exploratory study is partly focussed on finding out how actors have dealt with fragmentation. Therefore, the results may show *other practices* of dealing with fragmentation conditions than those mentioned in the body of knowledge section. These were for example moments in which actors stuck to procedures when faced with ambiguity instead of working around them. It was necessary to have this code due to the explorative nature of the study and the novelty of the fragmentation literature. For these reasons it was always possible to find practices that were not explicitly mentioned in the literature.

Separate pockets of control refers to a situation in which different fragmented functional areas have emerged. This means that pockets of actors are essentially conducting their own operation without knowing what other pockets are doing. These pockets are not coordinating their actions nor sharing information with other pockets (Lamont & Molnár, 2002; Wolbers, Boersma, & Groenewegen, 2018). A section of the reconstruction was coded wit “SPoC” when it was clear that functional or knowledge boundaries had emerged between actors. The code was given when pockets of control had emerged that did not share information nor tried to coordinate their efforts. For example: the code was given to a section of the reconstruction where the police commander failed to share his declaration of PLATO with other services, creating a knowledge boundary, and as such was solely focussed on police operations, creating a functional boundary.

Discontinuity is added as an indicator due to it being one of the fragmentation conditions. The code is given when an actor has discontinued its contribution to the operation. A portion of the reconstruction was for example coded with *‘Disc’* when ambulances were

unable to attend to one of the bomb sites during the London 7/7 bombings. Another example is a section of the reconstruction when local fire crews were to stand down because their pre-alert had expired during the Manchester Arena bombing.

3.4.2 Sensemaking

Sensemaking is described to be an important process of fragmentation, since fragmentation itself boils down to a breakdown of collective sensemaking and action (Wolbers, Boersma, & Groenewegen, 2018). Sensemaking is a process of extracting and interpreting cues from the environment in order to understand what is going on by actively making sense of these cues (Brown, Colville, & Pye, 2015; Maitlis & Christianson, 2014; Weick, 1995). Analysing how actors made continuous sense of the situation during the operations is done by identifying the cues they *extracted* and how they *interpreted* these cues to form a frame of what was going on. Therefore *extracting* and *interpreting cues* are vital indicators for the sensemaking theme.

Extracting cues as a code was essentially given to every bit of information an actor received about the nature of the situation. Examples are that reports or emergency calls came in during the London 7/7 bombing that "smoke was rising from the tunnel", or that "explosions were heard".

Interpreting cues is essentially the process of linking cues to a frame of reference (Brown, Colville, & Pye, 2015; Maitlis & Christianson, 2014; Weick, 1995). The cue was given to a section of the reconstruction when it was clear that an actor had constructed a frame of understanding, or that he had linked extracted cues to a frame of understanding. To use the same example: the extracted cues on smoke rising from the tunnel and the sound of explosions were interpreted by the fire department as that there was a fire or some sort of explosion inside the underground tunnel.

Multiplicity of interpretations could be viewed as an embodiment of ambiguity and a result of different sensemaking processes. When multiple actors during the coordination process have different interpretations of the situation, fragmentation is present and separate pockets of control are likely to emerge (Martin, 1992). It is important as an indicator for the analysis because it essentially shows sensemaking breakdowns. The code is given when different actors clearly have a different picture of the situation. The difference with separate pockets of control is that it is not yet clear that separate functional areas have emerged. *Multiplicity of interpretations* only means that actors have attributed different meanings to the nature of the situation. A section of the reconstruction of the Manchester Arena bombing was

for example coded with “MoI” when the fire department was still under the impression that a firearm terrorist attack was occurring while the other services knew that that was not the case.

Collective sensemaking is the effort of multiple parties to produce a shared understanding of the situation and of the coordinated action that is to be taken (Maitlis & Sonensheim, 2010). Collective sensemaking as an indicator views moments in which actors attempt to collectively make sense of the situation and lessen ambiguity. Essentially, it is a way to deal with a multiplicity of interpretations and thus deal with fragmentation conditions. A section in the reconstruction of the Manchester Arena bombing was for example coded with “Col S” when the medical and police commanders at the scene of the blast started to initiate on scene talks in order to come to a shared understanding of the situation.

3.5 Discussion of limitations

This exploratory comparative case study has focussed on two cases of emergency response operations that occurred in Britain. Having only two cases provided the opportunity for in depth analysis, which improved the accuracy of the study. Exploratory process tracing was used because the goal was to unravel a process by looking at certain events, choices and activities within a set time frame (Langley, 1999). Using multiple process tracing strategies like narrative strategy and temporal bracketing provided the opportunity for an accurate depiction of events (Langley, 1999). Though, every research is not without its limitations (Neuman, 2014).

An important limitation of the study is the sole use of secondary sources. Although the incident reports were rich enough to be able to reconstruct and analyse, primary sources would have provided an extra layer of depth in that certain knowledge gaps could have been filled, yielding more precise and rigorous results. Still, the scope of the study was limited and time constraints limited the opportunity for the number of in-depth interviews that would have been needed to make a meaningful contribution to the already fairly rich data. Another limitation is related to the choice for consistency of focusing on one country. Focussing on two cases that occurred in one country means that the results will be less generalizable to the particularities of other response systems. In addition, each crisis is complex and different, because they for example occur in different countries or feature different emergency needs. This means that a typical case does not exist when researching crises, making it difficult to relate the outcomes to other case studies. Still, coordinators of emergency response efforts usually need to cope with similar issues of ambiguity and discontinuity (Wolbers, Boersma, & Groenewegen, 2018). Therefore, accurate results make comparisons between other cases possible when scoping a

study to focus on these conditions and how actors deal with them. It should also be noted that this study is part of a larger research project on the phenomenon of fragmentation, thusly, the findings will be valuable to a wider audience since it will be combined with results from similar studies on other cases at later stages.

Chapter 4: Results

In this chapter, both cases are analysed on the basis of the themes and concepts from the Body of Knowledge section. The chapter is structured in the following way: first a summary is given of the emergency service operation of each case which is derived from the full reconstruction of each case; hereafter, three phenomenon of each case are analysed in depth. A full reconstruction of events of both cases can be found in appendix 1 and 2.

4.1 The Manchester Arena bombing

4.1.1 Operation summary

The Manchester Arena bombing occurred on 22 May 2019 at 22:31 local time when Salman Ramadan Abedi detonated a self-made bomb amidst a crowd of people who were leaving a concert by Ariana Grande. The attack occurred in the 'City Room', or 'Foyer', which is located just outside the Manchester Arena and starts a pathway to Victoria Station. Around that time the concert was at its end and the Foyer was busy with departing visitors, waiting relatives and merchandise sellers. Twenty-three people died from the explosion, including the attacker. A further 139 were physically injured and many more suffered severe psychological and emotional trauma (The Kerslake Report, 2017).

The emergency response to the incident started immediately as officers from the British Transport Police (BTP) who heard the explosion rushed towards the scene to find the numerous injured and deceased victims of the bombing attack. Initial reports of the first BTP officers mentioned that a 'nuts and bolts' bomb had exploded and that the injuries were referred to as 'large holes' (Phillips, & Roberts 2018). The BTP sergeant who had initial command did consider the possibility of a secondary attack, yet he chose not to evacuate the BTP officers due to the many injured people who needed first aid (Phillips, & Roberts 2018).

Not much later the first armed Greater Manchester Police (GMP) officers arrived and the assigned Force Duty Officer (FDO), who was in overall command of police operations,

quickly followed. Soon hereafter, the Force Duty Officer declared a protocol called: "operation PLATO", in order to deal with a terrorist incident (The Kerslake Report, 2017).

Meanwhile, medical personnel from the North West Ambulance Service (NWAS) were assessing the injuries and were setting up a casualty clearing station on the concourse of Victoria Station. It was decided that the injured should be evacuated from the Foyer towards the casualty clearing station (Greater Manchester Combined Authority, 2018). The evacuation process began according to the seriousness of the injuries (The Kerslake Report, 2017, p. 87). The fire department could have played a major role in assisting the evacuation process, yet, they arrived at the scene two hours after the blast occurred and had no role to play in the first hours.

4.1.2 Analysis

Three vital phases have been identified in the reconstruction of the Manchester Arena bombing's emergency response operation that feature conditions of fragmentation and how actors dealt with them. The full reconstruction can be viewed in appendix 1. These will be analysed in depth on the basis of the main theories on sensemaking, coordination and fragmentation. The phases essentially show the most vital courses of events during the operations of the police, the medical services and the fire department. The phases are identified as:

- Declaration of operation PLATO
- Casualty evacuation
- Late arrival of the fire department

- *Declaration of operation PLATO*

The police control room was alerted at 22:33 and they assigned a Force Duty Officer. At this point, it was unclear for the FDO what had happened or was happening at the scene. The GMP officers at the scene provided him with two major cues that contributed to the FDO's sensemaking process. These were that an improvised explosive device had detonated and that some injuries seemed to have been inflicted by gunshots.

The FDO interpreted these cues and constructed a frame of reference that an attack with explosives and a Marauding Terrorist Firearm Attack (MTFA) was possibly taking place. It is likely that he constructed this frame due to recognition of past events that featured these types

of attacks (e.g. Mumbai 2008 and Paris 2015). Due to the number of citizens still in the area and the potential danger for them, he believed that the site of the incident was a 'hot zone' (The Kerslake Report, 2017, p. 66). In line with the Joint Emergency Services Interoperability Principles (JESIP) when such an attack is possibly taking place, the FDO declared operation PLATO at 22:47. PLATO gave the FDO the authority to ascertain support from other armed police, national counter terrorism groups and the military.

The JESIP procedures with regard to PLATO[3] indicate that emergency services in the event of a Marauding Terrorist Firearm Attack should operate in a so called 'hot', 'warm' and 'cold' zone structure. The hot zone is the area in which terrorist are active. Specially trained armed personnel are the only ones who go into the hot zone to apprehend the terrorists. The warm zone is an area that has no active terrorist presence, yet absolute safety cannot be guaranteed and a threat still remains. Non-police first responders with protective gear are allowed to work in a warm zone. The cold zone is the area where no terrorism threat is present. In addition, all emergency services are to be notified of the declaration of PLATO (The Kerslake Report, 2017, p. 27).

This is where signs of a fragmented response become clear, because he did not share this declaration with the medical and fire services. This meant that common understanding condition of integrated coordination was not uphold, not to mention that it was against PLATO protocol not to share. This created a separate pocket of control around the FDO, since separate functional area around him had emerged in which he was only working on police manners. Yet, this separate pocket of control made it possible to decide swiftly without having to consult other services. In this way he could quickly ascertain additional policing capabilities to deal with the perceived threat. Still, as a consequence of not sharing, a knowledge boundary was created because the other services were not aware of PLATO, meaning ambiguity for the NWAS and the fire department remained.

PLATO protocols imply that the now designated hot zone should be evacuated from all non-specialised personnel due to the danger of an active attacker. The FDO needed to decide whether to evacuate actively working medical and unarmed police units, and in doing so denying many injured people first aid; or to let the responders continue their operations. His perception of the situation had changed in the meantime. He extracted and interpreted a further

[3] The original JESIP Marauding Terrorist Firearms Attack (MTFA) document is classified. Fortunately the Kerslake researchers were able to view them.

two cues that made him believe that the threat of a follow-up attack was not as severe as he had initially believed. These were that enough armed police officers were at the scene to reduce the threat of a Marauding Terrorist Firearm Attack and that bomb searching dogs were deployed, which reduced the risk for the presence of a concealed second bomb (The Kerslake Report, 2017, p. 67). This change in perception was essentially a consequence of the actions the Force Duty Officer had previously undertaken, such as deploying search dogs and additional firearm teams. This made him decide to work around the PLATO procedure and let the first responders in place.

Around 23:23 a tactical firearm commander relieved the FDO of his command at the scene. The new commander shared the FDO's perception of the scene and continued to let emergency services work. He decided that the Arena could be seen as a 'warm zone' since there was clearly not an ongoing attack (The Kerslake Report, 2017, p. 70). He started to initiate on scene inter-agency talks between tactical and operational commanders from the police and medical services. This a clear attempt at collective sensemaking through inter-agency talks. At 00:15, during one of these talks he informed the NWAS commander about an adapted form of PLATO, so called PLATO on stand-by. This did not have an immediate effect on the continuity of the operation, yet it was now clear that the protocol could be fully reinstated if a further threat materialized. This meant that the medical services were aware of the possibility of an evacuation. Fortunately, this did not occur (The Kerslake Report, 2017, p. 72).

- *Casualty evacuation*

The North West Ambulance Service (NWAS) received a wide range of initial cues on the nature of the incident. First reports ranged from 'gunshots' to 'speakers exploding'. In reaction to those cues, ambulances were mobilised. An Advanced Paramedic soon after the bomb exploded self-deployed to the scene, where he started to extract and interpret cues and report his findings to the NWAS control room. He was told by a BTP officer that a suicide bomb had exploded (The Kerslake Report, 2017, p. 85). The presence of an Advanced Paramedic at the scene greatly contributed to the sensemaking process of the NWAS.

When ambulances started arriving, a casualty clearing point was set up at the concourse of Victoria Station. In the Foyer it was decided between the NWAS, BTP and GMP that casualties were needed to be evacuated from the scene and first aid could not continue there. Although the FDO had not shared his perceptions and the declaration of PLATO, all services shared the fear of a secondary attack due to the mixed reports and on the scene talks between medical and

police personnel (Greater Manchester Combined Authority, 2018). In addition, there were concerns about the structural state of the building after the blast. These cues made it clear to the NWAS that an evacuation of injured was necessary. However, the fire departments expertise and material for evacuating injured could not be used because they were not at the scene, this meant that there were little stretchers available. The local crews adapted and an ad hoc coalition of NWAS personnel unarmed police officers, members of the public and Arena personnel formed around this specific task. They came up with creative solutions for transportation as improvised stretchers such as advertisement boards and crowd barriers were used to move the injured. This emergent coordination effort then proceeded to evacuate the injured in accordance to the seriousness of their injuries (The Kerslake Report, 2017, p. 87).

The majority of NWAS paramedics remained at the concourse rather than in the Foyer. This may have been concerning for the injured since there were only a few paramedics as far as they could see. However, the evacuation was the priority as of now. Which gave the NWAS paramedics at the concourse room for advanced treatment close to where the ambulances were coming and going. In addition, according to a GMP inspector, coordination went well and no further assistance was necessary (The Kerslake Report, 2017, p. 69). This statement contradicts the fact of the situation in that the fire department could have assisted the evacuation effort in an effective manner. This is an indication that the different actors were not completely aware of each other's capabilities.

- *Late arrival of Fire Department*

There is a vast difference between the number of cues coming directly from the incident that the Greater Manchester Fire and Rescue Service (GMFRS) received compared to the cues the other two services received, due to 999 calls being mostly directed to the other agencies. This meant that the GMFRS could only interpret cues passed to them by partner agencies, which were scarce as well. They were notified of an explosion at the Arena during an unrelated conversation with the GMP. As result, the GMFRS control room started to initiate their 'BOMB' protocols. Which meant that a Duty National Inter-Agency Liaison Officer (NILO) was to be notified and an inter-agency rendezvous point was to be established (The Kerslake Report, 2017, p. 94). The control room was so busy with initiating this protocol that they missed a pre-alert, which was automated when one citizen called 999. As a consequence, the fire units who were already mobilising from the Manchester Central Fire station were to stand down due to the pre-alert being expired (The Kerslake Report, 2017, p. 95). This shows that protocols

hindered a quick response from local fire units, due to the control room focusing their effort on following a protocol and the local fire units, who heard the explosion, followed automated procedures in that they were to stand down. Strictly following procedures meant that these fire units were unable to self-deploy without a formal order from the control room. Contrary, a NWAS advanced paramedic was able to self-deploy to the scene (Greater Manchester Combined Authority, 2018). In addition, a large portion of the first British Transport Police officers also self-deployed from their offices nearby because they heard the explosion (The Kerslake Report, 2017, p. 63). This shows a sharp contrast between the strictness and discipline in following procedure between the fire department and the other two services.

At 22:41 the duty NILO was notified. He received a few cues on the nature of the incident in that an explosion had occurred at the Arena and that there was much uncertainty on its nature. He also received a cue that the GMP had reported that injuries seemed to be inflicted by a gun and the possibility of an active shooter. One minute later, the control room received an update that the wounds were in fact caused by shrapnel. They tried to contact the NILO, yet could not reach him and update him about this new understanding of the situation. This moment was essential in the sensemaking process of the NILO, who did not receive the update, and kept under the impression that a Marauding Terrorist Firearm Attack was taking place (The Kerslake Report, 2017, p. 96). The NILO started to travel towards the GMFRS rendezvous point while trying to coordinate the response. Although he did not know for sure whether PLATO had been declared, he interpreted the information he had at that point and assumed that a Marauding Terrorist Firearm Attack was taking place and started to follow the PLATO protocol (The Kerslake Report, 2017, p. 95). He ordered the previously mobilising units at Manchester Central Fire Station to retreat outside the 500 meter exclusion zone as mentioned in the PLATO protocols. In addition, the GMP assigned inter-agency rendezvous point was inside the 500 meter zone. The NILO, being surprised by this, tried to contact the FDO, yet could not reach him. In the mind of the NILO the rendezvous point was unsafe and a new GMFRS rendezvous point at Phillips Park station was designated (The Kerslake Report, 2017, p. 95).

This shows how the PLATO procedures hindered a swift response from the fire department, because the local units were told to retreat and the inter-agency rendezvous point was ignored, limiting the possibility of gathering more cues about the incident and resulting in discontinuity. A lack of cues and action ambiguity in that the NILO was not sure that the site was safe led the NILO to take precautionary steps to ensure the safety of his men. His way of dealing with conditions of fragmentation turned out to be to hold on to the familiar protocols,

namely: the PLATO protocol. This shaped the image in his mind that the 500 meter zone around the incident location was not to be accessed. If he had gone towards the inter-agency rendezvous point, he would have come across other services which would greatly increase his situational awareness. It should be noted that a lack of inter-agency radio and communicational issues between the services also contributed to this situation (The Kerslake Report, 2017, p. 96).

At 23:40, the Duty NILO and two further NILOs and fire units rendezvoused at Phillips Park station. One of the NILOs contacted the Chief Fire Officer, who was in overall command. This was the first time that this occurred. As a result of the call, the group headed towards Manchester Central Fire station. Here they saw NWAS personnel going to and from the scene without protective gear. These cues provided a contrasting image to what they believed what was going on. Meanwhile at 00:12, the Chief Fire Officer called a medical bronze officer he knew well about the assistance the fire department could provide at the scene. This provided him with the knowledge that normal fire units would be safe to go towards the scene, and he ordered them to do so. Yet, the NILOs were still under the impression that the scene was unsafe. A multiplicity of interpretations inside the GMFRS had developed, because the Chief Fire Officer did not share the new cues he extracted from the medical bronze officer with the NILOs. The NILOs thought only specially trained units could go, yet normal units were ordered and they arrived at Victoria Station at 00:37 (The Kerslake Report, 2017, p. 173).

The Chief Fire Officer noted in an interview reacting to the Kerslake report that the police was to blame for not updating the GMFRS of the ongoing situation and were therefore delayed (Chakraborti, 2018). Contrary, the Kerslake researchers note that the fire department could have been more proactive in gathering cues themselves (The Kerslake Report, 2017). This discussion, also in the aftermath of the response, clearly shows that sensemaking mishaps from the Duty NILO and the existence of the PLATO protocol played major parts in the delay of the fire department. The Duty NILO had built a frame of a Marauding Terrorist Firearm Attack which prevented the fire department from going to the scene. He was unable to deviate from this frame even when confronted with alternate cues, such as that the ambulances did go to the scene and that the inter-agency rendezvous point was designated inside the 500 meter exclusion zone. A breakdown of sensemaking would have been necessary in this instance in order to break with the frame of the MTFA and construct a new frame on the basis of the alternate cues. Still, the GMP could have made clear that PLATO had been declared, even in its adapted form. This would have greatly increase common understanding and could have possibly prevented such a lengthy delay of the fire department.

4.1.3 Sub conclusion

The results have shown that the Manchester Arena bombing featured ambiguity and discontinuity throughout the emergency response operation. The initial extracted cues on the reported gunshot wounds would turn out to be a deciding factor for the continuous emergency response on that night. The police, the medical services and the fire department all had different ways of dealing with the fragmentation conditions. The police was rather pragmatic, since they built a frame from the extracted cues, declared the PLATO protocol fitting that frame and immediately adapted the protocol and started to work around the protocol in order to continue operations when their frame had shifted. Not sharing the declaration of PLATO caused a knowledge boundary between the services. Still, even in the face of this added ambiguity, the medical services continued their operations, although they did decide to set up a casualty clearing point just outside the Arena for safety reasons. Their presence at the scene provided them with the vital cues that made them believe the site was safe enough to operate. Contrary, the fire department, who were not at the scene, built a frame around the possibility of a Marauding Terrorist Firearm attack. In the face of ambiguity, they started to rigidly stick with the familiar PLATO protocol. Their inability to deviate from this constructed frame hindered their ability to extract the right cues on the incident and break from this frame, because they remained outside the 500 meter exclusion zone. The vital cues that would have caused the necessary breakdown of sensemaking would have been extracted when they would have gone towards the inter-agency rendezvous point from the start.

4.2 London 7/7 bombings

4.2.1 Operation summary

On 7 July 2005, at 8:50 in the morning, three bombs were detonated in short succession inside three different London Underground trains. The first bomb exploded inside a number 204 Circle Line train when it was traveling eastbound between Liverpool Street station and Aldgate station. The second bomb exploded in a number 216 Circle Line train which was traveling westbound from Edgware Road towards Paddington. This train had just left Edgware Road when the bomb was detonated. Approximately two minutes later, a third bomb exploded inside a number 311 Piccadilly Line train when it was traveling southbound between King's Cross station and Russel Square station. At 9:47 in the morning, a fourth bomb exploded on the top deck of a number 30 double decker bus when it just arrived at Tavistock Square. The attacks of the day resulted in 52 fatalities and over 700 injured (Greater London Authority, 2006; Hallet, 2011).

During the first minutes after the explosions, it was very unclear what had happened. The explosions occurred underground, which meant that they were not immediately detected by anyone above ground. In addition, multiple reports were made to the London Underground Network Control Centre, the media and emergency services. Reports of loud bangs, a derailed train, a person being hit by a train and smoke rising from tunnel were among the first pieces of information hinting at what had happened. At 8:59 the London Underground Network Control Centre made a call to all emergency services to attend to Edgware Road, Aldgate and King's Cross on the basis of the initial reports from London Underground workers (Greater London Authority, 2006, p. 29). Around 9:15, it became clear that there had been explosions, yet the scale, cause and exact locations were still unclear. Around this time the first alert system was activated, which is a conference call between the emergency service and transport service control rooms. It was decided at 9:15 to declare a network emergency and to evacuate the entire underground network (Greater London Authority, 2006, p. 38).

For a long time, it was believed by the emergency services that there had been up to six explosions. At 11:15 the first press conference by the Metropolitan Police Service (MPS) commissioner mentioned six explosions. Five of which were believed to have been inside the London Underground, which meant that they responded to five different London Underground locations. This was due the location of two blasts being between two underground stations. Reports, 999 calls and victims would come from both of the stations, making emergency services believe there had been four incident sites instead of two (Greater London Authority, 2006).

The analysis on the emergency service operation of the London 7/7 bombing is based on a full reconstruction, which can be viewed in appendix 2. The analysis is structured on the basis of three subjects, namely:

- *Initial ambiguity*
- *Medical response at Russel Square and Tavistock Square*
- *Gold Coordinating Group and communication difficulties*

4.2.2 Analysis

Initial ambiguity

As mentioned, the early stages of the operation were very ambiguous on the nature and location of the incidents. Normally during a large-scale emergency, the bulk of initial cues on what has occurred are extracted from 999 calls. These calls are then compared and interpreted and a

picture is built of the situation in order to make sense of what has happened (Greater London Authority, 2006, p. 13). During the morning of 7 July 2005, very few 999 calls were made. Nobody saw the actual explosions above ground and those who were in the trains had no way to contact the emergency services or underground personnel.

The London Underground control room requested attendance of emergency services at Edgware Road, Aldgate and King's Cross after interpreting cues sent to them by their personnel who were often the first people to notice the incidents. This did not come through, since the services did not mobilise towards these stations immediately and were only mobilised after 999 calls from members of the public in and around underground stations.

The London Fire Brigade (LFB) for example quickly extracted and interpreted cues at Aldgate, where the first bomb exploded, and knew that an explosion had occurred. This was mainly due to a 999 call from a citizen who reported an explosion and fire. The other services received more vague reports such as 'loud bangs' and 'dust in the air'. Yet, the LFB did not share their initial assessment with the other services. This could have led to a multiplicity of interpretations on what was going on, however the other services later found out for themselves (Greater London Authority, 2006). This shows that the services were not coordinating in an integrated manner. Another sign that shows this, is that all the emergency services declared major incidents at each site separately. One would assume that the first declaration of a major incident automatically puts in place the major incident procedures for all emergency services (Greater London Authority, 2006, p. 39). Yet, each emergency service extracted and interpreted cues separately and acted upon them by declaring a major incident separately. This occurred at most the incidents sites that day, showing that separate pockets of control were not only coming into being as the operation unfolded, but were in fact there from the start.

The second explosion at Edgware Road was first noticed by a member of the public at Praed Street, who called the London Fire Brigade (LFB). This cue was interpreted by the LFB that an explosion had occurred on that street, which turned out not to be the case. This resulted in discontinuity for these units for a while, since they stayed on that street trying to extract cues on what had happened. They were soon told by the LFB control room to head towards Edgware Road, yet one fire engine remained on the wrong street for half an hour (Greater London Authority, 2006, p. 29; Hallet, 2011, p. 30). This clearly shows signs of ambiguity leading to discontinuity since the fire units were confronted with a situation that did not match their perceptions and it became unclear what their next actions should be and what the consequences might be for those actions, resulting in discontinuity for a while.

Medical response at Russel Square and Tavistock Square

The third bomb exploded between King's Cross and Russel Square. This particular site became very isolated as a consequence of the explosion. Therefore it took a long time before the first cues about the incident were extracted. The first cues were from a 999 call about smoke rising from the tunnel at King's Cross. A few ambulances did go towards King's Cross around 9:05 and one went towards Russel Square. The latter was actually the station which was the closest to the location of the blast and here most of the walking wounded started to come out of the tunnel. MPS and London Ambulance Service (LAS) crews who were already at the scene requested ambulances multiple times during the morning for this site. Yet, it took until 11:00 before a sufficient amount of ambulances started arriving (Greater London Authority, 2006, p. 53; Hallet, 2011, p. 32).

The reason for the delay of ambulances was that ambulances destined for the Tavistock Square site and the Russel Square site were directed towards the same rendezvous point on a road nearby both of the sites. Tavistock Square was perceived to be a more severe attack by the medical personnel who were directing the ambulances at the rendezvous point onwards. The devastation of the scene was directly visible, since the bomb detonated above ground in the middle of a crowded square as opposed to beneath the surface in the middle of a tunnel (Greater London Authority, 2006, p. 53). For the medical teams at the rendezvous point there was much uncertainty on the incidents in the underground, yet the Tavistock Square site was much more obvious. The abundance of cues on the severity of the Tavistock Square site constructed a frame for the medical teams at the rendezvous point that that site was in need of more ambulances. This caused a multiplicity of interpretations between the crews at the LAS rendezvous point and the crews working at the scene of Russel Square.

As a result, all the ambulances coming to the rendezvous point were sent towards Tavistock Square, leading to a discontinuity of LAS operations at Russel Square. In other words, Tavistock Square had an abundance of ambulances and Russel Square had far too little. In addition, communication difficulties between the crews on the ground, the control rooms and between the scenes made it difficult to find out why these ambulances were not coming. At 11:00 it was finally realised by the London Ambulance Service that this was happening, the frames switched and an improvised system of runners was set up to communicate between the scenes in order to lessen ambiguity and attempt collective sensemaking. This shows that the crews deviated from normal workflows in order to adapt to the new situation. Hereafter ambulances finally started to arrive at Russel Square (Greater London Authority, 2006, p. 53).

Gold coordinating group and communication difficulties

Strategic inter-agency coordination was managed at the gold coordinating group. Each branch would have its strategic representative in the group. "Gold" in this context refers to strategic command, whereas "silver" refers to tactical and "bronze" refers to operational command (HM Government, 2013). The MPS Gold commander had overall command of the operations that day. Various communication issues occurred during the morning. Different radio systems were failing and mobile phones were not working. A consequence of this becomes clear in a quote from a London Fire Brigade (LFB) de-briefing report: *"Incident Commanders felt isolated as they were unable to get information about the other incidents from Gold Support, as mobile phones were not working"* (Greater London Authority, 2006, p. 43). This meant that the operational commanders at each site had no way to extract cues on the wider ongoing operation and lacked strategic support to lessen this ambiguity. Another example of communication difficulties is that the LFB was unable communicate between their first responders in the tunnel at King's Cross and the command module on the surface. To deal with these issues, an improvised system of runners was used between the underground and the surface. This shows how the LFB tried to overcome unexpected communication difficulties by improvisation in order to preserve continuity. All services experienced similar issues throughout the morning.

The London Ambulance Service (LAS) requested from Gold Command to activate the Access Overload Control system (ACCOLC), which is a system designed to limit a mobile phone network in a specific area to emergency service personnel. Gold Command decided not to activate this system. Their reasoning being that it could cause public panic and it was unclear which incident commanders were in the possession of ACCOLC phones (Greater London Authority, 2006, p. 44).

The City of London Police (CLP) had communication issues because they mainly used mobile phones as a means of communication and the network was overloaded. The commanding officers found it increasingly difficult to communicate with units on the ground at Aldgate as the operation progressed. Therefore, CLP decided to initiate the Access Overload Control (ACCOLC) system for the O2 network at 12:00, for a 1 kilometre radius around Aldgate (Greater London Authority, 2006, p. 45; Hallet, 2011, p. 33). This decision went against the gold command decision not to initiate ACCOLC (Greater London Authority, 2006, p. 44). This clearly shows that a multiplicity of interpretations had emerged during the operation, because the CLP Commissioner who initiated ACCOLC had no knowledge of the decision by Gold Command. A separate pocket of control around CLP had emerged because

they were isolated and experienced action ambiguity due to their communication issues during their response at Aldgate. In order to regain control they decided to initiate a system that affected all local emergency services and the public around the Aldgate site. Essentially working on their own behalf.

4.2.3 Sub conclusion

During the London 7/7 bombings, there was a lot of ambiguity from the start due to the locations of the bombs as being underground, which meant that very few initial cues on the incident were extracted by the police, medical services and fire department. In spite of this, emergency services went towards the scenes and started to extract and interpret cues in order to construct their situational understanding. Due to these actions, they were able to construct a frame of understanding that bombs had exploded inside the underground tunnels. Still, a lack of inter-agency communication, communication between the scenes and between operational and strategic command hindered attempts at collective sensemaking and caused separate pockets of control in that the services were constructing their frames separately without sharing cues. In addition, at the scenes, incident commanders felt isolated as they had no idea what was going on at the other incident sites. This meant that distributing recourses evenly between the scenes was difficult, which led to numerous delays for the medical services. This shows that coordination during the 7/7 bombings was very fragmented as opposed to integrated. Actors dealt with these ambiguity and discontinuity conditions by deviating from normal workflow in that improvised systems of runners were set up in order to regain communication and in this way reduce ambiguity and regain operational continuity.

4.3 Comparison

It is clear that initial ambiguity existed in both cases, although it was much sooner clear what had happened at the Manchester Arena. This was mostly due to the nature of the incident in that it was above ground and had a lot of witnesses. Therefore this case featured an abundance of initial cues. This did not mean that it was immediately clear what had occurred or was occurring for all services, because the fire department did not receive the same amount of cues as the other services. In the case of London, similar discrepancies in sensemaking were observed. The fire department at Aldgate received cues that an explosion had occurred for example, whereas it took the other services a lot longer to find this out. The nature of the incident in London in its complexity and uncertainty on the locations of the blasts, meant that various separate pockets of control emerged around the incident sites and between the separate services. Still, when it was clear where the bombs went off, these separate pockets of control were continuing their

own operations at the sites in order to provide aid for the injured and move them above ground and towards the hospitals.

It is clear that there was an inability to share cues in both cases. In both cases, emergency services extracted and interpreted cues separately, meaning there was fragmented sensemaking. Still, various attempts at collective sensemaking were observed, especially at the incident site itself. Yet, clear lack of inter-agency communication through radio and telephone in both cases made it difficult to have a shared picture of reality. This was partially due to the fact that an inter-agency overview in the form of strategic command was lacking in both cases. In London a gold coordinating group was set up fairly soon into the operation. Yet, they were unable to communicate with the operational commanders at the various scenes. This led to the moment where the local police imposed to initiate the ACCOLC systems without knowing that strategic command had decided not to do so. In Manchester, it took a while before the first inter-agency strategic meeting took place and inter-agency coordination mostly took place at the scene itself. This meant that there was no central point of collection and distribution of information to all agencies.

The results have made clear that both cases featured a very fragmented response as ambiguity and discontinuity conditions were clearly present. Still, both cases show examples of how actors dealt with the ambiguity and discontinuity conditions. In the Manchester case, the fire department was not present at the scene. This meant that their expertise in evacuating people could not be used. As a result, an ad hoc coalition formed and improvised, creative solutions were used to transport the individuals. In the London case, creative solutions to fragmentation difficulties were observed as well. For example, an improvised system of runners was set up to overcome communication difficulties and lessen ambiguity between the Tavistock and Russel Square sites.

The difference between the organisational structures of the two cases is that during the Manchester Arena bombing, a specific protocol existed to initiate inter-agency coordination during a terrorist attack. The existence of this PLATO protocol played a major part in the response operation of the Manchester Arena Bombing. The protocol had a negative effect on the continuity of the operation. The fire department, who were not present at the scene and lacked the amount of cues necessary in order to fully understand the nature of the situation, stuck to the frame of a Marauding Terrorist Firearm Attack. As a reaction, they stuck to the familiar PLATO protocol. This protocol provided them with a sense of security because it was designed to improve operational security for all actors by imposing 500 meter exclusion zones

or “hot zones” for all non-specialized personnel. As the results have shown, this led to discontinuity for the fire department because they did not go near the scene. The other services were able to continue their operations since they did not rigidly stick to the particularities of the PLATO protocol. This shows that the existence of a PLATO protocol could hinder continuity, because it provides a sense of security and strengthens the frame of insecurity at the scene when only little information is available. When actors are stuck in such a frame and rigidly stick to a protocol, it is harder to improvise and consider other realities.

When looking at the London case, a similar protocol did not exist. During this operation, the first responders all went to the scene and just started their operations. In addition, various moments of discontinuity and ambiguity were overcome by continuation of operations and by using improvised measures, such as the system of runners that was set up to overcome multiplicities of interpretations between the Tavistock and Russel Square sites. The non-existence of a similar PLATO protocol decreased the change for sticking to a strong frame of insecurity at the scenes, which meant that first responders just went to the scenes and started their operations and sensemaking processes. The danger of forming such a dominant frame when a PLATO protocol exists is particularly high when cues are not shared between agencies, as was observed in the Manchester case. Looking at the communication errors and failures to share cues that occurred in London, the existence of a similar protocol in this case would perhaps have caused various first responders to construct similar dominant frames of on scene insecurity as the fire department did in Manchester.

Chapter 5. Discussion

The fragmentation perspective has provided this thesis with a realistic view on how crisis response coordination occurs in practice (Wolbers, Boersma, & Groenewegen, 2018). The results correspond with this fragmented nature of coordination as opposed to the integration ideal (Okhuysen & Bechkey, 2009) of coordination. Even when structures were put in place that are rooted in the integration perspective, like the PLATO protocol, the first response coordination was still very fragmented as multiple interpretations of the situation unfolded and separate pockets of control formed. In fact, the PLATO protocol caused a major hindrance in the Manchester case because its existence strengthened the dominant frame of the fire department that a Marauding Terrorist Firearm Attack was taking place. By sticking to this frame and rigidly following the protocol, the fire department was unable to see a different reality, which discontinued their contribution to the operation. This shows how protocols can

play a major part in the sensemaking process of first responders, since the existence of a protocol, much like past experience (Colville, Pye, & Carter, 2013; Weick, 1995), already provides actors with a frame of understanding from what might be going on. It is highly likely that actors start to link extracted cues to this provided frame of understanding and form their sensemaking process around it, making it the dominant frame from which it becomes difficult to step away (Brown et al., 2015; Colville et al., 2013; Maitlis & Christianson, 2014; Weick, 1995). In the case of Manchester, this led to the discontinuity of the fire department's operations, meaning they could not contribute to the coordination of first responders at the scene. A breakdown of sensemaking would have been necessary in this instance in order to switch frames of understanding and perceive a different reality. Much the same as what could have prevented the Stockwell shooting (Cornelissen, Mantere, & Vaara, 2014). This goes to show that fragmentation could not only be beneficial, but could sometimes even be necessary.

This notion that actors, when faced with uncertainty, might choose to stick to certain protocols because they provide a sense of familiarity and security is an important contribution of this thesis to fragmentation literature. Though, it is sharp contrast with the notion that actors often work around procedures and alter expected workflows when confronted with uncertainty and changing circumstances (Faraj & Xiao, 2006). A point that shows this is that the protocol was a hindrance for the other services as well because they had to adept the protocol and work around it in order to preserve operational continuity. This corresponds with the contemporary literature on coordination and crisis response in that actors often alter expected workflow (Faraj & Xiao, 2006) and work around procedures (Wolbers, Boersma, & Groenewegen, 2018) in order to meet the demands of changing circumstances (Comfort, Boin, & Demchak, 2010).

This thesis has shown that both instances occur in practice. However, it is unknown which exact circumstances might lead to sticking with a certain frame and the choice of sticking to protocols. Granted, the results have shown that it could have something to do with the physical distance to the incident or the rigid discipline of the emergency services' responders. Still, further data should be gathered on other similar cases in order to unravel and understand the underlying motivations and circumstances that lead first responders to stick to a protocol in the face of uncertainty.

Fragmentation is still a novel perspective when looking at crisis response coordination (Wolbers, Boersma, & Groenewegen, 2018). Still, this thesis has shown that this perspective offers the most realistic way of looking at crisis coordination, because ambiguity and discontinuity have shown to be dominant conditions in both cases. Yet, since this research has

only focussed on two cases of emergency response operations, it is important that future research on different cases of crisis response operations is conducted that use a similar perspective. These case studies could use more primary sources in the form of interviews with first responders who were present at the scene, or with commanding officers from each emergency service. In this way, more in depth evidence of the impact of fragmentation and how actors deal with it could be gathered and a proper fragmentation theory could be built that is based on a wide range of case studies.

Chapter 6. Conclusion

To conclude, coordination during the emergency response operations of the London 7/7 bombings and the Manchester Arena bombing was fragmented in nature since ambiguity and discontinuity conditions were widely observed. Still, first responders dealt with these issues in creative and improvised ways in order to preserve operational continuity.

The London and Manchester bombings featured various moments in which the police, medical and fire services experienced fragmentation. Ambiguity from the start in both cases meant that actors were struggling to find out what had occurred or was occurring. A lack of sharing cues meant that actors were conducting their own sensemaking processes from the start of the incident. Even more so in the London case, uncertainty of the situation in that multiple incident sites emerged underground and a lack of collective sensemaking led to multiplicity of interpretations and caused separate pockets of control from the very start of the incident. Moments of discontinuity followed as ambulances were delayed at Russel Square site. As a reaction to these ambiguity and discontinuity conditions, improvised systems of runners were set up between various locations in order to improve collective sensemaking. Still, on the whole the separate pockets of control in the London case were continuing their response operations at the various incident sites.

In the Manchester case ambiguity was quickly lessened for the police and medical services who were present at the scene as it became clear what had happened. Yet, a lack of sharing cues led to multiplicity of interpretations in that the fire department were sticking to a frame of Marauding Terrorist Firearm Attack, while the other services thought the area was safe enough to operate. As a reaction to this ambiguity, the fire department stuck to the PLATO protocol and chose to not go into the 500 meter exclusion zone, which led to the discontinuity of their operation. At the site itself, actors worked around the protocol in order to preserve

operational continuity and the medical personnel, police and members of the public formed ad-hoc coalitions and created improvised solutions in order to evacuate the injured without the expertise of the fire department.

To sum up, it is clear that coordination in both cases was fragmented in nature, while first responders coordinated under conditions of ambiguity and discontinuity by working around procedures; by forming ad-hoc coalitions; and by imposing creative improvised measures on the spot and thusly deviating from expected workflow. The exception being that the fire department in the Manchester case rigidly stuck to procedures.

Glossary

ACCOLC: Access Overload Control

BTP: British Transport Police

CLP: City of London Police

FDO: Force Duty Officer

GMP: Greater Manchester Police

GMFRS: Greater Manchester Fire and Rescue Service

JESIP: Joint Emergency Services Interoperability Principles

LAS: London Ambulance Service

LFB: London Fire Brigade

LU: London Underground

MPS: Metropolitan Police Service

MTFA: Marauding Terrorist Firearm Attack

NILO: National Inter-Agency Liaison Officer

NWAS: North West Ambulance Service

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Appendix 1 – Reconstruction: The Manchester Arena bombing

Summary of the event

The Manchester Arena bombing occurred on 22 May 2019 at 22:31 local time when Salman Ramadan Abedi detonated a self-made bomb amidst a crowd of people who were leaving a concert by Ariana Grande. The attack occurred in the 'City Room', or 'Foyer', which is located just outside the Manchester Arena and starts a pathway to Victoria Station. Around that time the concert was at its end and the City Room was busy with departing visitors, waiting relatives and merchandise sellers. Twenty three people died from the explosion, including the attacker. A further 139 were physically injured and many more suffered severe psychological and emotional trauma (The Kerslake Report, 2017).

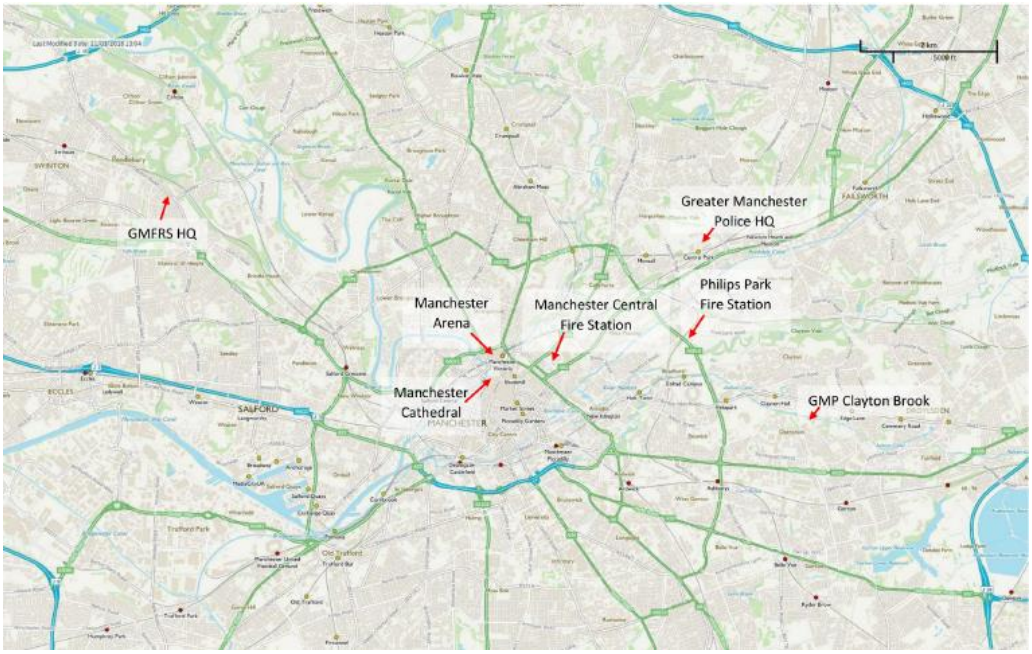

Figure 1 Geographical Map of key location during the Manchester Arena bombing (The Kerslake Report, 2017, p. 62)

The exact locations of the attacks and the key locations during the emergency response operations are viewed in figure 1. This section continues with a reconstruction of the response of each emergency service. The actors mentioned in this section are the following:

- Police
    - British Transport Police (BTP);
    - Greater Manchester Police (GMP);
- Medical Services
    - North West Ambulance Service (NWAS);
- Fire Department
    - Greater Manchester Fire and Rescue Service (GMFRS).

Time	Actor group	Name	Event
22:31	Terrorist	Salman Ramadan Abedi	Suicide bomb explodes in the foyer area of the Manchester Arena
22:31	Police	BTP	Four officers stationed at Victoria Station rush towards the scene
22:31	Police	BTP	Officers working at the office nearby heard the explosion and rushed toward the scene
22:31	Police	BTP	Report from BTP officer at the scene mentions wounds of "bolts and nails"
22:32	Police	BTP	BTP and members of the public provide first aid
22:32	Police	BTP	BTP sergeant takes initial control over the emergency response coordination at the scene
22:32	Medical Services	NWAS	NWAS receives calls on possible explosion
22:33	Police	GMP	GMP is alerted of possible explosion
22:33	Police	GMP	Force Duty Officer (FDO) assigned and log created
22:35	Fire Department	GMFRS	GMFRS was notified by GMP control room operator on explosion during an unrelated conversation
22:35	Fire Department	GMFRS	GMFRS received no calls from partner agencies at the scene
22:37	Medical Services	NWAS	Resources were deployed and contact made with GMP and GMFRS
22:39	Police	BTP Sergeant	METHANE report to BTP control room
22:39	Police	BTP Sergeant	Major incident is declared with 60 plus casualties
22:40	Fire Department	North West Fire Control Room	National Inter-Agency Liaison Officer was notified of an explosion and the designated incident rendezvous point by GMP
22:40	Fire Department	North West Fire Control Room	999 call came in and activated automated pre-alert
22:41	Police	GMP	First armed police arrive, GMP take over control from BTP
22:41	Police	GMP	GMP inspector takes over control from BTP sergeant and performs "bronze" commander duties
22:41	Police	GMP Armed Police	First Situational report for FDO mentions gunshot wounds
22:41	Fire Department	North West Fire Control Room	Messages NILO on possible gunshots wounds and active shooter
22:42	Fire Department	North West Fire Control Room	GMP advised that the gunshot wounds were in fact shrapnel wounds, update was not sent to the N
22:42	Medical Services	NWAS	First paramedics arrive at the scene, casualty management taken over from BTP
22:43	Police	GMP Inspector	GMP inspector remained in the foyer in order to obtain situational awareness
22:44	Medical Services	NWAS Advanced Paramedic	METHANE report to NWAS control room
22:44	Medical Services	NWAS Advanced Paramedic	NWAS makes casualty triage assessments and a Casualty Clearing station is set up
22:45	Fire Department	GMFRS	Pre-alert expired and local units were to stand down
22:46	Medical Services	NWAS	Major incident is declared by NWAS
22:46	Police	GMP	Road closures start
22:46	Police	GMP Inspector	GMP inspector perceived that the coordination of parties at the scene went well and additional resources were not needed (e.g. GMFRS)
22:46	Medical Services	NWAS/BTP/Public	Casualties are evacuated by using improvised stretchers as stretchers were not available
22:47	Police	GMP FDO	FDO declares operation PLATO due to risk of marauding firearm terrorist attack
22:47	Police	GMP FDO	Military and special police units are notified on PLATO, NWAS and GMFRS are not
22:47	Fire Department	Duty National Inter-Agency Liaison O	NILO expects Marauding Terrorist Firearms Attack and relocates Fire Engines further away from the Arena
22:47	Fire Department	Duty National Inter-Agency Liaison O	NILO tries to contact GMP FDO on current situation, yet the call did not come through
22:48	Police	GMP FDO	FDO decided not to evacuate emergency services at the scene
22:49	Medical Services	NWAS	Twelve ambulances arrive at the scene
22:58	Medical Services	NWAS	Movement of injured from foyer towards Victoria Station commences
23:20	Medical Services	NWAS	NWAS Gold commander arrives and is disturbed by the lack of GMP and GMFRS bronze commanders at the scene
23:23	Police	GMP	Ground Assigned Tactical Firearms Commander (TFC) relieves FDO from command
23:23	Police	TFC	Perceives that there is no ongoing attack (no hot zone), yet risk is still present (warm zone)
23:23	Emergency Services	GMP/NWAS	From this time onwards, JESIP 'scrums' between NWAS and GMP were held and led by TFC
23:40	Fire Department	GMFRS	Two further Liaison Officers were called in and the three rendezvoused at Philips Park
23:40	Fire Department	GMFRS	Inter-agency radio was quiet at this time
23:40	Fire Department	GMFRS	One of the Liaison Officers appointed himself as the officer in charge
23:58	Fire Department	GMFRS	The Officer-in-charge and the Chief Fire Officer conversed on telephone
00:04	Fire Department	GMFRS	The Officer-in-Charge and other GMFRS relocated to Manchester Fire Station where they met NWAS personnel going to and from the scene
00:12	Fire Department	GMFRS	The Chief Fire Officer telephoned a NWAS bronze officer about the assistance fire could give
00:15	Fire Department	GMFRS	National Inter-Agency Liaison Officer overheard declaration of operation PLATO
00:15	Emergency Services	NWAS/GMP	First shared risk assessment was undertaken during one of the many "scrums"
00:15	Emergency Services	NWAS/GMP	TFC and bronze NWAS commander agreed on "PLATO on standby" rather than active in order to continue NWAS operations
00:18	Medical Services	NWAS	NWAS gold commander was informed of "PLATO on standby"
00:27	Fire Department	GMFRS	Three fire engines and the Duty NILO made their way towards the scene after request from the conversation with the NWAS bronze
00:37	Fire Department	GMFRS	First three fire engines arrive at the scene and started to assist NWAS with casualty movement
00:59	Emergency Services	Emergency Services	First inter-agency meeting where all agencies were present
02:46	Medical Services	NWAS	Last casualty was transported to the hospital
03:08	Fire Department	GMFRS	Fire crews stood down

Figure 2 Manchester Arena bombing: Timeline

- Response Police

The first emergency service personnel to arrive at the site of the blast were four BTP officer who were stationed at Victoria Station. They rushed to the scene, arrived at 22:31 and started to provide initial first aid to the victims in collaboration with members of the public. A BTP sergeant took initial command over emergency coordination at this moment (The Kerslake Report, 2017, p. 69). A BBC documentary on the Manchester Arena mentions that one of the first BTP officers at the scene reported that a 'nuts and bolts' bomb had exploded at this time. In addition, injuries were referred to as 'large holes'. The documentary also mentions the initial fear of a secondary explosive device. It was considered by the BTP officer in charge to evacuate his men, yet he did not do so due to the injured that needed aid (Phillips, & Roberts 2018).

At 22:33, the GMP was alerted. They immediately assigned a Force Duty Officer (FDO) and started to mobilise armed response vehicles, although as of yet it was unclear what had occurred. The BTP sergeant at the scene provided the first METHANE report for the BTP control room and declared a major incident with more than sixty casualties at 22:39 (The Kerslake Report, 2017, p. 63). METHANE is a joint operating standard for reporting during incidents. It is an acronym for: Major Incident declared?; Exact location; Type of incident; Hazards present or suspected; Access routes that are safe to use; Number, type, severity of casualties; Emergency services present and those required (JESIP, 2016; The Kerslake Report, 2017).

Two minutes after the first METHANE report the armed GMP officers arrive at the scene. Their first report to the FDO mentions an improvised explosive device. In addition it mentions injuries that appear to have been inflicted by gunshots. It should be noted that, at this time, it was unclear what had happened and it was believed the risk for a further attack or a second explosive device was real (The Kerslake Report, 2017, p. 65).

When the GMP officers arrived, initial command at the scene was taken over from the BTP sergeant by a GMP inspector. This inspector would primarily focus on the on-scene coordination between the NWAS, BTP, GMP and other individuals to treat and evacuate casualties. The inspector chose to remain in the Foyer in order to obtain continuous situational awareness. He performed GMP bronze duties for the rest of the operation (The Kerslake Report, 2017, p. 69). After a while (time is unknown), the GMP inspector felt that the coordination of evacuation and treatment went smoothly and believed that further recourses were not required (The Kerslake Report, 2017, p. 69).

Meanwhile the FDO, thought with the information that he had at the time that a second bombing or a marauding terrorist firearm attack could occur. This meant that the FDO perceived that the Arena could be a so called 'hot zone'. Therefore he declared operation PLATO at 22:47 (The Kerslake Report, 2017, p. 66). The PLATO declaration gave the FDO the authority to ascertain support from other armed police, national counter terrorism groups and the military (The Kerslake Report, 2017, p. 70). Operation PLATO is primarily meant to be initiated when a so called Marauding Terrorist Firearm Attack (MTFA) is occurring, moreover the nationally agreed Joint Emergency Services Interoperability Principles (JESIP) state that sixteen other emergency services need to be notified and the that the 'hot zone' needs to be evacuated of all unarmed personnel (The Kerslake Report, 2017, p. 27)[4].

The JESIP procedures indicate that emergency services in the event of a MTFA should operate in a so called 'hot', 'warm' and 'cold' zone structure. The hot zone is the area in which terrorist are active. Specially trained armed personnel are the only ones who go into the hot zone to apprehend the terrorists. The warm zone is an area that has no active terrorist presence, yet absolute safety cannot be guaranteed and a threat still remains. Non-police first responders with protective gear are allowed to work in a warm zone. The cold zone is the area where no terrorism threat is present (The Kerslake Report, 2017, p. 27).

Contrary to what JESIP states, the FDO did not notify the Medical and Fire services of the PLATO declaration. In addition, at 22:48, the FDO decided to not evacuate the emergency services who were working at the site of the blast. This decision was based on the assessment that there were enough armed police officers at the scene to reduce the threat of a Marauding Terrorist Firearm Attack. In addition, bomb searching dogs were already deployed, which reduced the risk for the presence of a concealed second bomb (The Kerslake Report, 2017, p. 67). It should be noted that the FDO was performing a wide range of tasks at this time, since he was in command of the firearm response at the scene, monitored the normal police duties in Manchester and was the main contact point for other emergency services. By 23:23, a Silver Ground Assigned Tactical Firearms Commander relieved the FDO of the command of the operations at the scene (The Kerslake Report, 2017, p. 68). The Firearm Commander decided that PLATO was still needed, yet the Arena could be seen as a 'warm zone' since there was clearly not an ongoing attack (The Kerslake Report, 2017, p. 70).

[4] The original JESIP Marauding Terrorist Firearms Attack (MTFA) document is classified. Fortunately the Kerslake researchers were able to view them.

The Firearm Commander led various one scene talks, or ‘scrums’ with NWAS and other services throughout the night. The purposes of these scrums were to attain shared situational awareness (The Kerslake Report, 2017, p. 88). At 00:15, during of these ‘scrums’, the first inter-agency risk assessment took place. At this time, the NWAS commander at the scene became aware of operation PLATO. They agreed that operation PLATO was on standby rather than active. This meant that both the GMP and NWAS were aware that casualty clearing operations could continue at the site, yet, if another attack would occur the ‘hot zone’ regulations would immediately be reinstated (The Kerslake Report, 2017, p. 72).

- Response Medical Services

NWAS became aware of an explosion at the Manchester Arena when multiple calls came in at 22:32. A multitude of different messages were reported ranging from ‘gunshots’ to ‘speakers exploding’. NWAS immediately started to mobilise their capabilities (The Kerslake Report, 2017, p. 84). Nearby the Arena, an Advanced Paramedic was viewing NWAS activates in his office. When the explosion occurred, he self-deployed to the site and arrived at 22:42. He was told by a BTP officer that a suicide bombing had occurred. He proceeded to move into the scene of the blast where he began to assess the situation and to triage the casualties. At 22:44 he made a METHANE report to the NWAS control room and a major incident was declared (The Kerslake Report, 2017, p. 85). From the arrival of NWAS paramedics onward, casualty management was taken over from the BTP. At 22:49, twelve ambulances arrived at the scene and a casualty clearing station was set up at the station concourse. Most NWAS personnel remained in the concourse and those in the Foyer focussed on the triage. This meant that NWAS personnel were less able to provide first aid at the site of the blast (Greater Manchester Combined Authority, 2018). The unarmed BTP and GMP officers, members of the public and Arena personnel started to begin evacuation of the casualties to the casualty clearing point at 22:59 (The Kerslake Report, 2017, p. 147). The decision was made to move the injured from the Foyer due to structural issues of the building, the danger of a follow-up attack and to bring the injured closer to where the ambulances were arriving (Greater Manchester Combined Authority, 2018). The evacuation process began according to the seriousness of the injuries. However, there were too little stretchers available. For this reason improvised stretchers, such as advertisement boards and crowd barriers, were used to move the injured (The Kerslake Report, 2017, p. 87).

By 23:20, the NWAS gold commander arrived at the scene and started to press concern on the lack of bronze GMFRS and GMP officers. Although as the NWAS gold would later find out, all this time, the GMP bronze had not left his post at the Foyer (The Kerslake Report, 2017, p. 88). The NWAS gold took part in the 'scrums' with the GMP Firearm Commander and found out that PLATO had been declared. Together they agreed on PLATO on standby and continued the NWAS operations at the scene (The Kerslake Report, 2017, p. 88). At 23:41, all casualties were evacuated from the Foyer.

- Response Fire Department

The response of the GMFRS took a lot longer to materialise than the response of the other agencies. By 22:35 the GMFRS did became aware of a possible explosion at the Manchester Arena during an unrelated conversation with the GMP control room. It should be noted that, the GMFRS did receive very little 999 calls that were related to the incident. This meant that the fire department relied on the other agencies for its situational awareness, yet the GMFRS did not receive any calls from partner agencies who were at the scene (The Kerslake Report, 2017, p. 91).

At 22.40 the Duty National Inter-Agency Liaison Officer was notified of an explosion and that the situation was uncertain by the North West Fire Control room. Moreover he was told that the inter-agency rendezvous point was located at the Cathedral car park. At the same time, a 999 call came in from a citizen who tried to contact medical services. This activated a so called automated 'pre-alert', which meant that the local fire units at Manchester Central Fire station were put on standby to deploy. Many of the fire fighters stationed there could hear the sound of the blast. However, pre-alert means that if 5 minutes pass without an order to deploy, the units are to stand down. At this time the North West Fire Control room was busy with mobilising so called 'BOMB' procedures following the notification of an explosion. These procedures require that the Duty National Inter-Agency Liaison Officer is to be notified and in consultation with him, further actions, such as the establishment of a rendezvous point are agreed upon (The Kerslake Report, 2017, p. 94). As a result of the Fire Control room being busy with establishing these procedures, the five minutes expired and the units stood down (The Kerslake Report, 2017, p. 95).

At 22:41, the fire control room told the Duty Liaison officer that the GMP had reported about injuries inflicted by a gun and the possibility of an active shooter. A minute later, the GMP advised fire control that the injuries were in fact caused by shrapnel and not bullets. The Fire

Control room tried to contact the Duty Liaison Officer on this update, but reached his voicemail (The Kerslake Report, 2017, p. 96). This moment was crucial in the establishment of the Duty Liaison Officer's situational awareness. It so happened that the officer based his situational awareness on the initial information and suspected a Marauding Terrorist Firearm Attack. Therefore he instructed the fire department to regroup outside the 500 meter exclusion zone as mentioned in the PLATO procedures. This meant that fire units who were previously mobilising at Manchester Central Fire Station were retreated towards Phillips Park Fire Station, which became the GMFRS rendezvous point (The Kerslake Report, 2017, p. 95).

The Duty Liaison Officer suspected that PLATO was operational, however nobody at the GMFRS was notified by the GMP of its declaration. The liaison officer was therefore surprised that the inter-agency rendezvous point was located at Cathedral Park, which was inside the 500 meter exclusion zone. He tried to contact the GMP Force Duty Officer on extra information regarding the nature of the incident, yet he could not reach him (The Kerslake Report, 2017, p. 95).

It should be noted that, throughout the night, the inter-agency radio channels were reported to be quiet by the GMFRS. In addition GMFRS radio was quiet as well compared to the channels of the police and medical services, which capacities needed to be boosted around 23:30 due to the sheer quantity of radio traffic (The Kerslake Report, 2017, p. 96).

Two further Liaison Officers were called in and the three officers met at Phillips Park station along with four fire engines and two special response teams at 23:40 (The Kerslake Report, 2017, p. 97). Special Response teams are GMFRS units trained and equipped to deal with terrorist attack situations. These units are equipped with so called 'Sked' stretchers which are designed to quickly evacuate injured people from warm zones (The Kerslake Report, 2017, p. 148). At the same time a fourth Liaison Officer self-deployed to the Gold GMP command group (The Kerslake Report, 2017, p. 97).

The Duty National Inter-Agency Liaison Officer did not tell the other two Liaison Officers about the GMP designated inter-agency rendezvous point at the Cathedral car park. In his mind, the rendezvous was unsafe and he did not think to inform the other two officers of its existence. As a result, Liaison Officers two and three thought the nearest safe rendezvous point to the Arena was Manchester Central Fire Station, since they now knew that the base was currently used by NWAS personnel (The Kerslake Report, 2017, p. 170).

Liaison Officer Three now appointed himself the Officer in Charge in order to have a clear command structure. He then called the Chief Fire Officer, who was in command of the GMFRS, about further actions. This would be the first time a Liaison Officer had contact with the Chief Fire Officer. As a result of the call, the group of GMFRS units and the officers relocated toward Manchester Central Fire Station where they arrived at 00:04. It was here that the GMFRS encountered NWAS personnel who were traveling to and from the Arena, hospitals and their rendezvous point and the Manchester Central Fire Station (The Kerslake Report, 2017, p. 97). To their surprise, the Liaison Officers witnessed NWAS personnel going directly towards the scene without any protective gear. It should be noted that these GMFRS officers were not aware of any METHANE reports nor did they know that PLATO had been declared. Thinking the scene was dangerous, the self-appointed Officer in Charge started to mobilise Special Response teams towards the scene (The Kerslake Report, 2017, p. 173).

At 00:12, the Chief Fire Officer called a NWAS bronze officer he knew well about the assistance the GMFRS could provide at the scene. As a result of this call, the Chief Fire officer ordered the Duty Liaison Officer and three fire engines to head toward the scene instead of the now mobilising Special Response teams. The Liaison Officers were surprised by this command since they believed that the nature of the situation at the Arena indicated that specially trained and equipped units were required. In addition, the Chief Fire Officer seemed to have taken over the role of Incident commander by giving this command, yet, normal procedure would have that the Officer in Charge would be in command (The Kerslake Report, 2017, p. 174).

At 00:20 the Liaison Officers were notified by the fourth Liaison Officer from the GMP gold command module that operation PLATO had been declared, yet its current stand-by status was not communicated. This meant that the Liaison Officers' believe that a Marauding Terrorist Firearm Attack was occurring was now confirmed. They tried again to request Special Response Teams, yet this was declined by the Chief Fire Officer because he had been made aware of the declaration of PLATO and its stand-by status, meaning normal units sufficed (The Kerslake Report, 2017, p. 174). The three fire engines and the Duty Liaison Officer proceeded towards the scene and arrived at Victoria station entrance at 00:37.

Appendix 2 – Reconstruction: The London 7/7 bombings

Summary of the event

On 7 July 2005, at 8:50 in the morning, three bombs were detonated shortly after each other inside three different London Underground trains. The first bomb exploded inside a number 204 Circle Line train when it was traveling eastbound between Liverpool Street station and Aldgate station. The second bomb exploded in a number 216 Circle Line train which was traveling westbound from Edgware Road towards Paddington. This train had just left Edgware Road when the bomb was detonated. Approximately two minutes later, a third bomb exploded inside a number 311 Piccadilly Line train when it was traveling southbound between King's Cross station and Russel Square station. At 9:47 in the morning, a fourth bomb exploded on the top deck of a number 30 double decker bus when it just arrived at Tavistock Square (Greater London Authority, 2006).

During the first minutes after the explosions, it was very unclear what had happened. The explosions occurred underground, which meant that they were not immediately detected by anyone above ground. During the first minutes, multiple reports were made to the London Underground Network Control Centre, the media and emergency services. Reports of loud bangs, a derailed train, a person being hit by a train and smoke rising from tunnel were among the first pieces of information hinting at what had happened. The explosions caused power outages in sections of the underground, which led the London Underground Network Control Centre to respond to a power surge scenario. At 8:59 the London Underground Network Control Centre made a call to all emergency services to attend to Edgware Road, Aldgate and King's Cross on the basis of the initial reports from London Underground workers (Greater London Authority, 2006, p. 29). Around 9:15, it became clear that there had been explosions, yet the scale, cause and exact locations were still unclear. Around this time the first alert system was activated, which is a conference call between the emergency service and transport service control rooms. It was decided at 9:15 to declare a network emergency and to evacuate the entire underground network (Greater London Authority, 2006, p. 38).

For a long time, it was believed by the emergency services that there had been up to six explosions. Five of which were believed to have been inside the London Underground, which meant that they responded to five different London Underground locations (Greater London Authority, 2006). The exact locations of the attacks is viewed in figure 3. This section continues with a site by site reconstruction of the response of each emergency service. The actors mentioned in this section are the following:

- Police
    - Metropolitan Police Service (MPS);
    - British Transport Police (BTP);
    - City of London Police (CLP);
- Medical Services
    - London Ambulance Service (LAS);
- Fire Department
    - London Fire Brigade (LFB);
- Other
    - London Underground (LU).

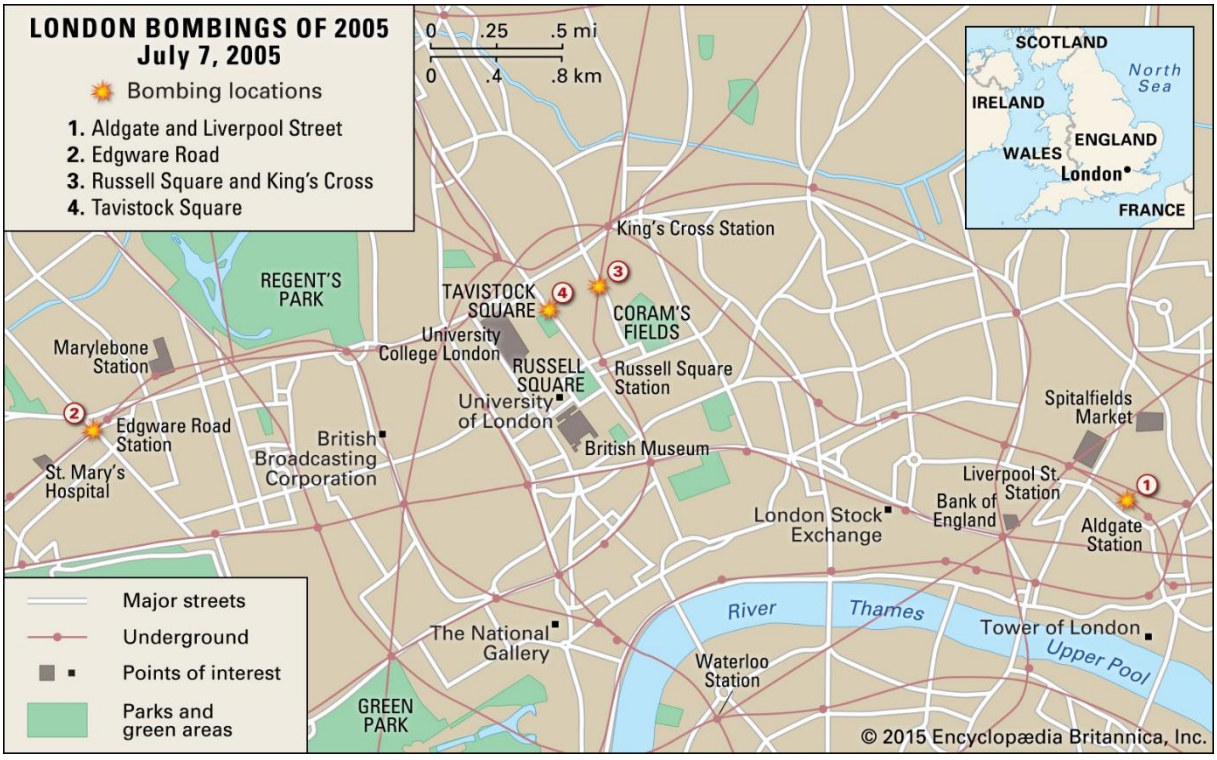

Figure 3 Locations of the 7/7 attacks (Ray, n.d.)

Liverpool Street – Aldgate

Time	Actor group	Name	Event
08:51	Police	BTP	999 call from London Underground staff reporting a loud bang and dust in the air
08:51	Medical Services	LAS	LAS was called to attend Liverpool Street Station
08:55	Police	BTP	First BTP Officer arrives at the scene - reported "building shock" and smock coming from the tunnel
08:56	Fire Department	LFB	Call received on fire and explosion at Aldgate - recourses dispatched
08:58	Police	BTP	BTP identified the location of the incident between Liverpool Str. and Aldgate
08:59	Public Transport	LU Network Control Centre	Call to all emergency services to attend to Edgware Road, Aldgate and King's Cross
09:00	Fire Department	LFB	First fire engines arrived at Aldgate - Reported that there had been an explosion
09:01	Medical Services	BTP	BTP requested LAS for 3-4 walking wounded
09:02	Fire Department	LFB	Reports of smoke in the tunnel - two fire engines and a Senior officer were sent to Aldgate
09:03	Medical Services	LAS	First ambulance arrived at Liverpool Str.
09:05	Fire Department	LFB	LFB declares MAJOR incident at Aldgate
09:06	Medical Services	LAS	LAS emergency planning manager arrives
09:07	Police	BTP	BTP reports 25 walking wounded
09:07	Medical Services	CAC	CAC advised by LAS emergency planner to place hospitals on major incident standby, identify safe rendezvous points in case of a Chemical, Biological, Radiation or Nuclear (CBRN) risk, and mobilise equipment vehicles.
09:08	Police	BTP	BTP declares MAJOR incident - train incident reported
09:10	Police	COLP	COLP declares MAJOR incident - explosion caused by bomb reported
09:14	Medical Services	LAS	Reported that incident at Aldgate was an explosion - 5 fatalities
09:14	Medical Services	LAS	First ambulance arrives at Aldgate
09:14			All emergency services were now aware of explosion at Aldgate East
09:15		Control Rooms	Decision was taken to declare a network emergency and evacuate the entire Tube network
09:19	Police	MPS	BTP formally request MPS assistance
09:24	Medical Services	LAS	Emergency Planner declared MAJOR INCIDENT at Aldgate and requested 30 ambulances, and equipment vehicle and a Medical Incident Officer.
10:09	Medical Services	LAS	Aldgate site was cleared of casualties
10:30	Command	Gold Coordinating Group	First strategic inter-agency meeting
10:30	Command	Gold Coordinating Group	Decision was made to not activate ACCOLC (limiting cell phone network to emergency services)
12:00	Police	COLP	ACCOLC was activated by CLP for the O2 network, without validation by Gold Command
12:00	Police	COLP	The COLP officer who made the decision was not aware of the decision by Gold

Figure 4 Aldgate –Liverpool Street: Timeline (Greater London Authority, 2006)

- Initial alert

The incident at Aldgate was first noticed by a member of London Underground staff, who made a 999 call to the British Transport Police at 8:51, reporting loud bangs and dust in the air. At the same time, the London Ambulance Service was called to go to Liverpool Street Station. The first call made to the London Fire Brigade was made at 8:56, it reported an explosion and fire (Greater London Authority, 2006, p. 25).

- Response Police

Four minutes after the initial call, the first BTP officer arrived at the scene. He perceived no structural damage, yet did see smoke rising from the tunnel. Soon he discovered the site of the incident in the tunnel between Liverpool Street and Aldgate. At 9:01 he began to see injured walking people and requested assistance form the London Ambulance Service. By 9:08, the BTP officer witnessed that there had been a train incident and he declared a major incident. Two minutes later, the City of London Police declared a major incident as well since they discovered that the incident was caused by a bomb explosion. At 9:19 the Metropolitan Police was formally requested to attend to the site of the blast, since they take overall command if

there is a major incident. The first MPS officer arrived one minute later (Greater London Authority, 2006, p. 25). Various communication issues occurred during the morning. CLP could for example not communicate because they relied on cell phone communication for their response on Aldgate and the network was overloaded. Therefore CLP decided to initiate the Access Overload Control (ACCOLC) system at 12:00. This system limits all cell phone communication in a specific area to emergency services. This decision went against a Gold command decision not to initiate ACCOLC (Greater London Authority, 2006, p. 44)

- Response Medical Services

The first ambulance and emergency planner were at Liverpool Street at 9:06. A minute later, the emergency planner told the Central Ambulance Service to place hospitals on standby for a major incident and to activate equipment vehicles, which are vehicles that provide specialist equipment for the treatment of injured. In addition, he advised that rendezvous locations were to be set up in case of Chemical, Biological, Radiation or Nuclear (CBRN) danger. At 9:14 the first ambulance arrived at Aldgate station. At that time the LAS was aware of the fact that an explosion had occurred. Ten minutes later, a major incident was declared by the LAS emergency planner and he requested 30 ambulances (Greater London Authority, 2006, p. 25). At 10:08 the same emergency planner reported to LAS Control Room that the site was clear of casualties and they that could start to redeploy capabilities towards other sites (Greater London Authority, 2006, p. 51).

- Response Fire Department

The first fire units arrived at Aldgate at 9:00 in the morning. At this time they knew that they were dealing with an explosion. The units that arrived included three normal fire engines and one Fire Rescue unit, which is a specialised assistance vehicle that provides special rescue equipment and gas-tight suits. Around the same time further units were mobilised due to reports of the explosion. Two minutes later, further units and a senior officer were sent towards Aldgate and one fire engine was sent to Liverpool Street. The LFB declared a major incident at 9:05 (Greater London Authority, 2006, p. 25). .

Edgware Road

Time	Actor group	Name	Event
08:50	Public Transport	LU	Two London Underground workers heard an explosion and rushed to the scene at Edgware Road
08:58	Public	Citizen	First 999 call from Edgware Road incident came from Praed Street reporting fire and an explosion
08:58	Police	BTP	BTP received first call on Edgware Road on a person under a train and a train collision
08:59	Public Transport	LU Network Control Centre	Call to all emergency services to attend to Edgware Road, Aldgate and King's Cross
09:00	Fire Department	LFB	LFB mobilized 5 units for Edgware Road
09:04	Fire Department	LFB	LFB units arrived at Praed Street, which was not the site of the incident
09:04	Police	MPS	MPS was alerted by LFB about incident on Edgware Road
09:07	Fire Department	LFB	LFB is alerted on the correct location of the incident at Edgware Road
09:12	Police	MPS	First MPS officer arrives at the scene at Edgware Road
09:12	Medical Services	LAS	First ambulances arrived at Edgware
09:13	Fire Department	LFB	Four units mobilized toward Edgware Road (only one of which from Praed Str.)
09:14	Medical Services	LAS	First report to LAS control room mentioned 1,000 casualties and requested 'as many ambulances as you can muster'.
09:15		Control Rooms	Decision was taken to declare a network emergency and evacuate the entire Tube network
09:15	Fire Department	LFB	Two fire units were still at Praed road
09:18	Fire Department	LFB	First fire engine arrived at Edgware Road
09:32	Police	MPS	MPS declares MAJOR INCIDENT at Edgware Road
09:34	Fire Department	LFB	LFB declares MAJOR INCIDENT at Edgware Road
09:37	Fire Department	LFB	Last fire unit redeployed from Praed Str.
12:00	Medical Services	LAS	Edgware Road was cleared of casualties

Figure 5 Edgware Road: Timeline

- Initial alert

Within the same minute of the Aldgate explosion, the second bomb exploded Edgware Road station. Among the first to arrive were the London Underground workers, who soon reported to their control room what they saw and that ambulances were needed (Greater London Authority, 2006, p. 29). From these and similar reports from other sites, the London Underground Network Control Centre called and requested all emergency services to go to Edgware Road, Aldgate and King's Cross.

The first 999 call on the Edgware road incident was made by member of the public on Praed Street, who reported a fire and an explosion.

- Response Police

The police became aware of an incident at Edgware road when the BTP was called about a train collision and an individual being hit by a train. The MPS was at Edgware Road at 9:12 after being alerted by the London Fire Brigade shortly before. Approximately forty minutes after the explosion (at 9:32), the MPS declared a major incident at this site (Greater London Authority, 2006, p. 29).

- Response Medical Services

One ambulance arrived at Edgware Road at 9:12. The initial reports of that LAS crew painted a very dark picture as they reported an explosion with 1000 casualties and requested *'as many ambulances as you can muster'* (Greater London Authority, 2006, p. 29). Unfortunately the response of the LAS over the morning is unclear due to the fact that the LAS did not keep

records at this site (Greater London Authority, 2006, p. 52). It is clear however, that it took three hours before all casualties were cleared by the LAS at Edgware Road. Reports from victims confirm that it took a long time before casualties were taken to the hospital due to a lack of ambulances (Greater London Authority, 2006, p. 52).

- Response Fire Department

The LFB responded to the first 999 call which was made on Praed Street. They arrived on that street at 9:04, five units strong, including a Fire Rescue unit and an investigation unit. However, this was not the scene of the incident. Three minutes later, the LFB Control Room was alerted on the right location at Edgware Road. Four units, one of which was redeployed from Praed Street, were sent to this location and arrived at 9:18. However, it took until 9:37 for the last fire engine (the Fire Rescue Unit) to move from Praed Street to Edgware Road. A major incident at this site was declared at 9:34 by the LFB (Greater London Authority, 2006, p. 29).

King's Cross - Russell Square

Time	Actor group	Name	Event
08:56	Police	MPS	MPS was first alerted on incident at King's Cross via CCTV footage
08:59	Public Transport	LU Network Control Centre	Call to all emergency services to attend to Edgware Road, Aldgate and King's Cross
09:02	Fire Department	LFB	LFB receive first 999 call on King's Cross incident
09:04	Fire Department	LFB	Split attendance mobilized - Euston Square and one to King's Cross
09:04	Medical Services	LAS	First 999 call on incident at King's Cross station
09:13	Fire Department	LFB	First fire engines arrive at King's Cross station
09:14	Medical Services	LAS	LAS Fast Response Unit arrives at the scene at King's Cross
09:15	Police	MPS	MPS declares MAJOR INCIDENT at King's Cross station
09:15		Control Rooms	Decision was taken to declare a network emergency and evacuate the entire Tube network
09:18	Public	Citizen	First 999 call on incident at Russel Square
09:18	Police	BTP	BTP reports 200 casualties at Russel Square
09:19	Fire Department	LFB	Further fire engines requested (again at 09:36)
09:19	Medical Services	LAS	First regular ambulances arrive at the scene at King's Cross
09:21	Medical Services	LAS	LAS declares MAJOR INCIDENT at King's Cross
09:24	Medical Services	LAS	LAS Fast Response Unit dispatched towards Russel Square
09:30	Medical Services	LAS	LAS Fast Response Unit arrives at the scene at Russel Square
09:38	Medical Services	LAS	LAS declares MAJOR INCIDENT at Russel Square
09:38	Medical Services	LAS	LAS Officer reports 6-15 fatalities and 50+ casualties at Russel Square
09:39	Medical Services	LAS Ambulance	Ambulance crew reported that there was no officer at the scene at King's Cross
09:40	Police	MPS	MPS at Russel Square requested LAS to send every ambulance they have
09:46	Medical Services	LAS	First LAS manager sent to King's Cross
10:02	Medical Services	LAS	MPS manager at Russel Square reported 50 walking wounded and 100 stretcher cases in the tunnel - still only one ambulance was present
10:13	Medical Services	LAS	King's Cross report: still 50 casualties in the train - further 10 ambulances and equipment vehicle are requested
10:22	Medical Services	LAS	LAS at Russel Square further request for equipment vehicle
10:22	Public Transport	Bus drivers	4 busses with casualties were taken from King's Cross to the Royal London Hospital
10:27	Medical Services	LAS manager	King's Cross report: still 50 casualties in the train
10:27	Police	LAS manager	Russel Square: Requested ETA for Central Ambulance Control - no reply
10:42	Police	LAS manager	Russel Square: Further request for ETA Central Ambulance Control - still no reply
11:00	Medical Services	LAS	Up until this point, ambulances meant for Russel Square were misdirected toward Tavistock Square
11:00	Medical Services	LAS	System of runners was set up between Russell Square and Tavistock Square to cope with communication issues
11:10	Medical Services	LAS	Russel Square: three ambulances at the scene, more to follow
11:16	Medical Services	LAS	King's Cross is cleared of casualties
12:12	Medical Services	LAS	Russel Square is cleared of casualties

Figure 6 King's Cross - Russel Square: Timeline

- Initial alert

The third bomb detonated shortly after the first two, yet it took longer before anyone outside of the train noticed. The explosion caused the train to be completely disconnected from the outside world. The first 999 calls came from members of the public who reported smoke emitting out of the tunnel at King's Cross station.

- Response Police

The MPS became aware of the incident from watching camera footage. At 9:15 MPS declared a major incident at King's Cross. The MPS officer at the scene had control and started to request ambulances, yet he did not get a reply. Ambulances started to arrive at 11:00 (Greater London Authority, 2006, p. 53).

- Response Medical Services

LAS became aware of an incident at King's Cross at 9:04 and their first responders arrived ten minutes later. However, the explosion occurred more closely to Russel Square station and it was at this site that walking victims began coming from the tunnels. The first 999 call at Russel Square was made at 9:18 and at 9:30 the first ambulance arrived. This site became the site from which most of the seriously injured were coming out of the tunnel. At 9:38, the LAS declared a major incident at Russel Square and the LAS officer at the scene reported 6 to 15 fatalities and more than fifty injured, yet only one ambulance was at the scene (Greater London Authority, 2006, p. 33). The MPS then requested every ambulance the LAS could give. At 10:02 the MPS manager requested five ambulances and a bus. At 10:27 and again at 10:42, the manager asked for an estimated time of arrival of the ambulances from Central Ambulance Control. No replies were given. It took until 11:00 before more ambulances started arriving. Finally at 12:12 the scene was cleared of casualties (Greater London Authority, 2006, p. 53).

- Response Fire Department

The LFB was the first to receive a 999 call on the smoke coming from the tunnel. Because the LFB was not sure where the location of incident was in the underground, they activated a 'split attendance' which means that three fire engines are sent to one underground station and one to another. One was sent to King's Cross and three were sent to Euston Square at 9:04. The latter turned out to be the wrong location. The LFB experienced communication difficulties between the incident location and the control position at King's Cross station. Therefore, they used runners to communicate between the underground and the surface (Greater London Authority, 2006, p. 33).

Tavistock Square

Time	Actor group	Name	Event
09:47	Terrorist	Al Qaeda	Terrorist detonates a bomb on the top deck of a number 30 double-decker bus near Tavistock Square
09:47	Public	Citizen	First 999 call from Tavistock Square - Twelve more were made within 10 minutes
09:47	Medical Services	Doctors	The headquarters of the British Medical Association were nearby, so medically trained people were immediately at the scene and started to treat injured
09:47	Police	MPS	MPS officer was already at the scene
09:50	Fire Department	LFB	Three fire engines dispatched - not clear when they arrived
09:57	Medical Services	LAS	First ambulance arrived at Tavistock Square
11:00	Medical Services	LAS	System of runners was set up between the two sites to cope with communication issues
11:31	Medical Services	LAS	LAS Silver Officer reports that there are enough vehicles at the scene
12:00	Medical Services	LAS	LAS Silver Officer reports remainder of casualties still needed to go to the hospital

Figure 7 Tavistock Square: Timeline

- Initial alert

At 9:47, a fourth bomb exploded at Tavistock Square on the top deck of a double decker bus. It was immediately clear what happened due to the amount of witnesses that saw the explosion.

The first 999 calls came in within a minute after the explosion and within ten minutes twelve 999 calls were made (Greater London Authority, 2006, p. 37).

- Response Police

A MPS officer was already at the scene when the bomb exploded (Greater London Authority, 2006, p. 37).

- Response Medical Services

The bomb exploded in near vicinity of the British Medical Association. This meant that doctors and medically trained people were close by. They immediately started to treat the injured. The first ambulance was already at the scene at 9:57 because it passed by. At 11:31, the silver LAS commander reported that there were enough vehicles at Tavistock square. Yet, at 12 he reported that casualties still needed to be transported to the hospital.

- Response Fire Department

The LFB soon send three fire engines toward the scene of the bus bombing, further information on the response of the LFB at Tavistock Square is not available (Greater London Authority, 2006, p. 37).