A New Look at the Sector Ladder

by Dave Perkins and Pete Roberts

Northumberland National Park SRT

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Foreword to the 2005 edition

This document is reproduced in the same form as the original 1994 book apart from a certain amount of tidying of language and presentation. It retains all of the original ideas and points of discussion even though some of them might seem a little dated.

o   part 1 explains how to carry out the Initial Consensus Ranking
o   part 2 goes through the process of producing an Automatic Ladder and revising it
o   part 3 gives reasons why you might want to revise your Automatic Ladder and sets out the rules for doing it
o   part 4 contains the working documents
o   part 5 consists of a worked example

A re-appraisal of the Sector Ladder approach

o   the Sector Ladder approach was developed as a reaction to what appeared to be the increasing use of computers in Search Management in the early 1990s. It was designed to demonstrate that the ability of the management team to deal with information from a variety of sources was of greater importance than the ability of a computer to perform rapid calculations

o   it set out to impose procedure and discipline, which is no bad thing

o   some of the methodology now seems cumbersome and unwieldy even though at the time it just seemed that we were being thorough –   particularly in Part 3; perhaps now we are more tolerant of an approach that tries not to be too precise but is instead flexible and allows for more control by the user

o   the approach still has much to commend it - if you can understand what it is trying to do then you understand something about the process of managing an incident; it could still provide a useful vehicle for training

o   the emphasis nowadays in the majority of incidents is more to do with a small group (possibly just one person) initiating the incident management and not having a formally convened consensus group

o   there is no mention of scenarios in this document, although their use is implied in paragraph 1 of Part 1

o   the entire approach was based on sectors - in practice these might not feature in a plan until the second operational period or later; the involvement of routes was added in later

o   there is reference throughout to PoD; we are all generally more careful with our terminology now and would refer to how likely it was that a search resource would find the missing person, but it is nevertheless clear what we are talking about in the document

o   similarly the text reads as though PoD is something that relates only to a search resource, rather than a search resource operating in a particular environment and under the prevailing conditions

Part 1   Initial Consensus Ranking

The technique used for the Initial Consensus is based on the O'Connor method; if you prefer another way of doing an Initial Consensus that's fine, but the end product has to conform to the outcome of the process described in the following paragraphs.

1.   Based on what you know about the incident, the missing person, your own local knowledge of the area, missing person behaviour and anything else which you would normally do, you decide on your Search Area, mark it on the map and sector it. In addition you may wish to mark routes for Initial Response searching, but make sure that you label them in such a way that a sector and a route through it will have different labels; for example, sector A might have routes R1, R2 and R3 passing through it.

2.   Select the people who are going to carry out the Initial Consensus Ranking. This is an important activity because not only does it give you the Sector Ladder for the Initial Phase but also it determines, to a large extent, the priority that sectors will carry throughout the entire incident; it therefore needs to be done with thought and care. Make sure that they:

      o   are in full knowledge of all the facts relating to the incident - it is worthwhile spending a few minutes briefing and updating them before they begin
      o   are totally familiar with the consensus method

      Each of them will need a Participant's Sheet (Sheet 1) - if they have not used one before then explain to them what they have to do

3.   Each member of the group then completes their Participant's Sheet (Sheet 1), on their own and without reference to any of the others. They go through all the sectors and routes in the Search Area and decide which of the likelihood

descriptors shown on Sheet 1 best describes the probability that the missing person is there. The sector or route label is written in one of the boxes alongside the chosen descriptor. The 'in between' descriptors are there to widen the range of choices.

4. When all participants have dealt with all the sectors and routes they move on to the second stage in the process, which is the completion of the Summary Sheet (sheet 2). The purpose of this is to bring together the opinions of each of the participants. One person writes the labels for all the sectors and routes in the Search Area in the left hand column; then, using one column for each participant, they write the participant's initials at the top and underneath that the score for each sector and route from the 'score' column on Sheet 1.

5. When that is done work out the overall score for each sector and route by totalling across the Summary Sheet (Sheet 2).

6. Find the sector or route with the highest overall score; this is the one considered overall to be most likely to contain the missing person. The label for this is written in the top position of the Initial Phase Ladder on the Planning Sheet (Sheet 3) - this is the column on the left, headed 'Initial Phase'. Then find the sector or route with the second highest overall score and write that into the second position on the Ladder, and so on. After the last one has been put onto the Ladder write RoW (for Rest of World) below that.

Part 2   Automatic and Revised Ladders

1.   Allocate the search resources for the initial response to the sectors at the top of
      the Ladder - these have the highest priority. You should always allocate your
      search resources so that the search resource with the highest predicted PoD goes
      into the sector at the top of the Ladder, the resource with the second highest
      predicted PoD goes into the second sector on the Ladder and so on. If you are not
      too sure about the kind of PoD you can expect from a search resource then refer
      to part 3.

2.   Once these resources are in the field you can begin to update the Ladder for the
      second phase. Updating the Ladder is always done in two steps: for the first step
      you write down the Automatic Ladder for the next phase (Planning Sheet, Phase 2,
      the left hand column) by writing in at the bottom, in their original order, the sectors
      which are being searched in the Initial Plan, and above them you write down, in
      their original order, all the other sectors, including RoW.

3.   The second step is to revise the Automatic Ladder when the initial searching is
      drawing to a close - but only revise it if you have a good reason for doing so. The
      Revised Ladder for Phase 2 is written in the next column on the Planning Sheet
      and you must make an entry on Sheet 5 (Reasons for Revision) to explain why
      you have done it. Reasons for revising the Automatic Ladder will be explained in
      part 3. If you have no valid reasons for revising the Automatic Ladder then leave
      that column blank.

4.   Your new Sector Ladder gives the priority order for searching in Phase 2. Once
      you know what search resources are available then you allocate them to the
      sectors at the top of the Ladder, with the search resource with the highest
      predicted PoD going into the sector at the top of the Ladder as before.

5.   Once Phase 2 is started you can begin to work towards your plan for Phase 3. The first step is to write down the Automatic Ladder for Phase 3, just as before, by putting the sectors being searched in Phase 2 at the bottom, in the same order, and moving all the others up. When Phase 2 is drawing to a close you revise the Automatic Ladder if necessary.

6.   Begin Phase 3 by allocating your search resources to the sectors at the top of the Ladder as before. You can then write down your Automatic Ladder for the next phase, and revise it as necessary when Phase 3 is drawing to a close.

7.   Repeat that until RoW gets to be about half way up the Ladder; at that point you need to consider expanding the Search Area.

Comment - in real life, searchers arrive at all kinds of times during the incident and not necessarily in convenient numbers to make up new search groups just before a new phase starts. Search Managers will therefore need to consider the problem of what to do with additional searchers who arrive while the search is in progress. Two solutions:

o   if you are nearing the end of a search phase and you have decided on your Sector Ladder for the next phase then you can get an early start on it by putting search groups into the sectors or routes at the top of the Ladder for the next phase.

o   if you have not yet decided on your Sector Ladder for the next phase then you have two options:

   ➢   hold the additional searchers back until you get to the end of the current phase, by which time even more might arrive giving you even more search groups to deploy in the next phase, or
   ➢   make up as many new search groups as you can and put them into the routes and sectors nearest to the top of the Ladder which are not at present

being searched; you will need to remember that this has happened when you produce your Automatic Ladder for the next phase.

Note that sheet 4 is a continuation of Sheet 3; since it has no pre-printed search phase numbers it can be used for all phases from Phase 5 onwards.

Part 3   Reasons for revising the Automatic Ladder

This section explains why you might decide to revise the Automatic Sector Ladder and provides you with some rules for doing it. Sector Ladder Revision is not an oddball process which implies that there is something unusual going on - it is part and parcel of the Sector Ladder technique and you should always consider doing it. There are five reasons why you might want to revise your Sector Ladder - these are:

1.   to remove routes that have been searched
2.   to allow for resources with a variety of PoDs
3.   to cater for sectors which have a "very likely" Initial Consensus rating
4.   to expand the Search Area
5.   to react to the finding of a clue

Each time you get near the end of a phase of the search you should go through the above list of reasons, in the order in which they appear, and decide for each of them if any revision is necessary. If it is then do it, and move on to the next reason. Even if you have to cross out one Sector Ladder and write in another it does not matter - provided that you are following the rules and writing down your reasons on Sheet 5 each time then you are doing the right thing. We suggest that you do not erase a Revised Sector Ladder if you need to revise it again, but rather that you cross it out and write the new one in alongside. If necessary move into the next column on Sheet 3 and change the headings.

Reason 1 - revising the Sector Ladder to take out routes. In the initial phase there are likely to be routes as well as sectors. Once a route has been searched you may want to ignore it from now on as a search option, particularly if it runs through a sector which also appears on the Sector Ladder - from now on you are likely to want to search the entire sector rather than just the route. The rule is:

o   to remove a route which you have searched and will not want to search again you revise the Ladder by rewriting it and merely missing the route out

Reason 2 - revising the Automatic Sector Ladder to take account of predicted PoDs. In the rules which follow, search resources are put into three categories, each of which represents a range of PoD values. Here are the suggested categories, with an indication as to what resource might fall into them:

o   high - this represents a trained search dog and handler in good conditions or a small group of trained searchers with an experienced leader who are using purposeful wandering under good conditions

o   medium - this represents the likely performance of the same two resources in conditions that are not so good

o   low –   this represents either poor conditions or a lack of experience

These are the revision rules for our three categories. Note that it is that it is the position on the Ladder of the RoW sector which determines the outcome.

o   high - sectors and routes in this category do not need to be revised for reasons of PoD; they stay where they are on the Automatic Ladder

o   medium - sectors and routes for this category should be revised to a position on the Ladder which is just above RoW until half of the sectors have been searched; after that they do not need to be revised for reasons of PoD, except that they should come above any routes or sectors in the high category from the previous phase.

o   low - these are the most complicated sectors to revise from a PoD point of view. The rules for these are:

    ➤   for Phase 2, revise any routes or sectors in this category which are searched in the Initial Phase to a position around half the Ladder length above RoW.

➢ for Phase 3, revise any routes or sectors which are searched in this category in Phase 2 to a position one third of the Ladder length above RoW.

➢ for Phase 4, revise any routes or sectors searched in this category in Phase 3 to a position about one fifth of the Ladder length above RoW.

➢ for Phase 5 onwards, routes and sectors searched in this category in the previous phase are revised to a position just above RoW.

Reason 3 - revising the Automatic Sector Ladder for Phase 2 to allow for routes or sectors which have been searched in the Initial Phase which consistently scored 8's and 9's in the Consensus. The Consensus group considered that these had a high likelihood of containing the missing person, and even though nothing has been found in them in the Initial Phase it seems reasonable that they should be searched again before search resources are put into sectors which were initially at the bottom of the Ladder. The rule applies only to the Automatic Sector Ladder for Phase 2 and the action you take depends on the PoD category of the resource used:

o high - no revision needed

o medium - revise these routes and sectors so that they appear half way down the Revised Ladder for Phase 2.

o low - revise these routes and sectors so that they appear a quarter of the way down the Revised Ladder for Phase 2.

Reason 4 - revising the Automatic Sector Ladder to allow you to expand the search into RoW. Once RoW has started to move up the Ladder you need to be aware of the fact that at some point in the near future you may have to expand the Search Area. By the time you reach that point you should have decided on an additional Search Area, marked it on your map and sectored it.

These new sectors need to be put into a priority order for searching so that they can go onto the Ladder. You may wish to re-convene the Consensus group for that, although

we suggest that just two suitably experienced people who took part in the original Consensus could do the job adequately. The rule is:

o   once you have established the sequence for the additional sectors, you put them on the Ladder at the position currently occupied by RoW; below them you put the sectors which are currently below RoW on the Ladder and you write RoW at the bottom of the Revised Ladder.

Reason 5 - revising the Automatic Sector Ladder to account for the fact that a clue has been found; this might mean that a search group has found some item of equipment or clothing belonging to the missing person, or that a new witness has turned up with important information.

What we are going to do here is no more than you would do anyway - a clue has been found, so you now have a new LKP and as a result some sectors suddenly become important and need to be searched sooner than they would otherwise be, whereas others become less important and can be forgotten for a while.

The Sector Ladder merely imposes some kind of formality on the way you decide on the relative importance of the sectors. The rule is:

o   any sectors which you want to search as soon as possible should be moved to the top of the Ladder so that they get searched either in the next phase, or the one after that, depending on reasons. Keep all the other sectors in the same sequence, but if you think that a sector is now too high up the Ladder then move it down to a position which you feel is more appropriate. We suggest that you do all your "moving up" first, and then the "moving down". It could be that some of the "moving down" will have been taken care of by your "moving up".

We conclude this section by saying that it is important that you keep to the recommended order of revision:

1. removing routes which you searched at the start and will not be searching again because from now on you are concentrating on searching sectors.
2. revising to take search group PoD into account - this is likely to happen in the first few phases only.
3. revising the Automatic Ladder for Phase 2 to move a high likelihood sector up the Ladder.
4. expanding the search Area by inserting new sectors into the Ladder at the point currently occupied by RoW - typically you will do this when RoW gets to be about half way up the Ladder, but in reality it will depend on your resources and how soon RoW would reach the part of the Ladder which search resources are allocated to.
5. revising the Ladder to take into account the fact that a clue has been found and therefore the immediacy with which some sectors need to be searched might have changed.

You may find that you are revising the Automatic Ladder more than once in preparing for the next phase, particularly near the start of the search. That's fine so long as you do it in the right order and follow the Rules each time. We strongly suggest that you write the Revised Ladder down each time, and if you need to revise it again all you do is cross out the parts that you are going to change and write the new Ladder alongside - you will find that there is enough space to do that because we have deliberately made the Revised Ladder column on Sheet 3 wide enough to allow for that. In each case you will need to make an entry on Sheet 5.

Part 4   Sector Ladder working documentation

There are five separate sheets for the Sector Ladder technique. Sheets 1 and 2 relate to the Consensus activity, the results of which are transferred onto Sheet 3 in the form of the Initial Sector Ladder. Sheet 3 is used for a total of up to 5 phases of the search, after which you continue on Sheet 4. Sheet 5 is for documenting your reasons for revising the Ladder. Design, layout and vocabulary has been standardised across the five sheets to simplify their use.

SECTOR LADDER DOCUMENTATION - SHEET 1
INITIAL CONSENSUS RANKING - PARTICIPANT'S SHEET

Participant: _____   **Date:** _____

Likelihood Descriptor	Sectors - write the labels in the boxes						Score
very likely							9
in between							8
fairly likely							7
in between							6
average							5
in between							4
fairly unlikely							3
in between							2
very unlikely							1

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SECTOR LADDER DOCUMENTATION - SHEET 2

INITIAL CONSENSUS RANKING - SUMMARY SHEET

Incident: _____   **Date:** _____

Sector / Route Label	Write the score for each sector / route in the boxes below - one column for each participant					Total Score	Rank
	1	2	3	4	5		

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SECTOR LADDER DOCUMENTATION - SHEET 3
SECTOR LADDER PLANNING SHEET

Incident: _____   **Date:** _____

Initial Phase	Phase 2		Phase 3		Phase 4	
	Auto	Revised	Auto	Revised	Auto	Revised

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SECTOR LADDER DOCUMENTATION - SHEET 4
SECTOR LADDER PLANNING SHEET

Incident: _____   **Date:** _____

	Phase # ____		Phase # ____		Phase # ____	
	Auto	Revised	Auto	Revised	Auto	Revised

SECTOR LADDER DOCUMENTATION - SHEET 5
REASONS FOR REVISION

Incident: _____   **Date:** _____

Phase	Sector(s)	Reason	Authorized by

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Part 5 - The Sector Ladder Documentation in action: a worked example

The Initial Search Area contains ten sectors labelled A to J. The Consensus is carried out by three participants (Hamilton, Perkins and Roberts. Each completes a copy of sheet 1. The scores are transferred from these onto sheet 2 and totalled. The sectors are then written in rank order on sheet 3 as the Initial Phase plan, with RoW at the bottom. Three search resources are available for the Initial Phase.

The automatic plan for phase 2 puts the three sectors searched at the bottom of the Ladder with all the others moving up three places. However, the Search Manager decides that since none of the searching in the Initial Phase was likely to yield a high PoD all three sectors are moved up the Ladder to a position above RoW (Reason for Revision no. 2). Furthermore, sector E was felt to be highly likely to contain the missing person and so for phase 2 it is moved to a position half way up the Ladder (Reason for revision no. 3). These two revisions give the Revised Ladder for phase 2. The revisions are recorded on sheet 5. There are five search resources available for deployment in phase 2.

On the automatic plan for phase 3, RoW is half way up the Ladder and therefore the Search Area needs to be expanded (Reasons for Revision no. 4). This gives eight new sectors labelled K to R. Two members of the original group carry out a consensus and the new sectors are inserted into the Ladder to replace RoW. This gives the Revised Ladder for phase 3 (the lowest two sectors, I and the new RoW, are off the page). There are now eight search resources available.

The automatic plan for phase 4 puts the eight sectors searched in phase 3 at the bottom of the Ladder and moves all the others eight places up (L and K are off the page). However, during phase 3 a clue has been found in sector L; we want to search L and any adjacent sectors again as soon as possible, and this results in sectors L, Q and M moving to the top of the Ladder (Reason for Revision no. 5). And so on.

SECTOR LADDER DOCUMENTATION - SHEET 1

INITIAL CONSENSUS RANKING - PARTICIPANT'S SHEET

Participant: _C. Hamilton_   Date: _16 May 94_

Likelihood Descriptor	Sectors - write the labels in the boxes						Score
very likely							9
in between	E	B					8
fairly likely	G						7
in between							6
average	D	F	A				5
in between	I						4
fairly unlikely	J	C					3
in between	H						2
very unlikely							1

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SECTOR LADDER DOCUMENTATION - SHEET 1
INITIAL CONSENSUS RANKING - PARTICIPANT'S SHEET

Participant: _D. Perkins_   **Date:** _16 May 94_

Likelihood Descriptor	Sectors - write the labels in the boxes						Score
very likely							9
in between	E						8
fairly likely	B	D	F				7
in between	A						6
average	G	J					5
in between							4
fairly unlikely	C						3
in between	H	I					2
very unlikely							1

SECTOR LADDER DOCUMENTATION - SHEET 1
INITIAL CONSENSUS RANKING - PARTICIPANT'S SHEET

Participant: _P. Roberts_   **Date:** _16 May 94_

Likelihood Descriptor	Sectors - write the labels in the boxes						Score
very likely	E						9
in between	D						8
fairly likely							7
in between	B						6
average	F	G					5
in between	A	J					4
fairly unlikely	H	I					3
in between	C						2
very unlikely							1

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SECTOR LADDER DOCUMENTATION - SHEET 2
INITIAL CONSENSUS RANKING - SUMMARY SHEET

Incident: _Handbook Example_   **Date:** _16 May 94_

| Sector / Route Label | Write the score for each sector / route in the boxes below - one column for each participant | | | | | Total Score | Rank |
| | CH | DP | PR | | | | |
	1	2	3	4	5		
A	5	6	4			15	6
B	8	7	6			21	2
C	3	3	2			8	9
D	5	7	8			20	3
E	8	8	9			25	1
F	5	7	5			17	4=
G	7	5	5			17	4=
H	2	2	3			7	10
I	4	2	3			9	8
J	3	5	4			12	7

SECTOR LADDER DOCUMENTATION - SHEET 3
SECTOR LADDER PLANNING SHEET

Incident: *Handbook Example* **Date:** *16 May 94*

Initial Phase	Phase 2		Phase 3		Phase 4	
	Auto	Revised	Auto	Revised	Auto	Revised
E ✓	F	F ✓	E*	E* ✓	O	L* ✓
B ✓	G	G ✓	C	C ✓	Q	Q ✓
D ✓	A	A ✓	H	H ✓	M	M ✓
F	J	J ✓	B*	B* ✓	N	O ✓
G	I	I ✓	D*	D* ✓	R	N ✓
A	C	E*	RoW	P ✓	F*	R ✓
J	H	C	F*	L ✓	G*	F* ✓
I	RoW	H	G*	K ✓	A*	G* ✓
C	E*	B*	A*	O	J*	A*
H	B*	D*	J*	Q	I*	J*
RoW	D*	RoW	I*	M	RoW	I*
				N	E**	RoW
				R	C*	E**
				F*	H*	C*
				G*	B**	H*
				A*	D**	B**
				J*	D*	D**

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✓ searched this phase
* already searched

SECTOR LADDER DOCUMENTATION - SHEET 1
INITIAL CONSENSUS RANKING - PARTICIPANT'S SHEET

Participant: _D. Perkins (Phase 3 RdW)_   **Date:** _16 May 94_

Likelihood Descriptor	Sectors - write the labels in the boxes						Score
very likely							9
in between							8
fairly likely	P						7
in between	L	O					6
average	K	M	Q				5
in between							4
fairly unlikely	N						3
in between	R						2
very unlikely							1

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SECTOR LADDER DOCUMENTATION - SHEET 1
INITIAL CONSENSUS RANKING - PARTICIPANT'S SHEET

Participant: _P. Roberts (Phase 3 RoW)_   **Date:** _16 May 94_

Likelihood Descriptor	Sectors - write the labels in the boxes						Score
very likely							9
in between							8
fairly likely	L	P					7
in between	K						6
average	O						5
in between	N	Q					4
fairly unlikely	M	R					3
in between							2
very unlikely							1

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SECTOR LADDER DOCUMENTATION - SHEET 2

INITIAL CONSENSUS RANKING - SUMMARY SHEET

Incident: _Handbook Example (Phase 3)_   **Date:** _16 May 94_

Sector / Route Label	Write the score for each sector / route in the boxes below - one column for each participant					Total Score	Rank
	DP	PR					
	1	2	3	4	5		
K	5	6				11	3=
L	6	7				13	2
M	5	3				8	6
N	3	4				7	7
O	6	5				11	3=
P	7	7				14	1
Q	5	4				9	5
R	2	3				5	8

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SECTOR LADDER DOCUMENTATION - SHEET 4
SECTOR LADDER PLANNING SHEET

Incident: _Handbook Example_ **Date:** _16 May 94_

	Phase # 5		Phase # ___		Phase # ___	
	Auto	Revised	Auto	Revised	Auto	Revised
	A*					
	J*					
	I*					
	RoW					
	E**					
	C*					
	H*					
	B**					
	D**					
	P*					
	K*					
	L**					
	Q*					
	M*					
	O*					
	N*					
	R*					

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SECTOR LADDER DOCUMENTATION - SHEET 5
REASONS FOR REVISION

Incident: _Handbook Example_   **Date:** _16 May 94_

Phase	Sector(s)	Reason	Authorized by
2	EBD	Initial high priority, need to be searched again before expanded into RoW. E moved up so it will be searched in #3	CH
3	RoW	Expand search area. New sectors K to R. Consensus done by DP & PR	CH
4	LMQ	Map case found in L in #3. Move to top of ladder for #4.	CH
5	RoW	Expand search area. New sectors S to Z. Consensus by DP & PR - abandoned, person found in sector Q.	CH