



19th April 2011

*Committee Secretary
Senate Standing Committees on Environment and Communications
Parliament House
Canberra ACT 2600*

Re Senate Inquiry into the capacity of communications networks and emergency warning systems to deal with emergencies and natural disasters

By e-mail to ec.sen@aph.gov.au

Sentinel Alert – An Intelligent Public Warning System

Dear Committee Secretary

Please accept this document as a submission to your inquiry.

The focus of this submission is the provision of warnings to those in harm's way and in particular to add to your collection of knowledge concerning the criteria appertaining to the terms of reference of your inquiry.

The company making this submission, Sentinel Alert Pty Ltd was specifically formed to advocate an intelligent public warning system that it has developed and patented to promote the notion that with its use, more lives could be saved in times of local, state or national danger.

At a national level, during 2010, proof of concept demonstrations of Sentinel Alert were given to a number of Senators, Members of Parliament and Government Departments including the Attorney General's department. At a State level the Sentinel Alert system has been presented and demonstrated to the Fire and Emergency Services Authority of Western Australia (FESA) at both a regional and headquarters level. It has received in principle support from the FESA chief executive.

Sentinel Alert Pty Ltd has also provided a submission (Nbr 54) to and appeared before the 2010 Senate Inquiry into Bushfires in Australia.

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The primary focus of Sentinel Alert Pty Ltd has been concentrated on bushfire warnings but it is important to note that the Sentinel system is designed to cater for almost any kind of danger where accurate, fast and reliable delivery of warnings is required. Warnings in respect of Fire, Flood, Cyclone, Tsunami, Terrorism – all are able to be encompassed within the Sentinel Alert system.

By way of example in the context of the recent Perth Hills fires, where some 70 or so houses were lost and warnings were reportedly not received by residents for up to one and a half hours after the fires had begun; had the Sentinel Alert system been available, local on-scene incident controllers could have immediately issued an initial alert to every household they thought potentially to be at risk.

Key attributes that Sentinel Alert would have provided are:

- Every household with a Sentinel Alert unit in a zone or zones determined by the on-scene incident controller would have received the initial alert within a couple of minutes of it being initiated by the incident controller. No privacy issues or access to user databases are prerequisites to use Sentinel Alert;
- The level of alert issued and associated information could have been continuously updated and passed to householders as the situation developed and more information became available;
- Different levels of alert, based on geographical co-ordinates could have simultaneously existed and have been concurrently issued / updated throughout the incident;
- FESA head office, local command centres, police and other first responders would have all been automatically and continuously updated with the messages being sent by the on-scene command. More centralised control of warnings being issued could have been implemented at any stage during the incident.

Sentinel Alert Pty Ltd consists of a team of highly experienced Australian communication and electronics engineers who have examined the adequacy of existing warning systems and have built what we believe to be a viable, dynamic, flexible and affordable tool to assist authorities to provide warnings of varying degrees of severity that are fast, accurate and easily updated.

As an indication of the expertise within the Sentinel partner companies, I mention here that Fastwave Communications Pty Ltd who provided the design and equipment for the satellite backbone of the Sentinel system, was recently announced as the winner of the West Australian Information Technology and Telecommunications Industry infrastructure award. (see www.waitta.asn.au) for its Ocean Star system.

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A Proof of Concept site for Sentinel Alert has been established in Dunsborough in the south west of Western Australia. A second site in Jalbarragup also in the south west of WA will commence operation in April 2011 thanks to funding from the South West Development Commission. These sites are available for demonstration.

Our purpose here is to bring to the attention of your inquiry our view that a superior public warning system could be made available to authorities and the community across states and indeed across the country at a modest cost and within a short time frame.

Genesis

The idea for Sentinel Alert was born when one of our team, Ray Datodi, who lives in the fire-prone area of Yallingup in WA was alerted to a fire in his neighbourhood, not by a designated warning system but by the sound of water bombing aircraft flying low over his property and attacking a bushfire only a few hundred metres from his property.

Community meetings held after that fire quickly showed Mr Datodi that his experience was not an isolated one and clearly there was a significant gap in the tools available to authorities to accurately warn residents in a timely manner.

A member of the Sentinel design team is also a current active volunteer in the fire and rescue service and his experience together with contributions from other local volunteers, professional fire fighters and shire fire management officers has been instrumental in the development of a functional system

A key criterion in the Sentinel Alert approach to warning systems is that the design commenced with essentially a blank piece of paper. This is in sharp contrast to many existing warning systems where the design criteria has been more “How can we use “X” existing system to provide “Y” functionality” almost always then giving a sub-optimal result because of inherent limiting factors in adapting existing systems to a function that they were never designed for.

For example in the 2009 Black Saturday fires in Victoria over 2 million SMS messages were sent by authorities but these took several hours to actually send (2009 Victorian Bushfires Royal Commission, Interim Report, Page 153 Ref 4.251). This for a single message – how on earth do authorities then update that warning so it is received in a timely manner ? SMS is an efficient social and business networking tool – it was never conceived as a mass warning system.

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Sentinel Alert design criteria

- Capable of delivering warnings to large or small communities
- Capable of accurately targeting houses and properties that are under threat
- Capable of delivering messages to large or small number of properties simultaneously and within minutes of initiation by a responsible officer
- Capable of being activated and controlled at a local level and at the same time able to be layered so state or even national warnings can be broadcast
- Able to cover every property, anywhere without “dead spots”
- Able to act as an “Early Warning” system not just a “Warning of Last Resort”
- Free of conventional ground based communications infrastructure
- Not subject to congestion at times of crisis or high demand
- Not Network or Carrier specific
- Able to offer high levels of system redundancy
- Able to provide different levels of alert or alarm simultaneously to different areas
- Able to warn users who may be away from their property – eg in vehicles / tractors
- Able to cater for tourists staying in or touring a region
- Able to provide specific text information relevant to the particular threat to each property
- Able to provide easily updated information as a situation develops
- National coverage
- Simple to deploy
- Suitable to warn disabled people
- Simple to administer
- Simple to operate
- Able to co-exist with other warning systems
- Able to accept inputs from Fire detection systems – eg Landgate imaging and prediction models
- Secure - with trusted, credible advice from an authoritative source
- Economical for end users and for Authorities

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CRITERIA	Sentinel Alert	State Alert	Fixed Line
Capable of delivering warnings to large or small communities	Complies	Complies	Complies
Capable of accurately targeting houses and properties that are under threat	Complies	Does Not Comply	Complies
Capable of delivering messages to large or small number of properties simultaneously and within minutes of initiation by a responsible officer	Complies	Does Not Comply	Does Not Comply
Capable of being activated and controlled at a local level and at the same time able to be layered so state or even national warnings can be broadcast	Complies	Does Not Comply	Complies
Able to cover every property, anywhere without "dead spots"	Complies	Does Not Comply	Does Not Comply
Able to act as an "Early Warning" system not just a "Warning of Last Resort"	Complies	Does Not Comply	Complies
Free of conventional ground based communications infrastructure	Complies	Does Not Comply	Does Not Comply
Not subject to congestion at times of crisis or high demand	Complies	Does Not Comply	Does Not Comply
Not network or carrier specific	Complies	Does Not Comply	Does Not Comply
Able to offer high levels of system redundancy	Complies	Does Not Comply	Does Not Comply
Able to provide different levels of alert or alarm simultaneously to different areas	Complies	Does Not Comply	Complies
Able to warn users who may be away from their property – eg in vehicles /tractors	Complies	Complies	Does Not Comply
Able to cater for tourists staying in or touring a region	Complies	Does Not Comply	Does Not Comply
Able to provide specific text information relevant to the particular threat to each property	Complies	Complies	Does Not Comply
Able to provide easily updated information as a situation develops	Complies	Does Not Comply	Does Not Comply
National coverage	Complies	Does Not Comply	Complies
Simple to deploy	Complies	Complies	Complies
Suitable to warn disabled people	Complies	Complies	Complies
Simple to administer	Complies	Does Not Comply	Does Not Comply
Simple to operate	Complies	Does Not Comply	Does Not Comply
Able to co-exist with other warning systems	Complies	Complies	Complies
Able to accept inputs from Fire detection systems – eg Landgate imaging and prediction models	Complies	Does Not Comply	Does Not Comply
Secure - with trusted, credible advice from an authoritative source	Complies	Complies	Complies
Economical for end users and for Authorities	Complies	Does Not Comply	Does Not Comply

LEGEND *COMPLIES* *DOES NOT COMPLY*

How Sentinel Alert Works

In understanding this sequence, it is important to note that satellite transmissions to the radio towers are made using a short burst of data. This message is sent only once (providing the tower acknowledges its receipt) to each tower. The tower then continuously rebroadcasts that message (free to air) until it is updated. One tower can cover up to 8000 square kilometres and hundreds or even thousands of properties. A single satellite message sent to a tower initiates continuous warning messages. The cost and time to send the single satellite message required to simultaneously cover all the properties within range are in the same order of magnitude as sending a single SMS on a cellular phone.

It is not necessary for towers to be contiguously arranged – each tower has its own satellite receiver and as such has a stand-alone capability. Satellite coverage of the whole of Australia and territories is continuous.

Existing towers should be often suitable for use.



How it works

Control officer draws danger zone on computer mapping interface
Computer calculates GPS co-ordinates of danger zone





How it works

Officer in charge authorises transmission and message is sent directly to satellite constellation



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How it works

Radio towers receive the message and commence to broadcast (continuous repeats)



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How it works

All Sentinel units within range receive the message – immediately. Satellite message need only be sent once. Towers repeatedly re-broadcast the free to air message



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How it works

Sentinel units within danger zone change to Alarm status



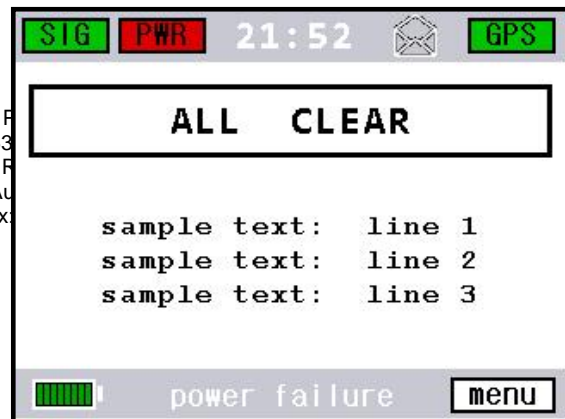
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The Sentinel Alert Home Receiver

Showing the Fire Danger Rating for its location which is updated automatically as authorities issue new levels.



Screen Shots – showing various levels of alert / alarm and performance indicators



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Coverage

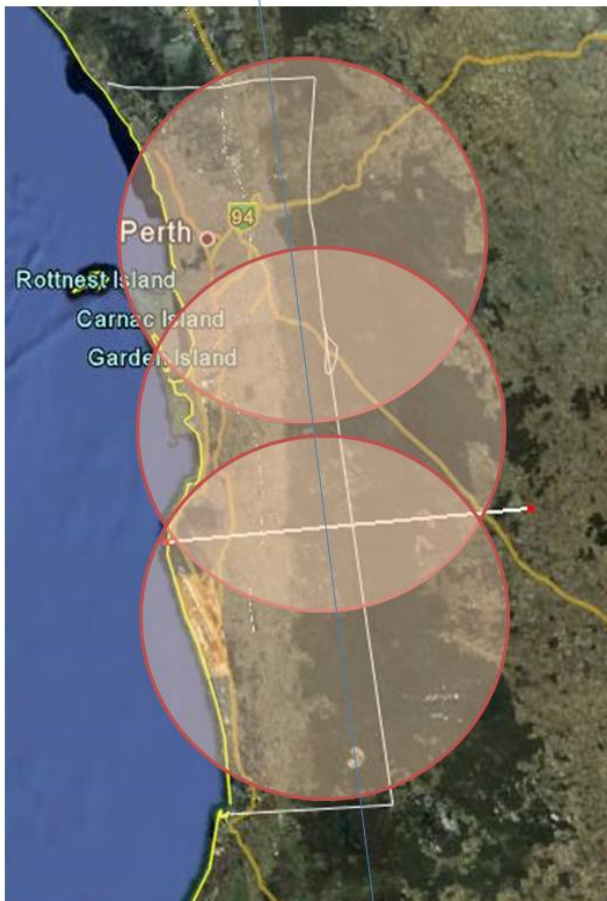
At the current level of radio transmission power and the licensed frequency that Sentinel Alert is using, each radio tower has a range of approximately 50 kilometres or, put another way, can cover an area of about 8,000 square kilometres.

To give these figures some context, the illustration below notionally shows the coverage that could have been available with 3 Sentinel transmitters located to the east and to the south of Perth covering the metropolitan area and the entire area of the recent Perth Hills fires.

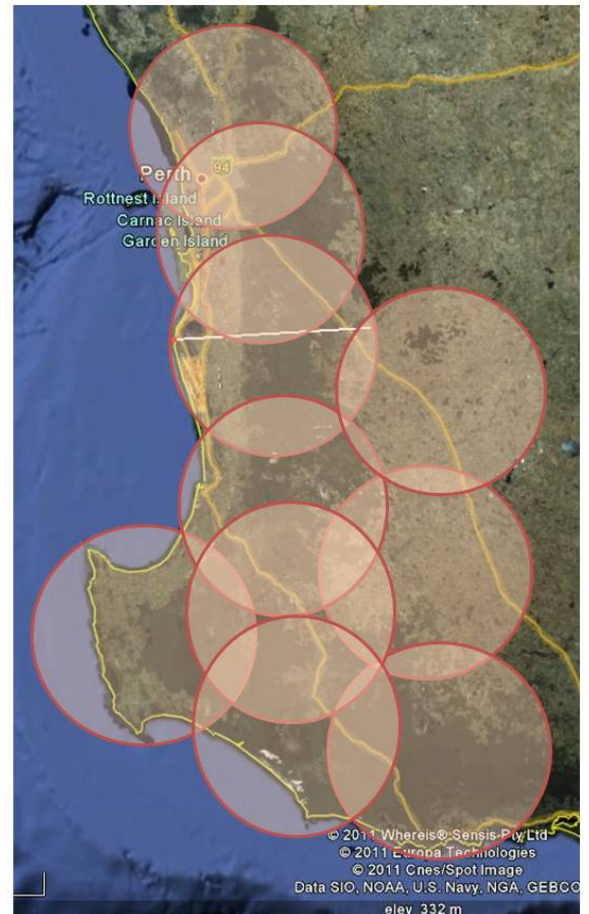
For further context and alternatively 10 Sentinel transmitters could notionally cover Perth and the south west of Western Australia.

These illustrations are for context and an appreciation of scale only; they do not take into account topography, propagation, tower availability, redundancy or other issues that would need to be considered under an actual deployment plan

Notional Coverage with 3 Sentinel Alert Radio Transmitters along the escarpment east of Perth



Notional Coverage with 10 Sentinel Alert Radio Transmitters Covering Perth Hills and the Southwest



Scale of Equipment

The size of the equipment used for both the satellite segment and for the radio transmissions is modest.

The satellite transceiver is about the size of two paperback books placed on top of each other. The satellite antenna is also small, about the size of an inverted coffee mug and does not require orientation to “point” in any particular direction.

Satellite Transceiver



Satellite Antenna



The radio transmitter is designed to fit in a standard 19” rack (for context – about the size of 2 laptop computers stacked one on top of the other) and the associate antenna is similar in dimension to a domestic roof mounted TV antenna

Radio Transmitter in 19” rack



Radio Antenna



This modest scale of equipment means modest costs and easy mounting on existing towers with only a very small increase in the tower loading.

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Similarly power requirements are modest allowing the incorporation of solar and battery back-up to provide redundancy in the event of failure of a primary power source.

Control of the system

It is not within our purpose to attempt to describe how authorities might organise themselves to delegate responsibility to issue warnings. However it is important to indicate that within the Sentinel Alert system it is possible to have layers of authority and control that can simultaneously co-exist.

Local Control

A local Fire Control Officer for example may be designated with the authority to issue alerts and alarms to his or her defined local area. This means that he or she could issue an alert or alarm immediately on receipt of local advice that a fire danger exists.

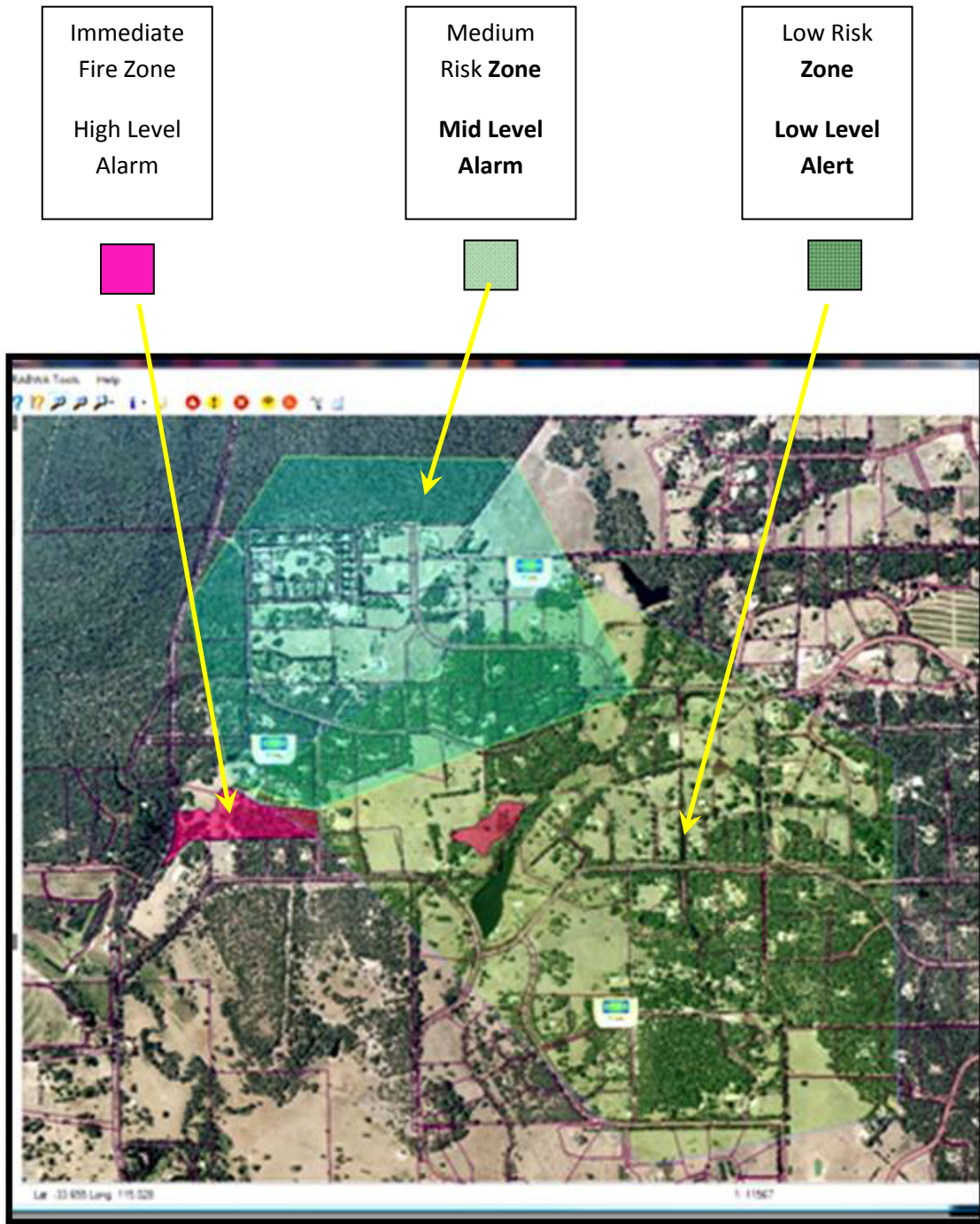
The local Fire Control Officer could decide, on the basis of the information available, the levels of risk and the area under threat. Without having to wait to advise a central system to issue warnings He or she can draw the danger zone on the local control station, select the appropriate alert level, insert a text advice to go with the warning and initiate the transmission. Within minutes every property within the selected zone could receive that warning. Regardless of whether that is a single property or 10,000 properties, all receive the warning simultaneously – But because of the built in intelligence in the Sentinel Alert receiver, only those in the affected area will change to alert/alarm status.

As the situation changes and further information becomes available the Fire Control Officer can upgrade the level of warning to those already alerted, and or issue additional warnings with selectable and varied level of alert to other areas. The text advice can similarly be updated. Again this information is delivered to all affected properties within minutes of initiation but only those targeted change their status.

Importantly because those properties not targeted for the alert do not change to alert or alarm status – the issue of “cry wolf” false alarms that can degrade the perceived value of warning systems is avoided.

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Illustration of Sentinel Alert Computer Map with 3 simultaneous but different levels of warning for 3 separate areas



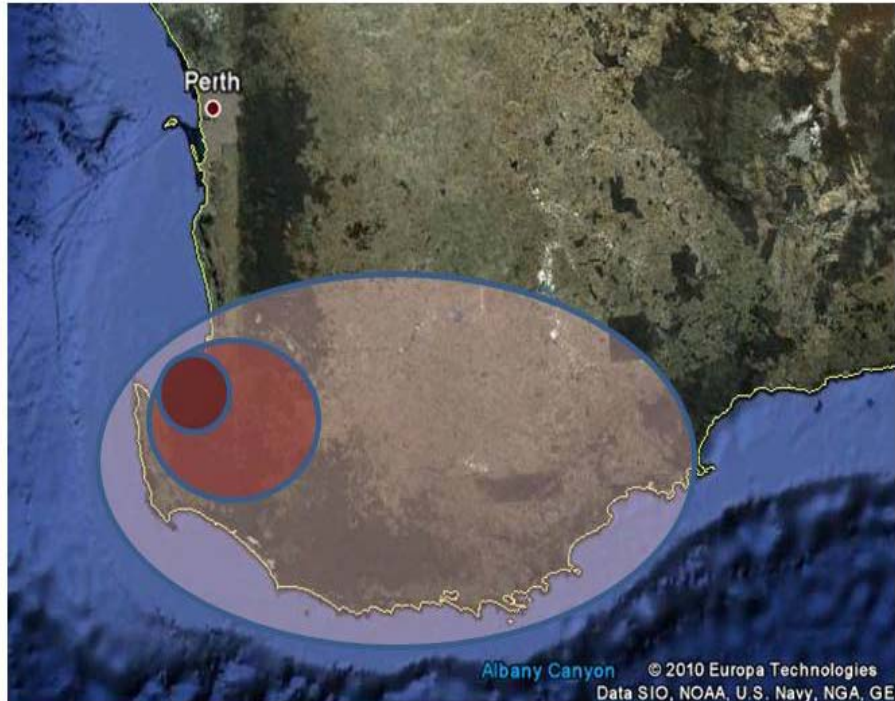
Wider Area Control

Where an incident might grow to encompass larger areas of responsibility, a more centralised control over the issue and distribution of warnings can be triggered. This could be arranged such that local officers feed their advice back to a central command post where that information can be incorporated into a more holistic warning issued from that command post. Without labouring the technical details in this document, the satellite backbone to the Sentinel Alert system allows for 2 key features:

- All warnings and alerts issued by local fire officers can be displayed (and advised by SMS and/or email) to central control officers. This gives a constant oversight of the status of any warnings issued and subsequent updates.
- Central command could implement an overriding system command such that alerts / alarms could not be transmitted locally without specific authority. This feature can be used to ensure consistency of advice and alert levels in the case of a large incident with significant geographical spread.

Diagram of overlaying areas of Authority

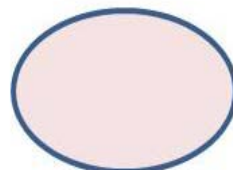
Areas of Authority can co-exist



Level 1



Level 2



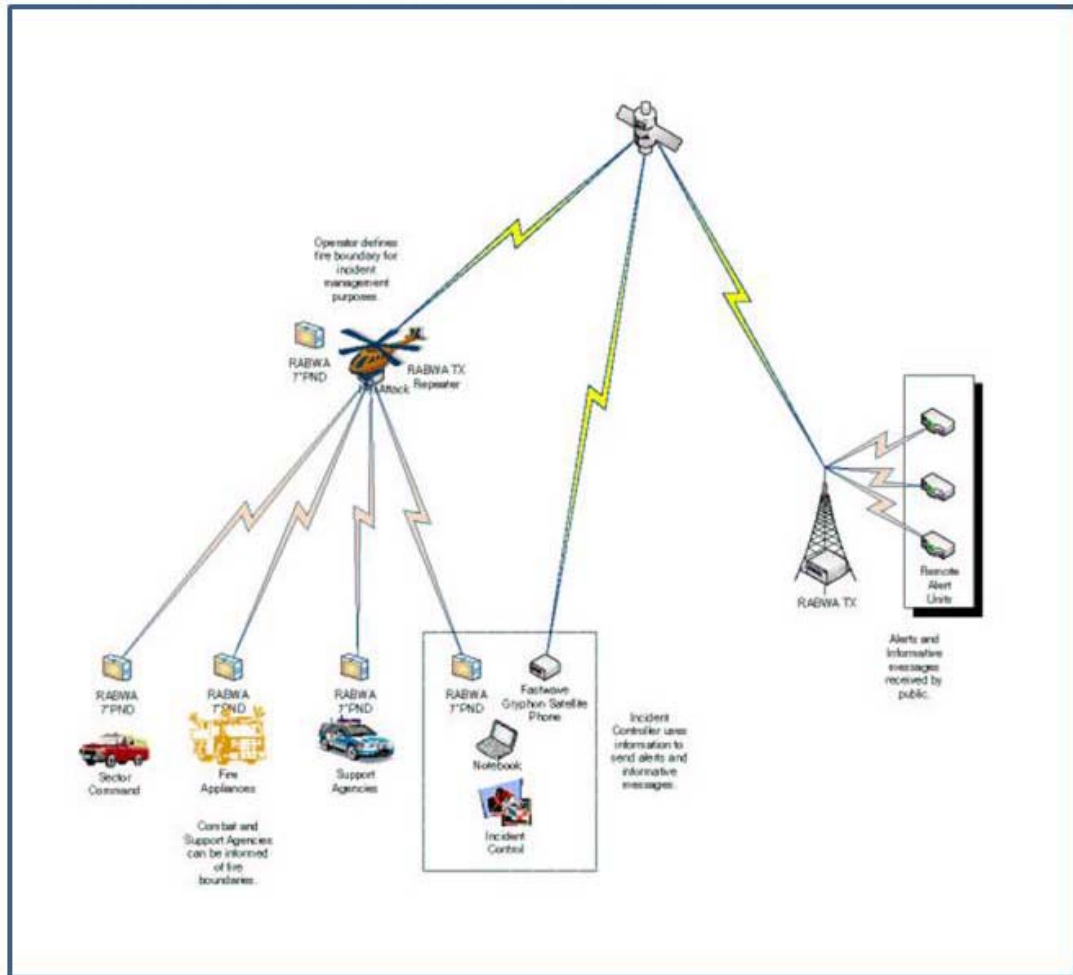
Level 3

Mobile Command Units

As illustrated in the “How it Works” section above, the “backbone” of the Sentinel Alert system uses a satellite link to carry the message and commands to the radio transmission towers. Because the satellite system is in Low Earth Orbit (LEO) and therefore relatively close to the Earth the size of the satellite equipment used on the ground is small, does not have to be orientated to point directly at a satellite and the signal has good penetration characteristics for smoke, cloud and foliage. These features make the equipment suitable to mount in mobile command units – either on the ground or in the air.

For example, airborne observers could use the system to advise ground control officers of the boundaries of a fire using the same “draw it on a screen” technique that the Fire Control Officer uses or indeed the Fire Control Officer could be airborne and be able to issue commands to the radio towers directly from an aircraft.

Airborne Communications-Options



Situational Overview

A further feature of the Sentinel Alert proposed system is that regardless of where control is being exercised for any particular incident, the information being authorised for transmission to the public, (the level of alert / alarm and the specific text messages being transmitted) can be fed back into a network allowing a wide range of authorised personnel to have a situational overview in real time. They could see what the incident controllers (be it local, shire, district or state) are actually promulgating to the public. This information will also contain and display on mapping (GIS) displays the geographical areas selected by controllers for various levels of alert.

The situational overview can be distributed by the Internet and therefore has a virtually unlimited range and reach to appropriate personnel from a local level through to a national level.

The use of “smart phones” and/or satellite equipment also allows this information to be observed by personnel on the move.

Integration of other data sources

The combination of the satellite backbone and Internet also allows for other data sources to be integrated into the decision making tool set. For example, one of Sentinel Alert’s partner companies (Fastwave Communications) who provides the satellite expertise and systems for Sentinel Alert is also a provider of mobile weather stations. These are used extensively by CFAs in Victoria and in South Australia as rapidly deployed units able to be sited around the area of a bushfire. Local weather conditions are then transmitted from these units by satellite to the Bureau of Meteorology and to fire authorities. This type of data feed into the decision making tool set can be easily incorporated in the Sentinel Alert system.

A further example of the potential for use of the satellite backbone and Internet distribution is evidenced by the offer by Landgate (a WA Government agency developing predictive fire behaviour models from satellite imaging) to work with Sentinel Alert to provide predictive information via the Sentinel Alert system to decision makers dealing with a bushfire.

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Resource tracking and management

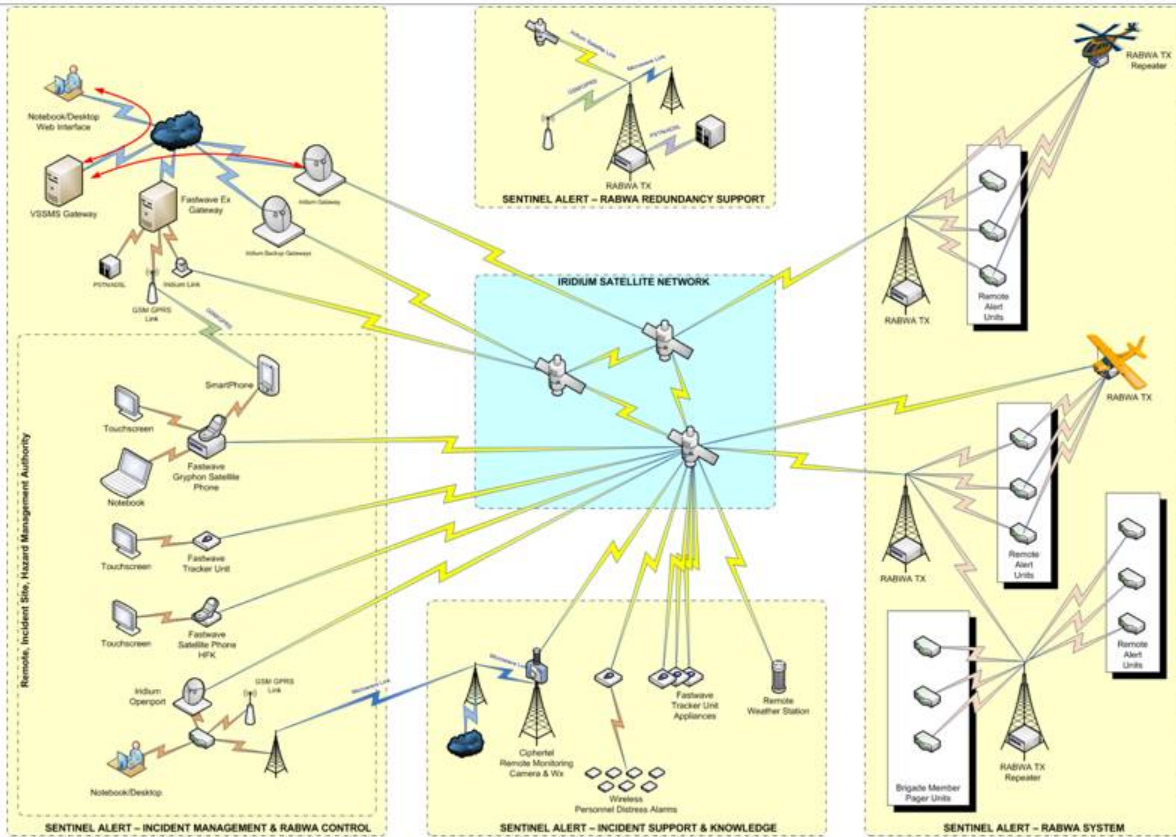
Core issues in dealing with an emergency are:

- The dissemination of information to those on the ground dealing with an incident.
- Knowing in real time the location of personnel and assets with respect to the boundaries and dynamics of a developing incident.
- To be able to continuously update and disseminate incident and asset status
- To track and co-ordinate the movements of personnel and assets during and incident
- Panic alarm “Man Down” capability from the theatre of operation

The architecture used by Sentinel Alert allows seamless integration of two-way information to deal with these aspects of incident management. Equipment, Systems and Service provided by Sentinel’s partner company Fastwave Communications Pty Ltd enable this capability. A series of diagrammatic illustrations now follow that outline some of the potential aspect of using this technology. The Sentinel and Fastwave teams are available to discuss these aspects in more detail should your inquiry wish.

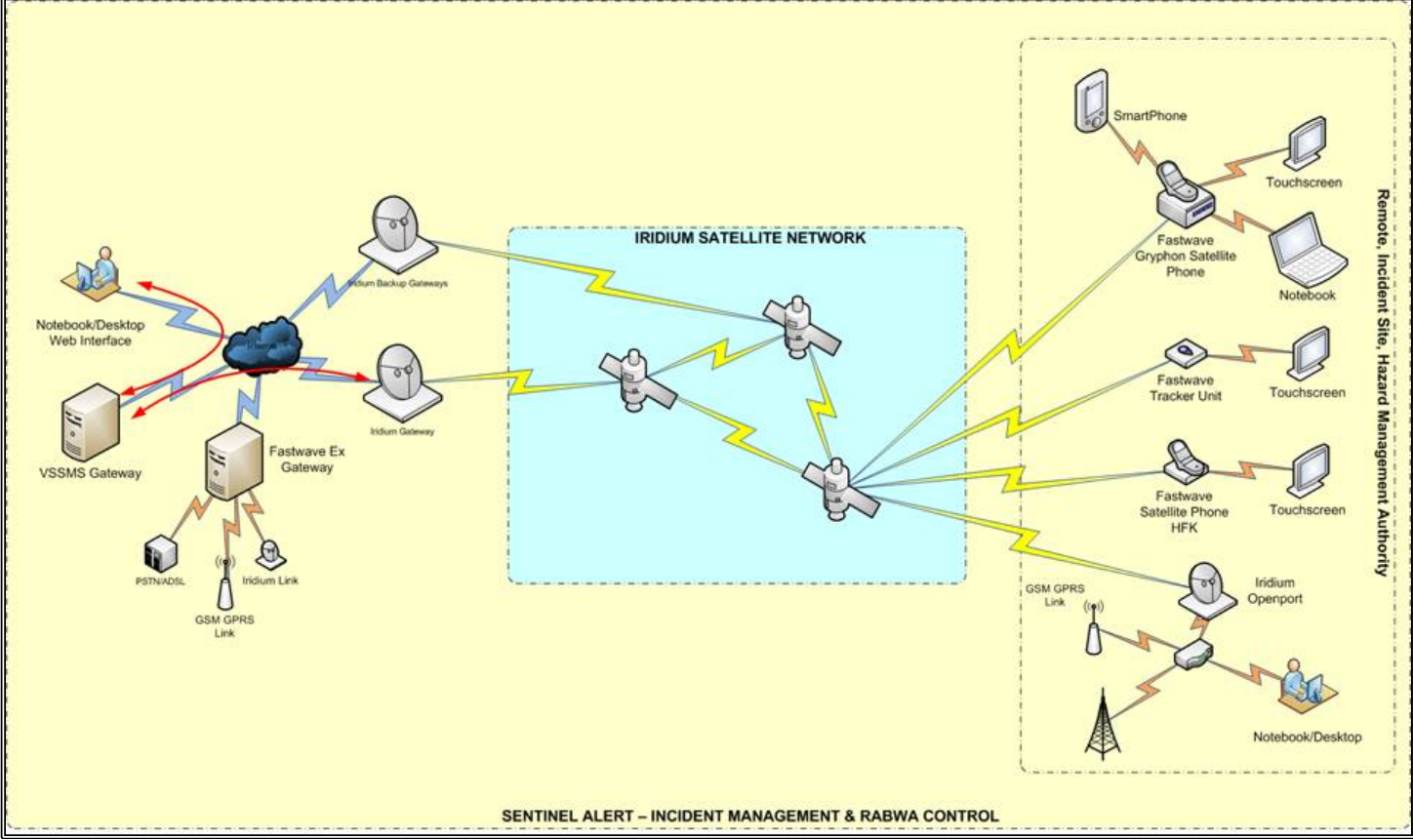
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System Overview



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Activation



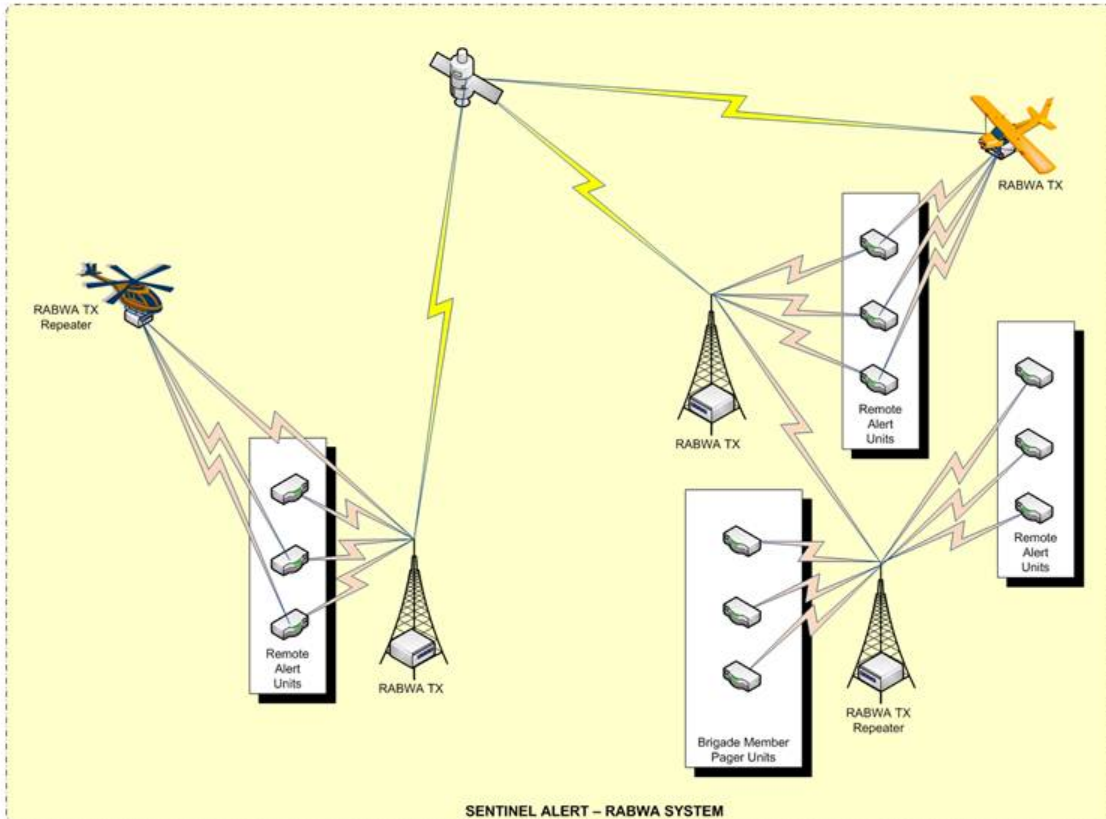
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Activation SOP



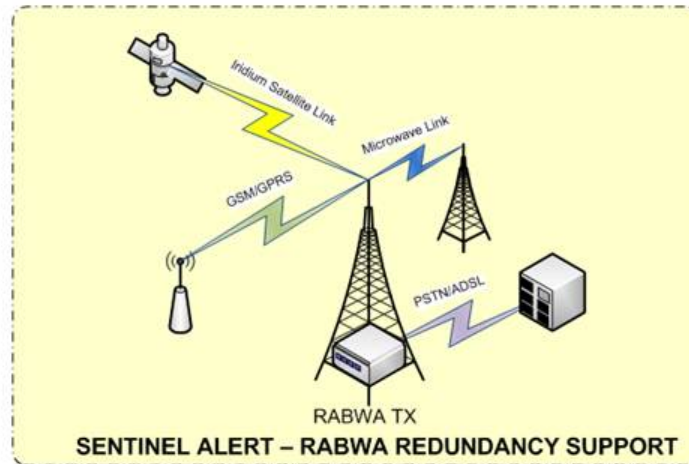
- Flexible SOP integration
- Localised Activation of Advice & Watch & Warn Messages by HMA-IC
- Incorporation of SDD & SDC for Emergency Warnings if required
- Authority sequencing for message activation
- Template of message text
- Remote Monitoring or addition to activations

Receiver Activation



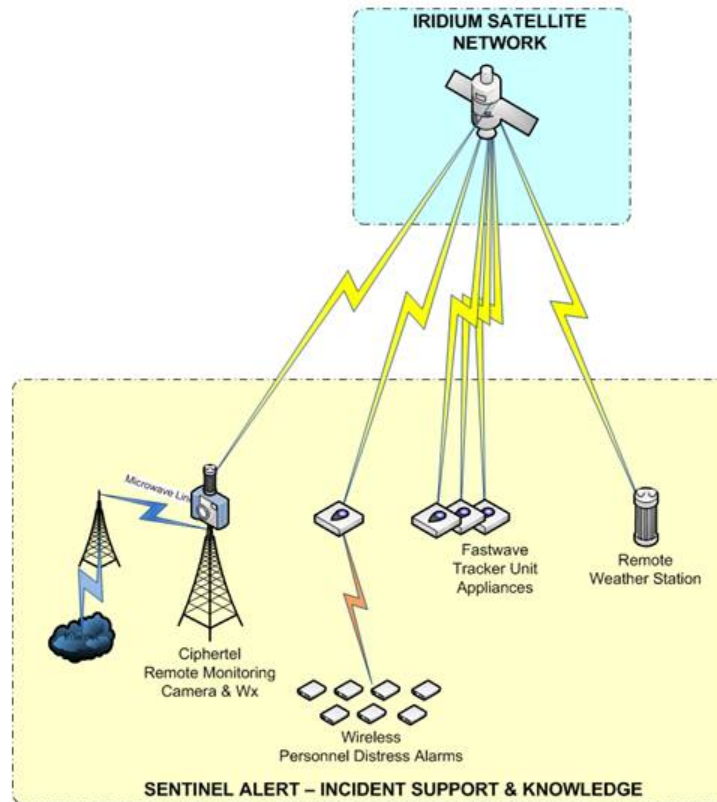
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Design Redundancy



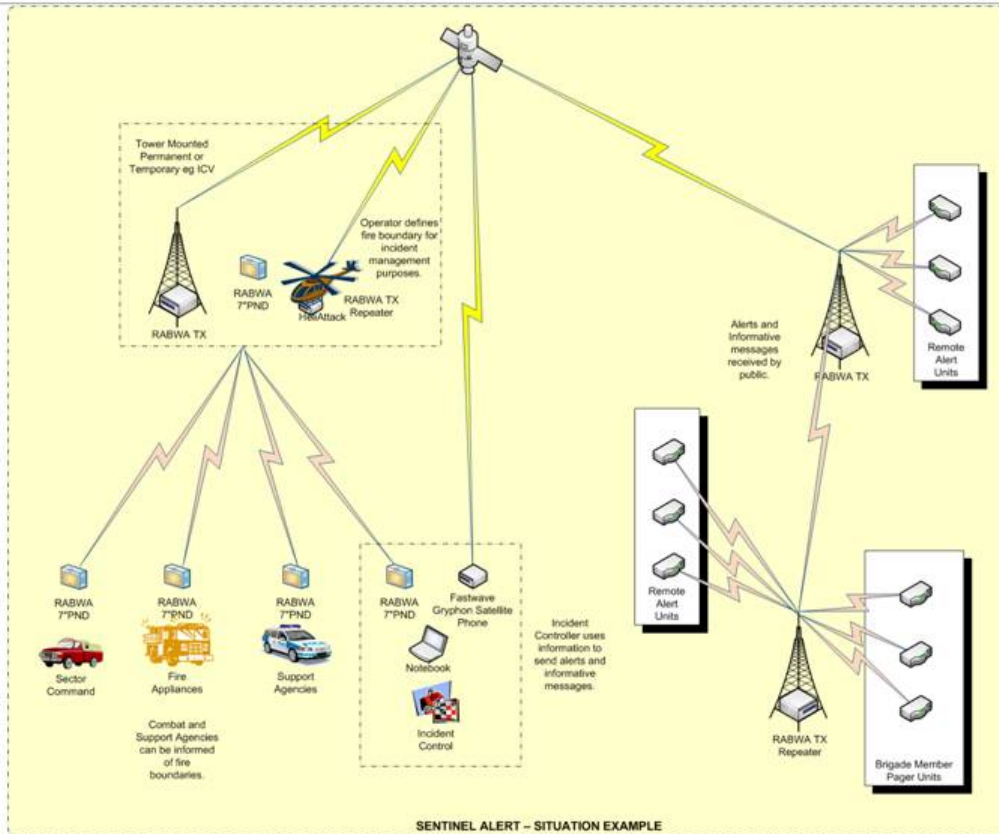
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Supplemental



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Situation Example



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Current status of the Sentinel Alert project

In 2010 Sentinel established a small scale proof of concept trial site in Yallingup, Western Australia. A transmission tower was commissioned and a small number of units deployed through the community. Initial operating data and user feedback has enabled useful improvements to be made to the hardware and operating system.

The trial is due to be expanded during April 2011 to some 50 receiver sites with some operational changes such as relocating the main Yallingup transmitter to a more suitable site currently taking place.

A second trial site will become operational also in April 2011 in Jalbarragup again in South West WA.

Jalbarragup, in the shire of Nannup, is a small community where fire danger is very high, the area is densely wooded with difficult terrain and poor conventional communications. All the challenges that Sentinel is designed to overcome.

Because the Jalbarragup community is small, the trial is going to be able to cover every property (approximately 80) and with the co-operation of the Shire and their Fire Control Officer, Sentinel Alert will have, for the first time, a complete system serving a community.

The knowledge gained from the experience at Yallingup has been incorporated into the design and build of 100 units which are due to be deployed both in Yallingup and at the new trial site with installation due to commence during the week of 28th March 2011.

The Jalbarragup trial is particularly satisfying for Sentinel as it received funding for the trial from the SW Development Commission. This is the first external funding that the project has received; all previous development and trials having been self-funded by the shareholders.

The Jalbarragup site will not only serve the community, provide valuable operating experience and feedback to Sentinel but it will also serve as a visible and working demonstration of how Sentinel Alert operates in the real world. Sentinel Alert is looking forward to welcoming authorities and communities who visit the sites to see how the system could work for them.

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Next steps for Sentinel Alert

Sentinel Alert was conceived as a humanitarian project. From the initial idea of a life and property saving process for a local community in south western WA the concept has grown to the point whereby potentially the whole Australian community can benefit. However to grow the project to that size requires the support of Government at every level Local, State and Federal. Sentinel Alert would like to encourage the development of a measured process whereby the Sentinel Alert system can be refined further and trialled on a wider basis to prove up and demonstrate to government, authorities and to the community that a valuable life saving warning system can be made available to every Australian.

An outline plan to develop the Sentinel Alert system to the next level follows. The implementation of this plan is subject to the availability of appropriate support and funding.

Development Plan

Broad objectives

- *Continue the development of and have available for demonstration, the new Jalbarragup site as well as the existing Dunsborough Yallingup Proof of Concept site.*
- *Engage local government and community support to fully test and develop the system such that specific community issues and needs are understood and met.*
- *Build rapport with Emergency Authorities such that operational needs are understood across a wide range of different situations and potential public dangers. Develop control procedures and message protocols to match needs.*
- *Develop the “mobile” Sentinel Alert unit for warnings to those away from their properties*
- *Examine the potential for Sentinel Alert to act as a paging system to provide other forms of advice and alerts to particular recipients – eg first responders.*
- *Establish trial sites in every State and Territory*
- *Examine the potential for Sentinel Alert “home units” to also incorporate SMS and AM radio thus providing a single unit with access to multiple warning systems.*

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Outline Plan

Continue the Development of the Jalbarragup and Dunsborough PoC sites

We believe it is important in building wide ranging support for the Sentinel Alert system that as many people as possible have access to our 2 trial sites. This will enable demonstrations to be held in locations that face many of the challenges faced by other communities across Australia. Whilst some of the specifics may be different, the primary need for well timed, credible community advice of potential danger is common to all. Having real scale demonstration sites will enable those who remain to be convinced to come and see for themselves. Access to full scale trial sites also allows our ongoing development of the system to continue.

Government and Community Support

Local support is crucial for the success of a warning system. Within trial sites community education as to what the system can achieve, how it works, what to expect, will be a prerequisite. Local government (with Sentinel Alert support) is seen as a key to disseminating this information and advice.

Local dangers will be alerted initially by local first responders. With their support and their perception that Sentinel Alert is a useful tool to them, then the community will understand that messages on the Sentinel Alert system are credible and relevant to them.

Importantly during the trials community feedback will enable the system to be refined to take account of real experience from community members faced with potential dangers.

Rapport with Emergency Authorities

In a similar vein to the need to achieve community support – Emergency Authorities are a community in themselves. From first responders and volunteers through to senior personnel, the trials will provide the opportunity for close dialogue with Authorities so that they are on the one hand able to appreciate the value and simplicity of the system and on the other hand able to work out how their command structures might make the best use of the features incorporated within the system. Close dialogue and feedback from Authorities will enable the control and command features and the format of messages to be tailored to consistently fit with the needs of responding Authorities and conformity with other existing warning systems.

Development of the Mobile unit

Clearly for the Sentinel Alert system to cover as many hazardous situations as possible there is a need to be able to warn people who may be working away from their properties. To that end Sentinel Alert intends to develop a mobile unit with the capability of displaying data about 2 different warning locations – the current location of the unit and the “home” location of the unit. This will enable advice and alerts to be received with respect to where the unit is at the time as well as in respect of the owner’s home or business property.

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Potential for use as a selective paging system

The Sentinel Alert transmission and receiver can be considered as and could (in addition to its warning functions) act as, a pager system. The case for a Selective Paging System would be based on being able to make more efficient use and deployment of resources, enabling Controllers both on the front line or within an Incident Control environment to contact personnel by pager. We intend to examine the potential use of the Sentinel Alert radio transmission capability and the feasibility of a suitably modified “mobile” Sentinel Alert units to act as pagers and to notify relevant personnel such as volunteers or off duty police or fire crews of an incident and / or of the developing situation of an incident

The ability to be quickly updated in the field, ensures individuals are informed of the changing status and situation and provides the Incident Controller a means to manage them as needs change through timely advice messages delivered in near real time.

Trial Sites

The objective of establishing trial sites in every state and territory is to encompass and be able to deal successfully with the full range of dangers that various communities might face, be it from bushfires, floods, cyclones, tsunamis or any other form of public danger. Sites should be chosen to encompass the full range of different terrains and topographies that the system must work across.

A further objective is to trial the Sentinel Alert system on a scale that is on the one hand meaningful and representative yet is constrained to a manageable and responsible cost.

Potential for incorporating other warning systems

Sentinel Alert system is seen a complementing not supplanting other warning systems such as State Alert and Public Radio broadcasts (ABC). As such we have briefly examined the technical feasibility of incorporating 2 further features within the home and mobile modules:

- Incorporation of a GSM/GPRS/Next G module – this to allow the receipt of State Alert or other SMS warning messages;
- Incorporation of an AM radio receiver to receive public broadcasters warning messages (ABC Radio).

Technically both of these appear to be feasible although the financial implications have not yet been examined. Additionally the desirability of having an “all in one” unit has also to be canvassed.

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Conclusion

Sentinel Alert Pty Ltd is a company specifically established to develop and promote what it believes to be the most competent Intelligent Public Warning System. It was born in a local community and from a perceived community need. It has no current source of income and has been funded to date by its shareholders and more recently by the South West Development Commission. To progress with the proposed Development Plan will require further support and funding.

Sentinel Alert as a system with its genesis in community needs has the potential to remain in local control with its immediate relevance and reaction time; yet it is able to reach beyond local boundaries to encompass wider public needs.

It is designed specifically for intelligent public warnings and to overcome some of the inherent shortcomings of existing systems.

It can offer timely, immediate and continuously updated information. Unlike other systems it easily and continuously provides graded information from early warning through to last resort and after the danger has passed an "all clear".

In terms of technical performance, specification, potential cost to the public or individual purse or any other aspects of the Sentinel Alert system that your inquiry may wish to examine we are available to discuss these as you may see fit.

Thank you for your attention to our submission.

Sincerely

Signed Original Submitted

Name Provided

Director and CEO

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APPENDIX 3

EXTRACT From 2009 VICTORIAN BUSHFIRES ROYAL COMMISSION INTERIM REPORT

WHAT MAKES A GOOD BUSHFIRE WARNING?

4.37 The Commission received expert advice on what constitutes an effective warning in written submissions and in oral evidence.²⁹ Other key documents on this topic include:

- 2005 and 2009 Australasian Fire and Emergency Service Authorities Council (AFAC) position papers³⁰
- 2008 Australian Government advice Emergency Warnings — Choosing your Words³¹
- Material relating to the Common Alerting Protocol (CAP).³²

4.38 There is a high level of consistency between these key documents and the expert advice received by the Commission. The State has committed to implementing improvements in bushfire warnings for the forthcoming fire season.³³ This guidance highlights that the content of a warning should be driven by its aim. In this context, Professor Handmer, Innovation Professor in Risk and Sustainability and Director of the Centre for Risk and Community Safety at RMIT University, set out the features of a good warning.³⁴ In particular, it should let people know what they should or should not do to protect themselves, empower them to respond appropriately, be ‘people centred’ and be based on local needs and expectations.³⁵

4.39 In oral evidence, Professor Handmer added that the purpose of a warning is to ‘provide a signal for some action’.³⁶ He noted that it is important to ensure that people realise that the warning relates to their personal situation.³⁷

4.40 Professor Handmer also suggested that messages should set out the expected timing and severity of the event, say what is likely to happen and when it will occur, indicate how people should act and identify the source of the message (which should be one that is trusted as credible by those at risk).³⁸ He noted the phenomenon of people seeking to confirm and discuss warnings in their personal networks.³⁹ He said that language should be vivid, rather than vague or abstract; messages should be positive, rather than negative (that is, they should advocate what to do); and they should invite sociability (for example, by recommending that people check on their neighbours) because people like to ‘do something’.⁴⁰

4.41 Urgent messages should contain locally specific information.⁴¹ Professor Handmer recommended that messages should include information about the degree of severity of the fire, or the predicted event.

... the severity message is to help people gain an appreciation of what is coming and to help them make an appropriate decision⁴²

4.42 He made the following further suggestions for improvements to existing materials:

- consideration should be given to having another level of fire danger for particularly extreme conditions⁴³
- high-risk areas and vulnerable groups should be targeted for more personalised messages and bushfire-related education⁴⁴
- commercial media needs to become part of the fire and emergency management system⁴⁵
- informal networks could be used more to disseminate warnings, and to add locally specific information to the message⁴⁶

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- to be useful, warnings need to provide those at risk with enough time to take protective action.⁴⁷

4.43 Mr Alan Rhodes, Manager Community Safety Research and Evaluation for the CFA, referred to the research of two American experts, well known in the field, Mr Dennis Mileti and Mr John Sorensen. He set out their view that for a warning to be effective, it must:

- describe the precise nature of the threat and how it poses a danger to the public
- communicate the exact location of the threat
- provide guidance as to the specific actions the public should undertake
- specify the time when the hazard is likely to impact
- state the agency which is giving the warning (multiple sources are preferable).⁴⁸

These statements provide sound guidance as to what constitutes a good warning.

4.44 Many of the matters explored in the evidence of Professor Handmer are strikingly similar to the views of the Emergency Services Commissioner, Mr Bruce Esplin. The OESC has produced a number of significant reports in relation to warning systems, emergency management and emergency events in Victoria.⁴⁹ The Commission commends the work of Mr Esplin's office and its contribution to the development of the learning and research in the area, in particular its work on the Community Information and Warning System: The Report of Trial and Evaluation (2006).⁵⁰

4.45 In evidence, when asked what constitutes a 'good warning', Mr Esplin said the following:

I have formed a view in that regard and the first thing is that the warning has to be delivered to a community that has been prepared to receive the warning and to know (a), hopefully where to access information and what to do when they get that information. A good warning is simple; it is probably locally relevant information delivered by locally credible sources.⁵¹

4.46 It is also useful to consider the work of the American expert, Mr Sorensen. In his article, Hazard Warning Systems: Inquiry of 20 Years of Progress, Mr Sorensen referred to six warning myths that 'all too often constrain the effectiveness of warning systems when implemented'.⁵² He describes the six myths:

(1) the myth of 'public panic': Mr Sorensen says that social scientists have shown this is not the case, except in situations affected by closed physical space and an immediate and clear source of death where escape routes are not available to everyone affected.

(2) the second myth Mr Sorensen cites is that 'officials are usually worried about overwhelming people with too much information': in his opinion, the public 'rarely, if ever' receives too much information during an emergency.

(3) Mr Sorensen refers to the concern about raising 'false alarms': he notes that the likelihood of people responding to warnings is not diminished by what has been labelled the 'cry wolf' syndrome — so long as the basis of the false alarm is understood.

(4) the belief on the part of authorities that a single spokesperson is good practice when disseminating emergency information: indeed, to the contrary, says Mr Sorensen, the public needs information from a variety of sources.

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(5) it is a common belief that people will take action immediately on receipt of a warning: however, most people ‘simply do not’ do so, says Mr Sorensen.

(6) the sixth myth is that officials often think people will follow all recommendations made in a warning, but research shows people will not blindly follow instructions, unless the basis for the instruction is clear and that basis makes ‘common sense’.⁵³

4.47 The myths described by Mr Sorensen appear to have underpinned some of the development of our current bushfire warning systems. The challenging of these myths assists in assessing the system with fresh eyes. An improved understanding of the way in which people react to warnings assists in crafting better warnings.

THE WARNING POSITION ADOPTED BY AFAC

4.48 In 2005, AFAC prepared a draft position paper on bushfire information and warnings.⁵⁴ The paper was last modified on 24 April 2007, but remained in draft form.⁵⁵ The AFAC paper is described as being ‘In Response to Recommendation 8.5 from the COAG Report on Bushfire Mitigation and Management’.⁵⁶

4.49 The 2005 AFAC paper emphasised the importance that messages should use plain language and should address the following questions:

- *What is the risk?*
- *Where is the threat now?*
- *Where is the threat expected to move to next?*
- *What are the immediate risks faced by people in the threat area?*
- *What are the public advised to do about those risks?*
- *What are the response agencies doing about the situation?*⁵⁷

4.50 It indicates that bushfire information and warning messages should also include:

- clear information about the area of risk
- where a specific location is provided, information about the general location — local place names should not be used unless supplemented with general location details
- the time and date that the message was issued, including the length of time that the message is current.⁵⁸

4.51 Though this 2005 paper has been superseded, it expressed a number of sound principles, drawing on the work of COAG in 2004, and it constitutes a useful guide to a clear approach to the construction of bushfire warnings.

4.52 The call for clearer content in warnings was reiterated in a subsequent AFAC draft paper titled A National Systems Approach to Community Warnings: Discussion Paper Draft Version 2.0 (May 2009).⁵⁹ This paper proposes a systems approach to warnings incorporating four elements:

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- preparing the community
- situational awareness
- message construction and dissemination
- appropriate action taken.

4.53 This 2009 AFAC paper advocates a consistent national approach given the transient nature of the population and the fact that ‘emergencies have no regard for jurisdictional boundaries’.⁶⁰ The paper observes that the ‘most crucial aspect of the warnings system is the continued development of community survivability strategies that are in place well before any emergency event occurs’.⁶¹

4.54 The second element, ‘situational awareness’, refers to the information and awareness that resides in individuals, communities, industry and the emergency services. The paper notes that individuals and emergency service organisations all receive information from a range of sources, formal and informal. Based on that information, organisations decide to warn, and individuals to act — but these actions may not align (for example, people may act prior to the warning). This is not necessarily a problem, as:

*No matter how the information gets to someone, the challenge is to make sure the information is able to be corroborated through the authoritative source, is meaningful and people are confident they know what to do when they receive it.*⁶²

4.55 The evidence before the Commission tends to confirm that while emergency services are monitoring natural disasters, gathering intelligence and considering issuing official warnings, many (but not all) in the community are likely to be responding to the environmental cues and informal sources of information available to them. On receipt of an official warning, people commonly seek corroboration from other sources, and further information about the appropriate response.

4.56 The 2009 AFAC paper also notes that there is no consistent Australian standard for message construction, or protocol for triggering a warning and calls on COAG to adopt the use of the CAP as the basis for messaging in Australia and to set a timeframe for its implementation by emergency agencies.⁶³

4.57 Finally, the AFAC paper notes studies that demonstrated the significant association between community education and higher levels of household preparedness and the taking of appropriate protective action.⁶⁴ This is certainly consistent with the evidence before this Commission.

Best practice IN BUSHFIRE WARNINGS: Choosing Your Words

4.58 In 2008, the Commonwealth Attorney-General’s Department released Emergency Warnings — Choosing Your Words.⁶⁵ This document is a valuable guide to best practice in drafting warnings. Its content is practical and clear. The paper set out a number of guiding principles. It counselled against making assumptions about the audience, noting that warnings will need to reach a broad audience and that any message needs to be appropriate for those at home, at work, in the car or visiting the area.

4.59 The paper noted that an emergency warning is a ‘dialogue with the community, not a command situation’. It promoted seeking cooperation with a suggested action, not compliance with an order: ‘This is best achieved by giving people information that convinces them that a particular course of action is the best one to take’.⁶⁷

4.60 In describing the way in which people generally respond to warnings, the paper suggested that this is a process and not a single step. People generally follow a certain thought process before deciding to respond, starting with receiving a message, believing its credibility, confirming it, personalising it, determining what action is required and ending with determining whether the action is feasible.⁶⁸

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4.61 Professor Handmer agreed that the advice in Choosing Your Words is sound.⁶⁹ Ms Jillian Edwards, Manager Strategy and Knowledge, AFAC, said that it was ‘a very good piece of work that provides a lot of insight into some of the language that could be used to elicit certain reactions from people’.⁷⁰ Mr Pearce, now Director General of Emergency Management Australia, agreed it was provided to agencies to guide them in best practice.⁷¹ Mr Rhodes accepted that CFA messages could benefit from some of the paper’s suggestions.⁷²

4.62 Choosing Your Words provides excellent practical guidance as to the best method of drafting and constructing a clear and useful bushfire warning. There is general support among the parties for the proposition that the content of bushfire warnings should be based on the principles set out in Choosing Your Words.⁷³ The State indicated in its submissions that it would, before the next fire season, refine fire messages based upon the Choosing Your Words publication.⁷⁴

The Common Alerting Protocol IN BUSHFIRE WARNINGS

4.63 There is evidence before the Commission concerning the development of a protocol and standard digital format for expressing the content of warnings, known as CAP.

4.64 CAP was designed in the United States by emergency managers and technology experts and ultimately adopted there in April 2004 by the Organisation for the Advancement of Structured Information Standards (OASIS). Use of CAP is mandated in the United States.⁷⁵ It is now being introduced in other countries including Italy, Canada, Indonesia and Japan.⁷⁶

4.65 The use of CAP permits a consistent warning message to be disseminated simultaneously over different media (for example, internet, SMS, landlines, email).⁷⁷ Once adopted, CAP can be incorporated into any number of technology applications.⁷⁸ It has been described as a ‘write it once’ tool.

4.66 As Ms Edwards explained, CAP is two things:

It is a simple but general template for the consistent construction of messages, using standard classifications and terminology.

It stipulates a digital format for making the constructed message readable by any machine.⁷⁹

4.67 The benefits of the adoption of CAP have been described as including:

- efficiency and minimisation of confusion during emergencies
- reduction of costs and operational complexity by eliminating the need for multiple custom software interfaces to the many warning sources and dissemination systems involved in all hazards warning
- facilitation of movement towards coordinated warning messages over multiple delivery systems
- distribution of authoritative alert messages to those who need them in a timely and effective way, ultimately reducing damage and loss of life
- capability of conversion to and from the ‘native’ formats to all kinds of sensor and alerting technologies, forming a basis for technology independent of national and international alerts and warnings.⁸⁰

4.68 In April 2008, AFAC formally adopted the position that its member agencies will use the OASIS Common Alerting Protocol, V1.1, or its derivative, as the standard alerting protocol for handling the essential content of alert warning messages.⁸¹

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4.69 In its 2009 draft paper A National Systems Approach to Community Warnings, AFAC suggested that a 'standards based, all media, all hazards public warning strategic framework makes for a more effective solution and more efficient use of resources'.⁸² The paper went on to note that the OASIS CAP provides a suitable basis for messaging format, with some adjustments for Australian content and terminology.⁸³

4.70 The introduction of CAP would assist in simplifying bushfire warnings in Victoria, and would contribute to what should ultimately be a nationally uniform approach. The written submissions of AFAC endorsed the adoption of CAP.⁸⁴ The State undertook in its written submissions to adopt CAP in the next fire season.⁸⁵

RECOMMENDATION 4.1

The State ensure that bushfire warnings issued in Victoria:

- are founded on the principle of maximising the potential to save human lives;
- embody the principles encapsulated in Recommendation 8.5 of the Council of Australian Governments report the National Inquiry on Bushfire Mitigation and Management (2004);

Recommendation 8.5

The Inquiry endorses the recommendations on warning systems in the report Natural Disasters in Australia. In addition, it recommends as follows:

that all fire ban advice and subsequent 'bushfire threat warnings' related to specific fires be conveyed consistently in all states and territories, including the use of the Standard Emergency Warning Signal when lives or property are threatened

that the final structure of the warnings be based on the findings of the Bushfire Cooperative Research Centre's project Communicating Risk to Communities and Others .

Effective warnings are essential in mitigating and managing bushfires and other natural disasters. The *Natural Disasters in Australia Report*, prepared for COAG in 2002, placed considerable emphasis on warning systems in its recommendations and these have been accepted in principle by COAG.

COAG supports recommendation 8.5 concerning the adoption of nationally consistent procedures for conveying fire ban advices and bushfire threat warnings. Action will be coordinated through the Australasian Fire Authorities' Council, in collaboration with the Bureau of Meteorology, towards achieving standardisation of fire ban advices.

COAG notes the ongoing work of the Bushfire Cooperative Research Centre on communicating risk which will inform the Australian Emergency Management Committee and the Augmented Australasian Police Ministers' Council.

COAG also notes the work currently being carried out under the auspices of the Australian Emergency Management Committee to develop draft guidelines for the use of the Standard Emergency Warning Signal when lives and/or property are threatened.

COAG will request a progress report on these areas from the Augmented Australasian Police Ministers' Council within twelve months.

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- embody the principles endorsed in the Australasian Fire and Emergency Service Authorities Council Draft Discussion Paper, A National Systems Approach to Community Warning (May 2009);

and

- incorporate the use of the Common Alerting Protocol, as adapted for the Australian context.

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