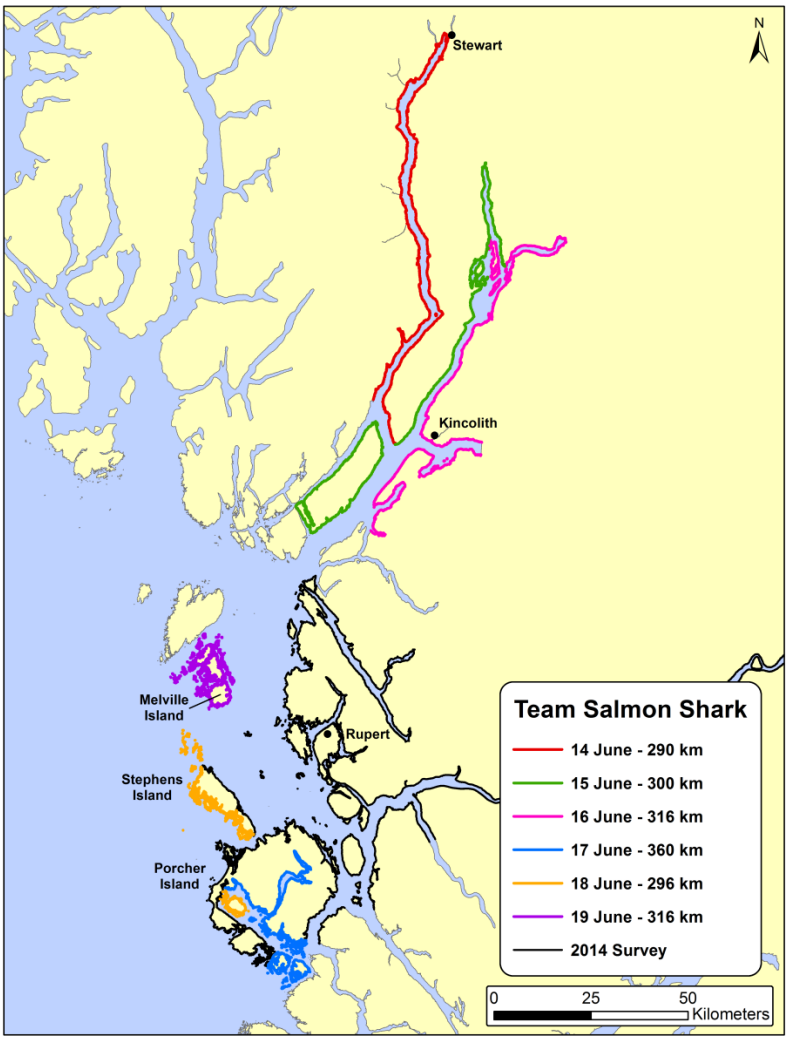
2015 AVI Technical Manual
Team Salmon Shark (SH)
June 14-19, 2015



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Tide Summaries: June 14-19, 2015

(all times in PDT; lows in meters)

Gauge: Kincolith, BC

*below 1.5 meters

Day	Date	Sunrise	Open	Close	Length	Low	TimeLow
1	14 Jun	5:07	5:25	8:20	2:55	0.80	6:54
2	15 Jun		6:00	9:20	3:20	0.55	7:39
3	16 Jun		6:40	10:10	3:30	0.42	8:24
4	17 Jun		7:20	10:55	3:35	0.41	9:09
5	18 Jun		8:05	11:30	3:25	0.52	9:48
6	19 Jun		8:50	12:00	3:10	0.72	10:27

Gauge: Qlawdzeet Anchorage, BC

*below 1.5 meters

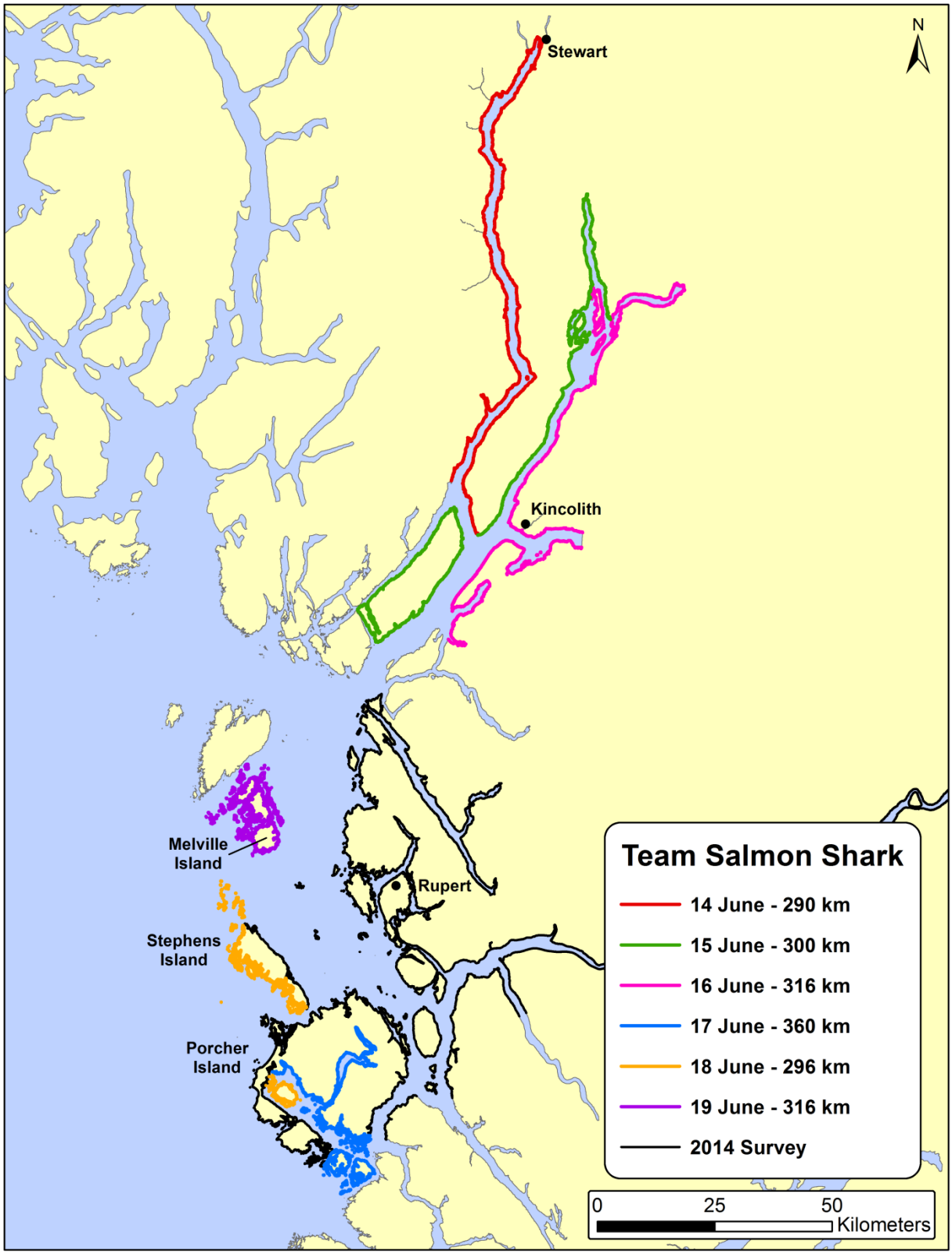
Day	Date	Sunrise	Open	Close	Length	Low	TimeLow
1	14 Jun	5:07	5:15	8:20	3:05	0.79	6:45
2	15 Jun		5:50	9:20	3:30	0.54	7:33
3	16 Jun		6:30	10:10	3:40	0.41	8:15
4	17 Jun		7:10	10:50	3:30	0.41	9:00
5	18 Jun		7:55	11:25	3:30	0.52	9:36
6	19 Jun		8:40	11:55	3:15	0.72	10:18

Gauge: Kitkatla Islands, BC

*below 1.5 meters

Day	Date	Sunrise	Open	Close	Length	Low	TimeLow
1	14 Jun	5:07	5:10	8:15	3:05	0.71	6:45
2	15 Jun		5:50	9:15	3:25	0.46	7:33
3	16 Jun		6:25	10:05	3:40	0.33	8:18
4	17 Jun		7:10	10:45	3:35	0.33	9:00
5	18 Jun		7:55	11:25	3:30	0.45	9:39
6	19 Jun		8:40	11:55	3:15	0.66	10:21

Team Salmon Shark				Time in PDT; height in meters					
Day	**Date**	***Gal***	**Time**	**Flight**	**Shoreline**	**Total**	**Transit**	**Location**	
				Time (hr)	**(km)**	**(km)**	**(km)**		
1	14-Jun-15		4:50				85	Liftoff Seal Cove and transit to Portland Canal	
			5:25		145			Image west Portland Canal to Stewart	
		50	6:50	*2:00*			0	Setdown Stewart and refuel	
			7:10		145			Liftoff and survey east Portland Canal	
			8:35				75	Rertun to Rupert	15 min over tide
		50	9:05	*1:55*				Setdown Seal Cove and refuel	
				3:55		**290**			
2	15-Jun-15		5:30				70	Liffoff and transit to NE Pearse Island	
			6:00		123			Survey Pearse Island	
			7:15				13	Transit to Kincolith	
		50	7:20	*1:50*				Setdown Kincolith and refuel	
			7:40				9	Liftoff and transit to Observatory Inlet	
			7:45		177			Survey Observatory and Hastings Arm	
			9:30				130	Tranist to Rupert	10 min over tide
		80	10:25	*2:45*				Setdown Seal Cove and refuel	Can stop in Kincolith if needed
				4:35		**300**			
3	16-Jun-15		5:50				125	Liftoff and transit to Observatory Inlet	
			6:40		185			Survey to Kincolith	
		70	8:30	*2:40*			0	Setdown Kincolith and refuel	
			8:50		131			Liftoff and survey to Kwinimass River	
			10:05				55	Return to Rupert	5 min short of tide
		40	10:30	*1:40*				Setdown Seal Cove and refuel	
				4:20		**316**			
4	17-Jun-15		6:40				60	Lifoff Seal Cove transit to south Porcher	
			7:05		182			Survey Porcher and Kitkatla Group	
			8:55				25	Transit to north Porcher for fuel	
		65	9:05	*2:25*				Setdown north Porcher and refuel	* One drum north Porcher
			9:25		108			Liftoff and survey Porcher	
			10:30		70			Survey Porcher Inlet and Salt Lagoon	Hopefully tidal delay
			11:15				50	Return to Rupert	
		55	11:35	*2:10*				Setdown Seal Cove and refuel	
				4:35		**360**			
5	18-Jun-15		7:35				35	Liffoff and tranist to Tree Nob Group	Weather liftoff at 6:50 for flight and refuel
			7:50		245			Survey West Stephens	by way of north Porcher
			10:20				10	Tranist to north Porcher for fuel	Adds 45km and a fuel top up
		70	10:25	*2:50*				Setdown north Porcher and refuel	* One drum north Porcher
			10:45				10	Liftoff and transit to Gurd Island	
			10:50		51			Survey Gurd Island Group	
			11:20				55	Return to Rupert	
		25	11:45	*1:00*				Setdown Seal Cove and refuel	
				3:50		**296**			
6	19-Jun-15		8:25				30	Liftoff and transit to Melville Island	
			8:40		213			Survey Melville Island and Dunira Island	
		65	10:50	*2:25*			0	Setdown Melville and refuel	* One drum Melville
			11:10		103			Liftoff and survey Baron Island	
			12:10				35	Return to Rupert	15 minutes over tide
		35	12:35	*1:25*				Setdown Seal Cove and refuel	
				3:50		**316**			
		655		**25:05:00**	Heli Time	**1,878**	**km**		
	Return positioning Terrace			2:00:00					
	2 sling trips North Porcher			1:30:00					
	2 slings trips Melville			1:00:00					
				29:35:00	Total Heli Time				
Notes									
- 100 km/h survey rate, 150 km/h transit rate (can be faster if clear)									



Daily Survey Plan for team Salmon Shark, Prince Rupert, BC, June 14-19, 2015.

FLIGHTS
Air Canada – 1-888-247-2262

Confirmation Code: PD8ZGR – Kalen Morrow, Sarah Cook, Alex Haggis
Departure Sat. June 13th

Flight: AC8054
Departs: Victoria, BC (YYJ) at 07:00
Arrives: Vancouver, BC (YVR) at 07:24

Flight: AC8278
Departs: Vancouver, BC (YVR) at 09:05
Arrives: Prince Rupert, BC (YPR) at 11:03

Departure Fri. June 19th

Flight: AC8281
Departs: Prince Rupert, BC (YPR) at 20:05
Arrives: Vancouver, BC (YVR) at 22:00

Flight: AC8083
Departs: Vancouver, BC (YVR) at 22:55
Arrives: Victoria, BC (YYJ) at 23:22

LODGING

Crest Hotel
Phone: 250.624.6771 or 800.663.8150
Nights of June 13-18th (6 nights)
4 rooms/6 nights - $159 per room
Confirmation #: 185099

QUANTUM HELICOPTERS

Office, Terrace, BC
4445 Bristol Rd
Terrace, BC
www.quantumhelicopters.ca
Phone: 250.615.0168
Fax: 250.615.0169

Contact
Ian Swan – Chief Pilot
Quantum Helicopters
ian.swan@quantumhelicopters.ca
Cell: 250.975.0024

Angela Wiebe
Dispatcher
Phone: 250.615.0168
awiebecda@hotmail.com

VECHICLE RENTAL

National: 106-815 First Ave West, Prince Rupert
Phone: 250.624.5318
Standard SUV – Sat June 13th at 13:00 to Fri June 19th at 17:30
Confirmation #: 895113786

Typical personnel functions are identified in Table 1. While the pre-and post-flight responsibilities tend to be shared among personnel, in-flight activities are generally not shared. Recommended personal equipment is listed in Table 2.

Table 1. Survey Personnel and Responsibilities

Personnel	**Pre-Flight Activities**	**In-Flight Activities**
Videographer Geologist	• responsible for setting up camera • tests entire system prior to lift off • synchronize video camera clock to GPS clock • synchronize mp4 recorder clock to GPS clock • ensure spare SD cards and camera/recorder batteries	• video-imaging and continuous geological description • checks image framing • adjusts ND filters if necessary • advises pilot re flying corrections • checks camera switches at regular intervals • check audio meters for sound level • checks time counter on camera
Photographer Biologist	• synchronize video camera clock to GPS clock • tests designated audio-sound track • ensure extra SD cards and camera batteries	• provide continuous biological commentary • shoots digital still photos • stores digital media • advises pilot re flying corrections • assists in navigation using paper charts
Navigator	• assists in design of flight plan • ensures proper digital charts are loaded in laptop • familiar with tide window and timing of flight plan • synchronizes computer clock to GPS clock • brings and uses papers charts if necessary	• monitors electronic mapping and logging system • directs pilot in general strategy (use clock face for directional instructions) • provides geographic reference points to the geologist for recording on audio track • provides feedback on quality of commentary to biologist and geologist

Table 2. Recommended Personal Equipment

All personnel	• mustang survival suit or similar • inflatable PFD (*not water activated) • seat belt cutter • lighter • gloves (fingerless) • watch (digital) • hat / sunglasses • small backpack • thermos / cup • water / snacks • gum / mints

Table 3. Pre-Survey Equipment Check List

	Video System		***Digital Still Camera***
	Video Camera (Sony)		Digital Nikon D-70 Camera
	Sony camera external hard drive		lens cleaner/paper
	Camera Batteries		manuals for camera
	Vitec mp4 Recorder with Batteries		spare SD cards
	Ninja Recorder		camera batteries
	Ninja Batteries		
	Raincoat for camera		***Miscellaneous***
	Sunshade for Ninja		duct tape
	HDMI cables		electrical tape
	Ram mounts		soldering gun
			tools; wiring, spare cables, pliers
	Manuals (camera, Ninja, Vitec)		screw drivers, connectors
			paper towels
			small-scale chart for daily progress
	Communications System		power bars and extension cord
	Lapel microphone (x3)		halibut gangion
	Push-to-talk cable		pencils/pens/sharpies
	Ear phones		ziploc bags
			tech manual and tide tables
			bungie cords
	Power Supplies		zap straps
	12V DC gel-cell battery pack		field notebook
	Gel cell battery charger		
	Sony camera battery charger		
	DC/AC power inverter		***Navigation System***
	28V power inverter		DGPS
			Garmin backup handheld GPS
			Backup GPS antenna cable
	Computers & Software		Backup GPS computer-to-GPS cable
	Laptop		paper charts; chart index
	Fugawi and Tides software		manual for DGPS
	ArcView and extensions		manual for Garmin backup GPS
	BSB Charts		

Table 4. Pre-Flight Check List

	Video System		***Digital Camera***
	camera clock sync to pc/gps		clock sync to pc/gps
	mp4 recorder/ ninja clock sync		settings checked
	spare SD cards		lens clean
	spare camera/recorder batteries		***Navigation System***
	cables taped in		power, ports, and satellites
	view finder picture, auto focus		gps to laptop
	flashing ND filter (change settings)		fugawi track log named & active
	audio test (2 separate channels)		pc clock sync to gps
	test recording, playback, sound		video and camera sync to pc/gps
	lens clean, raincoat available		flight plans, maps, targets
			back up USB stick and procedure
	Communications System		
	headsets/push-talks operational		***Misc***
	audio test (2 separate channels)		pencils, small notebook
	playback/sound test both tapes		charts
			sync watches
			barf bag (ziploc)

Table 5. In-Flight Check List

	Videographer		***Navigator***
	REC on camera		gps green light in fugawi
	REC on mp4 recorder		flightline track w/ day's log active
	flashing ND filters		log advancing # points & km
	counters advancing		data backups (fugawi and export)
	burn on date/time		mark waypoints w/ MOB
	audio plugs taped		watch for seal/sea lion haulouts
	video plugs taped		watch time and targets
	camera clock sync'd		
	auto focus		
	image framing		***Biologist/Photographer***
	battery power		camera memory card changes
			camera settings okay
			battery power

Equipment Setup and Testing

1) **GPS**
   Mount the GPS on the front window/dash inside the aircraft with the RAM suction cup. Smile a lot. Promise the pilot that it everything will be alright, but get permission first. Connect GPS to the batteries, then the serial cable into the laptop.
2) **Vitec MP4 player**
   Mount the Vitec mp4 recorder on a rail in front or to the side of the geologist (positioning depends on aircraft type). The Vitec battery only lasts for approx. 3 hours so make sure you have the spare charged and a plan to change it. Alternatively make sure you have the Vitec power cable that plugs directly into a two-pack of 12V gel cell batteries. This cable is fused, so have spare fusses. This power set up will last all day (dependent on what else you are running off the batteries, i.e. GPS).
   The record format should be set to "Proxy Premium" this is the highest quality mp4 format (see page 6 in manual).
   File format should be set to "MP4" as opposed to "MOV". This is accessed by pressing and holding the "Mode" button. Date and time is also set through the Mode button, try this at home as it can be tricky.
   Backlight set to "Low" saves battery power.
   Check battery power by pressing and holding the "OK" button.
   Press OK quickly and you will take a still snapshot, not hugely useful for us. This can happen by accident and can be later deleted once downloaded if unintentional. However this feature could be useful in certain situation.
   When recording a time meter will count up telling you how long you have been recording, this is essential to monitor in-flight to make sure you are still recording. Stopping record will start a new MP4 file, it is convenient for post processing to not let the MP4 time exceed 60 minutes.

3) **Sony Video Camera**
   Video camera settings: On the Sony HXR-NX5U, set the Record Format in the Menu to **HD 1080/30p.** Resist the urge to use the 60i settings. Interlaced video is not good for web posting, which is where this video will be mostly viewed.
   Also make sure the "Date Rec" option is set to "On". This gives you the Date and Time burn on at the bottom of the image.
   Mics: Tape the lapel microphones to the headset booms for the geologist and the biologist, placed to minimize wind noise. Mics are powered through the camera battery (carry the spare mic with you at all times). Plug firmly into the mic inputs on the camera and make sure it clicks in. Use the "display" button on the camera to have the "sound bars" continually displayed in the lower right corner of the screen. Note that these will constantly be grabbing sound from the wind, but no action on the sound bars indicates that a mic isn't working at all.
   On the sound controls closest to the input plugs have the switches for both mics set to "Mic +48V".
   On the left side of the camera, open the cover and set the switches to "Input 1 and Input 2" (down position). Set the second set of switches to "Auto" and the sound can be cranked up to 10.

HDMI: Plug the HDMI cable into the back of the camera "HDMI out" port and run it to the Vitec where it plugs into the top "HDMI in" port. Tape the cable in with electrical tape since it is very easy to pull out mid-flight, especially from the back of the camera. The HDMI cable also transmits the sound.

4) **Synchronize times**

Do this on ALL devices. Video camera, Vitec, still camera and laptop. It should all be synchronized to the official GPS time. Also make sure the time is set on the backup video and still cameras, this will save you precious time should you need to use them. Trying to fumble through a time set with a rising tide and rotor blades whizzing around your head will not end well for you.

5) **Sound and recording check**

Ensure both geological and biological commentaries are audible through earphones plugged into camera, unfortunately you cannot check audio on the Vitec until video is downloaded so check the Vitec sound at home.

Audio channels should be separate (geologist in one ear, biologist in the other). Turn up the volume on the video camera. Audio problems are often traced to the mics themselves or their connection points.

It is a good idea to record a small test of video and replay it on the camera making sure you listen for the audio.

6) **Laptop Power**

Laptops can be powered through the 28V to 115V power inverters. These will work in Jet Rangers and Robinson R44 Raven 2's, although it is pertinent to note that the early R44's were called a "Raven 1" and are run on 14V power. Potentially you could use a standard 12v to 120v power inverter although this has never been tested at CORI.

Typically the Jet Ranger will take the three prong plug and the R44 will take a cigarette lighter style plug.

Communicate with the company beforehand to see if these will work on their aircraft. However, even if they are confirmed to work be prepared for them not to work. Multiple problems can exist ranging from bad plugs (typically not used very often) to being wired for too little amperage. This is why you should always have some 12V gel cell batteries and know how to use them.

If it does work then you can typically leave them plugged in and charging continuously, although some pilots might like them switched off during start up. If this is the case then remember to switch them on as this is easy to forget. A good habit is to always check that your computer is operating on AC power once the helicopter is running and warming up.

If you need to use 12V gel cells then connect the laptop to the gel cell battery pack using a 12v DC to AC power inverter. During flight, use the power monitor on the PC to carefully manage battery power. The laptop internal battery can last anywhere from 3 to 6 hours. Use the gel cell pack to intermittently charge the laptop during refuels, transits, or set-downs. It is best to cycle the battery pack on and off to keep up the charge on the laptop. Plug in the power inverter to the battery pack for 10-15 minutes and then unplug it for 10-15 minutes. Cycle continually to keep the battery power above 70% and **Do not leave the laptop charging continuously** or the battery will drain below the minimum limit and provide no charge. At the end of a long survey day, the laptop battery may be as low at 50%.

Do not allow the laptop battery to drop below 35% at any time. Although you might think this is plenty of time, the last 20% of batteries can disappear surprisingly quickly. Dropping from 20% to 0% can happen in a matter of minutes.

7) **Laptop**
Set the power options so that the laptop will default to these settings when not hooked up to the battery: NO HIBERNATING, low screen brightness, high CPU speed.
Disable the wireless and screensaver options.
Adjust the time to UTC time by clicking on the computer clock. Be sure that **GMT is not adjusted for daylight savings** (you will usually have to uncheck a box) **GMT Casablanca or Monrovia** will usually accomplish what you want.
Sync GPS and laptop using Fugawi. Sync all cameras, watches, and equipment to this time.

8) **12v Gel Cell Battery Power**
Open battery box and connect terminals very carefully, always making sure red to red and black to black. A key component of the survey is battery maintenance. Keep a log of the battery voltage before and after each day of surveying to monitor the health of the batteries. **Check power using a digital multimeter with the dial set at 20.** Charge will be up to 13.2v when full and as low as 11.0v when used. Charge the batteries immediately upon returning from the survey day as this can take several hours if the batteries are really low. When the solid red light on the charger goes out, charging is complete.

Fugawi

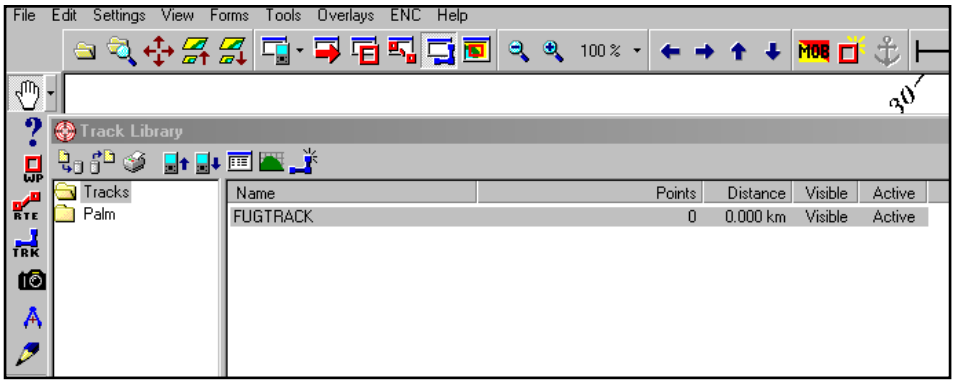
1) Plug the 9-pin serial cable from the GPS into the computer before starting Fugawi. Note that we use Panasonic Toughbook's specifically for the 9-pin serial plug. Although old technology, this has provided the most reliable data. If changing to a new GPS or a laptop with only a USB input for GPS, be sure to do some rigorous testing before field work as these have been notoriously unreliable for CORI.
Take a backup copy of Fugawi software with Serial numbers for activation in case you need to re-install it.

2) Open Fugawi and use **Forms> GPS>Settings> Change Port>** to change settings to match the incoming COM PORT. For Panasonics with 9-pin ports set port to: none. Set other options to:
    Speed: 4800
    Parity: none
    Data bits: 8
    Stop bits: 1
    Flow control: None
Press OK and wait a few seconds while it finds the GPS.
A green dot appears on the bottom left hand corner of the screen indicating successful capture of a GPS signal. If not, check the satellites map and troubleshoot. Synchronize the GPS with computer clock using **Tools>Synchronize Time**.

3) Create a new track file for each day using the standard filename format (such as **pe04may08** where pe = Team Petersburg). Open **Forms> GPS>** to select the **log file** and click the **Active** button. Leave this window open and shrink it enough to see the NMEA string clicking away.

4) Check box for "**enforce checksum**." If you are having trouble acquiring enough satellites, you can temporarily change this to "any talker," but be advised the accuracy of the position will be reduced.

5) Begin logging the trackline using **Forms>Track Library**. A small icon resembling a **blue backwards L** appears; click this to create a new trackline. Click the **Active** and **Visible** cell to begin logging. During breaks or transits where logging isn't necessary, set the 'Default' track to be Active. Remember to change it back to the day's track when actively logging.



6) Add charts using **File>Open** and navigate to BSB charts on the hard drive. Don't add the detail-scale charts.

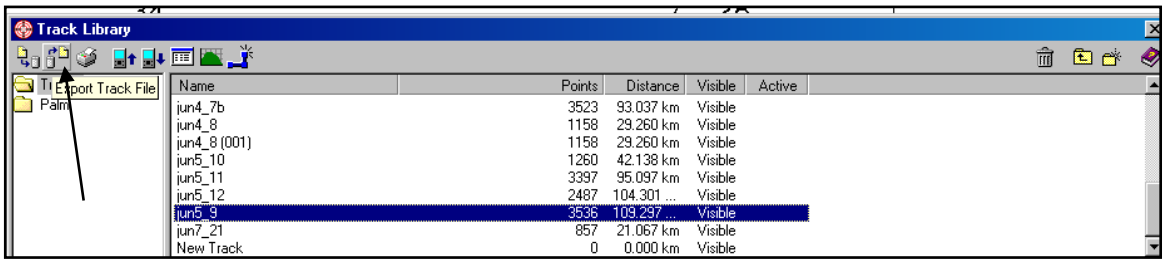
7) Set initial unit preferences: **Settings>Preferences>**
   - Units = Metric
   - Lat/Long Format = ddd.ddddd (decimal degrees)
   - Magnetic Variation = Automatic
   - Display Datum = Map Datum
   - Location Format = Lat Lon
   - Types of PDA = leave blank

8) Set Trackline capture options: **Settings>Track Options**
   - Recording = Enabled
   - Interval = 1 second
   - Min Dist = 0 m
   - Max Dist = 200 m

9) Sync GPS with Computer clock: **Tools>Synchronize Time**
   Note computer clock must NOT adjust for Daylight Savings (GMT Casablanca/Monrovia)

10) To correctly log the track, 3 settings must be checked:
   ✔ Track Options - recording enabled, ✔ Log Active, ✔ CheckSum

11) **Export** TXT and TRK files of the trackline periodically (every 20 minutes in flight). Set up the naming convention and destination folder prior to the flight. In the Track Library window, select the "Export data" icon (second from left, shown by arrow in figure below).
   Name the file according to the standard (such as **pe04may08a.txt** where pe = Team Petersburg)
   Select "**Text**" as output type
   Highlight the top fields from **Latitude to UTC Time**, and click the ">" key to move them to the right side.
   Save to that day's data folder on the hard drive and on the memory stick. Repeat the procedure and save as "**Track**" with a .trk suffix on the filename.



Note: Saving to the laptop may cause a delay of a few seconds, during which GPS points on the current trackline may be dropped. Append each subsequent file name with a lowercase alphabetic letter so that at the end of the day, your most recent trackline will be the highest letter.

12) Also save the Fugawi library as an .fbk file by using **Tools>Backup Libraries**. Use the same naming convention. This can be done less frequently (every 40 minutes in flight).

13) Ensure **BSB charts** and **seal haul-out** locations are loaded into Fugawi. Seal haul-outs and other waypoints can be added to Fugawi using the following procedure:
    Waypoints must have unique names. If a site name is not provided in the Excel file, use the number of animals and add a lowercase letter added to the end to create a unique name. Convert Excel locations file to a tab-delimited TXT file.
    Fugawi select Forms -> Waypoints
    Select all current waypoints and delete them.
    Select Import waypoints at top left on dialog box. Navigate to the sea haul-outs text file, select “open.”
    In the import fields data box select 3 fields: Name, Latitude, Longitude
    In the field diameter box, choose TAB (text file should be in tab delimited format); click OK.

Navigator (Pre-Flight):

- Locations of **marine mammal haul-outs** should be obtained well in advance. During flight, alert the crew to upcoming haul-outs. Mark **significant unmarked** haul-outs in-flight using the MOB feature in Fugawi.
- Ensure the laptop and battery packs are fully charged the night before.
- Assemble the hard-copy **charts** you will need for the day (in a large ziploc in your backpack). Know geographic names for where you are flying for the day, and have the survey plan handy. Understand the day's **benchmarks** to be reached during the survey, as well as refuel locations and times. Bring pencils, electrical tape, knife, water, and snacks in your pack.
- Ensure the laptop power management settings have disabled the automatic hibernate functions. Create an icon to monitor laptop battery status. Set the laptop display time to UTC without daylight savings adjustment (click on computer clock, set to GMT Casablanca/Monrovia).
- The videographer will provide you extra SD cards and camera batteries. Check these and store them in Ziploc bags in your pack (it can be wet/moist in the backseat).

Navigator Flight Kit:

- Charts for the day – in Ziploc bag – available for quick viewing
- Handheld GPS with cables
- USB stick – AVI Bible, Fugawi software
- Spare Inverter - to power your computer should the original fail.
- Spare HDMI cable
- Spare lapel mic
- Appropriate fuses, wire, and connectors
- Pliers, knife, and small screwdriver; Leatherman or similar can be very helpful
- Small notebook and a pencils
- Electrical tape
- Barf bag (Ziploc)
- Gum, candy, Gravol

Pre-Flight Videographer: Daily plan and targets

Use GIS and tide windows to finalize daily plan and targets at mid-tide, refuel, and end of the tide.
Supply the team with a brief summary of times/locations for lift-off, refuel, and set-down.
Supply navigator the charts for the day.

Pre-Flight Biologist

Refer to image handling section for camera settings and instructions.
Participate in time synchronizing and audio testing with the geologist and navigator.

PRE-FLIGHT FULL SYSTEM CHECK (NAV/GEO/BIO):

- Times synchronized all devices
- Full power all devices
- Sound in separate channels
- GPS trackline logging in Fugawi

Navigator (In-Flight):

- Monitor trackline, GPS, laptop battery.
- When the GPS is being transmitted through the serial cable, a green dot and LAT/LON position will appear in the GPS status bar.
- The Fugawi charts should update automatically as you are flying. Know which BSB chart(s) you need for the general area you are working in. Avoid frustration by not importing detailed BSB charts (such as for harbors). Turn on vessel centering by clicking the 6th button from the bottom on the left; toggle it off to pan around the map. View the previous day's trackline by making it visible (NOT active). Change the color of the trackline for different day using the square with legs icon. This is important if you are near where you flew the previous day or when you are trying to close gaps. Turn trackline logging off during long transits and refuels using the toggle "log track" (bottom button). (This way our flightlines aren't shown for places we aren't collecting imagery).
- Trouble: If GPS position is lost, a red dot will appear in the status bar on the lower left. Check power, cables, and number of satellites.
- Keep a log of tapes, change times, and general start/end locations. Tell the videographer your geographic location when changing tapes so he/she can make a comment on the audio (eases tape logging later).
- Keep an eye on the Vitec mp4 recorder to make sure the time is counting up, but not passed 60 minutes per segment.
- Ensure all islands and shorelines are captured in the nav trackline.
- Communicate...
  Use the charts to advise the pilot and imaging crew of upcoming features such as large deltas, places where loops are going to be needed, hidden inlets, and mammal haul-outs. Use a clock face to indicate direction to look or fly. ("There's a seal haul-out coming up at 9 o'clock.")
- Relay information on speed to the pilot... try to keep the survey at 100 km/hour.
- Keep the geologist alerted to the day's progress and where we are in the tide window.
- Provide the geologist with geographic names (islands, rivers, bays, headlands).
- Trackline should be backed up right after tape change before filming begins again.
- Backup...
  Save navigation trackline often to hard drive and geek stick as FBK, TRK, and TXT. To export as TXT, highlight the track and click the export icon. Choose the following fields:
  Latitude/Longitude
  UTM84
  Date(UTC)
  Time(UTC)
- During long transits, temporarily change the active trackline logging file to the "default" rather than the day's survey log. Ensure you change it back to the active log back to the day's survey before resuming filming.
- Use the MOB button to mark places or times where events occurred that you may want to recall later.
- Do not shut Fugawi down using the top window bar "X" top right hand corner. Use File>Close, File>Exit on the menu.
- When finished filming, back up navigation in both text and Fugawi formats to both the hard drive and the geek stick.
- At the end of each day's survey, begin charging gel cells and laptops as soon as possible. Gel cells should be monitored while charging and disconnected as soon as fully charged.

Using the hand-held GPS76:

To log data into Fugwai:

1. On any page press the menu button twice. This takes you to the “Main Menu”.
2. Scroll down to “Setup” and press enter.
3. Use the directional button and scroll to the right until you come to the “Interface” tab.
4. Choose - Serial Data Format = NMEA and press enter. (Baud should automatically be set to 4800).
5. Hit “Quit” twice.
6. Use the serial download cable (connect it to a serial to USB cable) and plug the USB cable into the computer.
7. Figure out what port it is plugged into through the “Device Manager”.
8. In Fugawi go to “Form” Menu and choose “GPS”.
9. On the “Settings” tab direct Fugawi to the right port. (You figured this out in step 6)
10. On the “Model” tab make sure the model is set to “NMEA”.
11. You should now be logging data into Fugawi if you have satellite reception.

To collect data on the handheld:

1. On any page press the menu button twice. This takes you to the “Main Menu”.
2. Scroll down to “Tracks” and press enter.
3. The track log should be 0% full to start. This is also the screen where you can periodically save your track (by pressing “Save”).
4. Press “Menu” and then scroll down to “Setup Track Log” and press enter.
5. In the “Track Log Setup” choose
a. Recording – Stop when full.
b. Record Method – Time
c. Interval – 1 second. Note: the GPS can only collect 2000 points, this is only enough for roughly 30 minutes of logging. After 2000 point is reached you will quit logging. If you need to collect more than 2000 points than you can change the logging interval to 2 seconds or greater. We can fill in the missing seconds back in the office. A 2 second interval should give you one hour. 4 second interval should give you 2 hours etc….
Note: If the GPS is on and receiving satellites, you will automatically be collecting tracks unless you have accidently set the Record Method to Off (see step 5).

To download your collected data to Fugawi:

1. On any page press the menu button twice. This takes you to the “Main Menu”.
2. Scroll down to “Setup” and press enter.
3. Use the directional button and scroll to the right until you come to the Interface tab.
4. Choose - Serial Data Format = Garmin and press enter.
5. Hit “Quit” twice.
6. Use the serial download cable (connect it to a serial to USB cable) and plug the USB cable into the computer.
7. Figure out what port it is plugged into through the “Device Manager”.
8. In Fugawi go to “Form” Menu and choose “GPS”.
9. On the “Settings” tab direct Fugawi to the right port. (You figured this out in step 6)
10. On the “Model” tab make sure the model is set to “Garmin”.
11. Now go to the “Forms” menu and choose “Track Log”.
12. On the Track Log form click the “Download from GPS” button. Presto! The track should start downloading.
13. Now follow the steps outlined in “Exporting the Trackfiles to Excel and Access” section of this Manual.
14. Change the model back to “NMEA” once you are done (see step 10).

Using the hand-held GPSmap60:

To log data into Fugwai:

1. Press the menu button until you reach the “Main Menu”.
2. Scroll down to “Setup” and press enter.
3. Scroll over to the “Interface tab” and press enter.
4. Serial Data Format = NMEA In/NMEA Out and press enter. (Baud should automatically be set to 4800).
5. Hit “Quit” three times.
6. Connect the USB cable from the GPS to the computer.
7. In Fugawi go to “Form” Menu and choose “GPS”.
8. On the “Model” tab make sure the model is set to “NMEA”.
9. You should now be logging data into Fugawi if you have satellite reception.

To collect data on the handheld:

1. Press the menu button until you reach the “Main Menu”.
2. On the “Tracks” icon press enter.
3. The track log should be 0% full to start with and the Track log should be set to “On”. This is also the screen where you can periodically save your track (by pressing “Save”).
4. Scroll to “Setup” and press enter.
5. In the “Track Log Setup” choose
a. Uncheck “Wrap when full”.
b. Record Method – Time
c. Interval – 1 second. Note: the GPS can only collect 2000 points, this is only enough for roughly 30 minutes of logging. After 2000 point is reached you will quit logging. If you need to collect more than 2000 points than you can change the logging interval to 2 seconds or greater. We can fill in the missing seconds back in the office. A 2 second interval should give you one hour. 4 second interval should give you 2 hours etc….
6. Hit “Quit” thee times to get out of this screen.
7. Hit “Page” until you get to the “Map” page. This is where you can watch your track accumulate points.

To download your collected data to Fugawi:

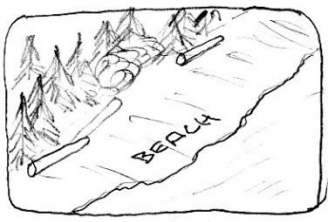
1. Press the menu button until you reach the “Main Menu”.
2. Scroll down to “Setup” and press enter.
3. Scroll over to the “Interface tab” and press enter.
4. Choose - Serial Data Format = Garmin and press enter.
5. Hit “Quit” three times.
6. Choose - Serial Data Format = Garmin and press enter.
7. Hit “Quit” three times.
8. Connect the USB cable from the GPS to the computer.
9. In Fugawi go to “Form” Menu and choose “GPS”.
10. On the “Model” tab make sure the model is set to “Garmin”.
11. Now go to the “Forms” menu and choose “Track Log”.
12. On the Track Log form click the “Download from GPS” button. Presto! The track should start downloading.
13. Now follow the steps outlined in “Exporting the Trackfiles to Excel and Access” section of this Manual.
14. Change the model back to “NMEA” once you are done (see step 10).

Top Nine Pointers for Geoscientist/Videographer

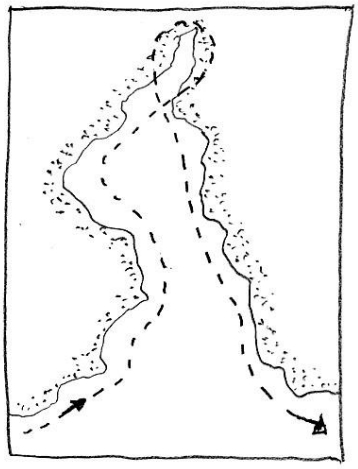
ShoreZone Aerial Surveys

1. **Speed and Altitude:** Typical flight speed is 60 knots and altitude is 250' (100 km/h survey rate, 150 km/h transit rate). Be careful about the speed as often the pilots unconsciously speeds up or slows down and has to be refreshed. On intricate shorelines, speed will have to be lower and on long straight sections it can be a bit faster. Altitude should vary as width of the shore zone. Wide shore zones require higher altitudes (500-600' is typical for estuaries). Generally the pilot gets the idea and automatically climbs as he approaches an estuary.

2. **Shooting Angles:** Keep the horizon level (using the treeline helps), shooting about 45 degrees *off the trackline* with the door jamb just out of the right side of the image. The camera should be pointed around 45 degrees *down* so the shoreline is appearing in the right upper corner, passing through the center of the screen and out of the left lower corner (sketch at right). It does help the mappers to shoot ahead occasionally so they get a single view showing the overall complexity (or similarity) of the coast. Also you can follow an interesting feature with a slight zoom in, holding the framing stationary on the feature as the helicopter passes over.



3. **Cornering:** Get the pilot used to always making counter-clockwise turns (see preferred trackline at right). This puts the left side of the helicopter down and allows for better filming, although the camera person will have to lift the camera during the turn. Some pilots persist on doing clockwise, "hover" turns at the end of long narrow inlets but it invariably doesn't work – the helicopter has to slow down more, is less stable and struts and skids fill the image.



4. **Framing:** Use the monitor to frequently check framing. You should also check that the little red dot is in the image (indicates recording) and that the tape-remaining counter is running. At the same time, make sure you camera is recording (little red light on back of handle). Minimize the sky in the image to avoid silhouetting the shore zone; too much sky will cause the shore zone to be almost black. This is very difficult to avoid in bright surf areas.

5. **Narration:** Generally the morphology doesn't need to be described because mappers can see this in the videography. Concentrate on the sediment texture, which is not so clear in the imagery; be as precise as possible ("a veneer of pebbles and cobbles over sand"; "medium sand beach face and a pebble sand berm"; "pebbles and sand with scattered boulders." Provide the description from supra-tidal down to lower intertidal. The other thing to mention is widths, over and over. Be precise ("the beach face is 20 m wide.") Widths on all components (multiple A, B zones) are helpful but even if you can only provide a few, it is useful to the mappers. Let your enthusiasm be part of the narration – there will be an army of mappers working on this all winter. Geographic names provided by the navigator have to be repeated as the navigator's comments are not recorded.

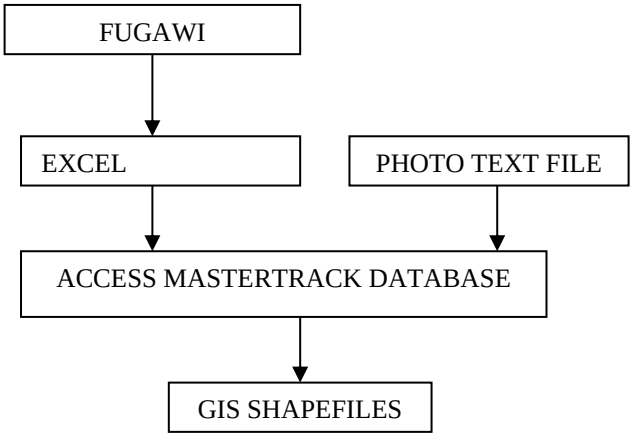
6. **Camera settings:** Autofocus with filter adjustments off. Look out for: flashing "ND1" in video camera frame and adjust the filter setting to whatever the camera recommends. Toggle the "display" button to prevent red "REC" and other information appearing in recorder frame. Mate and tape all cables so they are neat and not loose. If recorder becomes black and white, cables are probably loose. Make sure the sound is set to 2 channels.

7. **Time:** Synchronize watch, digital camera, GPS, and laptop at the start of each day.

8. **Mapping Terminology tips:** Use "ramp" for 5-15 degrees slope, "platform" for <5 degrees, and note whether a cliff is MORE or LESS than 35 degrees (Casl vs Cail). Note if widths are more or less than the 30 m benchmark.

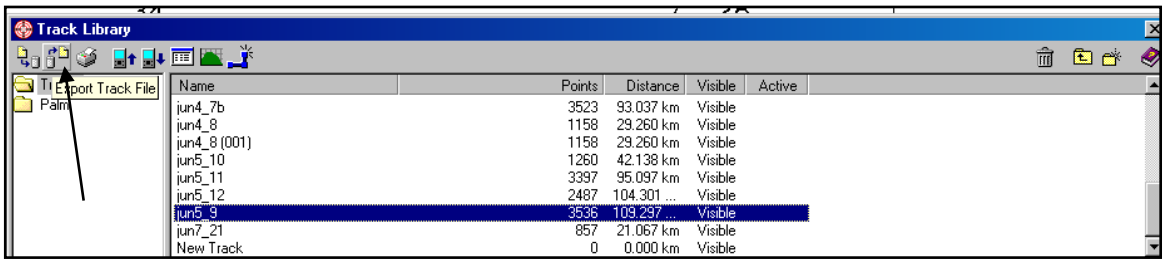
9. **Video camera and filming reminders:** Use only a skylight filter, not a polarizing filter. Look over pilot's shoulder to see 60 knots speed. Ask navigator to monitor GPS is around 100 km/h speed. Don't get too close or too far from shore. Try to shoot 45 degrees out the door and 45 degrees down to the ground.

A trackline file will be created for each day of the survey according to the following general schematic and outline of steps. Details on processing are on the following pages. Follow guidelines for directory structure and naming conventions.



Exporting the Trackfiles to Excel and Access

1) In Fugawi, highlight the track of the day and export the following fields as a text file:
   - Latitude/Longitude
   - UTM
   - Date(UTC)
   - Time(UTC)



2) In Excel, choose File – Open and choose the text file. Select delimited by comma. Assign Date and Time columns with TEXT format. Start at line 12.

3) Add a row above the first set of actual data and copy/paste the headers listed in the table below (copy exactly to ensure smooth import and append to the master trackline table in Access). You can copy from the table in this document and choose **Edit>Paste Special>Text** in Excel, then copy again and choose **Edit>Paste Special>Values Transpose** so the titles end up as row headers. Note that two new field headers exist after pasting in Excel: DATETIME and TAPE_NO. Delete the top columns of text so that the first line of the spreadsheet is the row of headers.

4) DATETIME
This is a very important, unique ID field that needs to be a concatenation of the two fields DATE_UTC and TIME_UTC with no space between the two sets of numbers. Type the following formula into the first cell under the DATETIME column:

=CONCATENATE(F2,G2)

Put the cursor on the lower right corner of the cell until the "+" appears, and double click to fill the formula all the way down to the end of the data set automatically. Select the entire column, copy, and choose **Edit>Paste Special>Values**. Right click on the column, choose "Format Cells" and select "Text." (You may have to pre-format the destination column as text.)

5) Expand the cell width to 20 characters. DATETIME is now a text string that is unique to each second of the survey. This field is used to match the digital photos to the GPS position. Save the processed navigation data as an Excel file, with the naming convention shown on the following pages.

6) Right click on the DATE_UTC and TIME_UTC fields, select "Format Cells" and "Text." Right click again, select "Column width" and adjust to a width of 10. Set other columns according to the table below.

HEADER	FORMAT	COLUMN WIDTH
LAT	double-integer (number: 10 decimal places)	20
LON	double-integer (number: 10 decimal places)	20
UTM_E	double-integer (number: 2 decimal places)	10
UTM_N	double-integer (number: 2 decimal places)	10
UTM_Z	text	10
DATE_UTC	text	10
TIME_UTC	text	10
DATETIME	text	20
TAPE_NO	text	20

7) Using the start and end times on tapes (provided by the videographer), fill in the TAPE_NO field according to the format of survey code and year_team_tapenumber (e.g. PWS07_NG_01). Assign the tape code "PWS07_NG_9999" to trackline times lacking data.

8) On the first day, start with a blank **Trackline Database** (available on the laptop or from the *AVI Survey Bible* disk). Import the navigation *.xls file into the database using **File>Get external data>Import** (show *.xls files). Check the box for column headings and scroll across to make sure the data looks okay. Click Next, **New Table**, Next. Keep indexed at "no" for all fields and keep choosing Next until primary key option comes up, then click on **No Primary Key**. Choose Next, Import to table (name), and Finish. On subsequent days, copy and rename the previous day's trackline database, and append all data to it (include date in the file name each day). All other import procedures for the navigation data Excel file are the same.

9) In Access, right click on the data table, select "Design View" and compare side by side with design of trackline table. Format the fields in the new table to match blank master exactly (even the width!). Add a field for ID at the tope of the table; format it as Auto Number. Close the nav table and save changes. Ok through warning about loss of data.

10) Append new navigation data in the table to the master trackline using the following steps:
Query tab - new - design view
Select master trackline table and new navigation table – click “Add” and then “Close”
If a link appears between the ID fields of the two tables, click on it and delete it.
Query menu - append query - append to Table Name “**Master Trackline**” (existing)– click OK
(Troubleshooting: If the master table doesn’t appear in the drop-down box, go back to the tables view, create a copy of the master table, and rename the *older* version. The new copy should appear in the drop-down box to append the data to it. When finished, delete the older version to avoid confusion.)
Right click on the master trackline table and remove it from view
In the nav data table, select from LAT field down (not star or ID)
Drag down to query box
Toggle view table to preview result
Untoggle view and **run query** using the “!” button (close and do not save query)
Tables tab - open trackline table to check cumulative append of each data table (expand tape_no column; first row is a placeholder that can be deleted).
Make a safe copy of the **trackline DB with tape numbers** before bringing in photos. Export as a DBF IV)

11) Process the photo times file from the biologist using the following steps:
In Excel:
column headers: PHOTONAME, DATETIME
set all columns to text
In Access:
import photodatetimes_all.xls into master trackline database
check box for headers
all formats should be text
no primary key
compare photo table with trackline table in design view
add Field "PHOTONAME" with Text format (50 characters) to trackline table
check that datetime is the same in both tables
close and save design

12) Link the photo names to the master trackline in Access using the following steps:
(note it is critical that the biologist synchronizes the camera clock wit the GPS each day!)
Query tab - new - design view
select Master Trackline table and Photo Times table
link DATETIME fields of the 2 visible tables (delete ID link of present)
query menu - update query
drag PHOTONAME down from Master Trackline table
click “Update To:” box to make active, click “builder” icon (magic wand)
double-click “Tables” in left side dialog box
select Photo Times table in left side dialog box
double-click “PHOTONAME” in center dialog box
expression builder box should show something like: [rc_photos_01juj07]![PHOTONAME]”
click ok, and the expression should appear in the “Update To:” field

13) **Ensure** you have a safe backup copy of that day's master trackline table before running the query. **Run** query and check that photo fields have been updated. Note that not all date-time navigational points will have a photo name (e.g. 696 fields of 7700 fields).
Sort by DATETIME and create a sequential auto-numbered ID column (if it doesn't exist).
Open the Master Trackline table, check that the photo names have been added, and **compare** the number of photos now in the database to the number that were in the photos Excel file.
**Troubleshooting: too many missing photos could mean the trackline has excessive dropped GPS points and needs repair; see section on trackline repair using Excel macro.
**Note: the ID column should be updated after repairing tracklines.
With the Master Trackline table open, select **File>Export**. From the drop-down menu choose "DBF (IV)" format and supply a file name (6 letter filename only, such as "pe04my.dbf").

14) Create a trackline shapefile in ArcView according to the following steps:
Create a new project. Select "Tables," click "Add," and select the trackline DBF table you exported from Access.
Create a new view. Select **View>Add event theme**. Set X = Lon, Y = Lat, click ok.
Select View>Properties>Projections>Projections of the US>Albers Equal Area Alaska
Map units and distance units in the View Properties window should now read "meters."
In the view with the trackline theme active, select Theme>Convert to shapefile.
Assign **filename** such as "pe04may08_track.shp"
(Note previous files were named with an underscore "_a" denoting albers projection; this projection is a standard for all files in 2008 and has been dropped from the naming convention.)
Select "yes" in box about converting projection (won't add to view but is saved to disk).

15) Create a new view and assign "meters" to the properties window. Add the shapefile to the new view, along with the appropriate shoreline, and it should overlay correctly.
Click on the shapefile and open its attribute table. Select ST>Add ID. (If the ST menu is not present, choose File>Extensions and add SantiTools.
Create photo shapefile by building query (hammer icon): ([Photoname] <> "")
Theme - Convert to shapefile and assign a **filename** such as "rc01jun07_photos_a.shp."
Use legend files for displaying trackline and photos.

16) Create a tape log for each tape of each day, using the processed trackline and photo shapefiles (see example tape log below).

17) Flight reports and client deliverables **will include** "master" tracklines and photo points that contain "9999" still in them. Do not delete this information.

18) Back up all files to Data DVD daily! Two copies (one President, one Vice President) should be made and given to another person for safe-keeping. (Remember the President and VP never travel together!) At the end of the survey, create a "final field" data folder that contains all days of the survey. Other daily versions should be kept but archived as "daily backups" following the survey.

19) **Directory structure and naming conventions** for files and folders must use the project code (such as PWS07 or SE08), team (such as DV or WR), and date in the format ddmmmyy (such as 01jun07).

Main Folder: SE08_PE_FieldData
- Folder: Navigation Data
  - pe04may08
    - Flight_data
      - pe04may08.TRK
      - pe04may08.TXT
    - Post_flight_processing
      - PE04MY.DBF (this file exported from Access will be limited to 6 characters)
      - pe04may08_track.shp (and associated files)
      - pe04may08_photo.shp (and associated files)
- Folder: Trackline_DB
  - SE08_PE_Trackline_Database_04May08.mdb
- Folder: Trackline_Shapefile
  - pe04may08_track.shp (also dbf, sbn, sbx, shx)
  - *Note: This "survey" trackline is cumulative (updated with each day's flight information), so multiple versions will exist for the survey. For example, pe07may08_track will contain *all* the survey data up through May 7. It will include 9999 records, but no blank records. Daily versions should be kept but archived in the field data following the survey.
- Folder: Daily Pics
  - The biologist should provide high-resolution and smaller-sized versions of representative photos for each day's survey. The reduced pictures should be placed in a table with captions (including the photo name and location). It is important that the photos be part of the trackline rather than scenic images. The captions should be relevant and professional, because they are eventually delivered to clients with the flight report.

Video Files

You will need 2 external hard drives per survey.

1. Immediately (before even viewing them) copy the MP4 files from the Vitec SD card to an external hard drive so there is a backup copy of them.
2. Copy the AVCHD files from the Sony external hard drive to the same hard drive mentioned in step #1.
3. Copy hard drive #1 (loaded in steps #1 and #2) to external hard drive #2. Now you have two copies of everything. Divide these up if possible. Storing them in the same location defeats the purpose if they both befall the same calamity. i.e. Fire, flood, theft, earthquake, meteor, aliens (relevant in Nome), bear attack, beer spillage, etc….
4. Archive the SD cards from the Vitec and the Sony Video camera. Don't erase them. This is your third back up. This means taking enough SD cards to fly the whole survey without erasing anything (approx. 18 cards for a full six day survey).

2008 Southeast Alaska Aerial Video Imaging Survey
Team Petersburg (PE)
SAMPLE TAPE LOG

Tape: **SE08_PE_02** **Date:** **04 May 08**

General Location: West Etolin Island

Time Start (UTC): 14:48:40 **Geo:** Harney
Fuel Break: None **Bio:** Lindeberg
Time End (UTC): 15:48:32 **Nav:** Still
Tape Length: 00:44:54

Weather: Overcast, windy

Time (UTC)	Location	Photo
14:49:11	Observation Island	SE08_ML_00462
15:02:02	Islands off Johnson Cove	SE08_ML_00595
15:08:55	Screen Island	SE08_ML_00671
15:12:49	Lincoln Rock and Lighthouse	SE08_ML_00711
	Tape Break: 15:14:09 to 15:15:01 (transit)	
15:20:04	Three Way Passage	SE08_ML_00776
	Tape Break: 15:26:17 to 15:40:19 (gps failure)	
15:46:47	Three Way Passage	SE08_ML_00940

Camera Settings for the Nikon D7100 (October 2014)

Use these camera settings with the page number in instruction book for reference:

1. Set Image Quality and Image Size.
   Set the 'Image Size' to **M (medium)** p.68 An 'M' will be visible on the top control panel. Set the 'Image Quality' to **FINE** p.66. The word 'FINE' will be visible on the top control panel.

2. Synch camera time clock to GPS time. Date/Time format and setting is at the 'Time zone and date' tab on Setup Menu. See p. 28 and p. 265. Currently set at London, Casablanca for GPS time, and Daylight saving time is OFF. Date format is Y/M/D.

   The time appears at the bottom of the 'time zone and date' screen. If you can synch your watch to GPS time, it is easier to check camera synch to your watch than to find the GPS time on the navigator computer. Use caution you are doing setup late in the day, as the UTC time will be the next day's date in Greenwich.

   The 'image review' on playback menu is OFF. (p.222). This helps conserve battery power. To review images and check camera function during survey, press the playback arrow. This is important to confirm that photos are working okay during survey. See p. 39. Note that exposure, speed, ISO, jpg number and other details are displayed on the alternate screen during playback (details described p. 187).

3. Set the **'ISO AUTO' to ON** p. 81. Set the **ISO Noise Reduction** (ISO NR) to **HIGH** (p. 228). Set **ISO Sensitivity** (ISO Sens) to **100** (this is the Auto set default). Set the **Max Sensitivity to 6400** and set **Minimum shutter speed to AUTO**.

4. Set mode dial to **SPEED priority** (S on top left dial, p. 49) and always keep camera speed at 1/250 or higher. Check screen on top of camera to see what speed is set. Also shows in image review Take care that the Speed setting doesn't get accidentally changed during flight, as the adjust dial can be bumped easily.

   The camera will balance the shutter speed with the ISO (equivalent to film speed) when you do step 3. When you start in the morning and conditions are dark, you will notice that the 'ISO AUTO' icon in view finder may blink, and the ISO AUTO value will show in red in the image review. This camera is incredible at taking great photos with ISO AUTO correcting for speed/exposure. Keeping speed at least 1/250 will make sharp photos even in low light.

   As the daylight brightens (especially on bright, sunny days) you should increase the camera speed to 1/500 or higher.

   Also, keep the sunshade hood handy to install to help reduce sun glare on those direct sun days.

5. Set the focus on Auto (lever on left side of body at lens), with focus setting on lens at M/A...this way you can help the camera find the focus if necessary. Camera default focus is AF-A – Auto Select still or moving subject (p. 71). Make sure lens is set VR to ON (switch on left side of lens).

   Occasionally, if the air is hazy or there's ambiguous subject (like the surface of the water reflecting sunlight) the camera can't find the focus. With the M/A (manual assist) setting on, you can move the lens slightly to confirm the focus at infinity and the camera will take the image.

6. Set the **sequencing of the numbering to ON** p. 240 (on d in Custom Setting Menu).

   This setting will count jpgs consecutively, regardless of card changes or date. Counter reset is also on this menu and you may wish to reset the counter at the beginning of each day as that's an easy way to keep track of daily photos (and you will be renaming all photos each day).

7. This camera has TWO SD card slots. You may need two 8gig cards to have enough capacity for photos for each one hour tape? Card slots now set for Slot 2 to be overflow for Slot 1. (p. 31).

OTHER: Turn camera off to change cards or to change battery. New SD cards or cards previously used by other cameras will need to be formatted by the D7100 prior to use in camera.

Post-flying Image Handling

You will need 2 external hard drives for backing up images in the field and enough SD flash cards so that you don't need to erase any during the survey (they are a third back-up).

Downloading Images

Download all photos from the flash cards to the first external hard drive (the 'President')

Download one folder at a time from each SD card to keep file transfers to a manageable size. Number the SD cards sequentially through the survey (First card used is 1, second card is 2…) and label each downloaded folder with the card number, folder number and survey day (Card1_1_Day1, Card 1_2_Day1 etc.). Keep a paper record (Photo Log) of which photos have been downloaded into each folder to help with the renaming process.

Example photo log:

Folder Name	Raw Photo Numbers	Processed Photo Numbers	Total # of Photos
Card1_1_Day1	0001-0999	bs14_bt_00001-00995	995 (999 raw)
Card1_2_Day1	1000-1598	bs14_bt_00996-01593	598 (598 raw)
Card2_1_Day1	1599-2598	bs14_bt_01594-02593	999 (999 raw)

Do not erase the SD cards after downloading but store them safely as a third back-up copy.

Open ACDSee. Turn off the auto rotate function: Tools > Options > in General, untick "Auto rotate jpg orientation". Do this *before* opening the folder of images otherwise the tool is still active. Open the images and review all while manually rotating those oriented in the portrait position (versus landscape).

Processing Images

Before the batch rename, remove all non-AVI photos, (such as: scenics and people shots) to store in a separate folder for that day. This ensures that the AVI pix have consecutive numbering, with no gaps. Make sure to retain and backup the non-AVI photos with the rest of the pix from that day's survey, but keep them in a separate folder.

Use ACDSee batch rename feature to rename the AVI photos using a standard convention, which includes the survey location, team's initials and the photo number with five digits. For example, the first photo taken during the 2010 Southeast Alaska survey would be named se10_se_00001.jpg. Different acronyms are used for each survey. **Make sure that all letters are in lower case.** During batch rename, use drop down box at lower screen 'File Name Case' to batch convert all txt to lower case.

Linking Photos to Flightline

The EXIF data needs to be exported from the photo files using ACDSee. The information then needs to be imported into Excel and formatted correctly to link each jpeg to the flight track line.

1. In the Browse window of ACDSee, change the View Mode to Details. Wait for all details to load.

2. Choose **View Mode: Choose Details**. Select **File Properties: Filename** and the **EXIF: Image Date/Time Original**. Delete all other details. Adjust the date/time options in ACDSee: Tools > Options > under General change Date/Time output format to custom Date yyyy/mm/dd and Time HH:mm:ss. Be sure to change your laptop settings to view to the time in the 24-hour clock and the date in the appropriate format: Control Panel > Regional Options > format Time to equal HH:mm:ss and > format Date to equal yyyy/mm/dd.

3. Select all the photos in the folder (Ctrl A) and generate the file listing: Database > Export > Generate File Listing (Ctrl G).

4. Repeat this for all photo folders and save the resulting text files in one folder and then combine them into one long text file for the day.

5. Open the combined text file in Excel for formatting: Data > Get External Data > Import Text File. **Be sure to change the Column data format to *text* for all fields**.

6. Rename the columns with the headings: PHOTONAME and DATETIME. The PHOTONAME is how it has been imported from the text file. The DATETIME field is a concatenation of the jpeg date and time fields exported from ACDSee. Once imported, the datetime field needs to be formatted correctly. Combine the date and time into one column using the concatenate feature. Remove the slashes and colons with a find and replace. Now the DATETIME field should be just a string of 14 numbers. Save this file and hand it over to the navigator.

Backing up Files

Back up all files for the day on the second external hard drive (the 'Vice-President') once the processing has been completed. Organization of images by tape will be done back in the office.

Salmon Shark, Prince Rupert Survey – Safety Plan, 2015

The 2015 Prince Rupert AVI program will be conducted around Prince Rupert, BC and the survey team will have limited resources to deal with any accidents or injuries that may occur. This Safety Plan outlines procedures that should reduce the potential for accidents and provide guidance should an accident occur. Prevention of accidents is paramount and all crew members should contribute to collective safety of the team.

- Helicopters can be dangerous without due care. The pilot will conduct a team safety briefing prior to any flights and team members are expected to adhere to pilot safety procedures.
- The team will provide a daily flight plan and leave the flight plan with a responsible person, including agreed-upon procedures for notification of response personnel should the flight plan not be closed.
- Operation of a helicopter without doors poses special risks of objects flying from the helicopter and striking rotors. All objects within the helicopter will be secured. The pilot will ensure that the objects are secured to his satisfaction. Don't be casual about this – complacency could be fatal.
- In addition to the aircraft ELT, a SPOT satellite messenger will be carried. This can alert support personnel to: (a) completion of normal operations, (b) non-emergency "situations" and (c) an emergency. The team crew cheif will be responsible for the SPOT operation but other team members should be familiar with its operation.
- At least one team member will have current wilderness first aid certification, including CPR.
- Team members will provide a *current medical form* in a sealed envelope that will be kept in the onboard first aid kit. These forms are designed to provide medical background should a medical event occur. The CORI First Aid Officer is responsible for collection of the forms and maintenance of the first aid kit.

Twelve Standard Aviation Questions

1. Is the flight necessary?
2. Who is in charge?
3. Are all hazards identified and have you made them known?
4. Should you stop the operation of the flight due to change in conditions?
5. Is there a better way to do it?
6. Are you driven by an overwhelming sense of urgency?
7. Can you justify your actions?
8. Are there other aircraft in the area?
9. Do you have an escape route?
10. Are any rules being broken?
11. Are communications getting tense?
12. Are you deviating from the assigned operations of the flight?

Field Safety Plan

Project Number and Name: 15CRHA0004 North Coast Imaging (15-13)

Description: Helicopter survey around Prince Rupert, BC

Field safety officer: Kalen Morrow

Dates of field work: June 14-19, 2015

List of field crew: Kalen Morrow, Sarah Cook, Alex Haggis

- No known medical issues.

Field crew training reviewed: June 2015

Safety equipment required:

- List the equipment – Mustang suit, PFD, gloves, warm clothes, first aid kit, SPOT face up and tracking turned on

First Aid attendants: Kalen Morrow, Sarah Cook, Alex Haggis

Communications: Spot OK Button

- Who to: Carl Schoch, Margaret Minshall. Kalen Morrow
- When/how often: Start of day (this begins tracking). Fuel Breaks.

End of each survey day – Custom Message Button (Send Pizza) - Essential

- This alerts that survey day is done, team safely back in town.
- Who to: Carl Schoch, Margaret Minshall, Kalen Morrow
- When/how often: **Must receive at end of each survey day – Essential**
- Projected Touchdown times for each day

  June 14 – 9:30

  June 15 – 11:00

  June 16 – 11:00

  June 17 – 12:00

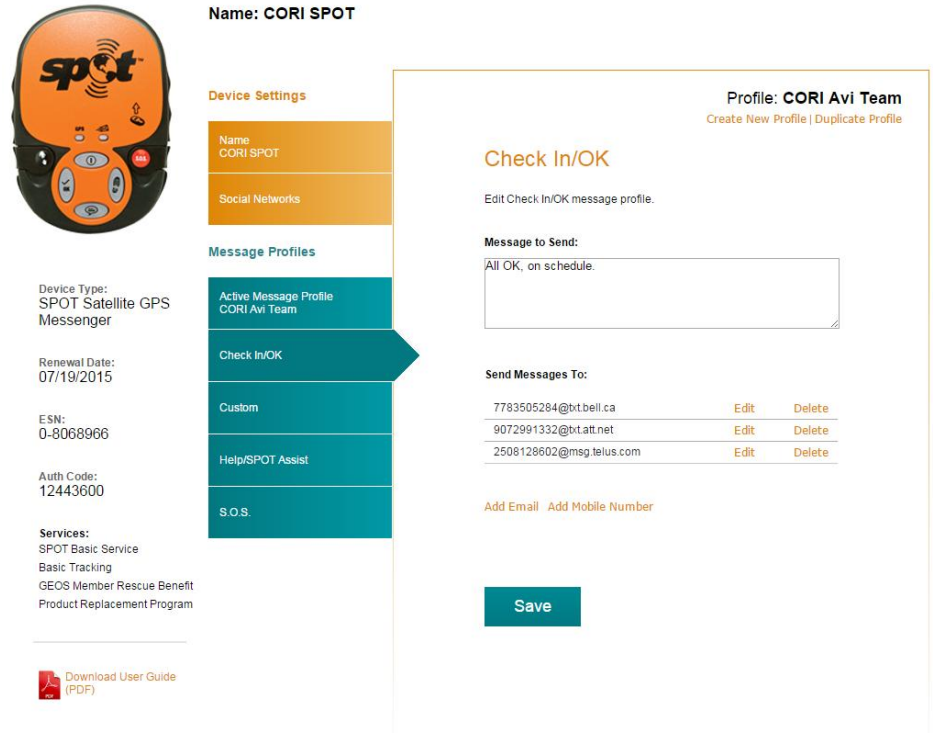
  June 18 – 12:15

  June 19 – 13:00

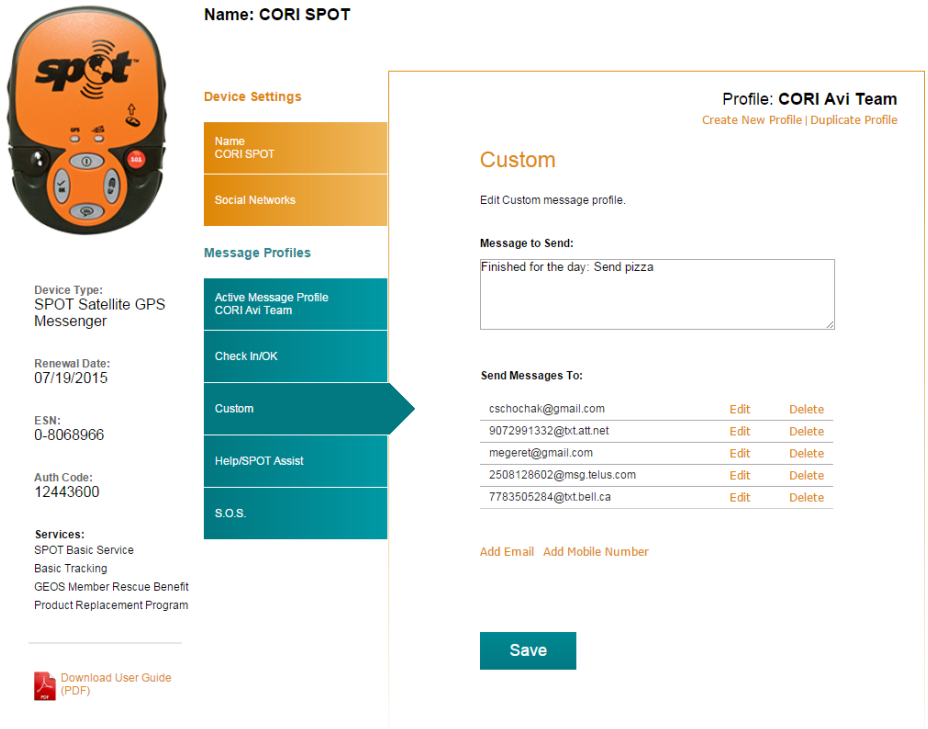
- What should the emergency contact(s) do in event of non-contact by survey team?
- 1 hour after projected touchdown – Ground person will try to make contact with survey team / Quantum Helicopters
- 3 hours after projected touchdown – Ground person will mobilize all resources to find survey team.

SPOT Messanger

Check In/OK

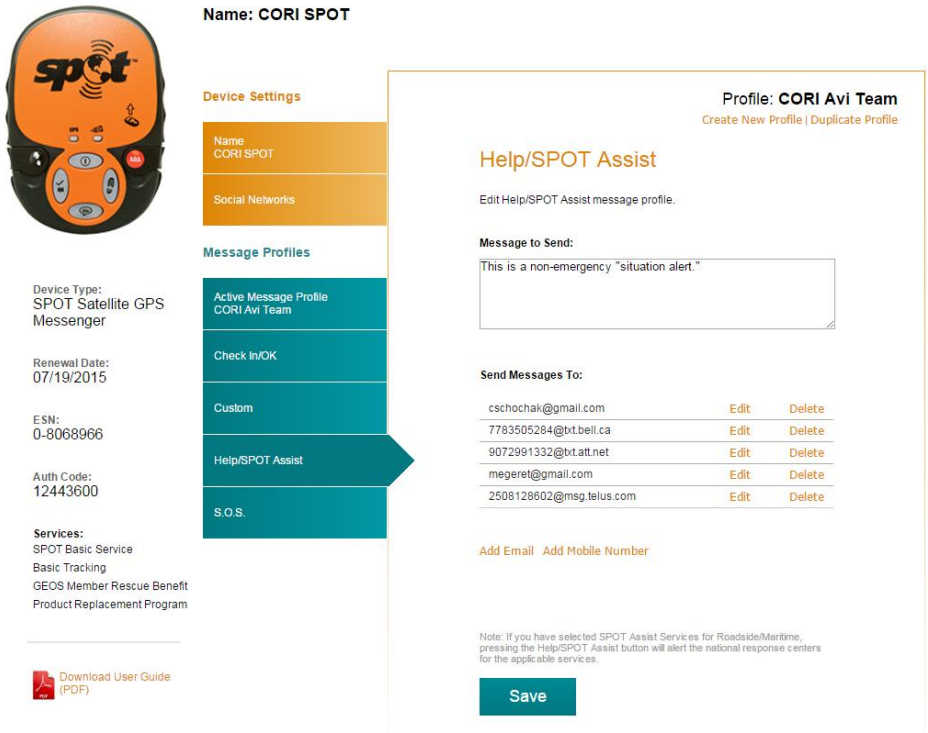


Custom / Done survey for the day



Help/Assist

Contact Quantum Helicopters –
Office/Dispatch Phone: 250.615.0168
Ian Swan Cell (Chief Pilot): Cell: 250.975.0024



Job Hazard Analysis Form

Task: AVI Survey **Date: June 14**

Basic Job Steps	Potential Hazards	Controls & Recommended Actions	Training Associated
Mobilization to Site ▪ Determine requirements for personnel and vehicles to the site. ▪ Unloading of supply vehicles.	▪ Physical strain from improper lifting. ▪ Slips/trips/falls ▪ Vehicular accidents/collisions	▪ Wear appropriate clothing. ▪ Monitor work for good housekeeping practices. ▪ Keep walking surfaces free from slip/trip hazards. ▪ Follow proper lifting techniques. ▪ Be aware of and keep hands out of potential pinch points	▪ Valid motor vehicle driver's license.
Helicopter Operations ▪ Pre-survey review ▪ Install AVI equipment in helicopter ▪ Ride in helicopter to complete survey from air	▪ Slips/trips/falls ▪ Heavy lifting ▪ Sprains and strains ▪ Engine noise ▪ Weather hazards	▪ Proper lifting techniques ▪ PPE – PFD/float coat, warm clothing, hearing protection ▪ Wear seatbelt at all times ▪ Make sure that there are no loose items from equipment installation ▪ Review underwater egress during transit to first survey location ▪ Helicopter company will complete all pre-flight activity and manage in-flight safety	
Demobilization ▪ Remove equipment from helicopter	▪ Physical strain from improper lifting. ▪ Slips/trips/falls	▪ Wear appropriate clothing. ▪ Keep walking surfaces free from slip/trip hazards. ▪ Follow proper lifting techniques. ▪ Be aware of and keep hands out of potential pinch points	▪ Valid motor vehicle driver's license.

Team Members

Print Name	Signature	Print Name	Signature

Job Hazard Analysis Form

Task: AVI Survey **Date: June 15**

Basic Job Steps	Potential Hazards	Controls & Recommended Actions	Training Associated
Mobilization to Site ▪ Determine requirements for personnel and vehicles to the site. ▪ Unloading of supply vehicles.	▪ Physical strain from improper lifting. ▪ Slips/trips/falls ▪ Vehicular accidents/collisions	▪ Wear appropriate clothing. ▪ Monitor work for good housekeeping practices. ▪ Keep walking surfaces free from slip/trip hazards. ▪ Follow proper lifting techniques. ▪ Be aware of and keep hands out of potential pinch points	▪ Valid motor vehicle driver's license.
Helicopter Operations ▪ Pre-survey review ▪ Install AVI equipment in helicopter ▪ Ride in helicopter to complete survey from air	▪ Slips/trips/falls ▪ Heavy lifting ▪ Sprains and strains ▪ Engine noise ▪ Weather hazards	▪ Proper lifting techniques ▪ PPE – PFD/float coat, warm clothing, hearing protection ▪ Wear seatbelt at all times ▪ Make sure that there are no loose items from equipment installation ▪ Review underwater egress during transit to first survey location ▪ Helicopter company will complete all pre-flight activity and manage in-flight safety	
Demobilization ▪ Remove equipment from helicopter	▪ Physical strain from improper lifting. ▪ Slips/trips/falls	▪ Wear appropriate clothing. ▪ Keep walking surfaces free from slip/trip hazards. ▪ Follow proper lifting techniques. ▪ Be aware of and keep hands out of potential pinch points	▪ Valid motor vehicle driver's license.

Team Members

Print Name	Signature	Print Name	Signature

Job Hazard Analysis Form

Task: AVI Survey **Date: June 16**

Basic Job Steps	Potential Hazards	Controls & Recommended Actions	Training Associated
Mobilization to Site ▪ Determine requirements for personnel and vehicles to the site. ▪ Unloading of supply vehicles.	▪ Physical strain from improper lifting. ▪ Slips/trips/falls ▪ Vehicular accidents/collisions	▪ Wear appropriate clothing. ▪ Monitor work for good housekeeping practices. ▪ Keep walking surfaces free from slip/trip hazards. ▪ Follow proper lifting techniques. ▪ Be aware of and keep hands out of potential pinch points	▪ Valid motor vehicle driver's license.
Helicopter Operations ▪ Pre-survey review ▪ Install AVI equipment in helicopter ▪ Ride in helicopter to complete survey from air	▪ Slips/trips/falls ▪ Heavy lifting ▪ Sprains and strains ▪ Engine noise ▪ Weather hazards	▪ Proper lifting techniques ▪ PPE – PFD/float coat, warm clothing, hearing protection ▪ Wear seatbelt at all times ▪ Make sure that there are no loose items from equipment installation ▪ Review underwater egress during transit to first survey location ▪ Helicopter company will complete all pre-flight activity and manage in-flight safety	
Demobilization ▪ Remove equipment from helicopter	▪ Physical strain from improper lifting. ▪ Slips/trips/falls	▪ Wear appropriate clothing. ▪ Keep walking surfaces free from slip/trip hazards. ▪ Follow proper lifting techniques. ▪ Be aware of and keep hands out of potential pinch points	▪ Valid motor vehicle driver's license.

Team Members

Print Name	Signature	Print Name	Signature

Job Hazard Analysis Form

Task: AVI Survey **Date: June 17**

Basic Job Steps	Potential Hazards	Controls & Recommended Actions	Training Associated
Mobilization to Site ▪ Determine requirements for personnel and vehicles to the site. ▪ Unloading of supply vehicles.	▪ Physical strain from improper lifting. ▪ Slips/trips/falls ▪ Vehicular accidents/collisions	▪ Wear appropriate clothing. ▪ Monitor work for good housekeeping practices. ▪ Keep walking surfaces free from slip/trip hazards. ▪ Follow proper lifting techniques. ▪ Be aware of and keep hands out of potential pinch points	▪ Valid motor vehicle driver's license.
Helicopter Operations ▪ Pre-survey review ▪ Install AVI equipment in helicopter ▪ Ride in helicopter to complete survey from air	▪ Slips/trips/falls ▪ Heavy lifting ▪ Sprains and strains ▪ Engine noise ▪ Weather hazards	▪ Proper lifting techniques ▪ PPE – PFD/float coat, warm clothing, hearing protection ▪ Wear seatbelt at all times ▪ Make sure that there are no loose items from equipment installation ▪ Review underwater egress during transit to first survey location ▪ Helicopter company will complete all pre-flight activity and manage in-flight safety	
Demobilization ▪ Remove equipment from helicopter	▪ Physical strain from improper lifting. ▪ Slips/trips/falls	▪ Wear appropriate clothing. ▪ Keep walking surfaces free from slip/trip hazards. ▪ Follow proper lifting techniques. ▪ Be aware of and keep hands out of potential pinch points	▪ Valid motor vehicle driver's license.

Team Members

Print Name	Signature	Print Name	Signature

Job Hazard Analysis Form

Task: AVI Survey **Date: June 18**

Basic Job Steps	Potential Hazards	Controls & Recommended Actions	Training Associated
Mobilization to Site ▪ Determine requirements for personnel and vehicles to the site. ▪ Unloading of supply vehicles.	▪ Physical strain from improper lifting. ▪ Slips/trips/falls ▪ Vehicular accidents/collisions	▪ Wear appropriate clothing. ▪ Monitor work for good housekeeping practices. ▪ Keep walking surfaces free from slip/trip hazards. ▪ Follow proper lifting techniques. ▪ Be aware of and keep hands out of potential pinch points	▪ Valid motor vehicle driver's license.
Helicopter Operations ▪ Pre-survey review ▪ Install AVI equipment in helicopter ▪ Ride in helicopter to complete survey from air	▪ Slips/trips/falls ▪ Heavy lifting ▪ Sprains and strains ▪ Engine noise ▪ Weather hazards	▪ Proper lifting techniques ▪ PPE – PFD/float coat, warm clothing, hearing protection ▪ Wear seatbelt at all times ▪ Make sure that there are no loose items from equipment installation ▪ Review underwater egress during transit to first survey location ▪ Helicopter company will complete all pre-flight activity and manage in-flight safety	
Demobilization ▪ Remove equipment from helicopter	▪ Physical strain from improper lifting. ▪ Slips/trips/falls	▪ Wear appropriate clothing. ▪ Keep walking surfaces free from slip/trip hazards. ▪ Follow proper lifting techniques. ▪ Be aware of and keep hands out of potential pinch points	▪ Valid motor vehicle driver's license.

Team Members

Print Name	Signature	Print Name	Signature

Job Hazard Analysis Form

Task: AVI Survey **Date: June 19**

Basic Job Steps	Potential Hazards	Controls & Recommended Actions	Training Associated
Mobilization to Site ▪ Determine requirements for personnel and vehicles to the site. ▪ Unloading of supply vehicles.	▪ Physical strain from improper lifting. ▪ Slips/trips/falls ▪ Vehicular accidents/collisions	▪ Wear appropriate clothing. ▪ Monitor work for good housekeeping practices. ▪ Keep walking surfaces free from slip/trip hazards. ▪ Follow proper lifting techniques. ▪ Be aware of and keep hands out of potential pinch points	▪ Valid motor vehicle driver's license.
Helicopter Operations ▪ Pre-survey review ▪ Install AVI equipment in helicopter ▪ Ride in helicopter to complete survey from air	▪ Slips/trips/falls ▪ Heavy lifting ▪ Sprains and strains ▪ Engine noise ▪ Weather hazards	▪ Proper lifting techniques ▪ PPE – PFD/float coat, warm clothing, hearing protection ▪ Wear seatbelt at all times ▪ Make sure that there are no loose items from equipment installation ▪ Review underwater egress during transit to first survey location ▪ Helicopter company will complete all pre-flight activity and manage in-flight safety	
Demobilization ▪ Remove equipment from helicopter	▪ Physical strain from improper lifting. ▪ Slips/trips/falls	▪ Wear appropriate clothing. ▪ Keep walking surfaces free from slip/trip hazards. ▪ Follow proper lifting techniques. ▪ Be aware of and keep hands out of potential pinch points	▪ Valid motor vehicle driver's license.

Team Members

Print Name	Signature	Print Name	Signature

Underwater Egress/Safety Plan

In water accidents, seaplanes tend to come to rest inverted. The key to your survival is to retain your situational awareness and to expeditiously exit the aircraft. The following actions are recommended once the seaplane momentum subsides:

1. Stay calm-Think about what you are going to do next. Wait for the significant accident motion to stop.

2. Grab your life preserver/PFD-If time permits, put on, or at least, grab your life preserver or PFD. DO NOT INFLATE IT until after exiting. It is impossible to swim underwater with an inflated life preserver. You may get trapped.

3. Open the exit and grab hold-If sitting next to an exit, find and grab the exit handle in relation to your left or right knee as previously established. Open the exit. The exit may not open until the cabin is sufficiently flooded and the inside water pressure has equalized. DO NOT release your seat belt and shoulder harness until you are ready to exit. It is easy to become disoriented if you release your seat belt too early. The body & rsquo;s natural buoyancy will cause you to float upwards, making it more difficult to get to the exit.

4. Release your seat belt/harness-Once the exit is open, and you know your exit path, keep a hold of a fixed part of the seaplane and release your belt with the other hand.

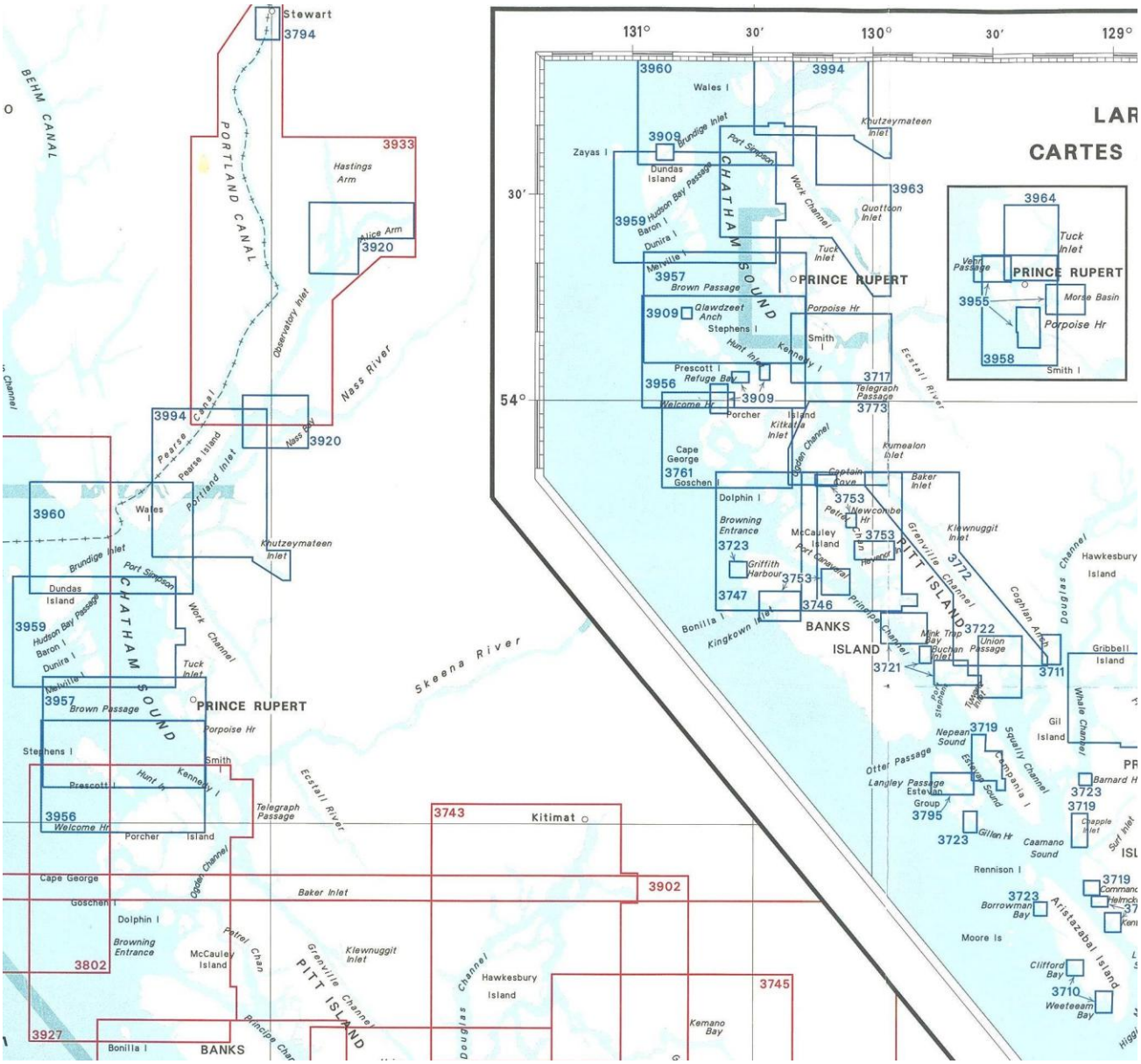
5. Exit-Proceed in the direction of your nearest exit. If this exit is blocked or jammed, immediately go to the nearest alternate exit. Always exit by placing one hand on a fixed part of the aircraft, and not letting go before grabbing another fixed part(hand over hand). Pull yourself through the exit. Do not let go until you are out. Resist the urge to kick, as you may become entangled in loose wires or debris, or you might kick a person exiting right behind you. If you become stuck, back up to disengage, twist your body 90 degrees, and then exit.

6. Get to the surface-Once you have exited the seaplane, follow the bubbles to the surface. If you cannot do so, as a last resort inflate your life preserver. Exhale slowly as you rise.

7. Inflate your life preserver-Only inflate it when you are clear of the wreckage, since life preservers can easily get caught on wreckage, block an exit, or prevent another passenger from exiting.

CORI Checklist

1) Stay calm
2) Hold on to exit handle
3) Wait for Helicopter to fill up with water (equalize pressure)
4) Undo seatbelt
5) Exit and surface



Charts for the Prince Rupert area

Alice Arm


Kashiini Creek
Earthstar Geographics, CNES/Airbus DS | Esri, HERE, DeLorme, NRCan

Porcher Island

Stephens Island

Melville Island Group

Emergency Contacts

Agency or Group		Telephone
US Coast Guard	Alaska Emergency	800-478-5555
	Non-emergency	907-463-2069
	Pacific Area Emergency	510-437-3701
Coastal and Ocean Resources	John Harper	250-480-6753
	Carl Schoch	907-299-1332
	Office	250-658-4050
Moran Environmental Services	Leanne Stegman	203- 948-8342
	Brian House	781-815-1175
Report Oil and Chemical Spills	US Coast Guard	800-424-8802
US Customs	General	907-248-3373
NOAA	General	907-271-3593
NOAA NMFS	Marine Mammals	907-586-7163
Tsunami Warning Center		907-745-4212
FAA	Aviation	907-271-3430
US Fish and Wildlife	Yukon Delta	907-543-3151
	Law enforcement (Anchorage)	907-786-3311
US Forest Service		907-586-8806
National Park Service		907-257-2696
Alaska Division of Emergency Services		800-478-2337
Alaska State Troopers		907-428-7200
Air Ambulance	Guardian Flight	888-997-3822

Canadian Coast Guard	24 Hours Emergency	800.567.5111
	Search and Rescue	250.413.8933
Canadian Coast Guard	Marine Pollution	800.889.8852
Canadian Coast Guard	Marine Safety and Hazards	250.627.3081

CORI Emergency Contact List

Kalen Morrow
Aimee Morrow
250.590.5284
Jim Tarves
250.464.1468

Sarah Cook
Derek Shrubsole
Home: 250.590.7746
Cell: 250.213.2754

Alex Haggis
Jane Haggis
Home: 250.479.6902
Cell: 250.893.1760

Team Field Contacts

Kalen's Cell: 778.350.5284
Email Kalen's Phone: kalenmorrow@yahoo.ca

Sarah Cook Cell: 250.381.8206

Alex Haggis Cell: 250.893.6902

CORI Office Contacts

Office: 250.658.4050 or 250.658.4094

Carl Schoch Cell: 907.299.1332
Email: carl@coastalandoceans.com or cschochak@gmail.com

John Harper Cell: 250.480.6753
Email: john@coastalandoceans.com or harperjohn07@gmail.com

Margaret Minshall Cell: 250.812.8602
Email: Margaret@coastalandoceans.com or megeret@gmail.com

CORI Resources

Voicemail: 250.655.7373, #, 4674#


Team Salmon
Shark

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