St. Johns River Ferry Feasibility Study

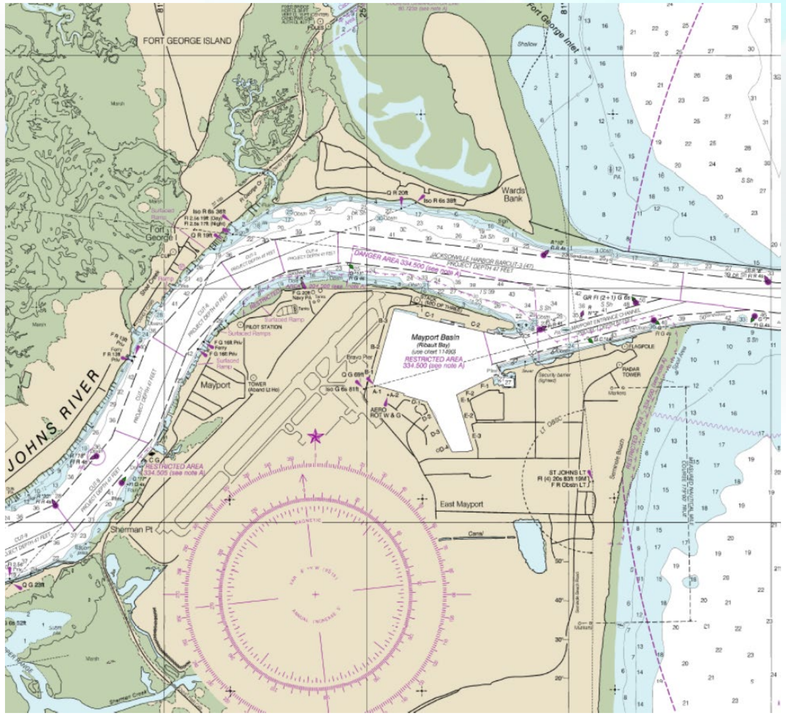
Presentation to the Mayport Waterfront Partnership

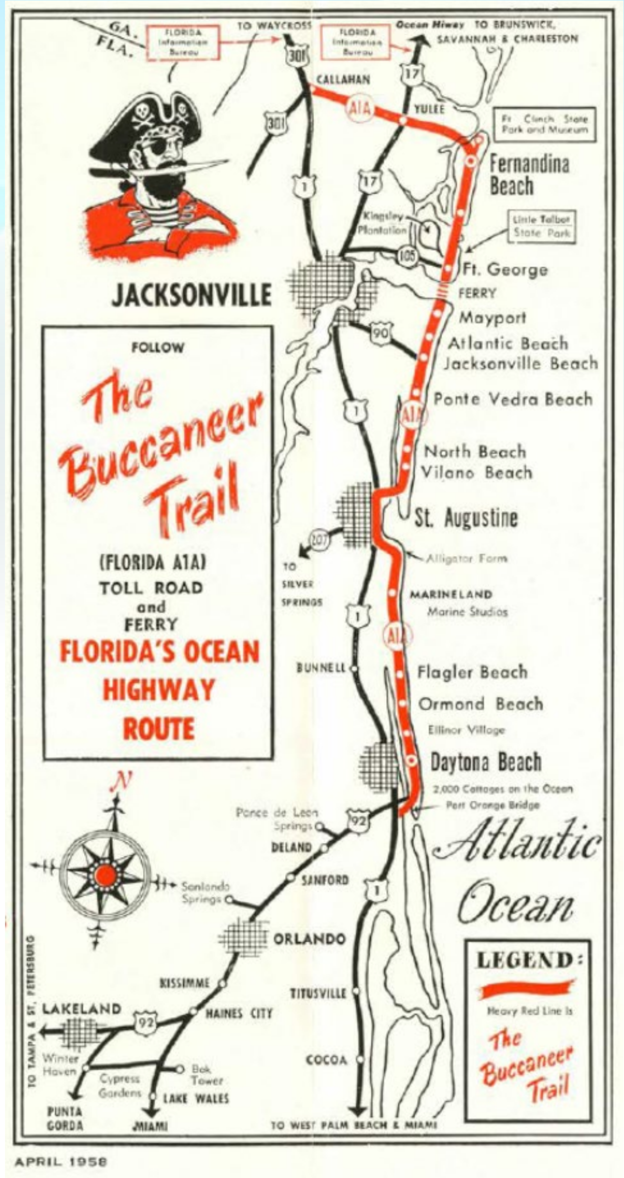
November 14, 2023

Project Background

The St. Johns River Ferry began operations in 1948 in its current format

- Crossing from Mayport to Fort George Island
- 0.4 Miles Route
- Part of the Buccaneer Trail
- Vital community connection
- JTA assumed operations of ferry service in 2016

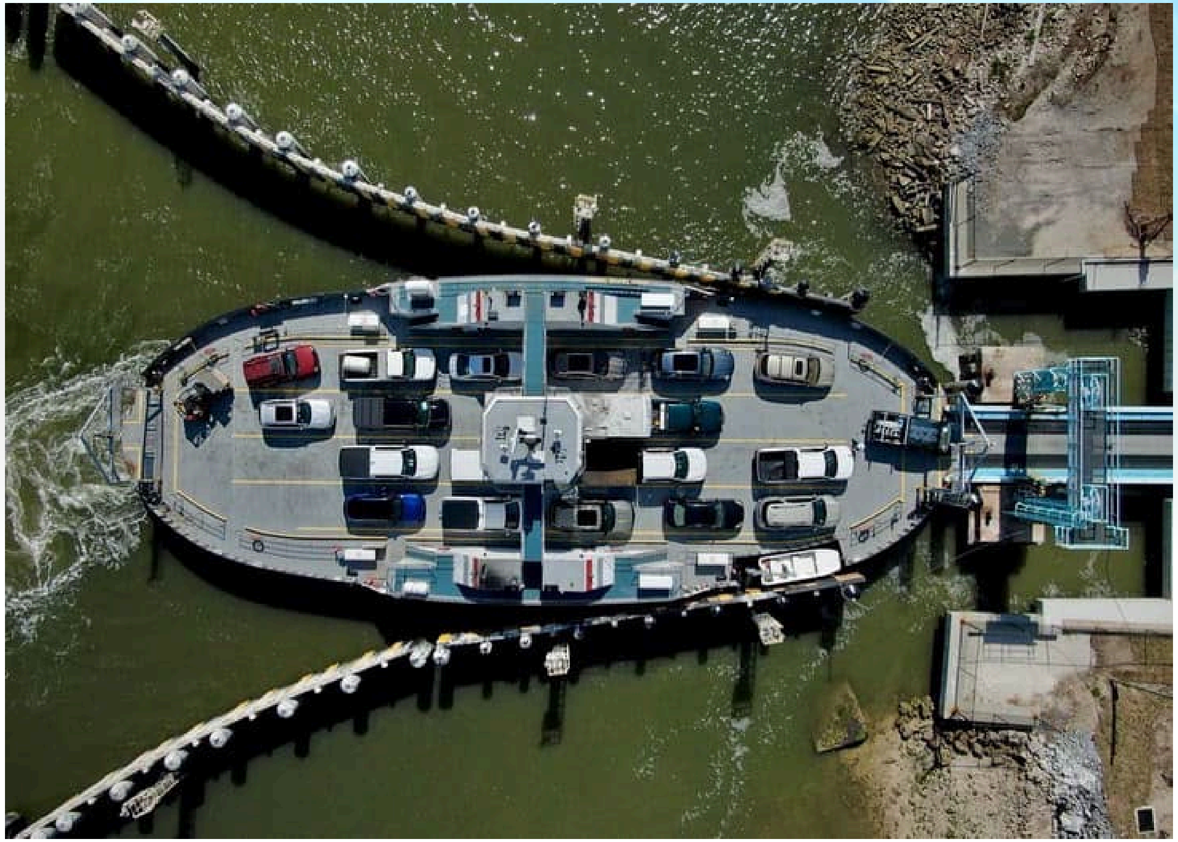




The JTA has worked to improve the safety, reliability and level of service offered by improving the infrastructure on both sides of the river and proactively maintaining the aging ferry, Jean Ribault

Need for Feasibility Study

- Jean Ribault constructed in 1995
- Only vessel in service, leads to service interruptions during vessel down time
- Useful Life for vessels 30-40 years
- Need to meet net zero emissions goals by 2050
- Local Option Gas Tax Legislation



JTA given authorization under LOGT legislation to construct new St. Johns River Ferry Vessel

Goals for the Ferry Replacement Project

The Goals for the overall project are to:

- Develop a modern, safe vessel appropriate for the short service route
- Efficient use of funds to replace vessel
- Develop a no- or low-emissions ferry that helps JTA meet net zero 2050 targets
- Investigate reusing the Jean Ribault as a standby vessel

Ferry Replacement Feasibility Study Scope

- Baseline analysis of existing infrastructure and vessel characteristics
- Operations Analysis
- Develop Conceptual Ferry Design Criteria
- Develop Alternatives and Perform Alternatives Analysis
- Investigate Upland Development and vessel support needs
- Investigate repowering of the Jean Ribault to serve as standby vessel
- Develop path forward for remainder of project

Summary of Ferry Configuration Criteria

Criteria	Jean Ribault	New Vessel
Length	153.6′	154′
Beam	56′-0″	56′-0″
Draft	7′-0″	8′-0″
POV Capacity	36	36
PAX Capacity	205	205
Power	1950 HP	2000 HP
Propulsion	Twin Propeller, Straight Shaft	Fore and Aft Azipods

The New Vessel will be similar in shape, size, power and capacity to the Jean Ribault, to assure that the service provided by the new vessel maintains at the same high standards for safety and service

Alternatives Analysis

- Study three different power platforms – ICE Mechanical, ICE Electrical and All Electrical
- Study Different Fuels – Diesel, Renewable Diesels, Natural Gas, Methanol, Electric and Hydrogen
- Study Costs and Qualitative Evaluation Factors

	Alternative Number	Vessel Platform
Internal Combustion Engine Mechanical Systems	ICE-1	Diesel ICE Mechanical
	ICE-2	BioDiesel ICE Mechanical
	ICE-3	Renewable Diesel ICE Mechanical
	ICE-4	CNG ICE Mechanical
	ICE-5	LNG ICE Mechanical
	ICE-6	Methanol ICE Mechanical
	ICE-7	Bio Methanol ICE Mechanical
Internal Combustion Engine Electric Systems	E-ICE-1	Diesel Electric Drive
	E-ICE-2	Bio Diesel Electric Drive
	E-ICE-3	Renewable Diesel Electric Drive
	E-ICE-4	CNG Electric Drive
	E-ICE-5	LNG Electric Drive
	E-ICE-6	Methanol Electric Drive
	E-ICE-7	Bio methanol Electric Drive
Electric Systems	E-1	Battery Electric
	E-2	Diesel Plug In Hybrid Electric
	E-3	Hydrogen Fuel Cell

The heart of the feasibility study is the alternatives analysis. The goal is to balance the most cost-effective solutions with the need to meet JTA's net-zero goals by 2050

Alternatives Analysis Scoring

- Ordinal Based System, Lower score is more desirable
- Develop Cost Ordinal and Qualitative Ordinal and add together to create final ranking ordinal
- Appropriately weight criteria to accommodate JTA's policies and organizational goals

$$Overall\ Score = \sum(Cn * Wn) + \sum(Qn * Xn)$$

Criteria (Cn)	Criteria Name	Ordinal Range	Weight (Wn)
C1	Vessel and Landside Capital Costs	1-17	33%
C2	Vessel O+M Costs	1-17	33%
C3	Yearly Fuel Costs	1-17	33%

Criteria (Qn)	Criteria Name	Ordinal Range	Weight (Xn)	Comment
Q4	Availability / Reliability of Fuel Source	1-9	35%	Relates to the ability to have a stable, reliable service to the traveling public. Also considers volatility of fuel pricing
Q5	Carbon Neutrality	1-9	35%	Relates to the overall emissions reduction for the full well to wake life cycle including the feedstock, production process and transportation of the fuel.
Q6	Path to Zero Emissions	1-9	15%	The ease at which the technology platform can be transitioned to zero emissions from well to wake.
Q7	Crew Familiarity	1-9	10%	The familiarity of the existing operations crew with the alternative and the necessity to retrain for new technology.
Q8	Maturity of Technology	1-9	5%	Involves the rate of adoption of the technologies and thus the related maintenance parts and skill sets present in the marketplace

Final Ordinal Rankings for All Alternatives

- Electrical and ICE Electrical propulsion platform is highly ranked
- Battery and Hybrid Electrical highly ranked
- Conventional Diesel using renewable fuels highly ranked
- Hydrogen is costly and ranked low

Alternative Number	Vessel Platform	Total Cost Ordinal	Qualitative Evaluation Factor Ordinal	Combined Ordinal
E-1	Battery Electric	7.00	2.30	9.30
E-2	Diesel Plug In Hybrid Electric	7.67	2.15	9.82
E-ICE-3	Renewable Diesel Electric Drive	8.00	2.85	10.85
E-ICE-2	Bio Diesel Electric Drive	7.67	3.50	11.17
ICE-3	Renewable Diesel ICE Mechanical	8.33	2.85	11.18
E-ICE-5	LNG Electric Drive	7.33	4.00	11.33
ICE-2	BioDiesel ICE Mechanical	8.00	3.50	11.50
E-ICE-4	CNG Electric Drive	8.00	3.65	11.65
ICE-5	LNG ICE Mechanical	8.00	4.00	12.00
E-ICE-1	Diesel Electric Drive	6.67	5.35	12.02
E-ICE-6	Methanol Electric Drive	8.00	4.30	12.30
ICE-6	Methanol ICE Mechanical	8.33	4.30	12.63
ICE-1	Diesel ICE Mechanical	7.33	5.35	12.68
E-ICE-7	Bio methanol Electric Drive	9.33	3.35	12.68
ICE-7	Bio Methanol ICE Mechanical	9.67	3.35	13.02
ICE-4	CNG ICE Mechanical	10.00	3.65	13.65
E-3	Hydrogen Fuel Cell	17.00	4.65	21.65

Recommended Alternatives

- Battery Electric – Higher Capital Costs offset by lower maintenance and fuel costs
- Hybrid Electric – Lower Capital Costs, Emissions can be offset by using renewable fuels
- Renewable Diesel Electric – Low capital costs, proven technology, fully net zero emissions reduction through carbon offsets
- Biodiesel Electric – Low capital costs, proven technology, close to net zero with emissions reduction through offsets

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E-ICE-2	Bio Diesel Electric Drive	7.67	3.50	11.17

These alternatives meet the goals of the study and represent the optimal solution for replacement of the ferry balancing cost and net zero emissions potential

Next Steps in Project Development

- Community and Stakeholder Engagement and Input - (Fall 2023)
- Select Final Alternative to proceed with design – (December 2023)
- Engage naval architect to develop vessel criteria – (Winter 2023/2024 – Fall of 2024)
- Procure vessel builder (Fall 2024 – Spring 2025)
- Vessel construction and commissioning (Spring 2025 – Spring 2028)
- Begin design and construction of vessel support facilities (Fall 2024 – Spring 2027)

A consideration for this procurement is that the vessel will need to be constructed by an American shipyard under the regulations of the Jones Act and the Passenger Vessel Services Act.

Next Steps for Jean Ribault

- Develop plan for future repowering (Concurrent with New Vessel Design)
- Rehab and repower ferry when new ferry is operational
- Develop Layberth Facility on Ft. George Side for standby ferry docking

The Ferry operator envisions using the Jean Ribault to maintain continuous ferry operations during maintenance windows and to provide enhanced service during high peak times.

Wrap Up

- Comments?
- Questions?