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## **New IAATO Guidelines for Submersibles and Remote Operated Vehicle activities**



# **New IAATO Guidelines for Manned Submersibles and Remote Operated Vehicle Activities**

**Information Paper Submitted by IAATO**

## ***Introduction***

IAATO is committed to advocate and promote the practice of safe and environmentally responsible private-sector travel to the Antarctic. Industry peer reviewed guidelines have been the backbone of IAATO Members operations in Antarctica.

The IAATO Field Operations Committee has prepared new guidelines for submersibles and remote operated vehicles (ROV) activities. These new guidelines were adopted during the recent IAATO2017 meeting in Edinburgh 2-4 May, 2017 and will be incorporated into the IAATO Field Operations Manual for the 2017-18 season onwards. They complement IAATO's Underwater Activity Guidelines which cater for diving and snorkelling activities.

## ***Submersibles***

To date, submersibles have only been used occasionally on private yachts; however, with recent improvements in submersible technology, it is anticipated that there may be more submersible activity in the future. Submersibles allow the underwater visitor to explore depths well beyond diving limits, often exploring areas which have never been investigated before. Done safely and responsibly these activities can contribute to a greater understanding of the Antarctic ecosystem.

Appendix A details the new IAATO Guidelines for Manned Submersible Activities, which are intended to provide expedition operators with a general framework within which they can tailor their own submersible activity.

## ***Remote Operated Vehicle Activities***

Remotely Operated Vehicles (ROVs) are unmanned submersible vehicles tethered via an umbilical cord to a vessel or support tender.

ROVs have the capability for filming, surveying and rescue/recovery, and fall outside the realm of a purely recreational vehicle. ROVs allow underwater exploration to depths well beyond diving limits, often exploring areas which have never been investigated before. Additionally, ROVs do not require human presence below the surface, but through the medium of film, allow those unable to dive to still experience and learn about this unique ecosystem. Used safely and responsibly, ROVs can contribute to a greater understanding of the Antarctic ecosystem.

Appendix B details the new IAATO Remote Operated Vehicles (ROV) Guidelines which are intended to provide expedition operators with a general framework, within which they can tailor their own submersible activity.

**Appendix A – IAATO Guidelines for Manned Submersible Guidelines**

**Appendix B – IAATO Remote Operated Vehicles (ROV) Guidelines**

## Appendix A – IAATO Guidelines for Manned Submersible (HOV) Activities

### IAATO Guidelines for Manned Submersible (HOV) \* Activities

- *Human Occupied Vehicle (HOV)*

These guidelines are for primarily recreational activities. Science and commercial filming, which fall outside these guidelines, require separate permissions/certifications.

Prior to offering the activity, please ensure that submersible is included in your operators permit/authorization conditions (Advance Notification and EIA). Where applicable, all vehicles should carry equipment required by laws and rules within the permit/authorisation agreement.

#### *Introduction*

Underwater activities give a unique perspective on Antarctica's marine wildlife and the underwater icescape. Underwater activities have formed an integral part of National Programs marine research for many years, and increasingly expedition operators are delving into underwater exploration, using SCUBA, snorkelling or submersibles.

Submersibles allow the underwater visitor to explore depths well beyond diving limits, often exploring areas which have never been investigated before. Done safely and responsibly, these activities can contribute to a greater understanding of the Antarctic ecosystem.

#### *Pre requisites*

- Every submersible should have an operating manual available to the Submersible Pilots, as well as the Bridge Officers and Expedition Leader. This Operating Manual should adequately describe the functions and capabilities/limitations of the vehicle; equipment on-board the vehicle and operating details including diving and surfacing.
- Submersibles operating in the Antarctic will be operating in water temperatures between -2 and +2 degrees Celsius and air temperatures to -10C. The Operating and Maintenance Procedures should take these consistently cold sea conditions into account. It may be necessary to consult with the manufacturer about the suitability of the vehicle for polar operations including battery life, potential for thermal shock, condensation in lines (freezing) etc.
- A risk assessment and systems test should be undertaken pre-dive. This would include but not be limited to:
  - Possibility of Entrapment from ice overhead.
  - Ice, Current, and Sea condition assessment. Additionally, surface weather should be considered, especially in areas known for katabatic winds, which can impede the recovery of the submersible and/or support tenders.

#### *Diving in the Vicinity of Ice*

- A pre-site survey should be conducted by ship's Captain and/or Ice Pilot, Expedition Leader, and Submersible Pilot. This should include and not be limited to:
  - Review of Chart and Bathymetry
  - Weather Forecast – is there a possibility of deteriorating weather conditions which might inhibit recovery?

- Tidal information - be aware of current speed, and only operate within the safety parameters specific for the vehicle.
- Proximity to Ice – What kind of Ice is it and how is it moving?
- No submersible activities should occur under fast ice.
- No submersible activities should occur under large concentrations of ice, which may inhibit recovery in the event of an emergency or uncontrolled surfacing.
- No submersible activities should occur in the vicinity of unstable sea ice.
- No submersible activities should occur in the region of a glacial terminus, where calving is possible.
- Adequate distance from large ice bergs should be maintained. Be aware icebergs not only break from the top down, but also send shooters from the lower parts of the iceberg.
- Bridge personnel should remain vigilant and report all weather, sea state and ice changes.
- Clear communication between the ship and manned submersibles must be kept.
- When in doubt, return the submersible to the surface for recovery.
- Smaller surface support vessels should follow IAATO guidelines for small boat activities in the vicinity of ice.

### ***Clothing and equipment***

- Vehicle occupants and/or Surface Support should be appropriately clothed for Polar Waters.
- Support Divers should be outfitted with appropriate polar diving gear, and if using SCUBA follow IAATO Underwater Activity Guidelines.
- Adequate Emergency equipment for Surface Support and Vehicle occupants should be available for the entire operation. Emergency equipment available for vehicle occupants should be sufficient for the HOV's emergency life support window.
- Equipment should be regularly inspected and maintained.

### ***Briefing***

- The Captain and/or Ice Master, Expedition Leader, Submersible Pilot, Surface Officer and Watch officers should have a site-specific briefing before every submersible operation.
- Briefings should include:
  - Emergency procedures
  - Overview of operation procedures from client perspective
  - Safety practices for changes in weather conditions and ice conditions
  - Familiarization of communication strategies between the guide and clients
  - Environmental awareness
  - Dive depth and Time

### ***Deployment***

- Deployment of the submersible should be in accordance with the ship's and submersible's standard operating procedures and environmental operating procedures.
- Any activities that take place within a protected or managed area will be done in accordance with the relevant management plan provisions.

### **Wildlife and Seafloor Considerations**

- Leopard Seals are known to be curious, and may interact with the submersible. Submersible design and tough exterior proposes it is in no danger of damage by a Leopard Seal.

Exceptions would be:

- The surface support boats, especially with inflatable pontoons. These boats should be aware of the IAATO Leopard Seal Watching Guidelines.
- Never “chum” marine animals.
- Maintain appropriate distances from wildlife as outlined in IAATO Wildlife Watching Guidelines:
- No matter the distance, negative reactions to the submersible, such as rapidly swimming away, should be minimized at all times.
- When setting down on the seafloor, care should be taken to avoid areas with high concentrations of marine life, especially soft invertebrates.
- While sitting on or hovering close to the bottom, use thrusters minimally to avoid disturbing the delicate benthic community.
- IAATO Wilderness Etiquette should always be followed.

## Appendix B – IAATO Remote Operated Vehicles (ROV) Guidelines

### IAATO Guidelines for Remotely Operated Vehicles (ROV)

**Remotely Operated Vehicles (ROVs) are unmanned submersible vehicles tethered via an umbilical cord to a vessel or support tender. ROVs have the capability for filming, science, survey and rescue/recovery and fall outside the realm of a purely recreational vehicle. Prior to offering the activity, please ensure that Remotely Operated Vehicle is included in your operators permit/authorisation conditions (Advance Notification and EIA).**

**Please note for the remainder of this document, the size of the ROV referenced is less than 75kg, and other guidelines and considerations would apply to industrial/working ROVs.**

#### *Introduction*

Underwater activities give a unique perspective of Antarctica's marine wildlife and the underwater icescape. Underwater activities have formed an integral part of National Program marine research for many years, and increasingly expedition operators are delving into underwater exploration, using SCUBA, snorkelling, ROVs or submersibles.

ROVs allow underwater exploration at depths well beyond diving limits, often exploring areas which have never been investigated before. Additionally, ROVs do not require human presence below the surface, therefore reduce some safety concerns associated with underwater exploration. Used safely and responsibly, ROVs can contribute to a greater understanding of the Antarctic ecosystem.

#### *Pre requisites*

- ROVs operating in the Antarctic will be operating in water temperatures between -2 and +2 degrees Celsius. The Operating and Maintenance Procedures should take these consistently cold sea conditions into account.
- Before each season and/or when key personnel rotate away into the operation, the Ship's Captain and ROV Pilot should have a briefing on Emergency Procedures and Communication protocol between the support tender and the bridge.
- A risk assessment and systems test should be undertaken pre-dive. This would include but not be limited to:
  - Ice, Current, and Sea conditions assessment. Additionally, surface weather should be considered, especially in areas known for katabatic winds, which can impede the recovery of the ROV and/or support tender.
  - A test of operating systems and thrusters before the ROV is deployed underwater.
- Check-out operations, for limited duration and to limited depths, should be performed at the beginning of the season.
- The umbilical cord and its connections should be checked before the season and inspected regularly afterwards.
- All Operations and Maintenance should be logged.
- All equipment should be inspected and maintained daily during operational periods.
- ROVs should be stored appropriately to minimise risk of damage during transit periods or from natural elements.
- The ROV must have a support vessel and driver who are not involved in actively assisting with the ROV. The driver is responsible for maintaining safe distances to ice and wildlife, as well as observing any potential weather deterioration.

## *Pre – Operation Briefing*

- A pre-site survey should be conducted by ship's Captain and/or officer on watch, and ROV Pilot. This should include and not be limited to:
  - Review of Chart and Bathymetry
  - Weather Forecast – is there a possibility of deteriorating weather conditions which might inhibit recovery?
  - Tidal information - be aware of current speed, and only operate within the safety parameters specific for the vehicle.
  - Proximity to Ice – What kind of Ice is it and how is it moving?
- Pre-Operations Briefings should include:
  - Where the ROV will be deployed
  - Time away from the vessel
  - Who and how many personnel will be in the ROV support boat

## **ROV Operations in the Vicinity of Ice**

- Support Vessels should follow IAATO Guidelines for small boat operations in the vicinity of ice.
- The umbilical cord of an ROV is a vulnerability. There is a possibility the cable can be caught around protrusions of ice, either damaging or causing the ROV to be lost on recovery. Therefore, ROV dives near or under fast/brash ice should be undertaken with the utmost care.
- Whilst ROV activities may occur in the region of a glacial terminus, because of possible calving, glacial activity should be assessed, and the support tender should always keep a safe distance of **at least** 200 meters/600 feet from tide water glaciers to avoid both direct hits and the largest waves. For high activity glaciers this should be increased to 400 meters/1200 feet.
- ROV activities should not be performed in front of high activity glaciers.
- Support boats should keep the recommended 2x the height of the iceberg away from icebergs. Be aware icebergs not only break from the top down, but also send shooters from the lower parts of the iceberg.
- Support Vessels should keep the recommended distance of 2x the height
- Support driver and Bridge personnel should remain vigilant and report all weather, sea state and ice changes.
- Clear communication between the ship and the ROV support tender must be kept.
- When in doubt, return the ROV to the surface for recovery.

## *Clothing and equipment*

- Surface Support Operators should be appropriately clothed for Polar Waters.
- Emergency Equipment should be regularly inspected and maintained.

## *Deployment*

- Deployment of the ROV should be in accordance with the ship's and ROV standard operating procedures and environmental operating procedures.
- Any activities that take place within a protected or managed area will be done in accordance with the relevant management plan provisions.
- All equipment should be checked prior to entering the water.
- Communication should be maintained between the bridge, ROV support boat for the duration of the activity. The bridge officer and Support boat driver should monitor the weather during the activity and notify all involved of any adverse changes.



- ROV activity should be logged.

### **Wildlife and Seafloor Considerations**

- Leopard Seals are known to be curious, and may interact with the ROV which may pose a risk of damage to the umbilical or anything that may become entwined in it should the seal pull on the cable (whether purposefully or accidentally).
- Support boat should be aware of the IAATO Leopard Seal Watching Guidelines.
- Maintain appropriate distances from wildlife as outlined in IAATO Wildlife Watching Guidelines:
  - Submersibles 30 meters/90 feet away from birds and seals and 100 meters/300 feet away from whales.
- Regardless of recommended distances, negative reactions by wildlife to the ROV or support boat, such as rapidly swimming away, should be minimized at all times.
- When setting down on the seafloor, care should be taken to avoid areas with high concentrations of marine life, especially soft invertebrates.
- While sitting on or hovering close to the bottom, use thrusters minimally to avoid disturbing the delicate benthic community.
- Any collection of marine samples must only be done with the appropriate permits.
- IAATO Wilderness Etiquette should always be followed.