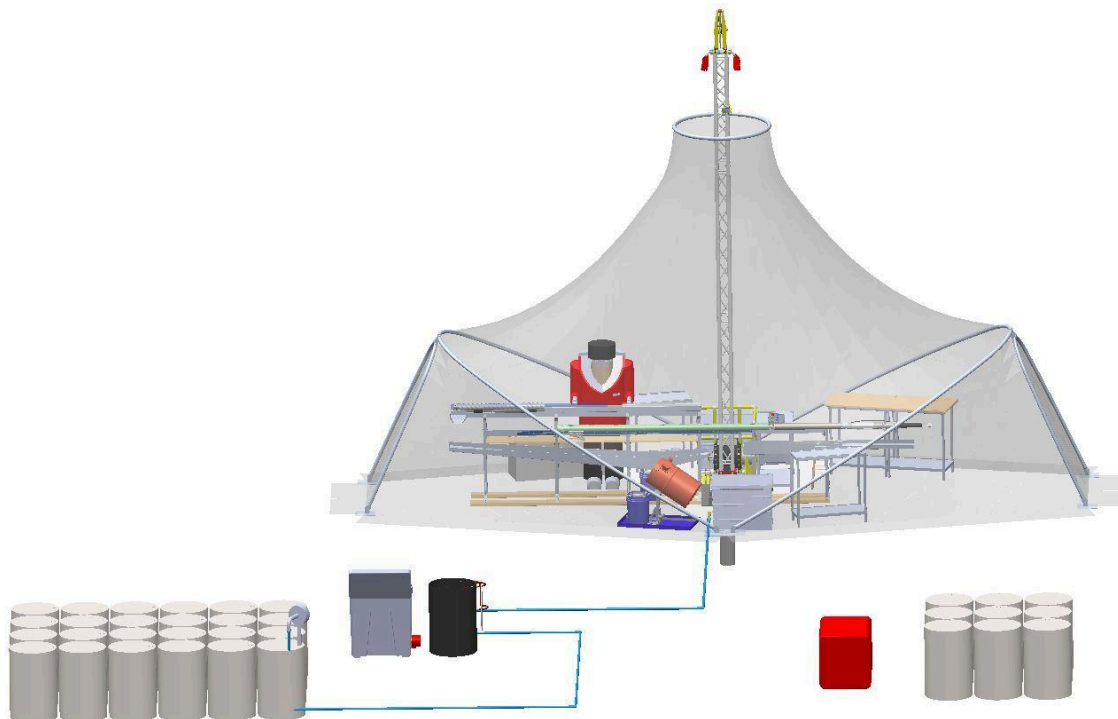


700 DRILL

The 700 Drill is a small-diameter electromechanical ice coring drill in development at IDP that will retrieve 70 mm (2.76-inch) diameter x 1-meter-long ice cores to 700 meters depth. The primary design goals for this drill were to build a drill system that was less logistically intensive than other systems, for use at alpine or polar ice coring sites with limited logistics and two months or less on site. This necessitated reducing the core diameter to the extent possible to reduce the transport volume and weight of drilling fluid and ice cores.

While this drill system breaks down into small enough pieces to be transported by helicopter, it would not be very practical due to the number of flights required to move all the equipment, drilling fluid, and fuel. However, light aircraft, such as the Twin Otter or Basler, are good options for deploying this drill system. Deployment with LC-130 heavy lift aircraft or overland tractor traverse are also viable options depending on where the drill is being deployed.



Name	700 Drill
Type	Ice Coring
Max. Practical Depth	700 m
Hole Diameter	98 mm (3.86-inches)
Ice Core Diameter	70 mm (2.76-inches)
Ice Core Length	1 m
IDP Driller Required?	Yes
Drill Fluid Required?	Yes
Power Requirements/Source	12 kW generator
Estimated Drilling Time	700 m – 40 days
Time to setup or take down	~3 days
Helicopter Transportable?	Yes
Light Aircraft Transportable?	Yes
Shipping Weight	5,500 lbs. (drill system); 7,400 lbs. (drilling fluid)
Shipping Volume (Cube)	305 (drill system), 162 (drilling fluid)

BLUE ICE DRILL

The Blue Ice Drill (BID) is a large-diameter electromechanical ice coring drill that retrieves 241 mm (9.50-inch) diameter x 1-meter-long ice cores to 200 meters depth. This drill is particularly useful for projects that require either a large diameter access hole or large volumes of ice for analysis.



Name	Blue Ice Drill
Type	Ice Coring
Max. Practical Depth	200 m
Hole Diameter	288 mm (11.30-inches)
Ice Core Diameter	241 mm (9.50-inches)
Ice Core Length	1 m
IDP Driller Required?	Yes
Drill Fluid Required?	No
Power Requirements/Source	5 kW generator
Estimated Drilling Time	50 m – 1.5 days 100 m – 4 days 200m – 9 days
Time to Move (breakdown and setup)	~4 hours
Helicopter Transportable?	Yes
Light Aircraft Transportable?	Yes
Shipping Weight	4,300 lbs.
Shipping Volume (Cube)	270

FORO 400 DRILL

The Foro 400 Drill is an electromechanical ice coring drill that retrieves 98 mm (3.86-inch) diameter x 1-meter-long ice cores to approximately 400 meters depth. The sonde shares many of the same components with the Foro 1650 intermediate depth drill and Foro 3000 deep drill system to maximize component interchangeability and minimize the number of unique components that must be maintained.

Deployment of the Foro 400 Drill with a helicopter is practical for drill sites within about 160 km of the point of origin, such as a ship or established camp that can support helicopter operations. Transport with other larger aircraft or an overland tractor traverse are also viable options.



Name	Foro 400 Drill
Type	Ice Coring
Max. Practical Depth	400 m
Hole Diameter	126 mm (4.96-inches)
Ice Core Diameter	98 mm (3.86-inches)
Ice Core Length	1 m
IDP Driller Required?	Yes
Drill Fluid Required?	No
Power Requirements/Source	5 kW generator
Estimated Drilling Time	50 m – 1.5 days 100 m – 4 days 200 m – 9 days 400 m – 21 days
Time to Move (breakdown and setup)	~4 hours
Helicopter Transportable?	Yes
Light Aircraft Transportable?	Yes
Shipping Weight	1,200 lbs. (1,600 lbs. with spares)
Shipping Volume (Cube)	71 (85 with spares)

FORO 1650 DRILL

The Foro 1650, designed by IDP, is the next generation of the Danish Hans-Tausen Drill and Danish Deep Drill, with the capability of producing 2-meter-long cores. Foro 1650 is sufficiently portable for coring at a wide variety of sites, and capable of retrieving 98 mm diameter core from the surface down to 1650 meters depth in two field seasons. A 19.5 m L x 4.9 m W x 2.8 m H un-insulated tent is deployed with the drill system to house not only the drill, but the included core processing and drilling fluid handling systems.

The Foro 1650 is designed and constructed to be transportable by Twin Otter or Bell 212 (or similar) helicopter. However, due to the number of flights that would be required when drilling fluid, fuel and ice core shipments are factored in, deployment to field sites by LC-130 heavy lift aircraft or overland tractor traverse would be more practical. For field projects lasting more than one season, most equipment is left onsite to "winter-over". To drill to 1650 meters depth in two field seasons, a 10-person field-team, including drillers and core handlers, working 24-hours per day, six days per week is required.

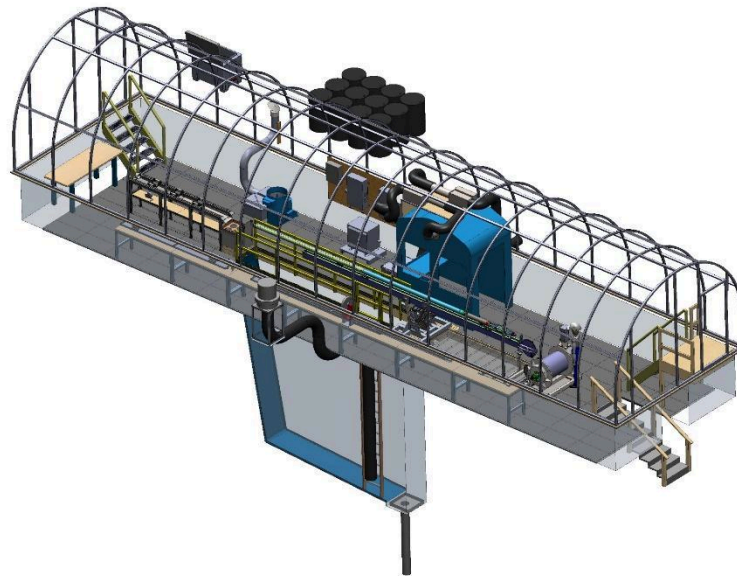


Name	Foro 1650 Drill
Type	Ice Coring
Max. Practical Depth	1650 m
Hole Diameter	129.6 mm (wet hole) 126 mm (dry hole)
Ice Core Diameter	98 mm (3.85 inches)
Ice Core Length	2 m
IDP Driller Required?	Yes, 2 per shift
Drill Fluid Required?	Yes
Trench Required?	Yes (3m x 0.9 m x 3.5 m deep)
Power Requirements/Source	35 kW, 460 V 3-phase generator
Estimated Drilling Time	1,500 m – 85 days (assumes 24-hour operations)
Time to Move (breakdown and setup)	2 weeks
Helicopter Transportable?	Yes, but not practical
Light Aircraft Transportable?	Yes, but not practical
Shipping Weight	28,000 lbs. (does not include drilling fluid, generator, or generator fuel)
Shipping Volume (Cube)	2,130

FORO 3000 DRILL

The Foro 3000 Drill is a new deep ice drill that was recently developed by IDP. It is basically an enhanced version of the Foro 1650 Drill, with the capability of producing 3-meter-long cores to a depth of 3000 meters. Like the Foro 1650 Drill, the Foro 3000 recovers a 98 mm diameter core. The 3-meter-long core barrel will make it possible to drill from the surface to 3000 m depth in three field seasons with a 10-person field-team working 24 hours per day, six days per week. The drill, core processing and fluid handling systems are housed in a 20.7 m x 4.9 m x 2.8 m high uninsulated tent to keep equipment free of blowing and drifting snow.

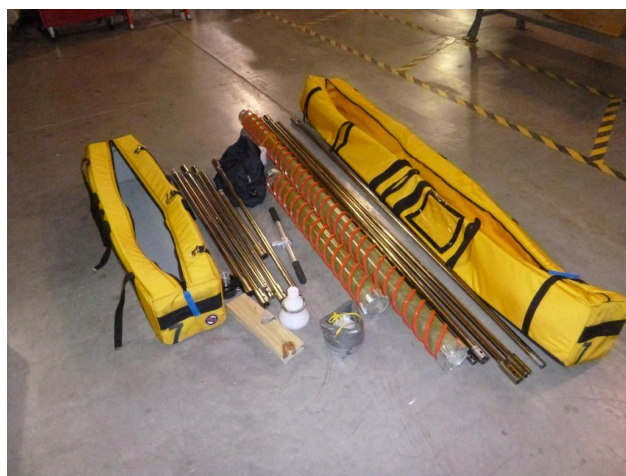
While most of the system could be broken down for transport by light aircraft, such as a Twin Otter or Basler, a deep drilling project utilizing the Foro 3000 Drill would be best supported by overland traverse or LC-130 heavy lift aircraft for put in and take out due to the volume of cargo, the amount of drilling fluid and fuel required, and the volume of ice core produced.



Name	Foro 3000 Drill
Type	Ice Coring
Max. Practical Depth	3000 m
Hole Diameter	129.6 mm (wet hole) 126 mm (dry hole)
Ice Core Diameter	98 mm (3.85 inches)
Ice Core Length	3 m
IDP Driller Required?	Yes, 2 per shift
Drill Fluid Required?	Yes
Trench Required?	Yes (3m x 0.9 m x 5.5 m deep)
Power Requirements/Source	38 kW, 460 V 3-phase generator
Estimated Drilling Time	3,000 m – 120 days (assumes 24-hour operations)
Time to Move (breakdown and setup)	2 weeks
Helicopter Transportable?	No
Light Aircraft Transportable?	Yes, but not practical
Shipping Weight	35,200 lbs. (does not include drilling fluid, generator, or generator fuel)
Shipping Volume (Cube)	2,250

IDDO HAND AUGER

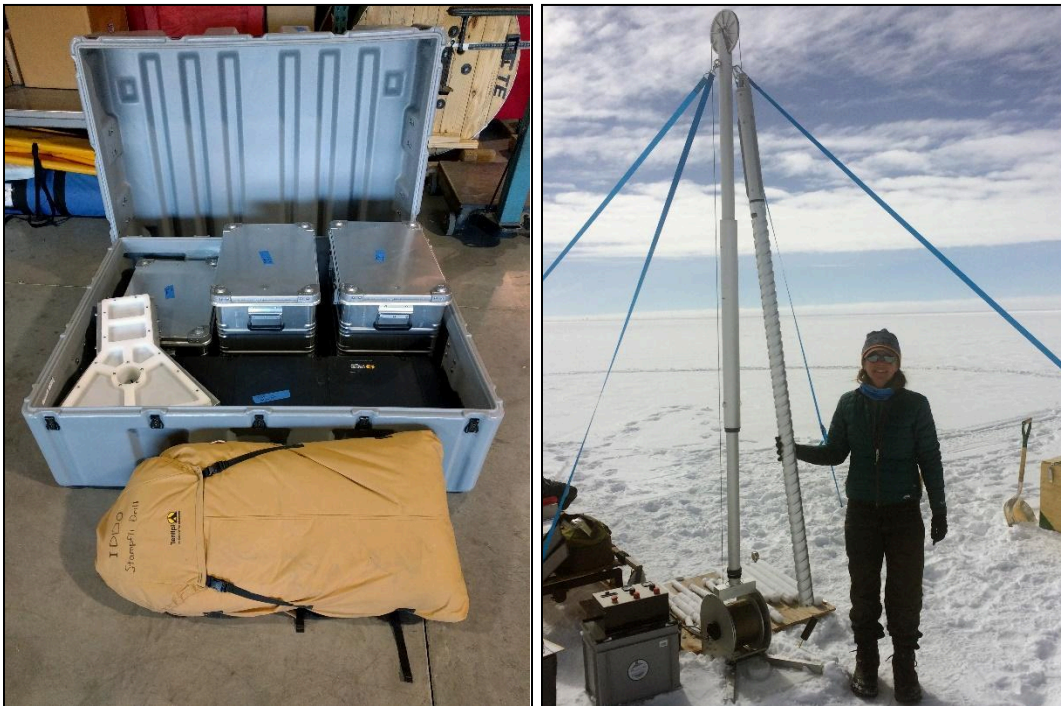
The IDDO hand auger system is a small lightweight, portable drill system that is designed to take core from firn but will also work in many kinds of solid ice. IDDO augers come in two different diameters: 79 mm (3.1-inches) or 101 mm (4.0-inches). Both models can be configured to take ½-meter or 1-meter-long cores. The standard IDDO hand auger kit contains everything needed to take core to a depth of 20-meters. Customized kits are provided on request for deeper coring or lighter weight requirements.



Name	Hand Auger, IDDO
Type	Ice Coring
Max. Practical Depth	20 m (30-40 m with Sidewinder)
Hole Diameter	110 mm (4.3 inches) 132 mm (5.2 inches)
Ice Core Diameter	79 mm (3.1 inches) 101 mm (4.0 inches)
Ice Core Length	1 m
IDP Driller Required?	No
Drill Fluid Required?	No
Power Requirements/Source	Hand-powered or Sidewinder
Estimated Drilling Time	5 m – 2 hours 10 m – 4 hours 20 m – 7 hours
Time to Move (breakdown and setup)	<1 hour
Helicopter Transportable?	Yes
Light Aircraft Transportable?	Yes
Shipping Weight	90 lbs. for 20-meter kit
Shipping Volume (Cube)	6

STAMPFLI DRILL

The Stampfli 2-Inch Drill is a lightweight electromechanical drill that collects a 57 mm (2-inch) diameter core. The drill was purchased from Dieter Stampfli in Switzerland to meet requests from the community for a lightweight, PI-operable system capable of collecting core down to 100-meters depth. The drill is configured with a winch and cable for 100 meters depth and is powered by batteries, which can be charged by either a small generator or a set of solar panels. The drill is very field portable. The drill system fits inside one helicopter or twin otter and is packed in pieces that can be lifted by one person and transported up a mountain solely by a human on foot or skis. A lightweight tipi style tent is also provided with the drill for improved operation in stormy or windy conditions.



Name	Stampfli Drill
Type	Ice Coring
Max. Practical Depth	100 m
Hole Diameter	72 mm (2.8 inches)
Ice Core Diameter	57 mm (2.2 inches)
Ice Core Length	0.8 m
IDP Driller Required?	No
Drill Fluid Required?	No
Power Requirements/Source	Solar panels or 2 kW generator
Estimated Drilling Time	20 m – 3 hours 50 m – 14 hours 100m – 40 hours
Time to Move (breakdown and setup)	1 hour
Helicopter Transportable?	Yes
Light Aircraft Transportable?	Yes
Shipping Weight	380 lbs. (including tent, excluding generator)
Shipping Volume (Cube)	37