Great Lakes Hyperloop Feasibility Study

Pre-Proposal Meeting

March 22, 2018
AGENDA

• Welcome and Introductions
  • NOACA
  • Hyperloop Transportation Technologies (HTT)
• RFP Overview
• Scope of Work
• Evaluation Criteria
• Schedule/Important Dates
• Q & A
INTRODUCTIONS

• Grace Gallucci
  • NOACA Executive Director
• Kathy Sarli
  • NOACA Planning Director/Project Manager
• Randy Lane
  • NOACA Programming Director
• Susanna Merlone
  • Director of Administrative Services
• Chuck Michael
  • HTT Project Manager
WHAT IS NOACA
... AND WHAT DOES IT DO?

NOACA is the federally designated metropolitan planning organization (MPO) for northeast Ohio.

Conducts multi-modal transportation & environmental planning for a five-county region.
Determines how federal transportation dollars are spent.
Conducts transportation-related air quality planning and public education activities.
Functions as the “areawide” water quality planning agency for the region.
HYPERLOOP TRANSPORTATION TECHNOLOGIES

www.hyperloop.global
How it works

Operational costs minimized through alternative energy and systems automation.

Electromagnetic propulsion enables emission-free transport.

Fully enclosed environment protected from weather and traffic crossing.

Levitated capsule reduces friction, increases efficiency.

Operational costs minimized through alternative energy and systems automation.
Capsule

30 M LENGTH | 20 TONS WEIGHT
2.7 M DIAMETER

1,223 KM/H MAX / LEVITATION AT 40 KM/H
28-40 PASSENGER CAPACITY
160,000+ PASSENGERS DAILY
4,000+ CARGO SHIPMENTS DAILY

PASSIVE MAGNETIC LEVITATION
ELECTROMAGNETIC PROPULSION

Design credit: PriestmanGoode
LOW PRESSURE ENVIRONMENT
< 100 PA

4 M DIAMETER

30 M WIDE

ELEVATED ON PYLONS
HEIGHT DEPENDING ON TERRAIN

SEISMIC ISOLATION
TECHNOLOGY

POWERED BY ALTERNATIVE
ENERGY SOURCES

Design credit: MAD Architects
INTEGRATED OR NEWLY BUILT STATIONS

ADAPTIVE 40 SECOND DEPARTURE RATE

SIZE

MIN TURN RADIUS

ACCELERATION

> 1,450 SQ M

0.1-1.6 KM

0.6G

H
Speed

430 KM/H  High speed rail
925 KM/H  Airplane
1,223 KM/H  Hyperloop™
2,170 KM/H  Concorde
Energy Balance

Energy generated:
- Solar Panels
- Regenerative Braking

Energy consumed:
- Acceleration
- Capsule Systems
- Vacuum

Energy Net Positive
Intrinsic Safety features

- Immune to weather conditions
- Protected separated tube
- No grade crossings with traffic
- Quiet and clean electric propulsion
- Passive magnetic levitation
- Smart sensors in capsules and tubes
- Proven insurable by Munich Re
Crowd-powered ecosystem
The map illustrates the proposed route of the Great Lakes Hyperloop Consortium, connecting major cities such as Chicago, South Bend, Kalamazoo, Ann Arbor, Toledo, and Detroit. The estimated travel times are as follows:

- Chicago to Detroit: 21.55 minutes
- Chicago to Toledo: 19.41 minutes
- Toledo to Ann Arbor: 5.6 minutes
- Ann Arbor to Detroit: 5.25 minutes
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<thead>
<tr>
<th>Integrated partners &amp; sponsors</th>
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<tr>
<td><strong>Engineering</strong>&lt;br&gt;One of the world’s most respected design, engineering, and project management consultancies</td>
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<td><strong>Passenger capsule</strong>&lt;br&gt;A composites leader in the aerospace, automotive and infrastructure markets</td>
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<td><strong>Vacuum</strong>&lt;br&gt;Inventor of the vacuum pump, with over 165 years in vacuum technology</td>
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<td><strong>Legal expertise</strong>&lt;br&gt;Ranked most successful firm in the U.S. from American Lawyer’s A-list</td>
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<td><strong>Technology</strong>&lt;br&gt;Invented the GPU, redefined modern computer graphics and parallel computing; GPU deep learning ignited modern AI</td>
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<td><strong>Design</strong>&lt;br&gt;Design consultancy that delivers exceptional brand experiences for leading international companies</td>
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<td><strong>Magnetic levitation</strong>&lt;br&gt;Exclusive license for Inductrack™ passive magnetic levitation technology</td>
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<td><strong>Augmented Reality</strong>&lt;br&gt;Award-winning software platform providing solutions for Augmented Reality</td>
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<td><strong>Reinsurance</strong>&lt;br&gt;One of the world’s leading reinsurers on global &amp; local risk solutions</td>
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Global agreements

Abu Dhabi, UAE
- First comprehensive Feasibility Study completed
- Royal strategic partnership
- Plan to build a passenger prototype

Bratislava, Slovakia
- Pre-feasibility Study completed
- Explore building a local Hyperloop system, with the vision of creating future routes

Brno, Czech Republic
- Feasibility Study agreement
- Exploration for a Hyperloop system connecting Brno and Bratislava, Slovakia

Toulouse, France
- Opened first R&D facility for developing and testing Hyperloop related technologies
- Building of full-scale prototype

Great Lakes, United States
- Public-Private Partnership agreement with broad industry consortium
- Multi-state Feasibility Study

Jakarta, Indonesia
- Feasibility Study agreement
- First agreement in Southeast Asia
- Initial focus on Jakarta

Andhra Pradesh, India
- Feasibility Study agreement
- Public-Private Partnership model
- Initial focus on Andhra Pradesh, start 2018
A new mode of transport, the Hyperloop, will revolutionize travel by connecting people and goods safely and efficiently.

Feasibility study to be developed in cooperation with HTT to evaluate the first commercial Hyperloop transport system in Ohio.

DBE Goal of 10%
SCOPE

- Phase 1 - Project Objectives and Organization
- Phase 2 - Site Reconnaissance and Preliminary Route Analysis
- Phase 3 - Technical and Financial Feasibility
- Phase 4 - Project Development Cost, Schedule, Implementation Strategies and Final Report
SCOPE

Phase 1 - Project Objectives and Organization
• Objectives
• Project Execution Plan
• Communication/Stakeholder Engagement Plan

Consultant Deliverables
• Project Execution Plan
• Communications/ Stakeholder Engagement Plan
Phase 2 - Site Reconnaissance and Preliminary Route Analysis

- Site Reconnaissance
- Corridor Route Analysis
- Preliminary Network Analysis

Consultant Deliverables
- Technical Memorandum No. 1 addressing Site Reconnaissance, Corridor Route Analysis, and Preliminary Network Analysis
Phase 3 - Technical and Financial Feasibility

- Environmental and Regulatory
- Conceptual Engineering
- Right-of-Way
- Technology Assessment
- Passenger/Freight Forecasts/Travel Demand
- Conceptual Operating Plan
  - Station Locations/Operating Timetables
  - Testing/Deployment
Phase 3 - Technical and Financial Feasibility Consultant Deliverables

- Draft and Summary Environmental and Regulatory Findings
- Technical Memorandum No. 2
  - Alignment Constraints
  - Location of Major Structures
  - Operations/Maintenance and Layover Requirements
  - Interfaces with Other Transportation Infrastructure
  - Right of Way
- Technical Memorandum, No. 3 addressing Passenger and Freight Forecasts and Travel Demand
Phase 4 - Project Development Cost, Schedule, Implementation Strategies and Final Report

• Cost Methodology
  • Technology Cost Methodology (HTT)
  • Infrastructure Cost Methodology

• Conceptual Cost Estimate
  • Technology Cost Estimate (HTT)
  • Infrastructure Cost Estimate

• Design/Build Readiness Assessment
  • Analysis and Recommendations
  • Project Schedule
  • Project Implementation Strategies

• Summary Report
Phase 4 - Project Development Cost, Schedule, Implementation Strategies and Final Report

Consultant Deliverables

• Infrastructure Cost Methodology
• Infrastructure Cost Estimate
• Design/Build Readiness Assessment
  • Project Delivery Analysis
  • Workforce/Labor Assessment
• Project Schedule (with NOACA and HTT)
• Project Implementation Strategies (with NOACA and HTT)
• Final Summary Report
SCOPE

PROJECT FINAL SYNTHESIS
Consultant Deliverable

• Final report that synthesizes all deliverables and related components into a final report that is comprehensive and logically organized.
A minimum of a two-week review cycle by NOACA is built in to the Project Timeline, anticipated at the end of each phase.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Duration</th>
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<tr>
<td>Phase 1: Project Objectives and Organization</td>
<td>8 weeks</td>
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<tr>
<td>Phase 2: Site Reconnaissance and Preliminary Route Analysis</td>
<td>9 weeks</td>
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<tr>
<td>Phase 3: Technical and Financial Feasibility Study</td>
<td>11 weeks</td>
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<tr>
<td>Phase 4: Project Development Cost and Schedule</td>
<td>8 weeks</td>
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<tr>
<td>TOTAL MAXIMUM FEASIBILITY STUDY TIME PERIOD</td>
<td>36 weeks</td>
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## EVALUATION CRITERIA

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<tr>
<th>Criteria</th>
<th>Weight %</th>
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<tr>
<td>Project Approach: Exhibit 1, Note 1</td>
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<td>Project Management: Exhibit 1, Note 2</td>
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<td>Qualifications of Firm/Staff- Exhibit 1, Note 3</td>
<td>25</td>
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<td>Experience of Assigned Staff including Subconsultants: Exhibit 1, Note 4</td>
<td>25</td>
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<td><strong>Total</strong></td>
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March 22, 2018 – Pre-proposal Meeting
April 24, 2018; 12:00 Noon – Deadline for Submissions
April 26 & 27, 2018 – Interviews with Selected Candidates
June 2018 – Approval of Contract by NOACA Board of Directors
All verbal comments, questions and responses are non-binding
Official responses will be made in writing and posted to the website
Copies of this presentation will be posted on the website http://www.noaca.org
FOR MORE INFORMATION:
www.noaca.org
NOACA will STRENGTHEN regional cohesion, PRESERVE existing infrastructure, and BUILD a sustainable multimodal transportation system to SUPPORT economic development and ENHANCE quality of life in Northeast Ohio.
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<tr>
<th>Name</th>
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Great Lakes Hydrocor Pre-Proposal Meeting
Northwest Ohio Aerosol Coordination Agency
March 22, 2018, 12:30 p.m.