

# Basis of Estimate

**1. WBS ID** 1.2.10 \$98,922 total cost for this WBS

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**2. WBS Name** Installation Field Seasons

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**3. Estimated by** Delia Tosi (University of Wisconsin)

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## 4. WBS Dictionary Description

The Installation Field Season WBS 1.2.10 includes detailed activities list and on-site management of polar field season work required for installation; on-ice installation activities, including pre-installation activities and installation proper activities coordinated with deep drilling; labor, travel, M&S for installation lead; all the remaining labor is provided by in-kind personnel and personnel from other WBS (1.6 and 1.4)

## 5. Assumptions and Related Documents

The estimates described in this document rely on the following assumptions, which are consistent with the Project’s “Key Assumptions” document” (1) and the “Cost Estimating Plan” (2).

- The cost estimate technique classifications (A-L) follow the US Government Accountability Office (GAO) best practices. These are summarized in the Project’s Key Assumptions document (1). The techniques are: A=Analogy; C=Engineering build-up; D=Expert opinion; E=Extrapolation from actuals; F=Parametric; L=Learning Curves.
- Contingency codes are assigned to each item: C1—C8. These reflect the estimated uncertainty in the estimate. The meanings of the contingency codes and the percentage of contingency in each case are described in the Key Assumptions document (1).

## 6. Scope

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The scope of this BOE covers the following L4 areas:

1.2.10.1	Seasonal Staffing & Training, Off-Ice Coordination	Off ice training (installation team, drillers and management is trained for installation activities at the South Pole)
1.2.10.2	Installation Field Season 0 (FY23)	Activities and cargo movement related to installation in FS0 (FY23)
1.2.10.3	Installation Field Season 1 (FY24)	Activities and USAP cargo movement related to installation in FS1 (FY24)

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1.2.10.4	Installation Field Season 2 (FY25)	USAP cargo movement related to installation in FS2 (FY25). Installation of Field Hubs, patch panels and patch cables. Surface Cables Assemblies are installed into the into the ICL through the ICL west tower and connected to the Field Hubs. Surface Junction Boxes are installed for all the 7 Strings. The Sensor Testing Setup, sleds and tent are prepared. Two strings worth of sensors are fully tested.
1.2.10.5	Installation Field Season 3 (FY26)	Activities and USAP cargo movement related to installation in FS3 (FY26). Test of 7 strings of sensors. Installation of 7 strings. Coordination with Drill Activities.

## 7. Equipment, Materials, Supplies and Travel

### 7.1. Equipment

No equipment is included in 1.2.10.

### 7.2. Materials & Supplies

Materials and Supply in 1.2.10 are the Physical Qualification costs, ECW gear for 1.2.10 personnel deploying for installation (Headcount 1: Installation Lead). All the remaining personnel are in-kind and corresponding expenses are also in-kind. Allocation are the ones established at Project level.

WBS	Activity	Subtype	12mo Subtotal PY5	12mo Subtotal PY6	12mo Subtotal PY7	12mo Subtotal PY8	Estimating Technique	Contingency
1.2.10.4.2	Install FS2: Install Team FS2 PQ Costs (Headcount 1)	M & S	\$0	\$700	\$0	\$0	E - Extrapolation from Actuals	C1
1.2.10.4.2	Install FS2: Install Team FS2 ECW Costs (Headcount 1)	M & S	\$0	\$250	\$0	\$0	E - Extrapolation from Actuals	C1
1.2.10.5.2	Install FS3: Install Team FS3 PQ Costs (Headcount 1)	M & S	\$0	\$0	\$700	\$0	E - Extrapolation from Actuals	C1
1.2.10.5.2	Install FS3: Install Team FS3 ECW Costs (Headcount 1)	M & S	\$0	\$0	\$250	\$0	E - Extrapolation from Actuals	C1

### 7.3. Travel

Travel budget is estimated at \$1,800/person according to the Project’s “Key Assumptions” document” (1). Travel budget in 1.2.10 is allocated only for the installation lead, all in-kind personnel’s travel is assumed to be in-kind contributions from collaborating institutions.

WBS	Activity	12mo Subtotal PY5	12mo Subtotal PY6	12mo Subtotal PY7	12mo Subtotal PY8	Estimating Technique	Contingency
1.2.10.4.2	Install FS2: Install Team FS2 Deployment Travel Costs (Headcount 1)	\$0	\$0	\$1,800	\$0	E - Extrapolation from Actuals	C1
1.2.10.5.2	Install FS3: Install Team FS3 Deployment Costs (Headcount 1 + 9 in-kind)	\$0	\$0	\$0	\$1,800	E - Extrapolation from Actuals	C1

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## 8. Labor

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### 8.1. Labor Estimate

The 1.2.10 WBS covers labor of the installation lead for the time spent in the field. This time is estimated based on the start and end date of on-ice activities and assumes a 9 hr/day, 6 days/week workweek. Each activity is linked to milestones such as cargo arrival, personnel arrival, and other activities to guarantee completion of deliverables by due dates. Additional labor included in this WBS is for specific installation training of drillers.

### 8.2. Summary of Labor Resources

WBS	Activity	Resource ID	LPY5	LPY6	LPY7	LPY8	Estimating Technique	Contingency
1.2.10.1.3	Install FS3: FS3 Off-Ice Installation Training: Drillers	TE	0	0	288	0	D - Expert Opinion	C1
1.2.10.4.10	Installation: On-Ice Labor (FS2) (Installation Lead)	SC	0	0	396	0	D - Expert Opinion	C1
1.2.10.5.8	Installation: On-Ice Labor (FS3) (Installation Lead)	SC	0	0	0	558	D - Expert Opinion	C1

## 9. References

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[Ref-1] 1. **IceCube Upgrade Project. Key Assumptions for the IceCube Upgrade Project.**

[Ref-2] 2. —. *Cost Estimating Plan.*

## Revision History

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Date	Revised by	Summary of changes
2022-02-25	Delia Tosi	

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