

Whilst the events of 911 were unfolding millions of people around the world were able to see the events in real-time thanks to the wonders of modern communications technology, unfortunately firefighters at the scene of the disaster were having problems establishing radio communications with their colleagues on the upper floors of the buildings.

Incident command and control was being undertaken using a number of dry wipe boards in the foyer of the buildings. It is unfortunate fact that incident command and control literally fell apart when the buildings collapsed. Following the collapse all information relating to who was where and who was doing what task was lost forever.

Is it time to bring fireground command and control into the 21st century?

Part I.

Historical information.

As a qualified electronics engineer it was a quirk of fate that caused me to become involved with Breathing Apparatus Telemetry; my company had just completed a Telemetry System for the Gypsum mining industry. The main contractor for the project was Transmitton (a division of Siemens), but as the project required expertise that was out of their normal experience we were asked to design the system as we had already completed a number of one-off projects for them that involved telemetry. Tyne & Wear Fire Brigade following the accidental burning of two firefighters wearing Breathing Apparatus (BA) during a training session contacted Transmitton as a possible supplier of a solution to this problem. Tyne and Wear wanted a device that could be worn by a fire-fighter that could accurately measure the ambient temperature and inform the wearer of that temperature. Based on our previous work Transmitton asked us if we could supply a solution. After a short development period we produced a demonstration unit that exceeded their expectations in that the prototype unit measured environmental temperature and air cylinder contents, and used digitised speech to announce to the firefighter every few seconds " The Temperature is" followed by " The Pressure is". The units were demonstrated to Transmitton and Tyne & Wear Fire Brigade, both expressed an interest but the cost of producing certified production units brought the project to an abrupt stop (or so we thought).

A few months after our development work with Tyne & Wear, London Fire and Civil Defense Authority (LFCDA) lost two BA Equipped firefighters in a warehouse fire, and a fire at Kings Cross Underground Station highlighted major problems relating to the use of BA equipment and the command and control procedures that were in use at the time (particularly relating to extended duration BA). Based on our work with Tyne and Wear we were contacted by LFCDA Research and Development Unit.

We attended a number of meetings with LFCDA and RACAL (the suppliers of BA and Distress Signaling Unit (DSU) to LFCDA at that time) this was around summer 1993. As a result of these meetings we were asked to develop a unit that would give the BA equipped wearer a visual indication in a visor mounted display relating to air cylinder contents and environmental temperature. It was agreed to give visual indication rather than audible information due to the high background noise present at a fire-ground incident. Irrespective of what some BA manufacturers claim we were the first company to offer a mask mounted visual display of air cylinder contents and environmental temperature. As seems to be normal in developing any equipment requirements seemed to change almost on a daily basis. The final specification included a radio telemetry link to the BA Control Officer allowing information to be sent to a

Control Computer, thereby allowing remote monitoring of temperature and pressure together with the ability to recall individuals or teams and evacuation of all firefighters. We also interfaced to the DSU (Kindly modified by Diktron Developments) so that firefighter down information could be sent to BA Control. All the information was stored on the control unit so that it could be used as a training aid or in the event of an accident or fatality as an aid to establishing the circumstances at the time of the accident. We decided to store a copy of the information within the unit worn by the firefighter so that vital information was available for analysis should radio contact be lost. Prototype units were developed and shown to LFCDA, the Fire Brigade Union and a number of representatives from other Fire Brigades and the Home Office. The original units utilised the Radio carried by the firefighter to send the Telemetry information as we had been told that the demand for radio channels was such that dedicated Telemetry channels would never be made available.

Following the demonstration of the units BA Telemetry was considered to be a priority, the Fire Brigade Union seemed to give its blessing and the Home Office set up a sub committee in order to set some standards, and the Home Office surprised everyone by allocating two dedicated BA Telemetry Channels (these channels are now pan-European). Suddenly everyone wanted to speak to us regarding BA Telemetry. Along with other representatives from the fire safety world we were invited to sit on the Home Office Committee created to set standards and procedures for BA Telemetry. We were also asked to co-operate with GEC Marconi to create a standard protocol for the Telemetry information. This protocol was to be public domain such that any manufacturer could produce compatible equipment. Due to our experience about 90% of the standard was based on our previous work. The standard set the data rate and the protocol for the messages that were transmitted to and from the firefighter units. Due to the data rates there was a practical limit of under a hundred units, as above this number it could take an unacceptable time to get data from each unit.

We continued our R&D, and we eventually produced a final set of prototype equipment that incorporated dedicated radios for the telemetry. The final generation of prototypes were delivered mid 1994 and offered all the features of previous generation equipment but had a considerably more sophisticated BA Control Unit in that it used a touch screen computer offering a very simple user interface, it also supported a number of power options including internal battery, vehicle battery or generator/mains input. It was decided not to incorporate an DSU in the fire-fighter worn unit as one of the leading manufacturers of this type of equipment (Diktron Developments) had already modified one of their units to allow the interfacing to BA Telemetry equipment.

I moved to New Zealand to live in late 1994, and did not have cause to follow the progress of BA Telemetry but following a move to Australia in 2003 I became actively involved with fireground command and control so I did some brief research on the subject fully expecting BA Telemetry to have become well established within UK Fire Brigades, but as far as I was able to ascertain penetration of this type of equipment had been very slow due to a number of factors.

These factors include:

COSTS

It was anticipated that to equip a team of four firefighters with BA Telemetry would cost around 10,000 pounds. This may seem a high price to pay but unfortunately intrinsically safe equipment has always been very expensive (Intrinsically safe radio's can easily cost 1000 pounds each) and there were no off the shelf equipment available meaning that all the equipment would have to be designed and manufactured. It is worth highlighting the fact that whilst the cost of providing equipment would be very expensive the cost to the fire service

following the death of a firefighter while at work can amount to hundreds of thousands of pounds.

FIRE BRIGADE UNION CONCERNS

The Fire Brigade Union then became very reluctant to allow the changes of operating practices required to allow the use of BA Telemetry Equipment on the fire ground. There are a number of reasons for the reluctance one may be the fact that the log files produced at an incident could theoretically be used to assess the physical performance/fitness of individual firefighters.

INCENTIVES TO MANUFACTURERS

Manufacturers had no real incentive to produce production versions of the equipment, as they were constantly being told that brigades had no money to spend. As a very small company we invested over 250,000 pounds in developing our prototype equipment and I know that GEC Marconi invested well over 1,000,000 pounds in developing radio equipment suitable for telemetry purposes, additionally Diktron Developments Limited invested over 350,000 pounds. During the early stages of development we had all been encouraged by promises from the FBU (Fire Brigade Union), Home Office and various Fire Brigades regarding high sales prospects for the equipment, but sadly for reasons mentioned above expected orders for this type of equipment have failed to materialise.

Based on anticipated sales and winning a British Technology Award we tried to attract commercial funding to produce a salable product but at the time I left the UK no funding offer had been received, although about a year after I left for New Zealand my ex colleagues did obtain around 350,000 pounds of funding but for various reasons a commercial product never materialised.

Our initial work on a practical BA Telemetry seems to have resulted in at least a couple of commercially available products. GEC Marconi and Diktron Developments developed the REDS system which is a BA Telemetry/Radio DSU system but without a sophisticated BA Control Computer. Drager produced the Bodyguard/Merlin system, which once again is a BA control system incorporating telemetry but only handles BA control functions. To date sales of both systems have only been minimal but who knows what the future may hold. It seems that most BA manufacturers have either developed or are developing equipment that either supports Telemetry or can be upgraded to Telemetry.

I welcome these new products as they represent a major step in enhancing the safety of the wearers but this equipment is designed around standards that are now over 10 years old. These standards now need to be upgraded to allow added functionality made possible thanks to advances in radio networking and computer technology.

This article is concluded in next month's publication.....