Exercise Evaluation Report

Operation Care

Location:	Tarn Basin Mt Cheeseman
Date:	30 June 2018
Report version:	Version 1 IMT & Field Evaluation
Evaluator(s):	*S/Const Conrad Smith* *Ryan O'Rourke, Selwyn District Council*

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Executive Summary

This multiagency avalanche SAREX was conducted at Tarn Basin adjacent to the Mt Cheeseman Ski Area.

Given the sharp trend nationally showing an increase in recreational back country alpine use from activities such as ski touring, climbing and hunting, it was considered timely to test the Canterbury avalanche response plan along with the response capabilities of participating agencies.

An avalanche response requires skilled ACR members to attend and as such the abilities of these rescuers are very high as they regularly work and recreate in this environment.

This is reflected in the lack of recommendations following the exercise and the objectives all being met.

A high level of expertise was employed to evaluate the IMT and field team's capabilities however this overall evaluation is lacking in technical comment to the field teams performance onsite due to this report not having been received at the time of writing.

1. Recommendations

Recommended corrective actions from the IMT

Nil

Recommendations for the Overall SAREX

1. KPI’s used in the planning of the event could be more specific

2. Introduction

The NZSAR funded Avalanche SAREX has become an annual event over recent years with exercises being run in the North and South Islands involving a large scale multi agency response in real time.

Given the remote location of avalanche events and the need for a timely response these exercises are costly and realistic training opportunities are few and far between.

Op CARE was organised and coordinated by Snr Const Paul Beaver who employed the specialist expertise of Andrew Hobman from Avalanche NZ for the scenario set up and field evaluation.

Ryan O'Rourke from the Selwyn District Council evaluated the IMT and his report is attached to this overall evaluation.

At the time of writing the Field Evaluation from Andrew Hobman has not been received.

3. Background

This event has become an important exercise within the Alpine Cliff Rescue community in both the North and South Islands having become an annual event over recent years. It is eagerly anticipated and well supported by the various ACR groups throughout the country.

3.1 Background to the Exercise

The low frequency high risk nature of an avalanche event coupled with the specialist skills required by rescuers onsite and the unique nature of the IMT response make training imperative.

However the nature of the terrain, time constraints, and the numerous agencies involved in an avalanche response make realistic training opportunities expensive and as such few and far between.

When these large exercises are financially supported by NZSAR and facilitated by Police the good turnout from the ACR community confirms industry knowledge of how important and appreciated these opportunities are.

Operation CARE was another example of how appreciated these training events are with over 60 volunteers giving their time to come together and train from different LandSAR ACR groups and agencies.

Often with avalanche rescue training the scenario stops when the patients are located and extricated from the debris. This however is only a part of the overall rescue and the transportation, care and handover to medical professionals off the mountain is also an imperative part of the process and needs to be practiced. As such St Johns was invited to attend and did so in force proving a very valuable training opportunity for both rescuers and medical staff receiving the handover.

3.2 Dates, location, organising agency(s), key people

Date: 30th June 2018

Location: Tarn Basin, Mt Cheeseman

Organising Agencies: NZ Police, Avalanche NZ,

Key People: Snr/Const Paul Beaver, Andrew Hobman

3.3 Participating organisations

- NZ Police
- Avalanche NZ
- Canterbury, Aoraki and Fox LandSAR ACR teams
- LandSAR NZ
- Avalanche Dogs NZ
- Local Alpine Guides
- St Johns Ambulance
- Garden City and Mt Hutt Helicopters
- Department of Conservation

3.4 Exercise aim

To practically test and evaluate the Canterbury Avalanche Response Plan and the readiness and response of attending agencies, including the Incident Management Team, Search and Rescue teams, helicopter operators and the medical chain of care.

3.5 Exercise objectives

Objectives for the exercise were split into specifics for the IMT as well as the overall exercise.

IMT

1. To enhance multiagency and intergroup coordination between the participating agencies and their support agencies and personnel in the event of an avalanche search and rescue incident.
2. To provide all participants the opportunity to refresh and practice their search and rescue incident management knowledge and skills during a full scale operational exercise previously learnt during avalanche training, CIMS courses, avalanche SAR controller courses and through their own experiences and to identify gaps and areas that need further development.
3. To ensure value is delivered for all personnel.

Overall SAREX

1. Test and evaluate the effectiveness and accuracy of the Canterbury Avalanche Response Plan including the call out systems and process.
2. Test and evaluate the readiness and response of the field teams and other resources, including management of the incident site, personal search and digging skills, appropriate equipment, appropriate patient management and safe working around helicopters.
3. Test and evaluate the readiness and response of the Incident Management team, including application of CIMS, Resource tracking, logs and recording and forward planning.
4. To improve coordination and effectiveness between the responding agencies including consistency of search and rescue techniques, common resources, communication methods, meeting key personnel and working with other responders.
5. To document and communicate the learnings and recommendations to the New Zealand Search and Rescue sector in a timely manner.

3.6 Exercise Scenario

An avalanche has been triggered by a group of back country skiers in the Tarn Basin area adjacent to the Mt Cheeseman ski area.

Six members of the party were buried at various locations and depths within the debris.

The buried parties possessed varying types of equipment on their person such as transceivers and recco chips to allow for practice of different search techniques.

A witness to the avalanche made a call to Police supplying limited information and a SAR response was initiated with an IMT established and based in Christchurch.

A staging area was established at the roadside at the bottom of the ski field where St Johns establish a medical handover point.

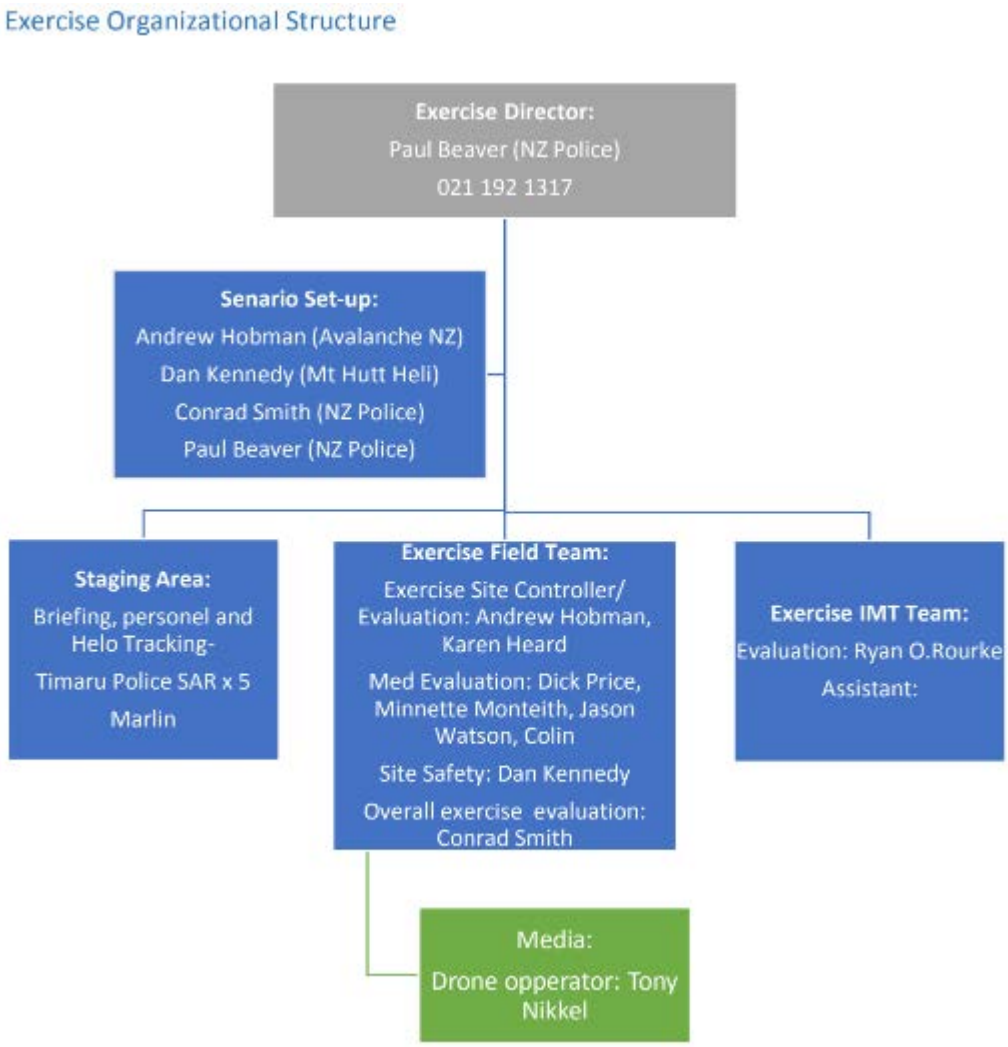
A seventh member of the group involved in the avalanche was located toward the end of the exercise walking out along the access road and was also able to provide further information albeit at a very late stage in the exercise.

4. Evaluation Methodology

4.1 The agreed outcomes of the evaluation activity

The organisation team had pre prepared ideas on how the exercise was to be observed and evaluated.

With numerous aspects requiring evaluation at different locations, plans were put in place for Ryan O'Rourke to observe and evaluated the IMT, Andrew Hobman observe and evaluate the field response, Karen Heard the Avalanche Dogs, Dr Dick Price the medical care onsite, Dr Malin Zachau for the patient handover with St Johns at the staging area and myself as the overall exercise evaluation. An extremely high level of skill and experience coving every aspect of the exercise.



4.2 Evaluation scope

- Establishing an effective IMT with appropriate resourcing in a timely manner.
- Initiating an emergency response to the scene in a timely manner with appropriately skilled resources.
- Safety of all resources deployed onto the scene.
- Locating the patients caught in the avalanche in acceptable timeframes using various techniques correctly.
- Extrication and medical care of patients using current best practice procedures.
- Continued medical care of patients until handover to medical staff off the mountain.
- Constructive debrief and feedback provided to the ACR sector.

4.3 Aspects of the exercise observed, what was not observed

I am confident that all aspects of the exercise were observed by evaluation members very experienced in their roles to provide useful feedback.

A previously stated the IMT had Ryan O'Rourke focused on this aspect who has provided a detailed report against the exercise objectives.

The field response was observed by myself and Andrew Hobman although a report has not yet been received from Andrew at the time of writing.

The high end medical expertise of Dr Dick Price was utilised on site and evaluated the initial patient care and followed up with Dr Malin Zachau working with St Johns at the staging area for handover of patients.

Unfortunately I was unable to attend the cold debrief in the weeks following the exercise.

4.4 The process followed in preparing and submitting the report

The IMT was observed in person and feedback against the objectives provided from extensive personal experience. The KPI's provided by the organisation team to Ryan were not used as he felt they provided little to no usefulness in addition to his report.

Field evaluators including medical staff working onsite under the guidance of Dr Dick Price were provided with pre-formatted forms allowing feedback to be recorded.

These were used for Field teams, Patient management and Site Management as per below.

This coupled with expert knowledge of the evaluators made up the gathering of the evaluation information.

The templates for the forms are attached below however having not yet seen these myself I have had to rely on my own knowledge, observations and discussions at the time on how the on scene response was conducted.

Field Teams | Name:

Physical condition

Poor 1 2 Good 3 4 Excellent 5

Comment

Teamwork

Poor 1 2 Good 3 4 Excellent 5

Comment

Search and rescue skills

Poor 1 2 Good 3 4 Excellent 5

Comment

Appropriate Equipment

Poor 1 2 Good 3 4 Excellent 5

Comment

Gear Management

Poor 1 2 Good 3 4 Excellent 5

Comment

Communication

Poor 1 2 Good 3 4 Excellent 5

Comment

Patient Management | Name:

Engaged in role play

Poor 1 2 Good 3 4 Excellent 5

Comment

Teamwork

Poor 1 2 Good 3 4 Excellent 5

Comment

Primary and secondary survey

Poor 1 2 Good 3 4 Excellent 5

Comment

Recording of vitals and ongoing monitoring

Poor 1 2 Good 3 4 Excellent 5

Comment

Communication of patient condition

Poor 1 2 Good 3 4 Excellent 5

Comment

Appropriate management of injuries/ hypothermia

Poor 1 2 Good 3 4 Excellent 5

Comment

Packing, appropriate immobilization and transportation

Poor 1 2 Good 3 4 Excellent 5

Comment

Site Management | Name:

Appropriate roles established

Poor 1 2 Good 3 4 Excellent 5

Comment

Appropriate facilities established

Poor 1 2 Good 3 4 Excellent 5

Comment

Marking and recording

Poor 1 2 Good 3 4 Excellent 5

Comment

Appropriate resource allocation

Poor 1 2 Good 3 4 Excellent 5

Comment

Heli pad management

Poor 1 2 Good 3 4 Excellent 5

Comment

Patient triage and evacuation

Poor 1 2 Good 3 4 Excellent 5

Comment

Overall site management

Poor 1 2 Good 3 4 Excellent 5

Comment

3

5. Findings

Exercise aim

To practically test and evaluate the Canterbury Avalanche Response Plan and the readiness and response of attending agencies, including the Incident Management Team, Search and Rescue teams, helicopter operators and the medical chain of care.

The overarching aim of the exercise is broad and multi-faceted and as such has many working parts to comment on in these findings. This is however accurate of an avalanche response.
The exercise objectives all follow a common theme of multi-agency cooperation and communication in a specialist environment that needs to be executed timely and safely.
The KPI's provided sit alongside the objectives and my findings are set out in response to the extent that these were met.

SAREX KPIs

Exercise objectives	Exercise Key Performance Indicators
Test and evaluate the effectiveness and accuracy of the Canterbury Avalanche Response Plan including the call out systems and process.	A well organized and safe SAREX is run that allows teams to perform to their ability, work with other responders and have a fair and consistent evaluation. All attending personnel are aware of the expectations and evaluation criteria ahead of the exercise. Evaluators are appropriate for the task, well briefed and provided resources to record actions and timings.
Test and evaluate the readiness and response of the field teams and other resources, including management of the incident site, personal search and digging skills, appropriate equipment, appropriate patient management, safe working around helicopters.	
Test and evaluate the readiness and response of the Incident Management team, including application of CIMS, Resource tracking, logs and recording, forward planning.	
To improve coordination and effectiveness between the responding agencies including consistency of search and rescue techniques, common resources, communication methods, meeting key personnel and working with other responders.	A cold debrief is held, shortly after the exercise, involving the participating agencies or organisations to identify issues and make recommendations towards the final report.
To document and communicate the learnings and recommendations to the New Zealand Search and Rescue sector, in a timely manner.	A full report is produced and findings are communicated to the sector.

KPI 1 - A well organized and safe SAREX is run that allows teams to perform to their ability, work with other responders and have a fair and consistent evaluation.

Achieved - A significant amount of organisation was poured into this exercise which was supported by Police in allowing time for Snr Const Paul Beaver to organise the bulk of it.

Speaking with him he stated that he could have used more release time from his day to day Policing duties however he managed to achieve a great, well organised exercise with many different agencies involved.

The location and scenario catered for all levels of team member's skills and involved everyone working together. There is no way SAR members from different groups cannot work together on an avalanche scene and numerous examples of this were observed in a fluid environment. Onsite tuition was observed with more experienced members sharing advice and leadership to others. An example being a member deployed with a Recco unit clearly not being experienced in its use and then being shown.

As previously stated a very high skill base was employed to evaluate the various aspects of the exercise. This was extremely well done on site and in the IMT. The abilities of the evaluators were amongst the best in the ACR and avalanche field available in New Zealand.

The evaluation was consistent with other avalanche exercises held involving other ACR teams in the North Island.

KPI 1 sits alongside the first three objectives. The exercise was organised and conducted in a manner that allowed the first objective to be met. Whilst there is always going to be some inaccuracies around the callout procedure for an exercise opposed to a real SAROP the overall response was simulated well.

Regarding the second objective, the SAREX was organised in a way that allowed the participants to fully test their skills and response safely. Dan Kennedy was appointed the safety officer and was situated in an elevated position alongside the drone operator with comms and able to have an overview of the exercise. I witnessed Dan question the suitability of one person's personal equipment and discussed options around their access to the site as an observer.

KPI 2 – All attending personnel are aware of the expectations and evaluation criteria ahead of the exercise.

Achieved – Although I was not privy to any information received by participants attending the exercise in the days prior to the event, there was a substantial briefing provided by Andrew Hobman at the staging area in the time leading up to the exercise. Participants were made aware of the expectations, the fact that they were not being individually 'assessed' but that it was all about the group learnings and that the evaluators would be onsite in vests shadowing their response and providing information around patient injuries comparative with the time they were located and dug out.

Specific emphasis was put on the medical care of the patients extricated and evacuated to the staging area where they would conduct a handover. This was a key point outlined in the aim for the exercise.

KPI 3 – Evaluators are appropriate for the task, well briefed and provided resources to record actions and timings.

Achieved - …and then some! The evaluators as previously discussed in the Evaluation Methodology are world class and experts in their field. Participants were fortunate to have the expertise of these people for this exercise.

KPI 4 – A cold debrief is held shortly after the exercise involving the participating agencies or organisations to identify issues and make recommendations towards the final report.

Achieved – A hot debrief was held at the immediate conclusion of the event with good discussion. This was shared with everyone present in the field part of the exercise but obviously not the management personnel and as such the points raised were minor and exercise related opposed to the big holistic view of the exercise. For example Radio silence was not observed when requested during a winch and role playing with the victims could have continued right to hand over.

A cold debrief was held in Christchurch on the 11th of July. This was well attended from all agencies with good discussion and the major learnings coming out were around communications. Comms with the site and comms on the site as well.

KPI 5 – A full report is produced and findings are communicated to the sector.

Partly achieved – Again at the time of writing the evaluation of the onsite response has not been received. However this is coming and will capture all the evaluator's comments from the site and I believe this box can be ticked. The IMT has had a comprehensive report completed.

It would be my thoughts that when the site evaluation is received it be attached to this evaluation along with the IMT Evaluation and this KPI will be reached.

However as it stands at present this can only be graded as partly achieved.

6. Conclusions

Overall the objectives and KPI's outlined for this exercise were easily met.

Avalanches are time critical and a response must be timely but safe and the logistics around this can be difficult given the large amount of resources and agencies involved. The objectives were appropriate for the exercise and well met.

However the KPI's were too broad, non specific and lacking in quantity.

I believe there is an opportunity to use the KPI's to drill down to more specific details within the objectives and an avalanche has many areas that could have been assessed more accurately.

For example objective two around testing the response of field teams there could be specific KPI's included such as:

- ASC establishes themselves in an appropriate location with the best possible overview of the site.
- Appropriate helicopter landing sites are established on site
- Correct flags are used to label clues found

Much of this feedback may come in the field report on the day however this could be incorporated into the planning as well.

When the field report is received from Andrew Hobman then more detail can be expected on the technical skills of the rescuers on site as this will also have detail around the medical care provided.

As such I have provided response to the objectives as best I can without this technical report of the rescuers onsite.

7. Appendix

Appendix 1.

IMT Review completed by Ryan O'Rourke.

REVIEW OF INCIDENT MANAGEMENT TEAM

DURING CANTERBURY AVALANCHE EXERCISE June 2018

Canterbury Avalanche Exercise – IMT Evaluation

New Zealand Police ran a multi-agency avalanche rescue exercise in Canterbury on Saturday 30 June 2018. The exercise was supported with funding from New Zealand Search and Rescue. The incident scene was located in a basin to the south of Mount Cheeseman ski-field in the Craigieburn Range.

The Incident Management Team (IMT) was located at the Christchurch Justice and Emergency Services Precinct in a room off the main Emergency Operations Centre (EOC) hall. I was invited to review the performance of the IMT during the exercise. I have prepared the notes below based on my observations of the exercise. There were three objectives for the exercise, with a number of supporting criteria. I have structured my notes around these objectives.

1. Objective 1 - to enhance multi-agency and inter-group coordination between the participating agencies and their support agencies and personnel in the event of an avalanche search and rescue incident

1.1 Taskings

The avalanche occurred at 1035 hrs. The initial taskings were pre-written in the avalanche plan and were activated by the police Southern Communications Centre, as per the district mobilisation plan for avalanche incidents. The use of Whispir communcations software to send and receive SMS messages and emails was a very effective and fast way of notifying and activating responders.

In the initial notification message to response agencies, the message from police asks responders to reply with their location, availability and names of responders. However it doesn't explicitly ask for those responding to the message to include their organisation in the reply. This caused a slight delay within the EOC and could easily be alleviated by amending the initial notification message that goes out from the Whispir system.

1.2 Resources

Resource tracking was carried out on whiteboards and the Tracplus helicopter tracking software. It was clear and effective.

However as police has not purchased a licence to use Tracplus they have been forced to borrow a logon from an operator that is paying for the service – potentially breaching that operator's contract with Tracplus.

As a lead agency for search and rescue (SAR), it's critical police support their staff by providing suitable tools to manage these incidents. Tracplus is the industry standard for tracking helicopters. A licence to view the tracks of any operator who shares it with police costs one US dollar a day. As tasking a helicopter costs between $35 and $95 a minute when they are in the air, the tasking agency should be carefully monitoring the use of these assets, not to mention the safety aspects of knowing where their resources and personnel are and their status.

The IMT personnel did a good job getting to grips with the resources that were being used despite having poor communications with the scene.

1.3 Recommended Corrective Actions

1. Police should invest in resource tracking software for helicopters
2. Police should amend the initial notification message to responders to request they include their organisation when replying to Whispir text message

Objective 2 – to provide all participants the opportunity to refresh and practice their search and rescue incident management knowledge and skills during a full scale operational exercise previously learnt during avalanche training, CIMS courses, avalanche SAR controller courses and through their own experiences and to identify gaps and areas that need further development.

1.4 Information Gathering

It was good to see a member of the IMT assigned to the intelligence role early on. They were very fast to follow up with the initial informant to try and obtain any more relevant intelligence, however due to the scenario this was not forthcoming. Due to the communications problems, there was no way to provide intelligence to the incident site.

By the time the planning meeting occurred, the IMT Intelligence function had a very good handle on the background to the incident and the total number of missing people.

The Intelligence function in the ICP

1.5 Incident Management Team Setup

The exercise created artificialities in this area, in that the management team was able to set up very quickly in a dedicated SAR room, as they were already present and waiting for the exercise to begin. This is not unrealistic, as SAR managers could easily be working in the building when an incident occurred and may be able to respond very quickly.

The room itself was ideal for managing an incident of this nature and appears to have everything that is required. Being adjacent to the EOC hall means there is sufficient space should the incident grow. Some thought should perhaps be given to where SAR would manage incidents from if the EOC hall was being used for another emergency (if it hasn't already).

1.6 Incident Controller

The controller performed well and had a calm demeanour about him. He was very frustrated by the lack of communications with the Avalanche Site Controller (ASC), which really prevented the EOC taking any actions beyond the initial deployment of assets to the scene. It was good to see the controller removing himself from the noise of the EOC to think and work out his priorities and ensure his decisions were recorded in a notebook. He also had regular contact with functional managers, without getting too involved in the detail.

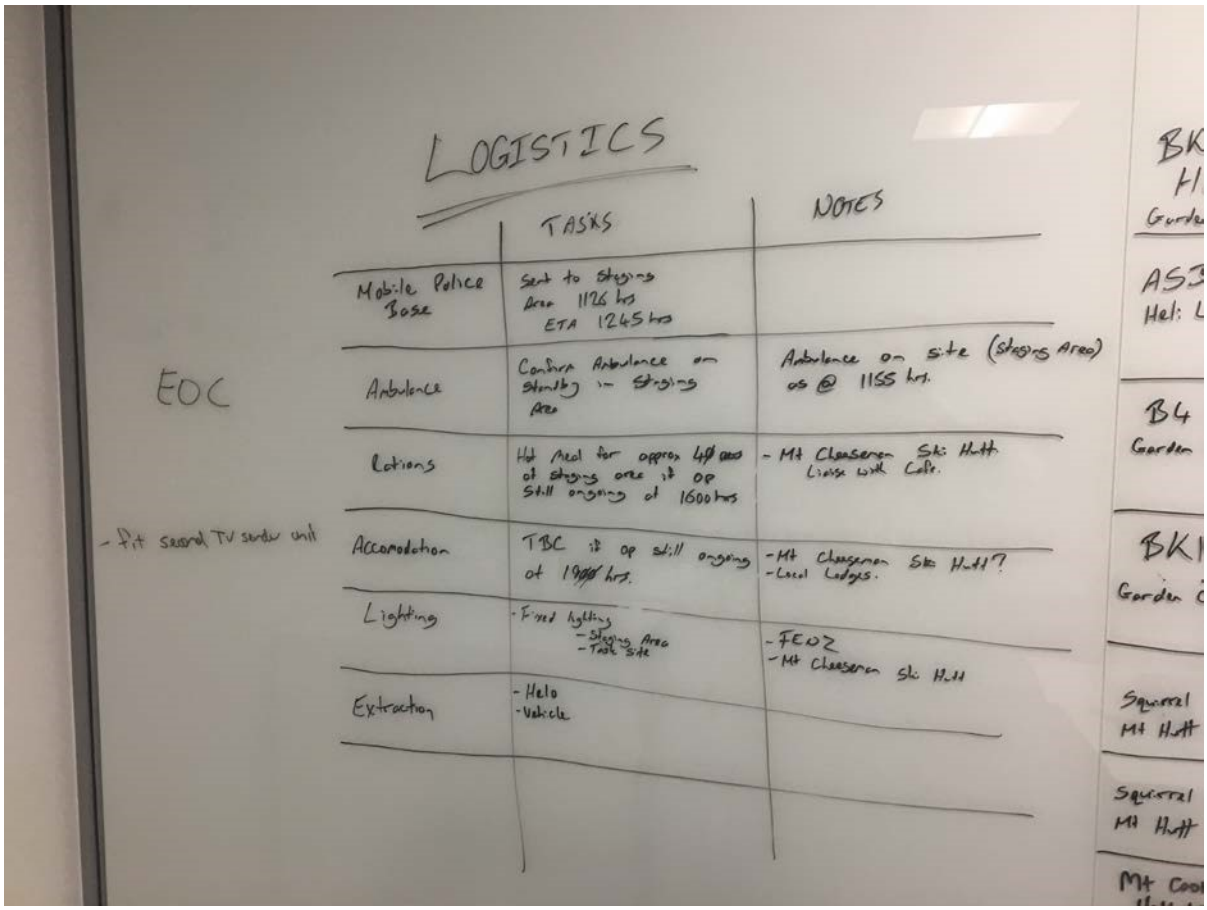
I didn't observe any briefings to the full EOC team from the controller (other than the planning meeting), which would have been a good way to ensure the whole team was clear

on his expectations and priorities. However it was a small team so it was easy to communicate informally with the full team at once.

1.7 Logistics

No-one was assigned to the logistics role initially – it was not until 1120 hours that a member of the IMT was tasked with the logistics role, put the vest on and began operating in this area. Initially the focus of the controller and the IMT was on the operations role, which is appropriate given the need to deploy a lot of resources quickly. But it would be useful to staff the logistics role earlier in order to start identifying other resources that may be required, check their availability and put them on standby to deploy.

Once the role was staffed, the logistics manager quickly got to grips with the resources that were being used and began looking forward to identfy future requirements and planning for a second operational period.



Logistics board showing available resources

1.8 Operations

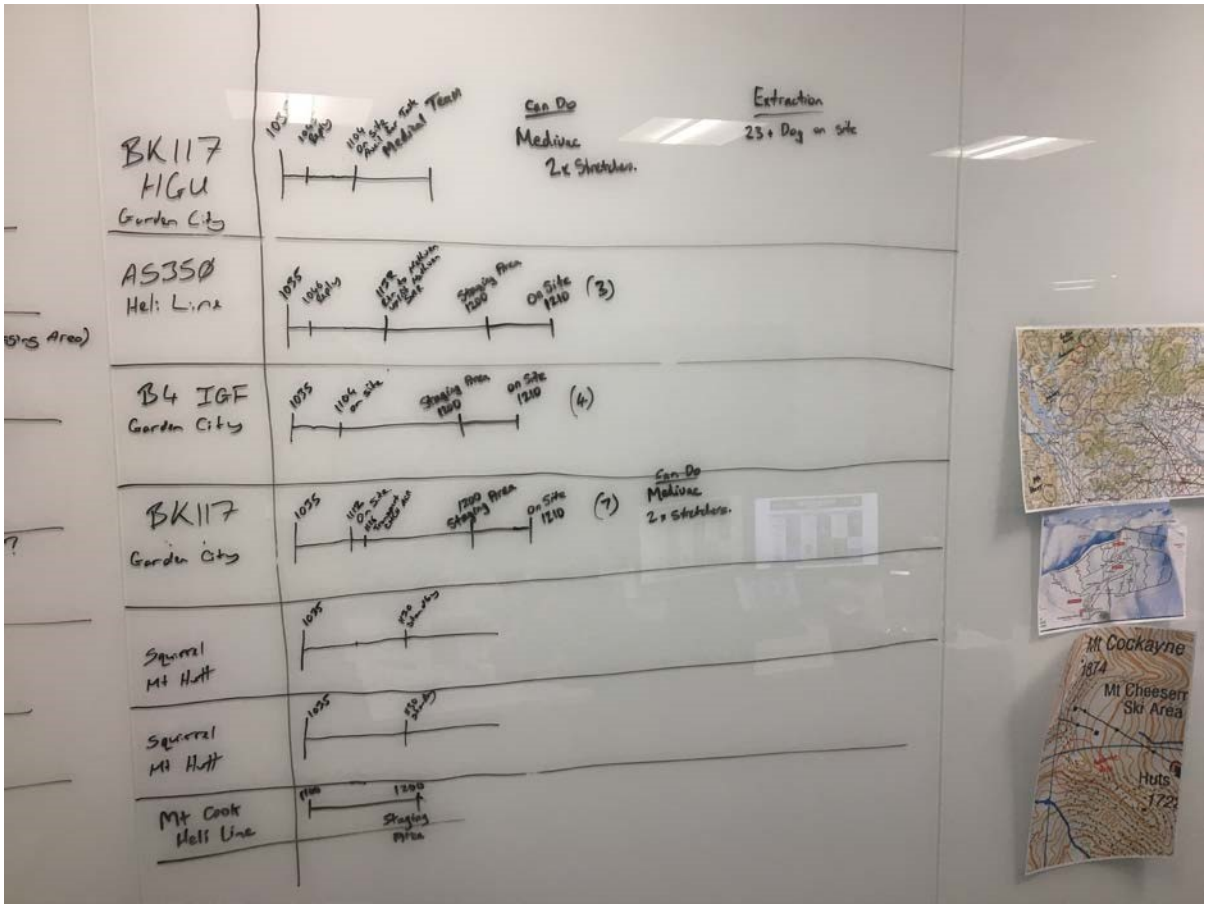
The operations function appeared to be well managed with sufficient staff resource allocated by the controller. Information was clearly recorded and displayed. However the operations function wasn't really tested, as once the initial deployments occurred, the lack of communication with the scene meant that there was little else they could do.

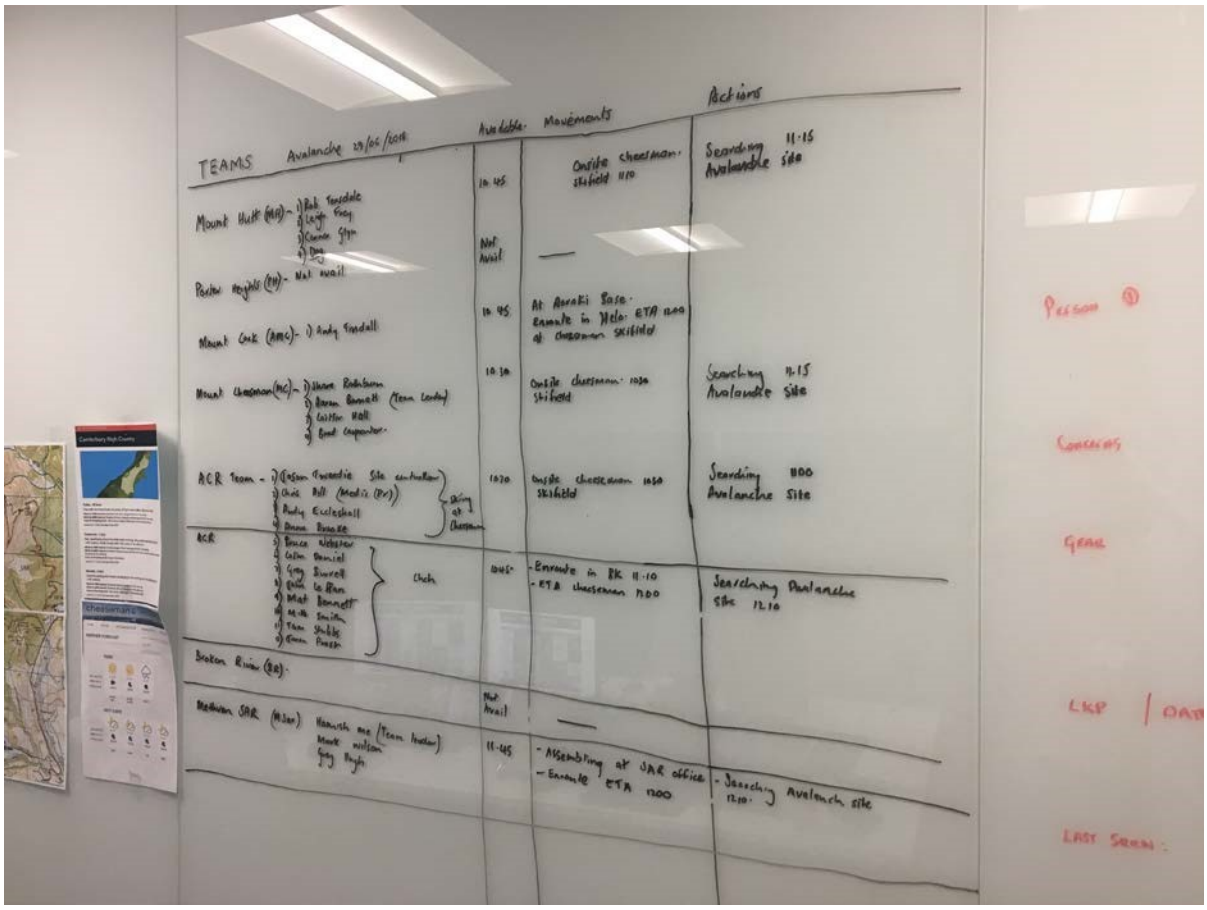
The communications issues really hampered the operations team, as they had no idea when, or even if, resources had arrived on site, what the ASC's priorities on site were and what the rescuers taskings were. At one stage the operations team resorted to contacting one of the helicopter companies to try to get information back about what was happening on site.

The ability of the Whispir system to both send and receive messages meant that the operations team had a good knowledge of who was deploying to the scene initially, and this information was clearly displayed in the EOC. As previously mentioned, the agencies receiving these messages need to include their agency name in their reply.

The aircraft tracking system Tracplus proved useful to identify where the helicopters were landing, and therefore the rough location of the incident.

The list of resources that were tasked was also clearly displayed on the whiteboard – it may have been useful to add columns with the passenger capacity of each helicopter and if it was a medical helicopter or not.





Helicopter details, taskings and timeline (top photo) and personnel details, location and tasking (bottom photo)

1.9 Planning

An action plan was quickly created and displayed in the EOC. The goal was 'to safely locate and rescue the missing people'. The objectives for the first operational period were:

1. Get assets mobilised and on site
2. Ensure site is safe
3. Identify likely areas to search
4. Search for missing parties
5. Medical evacaute (sic)

The action plan was basically effective, but due to the communications issues it wasn't possible to communicate it to the ASC.

There is a degree of confusion about the role of the EOC. Some of the objectives in the action plan related more to tactical actions that would occur on site, under the direction of the ASC. EOC staff are too remote, and most lack the technical knowledge to decide on rescue tactics. Some of the EOC objectives would be better framed around supporting the ASC, the incident site and the staging area. A basic action plan at the incident site should describe rescue tactics.

It may be more useful to change the terminology – the location where the ASC is located should be referred to as the Incident Control Point, with the ASC as the

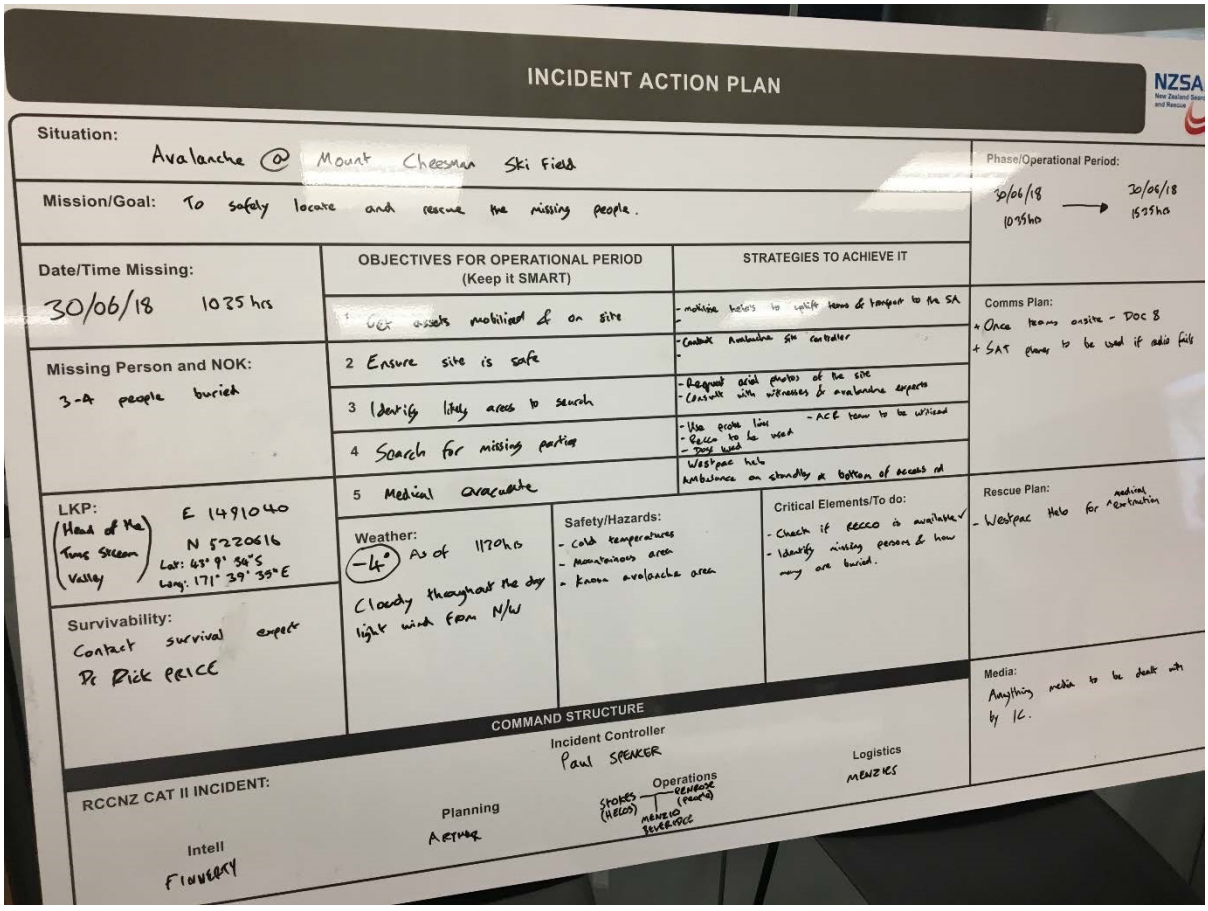
Incident Controller. The controller in the EOC would then become the Local Controller. The action plan for the EOC would focus on enabling the ICP to take the actions necessary to resolve the incident. A second, basic action plan for the ICP would focus on incident level, tactical objectives. Both of these action plans could be pre-written for the first operational period of any avalanche incident. This means the EOC and ICP planning functions can focus on the next operational period. These pre-written action plans should be included in the avalanche pre-plan.

That doesn't mean a full ICP is required at an avalanche incident. The ASC may be conducting the IC and Operations roles, and a police member may handle logistics, communciations and planning. If the IC was overwhelmed they could bring in additional staff from the site to fill CIMS roles as required.

One issue with the current SAR action plan template is that it lacks any place to record controller approval. This is important to demonstrate to any later enquiry or reivew that the controller has read the action plan and is satisfied that it is delivering on their intent. There was no way of telling if the action plan was still a draft, or if the controller had signed off on it.

The action plan created for the exercise covered the period 1035-1535 hrs. No action plan was produced for the second operational period, probably due to the timeframe around the exercise. However the planning manager mentioned in the planning meeting that he had started looking at requirements for the next operational period.

The police member assigned to planning never put on a vest, so it was initially difficult to see who (if anyone) was performing that role.



The action plan for the exercise.

1.10 Intelligence

As previously mentioned, the intelligence manager was quick to follow up on the details supplied in the initial information given to the police communications centre. However there was little they could do to build profiles of the missing subjects, or add to the common operating picture, due to the scenario itself and also the lack of communications with the incident site.

In a real event it would be useful for the intelligence manager to produce and disseminate a situation report to all agencies involved in the response and other interested parties.

1.11 Logging of Actions Taken in ICP

The Incident Controller maintained a log in his notebook, other staff were also observed writing in notebooks and some updates were entered into I/Net Viewer, which also updates the police dispatch system.

However maintaining logs in individual notebooks can be problematic, as other functional managers don't have easy access to this information. Information in notebooks also isn't readily retrievable at the end of the operation, without scanning the notebooks into a document storage system.

Most emergency management organisations are using some kind of software to record planning and decision making during incidents and police should investigate the options available. Using dedicated incident management software means operation records are more likely to withstand the scrutiny that comes with audit and review and potentially coronial processes. Police should support SAR managers buy purchasing suitable incident management software.

1.12 Radio Procedure

The EOC only started using radios when the exercise control radio channel began being used for communications between the EOC and the scene. This was several hours into the incident. Communication was via a secure police channel and there were no issues with radio procedure.

1.13 Communication and Information

Communication between the ICP and the Avalanche Site Controller was poor to non-existant for most of the exercise. A satellite phone was supposed to be supplied to the ASC and they were expected to contact the EOC. The satellite phone never made it to the scene and there were no communications at all for the duration of the exercise between the EOC and the ASC. Once the EOC began using the exercise control channel, radio communciations were between the EOC and the staging area, and then presumably between the staging area and the ASC.

This put the IMT in a very difficult position. Two hours after the exercise began the team still had no information, other than the intial details received by the police communications centre. The IMT had started all relevant taskings but had no information from the scene as to what rescue resources (if any) were on site, what their taskings were, what additional resources were required, no information on any rescues or any updates on the number of people buried.

In a real incident this situation would be disastrous. It is totally unacceptable for the controller not to have further information about the event, two hours after it started, especially with seven people trapped or injured. The media would be voracious in their demands for updates and the police heirachy would also require information to assure themselves that the incident was being managed appropriately. If police were perceived as struggling to manage the incident, or obtain important information from the scene, that would likely erode public confidence in police to lead these operations.

Communications are often a problem in back-country incidents. But solutions are available, including satellite phones, VHF radio and portable VHF repeaters and cellular radio. Police SAR squads have much of this equipment and are trained to use it.

There is a general presumption within SAR circles that police aren't trained or equipped to deploy to avalanche incidents as rescuers, which is generally correct. However the response would benefit from one or two SAR squad members standing next to the ASC with communications equipment. They would be able to relay activity on the site back to the EOC and seek additional resources as necessary.

The ASC's focus will always be outwards, on the incident immediately in front of them, not upwards to the EOC. ASC's may not appreciate the importance of providing information to the EOC, particularly when faced with a serious situation in front of them that requires their expertise. However police staff understand these needs.

The area where the ASC sets up to manage a site should be a safe area, where SAR trained police are capable of operating safely, under the direction of the ASC. I believe getting police SAR members to the site is a priority to ensure EOC has the necessary situational awareness to support the incident.

1.14 Documentation

As per the section on *Logging of Actions Taken in the ICP*, there is a need to investigate emergency management software. Systems like D4H Incident Management (https://www.d4htechnologies.com/public-safety/emergencyoperations/incident-management) allows organisations to have pre-written action plans and taskings, allows the sharing of live situation reports, logging of information and allows any agency to connect remotely to the incident. At the end of the incident all data entered into D4H, including logs, is exported as a package of PDF documents.

The EOC completed an effective action plan using the standard SAR template. Most of the other information gathered by the IMT was displayed on whiteboards, enabling visibility by the whole team. The information was clearly and systematically displayed and all whiteboards were photographed at the end of the operational period.

1.15 Recommended Corrective Actions

3. One or two Police SAR members should be deployed to an avalanche scene to operate alongside the ASC, to establish and maintain communications with the EOC.
4. Police should obtain suitable incident management software for SAR managers.
5. Amend the terminology in the pre-plan to make clear the difference between the EOC and the ICP and the different roles the two have.

6. Develop pre-written action plans for the first operational period of any avalanche response for both the ICP and the EOC.
7. Develop a template and system for distributing situation reports during an avalanche response (using incident management software).
8. Amend SAR action plan template to include a controller approval field.
9. Consider where to manage avalanche incidents from if the CJESP EOC is already in use for another emergency (if not done already).
10. Consider producing and disseminating a Sitrep to interested parties during major events

2. Objective 3 – to ensure value is delivered for all personnel

2.1 Personnel Involvement

Personnel involved in the EOC commented at the hot debrief that they found the exercise useful. Several also commented that the session that was run earlier in June was particularly useful ahead of the exercise. This session involved a presentation from Andrew Hobman on avalanche behaviour and characterictics, survivability and search techniques. The session also gave police SAR staff an update on the latest version of the avalanche plan, which then led into a desktop exercise. This training was beneficial ahead of the full exercise to help participants extract maximum value from the exercise.

2.2 Risk Management

Risk Management was addressed through deploying appropriately trained and experienced people to the site and through the use of reputable commercial helicopter operators, experienced in mountain flying.

There are other risks around managing avalanche operations (reputational risk, loss of trust and confidence in police and rescue agencies) that could occur in an operation if the communications issues between the EOC and the ASC aren't addressed by police as the lead agency.

2.3 Resources

Succession planning was underway in the EOC during the exercise, along with a plan to rest rescue resources. Consideration had been given to continuing the operation through the night if necessary.

2.4 Planning Meeting

A planning meeting was conducted at 1230 hours. This was hampered by a lack of information from the incident site due to the communications problems. The incident controller ran the meeting effectively, keeping it on track and ensuring functional areas gave brief updates.

A liaison officer from St John Ambulance was present for most of the exercise and he should have been included in the planning meeting. However it appears the IMT wasn't aware of his role.

The meeting summarised the current situation and then look at priorities going forward, both in the current operational period and the next period.

It may have been helpful for the controller to give a quick summary at the end to ensure all personnel understood his priorities.

EOC staff conducting a planning meeting.

Recommended Corrective Actions

Nil

2.5 Conclusion

I was impressed with the calm way the management team responded to the situation and with how quickly they were able to gain situational awareness and begin managing the incident. They also coped well with the poor communications situation and looked for work-arounds and solutions. I'm confident this team would perform well in an avalanche emergency.

Ryan O'Rourke
Team Leader – Emergency Management
Selwyn District Council
5 July 2018

Avalanche SAREX Evaluation Report
Canterbury Police Operation – CARE
30th June 2018

Operation site: Tarn Basin, Craigieburn Range, Canterbury.

Prepared by Andrew Hobman

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Background

The Craigieburn Range, in central Canterbury, is within an hours drive from Christchurch and a popular destination for skiers, climbers, walkers and bikers. Many activities take place on or around the snow and on slope angles between 30°- 45°, where there is a chance of triggering an avalanche. Natural avalanches regularly release in terrain at these angles and run significant distances through much lower angled terrain.

There is a well-documented history of very large natural avalanches in the range and fatal involvements from human triggered events.

The Canterbury Police District have a prime responsibility to respond to avalanche incidents within its policing boundaries including the Craigieburn Range and Arthurs Pass National Park. The Search and Rescue (SAR) response is coordinated through the Police and an Avalanche Response Plan. Rescue resources are drawn from the LandSAR Alpine Cliff Rescue and Search Dog Teams, staff from seven local ski areas and guiding companies with Incident Management Team (IMT) support from Police and local resources. There are at least three helicopter companies in the regional, that are able to provide transport including at least one dedicated to medical support.

The primary role of these groups is to provide a rapid search and rescue response to any avalanche incidents that may occur in the mountains.

From a risk management perspective, an Avalanche SAR response contains many factors that increase the complexity, risk and safety of an operation. Avalanche rescue response:

- Is a time critical, medical emergency
- Requires highly skilled teams to assess and manage the avalanche and other alpine hazards
- Uses multiple Helicopters, operating, loading and unloading people in an alpine environment
- Are low probability/ high consequence events that rescuers and management do not experience often.
- Have the potential to be multi-causality events requiring high numbers of responders
- Involve multiple agencies.

These 'Red Flags' should be considered and prepared for in the response planning and operational management throughout the event.
Key components to increase the chances of a safe and successful operation include:

- Robust planning, reviews and updates
- Competent Field and IMT personnel
- Regular and realistic training.

There is high value in running realistic large scale, inter-regional training exercises to increase the various agencies level of experience and proficiency, ability to work together, test the Response Plans, improve preparedness and reduce the risk in a real event.

Terms of Reference

This report has been compiled for NZSAR on the Avalanche SAREX, Operation CARE, Canterbury, June 30th 2018.

The purpose of this report is to provide an evaluation of the Field Teams' search and rescue response to an avalanche incident and it will address the Field Teams actions, site management, search and rescue techniques and patient management.

The author of this report, Andrew Hobman (Avalanche NZ) is an avalanche risk management consultant and educator and an experienced Search and Rescue practitioner both in the field and within incident management teams. He has worked for the New Zealand Mountain Safety Council (MSC) as the Avalanche & Alpine programme manager, the Department of Conservation as a Search and Rescue Team leader at Aoraki/Mt Cook National Park and is a current member of the LandSAR Backcountry Technical Rescue Advisory Group.

Summary

On the 30th June 2018 a regional Avalanche Search and Rescue exercise (SAREX) was held on the South Eastern slopes of Tarn Basin (Craigieburn Range), involving the Canterbury Police District staff, LandSAR teams (Christchurch, Aoraki/ Mt Cook, Methven and Avalanche Search Dog), local guides and ski area staff, St Johns Ambulance and local helicopter operators. Financial support was provided by NZSAR with organisation and evaluation provided by NZ Police and Avalanche NZ.

Exercise Aim: To practically test and evaluate:

- The Canterbury Avalanche Response Plan
- The readiness and response of the Alpine Cliff Rescue Teams and other local resources
- The readiness and response of the Incident Management Team

And to improve co-ordination and cohesion within and across the Police Districts and key responders. (See Appendix 5 for a full Needs, purpose and objectives)

Scenario:

An avalanche incident involving multiple burials of back country users.

The exercise included six burials (3 with avalanche transceivers and 3 without) and was run in 'real time', with the incident reported via a 111 phone call to the Police communication centre. The Canterbury Police SAR (On Call) officer then initiated a Search and Rescue operation as per the local response plans using the Whisper call out system. The exercise concluded when the final victim had been evacuated and the rescue teams stood down by the Incident Controller.

A debrief was conducted immediately after the exercise at the Staging Area, for the field teams and at the Incident Control Point in Christchurch, for the IMT. A further full debrief was held at Flock Hill Station two weeks later.

Conclusion

Overall the exercise was successful and the key aims were achieved. The response of the rescue teams and the Incident Management teams was well tested and a number of clear learning points were identified. The capability of the responding teams, both in search and patient management, has improved from an already high level displayed in the 2012 Avalanche SAREX. Equally, the Police Response plan, call out system and operational management has continued to improve and shows the value of training and exercising for a SAR operation.

This development illustrates the value and success of the NZSAR supported avalanche SAREX and accompanied training over the last ten years. Above this, the learnings have shifted away from the rescuers core search skills to issues around planning and patient care beyond the accident site.

Good interaction between the all responders added to an effective conducting of the exercise.

There were no safety issues for the field teams however ongoing training around helicopters should be undertaken by all potential responders.

TVNZ made a short article on the event and this can be seen here: https://www.tvnz.co.nz/one-news/new-zealand/avalanche-scenario-triggers-rescue-exercise-canterbury-mountain

The mid slope heli-pad. *Photo: A.Hobman*

Evaluation

The Exercise was evaluated by independent personnel to provide learnings for future training and operations. It was not an assessment of individuals but more broadly, how they worked within a team and how the teams responded to the site, search and patient management requirements of the scenario. Each of these was broken down to specific components and rated from 1 (poor) to 5 (excellent). However this scoring only provided a part of the overall evaluation and focus should be given to the learnings rather than the point ratings. See Appendix 6 for a sample evaluation form.

The Evaluation team was also there to provide patient injury information as victims are dug out of the snow.

The evaluation team:

- Field operations – Andrew Hobman (Avalanche NZ)
- Patient care and information –Jason Watson, Dr Dick Price, Colin, Minnie.
- Dog – Karyn Herld-Robertson (LandSAR)
- IMT operations – Ryan O'Rourke (Selwyn District Council)
- Overall exercise- Conrad Smith (Police)

Key Learning Points

The operation ran very well and the individual responders did a good job in finding the buried subjects and managing their injuries. The following points are areas for improvement. See the Findings section for a full assessment of the response.

Planning

The Avalanche Response Plan has continued to develop however further work on the points below would improve the SAR effort. The Whisper call-out system worked well. There were some responders that did not receive the alert but I believe this has been worked on.

- Communications plan. There is a need to keep developing plans to better prepare for the communication complexities of different agencies, groups and individuals attending a SAR operation with a wide range of radios. This should include plans for areas with limited or no coverage for cell phone and radios.
  A diagrammatic model could be incorporated with the ability to adjust and add. This should also be displayed at the Staging Area and communicated to the ASC/ SFP. See Appendix 7.
- Staging Areas. Possible Staging Area locations should be identified in high probability incident locations (Arrowsmiths, Mt Hut, Craigieburn, Arthurs Pass National Park, etc.) and solutions found for issues such as heli-pad sites, road access (including ambulance), parking for responding groups and individuals, medical areas, press access, family and bystander management and communications to the Christchurch Operations Centre, possible Incident Control Points and incident areas etc.

Staging Area and Site management equipment:

Gear and equipment that would improve the management of the Staging Area and the avalanche site should be made one of the early priorities. These items should be listed in the Response Plan, along with where they might be sourced and plans for how and when to get them to site.

They include:

- Vests to identify roles. (SA and site)
- Aide-memoire and checklists. (SA and site)
- Whiteboards for communicating information. (SA)
- Radios, satellite phone, portable repeater. (SA and site)
- A registration and recording process. (SA and SFP)
- Shelter, flags and marking, wind wands/smoke etc.

Field teams

The responding rescuers had strong personal search and rescue skills and good equipment.

- More stretchers required on site to transport patients.
- More radios required and continued training on how they would be used in a large search, including unlocking the key-pad and finding common channels.
- Better understanding of personnel transceivers including revert to send functions, how they react to radio/ GPS interference and deep multiple burials.
- Continue training with the Recco hand-held search device.
- Continued training around helicopters including safety, how different aircraft can accommodate stretchers, hard points for clipping to and getting acquainted with the pilots.

Site Management

Overall site management suffered from poor communications and a lack of delegated roles. A very limited number of radios initially came to site and no communications plan meant that individual rescuers were mainly self-tasking. The Avalanche Site Controller (ASC) remaining on the ridge top also made the site management difficult given the communication issues. Decisions around searcher safety, like should all searchers revert to send on their transceivers once the site is cleared or radio silence for the winch operation, where impossible to share.

The establishment of the following roles, and thus allocation of responsibilities would have improved the effectiveness of the operation:

- A Safe Forward Point (SFP) supervisor to meet, record and task incoming resources and gear.
- A Search Supervisor to oversee the search effort (visual clues, transceiver, dog, Recco, probe-lines) and ensure the site has been cleared.
- A Digging supervisor to manage diggers and focus effort in higher probability burials.
- A Medical supervisor to advise on treatment and triage the patients for transport. This should an experienced medical professional (Doctor, Rescue Helicopter Medic etc.)

The role of a Scribe was established and a good timeline was recorded. Additional recording of the site (map, photos) and clues would help to manage the search effort especially on a difficult site, poor weather or a scenario with no buried victims wearing transceivers.

Patient care

Patient management was to a very high level especially given the contrived nature of an exercise. Improvements can be made in the recording and communication of patient details and medical status.

- Teams should be carrying waterproof notebooks or paper sheets for recording patient info. These should stay with the patient for handover to Heli-medics, Ambulance and hospital staff. Consultation with St Johns and DHB is required to ensure the information collected is consistent and relevant.
- A system of keeping this information with the patient through the hand over processes should be established (i.e. a lanyard).
- St Johns Ambulance staff are unable to continue CPR while under transport, due to staff safety issues. This goes against international best practice for care of a patient with cardiac arrest due to hypothermia. These patients need continuous CPR until they reach a medical facility and should not be pronounced deceased until they are rewarmed in a hospital setting.
  Automatic CPR machines should be carried in ambulances and all rescue helicopters.
  Ongoing training and development of procedures is required to better manage an unresponsive hypothermic victim from accident site to the ECMO unit in Auckland Hospital.

Dogs and Doctors

Get them to site as soon as possible. The single dog that arrived on site performed very well and indicated the location of most of the buried victims before the transceiver search had begun.

- Dogs are a very good asset for searching accident sites quickly and one of the few options if the buried victims are not wearing transceivers. The LandSAR Avalanche Search Dogs National Avalanche Coordinator – **Karyn Robertson (027) 406 3 604** or if not available: **Dan**

Kennedy (027) 432 0898 should be included in the Response Plan and utilised early to find available assets.

- Doctors and advanced medical personnel are needed on site as soon as possible. Not only to assist with injury management but possibly even more importantly, to help manage the critical task of triage of patients for evacuation.

Recommendations

In New Zealand, large scale avalanche rescue operations are rare and teams and search managers have limited opportunities to experience what can be a complex and high risk SAR operation. A highly effective way to prepare people for these low probability/ high consequence events is regular and realistic training.

Police/ NZSAR:

- Continue to support training and running large scale, multi-agency avalanche IMTEX and SAREX's.
- Include the medical response and evacuation of patients in future exercises including St John Ambulance and District Health Board staff.
- Develop communication and Staging Area plans for the Avalanche Response Plan.
- Develop resources to support the Site and Staging Area Management

SAR team leaders/ training co-ordinators:

- Run regular training on personal transceiver searching skills, digging, probing, visual searching, triage and patient care.
- All potential responders should familiarise themselves with the latest International Commission for Alpine Rescue (ICAR) protocols for handling avalanche/ cold injury victims. http://www.alpine-rescue.org
- Ensure large numbers of marker wands are available. Flags should be colour coded using the New Zealand standard.
- Ensure responders are equipped with a radio. Run regular training on radio use. Include 'How to use' check cards and ensure all radios are compatible with other areas, DOC and SAR channels.
- Train with RECCO handheld search device.
- All rescuers should be familiar with the Coordinated Incident Management System (CIMS) and how it applies to avalanche search.
- Ensure that teams are full equipped for an avalanche SAR including cold injury treatment, patient protection and team members prepared for unexpected situations including having to walking out or spending the night in the field.

St Johns Ambulance and Garden City Helicopters

- Carry automatic CPR machines in all responding vehicles/ aircraft
- Be familiar with the latest ICAR and St Johns protocols for handling hypothermic victims.
- Identify staff that could fill the Medical Supervisor role and work with the Police and LandSAR for planning and training opportunities.

Rescue helicopter winching victim No. 2 from site. *Photo: A.Hobman*

Findings

Site Management

Summary

The role of ASC is a difficult task and this was made harder by the lack of radios brought to site and no real communications plan for how best to use the various different models that did show up. The lack of communication made it harder to delegate roles and maintain an information flow, which in turn made it difficult to manage the site.

The initial key tasking's of visual, dog and transceiver search went very well and the high level of individual skills within the responders meant that they began successfully self-tasking for the next phases of probing, digging to extract the patients and applying first-aid. There was still some confusion over what areas had been searched and what people should do next.

In many ways the tasks were successfully completed without any supervision but decisions around evacuating patients were slow to be made and this highlighted the importance of a Medical Supervisor to oversee this critical component. The other supervisor roles (Search and Digging) may have better utilised the available people.

More training is needed for people undertaking a leadership role in the field.

- Specific training for the Avalanche Site Controller (ASC) including Search Theory and the application of CIMS should be offered on a regular basis.
- Resources such as Field note books and check lists should be developed and distributed widely. Another approach is to have these as part of a gear bag that goes to site asap and includes other Site Management resources like Flags, smoke flares, spray paint, ID vests, radios, sat phone, etc.

Evaluation notes

Evaluation component	Detail	Score	Note
Appropriate roles established	ASC, SFP supervisor, Helipad supervisor, scribe, search team supervisors. Span of control maintained.	4/5	Initial roles were setup well. As the search progressed, communication and management of resources became difficult. The ASC decided to stay at the top of the slope. A medical team supervisor was needed to triage patients and manage the evacuation by priority. A Digging team supervisor would have helped to focus resources.
Appropriate facilities established	SFP, Helipad, Medical area, etc.	4/5	Initial facilities were setup at the top of the slope. A secondary Helipad was established mid-slope, on a natural bench to the right side of the debris making patient and rescuer evacuation much easier. A SFP lower on the slope would have made resource management, tasking and re-tasking easier. Limited or no SFP recording of resources arriving and tasking.
Communication	Communications set-up and maintained: *within site/ To and from IMT/ To and from* Helicopters. Regular SIT-REPS	3/5	Coms continue to be an issue within the site and to and from the Staging area and IMT. The Garden City Rescue Helo required radio silence while winching, which was difficult to maintain.
Marking and recording	Marking Flags used. Appropriate recording *-Site map* *-Photos – sent to IMT* *-Resources tracked* *-Clues processed* *-Victim details* *-Timings* *-Witness information*	3/5	Clues were marked and partially recorded but not communicated to IMT. No site map was drawn or photos taken and sent to IMT. Good timeline recording by scribe.
Appropriate resource allocation		3/5	As above. The initial roles were established and search tasking's implemented well. The digging and patient evacuation would have been more effective with some closer supervision.
Heli pad management	Sites safe and fit for purpose *-marked* *-wind wand*	4/5	Safe. Some loose items close to winching site needed better management. Better packaging of gear before loading would improve efficiency and safety.

			Mid and lower slope pads well prepared.
Patient triage and evacuation	Managing the first aid and evacuation requirements	3/5	There was a lack of clear oversite for patient triage and evacuation. Patient condition was not managed and evacuations by priority needed to be better communicated.
Overall site management	Safety maintained	3/5	As above. The SAR ran well and safely. Better management of resources would have improved the patient outcomes.

A Probe line working around clues on the upper slope. *Photo: NZ Police*

Field teams

Summary

As noted above, the field teams came with a very high level of personal skills and undertook the rescue efficiently and effectively.

All team members need to continue with regular training in:

- Transceiver searching with specific focus on deeper burials and tactics for other complex searches
- Digging including V shaped, Conveyor Belt approach.
- Probing; to pinpoint the victim and formal Probe-lines to latest ICAR recommendations.
- Patient care including hypothermic victims and the latest international guidelines.

All team members should be prepared for unexpected situations and to be self-sufficient. They should all be carrying:

- Overnight gear, including shelter, food and extra clothing,
- Communication devices,
- Medical kits,

- Equipment to 'walk out' in, including maps/compass, crampons, ice axe, rope (short), slings, carabiners etc.

All teams should be arriving at a training or real event with adequate medical equipment to attend injured parties and transport them from site, including:

- Rescue stretchers (collapsible, rigid or soft),
- Additional weather protection for the patient including Sleeping bags, blankets, mats, bivi bags, face shields etc.,
- Shelter. A tent or bothy bag,
- A comprehensive First Aid kit including cold injury treatment.

Additional training and familiarisation in the Recco search device would be good for all teams.

Marking

All teams should be carrying Avalanche site marking flags that are consistent with the New Zealand standard. These should be used at all trainings and real events.

Additional 'marking' equipment should also be carried to indicate specific areas such as Helipads, Medical, Safe Forward Point (Spray-paint or dye) and wind direction (smoke flares or wind wand/ flag)

As stated above, these items could be provided in grab bags that are stored at SAR bases, helicopter bases and or ski areas.

Communications

All teams should be carrying radios and know how to use them.

- Regular training should be undertaken in how to use the radios.
- Check cards, that travel with each radio, should be developed that detail how the use the radios and all the channels available, including other areas/district equivalent channels.
- A communication plan including identification of black spots, repeater options, cell-phone coverage, all channel names and numbers and available radio supplies should be part of the Response Plan and updated regularly.

Helicopters are a high hazard. Given the environment, landing areas and number of people they are a significant risk.

- Train heli-safety.
- Manage landing sites.
- Provide spray paint for marking landing sites
- Wind indicator- wand, smoke

Evaluation notes

Evaluation component	**Detail**	**Score**	**Notes**
Physical condition	Are individual in physical condition to safely and effectively undertake a SAR	4/5	The responders moved effectively around the site and had no issues with the search, digging or moving patients to the heli-pad.
Teamwork	How well do all the responders work together	4/5	All responders worked well together.

Search and rescue skills	Visual, transceiver, probing (pinpoint, spot, probe-line), digging, Recco	4/5	Transceiver searches were done well however there was some confusion over transceivers returning to send and if the debris had been completely searched. This was partially a fault of the Site Control and limited comms. A special mention for the Recco search, which was undertaken by a searcher with little or no experience, and successfully located the victim that was missed by the dog and had no transceiver. The Probelines' need better training on the latest techniques as per ICAR guidelines.
Appropriate equipment	Over snow travel. Overnight gear. Food. Shelter- *patient and SAR teams.* First aid *including hypothermia treatment*. Navigation- *Map, compass, etc.* Communication- *radios, SAT phone.* Marking- *flags, spray paint* Wind indicator- *wand, smoke*. Patient transport- Stretchers, ropes. Spare clothing. Recco. Heli-beacon.	4/5	The attending rescuers appeared to be well prepared and equipment to manage patient injuries, particularly equipment to limit patients cooling further like vapour-barriers, heating pads and sleeping bags were abundant. The Christchurch Alpine Rescue team had developed individual grab bags for patient care, which worked very well. Limited stretchers or shelter made it to site. Limited radios made it to site. Limited or no spray paint, wind wands or smoke flairs to mark heli-pads
Gear management	Packs, clothing and rescue equipment organised and kept with rescuers.	3/5	Personal gear was generally well organised however some small loose items were blowing around as the patient mid-slope was winched from site.
Communication		2/5	Teams were unable to communicate with others. Limited Radios onsite.

Rescuers clearing the final victim from the debris and providing CRP and Mouth to mouth resuscitation. Note the yellow dri-bag, carried by the Christchurch ACR team, with pre=packed supplies for individual patient care in an alpine setting. *Photo: A. Hobman*

Patient Management

Summary

The management of patient injuries was to a very high level and greatly helped by the extra equipment that was brought to site by the Christchurch ACR team or carried in the rescuers packs. More stretchers were needed to load and transport patients. The recording of vital patient information was good however some of the recording forms (i.e. the ICAR avalanche victim resuscitation checklist) carried have now been superseded and organisations and individuals need to ensure that they have the most up to date forms.

Dr Malin Zachau https://drmwildernessemc.wordpress.com has done some very good work in identifying the gaps in the New Zealand chain of care for hypothermic victims and highlighted the need for better training and automatic CPR machines in road ambulances and rescue helicopters.

Her website has the latest information on the care of hypothermic victims including first-aid treatment, primary care and hospital procedures. This is an area that is getting a lot of international focus through the alpine medical sector and regular updates and improvements are being published.

The need for someone in the role of Medical Supervisor was highlighted and this is an area which can greatly improve patient outcomes. The position requires people with medical, alpine and leadership skills to not only oversee the treatment of a range of injuries but also to communicate these and make decisions on priority evacuations.

A rescue helicopter paramedic could fill this role and it would be a great advantage if the designated medical helicopter could be dispatched with two medics. However further planning should be done to ensure this role is filled as early as possible.

Evaluation notes

Evaluation component	Detail	Score	Note
Engaged in role play	Responders get the most out of the training by	4/5	The level of role play was very high with rescuers engaged in the scenario and patients managed as per a real event.
Teamwork	Individuals worked well together.	3/5	Individuals worked well together in extracting and managing the patients. Site management was effective through highly skilled individuals making decisions on site and working well with others
Primary and secondary survey	Where these undertaken?	3/5	In general patient assessment undertaken and recorded and many of the victims were evacuated with the appropriate paper work.
Recording of vitals/ongoing monitoring	Was this done?	3/5	As above
Communication of patient condition		3/5	Limited patient information was reported by radio.
Appropriate management of injuries/ hypothermia		4/5	Injuries and hypothermia were well managed.
Packing, appropriate immobilization and transportation		5/5	As above. Patient packaging, thermal protection and immobilization were undertaken. A lack of stretchers on site meant that moving patients to the heli-pads was not as easy as it should have been and the models of helicopters used (other than the Rescue BK) would have struggled to load a rigid stretcher and continue the management of the patient. Further pre-planning and training is needed using secondary helicopters other than the designated rescue BK.

Appendix 1: Site details

Location	Path	Length of Path	Elevation at top of debris	Elevation at bottom of debris	Length of debris	Width of debris	Area of debris
Tarn Basin, Craigieburn Range	True right slopes of centre rocks to tarn	391m	1785m	1639m	330m	64m max	18647m² (1.8 Hectres)

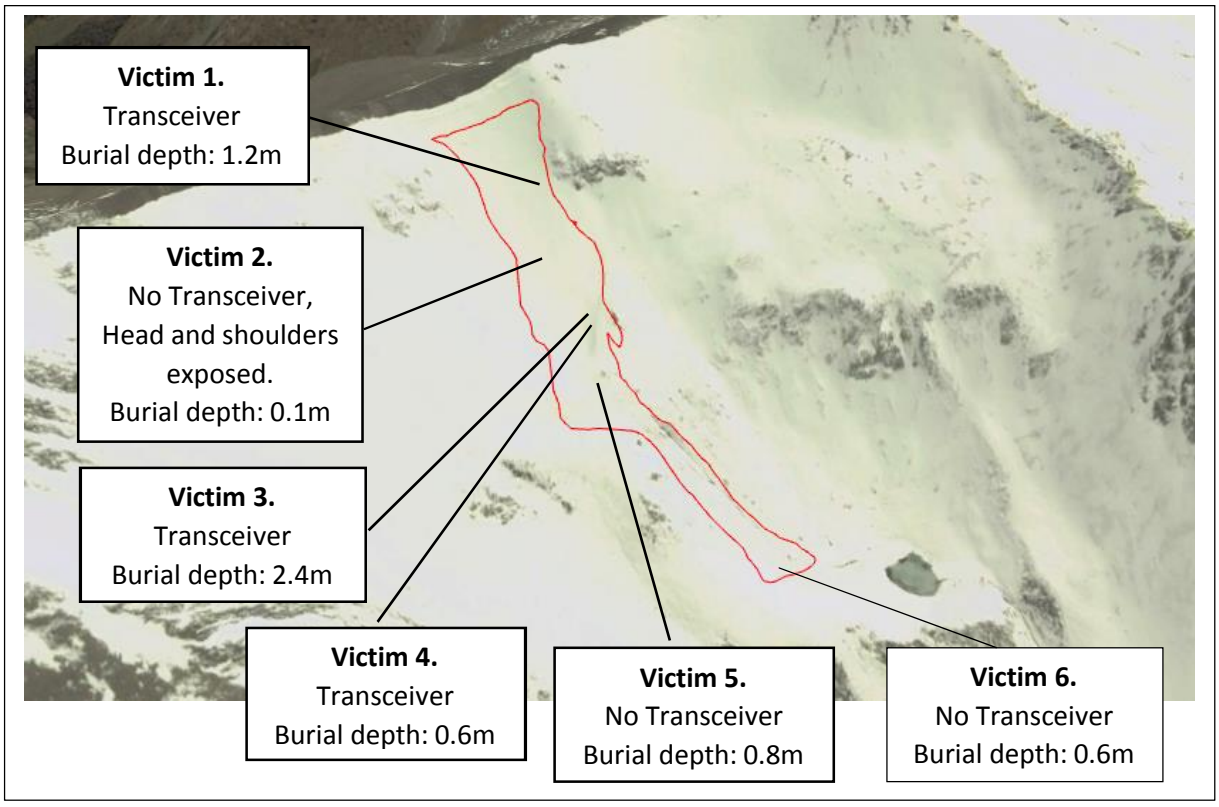


Fig 1: Position of victims in the debris (outline marked in red) and burial details.

Appendix 2: Victim recovery times

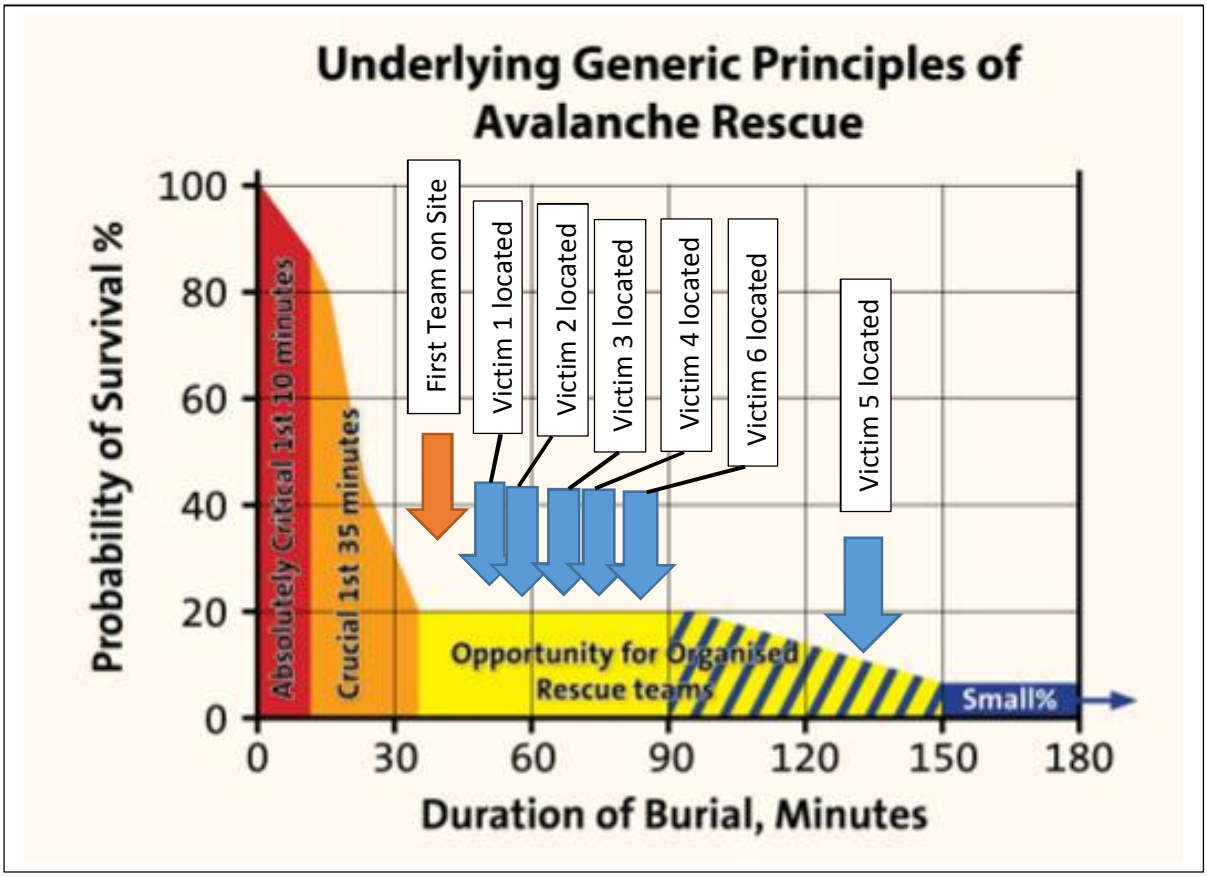


Fig 2: Location times overlaid on the Probability of Survival graph.

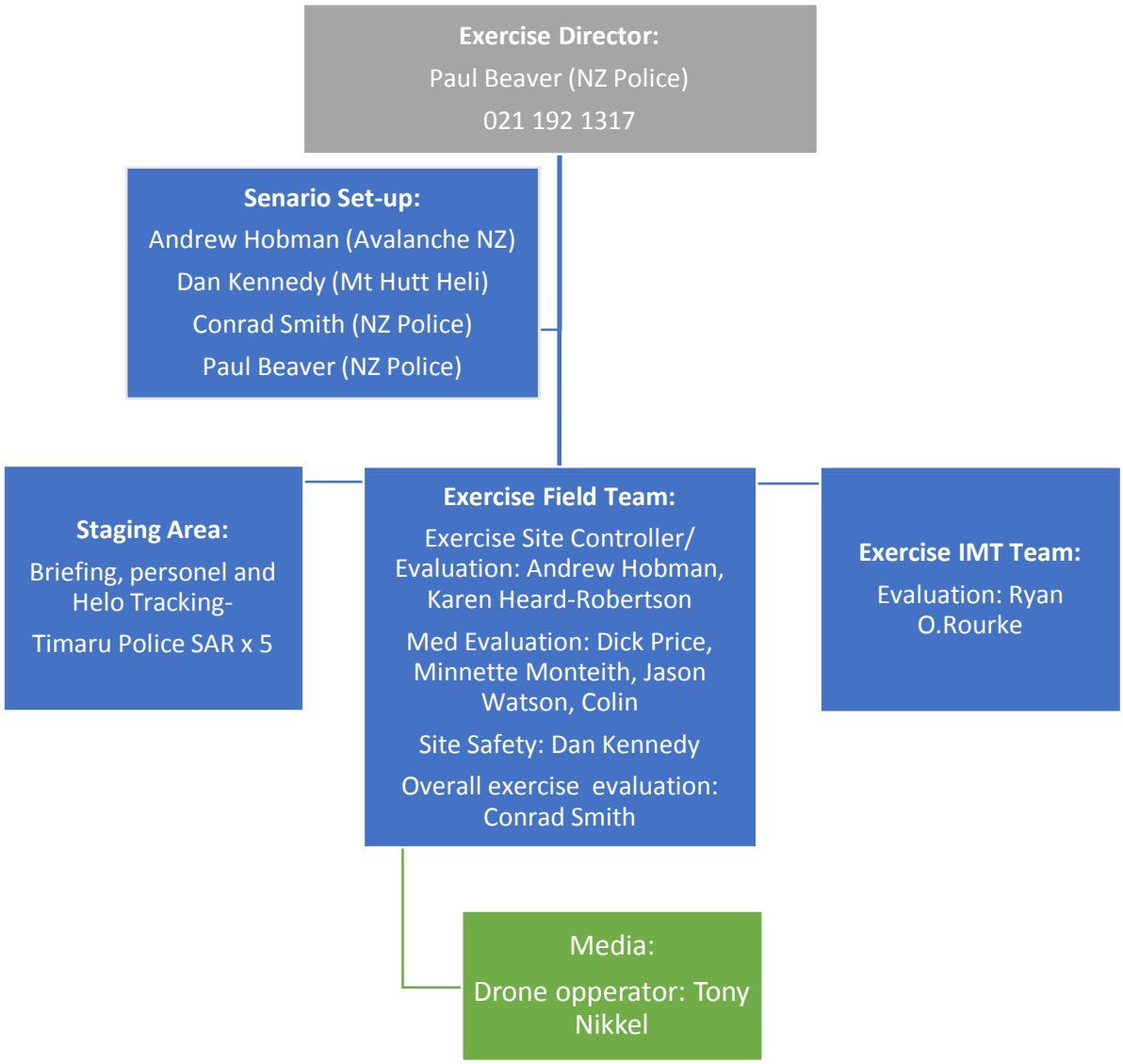
Appendix 3: Operation timeline

Canterbury SAREX 30-5-18				
Time	**Elapsed time**	**T (min) =**	**Details**	**Additional info**
10:30:00	0	0	Initial 111 call made	
10:44:00	0:14	14	Whisper call out received	
11:15:00	0:45	45	First team on site	2 Pax- ASC established
11:26:00	0:56	56	Patient 1 - located	No medic
11:28:00	0:58	58	Patient 2 - located	Dog strong indication
11:30:00	1:00	60	3rd heli load	
11:35:00	1:05	65	4th heli load	
11:37:00	1:07	67	Patient 3 - located	
11:43:00	1:13	73	Patient 4 - located	
11:50:00	1:20	80	Patient 6 - located	Dog strong indication
12:00:00	1:30	90	Patient 6 - dug out	
12:25:00	1:55	115	Patient 1 and 3 - flown out	rough handling of patients
12:35:00	2:05	125	Patient 2 - Medic winched	
12:37:00	2:07	127	Patient 5 - located	Recco
12:43:00	2:13	133	Patient 2 - Winched from site	
12:47:00	2:17	137	Patient 6 - evac from site	B3
13:05:00	2:35	155	Patient 5 - evac from site	B3. good medical management
13:23:00	2:53	173	Patient 4 - Evac from site	B3

Appendix 4: Exercise Organisational Structure

Date:	**Location:**
Saturday 30th June 2018.	Craigieburn Range
Response Lead Agency: New Zealand Police **Budget Provider:** NZ SAR Secretariat	**Exercise Planning and Coordination:** Phil Simmonds (NZ Police) Andrew Hobman (Avalanche NZ) Paul Beaver (NZ Police)

SAR Participating Agencies:
NZ Police (Canterbury, Westcoast), LandSAR (Christchurch, Aoraki, Avalanche Dogs), Department of Conservation, 7 Ski Areas, 1 guiding company, Garden City and Mt Hutt Helicopters, St Johns Ambulance, Canterbury DHB



Appendix 5: SAREX Need and purpose.

Trends and predictions:

- Sharp increase in sales of backcountry touring equipment to recreational skiers and snowboarders.
- Increase in the number of people hunting and tramping in alpine terrain in the shoulder seasons.
- Increase in irregular weather systems that deliver high volumes of precipitation and often accompanied by strong winds, creating unpredictable avalanche conditions.

Response needs:

Day/night, all weather, alpine terrain ability to provide:

- SAR response for multiple people caught and or buried in an avalanche, including vehicles and buildings.
- SAR response capability for assessing the avalanche hazard and managing the risk, using avalanche rescue equipment, working around helicopters in an alpine environment.

Asset assessment:

- Response plans developed and updated annually. Plan tested in 2012
- Response teams undertake annual training in personal search skills and working with helicopters.
- Limited experience of actual avalanche events

SAREX Need:

There is an increasing likelihood of an avalanche incident involving multiple burials due to increasing use of backcountry terrain and large weather events.

This will require experienced, well trained and well equipped responders to maximize the chance of a successfully operation and minimize risk

Purpose

Exercise Aim: To practically test and evaluate the Canterbury Avalanche Response Plan and the readiness and response of attending agencies, including the Incident Management Team, Search and Rescue teams, helicopter operators and the medical chain of care.

Objectives:

- Test and evaluate the effectiveness and accuracy of the Canterbury Avalanche Response Plan including the call out systems and process.
- Test and evaluate the readiness and response of the field teams and other resources, including management of the incident site, personal search and digging skills, appropriate equipment, appropriate patient management and safe working around helicopters.
- Test and evaluate the readiness and response of the Incident Management team, including application of CIMS, Resource tracking, logs and recording and forward planning.
- To improve coordination and effectiveness between the responding agencies including consistency of search and rescue techniques, common resources, communication methods, meeting key personnel and working with other responders.
- To document and communicate the learnings and recommendations to the New Zealand Search and Rescue sector, in a timely manner.

Appendix 6: Example evaluation sheet

Site Management	Name:
Appropriate roles established *Poor* 1 2 *Good* 3 4 *Excellent* 5 Comment	
Appropriate facilities established *Poor* 1 2 *Good* 3 4 *Excellent* 5 Comment	
Marking and recording *Poor* 1 2 *Good* 3 4 *Excellent* 5 Comment	
Appropriate resource allocation *Poor* 1 2 *Good* 3 4 *Excellent* 5 Comment	
Heli pad management *Poor* 1 2 *Good* 3 4 *Excellent* 5 Comment	
Patient triage and evacuation *Poor* 1 2 *Good* 3 4 *Excellent* 5 Comment	
Overall site management *Poor* 1 2 *Good* 3 4 *Excellent* 5 Comment	

Appendix 7: Conceptual Communications diagram