Low Cost, High Value
Maglev

Jim Fiske
VP, Advanced Systems

LaunchPoint Technologies, Inc.

- Maglev Heart Pumps
- 1st Human Implants
- 1st Infant Pump
- Maglev Energy Storage
- Maglev Space Launch

Power Ring
Electricity Storage

Launch Ring Space Launch

WorldHeart
Rotary VAD

Pedia VAD

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**Rail Motor Railway Electrification**

- Converts *existing locomotives* to electric operation in selected zones
- Eliminates *all air pollution from trains* in those zones
- Improves energy efficiency
- Improves system throughput
  - Higher speed on inclines
  - Replaces pusher locomotives
  - Regenerative braking on declines

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**What is the Best Investment for New Southland Transit Infrastructure?**

- Population growth outpacing rest of State and US growth
- Passenger travel and freight already straining capacity, raising costs and hurting QOL
- Transit investment must maximize social benefits — increase ridership, reduce congestion, energy usage, pollution (diesel particulates)

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Barriers to Improved Transit Service

- High right-of-way, construction costs for new transit routes
- High operating, energy, environmental costs at current ridership levels
- Technology limits – fixed schedules, transfer delays, slow door-to-door travel time

Why hasn’t MAGLEV solved the problem?

- Extensively researched for 30+ years
- Tremendous potential benefits
  - several levitation and propulsion designs
- BUT….operational limitations and high costs have prevented acceptance

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Limitations of Conventional Maglev

- Slow, expensive mechanical guideway switching
- In-line stations, no dynamic routing
- Long headways

Result: Competing Transit Modes

**Conventional Maglev:**
- Faster (slightly)
- Most energy-efficient
- Quiet at urban speeds
- Very high ROW costs
- Lack of flexibility limits urban usage
- Need to switch modes increases travel time

**HSR:**
- Fast (with costly ROW improvements)
- Only for long distances

**Urban Rail:**
- Limited capacity
- Fixed schedules
- Noisy
- High O&M costs
**Solution: Maglev on Rail**

- A New “Standard Gauge” for All Rail Transit
- Fully Inter-Operable: “Backwards Compatible”
- Subway Retrofit/New Intra-City Transport
- High-Speed Inter-City Transport
- Freight Transport — Trucks and Cars Possible

**A Simpler, Better Maglev Design**

SPM: Stabilized Permanent Magnet Suspension Using Opposed Halbach Arrays

- Permanent levitation
- Electronic stabilization
- Few mechanical parts
- Low drag at all speeds
- Low power
- Instant track switching
Incremental Upgrade

- Inter-Operable
  - Simultaneous rail/maglev operation possible
- Builds on Existing Infrastructure
  - Zero ROW costs for retrofit
  - Can use existing stations, etc.
- Reduces Risk
  - Incremental network upgrade
- PLUS...all the advantages of maglev

A Unique Set of Advantages

- Flexible Infrastructure
  - Mass Transit, Group Rapid Transit, Personal Rapid Transit
  - Combined Inter-City and Urban Transit
  - Installations on rail or roads (highway medians)
- Dynamic Routing
  - Optimize ridership, cut travel time, customize itineraries
- High Performance
  - Fast & Quiet with low energy usage
  - Maximizes value of transit-oriented development

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Key Component Cost Comparison

Cost per mile of dual guideway, tracks, motor and electrical:

<table>
<thead>
<tr>
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<th>Conventional Maglev</th>
<th>SPM Maglev Retrofit</th>
<th>New SPM Maglev</th>
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<tbody>
<tr>
<td>~$45-60M</td>
<td>~$20M</td>
<td>~$25M</td>
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Value vs. Investment

- **Incremental HSR**
  - Upgrade existing railways (~90-150 mph)
  - Value/Initial Investment = 1

- **New HSR**
  - New alignments and track (175-200 mph)
  - Retain access to city centers
  - Value/Initial Investment = 0.3

- **Conventional Maglev**
  - Entirely new guideways (200+ mph)
  - 4-9x the cost of HSR
  - Value/Initial Investment = 0.3

- **SPM Maglev**
  - Upgrade existing railways (200+ mph)
  - Value/Initial Investment >1

*Report to Congress: Costs and Benefits of Magnetic Levitation
U. S. DOT, FRA, 11/2005

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Design Also Supports Maglev PRT

LaunchPoint Prototype

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Project Status

► Fastransit funding construction and test of demo system
► Recruiting development partners and hiring staff
► Beginning outreach to key customers and constituents

Seizing the Opportunity

► Build a Low Cost Demonstration System
  – Existing rail lines
  – Existing stations
  – Maglev Performance & Advantages
► Prove the Concept to Stakeholders
► Grow the System Incrementally
► Create a Revolutionary New Form of Transit that fully Utilizes Existing Infrastructure

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Thank-you

Questions?

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