PRODUCTIVITY COMMSSION

PUBLIC SAFETY MOBILE BROADBAND
DRAFT REPORT
(23 September2015)

RESPONSE TO THE DRAFT REPORT
(25 October 2015)

Section No	Description	Page No
	University of Melbourne **CDMPS Response to Productivity Commission Draft Report** **On Public Safety Mobile Broadband Capability**	

Executive Summary

The University of Melbourne's Centre for Disaster Management and Public Safety (CDMPS) welcomes the opportunity to respond to the Commission's draft report and ability to meet with the Commissioner and his staff during the consultation process conducted by the Commission.

Consideration of the Commission's draft report in the context of the advice provided in the CDMP's previous Submission suggests that the ability to be able to provide Australia's Public Safety Agencies with a mobile broadband capability will rely upon the collaboration of Commonwealth, State and Territory Governments, supported by academic applied research, to address the following issues:

- Policy and Regulation
- Stakeholder Identification
- Public Safety Mobile Broadband Capability (Need)
- Leadership
- Funding

These issues are consistent with those identified in the CDMPS Submission in June 2015 as not being specifically covered in the Commission's original Issues Paper;

- Governance;
- Organisational change;
- Culture change;
- Transparency;
- Trust.

These issues are primarily "people" and not "technology" related issues making it important that the conversation started by the Commission with key stakeholders continues; the conversation is transparent and includes the community; and the "lessons learnt" by other countries and sectors is leveraged to the benefit of Australia's Public Safety Agencies and the communities they protect.

The CDMPS believes the Commission's report will add to the global body of knowledge about potential use of a public safety mobile broadband capability for the Emergency Management Sector and its Public Safety Agencies.

The Commission's report also reinforces the need for continuing research to support evidence based investment decisions for the Sector in the context of the broader discussion about Australia's "infrastructure" needs and priorities.

The University of Melbourne is in the process of establishing a Mission Critical Communications Research Unit within the CDMPS to support this research and the on-going "conversation" about public safety mission critical communications.

1.0   Introduction

This Submission is made by the University of Melbourne's Centre for Disaster Management and Public Safety (CDMPS)[1] and provides a response to the draft report produced by the Productivity Commission Inquiry into Public Safety Mobile Broadband (PSMB) released in September 2015.

This information provided in this Submission:

(a) Builds upon the previous Submission made to the Inquiry in June 2015; addresses the specific questions posed by the Commission in its draft report; and provides comment on the Key Points highlighted in the draft Report.

(b) References the outcomes from a Plenary Session conducted at the University of Melbourne's CDMPS International Symposium on Disaster Management (ISDM) on 12 October 2015.

(c) References the University of Melbourne Submission and subsequent evidence to the House of Representatives Standing Committee on Communications and Infrastructure Inquiry into the use of Smart ICT in the design and planning of infrastructure which is running in parallel with the Commission's Inquiry[2].

2.0   International Symposium on Disaster Management and Public Safety

During the consultation period on the Commission's draft report the CDMPS held its second annual International Symposium on Disaster Management (ISDM) between 12 and 14 October 2015. The opportunity was used to obtain input to this Submission by opening the Symposium with a Plenary Session on Mission Critical Communications for which the following context was set:

"The ability of the Emergency Management Sector to mitigate, respond to and assist communities in recovery from major emergencies and disasters resulting from human activity, the natural environment or a combination of the two depends on the availability of highly interoperable resilient public safety grade communications. Traditionally the Emergency Management Sector has been provided with a voice capability by the wireless industry through Land Mobile Radio using dedicated spectrum. The recent and rapid development of mobile broadband technologies provides the Emergency Management Sector with new capabilities based upon the ability to access spatially enabled data to produce information and generate knowledge that will significantly enhance the Sector's capabilities to contribute to economic and social wellbeing of communities through the protection of life and property. These new capabilities and associated service delivery methods available to the Emergency Management Sector are yet to be fully understood at a time when communities reasonably expect that the Sector can now access as a minimum the same consumer grade broadband technologies that provide services that have become part of everyday life in developed counties."

This context was addressed by an Expert Panel comprising representatives from the Department of Communications, Productivity Commission, Standards Australia and Infrastructure Australia through presentations generating informed discussion with the audience.

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[1] www.cdmps.org.au.
[2] ww.aph.gov.au/Parliamentary_Business/Committees/House/Infrastructure_and_Communications/Smart_ICT

In summing up the Plenary Session CDMPS Director Professor Abbas Rajabifard noted the following outcomes:

- **Policy and Regulation**

Policy frameworks need to be agile to meet the dynamic needs of future users and to inform the development of regulatory regimes that provide minimal prescription and maximum certainty and the clarity to drive innovation.

- **Stakeholder Identification**

Stakeholders need to be clearly identifiable and transparently involved in policy development and regulation that achieves the highest value use of discreet resources. Appropriate modelling techniques used in this process should produce predicable outcomes not based on cost alone.

- **Public Safety Mobile Broadband Capability (Need)**

The Emergency Management Sector needs to identify a need for a Public Safety Mobile Broadband capability utilising technology trials based upon open standards to achieve both data interoperability and spatial enablement. While these needs will more than likely be provided by a commercial option significantly cheaper than either a hybrid or dedicated option existing land mobile radio networks will continue to provide a safety net for Public Safety Agencies for a significant number of years.

- **Leadership**

The ability to undertake a coordinated national rollout by individual States and Territories of a Public Safety Mobile Broadband capability will require the identification of Leaders and Champions to achieve the significant culture change required.

Consistent with providing research into the support of these outcomes and too reinforce the focus on Public Safety Communications as one of the CDMP's Key Priority Agenda Items a Mission Critical Communications Research Unit is currently being established within the CDMPS.

This new Research Unit will specifically deepen the existing CDMPS Research Agenda through collaboration with the University of Melbourne's School of Electrical and Electronic Engineering in conjunction with the international reach of the CDMPS relationship with APCO International[3] and the National Public Safety Telecommunications Council (NPSTC)[4].

3.0   The International Mission Critical Communications Community

The Plenary Session on Mission Critical Communications and its outcomes came at a time when, from an Australian perspective, the draft report from the Productivity Commission's Inquiry into Public Safety Mobile Broadband[5] and the Australian Communications (ACMA) Beyond 2020[6] have both been released for further submissions.

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[3] www.apcoint.org
[4] www.npstc.org
[5] http://www.pc.gov.au/inquiries
[6] www.acma.gov.au/theACMA/About/Events/Spectrum-tune-up-Beyond-2020/beyond-2020.

In Europe fifteen European countries have said they are committed to work together to establish a common roadmap for the evolution of European Union (EU) public protection and disaster relief (PPDR) radio communications via the BROADMAP partnership.

The BROADMAP partnership facilitated by Public Safety Communications Europe (PSCE)[7] created a proposal to answer the EU Union Horizon 2020 DRS-18 call for proposals. Specifications and transition road mapping of future broadband PPDR radio communications in the EU will be available in 2017, if the proposal is agreed by the Horizon 2020 evaluation process.

In the United States the NPSTC released its latest publication *"Public Safety Entity Control and Monitoring Requirements for the Nationwide Public Safety Broadband Network* "to the Public Safety Advisory Committee (PSAC) of the FirstNet Authority for consideration. This report marks a further step towards documentation of the needs of Public Safety Agencies in the 57 States and Territories of America for a public safety mobile broadband capability.

In November 2015, the International Telecommunications Union World Radio Congress (WRC)[8] in Geneva will consider recommendations for PPDR mobile broadband radio communications and set the agenda for WRC 2019. There is no doubt that the outcomes from the ISDM Plenary Session could be and should be applied to the WRC process.

The actions being taken in the international mission critical communications community reinforce the outcomes from the ISDM Plenary Session and, consistent with the ISDM 2015 theme, the need for academia, government and industry to be *"working together for a safer world".*

4.0 Information Requests Made By the Commission

INFORMATION REQUEST NO 1

The Commission is seeking feedback on how it has operationalised the concept of a mission critical mobile broadband data network (draft finding 4.3).

Response:

The missing element in draft finding 4.3 is a well documented base line describing the needs of Australia's Public Safety Agencies for a Public Safety Mobile Broadband capability.

An example of such a baseline is that developed by the National Public Safety Communications Council (NPSTC) titled *"Public Safety Broadband High-Level Launch Requirements Statement of Requirements for FirstNet Consideration"* published in December 2012 .

NPSTC subsequently prepared and published a document titled *"Defining Public Safety Grade Systems and Facilities"* dated 22 May 2014 followed by *"Priority and Quality of Service in the Nationwide Public Safety Broadband Network* - R 1.4" in August 2015.

These documents are being provided to the Public Safety Advisory Committee of the FirstNet Authority for use in the development of the design of the Public Safety Mobile Broadband Network for Public Safety Agencies in the United States. Information about the public release of the documents is provided through the NPSTC website.

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[7] http://www.psc-europe.eu
[8] http://www.itu.int/en/ITU-R/conferences/wrc/2015/Pages/default.aspx

INFORMATION REQUEST NO 2

To what extent do the current LTE standards support dynamic adjustment of the prioritisation of users or applications in real time? Can dynamic adjustment of prioritisation be on the basis of a user's role, agency or location? Using non-proprietary technology, is it possible for dynamic prioritisation to feature in commercial delivery approaches?

Response:

It is recommended that the Commission consider the previously referenced NPSTC Document titled *"Priority and Quality of Service in the Nationwide Public Safety Broadband Network - R 1.4"* dated August 2015 and to the presentations available on the Public Safety Communications Research (PSCR) Program website relating to the PSCR Broadband Stakeholders Conference held in June 2015 which address the information requested.

INFORMATION REQUEST NO 3

What types of costs arise from augmenting mobile carrier networks to meet PSA traffic? What is the appropriate approach to estimate these costs? Are there alternative methods that could be used as robustness checks?

Response:

These questions relate to the previously referenced need for a base line of requirements from Australia's Public Safety Agencies for a Public Safety Mobile Broadband capability and the previously referenced NPSTC documents.

Information relating to these questions may be available from the Department of Communications as a result of submissions sought to a discussion paper issued by the Department in December 2013 on options to invest $100M in augmentation of mobile carrier networks.[9] Information may also be available from an NBN announcement in January 2014 regarding plans[10] to conduct a technology trial to determine whether its fibre infrastructure can be used to haul traffic to and from mobile phone towers and help gauge the "loading and traffic demands" of mobile telephony and broadband infrastructure.

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[9] IT News December 2013
[10] IT News January 2014

5.0 Comment on the Key Points in the Commission's Draft Report

Public safety mobile broadband (PSMB) holds considerable potential to improve how the police, fire, ambulance and other public safety agencies (PSAs) deliver their services. It will allow frontline officers to access high-speed video, images, location tracking and much more.

The PSMB needs to be considered in the context of the Emergency Management Sector and the agencies and jurisdictions contained within that Sector as well as the other Sectors such as Transport and Health that form a public safety market.

Examination of the needs of these Sectors for a mobile broadband capability and capacity rather than at agency and/or jurisdiction level will support the concept of "sharing" this capability and capacity and assist in the development of a formal needs assessment to inform an estimate of the "considerable potential" to improve service delivery.

PSAs currently rely on their own radio networks for voice communications and some low-speed data. Mobile broadband use has been modest due to concerns that the quality of commercial services is insufficient to support 'mission critical' operations.

The traditional use by PSAs of their own dedicated Land Mobile Radio (LMR) networks designed to meet their specific needs coupled with the ability to exert control over the use of these networks has built a level of confidence and trust which will need to be developed over time with LTE data networks.

The standards upon which LMR networks are based have been developed by Standards Development Organisations (SDOs) through which End Users have the opportunity to be involved in the evolution of these standards. Products and services produced by industry based upon these standards will provide the interoperability desired by PSAs subject to the use of the standards in the procurement process and the culture to support the principle of interoperability.

The LTE standards for mission critical public safety mobile communications are still being developed and progressively released. As noted by the ACMA in *"Beyond 2020—A spectrum management strategy to address the growth in mobile broadband capacity"* the process of bringing new technologies to market is a long one.

The network capacity that PSAs require is uncertain. PSAs are seeking a higher quality of service than what is currently available on commercial networks. However, the standards required (in terms of coverage, reliability, security, priority access and so on) are not specific.

A Public Safety Mobile Broadband capability <u>MUST</u> be based on the standards currently being developed through the global collaborative efforts of Standards Development Organisations to meet the specific needs of the Public Safety Agencies for mission critical communications.

The Standards are being developed based upon the identification of the needs of Public Safety Agencies being provided as input to the standards process underpinning the previously referenced starting point to determine network capacity has to be the development of a well documented base line describing the needs of Australia's Public Safety Agencies for a Public Safety Mobile Broadband capability.

There is now a sufficient body of knowledge for Australia's PSAs to draw upon to develop this

base line however a high level of leadership will be required to bring about the culture change required to deliver a Public Safety Mobile Broadband capability for Australia's PSAs.

Attachment A provides an extract from the Department of Communications Submission to the House of Representatives Standing Committee on Communications and Infrastructure Inquiry into the use of Smart ICT in the design and planning of infrastructure. This extract summarises the difficulties and challenges that the Emergency Management Sector will need to meet in the future.

There are many ways to provide a PSMB capability, including the construction of a dedicated network, a commercial approach, or some combination (hybrid) of the two.

The option selected has to provide PSAs with an acceptable and well understood level of PQoS and be based on an equitable sharing of risk between the provider and the receivers of the capability and the services it will provide. The reason a commercial operator would want to be involved should be fully articulated with a particular focus on enforceable contractual arrangements related to PQoS. Observation of the contractual and risk allocation model to be used by the UK Home Office in the commercial provision of a public safety mobile broadband capability for both mission critical voice and data should provide some guidance.

The Commission has undertaken an illustrative evaluation of the costs of several specific delivery options over a 20-year period. The cost of a dedicated network was estimated to be in the order of $6.1 billion, compared to $2.1 billion for a commercial option. Even the lowest-cost hybrid option is twice as expensive as a commercial option.

The work performed the Commission will add to the global body of knowledge and what is understood to be a very limited amount of information relating to the cost of public safety communications networks.

In the present era of "infrastructure" discussion by both Commonwealth and State/Territory Governments the Commission's work provides some visibility to the scale, order of cost, and the importance of the investment decision relating to public safety mobile broadband capability in the context of other State based infrastructure projects.

The suggestion by the Commission for small-scale trials providing an opportunity for jurisdictions to gain confidence in a commercial approach; gauge the costs, benefits and risks of PSMB; and develop a business case for a wider-scale roll out is fully supported.

The Australian Government could choose to become more directly involved in the delivery of a PSMB capability within each state and territory if there are national interest considerations. This might involve, for example, seeking to develop common technical or service standards for PSMB, providing funding support, or exercising its regulatory and legislative powers to encourage a particular outcome.

The commission makes a number of observations regarding the difference between the Australian Government and jurisdictional responsibilities including that jurisdictions will need to weigh up the costs and benefits of different levels of coverage and quality of service, and set funding arrangements. As observed by the Australian Business Roundtable, "The costs of natural disasters throughout Australian history are substantial. Between 2000 and 2012 alone, the insured losses (borne by insurers) totalled $16.1 billion, an average of over $1.2

billion per year"[11].   It is envisaged that a Public Safety Mobile Broadband capability will assist in improving the response to natural disasters and help to reduce the annual cost impact on the Australian economy.   Further national impact will be derived through enhanced digital and operational efficiency in broader public safety outcomes during business as usual activity by PSAs.   As such there is a significant national interest in developing Australia's Public Safety Mobile Broadband capability and it is essential that the Australian Government provides funding support to achieve this goal.   International examples such as First Net demonstrate how a proportion of the revenue raised through spectrum sales can be used to provide support to jurisdictions to develop a national Public Safety Mobile Broadband capability.

Competitive procurement is essential. Splitting up tenders, leveraging infrastructure assets and insisting on open technology standards can help governments secure value for money.

While this procurement approach is contractually possible it must be continuously measured against the outcomes to be achieved i.e. the data management; data interoperability and cybersecurity needs of the PSAs are being achieved in a manner that minimises risk while also achieving value for money.

Achieving interoperability will require jurisdictions to agree on common technical standards. PSAs will also need to adapt their operations to make the most of PSMB. This includes protocols for sharing information and network capacity among agencies.

Regardless of what option is selected to provide a Public Safety Mobile Broadband capability the option must support interoperability achieved by adherence to the standards required produce both public safety grade infrastructure and broadband products and services that meet PSAs needs.   Under any option engineering, product and service compliance based upon these standards must be part of the procurement process.

Spectrum allocation is an Australian Government responsibility. Any spectrum made available for PSMB should be priced at its opportunity cost to support its efficient use.

The vexed question of whether opportunity cost and highest value use should be applied to public safety communications spectrum may well be addressed through the development of highly dynamic self organising networks based upon design scenarios developed in collaboration with the PSAs i.e. the amount of spectrum required for specific events will be dynamically allocated by the network.

6.0   Contacts

For further information regarding this Submission please contact:

- Ged Griffin
- Geoff Spring
- David Williams

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[11]

http://australianbusinessroundtable.com.au/assets/documents/White%20Paper%20Sections/4.%20The%20cost%20of%20natural%20disasters.pdf

Attachment A

Extract from the Department of Communications Submission to the House of Representatives Inquiry into on Communications and Infrastructure Inquiry into the use of Smart ICT in the design and planning of infrastructure

"Smart ICT and emergency services

The appropriate use and integration of Smart ICT within the emergency services sector is another important consideration for policy makers, regulators, emergency service organisations, and network operators seeking to ensure the operation and management of emergency response efforts can keep pace with applicable technological innovation and relevant consumer usage trends.

The Department notes the emerging use of Smart ICT in the car manufacturing industry where real-time monitoring and in-car automated alert technology is becoming increasingly integrated into new car design. Car manufacturers have introduced smart technologies that have the capacity to automatically alert emergency response organisations in the event of an accident (i.e. via a phone call and/or dispatch location-coordinates) where various in-car sensors or triggers have been activated, such as the deployment of in-vehicle airbags. As these smart in-car ICT technologies continue to evolve, more sophisticated features are anticipated (i.e. real-time vehicle monitoring, integration with other in-car control systems).

However, from a broader emergency planning and operational perspective, a number of key challenges remain, and arguably impede, the successful integration smart in-car alert technologies on a widespread scale. For example, the effectiveness of new and emerging Smart ICT can be constrained within an emergency services context by issues associated with jurisdictional diversity, regulatory inconsistencies, the incompatibility of ICT systems, the capacity of networks and technologies to prioritise emergency communications, and the varying organisational capabilities and operational processes of individual emergency response organisations themselves. These challenges present real and significant risks to network operators, policy makers, and emergency service organisations who remain focussed on ensuring (among other things) the efficient deployment of limited resources, funds for service and system upgrades are appropriately prioritised, and the highest possible level of protection to individuals is being achieved.

Despite these issues, the opportunities Smart ICT offers in providing service enhancements within the emergency service environment are undeniable. Further, these challenges collectively emphasise important design considerations that should potentially underpin any related future planning and development activities – both within the car manufacturing sector as well as other relevant sectors where the application of the Smart ICT technologies spans multiple jurisdictions and/or sectors. In addition, as the current telecommunications landscape continues to evolve, it will provide the benefits of greater bandwidth, flexibility, resilience and functionality. "