

Multibeam Advisory Committee (MAC) 2021 UNOLS Update

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The Multibeam Advisory Committee (MAC)

- Established 2011 with funding from NSF to ensure the consistent collection of high-quality multibeam data across the U.S. Academic Research Fleet (USARF)
 - *On-board & remote support for ships*
 - *Standardize system performance testing*
 - *Publish performance and share best practices*
- Technical Reports & Resources
 - Sea Acceptance, Quality Assurance, Noise
 - Reports from USARF and other vessels
 - Cookbooks, guidance, tools
- Help Desk: mac-help@unols.org
- Website: <https://mac.unols.org>



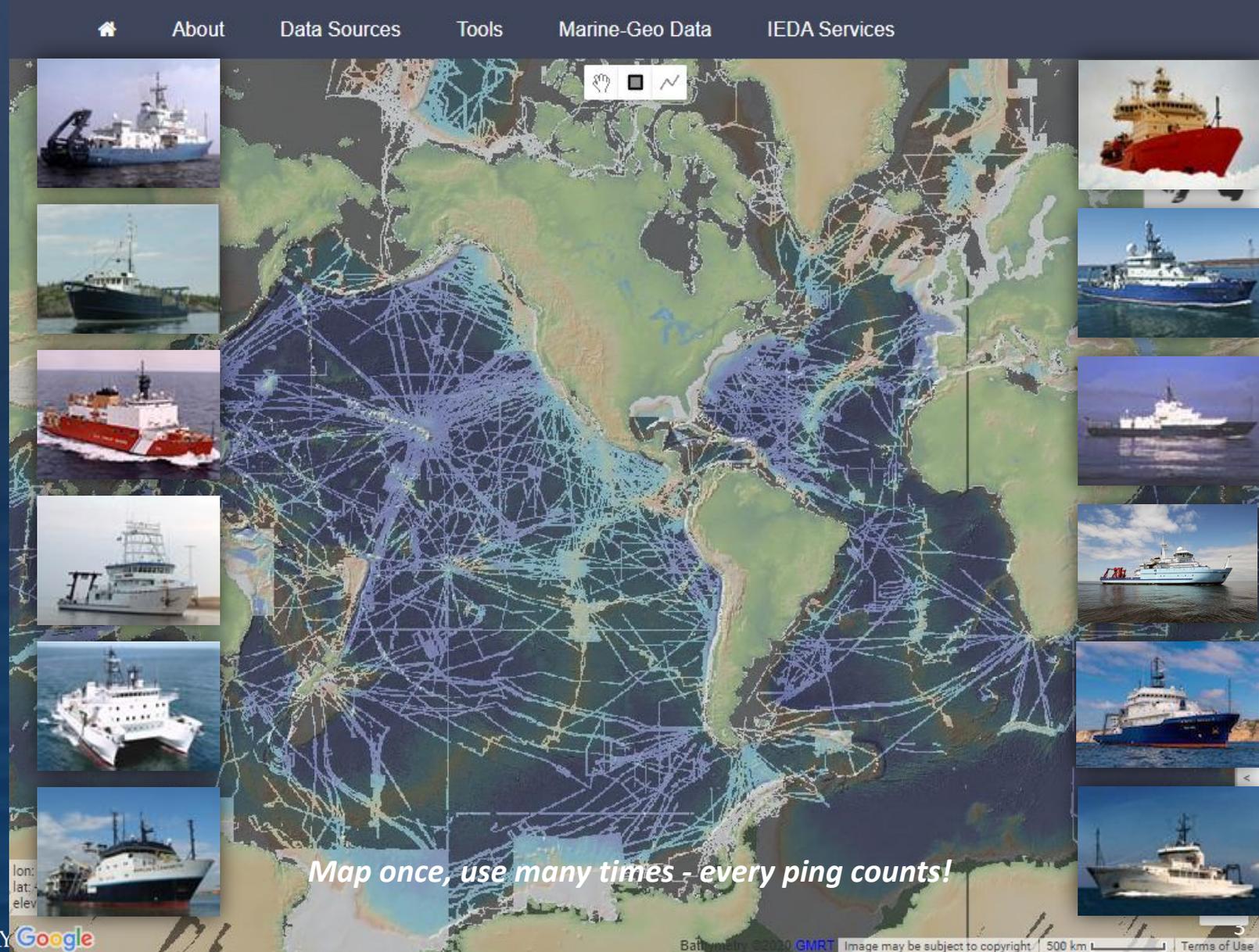
Ship Info	Sonar System Info	MAC Resources	Related Links
Atlantis (WHOI)	Kongsberg (12 kHz, 1x1° beam)		
Blue Heron (UMN)	Reson Sea (240 kHz)		
Healy (USCG)	Kongsberg (12 kHz, 1x1° beam)		
Hugh R. Sharp (UDEL)	Reson Sea (240 kHz), Reson Sea		

Report Title	Team
2021 Sikuliaq EM302/EM710 QAT	QAT
2021 Atlantis EM124 SAT	QAT
2021 Healy QAT	QAT
2021 Sally Ride EM124/EM712 QAT Report	QAT
2021 Kilo Moana EM122/EM719 QAT Report	QAT
2021 Revelle EM124/EM712 SAT	SAT
2021 Okeanos MKII SAT	SAT
2020 Healy EM122 QAT Report	QAT
2020 Kilo Moana EM122/EM710 QAT	QAT
2020 Sikuliaq EM302/EM710 Calibration Report	QAT



Mapping Systems in the U.S. Academic Fleet

- 12 USARF vessels w/ MBES
 - 11 Research Vessels
 - 1 USCG Icebreaker
- 15 Kongsberg systems
 - EM710 / EM712
 - EM302
 - EM122 / EM124
- 2 Reson shallow systems
- 3 RCRVs on the way
 - EM304 / EM2040



Kongsberg Systems in the U.S. Academic Fleet

Ship	System(s)	Gondola	Arrays	Life Cycle	MAC Visits (Last)
<i>Atlantis</i>	<u>EM124</u>	Y	2021	Early-Life	QAT*, SAT* (2021)
<i>Healy</i>	EM122	N	2010	Late-Life	QAT, ANT (2021)
<i>Kilo Moana</i>	EM122 / EM710	N	2012	Late-Life	SAT, QAT*, ANT (2021)
<i>Marcus G. Langseth</i>	EM122	Y	2007 (TX) / 2010 (RX)	Late-Life	QAT* (2020)
<i>Nathaniel B. Palmer</i>	EM122	N	2015	Mid-Life	SAT, QAT, ANT (2015)
<i>Neil Armstrong</i>	EM122 / EM710	N	2016	Mid-Life	SAT, QAT (2020)
<i>Roger Revelle</i>	EM124 / EM712	Y	2020	Early-Life	SAT*, QAT (2020)
<i>Sikuliaq</i>	EM302 / EM710	N	2014	Mid-Life	SAT, QAT* (2021)
<i>Sally Ride</i>	<u>EM124</u> / EM712	N	2016	Mid-Life	SAT, QAT (2021)
<i>Thomas G. Thompson</i>	EM302	N	2018	Early-Life	SAT, QAT* (2021)

**Includes virtual visits*



System Performance Testing

SAT and QAT procedures include:

1. System offset / config. review
2. Calibration ('patch test')
3. RX noise testing
4. Swath accuracy
5. Swath coverage (extinction)
6. Impedance testing
7. Water column evaluation
8. BS normalization**
9. Reporting

Multibeam Advisory Committee Mapping System SAT/QAT Checklist

Roger Revelle EM124 / EM712 SAT
San Diego, October 2020

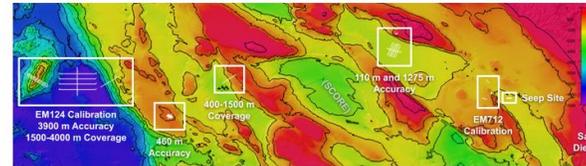
General

[Shared documents for RR 2020 SAT planning](#)

[Revelle IMTEC survey docs](#)

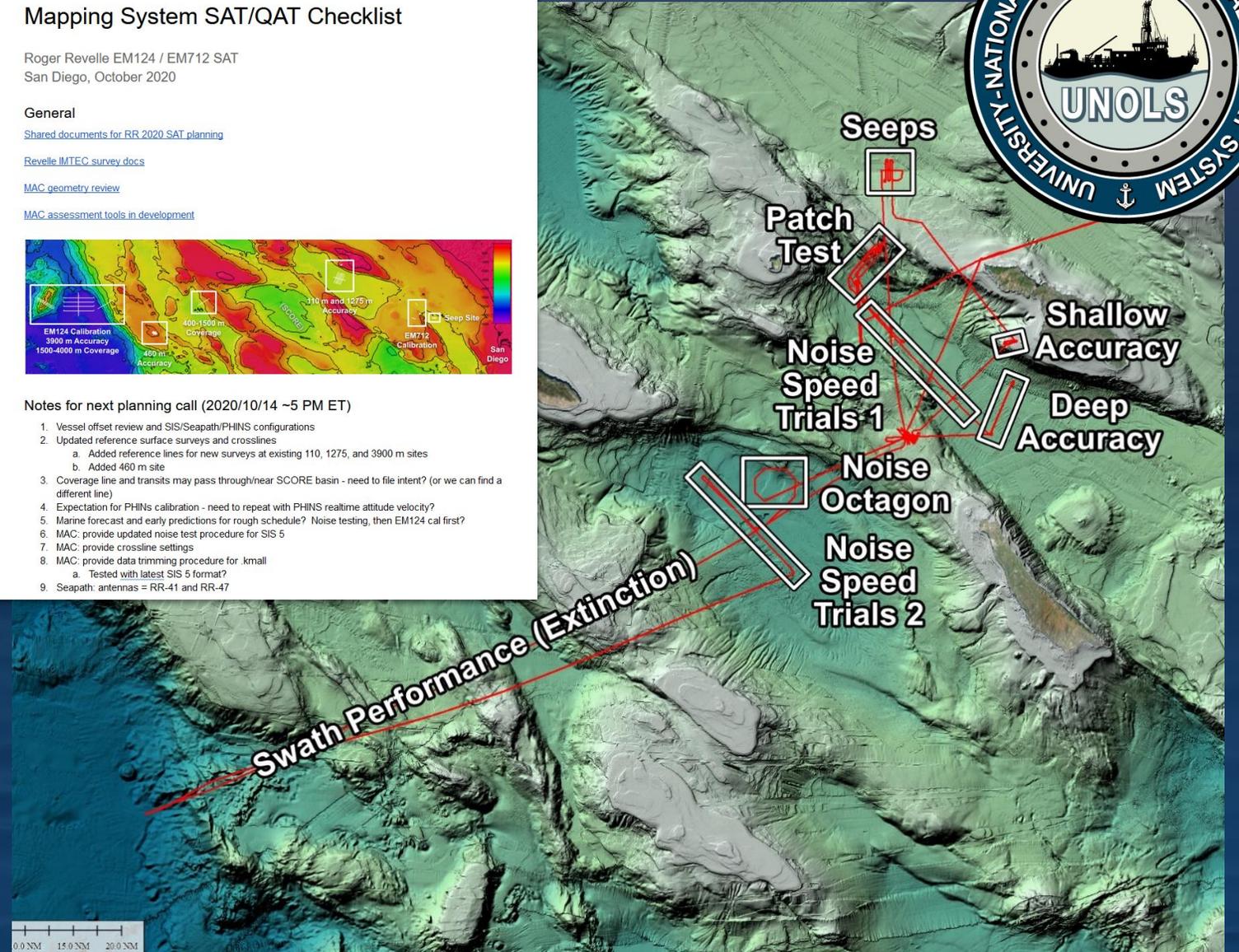
[MAC geometry review](#)

[MAC assessment tools in development](#)



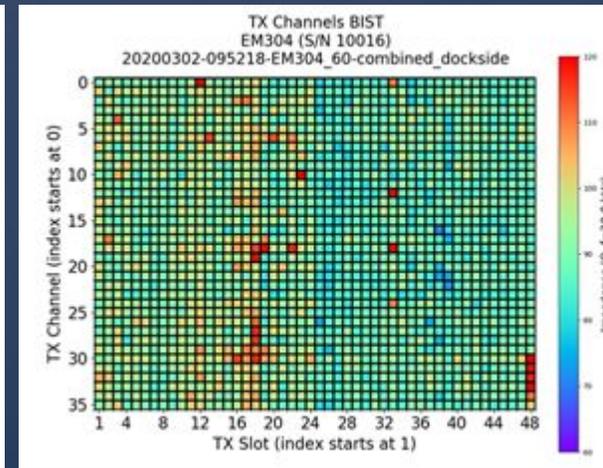
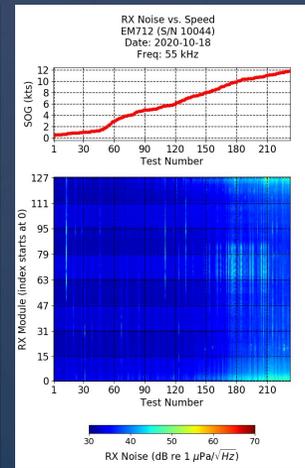
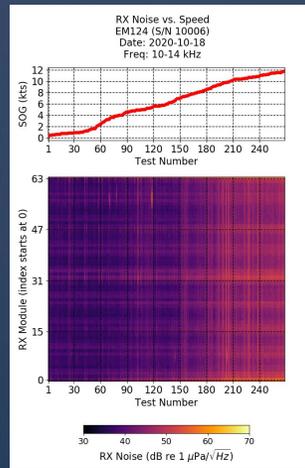
Notes for next planning call (2020/10/14 ~5 PM ET)

1. Vessel offset review and SIS/Seapath/PHINS configurations
2. Updated reference surface surveys and crosslines
 - a. Added reference lines for new surveys at existing 110, 1275, and 3900 m sites
 - b. Added 460 m site
3. Coverage line and transits may pass through/near SCORE basin - need to file intent? (or we can find a different line)
4. Expectation for PHINS calibration - need to repeat with PHINS realtime attitude velocity?
5. Marine forecast and early predictions for rough schedule? Noise testing, then EM124 cal first?
6. MAC: provide updated noise test procedure for SIS 5
7. MAC: provide crossline settings
8. MAC: provide data trimming procedure for kmall
 - a. Tested with latest SIS 5 format?
9. Seapath: antennas = RR-41 and RR-47

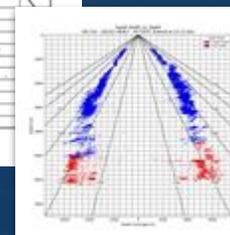
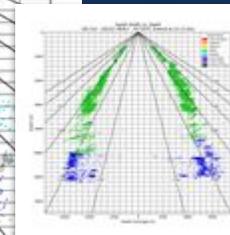
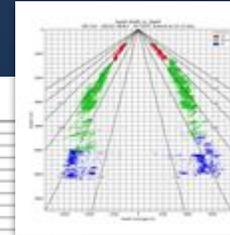
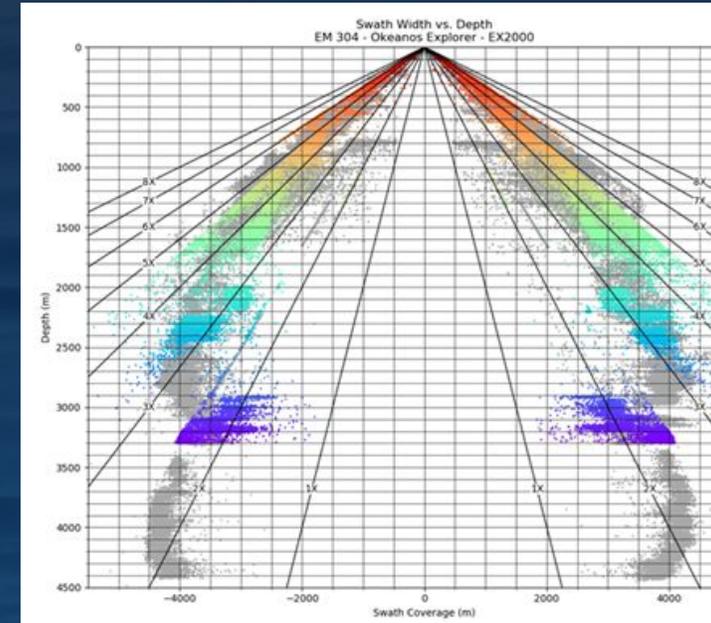
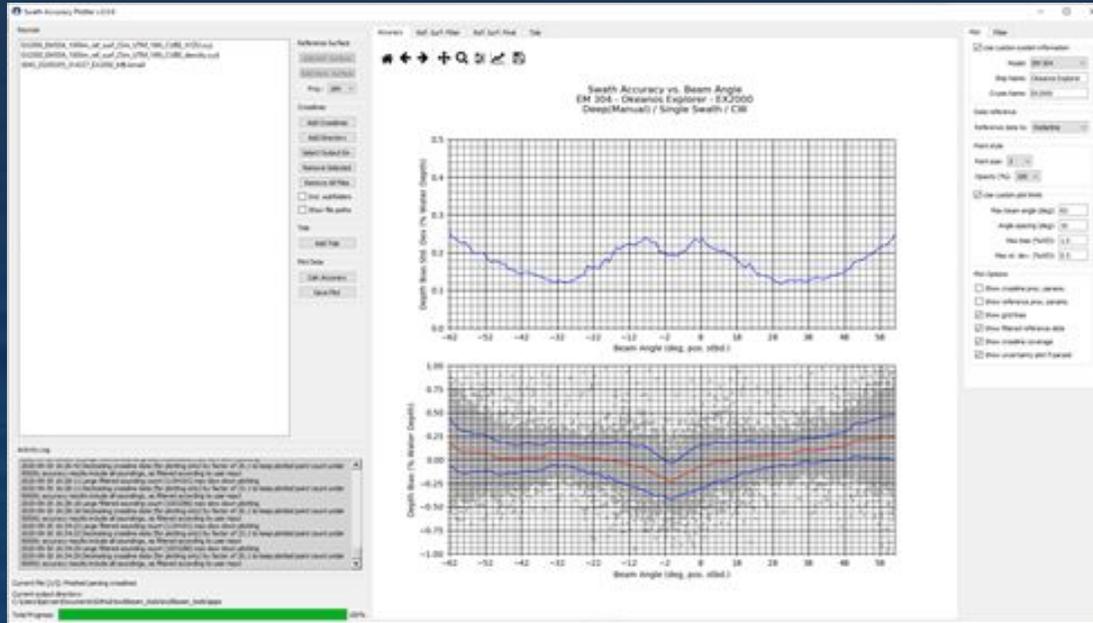
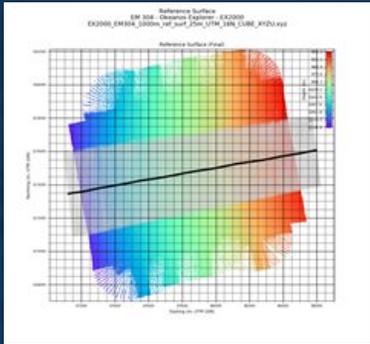
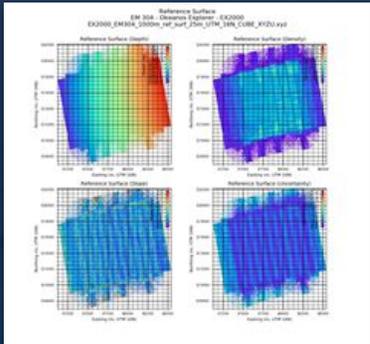


Assessment Tools

1. File Trimmer
2. BIST Plotter
3. Swath Coverage Plotter
4. Swath Accuracy Plotter



<https://mac.unols.org/resources/assessment-tools>



MAC Activities since 2020

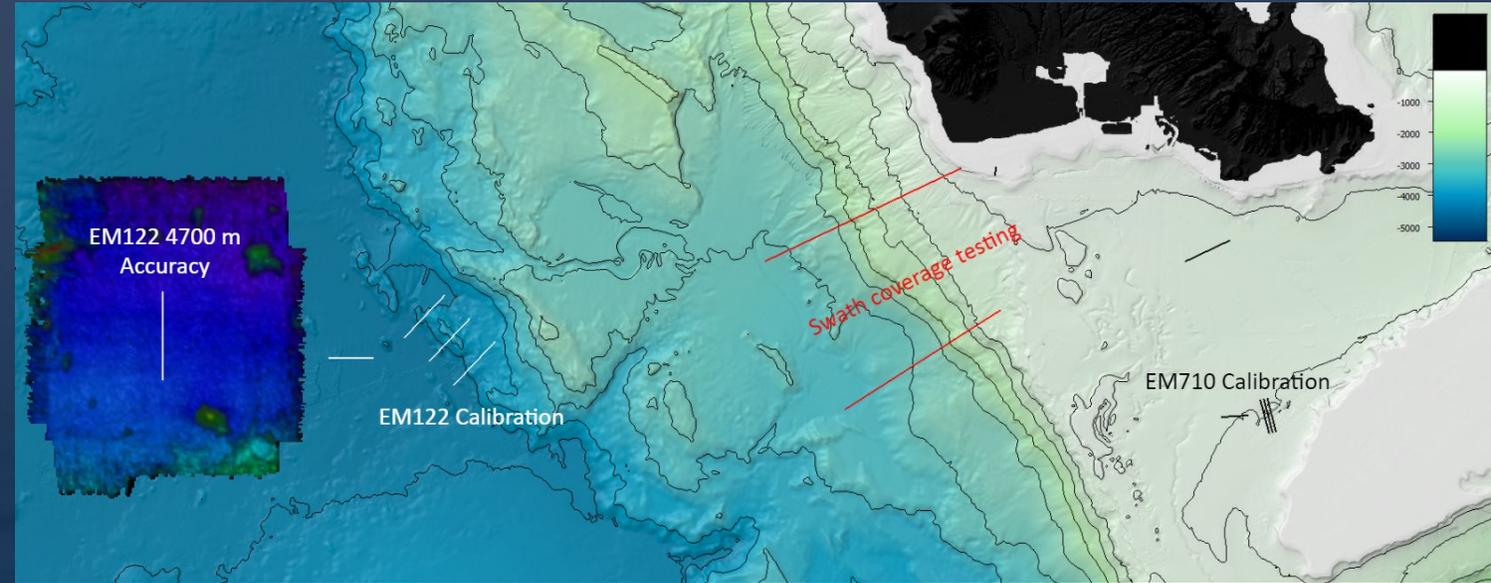
Remote* and on-board support:

- *Atlantis* (SAT*)
- *Healy* (QAT*)
- *Kilo Moana* (QAT*)
- *Sally Ride* (SAT)
- *Sikuliaq* (QAT*)
- *T. G. Thompson* (QAT*)

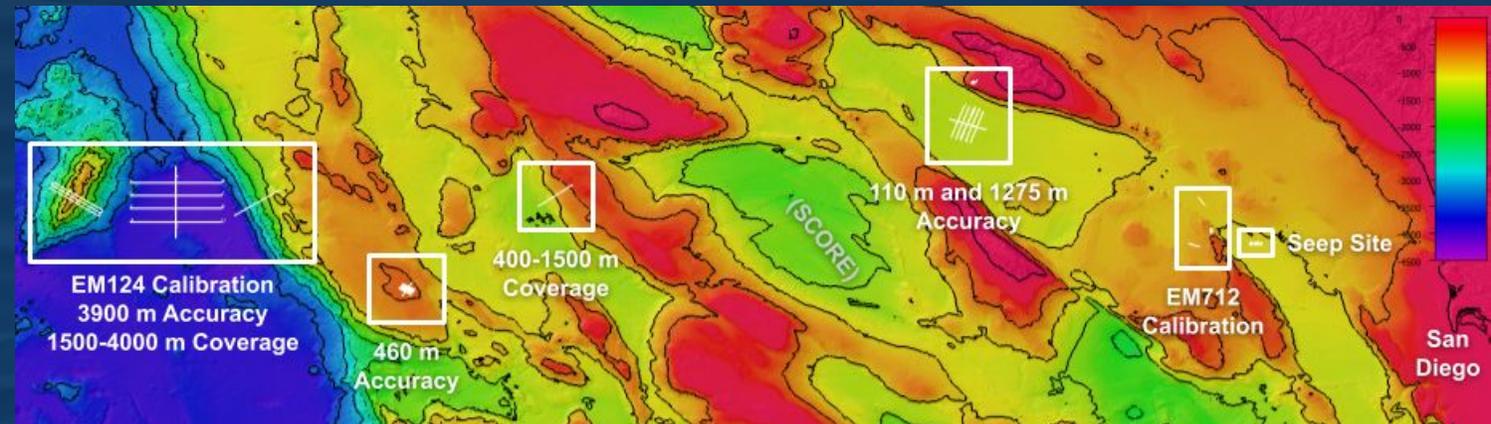
Assessment Tools (e.g., .kmall)

Non-MAC testing:

- *Saildrone* (EM304 / EM2040)
- DRiX (EM2040)
- *Okeanos Explorer* (EM304 MKII)
- *Nautilus* (EM302)

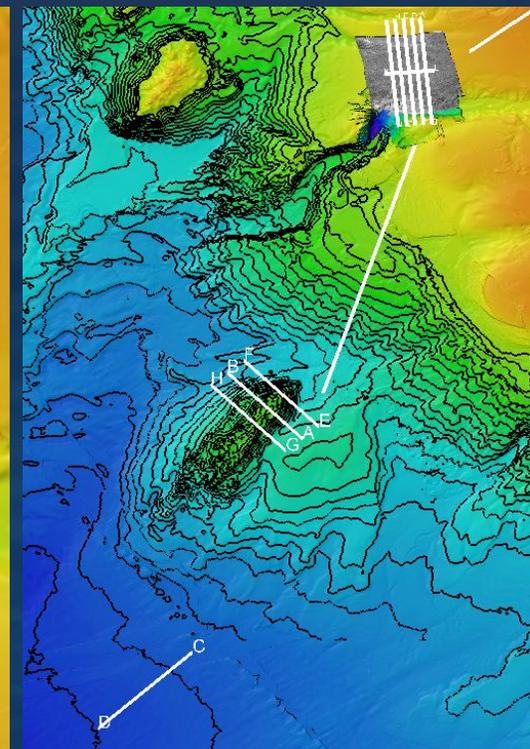
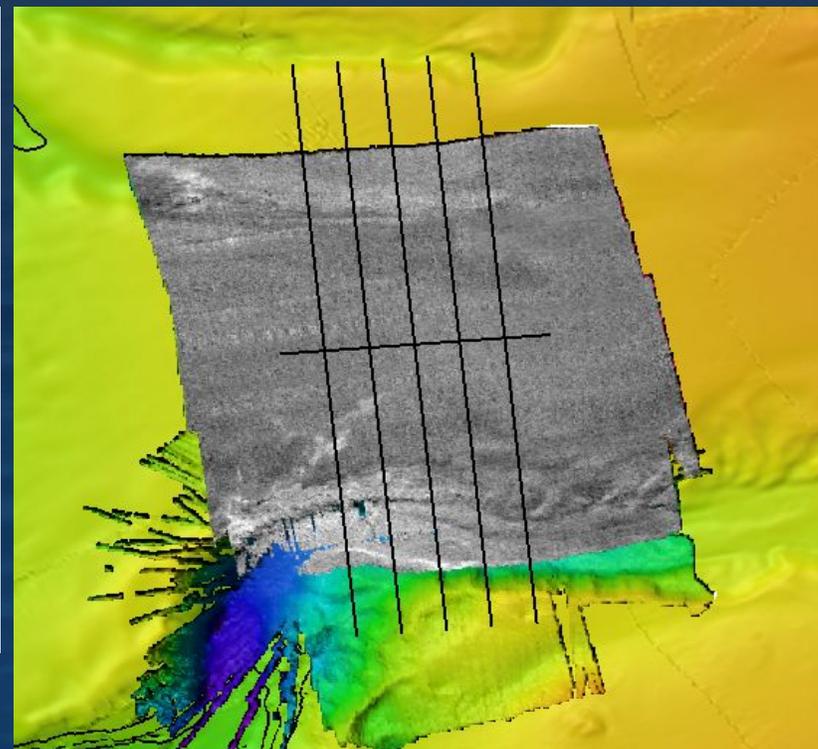
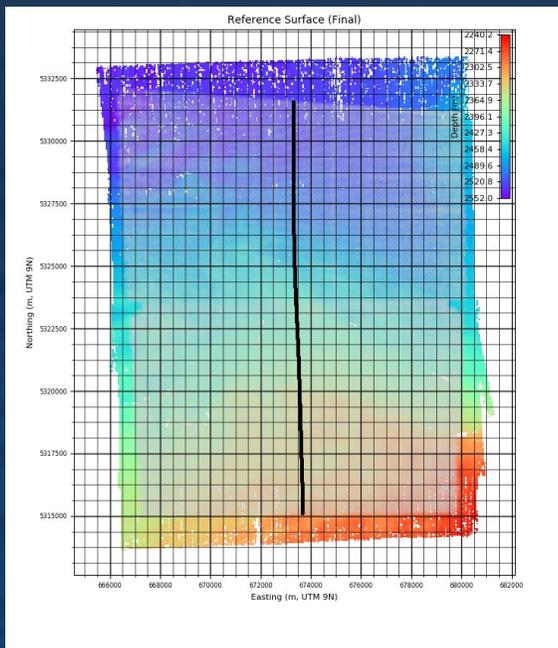
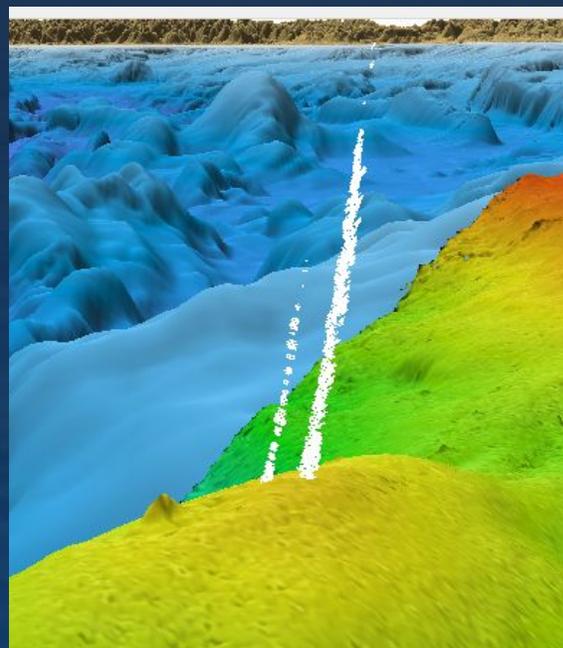


**THANK YOU to technicians and managers
for making remote support possible**



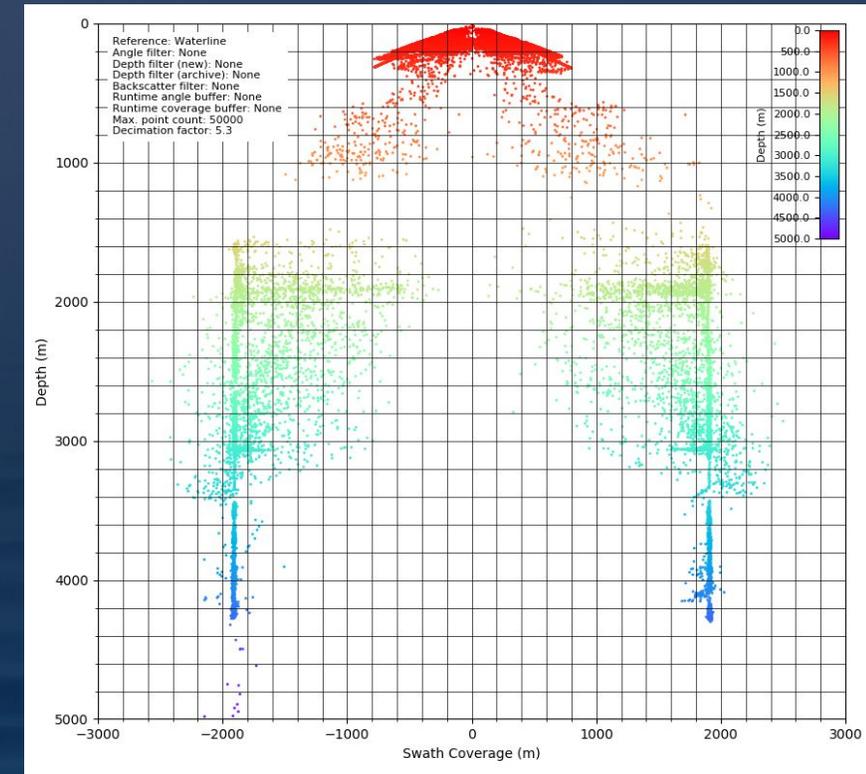
Lessons Learned 2020-21

- Standard test sites and methods = efficient use of ship time and personnel
- Transit mapping fills the gaps *and* helps to catch problems early
- Performance testing plans are flexible, with limits
- Scientist / user feedback is extremely valuable



Next Steps: Transit Data

- Increasing and improving transit mapping data
- **Map The Gaps**
 - US EEZ, GMRT, Seabed 2030, UN Ocean Decade
 - Swath coverage, backscatter normalization, etc.
- Improving resources/tools for transits
 - Sound Speed Manager
 - Route planning for gaps
 - Reoccupying test sites en route



What's Next?

- RCRVs planning in progress
- *Healy* EM122 replacement
- Late-life cycle systems
 - EOL performance testing
 - Ship purposes / regions?
- Best practice documentation
 - Ocean Best Practices
- What Went Wrong Wednesday



Thank you!

<http://mac.unols.org>

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