SILVERSEA EXPEDITIONS

EXPEDITION OPERATIONS MANUAL

FOR the Expedition Staff aboard:
MV Silver Explorer
MV Silver Discoverer
MV Silver Cloud

STANDARD OPERATING PROCEDURES

These instructions provide common guidelines for activities that are key parts of Silversea Cruise's expeditions.

A copy of this manual is to be retained on the Bridge and in the Expedition offices and cabins aboard each Expedition ship.

It is the responsibility of each Expedition Team member to read and understand the relevant sections of the manual as part of their job responsibilities. Any questions can be directed to the Expedition Leader for clarification.

A digital copy will also be distributed to each Expedition Team member prior to embarkation. All Expedition Team members are to read the manual and sign a form once aboard stating they have read and understood the relevant sections.

STANDARD OPERATING PROCEDURES

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Standard Operating Procedures

1. ZODIAC OPERATIONS

1.1 Zodiacs – A General Overview

Most Silversea Expeditions rely on Zodiacs to transport staff, crew and guests to and from the vessel, and to take guests on Zodiac cruises in remote destinations. The boats and the people who operate them are a critical part of the Silversea Expedition product.

All drivers responsible for guest transits must be responsible, professional and qualified.

1.2 Responsibility And Authorization

- The Chief Officer/Staff Captain has overall responsibility for Zodiac operations, the drivers, and driver training.
- The Zodiac driver is responsible for safe driving and the safety of the passengers. Under no circumstances should these be compromised. The driver is in command of the Zodiac and passengers should not be allowed to influence his or her decisions and if needed can be instructed in a firm, polite manner.
- The Expedition Leader in conjunction with the Chief Officer/Staff Captain will decide on the landing procedure and recommend a number of passengers per Zodiac. Their directions must be strictly followed.
- Unauthorized persons are not permitted to drive Zodiacs.

1.3 Expedition Program & Itinerary

- Before the start of each voyage, the Expedition Leader is to prepare and discuss with the Captain a tentative itinerary of planned activities.
- The Bridge and relevant engineers are to be given a copy of the itinerary and daily Chronicles for reference.
- The Captain must approve all unscheduled Zodiac cruising, landings etc.
- On a daily basis, the Expedition Leader is to discuss with the Chief Officer/Staff Captain planned Zodiac operations. They are to keep the Captain informed of their planned operations. In planning Zodiac operations, they are to consider:
  - A detailed Zodiac program including the number landings or cruises to be conducted, the number of boats, drivers and time required for each activity
  - Staffing requirements for disembarkation and shore party
  - Anticipated problems in boarding and landing passengers

- Any by-laws in ports, or permit conditions in national park areas regarding speed limits, wake restrictions or restricted areas
- The weather forecast and possible implications of change in weather

1.4 Types Of Zodiacs & Engines

Silver Discoverer – total of 12 Zodiacs
- 10 x MK5 Zodiacs with tiller arm, electric start 60hp Yamaha engines
- 2 x MK6 Zodiacs with center console steering – one with electric start 80hp Yamaha engine and one with electric start 90hp Honda engine

Silver Explorer – total of 10 Zodiacs
- 8 x MK5 Zodiacs with tiller arm, electric start 60hp Suzuki 4-stroke engines
- 2 x MK6 Zodiacs with center console steering wheel, electric start 80hp Suzuki engines

Silver Cloud – total of 16 Zodiacs
- 16 x MK5 Zodiacs with a combination of tiller arm, electric start 60hp Yamaha engines and center console Yamaha 80hp engines

1.5 Pre-Operation Check-List

Upon taking command of a Zodiac the driver ensures the following:

Engine
- Before being released from tether lines, the Zodiac's engine needs to be running
- Make sure that the engine is securely clamped and bolted to the boat

Fuel
- Make sure your tank is filled and always carry a full second tank. Make sure you have enough fuel for your intended trip and some in reserve. For more fuel radio the Expedition Leader or the Officer on watch.
- Open vent screw on tank in use
- Check fuel hose and line are properly connected to the tank and to the engine

Throttle Controls & Steering
- Make sure the controls operate properly
- Turn the steering wheel if MK6 and the tiller arm if MK5 from one side to the other
- Shift the throttle from ahead to astern

Propeller
- Make sure that the propeller, drive leg, and cooling water intake are free of debris
- Be sure to check that the prop is clear when you start the engine

Cooling System
- Once engine is on, check if cooling water is discharging forcefully from the engine
- If it is not, or the stream is weak, turn off the engine immediately
- Clear the discharge outlet with wire and try again
- If not working properly radio for mechanical assistance

Bow & Stern Lines
- Check that all lines are inside the boat and properly secured

Kill Cord
- It is required that all drivers wear a kill cord when operating the Zodiacs

Pontoons
- Make sure that all isolating valves are turned to "NAVIGATION"
- Check pressure of all chambers
- If the chambers need inflation radio for assistance

Cleanliness of Zodiac
- Remove any rubbish
- Boats should be clean and the pontoons wiped off prior to boarding guests

Safety Equipment
- Check that the following equipment is aboard your Zodiac or with the driver
  - Anchor, chain & rope
  - Paddles (x2)
  - Pump/Bailer
  - Tool kit
  - Fire extinguisher
  - Radio
  - GPS/compass
  - First aid kit
  - Flares and sound signaling device
  - Boat Hook
  - Water cooling pin
  - Radar reflectors (if required)
  - Torch (for night operations)
  - Full spare fuel tank
  - Spare kill chord

1.6 Defects/Problems/Missing Equipment/Zodiac Maintenance

- Zodiac maintenance should be preventive
- Reporting details of issues with the engine and/or boat performance to Expedition Admin staff as per procedure is of utmost importance. Each entry should contain:
  - Date and time
  - Engine number
  - Driver's name
  - Defect/problem/missing safety equipment

1.7 Personal Buoyancy & Clothing

- You **must** wear a lifejacket. No crew, guest, or local official is to board a Zodiac, even a Zodiac that is tied up alongside the ship or a dock, without a lifejacket.
- All persons on the embarkation/disembarkation platform MUST also wear a lifejacket.
- Make sure you are properly dressed for the conditions you operate within.

Hot Weather
- Standard SS uniform codes apply
- You must wear, suitable footwear (no bare feet)

Cold Weather

- Standard SS uniform codes apply.
- You will receive standard SS outdoor gear, which you should wear on the Zodiacs although your own foul weather gear is suitable in addition and as needed

1.8 Passenger Embarkation into the Zodiac at the ship

- Always follow instructions from the Staff Captain and/or Bridge Officer on watch
- Ensure that passengers use the sailor's-grip and have their hands free at all times
- Drivers should help with the loading of passengers if conditions allow
- Direct passengers to their seats and insist that they sit down immediately
- Load passengers on alternate sides so that the boat is always balanced
- Keep watch for ice, logs or marine debris floating towards the Zodiac and be ready to drive away from the platform in case of danger. Be alert at all times!
- Before leaving the gangway, double-check lifejackets are properly donned
- Leave the gangway slowly, ensuring you do not create a wake until you are clear of any local traffic or other Zodiacs
- Zodiac drivers should never load or unload passengers without assistance

1.9 Passenger Behavior Onboard Zodiacs

- Passengers should remain seated unless embarking or disembarking from the boat, or unless the boat is stopped and permission is obtained from the Zodiac Driver
- There should never be more than one passenger standing at one time while underway, or while embarking or disembarking
- Secure equipment and belongings to avoid losing items overboard

1.10 Driving Procedures

- When driving with passengers, always adapt to the conditions to make sure the ride is as smooth and comfortable for the guests as possible
- It is better to go too slow than too fast
- Communicate with your passengers and ask them if they are comfortable
- Be aware of sea and tide conditions before leaving the ship. Get information from the Bridge, your Expedition Leader and/or the scout boat about local conditions.

1.11 Zodiac Tours

- ALWAYS travel together with a minimum of two Zodiacs paired up at ALL times during a Zodiac tour.
- Please note that the 4-stroke hydraulic engines are always in the locked position. Serious damage to the engines can be caused by hitting the engines on rocks, reef or ice. It is

extremely important to drive slowly and carefully, with the engine tilted up when in shallow or foul waters.

- Zodiac cruises are a team effort. Share sightings with other drivers to optimize everyone's experiences.
- Be aware of the location of the other drivers and assist each other as needed
- Be aware of any local traffic conventions and tidal action
- Be aware of passengers who wish to take photographs and ensure all have taken their pictures before moving on - within reason.
- Remember not to favor one side of the boat. Whenever possible, ensure that passengers on one side of the boat do not have the scenery to their backs.
- Be aware of floating hazards in the water – e.g. fishing nets, lobster buoys or ice.
- If entering caves, watch the swell very carefully for a few moments to see the effect of surges. Often it is safest to enter caves stern first as this allows for a speedy exit.
- In rough weather passengers are susceptible to back injuries in a pitching or bouncing Zodiac – do not sacrifice safety or comfort for speed. Do not allow passengers to sit on the floor of the Zodiac under these conditions as they are more likely to sustain injuries in that position.
- Be aware that during long Zodiac cruises in tropical or polar destinations it is possible for passengers to get over heated or cold respectively. Be aware of their comfort and any signs of hyper- or hypothermia.
- Finally be aware of the effect of the engine fumes on your passengers. CO_2. There is a slim chance of this happening in caves or areas with restricted air movement.

1.12 Shore Landings

- On shore, instruct passengers as to the safest way to disembark appropriate to that specific landing site, whether it is a beach, a jetty or a muddy bank
- On approach to the landing, drivers should ensure passengers know the correct way to disembarkation and not to stand up in the Zodiac until instructed to do so
- As the engines are permanently locked down approach the landing slowly and tilt the engine to avoid rocks, reef or submerged objects that may damage the engine
- Be aware that the EL may call you with specific instructions regarding the landing on your first approach
- With stern landings it is critical that no guests, crew, or staff disembark over, or stand behind, the transom. It is possible to be knocked over by the surf in that position and then have the full weight of the boat and engine land on top of you.
- During difficult landings, particularly stern landings, drivers should wait for a signal from the lead shore party person that it is safe to approach the shore.
- Always keep an eye on the swell and surf when approaching a landing and use these varying conditions to aid your approach.

- If lifejackets are removed onshore, they need to be stored inside a bag/bin. Dirt, sand or grit may jeopardize the automatic inflation mechanisms of the lifejackets.

1.13 Returning To The Ship

- Pay attention to "all aboard/last Zodiac" times given by the Expedition Leader and return to the ship at or before that time so as not to delay the ship's departure. Punctuality may be critical and a late departure may jeopardize the next outing.
- If muddy conditions were encountered on shore, have passengers scrub their footwear before re-embarking the Zodiac to return to the ship.
- Show consideration for other drivers returning to the gangway and avoid overtaking them. Remember that you are working as a team.
- Follow instructions from the Bridge Officer in charge of gangway operation.
- Keep watch for floating debris (ice, logs, mats of vegetation, etc.) and be ready to drive away from the platform in case of danger.
- Remind passengers to remain seated until the Zodiac is secure alongside the platform and the Able Bodied seamen can assist with embark/disembarkation. Ensure that passengers use the Zodiac-grip and have their hands free at all times.
- Assist the Able Bodied seamen with passenger disembarkation. Disembark passengers from alternate sides so that the boat is always balanced.

1.14 Radio Operations:

- Always monitor your radio. Your safety, and that of others may depend upon it.
- Keep radio conversations short and to the point
- Be aware of the location of other Zodiacs and share information if appropriate
- Keep the EL informed should you, for any reason, deviate from the original plan.
- Stay off the radio while the ship is anchoring or maneuvering, except in an emergency, so the Bridge can communicate.
- Always remember that everyone, including guests, can hear radio transmissions.

1.15 Man Overboard (MOB) – *For more detail see MOB Procedures in Appendix*

Alert ANYONE nearby

- If someone goes overboard, Shout MAN OVERBOARD! MAN OVERBOARD!
- Instruct one person to point at the MOB at all times.
- Notify the Bridge and/or EL via radio
- Always keep an eye on the MOB, never losing sight of the person in the water.
- Retrieve the MOB quickly if you are able and safe to do so

1.16 Natural Hazards To Consider

Coral and Rock Reefs

- In the tropics water color will tell a driver much about the depth of the water around coral reefs. As a rule of thumb remember, "Blue, Blue – Sail on Through" and "Brown, Brown – Run Aground."
- Reefs are both a hazard and a sensitive marine habitat. Keep your distance and never anchor your Zodiac on coral. Look for nearby sandy sea floor for anchoring.

Cliffs & Falling Rocks

- Avoid driving Zodiacs close to cliffs to stay clear of hazardous falling stones, ravines with lose sand/stones and ice or snow that could be breaking up.

Ice conditions

- When driving avoid ice with sharp edges that can rip a hole in your Zodiac
- Ice is dense and causes severe propeller damage – just like hitting a rock
- Always travel through ice slowly and look for a route with the least amount of ice
- In the event of glaciers calving, be aware that the newly broken off ice can float great distances and surround your Zodiac very quickly

Drift Sea Ice

- Be aware of the ice drift before the Zodiac operation begins
- Note what the tide is doing, how the ice is shifting and how quickly
- Drift ice moves with wind and sea currents. You might suddenly be enclosed when driving in drift ice. ALWAYS watch out for the ice and how it is moving.

Icebergs

- Always try to determine if the iceberg is grounded or floating. Stay a greater distance away from a floating iceberg.
- Icebergs are all potentially unstable - all icebergs can suddenly flip over, causing huge waves and sending ice chunks flying through the air at great speeds
- Keep your distance at all times
- Remember that 90% of the iceberg is under water
- Never drive over the underwater 'footprint' of an iceberg where you can see the light blue water color indicating there is an ice ledge below
- Be aware of 'poppers' or 'shooters' – pieces of ice that dislodge underneath the ice – they can come up under your Zodiac and burst the pontoon or tip you over
- Never approach an iceberg closer than 1.5 times the height of the iceberg above water. Even at this distance extreme caution should be used.
- Listen for cracks, groans, and the rumble of internal ice collapses. These are indications of ice shifting and the activity means you should stay further back!

Glacier Fronts

- Glacier fronts may calve, causing flood waves, flying ice and lots of floating ice that can block your route to or from the site. Keep your distance!
- Never approach closer than ten (10x) times the height of the glacier front. It is recommended these days, due to warmer climate and increased calving events (in size and frequency) to stay a minimum of 500m from the glacier front
- At some glacier fronts even this is too close – use good judgment.
- Avoid being trapped by islands close to the glacier front if a calving should occur
- Factors that might affect the probability of a calving:
  - Glacier front height
  - Gradient of the glacier on the shore
  - Degree of fracturing in the glacier front
  - Sea and current dynamics under the glacier front

1.17 Wildlife viewing from Zodiacs & Zodiac Tours

- Follow all AECO & IAATO guidelines when operating in the Arctic & Antarctic
- Follow all international rules & regulations regarding interactions with wildlife
- Regardless of regulations, it is SS policy to avoid disturbing animals at all times

No Disturbance Distance

- To avoid disturbing animals, avoid provoking a reaction in the first place.
- It is the responsibility of the Zodiac drivers to avoid interactions/disturbance of animals and to define how disturbance will be avoided
- It can be difficult to establish exact distances from wildlife to ensure no disturbance. Different animals, or even the same animals in different situations, will react differently to a given situation. Thus, always ere on the side of caution.

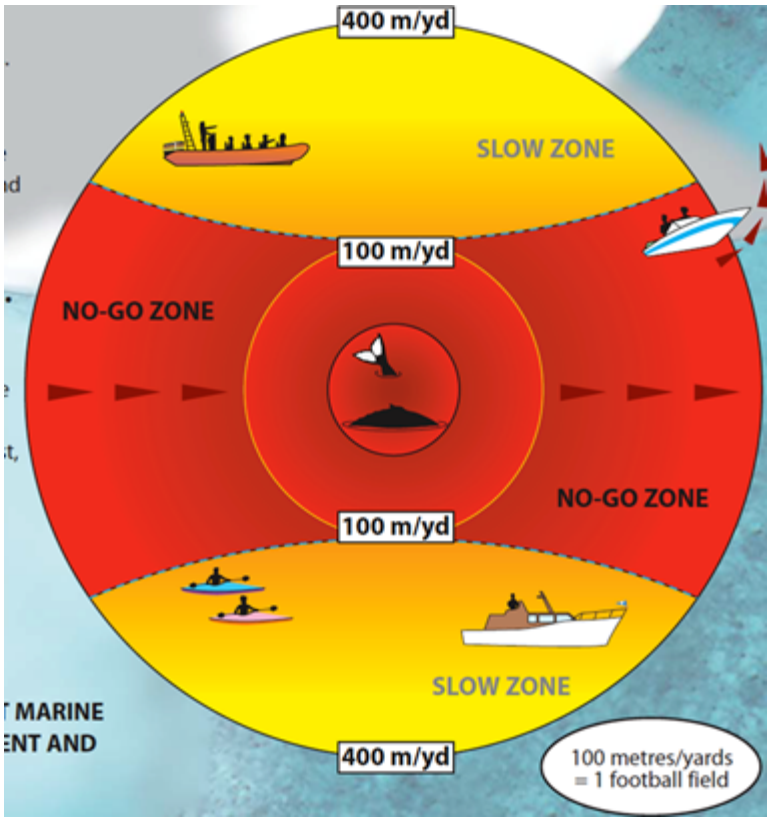
Avoid Disturbing Wildlife with Noise

- Keep radios on a low volume setting and keep conversations low and calm
- Suspend announcements on outer decks whenever wildlife is nearby
- Avoid excess engine use, gear changes, maneuvering or backing up to the animals as these movements produce sudden, large changes in underwater noise levels, which may startle, agitate or drive the animals away

Proper Speed Near Wildlife

- Drive slowly and carefully whenever operating near breeding colonies or large congregations of wildlife
- Accidental strikes could happen and ultimately are each individual driver's responsibility

Driving Around Whales (refer to diagram below)



- All Zodiac drivers must work as a team
- Keep to the side of the animal(s) and take turns for the closest watching opportunities
- Do not 'box-in' animals or cut off their travel or exit routes
- Do not go closer than 100 m to whales
- Avoid having too many boats near one animal at any one time or for too long
- Avoid scattering groups of dolphins, seals, whales etc.

Approaching Birds or Seals on Ice or Land

- Watch behavior carefully for signs of disturbance (head waving, moving away, opening mouths).
- If you are disturbing them, move off slowly
- Often you can use wind or current to drift past wildlife on shore or ice with your engine off. This provides a quiet way to view wildlife. When you do then need to start the engine do so carefully and wait before engaging the engine to head off.

Viewing Polar Bears

- Always drive quietly and slowly in the vicinity of bears
- Do not get close to polar bears on ice or rocks, they can leap up to 2 Zodiac lengths
- Stop immediately if a bear enters water – back off slowly to give it full right of way

Driving with Walrus

- Walrus can pose a hazard to Zodiacs
- With groups in the water there is usually a large bull patrolling the perceived Zodiac 'threat.' There have been incidents in which bulls try to climb into Zodiacs and/or puncture the pontoons.
- Do not allow these animals to come too close to the boats

1.18 AECO & IAATO Guidelines

- For some animals AECO and IAATO do give specific recommendations as to distances to the animals as a basic starting point
- Check and familiarize yourself with these distances and any local regulations

ALWAYS FEEL COMFORTABLE IN THE BOAT.

If you do not feel that your abilities match the requirements of the conditions THEN DO NOT DRIVE.

Inform the Expedition Leader or Staff Captain and ask to be replaced with another driver.

Standard Operating Procedures

2. KAYAKING OPERATIONS

2.1 Kayaking – A General Overview

On selected voyages, SCL will offer guided kayak excursions. These kayak excursions will be offered in safe locations to all passengers who fit the criteria. This will be optional and will be run at the same time ship operations are being conducted, only during daylight and in good visibility. These will be guided and supervised by professional kayak guides with experience in relevant environments (i.e. Polar, Temperate or Tropical Regions) and viewing marine wildlife and will be ~4 hours or less in length. These excursions will not take place during all ship operations, but rather when the weather conditions are appropriate and the kayak excursion does not hinder other ship operations.

- The main purpose of this activity is viewing scenery and wildlife, but an occasional landing is possible if conditions allow. In this case, all landing and shore operation procedures for Zodiacs apply.
- Paddlers are advised that for their own safety and comfort, and that of the other paddlers, it is important that they listen to, understand, and comply with any and all instructions given in English.
- Briefings will be given in English. Paddlers are advised to tell one of the guides immediately if they do not have knowledge of the English language or do not understand any of the instructions for any reason.
- To be involved in the kayak program guests must understand spoken English.

2.2 Kayak Guides

- The professionalism of the kayak guides is the cornerstone of the kayaking program. The kayakers safety is the guide(s) first priority.
- Leadership – Due to the expertise needed, the kayak guides will oversee all aspects of the kayaking program, but the expedition leader will ultimately approve all requests and sail plans. It is the kayak guides responsibility to report all issues and submit any reports needed to the expedition leader in a timely manner.
- Lead Guide – A designated lead guide will be established, it will be his/her responsibility to oversee the kayaking program, and in conjunction with the other guide and expedition staff, deliver the kayak program.
- Experience – At least one kayak guide will have extensive kayak guiding experience and previous experience in polar areas.
- First Aid – All kayaking guides will have a minimum of basic first aid certification.

2.3 Equipment

- All equipment will be regularly serviced and maintained to ensure kayakers have a safe and enjoyable experience.
- A qualified staff member will do any service or maintenance done on equipment.
- New equipment will be chosen in consultation with the kayaking guides.
- Kayaks – Current Designs Crosswinds tandem kayaks or equivalent have been selected for the kayakers. The boats are made of roto-molded polyethylene, making them extremely durable in cold weather water temperatures and protects the boats from damage, e.g. from brash ice or submerged rocks when paddling close to shore.
- These kayaks are exceptionally stable and provide minimum risk of capsize.
- Each kayak will be outfitted with the appropriate safety equipment – working rudder, bilge pump, and throw line with 15 meters of floatable rope.
- Kayak Gear – Each paddler will be equipped with a paddle, neoprene spray skirt and kayak specific US Coast Guard approved PFD (each PFD will be equipped with a fox 40 whistle).
- Polar Paddling Gear – Each paddler will be equipped with a dry suit appropriate to their size, neoprene booties, neoprene hand wear (paddle gloves or mitts). Guides are to recommended appropriate clothing be worn underneath dry suits

2.4 Safety

- At all times safety will take priority.
- Safety Kit – At all times a safety kit will be readily accessible to the kayak guides.
- Safety kits will be located in the safety zodiac and will consist of enough equipment to deal with both first aid emergencies and being stranded off the ship for an extended period time.
- The kit will include: 1 tarp – 8'x10', 2 L drinking water, 1 flashlight, 1 first aid kit, 5 emergency blankets, weatherproof matches, 1 compass, 1 whistles, 1 roll of duct tape, SOLAS rations, emergency candles, 1 sleeping bag, extra hat and gloves, multi-tool, and large bag of hand and feet warmers.
- Kayak guides will carry spare paddles, bailing pumps, and throw bag.
- Rescue Equipment – Each kayak guide will be equipped with VHF Radio, GPS, watch, rescue knife, rescue towing harness and a first aid kit
- Guidelines – At all times kayak guides will be responsible to adhering to IAATO's wildlife watching, site, and ice guidelines
- Group management – It is the responsibility of the guides to keep the kayak group together. No kayak should stray out of eyesight or voice command at any time.
- Documents – Each kayaker will be required to fill out and sign a liability release waiver as well as a pre-kayaking experience form in order to participate in the kayak program.

- Kayaker Experience – It is recommended that paddlers have previous kayaking experience. Paddlers must also know how to swim, as swimming experience is necessary to minimize any problems should a paddler need to make a wet exit.
- Participants are advised in the Company's Kayaking documentation that, regardless of experience, it is recommended that before leaving for their expedition they re-familiarize themselves with the basics of getting in and out of the kayak, as well as the wet exit. The kayak guides will cover this in their on board briefing, prior to the activity commencing.
- If a participant is totally inexperienced the kayak guides will make every effort to do a short "basics" instruction to allow the participant to paddle safely in a sheltered area. However, participation in general, and on specific outings, is completely up to the kayak guide team and the Expedition Leader.
- During the initial briefing it will be made clear that the program is not designed as an instructional program.
- Age Restriction – In order to participate in the kayak program, participants must be 16 years or older. Anyone that is 16 to 18 must have an adult to accompany them.
- Equipment Checks – Prior to each paddle, the kayak guides will check each paddler's equipment, and paddlers will be asked to carry out a safety check to ensure that all equipment they use is in good condition and that they understand its use. Paddlers must confirm to the kayak guides that they have checked their equipment properly and that it is in good condition.
- Kayaker Participation – Kayak guides and/or the Expedition Leader have the right to refuse participation if they feel a kayaker is unsuited for kayaking program. It is also understood that management will stand behind any decision made in interest of safety.

2.5 Briefings

- For kayaker's to be accepted into the program and for all excursions, kayakers are required to attend all kayak briefing aboard ship with the kayak guides before being allowed in the kayaks.
- During the briefing, expectations and kayaking protocols will be discussed, reinforcing the pre-departure guidelines provided, as well as going over issues such as safety, how to minimize risk, recommended dress, as well as behavior around wildlife.

2.6 Group Size

- Maximum group size of any kayak excursion we will be 16 kayakers.
- A guide-to-paddler ratio will be, 2 guides for 16 kayakers or 1 guide for 8 kayakers. Trained kayak zodiac safety driver will always accompany kayak excursion.

2.7 Kayak Safety Zodiac Driver

- A safety Zodiac, manned with a kayak trained driver, will be in the close vicinity to the paddlers at all times to assist if necessary.

- The decision of who will be that kayak safety Zodiac driver will be in cooperation with the Expedition Leader and kayak guides.
- The kayak safety Zodiac driver will have advanced training in all aspects of the program, including weather observation, risk management, program delivery, rescues, driving skills and group management.
- Communications – The kayak safety zodiac driver will be in constant radio contact with the kayak guides, Expedition Leader and the ship. If appropriate, the driver will run a 2-radio system, with one radio always on the same channel as both the ship and expedition team and a second radio working on a separate channel with only the kayak guides.
- Group Management – The safety Zodiac driver will also assist the guides in determining and maintaining the area of operation, as well as monitoring behavior and ensuring compliance with established protocols.

2.8 Location

- Sites ideal for kayaking in Antarctica include Port Lockroy, along the shores of Paradise Bay, Neko Harbor and Pleneau Island, the Aitcho Islands, and Deception Island that afford safe conditions, e.g. protected waters away from glacier faces where katabatic winds may occur, at locations that offer suitable sea, ice, wind and weather conditions and at sites that offer wildlife viewing opportunities and are scenic.
- In conjunction with the Expedition Leader, the kayak guides will determine the safest location to offer kayak excursions, based on temperature, wind, ice conditions (which include brash ice, icebergs and glacial faces) and the proximity to wildlife.
- All kayak excursions in Antarctica will be operated in accordance with the Antarctic Treaty, notably a provision of Annex V to the Environmental Protocol, the Antarctic Specially Protected Area (ASPA).
- Wind – No kayak excursion will start if the winds are sustained for five minutes or more at 15knots + in the anticipated paddling location. If winds reach 20 knots sustained or more the guides will call off paddling excursion and return to the ship.
- Safety, Icebergs – Paddling group will stay at least 2 times the height of the iceberg away, more if it looks unstable or has pieces that could break off.
- If there is a need to move amongst smaller icebergs, the guides in consultation with each other, will pick the safest and quickest route through.
- At no time should a paddling group be paddling over an ice tongue.
- Glacial Faces (Ice Walls) – Paddling group will stay at least 300 meters away from any glacial faces (ice walls), more if it looks unstable. Guides will thoroughly brief all paddlers on the dangers of glacial faces calving's and it producing a large swell.
- Timelines – Kayak excursions will last from 1 hour to 4 hours in duration, taking into account paddlers well-being.
- The kayak excursion will only be conducted during daylight and/or in good visibility. The kayak guides will determine the length of each excursion and cancel should conditions change.

- Wildlife – All wildlife encounters during kayak excursions will follow IAATO Wildlife Watching Guidelines. When in the vicinity of orcas or leopard seals, guides will take extra precautions and if the animals are exhibiting any aggressive behavior, guides will call off the kayaking excursion.

2.9 Kayaking Biosecurity

- It is the guide's responsibility to ensure IAATO biosecurity measures will be followed at all times.
- When paddlers embark or disembark from shore, IAATO boot washing protocols will be followed.
- When the kayaking program is transitioning from the Antarctica Peninsula to South Georgia and vice versa, IAATO boot washing protocols, clothing and gear inspection, and visual inspection of the kayaks will happen after the activity (washing of the kayaks if necessary).

Standard Operating Procedures

3. SNORKEL OPERATIONS

3.1 Gear Handout

Waiver Forms

- Guests must sign a waiver form first before receiving snorkel gear
- Waiver forms must be kept for the duration of time the guest remains onboard

Mesh Bags and Mask/Snorkel Sets

- Make sure all bags are clean and empty of gear and trash
- All masks & snorkels are to be disinfected and free of sand, smudges, & sunscreen
- Make sure all masks & snorkels are in good condition (no tears or broken pieces)
- Snorkels are to be properly attached to the masks

Fins & Other Gear

- Fins are to be clean and free of sand and in good condition (no tears or holes)
- Arrange fins by size groupings

Record Gear Handout on Waiver Form

- Be sure to mark what gear has been borrowed
- Include sizes, numbers or other ways of identifying the gear for collection purposes

3.2 Hand-In and Clean Up

- Guests should leave gear in a designated location after their last snorkel
- Wash all gear thoroughly with freshwater and appropriate cleaning solution
- Sort and store fins by size in appropriate places
- Refill Snorkel Safety Boxes (vinegar, shampoo, Vaseline, snorkel keepers, whistles)

3.3 Snorkeling From The Beach

Select best snorkel area

- Take into consideration entry conditions, swell, current, wave action & tides
- Be sure to tell every guest who goes snorkeling what the area limits are
- Have a lookout Zodiac ready onsite before any guest goes into the water
- Check waters for evidence of jellyfish. If there are lots of zooplankton (gelatinous 'jellies') in the water column, consider cancelling the snorkel
- Inform guests of any chance of getting stung by jellyfish

- NOTE: there have been cases of serious Irukadji stings in the areas we operate

Designated Lookout standing at waterline

- Minimize involvement in gear handout
- Keep a close eye on all persons involved in water activities

Be sure to have a selection of extra gear:

- Masks & snorkels & snorkel keepers
- Mixed sizes of fins
- Snorkel vests & noodles
- First aid kit & large bottle vinegar & whistle
- Baby shampoo

3.4 Snorkeling From Zodiac Platforms

Determine the best snorkel area

- Take into consideration entry conditions, swell, current, wave action & tides
- Anchor 2 – 3 Zodiacs as needed – each about 100m apart
- Inform all guests where the snorkel area limits are located
- Select the site with the same site considerations listed in Section 3.

Each Zodiac Platform should have:

- Ladders in place ready to use
- Life Ring/tow line ready to throw to snorkelers and tied onto the boat
- Lookout person at the ready

Shuttle Zodiacs

- Drivers should check with Zodiac platform lookouts before arriving with guests to determine which platform to deliver guests to
- Approach carefully without a wake and looking out for snorkelers in the water
- Always shut engine off when guests are transferring between Zodiacs

Completion of Activity

- Radio the Bridge and confirm all guests are out of the water and the snorkel operation is completed

3.5 Snorkel Lookouts & Safety Duties

This is very serious! It must be undertaken with care

Number of Lookouts

- Two(2) land or Zodiac lookouts must be on duty at all times
- One lookout is to carry out rescue, one is to continue lookout responsibilities
- Lookouts must ONLY do lookout duties

- Lookouts must NOT help in any other duties (e.g. Zodiac loading or lifejackets distribution) while guests are in the water
- If you leave your post, make sure another lookout is assigned to your location.

While On Duty

- Stand in a visible location – in the open
  - If on beach watch, stand at or near the waterline
  - If in the Zodiac – always face the guests in the water
- Continuously scan snorkel area – do not get distracted from your lookout duties
- Limit talking while on duty
- Wear polarized sunglasses and have a charged radio on you
- Have whistle hanging around neck to use immediately to signal Zodiac lookout
- Have personal gear (mask, fins, snorkel) in arms-length, ready to be used to carry out rescue (not in mesh bag)

Gear To Take

- Snorkel Safety Box (shampoo, vinegar, spare snorkel keepers, whistle)
- Bag with spare masks and snorkels and yellow snorkel vests.

Make Sure Your Gear is Nearby and Ready to Use – Beach & Zodiac Lookout

- Always look out watching guests – do not get distracted by talking with others
- Have gear & whistle within hand's reach ready to put on immediately

3.6 In-Water Snorkel Guides

- Remain in general area of the guests
- Constantly look around and check on guests.
- Stay particularly close to any guests having difficulties
- Do not wander off on your own!

3.7 First Aid for Jellyfish Sting Treatment In The Field

- Inform the ship, EL and ship's Doctor ASAP
- **Do not rub** - Rubbing can result in further venom release and make it worse!!!
- **Use vinegar** to flush the area thoroughly and try to maintain a constant flushing for several minutes (if possible)
- VINEGAR PREVENTS FURTHER STINGING by un-triggered tentacles
- DO NOT USE URINE OR ALCOHOL – they do not work
- DO NOT USE FRESHWATER – it could trigger more stinging cells

Flick Off

- Try to flick off remaining visible venom sacs with a credit card or other flat surface
- This gets rid of the stinging sacs without crushing them. If crushed, the venom will spread. Be careful that you do not get stung yourself.

Return to the Ship for Further Medical Treatment

- Carefully transport the injured person to the ship as quickly as possible and keep the doctor/bridge advised if any signs of anaphylactic shock are observed

Standard Operating Procedures

4. DRONE OPERATIONS

4.1 Commercial Drone Filming – An Antarctica Specific Overview

(General Guidelines Herein Applicable Elsewhere)

If conditions permit, qualified and pre-screened expedition staff photographers or parties with legitimate scientific or commercial Unmanned Aerial Vehicle (UAV) projects who have been vetted by the Company (see below) may elect to operate remote-controlled UAV's to obtain commercial aerial footage from select locations. Guests are not permitted to fly UAVs.

Parties with legitimate scientific or commercial UAV projects are welcome to inquire about possible logistical support while onboard a Silversea voyage. If a passenger (e.g. a scientist, researcher or documentary filmmaker) wishes to fly a UAV for non-recreational purposes on one of the Company's trips, it will be the responsibility of the passenger to first contact the Company. In the case of a scientist, it is the scientist's responsibility to obtain all authorizations and/or permits from the Competent Authority (e.g., in the United States, the process involves the State Department, the EPA, NSF, and potentially NOAA/NMFS). In the case of a commercial application (e.g. documentary filmmaking or filming on behalf of the company for commercial purposes), the company will consider the application under its own authorization. The final decision as to where, when and if the UAV can be used (regardless of application) will be made by the Company, Master and Expedition Leader.

Prior to approving the use of a UAV by a passenger for scientific purposes or limited commercial applications, such as documentary filmmaking, Silversea must be convinced that the activity is a legitimate activity and that appropriate authorizations have been obtained. Legitimate scientific activities would normally involve scientists from public or private universities or research institutions or filmmaking organizations that have a track record for producing documentaries or educational material or have prior experience with commercial UAV filming.

For the example of a scientist, who is considered an NGO, the passenger would need to work with the EPA, which reviews the IEE and issues the letter of authorization. The scientist would potentially work with the NSF for any permits required under the Antarctic Conservation Act (e.g., flying over seabirds or marine mammals or over an Antarctic Specially Protected Area, or to obtain a waste permit if there is the chance for loss of the UAV and the Marine Mammal Protection Act for particular research involving marine mammals).

For NGO scientists funded by a US federal government agency, the environmental impact assessment would be conducted by the funding agency, and not subject to EPA review. In those cases, the approval would be documented in the permit process described above.

Silversea would require submission of the EPA letter of authorization, IEE and all pertinent permits for federally-funded scientists to fly UAVs aboard their vessels.

All UAV use by passengers involved in scientific research or limited commercial applications must follow the conditions of the Competent Authority authorization and pertinent permits, and under final approval of Silversea per their guidelines and appropriate IAATO UAV guidelines and authorizations.

Proving proficiency may involve a pre-departure interview about the UAV photographer's experience with the equipment, proof in part of their competence, or confirmation of their abilities through proven professional use in Antarctica and other areas of the world. (Previous experience with UAV operation in Antarctica is preferred.) Silversea may also require UAV photographers to prove their proficiency at the port of embarkation before boarding the ship.

Only those who have proven proficiency in a way that satisfies Silversea's responsibility to their SOPs (below) will be allowed to operate UAV equipment with permission and support from the Company, Master and Expedition Leader.

Silversea will refuse the use of any UAV equipment if the Company feels the conditions or level of experience will not be met under their permit.

Silversea's Senior Vice President Expedition Planning and Strategic Development (Conrad Combrink) will be the one to approve any potential UAV photographers and the proposed equipment to ensure the UAV photographers operating under the Company's ACA Waste Permit meet or exceed the SOPs (below) set out by the Company. He will then coordinate with the vessel for check-out by the Expedition Leader to vet pre-approved UAV photographers and their equipment in person before any UAV operations commence in the field. Those who can demonstrate proficiency in a manner that satisfies Silversea's responsibility to the permit will be added to the Company's list of pre-approved UAV photographers for future seasons, but UAV photographers will always be subject to proving maintained competency with their equipment in similar conditions for future dates.

As no official training or certification frameworks currently exist, Silversea must rely on their SOPs, which are the IAATO Guidelines (below) to guide process. Extreme care will be taken in determining who represents the company in carrying out this activity.

4.2 IAATO Statement on the Use of Remotely Piloted Aircraft Systems (RPAS/UAV)

The term Remotely Piloted Aircraft Systems or Unmanned Aerial Vehicle (RPAS/UAV) is used for any remote piloted aircraft.

IAATO accept the general use of RPAS/UAVs within their members' operations, provided the following criteria have been met:

- For the 2017–18 season, recreational RPAS/UAV flights are not allowed in coastal areas;
- RPAS/UAV flights for scientific or commercial purposes are allowed, if conducted with the permission/authorization from a competent authority;
- RPAS/UAV flights are allowed at deep field sites, including coastal areas bound by ice shelves, if conducted with the permission/authorization from a competent authority.
- Members who allow RPAS/UAV flights should have Standard Operating Procedures in place that are specific to their operation.

- Prior to conducting the activity, the use of Remotely Piloted Aircraft Systems (RPAS/UAV) must be included in the operator's permit/authorization conditions e.g. Advance Notification, Environmental Impact Assessment (EIA) and Waste Management Permit (WMP), where relevant.
- Points for Consideration for Operators' Standard Operating Procedures
- In addition, for those instances where RPAS/UAV flights are allowed, Members agreed to provide the following information for consideration when setting up

4.3 Legal Requirements

- The tour operator and pilot must be familiar with, and adhere to, Antarctic Treaty and National legal requirements – additionally as they apply outside of Antarctica
- Waste Management should be considered in the event that a RPAS/UAV is lost
- Some Competent Authorities require a Waste Management Permit

4.4 Flight Operations and Piloting of (RPAS/UAV)

- Best practice guidelines presented in the peer-reviewed article by Hodgson and Koh (2016) should be reviewed by all parties involved with RPAS/UAV operations.
- All flights should be pre-approved by an authorized person/EL.
- RPAS/UAV equipment should be inspected by an authorized person/EL to ensure that it meets the requirements outlined in the authorized operating procedures.
- RPAS/UAVs should be of robust construction with suitable safety features for use in Antarctica. If operated over water it should have a flotation device or alternative mechanism (such as a leash) to allow for recovery if it lands in the water.
- RPAS/UAV pilots should be able to demonstrate proficiency and experience in varied flying conditions.
- RPAS/UAVs should not be operated in the immediate vicinity of a vessel if the vessel's radar is operational.
- Every flight should adhere to the individual Members' Standard Operating Procedures and a risk assessment carried out in advance for the activity.
- Each flight should have a pilot and an observer (except during solo expeditions).
- Pre-flight planning should include identifying an alternate landing area away from the launch site should the launch site become unusable. The authorized person/EL should be made aware of the alternate landing site before the flight begins.
- An Antarctic test flight should be undertaken to show authorized person/EL that the equipment is fit for purpose, and the pilot is proficient in its operation and use.
- Each flight should begin with an airborne test of the RPAS/UAV and its systems in an area away from people and wildlife. This should include testing the RPAS/UAV's failsafe systems for auto-return. (It is noted that south of 70 degrees, failsafe systems may be unreliable).
- The pilot should maintain visual contact with the RPAS/UAV at all times.

- The observer should maintain a lookout over the area for wildlife, people or other hazards, change in weather conditions and is responsible for monitoring signs of disturbance by wildlife.
- The observer is responsible for maintaining VHF radio contact with the other staff (Authorized person/EL/Bridge/Communications team). The pilot should not use a VHF radio while the RPAS/UAV is airborne.

4.5 Flight Restrictions

- Flights should be conducted in fair weather; with a cloud base sufficiently high that visual contact can be maintained with RPAS/UAV at all times to ensure control.
- Total flight durations should not exceed 20 minutes, and the pilot must have a way to monitor the flight battery voltage at all times during the flight. (It is noted that in colder conditions flight time will be controlled by battery life.)
- Flights should not be started in winds exceeding the UAV manufacturer's recommended maximum and should be aborted if winds exceed 25 knots.
- The maximum distance away from the pilot should never be beyond visual contact

4.6 Environmental Restrictions

- Electric powered RPAS/UAVs are preferable and should be used to minimize noise
- Be aware the lower the RPAS/UAV flight, the more likely wildlife will respond. Initial responses are often physiological and not always obvious to the observer. RPAS/UAVs should be flown at the maximum altitude practicable to achieve desired outcomes, and stopped as soon as a behavioral response is observed.
- RPAS/UAVs should be launched, when possible, out of sight of wildlife.
- RPAS/UAVs should never be launched closer than 100 meters from wildlife.
- RPAS/UAVs must not be flown over or near to concentrations of wildlife on shore or at sea, or over concentrations of marine mammals and flying birds.
- RPAS/UAVs must not be flown over Antarctic Specially Protected Areas (ASPAs).
- RPAS/UAVs must not be flown over Antarctic Specially Managed Areas (ASMAs) unless the activity is specifically allowed in the ASMA Management Plan.
- RPAS/UAVs must not be flown directly over designated Historic Sites and Monuments (HSMs).
- RPAS/UAVs must not be flown in the vicinity of scientific stations without the permission of the Base Commander. - If any wildlife indicates disturbance, unusual behaviour, or interest in the RPAS/UAV, the flight should be aborted immediately.
- At all times, Pilots, Expedition Leaders and Vessel Master recognize the desirability to keep RPAS/UAVs out of the sight / hearing range of all other vessels at all times.
- In the event of a crash, every effort should be made to collect all the remains and evidence of the RPAS/UAV, if safe to do so.

4.7 Record Keeping

- A log of all flights must be maintained, including location, length of flight, weather conditions, any crashes or unexpected landings.
- RPAS/UAV flights must be recorded on the PVR (post-visit report for Polar Regions), including the detail above and if there was any disturbance to wildlife.
- Additional reporting to the operator's Competent Authority may be required under permit/authorization conditions.

4.8 Additional Guidelines

- No flights over land will be conducted from the sea. Flights over the sea may be conducted from land, from a Zodiac, or from the deck of the ship when the radar is not operational.
- A Zodiac will always be on standby in the unlikely event that the device needs to be retrieved.
- UAVs will not be used over any wildlife colonies or concentrations of wildlife on shore, marine mammals at sea or over concentrations of flying birds to minimize potential impact to native birds and mammals. Other exclusions apply and are noted in the activity guidelines, including Protected Areas.
- Expedition Leaders are responsible for supervising all aspects of the UAV activity, including the field activities of the UAV photographers.
- The Expedition Leader or Assistant Expedition Leader is also responsible for meeting with the UAV photographers at the start of the voyage to brief them on the Company's SOPs and ahead of each day filming is anticipated to plan the proposed flights and discuss the filming goals of the photographer(s). UAV photographers must attend all staff and passenger briefings to ensure they are updated for activities off ship and ashore.
- Strict adherence will be given to Annex II of the Environmental Protocol which defines "harmful interference" as "flying or landing helicopters or other aircraft in a manner that disturbs concentrations of birds and seals."
- Aerial filming will not take place over ATCM Protected Areas including ASPAs, ASMAs (unless the Management Plan allows the activity) and HSMs.
- Biosecurity measures will be followed, including wiping down the device before and after flight with a disinfecting agent (e.g. Virkon-S, Virox5 or other).

Standard Operating Procedures

5. REGIONS WITH POLAR BEARS

5.1 General Polar Bear Safety

- Every staff member ashore must be armed with either a rifle or flare pistol, an appropriate number of rounds for the firearm, and must carry a working radio.
- Expedition staff members leading walks ashore need to do a head count for each group and keep their guests close together in tight walking groups. This means that the group walks only as fast as the slowest group member.
- Weather such as snow and fog that hampers visibility may make a landing unsuitable and decisions as to the viability of a landing need to be made accordingly between the Expedition Leader and the bear guards.
- In the event of an urgent shore side evacuation, it is the Expedition Leader's responsibility to double check as soon as possible that all guests and crew have left the shore and/or returned safely to the ship.
- Enough Zodiacs to evacuate everyone ashore must be on hand.
- Unless there is an emergency or under instructions, no staff member should ever load a round or fire a weapon at any time.
- No staff member should walk around by themselves on a landing site without notifying a bear guard or the Expedition Leader first.

5.2 Appropriate Polar Bear Reactions

Scenario A – Bear spotted at a distance

- If a bear is spotted at a distance while groups are ashore, the spotter will be sure the bear guards and the Expedition Leader are notified immediately on an alternate radio channel.
- Information to be conveyed should include the animal's location, approximate distance from the landing site, and any behavioral observations.
- The Expedition Leader and the bear guards will then continue to communicate as the situation dictates and will decide how to proceed based on the scenario.
- If the bear guards and Expedition Leader decide that it is necessary to evacuate the area, then this announcement will be made on the main radio frequency to all the other staff ashore using the code words, "Papa Bravo" and giving directions for everyone to return to the landing site.

- Expedition staff will then escort their guests, still in tight groups, back to the Zodiacs and will begin to assist in the evacuation of the landing site as needed.
- At this point, it will be important to keep the guests calm and moving in an orderly and efficient way back to the Zodiacs.

Scenario B – Bear spotted at close range

- In the unlikely event that a bear is spotted at close range on shore or in the water, the spotter or closest expedition team member may need to fire a flare right away in an attempt to scare the bear.
- It is recommended that the preliminary flare(s) be shot into the air or onto the ground in front of an approaching bear as the situation dictates.
- As soon as possible, all staff members ashore should be notified of the situation by radio, and will return to the Zodiacs to evacuate the guests as outlined above.
- If the evacuation is urgent, staff can distribute Zodiac lifejackets to the guests once they are already in the boats.
- In the event of a sudden site evacuation, all staff should remain on the main radio frequency in order to stay updated on the situation's developments, but keeping radio communications to a minimum in order to keep the channel clear for the most urgent messages.
- Meanwhile, the armed bear guards will be in charge of handling the bear as the situation and their training dictates.

Standard Operating Procedures

6. ESCORTING COACH TOURS

6.1 Prior to Departure of Coaches

- Read and review the PIQs to know what to expect on tour. Ideally this should be done a couple of days in advance to be prepared for questions from guests.
- Upon arriving at your designated coach (or assigned vehicle of the day), check in with the tour guide for that bus and review together the timings, destinations, and plans at each stop as given by the EL.
- If discrepancies are noted, advise the EL or AEL immediately to avoid issues.
- Check that the microphone is working and that the bus is clean.
- Reserve a seat in the front of the coach (not in the very front row however) for one expedition team member. This person is then in charge of communications with the guide to ensure the program runs smoothly. This person should also be the first one off the coach to assist guests and answer any questions they might have as they disembark the vehicle.
- Place a Silversea bus sign in the window and remember to collect it at the day's end.
- Check that there is a step in place for guests to board and unload the bus. If not, if may be possible to borrow a Zodiac step from the ship for the day.
- If there is more than one staff member assigned to a coach/vehicle, decide who will count guests onto the transportation and who will guide and assist guests to the buses along the route from the ship to the parking area.
- Once the guests begin disembarking the ship, all chit-chat between staff is to cease and staff begin to count the guests onto the coaches as they embark the vehicle. This head count is important to distribute guests evenly between the vehicles.
- Once you have a final count and all are seated and ready for departure, be sure to radio in a head count to the person in charge of debark – usually the AEL or Program Coordinator. This should be given as, "22 guests PLUS 3 staff" or simply "22 PLUS 3."

6.2 During the Coach Tour

- At each and every stop, be sure the guide tells the guests what time to be back ("in 20 minutes" is not acceptable, it must be at a time such as 1:20 pm) and where to meet up with the group at that time in case the guests get separated from the group.
- Be sure the guide also advises the guests if it is safe to leave belongings on the vehicle when they head out.

- A staff member should be at each door of the vehicle to assist guests off and answer any questions.
- At lunch or refreshment stops one staff escort should go inside the venue first to make sure all is ready and prepared and to direct guests to toilets, any points of interest, and the dining area.
- Record timings of the tour, guide names, and any comments for the tour report.
- Facilitate a great tour! Recognize when you need to step in to keep the tour on schedule, when the temperature or microphone volume needs to be adjusted etc. If guests unexpectedly need to return to the ship or have a medical emergency, it is your job to work with the local guides and tour operators to take care of them.
- Work with the guide in case they need to talk more (you can ask leading questions), talk less (you can discretely suggest a little rest time for the guests), or when to avoid statements such as, "we usually stop here, but today we are in a hurry."
- The use of cell phones and/or headphones on tours is discouraged except for communications to the ship and/or other staff on tour for logistics purposes and this should be done quietly and discretely out of ear shot of the guests if possible.
- After each stop it is the responsibility of the expedition staff members to count the guests back onto the vehicle and ensure that all are present and accounted for. In the event that someone is missing, steps will need to be taken to locate the missing individual(s) and further coordination with the tour operator and/or ship may be required.

6.3 Returning to the ship

- It's a good idea to choose a landmark on the outward drive away from the port so that you know when you are getting close to the ship on the return. When you see you are nearing the port, call the Bridge with your VHF radio, or contact someone aboard (EL or HD) by cellular phone to advise the ship you are returning with guests.
- Once you have helped all the guests off the transportation, be sure to collect the bus sign and thoroughly check the bus from back to front for any misplaced items. These can be brought to Reception to be placed in 'lost and found.'
- Touch base with your guide to make sure there are no outstanding issues or concerns from their perspective or from yours.

Appendix 1.

Essentials of Zodiac Driving

During operations Zodiac drivers should at all times wear a life vest, appropriate protective clothing and carry/monitor a VHF radio.

1. Starting the Engine

To start the engine, ensure that the throttle is in the neutral position, the kill cord is in place and that the key is in the ignition. If needed, squeeze the primer bulb until it is firm to allow fuel to reach the engine before starting. Turning the key with the throttle in neutral and the kill cord in place should result in the engine turning over. At this point, with the engine running, any tether lines can be released.

2. Boat Handling

Always when driving consider windage, swell, stream effects, momentum, prop effect, and the boat's pivot point. Anticipate the impact of sea and wind conditions on the handling of your Zodiac.

Windage

- Even a small Zodiac will be affected by wind and the driver needs to take this into consideration especially when coming alongside the platform and in marinas

Stream and Current

- Stream and current will impact the maneuverability of your boat. Pay particular attention to currents when maneuvering alongside the platform. Always tie up with the bow facing forwards into the stream.

Momentum – Carrying way and stopping

- A level of comfort using neutral and letting your boat move under its own momentum will come with practice. All boats "carry way" and a large heavy vessel will require more power to make it move in the first place, hence when moving it has greater momentum and will keep moving longer when in neutral.
- Use a small amount of engine power (i.e. reverse) to halt the last of this momentum; however it is best to think ahead to take advantage of the elements as much as possible – the wind and the stream.
- Especially at slow speeds a boat may travel in a different direction than the way it is pointing due to a combination of wind, stream, and handling characteristics.
- Areas downwind or downstream are your boat's "Danger Zone." By knowing which direction stream and wind are trying to take the boat you can use them to your advantage, as nature's brakes to slow you or to assist you into a berth. Learn how to read the elements and use them to your advantage.

Pivot Points

- In boats making headway the pivot point is about 1/3 of the boat's length from the bow. Putting the wheel/tiller hard over to the left (port) while making headway, roughly 1/3 of the vessel will turn to port and the remainder goes to starboard.

- When going astern the pivot point moves aft and with the wheel hard over to left (port) with stern way, 1/3 of the vessel moves to port, the remainder to starboard.

Steering

- Outboards steer from the thrust of water pushed by the prop as it is turned when the engine is in gear. In other words, "NO GEAR, NO STEER." To drive in the correct direction before power is applied remember, "WHEEL BEFORE GEAR."
- When driving at slow speed a controlled "burst of power" is effective to increase the maneuverability of the boat.

Turning

- Steering in a small space take into account all the points above
- Position the boat taking into account wind and stream. Approach as slowly as possible remembering that speed carried into the turn will make the turn larger.
- Turn the wheel/tiller hard over, engage headway, monitor the turn, and put the gear into neutral when space is short. As needed turn hard over in the opposite direction, engage astern, and monitor the turn. Continue this sequence as needed.
- It is usual to turn into whichever element is strongest, either wind or stream.

Coming Alongside

- Take into account how your craft reacts to the wind and current. Approach into the wind or stream and use whichever one will have the greatest effect. Prepare lines and plan your "escape" route in case the maneuver needs improvement.
- Your ideal angle of approach is 30 – 40 degrees off the bow. Use neutral to keep speed and momentum low. At about a boat's length distant, steer away from the pontoon and increase headway. This will straighten the boat without needing to go into reverse. If you are too fast or too steep, steer towards the pontoon and engage astern momentarily to bring the boat alongside. This has the effect of slowing you and bringing the stern in.

Leaving the pontoon

- If the route ahead is clear without wind or current a good push off on the bow and headway will suffice. However it is usually better to come away in reverse, utilizing a bit of forward and the shape of the boat to roll on the bow. Engage sternway and as the stern comes away, straighten up the wheel. Once well clear move off ahead.
- To leave with any wind or current, you may need to utilize spring lines – a bow or a stern spring. Drive against the line, engage neutral, slip the spring and motor away.

3. Anchoring

The Zodiac's anchor is one of the most important pieces of safety equipment. NEVER leave the ship without an anchor.

- Look for shelter from the elements, consider the tide and check the suitability of the bottom. Will there be enough room to swing free of other boats and terrain?
- Bring the boat to a stop into the prevail wind or current
- Lower the anchor slowly and in a controlled way until it touches the bottom
- Motor back slowly paying out the anchor rope so that it doesn't pile up upon itself

- Pay out plenty of line – the longer the line – the more secure your boat will be
- Once the rope has been paid out tie off and motor gently astern to dig the anchor in
- Check the boat is holding position using two objects in line with each other. If the two objects shift orientation the anchor is dragging - raise it and start again.
- When anchoring the Zodiac remember that it is the driver's responsibility to ensure that the boats are safely secured and clear of any dangers.
- When leaving an anchorage, engage ahead to ease the load, haul in the line and chain, taking care not to run over your line. Stow the anchor securely.

4. Rules Of The Road

Head-On Under Power

- When you are traveling head-on toward another vessel under power, both vessels should turn to **Starboard** so that you pass Port-to-Port
- Make your turn obvious so the other vessel's skipper can clearly see your intention

Crossing Under Power

- If you are showing your starboard side, you must give way and pass behind the other vessel. If you are showing your port side you must stick to your course.
- Another way to think of this is if the vessel is off to your starboard side they have right-of-way, or "RIGHT HAS MIGHT."
- Only change course if it is the only way to avoid collision.

Overtaking Under Power

- It is the responsibility of the overtaking vessel to stay well clear of the vessel being overtaken, while the overtaken vessel should maintain speed and course.

Using Channels

- On the water whenever possible drive on the **right hand** side of a channel

Lateral Markers

- Lateral marks are used to show a channel
- The meanings of the marker vary around the world – be sure you know the rules in the waters were you are operating
- **International (non USA or Canada)** – "*A little red port left in the glass*" – meaning leave the red channel markers to the port side of your boat as you enter into the harbor. Green markers will be passed on the starboard side of your boat.
- **USA & Canada (and some others)** – "*red on the right when returning*" – meaning leave the red markers to your right side as you enter a harbor (return from sea) and green markers on the left side.

5. Weather

A basic understanding of wind strength, direction, and what effect it has while you are out on the water is essential for skippers of small boats. Remember wind against the stream will make the sea state worse.

The Beaufort Scale and interpreting weather forecasts

Force	Wind Speed	Description	Wave height	Sea State
0	Less than 1 knot	Calm	0 m	Mirror like
1	1 -3 knots	Light Air	Up to 0.1m	Ripples on the surface
2	4 – 6 knots	Light Breeze	Up to 0.3m	Small wavelets with smooth crests
3	7 – 10 knots	Gentle Breeze	Up to 0.9m	Large wavelets with crests starting to break
4	11 – 16 knots	Moderate Breeze	Up to 1.5m	Large waves begin to form with the white foam crests
5	12 – 21 knots	Fresh Breeze	Up to 2.5m	Moderate waves and many white horses
6	More than 21 knots	Strong Breeze and more	2.5m and more	Large Waves and higher

Tides

Gravitational effects of sun and moon cause the seas to rise and fall giving us tides that vary depending on the position of the sun and the moon relative to the Earth.

Spring and neap tides

When the Earth, sun and moon are in directly line with each other, the sun and the moon pull together on the same part of the ocean, and we experience ‘spring tides’ (nothing to do with season of spring). Spring tides tend to be the most extreme.

When the sun, Earth and the moon are not in line and the sun and the moon are pulling against each other on different parts of the ocean, our tidal range is smaller. When the moon, Earth and sun form a right angle the weakest ‘neap tides’ are in effect.

Sea Breeze

The sun heats up the land's surface, especially during the middle of the day. The land transmits this heat to the air above it. Meanwhile, the sea and the air above do not warm up so quickly. The difference in temperature between the air over the land and the air over the sea means there is a pressure difference too. Air rushes from the sea to the land to equalize this pressure difference. This is what creates a sea breeze.

Land Breeze

At night the land cools quickly and temperatures drop below sea temperature. The temperature of the air over land drops below the temperature of air over the sea. The

difference in temperatures means a difference in pressure and air rushes out to equalize the pressure. This creates a land breeze which is not as strong as a sea breeze.

Wind Against Tide
When wind blows against the flow of the tide it can create larger, steeper waves. Be alert for this around harbor entrances and headlands where currents are stronger.

Wind With Tide
Wind blowing the same way as tidal flow can make the sea appear calm and smooth. Don't be fooled into thinking the wind is light, when in fact it may be strong.

6. Man Overboard (MOB) Procedures

In addition to alerting those around you, watching the MOB at all times, notifying the Bridge/EL via radio – follow these guidelines for retrieving the person in the water.

Approaching the MOB

- At slow speed turn the boat towards the MOB, this will move the propeller away from the MOB.
- Make a controlled turn back towards the MOB ensuring you have enough room not to run them down. If you are too close you will run in circles.
- Start the approach downwind of the MOB
- When the MOB is near put your engine into neutral, or if circumstances allow, switch off your engine. If possible, without headway, grab hold of the MOB.
- Radio the MOB situation to the bridge alerting the officer on watch and the other Zodiac drivers as to the status.

Picking up the MOB

- You will have to determine if the weather conditions allow for you to pick up the MOB without endangering the other persons on your boat.
- If it is not safe to return to the MOB, inform the bridge officer on watch and the nearest Zodiac driver who can assist
- Always keep an eye on the MOB, never losing sight of the person in the water