

**Total Aviation Quality Ltd**

# NZSAR Volunteer Air Observer Training Review

**17th April 2014 v.2**

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## Introduction

This Draft Report is prepared in accordance with the Contract for Services – NZSAR Observer Training Review commissioned December 2013 and the revised timetable outlined in the project update dated 10<sup>th</sup> February 2014.

It is of note that initiation of the review has been positively supported by all those who have contributed to date. Recommendations made in this report are, in the main, mutually coincident with each other in order to achieve benefits and are not intended to be considered in isolation.

## Executive summary

This report has reviewed the current provision of volunteer air observer training in New Zealand. The review has included interviews or liaison with 36 individuals representing 14 identified stakeholder organisations.

It has been of particular note that the responses from all those surveyed have been remarkably consistent across the spectrum of issues.

The review has also considered the results of an on-line survey of trained air observers conducted in early 2013. While 28% of all air observers trained to date were shown to have participated in the survey there was anecdotal comment that corporate IT limitations or restrictions precluded some volunteers from contributing to this survey on work computers. Potentially, then, the percentage of respondents might have been higher.

The review has considered the cost of providing air observer training to volunteers, and where the main cost generators are in the provision of the training. It concluded that the three main cost generators were:

1. The cost of providing the two-day initial training course at Police Training College Porirua including transport of attendees and course presenters/assessors.
2. The cost of hireage of aeroplanes for initial observer training and helicopters for advanced observer training (in some instances in the region of \$3000.00 per hour),
3. The cost of transporting course presenters to regional advanced training sessions.

In meeting the Objective of the report, *“To explore and propose viable, affordable and sustainable methods to assure the two coordinating authorities can access and task competent air observers for aerial search operations based upon operational need,”* 41 Recommendations are made. Many of the recommendations are to be considered coincident with each other.

All recommendations are made with a view to moderating the cost generators identified above and if adopted will ultimately reduce the cost of providing a well trained and competent pool of air observers in New Zealand.

The Recommendations can be broadly condensed into 3 areas that coincide with the numbered issues above:

1. Change the information presentation from classroom format to online e-learning format that candidates can achieve in their own time at their normal location.
2. Restrict the hire of aircraft for observer training to fixed wing only, making better use of close cooperation with dedicated emergency response helicopters for subsequent exposure to helicopter search experience.
3. By combining the benefits of 1 & 2, face-to-face knowledge transfer can be achieved by running regional courses for significantly smaller numbers of candidates and with a

smaller number of course presenters required to travel regionally having had most information already conveyed by e-learning.

## Consultation

- A list of stakeholders for this review was compiled with the assistance of the SAR Secretariat, RCCNZ staff members and air observer training providers.
- The list is intended to be as extensive as is practical and includes overseas SAR agencies.
  - 36 individuals representing 14 stakeholder organisations have been canvassed.
- Where face-to-face interviews have been impractical, consultation in the form of telephone interviews and email correspondence has been employed.
- Further organisations or individuals have been included along the way where they have been identified as interested parties during interviews with principal stakeholders.
- An updated consultation log identifying those organisations and individuals who have provided input to the review as of 24<sup>th</sup> February 2014, is attached to this report as Appendix 1.
- The review has identified that a number of Category 1 searches initiated by police at a regional level will utilise local (commercial) helicopter or fixed wing assets. It is not practical to consult with all commercial operators. A small representative sample of regular asset providers has been chosen.

## Assumptions and limitations

The Report is drafted with the following limitations and assumptions:

- The terms of reference confine the report to matters associated with the training of air observers.
  - The report does not consider the conduct of airborne searches during SAROPs.
  - The report confines itself to airborne observation. It does not address other airborne activities such as navigation, radio communications or other crew functions.
  - The report does not consider the training of ground-based SAR volunteers.
- While every effort has been made during consultation to ensure that all parties with a vested interest in the training of air observers has been given the opportunity to comment on the terms of reference, it has not been practical to speak with all individual volunteers.
- Where individual volunteers are represented by organisations, a key person within the organisation has been consulted and has provided input which is assumed to be representative of the views of the organisation e.g. Coastguard, LandSAR, and Police District SAR coordinators.
- The content of this report is based in input provided up to the date of completion (17<sup>th</sup> March 2014). Responses invited, but not received, at this date are not able to be considered or included.

## Glossary of terms, abbreviations and common language

Aircraft	Collective term for fixed wing aircraft and helicopter
Aeroplane	Fixed wing aircraft
AOC	Air Operator Certificate issued by the Director of Civil Aviation
AMSA	Australian Maritime Safety Agency
CTO	Commercial Transport Operations
CASARA	Civil Air Search and Rescue Association (Canada)
CAA	Civil Aviation Authority
CARs	Civil Aviation Rules
DF	Direction finding (equipment)
EPIRP	Emergency Position-Indicating Radio Beacon
HUET	Helicopter Underwater Escape Training
MCGA	(UK) Maritime Coastguard Agency
PLB	Personal Locator Beacon
406 ELT	Emergency Location Transmitter (aircraft)
RCCNZ	Rescue Coordination Centre New Zealand
SAROPs	Search and rescue operations
Sat-tracking	Proprietary aircraft on-board tracking system based on satellite technology
USCG	United States Coastguard
NVGs	Night Vision Goggles
PPE	Personal protective equipment
RPAS	Unmanned aerial vehicle or remotely piloted aerial systems

## Overview

- New Zealand search and rescue agencies regularly use rotary and fixed wing aircraft to search for lost or missing persons, vessels or objects over land and water. While this is an expensive platform for the conduct of searches, it has obvious advantages in terms of coverage and speed. Assuming the search area is appropriate, the relative effectiveness of air search is largely influenced by how the aircraft is flown and the skill of the air observer(s) conducting the search.
- Historically, NZ Police funded formal air observer training in New Zealand. This was supplemented by funding from Maritime NZ (RCCNZ) and, previously, CAA (NRCC). The Police SAR budget had progressively reduced over the years.
- For the last three years NZSAR has funded air observer training events. For the most part, the training has been organised and delivered by RCCNZ (RCCNZ footing cost of providing of personnel), and Police have provided most of the students and met some in-kind costs.
- The review of the 2005 ZK-HTF search recommended (w.) that:
  - *‘only trained observers in aircraft should be used in aerial searches –*
  - *When circumstances arise when only untrained observers are available, then a training/briefing session should be conducted by a suitably qualified SAR management team member prior to their deployment’.*

- More recently, the Air Ambulance / Air Rescue Standard (V2 2013) - applicable to all contracted EMS aircraft states '*All Air Observers should complete an Air Observers training course recognised by New Zealand Police and RCCNZ.*'
- A survey of past training recipients was conducted in early 2013. The survey was in two parts, namely:
  - To gain a better understanding of the capability and availability of the current pool of trained air observers, and
  - To seek input on the current and future content of air observer training in New Zealand
- The survey broadly indicated that while the standard of the training was of good quality, many of the people trained rarely (if ever) have had the opportunity to utilise their air observer skills.
- Of 587 volunteers who have attended the initial training course, 168 responses to the survey were received. The results of the survey have been considered in the compiling of this Report.
- There may be several factors affecting the survey response numbers, including (as mentioned above) corporate IT restrictions precluding on-line access from work computers or lack of awareness of the survey.

## Objective

- To explore and propose viable, affordable and sustainable methods to assure the two coordinating authorities can access and task competent air observers for aerial search operations based upon operational need.

## Legislation

### Civil Aviation

- For the avoidance of confusion, a search (or search and rescue) flight is conducted under Civil Aviation Rule (CAR) Part 119/135 and is deemed to be a 'Commercial Transport Operation'<sup>1</sup> where passengers on board the aircraft who are not a flight-crew members<sup>2</sup> are considered to be "*performing, or undergoing training to perform, a task or duty on the operation*".
- Accordingly, the aircraft operator is required to hold an Air Operator Certificate issued under Part 119/135. The clarification of this Rule interpretation by the Director of Civil Aviation during 2009<sup>3</sup> led to some necessary changes in the use-of-aircraft arrangements by some SAR agencies.
- Of further relevance to this review is **CAR Part 135.13 Passenger training**<sup>4</sup>

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<sup>1</sup> Civil Aviation Rule Part 1 Definitions

<sup>2</sup> Civil Aviation Rule Part 1 Definitions

<sup>3</sup> [http://www.caa.govt.nz/Legal\\_Information/Legal\\_Info\\_home.htm](http://www.caa.govt.nz/Legal_Information/Legal_Info_home.htm)

<sup>4</sup> Civil Aviation Rule Part 135 – Air Operations-Helicopters and small aeroplanes

- *In addition to the requirements in 91.211, each person performing a commercial transport operation shall ensure that each passenger receives additional briefing or training in safety and emergency procedures appropriate to the characteristics of the flight operation.*
- This requirement does not infer the operator is necessarily responsible for conducting the additional briefings and training, but rather that it is the operator's responsibility to ensure this has been carried out.

## Health & Safety

- Health and safety legislation is outside the scope of this Review. However the Health & Safety in Employment Act 1992 in so far as it refers to volunteers<sup>5</sup> may deserve some consideration outside of this report (Refer **Recommendations**).

## Scope

- From the interviews conducted, the project scope as determined in the contract has been deemed to be appropriate.
- The scope details have been disseminated to parties prior to consultation to allow respondents to consider their input in advance.
  - The original scoping document (MOSR4-9 2<sup>nd</sup> December 2103) is attached to this report as Appendix 2
  - This report condenses the review into a number of individual issues drawn from the scoping document that were agreed by the consulted parties to have relevance.

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<sup>5</sup> Health and Safety in Employment Act 1992 sect.3C, 3D, 3E

## Issues

### The volunteer air observer:

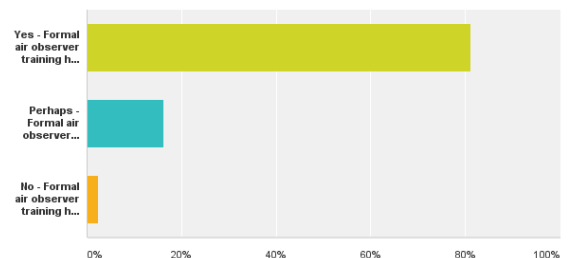
- 587 volunteer air observers have availed themselves of the air observer training course.
- No record appears to be kept on how many of these volunteers have or have not subsequently participated in searches.

### The case for air observer training:

- It was the unanimous opinion of all participants that formal air observer training is crucial in acquiring the requisite knowledge and skills to be an effective air observer.
- This position is consistent with overseas SAR agencies (AMSA, USCG, CASARA and MCGA UK) all which have formal and robust training syllabi and competencies for training air observers for SAROPs.
- 81% of respondents to the question in the 2013 survey “Did the skills/knowledge you obtained during formal air observer training make any practical difference to your capacity to locate targets from the air?” answered *Yes - Formal air observer training has directly and positively contributed to my ability to locate targets.*

Q11 Did the skills/knowledge you obtained during formal air observer training make any practical difference to your capacity to locate targets from the air?

Answered: 160 Skipped: 8



### What attributes are required of a competent air observer?

- Opinions on the answer to this question were consistent across the respondents.
- Air observers must be physically able. (Members need to rely on each other’s abilities in an accident or ditching), not prone to motion-sickness, claustrophobia, or distractions.
- A competent observer has proven eyesight (corrected or uncorrected), have demonstrated concentration over long periods and must in no way be a danger to him/herself, an impediment to the search or burden to other team members if left off the aircraft at remote locations.
- In order to be called upon regularly, an observer needs to be available at short notice and be situated in close proximity to where the SAR air assets are based.
- Criticism was voiced over the lack of selection of the above attributes when accepting volunteer observers at training.
- The review also uncovered criticism of the apparent lack of a robust ‘wash-out’ policy for volunteers who had demonstrated their unsuitability for ongoing use as air observers.
- Comment was made on the attendance at searches of some volunteers who had undertaken the training but did not (in the eye of the commenter) have the desired attributes for an air observer role. But nevertheless “took up a seat”



- While the attributes of a competent observer do not relate directly to the cost of training, filtering out aspiring volunteers who do not meet the desired criteria, before training commences, will assist in containing numbers and therefore the cost of training.

### **The ‘volunteer air observer pool’ model in New Zealand**

- Respondents were unanimous that the current pool of air observers who have attended the formal training and are/would be required to attend advanced or refresher training to maintain skills is far too great (currently 587).
- There is some frustration evident from the on-line survey that many observers having volunteered their time and availability for the initial training have never been used. Suggested reasons for this were:
  - In some districts volunteers are too numerous, too scattered, are of varying ability and varying availability.
  - It is also possible that in some districts a SAROP with the need for volunteer air observers has just not occurred in recent years (see ‘SAROP environment today’)
  - The local coordinating authority defaults to regular known or preferred assets (“closed shop/old boys club”).
- The cost of maintaining the skills and competencies of a large pool of seldom-used observers in today’s SAROPs environment is considered to be impractical and unsustainable.
- The consensus was that the availability pool for trained air observers must consist of smaller, more able (and available) cells of volunteers within each Police District or Area. These ‘cells’ by necessity must be situated close to the air assets most likely to be used (See **Recommendations**).

### **Could search results be enhanced by aligning observer experience and skills sets?**

- E.g. should observers with maritime skills be used for maritime searches, alpine observers be drawn from volunteers with alpine experience, observers for searches involving tramping/hiking targets be experienced trampers.
- While there are obvious benefits to this line of thinking, respondents felt that:
  - The logistics brought about by isolating different skills sets would be restrictive,
  - There currently is not repository for keeping and updating information on individual skill sets,
  - The benefits of the experience bases should be recognised and applied where it is practical to do so.
  - Responsibility for identifying skill sets and apportioning them appropriately to searches, where it is practical to do so, should lie at a District SAR coordinator level.
    - SAR Coordinators should be maintaining a core team of volunteers ensuring that the volunteer’s skills and experience are commensurate with the likely nature of searches within a particular district (inland, alpine, coastal, offshore etc.).

## **The SAROP Environment today**

### **Changing technology (non search):**

- The nature of many SAROPs in recent years has changed with advances in technology.
- While the ZK-HTF search during 2005 remains a defining event, advancement in the use of technology such as PLBs, EPIRBs, sat tracking, personal beacons products such as SPOT, portable GPS ownership, smart-phone capability (GPS, longer battery life and remote accessing), 406 ELTs, NVGs etc. means that extended searches requiring large resources are a less frequent event.
- On very many occasions, a call-out is initiated because of a phone call (from the target) or receipt of a distress beacon. An emergency response helicopter equipped with GPS and direction-finding capability is launched and homes-in on a beacon signal or coordinates. A localised search of a small area may be necessary, but more commonly these days, targets are located relatively quickly and recovery effected within a short time.
- This may not always be the scenario, but the case for maintaining a large pool of air observers who will regularly be used for extended searches may no longer be justifiable.

### **Structured, equipped and dedicated air search and rescue helicopters:**

- It is evident that the first line of response to a distress call more commonly now is the immediate launch of a dedicated emergency response helicopter.
- These are able to be dispatched within minutes and respond with appropriate equipment (DF, radar, winch, night-vision, NVG, experienced pilots/ crewmen and medical capability).
- With the advent of the technology discussed in the paragraph above, it is often the case that that this asset responds to and recovers a distress situation before an extended search capability is required.
- For the above reasons Police stated that when initiating a Category 1 search, they are more likely nowadays to utilise the dedicated emergency response asset in the first instance.

### **Air observer training of pilots:**

- It was acknowledged that it is just as important that pilots have formal training in the disciplines of SAROPs as it is for the observers in order to optimise an air search.
- SAROPs pilot qualifications or training is not currently assessed.
- There are some aspects of the air observer training in the current curriculum that pilots will not need training in or will have received elsewhere.
- However, search directors and on-scene coordinators must have confidence that search pilots being used are trained and competent in the use of emerging technology e.g. Track-map, GPS capability, file up/downloading etc., and are competent in search planning, search patterns, line-spacing's and responding to observer requirements.

### **Air observer training of dedicated helicopter crew/paramedics:**

- As discussed above, it is more common in today's SAROPs response that one of the country's dedicated emergency response helicopters will be dispatched for both Category 1 and Category 2 searches.
- This helicopter is dispatched with its permanent full time crew on board. The crew is expected to perform the air observer function if required.
- The review found that many crewmen had attended at least the 2 day initial course. There were three items of relevance to come out of the review:
  1. Crewman attending the full 2 day course found themselves sitting through several subjects with which they were already intimately familiar e.g. Safety around aircraft, CRM, human performance
    - a. While many of them considered themselves to be experienced searchers, they acknowledged that knowledge and techniques imparted during other subjects of the course greatly enhanced their observing skills.
  2. A number of operators reported that they had their entire crew attend the air observer training, but over time, crews move on and now the same operators cannot say all crew have attended training.
    - a. As such, where crew are performing an air observer role, the organisation is not compliant with sect. 3.3 **Air Observer** of the NZ Air ambulance / Air search and rescue standard v2.0 2013 to which they are accredited.
  3. On the occasion that the target is not located easily, extended search times will lead to the need to supplement the original responding crew with fresh observers, drawn either from within the organisation's other crewmembers or with outside volunteer assets.
- In today's SAROPs environment, all dedicated emergency response helicopter crews should have achieved a consistent trained air observer status.

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## Course delivery

**Is the current air observer training syllabus/program geared to deliver the right skills sets?**

- There was general consensus that the current training syllabus was appropriate. However if the method of delivery was enhanced, that creates an opportunity to improve training opportunities (See **Recommendations**)

**Why are Police trained with this skill? If it is important to them for their members – why don't they pay for it and organise it?**

- Funding for volunteer air observer training is provided via the SAR Council. A definitive reason for NZSAR funding of police attendance at volunteer air observer courses was not evident. However, the following comments fielded during interviews suggest the logic of the current structure:
- In today's SAROPs environment, police volunteers (alongside LandSAR) are second probably only to the dedicated air rescue helicopter crews in being available and regularly used to respond to a SAROP at short notice.
- Police are charged with the protection of life and property under a national framework and like the dedicated air rescue crews are available 24 hrs a day.
- They are equipped with many of the desired life-skills and attributes required of air observers. They are a natural fit for the role.
- They respond to SAROPs, sometimes in a volunteer capacity for NZ LSAR, and sometimes in a police capacity in addition to their normal duties.
- Regional SAR coordinators often utilise a small cohesive team of police volunteers and LandSAR volunteers for SAROPs response.
- Police attend volunteer air observer training along with other agencies such as LandSAR and Coastguard to meet the NZSAR Council's goal of providing capable SAR People.
- In the case of a search or recovery involving fatality, the police presence becomes a statutory one.

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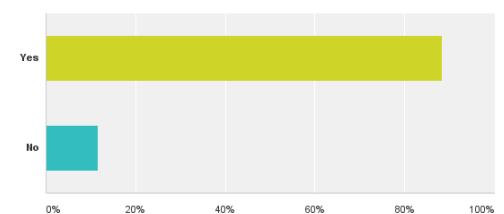
## Training format

### Use of aircraft for air observer training:

- The consensus of the review was that putting trainees into an aircraft to practice the skills imparted during the class time was invaluable.
  - In some instances this revealed a tendency to motion-sickness in the candidate and they withdrew from the training at this point.
- Interviews, discussions and the on-line survey results indicated an acknowledgement that fixed wing was an adequate platform for the initial training.
- There was a desire that helicopters were retained as the training platform for the one day advance training.
  - This was attributed to the likelihood that a helicopter would be the platform used during a real search (with some exceptions)
  - The on-line survey revealed that there was an acceptance that fixed wing was a suitable platform for the purpose of training (88%).
  - The course presenters who assess the onboard observation component of the air observer training on the initial course made the pertinent point that they are not assessing how expert a person is at searching from the aircraft – they are assessing that the person is capable of applying the skills and disciplines that were presented to them the day before.
  - The presenters position was that this is adequately assessed using a fixed wing aircraft.
  - Further reference to the use of aircraft is found in the **Recommendations** section.

Q16 Is the Fixed Wing Aircraft suitable as an observation platform for the initial course?

Answered: 163 Skipped: 5



### Classroom format for initial and advanced ground instruction:

- This subject was the one that came in for most discussion. The following sentiments were universally agreed as being valid and are presented in no specific order:
- The current course presenters were very well qualified to present the subject material.
- The content of the course as it is currently presented was agreed as being appropriate.
- There needs to be a greater use of multi-media presentation format and the use of modern technology e.g. use of real-life SAROPs footage from “Go Pro” cameras and use of actual SAROPs debriefs as study material (where permissible).
  - There was a stated desire for more recent experience to form part of the courses e.g. use of local SAR guest presenters at regional courses to present on local SAROPs experiences and lessons learnt.
- Many organisations experienced financial and resourcing impediments to getting staff to the centralised initial training. Less so for regional training courses.

### **The case for adopting computer based learning for on-line study:**

- There was an overwhelming acknowledgement that use of modern computer-based technology for course (or pre-course/post course) learning was available, desirable and logical.
- The cost of developing such a model has not been assessed in the review.
  - However, once developed, the saving in expenditure for the course funders and attendees alike would be quantifiable.
- If an on-line method of course study was developed this would allow for a much broader range of material to be presented without the (2 day/1 day) time constraints associated with the current model e.g. more CRM/Assertiveness, basic leadership, risk assessment.
- This was described during interviews as being able to add material that was 'good to know' to supplement the present 'need to know' syllabus.
  - For example a module could be developed using visual imagery and animation depicting the use of the variety of seat belt configurations, headsets, door opening/closing mechanisms, location of emergency and fuel / electrical isolation switches that could be encountered across a range of aircraft types and not just the one the volunteer gained seat-time in.
- This capability is already demonstrated by the MAROPS project using computer generation of the Becker 406 DF control head for familiarisation, available on the NZSAR website.
- Individual study modules could be developed for specific topics, skills and equipment. This would permit volunteers, crewmen and pilots to select topics for which they will have to had completed and passed to achieve 'air observer status' without wasting time on subjects already familiar to them. For example:
  - Pilots would be required to complete on-line modules such as:
    - Use of equipment – GPS, track-map, DF tracking, file upload/download, beacon technology,
    - Search planning, flying search patterns, line spacing,
  - But would receive 'credits' for other modules such as:
    - Aircraft familiarisation and safety, airborne communications, map reading.
- The same could be applied to air crewmen, police, and other specialists.
- On-line study modules could be divided into pre-course modules, post course study modules and refresher topics.
  - This may present the opportunity for considerable cost savings on one or more of the current courses expenditures:
    - The length of face to face courses,
    - The location of face to face courses,
    - The frequency of face to face courses.
    - The number of facilitators at face to face courses.

### **The case for virtual / synthetic spotter training simulation:**

- Unquestionably, a major cost in the training of air observers is the hire of aircraft so that trainees can experience the airborne perspective and apply the search techniques as imparted to them on the ground.
- ‘Seat time’ in the aircraft per volunteer at the initial and advanced courses is necessarily constrained by cost – so the objective is to ensure they have an understanding of the techniques described to them and can demonstrate their application.
  - It does not train skilled air observers – only extended time on searches will achieve this.
- Technology in use today is capable of presenting very realistic visual images in different formats meeting different needs.
  - Indeed, NZ Police exclusively use virtual imagery to train firearm safety and tactics.
- If use was made of this technology to supplement ‘seat time’ in aircraft a multitude of scenarios could be created, exponentially increasing the number of spotting experiences that volunteers could access at any time.
- Differences in scale, light, water and terrain conditions and shadows could be simulated. A vast range of targets could be created and the difficulty in identifying them varied infinitely.
- Air observers spotting skills could be maintained at hardly any further cost.

### **The case for regional training course platforms:**

- Assuming the adoption of on-line computer based training modules and possibly also virtual/synthetic spotter training simulation, there was a strong feeling that the total cost of presenting training courses could be significantly reduced.
- If there remained a need or desire for regular face-to-face knowledge transfer, regional (as compared to centralised) training courses were the preferred option for the following reasons:
  - Anticipated fewer number of facilitators required to travel and present (possibly just one or two)
  - Less logistical (rostering/travel/ time off-site) issues for the attending organisations
  - Opportunity to identify several (e.g. one North Island/one South island) venues with the required facilities such as:
    - Training facilities
    - On-site availability of suitable aircraft
    - Accommodation on-site or close by.
  - Frequency (and therefore cost) of regional meetings would be dictated by the uptake and effectiveness of technology option.
- Interviews and the on-line survey revealed a desire for more local content in the course material – regional courses could make use of regional (local) SAR specialists to present on local SAROPs experiences and lessons learnt.
  - The costs involved in using local specialists at regional meetings would not add significantly to the cost of regional courses.

## Training delivery

### Who is responsible for training air observers?

- The predominant answer was “whoever has the requisite subject knowledge and experience.”
- There was a general satisfaction with the status-quo. Although the present total reliance on the experience of the current presenters was recognised as a weakness.
- Comment was made that the material currently being presented (especially the spotter training) needs to be harnessed so as to be available into the future.
  - To some degree, it was felt this could be achieved with the creation of on-line modules as well as input to a virtual/synthetic simulation.

### Could a national pool of trained trainers deliver the requisite skills to recipients ‘on the spot’ as required?

- The answer to this question as a national SAR policy was generally a ‘No’.
  - Consistency of skills and competencies would be compromised.
- However, it cannot be ignored that there may be a rare scenario where the availability of trained observers is exhausted (such as the HTF example).
- In this situation, as is seen in the CAA legislation, the aircraft operator has a legal responsibility to “*ensure that each passenger receives additional briefing or training in safety and emergency procedures appropriate to the characteristics of the flight operation.*”
- If such a scenario were to occur, the expectation is that the emergency response helicopter crew or other airborne SAR asset would arrange for untrained observers to be placed onboard aircraft alongside trained observers with dialogue in techniques occurring ‘on-the-job.’

### Remotely piloted aerial systems (UAV or RPAS):

- While there is anecdotal evidence of informal use or experimentation with RPAS’s in the search/observer role in certain areas, the regulatory framework into which these systems will fit in the NZ aviation environment is still being worked on.
- Undoubtedly, the advancement of technology in this field is exponential, but, at this time, no evidence was found of any formal implementation of this technology into air observation roles.



## International SAR agency training comparisons

### United States Coastguard (USCG)

- The office of Search & Rescue USCG report that all training for Coast Guard SAR observers is conducted at a central location.
- Candidates are required to demonstrate to an evaluator a level of skills, knowledge and judgement **prior to entry onto the program.**
- Air SAR pilots, crew and observers must complete the training.
- Course delivery is classroom format and there is no shortage of aircraft available for spotter training.
  - Trainees do 10 hours seat time in an aircraft before being signed-off.
  - There is a 'competent/not yet competent' component to the process.
- There are elements within the USCG syllabus that are not covered in the NZ syllabus e.g:
  - Record keeping, post mission briefing/reporting
  - Understanding the use of a risk assessment matrix
- No use of computer based or on-line modules technology to supplement tradition classroom style learning is used.

### Civil Air Search and Rescue Association (CASARA)

- Canadian SAR air observers get classroom style training (supplemented with ppt. and video)
  - Use has been made of a proprietary (Microsoft Flight Simulator 10) computer simulation to provide virtual spotter training. This product is now obsolete.
- CASARA are field-trialling a contractor-designed spotter simulator using multiple screens.
- Indications are that this product is 'box-packaged' with its own computer and screens suggesting it is transportable.

### Maritime & Coastguard Agency (UK)

- UKSAR report that all air observation roles for air SAROPs are undertaken by full time crews from the RAF and Royal Navy. No volunteer air observers are used.
- There is an element of volunteers for land-based SAR and maritime (e.g. Royal National Lifeboat Institution).
- There are volunteer organisations which offer an additional air search capability which in the past have been used by some police agencies, but not by the National SAR agency.
  - However their use is currently under review by the UK Civil Aviation Authority and UKSAR advise these are no longer utilised.

## Australian Maritime Safety Association (AMSA)

- AMSA's current training format is reportedly similar to ours with instructors imparting knowledge in class room format and travelling to regional locations to do so.
- Air observers are drawn from State Emergency Services (SES) personnel which suggests a pre-course level of aptitude, knowledge and judgement.
- In deference to Australian workplace health and safety laws an element of 'wet-drill' training is required, completed in swimming pools donning life jackets and entering life-rafts.
- AMSA also hire commercially available aircraft for the 'seat time' spotter training.
- They are hoping in the near future to develop some pre-course study material in an on-line format (subject to staffing). Topics put forward for on-line training are:
  - Induction, roles & responsibilities, effective team membership,
  - Preparation for SAROPs, PPE, briefings, safety around aircraft, aircraft loading,
  - Searching, how to, saccading, sighting, maintaining sightings,
  - Post op de-briefing,
  - Survival at sea
- AMSA have, to date, not considered the use of virtual/synthetic spotter training simulation to supplement or reduce aircraft flight time.
  - But on mention of this during our correspondence their interest was aroused and they were keen to learn more about this line of thinking.
- It is possible there is potential for NZSAR to lead, or cooperate in, the development of the use of this technology given the interest shown by AMSA and CASARA.

[Intentionally Blank]

## Recommendations

- The objective of this Report is to explore and propose viable, affordable and sustainable methods to assure the two coordinating authorities can access and task competent air observers for aerial search operations based upon operational need.
- Many of the recommendations from this Report are intended to be considered concurrently and not in isolation.
- Recommendations should be read against information provided in relevant paragraphs earlier in this document
- Drawing from the input of respondents and interviewees, the following recommendations are made:

### **Administration of SAR volunteers training and activities (to be read in conjunction with all other recommendations):**

1. If the recommendations that follow were to be accepted, the current model of administration and funding should be retained while the recommended changes are implemented.
  - a. If the recommended changes are accepted the anticipated savings in resources and funding should be considerable.
2. NZSAR is retained as the logical administrator of the training.
3. RCCNZ should retain a smaller but pivotal role in facilitating the training.
4. Helicopter operators should assume responsibility for the management and record-keeping (induction, training, ongoing competency) of the helicopter pilots, crews and paramedics as 1<sup>st</sup> Tier air observers
5. Police District SAR Coordinators should assume responsibility for the management and record-keeping (selection, induction, on-going competency) of the 2<sup>nd</sup> Tier District-based volunteer air observer teams.

### **National availability pool of air SAR observers:**

6. Formal air observer training should be retained with oversight at a national level.
7. Overall number of volunteer SAR air observers should be severely rationalised in accordance with the following associated recommendations:
8. The future structure of the national air observer pool should recognise that the most common 1<sup>st</sup> response to a Category 1 or Category 2 search, in today's SAR environment, is the dispatch of the nearest fully equipped emergency response helicopter with trained crew with a recovery capability.
9. The first tier of national air SAR observers should be recognised as the dedicated helicopter crews (full time crewman and paramedics).

10. The national SAR air observer structure should require that all crewmen on emergency response helicopters are trained to a national air observer syllabus (as is currently a requirement under their own Standards).
11. All pilots of emergency response helicopters must have attained recognised training to qualify as SAR pilots.
12. For crewmen and pilots, a modular system of course presentation (see Recommendation 21) should allow recognition of some subject matter knowledge already attained by allowing credits on those course modules.
13. The second tier of trained SAR observers should be recognised as being small teams of able, experienced and well trained volunteers who have been shown to have the requisite personal and life attributes and skills to be effective air observers.
14. Formation of these teams aligns with current Police Districts with individual District SAR coordinators responsible for the recruitment, formation, training and management of these teams. Coordinators would also be responsible for 'washing-out' anyone not meeting or maintaining the requisite standard.
15. Numerical size and desirable skill sets of the volunteer teams for each District will be determined by the size and geographical nature of each region at the recommendation of the relevant District SAR Coordinator (i.e. no 'one size fits all').
16. Criteria for selection should not be organisationally-based (e.g. Coastguard, Surf Life Saving, Coastal Air Patrol, LandSAR etc.), but rather based on individual merit and suitability for the Districts likely geographical SAR scenarios.
  - a. For example: A District may identify a need to have land-based SAR skills as well as maritime or Coastal SAR skills. In this instance, volunteer team members who have the relevant skills base(s) will be selected.
17. Second tier teams should have a close and active association with the nearest air SAR asset (1<sup>st</sup> Tier) to maximise personal and operational familiarity, operating synergies, training opportunities and communications.
18. The second tier teams should have the ability to move across District boundaries bringing known experience and current competencies to support neighbouring teams on the occasion that a search becomes extended. This should be considered before utilising untrained volunteers.
19. Permanent relocation of trained observers out of a District into another District should be recorded within the Air Observer training structure so that skilled observers are not 'lost' if they are moved or transferred.
20. The national SAR framework should have a small overarching centralised control and management capability to coordinate the facilitation of training, manage the development of the changes recommended in this report, centralise records, maintain and monitor a database of active and available volunteer assets, their currency and changing locations. This role should be tasked with ensuring the national pool of air observers is maintained as efficiently as possible.

### **Aircraft emergency egress training (refer: Legislation, Health and Safety):**

21. All crew members and volunteers who are available for searches involving flight over-water should complete a basic course in aircraft emergency egress training and sea survival.
  - a. Subject to further consultation this training should, at the very least, mirror the Australian AMSA syllabus of swimming-pool based life jacket / life raft “wet-drills” and sea survival training to a consistent syllabus.
  - b. Formal helicopter underwater escape training (HUET) should be considered more appropriate for anyone performing air observer duties in a helicopter over water.
  - c. No person should be permitted to act as an air observer on board an aircraft over water unless the agreed level of emergency egress training has been completed and maintained at an appropriate frequency.

### **Use of aircraft:**

22. Initial air observer training flight time for evaluation of observation techniques should use fixed wing aircraft for the reasons outlined in the corresponding paragraph earlier in this report.
  - a. The use of helicopters as an observer training platform is considered desirable, but not essential.
  - b. Considerable cost savings could be made if the use of helicopters for initial training purposes was dropped.
  - c. The need for an advanced training component with helicopter flight time may be considered, subject to budget, at a regional level.
  - d. If the “air observer availability pool” recommendation is adopted, the smaller teams of more active volunteers should expect more frequent use and soon be familiar with operations on and around, and observation from, helicopters on a local level.
23. Recommended closer liaison with the nearest emergency rescue helicopter asset by 2<sup>nd</sup> Tier volunteer teams, if properly managed, should be designed to generate more training opportunities on a local basis around the helicopter asset they are likely to be called to work with, without extra cost to the training funder.

### **Classroom format / Course structure:**

Assuming other recommendations are accepted, the structure of the air observer training course delivery should be significantly changed to provide cost savings, enhanced subject presentation, broader range of relevant topics (“Need to know” as well as “good to know”), and reduced logistical demands on both RCCNZ as course presenters and attendee organisations in rostering time away for training.

24. The course structure should be changed to reflect the administrative and logistical advantages of using computer-based on-line training (e-learning).
25. Current course material should be divided into topics or learning modules.
  - a. Each module then can be developed with the contributions of subject-matter-experts.
  - b. Individual modules should be developed to cover most of the learning material currently imparted in the classroom style learning.
  - c. Further information could be incorporated with the introduction of more recent / relevant local SAROPs material and better use of multi-media presentation.

26. NZSAR should call for expressions of interest from suitably qualified organisations to discuss this potential and for prospective organisations to present their capabilities in respect of:
  - a. The development of e-learning modules including on-line tests to demonstrate an acceptable level of competency.
  - b. Administration and management of the e-learning 'package' including updating course material and administration of individual's records and currency.
  - c. At this point the potential savings in costs over a period of time could be quantified
  
27. The opportunity to coordinate the development of SAR air observer e-learning modules with AMSA to affect cost savings and a common standard should be considered.
  - a. The potential may also exist for the material to be copyright and have a commercial value to other SAR agencies.
  
28. The course modules should be available to be completed "on-line" by candidates in their own time.
  - a. To achieve air observer accreditation, candidates should be required to complete relevant modules in their own time, but within a defined period (e.g. all applicable modules within 6 months for initial training).
  - b. Further cost savings can be achieved by the recognition of participation in actual SAROPs as qualifying for re-validation without further training i.e. only those who have not participated in actual SAROPs in the previous year require refresher training.

#### **Virtual / synthetic observer training simulation:**

29. In association with the current course subject experts, NZSAR should consider the potential for the use of virtual / synthetic training simulation for developing and enhancing observation skills without the cost of additional aircraft flight time.
  
30. Expressions of interest (or use of existing relationships such as MAROPS) should be called to explore the potential for supplementing fixed-wing flight time for initial observer training with computerised simulation.
  - a. While cost savings may be possible, the likely benefit of the use of simulation is more likely to be a vastly expanded portfolio of observer/spotting/target acquisition scenarios that candidates could have access to.
  
31. Additional use of training simulation should be harnessed for instruction on a wide variety of search scenarios such as was observed as already being under development by MAROPS.

#### **Course delivery:**

Again, assuming the consideration of many of these recommendations as being co-incident, the method of delivery the initial and advance training will change.

32. Development of on-line e-learning modules should take place with the input of current course presenters and subject matter experts.
  
33. Modules should be developed to include as much material as is considered important without the constraint of having to fit it into a two day class room session.

34. The current 2 day initial training course at Porirua and the costs associated with putting that course on for volunteers should be eliminated.
  - a. The imparting of knowledge by 5 of the 6 instructors can be achieved by candidates availing themselves of the e-learning modules from the home base in their own time and over a defined period at no cost beyond that of establishing and maintaining the module content.
  - b. The role of the subject matter experts should then become one of maintaining and updating best available information presented in the e-learning modules drawn from local and international sources.
35. Regional presentation of the initial observer training flight-time component of the training (using fixed wing aircraft) should be achievable at the cost of just one or maybe two course instructors travelling to regional locations.
36. Consideration should be given to identifying several regional locations where the availability of an on-field training facility and (ideally) 2- 3 small high-wing aircraft such as C172's are resident or can be easily positioned.
  - a. Assuming the use of experienced helicopter emergency response crewmen and a small core of suitable volunteer candidates, the cost of presenting initial courses and associated fixed wing flight time should show considerable savings in cost.
37. Regional courses presented by a smaller number of instructors should make more use of updated instructional material including local SAROPs case studies and the use of local SAROPs personnel to present to the candidates on local experiences and lessons learnt.
38. Advanced and refresher training, if not achieved through more regular engagement in SAROPs, should be able to be achieved through the use of additional e-learning modules.
39. Maintenance of search/observer skills will ideally be maintained through more frequent flight time on SAROPs by the smaller numbers in the trained observer pool. However, the development and consistent access to virtual /synthetic observer simulation would greatly enhance the effectiveness of the observers.
  - a. Of note is the CASARA field trial of virtual spotter simulation with a box-packaged simulator kit with stand-alone computer and several projector screens, suggesting this is a portable device.
  - b. Such a portable device could be utilised by the experienced instructors at regional courses.

#### **Remotely piloted aerial systems:**

40. It is recommended that NZSAR and RCCNZ exercise caution when considering the informal or experimental use of RPAS's for searches, as difficulties exist with the separation of these vehicles from manned aircraft.
  - a. 'Informal use' suggests the use of these vehicles without the knowledge or consent of the regulator or other airspace users.
41. NZSAR & RCCNZ should keep an open dialogue with regulator (CAA) on the use of RPAS's.

## **In summary**

Ultimately, substantial, but as yet un-quantified, savings could be achieved by changing the course structure from that of separate formalised Initial and Advanced training courses to:

- a. Pre-qualification self-learning via on-line modules.
  - i. Accomplishment of 'credits' or 'passes' of required module topics by individuals being monitored by a small centralised coordinating office.
- b. Face-to-face training will be conducted at a regional level, ideally at pre-determined locations (Nth. Island and Sth. Island) with appropriate facilities.
  - i. Regional courses will:
    - build on the on-line knowledge uptake,
    - be at a frequency of "as required"
    - fulfil the multiple functions of initial training, training of replacement volunteers, refresher training and introduce local content (SAROPs, experiences, lessons)
    - Provide an introduction to fixed wing observation platforms.
- c. The equivalent of the current 'Advanced training' is expected to be accomplished via closer cooperation between the smaller more active volunteer SAR 'cells' and the Tier 1 dedicated SAR helicopter asset at a local level, promoting:
  - Closer cooperation and familiarity between crews/volunteers
  - Greater opportunities for combined ground-based training e.g. helicopter familiarisation, safety around aircraft, cabin husbandry, use of equipment, down-the-wire winch training, wet-drills, emergency equipment/procedures etc.
  - 'Ride-along' opportunities for volunteers during routine helicopter training flights.
  - Participation in SAROPs and debriefs

This report anticipates very little in the way of extra costs to NZSAR for the accomplishment and enhancement of advanced training.



**John Fogden**

17<sup>th</sup> March 2014



## Appendix 1

Consultation Log Air Observer Training (18/02/14)			
Organisation	Contact	Status	Comment
NZSAR	Duncan Ferner	i/view 15/01/14	
	Phil Burgess	" "	
Maritime NZ	Nigel Clifford	" "	
RCCNZ	Paul Craven	i/view 18/12/13	
	Rodney Bracefield	" "	
	John Dickson	i/view 14/02/14	
Course presenters	Graham Bell	i/view 5/02/14	
	John Bowman	i/view 14/01/14	
	Ross St. George		
AMSA (Australia)	David Ingram	Email correspond	
USCG (United States)	Cdr.Mark Turner	" "	
CASARA (Canada)	Rob McKenzie	" "	
UK MCGA (UK)	Rebecca Binstead	" "	
LandSAR	Peter Corbett	" "	
NZ Coastguard	Peter Healey	i/view 5/02/14	
MAROPS	Andrew Howes	i/view 3/02/14	
Tai Poutini Polytech			To be contacted
NZ Police HQ	Bruce Johnston	i/view 31/01/14	
	Scott Magill	" "	
Maritime Police	Martin Paget	Email correspondence	
Police Airwing	Colin Ware	i/view 4/02/14	
Police (Regional SAR)			
Wanaka	Aaron Nicholson	Email correspond	
Auckland	Dene Duthie	i/view 4/02/14	
Northland	Cliff Metcalfe	Email correspondence	
Dunedin	Brian Benn	Email correspondence	
Taupo	Barry Shepherd	i/view 5/02/14	
Central Districts	Bill Nicholson	i/view 11/02/14	
Waikato	Dave Pitchford	Email correspondence	
Invercargill	Ian Martin	Email correspondence	
NZDF	Cam Brownlee	Email correspond	
<b>Air Operators Dedicated</b>			
Northland (NEST)	Peter Turnbull	i/view 2/02/14	
Auckland (ARHT)	Herby Barnes	i/view 3/02/14	
Central (Philips)	Ref: Barry Shepherd	i/view 5/02/14	
Philips (Fixed wing)	Warren MacKay		To be contacted
Wellington (LFT)	Dave Greenberg	i/view 31/01/14	
Christchurch (GCH)	Simon Duncan	i/view (phone) 24/02/14	
Dunedin (Heli Otago)	Graeme Gale	Email correspondence	Waiting feedback
Lakes District (SLH)	Lloyd Matheson	i/view 4/02/14	
East Coast (HBHRT)	Charlie Beetham		
Taranaki (TRHT)	Mike Pamer	i/view 11/02/14	
<b>Air Operators Non - dedicated</b>			
Amalgamated Helis	Jason Deidrich	Email correspondence	Waiting feedback
Aspiring Helis	Charlie Ewing	No response to email	
Helipro	Shamus Howard		To be contacted

## Appendix 2

MOSR4-9

29 November 2013

### AIR OBSERVERS REVIEW

#### Objective

To explore and propose viable, affordable and sustainable methods to assure the two coordinating authorities can access and task competent air observers for aerial search operations based upon operational need.

#### Issues and questions

The reviewer will need to traverse and consider a broad range of issues. In no specific order, the following questions / issues need to be addressed plus directly related matters that arise in the course of the review:

- The need/case for air observer training requires clarification. What is our operational experience? Who actually does air search? How successful are they?
- Could air search results be enhanced by aligning air observer personal experience and skills sets with the nature of the search (e.g. maritime experience for overwater/vessel searches; alpine experience for alpine searches and outdoors/tramping experience for these types of searches?)
- International experience / comparison re aerial search skills should be explored.
- Based upon proven operational need, where are air observers required, how many of them, to what skill level - why?
- What are the key skills sets required of air observers?
- Do people need training at all - why not just experienced air crew?
- Should any attention be given to how searching aircraft are flown (in order to optimise air search)?
  - What specific skills are required of the pilots?
  - Are these currently being assessed?
- What is a competent air observer? The relevant skills/ competencies need to be articulated (can this be tiered?).
- Is the current air observer training syllabus / program geared to deliver the right skills sets?
- What does the most efficient 'air observer availability pool' model for New Zealand look like?
- Who is responsible for training them? Police/RCCNZ/air asset providers - why? What alternates are there?
- The NZSAR Council is not a training body and substantial funding of air observer training on a permanent basis does not align well with the Councils purpose.
- Why are Police trained with this skill? If it is important to them for their members – why don't they organise it and pay for it?

- Recent developments with the creation of a ring fenced TEC fund for SAR training may afford new opportunities.
- Training delivery:
  - Review the current flight component of observer training (fixed wing and helicopter) and propose the most cost effective method of achieving the desired outcomes from this component.
  - How are the requirements of the air rescue standard met and validated for the EMS assets?
  - Is the current training platform (i.e. regional courses) the most efficient method of delivery?
    - Is there a case for 'on-line' training for some topics/up skilling, re-currency?
    - Who would deliver and manage the 'on-line' component of the training?
  - Could potential savings of 'on-line' delivery of some aspects of the training be quantified?
  - Do trained people need continuation training? Why?
    - Could continuation training be achieved 'on-line'?
  - What other technology could be harnessed to manage the costs associated with training delivery (e.g. webinar, intranet)
  - Can we just have a national pool of trained trainers who deliver on the spot course as required?
  - Would this meet stakeholders expectations?
  - What is the ideal content of the training syllabus/ program?
  - Who can deliver it?
    - Can training be outsourced? To whom?
  - Can TEC SAR ACE funding via TPP be utilised?
- Consider current and future air observer requirements in the light of developing unmanned aerial systems) technology and contribution that this technology will make to the shape of future air observer requirements.

A written report with actionable recommendations is expected. The recommendations may include alternates and/or be scaled.

### **Administration**

The reviewer will need access to cross sections of relevant SAR people. The NZSAR Secretariat can assist by providing contact details and with meeting facilities.

Duncan Ferner  
 Secretariat Manager  
 New Zealand Search and Rescue