Innovating through Technology at the Seaway

"Even Old Infrastructure Dogs Can Learn New Tricks"

Straight from the Source Series

Cambridge, Mass. - July 26, 2012

Craig H. Middlebrook, Acting Administrator
Saint Lawrence Seaway Development Corporation
U.S. Department of Transportation

Presentation Outline

- Seaway Overview
- A Tradition of Innovation at the Seaway
- Areas of Innovation at the Seaway
- Characteristics of an Innovative Organization
- To What End Innovation?

The St. Lawrence Seaway

423 miles and 27 Border Crossings

<u>The U.S. Saint Lawrence Seaway Development Corporation</u>

A U.S. Government Corporation within the U.S. DOT that directly partners with Canada to manage and operate the Seaway.

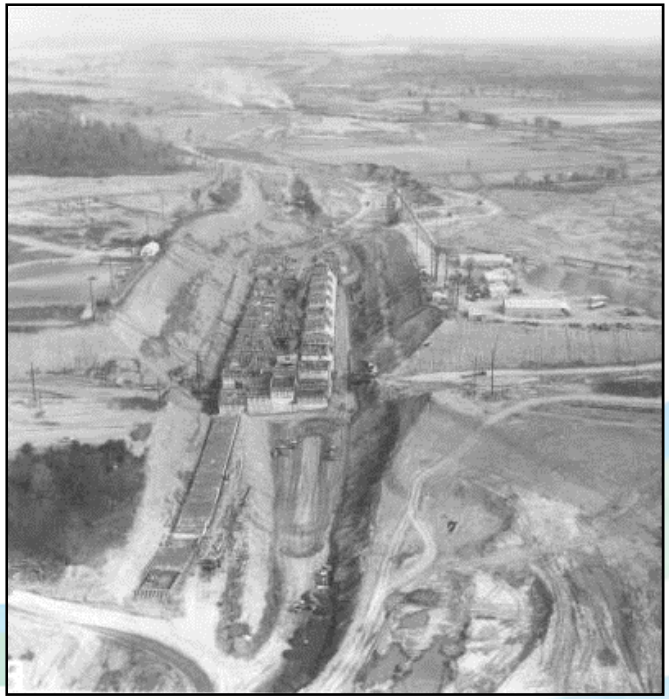
The St. Lawrence Seaway

- An Environmentally Sensitive Transportation Route
  - World's largest source of fresh water
  - Home to almost 43% of N.A. population
- Economic Gateway
  - Agricultural and Manufacturing Heartland
  - Significant Economic Benefits:

On an annual basis, commercial GLSLS maritime activity sustains:

227,000 jobs	$33.6 billion - business revenue
$14.1 billion – wages	$4.6 billion - taxes

A Technological Marvel of its Day



A Technological Marvel of its Day

- Longest deep-draft waterway in the world.
- Modeled on the Panama Canal.
- Nothing Fancy: reliable, mechanical lock components.
- Designated in 2000 by APWA as one of the "Top 10 Public Works Projects of the 20th Century."

A Tradition of Innovation

- Working with “basic infrastructure”, a strong culture of innovation.
- Innovative engineers and stakeholders.
- Customer and performance-focused operational managers.
- A willingness to listen and partner.
- Geographic and international challenges.
- A long-standing relationship with Volpe.
- Small is beautiful.

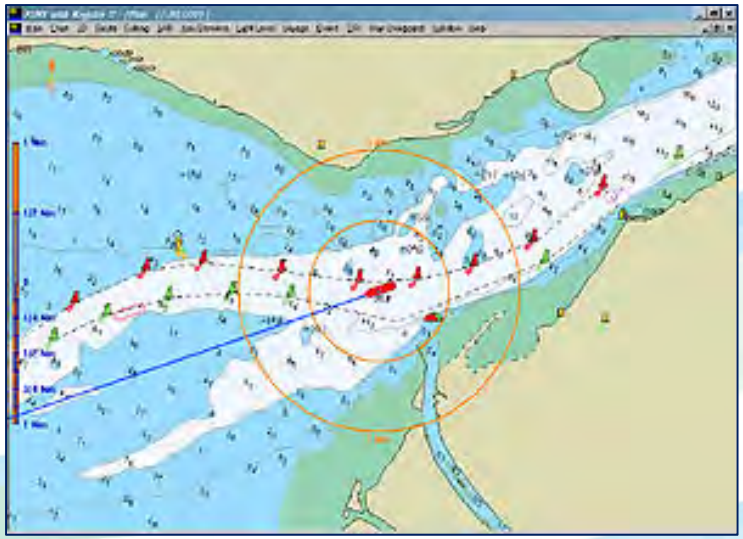
Areas of Innovation at Seaway

- Vessel Traffic Management Technology
- Infrastructure Technology
- Process and Procedures Innovations

Vessel Traffic Management - ECDIS

“Electronic Chart Display and Information System”

- Canadian Laker fleet led development and implementation in early 1990s.
- Seaway users were among the first to adopt.
- Seaway Corporations supported the testing and use of the technology the Seaway.

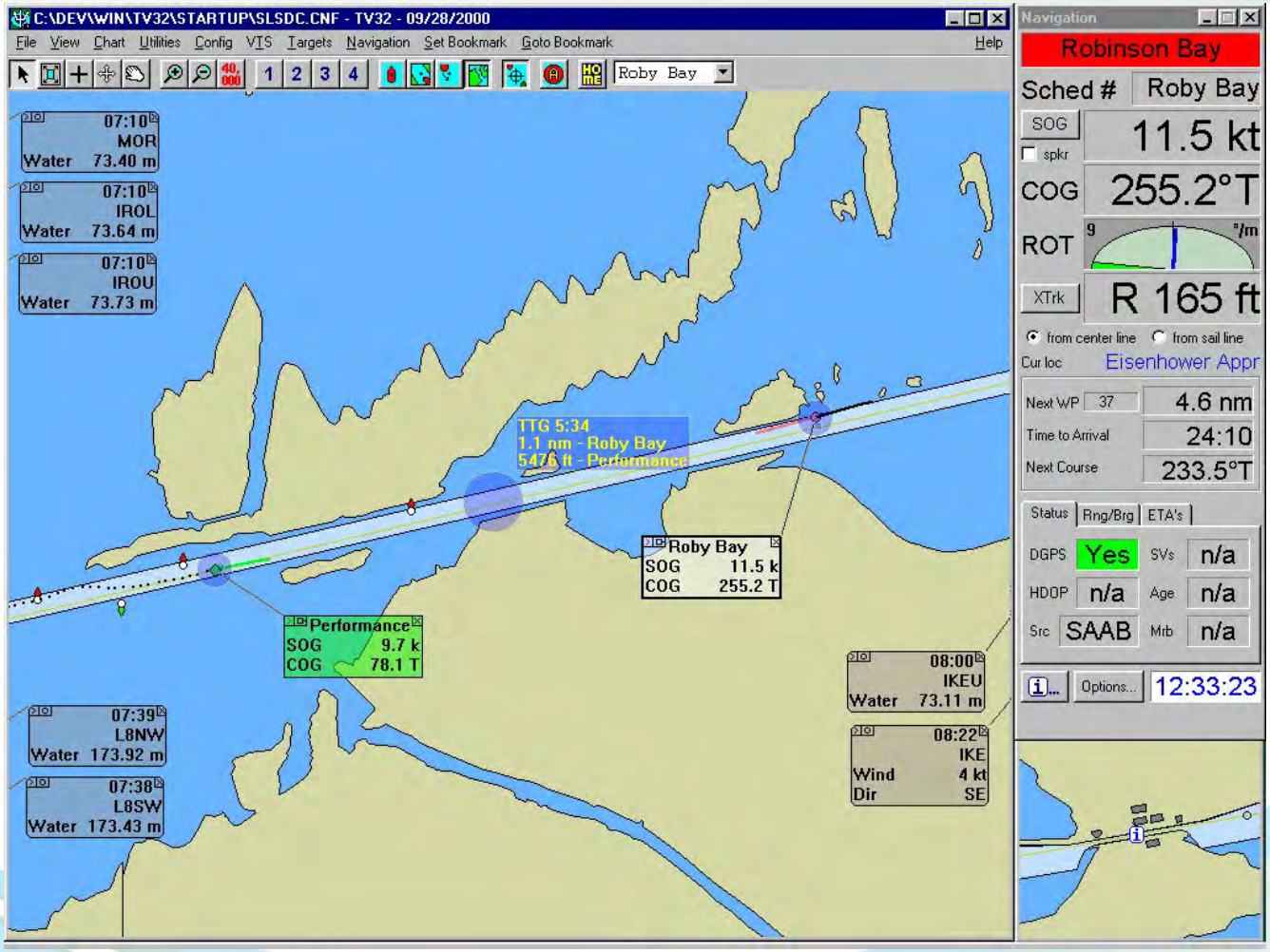


Vessel Traffic Management - AIS

"Automatic Information System"

- The most important technological innovation in the Seaway's 52-year history.
- Developed in the 1990s; adopted in 2002.
- Built on the ECDIS, incorporated GPS/DGPS.
- A radical upgrade of Seaway's Traffic Management System (TMS).
- Volpe designed and built the AIS for the U.S. and Canadian Seaway Corporations.

Vessel Traffic Management - AIS



Vessel Traffic Management - AIS

SLSDC's Erman J. Cocci Vessel Traffic Control Center in Massena, N.Y.

Vessel Traffic Management - AIS

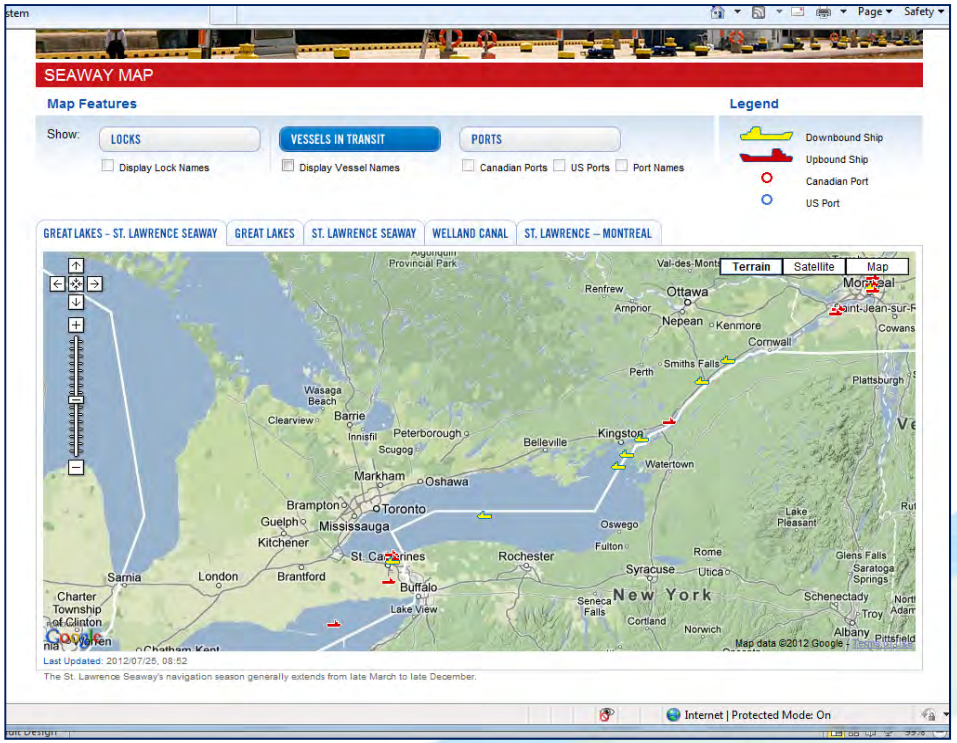
“Automatic Information System”

- A model partnership among:
  - Canadian and U.S. Seaway agencies
  - GLSLS Commercial Maritime Industry
  - The Volpe Center
- A cost-sharing model.
- Adopted latest technological developments.
- Adapted to emerging international standards.
- Has become the global standard in TMS.
- “Rock-solid” reliability over last 10 years.

Vessel Traffic Management - AIS

Benefits of Adopting AIS Technology in the Seaway

- Increased safety – fewer incidents and speeding violations.
- Better data when there are incidents.
- Better vessel management – "Seeing the whole picture."



Vessel Traffic Management - DIS

“Draft Information System”

- Newest technological innovation at Seaway – July 2012.
- Most important since adoption of AIS.
- Uses AIS as a key component.
- Allows for even more precise vessel traffic management.
- On-board software that integrates multiple navigation information data points and provides a projection of a vessel’s under-keel clearance in real time.
- Provides for a 3-D, data-rich interface.

Vessel Traffic Management - DIS

Vessel Traffic Management - DIS

- Relies on a real-time water level gauge network along the vessel's route which is communicated by the AIS network.
- Interpolates water level between two points.
- Displays vessel's position and speed in real-time.
- Utilizes high-resolution bathymetric data (S57 format) overlaid on an electronic navigation chart.
- Uses a set of squat equations developed to approximate the squat of the given ship-type in the given navigation environment, whether a confined channel, or a channel within a lake.

Vessel Traffic Management - DIS

- The next step in VMS safety.
- A major advance in efficiencies for users.
- Permits deeper drafts (up to 3 inches to 26’ 9”).
- Better control of vessel wakes.
- Customized speed limits?
- Like ECDIS, an idea that came from Seaway users.
- Ahead of the curve: deploying cutting-edge technology in a world of emerging international standards.

Infrastructure Technology Innovations

- Conversion to Hydraulic Lock Components
  - Valves
  - Gates

Infrastructure Technology Innovations

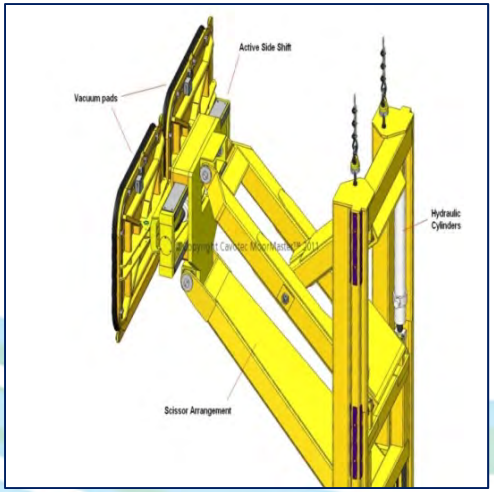
- Hands Free Mooring Technology

  Simplifying the Seaway Transit Experience.

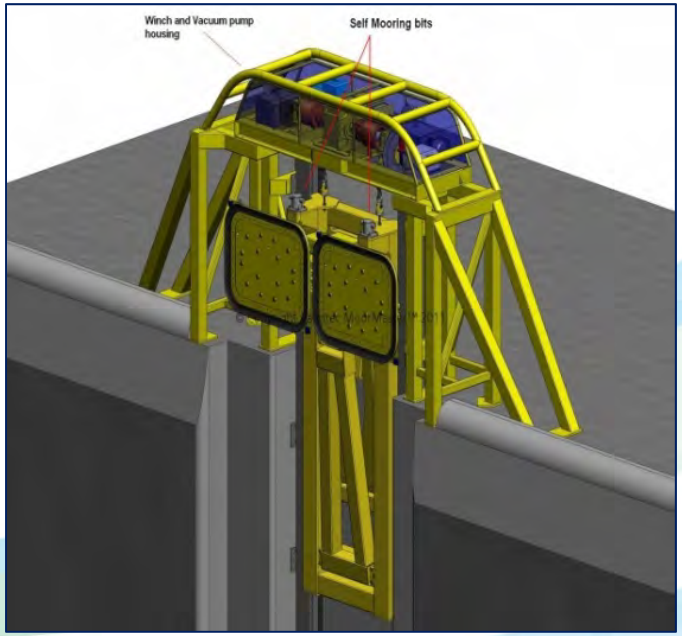
Infrastructure Technology Innovations

Hands Free Mooring System

- Under development since 2007 – currently version 3.0.
- Canadian Seaway (SLSMC) is taking the lead.
- Reduce linehandler injuries.
- Make Seaway accessible to more vessels.



Version 4.0



Process and Procedural Innovations

- ISO Quality Management System.
- Joint Enhanced Seaway Inspection Program (ESI).

Process and Procedural Innovations

ISO Quality Management System

- Adopted in 1998 – Certified in ISO-9001:2008.
- An internationally recognized internal and external process-assessment and improvement program.
- Subject to rigorous, third-party annual audits (Lloyd's Register Quality Assurance).
- Covers operational and administrative offices of both U.S. and Canadian Seaway Corporations.
    - SLSDC was one of the first U.S. Government organizations to submit to this quality-assurance testing.

Process and Procedural Innovations

Joint Enhanced Seaway Inspection Program - ESI

- SLSDC led the effort to concentrate all vessel inspections in Montreal, beginning in 1997.
- Prior to 1997, a vessel was subject to multiple inspections.
- Has significantly reduced vessel delays and incidents.
- Has significantly reduced vessel idle time.
- Program has been continually refined and expanded over the last 15 years.
- A model of international partnership.

Concluding Thoughts

Who Says 53 is "Old?"

Concluding Thoughts

Keys to an Innovative Organization, No Matter its Age

- Willing to listen to ideas "Not Invented Here."
- Focuses on results and customer needs.
- Hires and **Supports** innovative people.
- Sees challenges as opportunities
  ("Necessity is the Mother of Invention")
- Organizationally "Agile."
- Finds really smart partners.

To What End Innovation at the Seaway?

- Safety Benefits.
- Efficiency Benefits.
- Cost Benefits.
- Customer and Employee Satisfaction Benefits.
- Fosters Positive “Karma.”

“Always Open to a New Idea”

Thank You !

Many of the reports and other data sources mentioned in this presentation can be found on the Seaway's website:

www.greatlakes-seaway.com

Craig H. Middlebrook
Saint Lawrence Seaway Development Corporation
U.S. Department of Transportation