

# New Zealand Search and Rescue Consultative Committee Meeting

**Minutes of Meeting  
NZSAR Consultative Committee  
Tuesday 21 April 2015  
Ministry of Transport  
Level 6, SAS Tower  
89 The Terrace, Wellington**

## **Attendees:**

Carl van der Meulen – NZSAR (chair)	Richard Davies – DOC
Susan O’Neill – DIA	Allan Mundy – SLSNZ
Stu Rooney – NZFS	Mike Hill – RCCNZ
Jo Holden – Police	Duncan Ferner – NZSAR
Geoff Logan – Police	Alan Lloyd – AMSA
Jeff Sayer – AREC	Steve Kern – CAA
Rex Hendry – LandSAR	James Lamb – MOC
Harry Maher – LandSAR	Paul Craven – RCCNZ
Lloyd Matheson – Aviation NZ	Alison Goffin – NASO
Mike Ambrose – LandSAR	Carolyn McKenzie – RCCNZ
Patrick Holmes – Coastguard	Nic Drew-Crawshaw – RCCNZ
Mike Daisley – MSC	Rodney Bracefield – RCCNZ
Terry Blumhardt – LandSAR	Rachel Roberts – NZSAR
Matt Claridge – WSNZ	

## **1. Welcome**

Carl opened the meeting and welcomed the attendees, with particular welcomes directed to:

- Stu Rooney, New Zealand Fire Service
- Matt Claridge, on Water Safety New Zealand’s first meeting as the newest member of the Consultative Committee
- Susan O’Neill from the Department of Internal Affairs to speak to the Fire Services review
- Alan Lloyd from the Australian Maritime Safety Authority as an observer

## **2. Apologies**

David Waters – Ambulance NZ  
Simon Trotter – Antarctica NZ

Roger Pringle – NZDF  
Brendon Comerford – MOC

## **3. Minutes of previous meeting**

The minutes from the last meeting were accepted as a true and accurate record.

#### 4. Matters Arising from Minutes

Item	Action	Responsibility	Update
4. Notes from joint Consultative Committee and Council Workshop, held 21 August 2014	Refine the notes to create linkages with the Risk Register  Agencies should refer to the workshop notes when carrying out their own strategic level planning	Secretariat  All	Ongoing, and to be removed from further minutes as an action item
8. CAA	CAA to be asked to extend the feedback period for the consultation document on the emergency location of aircraft	CAA	Completed
9. Risk – SAR Funding	Council to be informed of the Committee's concerns around the extent of thought leadership for SAR funding	Secretariat	Completed
11. General Business – NATSAR 2014	Distribute a copy of the NATSAR Manual	Secretariat	Completed
11. General Business – UAS	Coastguard representative to attend UAS workshop and provide feedback to the Committee	Coastguard	This workshop was cancelled
11. NZSAR Awards	Agencies to provide nominations for NZSAR Awards	All	Completed

#### 5. SLA Monitoring Report: 1 January – 31 March 2015 Quarter

Reporting requirements for the SLA have been met by all partners, with 1,503 volunteers involved in SAROPS, and 10,626 volunteer hours recorded for the quarter. Additionally, 2,282 Coastguard volunteers responded to 914 non-SAR related calls for assistance during the quarter.

##### ***Issues and Updates:***

##### LandSAR:

- During the quarter LandSAR has focussed on:
  - Bedding in the Safety Management System which was deployed organisation-wide in December 2014.
  - Initiating the trial of the new Competencies Framework assessment system, to be trialled May to August and planned for wider deployment in late-2015.

##### Coastguard:

- Coastguard is preparing for their annual MayDay appeal.
- Changes to international VHF channel allocations will affect Coastguard, as they will need to migrate services to alternate channels.

## AREC:

- No issues or updates to report.

## SLSNZ:

- Work is continuing on the two new communications networks, to enable them to be ready for the 2015/16 season.
- SLSNZ has signed an MoU with MNZ to clarify invoicing arrangements for support provided to Category II SAROPs.

## **6. Sector Update**

There was no further discussion on the sector update report, which was distributed prior to the meeting.

## **7. Fire Services Review**

Susan O'Neill from the Department of Internal Affairs spoke to the DIA led "Response to the Independent Fire Review Panel & Other Matters". This response will be in the form of a discussion document, which is still to be released.

Considering the independent fire review (known as the Swain Report) and discussions to date, three core problems have been identified that the discussion document aims to address:

1. Changing expectations e.g. the mandate by which the Fire Service operates
2. Lack of coordination & leadership e.g. very few systems & data collection to provide national rural overview
3. Inconsistent investment for community needs e.g. underinvestment in rural fire

Feedback will be sought on the discussion document once it is released.

## **8. SAR in the Australian Context**

Alan Lloyd from the Australian Maritime Safety Authority (AMSA) provided an update of SAR in the Australian context. This update includes comments relating to:

- The cost pressures that all SAR authorities in Australia are operating under at the moment, and the impacts this has on SAR budget management
- The challenges of providing SAR responses to SIEVs when they are overshadowed by international politics
- The review and update for the Australian Inter-Governmental Agreement (IGA) for SAR in the Australian SRR
- Implementing lessons learned from the MH370 search, including papers prepared for ICAO and IMO Working Groups on SAR
- The transition to four Challenger 604 jet aircraft to replace the five Dornier 328 turbo prop aircraft for tier 1 SAR capability from 2016. The new aircraft will include the capability to DF on mobile phones

## 9. Risk

### Risk Matrix Review

The Risk Matrix was reviewed, with no changes suggested.

### Risk Register Strategic Discussion: SAR Funding

Duncan briefed the committee about the strategic discussion on this risk item at the Council's meeting in March. Representatives from the Wellington Community Trust (representing all the Community Trusts), National Ambulance Sector Office, Auckland Regional Amenities Funding Board, and the Department of Internal Affairs (representing the Lotteries grant Board) joined the Council for this discussion.

The meeting spent some time articulating some of the risks about the current volatility of funding, with the Council indicating it has an interest in ensuring funding for the SAR sector is sufficient, stable, adaptable, and prioritised. Attendees at the meeting agreed to engage more often, and to share more information with each other.

### Financial reporting regime

There could be some changes to accounting standards, which may impact national parent organisations that have affiliated local organisations. Accounting standards are the responsibility of the External Reporting Board. More information on the standards can be found at: [www.xrb.govt.nz](http://www.xrb.govt.nz)

## 10. National SAR Support Programme 2014/15

<b>Workshops &amp; Seminars</b>	<b>SAR Training</b>
Wander Symposium	Training Support and Advice
Land Search Seminar	Air Observer on line material
SAREX Planning	Air Observer training
Helicopter workshop	Land Formal Search Planning
SAR Partner Wksp support	Marine Formal Search Planning
Organisational Support	START material
<b>SAR Data management and IT</b>	<b>Prevention</b>
Data Store and analysis tools	AdventureSmart Comms & website maint
Data Extractions	Visitor Intentions
SAR Data Standard	Wander
Operational Analysis	Jasons / Tourism Radio
Resource database enhancements	Safety Code Partnership
Maint - SARNET, Website, START, RDB	<b>Exercises</b>
<b>SAR Documentation</b>	Police SAREX support
SAR Forms and Guidelines	MRO SAREXs
<b>Secretariat</b>	<b>SAR Research</b>
Communications and publications	Governance Review of SAR in NZ
NZSAR Awards	Avalanche Advisory Independent review
Travel, meetings, advice etc	SAR Funding part II

**Key:**

Dark Green – Completed  
 Light Green – On track  
 Yellow – Still to be completed  
 White – Yet to be started  
 Red – Cancelled

SAR Data Standard

The contract for the SAR data standard project has been signed. This will create a national data standard for SAR information. Over the next few months there will be a series of consultations with agencies and organisations within the sector, starting with NZSAR, Police, and RCCNZ, followed by the SLA partner agencies.

Exercise series RAUORA

Dates have been set for the RAUORA exercises across the Police Districts. They will be run in conjunction with the required Police command and capability training.

SAR Governance Review

An initial draft of the review has been presented to the Chair of the NZSAR Council. Overall, it appears that the governance arrangements have worked well and have stood the test of time. While it is unlikely there will be any significant changes, there may be some tweaks in how the Council reports to government via ODESC.

Abnormal flight behaviours workshop

This will be organised as part of next year's NSSP, with a date set for 3 July 2015.

SAR (ACE) Training

Duncan provided an update on SAR (ACE) training to date, as shown in the table below:

As at April 2015	April 2014	April 2015
Total SAR ACE EFTs	32.64	44.7
Number of courses to date	23	16
Number of courses cancelled (YTD)	9	8
Number participants registered for courses	332	462
Total number participants attending	321	238
Average numbers registered for course	14.43	19
Average Number attending per course	13.95	14.87
% non-attendance	3.31%	9.33%
% of NZSAR predicted courses (23/124)	18.5%	26.9%

**11. National SAR Support Programme 2015/16**

Duncan presented and spoke to the draft NSSP for the 2015/16 financial year, as shown in the table below.

<b>Workshops &amp; Seminars</b>	<b>SAR Training</b>
SAR Evaluation Seminar	Training Support and Advice
Technology Workshop	Air Observer training
SAREX Planning (+Police) Meeting	Marine Formal Search Planning (after gap analysis)
Hoist workshop	START material
SAR Partner Wksp support	<b>Prevention</b>
Organisational Support	AdventureSmart & Rec Safety Partnership
<b>SAR Data management and IT</b>	Visitor Intentions
Data Store maintenance and extractions	NZ Inc Recreational Safety Strategy
SAR Data Standard (Continues)	<b>SAR Documentation</b>
SAR Information Dashboard	SAR Forms and Guidelines
Maint - SARNET, Website, START, RDB	<b>SAR Research</b>
<b>Exercises</b>	Fatalities Analysis
Police SAREX support	SAR documentation gap analysis
MRO SAREXs	Impact – SAR Prevention messaging
Abnormal Flight Patter Behaviours	SAR Expectations
<b>Secretariat</b>	SAR Communications – Marine / Land
Communications and publications	Outdoor Safety Code – evidence base
NZSAR Awards	SAR Demand and Supply study (land)
Travel, meetings, advice, administration	SAR Demand and Supply Study (marine)
	SAR Performance Management

**Action:** Agencies to provide any feedback on the draft NSSP to Duncan by 29 May.

## 12. General Business

### SAR Self-Assessment

The consolidated self-assessment completed in August 2013 has been reviewed and updated (distributed with the meeting papers). There are no instances of deterioration in status of any of the action points identified in 2013.

### Changes to maritime VHF channels

The Committee was briefed on the changes to some of the maritime VHF channels, and how this will impact Coastguard.

### International consortium for first responder research and development

This is being led by the Defence Technology Agency (DTA), with the sector welcome to provide late feedback to the submission process. DTA is holding a forum in Wellington on 20 May.

**Action:** Secretariat to attend the forum on behalf of the sector.

### LINZ topographic survey

**Action:** Committee members were asked to complete the electronic survey (already distributed) from LINZ.

### NZSAR Awards 2015

Attendees were asked to arrive on time to the awards function at Government House.

### Meetings for 2015

- Thursday 27 August – Combined meeting with NZSAR Council
- Thursday 5 November

Carl van der Meulen  
Senior Advisor, NZSAR Secretariat  
Chair – NZSAR Consultative Committee

### **Actions and Decisions**

<b>Item</b>	<b>Action (A) / Decision (D)</b>	<b>Responsibility</b>
<b>11 NSSP 2015/16</b>	<b>(A)</b> Agencies to provide any feedback on the draft NSSP to Duncan by 29 May.	All
<b>12 General Business</b>	<b>(A)</b> Secretariat to attend the DTA forum on behalf of the sector.	Secretariat
<b>12 General Business</b>	<b>(A)</b> Committee members were asked to complete the electronic survey from LINZ.	All

# New Zealand Search and Rescue Consultative Committee

## Notice of Meeting

Tuesday 21 April 2015, 1-4 pm

Conference Room, Ministry of Transport

Level 6, SAS Tower, 89 The Terrace, Wellington

1.	Welcome (Coffee & Tea available)		
2.	Apologies		
3.	Minutes of meeting 06 Nov 2014	<i>for approval</i>	
4.	Matters arising from the minutes		
5.	SLA monitoring report: Jan-Mar 2015		Snr Adv
6.	Sector update		All
7.	Fire Services Review	<i>update &amp; discussion</i>	DIA
8.	SAR in the Australian context	<i>update</i>	AMSA
9.	Risk: Matrix	<i>review &amp; update</i>	Sec Mgr
	a. SAR Funding	<i>update &amp; discussion</i>	All
	b. Financial reporting regime	<i>possible changes</i>	SLSNZ
10.	National SAR Support Programme 2014/15		Sec Mgr
	a. SAR Data Standard	<i>update &amp; discussion</i>	Snr Adv / All
	b. Exercise series RAUORA	<i>update</i>	Snr Adv
	c. SAR Governance Review	<i>update</i>	Sec Mgr
	d. Abnormal flight behaviours workshop		Snr Adv
	e. SAR ACE training	<i>update</i>	Sec Mgr
11.	National SAR Support Programme 2015/16	<i>discussion</i>	Sec Mgr
12.	General Business		
	a. SAR Self-Assessment	<i>update</i>	Sec Mgr
	b. Changes to maritime VHF channels	<i>update</i>	Sec Mgr
	c. International Consortium for First Responder Research and Development		Sec Mgr
	d. LINZ topographic survey		Snr Adv
	e. NZSAR Awards 2015	<i>update</i>	Snr Adv

### Next meetings:

- Tuesday 21 April 2015, NZSAR Awards at Government House (6.00pm)
- Thursday 27 August 2015, combined with NZSAR Council
- Thursday 5 November 2015





# New Zealand Search and Rescue Consultative Committee Meeting

**Minutes of Meeting  
NZSAR Consultative Committee  
Thursday 6 November 2014  
Ministry of Transport  
Level 6, SAS Tower  
89 The Terrace, Wellington**

## **Attendees:**

Carl van der Meulen – NZSAR ( <i>Chair</i> )	Samantha Sharif – Aviation NZ
Joe Green – Police	Brendan Comerford – Kordia & MOC
Jeff Sayer – AREC	Harry Maher – LandSAR
Patrick Holmes – Coastguard	Rex Hendry – LandSAR
Mike Daisley – MSC	Richard Davies – DOC
Steve Kern – CAA	Duncan Ferner – NZSAR
Allan Mundy – SLSNZ	Paul Craven – RCCNZ
Phil Burgess – NZSAR	Amy Greig – MoT ( <i>Minutes</i> )

## **1. Welcome**

Carl opened the meeting, welcoming attendees and noting apologies as below.

## **2. Apologies**

Joy Cooper – NASO	Graeme Ayres – Antarctica NZ
Simon Trotter – Antarctica NZ	Lloyd Matheson – HNZ
Rodger Pringle – NZDF	

## **3. Minutes of previous meeting**

The minutes from the last meeting were accepted as a true and accurate record, with the exception of two editorial changes to be made to the list of attendees.

## **4. Notes from joint Council and Consultative Committee workshop held 21 August 2014**

The Committee endorsed the notes as being an accurate capture of the discussions of the combined workshop, and suggested they could be refined to make linkages with the Risk Register.

The notes highlight challenges for the SAR sector looking towards 2034. There was some discussion on how the sector should use these notes, and it was agreed that they should be referred to and used in conjunction with the Risk Register, future NSSPs, and other strategic level documentation.

**Action:** Secretariat to refine the notes to create linkages with the Risk Register.

**Action:** Agencies should refer to the workshop notes when carrying out their own strategic level planning.

## **5. Matters Arising from Minutes**

### Item 8 - Risk Framework

More information about work items for each risk to be included in the matrix.

*This is a continually ongoing process, so will be removed from the list of action items.*

### Item 10 – NSSP

Organisations to advise Secretariat of their point of contact for the SAR Data Standard Project.

*Ongoing – will be discussed under agenda item 10a*

## **6. Service Level Report: 1 July – 30 September 2014 Quarter**

Police data was unavailable at the time of the meeting, so a complete report of activity for the quarter was unable to be presented.

Reporting requirements for the SLA have been met by all partners, with 704 volunteers involved in SAROPS and 2,856 volunteer hours recorded for the quarter. 2,336 Coastguard volunteers responded to 238 non-SAR related calls for assistance during the quarter.

### ***Issues and Updates:***

#### Coastguard:

- Monique Caddy recently joined the team as National Communications Manager.
- Coastguard is engaged in a full review of its Constitutions. This is a large and complex piece of work.
- Peter Healy has settled in well to his new role of Health & Safety Manager
- Coastguard has commenced a review of Air Patrol operations. John Fogden has been engaged as an independent consultant to facilitate the review.

#### LandSAR:

- The Safety Management System and new LandSAR website/Training Management System projects are scheduled to be completed by Christmas 2014.
- The documentation of the Competencies Framework project will be completed by the end of the 2014 calendar year, with piloting and implementation of the system undertaken in 2015.

#### AREC:

- No issues or updates to report.

## SLSNZ:

- The Bay of Plenty / Coromandel Communications Network is near completion and should be operational from 20 October 2014.
- The Capital Coast Communications Network is underway and will be completed in time for the 2015/16 season.

## **7. Sector Update**

The sector update report was distributed prior to the meeting. The tabled update from the New Zealand Helicopter Association will be collated into the main report in time for the Council meeting.

## **8. Organisational Changes & Conferences**

### Police National Headquarters Update

Joe Green provided an update of recent changes at PNHQ. The recruitment process for the National SAR/DVI Coordinator position is underway.

### RCCNZ Organisational Changes

Paul Craven provided an update of the restructure at RCCNZ. Recruitment is underway for the Manager and two Deputy Manager roles that have been established at RCCNZ.

### LandSAR Conference

Harry Maher gave a verbal report on the recent LandSAR Conference and AGM. LandSAR is aware there are some challenges for the organisation in terms of the demographics of the volunteers. It's important that LandSAR are able to attract younger volunteers to the organisation as this is critical for long term success and sustainability.

### Coastguard Conference

Patrick Holmes gave a verbal report on the recent Coastguard Conference and AGM.

Duncan observed that there are differences as to how the various conferences across the agencies in the sector are conducted, and believes there would be benefit if senior members of the different organisations attend each other's conferences in the future.

### MSC Update

Mike Daisley gave a verbal update about the changes that will be happening at the Mountain Safety Council, especially regarding the delivery of training services to the public.

### NZFS Review

Duncan Ferner briefed the Committee on the status of the NZFS Review, which has been underway for the last two years. There has been a gap analysis between the existing Fire Service Legislation and the activities the NZFS engage in.

NZSAR continues to seek closer engagement with the NZFS, but has had no success so far this year.

### WSNZ Changes

Duncan briefed the Committee on the restructure of Water Safety New Zealand, including the establishment of a new water safety sector plan. Duncan recommended inviting WSNZ to become a member of the Consultative Committee from next year. The Committee endorsed the suggestion that this be taken to Council for approval.

**Decision:** Consultative Committee endorsed the recommendation to invite WSNZ to become a member of the Consultative Committee from 2015.

### CAA Work

Steve Kern briefed the Committee on two items of work CAA is currently engaged in that could impact the SAR sector.

- i. Emergency Location of Aircraft: the policy team at CAA has recently closed off public consultation on this policy, which was unknown to the majority of the SAR and aviation sectors. The Committee requested Steve brief the CAA policy team about the SAR sector and ask for an extension to the feedback on the consultation document.
- ii. Human Sling Loads: there is confusion across the sector about the approval status for various operators to engage in human sling load operations. Further discussion on this topic is to happen outside of the meeting.

**Action:** CAA to be asked to extend the feedback period for the consultation document on the emergency location of aircraft.

## **9. Risk**

### Risk Matrix Review

The Risk Matrix was reviewed, with no changes suggested at this stage.

### Risk Register Strategic Discussion: SAR Funding

The Committee had a discussion about the strategic risk relating to SAR funding. There are two aspects to this risk – funding volatility/uncertainty and sufficiency. Duncan provided a snapshot of various aspects of funding that are currently coming into the SAR sector, compared with the amount of SAR activity each agency typically carries out in a year.

The NZSAR Council has indicated it wishes to exercise thought leadership around the funding of the SAR sector, with the aim of eliminating/mitigating the identified funding risks. There was discussion about the extent of leadership the Council ought to exercise in regards to actual funding decisions.

**Action:** Council to be informed of the Committee's concerns around the extent of thought leadership for SAR funding.

## 10. National SAR Support Programme 2014/15

<b>Workshops &amp; Seminars</b>	<b>SAR Training</b>
Wander Symposium	Training Support and Advice
Land Search Seminar	Air Observer on line material
SAREX Planning	Air Observer training
Helicopter workshop	Land Formal Search Planning
SAR Partner Wksp support	Marine Formal Search Planning
Organisational Support	START material
<b>SAR Data management and IT</b>	<b>Prevention</b>
Data Store and analysis tools	AdventureSmart Comms & website maint
Data Extractions	Visitor Intentions
SAR Data Standard	Wander
Operational Analysis	Jasons / Tourism Radio
Resource database enhancements	Safety Code Partnership
Maint - SARNET, Website, START, RDB	<b>Exercises</b>
<b>SAR Documentation</b>	Police SAREX support
SAR Forms and Guidelines	MRO SAREXs
<b>Secretariat</b>	<b>SAR Research</b>
Communications and publications	Review of SAR in NZ
NZSAR Awards	Avalanche Advisory Independent review
Travel, meetings, advice	SAR Funding part II

### Key:

Dark Green – Completed  
 Light Green – On track  
 Yellow – Still to be completed  
 White – Yet to be started  
 Red – Cancelled

### SAR Information Project

The historic SAR incident data for the last four years has been successfully extracted from the Police and RCCNZ IT systems into a single relational data store. A business information (BI) tool has been installed on the Secretariat's computers allowing a more detailed analysis of SAR information. This will be useful in providing an evidence base for future projects across the sector. Any requests for specific analysis of information should be directed to Carl.

### Avalanche Advisory Review

A broad review of the provision of Avalanche Advisories for NZ has been completed, and will be presented to the NZSAR Council at their next meeting. The interest to SAR includes the fact that NZSAR organisations put their people into areas of potential risk of avalanche. The review recommends NZ should retain this form of service and provides recommendations on how an avalanche advisory Committee might look and be funded. Duncan will keep the Committee informed of progress.

## SAR Governance Review TOR

The Council has directed that a review of the governance of search and rescue in New Zealand is timely, as the current arrangements are 11 years old. A draft terms of reference for the review was distributed. The Committee provided some feedback on the draft TOR for Duncan to incorporate into the version to be presented to the Council for approval.

The timeline for the review is for it to be completed no later than 20 May 2015 with a draft being made available to the NZSAR Council one month prior. An independent contractor supported by the NZSAR Secretariat will conduct the review.

## SAR (ACE) Training

Phil provided an update about the SAR (ACE) training. Of note is the student course and tutor satisfaction results to September 2014, which are very pleasing.

This table provides a snapshot of training to date, although it doesn't factor in all training.

<b>As At 10 October 2014</b>	<b>October 2014</b>	<b>October 2013</b>
Total SAR ACE EFTs to date	112	86
Number of courses to date	64	43
Number of courses cancelled	28	40
Number participants registered for courses	1185	
Total number participants attending	965	492
Average numbers registered for course	18.51	
Average Number attending per course	15.07	11.44
% non-attendance	19.8%	
% of GPT predicted courses	59%	48%

## SAR Prevention

### *AdventureSMART* update

- The main site has had 32k sessions, 68k page reviews.
- The mobile site has had 3k sessions and 3.6k page views.
- 118k brochures have been distributed with Jasons, ISites and DOC visitor centres.
- The Recreational Safety Partnership continues with WSNZ, CNZ and MSC.
- Advertising now includes the Arrival magazine and Tourism Radio.

The Committee were played the Tourism radio ads for Hot Water Beach, Alpine Crossing and the Weather.

## 11. General Business

### Australian NATSAR 2014

Duncan provided feedback from the NATSAR 2014 (the Australian SAR Council). Topics of interest included the review of the Intergovernmental Agreement (IGA), MH370 briefing, SARMAP Working Group, Australian National SAR statistics, Australian Lost Person Behaviour, Technology, National SAR Manual update, ANZPAA training presentation, National Police SAR manager's course report, Beacon registration stickers, Laser fares, SAR Award and Microsoft SAR activity management programme.

The Committee expressed interest in receiving a copy of the NATSAR Manual.

**Action:** Secretariat to distribute a copy of the NATSAR Manual.

### UAS

The Secretariat received an invitation to attend a commercially led workshop on developing common user requirements for UAS. Other members of the Committee have also been invited to this workshop. It was agreed that Coastguard NZ would attend the workshop and provide feedback to the sector.

*Note: This workshop was subsequently cancelled – no action point for CNZ.*

### NZSAR Awards

The Governor-General has agreed to host the NZSAR Awards for 2014 at Government House on 21 April 2015. Nominations are required from the sector.

**Action:** Agencies to provide nominations for the NZSAR Awards.

### Air Operators Workshop

RCCNZ are planning a two day air operators workshop in Wellington next year (date to be confirmed). Any suggestions for the agenda are to be provided to RCCNZ.

### Meetings for 2015

- Tuesday 21 April (same day as the NZSAR awards)
- Thursday 27 August – Combined meeting with NZSAR Council
- Thursday 5 November

Carl van der Meulen  
Senior Advisor, NZSAR Secretariat  
Chair – NZSAR Consultative Committee

## Actions and Decisions

Item	Action (A) / Decision (D)	Responsibility
4 Notes from joint Consultative Committee and Council Workshop, held 21 August 2014	<p>(D) Notes were endorsed</p> <p>(A) Refine the notes to create linkages with the Risk Register</p> <p>(A) Agencies should refer to the workshop notes when carrying out their own strategic level planning</p>	<p>All</p> <p>Secretariat</p> <p>All</p>
8 WSNZ	(D) Consultative Committee endorsed the recommendation to invite WSNZ to become a member of the Consultative Committee from 2015	All
8 CAA	<p>(A) CAA to be asked to extend the feedback period for the consultation document on the emergency location of aircraft</p> <p><i>Completed</i></p>	CAA
9 Risk – SAR Funding	(A) Council to be informed of the Committee’s concerns around the extent of thought leadership for SAR funding	Secretariat
11 General Business – NATSAR 2014	<p>(A) Distribute a copy of the NATSAR Manual</p> <p><i>Completed (7 Nov 2014)</i></p>	Secretariat
11 General Business – UAS	<p>(A) Coastguard representative to attend UAS workshop and provide feedback to the Committee</p> <p><i>This workshop was cancelled</i></p>	<p>Coastguard</p> <p><i>No action point for CNZ</i></p>
11 NZSAR Awards	(A) Agencies to provide nominations for NZSAR Awards	All



NZSAR 2-1

17 April 2015

NZSAR Council  
NZSAR Consultative Committee

**Joint Service Level Agreement monitoring report:  
1 January - 31 March 2015 Quarter**

1. **Provision of Services.** Services have been provided by the SLA partners as described in the table of outputs.

Outputs	Coastguard	LandSAR	AREC	SLSNZ
Provision of expert services				
Provision of expert advice				
Provision of IMT Members			Not Required	
Summary of non-SAR activity		Not Required	Not Required	Not Required
Up to date details available				
Participation in joint SAREX				
Attendance at Forums				
Nominations NZSAR Awards				

2. A summary of activity as reported by the SLA partners for the quarter.

Outputs	Coastguard	LandSAR	AREC	SLSNZ	Totals
<b>SAROPs Attended</b>	121	117	15	34	--
<b>Volunteers Involved</b>	933	371	39	160	<b>1,503</b>
<b>Volunteer Hours</b>	7,890	2,158	188	390	<b>10,626</b>

3. **Activity for the Quarter.** A summary of overall activity for the quarter, as reported by the two coordinating authorities.

Measures	Police	RCCNZ	Totals
SAROPs	409	233	642
Lives at Risk	189	597	786
Lives Saved	12	4	<b>16</b>
People Rescued	75	26	101
People Assisted	95	90	185
LandSAR Taskings	82	3	85
Coastguard Taskings	103	0	103
SLSNZ Taskings	47	0	47
AREC Taskings	15	0	15
Performance of SLA Partners	Satisfactory	Satisfactory	Satisfactory

### Summary of Issues and Updates

#### 4. Coastguard

- Coastguard is preparing for their annual MayDay appeal.
- Changes to international VHF channel allocations will affect Coastguard, as they will need to migrate services to alternate channels.

#### 5. LandSAR NZ

- During the quarter LandSAR has focussed on:
  - i. Bedding in the Safety Management System which was deployed organisation-wide in December 2014.
  - ii. Initiating the trial of the new Competencies Framework assessment system, to be trialled May to August and planned for wider deployment in late-2015.

#### 6. Surf Life Saving New Zealand

- Work is continuing on the two new communications networks, to enable them to be ready for the 2015/16 season.
- SLSNZ has signed an MoU with MNZ to clarify invoicing arrangements for support provided to Category II SAROPs.

#### 7. AREC

- Have no issues or updates to report to the Council.



NZSAR 2-2

20 April 2015

NZSAR Council  
NZSAR Consultative Committee

## **Search and Rescue Sector Update**

The Search and Rescue sector update for the NZSAR Council and NZSAR Consultative Committee meetings for April 2015 is contained below.

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### **Ambulance NZ**

Nil report

### **Antarctica NZ**

Operations at Scott Base are progressing well with some of the Hillary Field Centre developments. The Winter Joint Search and Rescue Team (Scott Base and McMurdo Station) have an established training programme and have been conducting regular weekly training activities on ice. Although the requirements for the winter team is not of a highly technical nature there is still a strong interest from the US and Kiwi members to develop strengths in personal technical skills across the winter programme.

Recently there was one incident which was call out for the JASART crew for a missing person on a local recreation route on Ross Island. This was due to a walker having missed a regular radio check in with Scott Base. The person was found by a hasty party, returning to Scott Base after having become aware that they were in a communications dead spot and unable to communicate directly with Base. A number of valuable learnings came out of the incident.

Further discussion has been continues with the D.O.C Mt Cook SAR team to look at future training opportunities and possible alignment of standards. Antarctica NZ wishes to continue its development in the arena of SAR by engaging with other high performing groups.

### **AREC**

Nil report

### **Coastguard NZ**

Coastguard is preparing for the annual MayDay Appeal, a heightened awareness and fundraising period which runs for the entire month of May. For the third year running, Sir Graham Henry will be the "face" of the Appeal.

Changes to the maritime VHF channels currently allocated to Coastguard and the migration of services to alternative channels is a cause for serious concern with initial estimates suggesting a cost of more than \$500k. The changes are the result of the NZ government signing up to a revised international protocol - Coastguard has not budgeted for this expenditure and is seeking help from NZSAR to identify a timely and cost effective solution

## Department of Conservation

Nil report

## LandSAR NZ

### Operations

Since the last Consultative Committee meeting we have seen an increase in operational activity compared to the immediately previous third-quarter periods. All of the key 'demand' indicators (number of SAROPs, number of persons 'at risk' and rescued etc.) showed an increase over the previous year and were comparable to the levels of 3-4 years ago.

1 Jan – 31 March 2015	2014/15	2013/14	2012/13	2011/12	2010/11
<b>Category 1 operations</b>	109	52	79	121	69
<b>Category 2 operations</b>	8	3	7	6	7
<b>Volunteer hours during SAROP</b>	7890	3895	3185	4384	5585
<b>Volunteers used during SAROP</b>	933	545	644	993	1001
<b>Number of subjects</b>					
<b>People at risk</b>	150	66	95	214	125
<b>Lives saved</b>	19	6	2	18	4
<b>Rescued</b>	45	42	50	94	54
<b>Persons assisted</b>	61	17	34	106	55
<b>Perished</b>	15	4	9	13	11
<b>Not located (Missing)</b>	10	3	2	1	1

### Support Activities

The total amount of support effort (non-operational) in Quarter 3 2014/15 was 35,892 hours. This compares with 22,374 hours of support effort in Q3 2013/14.

Quarter 3	2014/15	2013/14	2012/13
<b>Total volunteer effort</b>	35,892	22,374	39,455
<b>Operations</b>	7890	3895	3185
<b>SAREX incl prep</b>	7029	5549	13,956
<b>Training</b>	13,445	7865	14,393
<b>Administration</b>	7528	5065	7921

### Training consumed by LandSAR volunteers (hours)

As with the operational tempo during the 2014/15 summer, and the support effort from LandSAR volunteers, there appeared to have been a 're-bounce' in training activity in

the first 3 months of 2015. There was a particularly noticeable increase in the uptake of SARACE-funded training.

Quarter 3	2014/15	2013/14	2012/13
<b>SAREX</b>	7029	5311	13,521
<b>Local/Regional Courses</b>	6980	4688	12,097
<b>Training prep/support</b>	1117	1427	1547
<b>Skills acquisition training delivered by TPP</b>	5348	1989	1185
<b>Total Training</b>	<b>20,474</b>	<b>13,172</b>	<b>28,349</b>

### Organisational Initiatives

The focus of effort in the 3rd quarter of 2014/15 has been on:

- Bedding in the Safety Management System which was deployed organisation-wide in December 2014
- Initiating the trial of the new Competencies Framework assessment system, to be trialled May to August and planned for wider deployment in late-2015.

### **Maritime Operations Centre**

Nil report

### **Mountain Safety Council**

Nil report

### **NZDF**

Nil report

### **New Zealand Helicopter Association**

The Aviation New Zealand annual Conference is scheduled to take place in Queenstown this year, with the Helicopter Association Programme running on Wednesday July the 1<sup>st</sup> through to Thursday July 2<sup>nd</sup> with both national and international guest speakers presenting on topical items of interest. Our Australian counterparts will be in attendance at what promises to be a great occasion, particularly with the ANZAC aviation celebrations being included as part of the conference activities.

Following are matters of interest managed by the HA Association since the last report:

- The Air Ambulance EMS Division has been resolved as a separate Division (due to lack of membership) and a subcommittee has been developed to sit within the Helicopter Association and this subcommittee is currently chaired by Peter Turnbull from NEST. This subcommittee will continue to be the member representation of Aviation NZ's role in the Air Ambulance Standards processes and procedures.
- Health and Safety. There is various work being undertaken in regards Health and Safety, as follows:
  - The Division has recently signed off on a software offer that will make SMS and Work-Safe compliance a user friendly system for operators of aircraft

who have not already adopted a safety management system in advance of the CAA's implementation for CAA Regulations for 135 operators;

- Aircare participants have a requirement to notify Industry of incidents involving environmental matters or those that are being investigated by the Regulator (but this is limited to those participating in the voluntary Aircare Program);
- The Regulator is beginning a process involving Fatigue Risk Management for all CAA Regulation 135 Operators. This will, along with other matters, involve Health and Safety requirements. NZHA representing 135 operators are engaged with CAA as part of the Fatigue Risk Management Panel that is developing material that will become a rule requirement.
- The Division presented at a RPAS (Remotely piloted Aircraft Systems – known to the media as drones) Symposium recently at Masterton. Like the AAA (Agriculture Sector), our Division have safety concerns about the apparent wholesale promotion of RPAS. Since then we are now seeing the promotion of “Beyond Line of Sight” activity. In regards to the UAV's themselves – the operations of these continues to raise concerns from members, and work is on-going within Division on ways to ensure safe operating procedures are considered by the regulator.
- The Helicopter Association has recently had input into Regional Council Plans and submissions: Involved with Whakatane, Whangarei and Melborough District Council Plans. Such involvement included addressing those hearings on Noise issues and in particular the Whakatane Council proposing a requirement for helicopter operators to obtain resource consent for frost fighting.
- The Divisional EMS subcommittee had input into the 2014 NZ Search and Rescue Council Awards.
- Robinson R44 Main Blade issues. These aircraft were subject to a temporary Grounding following a recent fatality. The Association continues to have on-going dialogue with the CAA over Divisional involvement in flight safety requirements being developed following the recent fatalities involving these aircraft.
- Safety Bulletins. Whilst these continue to be a popular publication with Bulletin No. 4 having just recently been published (**a copy of this bulletin is attached at the end of this report**), it is worthy of note two new developments have occurred since the last report: (a) that this publication has now gained overseas interest with Joe Dewar of the CAA Statistics Division recently making a presentation to the International Helicopter Association in the USA which generated a large amount of interest and feedback, and (b) this type of publication has now been adopted by the Agriculture Division of the industry with the continuing efforts and cooperation between the NZHA Division and the CAA. This particular Bulletin 4 covered Low G situations and mast bumping and turbulence – a topical issue currently facing industry.
- Aircare membership continues to be a focus for the Division, although there is some resistance by some air operators to become part of this industry safety initiative. The Aviation NZ Board Chair has suggested that it is timely for the industry to review Aircare with a view of overhauling this system.
- The NZSAR Secretariat has requested from industry input for the NZSAR Council's information pathway in its preparation of an “all of New Zealand SAR data standard”. This will be an on-going input item from the division over the next short period.

## Police

The Police Training and Tactics Coordinator's role is now being completed by Acting Senior Sergeant Jo Holden. She has brought with her a wealth of experience as the previous Wellington District SAR Coordinator and from her private activities in multi-sport events.

The Police National SAR Training camp at Dip Flats has just been completed (17/4/15) which is why A/S/Sgt Holden is unable to make it this afternoon.

Acting/S/Sgt Holden will get to know you as she attends the various meetings and fora that impact on SAR and Disaster Victim Identification (DVI). Expect to see her at a SAREX or meeting near you in the near future.

The SAR statistics show that we have been busy in both Land and Marine SAR activities over the past quarter. Police appreciate the support that so many agencies represented here provide for Category I SAR incidents. Thank you for your help and please express our thanks to your members back home for their time and expertise that they so willingly provide to make life safer for those who experience our great outdoors.

Police are working with NZSAR to deliver Mass Rescue Exercises at a district level, nationally. The work being completed is looking very promising and will enable us all to identify what we do well, what we may do better and who we need to work with to provide an optimal response.

We, together with NZSAR, will keep you updated as to progress and any new lessons learned as the training progresses.

Inspector Joe Green (Coordinator Emergency Management) is on long service leave until 17 May. If you have any service requests that would usually go to him please forward them to Inspector Geoff Logan.

## RCCNZ

### Operational

In the reporting period from January to March 2015 there have been 233 Category II incidents. This is an increase of 17.7% from last quarter (198>233) and almost similar to the same period in 2014 (236). CAT II incidents with taskings jumped significantly, up by 85% (40>74) from October-December period but dropped slightly 5.1% (78>74) against the January to March 2014 period.

Of the 233 CAT II incidents, 26.6% were in the maritime environment (30.3%), 34.8% aviation (33.9%), 29.6% land (23.2%) and 9.0% categorised unknown environment (12.6%). (Percentage figures in brackets are last quarters.) Comparison for the January to March quarter 2014 (236 incidents), marine 30.5%, aviation 35.2%, land 24.1%, unknown environment 10.2%.

Tasking during this period within the three environments result in:

MARINE (17): Seven 406 MHz, one 121.5 MHz beacon activations. Australian coded EPIRB on-board a Tongan fishing vessel: Missing fisherman Tuvalu, RNZAF P3 conducted search but was stood down due to weather conditions: NZ coded EPIRB on-board a Tongan fishing vessel, P3 tasked, located, crew and vessel recovered by Tongan Navy: Three cruise ships required medevac's of passengers: One fishing vessel, medevac of sick crew member: One sick crew member on-board an inbound

commercial vessel, deceased before medevac able to be undertaken: Sick yachtsman assisted to ashore by Coastguard: Local fishing vessel dead in the water, West Coast SI: SCUBA diver with breathing difficulties on-board a disabled launch: International effort to rescue a fishing vessel trapped in ice, Antarctica: Capsized boat of the West Coast SI, crew recovered: French yachtsman in path of Cyclone Pam taken off by RNZN warship: two fishermen blown out to sea, Marlborough Sounds: Old 121.5 MHz beacon tracked down to a vessel not in distress in the Kaipara Harbour: Yacht with three POB being blown onto rocks. Police assumed coordination and tasked SAR assets.

AIR (11): Five associated with a 406 MHz beacon alerts. Eight aircraft crashes (5 x fixed wing, 3 x helicopters), one forced landing (pair of gliders), one overdue (helicopter), one possible gyrocopter crash.

LAND (46): There were 40 associated with a 406 MHz beacons, the other six as a result SPOT transmitter alerts. one Fishing, five hunting, one jet boating, one kayaking, one motor biking, one mountain biking, six mountaineering, 26 x tramping, one canyoning, two rubbish dumps, and one medical.

Total beacon incidents for the quarter increased by 5.9% (151>160) from last quarter but dropped by 8% against the January to March 2014 quarter (174). Real distress alerts jumped 69.7% from last quarter (33>56) but were lower 18.8% against the same quarter in 2014 (69).

A total number of 597 (575) people were supported in the quarter. This comprised: 310 (298) at risk; 4 (2) lives were saved; 26 (21) lives rescued; 90 (56) lives assisted; 9 (0) people perished and 158 (198). self-assisted. (Figures in brackets, last quarter).

RCCNZ supported Police for 71 Category I (Police) incidents during this period. Incidents involved the provision of 12 SAD's RCCNZ (7 x SAD's, 4 x Active Involvement, 1 x with both Active Involvement and generation of a SAD). Of these 60 of the incidents were in the marine environment, eight on land and three aviation.

## **Operational Support**

### **Beacons**

Beacon registrations for the year to date have been consistent at approximately 911 per month. This is a 4% increase for the same period last year and the ratio of PLBs is two thirds of this volume. There remains a significant change in PLB registrations and now there are significantly more PLBs (29776) registered than EPIRBs (18776) with total registrations now 52519.

### **MEOLUT Project**

Following the selection of the preferred tender for the joint Australian and New Zealand MEOLUT project the contract to build was signed with Techno Sciences Inc. (TSi) in the United States on 22<sup>nd</sup> August 2014. TSi have subsequently entered into sub contracts with Kordia Australia and New Zealand to develop the ground site works, complete the build and in New Zealand's case the future operation of the MEOLUT installation. Site construction will commence at the Goudies location (between Rotorua and Taupo) on 29<sup>th</sup> April 2015 and the six antennas and control systems will be in an initial operation configuration in late June 2015. Full operational status, which is reliant on future satellite launches and extensive system testing, is unlikely before 2017.



## **Staffing changes**

During the period three new staff have been appointed to positions within RCCNZ: Mike Hill has been appointed to the position of Manager RCCNZ and Safety Services, Carolyn McKenzie the position of Deputy Manager Training and Nic Drew-Crawshaw the position of Deputy Manager Planning.

## **SLSNZ**

### **Surf Life Saving Operations**

This period January to March has been the busiest time of year for Surf Life Saving services; due to the school summer holidays and the tail end of what could be arguably the best summer season on record.

The early onset of very warm water conditions on top of a very prolonged fine weather pattern produced high beach visitation numbers. In January particularly the first two weeks, the crowds peaked; this coincided with a persistent swell on both coasts. This kept Life Guards extremely busy and most patrols reported large numbers of strong rips along their beaches. This resulted in, Surf Life Saving services responding to a number of other callouts and incidents that occurred during this time.

In addition to the Category 1 Search and Rescue Operations listed above (and detailed in the Appendices), surf lifeguards rescued (688) people, treated (1977) members of the public for injuries, conducted a further 273 searches and assisted 287,209 people through preventative activities (i.e. educated on rip currents and advised to swim between the red and yellow flags). Surf Lifesaving services amassed over 137,857 hours patrolling the beaches, attending incidents and providing other services where required.

### **Organisational Update**

The following organisational changes or progress has occurred of relevance to the search and rescue sector:

- The Bay of Plenty // Coromandel Communications Network is near completion, and is operational covering an area from Maketu to Onemana. The planned network was to provide radio communications coverage along the coastline between Hot Water Beach and Maketu however due to a theft of equipment at the Whangamata Repeater site and a prolonged administration period for the DOC consent for the Pauanui Repeater site the coverage stopped at Onemana in the North.
- The Capital Coast Communications Network is underway, and will be completed in time for the 2015/16 season. A meeting has been held with the Surf Life Saving Clubs, and consents and permissions to install repeaters at identified locations are being sought.
- A service level agreement has been reached between the Maritime New Zealand and SLSNZ setting asset costs for Surf Life Saving equipment used during category 2 searches across all New Zealand Coastal and inland water ways and all Surf Life Saving New Zealand regions. This will simplify the drawing up of invoices post events for SLSNZ and allow MNZ to gain a clearer insight into the costs of deployment for a response.



# New Zealand Helicopter Association Safety Bulletin

Low-G situations, mast bump, and turbulence

## NZHA SAFETY BULLETINS

SB 4

Late last year, shortly after a fatal R44 accident at the top of the South Island, we received the following e-mail:

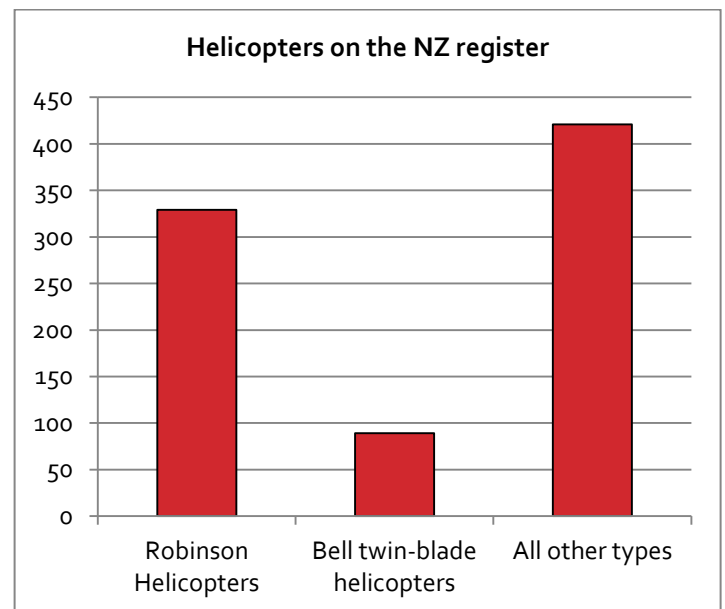
*“Having just returned last night from the South Island where I spent the day with the pilot’s father and sister on a hill waiting for ground search teams to follow along the wreckage trail in steep heavily covered bush forest, to discover the cabin and the pilot dead I believe the following is worthy of consideration for all who fly two-bladed rotor systems.*

*In relation to the above accident, the prevailing conditions, terrain, and wreckage trail was very similar to that of a 2013 accident in the Central North Island. The helicopter was flying downwind in about a 20 knot wind and had crossed a high ridge. First found were pieces of paper, followed by clear plastic, a blade tie down, honeycomb, and eventually the cabin.*

*It is most likely going to take a while for the formal investigations to be completed but I suspect both will identify mast bumping as a result of negative G experienced in the turbulence encountered after crossing the ridge.”*

Mast bump and other situations where control over the main rotor is lost are **leading causes of fatal accidents** in two-bladed semi-rigid rotor helicopters. In terms of

machines operating in New Zealand, this means mainly Robinsons and Jet Rangers. Combined these helicopter types make up **50% of the total register**:



Combined with New Zealand’s unique topography and weather, the high proportion of twin-blade machines means pilots here are at increased risk of mast bump accidents. This bulletin is targeted at preventing us from having any more of these accidents, which in the vast majority of cases are catastrophic. It also looks at other risks posed by turbulent conditions, particularly when operating over and within mountainous terrain.

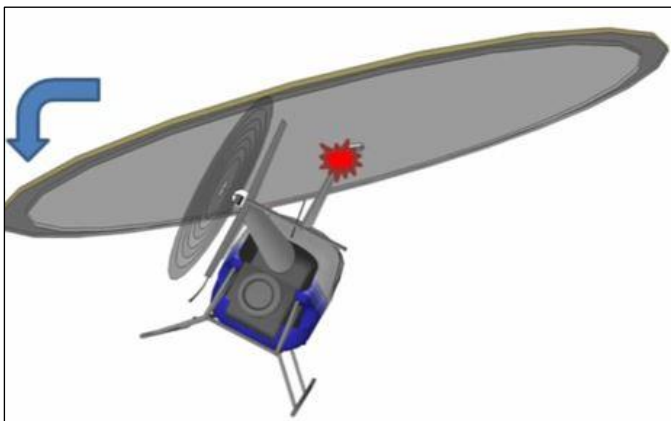
## Mast bumping explained

Twin-blade semi-rigid rotor systems are designed to allow the blades to flap. **Mast bump** is the name given to the accident situation where this flapping exceeds the structural limitations of the rotor hub's connection to the mast: the rotor head tilts so far that it contacts the mast, usually causing separation of either one blade or the entire rotor. The flapping can be such that the rotor severs the tailboom or strikes the cabin. **The vast majority of these accidents are fatal as the helicopter becomes completely uncontrollable. The causes are outlined below.**



## Low-G situations and mast bumping

Pilot-induced low-gravity situations are the most commonly-mentioned causes of mast bump in the operating handbooks and textbooks. In a low-G situation the weight of the fuselage is momentarily unloaded from the rotor disk. The thrust from the tail rotor then causes the fuselage to roll to the right very, very quickly: in a safety video from the early 90's Frank Robinson explains that **this roll rate can be "as fast as 100° a second"**. It is the instinctive reaction of pilots finding themselves in this situation to apply left cyclic – and generally this is done abruptly considering the rapidness of the roll and the panic induced by the sudden weightless condition that has preceded it. Application of left cyclic tilts the disk but has no effect on the fuselage: the static stop limits are exceeded, the rotor head contacts the mast and either the mast

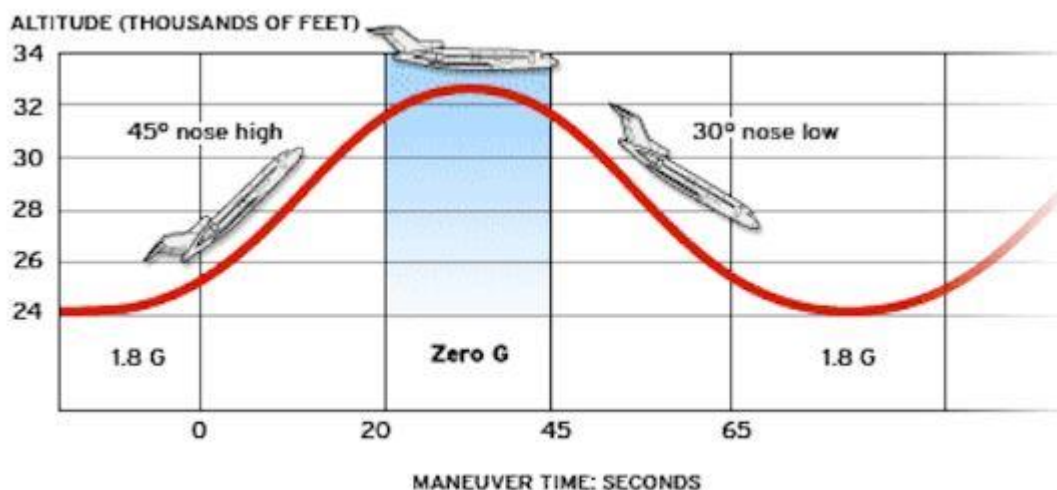


separates or the blades contact the fuselage, either the tailboom or the cabin. The image to the left illustrates the process.

### How control inputs can induce low-G states

Abrupt cyclic pushovers are the most frequently-mentioned cause. These can be induced in several ways. For instance they may occur when a pilot becomes focused on **following terrain**: as terrain begins to slope downhill the pilot may initiate a cyclic pushover while they concentrate on maintaining a steady height

above the ground. Cyclic pushovers can also occur when pilots **attempt to level out after climbing**. This is illustrated in the picture below. Although the example is for large jet aircraft flying many thousands of feet high, the principle is exactly the same. Note that the first of these (following descending terrain) can occur in level flight. Both of these cyclic pushover causes were addressed specifically in the Robinson Safety notice SN-11, originally issued in 1982. A related safety notice is SN-29 concerning fixed wing pilots transitioning to rotary. The learned, highly ingrained reaction of fixed wing pilots to push the stick forward when attempting to descend or to avoid a collision (say with a bird) can be fatal. Please be aware of the special risk that this presents.



**An example of just such a low-G accident in New**



## Zealand occurred in Taupo in early 2004:

The R22 was found crashed inverted, with a debris trail of cabin contents and shattered perspex leading to the accident site. Both the pilot and passenger were fatally injured. The weather on the day was perfectly clear, calm and still. The accident site was near several high voltage power lines. It was determined that at some point in the flight, possibly after climbing rapidly to avoid the power lines, the pilot had initiated an abrupt pushover leading to a low-G situation. The low G and roll to the right were so violent that the pilot's windshield, which survived the accident intact, bore marks from where his boots left the pedals and were forced against it (shown below):

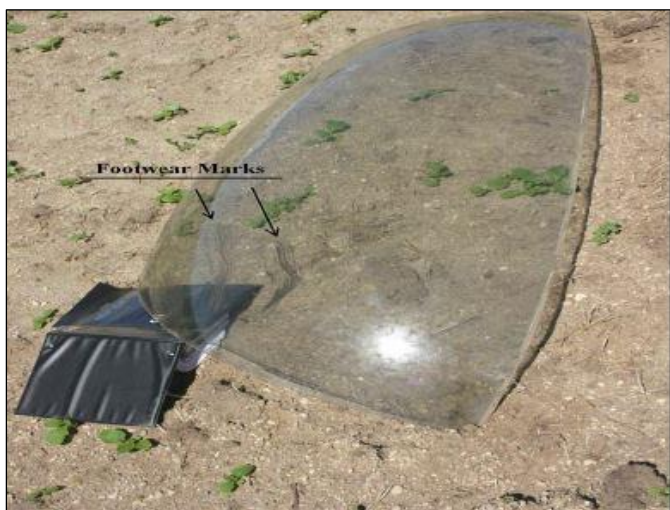


Figure 3: Pilot's windscreen with footwear marks. Note abrupt change in direction.

As the fuselage continued into the right roll the main rotor blades sliced through the cabin 3 times; first severing the roof of the canopy, then the control panel, and then the cabin floor through the center. The accident wreckage revealed that the cyclic pushover must have been so abrupt that once the low-G situation was reached it would have been impossible to recover from.

This accident vividly and horrifically demonstrates how critical this safety warning (in several Robinson safety notices and in operating handbooks) is:

***"Never abruptly push the stick forward".***

## Turbulence can induce a low-G state

Windshear and other meteorological conditions play a huge role in NZ aviation accidents, due in large part to the fact that the weather conditions here are uniquely challenging. **In New Zealand this is especially true of turbulence.** The Robinson Safety Notice SN-32 warns pilots of the increased risk of mast bumping and excessive blade flapping when operating in turbulent conditions.

**In a severe downdraft the loading on the main rotor disk can become low or negative,** exactly like the pushover-induced low-g situation mentioned above. Once again the main rotor becomes unstable; the tail rotor begins to roll the fuselage over and the risk of mast bump and/or the rotor cutting through the fuselage increases rapidly. If the turbulence is severe enough then recovery can become next to impossible, as in the accident below:

R22 near Mt. Aspiring. Both the instructor and the student were killed when the helicopter broke up in flight. The investigation revealed that the rotor hub teeter stops were crushed, indicating that mast bump had occurred, however before the blades separated from the mast they flapped to the extent that they severed the tail boom and the helicopter fell to the ground. At the time the helicopter was flying above 5000 ft in mountain country, crossing the Waipara Saddle. The turbulence was described as 'severe to extreme' by subsequent rescue pilots operating near the area. The wind speed in the area was around 30 kts. The severe turbulence was cited as the main cause of the accident.

Certain factors can increase the risk that an encounter with turbulence will be catastrophic for you and your machine. One of these factors is your airspeed. The effects of turbulence on blade flapping are increased as airspeed increases and if you are going too fast for the conditions you simply will not have the time to react and save the situation. Another factor is the control inputs used in response to turbulence encounters. Turbulence can encourage sudden, abrupt control inputs including overpitching that can lead to excessive blade flapping and mast bumping.

Consider these words from Robinson Safety Notice SN-32: ***"Do not overcontrol. Allow aircraft to go with the turbulence, then restore level flight with smooth, gentle control inputs."***

Both turbulence and airspeed were considered likely factors in the accident below:

R22 over Lake Wanaka: the helicopter crashed over Lake Wanaka and was recovered by a Navy Dive Squad from a depth of 80m. The wreckage and injuries to the pilot showed that a catastrophic mast bump event had occurred. Almost immediately following the mast bump one of the main rotor blades cut through the cabin, killing the pilot and sending the helicopter nose-down into the lake. While the exact causes of the mast bump could not be determined the TAIC investigation determined it was likely brought about by an encounter with turbulence while the helicopter was travelling with a high forward airspeed. A further contributing factor was the pilot's use of his cellphone during the onset of the accident sequence.

Below is an image of the damaged rotor hub and mast from the R22 in the accident:

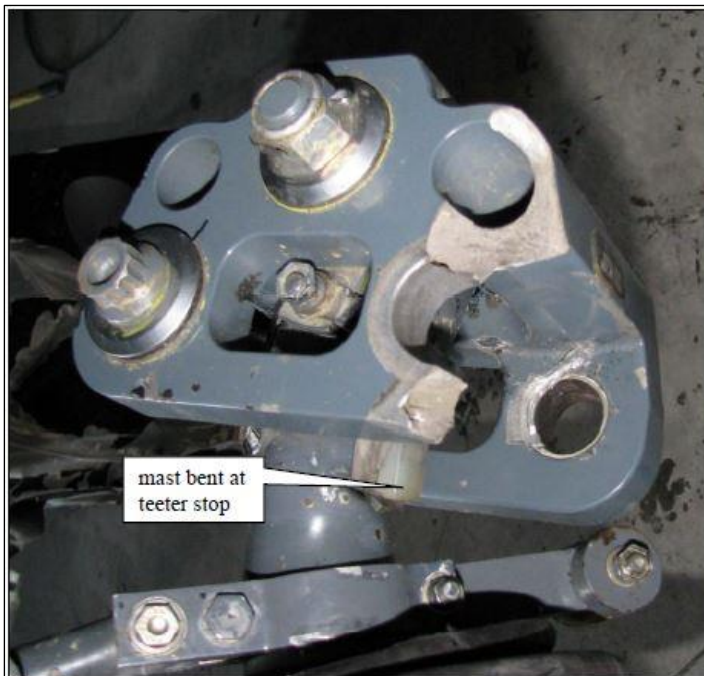


Figure 7  
Rotor hub and evidence of mast bump

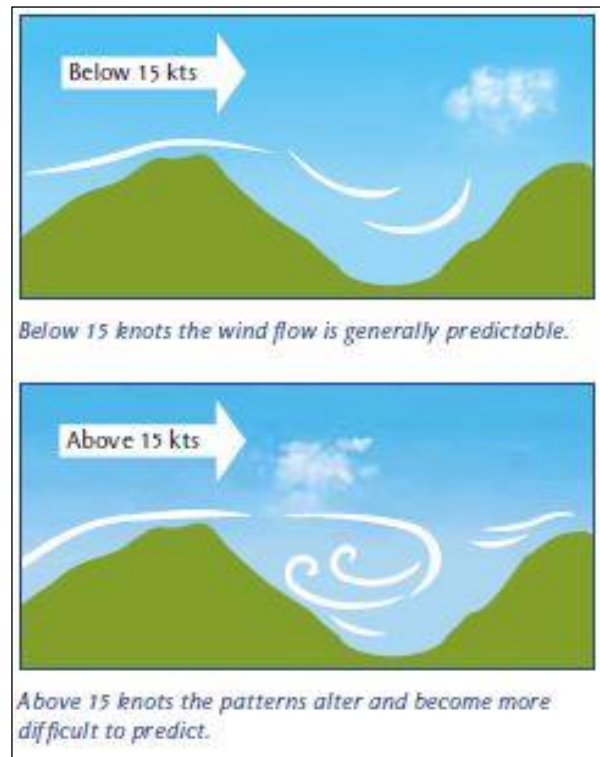
### Resilience against the risk

As so many other safety notices and bulletins state, the most important strategy to reducing the risk of being involved in a mast bump accident is avoiding the

conditions where it might occur in the first place. As the Rotorcraft Flying Handbook says: ***"this means avoiding turbulence as much as possible."*** But of course that's easier said than done in New Zealand, where over half of the terrain is mountainous and we lie as we do in the Roaring 40's. **It is important therefore that those who operate twin-bladed machines are fully up-to-speed on where and when turbulence will occur and what to do to:**

- a) Avoid it; or
- b) Manage it correctly

As the diagram below shows, whenever the wind speed gets up over around 15 kts and there are obstacles in front of that wind, turbulence is likely to occur:



Understanding how air flows in the mountains can be really hard but there is an easy way to learn about it. Get students to go to the river and watch how the water goes around the rocks (hills/mountains). Place different rocks in the river in various places (where the current is slow and fast, creating valleys and seeing the venturi affect) and use milk or cream dripped into the water upstream. This shows the turbulent areas and where the wind changes speed and even goes backwards. As air is just a fluid the water behaves the same as wind in the mountains. Before you scoff at how simple this sounds, bear in mind that this type of accident has claimed two

experienced pilots in the last two years. Understanding air movements and how turbulence occurs is key to ensuring the list of accidents in this category stops where it is now. There are some great resources online that are worth a look. Although it's focused on fixed-wing, Mountain Flying offers a lot of good information on weather in the mountains and is an extremely good resource for operators of all machines and all levels of experience: [http://www.mountainflying.com/Menu/mtn\\_fly\\_menu/mtn\\_fly\\_menu.html](http://www.mountainflying.com/Menu/mtn_fly_menu/mtn_fly_menu.html)

The CAA's GAP booklet on Mountain Flying is another good resource:

[http://www.caa.govt.nz/safety\\_info/GAPs/Mountain\\_Flying.pdf](http://www.caa.govt.nz/safety_info/GAPs/Mountain_Flying.pdf)

### Flight techniques: keeping the disc loaded and recovering from a low-G roll

The secret to avoiding mast bumping situations is to keep the disc loaded. Think of the helicopter fuselage as a pendulum suspended by the rotor disc. When the pendulum effect is removed by low G then the tail rotor will roll the fuselage – if it is providing sufficient thrust. The lower the collective, the less will be the T/R thrust so any uncommanded roll will be slower and give you more time to react. The reality is that the less cyclic inputs you make in turbulence, the safer the flight condition. So think about this:

- Lower the collective and reduce speed BEFORE turbulence is encountered. To be able to do this you need to understand wind over terrain.
- Where possible stay on the windward side of any ridge and if you must cross over try and follow a ridge that heads in the general downwind direction – then stay on the windward side of that.
- Keep the disc loaded by gently applying aft cyclic
- Use minimal cyclic inputs
- Restore the helicopter to normal flight once you are through the turbulence
- **Accept that there are conditions in NZ which will generate turbulence beyond the helicopter's ability to withstand. So wait for better conditions to prevail.**

When planning a flight that may involve significant turbulence consider the weight of the helicopter. A lightly loaded machine is more likely to suffer mast bumping than when it is heavily loaded. The forgoing is really all about prevention rather than cure.

### A word on recovery

Pilots have been taught that the correct response to a low G roll is to apply aft cyclic to load the disc. And this will work but the challenge for any pilot is not to apply cyclic in the opposite direction of the roll – **because that is instinctive.**

So the ability of pilots to cure a low G situation is heavily compromised by their instinctive reaction to a roll and that is why NZHA promotes prevention rather than cure. Please see the Appendix on the next few pages (pp. 6-9) for a paper on mast bump accidents and Robinson helicopters compiled by the CAA's Andy Mackay.



# Appendix: Flight into Turbulence

(Andy McKay March 2015)

## Robinson Safety Notice SN-32

Issued: March 1998

Revised: May 2013

### HIGH WINDS OR TURBULENCE

A pilot's improper application of control inputs in response to high Winds or turbulence can increase the likelihood of a mast bumping Accident. The following procedures are recommended:

1.

If turbulence is expected, reduce power and use a slower than normal cruise speed. Mast bumping is less likely at lower airspeeds.

2.

If significant turbulence is encountered, reduce airspeed to 60 - 70 knots.

3.

Tighten seat belt and firmly rest right forearm on right leg to prevent unintentional control inputs.

4.

Do not overcontrol. Allow aircraft to go with the turbulence, then restore level flight with smooth, gentle control inputs.

Momentary airspeed, heading, altitude, and RPM excursions are to be expected.

5.

Avoid flying on the downwind side of hills, ridges, or tall buildings where the turbulence will likely be most severe.

The helicopter is more susceptible to turbulence at light weight. Use caution when flying solo or lightly loaded.

## Correct Recovery from a low "G" Roll

**First** -Gentle aft cyclic (to recover from low G condition)

**Second** -Apply lateral cyclic (to recover from right roll)

**Third** -Land immediately

## So why does Robinson ask us to slow down in Turbulence?

- Simply put, to avoid a low G induced right roll that could lead to “Mast Bumping.”
- To a lesser degree, to reduce aerodynamic shock loading that can lead to damage

The actual mechanics of the “Mast Bump” itself is explained in another briefing.

The effects of shock loading damage can be unique to the type of Helicopter and Rotorhead. E.g. Hughes 500 heads have a tendency to break strap packs in bad turbulence.

In this briefing I want to get the relationship sorted between **Speed**, **Low G** and a **Low G Roll** on a two bladed helicopter, **specifically the Robinson**.

Low G is any G loading below 1g (1g is what we feel normally). Below 1g we start to feel a bit weightless and above 1 g we feel more weight pressure. Learn to feel this for yourself. We refer to this sometimes as an increase or decrease in loading.

It does not need to be negative to cause an issue in a 2-bladed helicopter.

Robinson have typically flight tested down to about 0.5g. A Pull-up and push-over in an R66 from 124 knots created a 0.478 g loading and a right roll that was on the limit of what the test pilot was comfortable recovering from in a timely manner. In the days when Low G was a demonstration the power setting for the demonstration in an R22 was typically 18-20 inches in a gentle pushover. The right roll was reasonably gentle and anticipated for recovery. However if the roll is commenced from high cruise power then the resulting roll is significantly faster and remember that's a recovery *with* anticipation. Generally in the real-deal the low G rolls are unexpected. **Please remember Low G demonstration is now strictly prohibited in flight.**

By the time it goes negative (below 0) the roll rate is likely to be extremely high (and possibly unrecoverable) depending on the power in use.

The killer with Low G is the pilot's incorrect input of cyclic control when it is encountered. The recovery should become second nature.

Often in bad turbulence you will feel a combination of an increase and decrease in loading as the helicopter reacts to the disturbed air. Often its not worth chasing as it will correct by itself. However be prepared should you be exposed to a prolonged decrease in loading as Low G issues may develop.

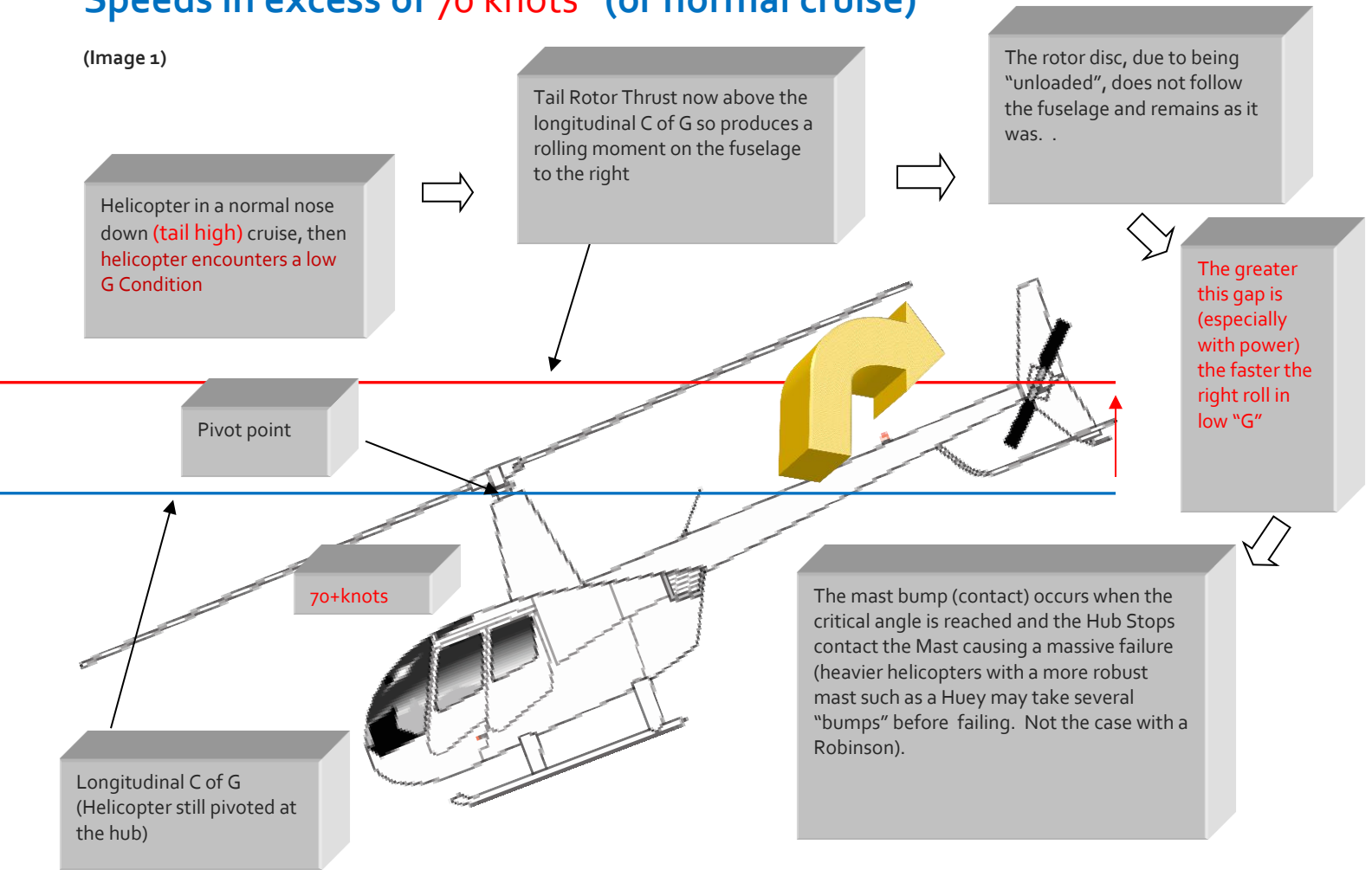
The best defence is avoid a Low G condition. Speed control is one means of achieving this.

Let me explain with some diagrams:



## Speeds in excess of 70 knots (or normal cruise)

(Image 1)



- Helicopter speed **70+ Knots**
- Nose down, tail high attitude.
- The higher the speed the higher the tail
- The higher the tail is above the longitudinal C of G then the higher the right roll rate.

Practical examples of where this may be a problem.

Crossing a ridge or saddle at 70+ knots and then allowing the nose to drop excessively on the downside or leeward side is not a good time to encounter turbulence and Low G.

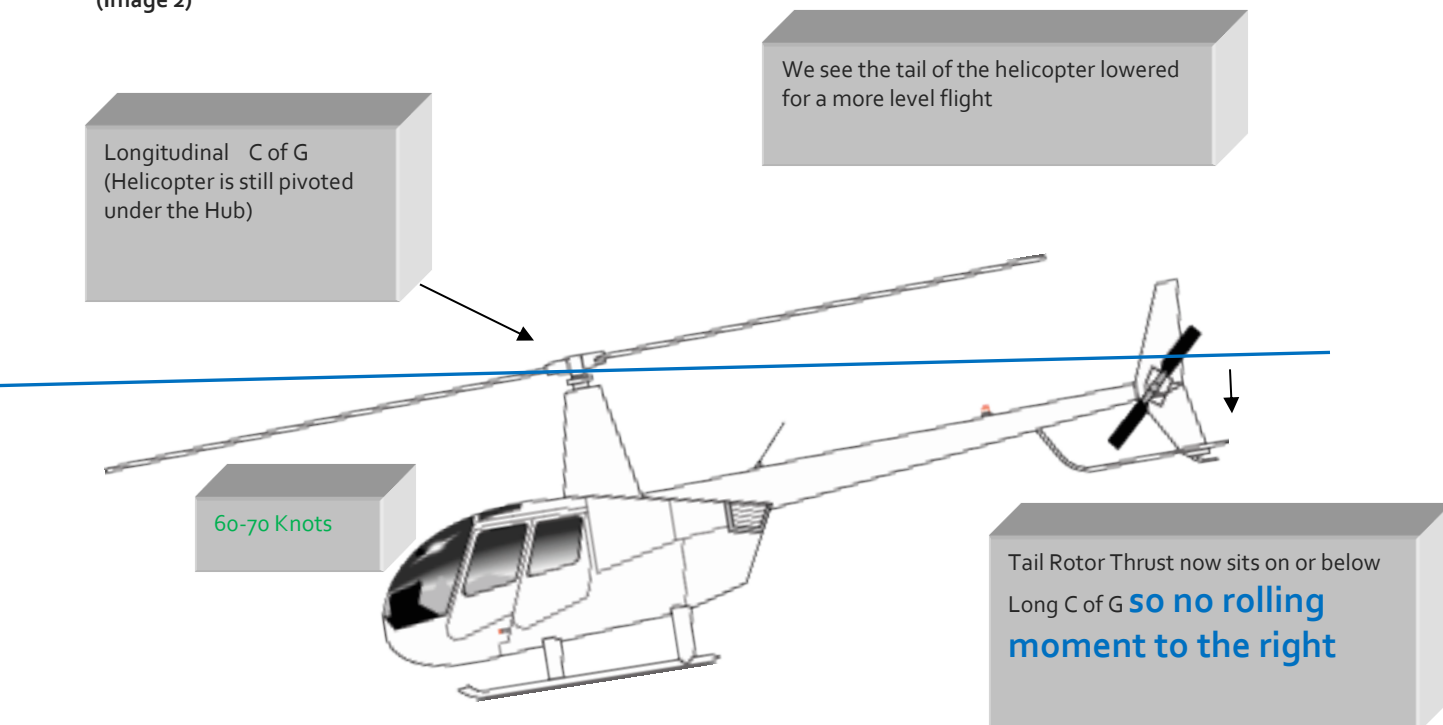
Any 'map of the earth' flying, especially in the mountains. Remember in a two bladed helicopter always lead with collective and watch where the nose + tail attitude is.

The lighter the helicopter, the more susceptible it is to Low G.

The faster the helicopter (i.e. an R66 at 130 knots), the longer it takes to reduce speed to 60-70 knots. Also this higher speed may indicate a high power setting and an extremely high roll rate if Low G is encountered.

## Now we reduce Speed to 60-70 Knots

(Image 2)



- Helicopter Speed is now **60-70 knots**.
- Helicopter loses the tail high attitude.
- No rolling moment as T/R thrust is below pivot point on Hub (longitudinal C of G)
- So if in turbulence and Low G occurs in this attitude there is no right rolling moment to allow the mast bump.

**\*\*Caution note \*\***However even with low airspeed if the tail is well above the Long C of G and Low G is hit then the helicopter will still roll. As long as the tail rotor is producing thrust (It may be on a low power setting) the roll rate will just be lower.

### Example

Watch out for climbing up to a high saddle from a valley in turbulence and then aborting the crossing and turning downwind and downhill and in the process allowing the nose to excessively drop (loss of horizon) and putting the tail high even at low speed. Not a good time to hit Low G (keep aware).

Helicopter may experience a Low G and get bounced around. This in itself is not an issue unless it rolls. Keep control movements to a minimum. Ride with it as much as possible.

With experience you should learn to anticipate where turbulence is hiding and if possible avoid it but at least prepare for it by **SLOWING DOWN**.



# New Zealand Helicopter Association Safety Bulletin

Low-G situations, mast bump, and turbulence

## NZHA SAFETY BULLETINS

SB 4

Late last year, shortly after a fatal R44 accident at the top of the South Island, we received the following e-mail:

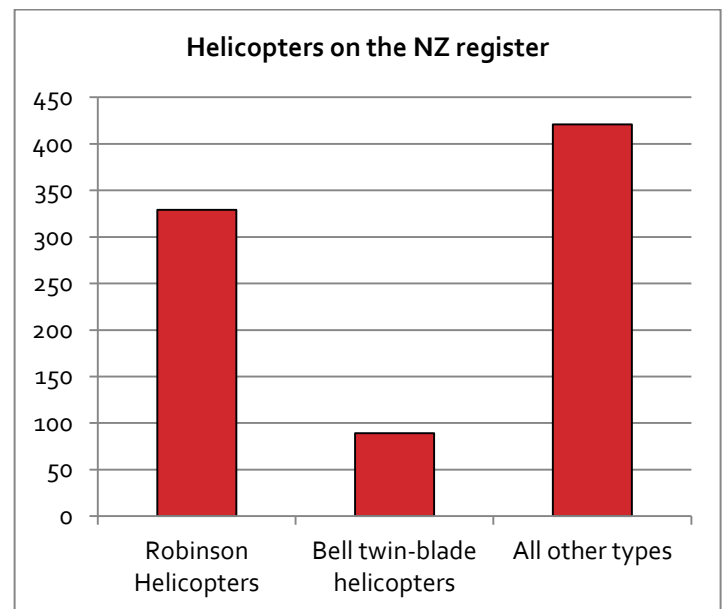
***“Having just returned last night from the South Island where I spent the day with the pilot’s father and sister on a hill waiting for ground search teams to follow along the wreckage trail in steep heavily covered bush forest, to discover the cabin and the pilot dead I believe the following is worthy of consideration for all who fly two-bladed rotor systems.***

***In relation to the above accident, the prevailing conditions, terrain, and wreckage trail was very similar to that of a 2013 accident in the Central North Island. The helicopter was flying downwind in about a 20 knot wind and had crossed a high ridge. First found were pieces of paper, followed by clear plastic, a blade tie down, honeycomb, and eventually the cabin.***

***It is most likely going to take a while for the formal investigations to be completed but I suspect both will identify mast bumping as a result of negative G experienced in the turbulence encountered after crossing the ridge.”***

Mast bump and other situations where control over the main rotor is lost are **leading causes of fatal accidents** in two-bladed semi-rigid rotor helicopters. In terms of

machines operating in New Zealand, this means mainly Robinsons and Jet Rangers. Combined these helicopter types make up **50% of the total register**:



Combined with New Zealand’s unique topography and weather, the high proportion of twin-blade machines means pilots here are at increased risk of mast bump accidents. This bulletin is targeted at preventing us from having any more of these accidents, which in the vast majority of cases are catastrophic. It also looks at other risks posed by turbulent conditions, particularly when operating over and within mountainous terrain.

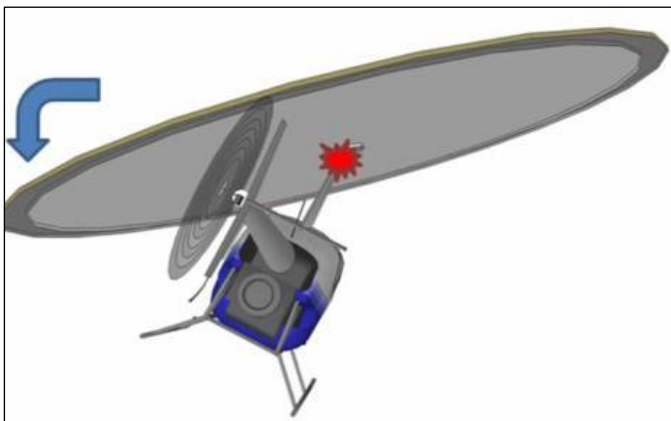
## Mast bumping explained

Twin-blade semi-rigid rotor systems are designed to allow the blades to flap. **Mast bump** is the name given to the accident situation where this flapping exceeds the structural limitations of the rotor hub's connection to the mast: the rotor head tilts so far that it contacts the mast, usually causing separation of either one blade or the entire rotor. The flapping can be such that the rotor severs the tailboom or strikes the cabin. **The vast majority of these accidents are fatal as the helicopter becomes completely uncontrollable. The causes are outlined below.**



## Low-G situations and mast bumping

Pilot-induced low-gravity situations are the most commonly-mentioned causes of mast bump in the operating handbooks and textbooks. In a low-G situation the weight of the fuselage is momentarily unloaded from the rotor disk. The thrust from the tail rotor then causes the fuselage to roll to the right very, very quickly: in a safety video from the early 90's Frank Robinson explains that **this roll rate can be "as fast as 100° a second"**. It is the instinctive reaction of pilots finding themselves in this situation to apply left cyclic – and generally this is done abruptly considering the rapidness of the roll and the panic induced by the sudden weightless condition that has preceded it. Application of left cyclic tilts the disk but has no effect on the fuselage: the static stop limits are exceeded, the rotor head contacts the mast and either the mast

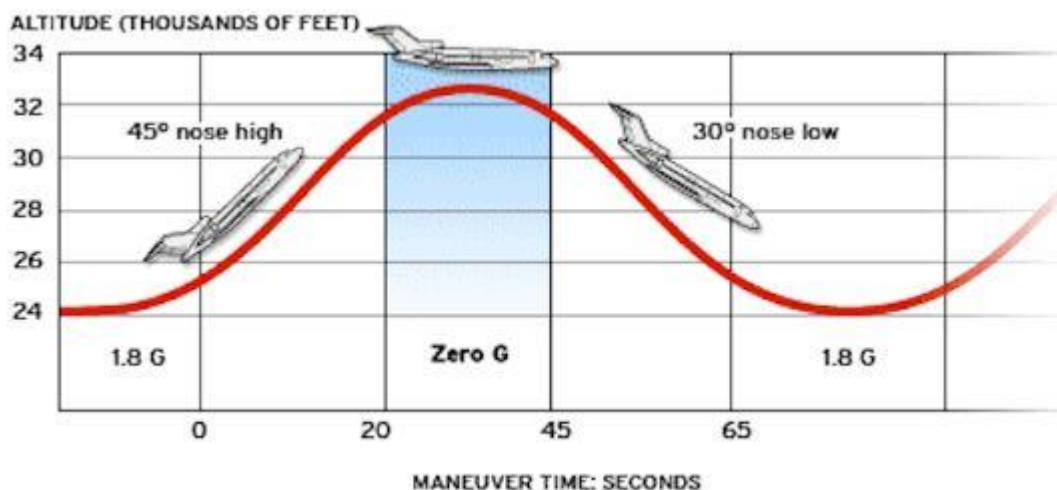


separates or the blades contact the fuselage, either the tailboom or the cabin. The image to the left illustrates the process.

## How control inputs can induce low-G states

Abrupt cyclic pushovers are the most frequently-mentioned cause. These can be induced in several ways. For instance they may occur when a pilot becomes focused on **following terrain**: as terrain begins to slope downhill the pilot may initiate a cyclic pushover while they concentrate on maintaining a steady height

above the ground. Cyclic pushovers can also occur when pilots **attempt to level out after climbing**. This is illustrated in the picture below. Although the example is for large jet aircraft flying many thousands of feet high, the principle is exactly the same. Note that the first of these (following descending terrain) can occur in level flight. Both of these cyclic pushover causes were addressed specifically in the Robinson Safety notice SN-11, originally issued in 1982. A related safety notice is SN-29 concerning fixed wing pilots transitioning to rotary. The learned, highly ingrained reaction of fixed wing pilots to push the stick forward when attempting to descend or to avoid a collision (say with a bird) can be fatal. Please be aware of the special risk that this presents.



**An example of just such a low-G accident in New**



## Zealand occurred in Taupo in early 2004:

The R22 was found crashed inverted, with a debris trail of cabin contents and shattered perspex leading to the accident site. Both the pilot and passenger were fatally injured. The weather on the day was perfectly clear, calm and still. The accident site was near several high voltage power lines. It was determined that at some point in the flight, possibly after climbing rapidly to avoid the power lines, the pilot had initiated an abrupt pushover leading to a low-G situation. The low G and roll to the right were so violent that the pilot's windshield, which survived the accident intact, bore marks from where his boots left the pedals and were forced against it (shown below):

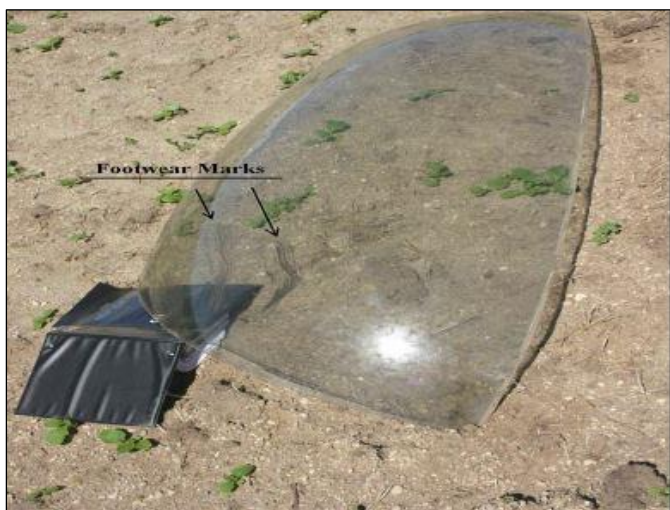


Figure 3: Pilot's windscreen with footwear marks. Note abrupt change in direction.

As the fuselage continued into the right roll the main rotor blades sliced through the cabin 3 times; first severing the roof of the canopy, then the control panel, and then the cabin floor through the center. The accident wreckage revealed that the cyclic pushover must have been so abrupt that once the low-G situation was reached it would have been impossible to recover from.

This accident vividly and horrifically demonstrates how critical this safety warning (in several Robinson safety notices and in operating handbooks) is:

***"Never abruptly push the stick forward".***

## Turbulence can induce a low-G state

Windshear and other meteorological conditions play a huge role in NZ aviation accidents, due in large part to the fact that the weather conditions here are uniquely challenging. **In New Zealand this is especially true of turbulence.** The Robinson Safety Notice SN-32 warns pilots of the increased risk of mast bumping and excessive blade flapping when operating in turbulent conditions.

**In a severe downdraft the loading on the main rotor disk can become low or negative,** exactly like the pushover-induced low-g situation mentioned above. Once again the main rotor becomes unstable; the tail rotor begins to roll the fuselage over and the risk of mast bump and/or the rotor cutting through the fuselage increases rapidly. If the turbulence is severe enough then recovery can become next to impossible, as in the accident below:

R22 near Mt. Aspiring. Both the instructor and the student were killed when the helicopter broke up in flight. The investigation revealed that the rotor hub teeter stops were crushed, indicating that mast bump had occurred, however before the blades separated from the mast they flapped to the extent that they severed the tail boom and the helicopter fell to the ground. At the time the helicopter was flying above 5000 ft in mountain country, crossing the Waipara Saddle. The turbulence was described as 'severe to extreme' by subsequent rescue pilots operating near the area. The wind speed in the area was around 30 kts. The severe turbulence was cited as the main cause of the accident.

Certain factors can increase the risk that an encounter with turbulence will be catastrophic for you and your machine. One of these factors is your airspeed. The effects of turbulence on blade flapping are increased as airspeed increases and if you are going too fast for the conditions you simply will not have the time to react and save the situation. Another factor is the control inputs used in response to turbulence encounters. Turbulence can encourage sudden, abrupt control inputs including overpitching that can lead to excessive blade flapping and mast bumping.

Consider these words from Robinson Safety Notice SN-32: ***"Do not overcontrol. Allow aircraft to go with the turbulence, then restore level flight with smooth, gentle control inputs."***

Both turbulence and airspeed were considered likely factors in the accident below:

R22 over Lake Wanaka: the helicopter crashed over Lake Wanaka and was recovered by a Navy Dive Squad from a depth of 80m. The wreckage and injuries to the pilot showed that a catastrophic mast bump event had occurred. Almost immediately following the mast bump one of the main rotor blades cut through the cabin, killing the pilot and sending the helicopter nose-down into the lake. While the exact causes of the mast bump could not be determined the TAIC investigation determined it was likely brought about by an encounter with turbulence while the helicopter was travelling with a high forward airspeed. A further contributing factor was the pilot's use of his cellphone during the onset of the accident sequence.

Below is an image of the damaged rotor hub and mast from the R22 in the accident:

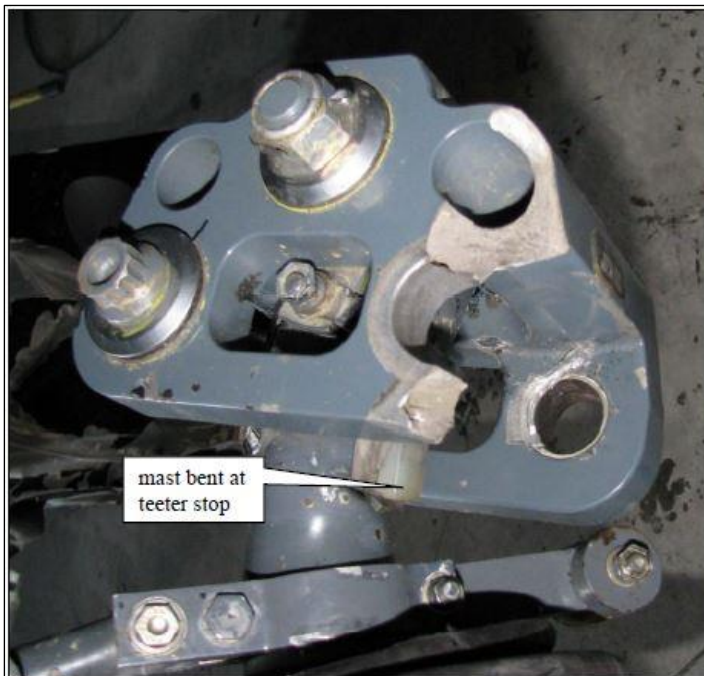


Figure 7  
Rotor hub and evidence of mast bump

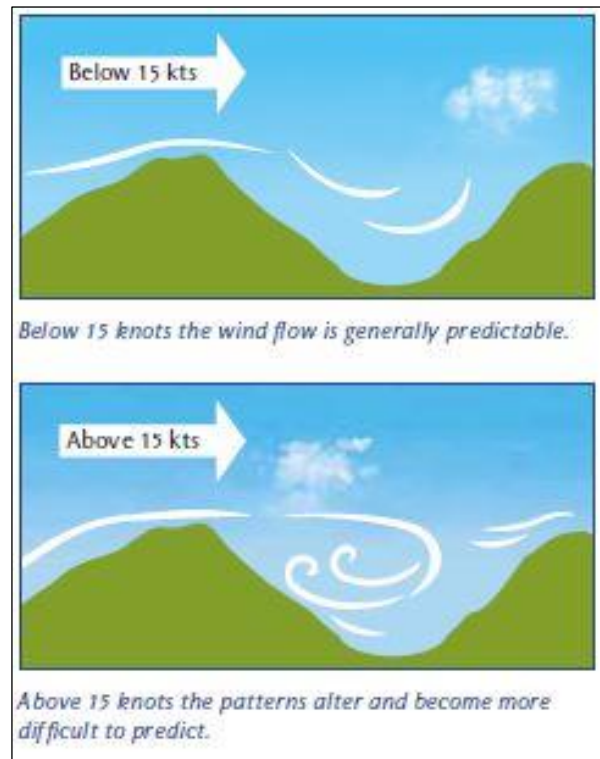
### Resilience against the risk

As so many other safety notices and bulletins state, the most important strategy to reducing the risk of being involved in a mast bump accident is avoiding the

conditions where it might occur in the first place. As the Rotorcraft Flying Handbook says: ***"this means avoiding turbulence as much as possible."*** But of course that's easier said than done in New Zealand, where over half of the terrain is mountainous and we lie as we do in the Roaring 40's. **It is important therefore that those who operate twin-bladed machines are fully up-to-speed on where and when turbulence will occur and what to do to:**

- a) Avoid it; or
- b) Manage it correctly

As the diagram below shows, whenever the wind speed gets up over around 15 kts and there are obstacles in front of that wind, turbulence is likely to occur:



Understanding how air flows in the mountains can be really hard but there is an easy way to learn about it. Get students to go to the river and watch how the water goes around the rocks (hills/mountains). Place different rocks in the river in various places (where the current is slow and fast, creating valleys and seeing the venturi affect) and use milk or cream dripped into the water upstream. This shows the turbulent areas and where the wind changes speed and even goes backwards. As air is just a fluid the water behaves the same as wind in the mountains. Before you scoff at how simple this sounds, bear in mind that this type of accident has claimed two

experienced pilots in the last two years. Understanding air movements and how turbulence occurs is key to ensuring the list of accidents in this category stops where it is now. There are some great resources online that are worth a look. Although it's focused on fixed-wing, Mountain Flying offers a lot of good information on weather in the mountains and is an extremely good resource for operators of all machines and all levels of experience: [http://www.mountainflying.com/Menu/mtn\\_fly\\_menu/mtn\\_fly\\_menu.html](http://www.mountainflying.com/Menu/mtn_fly_menu/mtn_fly_menu.html)

The CAA's GAP booklet on Mountain Flying is another good resource:

[http://www.caa.govt.nz/safety\\_info/GAPs/Mountain\\_Flying.pdf](http://www.caa.govt.nz/safety_info/GAPs/Mountain_Flying.pdf)

### Flight techniques: keeping the disc loaded and recovering from a low-G roll

The secret to avoiding mast bumping situations is to keep the disc loaded. Think of the helicopter fuselage as a pendulum suspended by the rotor disc. When the pendulum effect is removed by low G then the tail rotor will roll the fuselage – if it is providing sufficient thrust. The lower the collective, the less will be the T/R thrust so any uncommanded roll will be slower and give you more time to react. The reality is that the less cyclic inputs you make in turbulence, the safer the flight condition. So think about this:

- Lower the collective and reduce speed BEFORE turbulence is encountered. To be able to do this you need to understand wind over terrain.
- Where possible stay on the windward side of any ridge and if you must cross over try and follow a ridge that heads in the general downwind direction – then stay on the windward side of that.
- Keep the disc loaded by gently applying aft cyclic
- Use minimal cyclic inputs
- Restore the helicopter to normal flight once you are through the turbulence
- **Accept that there are conditions in NZ which will generate turbulence beyond the helicopter's ability to withstand. So wait for better conditions to prevail.**

When planning a flight that may involve significant turbulence consider the weight of the helicopter. A lightly loaded machine is more likely to suffer mast bumping than when it is heavily loaded. The forgoing is really all about prevention rather than cure.

### A word on recovery

Pilots have been taught that the correct response to a low G roll is to apply aft cyclic to load the disc. And this will work but the challenge for any pilot is not to apply cyclic in the opposite direction of the roll – **because that is instinctive.**

So the ability of pilots to cure a low G situation is heavily compromised by their instinctive reaction to a roll and that is why NZHA promotes prevention rather than cure. Please see the Appendix on the next few pages (pp. 6-9) for a paper on mast bump accidents and Robinson helicopters compiled by the CAA's Andy Mackay.



# Appendix: Flight into Turbulence

(Andy McKay March 2015)

## Robinson Safety Notice SN-32

Issued: March 1998

Revised: May 2013

### HIGH WINDS OR TURBULENCE

A pilot's improper application of control inputs in response to high Winds or turbulence can increase the likelihood of a mast bumping Accident. The following procedures are recommended:

1.

If turbulence is expected, reduce power and use a slower than normal cruise speed. Mast bumping is less likely at lower airspeeds.

2.

If significant turbulence is encountered, reduce airspeed to 60 - 70 knots.

3.

Tighten seat belt and firmly rest right forearm on right leg to prevent unintentional control inputs.

4.

Do not overcontrol. Allow aircraft to go with the turbulence, then restore level flight with smooth, gentle control inputs.

Momentary airspeed, heading, altitude, and RPM excursions are to be expected.

5.

Avoid flying on the downwind side of hills, ridges, or tall buildings where the turbulence will likely be most severe.

The helicopter is more susceptible to turbulence at light weight. Use caution when flying solo or lightly loaded.

## Correct Recovery from a low "G" Roll

**First** -Gentle aft cyclic (to recover from low G condition)

**Second** -Apply lateral cyclic (to recover from right roll)

**Third** -Land immediately



## So why does Robinson ask us to slow down in Turbulence?

- Simply put, to avoid a low G induced right roll that could lead to “Mast Bumping.”
- To a lesser degree, to reduce aerodynamic shock loading that can lead to damage

The actual mechanics of the “Mast Bump” itself is explained in another briefing.

The effects of shock loading damage can be unique to the type of Helicopter and Rotorhead. E.g. Hughes 500 heads have a tendency to break strap packs in bad turbulence.

In this briefing I want to get the relationship sorted between **Speed**, **Low G** and a **Low G Roll** on a two bladed helicopter, **specifically the Robinson**.

Low G is any G loading below 1g (1g is what we feel normally). Below 1g we start to feel a bit weightless and above 1 g we feel more weight pressure. Learn to feel this for yourself. We refer to this sometimes as an increase or decrease in loading.

It does not need to be negative to cause an issue in a 2-bladed helicopter.

Robinson have typically flight tested down to about 0.5g. A Pull-up and push-over in an R66 from 124 knots created a 0.478 g loading and a right roll that was on the limit of what the test pilot was comfortable recovering from in a timely manner. In the days when Low G was a demonstration the power setting for the demonstration in an R22 was typically 18-20 inches in a gentle pushover. The right roll was reasonably gentle and anticipated for recovery. However if the roll is commenced from high cruise power then the resulting roll is significantly faster and remember that's a recovery *with* anticipation. Generally in the real-deal the low G rolls are unexpected. **Please remember Low G demonstration is now strictly prohibited in flight.**

By the time it goes negative (below 0) the roll rate is likely to be extremely high (and possibly unrecoverable) depending on the power in use.

The killer with Low G is the pilot's incorrect input of cyclic control when it is encountered. The recovery should become second nature.

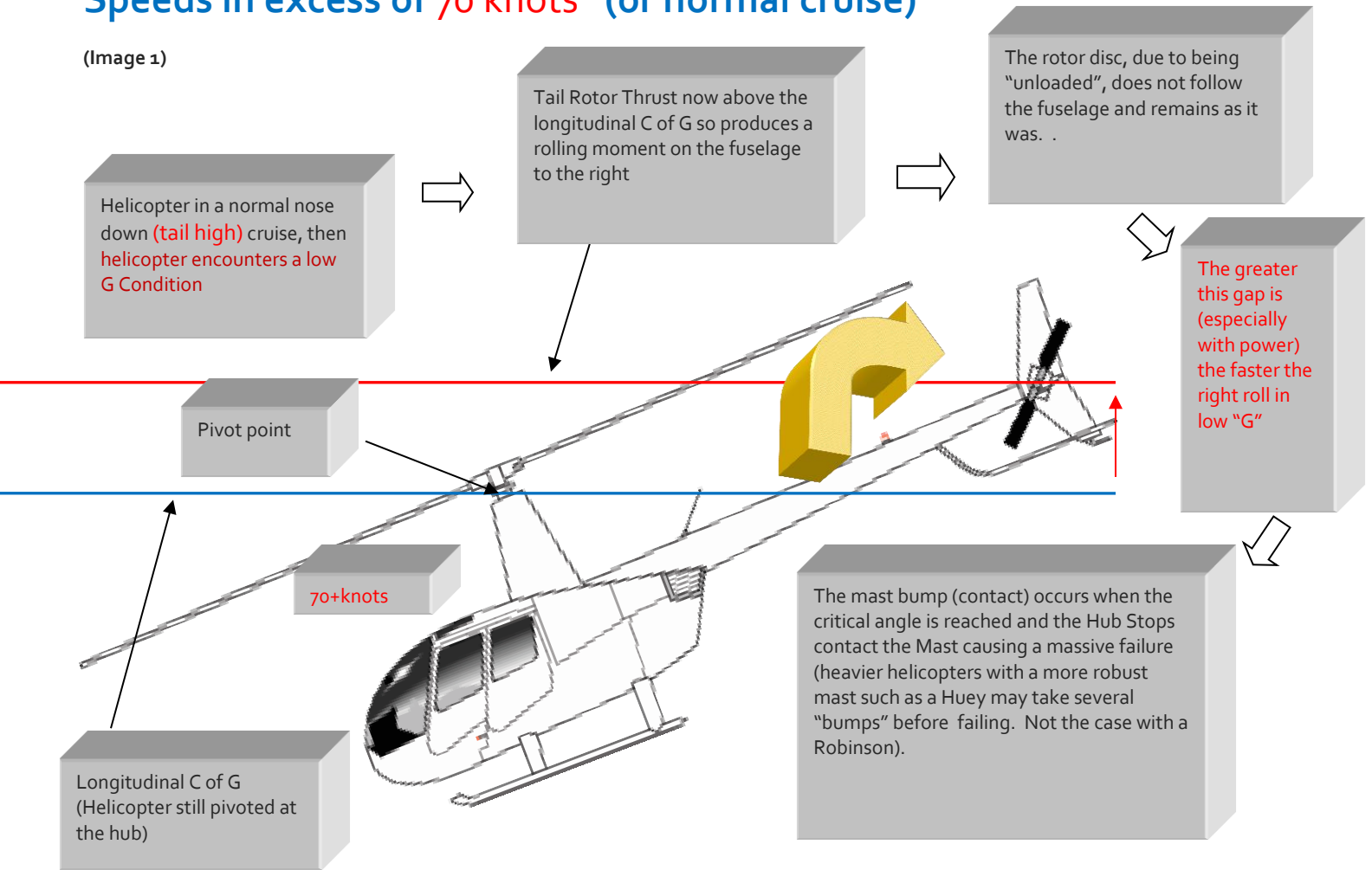
Often in bad turbulence you will feel a combination of an increase and decrease in loading as the helicopter reacts to the disturbed air. Often its not worth chasing as it will correct by itself. However be prepared should you be exposed to a prolonged decrease in loading as Low G issues may develop.

The best defence is avoid a Low G condition. Speed control is one means of achieving this.

Let me explain with some diagrams:

## Speeds in excess of 70 knots (or normal cruise)

(Image 1)



- Helicopter speed **70+ Knots**
- Nose down, tail high attitude.
- The higher the speed the higher the tail
- The higher the tail is above the longitudinal C of G then the higher the right roll rate.

Practical examples of where this may be a problem.

Crossing a ridge or saddle at 70+ knots and then allowing the nose to drop excessively on the downside or leeward side is not a good time to encounter turbulence and Low G.

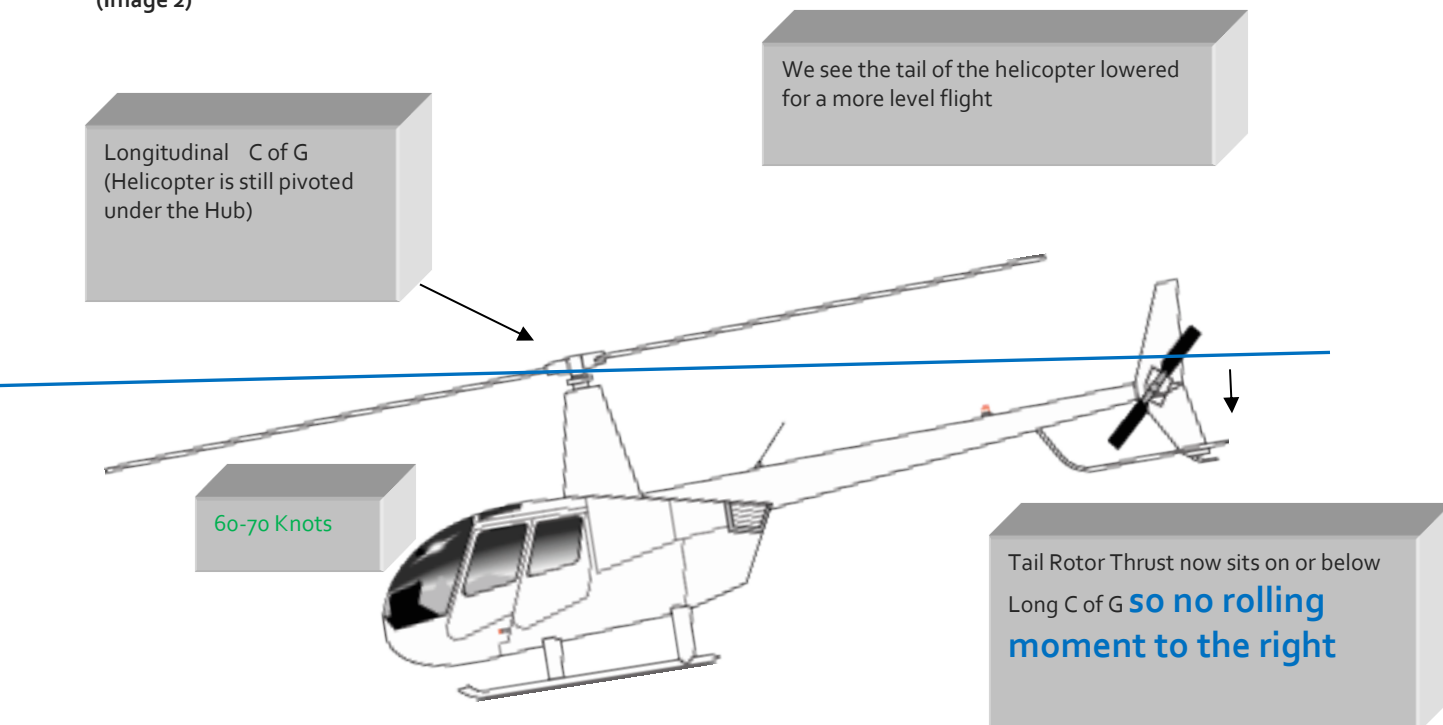
Any 'map of the earth' flying, especially in the mountains. Remember in a two bladed helicopter always lead with collective and watch where the nose + tail attitude is.

The lighter the helicopter, the more susceptible it is to Low G.

The faster the helicopter (i.e. an R66 at 130 knots), the longer it takes to reduce speed to 60-70 knots. Also this higher speed may indicate a high power setting and an extremely high roll rate if Low G is encountered.

## Now we reduce Speed to 60-70 Knots

(Image 2)



- Helicopter Speed is now **60-70 knots**.
- Helicopter loses the tail high attitude.
- No rolling moment as T/R thrust is below pivot point on Hub (longitudinal C of G)
- So if in turbulence and Low G occurs in this attitude there is no right rolling moment to allow the mast bump.

**\*\*Caution note \*\***However even with low airspeed if the tail is well above the Long C of G and Low G is hit then the helicopter will still roll. As long as the tail rotor is producing thrust (It may be on a low power setting) the roll rate will just be lower.

### Example

Watch out for climbing up to a high saddle from a valley in turbulence and then aborting the crossing and turning downwind and downhill and in the process allowing the nose to excessively drop (loss of horizon) and putting the tail high even at low speed. Not a good time to hit Low G (keep aware).

Helicopter may experience a Low G and get bounced around. This in itself is not an issue unless it rolls. Keep control movements to a minimum. Ride with it as much as possible.

With experience you should learn to anticipate where turbulence is hiding and if possible avoid it but at least prepare for it by **SLOWING DOWN**.

27 February 2015

## NZSAR RISK MATRIX

Risk #	Risk Description	Reasons or Causes	Consequences	Likelihood	Consequences	Risk Level (reviewed)	Risk Treatment(s)	Post Treatment (planned for )	Comments/Examples
2014/01	<b>SAR Information</b>  Search and rescue information is inadequate or unreliable for future planning.	SAR data collection is fragmented, lacks cohesion and is typically collected to meet the requirements of individual organisations. Properly analysed longitudinal information is difficult for decision makers to access. Data gaps and omissions render sound analysis difficult. In some instances, excessive detail is being collected.  Insufficient focus is placed on the analysis of existing data.  Drivers of SAR demand such as activity participation is not well understood.	Without reliable information, NZSAR will be unable to identify strategic changes and opportunities for the SAR community.  Effective decision making is compromised by the lack of reliable, analysed data. Information can also be hard to access as it can reside within silos.	Certain	Moderate	(Aug 14)	<b>Risk treatment 2014/01/A: SAR Data Standard</b> In consultation with operational SAR agencies, develop and document an agreed SAR data standard for collection, collation and analysis.	(14/15 NSSP)	Changing patterns in, for example, society, demographics, tourism, recreational activities, participation rates and technology is likely to impact on SAR needs and resources.
						(Aug 14)	<b>Risk treatment 2014/01/B: Data exchange and storage</b> Establish and maintain a single repository for all SAR data.	(14/15 NSSP)	
						(Aug 14)	<b>Risk treatment 2014/01/C: Data analysis</b> Analyse SAR data to identify trends and patterns in SAR events. Such analyses should be used in conjunction with other data to show broader trends and patterns. The resultant products will be made available to decision makers and stakeholders.	(Ongoing)	
						(Aug 14)	<b>Risk treatment 2014/01/D: SAR Operational Analysis</b> Conduct an operational analysis of SAR need mapped to SAR resources. Assist SAR providing agencies to reshape their organisations to match proven SAR need.	(14/15 NSSP)	
2014/02	The sector experiences funding sufficiency and volatility risks.	<b>Sufficiency.</b> Funding for the wider SAR sector has a variety of sources. Funders may choose to lessen or withdraw their funding support.	Inadequate funding for part or some of the sector may limit investment in training or equipment and lead to inadequate operational responses.	Possible	Moderate	(March 15)	<b>Risk treatment 2014/02/A: SAR Funding</b> Maintain an overall SAR funding picture. Work with other key SAR funders to sustain adequate supply. Maintain adequate PLA funding to meet Council goals.	(Ongoing)	
		<b>Volatility.</b> The funding levels for SAR agencies can be volatile due to profit variances with key gaming or lotteries trusts & boards. Grants policies also frequently change which can affect eligibility. Public appeals & donations are susceptible to change.	Volatile funding inhibits long term planning and investment. It also degrades sector effectiveness and efficiency.	Possible	Moderate	(March 15)	<b>Risk treatment 2014/02/B: Funded SAR SLAs</b> Continue to support key SAR providing agencies with appropriately funded three year Service Level Agreements.	(Ongoing)	

27 February 2015

Risk #	Risk Description	Reasons or Causes	Consequences	Probability	Impact	Risk Level (reviewed)	Risk Treatment(s)	Post Treatment (Planned for)	Comments/Examples
2014/03	<b>Cohesive SAR Training</b> The SAR sectors training lacks cohesion and a sector focussed integrated training framework.	SAR training has evolved, developed and is often delivered within organisational silos. The perspectives of individual organisations have frequently taken precedence over the needs and goals of the wider sector.	Training variances can impact on sector collaboration and degrade inter agency and internal cohesion. Training divergence can lead to incompatible incident management systems, different understanding of language and incompatible expectations, SAR processes and priorities. These factors can contribute to deficient SAR services, inefficiencies and potentially avoidable loss of life.	High	Moderate	(May 14)	<b>Risk treatment 2014/03/A: Redevelop NZSAR Core Training Curriculum</b> Redevelop the 2009 NZSAR Core Training Curriculum and update its content. Include process and procedures around SAR Adult and Community Education options.	(Complete and under action)	Development of the NZSAR Training Framework commenced in 2013.
						(May 14)	<b>Risk treatment 2014/03/B: Collaborative SAR training and exercising</b> Continue cooperative and collaborative training, exercising and relationship building. See treatment option 2014/04/A for a treatment option based on cross-agency training.	(Ongoing)	NZSAR supports the conduct of Police District SAREXs
2014/04	Risks exist around volunteer recruitment, retention and training.	Changing demographics and attitudes, increasing work demands impact on volunteer recruitment, availability and longevity with the SAR sector.	<p>The SAR sector is highly reliant on volunteers for the safe delivery of effective SAR services.</p> <ul style="list-style-type: none"> <li>Insufficient numbers of volunteers in the right locations is likely to impact on the safe delivery of effective SAR services.</li> <li>Volunteer turbulence increases the training burden and inhibits the formation of SAR leaders.</li> <li>Excessive training demands, poor or infrequent exercises and/or onerous administrative requirements deter people from volunteering and discourage existing volunteers from remaining.</li> <li>Infrequent utilisation for SAROPs can be dispiriting and discourage long term engagement.</li> </ul>	Unlikely	Moderate	(May 14)	<b>Risk treatment 2014/04/A: Maintain good information on SAR volunteers</b> <ul style="list-style-type: none"> <li>Maintain good information about SAR volunteers and their expectations.</li> <li>Assist SAR organisations with information around recruitment and retention of volunteers to help ensure a sufficient number in areas and types of need.</li> <li>Ensure administrative requirements are not excessive.</li> </ul>	(Ongoing)	NZSAR supports the conduct of Police District SAREXs
		Growing public and legal expectations of SAR performance and competence impacts upon the training and commitment levels of SAR volunteers.				(May 14)	<b>Risk treatment 2014/04/B: Support SAR training alignment to the NZ Qualifications Framework (NZQF)</b> When and where agreed by SAR agencies, NZSAR will actively Support and assist aligning SAR training to the NZQF.	(Ongoing)	
		Trained SAR Volunteers can be difficult to retain and motivate in areas where little SAR activity occurs.				(May 14)	<b>Risk treatment 2014/04/C: Quality SAR Exercises</b> The conduct of good quality, appropriately focussed and well evaluated SAR exercises is important as they enhance readiness, reinforce training and build cohesiveness and morale within the SAR sector.	(Ongoing)	

Risk #	Risk Description	Reasons or Causes	Consequences	Probability	Impact	Risk Level (Reviewed)	Risk Treatment(s)	Post Treatment (Planned for)	Comments/Examples
2014/05	<b>Recreational Knowledge</b>  Inadequate public understanding of personal risks taken during recreational activities.	A significant number of the public demonstrate a lack of understanding or underestimation of the risks involved with the recreational activity they are undertaking. Due to: <ul style="list-style-type: none"> <li>Decrease in public knowledge about recreational safety.</li> <li>Increase in the range of recreational activities.</li> <li>Little investment in proactive safety message promotion – particularly land, snow and avalanche safety information.</li> <li>Lack of understanding by inbound tourists about New Zealand’s conditions and weather.</li> <li>Poor coordination and cohesion between the plethora of competing agencies which provide safety advice.</li> </ul>	<ul style="list-style-type: none"> <li>Individuals fail to take adequate precautions and/or responsibility for their own safety.</li> <li>Unacceptable levels of harm to New Zealand residents and foreign tourists.</li> <li>Harm to the reputation of New Zealand as a tourist destination.</li> <li>Unrealistic public expectations of the SAR sector.</li> </ul>	Likely	Moderate	(May 14)	<b>Risk treatment 2014/05/A: Ensure the public has access to good quality, consistent safety advice.</b>  Maintain the NZSAR Adventure Smart website ( <a href="http://adventuresmart.org.nz/">http://adventuresmart.org.nz/</a> ) and support the promulgation of consistent sector messaging.	(Ongoing)	Example - Safety Code material.   Example: Safety Partnership.
						(May 14)	<b>Treatment option 2014/05/B: Recreational safety - provision of consistent information to the media.</b>  Support the relevant agencies to provide timely information to the media on personal responsibilities and better preparation when undertaking outdoor recreational activities.	(Ongoing)	
						(May 14)	<b>Treatment option 2014/05/C: Support domestic safety organisations.</b>  Support the SAR prevention efforts of domestic safety information providing agencies. Encourage and harmonise collaborative action.	(Ongoing)	
2014/06	<b>Mass Rescue Event</b>  Catastrophic mass rescue event overwhelms SAR capabilities.	New Zealand's SAR sector has very limited capacity to respond to large scale SAR events.  New Zealand has a very large SAR region with little or no SAR assets in much of the region.  Significant numbers of vessels and aircraft with large amounts of passengers transit the NZSRR.	<ul style="list-style-type: none"> <li>Significant numbers of people injured or killed that could have been rescued.</li> <li>Severe reputational damage to SAR agencies.</li> <li>Severe reputational harm to New Zealand as a tourist destination.</li> </ul>	Rare	Severe	(Aug 14)	<b>Treatment option 2014/06/A: Develop mass rescue policy and plans.</b>  In conjunction with partner agencies, develop appropriate mass rescue policies and plans.	(14/15 NSSP)	This risk is seen as high consequence but low likelihood. It is mainly controlled by the professionalism of ships officers and pilots together with advanced technology to help navigate such ships.
						(Aug 14)	<b>Treatment option 2014/06/B: Conduct regular mass rescue exercises.</b>  In conjunction with partner agencies, exercise the mass rescue plans in all Police districts to validate and refine them.	(14/15 NSSP)	



Risk #	Risk Description	Reasons or Causes	Consequences	Probability	Impact	Risk Level (Reviewed)	Risk Treatment(s)	Post Treatment (planned for)	Comments/Examples
2014/07	<b>MEOSAR Delay</b> Delay in development of the new MEOSAR ground station	A substantial delay in the development of the new ground station for receipt of satellite data from emergency locator beacons is likely to result in an inability to receive distress signals from the new medium-altitude satellites. Due to: <ul style="list-style-type: none"> <li>Lack of or insufficient funding;</li> <li>Poor project management; and,</li> <li>Technical faults.</li> </ul>	Consequences include: <ul style="list-style-type: none"> <li>Failure to meet international aviation and maritime agreements</li> <li>Damage to the international reputation of New Zealand.</li> </ul>	Rare	Major	(March 15)	<b>Treatment option 2014/07/A: Build and commission a ground station suitable for the MEOSAR satellites</b> Joint planning with Australia is ongoing. Capital finance has been approved and operational finance approved in principle. Tenders have been requested. The project is tracking well.	(Underway)	Existing low-altitude and high-altitude satellites are being replaced by medium-altitude satellites. In 2016-2017 the existing ground station will no longer be reliable and the aviation and maritime SAR capabilities will reduce.
2014/08	<b>Health and Safety</b> Incident or audit exposes SAR sector health and safety deficiencies.	NZ's H&S regulatory environment is changing. The SAR sector needs to adapt to the new requirements and implement the required changes for the SAR context.	SAR organisations fail to implement appropriate / necessary H&S processes and procedures and in the event of an audit or plans to mitigate severely negative H&S incident are: <ul style="list-style-type: none"> <li>Exposed to risk of prosecution.</li> <li>Suffer reputational damage.</li> <li>Experience an outflow of personnel due to perceived risk.</li> </ul>	Unlikely	Major	(Aug 14)	<b>Treatment Option 2014/08/A: Implement sound H&amp;S processes and procedures</b> NZSAR Council H&S processes and procedures for the SAR sector have been approved and are being implemented. The four SLA documents include H&S provisions from Jul 2014. SAR sector H&S monitoring and reporting has commenced.	(13/14 and 14/15 NSSP)	
		SAROPs and SAREXs often expose SAR people to an array of hazardous environments and situations. The sector is likely to experience a significant H&S related incident at some point.	<ul style="list-style-type: none"> <li>Experience an outflow of personnel due to excessive H&amp;S process requirements.</li> <li>Likely to expect significant external pressure / investigation / regulation / over watch following the trigger event.</li> </ul>	Rare	Severe	(Aug 14)	<b>Treatment Option 2014/08/B: H&amp;S incident contingency planning</b> SAR providing agencies and coordinating authorities are encouraged to develop contingency plans for use in the event of a SAR related severe H&S incident. Plans may include media, internal personnel and SAR partner engagement as well as grief & trauma counselling etc.	(14/15 NSSP)	





# New Zealand Search and Rescue Council Consolidated SAR Self-Assessment

Nzsar 12-4

25 March 2015

The International Aeronautical and Maritime Search and Rescue Manual (IAMSAR) includes a national self-assessment tool, which allows an individual Sovereign State to assess its SAR capabilities against international standards.

RCCNZ carried out the self-assessment internally in March 2012. Nzsar engaged a consultant to perform the self-assessment on behalf of NZ Police in June 2013. The action points from both reports have been collated into the tables below, organised by each of the six sections included in the self-assessment.

A review of this collated self-assessment was conducted over 23-24 March 2015. Comments following consultation with NZ Police and RCCNZ have been annotated in the relevant section. In 11 instances the overall status of the action points has improved, while in 16 cases there was no change (NC). A recording of NC does not reflect that there has been no work on the action point. Rather the outcome of any work conducted did not merit an improvement in the status category or the status was already assessed as green. There were no instances of a deterioration in status.

Key:



**NZ Police comments**

**Nzsar comments** [March 2015 update following consultation with RCCNZ and NZ Police]


**RCCNZ comments**



## Section One: General System Concept



#	Report	Action Point	Actions (Completed and Planned)	Status	Date
1	RCCNZ March 2012	RCCNZ should assist NZSAR with the continued development and implementation of a National SAR Plan.	<p>Aug 13: The Operational Framework for the New Zealand Search and rescue Region was completed in April 2011. This is due for an update.</p> <p>Mar 15: Update awaiting findings of NZSAR Governance Review. Work in Progress.</p>	 NC	March 2015
2	RCCNZ March 2012	RCCNZ to ensure agreements are in place for all NZ's neighbouring SAR partners.	<p>Aug 13: At June 2013 the following Agreements were in place: Australia, Chile (Maritime), Cook Islands, New Caledonia, Samoa, Tonga and United States Coast Guard.</p> <p>Agreements were being drafted for: Chile (Aviation), Fiji, Niue, Tahiti and Tokelau</p> <p>Mar 15: Chile (Aviation) agreement now in place. Efforts to achieve agreement with Fiji to be increased. Niue, Tahiti and Tokelau agreements remain Work in Progress.</p> <p>The current relationship status/letters of agreements held with each of NZ's neighbouring SAR partners is identified on the chart at Annex A. Each boundary is colour coded to reflect the status of the relationship with its neighbour. Similarly the relationships with the Pacific Island nations within the NZ SRR are also illustrated.</p>	 NC	March 2015


#	Report	Action Point	Actions (Completed and Planned)	Status	Date
3	Police June 2013	Police to ensure that appropriate priority is given to the update of the Manual of Best Practise.	<p>Aug 13: Project plan provided to NZSAR. Support for this is included in the 2013/14 Nssp. As at 1 August 2013 the SME draft (consulted internally at PNHQ) has been provided to the writer. Once written in the Policing Manual template wider consultation to occur (September 2013).</p> <p>Mar 15: SAR chapter has been incorporated into Police Master Standard Operating Procedures (MSOP). Ongoing work to include 'lessons learned'.</p>	 NC	March 2015
4	Police June 2013	Police ensure that sufficient time is allocated for the coordination of SAR at National, District and Area levels.	<p>Aug 13: Each Police District has a manager responsible for SAR - the District Operations Manager. Structure and deployment are aligned to risk. Organisational structure is the responsibility of the District Commander. Districts have differing but relatively consistent models of coordination, with a fit with the operational requirements of each District.</p> <p>Mar 15: The District Operations Manager in each Police District is responsible for SAR. Most Police Districts (11 of 12) have a SAR Coordinator. However, not all SAR Co-ordinators are full-time positions. Improving coordination at National, District and Area levels is an on-going process.</p>	 NC	March 2015

## Section Two: System Components

#	Report	Action Point	Actions (Completed and Planned)	Status	Date
5	RCCNZ March 2012	RCCNZ to follow up submission to IMO for realignment of aviation and maritime SAR boundaries to ensure this misalignment is corrected.	<p>Aug 13: Email exchanges have occurred with New Caledonia who have referred this matter to their HQ in France. No direct approach to IMO/ICAO has been made at this time.</p> <p>Mar 15: Realignment awaiting final French approval. However, agreement in principle of 'Shared Area' boundaries with New Caledonia SAR authority provides interim operational functionality.</p>	 NC	March 2015
6	RCCNZ March 2012	RCCNZ should continue to build its liaison programme with the national and international SAR assets. This includes wherever possible more participation in training and SAR exercises with the SAR assets. This should be done in conjunction with NZSAR and NZ Police.	<p>Aug 13: RCCNZ has been working with NZSAR and the other SAR agencies in the development of a national training programme. An international liaison and training programme will be developed when funding enables this to proceed. At this time discussions are taking place between MNZ and MFAT on an assistance programme for Tonga and the Cook Islands. It is likely that these programmes may commence in the Aug/Sept 13 period.</p> <p>Mar 15: National training programme in place. Increased liaison with RCCNZ personnel and national agencies (Harbour Masters/Coast Guard etc). International visit programme being actively utilised to improve liaison – particularly with Pacific Island nations.</p>		March 2015

#	Report	Action Point	Actions (Completed and Planned)	Status	Date
7	RCCNZ March 2012	RCCNZ to complete the Pacific SAR Plan, Cook Strait SAR Plan and Mass Rescue Operations.	<p>Aug 13: Collaborative efforts underway to prepare Mass Rescue Operation plans (including Cook Strait).</p> <p>Aug 13: The draft Pacific SAR plan has been circulated to Pacific Island States in June 2013 and will be updated on receipt of comment from those States.</p> <p>Mar 15: Pacific SAR plan in place with ongoing activity with individual nations to improve the plan. Mass Rescue Plan and Cook Strait Plan in place.</p> <p>Regional Mass Rescue Plans in place with individual Districts submitting their tailored plans. By end of 2015 this will have been exercised in all districts.</p>		March 2015
8	RCCNZ March 2012	Liaise with the aviation industry and in particular the major airports, and shipping companies for access to their individual SAR plans.	<p>Aug 13: RCCNZ has had limited contact with the major airports but will include this in the 2013/2014 work plan. Some local shipping company plans are held by RCCNZ and others are available from an international data base. Updating these plans will be undertaken in 2013/2014.</p> <p>Mar 15: National shipping company plans (Cook Strait ferries/Fullers Ferry etc) have been updated. Access to international shipping company plans are available from UK based database.</p> <p>RCCNZ have engaged with individual airline companies however, more engagement with regional airports is required. Work in Progress.</p> <p>Regional liaison visits now timed to coincide with national exercise calendar events.</p>	 NC	March 2015



#	Report	Action Point	Actions (Completed and Planned)	Status	Date
9	Police June 2013	Police to review whether Districts have, or need to have, plans for off-airport incidents.	<p>Aug 13: A transport mass rescue template for Districts to use in preparing their own pre-plans has been distributed to Districts. Work in progress. Mass casualty and mass fatality plans under development as work streams NSS public safety cluster.</p> <p>Mar 15: A transport mass rescue template has been developed and is available for use on MSOPs as the default template. Districts are modifying this template for use in their own regions. A National template has been presented for National Executive response. Work in progress.</p> <p>Mass Casualty Plan: Incorporated in the Ambulance Mass Transport Plan.</p> <p>Mass Fatality Plan: Signed in 2014.</p> <p>NSS public safety cluster: Work streams complete, awaiting Board review by DPMC.</p>		March 2015
10	Police June 2013	Police Districts that have no capability, or arrangement, to monitor the progress of air and water assets during a search should acquire this ability.	<p>Aug 13: Variable access nationally to TrackPlus. Identified need for a business case to be prepared for national capability (perhaps as part of SLAs). Police are primarily reliant on the asset advising their location. RCCNZ can track air assets (and are able to advise Police).</p> <p>Mar 15: Police access to TrackPlus continues to be limited. Discussions ongoing with Coast Guard to gain access. Police use of system primarily for analysis of SAR activity and some real-time monitoring.</p>		March 2015

#	Report	Action Point	Actions (Completed and Planned)	Status	Date
11	Police June 2013	Police should ensure that the appropriate staff have authority to deploy air assets. Communications Centre DMPs should reflect the urgency of deploying an air asset when there are persons in distress in any body of water.	<p>Aug 13: Police District Operations Managers have been asked to review the approvals process, ensuring that financial authority to deploy assets is, even if of limited amount, closer to the operational front where an immediate response is required.</p> <p>Mar 15: MSOPs amended to reflect that Communication Centres have authority to deploy air assets.</p>		March 2015






## Section Three: Training, Qualification, Certification and Exercises



#	Report	Action Point	Actions (Completed and Planned)	Status	Date
12	RCCNZ March 2012	RCCNZ should examine possibility of increased participation in SAREXs and training with neighbouring RCCs and national and regional SAR assets.	<p>Aug 13: A SAREX programme with adjacent Search and Rescue Regions has been planned with Australia and Chile.</p> <p>Mar 15: Australian and US SAR agencies have indicated that, due to significant 'real-world' events involving RCCNZ additional SAREXs are not required. This is agreed by RCCNZ. Pacific regional exercise programme is under development with a communications exercise planned with Chile in 2016. An aviation based exercise with Chile has been identified as a high priority. Exercise interaction with Fiji awaiting agreement. Major exercise conducted in Antarctic in conjunction with International Association of Antarctic Tourist Operators (IAATO). Ongoing Work in Progress.</p>	 NC	March 2015
13	RCCNZ March 2012	RCCNZ to assist NZSAR with national SAR training programmes.	<p>Aug 13: RCCNZ has been engaged with NZSAR and Police in development of training programmes. An update of the NZSAR Core Curriculum is included in the 2013/14 NSSP.</p> <p>Mar 15: NZSAR Core Curriculum completed by RCCNZ. Continued ongoing engagement with NZSAR and Police. Work in Progress.</p>	 ↑	March 2015
14	Police June 2013	Police should ensure that each members SAR role is properly reflected in her/his Position Description and Personal Appraisal.	<p>Aug 13: Police have a position description for SAR specialists. Districts report that the specialist squad policy requires that SAR members are appraised.</p> <p>Mar 15: Position Descriptions incorporated in SAR chapter of MSOP.</p>	 NC	March 2015



#	Report	Action Point	Actions (Completed and Planned)	Status	Date
15	Police June 2013	Police should ensure that training is properly planned and documented.	<p>Aug 13: The training outline for SAR is being strengthened in the rewrite of the SAR Chapter in the Policing Manual.</p> <p>Mar 15: Training pathway included in SAR chapter of MSOP.</p>		March 2015
16	Police June 2013	Police should ensure that staff who fill Incident Management roles have the appropriate training and qualifications.	<p>Aug 13: Management training programmes have been redeveloped to meet the needs of the SAR sector. CIMS 4 training is available at no cost.</p> <p>Aug 13: The (Police) National SAR course is the national standard for training. CIMS is an integral part of this training. A 'SAR managers' course has been piloted. This is in effect an advanced incident controller course using CIMS and is to be held annually.</p> <p>Mar 15: SAR Managers course now held annually with 3<sup>rd</sup> course commencing in June 2015.</p>	 NC	March 2015

## Section Four: Communications




#	Report	Action Point	Actions (Completed and Planned)	Status	Date
17	RCCNZ March 2012	There are no recommendations for this section.	<p>Aug 13: Nil action required.</p> <p>Mar 15: Complete audit of communications database in progress.</p>	 NC	March 2015
18	Police June 2013	Police should ensure that SAR members are trained, and qualified, in the use of marine radio and have access to such a radio.	<p>Aug 13: The use of radios is considered a core SAR skill. Police also have a policy on radio protocol and that protocol is expected to be complied with. Those Police employees engaged in marine SAR have access to marine radio.</p> <p>Mar 15: Police to investigate requirement for employees to hold valid VHF Marine Radio Operators licence.</p>	 NC	March 2015
19	Police June 2013	Police should take an active part in ensuring that portable tracking equipment is available in all Districts and any Areas where a need is identified.	<p>Aug 13: Police have engaged in the development of a strategy for Wander. The requirement for tracking equipment will fall out of this.</p> <p>Mar 15: No further progress in acquisition of Wander tracking equipment although Police in consultation with relevant agencies.</p>	 NC	March 2015

## Section Five: System Management

#	Report	Action Point	Actions (Completed and Planned)	Status	Date
20	RCCNZ March 2012	RCCNZ to assist NZSAR with strategic management of the NZ national and regional SAR assets.	<p>Aug 13: An upgrade of the Resource Database is included in the 2013/14 NSSP.</p> <p>Mar 15: Resource Database upgrade underway. Phases 1 &amp; 2 complete. Phases 3 &amp; 4 recently commenced. Anticipated project completion date June 2015.</p>		March 2015
21	RCCNZ March 2012	RCCNZ should increase liaison and education programmes around distress beacon use with both the distress beacon suppliers and end users.	<p>Aug 13: RCCNZ team visits to the various Police Districts and attendance at some boat shows have been used to promote the correct use and registration of beacons. A new beacon web site and a revised beacon pamphlet are planned for release in July 2013.</p> <p>Mar 15: Beacon education significantly improved with engagement of public via RCCNZ attendance at boat/hunting shows and increased use of internet and social media. Meetings with beacon importers and retailer education has improved registration process/compliance. Pamphlet updates ongoing.</p>		March 2015

#	Report	Action Point	Actions (Completed and Planned)	Status	Date
22	RCCNZ March 2012	RCCNZ to complete individual SAR plans.	<p>Aug 13: RCCNZ has SOPs that are regularly reviewed, the draft Pacific SAR Plan has been circulated to Pacific Island States for review. There is currently work being undertaken to complete the Cook Strait SAR Plan and work with Police to develop a nation MRO response plan.</p> <p>Mar 15: Cook Strait SAR Plan, Pacific SAR Plan and National MRO Plan now in place. Work in Progress to continually improve MRO for other locations. RCCNZ increasingly using intelligence and records to assess SAR risks and aid the development/amendment of SAR plans</p>	 NC	March 2015
23	Police June 2013	Police should ensure that all Districts have formal protocols regarding the rescue of injured people from remote locations.	<p>Aug 13: Collaborative efforts underway with NASO to address the underlying issues of Ambulance dispatching rescue helicopters to remote locations.</p> <p>Mar 15: National Ambulance Sector Office (NASO) have included section in their SOPs to clarify differences in SAR and Medical missions. Police to develop Letter of Agreement with NASO to define SAR and Medical missions. Work in Progress.</p>	 NC	March 2015

## Section Six: System Improvement

#	Report	Action Point	Actions (Completed and Planned)	Status	Date
24	RCCNZ March 2012	RCCNZ to work with CAA to obtain updates of international documentation relevant to aviation SAR.	<p>Aug 13: Ordered documents provided on payment.</p> <p>Mar 15: CAA liaison with RCCNZ has improved. All publication updates are now received directly from ICAO.</p>		March 2015
25	RCCNZ March 2012	RCCNZ to investigate improving liaison with ICAO through increased attendance at ICAO meetings.	<p>Aug 13: Subject to budget constraints RCCNZ will continue to participate in appropriate meetings as they occur.</p> <p>Mar 15: ICAO have commenced development of an Asia/Pacific Aviation SAR Plan to improve aviation SAR in the region. RCCNZ have a delegate who attends</p>		March 2015
26	Police June 2013	Police may wish to address the fact that some districts feel less than fully informed.	<p>Aug 13: Police employ a National SAR Coordinator with this as a specific task. Districts have been canvassed and none indicate a difficulty with information flow.</p> <p>Mar 15: Policy distribution and awareness has improved significantly with increased use of IT.</p>	 NC	March 2015



## Annex A - New Zealand SAR Region – Relationship Status

### NEW ZEALAND SEARCH AND RESCUE REGION

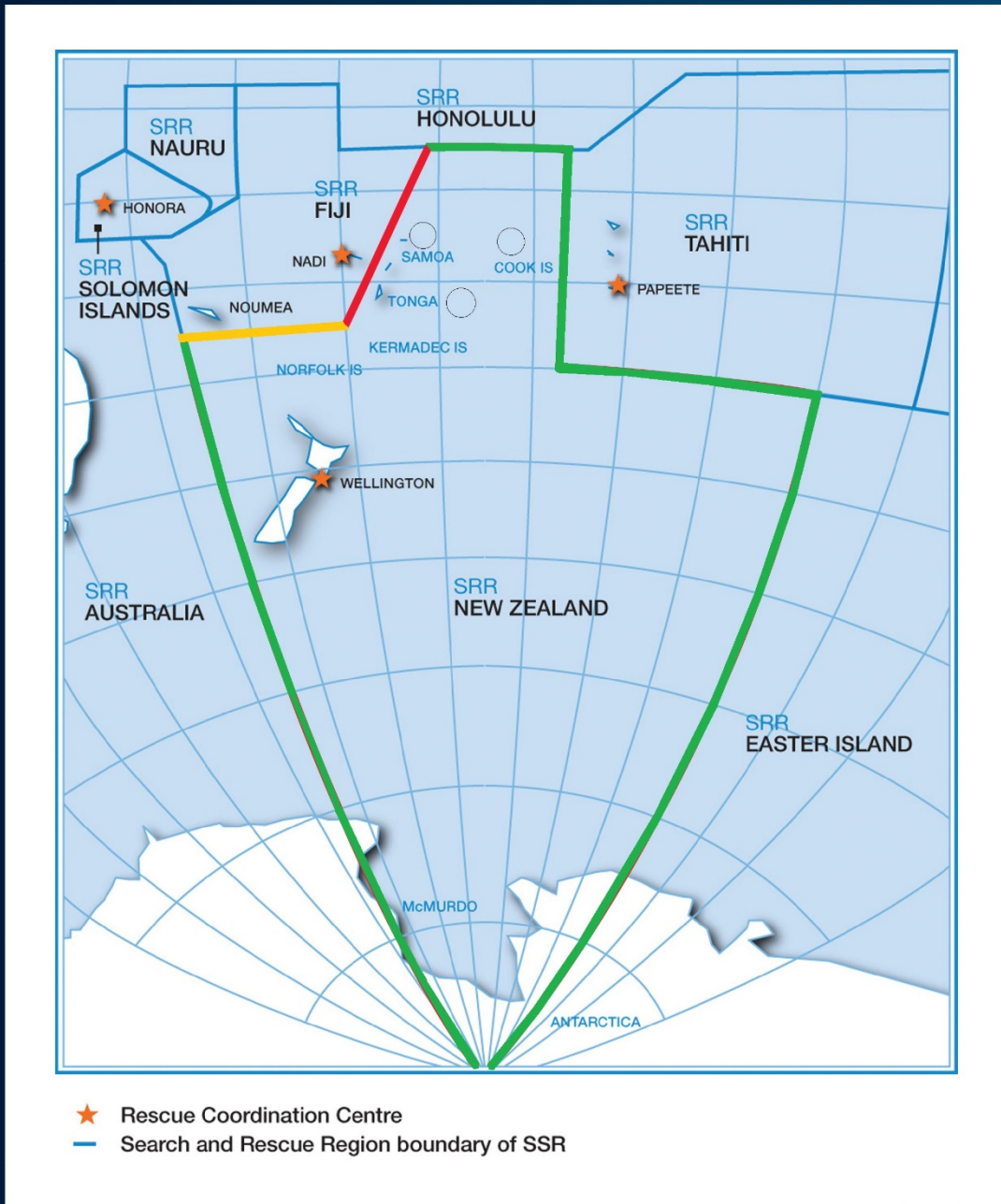


Diagram mock up only . Legend needs to be added (Green/Amber/Red to indicate status of agreement held with neighbouring RCC area).

Decision regarding inclusion of Pacific Island Nations individual relationships... if included what needs to be illustrated [overall Letter of Agreement in place, or broken down into Maritime/Air/Legal. If the latter then suggest a pie chart symbology, such as that shown below, could be used. 'Nations' mentioned in Action Point 2 above are... Cook Islands, New Caledonia, Samoa, Tonga, Australia, Chile, US Coast Guard, Niue, Tahiti and Tokelau. RCCNZ to discuss with NZSAR.

**Nation Name**



**Nation Name**



**Nation Name**



# NZSAR

New Zealand Search  
and Rescue



## NZSAR Consultative Committee Meeting

21 April 2015



# 1. Welcome

- Alan Lloyd – AMSA
- Stu Rooney – NZFS

# 2. Apologies

- David Waters – Ambulance NZ
- Simon Trotter – Antarctica NZ

- Brendan Comerford – MOC

*Please fill out the attendance register*

# 3. Minutes

Minutes of the meeting 6 Nov 2014 to be approved



# 4. Matters Arising

## Item 4

### **Workshop Notes.**

Refine the notes to create linkages with the Risk Register.

Secretariat

Agencies should refer to the workshop notes when carrying out their own strategic level planning.

All

*Ongoing*

## Item 8

**Sector Update.** CAA to be asked to extend the feedback period for the consultation document on the emergency location of aircraft.

CAA

*Complete*



# 4. Matters Arising

## Item 9

**Risk Framework.** Council to be informed of the Committee's concerns around the extent of thought leadership for SAR funding.

Secretariat

*Complete*

## Item 11

**General Business.** Distribute a copy of the NATSAR Manual.

Secretariat

*Complete*



# 4. Matters Arising

## Item 11

**General Business.** Coastguard representative to attend UAS workshop and provide feedback to the Committee.

Coastguard

*Workshop cancelled*

## Item 11

**General Business.** Agencies to provide nominations for NZSAR Awards.

All

*Complete*





# 5. SLA Monitoring Report

Outputs	Coastguard	LandSAR	AREC	SLSNZ
Provision of expert services to CA				
Provision of expert advice to CA				
Provision of IM Team Members				
Summary of non-SAR activity				
Up to date details available for CA				
Participation in joint SAREX				
Attendance at Forums				
Nominations for NZSAR Awards				



# 5. SLA Monitoring Report

Summary for the 1 January – 31 March 2015 Quarter

Measures	Police	RCCNZ	Totals
SAROPs	409	233	642
Lives at Risk	189	597	786
Lives Saved	<b>12</b>	<b>4</b>	<b>16</b>
People Rescued	75	26	101
People Assisted	95	90	185
LandSAR Taskings	82	3	85
Coastguard Taskings	103	0	103
AREC Taskings	47	0	47
SLSNZ Taskings	15	0	15
Performance of SLA Partners	Satisfactory	Satisfactory	Satisfactory



# 5. SLA Monitoring Report

## Summary for the 1 January - 31 March 2015 Quarter

Reporting requirements for the Quarter have been met by all of the SLA partners

Outputs	Coastguard	LandSAR	AREC	SLSNZ	Totals
<b>SAROPs Attended</b>	121	117	15	34	--
<b>Volunteers Involved</b>	933	371	39	160	<b>1,503</b>
<b>Volunteer Hours</b>	7,890	2,158	188	390	<b>10,626</b>

2,282 Coastguard volunteers responded to 914 non-SAR related calls for assistance during the quarter.



# 5. SLA Monitoring Report

## AREC

- Have no issues or updates to report for the quarter.

## SLSNZ

- Work is continuing on the two new communications networks, to enable them to be ready for the 2015/16 season.
- SLSNZ has signed an MoU with MNZ to clarify invoicing arrangements for support provided to Category II SAROPs.



# 5. SLA Monitoring Report

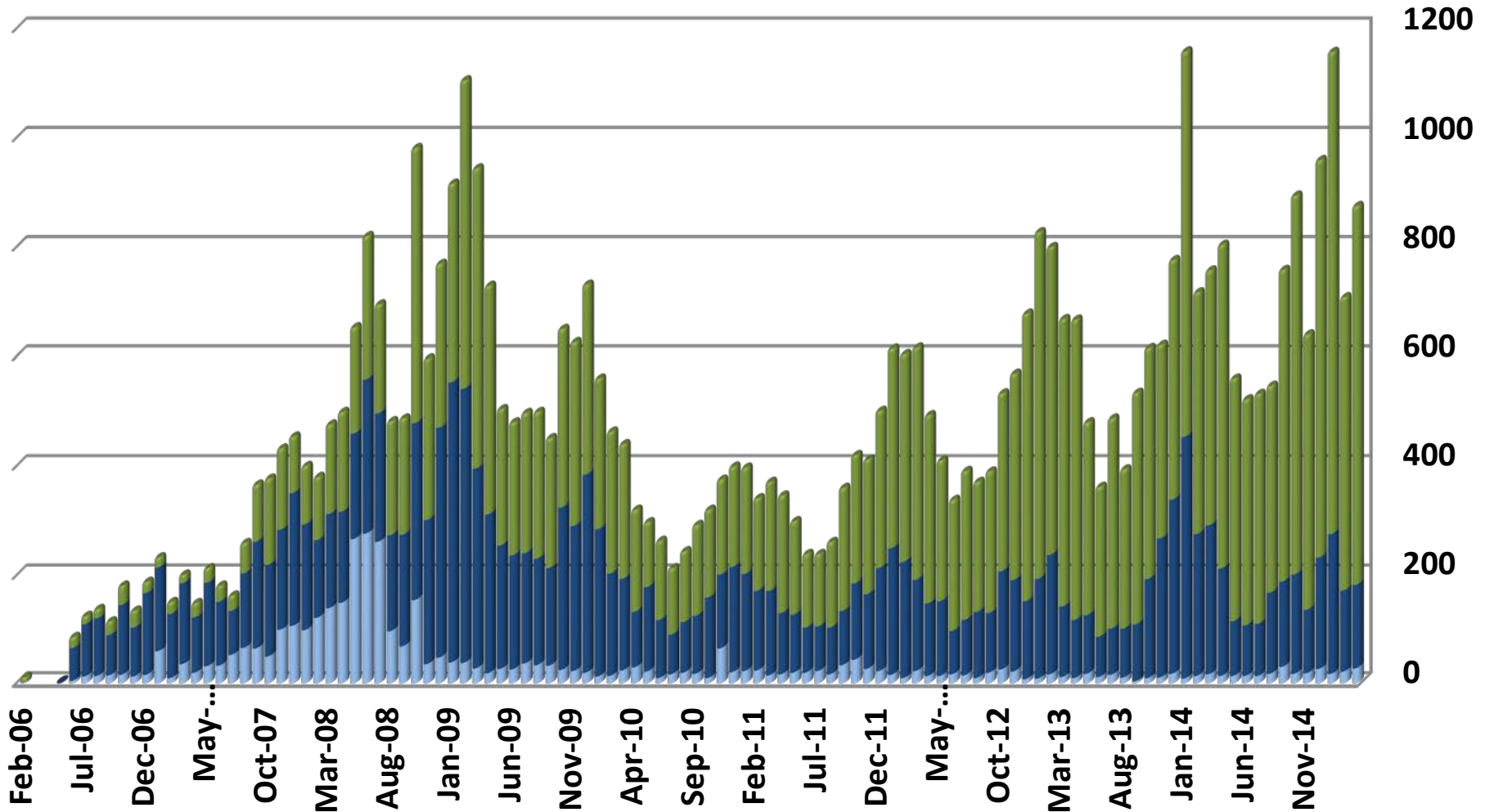
## Coastguard

- Coastguard is preparing for their annual MayDay appeal.
- Changes to international VHF channel allocations will affect Coastguard, as they will need to migrate services to alternate channels.

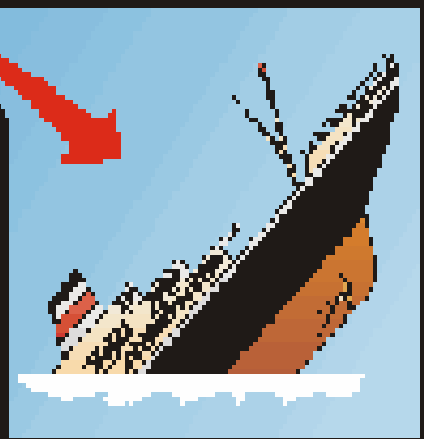
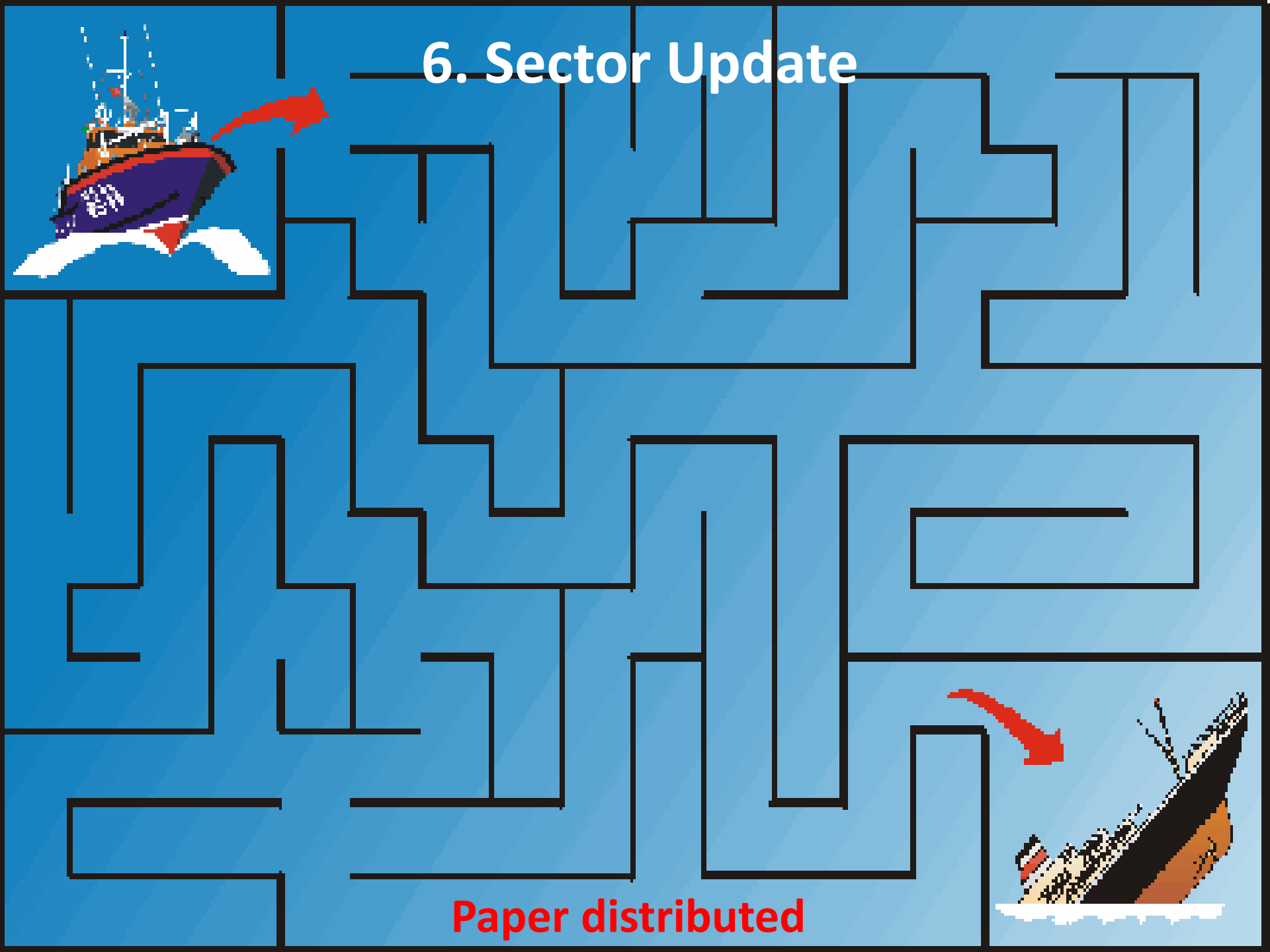
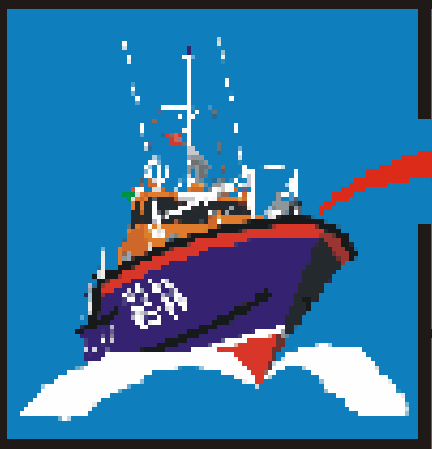
## LandSAR

- During the quarter LandSAR has focussed on:
  - Bedding in the Safety Management System which was deployed organisation-wide in December 2014.
  - Initiating the trial of the new Competencies Framework assessment system, to be trialled May to August and planned for wider deployment in late-2015

# 5. Beacon Registrations (52,519)



# 6. Sector Update



Paper distributed



# 7. Fire Services Review

Susan O'Neill, Department of Internal Affairs



# 8. SAR in the Australian Context

Alan Lloyd, Australian Maritime Safety Authority





Australian Government

Australian Maritime Safety Authority

# SAR Technology Update Australia



# Challenger 604 Tier 1 SAR Capability

## Existing system:

- 5 Dornier 328 turbo prop aircraft located at four bases – Cairns, Brisbane, Essendon, Perth

## August 2016 onwards

- 4 Challenger 604 jet aircraft at three bases – Cairns, Essendon, Perth
- 8 hours endurance standard (11 hours max)
  - Selex 5000E search radar
  - Wescam MX15 HDi EO/IR turret
  - Kinetic Avionics ADS-B, AIS, TCAS, TCAS-M
  - Techcomm TC-5025C/3 DF, Cobham mobile phone DF
  - Sentient ViDAR maritime anomaly detection software with fixed staring three-camera array
  - Large observer windows forward of the wings
  - Air operable door for stores delivery

Aircraft Type	Dornier 328	Bombardier Challenger 604
Transit speed	275 KTAS	M0.74/445 KTAS to M0.8/490 KTAS
Aircraft endurance, in normal standby configuration	6.7 hrs	8 hrs\11 hrs (max endurance)
Time on station at 400nm from Base, with a return to that Base	2 hrs	5 hrs
Response times	<ul style="list-style-type: none"> <li>Response One – 30 mins between 0700 and 1900 LT; 60 mins at other times</li> <li>Response Two – As agreed with JRCC</li> </ul>	
Bases	5 x acft - Cairns, Brisbane, Essendon, Perth, Darwin	4 x acft - Cairns, Essendon Perth - 8 August 2016
Simulator	Germany	Melbourne
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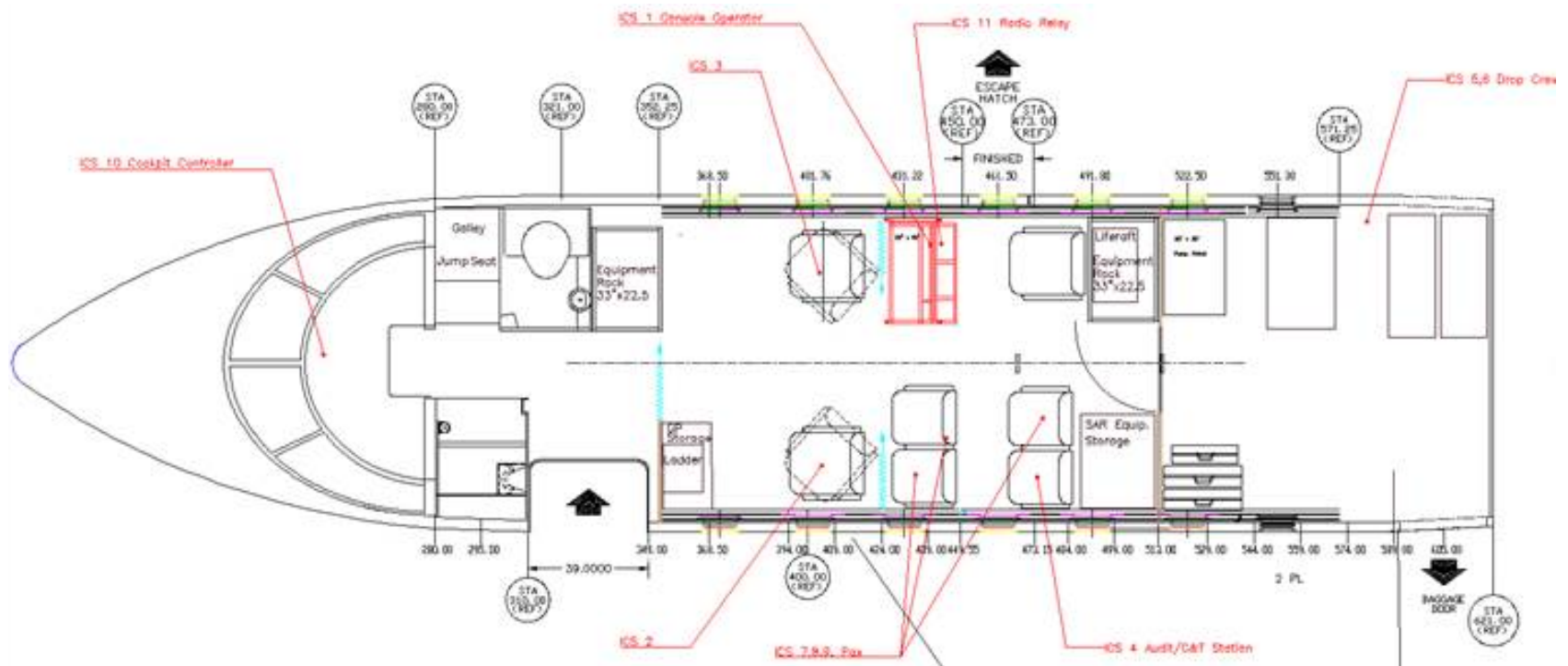
# First Flight



ANDY CLINE 2015



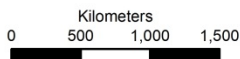
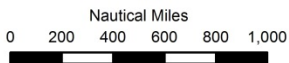
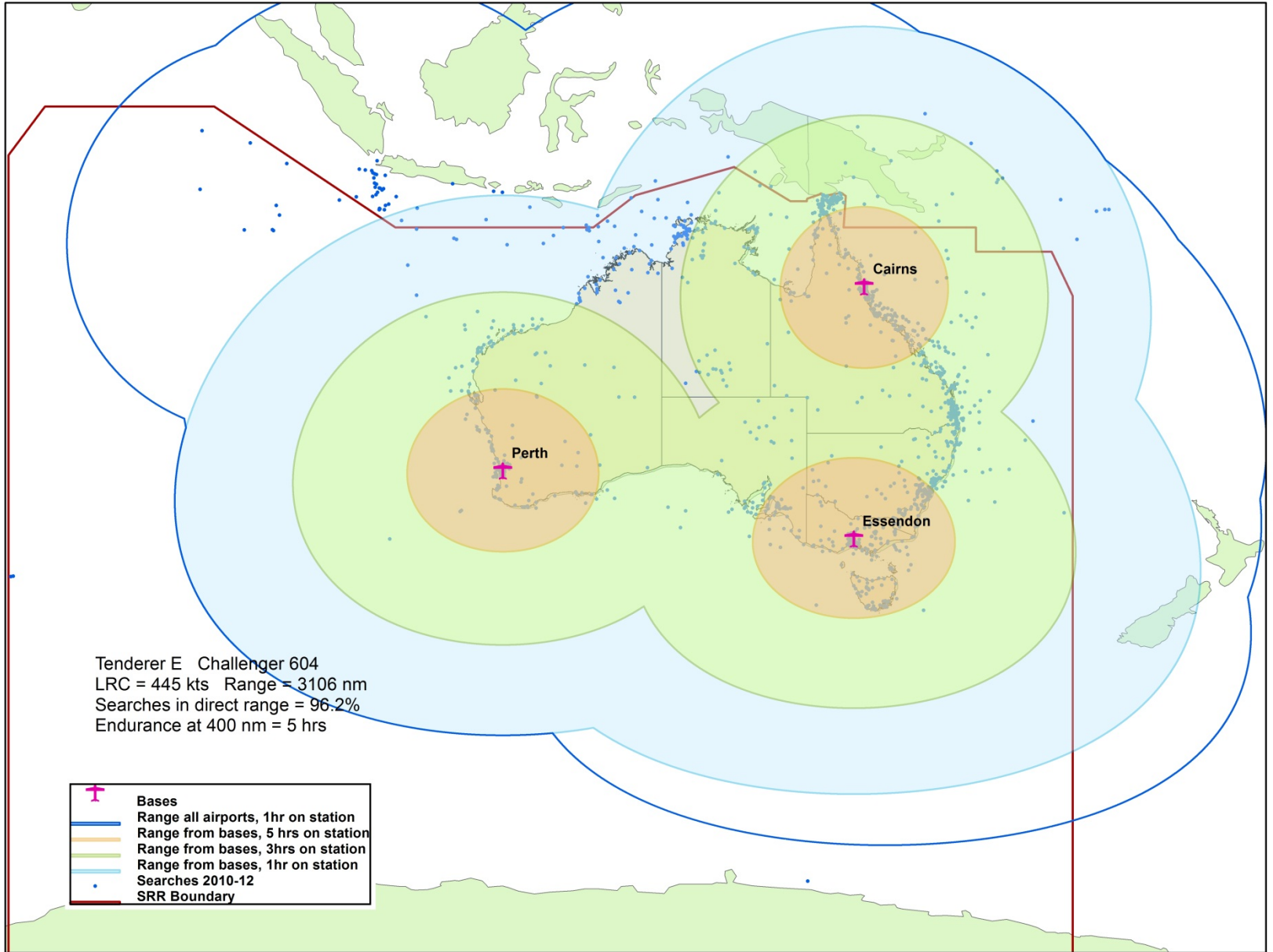
# Cabin Layout







# Tenderer's capability





# Mobil Phone DF

- Airborne cell emulator and direction finder
  - ▶ Quad band GSM support
  - ▶ Geo-locate target search devices
  - ▶ Future support for GSM-XPZ, Evolve4-Nimbus cell emulators
- ▶ JRCC Australia experience
  - ▶ Past 2 years 5 wide area searches
  - ▶ Resolved within 12 hours as opposed to 4-5 days



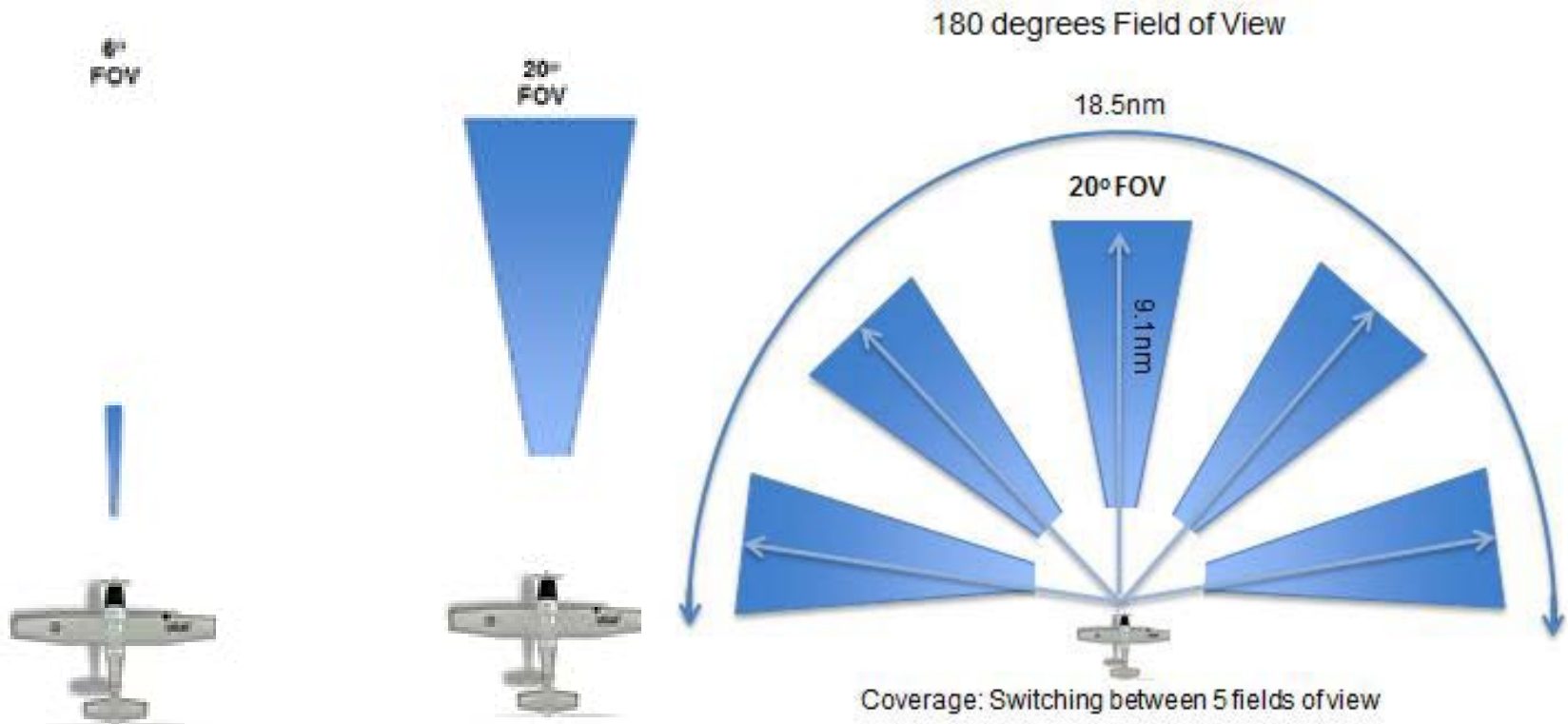


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# VIDAR Anomaly Detection

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- Extending coverage of visual airborne search by 20 to 80 times
- Automatically detect target types from people to in the water to large vessels
- Dependent on target type and sea surface conditions up to 8 nautical miles ahead and 3.5 nautical miles track





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**Questions?**



# 9. RISK discussion: SAR Funding

<p><b>SAR funding</b></p> <p>The sector experiences funding sufficiency and volatility risks.</p>	<p><b>Sufficiency.</b> Funding for the wider SAR sector has a variety of sources. Funders may choose to lessen or withdraw their funding support.</p>	<p>Inadequate funding for part or some of the sector may limit investment in training or equipment and lead to inadequate operational responses.</p>	<p>Possible</p> <p>Moderate</p> <p>(Mar 15)</p>	<p><b>Risk treatment 2014/02/A:</b> SAR Funding</p> <p>Maintain an overall SAR funding picture. Work with other key SAR funders to sustain adequate supply. Maintain adequate PLA funding to meet Council goals.</p>	<p>(Ongoing)</p>
	<p><b>Volatility.</b> The funding levels for SAR agencies can be volatile due to profit variances with key gaming or lotteries trusts &amp; boards. Grants policies also frequently change which can affect eligibility. Public appeals &amp; donations are susceptible to change.</p>	<p>Volatile funding inhibits long term planning and investment. It also degrades sector effectiveness and efficiency.</p>	<p>Possible</p> <p>Moderate</p> <p>(Mar 15)</p>	<p><b>Risk treatment 2014/02/B:</b> Funded SAR SLAs</p> <p>Continue to support key SAR providing agencies with appropriately funded three year Service Level Agreements.</p>	<p>(Ongoing)</p>



# 9. Funding Thought Leadership

- Council is vitally interested in SAR Sector Funding
  - Sufficiency
  - Stability
  - Prioritisation
  - Change / adaptation
- Acknowledge that SAR service often only part of total service provided by organisation.



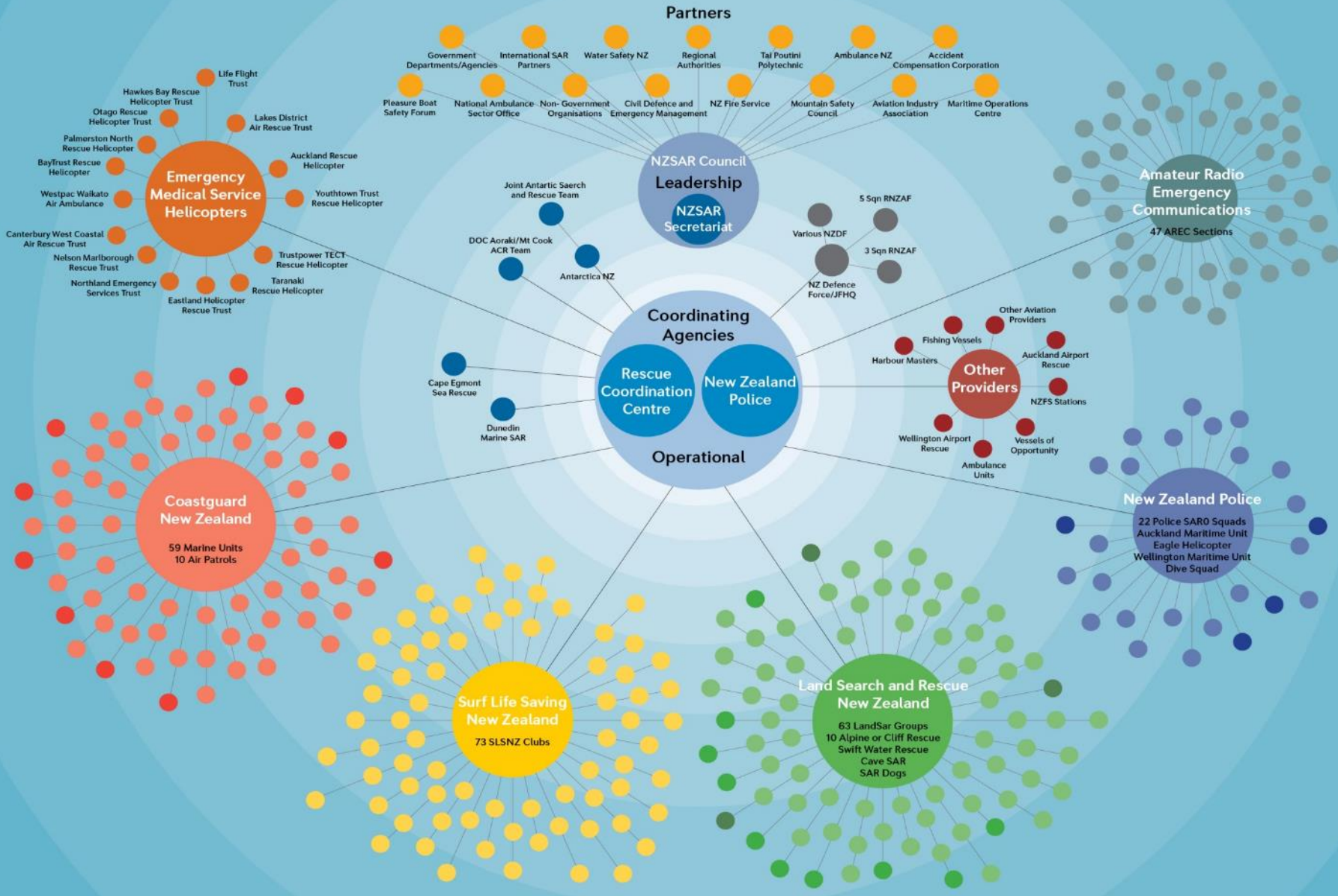
# 9. Funding Thought Leadership

- Council & Guests (AFRAB, LGB, Combined Community Trusts, NASO) opened lines of communications. (Sport NZ and ACC by paper)
- Shared SLA letters of intent.
- Agreed to develop information to suit their needs.
- Discussed sharing information across funding agencies to improve situational awareness.





# OUR SECTOR



# 10. 2014/15 NSSP Plan

<b>Workshops &amp; Seminars</b>	<b>SAR Training</b>
• Wander Symposium	• Training Support and Advice
• Land Search Seminar	• Air Observer on line material
• SAREX Planning	• Air Observer training
• Helicopter workshop	• Land Formal Search Planning
• SAR Partner Wksp support	• Marine Formal Search Planning
• Organisational Support	• START material
<b>SAR Data management and IT</b>	<b>Prevention</b>
• Data Store and analysis tools	• AdventureSmart Comms & website maint
• Data Extractions	• Visitor Intentions
• SAR Data Standard	• Wander
• Operational Analysis	• Jasons / Tourism Radio
• Resource database enhancements	• Safety Code Partnership
• Maint - SARNET, Website, START, RDB etc	<b>Exercises</b>
<b>SAR Documentation</b>	• Police SAREX support
• SAR Forms and Guidelines	• MRO SAREXs
<b>Secretariat</b>	<b>SAR Research</b>
• Communications and publications	• Governance Review of SAR in NZ
• NZSAR Awards	• Avalanche Advisory Independent review
• Travel, meetings, advice etc	• SAR Funding part II

# 10c. NZSAR Governance Review

- John Hamilton (Ex Director MCDEM, CAS RNZAF)
- Thanks for input
- Initial draft is with Martin
- Looks like:
  - We're doing pretty well all things considered
  - Nothing too fundamental will change
  - A range of tweaks, changes and additional projects will be recommended to improve our collective system



# 10e. SAR (ACE) Training Update

As at April 2015	April 2014	April 2015
Total SAR ACE EFTs	32.64	44.7
Number of courses to date	23	16
Number of courses cancelled (YTD)	9	8
Number participants registered for courses	332	462
Total number participants attending	321	238
Average numbers registered for course	14.43	19
Average Number attending per course	13.95	14.87
% non-attendance	3.31%	9.33%
% of NZSAR predicted courses (23/124)	18.5%	26.9%

# 10e. SAR (ACE) Training Update

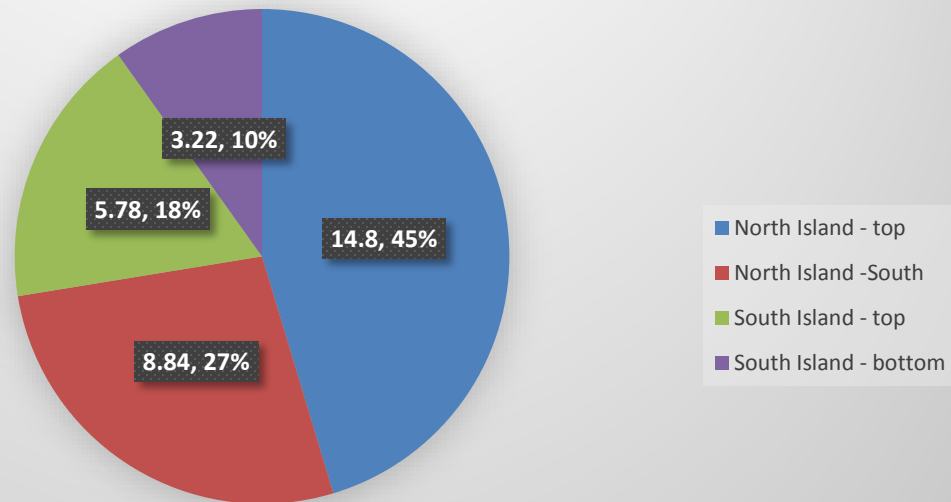
Running update for 2015

Month	# courses	Days of training	Actual EFTs	Running total
January	0	0	0	0
February	6	11	7.1	7.10
March	10	20	13.49	20.59
April	7	14	12.05	32.64
May				
June				
July				
August				
September				
October				
November				
December				
<b>TOTAL</b>	<b>23</b>	<b>45</b>	<b>32.64</b>	



# 10e. SAR (ACE) Training Update

SARACE Efts per region to 30 April 2015



# 11. 2015/16 NSSP Draft Thoughts

Workshops & Seminars	SAR Training
• SAR Evaluation Seminar	• Training Support and Advice
• Technology Workshop	• Air Observer training
• SAREX Planning (+Police) Meeting	• Marine Formal Search Planning (fol gap analysis)
• Hoist workshop	• START material
• SAR Partner Wksp support ???	<b>Prevention</b>
• Organisational Support	• AdventureSmart & Rec Safety Partnership
<b>SAR Data management and IT</b>	• Visitor Intentions
• Data Store maintenance and extractions	• NZ Inc Recreational Safety Strategy
• SAR Data Standard (Continues)	<b>SAR Documentation</b>
• SAR Information Dashboard	• SAR Forms and Guidelines
• Maint - SARNET, Website, START, RDB etc	<b>SAR Research</b>
<b>Exercises</b>	• Fatality Analysis
• Police SAREX support	• SAR documentation gap analysis
• MRO SAREXs	• Impact – SAR Prevention messaging
• Abnormal Flight Patter Behaviours	• SAR Expectations
<b>Secretariat</b>	• SAR Comms - Marine / Land
• Communications and publications	• Outdoor Safety Code – evidence base
• NZSAR Awards	SAR Demand and Supply study - land
• Travel, meetings, advice, administration etc	SAR Demand and Supply Study – Marine???
	SAR Performance Management

# 12. General Business

- A. SAR Self Assessment
- B. Changes to Maritime VHF Repeater channels
  - A. Late next year
  - B. Affects Coastguard and a few others
- C. International Consortium for First responder R&D
  - A. opportunity to work together re or collective R&D needs to industry
  - B. leverage greater standardisation, interoperability and economy of scale.
  - C. Now closed but can send you information if interested.
- D. LINZ topographic survey





# 12. General Business

## E. NZSAR Awards

- Please be at Government House at 6.00pm
- One Gold Award – Operational Activity
- Five Certificates – Operational Activity
- One Gold Award – Support Activity
- Five Certificates – Support Activity
- One Certificate – Special Award



# NZSAR

New Zealand Search  
and Rescue



## Proposed meeting dates for 2015:

- Thursday 27 August – Combined
- Thursday 5 November

**ENDS**





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# Tiered SAR Assets

# TIERED ASSETS

CAPABILITY	DESCRIPTION
TIER 1	Dedicated fixed wing aircraft and crew for supply dropping, homing to beacons and visual search.
TIER 2	Rescue capable helicopters and crew, that are already providing EMS (Emergency Medical Services) and SAR services to the Australian or a State/Territory Government, that can be engaged by AMSA on an opportunity basis for rescue, homing to beacons, search, limited supply dropping and which may be able to undertake command and control in a pollution incident. The helicopters may also have a capability to sling carry and operate a dispersant bucket.
TIER 3	Rescue capable helicopters and crew, already providing SAR services to a company, Australian or State/Territory Government, that can be engaged by AMSA on an opportunity basis for rescue, homing to beacons, search, limited supply dropping and may be able to undertake command and control in a pollution incident. The helicopters may also have a capability to sling carry and operate a dispersant bucket.
TIER 4	Fixed wing aircraft and crew on that can be engaged by AMSA on an opportunity basis for homing to beacons, visual search and may be able to undertake command and control in a pollution incident.
SUPPLEMENTARY	Fixed wing aircraft or helicopters and crew that can be engaged by AMSA on an opportunity basis for visual search.
TRANSPORT AND LOGISTICS	Turbo-prop and jet aircraft to take AMSA officers and their equipment from Canberra to an airport in Australia near the scene of the incident.





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# TIER 1 - Dornier 328





# Challenger 604

## Existing system:

- 5 Dornier 328 turbo prop aircraft located at four bases – Cairns, Brisbane, Essendon, Perth

## August 2016 onwards

- 4 Challenger 604 jet aircraft at three bases – Cairns, Essendon, Perth
- 8 hours endurance standard (11 hours max)
  - Selex 5000E search radar
  - Wescam MX15 HDi EO/IR turret
  - Kinetic Avionics ADS-B, AIS, TCAS, TCAS-M
  - Techcomm TC-5025C/3 DF, Cobham mobile phone DF
  - Sentient ViDAR maritime anomaly detection software with fixed staring three-camera array
  - Large observer windows forward of the wings
  - Air operable door for stores delivery

Aircraft Type	Dornier 328	Bombardier Challenger 604
Transit speed	275 KTAS	M0.74/445 KTAS to M0.8/490 KTAS
Aircraft endurance, in normal standby configuration	6.7 hrs	8 hrs\11 hrs (max endurance)
Time on station at 400nm from Base, with a return to that Base	2 hrs	5 hrs
Response times	<ul style="list-style-type: none"> <li>Response One – 30 mins between 0700 and 1900 LT; 60 mins at other times</li> <li>Response Two – As agreed with JRCC</li> </ul>	
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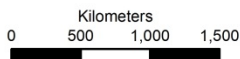
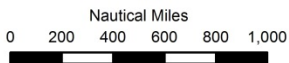
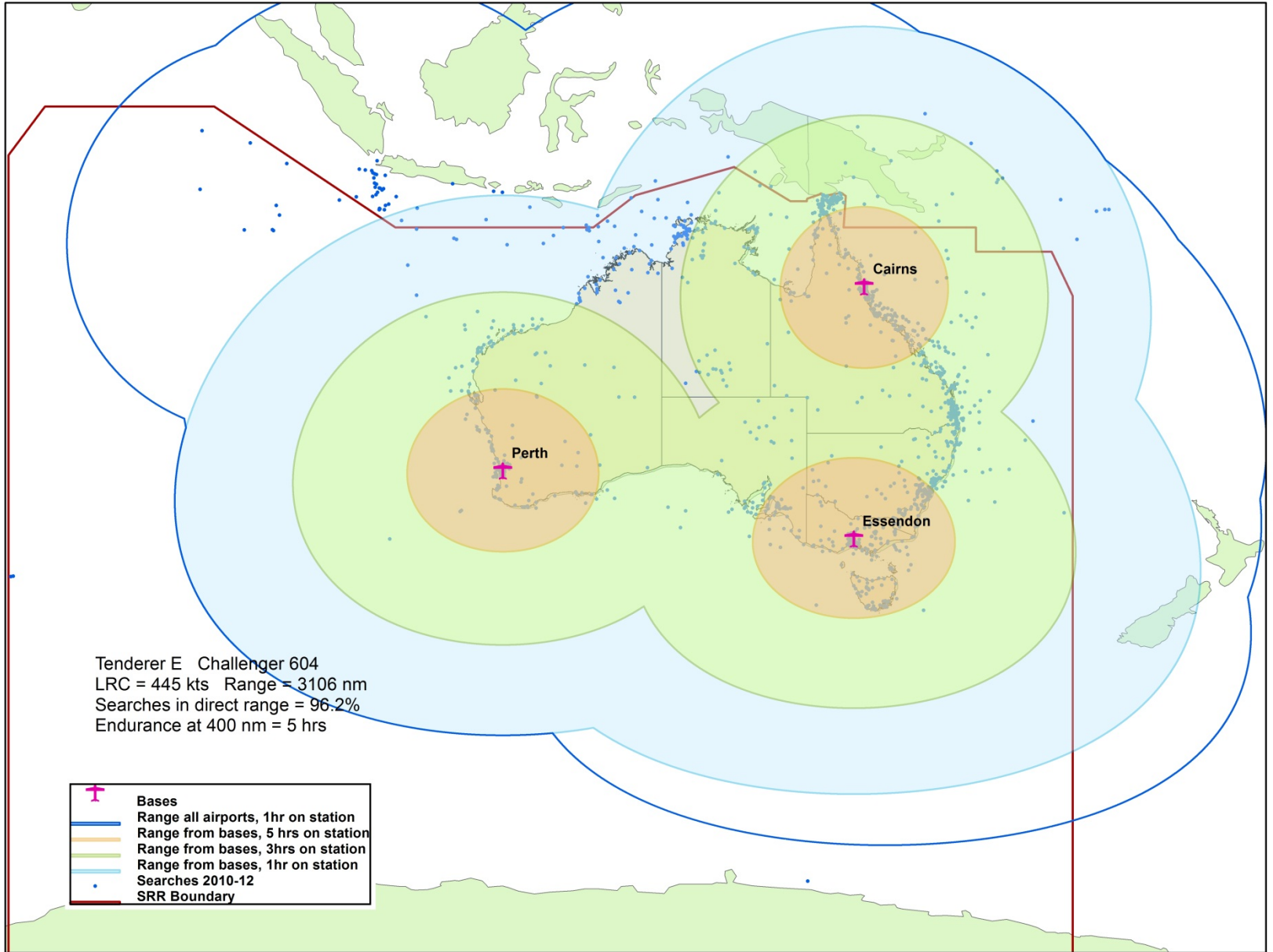
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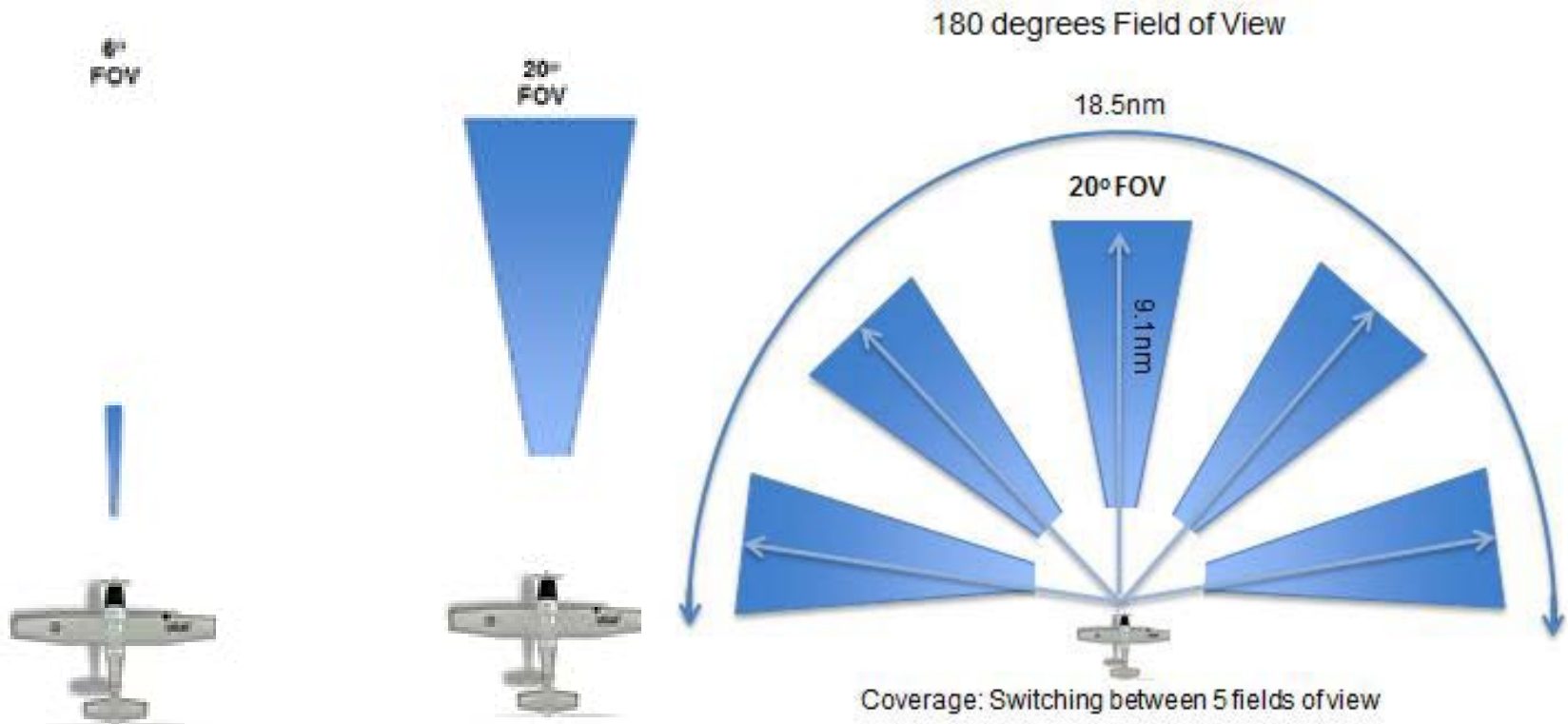


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# TIER 2 - Rotary Wing







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# TIER 4 – Fixed Wing





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# Long Range Aircraft - RAAF

- P3C Orion long range maritime patrol:
  - 6 hours SAR at 1,000nm
  - 1 hour SAR at 1,800nm
- C130 Hercules transport:
  - 4 hours SAR at 1,000nm
  - 1 hour SAR at 1,500nm
- Both have ASRK and SDB Drop Capability
- Both have 121.5 Homing Capability





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# C130 Hercules





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# P3 Orion

