

HCA13-07.1A



KONGSBERG

Kongsberg Maritime Operations in Antarctica and Arctic

**Jan Haug Kristensen
Regional Manager Americas
Subsea Sales & Marketing**

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WORLD CLASS – through people, technology and dedication

Antarctic and Arctic operations



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**B I O Hesperides, Spain
Constructed 1990 to 1992.
Mid Life Upgrade 2004.**

Antarctic and Arctic operations



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History

Today





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Antarctic and Arctic operations



**Future –
New Norwegian Polar RV
RV “Kornprins Haakon”
LOA: 100m, LPP: 84.8m
Beam: 20.0m
Draught: 7.6m
To be constructed by
Fincantieri, Italy**



Antarctic and Arctic operations - References



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Product	Config.	Class	Vessel	Customer/End User	Country	Installation
EM 122	1x1	Ice Breaker	Araon	KOPRI/KORDI	Korea	2009
EM 122	1x2	Ice Breaker	Healy	US Coast Guard	USA	2009
SBP 120	1x2	Ice Breaker	Araon	KOPRI/KORDI	Korea	2009
EM 122	1x1	Ice Breaker	ODEN	University of Stockholm	Sweden	2007
EM 302	1x2	Ice Breaker	"Amundsen"	Canadian Hydrographic Services	Canada	2007
SBP 120	3	Ice Breaker	ODEN	University of Stockholm	Sweden	2006
EM 120	2x2	Ice Going	"Maria S. Merian"	Kröger Werft GmbH	Germany	2004
EM 120	1x2	Ice Going	"B.I.O. Hesperides"	C.S.I.C./Spanish Navy	Spain	2004
EM 300	1x2	Ice Going	"F/F JAN MAYEN"	University of Tromsø	Norway	2004
EM 710	2x2	Ice Going	"HMS Endurance"	UK Royal Navy	UK	2004
EM 300	1x2	Ice Breaker	"Amundsen"	Canadian Coast Guard/Univ.Laval	Canada	2003
EM 120	1x2	Ice Breaker	"Nathaniel B. Palmer"	NSF/ASA	USA	2002
EM 120	1x1	Ice Going	"RRS James Clark Ross"	British Antarctic Survey Ltd.	UK	2000
EM 12	Dual	Ice Going	"TAKUAN"	Ministry of Transportation and Communication	Taiwan	1994
EM 12	2x4	Ice Going	"B.I.O. Hesperides"	C.S.I.C./Spanish Navy	Spain	1990 - 1992

Antractic and Arctic operating vessels without ice protection



Examples :

Almirante Maximiano	Brasilian Navy	EM 302/SBP 300
HMS Endurance and others	UK Navy	EM 710
Survey Launch	Spanish Navy/IHM	EM 3002/GS+
Survey Launch	Peruvian Navy/DHN	EM 3002
Survey Launch and others	Univ. Stockholm	EM 2040

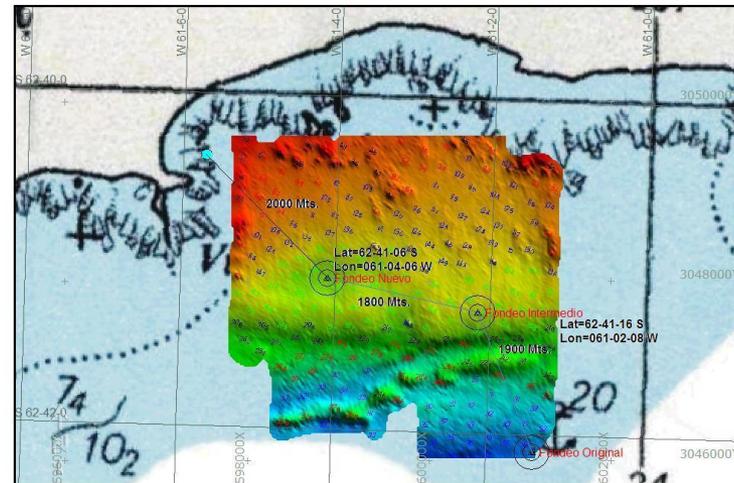
Antarctic and Arctic operations



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Courtesy of IHM, Spain

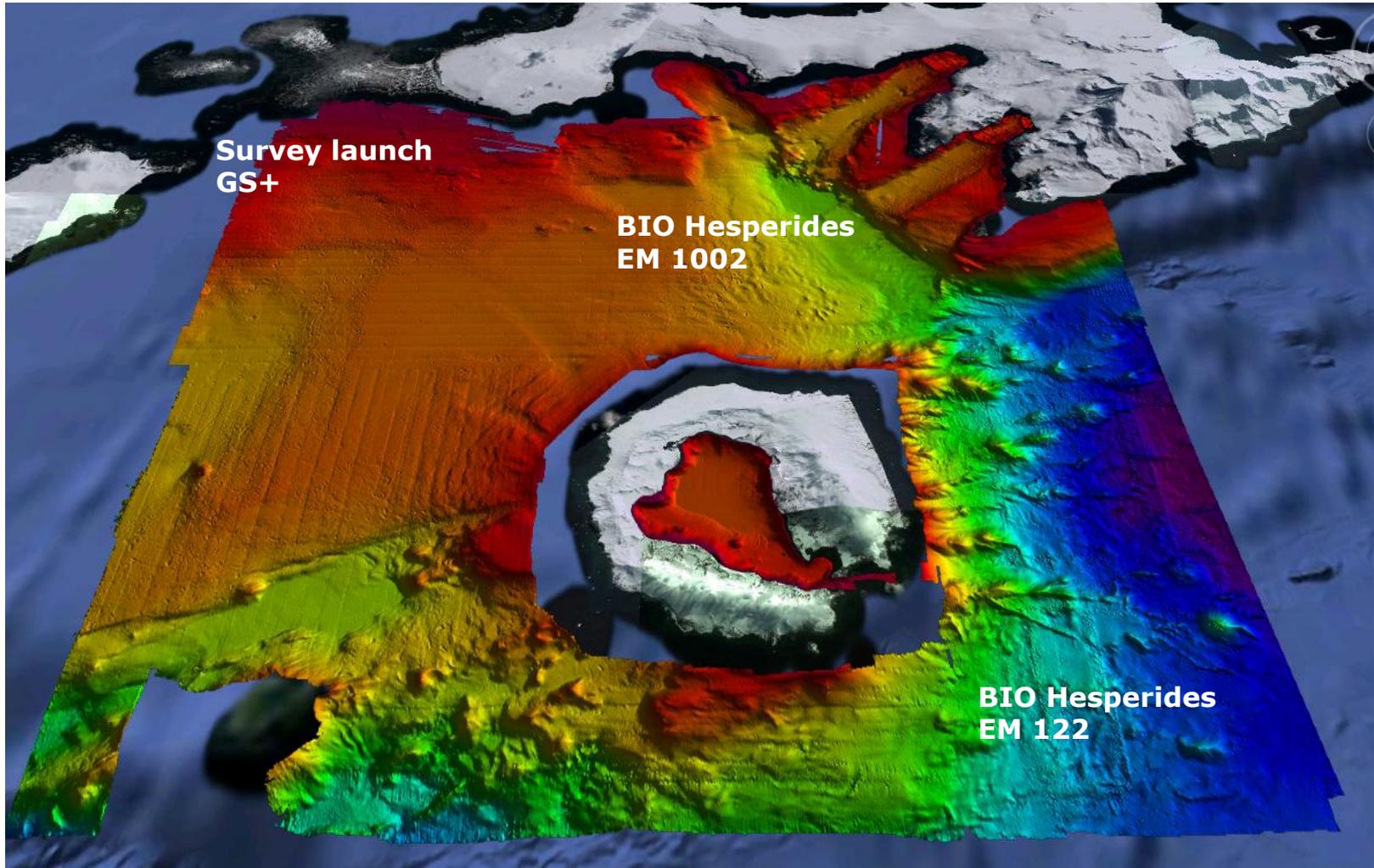


Isla de Livingston

Antarctic and Arctic operations



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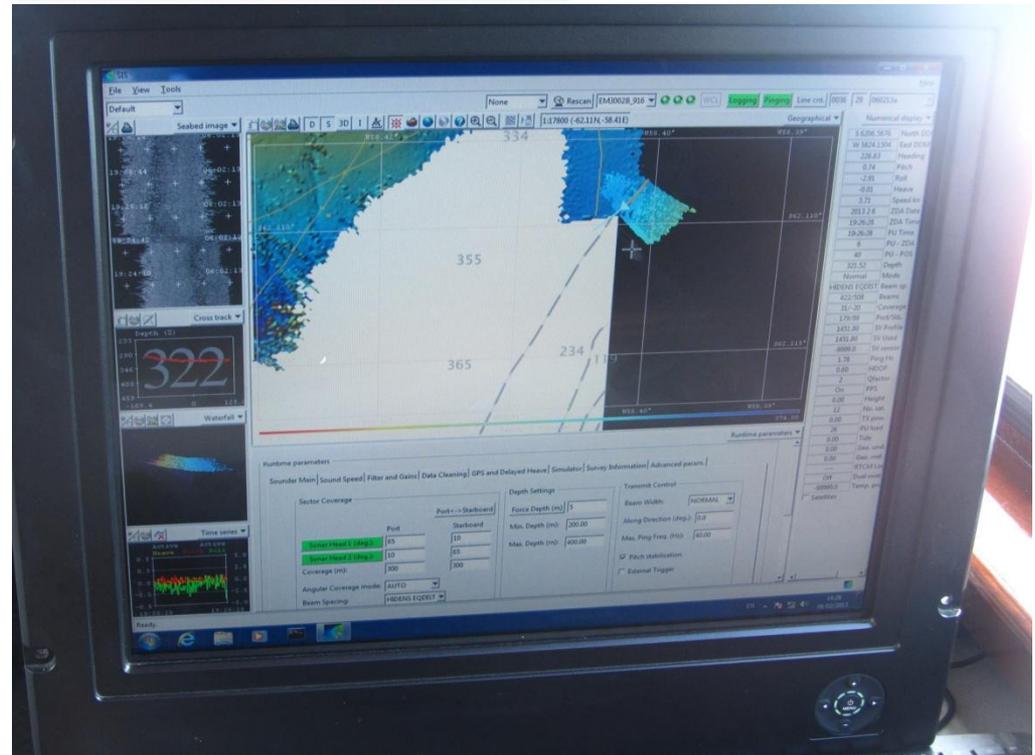


Courtesy of IHM, Spain

Antarctic and Arctic operations



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Courtesy of DHN, Peru



Antarctic and Arctic operations

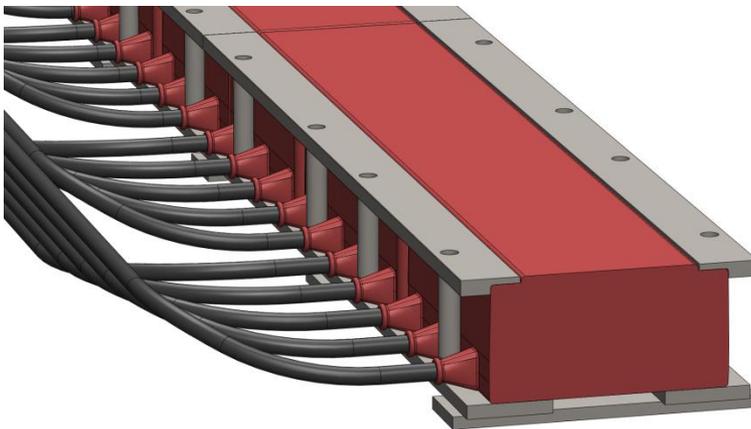
Definition :

Ice breaker version (26 ton/ 10x10 inch).

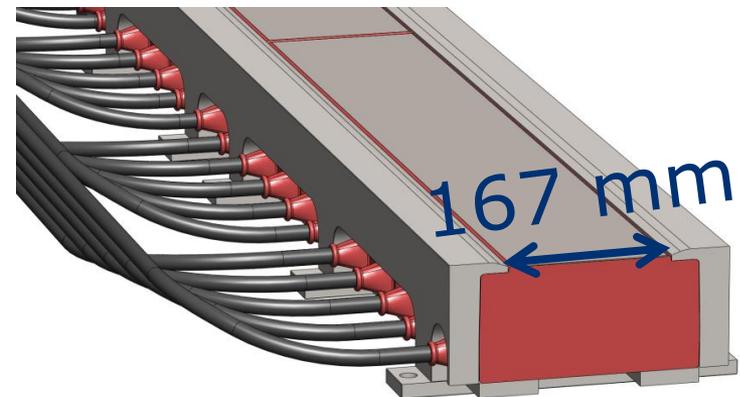
Is possible for low frequency systems due to low attenuation (EM 122, EM 302, SBP120/300).

For higher frequency systems (EM 2040, EM710) other solutions must be found, below is our solution for the EM 710 (70 – 100 kHz).

Standard TX



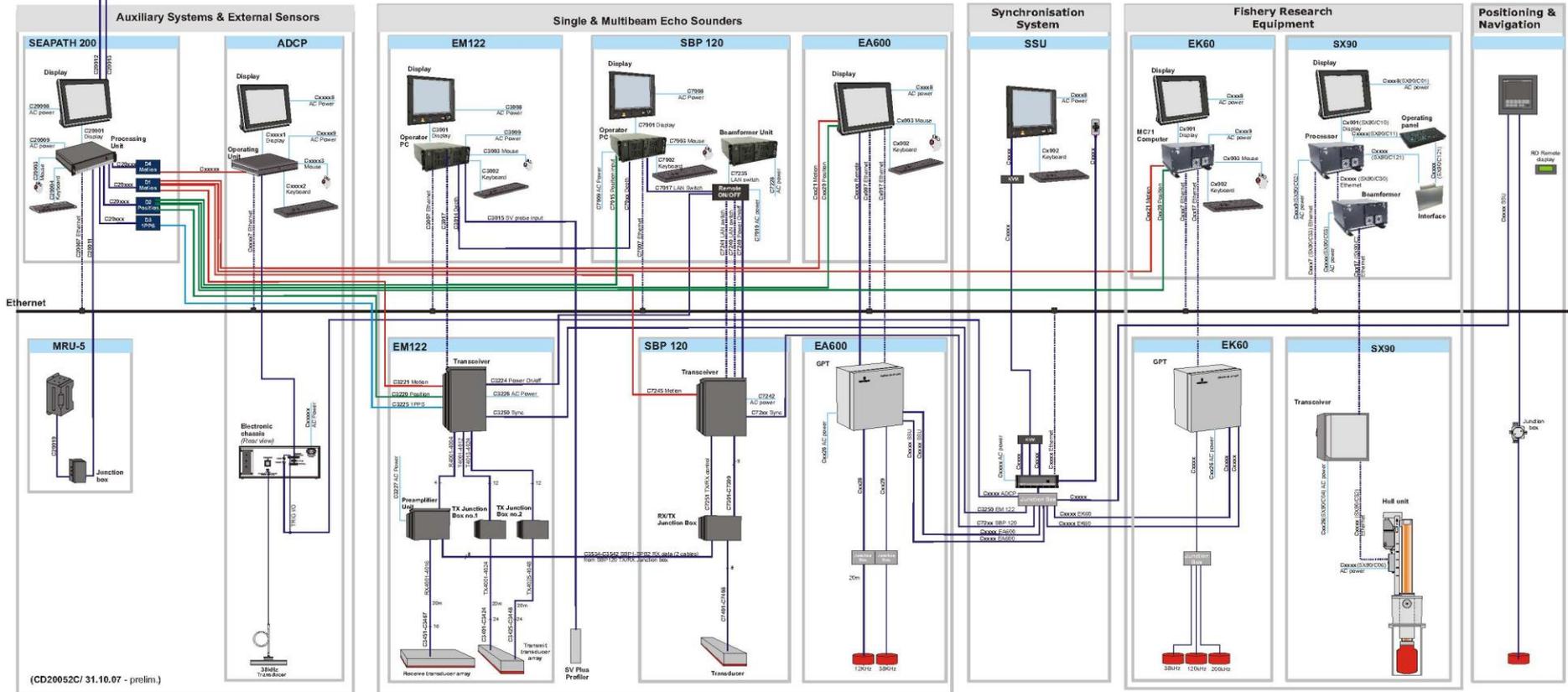
Reinforced TX





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KORDI ICE-BREAKER PROJECT
Scientific Instrumentation



(CD20052C/ 31.10.07 - prelim.)

Ice Breaker Transducer Installation



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RX Transducer casing, James Clark Ross



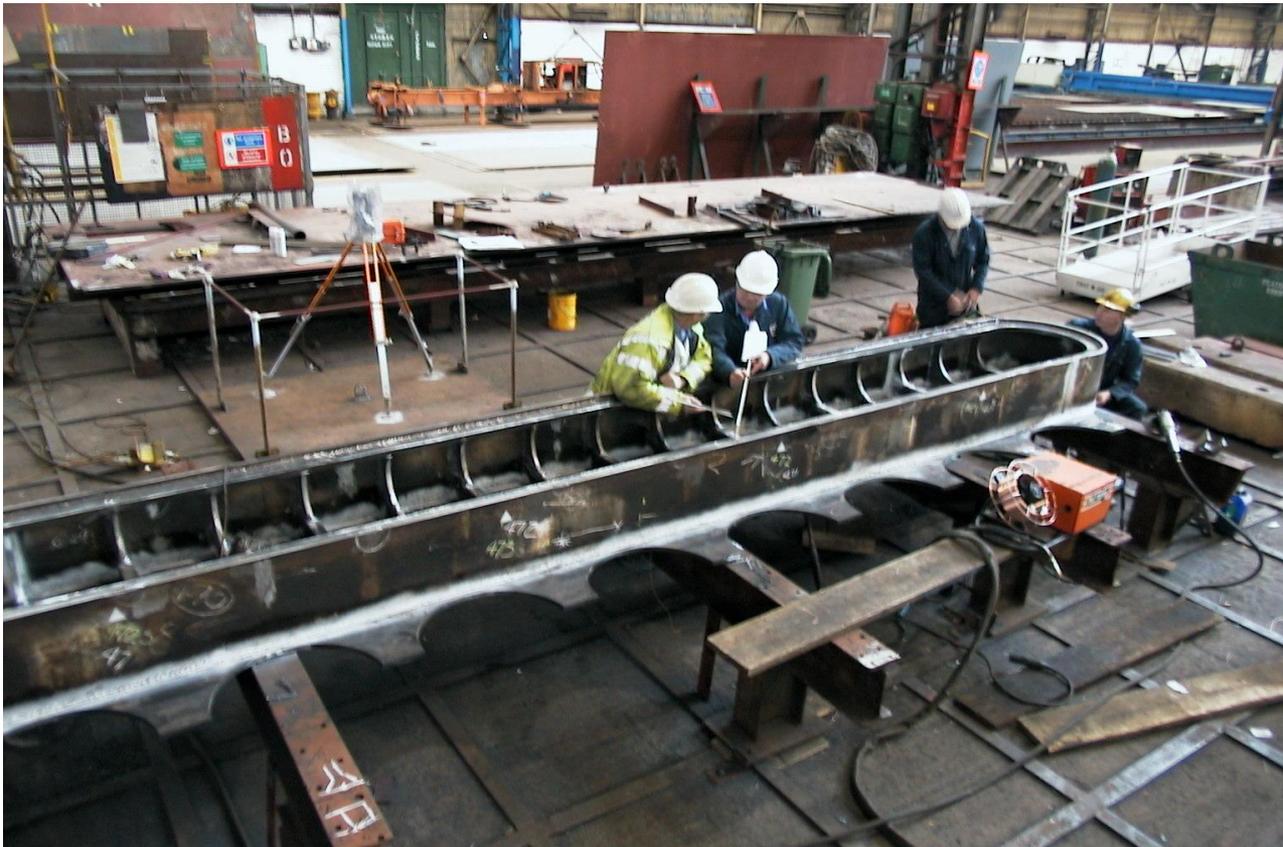
THE FULL PICTURE

Ice Breaker Transducer Installation



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TX Transducer Casing, James Clark Ross



THE FULL PICTURE

Ice Breaker Transducer Installation



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Preparation For Casing Installation, James Clark Ross



THE FULL PICTURE

Ice Breaker Transducer Installation



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Ready For Casing Installation, James Clark Ross



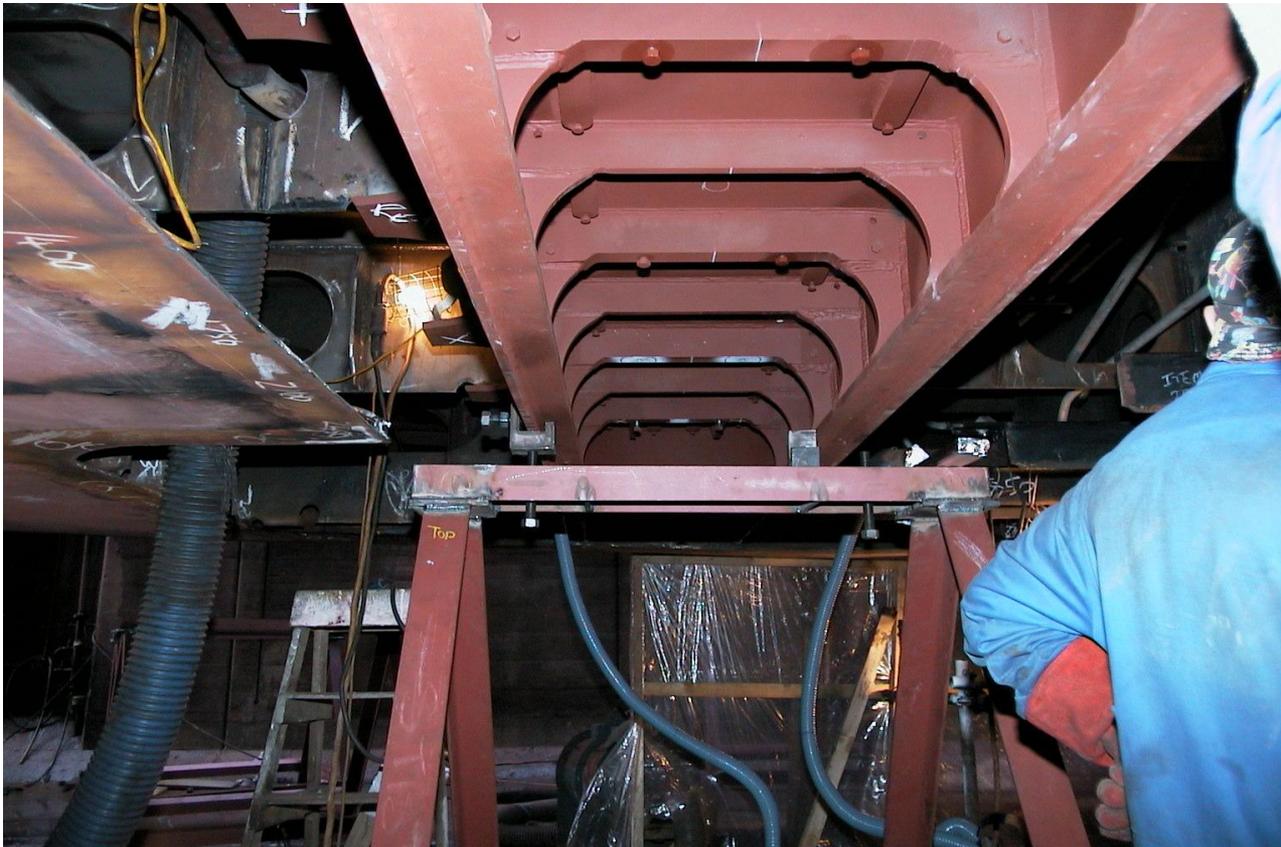
THE FULL PICTURE

Ice Breaker Transducer Installation



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Casing In Position, RX Transducer, James Clark Ross



THE FULL PICTURE

Ice Breaker Transducer Installation



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Casing Installed And Welded, James Clark Ross



THE FULL PICTURE

EM 120/EM 122 frame



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Ice Breaker Transducer Installation



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Transducer Frame Installation, James Clark Ross

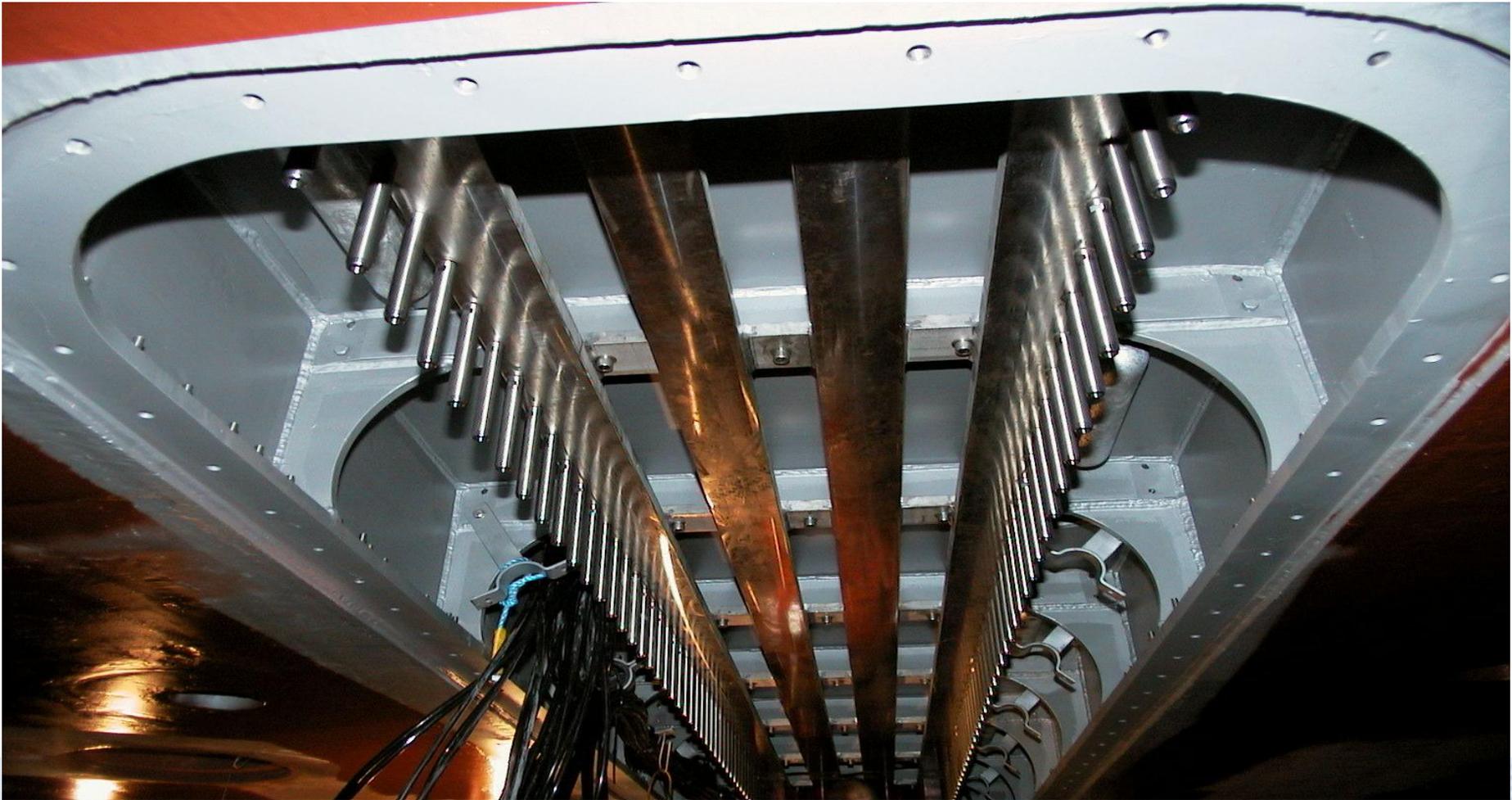


Ice Breaker Transducer Installation



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TX Transducer Frame Installed, James Clark Ross



Ice Breaker Transducer Installation



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Transducer Mounting, using a lifting table



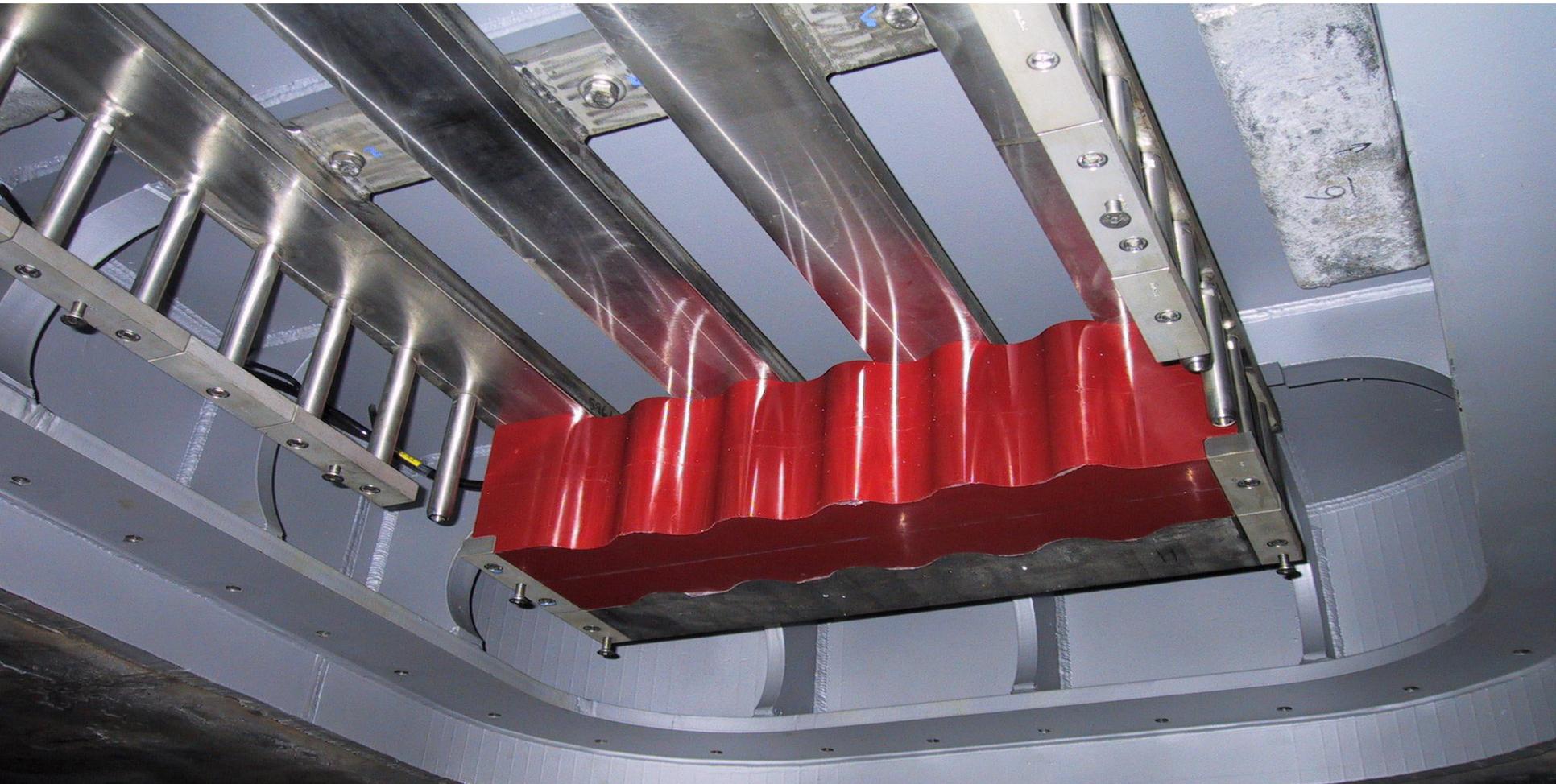
THE FULL PICTURE

Ice Breaker Transducer Installation



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Transducer Module Installed

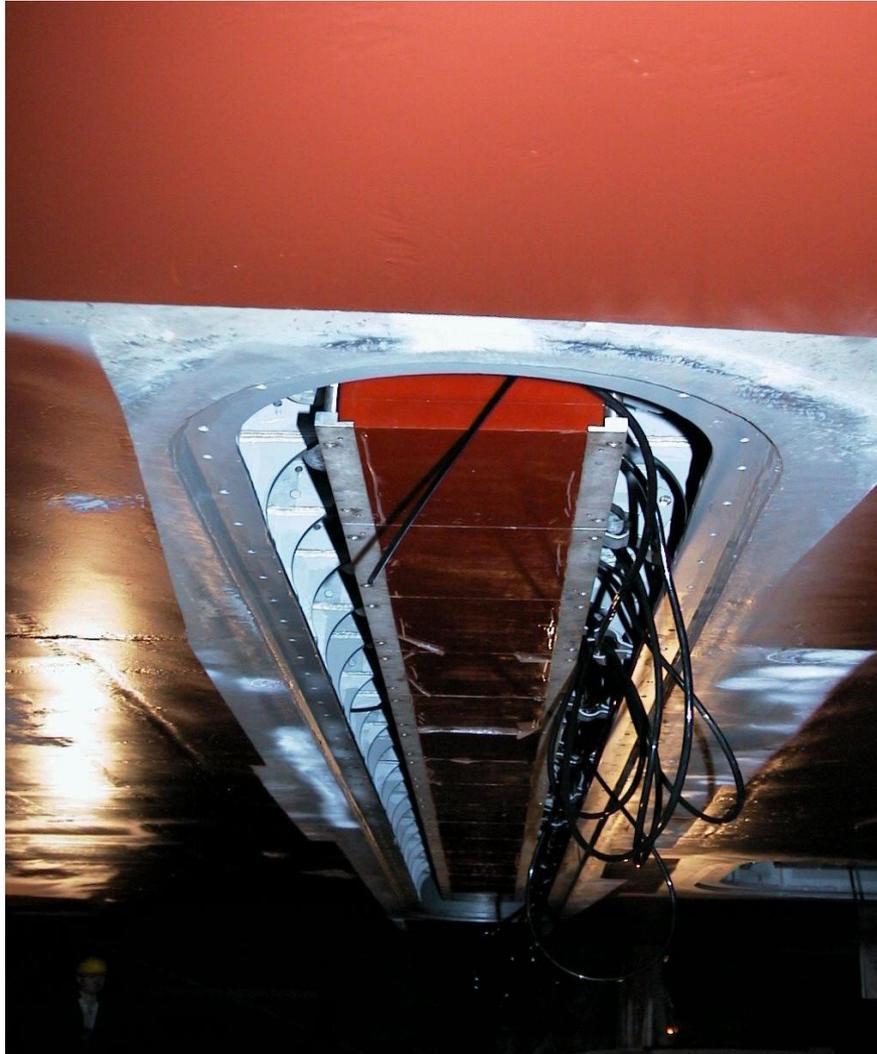


Ice Breaker Transducer Installation



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All RX Transducers In Position



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Ice Breaker Transducer Installation



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Titanium Ice Window Being Installed, James Clark Ross



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Ice Breaker Transducer Installation



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RX Transducer completed, James Clark Ross



Ice Breaker Transducer Installation



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TX Transducer Installation



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Ice Breaker Transducer Installation



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TX Ice Protection Windows



05/09/2007



Ice Breaker Transducer Installation



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Ice Window Installation Icebreaker Oden



Ice Breaker Transducer Installation



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TX Transducer Completed, Ice Breaker Oden



05/12/2007



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HUGIN 1000 system

- HISAS 1030 interferometric SAS
 - 4x4 cm SAS imagery (2x2 cm with reprocessing)
 - 10-20 cm resolution SAS bathymetry
- EM 2040 multibeam echo sounder
 - 400 kHz, $0.75^\circ \times 0.75^\circ$ beam width
 - 400 beams, ping rate 40-45 Hz at 3-4 m altitude
- TileCam optical camera and LED light bar
 - Millimeter-level resolution at 3-4 m altitude
- Imagenex DeltaT forward looking sonar
 - Obstacle avoidance
 - Bottom following
 - Allows safe operation at very low altitudes



THE FULL PICTURE

HUGIN Portable AUV System



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HIGHLIGHTS

- 20' and 10' container for both transportation and ship
- Small system footprint – high degree of modularity and
- Ship requirements: Voltage + deck space





**Gracias
Para
Su
Atencion**

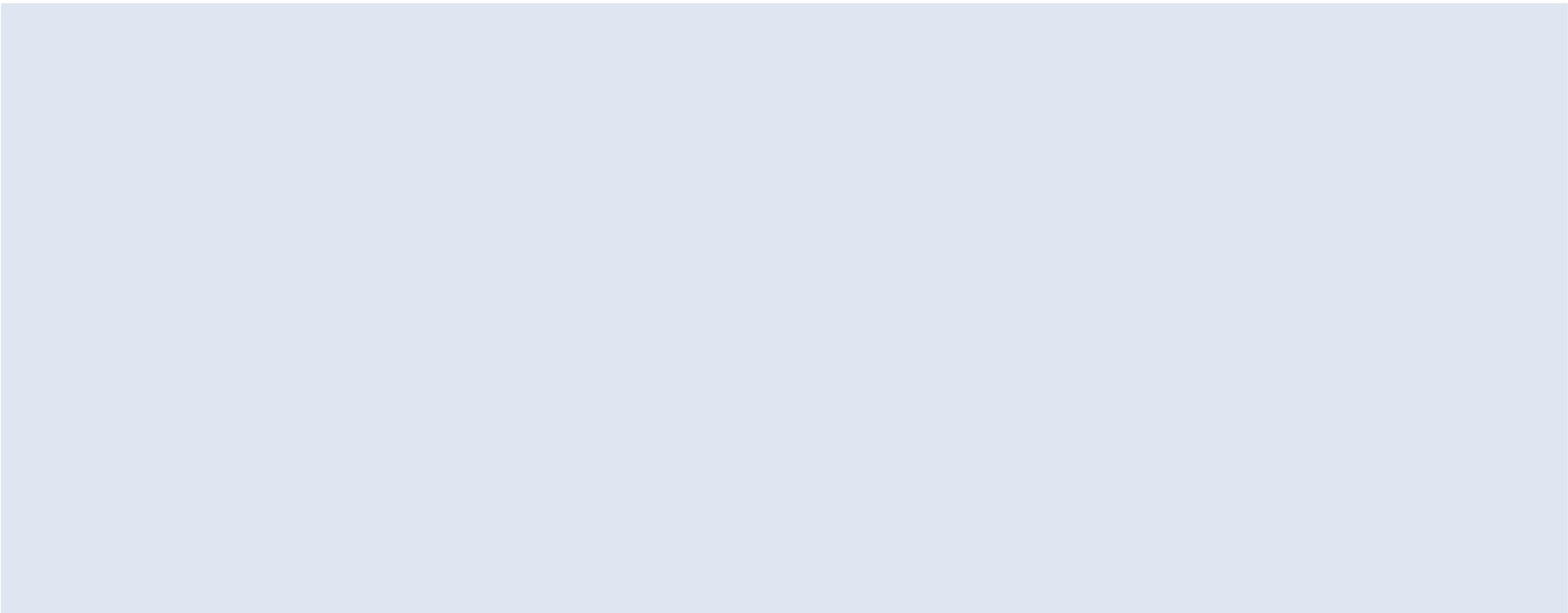




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