



How will improved Mobile Location aid in

Emergency Situations

A White Paper from an
Australia / New Zealand Perspective

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NECWG - A/NZ

INFORMATION DOCUMENT

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About NECWG-A/NZ

The Emergency Call Service (ECS) is the process by which a caller makes a call to the emergency number to gain rapid assistance from an Emergency Service Organisation (ESO) (Police, Fire, or Ambulance) in time critical (and sometimes life threatening) circumstances.

Within Australia, on calling an emergency number (000 or 106), the Emergency Call Person (ECP) receives the call and relays it to the designated ESO for an emergency response.

Within New Zealand, when a citizen contacts 111, the Initial Call Answer Point (ICAP) receives the contact and relays the citizen to the designated ESO for an emergency response.

The National Emergency Communications Working Group – Australian/New Zealand (NECWG- A/NZ) has been established to address the core issues of the ECS in both Australia and New Zealand and to ensure that the relevant issues are considered and discussed within both a national and Australasian framework.

The NECWG-A/NZ consists of Australia and New Zealand representatives from: ESO; Public Safety Organisations (PSO); ECP, ICAP, and Telecommunications Carrier, and NBN Co.

NECWG-A/NZ aims to:

- To provide an Australia/New Zealand representative forum to deal with emergency communications call and response issues, including the development of national positions on matters relating to the ECS; ESO operational communications response to those emergency calls; and affiliated PSO response to emergency events.
- To develop and represent the collective view on ECS issues which is consistent with ESO's responsibilities and accountabilities to their respective Governments. Where appropriate, to seek the endorsement of Commissioners of Police, Fire, and Ambulance collectively on particular issues being pursued.
- To engage with PSOs on issues relating to responding to emergency calls.
- To contribute to the promotion of the ECS within Australia and New Zealand, to ensure its identity, accessibility, reliability, integrity and overall effectiveness.

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- To provide ESO advice on ECS issues to Australian (national, state & territory) and New Zealand Governments, Industry bodies, and Telecommunications Carriers/Carriage Service Providers.
- To identify, develop, promote and support: standards; training; and interoperability initiatives.
- To discuss, promote and influence future development for emergency communication contacts and response, and the Emergency Call Services.
- To provide a forum for participants to collaborate, exchange ideas, network and discuss operational emergency communications issues, systems, performance and processes.

Introduction & Overview

Emergency Services, with good reason, have adopted the phrase 'location, location, location'. Without a location they are unable to help.

In Australia, New Zealand, and internationally; governments, telecommunications carriers, and Emergency Service Organisations are taking steps to improve location identification of people requiring emergency response.

1.1 Emergency Services in Australia and New Zealand and the need for improved location information

Emergency Services Organisations (ESO) in Australia and New Zealand face many challenges in protecting life and property.

One of the biggest challenges currently facing ESOs in responding to requests for assistance is determining the accurate location of callers using mobile phones. The key interface for the community and ESOs in Australia and New Zealand is the ECS for each country, referred to as Triple Zero (000) in Australia and Triple One (111) in New Zealand. Today around 65% of calls made to 000 or 111 are from mobile telephones. Determining the accurate location of these calls can prove difficult, as ESOs rely on the caller to know their location so that emergency services can be tasked. The lack of an accurate location can be detrimental to the safety of the community; as the time to determine location can absorb precious minutes in despatching resources to those in need, potentially resulting in adverse outcomes.

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Currently, locating a caller on a mobile phone has been a somewhat cumbersome process, particularly if the person contacting Triple Zero (000) / Triple One (111) is unfamiliar with the area they are in.

In Australia in 2011 cell based location information was first made available to ESOs. The initial process, known as 'Pull MoLI' (Mobile Location Identification), requires ESOs to request cell data location information from the telecommunications carriers after a call is received. This manual process can potentially take more than half an hour to obtain cell data location from the carrier. This data is only based on cell tower location and is not the accurate location of the caller. Whilst aiding in narrowing a caller's location to an area, it does not offer a solution to accurate mobile location.

In 2015 an improved MoLI process was introduced whereby the cell tower location data was provided by telecommunications carriers automatically at the time of the call being received by ESOs. The cell data location from towers is provided in the data stream provided to the ESOs. Telecommunication carriers also enhanced the capability to identify the nearest tower, or in some cases a range of towers, to narrow the field of search for the caller to Triple Zero (000). This capability is referred to as 'Push MoLI'.

While the Push MoLI capability can be beneficial in urban environments where mobile towers are more prevalent, in rural areas the range of search can still be many square kilometres. While PushMoLi is an enhancement to the mobile phone location, as it is received in the main with all mobile calls to Triple Zero (000), and it reduces the time taken to obtain information about location based on cell towers, it does not provide accurate location information, only providing an ESO Operator with an area within which a caller is. At times this area can be several square kilometres.

In Australia, in an attempt to address the lack of accurate location data for mobile callers to Triple Zero (000), ESOs released the Emergency+ App in 2013 to assist callers to Triple Zero (000). The App uses the mobile phone's GPS capability to provide the latitude and longitude coordinates which the person then verbally relays to the ESO Operator in instances where they are unfamiliar with their location.

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The App improves the ability for a caller to determine their accurate location, though requires the caller to read out the GPS coordinates to an Operator, posing a risk if the caller provides the wrong details or it is entered incorrectly by the operator. The App is not pre-populated onto mobile phones and requires a user to download the App. To date there has been over 560,000 downloads of the Emergency+ App. Given the number of mobile phones in Australia, this number is not very significant.

In New Zealand, the use of products that enable ESOs to send a message via SMS to a person's mobile phone requesting access to their GPS data allows ESOs to identify the location of a caller – albeit within the constraints of the national SMS networks.

1.2 Mobile Location Overseas Experience

In the United States, the Federal Government has put into policy a requirement that the telecommunications carriers must provide the location data of mobile phones to Emergency Services. This mandates the provision of the data to Emergency Services though it does not specify the manner or methodology for delivery of the information.

In Europe, there have been recent trials of an in-phone capability referred to as Advanced Mobile Location (AML). AML was trialled using Android phones and at the point of the person calling ESOs, the phone activates its GPS system, traps the location (x and y) data, then uses the phone's SMS to send the information to a dedicated point in the receiving organisation of the emergency call.

In 2016, after the successful pilot of the AML capability, Google announced that all Android devices version 2.3+ worldwide would utilise AML. It is important to note that AML is not an App and is device initiated when a caller explicitly dials the relevant emergency number. Location is relayed directly from the handset to a specific endpoint, a public safety answering point, which is not visible to Google.

Many other App developers are leveraging the mobile phone's GPS capability to identify the location of the caller, not only for emergencies but to provide information, such as the 'Fires Near Me' Smart Phone App.

1.3 Current Activity in Australia

In 2014 NECWG-AN/Z released the Next Generation Triple Zero (NG000) Strategy. The Strategy aims to enhance the ECS for the betterment of the community. The Strategy identifies one of the key actions to be the enhancement of location information.

In 2015, the then Minister for Communications, the Hon Malcolm Turnbull announced a review of the ECP, to be undertaken by the Department of Communications and the Arts (DoCA). In a letter to his State and Territory Ministerial counterparts, Mr Turnbull referenced the NG000 strategy as an element of the review. Following the release of the Review's findings, the DoCA identified that accurate mobile location was a necessary enhancement for the ECS. DoCA has engaged with NECWG-A/NZ following the handing down of the Review and sought NECWG-A/NZ Executive thoughts on the reviews findings – an extremely pleasing outcome from NECWG-A/NZ's perspective.

In August 2016, DoCA released a Request for Expressions of Interest (REOI) for the provision of location data services.

This REOI sought responses from organisations capable of delivering location data services to Triple Zero (000) via a mobile application, network-based services, or another viable alternative solution. The REOI closed in November 2016 with responses currently under review by the DoCA.

1.4 Location in a Wireless World

The roll-out of national initiatives such as the Australian National Broadband Network (NBN) highlight the imminent expansion of wireless or WiFi communications. There is already a trend for people to remove their home based phones as mobiles and WiFi calling becomes easier and more common.

With mobile calls representing 65% of all calls to emergency services, the introduction of NBN and other wireless services will place additional pressure on traditional location tracking processes and databases (such as the enhanced calling line identification processing system (ECLIPS)).

The identification of location for devices roaming on WiFi or wireless networks is a challenge that will likely dominate the emergency communications discussion in the coming years as the current mobile location challenge is presently.

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NECWG-AN/Z notes that any connection to Triple Zero (000) or Triple One (111) via wireless or WiFi (including Apps) must be in accord with Standards or Regulatory requirements for enhanced mobile location.

Opportunities and Impacts

The introduction of enhanced mobile location (MoLI) in Australia will be one of the most critical enhancements to the Emergency Call Service since its inception in 1961.

2.1 What Mobile Location (MoLI) Provides for the Australian Community and Emergency Service Organisations

The impact on community safety and security when an exact location is not known cannot be overstated. Numerous examples identified during the development of the NG000 strategy highlight the risk to a person's safety or life when a location is unknown.

The introduction of enhanced MoLI whereby ESOs will be able to immediately identify the physical location of the mobile phone caller requesting assistance will improve outcomes for the community. The European and United Kingdom experience highlights that the physical location of a caller can be identified to within metres in either urban or rural situations.

The provision of enhanced MoLI provides other opportunities for ESOs, enhancing their operations. These include:

- Reducing emergency call handling time
- Less reliance on older Pull / Push MoLI capability
- Identifying hoax call locations
- Improved first responder safety by avoiding officers being sent into situations in which the location offered is false or being used for diversionary tactics
- Consistency of data presented to the Emergency Services reducing costs of needing multiple systems
- Enabling the use of analytics to track call arrival to improve officer response activity or heat mapping to identify 'linked' incidents (e.g. multiple calls from a freeway about a fire)
- Contributing to the development of smart cities.

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Enhanced MoLI also offers significant opportunities for the community. During the formulation of the NG000 Strategy, it was evident that members of the community expected that ESOs are aware of their location, given the high take up of Smart Phones in Australia. The assumption is not unreasonable, with location information readily available to food and beverage merchants; transport providers; social media applications, and other mobile applications who utilise location information available on mobile phone handsets. The introduction of enhanced MoLI will ensure an increased level of confidence and value in the ECS and ESOs. With increased mobility, the community will be more confident that ESOs will be able to locate them in time of need. This is, particularly so where they are unfamiliar with their surroundings, or where a person may be disoriented or unable to verbally communicate with an ESO operator and provide their location due to the safety concerns, for example in domestic violence situations. It will also lead to a quicker response from ESOs as location search time is reduced, particularly where language barrier issues cause delay.

2.2 Collaboration with Industry on Mobile Location

The release of the REOI in Australia provides opportunity for industry to contribute directly to the solution and provision of this critical element of public safety. NECWG-A/NZ has been actively engaging with public safety service and product providers on the NG000 strategy and how their road maps align with the Strategy. As enhanced MoLI is a key component of NG000, which looks to leverage off capabilities provided by IP based systems, NECWG-A/NZ is working to ensure that public safety service and product providers will also play a significant part in ensuring mobile location is available and accessible to ESOs in the products they offer.

- **NECWG-A/NZ believes there is an opportunity through engagement with providers to support the development of a single standard for mobile location, which provides a number of benefits, in particular, reducing expenditure on developing multiple interfaces / systems**

The Impacts and Implications

Managing expectations will be an important part of the implementation of a mobile location solution.

3.1 Impacts and Implications Overview

NECWG-A/NZ members are positive about the introduction of enhanced MoLI and the opportunities that this will bring. In considering the introduction across all ESOs across Australia, it is clear a coordinated and planned approach is required to ensure that the enhancement to mobile location is realised. While the noted opportunities provide a benefit from the implementation of mobile location, equally for ESOs, industry, and the community there are implications and impacts that must be considered.

These implications can influence the manner and value of the introduction of enhanced MoLI and therefore need to be considered carefully when developing policy, process, and solutions.

In November 2016, Queensland (through market research company Taylor Nelson Sofres Australia Pty Ltd (TNS)) conducted a community expectations survey of its public safety communications services. In this survey respondents noted their willingness to securely provide the emergency services call takers with a range of supplemental information when making a Triple Zero call, including current location (94%), contact information (87%), medical information (81%), and any special entry or access requirements. This would indicate that while security of information is an important consideration, provision of private information can be accommodated in an emergency situation.

3.2 Impact of Mobile Location on Emergency Service Organisations

Ensuring a national approach is critical to the success of the introduction of enhanced MoLI across all ESOs within Australia. A key aim of NECWG-A/NZ is to foster collaboration across all ESOs and PSOs in achieving an effective outcome for the community. This was achieved with the introduction of PushMoLI, ensuring that citizens received the same level of response to calls no matter what part of Australia they were calling from.

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In planning for the introduction of enhanced MoLI, ESOs will need to consider the requirements to update their systems, (such as Computer Aided Dispatch (CAD)), including redundancy; and the impact on their business processes and workflows. Some of this planning can be undertaken whilst the REOI is being resolved. NECWG-A/NZ is working with its members to develop implementation plans within agencies to deliver on its commitment to a national approach.

As with any implementation or process improvement, change management will be critical for agencies dealing with Triple Zero (000) or Triple One (111) calls. Training and managing expectations will be key to a successful implementation.

With the goal of improved location accuracy to reduce response times and potentially save lives, the increase in staff confidence for those dealing with emergency calls will aid in reducing stress in an already volatile environment, leading to better outcomes for the community.

3.3 Impact of Mobile Location on the Community

With over 65% of calls to Triple Zero (000) and Triple One (111) coming from mobile phones, NECWG-A/NZ members report that many callers have an expectation that their location is known to the ESO operator. This expectation is founded on the understanding that “my phone knows where I am”. The Emergency+ App was designed by Australian ESOs to assist callers to easily retrieve their location and pass this onto ESOs as an interim measure to improve location information.

The introduction of enhanced MoLI will meet this community expectation that ESOs “know where I am”, providing for better outcomes, particularly when ESOs are responding to critical and life threatening situations. There are considerations that need to be addressed when considered the benefits enhanced MoLI will bring.

The consideration of privacy is at the forefront of ESO concerns, given the type and amount of information held. The November 2016 community expectations survey undertaken in Queensland highlighted that respondents noted their willingness to securely provide the ESO call takers with a range of supplemental information when making a Triple Zero call. This would indicate that while privacy of information is an important consideration, provision of private information can be accommodated in an emergency situation.

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Ensuring appropriate community education and understanding of what and how location information is provided will be key to providing citizens with confidence that their information is secure.

But whilst this functionality will benefit those who have a smart phone, not all Australians have such a device. It is estimated that smart phone users in Australia will reach 16.6 million in 2017¹. The DoCA have indicated that an enhanced MoLI solution/s needs to consider all mobile devices capability.

3.4 Impact of Mobile Location on Industry

The release of the NG000 Strategy in 2014 provided an opportunity for providers of services and products to the public safety environment to understand the strategic direction of ESOs. In particular, the move to access information through the provision of data was critical to the NG000 Strategy.

Working with industry players, NECWG-A/NZ aims to influence providers on their product offerings. With the release of the Strategy there is an expectation of NECWG-A/NZ members that products, systems, services provided in response to tenders will meet NG000 standards.

Those also wishing to provide emerging and future services and technologies that access the ECS, will also be required to meet NG000 standards and Federal regulation to ensure the integrity of the Emergency Call Service is maintained and community expectations are not compromised. Products and services providers that do not provide or facilitate enhanced mobile location will not be engaged by ESOs.

¹Statista 2017

Options for Delivery

Simplicity of design and function is an important factor in considering the options for delivery of mobile location services.

4.1 Delivery Options Overview

The capability that has already been developed both locally and internationally demonstrates that the delivery of enhanced mobile location can be achieved in a number of ways.

From sector specific Smart Phone Apps, to industry led standards, there are a range of options available for delivering enhanced mobile location. From an Australia/New Zealand perspective, and with the centralised arrangements of the ECP in both countries, maintaining a simplicity of design and function is an important factor in considering the options for delivery of enhanced mobile location services.

4.2 Options Discussion

Experience in local and international public safety sectors indicate that while the method of contact with ESOs is expanding, the underpinning standards in relation to data presentation and format from these sources must remain consistent. For example, location information should be presented as x and y coordinates using the global projection GDA94 (soon to be GDA2020) as standard.

The Next Generation Triple Zero (NG000) and Next Generation Triple One (NG111) strategies promote diversification of contact with Emergency Services including SMS, on-line, and other IP based communications.

Mobile location is a critical component of any and all contact methods. As NECWG-A/NZ's own research indicated, there is also 'implied consent' from the community that mobile location data will be provided to ESOs in the event of a person's contact with Triple Zero (000) or Triple One (111).

In Europe, the development of the 'Pan-European Mobile Emergency Application' (PEMEA) protocol recognises the development of multiple public safety Apps and provides a protocol through which Apps can identify the mobile location and contact local jurisdiction ESOs and direct the caller to that agency. This accommodates the multi-jurisdictional requirement of Europe but could also be

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applied in the Australian and New Zealand context for public safety Apps when people are travelling between the two countries.

The introduction of the Advanced Mobile Location (AML) protocol contained in firmware of Android phones by Google improves location identification, however is currently restricted to specific handsets.

In the United States, the Federal Government has put into policy that telecommunications carriers must provide mobile location information (x and y coordinates) to ESOs including specifications of distance/range. This information is provided through the telecommunications carrier's network infrastructure to the ESO receiving the call. Current investigations in the United States are exploring the capability to include the 'Z' coordinate axis (height) into the location information provided which will be useful in high rise or mountainous incidents.

The Next Generation Triple Zero (NG000) strategy identified that the prevalence and use of social media and other forms of on-line communications is, and will continue to become, a common form of interaction with ESOs. The challenge in this environment is to verify the location of the user, particularly if they are reporting an emergency or critical incident. The option to access the device's GPS coordinates and deliver it across a telecommunications carrier network increases confidence in the validation of the location.

Using the telecommunications carrier's network also reduces complexity for ESOs in having to have receptors or applications that can access and interpret messages from individual applications or on-line services.

NECWG-A/NZ identified as part of the NG000 Strategy that the current Australia and New Zealand use of an Emergency Call Person as the first point of contact for emergency calls is the most effective means of delivering an emergency call. The ECP assists ESOs by filtering false or mischievous calls, but is also a centralised repository for caller line information (CLI) which is passed through to ESOs.

- **The automated delivery of enhanced mobile location information to the ESOs, at the time of the call, utilising the same process for fixed line calls and PushMoli is the preferred method for NECWG-A/NZ members. This will be critical to deriving community benefit of faster response initiation.**

Risk

6.1 Risk

Research and results of surveys in Australia indicate that there is a community expectation that ESOs receive accurate location information when a call is made to Triple Zero (000). With over 65% of calls to Triple Zero (000) and Triple One (111) now emanating from mobile phones, the ability to meet this expectation is currently difficult to realise.

In Australia, the introduction of 'Pull' and 'Push' MoLI and the release of the Emergency + App has gone some way to reducing the risk of not locating a caller to Triple Zero (000).

In New Zealand, the use of products that enable ESOs to send a message via SMS to a person's mobile phone requesting access to their GPS data allows ESOs to identify the location of a caller to Triple One (111) – albeit within the constraints of the national SMS networks.

Though any change to the operating process of the ECS can in itself introduce risk, there are also risks in developing an appropriate solution, implementing it, operating the solution and in ensuring that the solution remains contemporary.

In considering risk, NECWG-A/NZ members draw on their experience in implementing change in a dynamic and volatile environment. The implementation of PushMoLI provides insight into how ESOs can successfully implement change to technologies, systems and processes.

In considering the implementation of enhanced mobile location, NECWG-A/NZ has identified several implications related to changes to technologies, systems and processes. New risk exposures and uncertainty about the effectiveness of enhanced mobile location information has the potential to mitigate the opportunity to fully realise the benefits of accurate location information. Most, if not all these risks can be mitigated through collaborative effort, however they need to be exposed to ensure they are managed appropriately during the process of transition.

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Some of this risks and challenges could be, but are not restricted to (and in no particular order):

- A lack of solution identification from government activities (e.g. the Expression of Interest process being conducted by the DoCA)
- The risk of litigation where the lack of location information resulted in an adverse outcome
- Time taken to determine a solution is too long, and technical innovation passes by and the ECS is unable to catch up
- The focus is too far into the future, misinterprets the long term requirement and misses the opportunities for the early tactical and mid-term capability improvements
- The principle and direction of the service and need for a mobile location solution is not bound to Government tenure.
- Delays in enacting changes to legislation/regulation cause delays in commencing or delivering a solution
- An over reliance on single solution for enhanced mobile location
- Significant organisational change requirement
- Potential degradation of current service capabilities
- The implementation of NBN will increase the volume of WiFi or data provided calls which in could reduce location data accuracy and is not part of the solution
- The proposed solution may not consider location identification requirements for future communications channels
- Perceptions of privacy
- The capability to implement a generic solution for all ESOs
- Potential limitations of customer coverage (e.g. Android only AML)
- Managing expectations of solution capability
- Effective marketing message
- Location details via preferred solution may not be accurate and/or available to ECP/s
- System delays in retrieval of subscriber data to ECP / ESOs
- Impact on network capacity during large scale events, e.g. NYE, and the capability to deliver location information in a timely manner
- Redundancy capability e.g. – network down; network busy; power failure

Recommended Next Steps

7.1 Conclusion and Recommendation

Accurate enhanced mobile location (MoLI) solution/s should extract location from the mobile handset, to deliver the following benefits:

- Increased location precision resulting in a shorter time to locate person in need.
- Faster response to community members with life-threatening conditions.
- Less questioning, less searching for the ESOs.

Accurate enhanced mobile location solution/s should use the existing / common methodology (e.g. CLI pathway) to deliver mobile location to ESOs via the ECP and should be inbuilt within the handset (Firmware or App).

Australia and New Zealand should follow international best practice for MoLI as opposed to developing a bespoke Australia and/or New Zealand solution.

7.2 Next Steps

The results of the DoCA REOI will identify the capability of the market to deliver a solution/s for accurate enhanced mobile location in Australia. NECWG-A/NZ takes the view that the next steps to deliver the recommended solution/s would include:

- Regulatory/Legislative review – to identify potential deficiencies and required actions, and federal endorsement (e.g. AML type solution may require legislative change for the ECP to progress SMS and pass through to ESOs)
- Agency support at a Commissioner/CEO level
- An engagement process between successful vendor/s, the ECP, and representatives of ESOs
- An agreed national implementation plan, coordinated through DoCA and the ECP; including the development of a proof of concept
- Ensure alignment to NG000 and NG111 strategies
- Seek alignment to NENA / EENA initiatives including policy, lesson learnt etc.