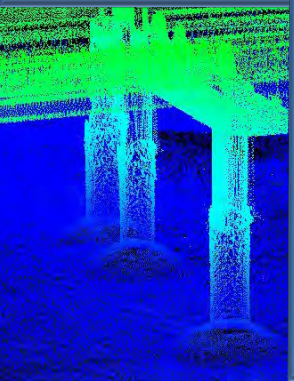


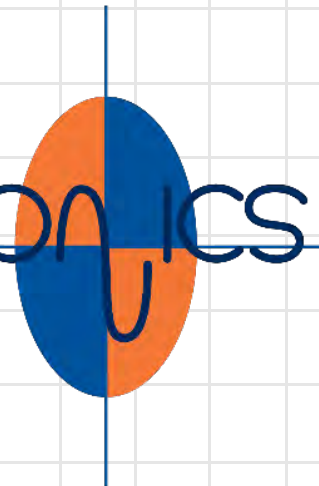


# MEASUTRONICS CORPORATION

## Using Multibeam SONAR Technology Through the Life of a Marine Construction Project



MEASUTRONICS



October 8<sup>th</sup>, 2019

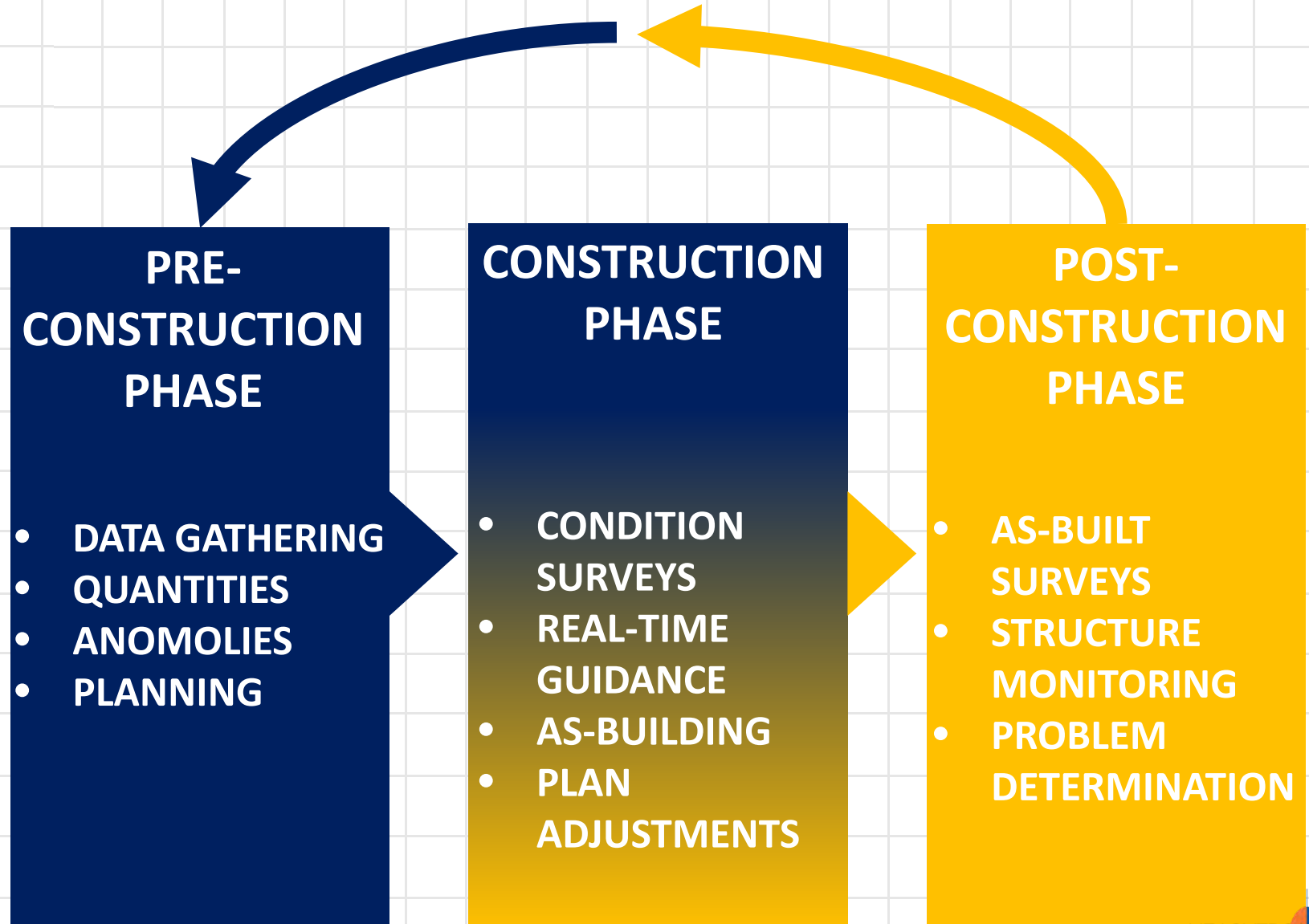
# ABOUT ME

## Nathan Keys

- B.S. in Geomatics from University of Florida, 2012
- Construction Systems Specialist for MT since 2013
  - Construction Projects
  - SONAR Projects
  - Software Training / Development
- Moved to MT West in 2018



# PHASES OF MARINE CONSTRUCTION



# THE SONARS

## TELEDYNE BLUEVIEW BV5000



### BV5000-1350

### BV5000-2250-N / 2250-W

#### Sonar & Software

Sonar Field of View (°):

42 x 1, 76 x 1

45 - 360

42 x 1, 76 x 1

Speed of Sound (m/s):

Up to 30

Up to 30

Maximum Range:

30 m (98 ft.)

2.25

10 m (32 ft.)

Optimum Range:

1 - 20 m (3.2 - 65 ft.)

0.5 - 7 m (1.6 - 23 ft.)

Number of Beams:

256

256

Beam Width (°):

1 x 1

1 x 1

Beam Spacing (°):

0.18

0.18

Time Resolution:

0.015 m (0.59 in.)

0.010 m (0.39 in.)

Data Output Format:

.son and .xyzi files

.son and .xyzi files

#### Mechanical

Size (L x W x H in inches):

10.5 x 9.2 x 15.4

8.9 x 8.6 x 15.4

Weight in Air/Water (lbs.):

21.7/8.2

19.1/6.0

Depth Rating:

1000 m (3,280 ft.)

1000 m (3,280 ft.)

4,000 m (13,123 ft.)

4,000 m (13,123 ft.)

Communication (Sonar/Pan & Tilt):

Ethernet/RS485

Ethernet/RS485

Power Consumption (W):

45 max.

45 max.

Power Requirement (V DC):

20 - 29

20 - 29



# THE SONARS

## TELEDYNE BLUEVIEW BV5000

# THE SONARS

## TELEDYNE RESON T-50 P/R

Teledyne RESON SeaBat® T50-P



### SEABAT T50-P SYSTEM SPECIFICATIONS

Input voltage	24VDC or 100-230VAC 50/60Hz
Power (typical / max)	150W / 300W
Ingress protection	Water resistant (IP54)
Transducer cable length	25m (standard) Optional: 10m, 50m or 100m
Temperature (operational / storage)	Portable Sonar Processor: -5°C to +45°C / -30°C to +70°C Sonar wet-end: -2°C to +36°C / -30°C to +70°C

	Height [mm]	Width [mm]	Depth [mm]	Weight [kg/air]	Weight [kg/water]
T50 Rx (EM7218)	102.0	460.0	90.7	8.2	3.9
T50 Tx (TC2181)	86.6	93.1	280	5.4	3.4
Portable Sonar Processor	131	424	379	14	N/A

T50 Acoustic performance	400kHz (max. frequency)	200kHz (min. frequency)
Across-track receiver beam width <sup>1</sup>	0.5°	1°
Along-track beam width <sup>2</sup>	1°	2°
Number of beams	Min 10, Max 512	
Swath coverage (up to)	150° Equi Distant, 165° Equi Angle	

Max Depth (CW <sup>3</sup> )	250 meters	475 meters
Typical Depth (FM <sup>2</sup> )	0.5-225 meters	0.5-550 meters
Max Depth (FM <sup>3</sup> )	300 meters	575 meters
Ping rate (range dependent)	Up to 50 pings/s	
Sample rate	34 kHz or 66 kHz	
Pulse length (CW)	15 - 300µs	
Pulse length (FM)	300µs - 10ms	
Depth resolution	6 millimeters	
Depth rating (sonar head)	50 meters	

For relevant tolerances for dimensions above and detailed outlined drawings see Product Description

1 Nominal values

2 This is a depth range within which the system is normally operated, from the minimum depth to a depth value corresponding to the max. swath -50%

3 This is the single value corresponding to the depth at which the swath is reduced to 10% of its max. value. For actual swath performance refer to Product Description.

4 An extinction coverage of +/-20° is observed at about 530 meter water.



**TELEDYNE RESON**  
Everywhereyoulook™

# THE SONARS

## TELEDYNE RESON T-50 P/R



**TELEDYNE RESON**  
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# THE SONARS

## TELEDYNE RESON T-20 P/R

SeaBat® T20-P



### SEABAT T20-P SYSTEM SPECIFICATIONS

Input voltage	24VDC or 100-230VAC 50/60Hz
Power (typical / max)	200W / 300W
Ingress protection	Water resistant (IP54)
TRANSDUCER CABLE LENGTH	10m (standard), 25m, 50m, 100m (optional)
Temperature (operational / storage)	Portable Sonar Processor: -5°C to +45°C / -30°C to +70°C Sonar wet-end: -2°C to +35°C / -30°C to +55°C

	Height [mm]	width [mm]	depth [mm]	weight [kg/air]	weight [kg/water]
T20 Rx (EM7219)	102.0	254.0	123.0	5.0	2.2
T20 Tx (TC2181)	86.6	93.1	280	5.4	3.4
Portable Sonar Processor	131	424	379	14	N/A

T20 Acoustic performance	400kHz (max. frequency)	200kHz(min. frequency)
Across-track receiver beam width <sup>1</sup>	1° (center)	2° (center)
Along-track beam width <sup>1</sup>	1°	2°
Number of beams	Min 10, Max 512	
Swath coverage (up to)	140° Equi distance 165° Equi Angle (12x water depth with dual head)	

Max Depth (CW <sup>1</sup> )	250 meters	550 meters
Typical Depth (FM <sup>2</sup> )	0.5-180 meters	0.5-450 meters
Max Depth (FM <sup>3</sup> )	300 meters	575 meters
Ping rate (range dependent)	Up to 50 pings/s	
Pulse length (CW)	15 - 300µs	
Pulse length (FM)	300µs - 10ms	
Depth resolution	6mm	
Depth rating (sonar head)	50 meters	

For relevant tolerances for dimensions above and detailed outlined drawings see Product Description

<sup>1</sup> Nominal values

<sup>2</sup> This is a depth range within which the system is normally operated, from the minimum depth to a depth value corresponding to the max. swath -50%.

<sup>3</sup> This is the single value corresponding to the depth at which the swath is reduced to 10% of its max. value. For actual swath performance refer to Product Description.

<sup>4</sup> An extinction coverage of +/-20° is observed at about 530 meter water.



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# THE SONARS



# THE SONARS

## TELEDYNE RESON T-50/20 IDH



Teledyne RESON SeaBat® Integrated Dual Head

SeaBat® Integrated Dual Head



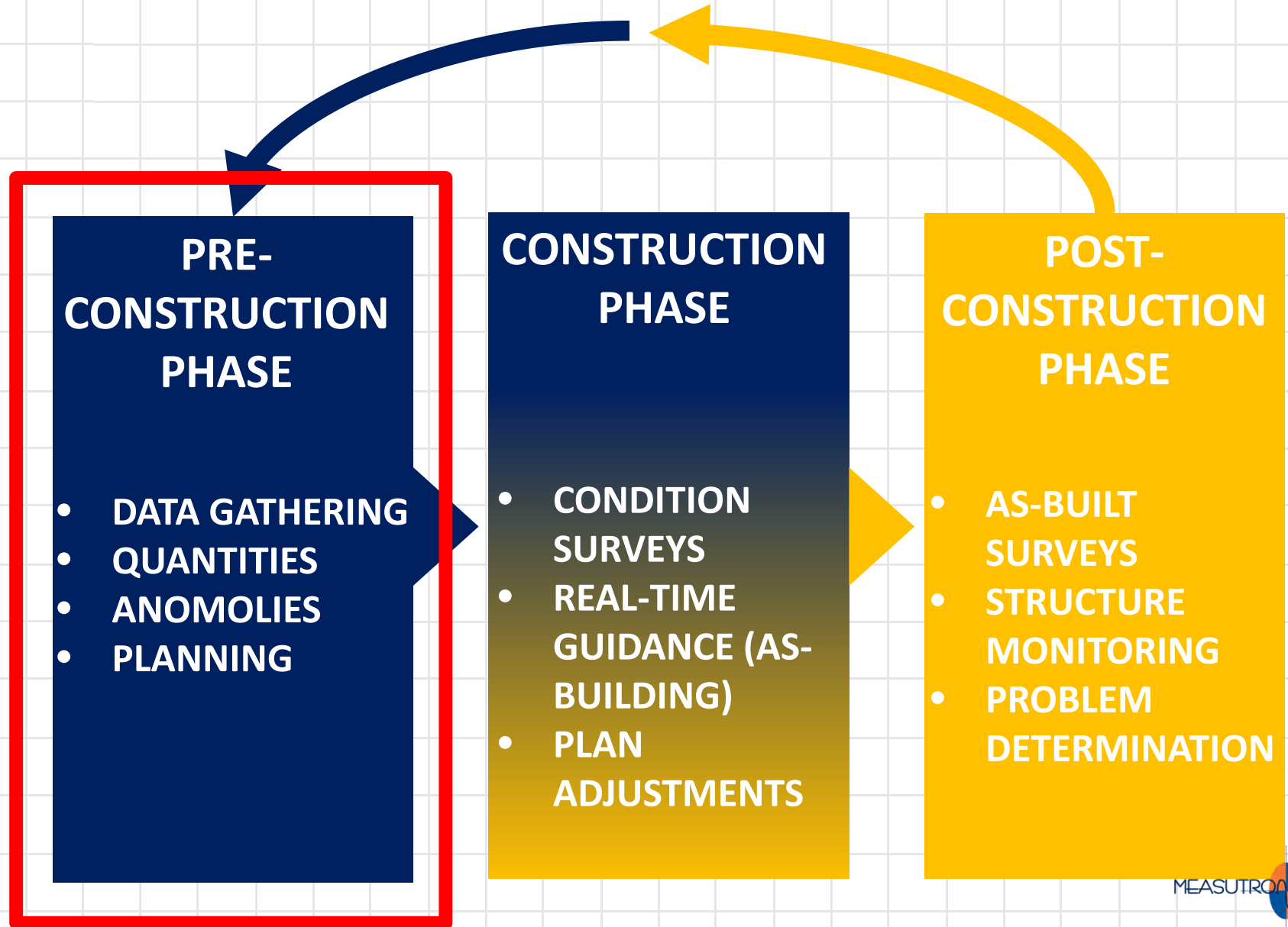
### SeaBat® Integrated Dual Head

	IDH T20-R	IDH T50-R
Input Voltage	100-230VAV 50/60Hz	
Transducer cable length	10m standard. Optional: 25m, 50m, 100m	25m standard Optional: 10m, 50m, 100m
Temperature (operational/storage)	RSP: -5°C to +45°C / -30°C to +70°C Wet-end: -2°C to +36°C / -30°C to +70°C	
Sonar head width / weight (air) / weight (water)	72cm 31.5kg / 16.1kg	95.3cm 41kg / 21.2kg
Teledyne Type 20/30 IMU Height/width/depth Weight (air)/weight(water)	12.3cm/11.8cm/9.6cm 3.0kg / 1.6kg	
Across track beam width <sup>1</sup>	1° @400kHz, 2° @200kHz	0.5° @400kHz, 1° @200kHz
Along track beam width <sup>1</sup>	1° @400kHz, 2° @200kHz	1° @400kHz, 2° @200kHz
Number of beams	20 to 1024 user selectable	
Swath coverage	Up to 210°	Up to 220°
Typical Depth (CW <sup>2</sup> )	0.5-150 meters @400kHz, 0.5-375 meters @200kHz	
Max Depth (CW <sup>3</sup> )	250 meters @400kHz, 550 meters @200kHz	
Typical Depth (FM <sup>2</sup> )	0.5-180 meters @400kHz, 0.5-450 meters @200kHz	
Max Depth (FM <sup>3</sup> )	300 meters @400kHz, 575 meters @200kHz	
Ping rate (range dependent)	Up to 50 pings/s	
Pulse length	30-300µs (CW), 300-5000µs (FM)	
Depth resolution	6mm	
Depth rating	50m	



**TELEDYNE RESON**  
Everywhere you look

# PHASES OF MARINE CONSTRUCTION



# PRE-CONSTRUCTION PHASE



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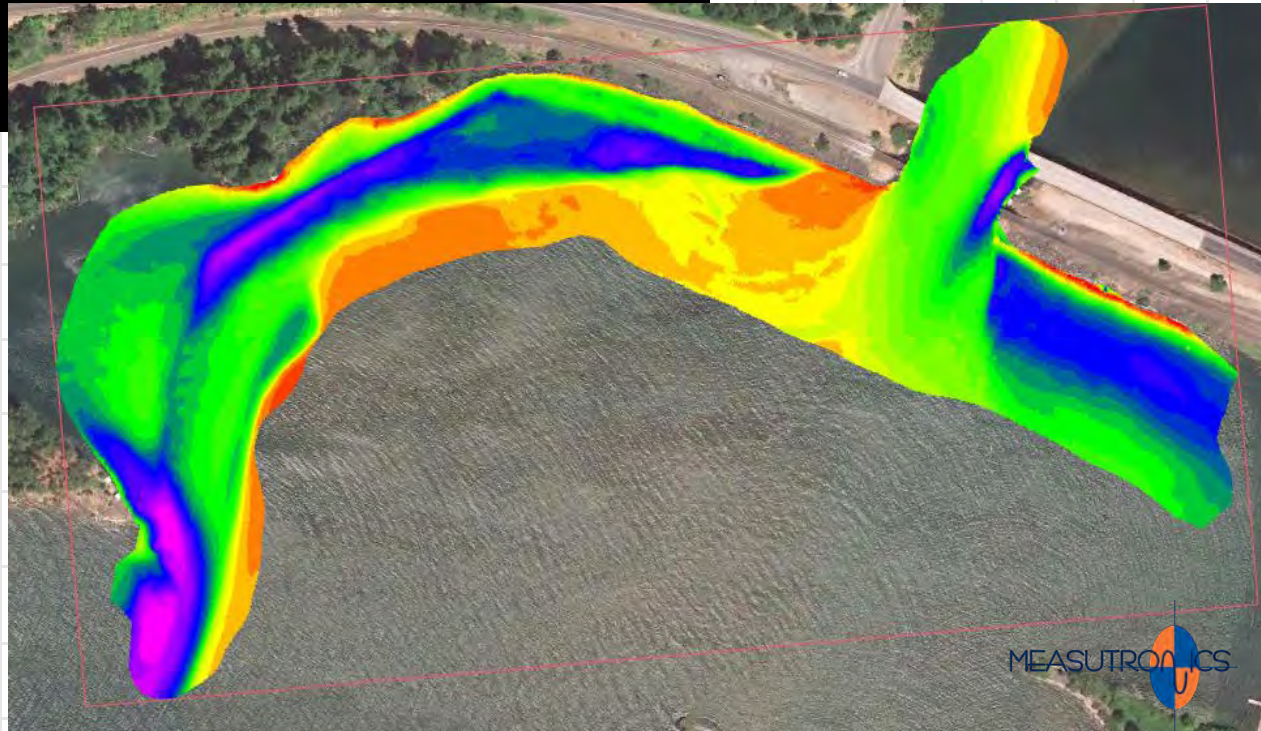
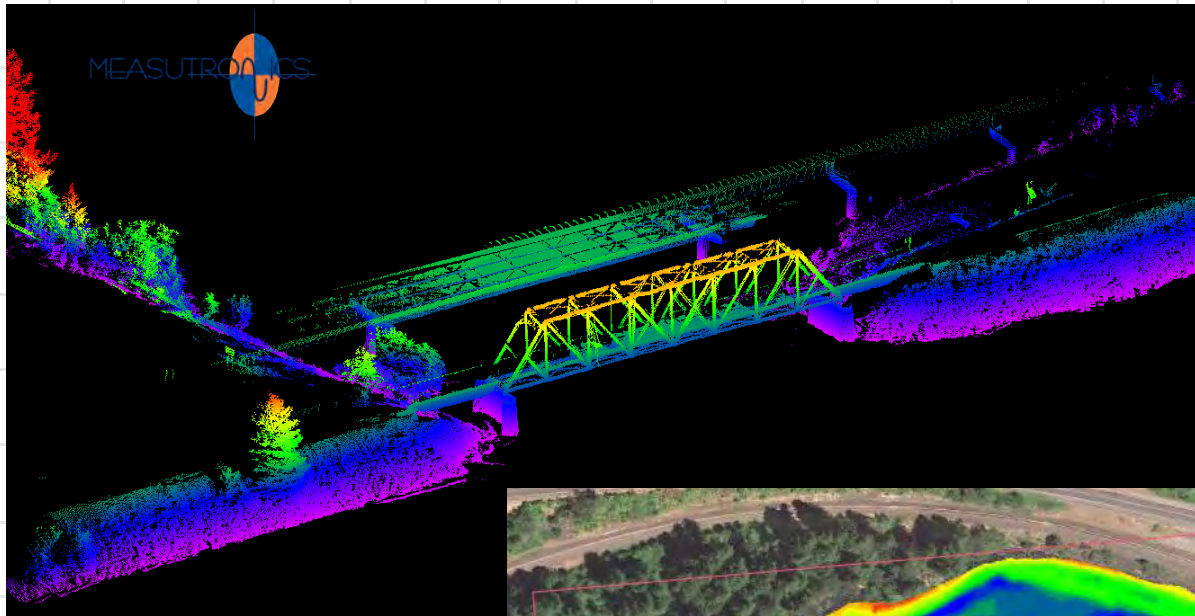
# PRE-CONSTRUCTION PHASE



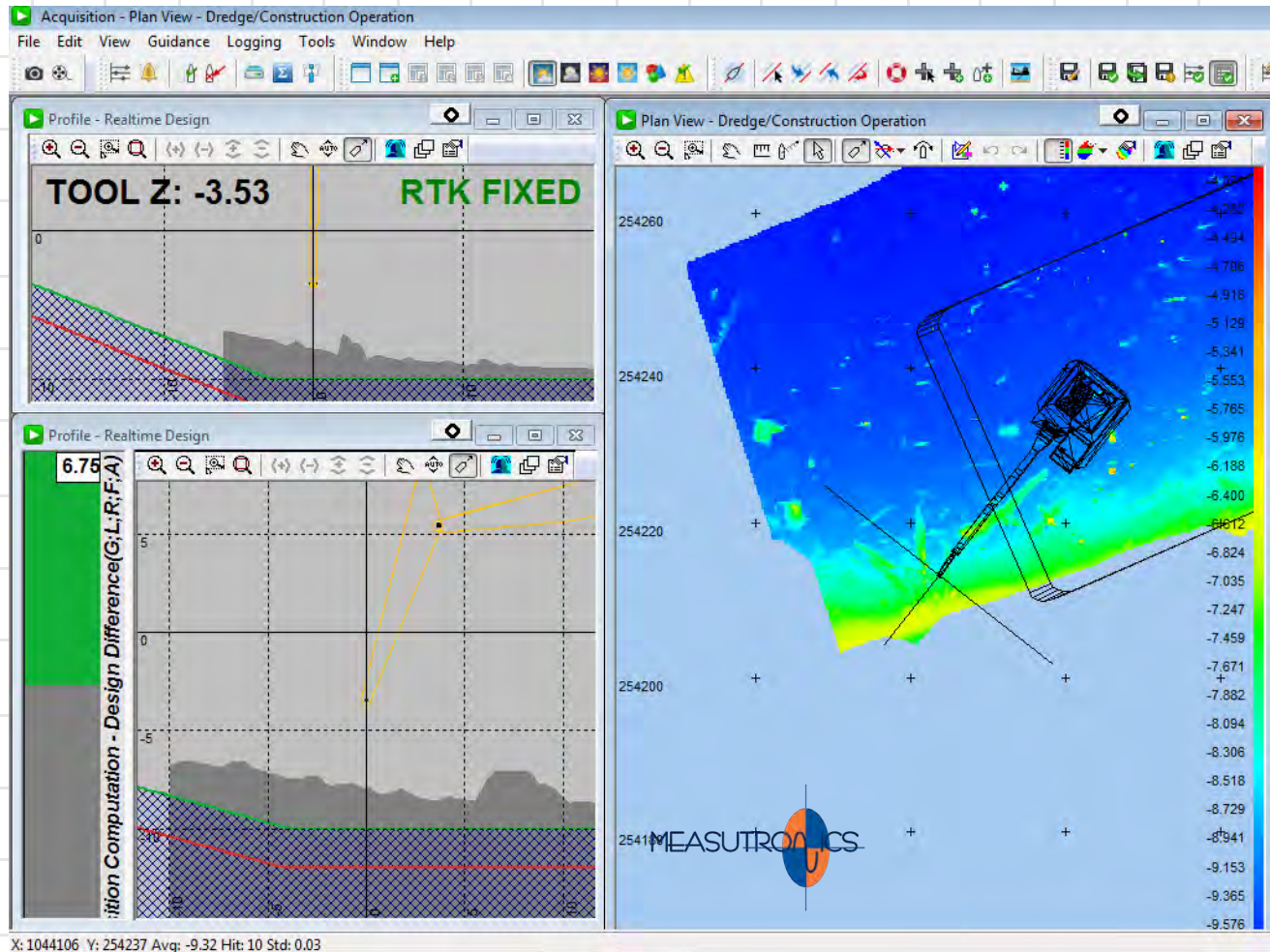
**TELEDYNE RESON**  
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# PRE-CONSTRUCTION PHASE



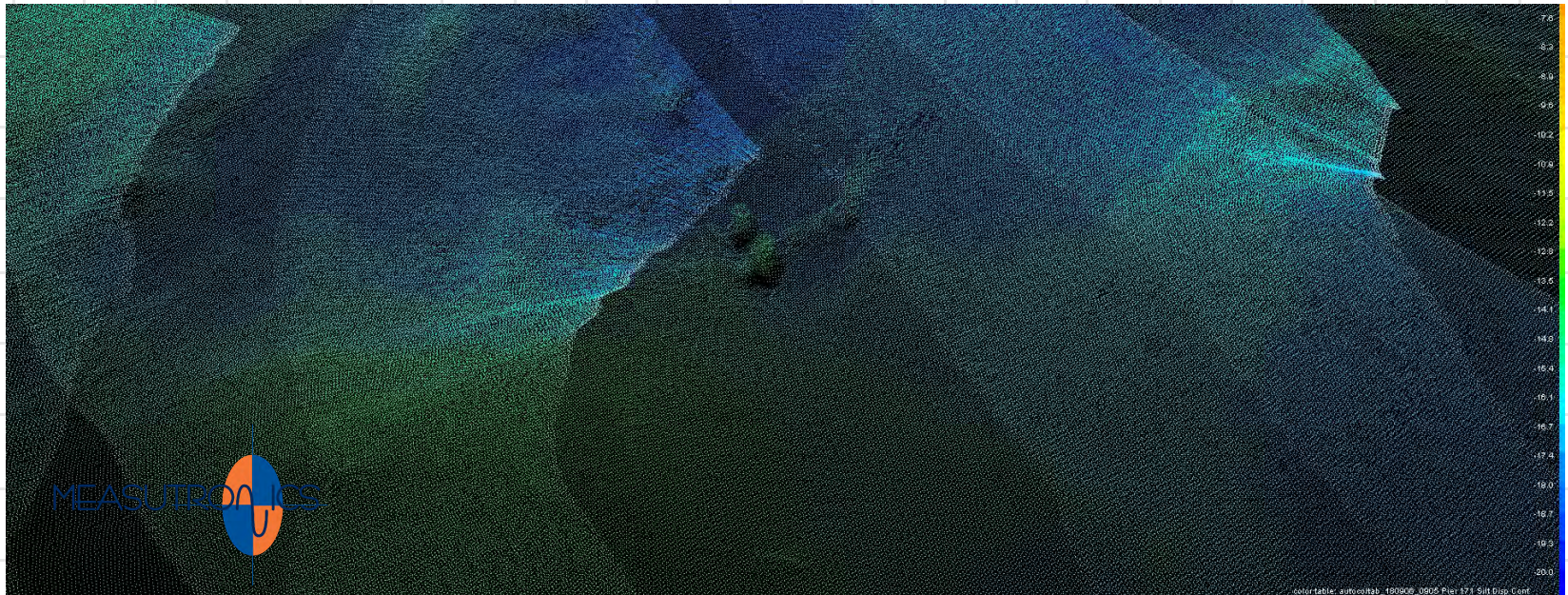
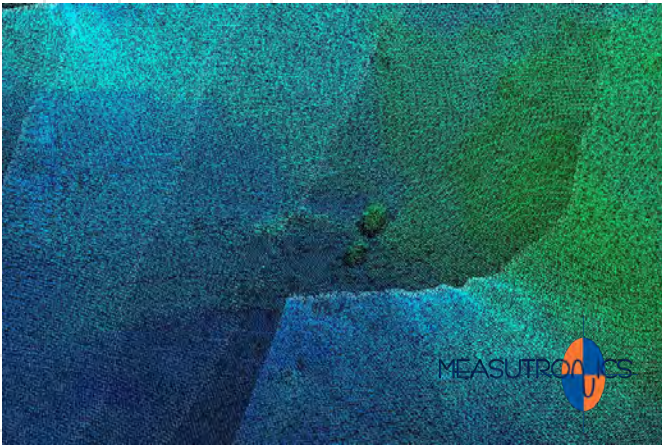
# PRE-CONSTRUCTION PHASE



**TELEDYNE RESON**  
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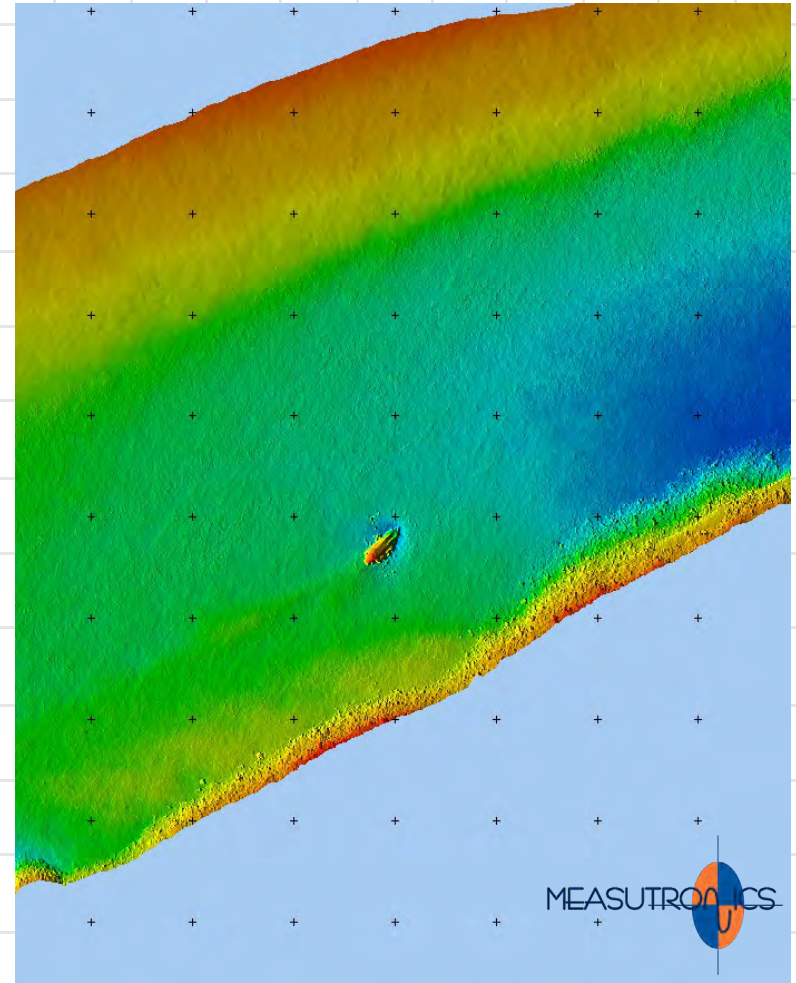
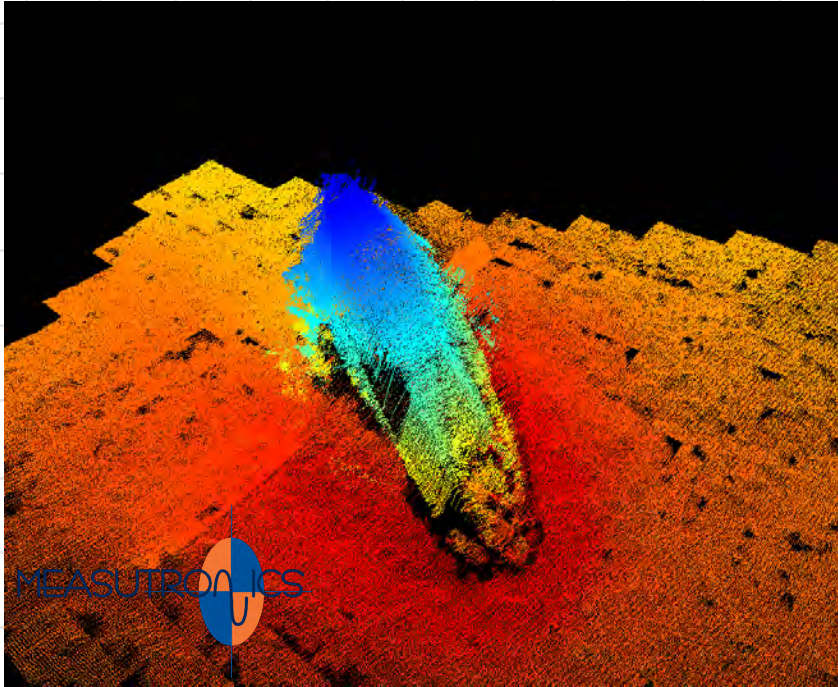
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**TELEDYNE RESON**  
Everywhere you look™

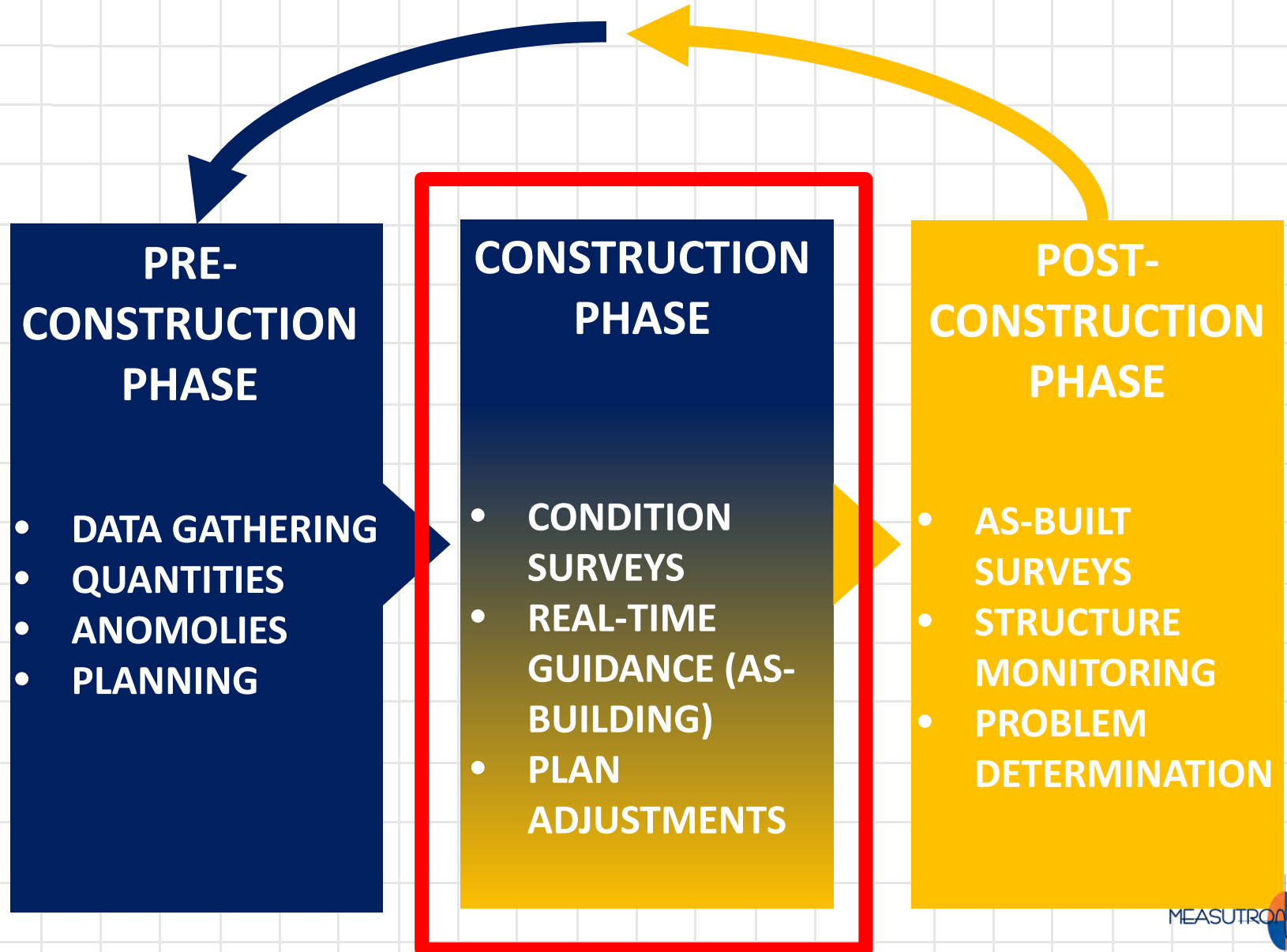


# PRE-CONSTRUCTION PHASE



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# PHASES OF MARINE CONSTRUCTION



# CONSTRUCTION PHASE



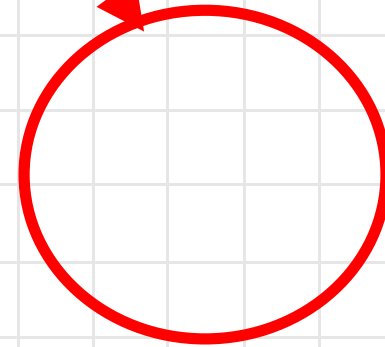
**TELEDYNE RESON**  
Everywhereyoulook™

# CONSTRUCTION PHASE

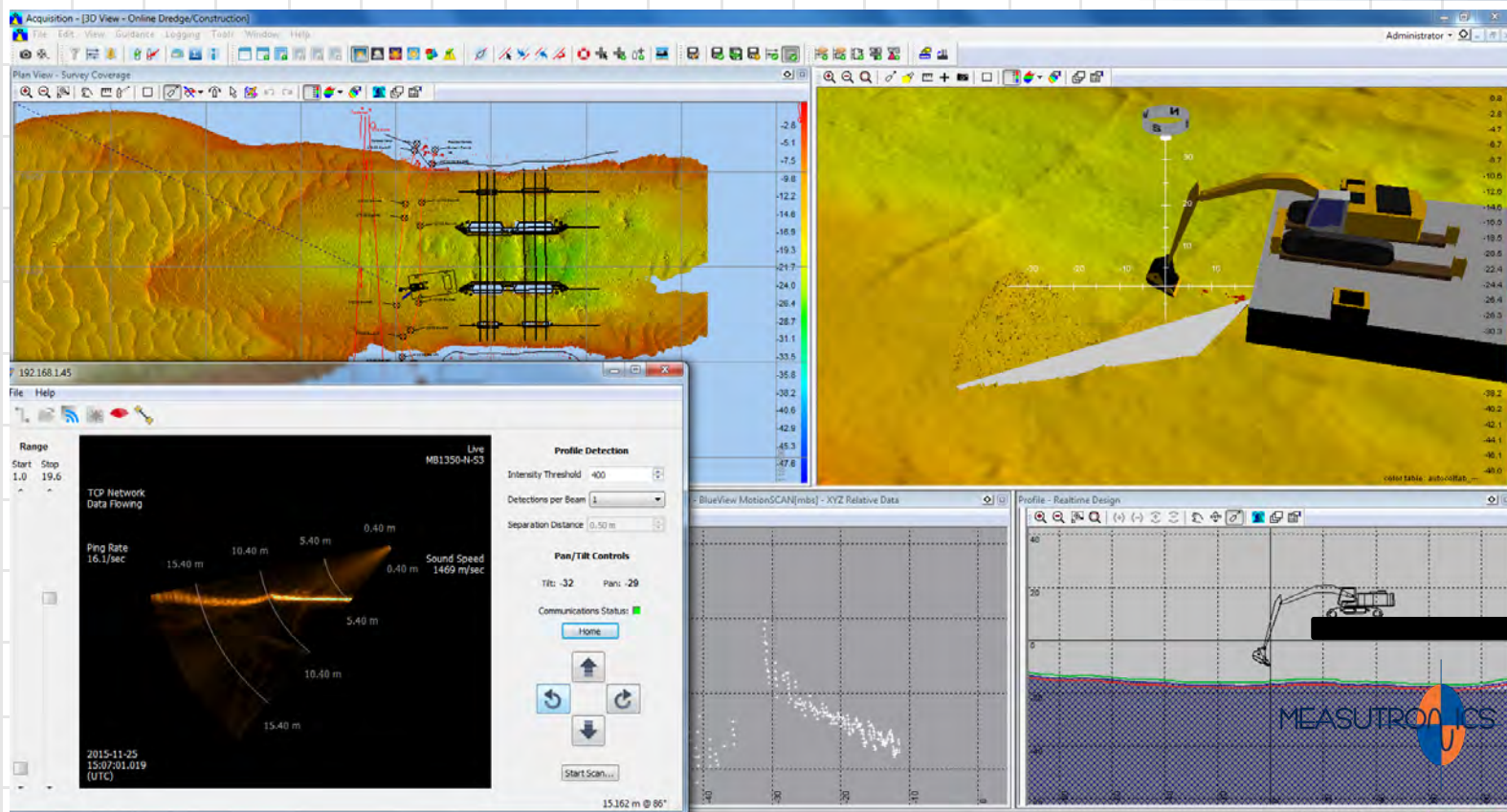


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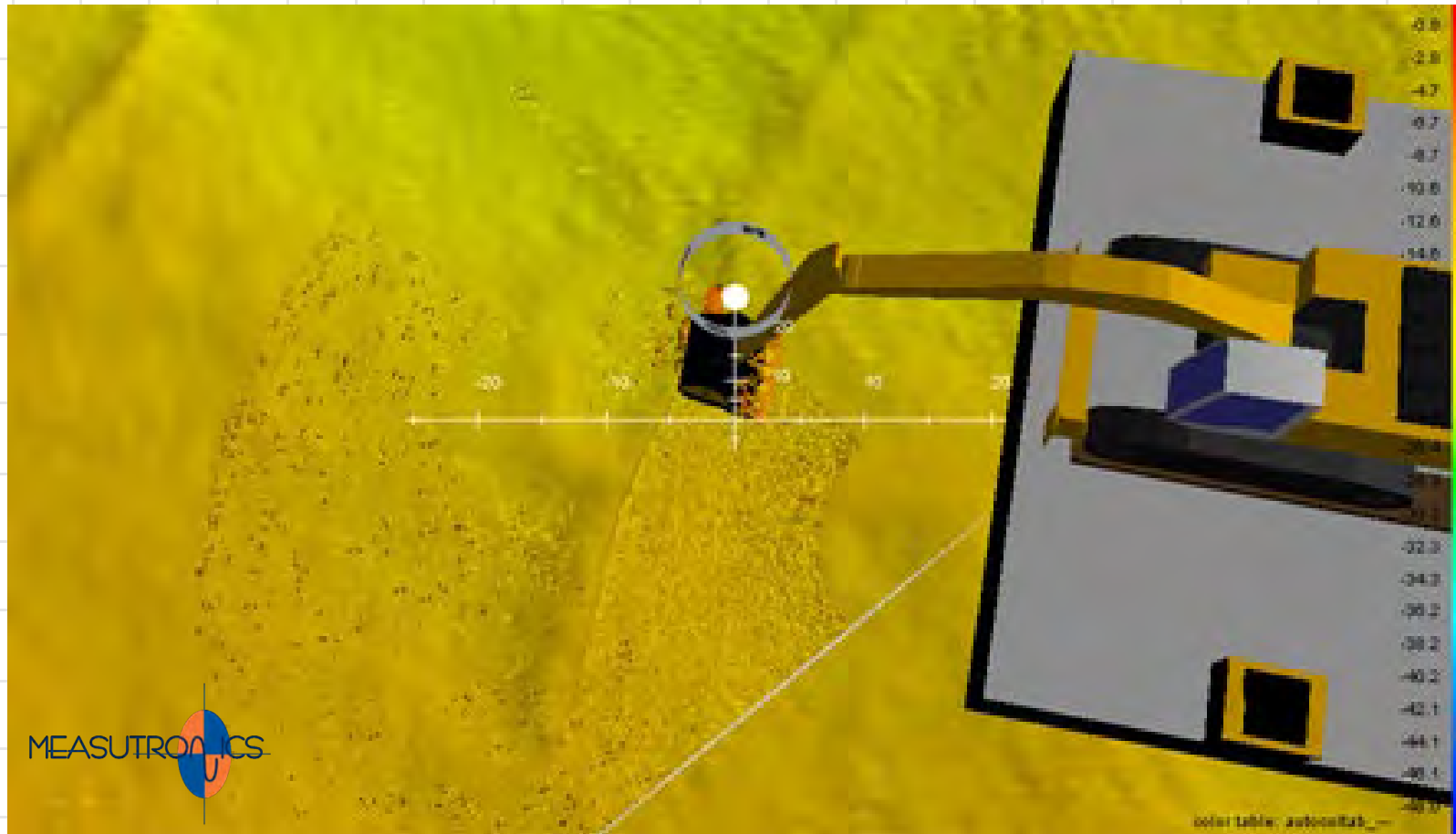
Updated Surface from  
SONAR Scan



# CONSTRUCTION PHASE



# CONSTRUCTION PHASE



 **TELEDYNE** BlueView<sup>™</sup>  
Everywhereyoulook<sup>™</sup>

# CONSTRUCTION PHASE



**TELEDYNE RESON**  
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# CONSTRUCTION PHASE



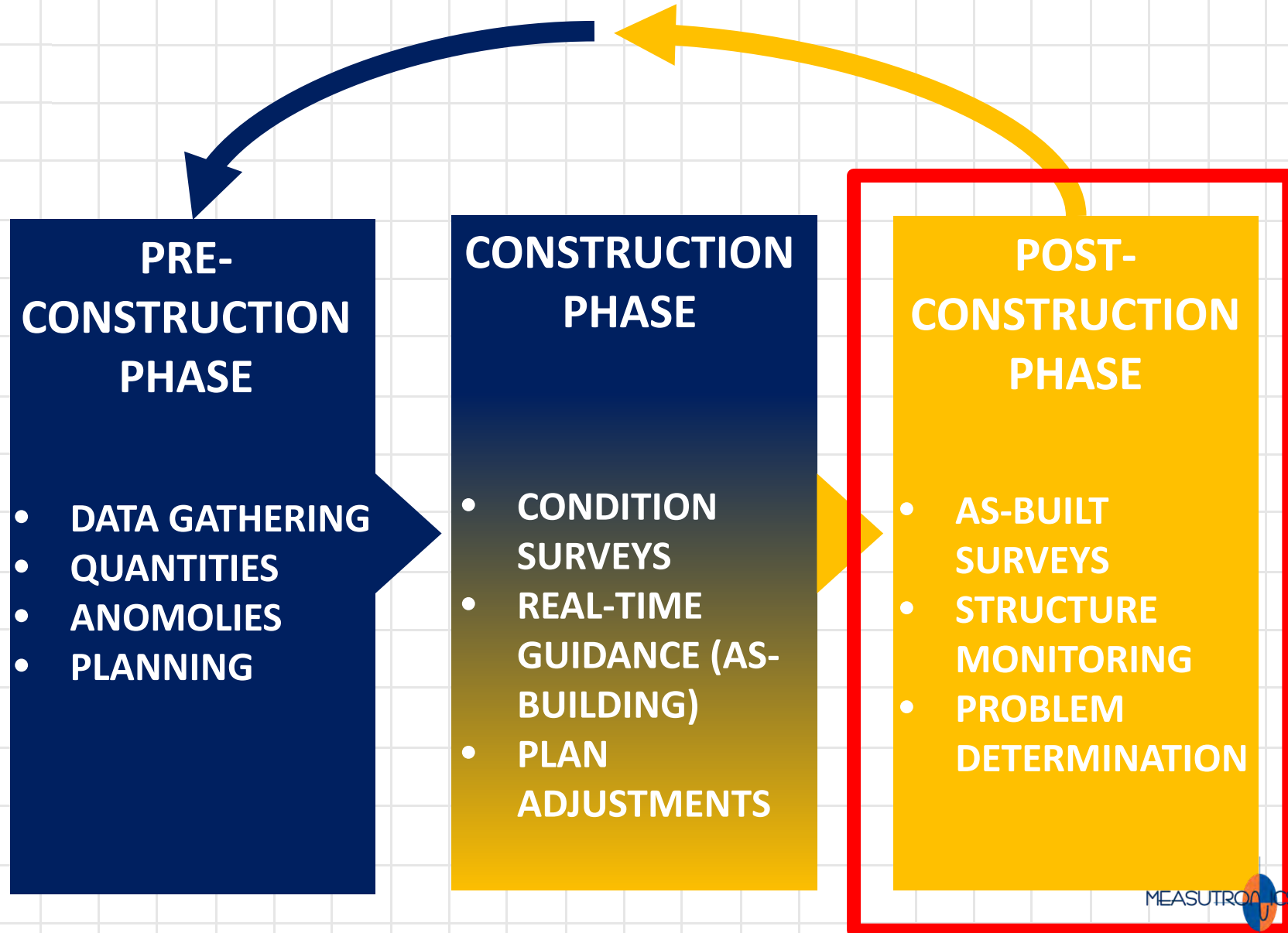
**TELEDYNE RESON**  
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# CONSTRUCTION PHASE



**TELEDYNE RESON**  
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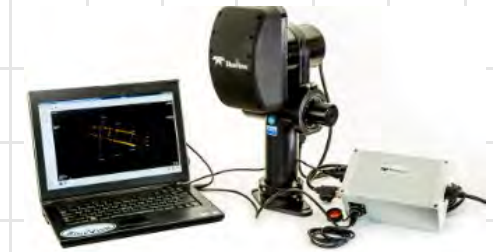
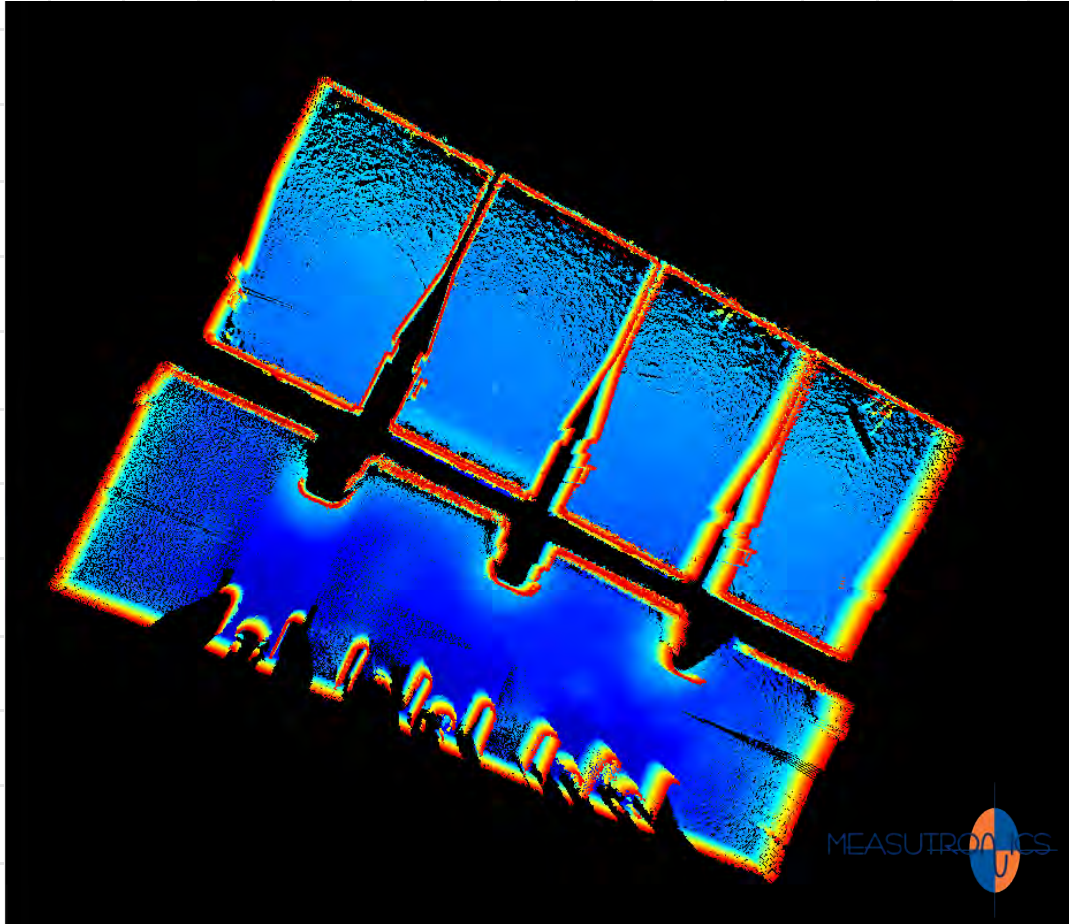
# PHASES OF MARINE CONSTRUCTION



# POST-CONSTRUCTION PHASE

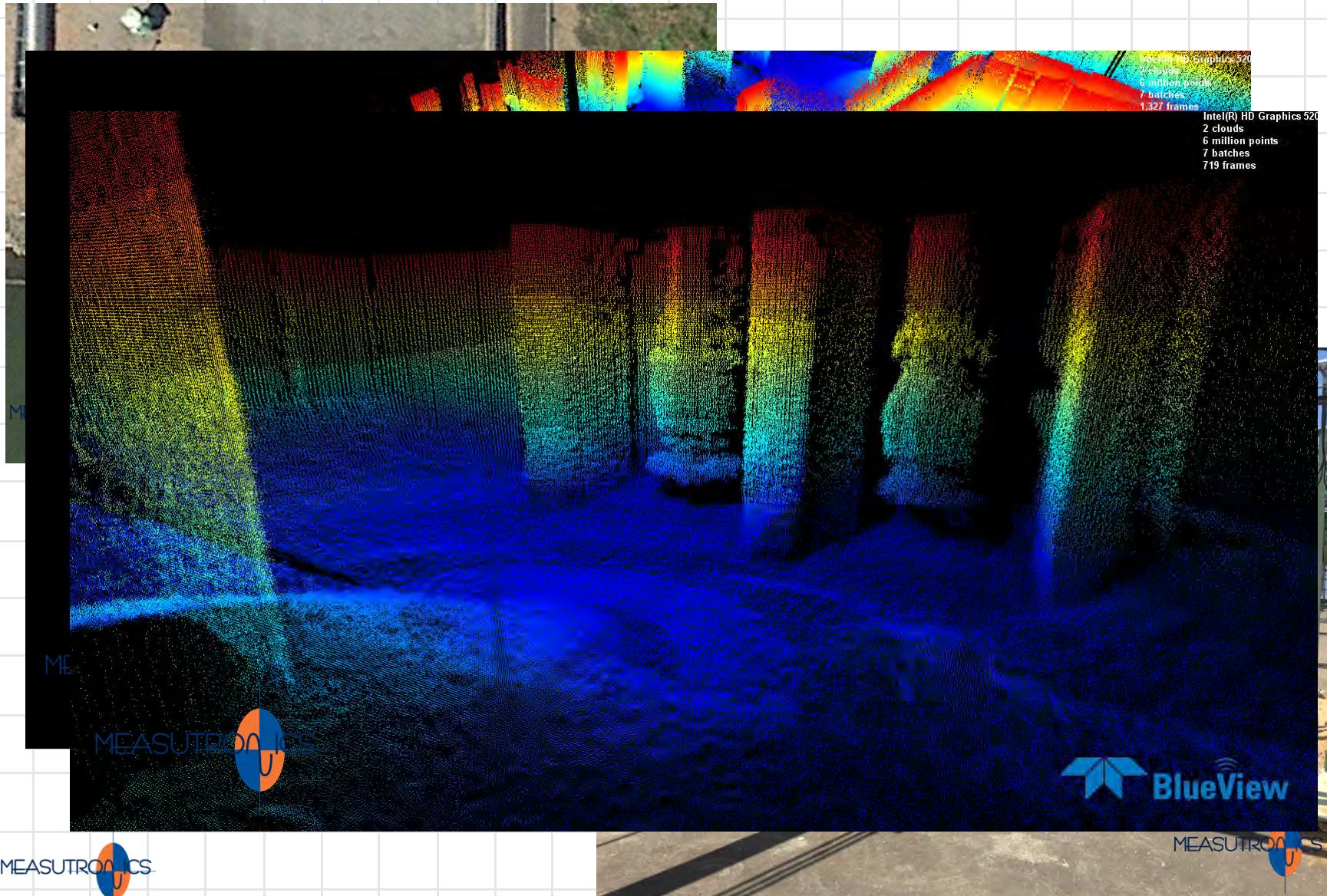


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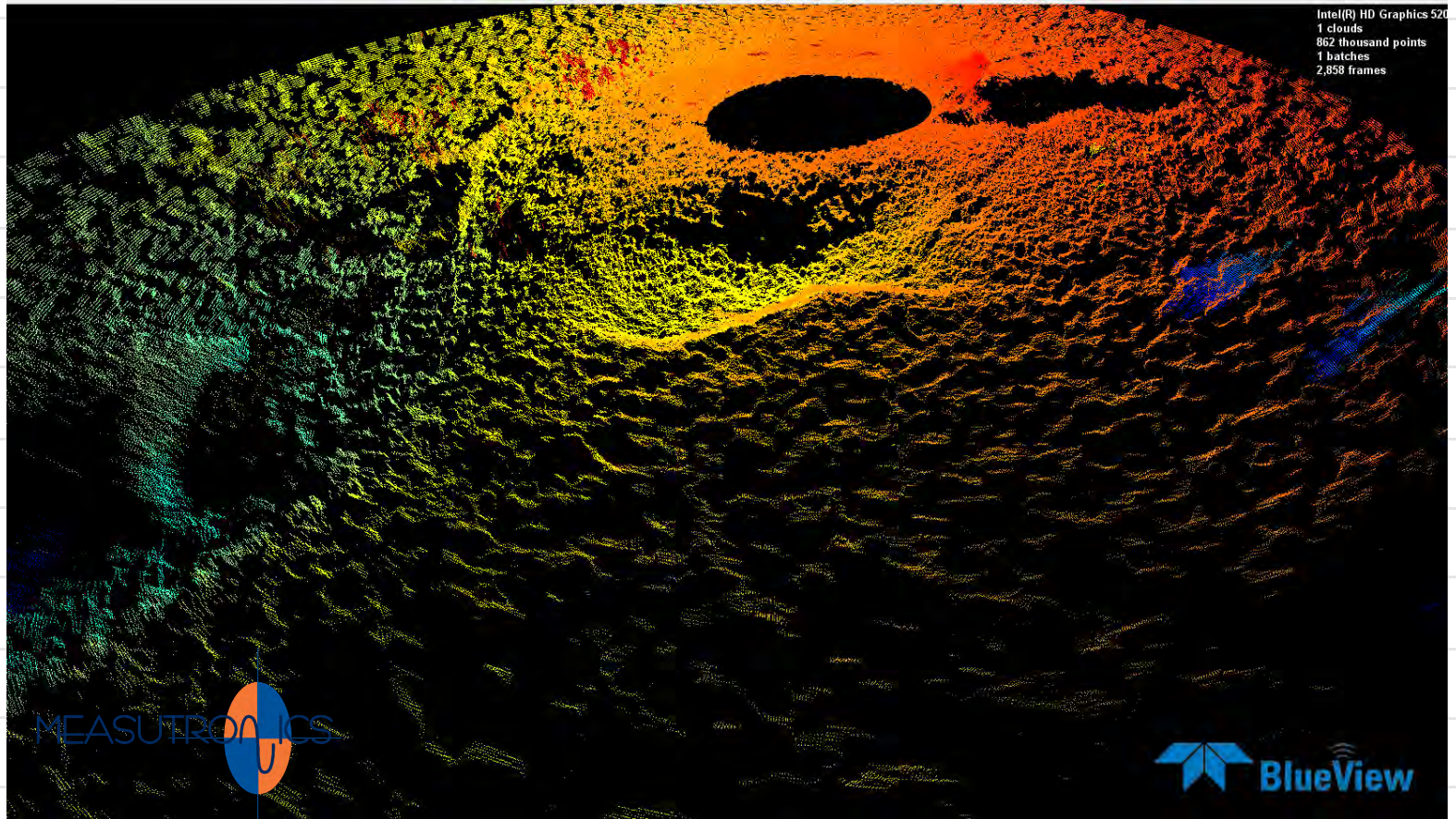


 **TELEDYNE** BlueView<sup>™</sup>  
Everywhereyoulook<sup>™</sup>

# POST-CONSTRUCTION PHASE



# POST-CONSTRUCTION PHASE



 **TELEDYNE BlueView**  
Everywhereyoulook™

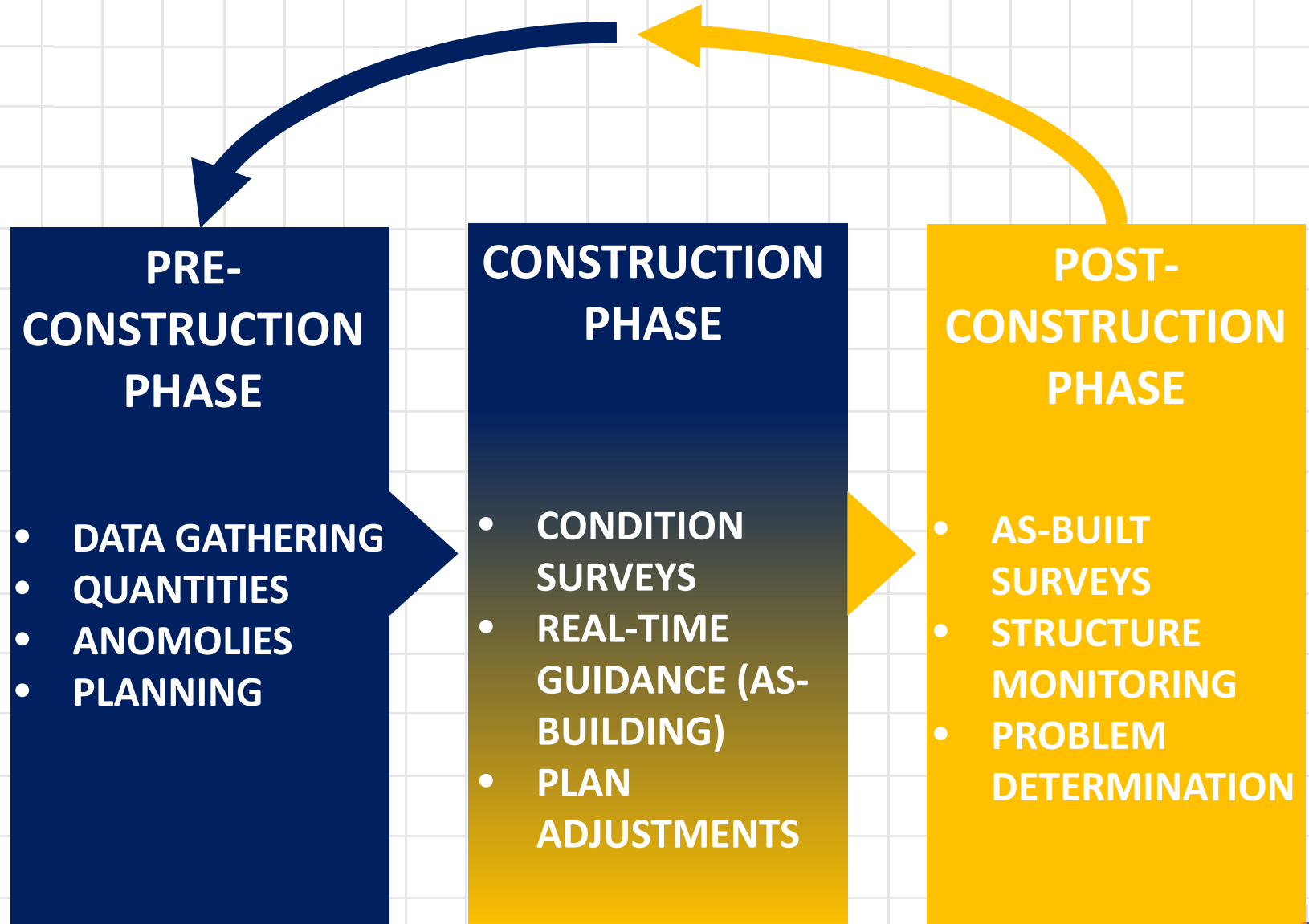
# POST-CONSTRUCTION PHASE



**TELEDYNE RESON**  
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# PHASES OF MARINE CONSTRUCTION



# Questions?



[www.Measutronics.com](http://www.Measutronics.com)