General instructions

► Read through this entire document before deployment starts.

► Deployment monitoring is done with a computer (housed in the TOS) running drill/deployment monitoring software (by Chuck Rentmeesters) with a GUI for readout and manual inputs. All deployment sensor data and manual inputs are logged and saved on disk by this system.

► For each manual entry into the monitoring interface (marked ENTER below), also make a note in the logbook (marked Logbook below).

► For each entry in the logbook, include name (initials) and time.

► Write down as much useful information you can think of (it will all be needed sooner or later).

Measurement instructions

► All vertical measurements are relative to the floor of the tower (not the lip of the kick board).
  - Measure well depth from this level.
  - Take cable mark readings at this level.

► The location of a DOM on a string (for distance measurements) is defined as the position of the center of the sphere (at the equator defined by the harness).

► When taking a cable mark reading, estimate the location to nearest cm (0.01 m) with closest cable marks and tape measure.

► The location of a Paro is defined at the bottom of its body (at the little hole with the nipple).

► The location of a Keller is defined at the row of holes in the black plastic nose cap.

► The distance between a pressure sensor and the nearest DOM is positive/negative if the unit is above/below the DOM.

► Well depth is measured with a laser ranger (if possible), or with a tape measure (if not).

► The unit used for all distances and depths during deployment is meters.
Distances between devices

calculate manually and enter on deployment screen

Distance between Paro2 and DOM60: _________________________ = __________

Distance between Keller and DOM60: _________________________ = __________

Distance between Paro1 and DOM60: _________________________ = __________

Distance between Paro2 and Paro1: _________________________ = __________

Distance between Paro2 and Keller: _________________________ = __________

Distance between Keller and Paro1: _________________________ = __________

Notes:

There are 60 DOMs on every string.

The nominal spacing between DOMs is 17 m.

The nominal spacing between breakouts is 34 m.

Breakouts (1-30) and DOMs (1-60) are counted from the top.

Paro1 is at breakout 1, just above DOM1.

The Keller is at breakout 15, just above DOM29.

Paro2 is at breakout 30, just above DOM59.
Check Sheet

STRING # ____

DATE: _____________

Before Deployment

☐ Action: Locate laser ranger for well depth measurements.

☐ Action: Locate metric tape measure.

☐ Action: Locate two Paros (and two adapter cables) and one Keller, *plus spares* of each.

☐ Action: Locate bucket (for cooling of Keller sensor with water/ice mix).

☐ Action: Fill bucket with snow and place in heated area to make slush.

☐ Action: Locate Setra uphole pressure assembly (sensor + cable).

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Deployment Startup

☐ Action: Note deployment start time.

Logbook: Time

☐ Action: Click “Reset Mission Time” on the right panel on the deployment screen.

☐ Action: Note DDB id number (1, 2, or 3).

ENTER: DDB# (select button)

Logbook: DDB#
**Action:** Take a well depth measurement with the laser ranger.

**ENTER:** Well depth [m]

**Logbook:** Well depth

**n/a** **Action:** Measure distance (in segments) between dust logger (at laser) and bottom DOM.

**Logbook:** Distance [m]; segment distances [m]

**Action:** Get cable mark reading at bottom DOM.

**Logbook:** Cable mark [m]

**Action:** Reset Payout when DOM60 breaks the plane of the floor.

**CLICK:** “Reset” button (Top of Hole Reset) on Payout/Temperature tab

**Logbook:** Payout Start value

**Action:** Attach Paro at breakout #30. (This is called “Paro2” on the monitoring screen).

**Logbook:** Paro serial number, adapter type (100Ω, 147Ω, no resistor)

**Action:** Measure distance between bottom Paro location and nearest DOM.

Estimate distance to bottom DOM by adding \( n \) 17-meter segments \( (n \) should be 1 for Paro2 since nearest DOM is #59).

**ENTER:** Distance [m] from Paro to bottom DOM (#60)

**Logbook:** Distance to nearest DOM, nearest DOM#, estimated distance to DOM60

**Action:** Get cable mark reading at bottom Paro.

**Logbook:** Cable mark [m]

**Action:** Take Paro air pressure reading just before it breaks the water surface.

**ENTER:** Ambient pressure [PSI] for Paro2

**Logbook:** Paro2 air pressure
During Deployment

- **Action:** Measure curved distance of main cable going around DOM (for at least two DOMs).
  
  \[ \text{Logbook: Straight (vertical) distance for DOM segment, curved cable distance} \]

- **Action:** Measure real distance between neighboring DOMs (for every pair) with laser ranger.
  
  \[ \text{Logbook: DOM#’s, distance} \]

- **Action:** Put Keller (and one spare) in bucket of water (at near freezing temperature) at least one hour before breakout #15 is reached.

  Note: The Keller is not temperature corrected and must therefore be brought to the temperature of the water in the hole (0-2°C) before the air pressure offset is determined.

- **Action:** Attach Keller at breakout #15.

  \[ \text{ENTER: Keller serial number} \]
  
  \[ \text{Logbook: Keller serial number} \]

- **Action:** Measure distance between Keller and nearest DOM.

  Estimate distance to bottom DOM by adding \( n \) 17-meter segments
  
  \( n \) should be 31 for Keller since nearest DOM is #29.

  \[ \text{ENTER: Distance [m] from Keller to bottom DOM (#60)} \]

  \[ \text{Logbook: Distance to nearest DOM, nearest DOM#, estimated distance to DOM60} \]

- **Action:** Get cable mark reading at Keller.

  \[ \text{Logbook: Cable mark [m] for Keller} \]

- **Action:** Determine Keller air pressure offset before (or just as) Keller hits water.

  \[ \text{ENTER: Ambient pressure [PSI] for Keller} \]

  \[ \text{Logbook: Ambient Keller pressure} \]

- **Action:** Get cable mark reading at top DOM.

  \[ \text{Logbook: Cable mark [m]} \]
Action: Attach Paro at breakout #1. (This is called “Paro1” on the monitoring screen).

Logbook:  Paro serial number, adapter type (100Ω, 147Ω, no resistor)

Action: Measure distance between top Paro and nearest DOM.

Estimate distance to bottom DOM by adding \( n \) 17-meter segments (\( n \) should be 59 for Paro1 since nearest DOM is #1).

ENTER:  Distance [m] from Paro to bottom DOM (#60)

Logbook:  Distance to nearest DOM, nearest DOM#, estimated distance to DOM60

Action: Get cable mark reading at top Paro.

Logbook:  Cable mark [m]

Action: Measure well depth when top Paro hits water.

ENTER:  Well depth [m]

Logbook:  Well depth [m], measurement method (laser/tape)

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**Between DOM attachment and String Drop**

Action: Lower Setra assembly into hole (after top DOM is >50 m under the surface).

Action: Measure distance between Setra sensor and floor of tower (distance marked on cable).

ENTER:  Distance Setra to floor [m]

Logbook:  Distance Setra to floor

Action: Measure well depth with Setra system and laser ranger and compare.

Logbook:  Well depth from Setra [m], well depth from laser [m]

Action: If the two well depth measurements agree, switch from laser to Setra in monitoring system.
**During String Drop**

- **Action:** Measure well depth manually (with laser ranger and/or tape measure).
  
  (if shift lead allows: repeat several times during drop)
  
  **ENTER:** Well depth [m]
  
  **Logbook:** Well depth, measurement method (laser/tape)

- **Action:** Read cable marks at regular intervals.
  
  **Logbook:** Cable mark [m]; depth readings [m] (Paro1, Paro2, Keller); time

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**End of Deployment**

- **Action:** Get final pressure readings from Paros (2) and Keller when final depth has been reached.
  
  **Logbook:** Pressure readings [PSI]; corrected depths [m] (from screen)

- **Action:** Get final well depth reading (laser and/or Setra).
  
  HAS TO BE SIMULTANEOUS WITH FINAL PRESSURE READINGS!
  
  **Logbook:** Well depth [m] (laser); well depth [m] (Setra)

- **Action:** Note deployment end time.
  
  **Logbook:** Time