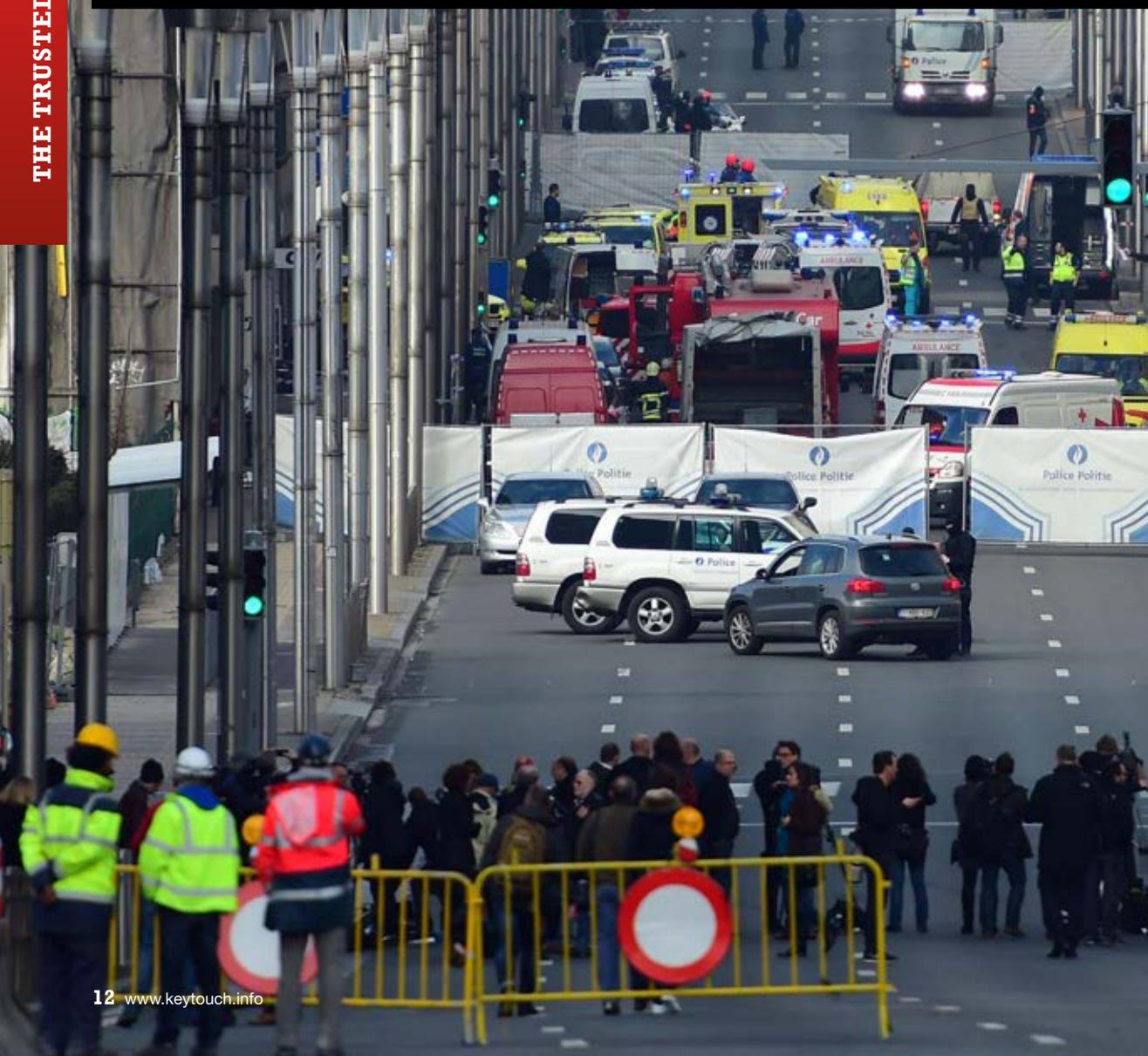


Hotels

MANUEL DONAND - LEHTIKUVA / AFP

THE TRUSTED WAY

The worst you can think of may not be bad enough



When a terrible day arrives – will your worst-case planning be good enough? The 2016 bombings in Brussels provide some valuable lessons.

You've prepared your network to face a critical situation. Your network has already proved able to face several large scale events, such as train crashes, gas explosions and armed criminals. What if something happens that is beyond your grimmest imaginings? That is what happened for the first time in 15 years of operations to the Belgian authority network operator ASTRID on 22 March 2016, when terrorists attacked Brussels.

Public safety professionals worked and communicated under intense pressure and in an unprecedentedly difficult situation. They had two complementary systems to use - radio communication over the ASTRID authority network, and for some, an additional secure broadband service, Blue Light Mobile, also provided by ASTRID.

With high demand, users experienced queuing in the ASTRID radio network and also had difficulty accessing the congested Blue Light Mobile. There were times when they just could not get through and many thought that the systems were down.

After the attacks, ASTRID immediately met with the user advisory board and decided together to analyze what happened and identify key factors in the congestion.

ASTRID network – queues and individual calls

The ASTRID network in Brussels had to serve almost twice the number of users as on a normal day – 4,300 compared to 2,500. In addition, three times the number of talk groups (600) were active during the day.

The network was simply not optimized for the way it was intensively used, with so many groups and calls within a very small area. As some of

the busiest base stations were nearing the limits of their traffic handling capacity, users had to queue for their turn to speak. About five base stations out of 24 in Brussels and two outside Brussels had serious congestion problems.

In this situation, if users release the PTT button on their radio and press it again, they lose their place in the queue, find themselves back in the line again, and generate more signaling on the system. When more people do the same, the congestion gets worse.

Individual, one-to-one calls are another factor that drains capacity. During the attacks, the ASTRID network had to handle an exceptional number of one-to-one calls in addition to group communication. Why? Because commercial mobile phone networks were unavailable. Calls which under normal circumstances would have been regular phone calls had to be conducted over ASTRID.

Blue Light Mobile – its platform wasn't available

Blue Light Mobile (BLM) is a broadband service provided by ASTRID. BLM is configured to use any one of

Brussels under attack - 22 March 2016

- Three bomb attacks
- Two at Brussels Airport (Zaventem)
- One at a Brussels metro station (Maalbeek)
- 35 people died in the attacks, including the three suicide bombers
- Some 300 people wounded



A security perimeter has been set, on March 22, 2016 near Maalbeek metro station in Brussels, after a blast at this station near the EU institutions caused deaths and injuries.

the commercial networks. On a normal day, this can guarantee that critical users get the best service available.

However, the situation during the attacks was anything but routine and the commercial networks became extremely busy. When all networks are unavailable, priority becomes meaningless.

Lessons learned

ASTRID and the public safety agencies learned some valuable lessons from the Brussels events. One of the major ones was that operational models - how different organisations use communication in these exceptional situations - affects the amount of capacity they use.

Network planning issues also have a great effect on traffic load. These include factors from both technical management and the operational model - Fleetmapping, priorities, pre-emptions and radio discipline.

In accordance with recommendations of the user advisory board, more radio network capacity is currently being added in Brussels.

Improvements identified are both technical and operational:

Enhancing capacity:

- 1 Obtain extra frequencies (400 MHz band)
- 2 Increase the capacity of the network in Brussels
- 3 Set up a Secondary Control Channel
- 4 Increase Blue Light Mobile priority for ASTRID and implement special priority on access
- 5 Conduct real time capacity monitoring

Operational management: Review planned operational models

- 1 Review strategy on priorities and pre-emption of calls between 'blue light' services
- 2 Review fleetmaps (multi-service groups) and usage policy
- 3 Improve training in radio network use and radio discipline in crisis situations
- 4 Improve operational communications management - who takes the lead?

It is not enough to plan for large scale events. The lesson of Brussels on 22 March is that every critical communications network operator and end-user organisation should take a look at their plans and decide if they are prepared for exceptional circumstances.



Unprecedented radio demand

The exceptional situation of two or more incidents almost simultaneously meant that communications were concentrated in several very limited areas. Users changed their operational model completely and many radio users were brought in from outside Brussels. Not everyone followed strict radio discipline, and there was a total loss of commercial networks for mobile telephony, although data was not too affected.

The impact can be shown by the unprecedented numbers involved:

- More than 4,300 active radio users in Brussels, instead of the normal 2,500
- Up to 600 active talk groups of 34 users, compared to 200 normally
- 34,400 group communications
 - 26,000 successful
 - 8,400 unsuccessful or interrupted (of whom 7,000 due to early PTT release)
- 1,000 individual communications.
- A great deal of scanning (consumes capacity) in Brussels and surroundings

Even though ASTRID was designed for and provides reliable service in critical situations, this was something beyond imagination.