This is a series of three articles that first appeared in magazine MR News in 2015

Land Search and Rescue, New Zealand (LandSAR – NZ)

In October 2014, I was a guest of LandSAR at their annual conference in Hanmer Springs. As well as making a presentation at the conference I gave a talk in Wellington to a group of senior officers of the NZ SAR Council and SAR Secretariat, including representatives of the Police, Coastguard, Civil Defence and LandSAR. I spoke about my experience of 40+ years in Mountain Rescue and the work of The Centre for Search Research (TCSR). I also contributed to a two day Tutor Forum of volunteer search managers and the Police in Oxford near Christchurch.

The organisation of search and rescue in New Zealand is an interesting model and dates back to 2003, so it is contemporary, innovative and built on best practice. The New Zealand Search and Rescue (NZSAR) Council has a mandate from the NZ government to provide strategic leadership to the New Zealand Search and Rescue Sector. Accountable to the Council is the SAR Secretariat who provide leadership to a Consultative Committee made up of key stakeholders. The three work closely as a team; the Council provide strategic leadership and the Secretariat operational direction.

LandSAR is the national volunteer organisation that provides land search and rescue services to the Police. It comprises over 3000 trained volunteers who are members of 62 LandSAR groups divided into seven regions across North and South Island. There are also two national specialist groups, Land SAR Dogs and LandSAR Caving. It is run by an elected board. This all sounds pretty much like MREW so far except for the national Council and SAR Secretariat at Government level but from here onwards LandSAR looks very different.

Land SAR has a full time-time paid Chief Executive Officer, a national Training and Development Officer, four Group Support Officers, an Organisation Support Officer and a raining Support Officer – all full time paid positions. They have an approved business plan that is financed from central government via the Council and Secretariat and lottery funding. This provides equipment and training to all volunteers. Their annual budget is about 2.4m NZ$ (about £1.2m).The outcome of the plan is an agreed standards based curriculum of training modules customised to area need and is provided free to all volunteers. It is subject to regular review and development by the Tutor Forum which is made up of volunteers and Police from each of the regions.

I delivered on a broad range of topics in Wellington, Hanmer Springs and the two day Tutor Forum which I found the most valuable:-

- The UK Missing Person Behaviour Study. New Zealand are working towards developing their own New Zealand statistics
- In the light of the recent shooting down of the Boeing 777 jet MH 17 they were keen to hear about my involvement in the search of Northumberland post Lockerbie for evidence (debris). My personal involvement lasted 3 weeks and was the first big test of the theory of Critical Separation in search large areas of mixed terrain.
- How TCSR have developed the concept of the Initial Response, both in terms of management and practical search skills, from first introducing the concept to the SAR world in 2000, to our current thinking.
- The importance of scenario based search management - the how, what and why?
- The Sector Ladder – an approach to dealing with shifting PoA
- A review of the concepts of Critical Separation and Critical Distance and how they are linked to Search Theory and PoD.

It was not all about me 'giving' there was some 'taking away' as well plus links established for future collaboration. Some of the topics that gave me food for thought:-

- The national organisational model.
- Investigative interviewing procedures (which we have already incorporated into our *After the Initial Response* training course).
- Scenario analysis techniques.
- The de-briefing of search groups.
- Critiques of past incidents in a non-threatening group atmosphere, viz the Tutor Forum – many learning points were discussed and taken away by participants.
- A move away (a Police directive) from maths based approaches to search management and in particular PoD.

The last point (PoD) is a subject in its own right and I hope to talk further about this in the next issue if Judy will permit?

All in all, the trip to New Zealand was an invaluable opportunity to share and discuss ideas with like minded people and I particularly enjoyed this aspect of the visit. It reminded me of the old adage, *the mind is like a parachute, it only works when it is open*. There were no vested interests to cloud issues and the 'open mind' approach was like a breath of fresh air.

My thanks to LandSAR for inviting me and to NZSAR and TCSR for jointly sponsoring the visit.

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Search Management and the Initial Response

- **Probability of Detection (PoD)**

In my article in the last MR News about the New Zealand LandSAR conference that I attended last October I said that this topic warranted an article of its own. There, I had a long discussion with a NZ Police Inspector and he told me of their move away (a Police directive) from maths based approaches to search management and in particular PoD. I commented that they were in danger of throwing out the baby with the bath water and PoD as mathematical concept could not be 'un-invented' as it were. We both agreed, however, on how the idea has been presented and taught, particularly in the last 10 years.

His presentation at the conference explained why NZ Police as a SAR coordinating authority, 'do not support the inclusion of PoD as a mathematical equation in the land SAR Formal Search Planning Guidelines of New Zealand'. However, he went on to say that de-briefing of field teams was important and this was echoed by other presentations at the conference that looked at techniques for de-briefing field search teams. Qualitative feedback is more important than quantitative – answers to what was your PoD are generally guesses based on how difficult conditions were, so why not say what the terrain was like. PoD is affected by many variables, some of which a searcher will have control of and some not:-

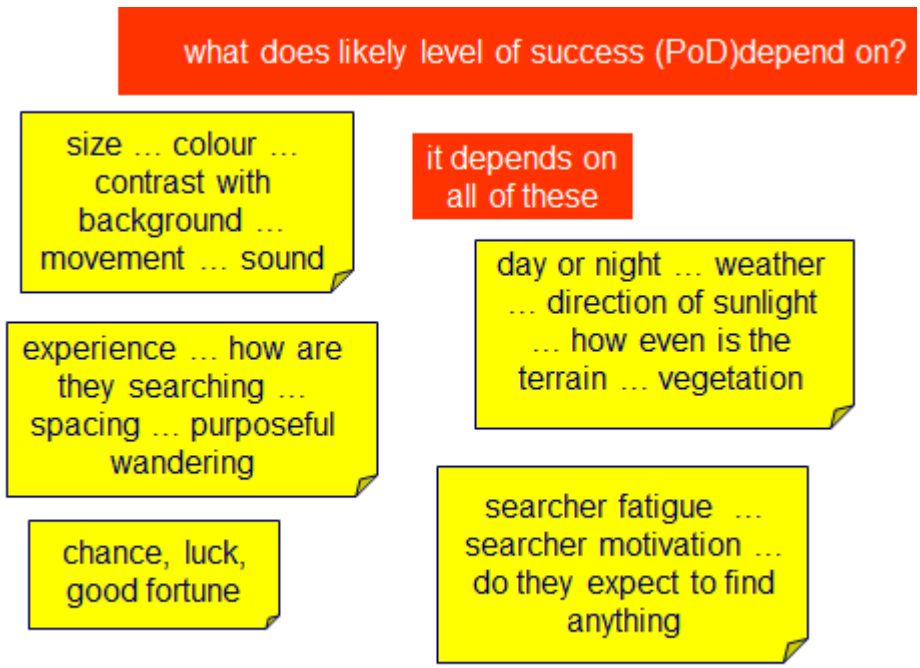


Figure 1 PoD 'variables'.

This resonated a lot with how TCSR has developed its current stance on PoD. We first embarked on our understanding of the concept back in the late 1980's and we published work on the concept of Critical Separation (CS). The theory stated that two searchers are at CS if an object placed between them is at the furthest distance for each searcher at which they can see the object. The distance from each searcher to the object is referred to as Critical Distance (CD), so CS = 2 x CD.

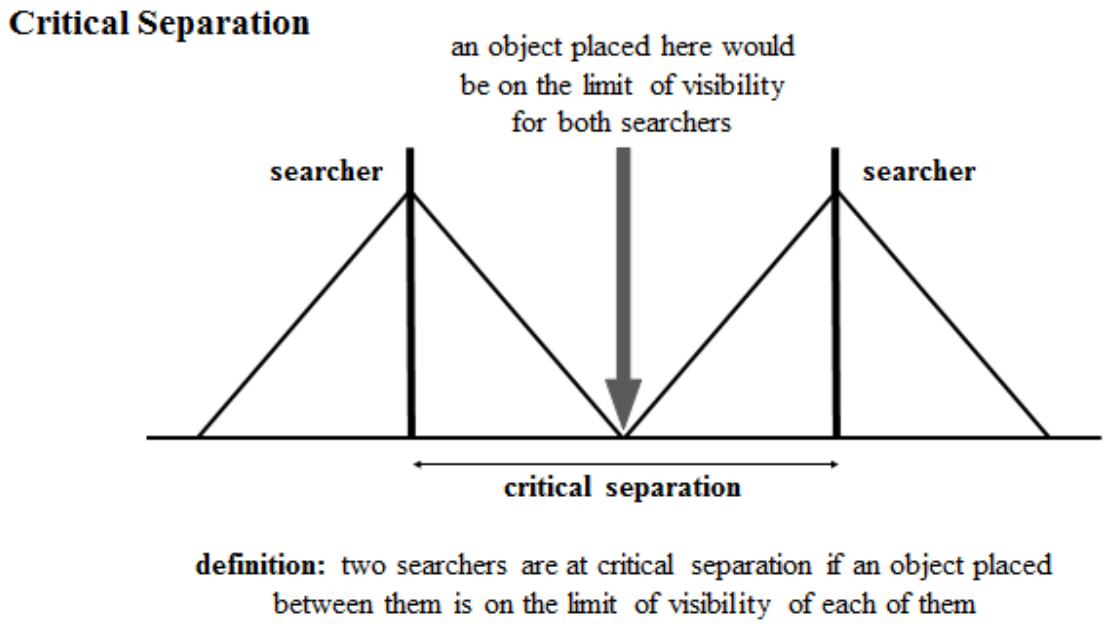
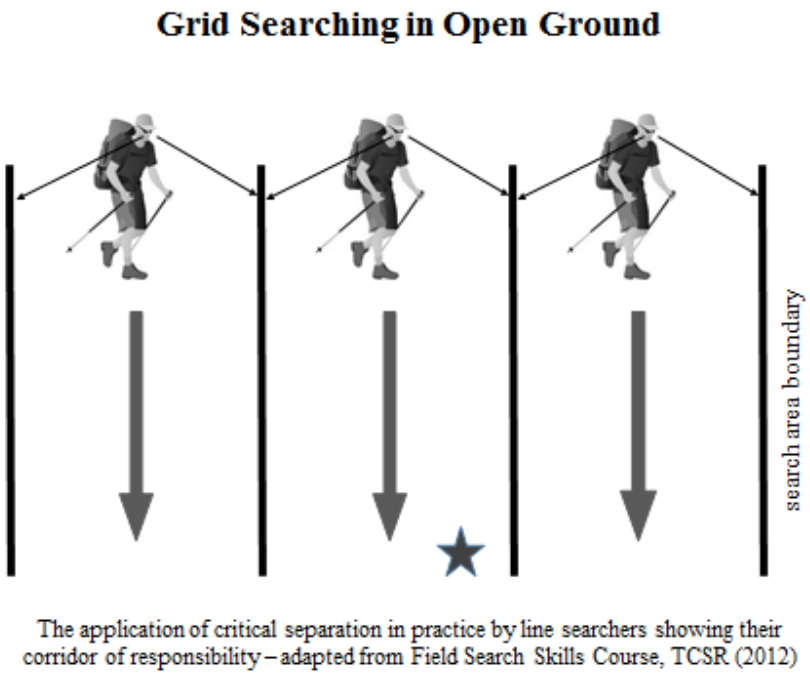


Figure 2 – Critical Separation

The 'theory' was tested and found to work during the evidence search of parts of Northumberland post Lockerbie. Teams from around the country came to help and on one day we had in excess of 400 searchers out in the field. Training for what was then a new idea was simple and straightforward and could be achieved in about 30 minutes. Critical Separation is an 'elastic' measure that is determined, crucially, by the searchers in the field, by the nature of the terrain, by the ambient conditions and by using something to represent the missing person – e.g. a rucsac with colour to represent the searching data that the search managers will have. Each searcher will then have a 'corridor' to search that they are responsible for.



The application of critical separation in practice by line searchers showing their corridor of responsibility – adapted from Field Search Skills Course, TCSR (2012)

Figure 3 Searching at Critical Separation

Some 16 years ago a group in America started to publish work linking Search Theory, a mathematically based approach to searching based primarily on a marine environment, to the Land SAR world. They suggested that the traditional ideas based on CS and CD were not mathematically sound and should not be used. A whole new lexicon followed, for example, Average Maximum Detection Range, (AMDR) viz *'the furthest distance for each searcher at which they can see the object',* and Average Range of Detection, *viz 'the furthest distance for each searcher at which they can see the object'.* There is no fundamental difference between AMDR and CD. The introduction of the new terminology is merely a re-branding exercise.

Dave Perkins of TCSR has shown that Search Theory can be used to determine PoD in a land environment and is based on the relatively simple concept of Critical Distance (CD). The paper 'PoD for the Search Manager', available free of charge from www.searchresearch.org.uk , explains how this is done.

For searching a clearly defined route, for example, during the Initial Response phase and using two searchers, one either side of the path or track, then search theory says they will have a PoD of 63% for a corridor extending out either side of the track. If there are three searchers then their PoD would be 73% and for four searchers 78%.

This theory has been shown to be empirically accurate following our observations and recording of results from some 50+ Field Search Skills courses we have taught this past 10 years or so. Extravagant claims? Can I recommend the paper referred to above – it works, and if you would like to see it discussed theoretically and demonstrated practically then we will be teaching our Field Search Skills course on November 11th in Northumberland as a pre-cursor to our Managing the Initial Response course on the 12th – see www.searchresearch.orguk for details.

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Searching at Critical Separation

Pete Roberts is member of Northumberland National Park MRT and has been for some 40+ years. In 1997 along with Dave Perkins they formed a registered charity called The Centre for Search Research (TCSR) – www.searchresearch.org.uk – through which they have taught search management courses throughout the UK and Ireland and have made presentations at conferences in the UK, Ireland, Europe, US and Canada. Recently Carl Hamilton of NNPMRT joined TCSR. They co-author the UK Missing Person Study with Ged Feeney, Mountain Rescue England and Wales (MREW) Incident Statistics Officer. Details of their courses and research can be found on their website.

Scenario Analysis in Search Management

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In the last two issues I talked about my trip to the New Zealand SAR conference in 2014 and as part of that I was involved in a two day workshop for LandSAR trainers. This group of people deliver approved training throughout the various regions and is made up of SAR volunteers and Police. One of the topics I taught was on search management and scenarios. There was total agreement in the group about the central role that scenarios have in search management.

In our *Managing the Initial Response* course we stress the fundamental importance of scenarios to help solve the problem of the missing person. Scenarios are an account of what might have happened to the missing subject and are the result of a careful *blend* of key points and they lead directly into the Incident Action Plan as illustrated in Figure 1 below.

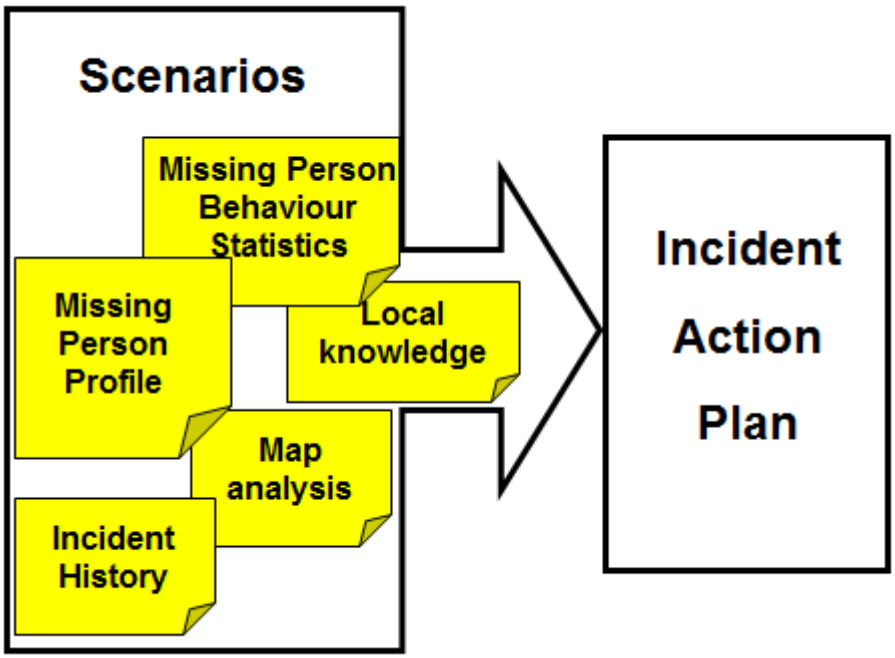
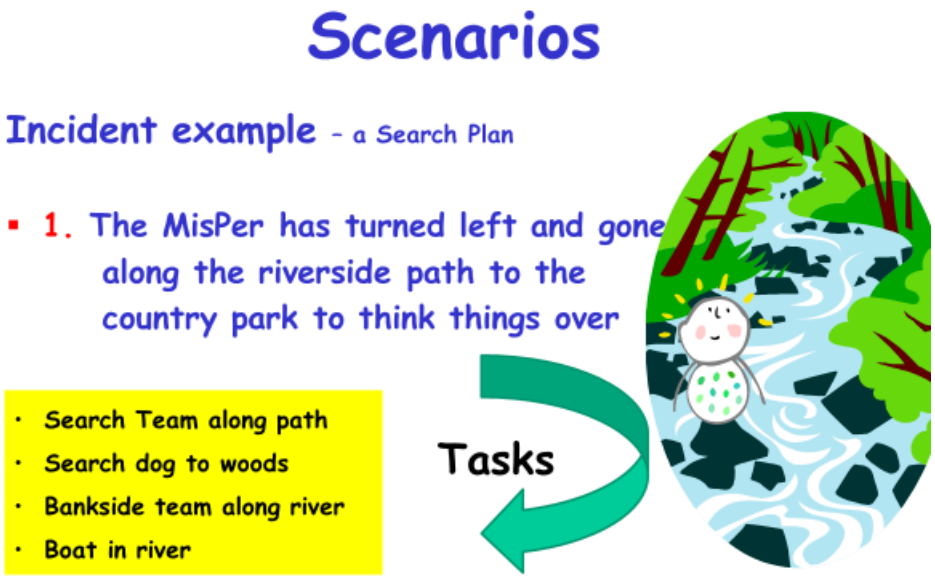


Figure 1 – Producing an Action Plan

No one *ingredient* has overall importance. Missing Person Behaviour statistics are part of the scenario planning tool but I have witnessed incidents where the Incident Action Plan has been driven totally by such statistics verbatim – not good practice. The skill is in the blending and understanding of each ingredient and how they come together to produce sensible and plausible scenarios. A scenario should have the following components:-

- ✓ Start point = IPP
- ✓ A direction of travel
- ✓ A route – a line
- ✓ A destination – a point
- ✓ An activity or purpose

An example scenario might be that a missing person, a male Despondent, came out of his front gate, turned left and took his favourite walk along a riverside path to a nearby remote country park. This is readily turned into a search task (see below) to form part of the Incident Action Plan by identifying a *line* of travel and destination or *point*. His route, the riverside path and the country park would be important areas to search and would be identified as such in the plan. An alternative scenario might be that they turned right out of their garden gate and took the path to a nearby and well know beauty spot that they frequently visited. Both scenarios, and others, can be incorporated into an Incident Action Plan that details various search tasks.



The idea of *lines* and *points* is supported by the UK Missing Person Behaviour Study (UKMPBS). Figure 2 below shows the most likely places where missing people are found for all categories of missing people. It should be noted that the percentage figures for each likely place are different for some categories to these overall statistics. For example, for the male dementia category, travel aids and linear features are more likely than the other places compared to the overall statistics shown in figure 4. Nevertheless, the guiding principle of *lines* and *points* still holds good for all categories but some will have different, more likely places, than others.

Lines and points are a fundamental of search in the Initial Response Phase of an incident and are searched prior to area or sector searches which will be incorporated into later phases of operations.

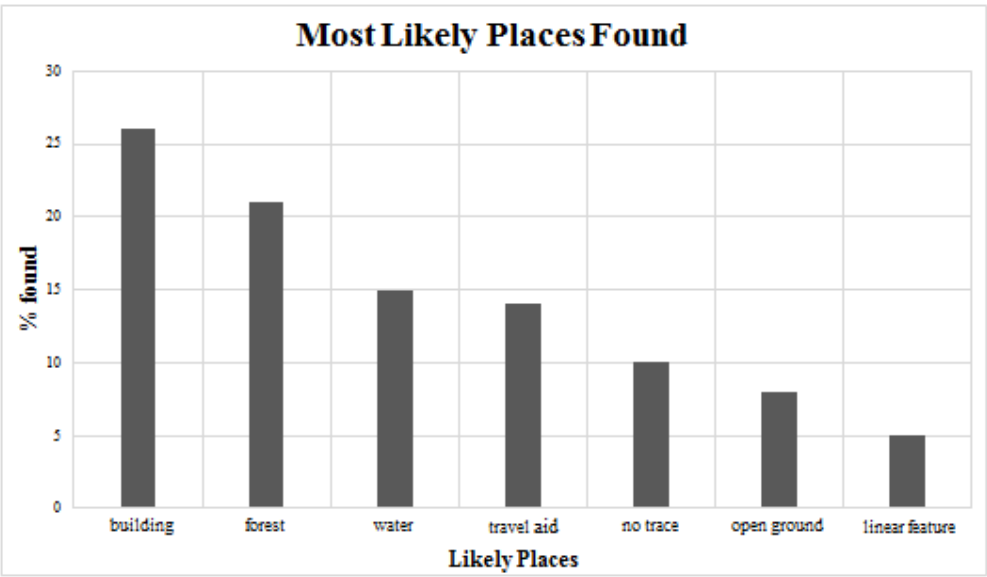


Figure 2 Lines and Points

Once a list of possible scenarios is compiled then they should prioritised into most likely, likely, and unlikely, being careful not to discount anything at this stage. Some of the scenarios will require further investigation. I picked up ideas from New Zealand based on a body of knowledge called the Analysis of Competing Hypothesis (ACH).

Essentially ACH provides a framework for the further analysis of hypotheses (scenarios) and questions such as what information do I need to have to support or counter my proposal (scenario) and who and where will I find that. This would be done by an Investigation Function of the whole search management process and would be more likely to happen once more formal planning procedures are in place beyond the Initial Response phase.

However, we believe it is a useful tool and is work in progress. I am continuing to collaborate with people from Land SAR NZ on how it might be developed for our course Managing the Initial Response and it is something we hope to discuss further at our annual course in Northumberland in November – full details at www.searchresearch.org.uk .