

Bowman

Ports & Harbors

Port Asset Condition Kit (PACK)



AAPA New Member Webinar

April 8, 2025

Meet the Presenters



Bryan Seitz
Moderator
(Ports & Harbors Operations)



Vijay Agrawal, PE
Executive Vice President,
Ports & Harbors

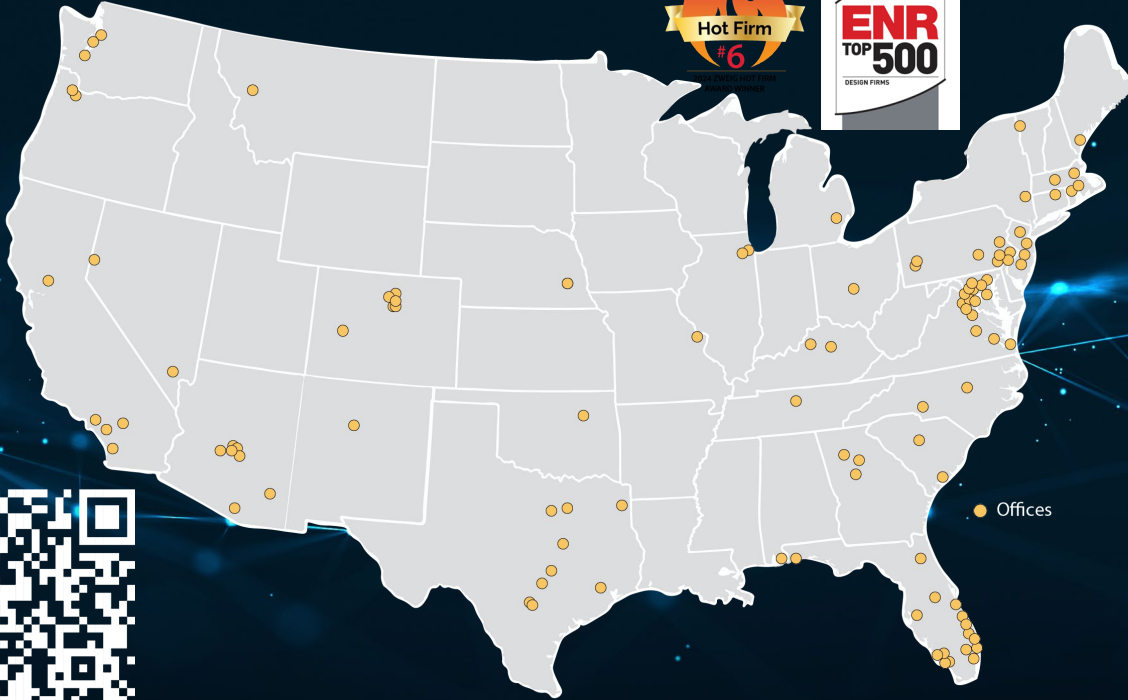


Trevor Thomas
Principal



Brandon Shiveley
GIS Developer II

About Bowman



29

Years in Business

106

Offices Nationwide

2,300

of Employees

50

Maritime Clients

Bowman

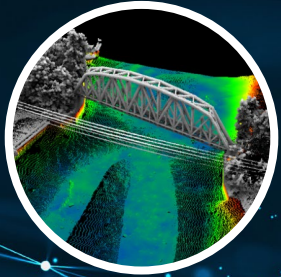
What are current practices for
Port Authorities?

An abstract graphic featuring a network of glowing blue dots connected by thin lines, set against a dark blue background with scattered light blue particles. The network structure is more prominent in the center and right side of the image.

PACK

Capabilities & Benefits

Bowman's Port Asset Condition Kit (PACK) Overview



Dual Mapping
technology



Cloud-based



Cost-effective

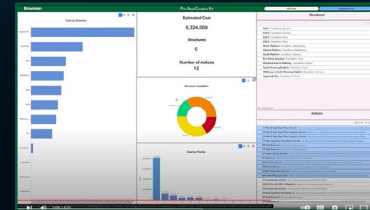
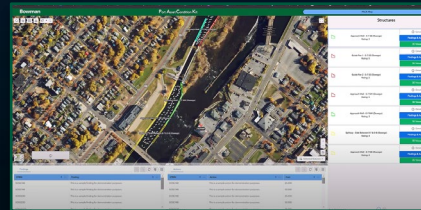
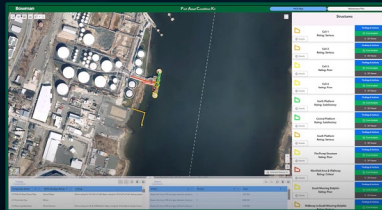
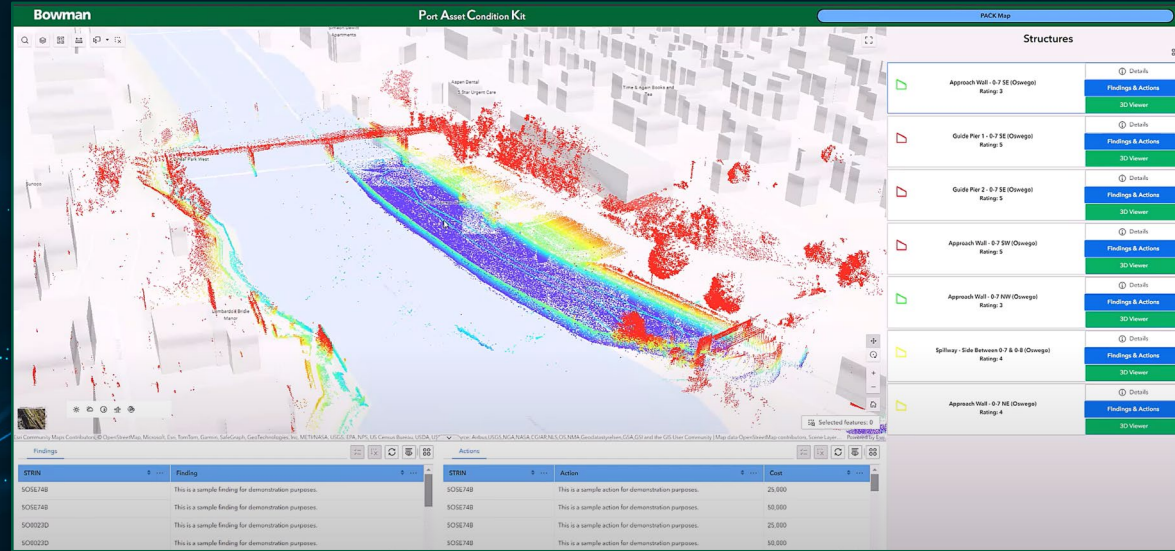


Integration with
your GIS software

*No third-party
software required*

PACK Overview

- Personalized, GIS-based system for port assets
- 2D and 3D interactive maps – above and below waterlines
- Database of port asset conditions, priority of repair, action steps, and associated costs
- [Video Link](#)



Collecting Data



ArcGIS Mobile Applications

- Survey123
- Field Maps
- QuickCapture

Data Collection Applications

- Digitized paper forms for easy use
- Introduced efficiencies for data collection
- Syncs with interactive maps in real-time

✕ Detention Pond Inspection ☰

Site Information & Time Keeping

▼ Site Information

Site ID
0027S

Facility Name

Facility Address

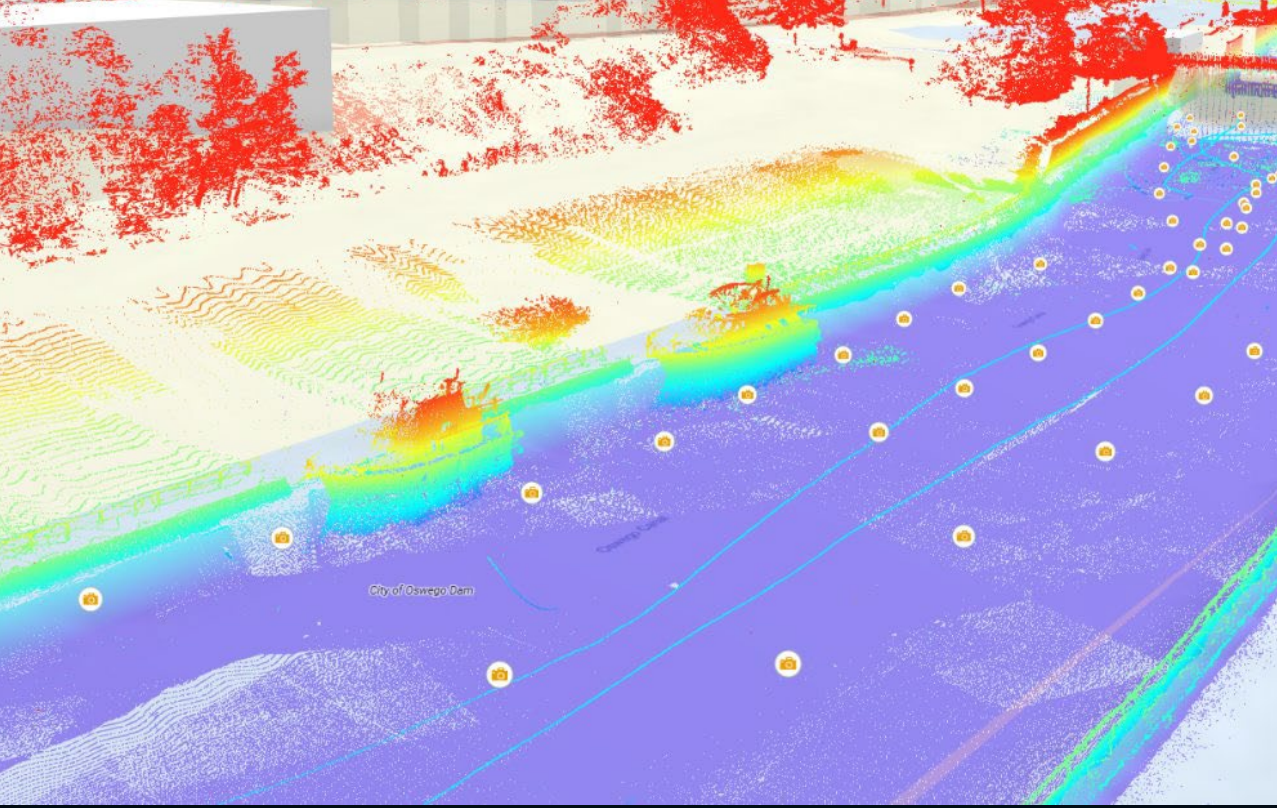
City
Burke

State
VA

Zip
22015

1 of 2 >

Port Asset Condition Kit (PACK)



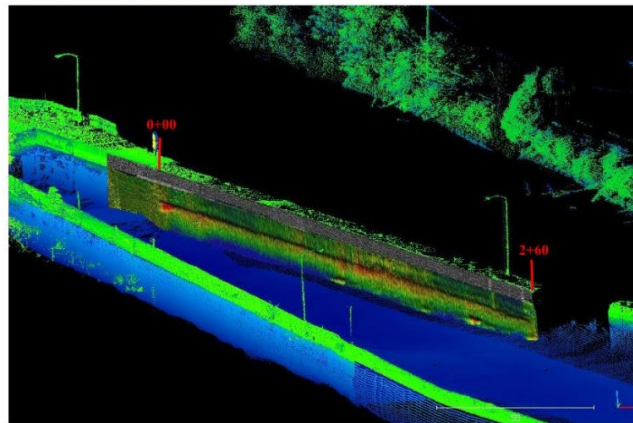
- GIS integrated asset management platform for ports
- Seamless view of site scan above and below waterline in 2D and 3D
- View georeferenced images collected during inspection
- View inspection results connected to GIS
- Augmented reality view of site in mobile device showing point cloud in 3D
- Compare archived scans of same locations
- Perform capital planning and condition assessment

- Custom PDF outputs
- Custom Excel/SmartSheet outputs
- Process Automation



Structure Name: Approach Wall - O-7 SE (Oswego)
Division: Western
Section: Syracuse
Inspection Completion Date: 09/06/2013

There are no addendums to this report.



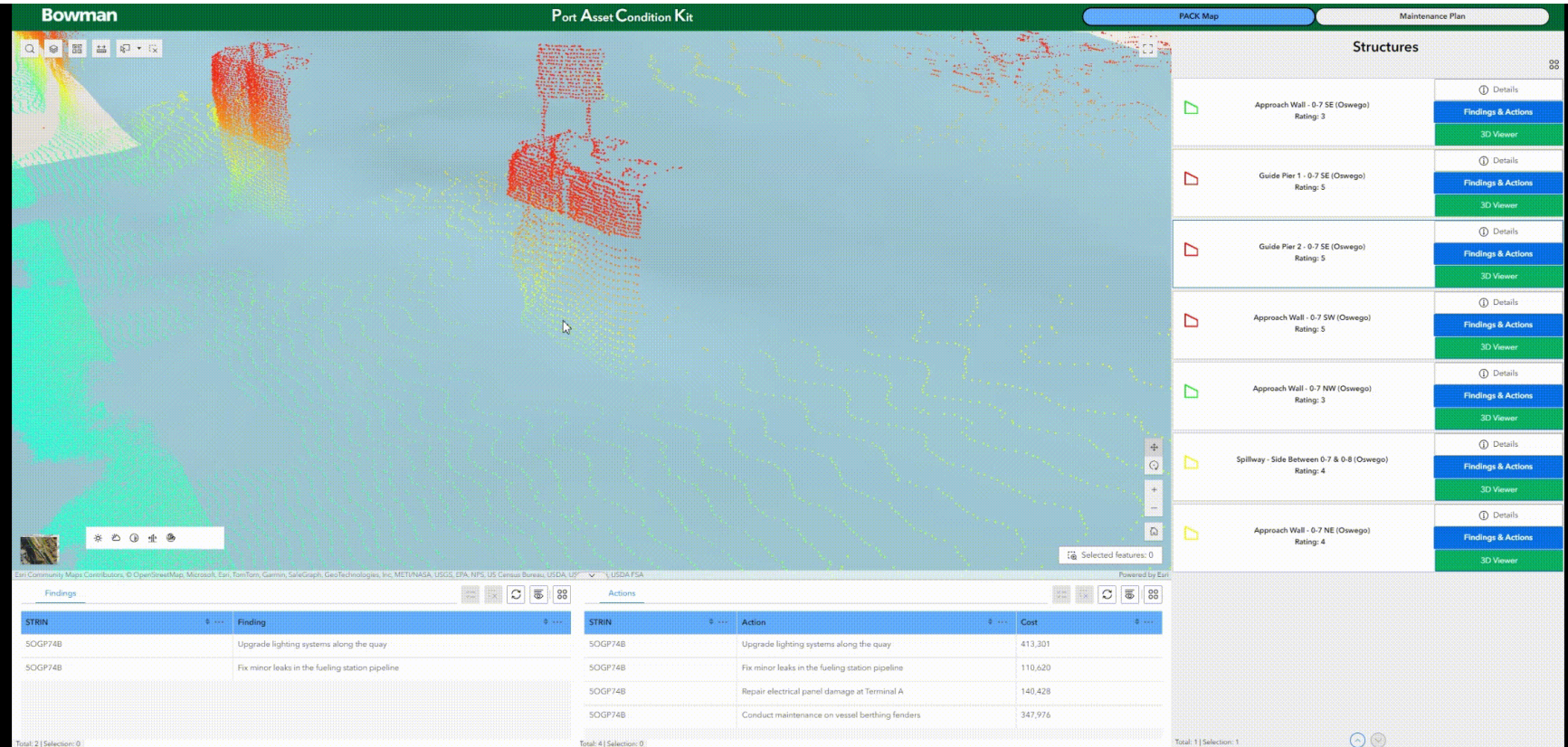
TO CORNER
20 CORNER

TOP OF WALL (MEASURED AT STA. 1+00)
ELEV. = 273.60

STRIN S05E74B

Stationing: 1+00, 1+10, 1+20, 1+30, 1+40, 1+50, 1+60, 1+70, 1+80, 1+90, 2+00, 2+10, 2+20, 2+30, 2+40, 2+50, 2+60, 2+70, 2+80, 2+90, 3+00, 3+10, 3+20, 3+30, 3+40, 3+50, 3+60, 3+70, 3+80, 3+90, 4+00, 4+10, 4+20, 4+30, 4+40, 4+50, 4+60, 4+70, 4+80, 4+90, 5+00, 5+10, 5+20, 5+30, 5+40, 5+50, 5+60, 5+70, 5+80, 5+90, 6+00, 6+10, 6+20, 6+30, 6+40, 6+50, 6+60, 6+70, 6+80, 6+90, 7+00, 7+10, 7+20, 7+30, 7+40, 7+50, 7+60, 7+70, 7+80, 7+90, 8+00, 8+10, 8+20, 8+30, 8+40, 8+50, 8+60, 8+70, 8+80, 8+90, 9+00, 9+10, 9+20, 9+30, 9+40, 9+50, 9+60, 9+70, 9+80, 9+90, 10+00, 10+10, 10+20, 10+30, 10+40, 10+50, 10+60, 10+70, 10+80, 10+90, 11+00, 11+10, 11+20, 11+30, 11+40, 11+50, 11+60, 11+70, 11+80, 11+90, 12+00, 12+10, 12+20, 12+30, 12+40, 12+50, 12+60, 12+70, 12+80, 12+90, 13+00, 13+10, 13+20, 13+30, 13+40, 13+50, 13+60, 13+70, 13+80, 13+90, 14+00, 14+10, 14+20, 14+30, 14+40, 14+50, 14+60, 14+70, 14+80, 14+90, 15+00, 15+10, 15+20, 15+30, 15+40, 15+50, 15+60, 15+70, 15+80, 15+90, 16+00, 16+10, 16+20, 16+30, 16+40, 16+50, 16+60, 16+70, 16+80, 16+90, 17+00, 17+10, 17+20, 17+30, 17+40, 17+50, 17+60, 17+70, 17+80, 17+90, 18+00, 18+10, 18+20, 18+30, 18+40, 18+50, 18+60, 18+70, 18+80, 18+90, 19+00, 19+10, 19+20, 19+30, 19+40, 19+50, 19+60, 19+70, 19+80, 19+90, 20+00, 20+10, 20+20, 20+30, 20+40, 20+50, 20+60, 20+70, 20+80, 20+90, 21+00, 21+10, 21+20, 21+30, 21+40, 21+50, 21+60, 21+70, 21+80, 21+90, 22+00, 22+10, 22+20, 22+30, 22+40, 22+50, 22+60, 22+70, 22+80, 22+90, 23+00, 23+10, 23+20, 23+30, 23+40, 23+50, 23+60, 23+70, 23+80, 23+90, 24+00, 24+10, 24+20, 24+30, 24+40, 24+50, 24+60, 24+70, 24+80, 24+90, 25+00, 25+10, 25+20, 25+30, 25+40, 25+50, 25+60, 25+70, 25+80, 25+90, 26+00, 26+10, 26+20, 26+30, 26+40, 26+50, 26+60, 26+70, 26+80, 26+90, 27+00, 27+10, 27+20, 27+30, 27+40, 27+50, 27+60, 27+70, 27+80, 27+90, 28+00, 28+10, 28+20, 28+30, 28+40, 28+50, 28+60, 28+70, 28+80, 28+90, 29+00, 29+10, 29+20, 29+30, 29+40, 29+50, 29+60, 29+70, 29+80, 29+90, 30+00, 30+10, 30+20, 30+30, 30+40, 30+50, 30+60, 30+70, 30+80, 30+90, 31+00, 31+10, 31+20, 31+30, 31+40, 31+50, 31+60, 31+70, 31+80, 31+90, 32+00, 32+10, 32+20, 32+30, 32+40, 32+50, 32+60, 32+70, 32+80, 32+90, 33+00, 33+10, 33+20, 33+30, 33+40, 33+50, 33+60, 33+70, 33+80, 33+90, 34+00, 34+10, 34+20, 34+30, 34+40, 34+50, 34+60, 34+70, 34+80, 34+90, 35+00, 35+10, 35+20, 35+30, 35+40, 35+50, 35+60, 35+70, 35+80, 35+90, 36+00, 36+10, 36+20, 36+30, 36+40, 36+50, 36+60, 36+70, 36+80, 36+90, 37+00, 37+10, 37+20, 37+30, 37+40, 37+50, 37+60, 37+70, 37+80, 37+90, 38+00, 38+10, 38+20, 38+30, 38+40, 38+50, 38+60, 38+70, 38+80, 38+90, 39+00, 39+10, 39+20, 39+30, 39+40, 39+50, 39+60, 39+70, 39+80, 39+90, 40+00, 40+10, 40+20, 40+30, 40+40, 40+50, 40+60, 40+70, 40+80, 40+90, 41+00, 41+10, 41+20, 41+30, 41+40, 41+50, 41+60, 41+70, 41+80, 41+90, 42+00, 42+10, 42+20, 42+30, 42+40, 42+50, 42+60, 42+70, 42+80, 42+90, 43+00, 43+10, 43+20, 43+30, 43+40, 43+50, 43+60, 43+70, 43+80, 43+90, 44+00, 44+10, 44+20, 44+30, 44+40, 44+50, 44+60, 44+70, 44+80, 44+90, 45+00, 45+10, 45+20, 45+30, 45+40, 45+50, 45+60, 45+70, 45+80, 45+90, 46+00, 46+10, 46+20, 46+30, 46+40, 46+50, 46+60, 46+70, 46+80, 46+90, 47+00, 47+10, 47+20, 47+30, 47+40, 47+50, 47+60, 47+70, 47+80, 47+90, 48+00, 48+10, 48+20, 48+30, 48+40, 48+50, 48+60, 48+70, 48+80, 48+90, 49+00, 49+10, 49+20, 49+30, 49+40, 49+50, 49+60, 49+70, 49+80, 49+90, 50+00, 50+10, 50+20, 50+30, 50+40, 50+50, 50+60, 50+70, 50+80, 50+90, 51+00, 51+10, 51+20, 51+30, 51+40, 51+50, 51+60, 51+70, 51+80, 51+90, 52+00, 52+10, 52+20, 52+30, 52+40, 52+50, 52+60, 52+70, 52+80, 52+90, 53+00, 53+10, 53+20, 53+30, 53+40, 53+50, 53+60, 53+70, 53+80, 53+90, 54+00, 54+10, 54+20, 54+30, 54+40, 54+50, 54+60, 54+70, 54+80, 54+90, 55+00, 55+10, 55+20, 55+30, 55+40, 55+50, 55+60, 55+70, 55+80, 55+90, 56+00, 56+10, 56+20, 56+30, 56+40, 56+50, 56+60, 56+70, 56+80, 56+90, 57+00, 57+10, 57+20, 57+30, 57+40, 57+50, 57+60, 57+70

Real-time Data Collection



Real-time Data Collection

Bowman Port Asset Condition Kit

PACK Map Maintenance Plan

Structures

	Approach Wall - 0-7 SE (Oswego) Rating: 3	Details Findings & Actions 3D Viewer
	Guide Pier 1 - 0-7 SE (Oswego) Rating: 5	Details Findings & Actions 3D Viewer
	Guide Pier 2 - 0-7 SE (Oswego) Rating: 5	Details Findings & Actions 3D Viewer
	Approach Wall - 0-7 SW (Oswego) Rating: 5	Details Findings & Actions 3D Viewer
	Approach Wall - 0-7 NW (Oswego) Rating: 3	Details Findings & Actions 3D Viewer
	Spillway - Side Between 0-7 & 0-8 (Oswego) Rating: 4	Details Findings & Actions 3D Viewer
	Approach Wall - 0-7 NE (Oswego) Rating: 4	Details Findings & Actions 3D Viewer

Selected features: 0

Findings

STRIN	Finding
SOSE74B	Replace damaged fender piles at Berth 3
SOSE74B	Resurface dock area due to excessive wear
SO0023D	Repair minor cracks in the bulkhead structure
SO0023D	Dredge sediment buildup near the main channel

Total: 12 | Selection: 0

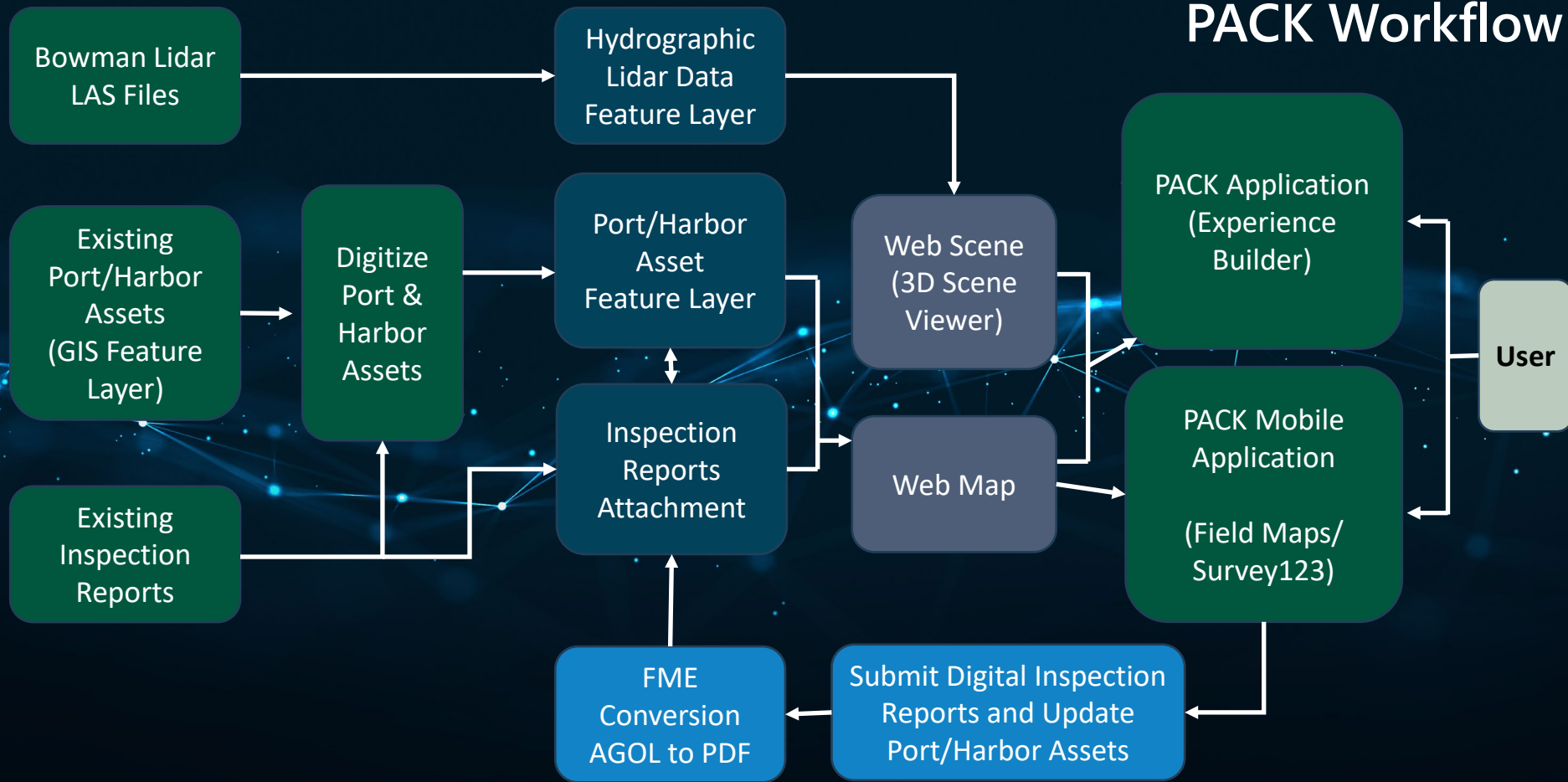
Actions

STRIN	Action	Cost
SOSE74B	Replace damaged fender piles at Berth 3	426,527
SOSE74B	Resurface dock area due to excessive wear	439,735
SOSE74B	Repair minor cracks in the bulkhead structure	457,355
SOSE74B	Dredge sediment buildup near the main channel	142,975

Total: 24 | Selection: 0

Total: 7 | Selection: 0

PACK Workflow





projects

Data Collection

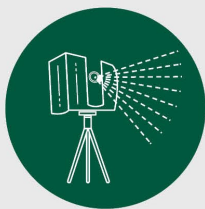
Integrated Survey / Geospatial Capabilities



CONVENTIONAL
SURVEYING



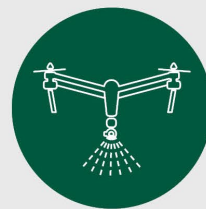
2D AND 3D
BIM AS-BUILT



LASER
SCANNING



MANNED
AIRCRAFT



DRONE
INTELLIGENCE



HYDROGRAPHY



MOBILE
MAPPING

Bulkheads

Piers

Wharfs

Overhead Structures

Piles

Navigation Channel

Utilities

Shoreline

Erosion/Scour/Obstruction

Buildings

Cranes

Equipment

Pavement

Example Assets

Georeferenced Location

Condition Assessment

Overturning

Pre- and post-incident Inspection

Missing Areas/Holes

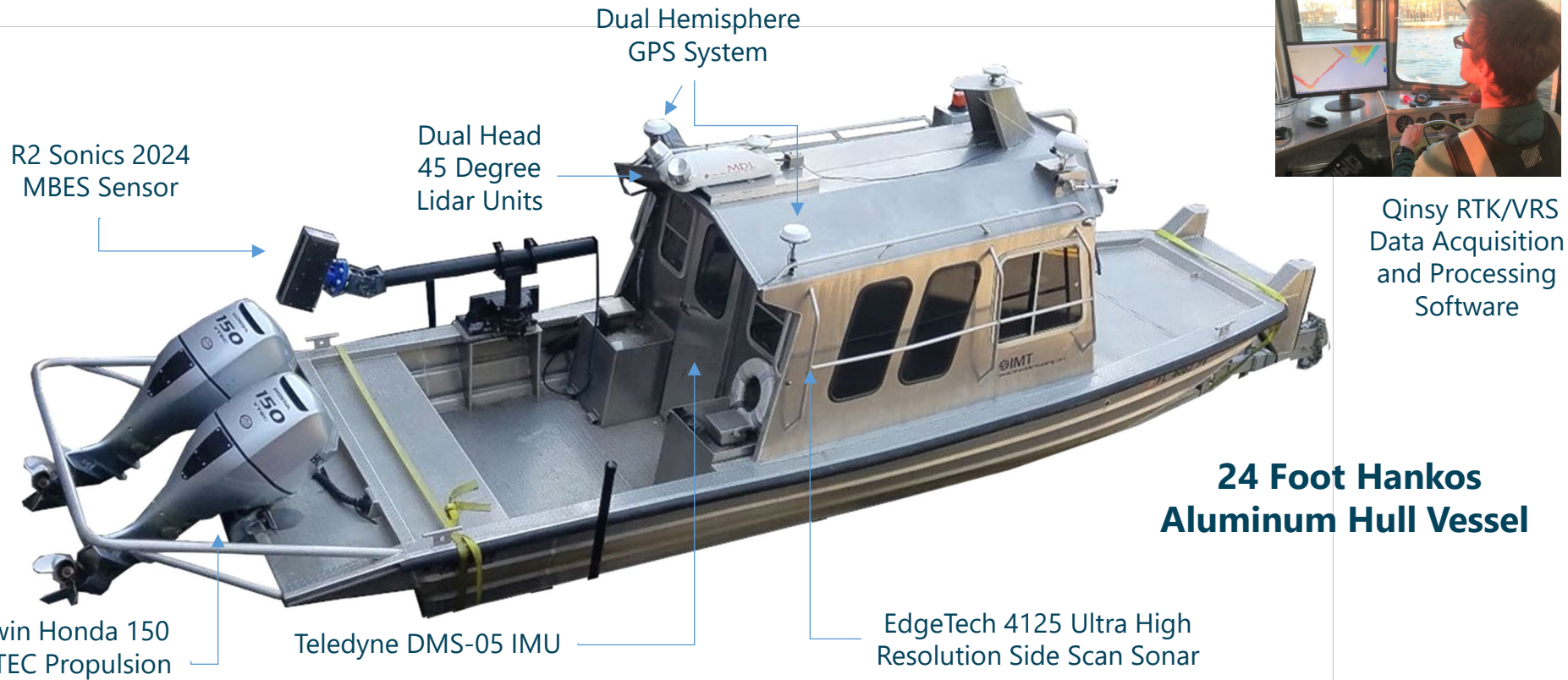
Damaged Areas

Obstructions

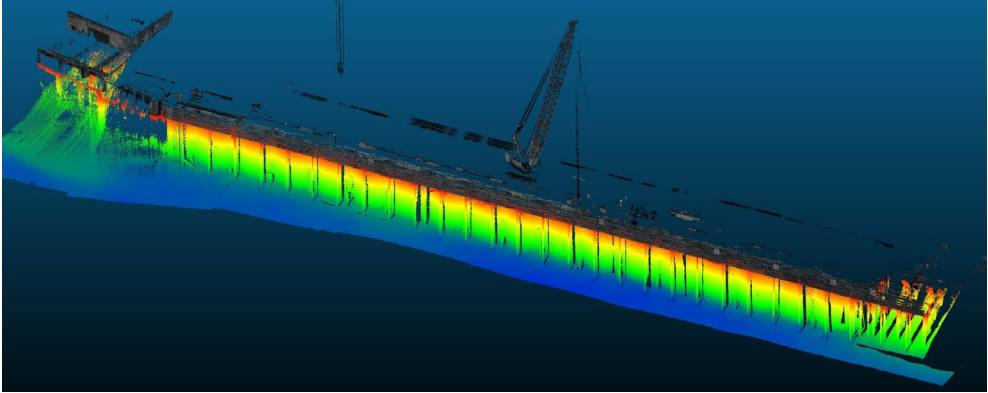
Sedimentation/Debris

Example Data

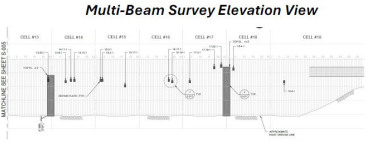
Bowman Survey Vessel – Dual Mapping Capability



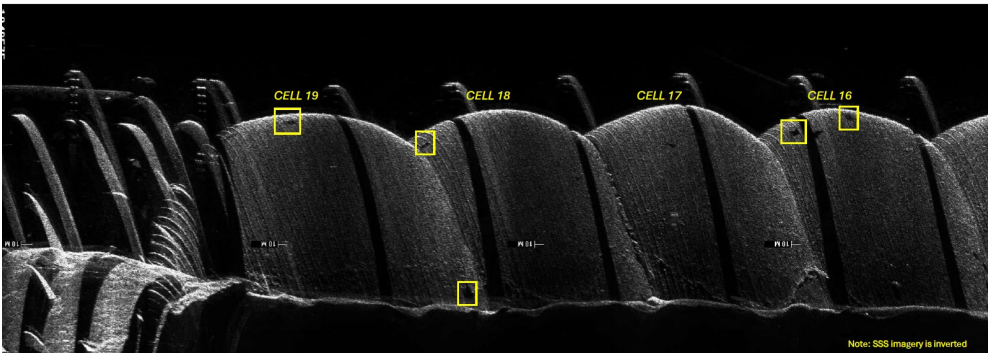
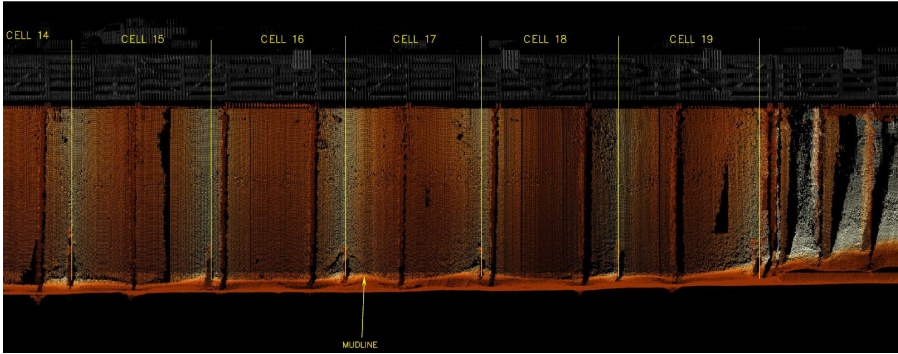
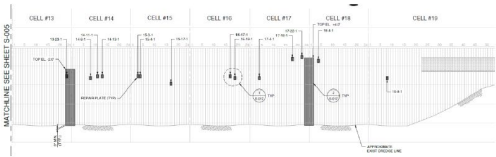
Port of Houston



Side Scan Sonar Survey



Multi-Beam Survey Elevation View

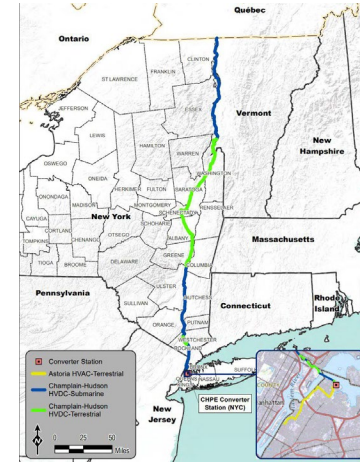


Champlain Hudson Power Express Project Details

Survey Locations for Clearance Analysis and Cable Design

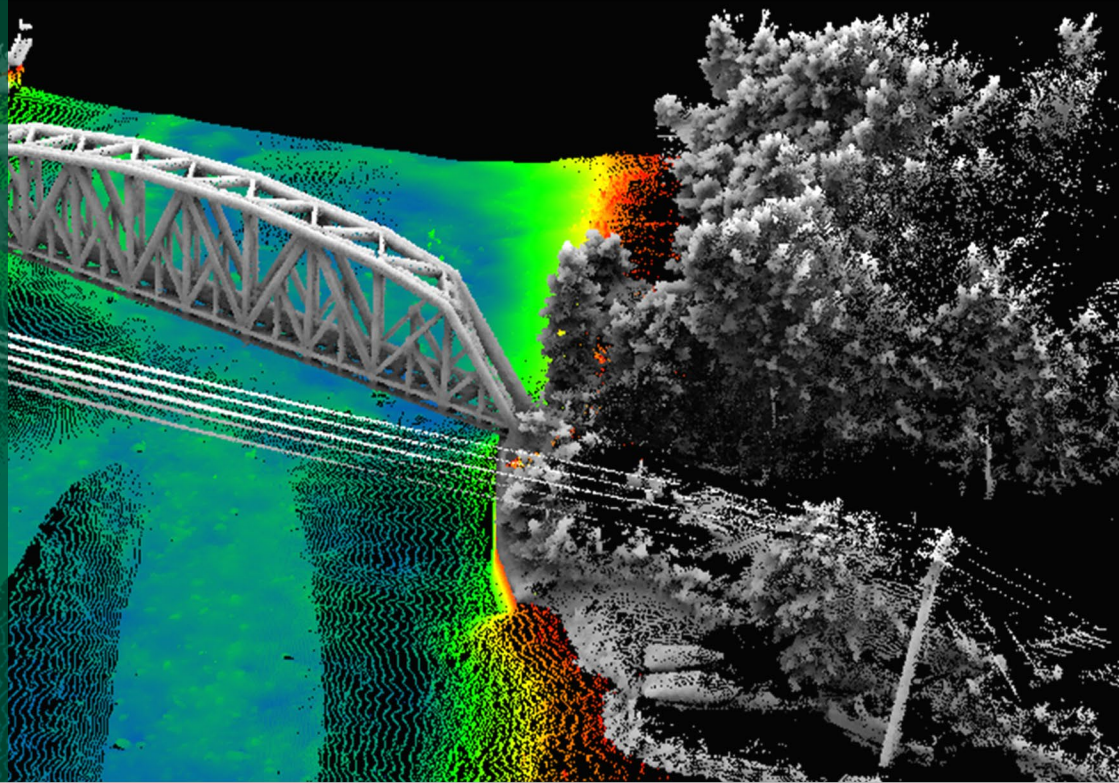
Champlain Canal System (Barge Clearance)

- 73 Miles of Navigation Channel
- 12 Lock Structures
- 11 Bridges and Overhead Structures
- 6.3 Miles of Harlem River (Barge Clearance and Cable Path Design)
- All Hudson River Bridge Crossings From Albany, NY to NYC (Barge Clearance)
- Docks, Mooring Locations, Ports



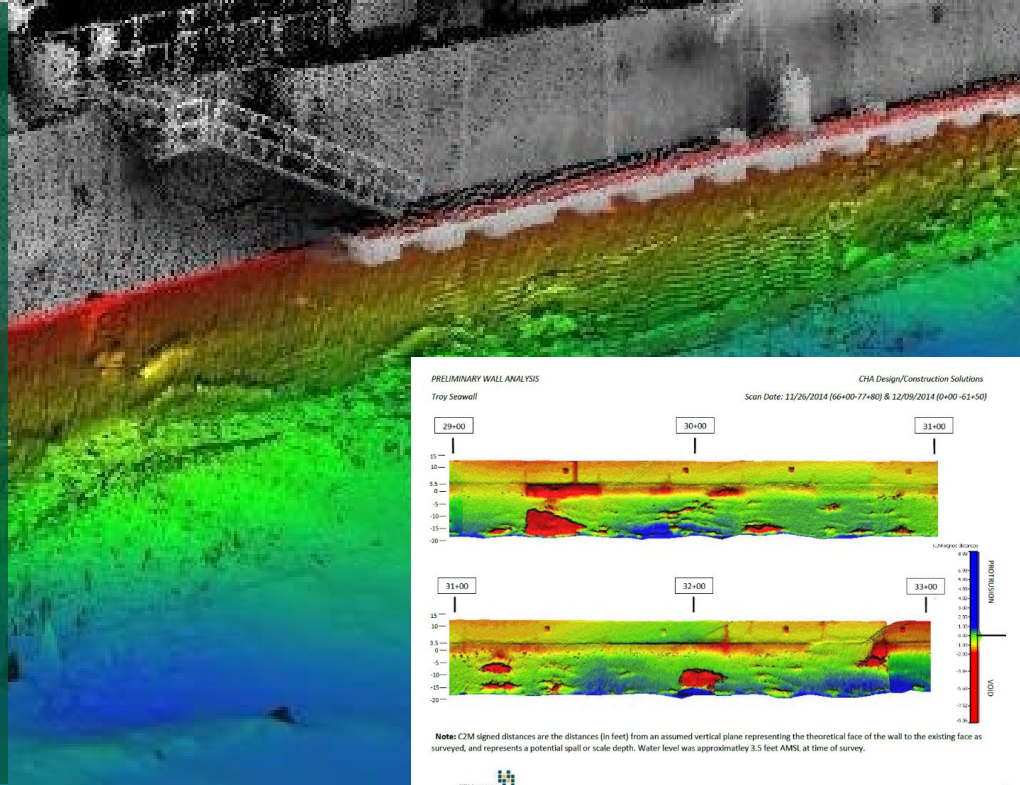
Erie Canal – Mohawk River Railroad Bridge Over Channel

- Collected for hydraulic openings
- 12 Miles of Mohawk/Erie Canal System
- MBES Bank to Bank
- Lidar Mobile Scanning Data
- Bridges-Locks-Overhead Structures
- Support of Ice Jamming/Flooding Issues
- Support 3D Hydraulic Flow Model



Seawall Stabilization and Condition Assessment | Troy, NY

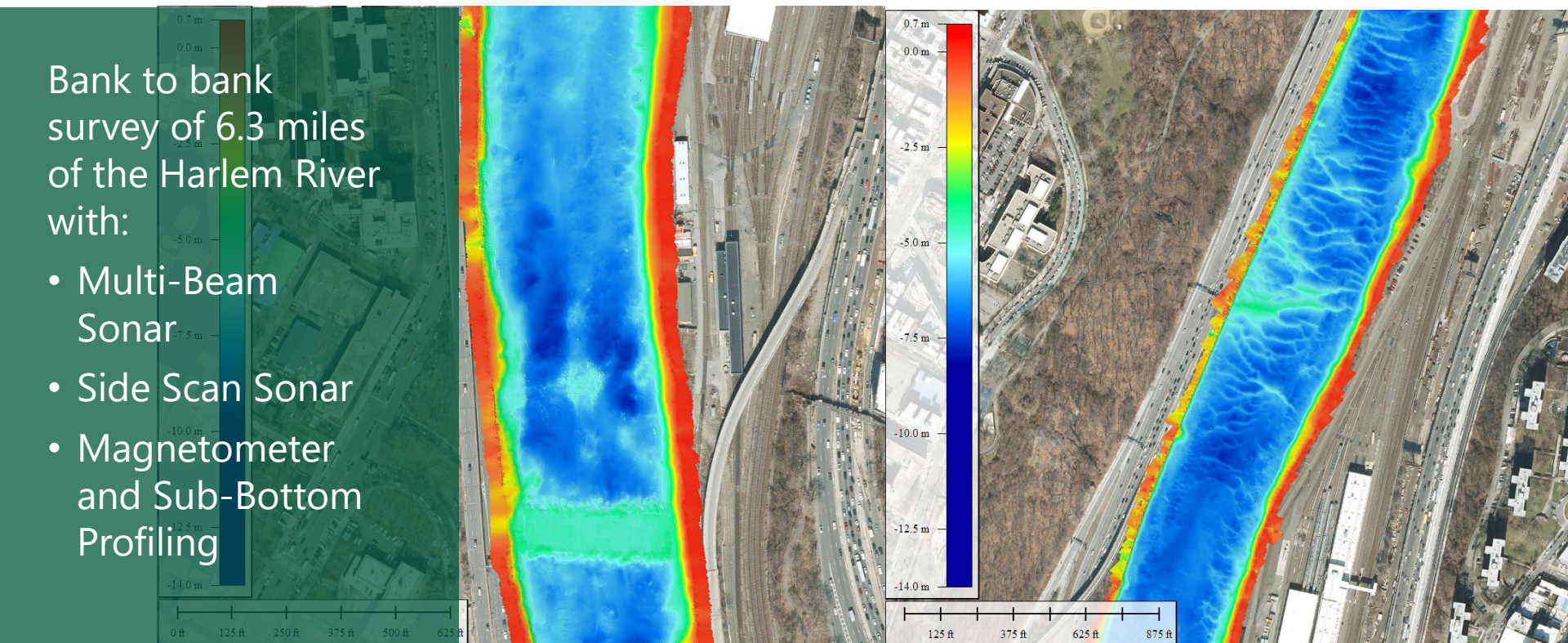
- Rehabilitation of 8,000 ft of Sea Wall along the Hudson River
- Vessel mobilized ahead of divers to use technology with inspection of canal structures
- Above and below waterline scanning
- Sub bottom profiling
- Field scanning time estimated at 1 week
- Deliverables include:
 - Site Mapping
 - Degradation analysis
 - Debris Analysis
 - Sub Bottom Profiling



Harlem River Survey (Barge Clearance and Cable Path)

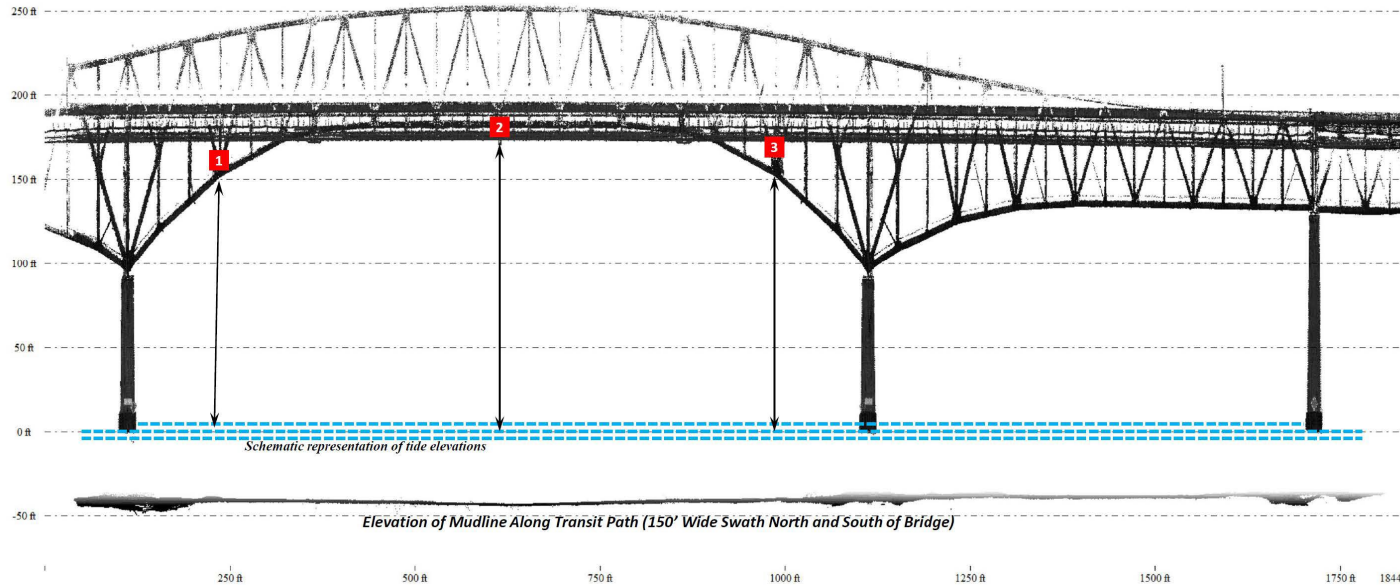
Bank to bank
survey of 6.3 miles
of the Harlem River
with:

- Multi-Beam Sonar
- Side Scan Sonar
- Magnetometer and Sub-Bottom Profiling



Newburgh-Beacon Clearance Analysis

Section Looking North



Air Draft Clearance Table

Bridge	Point	Description	Bridge Bottom Chord Elevation FT NAVD88	Tide Elevation			Clearance		
				Low FT NAVD88	Mean FT NAVD88	High FT NAVD88	Low Feet	Mean Feet	High Feet
Newburgh-Beacon	1	Beam	151.5	-2.2	0.1	2.3	153.7	151.4	149.2
Newburgh-Beacon	2	Nav Light	170.4				172.6	170.3	168.1
Newburgh-Beacon	3	Beam	151.6				153.8	151.5	149.3

- Tide information was obtained from NOAA database and not locally validated.
- NOAA Tidal elevations have an uncertainty of 0.23 US Survey Feet for this survey location.

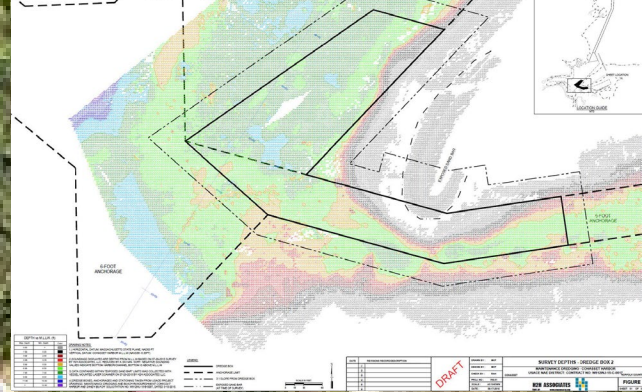
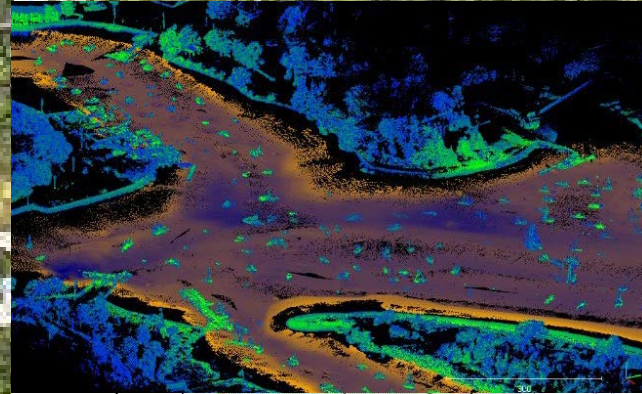


Figure: 5
Client: NKT
Project: Champlain Hudson Power Express
Sketch Name: Newburgh-Beacon Bridge

Figures are schematic only and Not To Scale

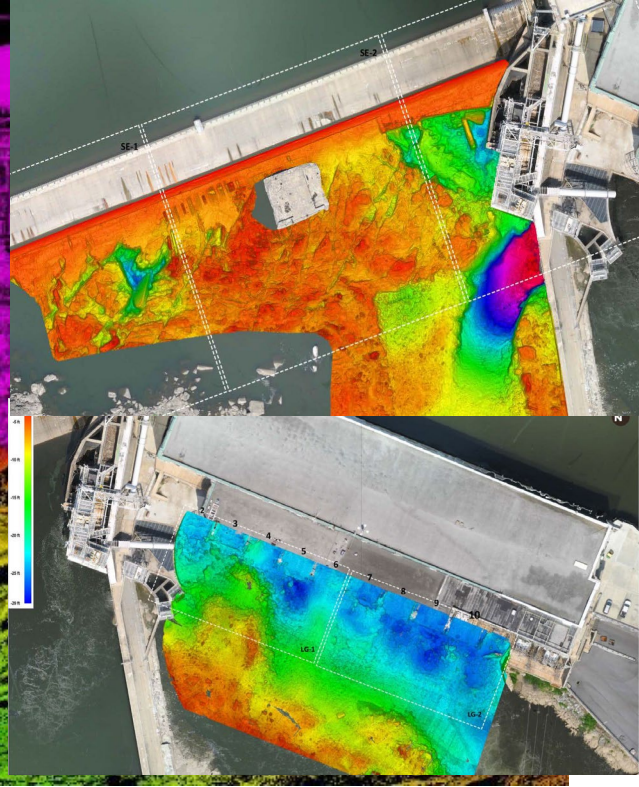
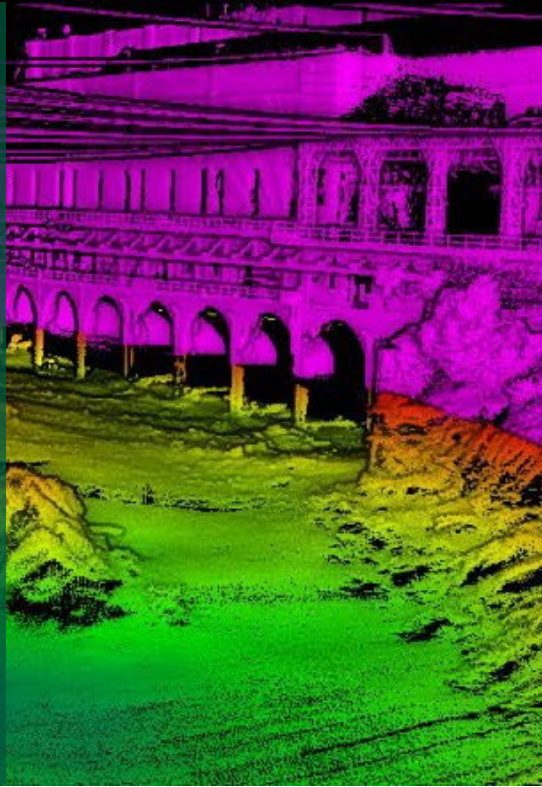
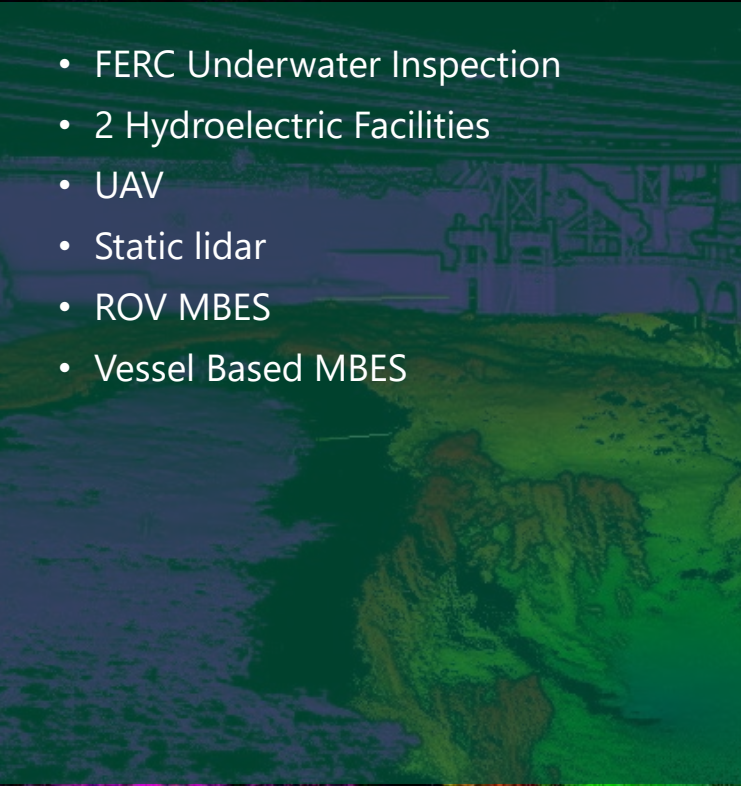
Cohasset Harbor Maintenance Dredging (USACE)

- \$1.7M channel dredging and beach nourishment project
- Services:
 - Multibeam
 - UAV Aerial
 - Topographic survey
 - Lidar survey
 - Volumetrics estimates
 - Hazard mapping and analysis
 - Pre- and post-dredge surveys
 - Pay applications
 - Construction documentation



Brookfield Renewables – Dam Inspection

- FERC Underwater Inspection
- 2 Hydroelectric Facilities
- UAV
- Static lidar
- ROV MBES
- Vessel Based MBES



Conclusion

“ [Bowman] does good work and consistently delivers exactly what we need... ”

Thank You

AAPA
ESSENTIAL. RESILIENT. UNITED.
SEAPORTS DELIVER

CaldwellMarine
INTERNATIONAL
A JAG COMPANY

Questions?



Contact Form

...or e-mail maritime@bowman.com