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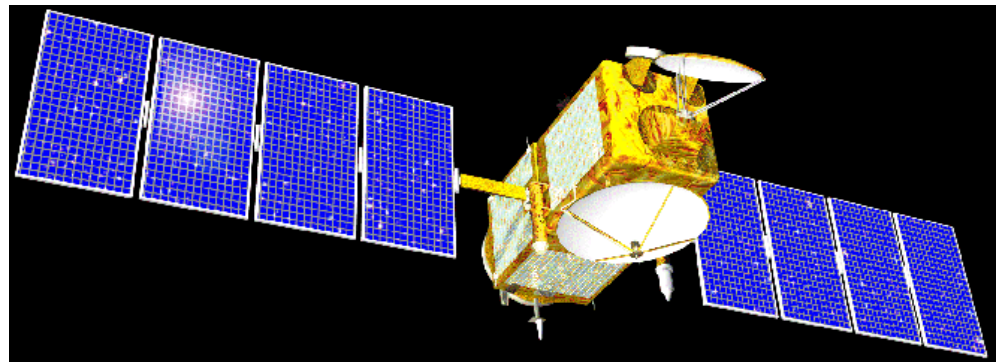
# Argo Floats

The Oceanographic Network

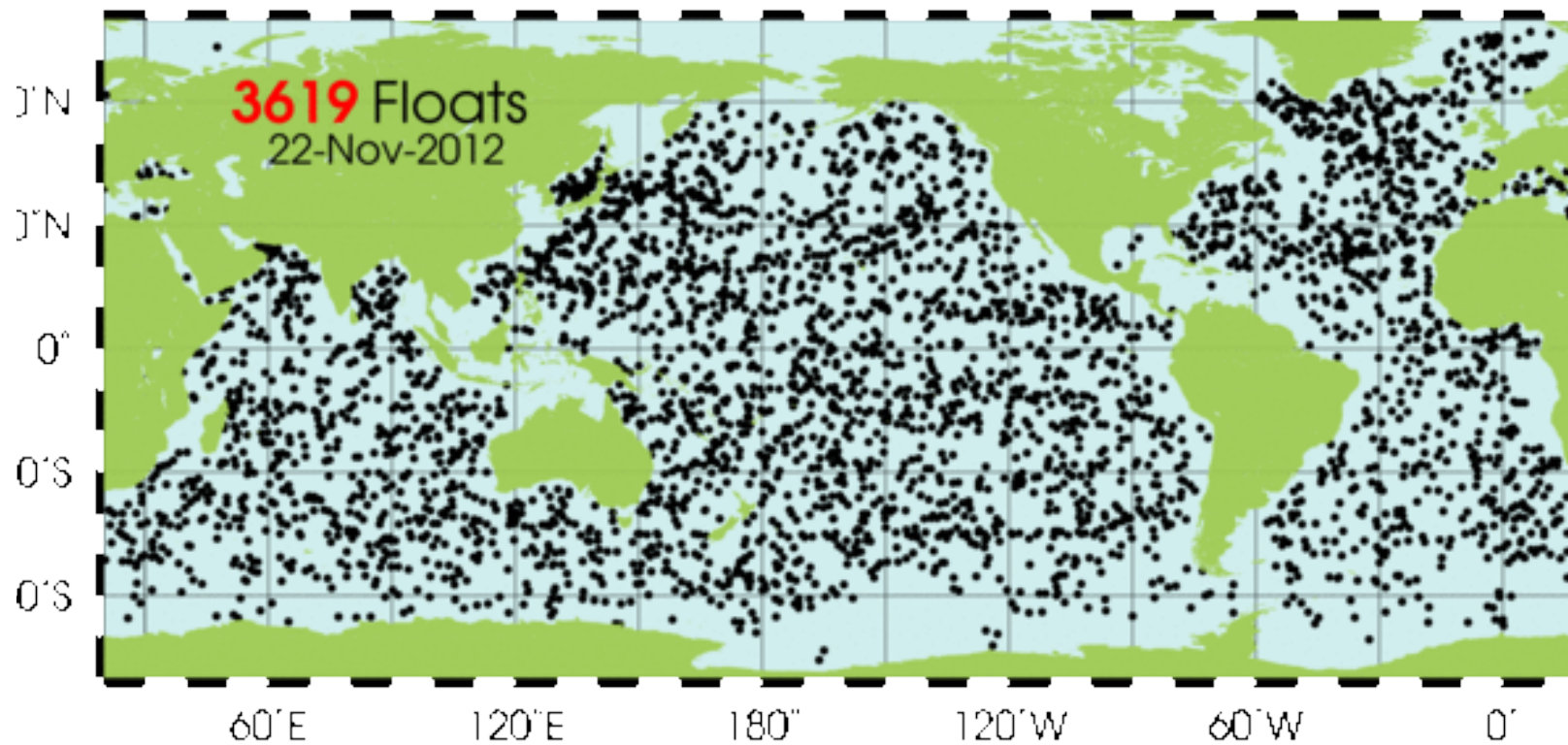
Noah Whitehead

# The Basics of Argo

- Argo, the mythological Ship of the Argonauts
- Developed in Connection with Jason Satellites
- 31 Nations Collaborate (%50 US) (23 provide floats)
- Project began in 2000



# The Ocean Project



# But Satellites Don't Float...



Argo Floats can be thrown off research vessel

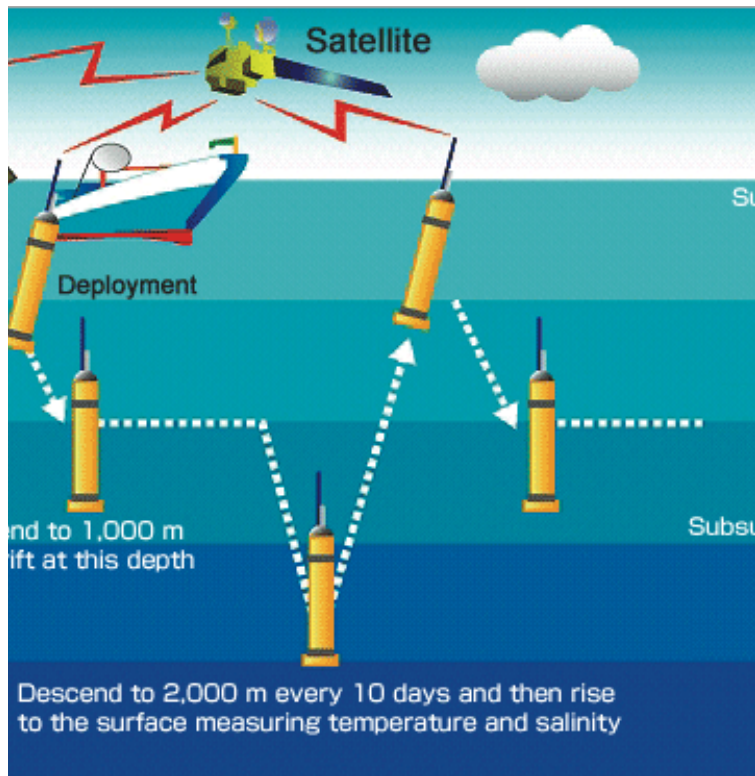
Life span ~5 years

800 deployed/year

Each one costs ~ \$15,000

(\$30,00 including deployment and maintenance) - \$24mil/year project

# A Day in the Life of Argo



Rests (drifts) at 1000m

Every 10 days – dives to 2000m then up to surface

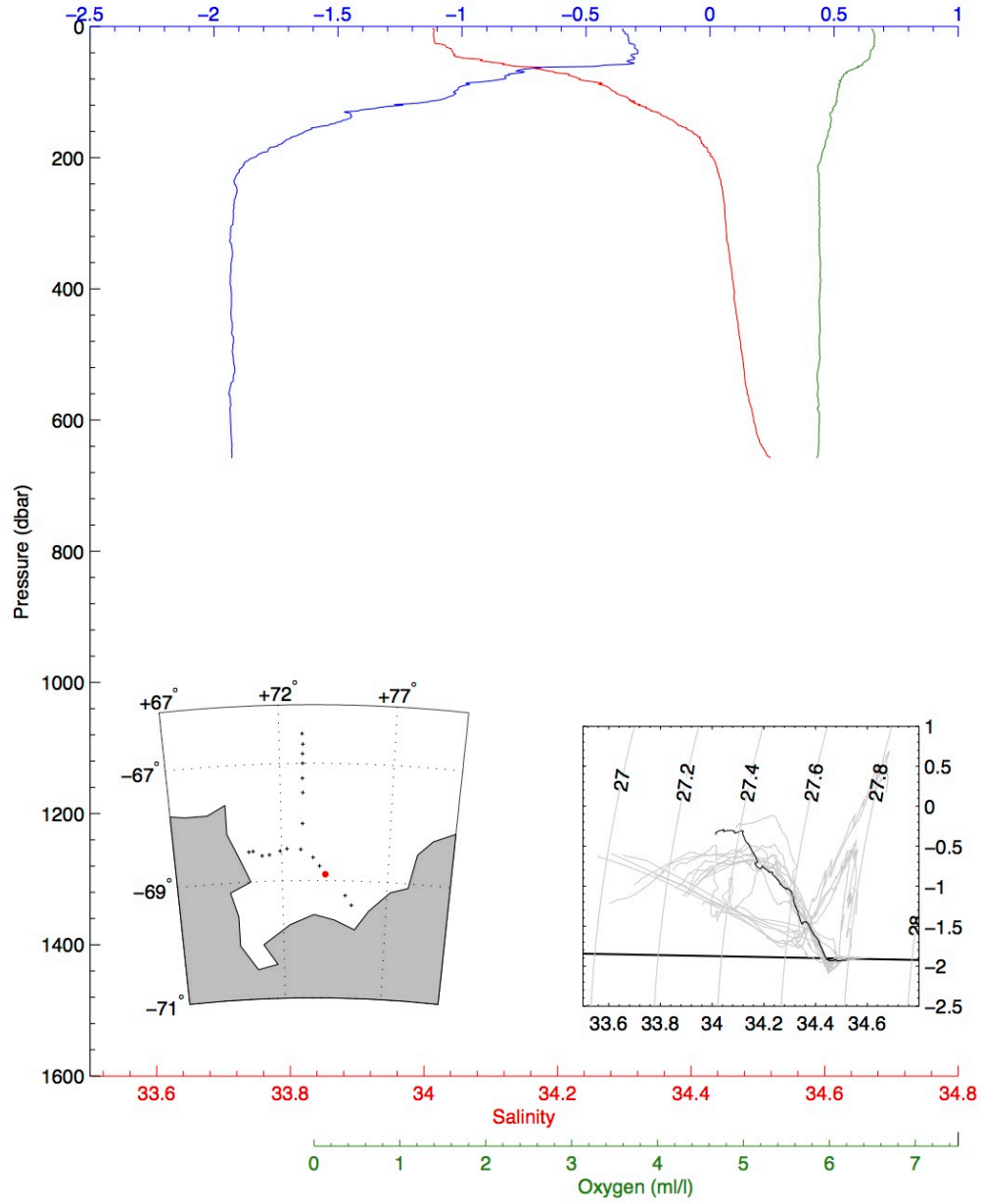
~6 hour rise

Measures CTD at a rate of ~200 per trip, every 10m

Feb-28-2012

Potential Temperature

lat = -68.8925 lon = 74.0423



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# What Came Before?

- Sensors off the back of ships – mostly commercial vessels
  - Often moving too fast to get good readings – thrown off by ship
  - Data concentrated to major shipping lanes – most of the ocean is ignored
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# The Bladder and The Antenna

Every 10 days, motor pushes piston down tube.

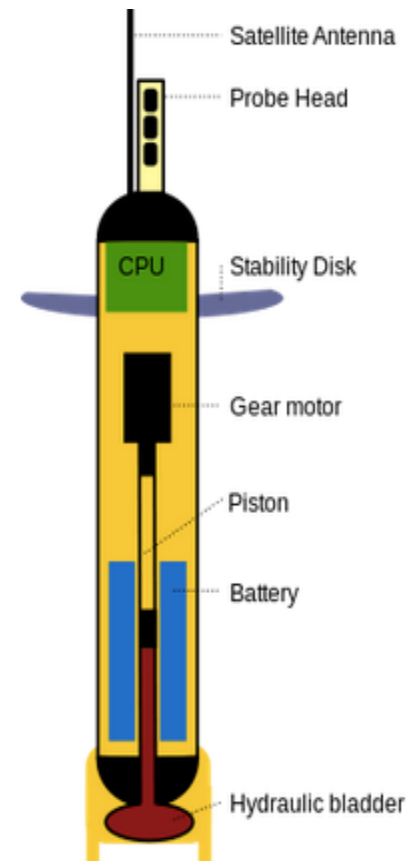
Piston displaces oil

Bladder fills, reducing density of float

At the surface, satellite antenna dumps data to “Systeme Argos” – commonly used

6 hour dump

250 use Iridium system





# The CTD

- Wein Bridge Oscillator Circuit – it's all about resistance

$$f = \frac{1}{2\pi RC}$$

- The “C” - Conductivity
  - Salt water Conducts
  - The Saltier the water, the better conduction → lower resistance → Higher frequency!



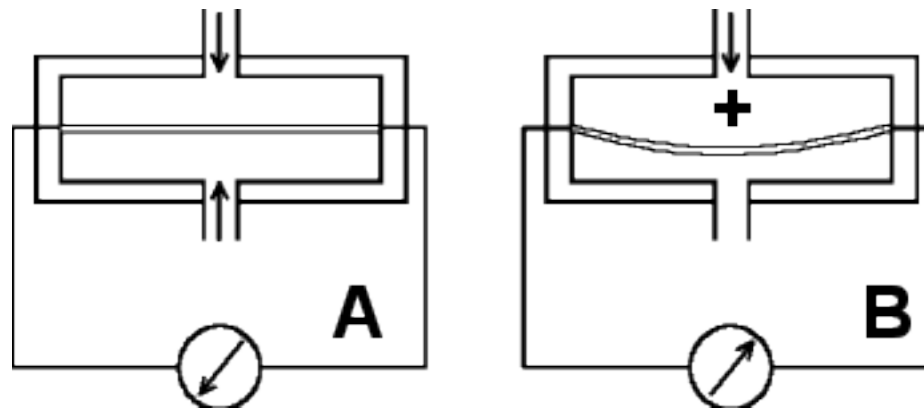
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# CTD (Cont'd)

- The “T” – Temperature
  - Thermistor bead – resistance varies exponentially with temperature
    - Higher temperature → lower resistance → higher frequency!
    - Good to within .001 deg C (Or better!)
- The “D” – Depth
  - Strain Gauge Transducer – resistance increases as membrane is deformed

# SGPT

$$R = K \frac{L}{A}$$



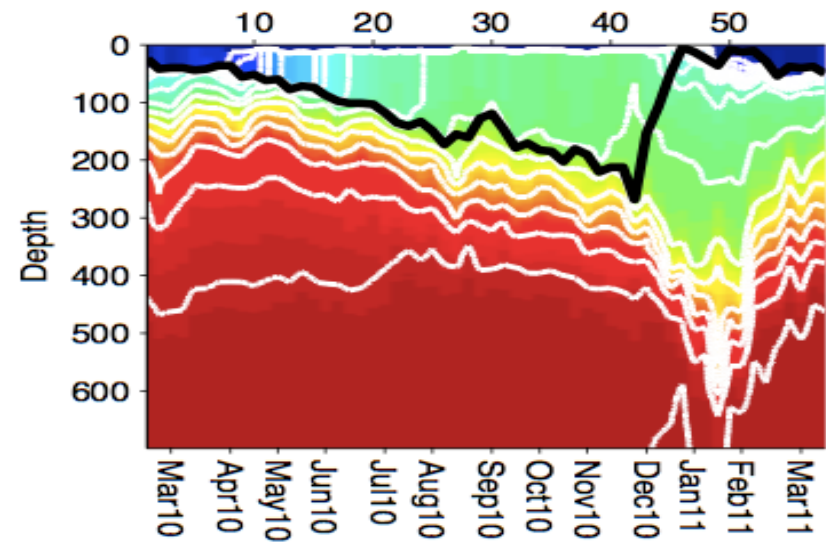
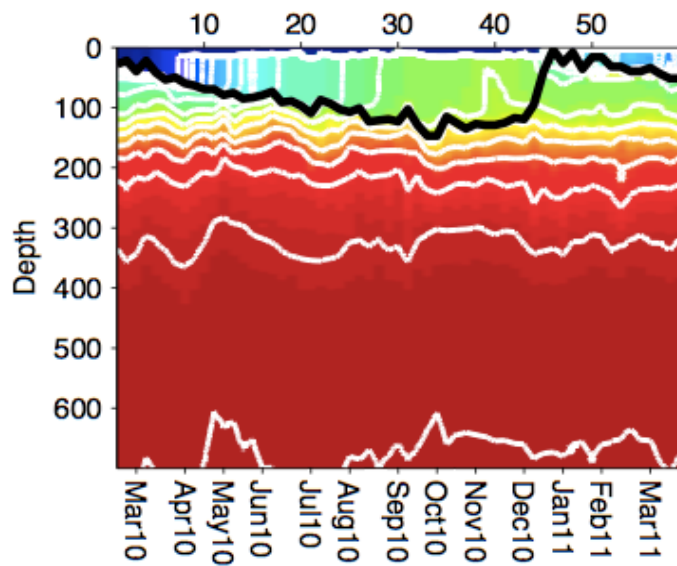
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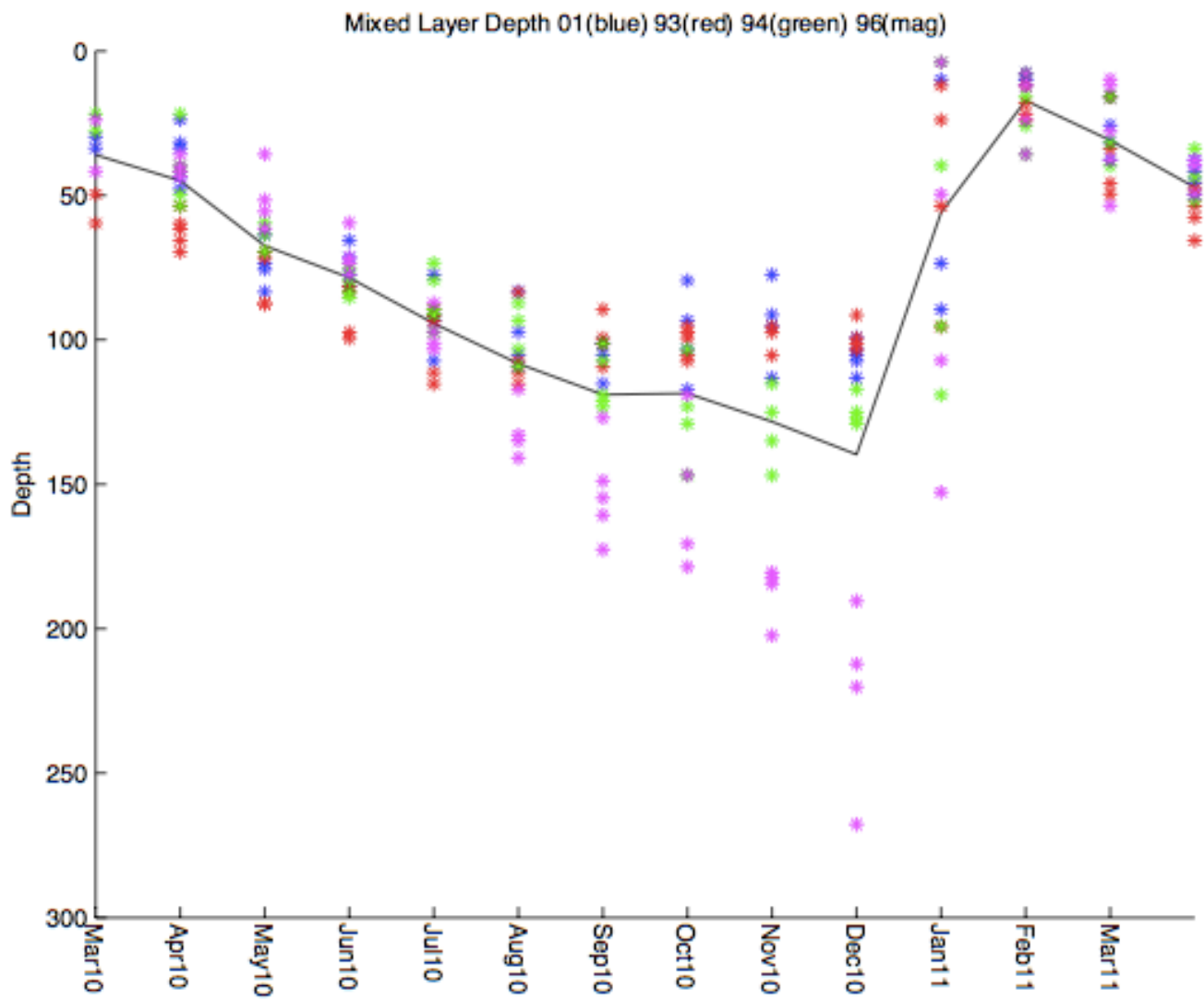
# So Why Do We Want It?

- Global Climate Change Signals – long term goal – impossible with 7 years of Data so far
  - Atlantic Meridional Overturning Circulation – it's not slowing!
  - Indian Ocean – What does it look like in a cyclone? -
  - Pacific – Identification of large eddies.
- Free to Access for Public!
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# Some Special Floats – Ice Sensing

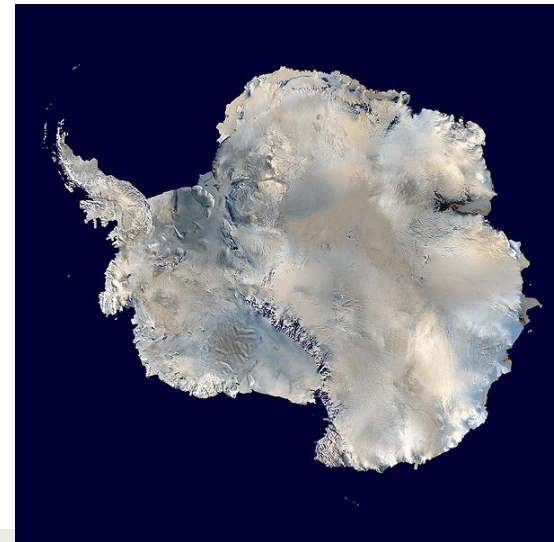
- Temperature pattern detection – Stops ~ 10m short of ice
- Useful in Southern Ocean





# The Floats of the Future

- Still can't get totally ice covered regions – Weddell Sea – arctic pole
  - Important regions of ocean circulation
- Floats that communicated by sonar?
- Environmental concerns?



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# Sources

- [http://www.seabird.com/products/spec\\_sheets/41data.htm](http://www.seabird.com/products/spec_sheets/41data.htm)
  - <http://www.google.com/search?q=MicroCAT+temperature&og=MicroCAT+temperature&sugexp=chrome,mod=7&sourceid=chrome&ie=UTF-8>
  - [http://www.seabird.com/pdf\\_documents/Datasheets/29brochureJan10.pdf](http://www.seabird.com/pdf_documents/Datasheets/29brochureJan10.pdf)
  - [http://www.seabird.com/pdf\\_documents/Datasheets/04brochureMar12.pdf](http://www.seabird.com/pdf_documents/Datasheets/04brochureMar12.pdf)
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