

The SARINZ *'Heads Up'*

HeadsUp – The training newsletter for the search and rescue community



Heads Up Activities & Events

September 2007

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The future of SAR perhaps..... The high-tech hunt for a missing adventurer

Did Jules Verne, back in 1870, ever envisage that the Nautilus in *Twenty Thousand Leagues Under The Sea* would evolve from a piece of highly imaginative science fiction writing into the technological marvel that is a modern day nuclear submarine? Or would the Wright brothers ever have imagined space flight whilst preparing for their first controlled take-off in a heavier than air flying machine at Kitty Hawk, North Carolina 104 years ago.....?

With those thoughts in mind read the underlying article about the search for Steve Fossett and consider what the future holds for search and rescue.

Sep 20th 2007

From *The Economist* print edition



AS *The Economist* went to press, Steve Fossett, a famed and fearless aviator who went missing over the Nevada desert on September 3rd, had not been found. But it was not for want of trying. Mr Fossett has been the subject of one of the most intensive civilian manhunts in history—and also, fittingly, one of the most technological. Besides

the usual panoply of search-and-rescue aircraft deployed by America's Civil Air Patrol, which wound down its search on September 17th, a different sort of search effort is being conducted online, using satellite photographs.

These pictures of the search area are being provided by two firms that supply information to Google Earth: GeoEye and DigitalGlobe. The search itself is being coordinated by a corner of the Amazon empire called [Mechanical Turk](#). This is an online job market which farms out tasks that humans are good at, but for which software is poorly equipped, like labeling images and transcribing speech. For the Fossett hunt, volunteers comb through the images and flag any that include what might be a plane or its wreckage.

Among those who keep track of slightly less high-profile missing-person cases, the story will be strikingly familiar. In January Jim Gray, one of Microsoft's programming gurus, disappeared while sailing near San Francisco Bay. Mr. Gray was as big a celebrity among computer geeks as Mr. Fossett is among thrill-seekers, and the story played out in the same way. A friend at Amazon, Werner Vogels, got in touch with DigitalGlobe, and the firm provided thousands of images. Within four days, Mechanical Turk was hosting the images and more than 10,000 volunteers were sifting through them—though to no avail, as Mr. Gray was never found.

Mechanical Turk's director, Peter Cohen, says that now the search protocol has been established, conducting such "distributed" searches is much easier. The limiting factor is the satellite imagery—which obviously has to be up-to-date. At the moment, only three commercial satellites provide the kind of resolution that can help in efforts like the Fossett hunt. The firms that own them have governments as their main customers. This makes search-and-rescue imaging a secondary concern.

That looks set to change, though. DigitalGlobe launched its second satellite, *WorldView-1*, on September 18th, and will launch a third late next year. GeoEye will launch its second next spring. This machine should set a new record for commercial satellite resolution: just 41cm (though that will still not be quite good enough to spot people as well as planes). In total, these launches will double the amount of satellite time that can be dedicated to requests for instant pictures.

Cost, however, is less of a problem. Areas such as the Nevada desert and San Francisco Bay are not strategic, so taking photographs of them does not displace paying customers—indeed, DigitalGlobe is not charging for the pictures being used in the Fossett hunt. With the extra capacity provided by the new satellites, the cost will drop even further. And Mr Cohen is convinced that the internet will always come up with the few thousand volunteers needed to scour the resulting images.

Far from being the invasion of privacy it was recently claimed to be, the technology behind Google Earth may in time grow to be a standard search-and-rescue tool.

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The SHEWEE – an article by Nick Coyne

Oedipus and Freud come to mind when spying this handy little device. And little it is from the male perspective – and best kept sheltered from the public view until it is really needed. Relegated to a pocket or a hand bag would seem more appropriate than tucked behind a fly.

The SHEWEE allows a female to leave behind apparent male sign. That's the classic two footsteps together with the wet spot – for some a metre forward – and well aimed. In other words this device allows females to pee standing up.

There is even instructions on the packet, obviously written by a human (or was that animal) behaviourist on how to confuse the most ardent observer of the habits that differentiate the sexes. "Aim urine at a suitable place – away from the feet, etc.". The instructions do fail to mention a number of crucials. "Away from the feet" is so basic. How about how high , on what and how to get the best advantage from the wind; but then that must reflect the experience level of the writer

Yes, the SHEWEE appears to be a device designed by women to be used by women for the sake of convenience and avoid a chill when toileting. The Japanese apparently are regular users in the urban scene when caught short while commuting in a crowd. Connected via a tube to a pocket bound plastic bag and you have a hand warmer as well. And there we have another expression of the inventiveness of the female mind . Taking what some would call a shortage and turning it into something better than what nature has endowed males.

So for those females who are interested "in going when you just have to go" they are available for a small fee; this one was supplied by Kevin McGuiness Bivouac Wellington.

As for those of us who are interested in tracking these developments and not wanting to confuse the fairer sex with the other, well it will just come down to employing some base instinct

What base instinctual senses are they?
Well that's for another time and place.



Nick Coyne explaining the Shewee at a Wellington Clue Processing Workshop

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A Kaimanawa Mystery – an article by Roger Bates

They say that search is like a classic mystery and like all mysteries some do not resolve themselves quickly and consequently consume many resources, time and public funds.

Such was the case in November 2006 in the Kaimanawa Ranges when a search commenced for a missing hunter.

Fortunately it had a happy ending as the missing subject walked out after 5 days but it was a little disappointing not to find any clues which would have assisted in getting a quicker result.

There are not many searches these days that go beyond 1 to 2 days in the Central Plateau region of the North Island. But when they do it is beneficial to analyse afterwards why we did not get a quicker result and whether we could have done it better.

It was a simple scenario whereby a hunter left his two companions on a Thursday morning to hunt a small bush/scrub covered valley and return the same day just carrying the bare essentials for a day's hunting. He did not return that night and early in the afternoon on the Friday the Police were alerted and a search got underway.

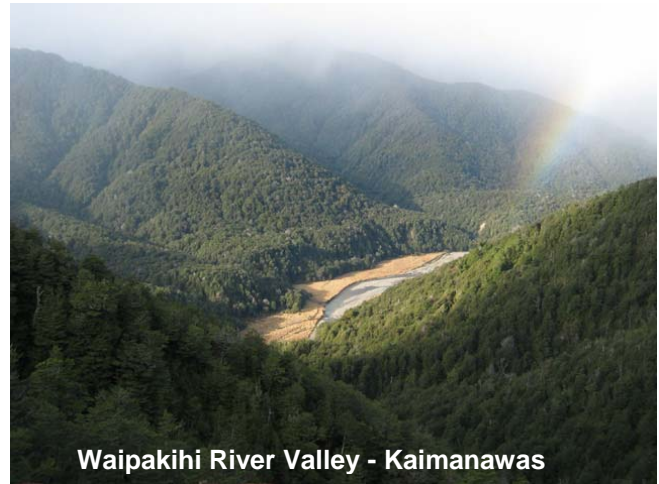
An air scenting dog and TCA teams were inserted into the last known point that night and were able to locate a toilet stop and follow footprints above a small stream for approximately 300metres where the tracks appeared to stop and turn around – these tracks then petered out and were lost.

The following day (Saturday) search teams (TCA) with the aid of 2 dogs searched the catchment using the ridges as the boundary. Other teams were deployed beyond this area and containment was put in place at obvious locations. Due to the number of searchers being deployed and the duration of the search the RNZAF was called in to assist with helicopter transportation.

With 3 full days of searching which included aerial coverage and a kayak search of the main river no more clues were found and the management team was assessing its next step when the missing hunter arrived at the Police Station after being picked up by a passing motorist.

From information gained from the hunter we were able to determine that on the Thursday he had gone up the stream a short distance and probably because the valley steepened had turned around and gone back down in order to approach the catchment from a less steep angle. This he did and travelled up a ridge to the top of the range which bounded the catchment and crossed over into a different watershed chasing a deer to the west. In the afternoon he was 1.7 km away from his camp site when the batteries in a GPS he was carrying failed.

At this stage he was not sure of the direction back to camp and spent Thursday night without shelter.



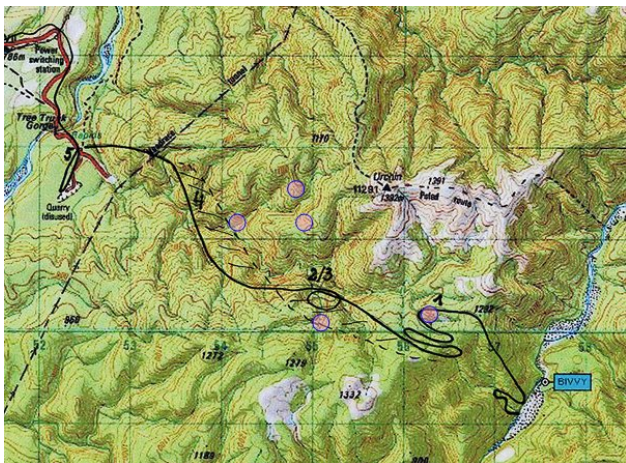
Waipakihi River Valley - Kaimanawas

He discovered the following morning that he had lost his compass and the weather was not good with low cloud and passing showers. In the afternoon he fired off three shots and kept the spent shells but it appeared these were not heard by his companions. He spent three days in this upper catchment not moving very far each day and not moving in any one set direction but on the fourth day, he walked out to a track which led him to a road end which he then followed out to State Highway 1 on the Monday.

The following information was obtained from the various subsequent interviews.

- He got wet on the Friday
- He was always in the bush, described as rough and thick.
- He encountered a river and a stream
- He moved to different locations each night not following any specific direction or features.
- He had a fire each night and the smoke drifted down the stream and under the bush.

- He thought he had spent some time in the open on the Sunday and saw a helicopter above him.
- He saw and heard a helicopter each day.
- He never saw the sun and stated it rained every day.
- He tried eating ferns which made him sick.
- He said he heard voices and thought he heard whistles.
- He carried water and 3 to 4 muesli bars.
- He had one unspent cartridge in his day pack when he came out.
- He said he saw a snow covered mountain and headed in that direction when he thought he was lost.



Search area and possible route taken by missing hunter

Lost Person Behaviour data for hunters

It is useful to consider the actions of the hunter when compared with the prescribed lost person behaviour for a hunter which are:-

- Many hunters will fire shots if they think searchers are looking for them and will respond to shots if practical.
- They often try shortcuts
- Many will go to great lengths to walk out
- An experienced hunter may attempt to build a fire and shelter for protection at night and then walk out at day break. Estimates say one in three will find their own way out.
- In the excitement of pursuing game, they are often led into rough areas with little regard for exhaustion or navigation.

Refer to 'The Textbook for Managing Land Search Operations' or the SARINZ Initial Response Search Guide (IRSG) for further information.

Plausible Scenarios

It is interesting to note that the management team was influenced when considering the various scenarios by the hunter's companions who suggested the hunter had most likely had an accident within a kilometre of the camp and that he would not travel outside the catchment. Similarly on a separate missing hunter search a companion was insistent that the missing subject would not travel far due to ill health and he was located up to 5 kilometres away from his point last seen. On a third operation an overdue hunter travelled out of the hunting area, swam across a major river (losing a dog in the process) and arrived at a road end approximately 10 kilometres away within a day.

Final Comments

Points which may have contributed to the search being prolonged are:-

- It was understood that the hunter had never visited the area before and was not familiar with the type of forest and the geography of the area.
- The clothing worn was dark.
- No artificial clues were left other than toilet paper and two muesli bar wrappers.
- It was thought the hunter may have been sleeping and therefore unresponsive on the Saturday as it was sunny and he stated he never saw the sun.
- He did not appear to answer the calls or whistles when he thought he heard them.
- It is estimated that the searchers may have been within 500 metres of his location at one stage.
- A helicopter had been flying over his location on several occasions and no smoke or disturbance was seen.
- He could have fired off the remaining one round of ammunition to attract attention.
- The distance from the camp to State highway 1 was approx 12 kilometres of which 6 was along the road.
- When in the vicinity of the stream his hearing would have been impeded.

This incident highlights the value of referring to the Lost Person Behaviour data when determining the various scenarios.

This case history may assist other SAR managers in assessing the possibilities for similar situations and highlight to hunters the consequences of not staying in one location or failing to attract attention to their location given reasonable visibility.

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Illuminating study on torches for SAR – an article by Eddie Halson

Having been involved with SAR in Queenstown and been on exercises and “live” call outs at night, I decided to look into suitable torches that would assist in TCA, Tracking and Light Sweeps and Light Lines.

I researched various sites off the internet, obtained or purchased a few samples and in very quick time had a number of options to “study”.

Firstly, I determined the general need for all searchers needing illumination through the hours of darkness. Generally we need a light which allows its light to last as long as possible on one set of batteries and a “bomb-proof” bulb. Next was a torch for TCA and tracking. I decided to look at various types available, fixed or variable power output, battery longevity and a flood rather than spot focus. Next is the use of Incandescent or LED white light for both uses.



I had long been a proponent of “Maglite” torches and these have long been the torch of choice of the Police (illumination and self defence). As a general rule we Search and Rescue volunteers don’t require the “self defence” aspect but definitely the illumination

ability of the Maglites. I had several options, Mini-Maglite (2 x AA), C-Cell Maglite (2 X C-cells), D-Cell Maglite (2 x D and 4 x D-cell). These were long the industry standard and obviously highly regarded by professionals. My son was given a 2 D-Cell Maglite with LED bulb so this was assessed also.

I had obtained a couple of Surefire torches due to their size and power through friends from America. These were a huge step up in performance over the Maglite models. Both of these utilise CR123 lithium batteries (usually expensive in New Zealand!) and they came with incandescent bulbs but I obtained LED heads also from Surefire via a friend

Also included in the assessment were Streamlight “Twin Task” 2 x Cr123 model and 3 x C-Cell models.

I looked at various offerings on the local market, LED-lenser, Eveready etc.

Then came the research aspect. Onto the internet and look at what else is out there. Several websites have assessment pages for a variety of torches and these were useful in researching further.

I ordered a variety of offerings based on stated ability, output and battery life.

From here on it was down to their performance.

I decided on various categories of usefulness.

Size

Using each one on a light-line or a light-sweep would mean getting Occupational Overuse Syndrome (RSI in the old days) pretty quickly with some of the bigger models.

Battery longevity

A torch that lasts 20 minutes to an hour of continuous use means hefting a few spares around for night operations. When added to everything else that packs weight goes up and up plus the added cost. Rechargeable batteries are available for all types tested. Beware which recharge-able you buy as some have very low milliamp ratings and drain quickly, generally the more milliamp rating the more expensive. Also, beware buying CR123a batteries locally as they retail around \$12-15 dollars. Our local SAR group will have them available for sale as a fundraiser for about \$3.50 each. Please contact me for further details at the address below.

Bulb life

I hate it when I need a torch and switch it on to find it either is blown or blows just after you put it on. Incandescent bulbs tend to be more fragile to bumps and knocks.

Light quality. This is where it got interesting. The LED light apparently is not white but very pale blue that appears white. Light emitting diodes are stated as lasting anywhere from 50000 hours to 100000 hours burn time.

Incandescent light thrown is yellow and Xenon and Halogen whiten up the yellow spectrum. Xenon, Argon, Halogen and normal incandescent use a filament coil and this filament puts a bias of intensity into the light thrown. The filament lights have lives anywhere from 22 hours burn time upwards but none match the LED continuous burn time.

Cost

There are some expensive options out there! One I looked at cost US\$599! This Wise-LED torch was incredibly powerful and versatile but large and too expensive. Some of the cheaper options had little output and cheaper build quality. The Surefire, Blackhawk and similar options from the US are comparatively expensive but build quality and performance are excellent. Some of the Chinese built models ranged in price considerably depending on where you bought them. Some of the same torches varied from US\$25 to \$95 depending on supplier. Beware!!

Construction

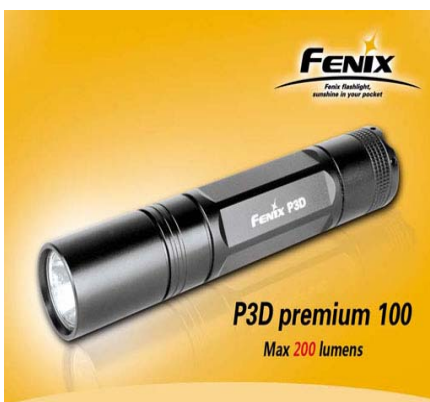
As you will be aware, plastic, aluminium and steel are the main types on offer. Some of the high impact plastics are great but the most versatile seemed to be aluminium as far as availability and price. Generally all were moderately waterproof and used o'rings for tight sealing.

Availability

All torches tested were either delivered quickly via international courier or national courier. The cost of freight was often minimal and sometimes absorbed by the supplier.

This was a limited test based on the criteria above and personal use without dollops of science and time. I am sure everyone has another favourite and I would love to hear your recommendations also.

My recommendation to our local group and the torch we have purchased for our group TCA kits (and some of our volunteers have purchased also) is the **Fenix P3D Rebel edition**.



This torch is 100mm long, 20mm in diameter and has six modes of operation. Battery life on the lowest setting is stated at 64 hours (12 lumens) up to 1.6 hours (200 lumens).

Ross Gordon also enthused that in strobe mode it would be amazing in a light line/ light sweep. The only detractor is the colours on offer are either black or anodised grey. I solved this by super-gluing reflective tape onto the clean surfaces. This has worked well. The size is perfect for all our tasks and use of these units on a night exercise for TCA and Tracking proved their worth. I highly recommend them. Anyone interested is welcome to contact me for further details and information at the following email address. ehalson@xtra.co.nz

Hamilton YSAR Camp – navigation exercise and radio hi-jinks – an article by Barry Were

Camp 10 started much the same as the previous camps with the exception that everyone was out of bed and pretty much ready to go by 8.00am. Early starts on weekends do not rank high on the favourites list for teenagers.



The six teams of two had been planning their route for two weeks. They knew that the planned traverse of the Kaimai Range had the potential

to turn into an epic with the added risk of another night in the bush if their navigation was not correct. The van departed at 8.30 am for the Tauranga side of the range at the end of Ngamuwahine Road. At the same time a support team from Hamilton SAR Group departed for the high point at Te Weraiti trig to put up the repeater.

Unfortunately, when the repeater was fired up we immediately heard another station using the channel on what seemed to be an exercise. The other repeater channel was tried but that was in use as well. When we called their base we were advised that it was the Auckland SAR Group on an exercise. They had a “No-duff” situation and wanted exclusive use of both channels. Clearly this was not going to work as we had no alternative means of contacting the YSAR

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teams so it was eventually agreed that we could share one of the two channels.

For the next three hours the radio communication between base and the YSAR teams was limited to the following:

- A single radio check with each team to ensure they were all on the channel
- A call to team 2 to contact team 4 on repeater reverse as they had not changed to the alternate repeater channel

You have to love the sharpness of teenagers – to them the switching of a radio to repeater talk-around is as easy as sending a txt message. Within seconds we had team 4 back on the channel. How did we know that team 2 was the closest to team 4? And how were we able to reduce the radio traffic so much and still track the teams?

The live tracking device attached to each F50 radio sends the location data every 10 minutes. This is displayed on a TUMONZ map of the area which is projected onto a wall. At all times we can see where the teams are and how well they are progressing – provided they are in range of the repeater.

Like all the YSAR navigation exercises most of the day was to be spent off track trying to find the easiest route through the bush and supplejack. The hardest part of the first leg was 2km of flat bush with no significant landmarks. Sticking absolutely to their calculated compass bearings was essential until they hit the DOC North-South track. Despite the supplejack all the teams reached the North-South Track by 1pm. They then headed south on the track for 1.5km then bush-bashed the last leg to the trig. The first team arrived at 4.30pm and the last team an hour after dark at 7pm.

Once we got everyone back to base the mood was excellent. They were all delighted with their performance although the truth was not revealed until the debrief started at 9pm. The GPS track for each team was then projected onto the wall and that team had to then justify the decisions they had made during the day. This is a brilliant opportunity for them to learn from their mistakes while the events are still fresh in their minds. (The GPS carried by each team is sealed in a plastic bag with the screen covered – they can only use it in an emergency)

Sunday was devoted to Tracking and Search Methods practise. The Search Methods training involved the on-going search for Robbie Roberts who went missing

a few years ago. Each team of 3 was given a GPS and the coordinates of Robby's LKP and told that it was a race to get there. Despite a wide variety of route choices all the teams arrived at the LKP (about 1km into the bush) within 30 minutes of each other. We were somewhat surprised to find that since last time we were in the area a massive windfall of two huge trees has completely flattened the LKP. An hour of purposeful wandering covered a chunk of new ground with no new finds.

Another full and challenging weekend for a great group of teenagers – our future SAR members and managers. Our thanks to Tony Wells for his assistance on the weekend and for offering to tag along with one of the teams on the navigation exercise. We had to bend one of our key rules about YSAR members doing these navigation exercises with a minimum of adult intervention. This means absolutely no shadow parties. The team really enjoyed your company Tony.

Also thanks to Andy Yorke from Waitomo SAR, plus John Twizell and Ralph Goudswaard from the Hamilton SAR Group.

The next intake of new YSAR members in the 14-18 year age range will happen in February 2008.

Live Tracking – the current system has been in use for 18 months and is critical for the safety of the YSAR teams. We have plans to improve on this and are currently working on a system that will provide updates from each team at two second intervals. As funds become available we will extend the scale of our testing which at present is limited to one team.
