

# **The Future of Navigation**

## **Innovative Technologies for a Resilient Marine Transportation System**

### **Committee on Marine Transportation R&D Conference**

June 24, 2014

James R. McCarville, Executive Director  
Port of Pittsburgh Commission

# Context: What's happening in society...

- We are embedded in social media
- Want it now, not next quarter
- More collaborative, crowd source-y types
- Want to be connected to family, friends, banks
- Look for approval from peers, more so than from authorities
- See less support for public infrastructure funding
- And we are still searching for the PPP magic bullet

# Context: What's happening in technology...

- Accelerating speed and declining marginal cost of innovation
- Miniaturization and touch-less computers
- Enormously growing cloud data storage
- Nearly ubiquitous access to information internet
  - ▣ With a big exception
- Data collection's cost becoming a value-added service
- Cyber security has end to end needs
- Cheaper, cleaner LNG fuels
- 3D manufacturing on vessels or on old locks
- THE INDUSTRIAL INTERNET

# What do we need to fix...

- Permitting processes that cannot keep up with technology
- Policies set in the 50s, 60s and 70s about funding priorities based on the kind of data collectable back then
- Plethora-s of panels that overload pilots with too much information
- Lousy inland waterway broadband coverage
- All the gizmos, gadgets, data and applications in the world that are either
  - ▣ locked behind government-only firewalls or
  - ▣ otherwise without a network

# Can we work on...

Putting electronic navigation charts, radar, GPS, compass, speed log, depth sounder, swing meter, and graphic notices to mariners, lock info and status, river objects, weather overlays, mile markers, river information and graphic notices to mariners on a Google-Glass-type device with voice-activated navigation

# Can we work on...

An inland broadband network capable of distributing all of the data above; plus secure, private corporate towing and intermodal information; plus environmental monitoring information; plus machine to machine and sensor to sensor communication of the industrial internet?

Why?

# Can we work on...

Developing a public-private test bed to bring together the best cutting edge technologies of each to bring inland navigation into the 21<sup>st</sup> century

# Can we work on...

Developing a portal that has all the public and all the related maritime commercial information together in one place



**Here's is something to build on...**

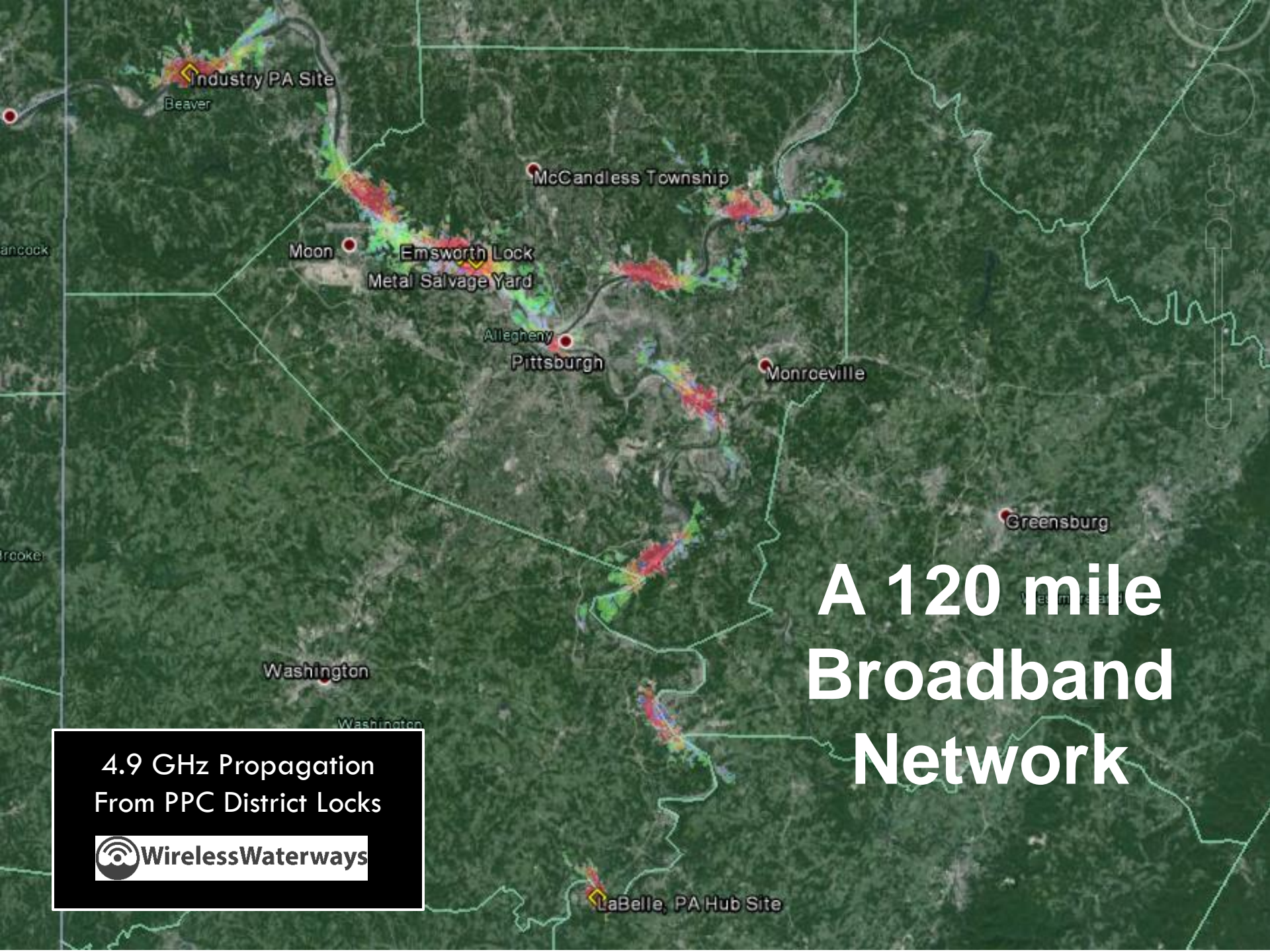
# Port of Pittsburgh Commission



Wireless Waterways

Wireless Waterways  
Project

June 24, 2014



# A 120 mile Broadband Network

4.9 GHz Propagation  
From PPC District Locks



High Speed 4.9GHz Multipoint Radio Array

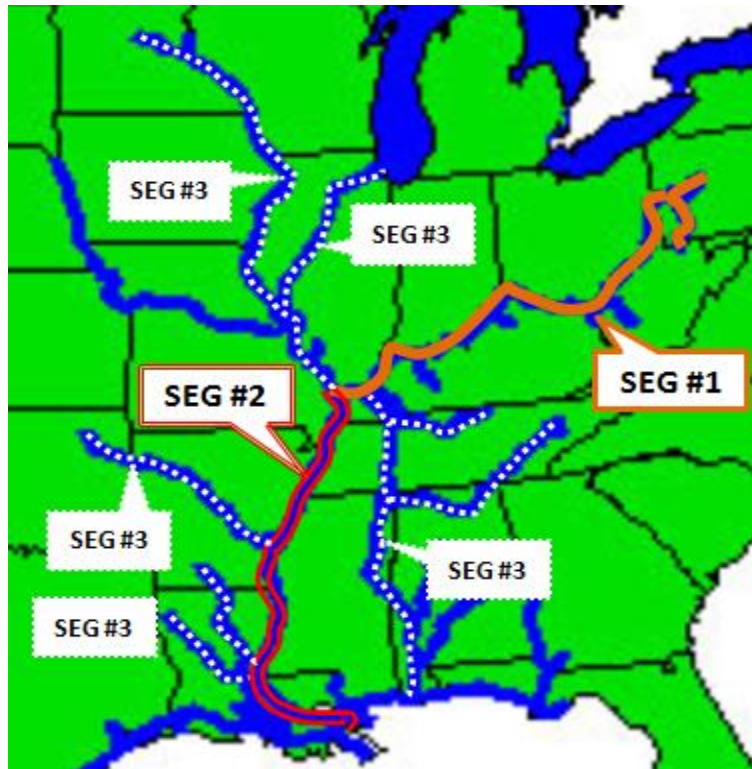
Up to 1Gbps Backbone Radio Link

Long-Range Metro Wi-Fi Radios



**WirelessWaterways**

# Envisioned Wireless Waterways



Description	Coverage(mi)	Locks	Site Qty
<b>Segment 1: PPC and Ohio River Only</b>			
PPC Area - Allegheny, Monongahela, PA part of OH,	120	14	
<b>Total PPC Area of Responsibility</b>	120	14	29
<b>Total Ohio River</b>	950	21	137
<b>Total Segment 1</b>	<b>1070</b>	<b>35</b>	<b>166</b>
<b>Segment 2: Lower Mississippi</b>			
<b>Total Segment 2</b>	<b>970</b>	<b>0</b>	<b>130</b>
<b>Total Segment 1 and Segement 2</b>	<b>970</b>	<b>35</b>	<b>296</b>
<b>Segment 3: Upper MS, IL and Chicago Rivers</b>			
Upper Mississippi	29	29	29
Illinois River & Chicago River	9	9	9
Red River	5	5	5
Mc-Kerr Arkansas River Nav System	18	18	18
Ouachita and Black Rivers	4	4	4
Old River	1	1	1
Tennessee River	9	9	9
Tennessee-Tombigbee Waterway	10	10	10
<b>Total Segment 3</b>	<b>85</b>	<b>85</b>	<b>85</b>
<b>Entire System --- Total Segement 1, 2 &amp; 3</b>	<b>2,125</b>	<b>120</b>	<b>381</b>

 **Vessel Locations**

 **AIS Source**

Filter Vessels ...

Select All Toggle

Refresh Rate: 30

- 307420000
- ALAN P HALL
- Amistad
- BUCK JOHNSON
- Bounty
- CG OSAGE
- D A GRIMM
- DANIEL T MARTIN
- DOTTIE D
- Dawn Treader
- EVANICK
- GEORGE W. JONES, III
- Gibson
- Indianapolis
- KIMBERLY JOHNSON
- LEE SYNNOTT
- MARY ELLEN JONES
- MOBILAN
- Maine
- Missouri
- Platypus
- Queen Anne's Revenge
- Riverquest
- SAFETY PLEDGE
- Santa Maria
- Serenity
- TAHOME
- TENNAS

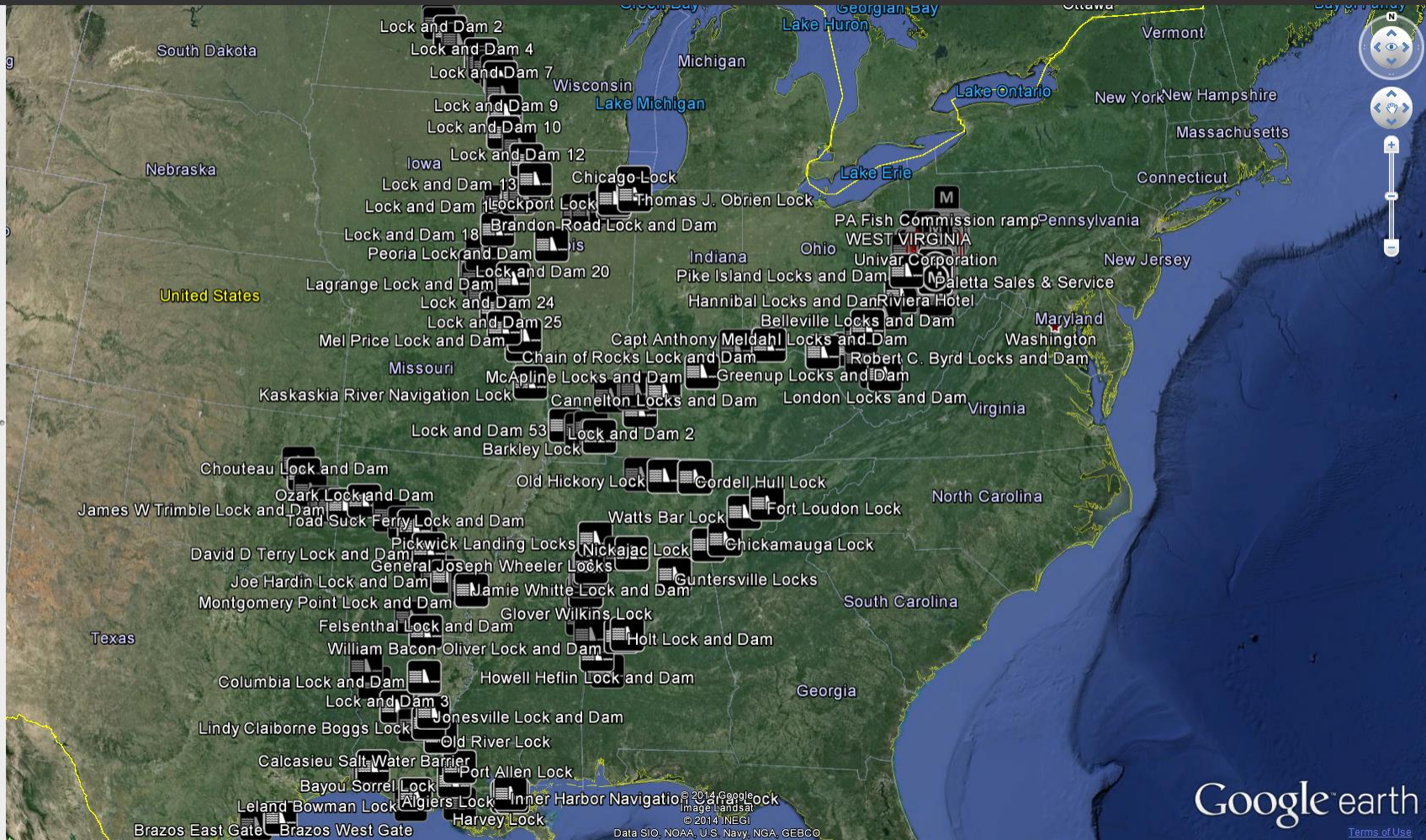
 **Vessel History**

 **NOAA**

 **USACE**

 **River Objects**

 **Google Earth**



## We have a Multi-company Cross-platform INDUSTRIAL INTERNET Testing Platform

- ❑ Advanced Wireless Communications Technologies
- ❑ Portable Cyber Security Encryptors
- ❑ Unmanned Surface Vessel collecting environmental data
- ❑ River Incident Response Management system
- ❑ Water Quality Sensors
- ❑ Intermodal Transportation Management systems
- ❑ Situational Awareness Portal and Collaboration Tools
- ❑ Maritime Social Media Technologies
- ❑ Testing of USACE technology under development.

# A Multi-company INDUSTRIAL INTERNET Testing Platform





# Test Bed Participant Comments

Great week at the WWW-ITB 14.

We were able to meet all of our testing objectives, working with and meeting all of the participants. The ITB allowed us to complete testing in a live environment over several days which otherwise would have taken weeks if not months to complete. The value of the ITB cannot be understated for companies like ourselves.

Thanks again for including Welbeck Secure Solutions with the IP Technology Labs solution.

All the best.  
Walt Rogers



I wanted thank you for taking the time to learn about our new water monitoring technology at the ITB event in Pittsburgh....even though the heat almost melted us all.

I hope we can collaborate in the future with our Carnegie Mellon developed sensor technology, and your knowledge of the local business environment.

Please do keep in touch.

Kindest Regards,  
David F. Speer



# QUESTIONS ?

## CONTACT Info.

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**WirelessWaterways**



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Commission**

