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MRV *Scotia*

Survey 1920S

## **PROGRAMME**

11-21 December 2020

**Loading:** Aberdeen, 08 December 2020

**Unloading:** Aberdeen, 21 December 2020

In setting the survey programme and specific objectives, etc the Scientist-in-Charge needs to be aware of the restrictions on working hours and the need to build in adequate rest days and rest breaks as set out in Marine Scotland's Working Time Policy (Notice 34/03). In addition, the Scientist-in-Charge must formally review the risk assessments for the survey with staff on-board before work is commenced.

In the interest of efficient data management it is now mandatory to return the survey report, to I Gibb and the Survey Summary Report (old ROSCOP form) to M Geldart, within four weeks of a survey ending. In the case of the Survey Summary Report a nil return is required, if appropriate

**Out-turn days per project:** 11 days: ST05b

### **Gear**

Sea-Bird CTD/Carousel, water filtering equipment, data buoy deployment equipment, chemistry sampling equipment.

### **Objectives**

1. Test the SBE911 and CTD carousel (main CTD crane) in the Buchan Deep.
2. Perform routine hydrographic sampling at stations along the long term monitoring JONSIS section in the northern North Sea (Priority 1).
3. Perform routine hydrographic sampling at stations along the long term monitoring Faroe-Shetland Channel section: Nolso-Flugga (Priority 1).
4. Perform routine hydrographic sampling at stations along the long term monitoring Faroe-Shetland Channel section Fair Isle-Munken (Priority 1).
5. Recover existing Loch Ewe mooring and deploy the new data buoy (plus conduct a CTD cast at the mooring location) (Priority 1).
6. Take salinity, nutrient, chlorophyll, dissolved oxygen, TADIC samples along all standard lines.
7. Run the thermosalinograph throughout the survey.
8. Run the VMADCP on all the standard sections.

Extra work listed below will be performed if time allows, priority 2 tasks are not listed in order of importance and the sequence will be determined depending on time/location/weather:

9. Perform a Stonehaven CTD cast at beginning/end of the survey (depending on the Stonehaven sampling schedule).
10. Perform hydrographic sampling along the Shelf 1 section (Priority 2).
11. Perform hydrographic sampling along the Shelf 2 section (Priority 2).
12. Perform hydrographic sampling along the Shelf 3 section (Priority 2).
13. Perform hydrographic sampling along the Shelf 4 section (Priority 2).
14. Conduct CTD/VMADCP survey around the Solan Bank (Priority 2).
15. Perform hydrographic sampling along the Stonehaven AlterEco section in the northern North Sea (Priority 2).
16. If weather/time permits repeat the JONSIS line at the end of the survey and extend to 001° 30' east (if we have Norwegian clearance) (Priority 2).
17. Perform hydrographic sampling along the East Coast section (in the Northern North Sea) (Priority 2).
18. Perform hydrographic sampling along the Fedje/Shetland section between Shetland and Norway (in the Northern North Sea, if we have Norwegian clearance) (Priority 2).
19. If conditions in the Faroe-Shetland Channel don't allow further work in the Faroe-Shetland Channel, conduct VMADCP/CTD work in the Moray Firth (details to be determined) (Priority 3).
20. If weather/time permits, perform a CTD/VMADCP survey on part of the Jonsis line (around 59° 17' N, 001° 15' W) (Priority 3).
21. If sheltering in a suitable location around Shetland or Orkney due to bad weather conduct VMADP/CTD surveys (details to be determined). (Priority 3).

### **General Procedure**

After departing Aberdeen and completing appropriate drills, *Scotia* will make passage to Buchan Deep for a test dip (unless we need to perform a Stonehaven CTD dip first). On completion, *Scotia* will head to the eastern end of the JONSIS section to carry out sampling with the CTD and carousel water sampler (Table 1, Figure 1).

The vessel will then either proceed to the Faroe-Shetland Channel or Loch Ewe, weather dependent. We will commence hydrographic sampling along the Nolso Flugga survey line (Table 2, Figure 1) in the FSC. On completion of the Nolso Flugga line, the vessel will proceed to conduct hydrographic sampling on the Fair Isle-Munken survey line (Table 3, Figure 1). The data buoy deployment in Loch Ewe will either happen before or after the FSC sampling (Figure 2).

Once the Priority 1 work is completed (or if time allows during Priority 1 work) and if time allows, *Scotia* will carry out additional work (listed among the cruise objectives as Priority 2 and 3, Figure 3). This extra work will include extra hydrographic lines on the shelf and/or the North Sea and additional CTD/VMADCP transects/locations. In case we are sheltering in a suitable location around Shetland, Orkney or the Moray Firth we will run the VMADCP and perform CTD sampling along specified lines (to be determined).

**Data buoy Position (Deployment during daylight hours)**

och Ewe: 57° 50.982' N, 005° 39.01' W. Water depth: ~45m

**Scientific Procedures**

It is expected that deployments of hydrographic equipment will be carried out with the CTD crane whilst the vessel is on station. Data buoy deployment will be done from the trawl deck (see deployment procedure in Appendix 1).

Two container laboratories will be required (one for water filtering and a dry container for communications with sampling equipment). Chlorophyll samples will be stored frozen in the freezer in the Fish House and nutrient samples will be stored in fish-free freezer down below (which needs to be clean for this purpose).

The thermosalinograph will be run throughout the survey.

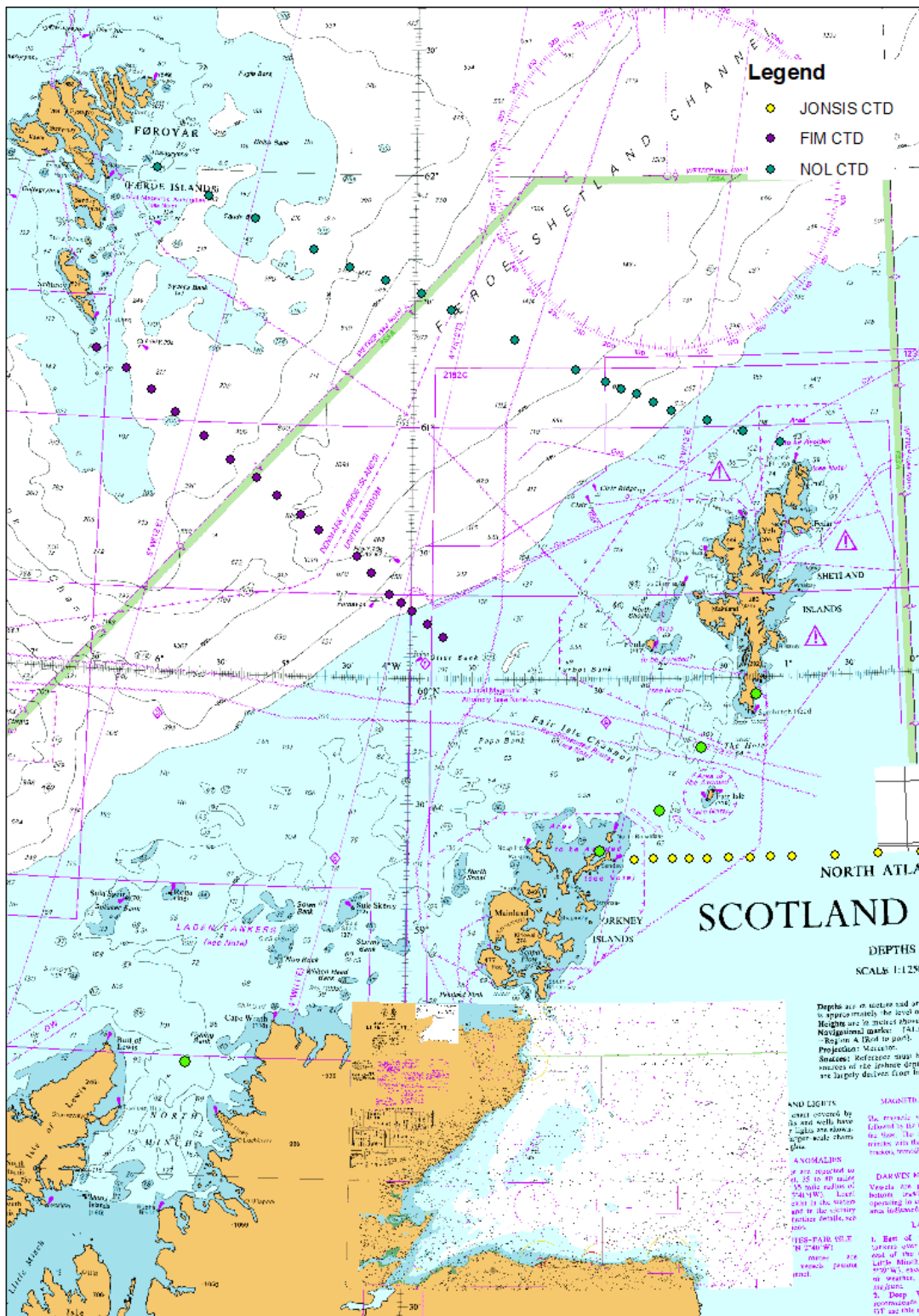
(NOTE: The survey will potentially take *Scotia* into the Foinaven Development Area. This is now standard practice, and normal on-site communications will be established with the Foinaven co-ordinating officer).

Normal contacts will be maintained with the laboratory.

Submitted:  
B Rabe  
03 December 2020

Approved:  
I Gibb  
04 December 2020

Figure 1: Map of main monitoring lines (Jonsis, NOL, FIM).



**Figure 2:** Map of data buoy deployment location.



**Table 1:** Jonsis.

| CODES | #      | Name  | Latitude     | Longitude    | Depth  | Spacing  |
|-------|--------|-------|--------------|--------------|--------|----------|
|       | 01     | JO 1  | 59° 17.00' N | 02° 14.00' W | 75 m   |          |
|       | 02     | JO 1A | 59° 17.00' N | 02° 5.00' W  | 90 m   | 4.59 nm  |
|       | 03     | JO 2  | 59° 17.00' N | 01° 56.00' W | 100 m  | 4.59 nm  |
|       | 04     | JO 3  | 59° 17.00' N | 01° 48.00' W | 80 m   | 4.08 nm  |
|       | 05     | JO 4  | 59° 17.00' N | 01° 40.00' W | 90 m   | 4.08 nm  |
|       | 06     | JO 5  | 59° 17.00' N | 01° 30.00' W | 95 m   | 5.10 nm  |
|       | 07     | JO 6  | 59° 17.00' N | 01° 20.00' W | 110 m  | 5.10 nm  |
|       | 08     | JO 6A | 59° 17.00' N | 01° 10.00' W | 120 m  | 5.10 nm  |
|       | 09     | JO 7  | 59° 17.00' N | 01° 0.00' W  | 125 m  | 5.10 nm  |
|       | 10     | JO 8  | 59° 17.00' N | 00° 40.00' W | 120 m  | 10.20 nm |
|       | 11     | JO 9  | 59° 17.00' N | 00° 20.00' W | 140 m  | 10.20 nm |
|       | 12     | JO10  | 59° 17.00' N | 00° 0.00' W  | 135 m  | 10.20 nm |
|       | Totals |       |              |              | 1180 m | 68.36 nm |

Priority Stations are JO-01, JO-03 and JO-06a, JO-10

**Table 2: NOL line  
Nolso-Flugga –**

| CODE | #         | Name          | Latitude            | Longitude           | Depth         | Spacing          |
|------|-----------|---------------|---------------------|---------------------|---------------|------------------|
|      | <b>01</b> | <b>NOL-01</b> | <b>60° 56.00' N</b> | <b>01° 00.00' W</b> | <b>110 m</b>  |                  |
|      | <b>02</b> | <b>SEFN1</b>  | <b>60° 58.70' N</b> | <b>01° 17.70' W</b> | <b>125 m</b>  | <b>9.00 nm</b>   |
|      | <b>03</b> | <b>SEFN2</b>  | <b>61° 01.40' N</b> | <b>01° 35.40' W</b> | <b>155 m</b>  | <b>8.99 nm</b>   |
|      | <b>04</b> | <b>NOL-02</b> | <b>61° 04.00' N</b> | <b>01° 53.00' W</b> | <b>270 m</b>  | <b>8.91 nm</b>   |
|      | <b>05</b> | <b>SEFN3</b>  | <b>61° 06.00' N</b> | <b>02° 01.50' W</b> | <b>440 m</b>  | <b>4.57 nm</b>   |
|      | <b>06</b> | <b>NOL-03</b> | <b>61° 08.00' N</b> | <b>02° 10.00' W</b> | <b>550 m</b>  | <b>4.57 nm</b>   |
|      | <b>07</b> | <b>SEFN4</b>  | <b>61° 09.30' N</b> | <b>02° 17.50' W</b> | <b>630 m</b>  | <b>3.85 nm</b>   |
|      | <b>08</b> | <b>NOL-3a</b> | <b>61° 11.00' N</b> | <b>02° 25.00' W</b> | <b>730 m</b>  | <b>3.98 nm</b>   |
|      | <b>09</b> | <b>NOL-04</b> | <b>61° 14.00' N</b> | <b>02° 40.00' W</b> | <b>1080 m</b> | <b>7.82 nm</b>   |
|      | <b>10</b> | <b>NOL-05</b> | <b>61° 21.00' N</b> | <b>03° 10.00' W</b> | <b>1370 m</b> | <b>16.03 nm</b>  |
|      | <b>11</b> | <b>NOL-06</b> | <b>61° 28.00' N</b> | <b>03° 42.00' W</b> | <b>1235 m</b> | <b>16.84 nm</b>  |
|      | <b>12</b> | <b>FARN2</b>  | <b>61° 32.00' N</b> | <b>03° 57.00' W</b> | <b>1200 m</b> | <b>8.18 nm</b>   |
|      | <b>13</b> | <b>NOL-07</b> | <b>61° 35.00' N</b> | <b>04° 15.00' W</b> | <b>990 m</b>  | <b>9.08 nm</b>   |
|      | <b>14</b> | <b>FARN1</b>  | <b>61° 38.00' N</b> | <b>04° 33.00' W</b> | <b>530 m</b>  | <b>9.07 nm</b>   |
|      | <b>15</b> | <b>NOL-08</b> | <b>61° 42.00' N</b> | <b>04° 51.00' W</b> | <b>235 m</b>  | <b>9.44 nm</b>   |
|      | <b>16</b> | <b>NOL-09</b> | <b>61° 49.00' N</b> | <b>05° 21.00' W</b> | <b>180 m</b>  | <b>15.84 nm</b>  |
|      | <b>17</b> | <b>NOL-10</b> | <b>61° 54.00' N</b> | <b>05° 45.00' W</b> | <b>290 m</b>  | <b>12.37 nm</b>  |
|      | <b>18</b> | <b>NOL-11</b> | <b>62° 00.00' N</b> | <b>06° 12.00' W</b> | <b>125 m</b>  | <b>14.04 nm</b>  |
|      | Totals    |               |                     |                     | <b>8250 m</b> | <b>162.60 nm</b> |

If stations need to be missed they should be dropped in this order  
 [Priority 4: FARN1, FARN2], [Priority 3: SEFN1, SEFN2, SEFN3, SEFN4]  
 [Priority 2, NOL-3a, NOL-05, NOL-07, NOL-10]

**Table 3: FIM  
Fair Isle - Munken**

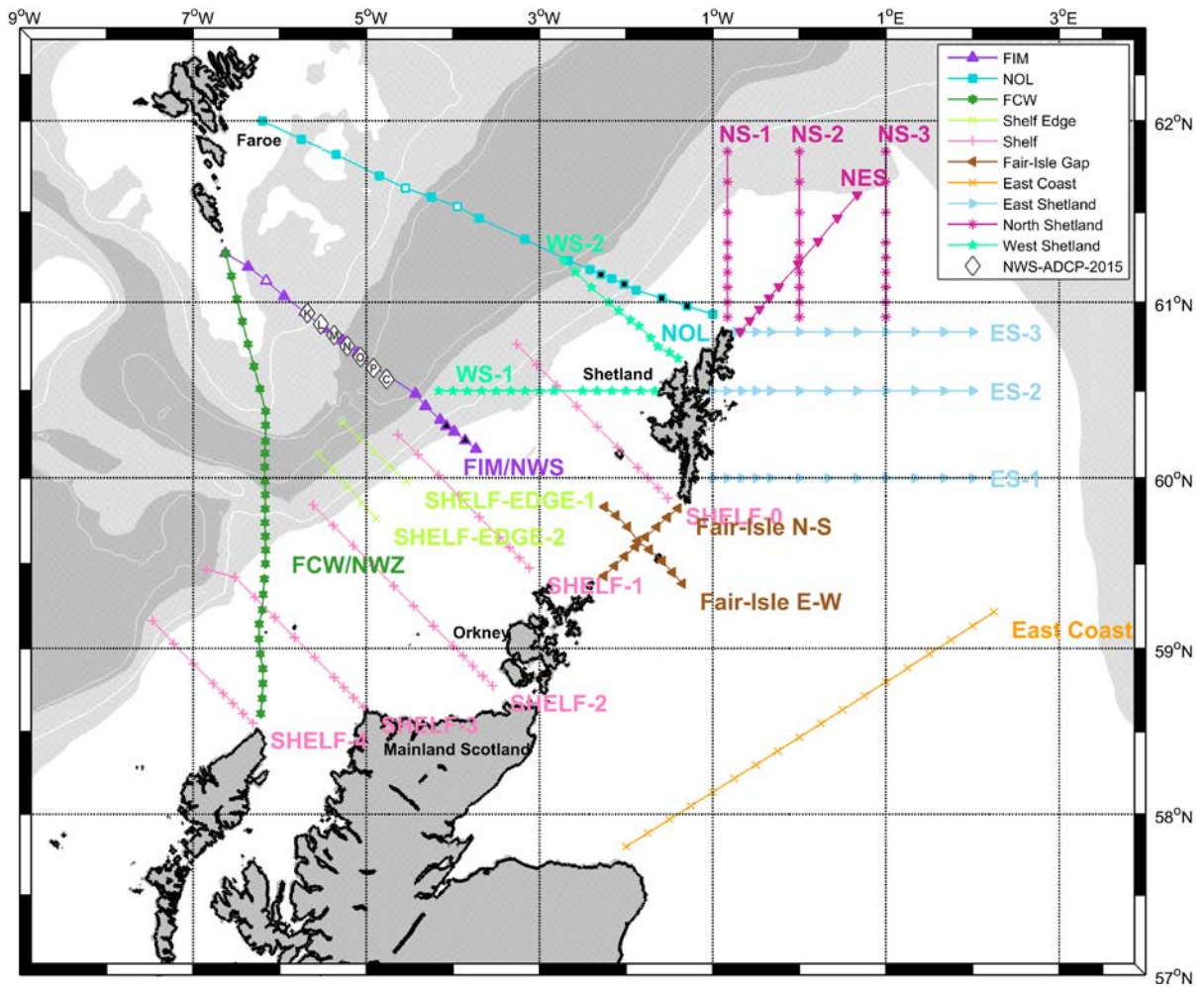
(Amended for presence of Foinaven oil platform)

| CODE | #       | Name          | Latitude            | Longitude           | Depth        | Spacing        |
|------|---------|---------------|---------------------|---------------------|--------------|----------------|
|      | 01      | FIM-01        | 60° 10.00' N        | 03° 44.00' W        | 150 m        |                |
|      | 02      | SEFF1         | 60° 13.00' N        | 03° 51.50' W        | 170 m        | 4.74 nm        |
|      | 03      | FIM-02        | 60° 16.00' N        | 03° 59.00' W        | 200 m        | 4.84 nm        |
|      | 04      | SEFF2         | 60° 18.00' N        | 04° 04.50' W        | 330 m        | 3.36 nm        |
|      | *<br>05 | <i>FIM-03</i> | <i>60° 20.00' N</i> | <i>04° 10.00' W</i> | <i>390 m</i> | <i>3.03 nm</i> |
|      | 06      | FIM-04        | 60° 25.00' N        | 04° 19.00' W        | 655 m        | 6.88 nm        |
|      | 07      | FIM-05        | 60° 29.00' N        | 04° 26.00' W        | 995 m        | 5.45 nm        |
|      | 08      | FIM-06        | 60° 35.00' N        | 04° 45.00' W        | 1090 m       | 11.15 nm       |
|      | 09      | FIM-6a        | 60° 38.00' N        | 04° 54.00' W        | 1030 m       | 5.33 nm        |
|      | 10      | FIM-07        | 60° 43.00' N        | 05° 06.00' W        | 915 m        | 7.70 nm        |
|      | 11      | FIM-08        | 60° 47.00' N        | 05° 16.00' W        | 830 m        | 6.34 nm        |
|      | 12      | FIM-09        | 60° 51.00' N        | 05° 29.00' W        | 600 m        | 7.36 nm        |
|      | 13      | FARF3         | 60° 56.70' N        | 05° 42.80' W        | 333 m        | 8.90 nm        |
|      | 14      | FIM-10        | 61° 02.00' N        | 05° 57.00' W        | 280 m        | 8.68 nm        |
|      | 15      | FARF2         | 61° 07.20' N        | 06° 09.40' W        | 250 m        | 7.95 nm        |
|      | 16      | FIM-11        | 61° 12.00' N        | 06° 22.00' W        | 240 m        | 7.67 nm        |
|      | 17      | FARF1         | 61° 16.40' N        | 06° 37.70' W        | 100 m        | 8.80 nm        |
|      | Totals  |               |                     |                     | 8,558 m      | 108.18 nm      |

If stations need to be missed they should be dropped in this order  
 [Priority 4: FARF1, FARF2, FARF3], [Priority 3: SEFF1, SEFF2]  
 [Priority 2, FIM-04, FIM-06a, FIM-07]



**Figure 3:** Map of some of the extra hydrographic lines (details to be provided at a later stage when necessary).



## Appendix 1: Data buoy deployment procedure

### DATA BUOY DEPLOYMENT- LOCH EWE 1920S

1. Run all components from reel onto the bottom net drum ,starting with the connection that goes onto the two ton weights. **Depending on the nature of the two Tonne weight it may be beneficial that the bottom 27.5 m chain is attached to the weight, and the start of the spooling is therefore the bottom part of the 75 m seasteel rope.**

**A stoppering off point should be prepared for when the end of the spooled line is detached from the net-drum. Such a stoppering off point is usually on the port side about 10 m forward from the wavegate**

The lower net drum will be used, as operations will be below head height for safety.

2. Prepare the weights on the trawl ramp with quick release hooks or dyneema slip ropes, make sure that the chains will slide down off the ramp ,rather and drop onto the ramp.

3. Proceed to around 800 mtrs from the deployment position and run either at very slow speed of D.P. joystick @ 1 knot .

4. deploy mooring buoy first , then pay out on net drum so mooring is slowly moving away from stern, once all the chain and seasteel have been paid out, **stopper off (see above)** then connect up to the weights hanging on the ramp.

5. If using slip ropes, once vessel is in position slowly slack to release the chains or if quick release hooks – knock out once in position and all props are stopped.

6. All personal are clear off the aft deck before releasing the weights.

7. Also make sure weights are lying on the ramp and not hanging above the ramp , it should be a controlled deployment , dyneema slip ropes would be best option for controlled deployment.