National Directorate for
Fire and Emergency Management

CAMP - THE NEXT GENERATION

FURTHER DEVELOPMENT OF FIRE SERVICES COMMUNICATION AND INFORMATION FACILITIES

CONTENTS

Executive Summary

This Report describes a review of the current fire services Computer Aided Mobilisation (CAMP) facilities and arrangements. CAMP provides a vital 24 hour/ 365 day facility enabling the public to contact fire services with their requests for assistance and then mobilises appropriate fire services response in Ireland. Since 1990, fire authorities have collaborated on a regional basis to provide an effective and efficient service in what was known as the Computer-Aided Mobilisation Project (CAMP).

However, the circumstances in which this service operates continue to evolve, and it is appropriate to review this aspect of fire service delivery. The review has been prompted in part by the intention of the Health Service Executive (HSE) to change its system of call handling and mobilising of ambulances. In considering the impact of this on fire services, some additional issues are taken into account, including the pressing need for greater efficiency in public services, the possibility of migrating to the Department of Finance sponsored shared service digital mobile radio solution (NDRS), and the fact that the current generation of fire service systems will need replacement within a 5 years timescale in any case.

The available options are reviewed, taking into account current good practice in the management and operation of emergency communication centres, and considered in the current context in Ireland, and the current methods of service delivery. Whilst a range and combination of options are identified, these are seen to revolve around the critical issue of identifying an optimum communication centre configuration.

From the review process, it is not seen as possible to implement a ‘quick fix’ option such as rebalancing calls among the three centres (and which would also rebalance revenue costs).

Summary of Recommendations

This Report recommends a transition from three separate regional communication centres to a single distributed system with multiple control nodes at the current three CAMP centres, using the National Digital Radio Project as the communications vehicle. This transition will provide the opportunity to re-engineer the current service provision model including reviewing the User Requirements, and developing a fire service TETRA "fleet map". This option will provide the opportunity to achieve cost savings together with an improved service provision to support the requirements of the fire service.

A new set of CAMP governance arrangements should be developed to deliver the recommendations of this report, and which will form the common path for all fire authorities to deliver their statutory responsibilities in a consistent manner, and with an equitable cost distribution model regardless of geographical location.

The current ERCC management and staffing model should be redefined to reflect the change in business activity resulting from the intended HSE transfer, which could reduce the workload of the ERCC to approximately one third of its current activity level, and to bring the ERCC management and staffing arrangements in line with national staffing arrangements and conditions for emergency control operators.

A project plan, developed under an agreed project management methodology, is required, given the scope and extent of work required to implement the recommendations of this report while minimising risks associated with the changes proposed.

1 – Introduction to Document

1.1 Introduction

The Regional Communication Centres (RCCs) provide a critical function within the Irish Fire Service. By "critical function" it is meant that any loss or impairment to that function would severely and adversely affect the safety and well being of the public served, and also potentially to the staff providing the service. The policies and procedures of the RCC are determined directly by the participating authorities in order to ensure that the services provided are appropriate to the needs of the Fire services within those authorities.

At a meeting of the Management Board of the National Directorate for Fire and Emergency Management, it was agreed to carry out a strategic review of the CAMP Project in accordance with the terms of reference in Appendix A.

This is the final report on the review process. At an earlier stage, comment was invited from interested persons/ groups in relation to:

- The overall approach proposed
- Comment on Chapter headings/ sections
- Comment on text
- Specific comment on conclusions and recommendations.

Following consideration of comments received, this is the final report on the review process.

1.2 Report Layout

The document is laid out in seven chapters. This first Chapter is an introduction to the Report. Chapter 2 paints in the background to the CAMP system, its role and development path. Chapter 3 introduces and discusses current issues, which prompted this review. Chapter Four provides a description and current appraisal of the key elements of the mobilisation and communications systems. Chapter 5 addresses the future vision, while Chapter 6 looks at and discusses options for moving forward and makes recommendations on an optimal path for the future. Chapter 7 addresses implementation planning of the proposed route forward.

2 - CAMP Background

2.1 CAMP Project Development

Ireland's fire brigades are operated by 30 fire authorities, with 217 fire stations with 1,260 full-time and 2,000 retained fire fighters. Up to the late 1980s, the fire service mobilisation and control functions were largely undertaken locally. The result of this was that standards and procedures differed across the country as each fire authority was responsible for its own mobilisation and control procedures.

A project, which become known as CAMP, (Computer Aided Mobilising Project), was initiated by fire services in December 1989 to modernise the arrangements for meeting the statutory function of fire authorities to make provision for the receipt of calls for assistance from the public and to dispatch appropriate fire service response. The drivers of change at the time were 'Telecom Eireann's' telephone exchange rationalisation, the need to relieve station officers' families of the burden of answering emergency phones, and to implement a recommendation of the Stardust Fire Tribunal of Inquiry[1] in Dublin in relation to the capital city's call-answering service.

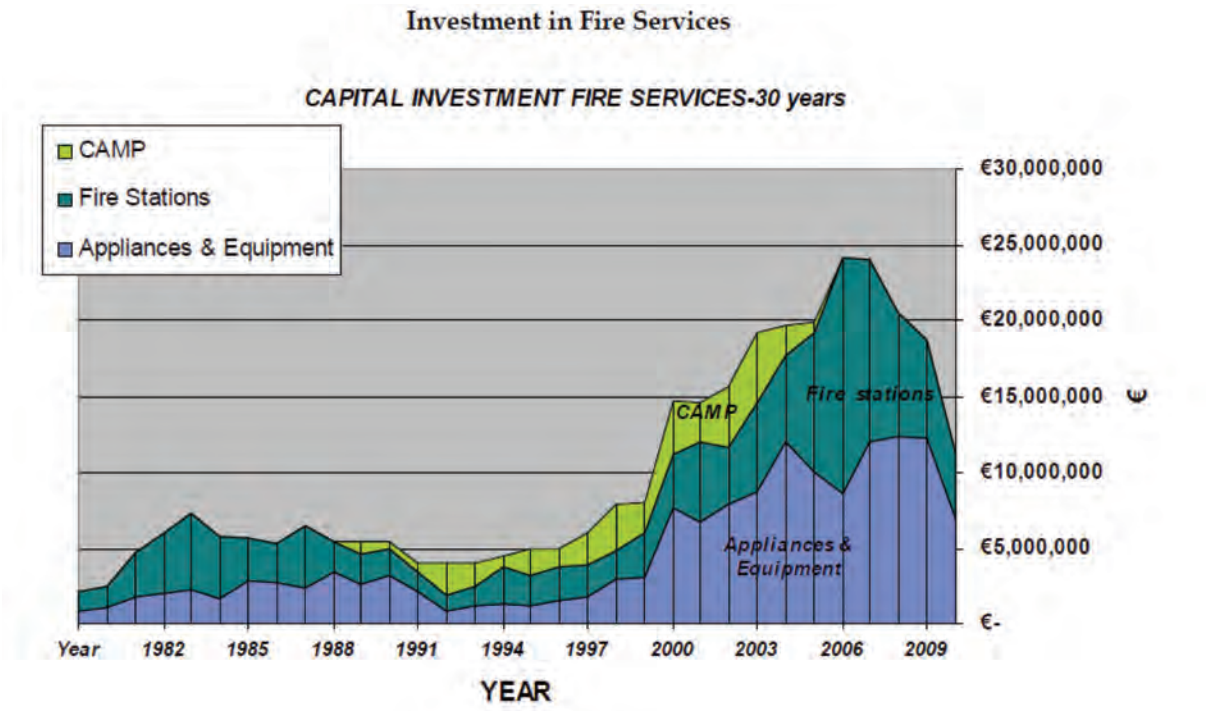
In general, the process for handling calls had been that Telecom Eireann, the national telecommunications company, would take the emergency 999 calls and route them directly to a designated contact number for that location. This usually meant that the call was directed to the local fire station (if staffed full-time) or, as was often the case across much of the country, to the local station officer's house. Thus, there were multiple (several hundred) locations that emergency calls could be routed to. Appliances were then mobilised and crews summoned using sirens and/ or pagers. This led to both a haphazard (and sometimes slow/ delayed) mobilisation of fire services resources.

The CAMP project began with a decision to develop three Regional Communications Centres (RCCs,) structured around groups of local authorities, with each regional communications centre run by a contracting local authority and managing emergency calls and mobilising of fire appliances for a number of Local Authority Fire Services. The mission of CAMP was to "develop and implement the infrastructure of the Regional Communication Centres (RCCs) to include Command and Control Systems design, communications systems and the administrative and operational procedures therein."

[1] Report of the Tribunal of Inquiry on the Fire at the Stardust , Artane, Dublin on the 14th February 1981 (1982) – Recommendation 9.216 et seq.

The drivers were a mix of top-down national initiatives, based around a desire for consistency and reliable public services, plus bottom-up local pressure for change. The capital costs of the project were met by grant-aid to the regional contracting authorities from D/ EHLG Annual Capital Programme. The project was developed in stages over an extended timescale to match the availability of capital funding, and juggling with other priorities for fire stations, training facilities, appliances and equipment. Annual spending on the CAMP project over the years was of the order of €1.5 to 3.0 million euro, and came to over €40m over a fifteen year period.

Figure 2.1, Comparative history of capital investment in the Fire Services.



2.2 Project Structure

It was necessary to create a new set of regional structures to ensure appropriate consultation and participation in decision-making by all parties involved in CAMP, including the multiple fire authorities. CAMP also had a National Co-ordination Committee to manage the sequencing of the project elements between the three regions. This was important at the start of the project for defining goals and strategy, but as the project moved on, its roles were devolved more to Regional Management Committees. There were also national sub-committees to deal with individual elements of the project. The key group were the CAMP Project Managers Group, which planned and drove the project elements delivery both within their own regions and collectively at national level. This Group has continued to advance other related projects to the present time.

Although the CAMP structure may be seen as elaborate, and leading sometimes to a protracted consultation and decision making process, it was essential to the success of the project as the individual fire authorities had fully participated in the design and procurement of it. Without this process, CAMP could have been seen as having been dictated by some remote central authority, and would have been very unlikely to succeed in the manner it did.

The project was supported by a number of key "champions" – e.g. predominantly but not exclusively County/ City Managers, Chief Fire Officers and Project managers who were instrumental in communicating on the project to the Fire Services, and ensuring that it was kept on course. The key lesson was that an extensive range of people had to be convinced as to the value of the project, and encouraged to take ownership of it. Without this buy-in, the CAMP project would be unlikely to have succeeded in delivering its objectives in the way it did.

2.3 Review of Project Development

The CAMP project was successful in that it delivered it aims and agreed User Requirements, albeit over an extended time-scale, because of the limited availability of capital. CAMP was also an early example of "shared service" delivery – an innovative demonstration project in several respects, as appropriate contracting, management and operational structures had to be devised and put in place for the development and operation of the new region-based, multi-authority systems.

The project was also successful in developing and delivering new infrastructure, in terms of three regional communications centres with associated IT systems for mobilising and communications, including command and control systems. A major task was development of the necessary address and pre-determined attendance databases, as the provision of means to reliably validate addressing information was essential to the success of the project in terms of migrating from a local, informal to a regional, formal system. Dedicated control centre staff were recruited, trained on the computer systems and have operated successfully in two of the three CAMP Centres.

Communication and mobilisation equipment was procured to common technical specifications, rather than being industry driven, as had been the case prior to the project. All the station based equipment is compliant with a common protocol known as MG4/ GD92, which basically means that irrespective of who supplied the hardware, it essentially talks the same language.

Barriers to CAMP Implementation

(i) Requirements Capture

A key part of the project was the development of the user requirements. Although difficult to get agreement across 30 fire authorities and different interest groups, the User Requirements document was completed/ signed off in 1993, and has remained at the core of the service since. The time spent on this, although difficult, has ensured the success of the project. The fact that ambulance service requirements had to be factored in at a later stage was difficult, and required a revision of the user requirements, since the fire service and the ambulance service user requirements are significantly different.

Scope-creep also emerged, and over the extended life of the project, there have been significant changes in technology. There is a danger that the technology can take over an IT project and it was necessary for the project managers group to exert very strong leadership to ensure that the original concept and user requirements were followed, and were not diverted into other technical issues.

(ii) Resistance to Change

Some authorities did not wish to participate in a regional structure, believing they could provide appropriate services themselves. However, the success of the initial "Interim" CAMP projects from 1992/1993 helped demonstrate the benefits.

Some interest groups, including staff where fire fighters had had a role in monitoring telephones in full time stations were initially reluctant about the changes, but these were overcome, and staff were freed for front-line duties. Retained fire-fighters are paid on a per-call out basis. Consistent procedures for mobilisation impacted on the number and duration of turn-outs. In the early stages this may have been perceived as leading to reduction in earnings, which caused some resistance and resentment to the changes in the early stages.

There were problems with cross-boundary mobilisation of fire services where incidents were close to the boundaries between fire authorities. The necessary definition of fire station areas, and enshrining the principle that the nearest brigade should be mobilised, regardless of administrative boundaries, helped overcome these difficulties, although these have never been fully eliminated.

(iii) Address information

The provision of accurate, national addressing information was essential to the success of CAMP to replace the "local knowledge" dimension of prior arrangements. However, providing this information was a major barrier to the implementation of CAMP and proved to be a considerable task in its own right. Prior to CAMP, dispatching was largely done on local knowledge since Ireland did not have a

national post codes or equivalent addressing system. The smallest geographic entity is a "townland". However, townland names are not unique and there is also a lack of house numbers and often addresses were known by the name of the person living in the house rather than the house itself. In order for CAMP to work, a national addressing system had to be developed from scratch and implemented nationwide. Local knowledge then had to be transferred from each Fire Station to a central database in order that RCC staff could effectively mobilise appliances and other resources. This process took some 10 years to complete for all fire authorities, and was a major sub-project within CAMP.

2.4 Benefits Achieved

Quality Public Services

The primary benefit of the CAMP Project was that it very successfully moved from what had been an extremely ad-hoc and informal emergency call-handling approach, with consequent losses, to that of a modern, computer-aided setting. Significant progress was made in aligning approaches to call handling processes and procedures so that the public who need to use the 112/999 system to call out fire services now talk to a consistently competent and accurate service. Two of the three centres operate to ISO quality assurance services, with continuous performance monitoring and improvement regimes. All calls are recorded, and complaints procedures are used to deal with any issues arising. The performance indicators show excellent 112/999 call pick up time rates, (> 95% in less that 5 seconds) extremely high accuracy rates in the location and validation of incident address detail and subsequent mobilisation of fire appliances (99.9%) , as well as fast call processing times, (less than 90 seconds is typical), from pickup to sending of mobilisation order to the required Fire service.

Major Emergency Management

The Regional Communication Centres also now provide a key link in the enhanced arrangements for response to major emergencies which have been developed in Ireland since 2005, and which are used for events such as the Cork Airport Tragedy in February 2011. As well as mobilising fire services in response to the 112/999 calls, the Munster Regional Communications Centre activated the local authority's Major Emergency Plan, making all the initial notifications inter-agency and within the local authorities involved. The RCCs were central to dealing with the public during flooding and severe weather emergencies, including storms, and RCC staff have provided training to additional local authority staff in running local call centres when deemed necessary.

During the Cork airport tragedy, the Munster RCC role included notifying government departments at national level so that a "Lead Government Department"

was appointed and RCC arranged communications between relevant officials at local and national level.

The Regional Communications Centres staff have been trained in MEM Information Management techniques, as they are regarded as a core assembler of information – a role which is particularly important in slower developing emergencies such as storms and flooding – and their information/ input underpins and frequently is of huge importance in shaping major emergency response. The RCC staff participate in multi-agency and multi-authority exercises in preparation for these critical communication roles.

Staff at MRCC have developed a training course in call taking and handling procedures for events such as severe weather and flooding . This course has be provided by the MRCC to Local Authority clerical staff who are called in to handle calls from the public as part of the LA severe weather response plan.

Fire Service Management

One of the key benefits of CAMP has been the provision of management information on the fire service, which has allowed changes to be introduced and measured. The information collected through the CAMP system provides the basis for the fire service performance indicators which are published annually by the Local Government Management Agency, and the annual Fire Service Statistics published by the Department of Environment, Community and Local Government.

The introduction of three regional communication centres has allowed the phasing out of watch-rooms or local control rooms in full time stations where fire-fighters were assigned to phone duties. This has occurred at 17 full-time stations, and it is estimated that €6.3m of direct saving annual is being generated by the CAMP project (taking one position per station requiring 5.25 full time equivalents to staff the position on a 24/7 basis, indicates that some 90 full-time fire-fighters, at average earnings of €70k). Equally importantly, these fire fighter positions were available for redeployment to provide front-line services.

There has also been a major benefit for the retained fire service in taking away the pressure on local fire station officers' families to monitor the phone around the clock and they no longer have to take calls at home and make mobilisation decisions.

Consistency in Service Provision

The CAMP system helped move towards the goal of consistent fire service delivery, facilitating standardisation of both pre-determined attendances and incident classification, as well as appropriate new procedures for incident management such

as the National Incident Command System. Although not perhaps initially seen as an explicit project objective, the move to consistency in many aspects of fire service has been greatly facilitated by the CAMP Project, while still respecting the fire authority as the fundamental service delivery unit.

Further Fire Service Development

The CAMP structure, working arrangements and staff have facilitated the on-going implementation of a number of initiatives in the fire service – a number of which are unrelated to ICT. For instance, when it was recognised that it was necessary to deal with the impact that certain incidents (eg multiple fatality car crashes) could have on staff in the fire service, arrangements for making Critical Incident Stress Management services available to all were developed and continue to be implemented via the CAMP regional organisational structure.

Likewise a regional approach to delivery of elements of fire service training arose from the CAMP structure. The CAMP Contracting authorities have procured and are currently rolling out a new "risk-based approach" model (the RBA project) to emergency service delivery management, and this is being rolled out to all authorities.

Previous development initiatives from the CAMP centres include;

- Earliest adoption and the first implementation of an ISO accredited quality management system, within fire services.
- The first successful shared service model within the Fire Service.
- Delivery of procurement arrangements such as a single service contract for member owned common equipment such as Mobile Radio and Radio paging alerting systems.
- Technical advice and decision support to member authorities in relation to ICT provision.
- The development of training courses and collateral for member authorities in such areas as, call handling for local authority employees during severe weather events and water shortages/outages.

Some Lessons Learned from a Reflection on the CAMP Project Experience

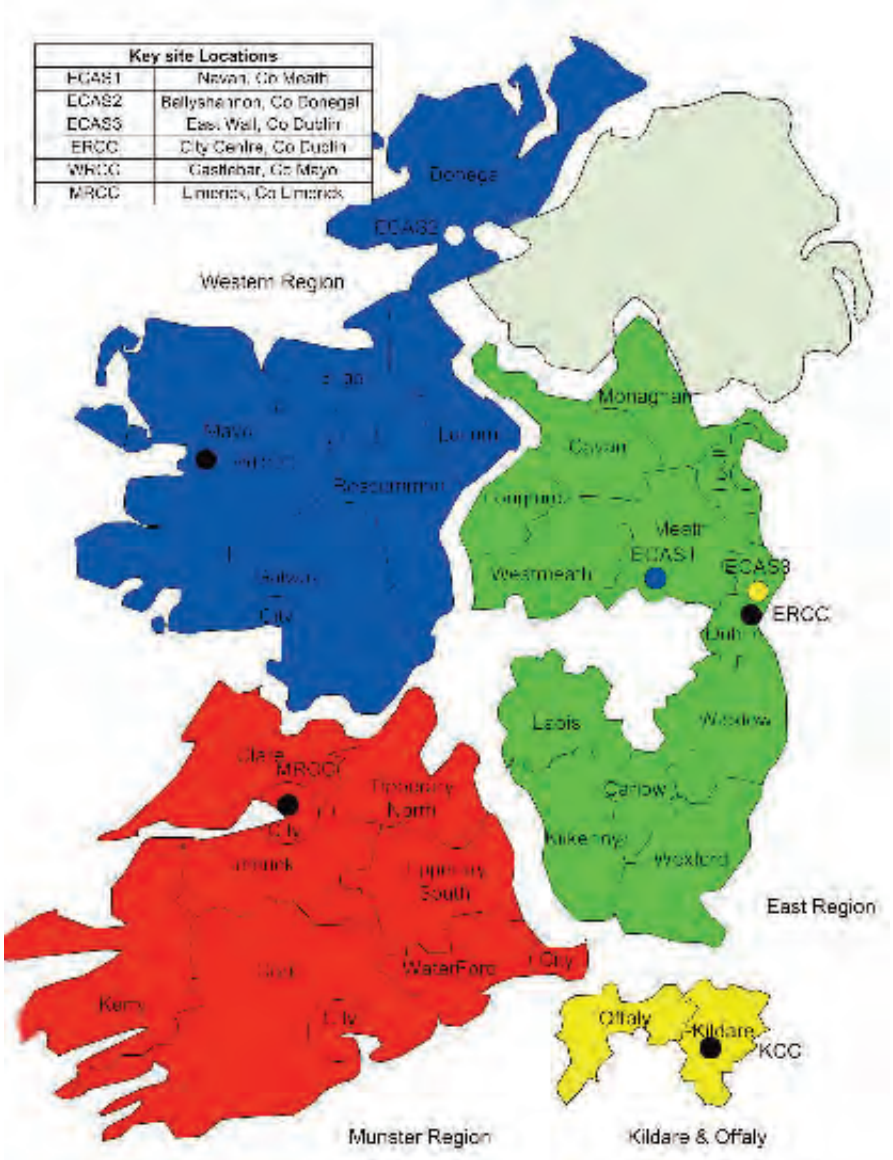
From the experience of CAMP, it is suggested the following lessons can be drawn;

- Structure is necessary to support communication and consultation at all levels. While it is vital in implementing change, this will slow intended progress.
- It is very beneficial if champions emerge who understand and are prepared to work at supporting the project among their peers.

- Demonstration projects are important in convincing stakeholders of benefits
- Issues associated with moving to collaborative and more distant support services can be overcome, provided the essential core of emergency service delivery is retained as important, and issues are made bigger than the self-interests which emerge. It is important to try understand the real issues behind resistance to change rather than those which are articulated sometimes.
- A regional mobilisation and command and control system can effectively provide high-quality services for multiple, distinct fire authorities.
- Structured project management is critical.

2.5 Current System Overview

Figure 2.2 Outline Map of current showing regional CAMP operational boundaries.



Workloads

Each of the three RCCs has different levels of incident work load for approximately the same number of emergency control operators. Apart from the outward facing 24 hour call-taking and subsequent incident mobilisation work, each RCC has a considerable work load associated with the inward facing facet of its business. Again while this work may be in proportion to the annual incident volume of the RCC such as MIS and fire statistic reporting, some of the RCCs provide additional services and more detail to their client Fire Authorities.

Staffing

The general structure of the Region Control Centres is as follows .The Munster Regional Communications Centre (MRCC) and West Region Communications Centre (WRCC) both have a senior manager with overall responsibility for the operations of the Centre, known as the CAMP Project Manager. The East Region Communications Centre (ERCC) does not have the same management structure as the other two RCCs. Overall responsibility for the management of the ERCC lies with; Assistant Chief Fire Officer ERCC (a Senior Officer of Dublin Fire Brigade), the operations manager with responsibility for Communications Room staff who are fire-fighters and the Senior Communication Officer with responsibility for information technology and communications.

With regard to Emergency control room operators, both the Munster RCC and West RCC employ dedicated control room operators whose core function is to perform duties within the communications room. This is in contrast to the East RCC where fulltime fire-fighters continue to perform the Emergency Control Operator (ECO) duties.

The agreed national pay conditions for dedicated ECOs such as those employed in Munster and the West RCC are based on 93% parity with the Local Authority Clerical Officer Grade III, while an additional shift allowance of 20% is paid for night duty and the unsocial working hours inherent in the ECO role. A typical ECO will work 2028 annualised hours, which is a 39 hour week for a 52 week year. In the WRCC these hours are broken down as follows; 26 hours Control room duties, 5 hours leave, 4 hours Cover/Training and 4 hours administrative duties per week. On the five watch basis, to staff a control operator seat in a 24/7 control room requires 6.5 fulltime equivalents. The MRCC and WRCC staff the control room with teams of 3 control operators, one senior operator (SECO) and two operators (ECOs), and this is sufficient to minimise call queuing in all but severe spate conditions.

The ERCC staffing model is different from the other two Centres. Dublin Fire Brigade fire-fighters and a small number of Sub Officers are transferred to Control Room operations on a rotational basis (two year rota). When assigned to the ERCC Control Room, which handles both fire and ambulance calls, they maintain

operational duties by being assigned to special fire appliances when not in the ERCC Control Room. These fire appliances include an incident command unit, foam tender, foam support unit, chemical incident unit, water tanker and second turntable ladder. In spate conditions and in the event of a major emergency, staff assigned to operations, if not deployed operationally, may be utilised in the ERCC Control Room to scale up call handling capacity and mobilisation throughput. They also cover break periods for Emergency Control Operators and supervisors. The minimum number assigned to the Control Room is one supervisor and seven controllers/dispatchers. The total pool of staff assigned to these roles is 80. This number covers the four working shifts, leave allocation, sick leave, training, etc. One Station Officer is also assigned to the Control Room in a supervisory role. Senior Fire Brigade Officers are also assigned responsibility for the management of the Control Centre, under the overall control of the Chief Fire Officer.

The ERCC handles the largest call volume of thee three centres, with 46,000 fire calls and 108,000 ambulance calls handled in 2010 (see Figure 2.3). Due to the combined fire and ambulance workload in the ERCC and the staffing model employed in the ERCC, direct comparison with staffing in the other two centres is not feasible. However, the notional assignment of fire brigade staff to the ERCC budget, for fire calls only, is equivalent to 20 full time equivalent fire-fighters. This cost is apportioned to the 12 Fire Authorities on an agreed basis with Dublin Fire Brigade, on account of its size and call volume, carrying approximately 65% of the total budget.

The shift pattern in Dublin Fire Brigades is a 2 cycle shift, a 9 hour day shift and a 15 hour night shift, each Fire-Fighter is rostered for 7 day and 7 night shifts per 28 days.

Within the RCC Organisational Structure there are also technical and managerial support staff roles, these roles require a third level qualification in areas such as; Information Technology, Electronic Engineering and Geographical Information Systems. The ERCC has four such staff, the MRCC has two, whilst the WRCC has an established vacancy for the role, but the post is not filled currently. These officers generally work a standard week but they also operate an out of hours roster scheme, where they may be called in to effect 2nd line repair on control room equipment, or in the event of any operational exception such as a spate condition. In addition to technical support, these Officers also provide capability in on-going development and provide additional services such as Fire Service Business Intelligence (data mining, and analysis) to member Fire Authorities. These staff also involved in sustaining continuous improvement in technical and business process's within the Centre.

Figure 2.3 Summary data of the three Regional Control centres at Q3 2011

Name	Eastern Region	West Region	Munster Region	Note
Call Sign	ERCC	WRCC	3MRCC	alias; CAMP East, West & Munster
Location	Dublin	Castlebar	Limerick	
Contracting Authority	Dublin City Council	Mayo County Council	Limerick City Council	Section 85, Local Government Act
Fire Authorities Encompassed	14 Fire Authorities	6 Fire Authorities	10 Fire Authorities	ERCC; Kildare and Offaly are not RCC members
Outturn 2011, Fire Activity only	€3,403,490	€2,110,000	€2,446,361	For Fire Service activities only
Incoming Calls via ECAS	48,781	11,088	16,578	112/999 from BT's ECAS
Incoming Calls from Others	45,785	6,623	14,352	HSE, Garda, Running call, Controlled burning, i.e.Incident related.
Total Incoming Calls	94,566	17,711	30,930	
Ambulance Incidents	71,171	0	0	Not included in ERCC Outturn
Fire Incidents 2010	26,954	7,080	14,352	
Managerial +Sustaining staff	2+ 4	1+ 0	1+2	Managers + Engineers
Emergency Control Operators	4+16*	6 + 12	8+15	ECO supervisors +ECOs
Total Staff	25	19	26	ERCC; 20 firefighters internally apportioned to Fire Incidents.
ISO Accreditation	Yes	No	Yes	
CAD System	Steria Storm	Fortek Vison	Capita Firecat	Capita recently acquired Sungard Public Sector Ltd. No Common CAD platform
Address Validation system	Multisource Gazeeter	GIS integrated into CAD	GIS integrated into CAD	No Common Address Database in use.
Area kM²	19,332	21,866	29,075	Total: 70,273
No. of Firestations Retained+Day manned +Fulltime	72+0+12	51+1+1	65 + 4	Total: 206 (excluding Kildare (6) and Offaly (5)).
Population Served	2,347,816	714,502	1,238,777	2011 Census, 4.3 Million, remainder in Kildare and Offaly
Percentage population	54.6%	16.6%	28.8%	

* Notional numbers for fire calls only out of total ERCC staffing and is subject to re-evaluation when ambulance calls revert to the HSE

Budgets

Costs of running the centres are apportioned on the basis of an "average of averages" formula (based on aggregated percentage of rates, population and numbers of calls per participating authority). This formula has been in place since the beginning of the service. The possibility of moving to a national, as distinct from the current regional, cost apportionment model is discussed later in the report. Summary financial information on the three centres is included in the table above.

2.6 Recognised Weaknesses of the Current System

Whilst significant achievements were made in terms of standardising the approach across the three Regional Centres, some weaknesses are seen to exist within the current CAMP structure.

Each RCC has a different mobilising (Computer Aided Dispatch/CAD) system in use. When the project was conceived, having a multi-vendor market situation was seen as an important goal to avoid exploitation by a sole supplier. However this policy has resulted in Fortek and Capita Sungard, being used in two of the controls, WRCC and MRCC respectively, a third system from Steria is in use by the ERCC. Each control has a separate, scaled down fallback capability in the event of the main control room becoming inoperable. There are no facilities or arrangements in place for RCCs to assist each other with call handling or mobilising during spate conditions e.g. extreme weather events, such as the flooding event in the Dublin area on 24 October 2011. Although both are staffed to provide minimal staffing levels, Camp West has a low call rate with an average of 7,000 incidents per annum as opposed to 14,000 for Camp Munster. Camp East at 27,000 incidents has a nominal staffing figure for budget purposes.

Each regional communications centre currently operates its own voice and data network. The three networks, whilst similar technology (circuit switch frequency division multiplexing) is used throughout, were designed in isolation without the future potential of interconnecting the networks being considered.

A civilian staffing model, which was a fundamental element of the original business case, was not achieved in the CAMP East. This is perceived to be connected with DFB staff desire to retain control of ambulance calls as they provide an emergency ambulance service in much of the Dublin area.

3 - Current Issues

3.1 Drivers for the Review

The Fire Services CAMP arrangement is currently facing a number of issues that necessitate a strategic review. Whilst CAMP has been a demonstrably successful IT project in moving the Fire Service in Ireland forward through the implementation of three regional communication centres to a set of common objectives, there is now an imperative to review the current situation to address evolving issues. The principal drivers for underpinning the necessity of a strategic review of the CAMP system at this time are set out below.

The first is the decision by the Health Service Executive (HSE) to consolidate call taking and dispatch for ambulances in two centres, thereby impacting on directly on both CAMP East (reduction in call traffic) and in CAMP West (reduction in revenue funding). The Health Service Executive, (HSE), currently utilise the Fire Service control in Camp East to handle and mobilise DFB ambulance calls for the Dublin area. The HSE also use the communications infrastructure of Camp West to support their ambulance service. HSE have decided to undertake a consolidation of their call handling and mobilising systems and proposed to take over responsibility for the Dublin ambulance calls from October 2011. This target date has not materialised and there is uncertainty as to the exact timing of the transition. The change will also impact on Camp West from a target date of May 2012 after which the CAMP infrastructure will no longer be utilised by the ambulance service when they migrate to the TETRA system.

Whilst the major change by the HSE would in its own right prompt a review to be carried out on the current arrangements within the fire services Regional Communications Centres, there are some additional issues prompting the review.

- The Programme for Government is seeking to achieve efficiency savings through shared services, value for money initiatives (including better use of existing infrastructure) as well as ensuring a focus on quality, integrated public services.

- The economic climate is very difficult for local authorities who fund the fire services including the CAMP system, and all areas of expenditure are being critically reviewed; There is a need to consider a new 'Shared Services' business model, with a view to achieving equity, sustainability and consistency in delivering a critical emergency service function for the public in an economical manner, given that the original CAMP model was designed around three regions.

- There is also a need to align with broader national communications initiatives. New technology, and in particular the migration of both An Garda Síochána (AGS) and the HSE to the National Digital Radio System (NDRS) based on the TETRA standard. It is also clear that the current fire service systems in low-band VHF is not sustainable into the long-term future. A move to a new radio system requires compatibility to be assured with both current and future mobilising systems.

- The life cycle of the existing CAMP technical infrastructure systems and the requirement for funding for upgrading/system replacement. While the current CAMP IT systems have maintenance agreements in place, it is sensible at this time to consider the future structure of the control provision and begin to plan for the next generation of controls and systems. Should a significant change of structure or re-organisation be planned, the timescales for such a project would be in the region of a minimum of 36 months.

- Requirements for additional functionality e.g. mobile data, location services, officer paging have emerged, and need to be considered. The original CAMP user requirements are now almost 20 years old and there has been considerable change in both fire service operational procedures and information technology in the intervening period, a validation and verification on CAMP user requirements would seem appropriate.

- Need to consider facilities and arrangements to provide mutual support capability in overwhelming 112/ 999 call load conditions.

3.2 National Context

To date, CAMP has delivered successfully the statutory function of local authorities under Section 10 (3) of the Fire Services Act, 1981 through a shared service model based on three distinct regions. The shared service model is implemented through section 85 of the Local Government Act , 2001. The benefits delivered through this initiative have been significant. Further, the shared service model has provided for the participation of the ambulance service in the facilities in Castlebar, CAMP West, and in Dublin, CAMP East.

Although a national level initiative, led, co-ordinated and funded by the Department of Environment, which delivered a nationally agreed set of user requirements, as noted above the three CAMP regions have differing underpinning technical solutions. Further, whilst the West and Munster utilise civilian control room operators, in the East the control room is staffed by fire-fighters. Any review of Fire Service control room arrangements will need to be undertaken against the back drop that there will be significant issues that need to be resolved from both a

technical and operational perspective if change is to be effected; and this is before any consideration of new ICT initiatives, such as the National Digital Radio System, would commence.

On its own, the decision by the Health Services Executive to consolidate call taking and dispatch for ambulances has a fundamental impact upon CAMP, through reducing both revenue funding and call traffic to the extent that there is no "Do Nothing" option available. Put alongside the national ICT initiatives being led by the Centre for Management and Organisation Development (CMOD) in the Department of Public Expenditure and Reform (formerly Finance) – National Digital Radio System; Emergency Service Control Room call taking & dispatch equipment; Command and Control & ICCS solutions; Emergency Call Answering Service (ECAS); LGMA National Information Society Framework – then it is appropriate for the Fire Service to carry out a strategic review of CAMP and embrace those ICT initiatives that can have a positive impact upon the delivery of the statutory duties of the fire authorities. Given that the economic climate is very difficult across the public sector in Ireland – and revenue funding for CAMP is provided by the Local Authorities – then consideration can also be given to extending the shared service model beyond Fire Service functions to address the needs of the Local Authorities and their other day-to-day service provision for the public.

3.3 Impact of HSE consolidation

The two key issues from the HSE decision to consolidate relate to addressing the underlying funding issue caused by withdrawal of HSE funding to the CAMP West centre that previously supported Ambulance activity; and the need to address the reduction in service provision through the removal of Ambulance control activity from CAMP East.

The key figures to note are that CAMP East will require a much-reduced staffing complement to deal with fire related incidents; and that CAMP West will lose ~30% of its annual income for a facility that is already sub-optimal in operator loading for what are the minimum practical staffing levels. One of the obvious options in looking forward is a rebalancing of the work load across the three communications facilities that are in place to support the Fire Services.

3.4 CMOD initiatives

As already noted, CMOD has a number of initiatives that are related to the provision of ICT services for the emergency service organisations. In a recent meeting with the Review team, CMOD expressed their aim as being to ensure that maximum use was made of the shared service initiatives which they are implementing. They have

also indicated that they will facilitate any cross government transfer of licences or equipment that is of benefit to the Fire Services where the current users no longer have a specific need. (One example of this could be the Fortek Vision Command & Control application currently used by the HSE in the West of Ireland; and also used by CAMP West).

Looking at each of the key CMOD initiatives in turn:

National Digital Radio System (NDRS)

The NDRS is a national mobile communications platform, based upon the TETRA digital radio standard. The system was procured by CMOD in response to a requirement of An Garda Síochána for a secure, nationwide, integrated communications service. An Garda Síochána has already migrated onto NDRS as have the Irish Prison Service and the Customs and Excise units of the Revenue Commissioners. The HSE are in the process of doing so as a key component in the consolidation of communication centres. The NDRS was used successfully (with some learning points) to support AGS communications relating to visits by heads of state in May 2011. From an operational perspective, NDRS can also offer the Fire Services significant benefits, including:

- A secure, nationwide mobile communications platform providing high levels of coverage
- Utilises up-to-date radio technology that has been adopted by the vast majority of Emergency Service Operators across Europe and further a field
- Feature rich voice services including point to point calls, group call and emergency calls
- Supports low speed data that is proven for mission critical applications
- A resilient network architecture to maximise availability
- Supports set-to-set working (Direct Mode) for local site communication where there is limited or no system coverage
- Applications such as two-way paging and lone worker solutions are available
- Supports Inter-agency voice communication.

NDRS is provided as a fully managed DBO service by TETRA Ireland Ltd and, from an operational perspective, it is apparent that the Fire Services should migrate to NDRS as its current communications systems need replacement. Other factors in timescales for migration will be the readiness of the communications control function to be capable of integrating the NDRS data delivery into such as computer aided dispatch (or command & control) systems to ensure no break in current functionality. The mobilisation function for the retained fire service remains a key, but unique requirement, for any new system.

However, one of the primary issues with migration of fire services to NDRS will be financial. The NDRS operates on a 'pay per functionality' basis (payable monthly similar to a phone bill) and this will give rise to a revenue expenditure stream. However these costs may be offset by savings from the maintenance, rental and licensing of the current telecommunications infrastructure. The actual charges for fire services use of NDRS will depend on a detailed "fleet mapping" exercise to calculate a more precise estimate of the likely annual cost of NDRS radio communications.

The Fire Service has provided an input on the User Requirements during the procurement stages of TETRA, which was led and managed by CMOD. In moving in this direction, there is an assumption that service provision arrangements between CMOD and the company are secure, and that the NDRS infrastructure will continue to be available to support emergency services throughout the term of the contract.

Integrated Communications Control System (ICCS)

ICCS systems provide an integrated platform for handling incoming telephony calls – and in particular emergency calls such as those delivered via the BT ECAS service – and for dispatch functions over mobile radio systems. CMOD has procured an ICCS solution from Capita Sungard based upon their DS2000 product that is understood to provide connectivity to NDRS, ECAS and the PSTN and which would operate as a "virtual" ICCS solution (i.e. all operator positions are remote to the switching equipment). This solution may offer operational benefits to the fire services and will be considered fully in light of the user requirements of the Fire Service. This solution also has the benefit of being a cost effective means of accessing the NDRS from any regional control centre. The purchase of a single ICCS solution for the Fire service would incur significant capital expenditure, whereas access to the CMOD ICCS should provide capital expenditure savings through shared infrastructure. The pricing and multi-service management arrangements for this possibility have yet to be developed.

Command & Control

CMOD, on behalf of the HSE, are currently leading an exercise to procure a Command & Control solution that is anticipated to meet not only the needs of the HSE for ambulance service incident management but also for the other emergency service organisations. At this stage little information is available as to the solution itself. This facility will also be an option for consideration by the Fire Service when matching its user requirements to technical solutions for the next generation of command and control systems, subject to the same constraints as the ICCS above.

Other CMOD Initiatives

One current CMOD initiated project that is in the final stages of testing and acceptance is the routing of Emergency call traffic from ECAS centres to the

communication centres operated by all emergency services. Using Voice over IP technology, calls from the ECAS centres are routed to the destination control centre (AGS, HSE, Fire or Coastguard) via the Government Data Network (GovNet). This initiative provides an alternate redundant path to the Public Switched Telephone Network (PSTN) to deliver emergency call traffic.

3.5 Developing the Current "Shared Services" Model

Shared Services – particularly around ICT functions – offer the opportunity to increase efficiency and effectiveness, and are now a very important issue in public service provision, and especially in the context of local authority service provision. The CAMP initiative was a very early example of a successful shared services initiative. Although 20 years on, CAMP may look somewhat limited in its scope, but it has shown that there is both a case for shared services, and a capability for dealing with the difficult realities of delivering this across the Fire Services. While the approach was regional, CAMP has shown that this approach does work, notwithstanding the very real difficulties encountered which were discussed earlier. The next stage for CAMP could be to develop a national ICT infrastructure and complimentary support services for the Fire Service and local authority emergency management. This would need to be done as part of a broader initiative by the Local Authorities, who individually fund fire service provisions, the LGMA and the National Directorate for Fire & Emergency Management who have national co-ordination mandates, and the broader Government structures including CMOD, who have a number of relevant national initiatives and interests.

The continuing objective should be to shape the future for the better – seeking standardisation at a national level to ensure consistency of information and decision making. Further development should fit with broader changes in local government system, and build on what is recognised as a unique level of collaboration and set of working arrangements between fire authorities and the NDFEM of the DECLG. A further development has the potential of acting as a demonstration project for the sector – showing possibilities can be delivered. There is sufficient practical experience to recognise the hard graft necessary and the difficulties which have to be overcome.

One weakness of CAMP has been the somewhat piecemeal collection and delivery of management information; moving forward there is an opportunity to standardise management information and have this available in real-time. Whatever the future shape of the CAMP communications control function, the CAMP locations can provide the hub for managing and collating management information in relation to incidents, use and status of resources, and plans relating to fire prevention and control. In this way, the CAMP centres are much more than 112/999 call answering services, and they are ideally suited to develop into central management

information hubs. They should be appropriately separate from the operational fire service – centres for collecting, processing and distributing data and management information – with connectivity out to all Fire Service stakeholders/ service users (individual fire stations; local fire service HQs; local authority HQs; National Directorate; etc). There is also the opportunity to broaden the remit should local authorities wish to avail themselves further of the facilities – be that data storage, the use of the call taking facility for non-emergency calls, or as a contact point for staff and in particular those who fall into the category of "Lone Worker".

In essence, a revised shared services model could involve an evolution from the current region-based system to a national ICT governance structure for fire services (also developing other shared support services), linked with the introduction of the National Directorate for Fire and Emergency Management, and integrated with other shared services, ICT staff development and engagement with Fire and Emergency management professionals to drive ICT based service transformation towards consistency in quality public services, and to provide real-time and independent service management information.

3.6 International Trends

United Kingdom

It is commonly understood that large-scale IT projects carry major risk, as they rarely meet initial timescales and often fail to deliver expected benefits. When this is linked with an emergency service, the risk in terms of failing to deliver a critical service multiplies by a significant factor. A current example of technical risk in such projects, if not mitigated through effective project management, is the abandonment of the UK FiReControl project. FiReControl was an ambitious UK Fire Control project with the goal of rationalising 49 local communication centres in the UK to 9 regional communication centres, primarily driven to by the desire to achieve efficiency and savings. The project was besieged by delays and spiralling costs before being terminated in early 2011 after 7 years. The project spend at that stage was in excess of £494 million, with future liability on leases for unoccupied communication centres. The project has been investigated by the UK treasury select committee, and a 2011 report from the UK Audit Office 7 describes the project as "a comprehensive failure". The FiReControl project has also had a major effect on the market for command and control systems within the UK, with the collapse of FiReControl there is now intense market activity as Fire and Rescue services procure solutions from vendors who were excluded from FiReControl contracts.

Scotland

The Scottish Government have consulted on the arrangements for the delivery of the police and fire service and decided there will be a single Scottish Fire Service

formed from the current eight Fire and Rescue services. Following on from that decision, the existence of the current eight Fire Controls is in question. Whether they should remain as eight Controls or if the function should in fact be carried out by one, two or three Communication centres is understood to be the main consideration in Scotland currently.

Wales

Wales, which had previously consolidated eight Fire and Rescue Services into three (including control centres) has undertaken a further review and has redesigned their Fire Control solution to provide a robust fallback and buddy system to each Control. They are maintaining the three Controls, which they feel best suits their needs but have significantly improved their resilience and ability to cope with short term spikes in call traffic by the use of a 'buddy' mechanism. Each of the three communication centres has a defined 'buddy' centre (one of the other two communication centres); at times of peak load (or systems failure) each control centre can handoff some or all of its workload to its 'buddy' centre. The three CAD systems in Wales are effectively integrated into one system, an ECO in North Wales can take a call from its buddy's region and mobilise resources to it via Inter-CAD communications. The Welsh architecture has significant lessons for the current Irish structure, where each RCC operates in isolation and must maintain its own backup/fallback centre for its region. With the Welsh RCC architecture, there is no additional cost for each RCC in maintaining a backup system; the backup is the buddy which is a fully functional and live control centre rather than a mothballed facility in the current Irish architecture. The Welsh system also employs dynamic load balancing whereby an overloaded or undermanned RCC can pass workload to its buddy in real-time

The Welsh Controls handle approximately 55,000 incidents per year, which is comparable to 47,000 in Ireland. The Welsh experience may be of significant interest, as all three Welsh Controls use the Fortek mobilising system which is the same as that used by Camp West (WRCC). As part of this CAMP review process, NDFEM staff have attended the 'Wales in Control' seminar hosted by the three Fire services in Wales where all aspects of the Welsh Control were presented, by both the solution providers and the end users of the control system.

The major deliverables of the Welsh control project were;

1. Resilient Architecture by providing an additional Fortek server and four workstations for each FRS, physically located at the Buddy site, and connecting the Control Rooms together over the PSBA network
2. Shared Gazetteer – an "All Wales" premise level Gazetteer. This allows any control room operator in any of the three FRSs to search for and use, in their own local system, a geo-coded address anywhere in the country.

3. InterCAD Interface – linking the Control Rooms together so that incidents may be passed between them, and resources tracked when providing assistance to a neighbour
4. RAPPEL,system which tracks the availability of individual retained fire-fighters, in order to determine the availability of the appliances they crew
5. Emergency Co-ordination Centre for Wales ECC (W) – supplying a Fortek Command Client for each FRS to allow staff located at ECC (W) to monitor FRS activities during a major incident/ emergency event

Australia – New South Wales

In NSW, in common with all Australian States, there are 2 fire services – Fire & Rescue NSW (FRNSW) which looks after all the major towns in NSW and Rural Fire Service (RFS) that looks after everywhere else. FRNSW is generally whole time fire fighters and RFS has a predominantly retained/ volunteer service. NSW also has the State Emergency Service (SES) which is predominantly a volunteer service that looks after floods, storm damage, etc.

FRNSW currently has 4 communication centres that are in the process of being consolidated to 2 larger ones. RFS and SES, although having a control centre, tend to set up smaller localised, simpler communication centres for particular incidents (e.g. a flood for SES or a bushfire for RFS). There is a move underway – it has been underway for several years – to get SES to use FRNSW facilities and consolidate into an FRNSW centre – this may start to happen over the next year or so as SES are already adopting FRNSW back-end systems and to potentially share communications infrastructure with FRNSW. The upgrade by FRNSW to Fortek's VISION for dispatch has been designed to support SES requirements. Likewise, RFS is being consulted in relation to the usage of FRNSW communications infrastructure. All three agencies use the Government Radio Network (GRN) which is a common platform; and all agencies are moving to use P25 non-trunking for their own PMR networks where there is no GRN coverage. A government "Telco Authority" has been formed in NSW to essentially takeover the ownership and operations of all communications infrastructure, including GRN and radio infrastructure for all agencies in NSW, an initiative that will help facilitate centralising facilities.

Traditionally, the local councils have provided substantial funding to FRS and SES for the provision of services. The State Government is starting on the path to centralise this funding and to provide that the insurance companies also contribute to these services. For example, the insurance industry (through a levy on fire policies) contributes about 73% of FRNSW expenditure.

Queensland

In Queensland, Queensland Fire and Rescue Service (QFRS) is part of the Department of Community Safety along with Emergency Management Queensland (EMQ) – which also directs the volunteer SES – and Queensland Ambulance Service (QAS).

QFRS, of which the Rural Fire Service (RFS) (including thousands of volunteers) forms a part, currently has seven communications centres distributed across the state. QAS also has seven communications centres, and EMQ operates one state crisis centres.

QFRS (and QAS and QPS) all have stated strategies to reduce the numbers of Communications Centres. Enabling projects to sort out communications including improving technical interoperability, improve CAD and telephony interoperability/virtualization are in varying degrees of progress.

QPS and DCS have a joint governance structure providing for collaborative development of Public Safety Communications. Under this governance, a portfolio of five programs is being managed, Pubic Safety Front-line Communications, fixed data networks, CAD applications, telephony, and finally facilities.

It is understood that two communications centres would be a target for Queensland.

South Australia.

The South Australian Metropolitan Fire Service (MFS) is the primary provider of structural fire fighting services to the State of South Australia. The MFS employs more than 1000 staff across 36 Stations (19 metropolitan, 17 regional), and has its headquarters in the Adelaide CBD. The MFS attends around 20,000 incidents each year.

The South Australia Country Fire Service (CFS) is a volunteer-based fire and emergency service dedicated to protecting life, property and environmental assets in regional and semi-metropolitan South Australia. The CFS has approximately 15,000 volunteers and 110 staff, and provides a range of fire and emergency services to more than 434 communities across the state. The CFS attends around 7,000 incidents each year, including bushfires, motor vehicle accidents and hazardous material (HAZMAT) incidents. The CFS also works closely with local government to perform the important roles of fuel removal, bushfire prevention and community bushfire and fire safety education.

The State Emergency Service (SES) is a volunteer emergency service organisation established under an Act of Parliament to render immediate assistance during emergencies and disasters, to provide community response to 'day to day' incidents such as vehicle accidents, searches, cliff rescues, flood and storm damage situations and any other incidents that might require rescue or search services. The SES is made up of approximately 1500 volunteers in 67 units across South Australia, and attends around 6,000 incidents each year.

Sitting across the top of all the above is SAFECOM, the South Australian Fire and Emergency Services Commission, which reports up to the Minister for Emergency Services.

Since 2007, emergency call receipt and dispatch (CRD) functions for MFS, CFS and SES have been integrated into a single Communications Centre (ComCen) located at the MFS headquarters in Adelaide. The legacy MFS CAD system is about to be replaced with Intergraph's I/Dispatcher, by the South Australian Computer Aided Dispatch (SACAD) project.

Disaster recovery involves relocating the CRD function to another agency's ComCen – SA Police have a single ComCen in Adelaide, as do SA Ambulance, and the three agencies have a mutual arrangement to provide DR facilities for each other.
The consolidation of CFS and SES dispatch functions to the MFS ComCen in 2007 was not popular with the CFS at the time, and there's still some lingering discontent reported with the arrangement, but in general it seems to work well.

All agencies in SA use the SAGRN radio network, and the fire services in particular rely heavily on the paging network for calling out volunteers.

Conclusion

The brief review of international practice is presented as a reminder of the risk and difficulty associated with developments in this field, and that success is never assured but must be managed carefully. The experience in Wales looks particularly relevant to the current Irish situation.

4 – Description and Appraisal of the Current CAMP IT and Communications Systems

4.1 Life-cycle of existing equipment

The existing equipment across the three CAMP centres is by and large reaching "end-of-life" and is based upon a set of user requirements first agreed around 1993. CAMP Munster has contracted support for a further 2 years; and CAMP West signed a new 5-year support contract in mid-2009 with the option to extend for an additional 2 years. CAMP East has support for their C&C system (Storm) through to 2016 – but have highlighted that they will need to invest a considerable sum as the Oracle 8i Enterprise Database in use by the Storm CAD system is no longer supported by their third party technical support contractor; this is a potentially significant investment at this point in time.

Whilst all three CAMP regions have on-going support for the systems implemented, some service contractors have raised concern in sourcing drop in replacement components. In particular, some sections of the radio communications network may have extended repair times, as re-engineering with available components will required to affect a repair. Such re-engineering will extend mean times to repair and increase repair charges. Should the need arise to purchase any additional equipment to the same specifications for expansion or interoperability then this may prove difficult.

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4.2 Systems Analysis

The following sub-sections look at each of the main building blocks of the CAMP ICT infrastructure and highlight potential short term issues when considering "quick wins", and looking to the future as to likely technical options. Above all of this when considering change, care must be exercised to ensure that appropriate fall back mechanisms are in place in the event of equipment failure and, in the event

that a degree of compromise is necessary, a risk analysis approach is recommended.

Call Taking

Delivery of emergency and non-emergency calls into a control room

Short Term: No major issues foreseen: all 3 RCCs have ECAS access; any load balancing will need to determine that delivery capacity is sized to cope with peak call loads

Future: Digital delivery available to any control room location

Mobilising

The alerting of both whole time and retained fire stations to respond to an incident. This is currently carried out using the radio system, with the PSTN as a fall back route. The radio data gateway has primary and secondary hill-top sites assigned for each fire station with fixed call set-up and retry times to minimise the delay in mobilising should there be a communications failure.

Short Term: There are potential issues with different data formats being used across the 3 CAMP systems. Work to align all 3 CAMP systems to the same format will be required which will impact central communications equipment; station end equipment; and potentially hill top site equipment. This alignment may not be a trivial task.

Future: The NDRS should provide a suitable radio bearer for over-the-air mobilising, with a TETRA fixed radio being used at individual Fire Stations to set off local paging alerters; the PSTN can still be used as a fall back route. There is an option to use two-way TETRA pagers – but further consideration will be required as to the fall back should the NDRS be unavailable, as this is a critical fire service function.

Station End

Each fire station has equipment to alert the crew to respond to an incident – this includes a printer, alerting equipment for a retained fire station, and ancillary device controls (e.g. open station doors, sound a siren, etc.)

Short Term: As well as the mobilising issues highlighted above, there are potential issues with regard to message formats for printed messages and "health" indications that are relayed back to the RCC (e.g. battery health, running out of paper, etc.).

Future: From an equipment age perspective, there will be a need to refresh all station end equipment. In this context, the use of two-way TETRA pagers for mobilising may prove to be a cost effective solution, as long as suitable arrangements are in place in the case of NDRS unavailability.

Radio System

The configuration of the radio systems for each region follows a common format. A regional channel supporting mobile data; a regional channel for voice communication; and a local channel generally on a one per hilltop site basis. All of the radio channels terminate at the appropriate RCC.

Short Term: The current radio systems are configured around the RCC being a hub for hill-top site terminations and channel control. Each utilises equipment from different manufacturers with subtle differences in control signalling and functionality. Any control room configuration other than the present 3 RCC model will require significant work to be carried out to enable radio channel control to be achieved – it might prove quicker and less costly to consider migration of some or all county fire services to the NDRS at this point, rather than trying to undertake such an exercise.

Future: Operationally, migration to the NDRS may be the only viable option; from a cost perspective.

Microwave

Connectivity for the radio system from each RCC to the individual hill top sites is provided by means of semi resilient microwave radio networks; further, in Munster the microwave radio network is used to support Wide Area Network connectivity for some local authorities.

Short Term: The current radio systems are configured around the RCC being a hub for hill-top site terminations and channel control; it is around this configuration that the microwave radio network has been designed. Any control room configuration other than the present 3 RCC model may require major work to be carried out, with additional higher capacity connections potentially reverting to land line connectivity. As well as the actual link equipment, consideration would need to be given to the multiplex solution and the ability to reconfigure this to the necessary circuit routings. Depending upon the level of reconfiguration, then this would add again to the argument that it may prove quicker and less costly to

consider migration of some or all county fire services to the NDRS at this point.

Future: Migration to the NDRS for radio communication would render the vast majority of microwave links obsolete.

ICCS

ICCS systems are implemented in CAMP West and East; Munster does not utilise ICCS technology instead having a separate telephony solution for call taking, and radio dispatcher for radio communication. The ICCS provides an integrated telephony and radio system – providing control of the radio channels – and receiving resource status messages including emergency calls.

Short Term: The two key issues for the ICCS solutions – as well as the Munster radio dispatch equipment – are the number of operator positions that will be required as a result of any load balancing; and the number of radio channel terminations available (both in terms of populated termination cards and spare slots).

Future: One future option upon migration to the NDRS is to consider the ICCS solution being implemented by CMOD. Alternatively, it could be questioned whether an ICCS is required at all – in this scenario there would be a networked telephony solution for call taking and the possibility of utilising the Command & Control system as the conduit for voice calls, a feature that the NDRS lends itself well to.

C&C

The Command & Control (or Computer Aided Dispatch) system sits at the heart of fire service operations. Three different manufacturer's solutions have been implemented across CAMP. Integral to C&C is the Geographical Information System (GIS) – this has the geocoding information for the region and pre-planned turnout instructions for specific address premises, category of incident, etc. It maintains the status of all resources so that when resourcing an incident the operator has full knowledge of the availability of resources able to respond. For each and every incident a full log of actions is maintained; this information can then be used by a Management Information System module to produce a suite of reports.

Short Term: The key issue short term is to have national location address information held on each C&C system such that any Communications Control room can take a call for anywhere in

Ireland and can mobilise any resource. Whilst updates for resources may not be automatically shared across the C&C systems, at least there will be an element of incident control. The effort required to achieve this should not be underestimated; and it is likely to be more difficult to do this for three separate C&C systems than one common system.

Future: Looking to the future, it will be necessary to consider having one CC system that sits across all of the communication control rooms. In theory this could be achieved through enhancements to any one of the existing systems – but care will be required to ensure that the correct level of integration can be achieved with the NDRS; that future initiatives, such as mobile data, can be cost effectively achieved; and that management reporting to a higher standard than is achieved at present can be facilitated. In essence, any new C&C system will sit at the heart of what could be termed a "system of systems". The CMOD procured system for the HSE will also need to be considered as a possibility for this function, bearing in mind the long-established, specific fire service user requirements.

Peripherals

All of the major building blocks of the CAMP ICT infrastructure have been described above. However, certainly when considering the short term, items such as UPS power systems; voice recording; and general suitability of equipment rooms must be taken into account also.

5 – Future Direction and Vision

5.1 Introduction

Whilst CAMP has undoubtedly realised a good many benefits since its inception, it is also recognised to have a number of key areas for improvement. These need to be addressed as part of this Strategic Review and help shape the future direction and vision for the Fire Service. To move to a national, rather than regional, basis for service provision CAMP requires facilitation work to be completed, specifically;

- Removing any boundaries that exist between the current RCCs in relation to the technical infrastructure, geographical data, processes, and the staff
- Ensuring that there is a common approach by all Brigades

Once the facilitation work, as described above, has been completed then the foundations will be in place upon which to build for the future which can address current weaknesses and implement new initiatives. In particular there are additional requirements with regard to;

- Overall availability and consistency of management information
- Data processing
- Providing a 24-hour emergency operations centre capability, which can serve both local and regional, as well as being integrated with national needs.

Setting a simple vision of fire services in Ireland that operates under the auspices of a national communications strategy and is in line with cross government ICT initiatives, with common operating and management information processes, that support the shared service philosophy, and which does so in a manner that is demonstrably cost effective, will be key factors in shaping the future direction.

5.1.1 "A Connected Fire Service"

Setting the goal to achieve Fire Services that operate to national standards and procedures requires common operational requirements and underpinning technical architecture. With the communication centres forming technical, interconnected, information hubs there needs to be connectivity out to individual fire brigade headquarters; and then onwards to individual fire stations. A national wide area network architecture – utilising where ever possible government network initiatives – will be an enabler for the achievement of national standards providing the platform upon which to deliver and share management information; e-learning and training standards; and ensure more effective working practices through the availability of real time information in terms of both provision and input/creation.

Information can be variously categorised – safety critical; mission critical; business critical; and general operational – with each category having different delivery (in terms of timing) and resilience requirements that need to be taken into account. Assessing the nature and needs of information flows within the fire service will be an important step to developing the requirements that will help determine just what shape "A Connected Fire Service" takes from a network architecture as well as support applications and overall ICT support perspectives.

The technical architecture could be based upon an agreed national framework that determines the connectivity requirements for differing location types. For example, a rural retained fire station will have differing needs from an urban whole time station – and most likely different communication solutions available to meet those requirements. Ireland has invested significantly in ensuring that there are broadband services available nationally both for citizens and government agencies alike; now is the time for the Fire Services to take advantage of this investment in a structured manner.

5.1.2 Management Information

The Fire Service of today is no longer only about responding to incidents, fundamental though that remains. Risk assessment and risk management is central to the work of fire brigades requiring effective geographic and management information tools. The ability to review incident and resource data helps with fire prevention work and can increase response effectiveness – both of which have to some degree been borne out by the initial implementation of CAMP.

Any national strategy should ensure that management information is not provided piecemeal but rather follows national guidelines and expectations for overall reporting. This will ensure consistency across all fire authorities and assist the National Directorate for Fire & Emergency Planning to develop policy based on common information sets. It will enable better informed funding decisions and targeted initiatives, both to the citizen and for individual brigades.

Finally, from an emergency management perspective, the availability of real-time management information will ensure that decisions can be fully informed and be made with a better understanding of the potential impact they may have. Integral to the procurement of a new C&C application – or upgrade of a legacy application – will be an agreed set of user requirements defining the Management Information necessary across the Fire Service.

5.1.3 National Standards

The provision of Fire Services is an essential function within the overall community, reflected by the fact that they are governed by statutory obligations. CAMP has

developed a closer relationship between the individual fire brigades but there remain some counties who can be considered "out on a limb" through their non-participation in CAMP. Kildare and Offaly maintain their own mobilisation system based at Newbridge – and there are some practices that are either local or, at best, regional. It is seen that the Fire Services should aim to provide a consistent level of service nationally. To be able to do that requires an overarching governance framework that comprises working structures, national standards, policies and procedures. These should be driven by good practice, value for money and seek to bring all fire brigades to an appropriate level, commensurate with the risks found in that community.

Similar goals will apply to CAMP. Communication rooms must be appropriately staffed – and this would suggest that the utilisation of dedicated Emergency Control Operators must be achieved nationally. The use of fire fighting staff within the communications room environment, as is the case currently in the East RCC, is not only expensive in simple monetary terms, but also diverting highly trained fire staff away from their primary roles of delivering services to the public. The earlier CAMP experience has proven that the use of dedicated Emergency Control Operators is both achievable and effective in Ireland, and provides a basis for consistently high quality service to the public as well as ancillary ICT and emergency management services.

5.1.4 Funding

In the current context, capital funding will only be available for the most cost effective solutions, and will be subject to the current economic constraints. The solution will have to satisfy the revised fire service user requirements. Revenue funding is also subject to constraints. A national cost apportionment model would spread out the revenue expenditure 'evenly' throughout the country. Counties with similar characteristics would pay similar contributions under a national apportionment model, and may be seen therefore to be equitable. A national cost apportionment model is a precursor to moving the system to a national CAMP service delivery model. However, it does raise issues with respect to the governance of the system.

5.2 User Requirements

The original CAMP User Requirements have stood the test of time, and will form a sound basis upon which a new/ updated set of User Requirements can be drafted. It is important that the User Requirements reflect the operational, rather than technical, needs for the service – and that they clearly articulate service delivery expectations against which implementation and subsequent delivery of the strategy can be measured.

In determining the extent of innovation and use of new technology the User Requirements will have a key role to play. As an example, internationally, there is a drive for ensuring that mission critical mobile communication networks are able to support high bandwidth applications; however, it remains unclear as to just what these applications may be. Fire Services recognise the value of real time video and that this requires high bandwidth mobile connectivity – but does this extend to a need to send it beyond the fire ground, requiring wide area, real-time, video transmission? If yes, then this will have a significant impact upon the wide area mobile communication requirements and the need for a high bandwidth capability away from the vicinity of the fire ground, and adding complexity and cost. Examples such as this highlight the importance of ensuring User Requirements are well thought through and are supported by operational process and their mapping to resources, roles, and locations.

Recommendation – It is recommended that the current CAMP User Requirements are revisited and updated.

5.3 Optimal use of Technology [Technical Analysis of Requirements]

It is important that technology is not the driver but a facilitator of change. Section [4] of this discussion document outlines the main building blocks of the current CAMP ICT infrastructure and the short term and future options that need to be considered to enable the Future Direction and Vision of CAMP.

Conclusion – Many of the short term issues must be resolved to enable CAMP to be able to move from a wholly regional to a national structure.

Technology choices will be available; and the optimal use of technology will enable key tenets of the operational requirements to be met including levels of availability; mechanisms for fall back and disaster recovery; common working practices; and homogenous delivery mechanisms for information transfer and processing.

5.3.1 NDRS

The fleetmap[2] is essential in determining the configuration of all radio devices – and delivery gateways – that will use the NDRS; the implications of incorrect device configuration can be extensive given a small change can have a substantial impact once devices have been distributed across the country. The fleetmap will also need to take account of the national fleetmap requirements for the emergency services as a whole in determining requirements for interoperability between agencies. It

[2] Fleet mapping is the mechanism by which the strategic policies and business objectives of the Fire Service are embedded into the working practices of that organisation and aligned with the supporting features and services available from NDRS such that those objectives can be achieved.

will also aid an overall strategy for the migration (that applies to each and every fire brigade) to NDRS; the migration strategy should outline the context, responsibilities for maintaining communications, reinforce key user requirements, opportunities for efficiency improvements, and an understanding of funding and procurement/sourcing implications.

Looking to the core communication control room technology, Command & Control (or CAD system), then the architecture of the system, or systems, will be just as important as the core functionality. It is accepted practice that emergency services have one core system – and that each control room operates as a virtual entity around the core. This concept is a key enabler to ensuring information is shared across all communication control rooms aiding resilience and disaster recovery; to enable effective load sharing during both normal and spate conditions; and to ensure standardised work practices and technology platform. It is also an enabler to cost reduction and the effective integration of supporting applications.

With a common Command & Control system – and supporting applications – comes the opportunity to look at how information can be made more accessible both from a front line and back office perspective. Operationally, the implementation of a national mobile data strategy will be achievable – whilst individual Fire Brigades are currently trialling mobile data solutions; they need to be conscious that there will be a need to conform to the national strategy in the near future. Mobile data is discussed in more detail in the following sub-section.

Conclusion – The NDRS can provide a common mobile communications platform for mission critical voice and data delivery; optimising the method of operation utilising NDRS requires a set of overarching principles to be established through the development of, and agreement to, a generic national fleetmap for fire services.

5.3.2 Mobile Data

Fire appliances and operational vehicles carry significant amounts of information to enable fire crews to be able to perform their roles safely and effectively. Currently, this information is almost exclusively carried as paper documents or manuals. Mobile data for the Fire Service generally means that this paper information is available on a laptop (or similar) device, plus significantly more information including giving access to such as maps, building plans, details of hazardous materials, locations of water supplies/ fire hydrants and critical risk information. The availability of this data electronically within the vehicles could save valuable time through improving operational response, thus enhancing both community and

fire crew safety. It can also ensure that the most up-to-date information is available to the fire crews in a common format across all fire brigades.

Mobile data in relation to incidents has two levels of criticality – mission critical (mobilising messages and vehicle location when mobile) and business critical (mapping & supporting information). This is important to understand, as the level of criticality will drive the data delivery mechanism. Mobilising messages need to be sent and received immediately – and would probably require the availability of multiple message bearers including the NDRS; updates to existing supporting information is less critical and could be carried out periodically when the vehicle is on station utilising such as the WAN infrastructure to the fire station and a local WiFi solution.

Another benefit of mobile data is around data management, including the input by crews of such as fire safety inspection or incident reports.
This new user requirement for a Mobile Data solution has emerged since the last CAMP evolution. Given the significant investment that will be required to equip all appliances (and potentially officers vehicles) along with the data bearer mechanism required to support information to/ from the mobile data terminals, there is now a need to extend the CAMP user requirements to include a Mobile Data solution. It is also important to determine which applications will be supported and the required back office architecture (which will be determined to some degree by the communications control room decision in terms of locations and numbers).

5.4 Integrated ICT & Data

In the context of both shared services and national standardisation, there is a potentially strong role for CAMP to lead across the Fire Service in relation to ICT standardisation, while working with the LGMA, the body which co-ordinates local authority ICT. There will be national standards and processes relating to all data that is both integral to the operation of CAMP (geocoding, pre-planned turnout, premises, etc) and which is generated by CAMP for the wider Fire Service by way of management information. There are examples where the CAMP equivalent are considered to be the fire service data hub, and therefore ideally suited to provide data storage and processing (i.e. data centre) facilities for all fire brigades and the National Directorate. Common applications could be hosted by CAMP and, as a national entity, ensure standardised data capture, management and format, thereby both freeing individual local authorities of this requirement, and achieving consistency.

Supporting the data storage, processing and application hosting could be an underpinning technical architecture as previously outlined in this Section of the review.

5.5 Automatic Vehicle Location Services and Satellite Navigation

Automatic Vehicle Location Services (AVLS) and automated routing to incident locations have proven to improve attendance[3] times to incidents via optimal routing and resource allocation, which directly enhances quality of service to the general public. There are secondary benefits in areas such as crew safety and fleet management. The RCCs are the obvious choice to provide such advanced location services to the Fire Services via either a centrally managed AVLS within one or more RCCs or as a conduit to managed service.

Integration of AVLS to the RCCs Computer Aided Dispatch system will be a requirement to achieve the maximum benefit from any AVLS and routing system. Data fusion with other data sources such as mobilisation records and fire reporting will provide valuable feedback in areas such as address gazetteer validation.

[3] A pre and post study performed by Astrium ltd of the benefit in AVLS and vehicle routing has shown that the average improvement yield in attendance times by UK Fire Services where the technology has been adopted is 4%.

6 - Options for Change/Improvement

6.1 Introduction

The options for control room configuration are discussed in this chapter – but in essence, irrespective of the option chosen, there are issues that will need to be resolved.

The current underpinning ICT architecture for the three CAMP regions is generally not aligned to enabling anything other than the current regional model; whatever the strategy for the future is in terms of control room configuration, there will be work that needs to be completed to re-align the ICT architecture. Further, as noted earlier, none of the three control rooms currently provide any fall back capability for the others, in contrast with near neighbours in Wales who have just completed such a project. The need for such support was graphically highlighted during the Dublin flooding event of 24 Oct 2011.

It is important to consider the long term strategy for communications centres when considering the available options. ICT optimisation could take the form of work required in the short term – essentially to enable control room configuration optimisation – and in the longer term facilitate the move to agreed roles, as well a new systems and services.

Control room configuration should also determine the optimum staffing levels – both in terms of call taking/ dispatching resources and necessary management and support arrangements. All front-line emergency services, including mobilisation and communications services, require appropriate support services to be able to operate to extremely high degrees of reliability required. The CAMP centres have potential headroom to absorb further additional activity. It will be important also to determine the staffing levels within the agreed control room configuration before finalising any technical requirements, as there will be a potential impact upon the number of control "seats" required.

In seeking efficiency improvements within Controls there are a number of approaches that can be adopted. There are varying risk levels and delivery timescales which apply to these options, depending on the level of change that is to be introduced.

Taking into account current good practice within the management of emergency controls, the available options are considered in the current context of Ireland and current method of service delivery.

Whilst there are a number of options listed these followed three main themes:

- Divesting service provision – Moving to outsource the service provision, or join/ collaborate with other emergency services to minimise infrastructure costs and maximise the potential return on state investment;

- Moving from Regional Systems to a National System – Joining the existing regional systems together into a virtual national system with one, two or three centre options

- No System Change – No immediate change to current configuration of centres, but elaborate changes in structure to rebalance costs on a national rather than regional basis, and/ or seek to achieve all possible efficiencies/ optimise loading for existing staffing, and make major changes when the new systems are brought in

.

The following sections provide detail on the different approaches that can be taken and outlines some of the risks and issues that should be considered in evaluating them.

It is suggested that the key focus of the review process is to optimise the control room configuration necessary to support the effective and efficient operations of the Fire Services in Ireland. This will drive the underlying ICT requirements and systems architecture, enable efficiency savings, and allow a national governance structure to evolve/ be created.

6.2 Divesting Service Provision

In this section the options for change are set out.

6.2.1 Outsourcing Service Provision

As we have seen in Chapter 3, the range of functions and activities of the RCCs extends well beyond simple 999/112 call-taking. With any binding contractual agreement, one pays for the defined service and any additions/ deviations invoke additional charges. The RCCs may be seen as an interface between the caller (general public) and the fire services, and as such the RCCs have both an inward and outward facing roles. At the very visible outward facet, the interaction with the caller is merely a stimulus or trigger for the bulk of the work within the RCC. The RCC-Caller interaction is a process of information extraction, disinformation rejection (both hoax and malicious calls) and misinformation resolution (duplicate, erroneous and incomplete). This intelligence is then transferred to the mobilisation systems which initiate the dispatch of crews to resolve the incident; this initial process terminates in less than 2 minutes in most cases, at which point the caller maybe permanently or temporarily released.

The RCCs are then engaged at the internal facet for the duration of that incident, as the incident develops and is brought to an eventual resolution. That process typically takes hours; hoax and malicious calls are zero duration and, at the other extreme, for example, the Kerdiffstown landfill fire extended to 30 days duration. Acting as an information hub, the RCC holds the interaction with other Emergency services, Rostered Senior Fire officers and a broad range of additional resources such as Electricty Ireland (ESB), Bord Gais, other sections of Local Authorities, EPA, Private contractors etc, as required to bring the incident to conclusion. The RCCs maintain the information on all incidents and calls and these are readily available to fire service management as part of routine fire service management or in the event of enquiry, dispute and/or query. The RCCs are a critical element of risk mitigation in a high risk activity such as fire-fighting. Their roles in the National Incident Command System and in structures such as the Major Emergency Framework and the National Co-ordination Group have evolved in response to very real needs. The outsourcing of this function to the private sector means that the fire authorities would still hold the risk while giving away control of the overall risk mitigation possibilities.

The choice to outsource a function in an organisation is usually driven by the need to address one of the following business needs; to secure the provision of goods or services at a lower cost than the organisation can currently supply, to meet increased demand for goods and services that the organisation cannot supply from its own internal capacity or to access the knowledge, technology, capability or competence of another organisation. The goal in outsourcing is to replace the once internal business function with a contract to supply, this contract is then placed with a selected outsourcing partner.

In general, the outsourcing process for any organisation begins with the generation of a highly detailed and accurate specification of what is to be supplied. Some goods and services by the nature of their design process such as computer designed products or production processes, are readily specified to an outsourcing partner and are therefore commonly outsourced. Another new requirement for the organisation that may arise is the need to measure the supplied goods or services against this specification; this is often performed by a quality management unit which is specifically tasked to deal with the outsourcing partner. Defined procedures are also required to deal with oversight management, inter alia, failure to supply, error and defects, change management and continuous improvement. With regard to business continuity, once an organisation has outsourced a function to another organisation, there is now new exposure to the affairs and business competences of the outsourcing partner, this new risk can be limited by outsourcing to multiple partners such that the organisation is never ‘single sourced’ wherever supply is critical. There are notable exemplars of outsourcing

failure, for example it is often that small but critical outsourced component that results in shortage of a higher value assembly, in outsourced software development. Also, the expected reduced costs are sometimes never attained due to incremental costs in other internal functions such as the specification process or the software testing functions. The private sector operator will be doing the service to make a profit, either through the margin on the costs involved or leveraging existing arrangements. Outsourcing operators, once in place, can be expected to charge heavily for any variations/ additions which are required. In addition, a private sector provider would have to evaluate the critical life safety function of the centres, and then this will have to be taken account of in whatever pricing model is utilised, and would undoubtedly incur a premium for the kind of services under consideration here.

If the above are considered in the context of the regional communication centres in their current three centre configuration, demand for call processing at the RCCs is generally relatively steady, there are slight annual variations, which would appear to be weather related but demand change correlates well with population.

A review of the operational performance and quality of service metrics for all three RCCs against international standards show that all the critical control metrics are being met, with two of the RCCs having ISO accredited quality methodology. Fire service appliances and fire-fighters are currently being dispatched accurately and efficiently. There are slight variations between each RCC, mainly due to the differing equipment platforms, processes, staffing arrangements and loading at each RCC. Continuous improvement is still evident from year to year although the rate of changed is beginning to slow as optimum performance levels are achieved.

A review of the outturns at each of the three communication centres reveals that the key opportunity to reduce costs that an outsourcing partner could provide is in the cost of labour, and that the only significant opportunity exists at the ERCC. The other centres employ approximately 40 ECO civilian staff between them, at wage levels that are comparable to the Irish industrial average wage. The ECO role in these centres does not require a third level qualification, are required to undertake shift work, and training is provided by the centre on initial induction. In the case of the ERCC, the ECO role for regional Fire and DFB Ambulance is performed by approximately 80 Fire-fighters[4], who have additional training and skillsets and accordingly are paid significantly higher with different shift premiums and allowances.

Other staff are employed across the 3 RCCs with NFQ level 8 & 9 qualifications employed in ICT management and ICT engineering roles. Given the current strong

[4] Under review

demand in the IT sector despite the current recession, it is unlikely than an outsourcing partner could source similarly qualified ICT staff with the experience in life critical systems at a significantly reduced cost. It should also be noted that within the current RCCs certain specialist technical roles are already outsourced, such as the maintenance of the regional communication network, CAD and electrical systems.

It is unlikely that an outsourcing partner would persist with the current three centre regionally bounded model for reasons of efficiency. They might also seek to take advantage of improved technology as well as a reconfiguration of the number of communication centres to increase ECO productivity, ie to externally implement a vertical migration, to consolidate three separate business units into one. As stated elsewhere in this document, a National communication network such as the NDRS is an enabling technology for any control centre consolidation. At present, the NDRS is licensed for organisations in the public service. Private sector users are explicitly excluded from this platform. It should also be noted that any outsourcing partner would not have exclusive access to such improvements in technology, it is also possible for the Fire Services to exploit the same technology advantage open to an outsourcing partner.

The outsourcing of the RCC functions to a private sector entity is not recommended therefore.

6.2.2 Horizontal Migration

Horizontal migration is the term recognised internationally for the case where service delivery arrangements involve merging the call handling and dispatch function with other emergency services; typically this would see all emergency service calls (eg police, ambulance, fire, coastguard) being handled by a single centre. This option may be useful where small, individual service, control rooms are inefficient and there is a desire to maintain a local emergency service facility, for example where a strong local identity is to be maintained in terms of the service delivery model. This is the case in the Isle of Man, for instance.

The significant risk with this option in other contexts is the commensurate drop in level of service. The nature of incident call management and dispatch is distinctly different between the three principal emergency services. As a result of these differences, the process of handling the call and dispatching vehicles generally gets split into the two distinct functions. Generic call takers obtain the address and incident details then forward this information to service specific dispatchers who decide which resources should be mobilised. . In reality, this can be both time consuming and a labour intensive process, and potentially extends the length of time it takes from receipt of the call until resources are mobilised.

Consolidating these processes and procedures across the services is a difficult and complex process, which has resulted in the ultimate failure of some projects. Projects were commissioned in both Wiltshire and Cleveland Fire Services in the UK to set up joint service controls. The projects were subsequently abandoned.

A horizontal migration model, a consolidation of Fire and Emergency Ambulance Dispatch operations was initially envisaged early stages of the original CAMP project but this goal was never achieved. Issues such as disparity in pay and conditions, clash of cultures, lack of suitable promotional outlets have been cited as reasons for failure.

In relation to potential savings in the cost of labour via a horizontal migration, there is usually very little differential in the labour rates of dedicated ECOs employed by state agencies. There may of course be achievable cost savings where one agency employs staff in role of ECO but those staff have specialist skills and are consequently receive higher pay and compensation determined by the specialist skill. In this case, transferring the workload to another Agency or indeed any other Organisation with labour rates appropriate to the role of ECO will yield potentials savings.

This together with a lack of similarity in the call handling processes, the generally increased time taken to dispatch appliances and the inability to seek best of breed systems all make this a potentially difficult option to achieve successfully without significant compromise.

The option of horizontal migration to service provision by another emergency services provider is not recommended therefore.

6.2.3 Co-Location

This option is a variation on 6.2.2 above. An example of this option is demonstrated in Wales where the North Wales Fire Control is also co-located with the Police in order to achieve efficiencies in terms of IT infrastructure and building costs, but remains totally separate in terms of the service control operations. Horizontal Migration could be relevant were the status quo of three controls to be maintained. Equally, this option can also be considered as an addition to vertical migration. Where a current site requires re-locating or infrastructure renewed, and where another emergency service organisation has a suitable site, then there is merit in considering sharing facilities. This is how the ERCC evolved, although not originally intended as such, where there are now two ambulance mobilisation systems (one HSE and one DFB) being operated on the floor of the ERCC.
Risks attached to this approach include potential loss of current staff and expertise,

and lack of control over facilities management through what may effectively be sub-tenant status. Where the same system is to be used, this can be a major issue as it will have been designed to support the needs of the main user and a secondary user could have less input on the systems design, operation and relevance to requirements.

The option of co-location for facility sharing should be considered on a case by case basis. Unless the possibility of meeting fire services requirements is adequately catered for, this option is not recommended

6.3 From a Regional to a National System

6.3.1 Vertical Migration

Vertical migration involves joining smaller, same service, controls together in order to achieve efficiencies in terms of staffing, systems, infrastructure and buildings. This option is not without risk, requiring harmonisation of both call handling and dispatch. There are examples of successful vertical migrations which have achieved significant savings.

Essentially, the original development of the three Camp Controls can be seen as an example of this and the significant developments which have already been achieved would certainly support further steps being taken in this regard.

In Ireland, with four communications centres currently in operation, a vertical migration would lead to either a two control or single control solution.

6.3.2 Vertical Migration –One Fire Service control centre

The risks with a single control are that failure of the site could be termed catastrophic for service provision, as there is no immediate fallback. This solution requires an investment in resilience with a fallback site installed that should, in theory, have the same capacity and equipment as the main control. The standby site requires regular checks to be undertaken to ensure equipment is operating correctly, training to be regularly undertaken in its use and arrangements for call handling to be made for the period when staff are transferring to the fallback site and there is no fire service control available. All resilience measures put in place for the main control require to be duplicated at the standby site, which can be a costly approach.

As has been seen in Chapter Four, moving to a single centre is not immediately achievable due to the timescales and workload involved. This could be considered as part of a longer term strategy and be delivered as the second generation of

CAMP when the current systems are due for replacement. It is estimated that it could take approximately 36 months to design, procure and implement this solution.

This option has to be seen as a high risk strategy, as it introduces a single point of failure to the emergency call handling function for the whole of Ireland, while not delivering unique benefits which are not achievable in other approaches.

The option of moving to a single communications centre is seen as a high risk, high requirement option with low benefits and is not recommended.

6.3.3 Vertical Migration –Two Communication centres.

Taking into account the risks attached to the failure of a single control, it would be a lower risk strategy to focus on a two control option, with each site providing mutual support and fallback resilience for the other.

In reality, there will be little difference in terms of operating costs within the two control option as both sites act as fallback to each other, negating the need for a separate fallback. A major benefit is that all equipment will be in daily use and therefore can be assured of its effective operation.

While there would be a virtual dimension to a two centre solution, practicalities of managing "duplicate" calls for the same incident, and liaison between front-line fire services and RCCs, indicate that calls from specific geographical areas would still retain a first preference in terms of where they are answered. It is only in spate conditions that an overflow would be picked up.

This proposal, while offering some short term gains, will take time to implement and will require investment in data management, system interfacing and communications links. Much of this expenditure in meeting short term efficiency targets in relation to staffing costs will have minimal long term ICT/ Systems benefit to the project and is likely to increase whole-of-life costs.

The option of moving to two centres, while there are potential benefits, is seen as premature and not readily achievable at this point and is not recommended.

6.3.4 Vertical Migration –One Distributed Control System with multiple centres.

This option is the migration of the CAMP system to a new single national shared system, with multiple sites. This is the concept being promulgated by CMOD. One

of the main attractions of this option, while taking into account the set up costs, the potential exists to make considerable savings on current costs by migrating in the longer term to a distributed control system with multiple virtual points of presence. A distributed system with multiple communication centres offers many advantages over the current regional configuration, provided that the implementation of a distributed national system is cost effective, will satisfy an enhanced set of CAMP functional requirements and whilst in operation can provide good value for money.

One distinct advantage is in enhanced resilience. In a distributed system where one control centre can mobilise the Fire Fighting resources of another control centre, there is no longer need for each control centre to maintain its own fall back facility, which will result reduced operational spend.

There is currently a requirement for each control centre to maintain a minimal level of reserve ECO staff to handle the additional workload resulting from the loss of one of the centres in the network, this level of reserve decreases with the number of control centre nodes participating in the distributed system. As the current communication centres currently operate to minimum staffing levels (lone worker avoidance etc), this reserve is already likely to be present within the current control centre staff levels. The staff reserve complement can be tasked with some other secondary activity such as additional services for local authorities provided by the control centre.

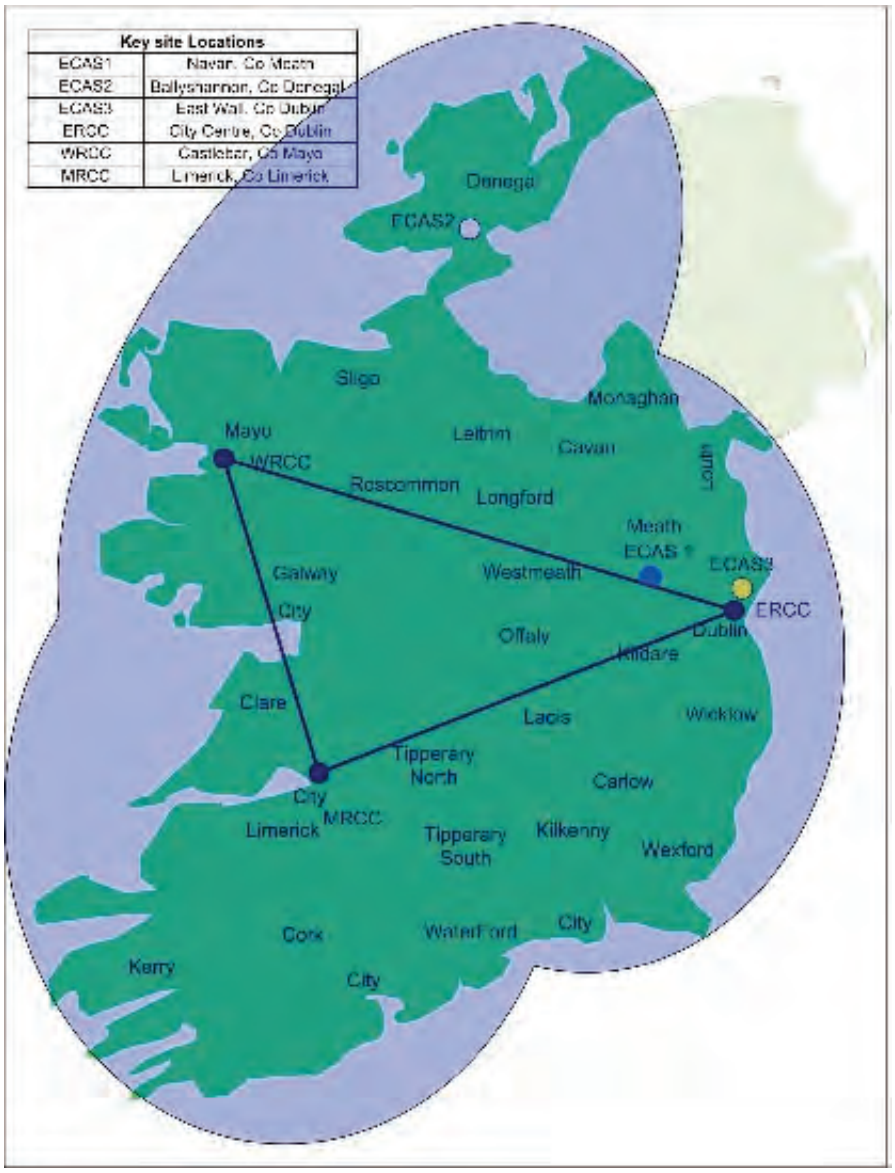
During call spate or overload conditions calls can be routed to available operators at the other centres, this provides each control centre with capability of rapidly increasing its call handling capacity at a time of urgent need such as a major emergency or a severe weather event. As seen in the flooding of 24 October 2011, the geographical diversity of current centre location is also advantageous in this regard.

There is a mathematical efficiency made available by such a distributed system where ECOs can effectively be viewed as a pooled resource. On average, callers in a single queue for service from single pool of ECOs will experience shorter queue times than callers queuing for the same number of ECOs but in separate queues. A common exemplar of this is the ability to pay for any goods at any cash register within a department store or by going to the next available teller in the bank no matter what type the transaction to be performed is. Within the commercial call centre industry, this consolidation or aggregation of queues for service agents is common practice in order to improve both service agent productivity and customer satisfaction.

The removal of the regional boundaries can provide operational advantages, boundary issues such those associated with the mobilisation of the nearest fire-fighting resource to an incident are improved. Visibility of available fire cover in the current boundary regions is also improved due to the sharing of fire fighting resource status information with the other communication centres in the distributed system.

This is seen as the direction in the future which offers an optimum path dealing with many of the current issues and future requirements. This option is recommended for further consideration and detailed evaluation.

Figure 6.1, A Graphical Representation of a Distributed Control System



6.4 No Change in System but Review Current Structure for Efficiency gains

6.4.1 Introduction

As described in Chapter Two, the CAMP project resulted in an improved mobilisation and communications function, which is in line with many of the county controls within England and Scotland, and efficient. The option of taking "no action" would be possible in the short term, if the loss of revenue to CAMP West (WRCC) from HSE could be absorbed progressively within current budgets, or a revised national based CAMP funding system be introduced.

However, in the medium term, consideration must be given to the second generation of systems in five years time when replacement systems have been implemented. The costs of replacing a system in three separate sites and maintaining staffing at current levels is unlikely to be supportable considering the current economic climate. "No change" would therefore only be a short term option. The impact on CAMP East (ERCC) after the HSE withdraw their ambulance calls to their new control centres would indicate that significant changes are necessary here in the short term, and the need for current staffing levels would be radically changed. As discussed earlier, this suggests that it is appropriate to reflect on staffing arrangements of CAMP East, with a view to changes in the short term.

As previously noted, the CAMP project did elicit significant improvements in the call handling function. From the foundation work undertaken during the initial project, there are some further adjustments that could be undertaken that could realise further gains.

Currently all the controls have separate, but very much scaled down, fallback capabilities and they do not provide support to each other in terms of handling spate call conditions. The systems were designed around support for regionally based operation, and do not lend themselves easily (or cost effectively) to integration as envisaged.

Regional communications staff providing centralised management information could be a significant improvement on the current process. The Regional Communications staff that create the data at source are in a prime position to both provide, quality assure and disseminate standardised data to both local and central authorities.

It is recommended that the management and staffing arrangements in the East RCC be reviewed to take account of the potential decrease in activity as a result of the HSE planned changes, and also to bring the centre management and staffing systems in line with the national Emergency Control Operator staffing models in place in the other two RCCs..

6.4.2 CAMP Rebalancing

The fire service incidents handled by each of the RCCs could be re-distributed to create a better balance. For instance, if the east region's non-Dublin call traffic was transferred to WRCC, this would even out the call traffic across the three centres. There are some potential savings to be made with this approach; however there is an element of significant cost, effort and disruption attached to this process. Station end equipment may require modification and address databases will require to be amended in order to reflect the new jurisdictional areas. Also, the existing microwave infrastructure is designed and configured to support three regions, and to change this may be a significant factor. So while this option has a lot to recommend it, it is not as straightforward and benefits may not be achievable quickly and cheaply.

The rebalancing option is not recommended therefore, as it could be a significant project to deliver, and the same potential benefits can be obtained at less risk through the option discussed above.

The main medium term recommendation of this report is to maintain the current communication centres configuration, and further leverage their major emergency/ incident management roles, and initiate development to migrate to the CMOD TETRA Ireland telecommunication network and a shared national CAD system. This is only feasible if the shared system is capable of satisfying the fire service user requirements at an efficient, economic and affordable cost and internal efficiencies which have been identified are pursued to offset increased cost.

Immediate actions which will yield benefits include a progressive move to the implementation of a National Cost Apportionment Model which will distribute CAMP revenue costs equitably among all fire authorities, based on the "average of averages" model. In addition, the report recommends that the staffing model in the East Region Control Centre be aligned with that in the two other centres.
It is clear from the review that, while taking into account the set up costs, the potential exists to make considerable savings on current costs by migrating in the longer term to a distributed control system with multiple virtual points of presence, and that this is the recommended direction for the future, as it offers an optimum path dealing with many of the current issues and future requirements. The review also points to the potential benefits of a wider role for CAMP in standardising and supporting provision of ICT for Fire Services.

Summary of Recommendations

Recommendation – This report recommends the transition from three separate regional communication centres to a single distributed system with multiple control nodes at the current three CAMP centres, using the National Digital Radio Project as the communications vehicle. This transition will provide the opportunity to re-engineer the current service provision model including reviewing the User Requirements, and developing a fire service TETRA "fleet map".

A new set of CAMP governance arrangements should be developed to deliver the recommendations of this report, and which will form the common path for all fire authorities to deliver their statutory responsibilities in a consistent manner, and with an equitable cost distribution model regardless of geographical location.
The current ERCC management and staffing model should be redefined to reflect the change in business activity resulting from the intended HSE transfer, which could reduce the workload of the ERCC to approximately one third of its current activity level, and to bring the ERCC staffing arrangements in line with national centre management and staffing arrangements and conditions for emergency control operators.

A project plan, developed under an agreed project management methodology, is required, given the scope and extent of work required to implement the recommendations of this report while minimising risks associated with the changes proposed.

7 – Implementation Planning

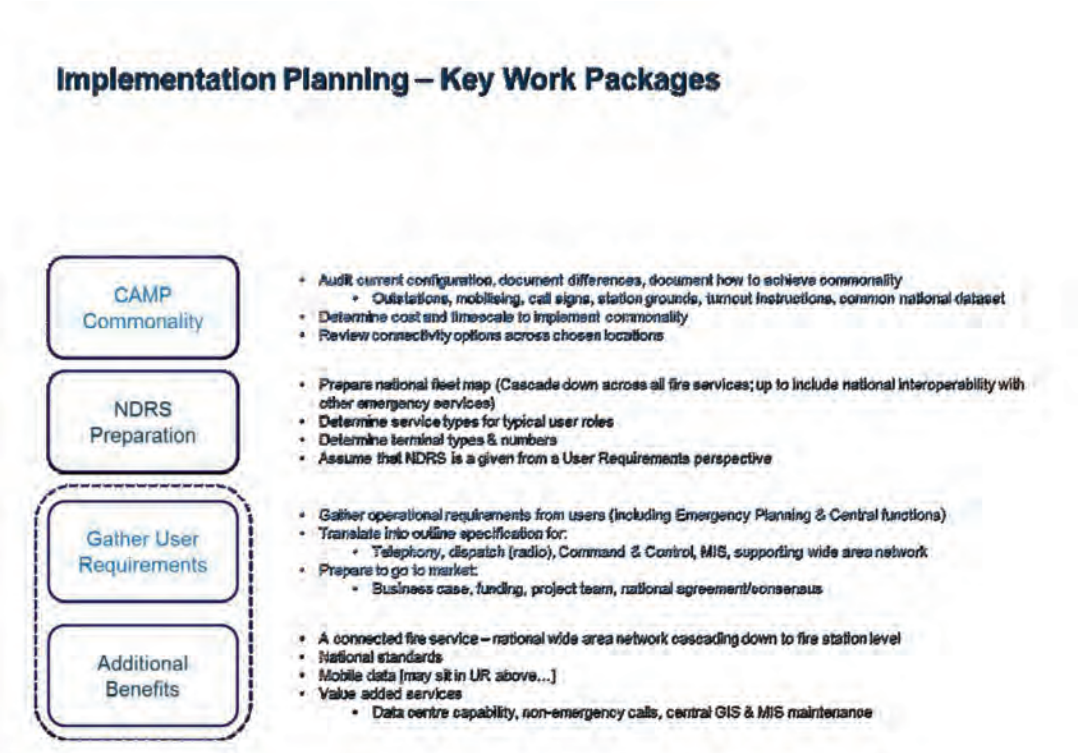
7.1 Overview

Implementation of the future vision for the Fire Service will require a structured plan that is implemented under the auspices of a formal programme management methodology, such as PRINCE2. The programme can be broken down into discrete work packages, or projects, that will each deliver benefits and provide the foundation for work packages that follow-on, similar to what was done in the CAMP development phase.

The adoption of a formal project management methodology will provide a strong basis to deliver the work packages to time, quality and budget. Whilst at this stage, no definitive target dates have been set other than looking at a 3 to 5 year timeline for substantive implementation of the vision; it is possible to break the programme down into key work packages and to give an indication of the interdependencies between work packages at a high level.

7.2 Key Work Packages

Implementation can be split down into five key work packages as outlined in the figure below. Each of the packages is described in more detail in the following sub-sections.



7.2.1 CAMP Commonality

A considerable body of work is required to determine how the current three CAMP systems can be brought together as a single country-wide solution. This report recommends that the optimal shape of delivery can be provided through the implementation of relevant CMOD initiatives such as

- Access to the NDRS via an ICCS shared with other emergency services
- The national network infrastructure available via GovNet.
- A CAD system, provided as service and shared with other ES users.

Other work within the fire services will include documenting any configuration and database work that is required to ensure commonality and the options to achieve connectivity across all three centres as a potential interim step.

Integral to this work will be the cost, timescale and resource requirements to complete the work, with consideration given to work items that could be considered optional depending upon the final configuration.

The output from this work package will be agreed steps to enable commonality of systems, databases and work processes across each individual fire brigade that will provide a clear route to having a single Ireland-wide architecture for Fire Service mobilisation and communications.

7.2.2 NDRS Preparation

This report recommends that the Fire Service will adopt NDRS as the chosen mobile radio solution across Ireland. In this regard, the key decision to be made in relation to the vision is the timing for migration from the current analogue radio systems to NDRS. Work from the first two work packages – Control Room options and CAMP Commonality – will flow down into the preparatory work that needs to be completed for NDRS.

A key task will be the preparation of a national fleetmap that cascades down across all of the individual fire brigades as well as ties into the national emergency service fleetmap to enable inter-agency operation. The fleetmap will also tie into the User Requirements work package as it essentially defines the features and functions that the Fire Service will adopt from NDRS.

Finally, the User Requirements will determine the NDRS service levels applicable to Fire Service operations, and the overall numbers and types of terminals that will be required.

The key output from this work package will be the template against which NDRS services will be procured and ensure a consistent approach across all fire brigades in relation to this activity.

7.2.3 User Requirements

Whilst CAMP has in place a set of user requirements against which the current systems were procured and processes developed, there is a work package required to update the original user requirements and bring them in line with achieving the vision. As with CAMP I the user requirements will be operationally rather than technically driven – in other words any technical solution will be procured/ implemented to achieve operations rather than the other way around.

From the user requirements, it will be possible to determine the outline specifications with which to go to market to procure the systems and services necessary; ahead of this it will be possible to complete the supporting business case, secure funding in principle, determine resourcing to deliver the implementation and subsequent support, and ensure national agreement.

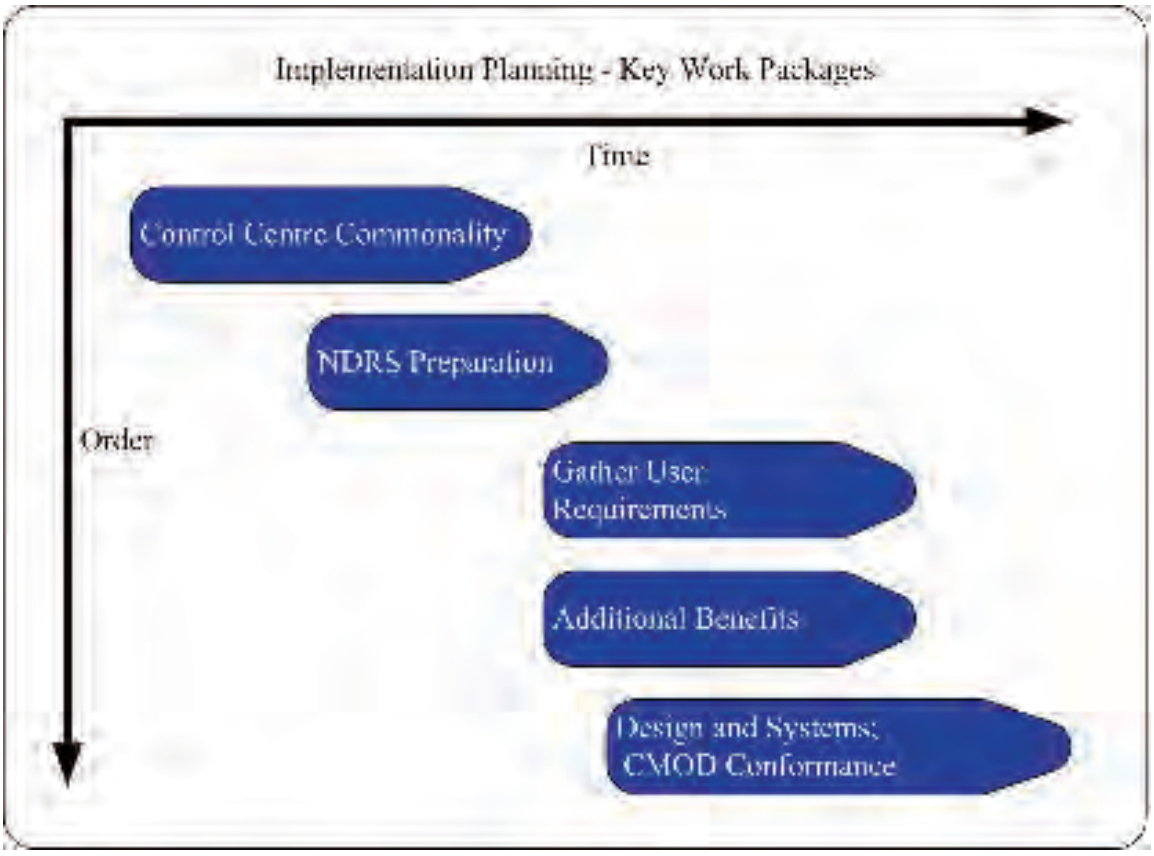
The user requirements should be drawn across all stakeholders – individual brigades (operational & management), emergency management (operational & management) and central government (policy and management) functions.

7.2.4 Realising Additional Benefits

The overall future vision encompasses not just core CAMP capabilities but also a range of other initiatives that will help overall effectiveness and improve efficiency, including generating savings which can be off-set against anticipated costs. This will include work towards a set of common national standards; the ability to provide value added services; etc. This work package is currently seen as sitting separate to the gathering of user requirements but the two need to progress in parallel.

7.3 Overall timescales

At this stage the overall timescales are difficult to determine but it is clear as to how each of the key work packages interact. The figure below illustrates this


Implementation Planning - Key Work Packages
Time
Order
Control Centre Commonality
NDRS Preparation
Gather User Requirements
Additional Benefits
Design and Systems; CMOD Conformance

8 - Appendices

8.1 Terms of reference

STRATEGIC REVIEW OF COMPUTER AIDED MOBILISATION PROJECT (CAMP) MAY 2011

BACKGROUND

The CAMP project was initiated almost 20 years ago to enhance fire service mobilisation and communications and in that time has achieved the vast majority of the original business objectives. Capital funding of 40 million euro was invested in the project over a fourteen year period. The principal drivers for underpinning the necessity of a strategic review of the CAMP system at this time include;

The decision by the Health Service Executive (HSE) to consolidate call taking and dispatch for ambulances in two centres, thereby impacting on directly on both CAMP East (reduction in call traffic) and in CAMP West (reduction in revenue funding).

New technology and in particular the migration of both An Garda Siochana (AGS) and the HSE to the National Digital Radio System (NDRS) (TETRA).

The life cycle of the existing CAMP systems and the requirement for funding for upgrading/system replacement.

Requirement for additional functionality eg mobile data, AVL, officer paging etc

'Shared services' business model

BRIEF

To review the current environment in which CAMP operates (taking into account international best practice) and to complete a high level strategic report together with recommendations for the future direction of this critical function. The report should analyse potential options, identify priorities and provide estimated timescales (short/medium/ long term), risks, costs and benefits.

9 - Glossary

CAMP: Computer Aided Mobilisation Project, the initial project name used for the Department of Environment sponsored project to transform the mobilisation of Fire appliances, beginning in the late 1980s.

ECAS: Emergency Call Answering Service, an outsourced service provided by British Telecom to direct 112/999 callers to the appropriate call centre for a specific Emergency Service and region.

NDRS: National Digital Radio System, A CMOD initiative to provide a nationwide digital mobile radio system for use by the entire public sector. A TETRA system was tendered for with TETRA Ireland ltd winning the tender. NDRS went live in early 2009 with An Garda Síochána as the lead and largest customer.

Terrestrial Trunked Radio. An open telecommunications standard for digital mobile radio systems, the standard is maintained by European Telecommunications Standards Institute (ETSI). The standard is in extensive use outside of Europe. Under the TETRA standard, radio terminals perform more like computers on a wireless network (with significant gain in feature functionality) compared to analogue radio technology. There is additional complexity in the management and maintenance of a TETRA radio system compared to a traditional analogue radio network.

TETRA Ireland. A limited company, winner of the DBO contract to provide the NDRS as a managed service. Tetra Irelands main shareholders are Eircom ltd, Motorola Ireland ltd and Sigma Wireless ltd.

P25. (ACPO-25) A competing telecommunications for Terrestrial Trunked Radio, the standard is published by the Telecommunications Industry Association (TIA). The standard is predominately in use in North America but is also emerging in installations throughout the world.

IP: Internet Protocol, a set of computer networking standards. Originally developed in the late 1960s as a military network protocol, its use has expanded rapidly since the development of network applications such as the World Wide Web (www/w3) in the early 1990s. The standard have evolved with IPv4 being in current use, IPv6 is beginning to be adopted.

PSTN: Public Switched Telephone Network, a national network, once owned by the state but now in private sector ownership. Telephone calls are routed through this network; the PSTN has evolved in some areas to provide broadband network access. Services are now delivered over various media, included mobile or cellular telephony.

PABX: Private Automated Branch Exchange, a private telephone system commonly used to make calls internally in an organisation. PABX are typically also connected to the PSTN so that incoming and outgoing calls can be made to those outside of the organisation.

VoIP: Voice over Internet Protocol, A means of implementing the functionality of a PABX or PSTN over a computer network that runs IP as its network protocol. The technology has significant cost advantages where an IP network already exists.

Cloud Computing: The practice of Internet-based computing, whereby shared resources, software, and information are provided as a managed service to the end users computer or other devices on metered demand, not unlike common utilities such as electricity . Cloud computing has been enabled by recent advances in network and data centre capacity as well as new capability in a field of computer science called virtualisation. The key advantage for the end user is lower costs, a shift from fixed cost of ownership traditionally associated with IT systems to a 'pay as you use' model.

Software Defined Radio: A radio telecommunication technology, where the functionality and capability of the radio is determined principally by software as the radio device is in effect a digital signal processor. Such a radio device can operate to broad range of communication standards and readily switch between them.

CAD: Computer Aided Dispatch, a system or system of systems containing computer harder and software, usually in a client -server deployment. ECOs at the client software can enter call details and process them to mobilising incidents. The CAD system maintains resource lists, mobilisation rules and monitors mobilisation activity through defined workflows. CAD systems are integrated to other software services such as address gazetteers, Mapping systems and telecommunication interfaces. For Emergency Service use, these CAD systems are often classified as life critical systems.

MIS: Management Information System, an enterprise wide software system used to collect and report information on the enterprises operations. The information generated is often used in decision support, exercising management control and strategic planning.

GovNet: A CMOD initiative to provide a national computer network with connectivity to all public service facilities. GovNet is a wide area Internet Protocol (IP) network. The network infrastructure is in part owned by the state, with some segments being provided by private sector network providers.

PSBA: Public Service Broadband Access, wide area network similar to GovNet, but with connectivity to every Public Service building within the UK.

CMOD: Centre for Management Organisation Development, a bureau within the Department of Public Expenditure and Reform, CMOD has a public service-wide brief with responsibility for researching, developing and implementing policies in the areas of telecommunications, technology, shared ICT services, and eGovernment.

GPS: Global Positioning system, a navigation aid, an array of satellites allows the position of any GPS receiver to be determined to within an accuracy of a few metres. AVLS: Automated Vehicle Location System, a hardware and software system where a vehicle position and motion dynamics is reported in real-time. Such systems are often integrated into mapping and management information tools. Each vehicle is fitted with a navigation receiver such as GPS and a communication transceiver to relay the location information to an AVLS.

Circuit Switched radio network: A telecommunication network infrastructure from circa 1970s. It is very similar in design to the PSTN with the exception that the communication channels are carried over radio rather than wires.

UPS: Uninterruptible Power Supply, an electronic device that generates AC electricity from a array of rechargeable batteries. Often used in conjunction with an electrical generator to ensure continuity of electricity supply should the mains electricity from the national grid to a premises fail.

MG4: A protocol to command a paging transmitter. The protocol was developed by the UK Home Office to standardise the specification of alerting equipment used in retained Fire Station.

GD92: A routable transmission protocol commonly used to deliver MG4 messages over a wide area network. It is the method that communication processors of a CAD systems use to command and control remote equipment at Fire Stations .Predominately used in the UK.

Spate Condition: An overload condition to a call handling centre, the rate of incoming calls exceeds the handling capacity of the call centre. Spate conditions

can be generated by events such as severe weather, multiple callers reporting the same incident, an incident in a high population area where many callers have visibility of the incident. Call centres are generally staffed to handle the normal level of activity, in spate conditions call traffic can increase by several orders of magnitude.