Deploying an ROV at the Grounding Zone
The History of SCINI

- 2007  Classic SCINI
- 2010  Andrill SCINI
- 2014  Deep SCINI
Submersible capable of Under Ice Navigation and Imaging
SCINI uses a small hole

|-- 15cm --|

|---- 20cm ----|
Jiffy Drilling

2 people can drill through 7m of ice in about 20 min
Working around Icebergs
SCINI External Anatomy

PVC Couplers
The Back Bone

Thruster Couplers
SCINI External Anatomy

Expanded Polyurethane
18 lbs per cu ft.
Working Depth 300 m
SCINI External Anatomy

7 lbs thrust at 450 w
PC Oil Filled
Unlimited Depth

Micro Tunnel Thrusters
SCINI External Anatomy

- Three dry modules
- Anodized Aluminum
- Borrowed thruster

Videoray Thruster

Main Electronics Housing

Dual Camera Housing
Micro Tunnel Thrusters
Model  Boat  Props

- Aluminum housing
- Fill and Drain plug
- 25mm
- 60mm
- Delrin stand off
Model Helicopter Motors

Razor Brushless Motor

Maxon 4.4:1 gear box

Loaded Lip Seal

Shaft Adaptor

4.4 : 1 Gear Box
Long Base Line Navigation

- Control Point
- Control Tent
- Surface Stations
- Base Line Stations
- Pinger

Dimensions:
- 7m
- 1500m
Performance

3 Complete units.
312 m Maximum depth reached.
8.5 h max dive time, 672 h total.
Penetrated 11 m of sea ice.
And 50 m glacier ice “crack access”.
Located lost experiments.
Documented iceberg scours.
Transects at 20+ sites at 5+ depths ea.
Discovered Shallow Octacoral.
Chased by 2 Antarctic Cod.
90 pilots in training “open house”
Andrill Coulman High drill site

PLANNED: total distance 93.811 mi / 150.974 km

ACTUAL: total distance 119.594 mi / 192.467 km

McMurdo Transition

Shear Zone

NSF

MODIS image date: November 6, 2010
Definitely not to scale

Ross Ice Shelf

Clump Weight

Navigation Transducer

220v line

Control Van

650m

250m

Dive Configuration Coulman High
What Did We Find ??????
SCINI Remotely Operated Vehicle (ROV) Team

Bob Zook                        Paul Mahacek                     Dustin Caroll
The Future of SCINI

Deep-SCINI (Initial Full Prototype)

Syntactic Foam Floatation

More Science Instrumentation

Diameter = 23 centimeters (~9 inches in diameter)
Total length = 2 meters (~6 feet long)
Forward, Up and Down facing cameras
Reconfigurable tooling bay with larger payload capacity than SCINI
The Goals Of Deep SCINI

Maximum depth 2km
Launch and recover through 1.5km Ice Shelf.
Launch via a 20cm hole.
Carry payloads up to 5kg.
Fiber optics replaces copper communications.
Utilize next generation VideoRay components.
Single Camera Bottle

Sapphire window

Elphel 5mp camera

2 km 6000ft Deep

3000psi 2.5in
Not enough room for a full sized RJ-45 connector
String latching mechanism utilizing weed eater string
1” Sapphire window
12 total circuit boards
RS-485 translator board didn't work.
Paralleled power supplies provided 1kw at 48v

Also problematic
140cc Syringe water sampler converted to fit our standard motor unit.

9pin stacking connector
Variable Trim

750g lead Brushless motor
1m long
Whillans Ice Stream Subglacial Access Research Drilling (WISSARD)
The Marine Cavity Exploration