Cost to Implement a MLLRS

Benefits & Cost Savings

Multi-Level Linear Referencing System (MLLRS)

Cost to Implement a MLLRS

Capital Costs
- Baseline System - $2 million
- Optional Functional Elements
  - Manage Change - $2K
  - Model Connectivity - $493K
  - LRM Development - $40K each
- Maintenance Costs
  - Baseline - $252K
  - Optional Functional Elements
    - Minor adjustments only

Cost/Benefit Analysis
- Based on a 5-year period
  - 3% escalation rate, constant dollar approach
  - Baseline System - $2.5 million in savings
    - Cost/Benefit Ratio = 2:1
  - Optional Functional Elements - $10 million in savings
    - Benefit/Cost Ratio = 21:1

Benefits & Cost Savings

Quantitative Benefits
- Ease of use and accessibility
- Flexibility and integration
- Quality of data
- Internal and external collaboration
- Data-driven decision support

Cost Savings
- Business/Operational Unit Improvements
  - Sample Business Units Used
    - Safety improvements
    - Reduced level of risk for litigation
    - Reduced impacts to projects
    - Reduced maintenance
  - Baseline Savings
    - $1.1 million
  - Optional Functional Elements Savings
    - $2.5 million

Acknowledgement of Sponsorship
Work was sponsored by the American Association of State Highway and Transportation Officials, in cooperation with the Federal Highway Administration, and was conducted in the National Cooperative Highway Research Program, which is administered by the Transportation Research Board of the National Academies.

Disclaimer
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<table>
<thead>
<tr>
<th>What is a MLLRS?</th>
<th>Why Implement ML into LRS?</th>
<th>Assumptions</th>
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<tr>
<td>Efficient planning, design, construction, and maintenance operations requires accurate, dependable and electronically based methods of positioning and locating specific facilities, operations, and needs. These methods must be logically linked with other organizational electronic management systems to optimize overall operational efficiency. The MLLRS is essentially the multi-dimensional LRS (MDLRS) defined in the NCHRP Report 460. To sum it up it:</td>
<td>More readily available data and information from different sources</td>
<td>A LRS already exists with at least one LRM</td>
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<td>- Meets the NCHRP 20-27 data model</td>
<td>- Improvements in quality, timeliness, and efficiency for reporting</td>
<td>- A good existing primary road network exists</td>
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<td>- Meets the needs of integrating increasing amounts of linearly referenced data</td>
<td>- Improved analysis leading to more data-driven decision support</td>
<td>- Includes a spatial representation</td>
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<td>- Logically links with other organizational electronic management systems</td>
<td>- Improved communication by being able to more readily share information in a timely manner</td>
<td>- 25,000 miles of centerline roadway</td>
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<td>- Includes multiple linear referencing methods, multiple cartographic representations and multiple network representations</td>
<td>- Desire to improve customer service</td>
<td>- Base hardware and software currently exists</td>
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<td>- Associates through a central object referred to as a “linear datum”</td>
<td>- Integrates with legacy systems and ultimately eliminates dependencies on obsolete technology</td>
<td>- Baseline = The minimum requirements to implement and maintain a MLLRS</td>
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<td>- Establishes standards to increase LRS consistency throughout the agency and industry-wide</td>
<td>- Optional Functional Elements = Additional elements added to the baseline to improve the overall function of the MLLRS</td>
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