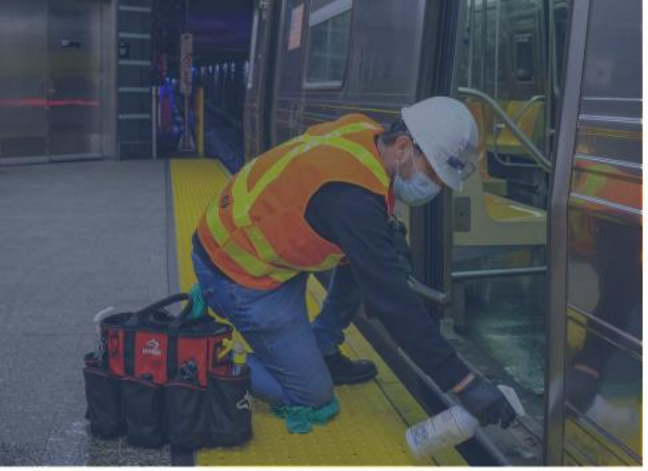
2020 FTA Joint State Safety Oversight and Rail Transit Agency Virtual Workshop

October 6-8, 2020

U.S. Department of Transportation

Federal Transit Administration



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Transit Advisory Committee for Safety (TRACS) Recommendations for Innovation in Transit: Roadway Worker Protections

Discussion of TRACS recommendations in report to FTA on innovations in Trespass and Suicide Prevention, Roadway Worker Protections and Employee Safety Reporting

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Roadway Worker Protection Subcommittee

Subcommittee Members:

- Paul King, Ph.D., (Acting Team Lead, Public Participant), California PUC
- Herman Bernal, ADOT
- Pam Fischhaber, Ph.D., Colorado PUC
- Ronald Nickle, Transit Safety & Security Solutions, Inc.
- Scott Sauer, SEPTA

Summary:

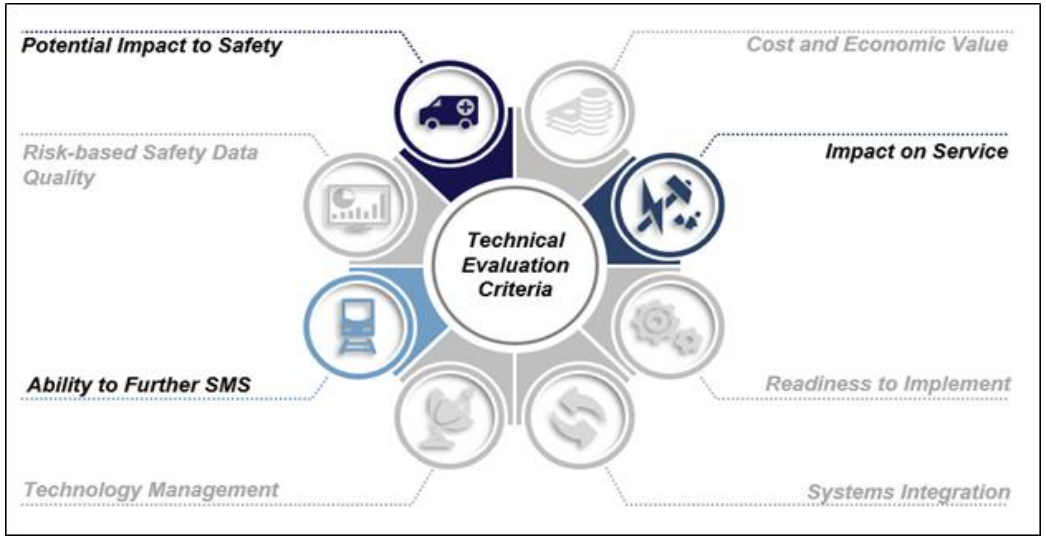
- RWP has been recognized as a priority by FTA and NTSB through NTSB reports and FTA Safety Advisory 14-1
- Roadway workers have been identified in fatality statistics as a high-risk occupation and have been the subject of many NTSB reports
- RWP Subcommittee developed 8 recommendations focused on technologies, human factors, safety and reliability needs of the rail transit industry

Roadway Worker Protection Recommendations

- #1 – Require Use of Secondary Warning Systems
- #2 – Funding for New Research and Implementation of New Systems and Technology
- #3 – Minimum RWP Safety Requirements as the Basis for Secondary Warning Systems
- #4 – Develop RWP Safety Technology Reliability Criteria
- #5 – Development of Risk-Based Safety Metrics Including Leading Indicators
- #6 – Fatigue Management for Maintenance, Controller, and Other Non-Operating Personnel
- #7 – Research and Create Guidance on Cognitive Workload and Distraction of LRT Operators using In-Cab RWP Technology
- #8 – Behavior-Based Safety Systems for RWP

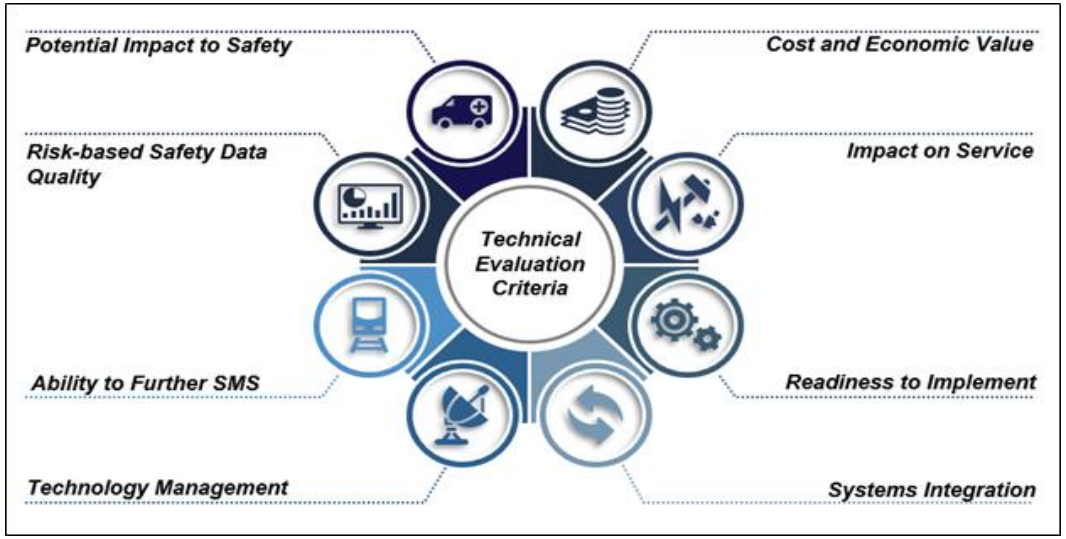
RWP Recommendation #1 – Require Use of Secondary Warning Systems

- Criteria/Methodology
  - Include problem and error analysis
- Key Takeaways
  - California already requires secondary systems
  - Potential positive impacts to safety and service
  - Safety technologies can further SMS
- Information Gaps
  - Number of agencies that have implemented RWP safety technology to address NTSB findings and FTA Safety Advisory 14-1: Right of Way Worker Protection
  - What are SSOAs doing with respect to RWP
  - Need a relevant working definition of redundant protection



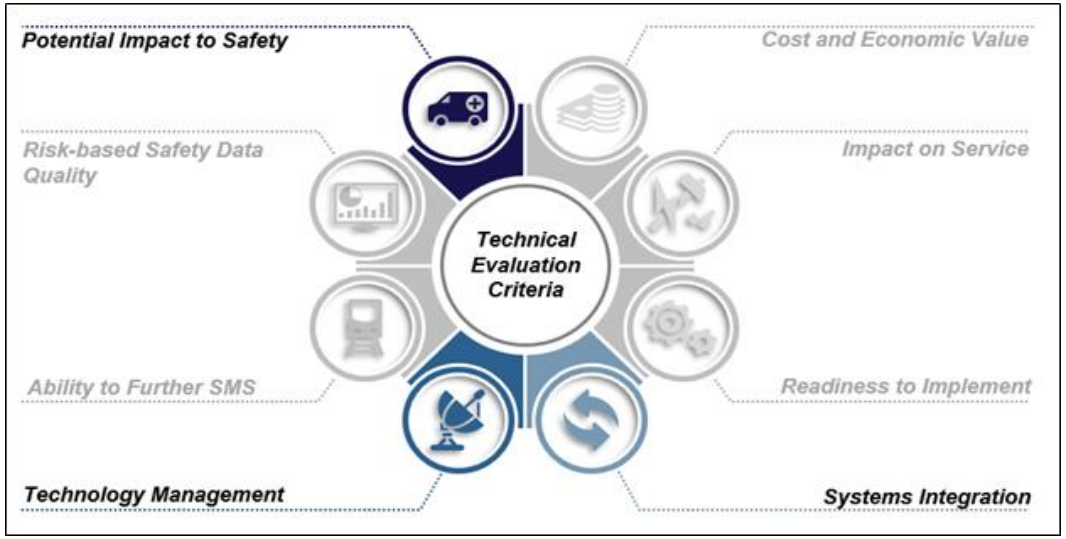
RWP Recommendation #2 – Funding for New Research and Implementation of New Systems and Technology

- Criteria/Methodology
  - Include review of railroad technologies
- Key Takeaways
  - A number of vendors already exist
  - RTAs are concerned about compatibility
  - Significant $$$$ and time to implement
- Information Gaps
  - Lack of significant research testing validity of existing technologies
  - Lack of research on applicability of railroad technology on rail fixed guideway systems
  - Lack of information on on-going maintenance costs once a system is installed
  - Lack of information on testing, implementation, and costs of other types of RWP systems



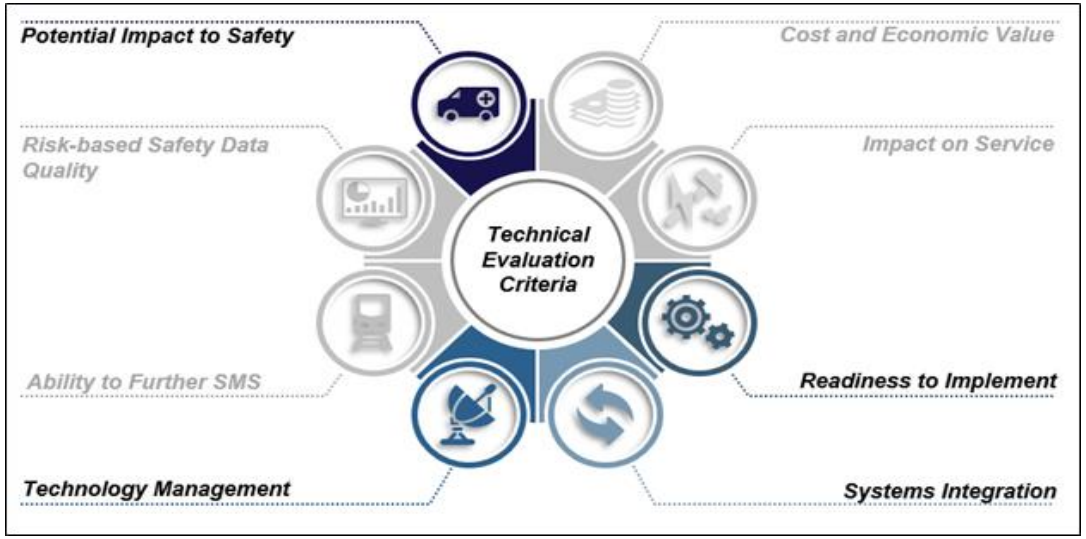
RWP Recommendation #3 – Minimum RWP Safety Requirements as Basis for Secondary Warning Systems

- Criteria/Methodology
  - Evaluation to include susceptibility to failure
- Key Takeaways
  - Tech exists to augment primary protections
  - Redundancies need adaptation to use-cases
  - Include RTA technology experiences
- Information Gaps
  - Need information on the evolution of technologies
  - Need information on newer RWP safety technologies being planned
  - Need information regarding use-cases
  - Awaiting TTCI use-case research



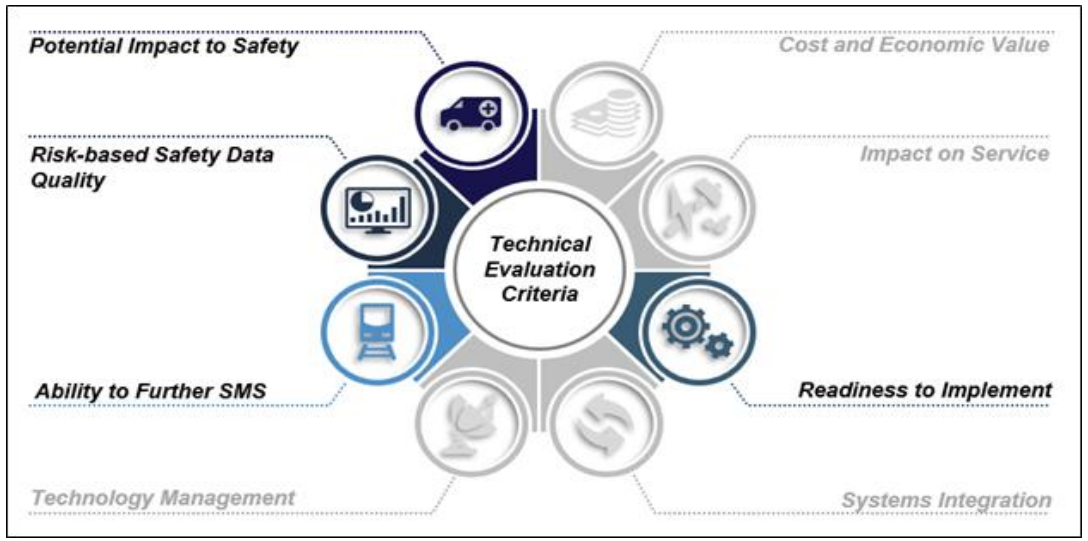
RWP Recommendation #4 – Develop RWP Safety Technology Reliability Criteria

- Criteria/Methodology
  - Include reliability experiences
- Key Takeaways
  - Different types of technology available
  - Different types of technology being used
  - Include existing work following from SA 14-1
- Information Gaps
  - Need reliability information on newer technologies
  - Information on how maintenance and issues may affect reliability
  - Need structure for reporting technological failures no matter how small
  - Need complete listing of secondary warning systems in use or in testing



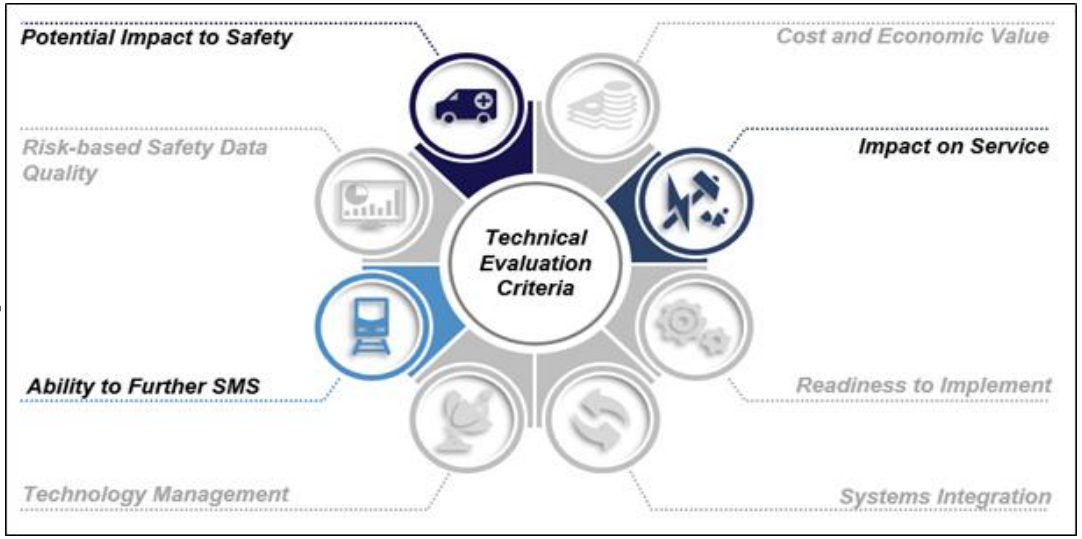
RWP Recommendation #5 – Development of Risk-Based Safety Metrics including Leading Indicators

- Criteria/Methodology
  - Leading indicator development important
- Key Takeaways
  - Risk-based safety metrics would benefit RTAs
  - Different types of technology being used
  - Include existing work following from SA 14-1
- Information Gaps
  - Need reliability information on newer technologies
  - Information on how maintenance and issues may affect reliability
  - Need structure for reporting technological failures no matter how small
  - Need complete listing of secondary warning systems in use or in testing



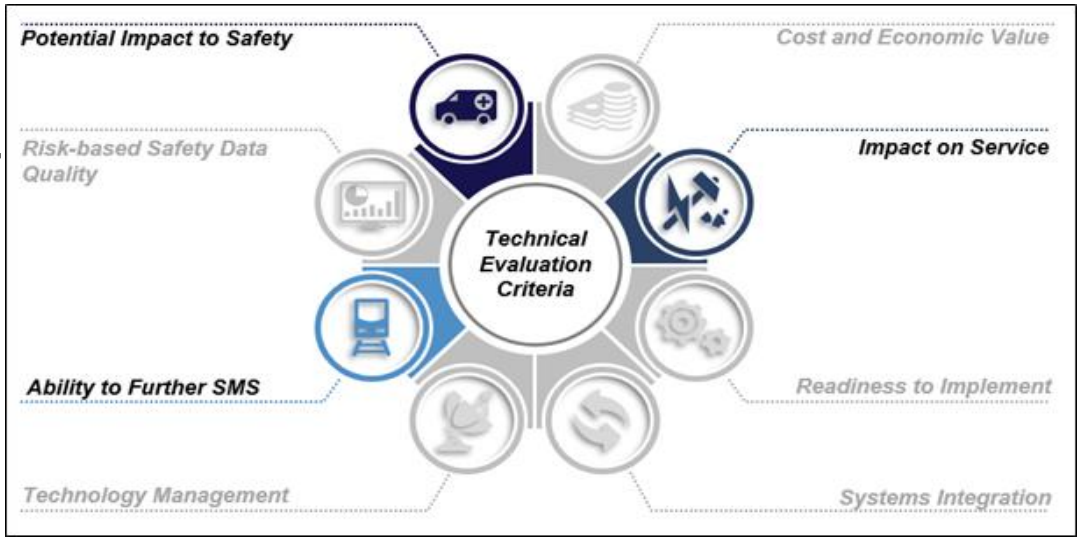
RWP Recommendation #6 – Fatigue Management for Maintenance, Controller, and Non-Operating Personnel

- Criteria/Methodology
  - Employee alertness important
- Key Takeaways
  - All RTA RWP involved personnel must be alert
  - Fatigue and alertness are incompatible
  - Fatigue must be managed
- Information Gaps
  - Need information on FTA actions on general fatigue management
  - Information on what fatigue management requirements exist for all RTA personnel
  - Need for a consistent framework so SSOA guidance not subject to multiple interpretations

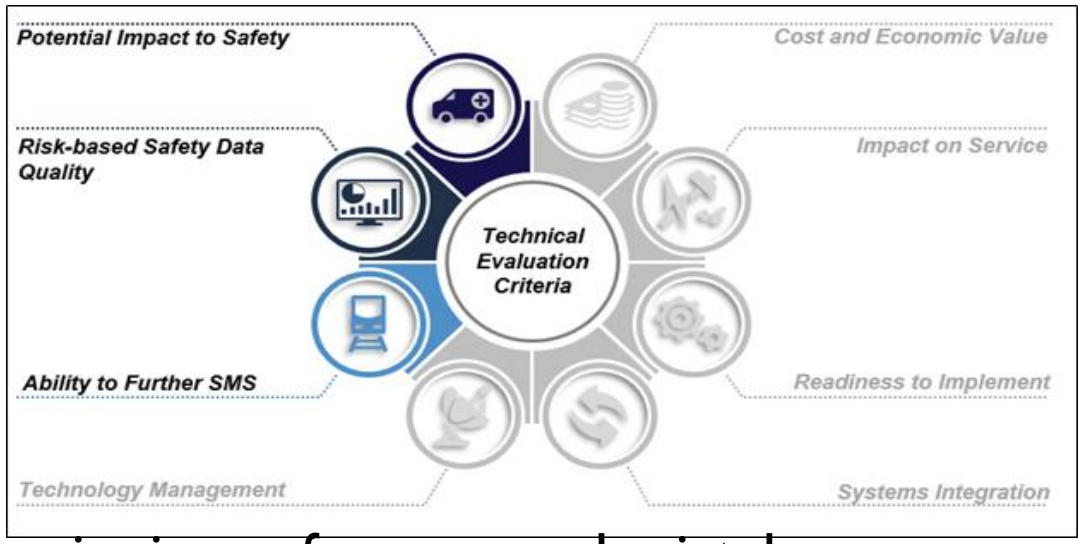


RWP Recommendation #7 – Research and Create Guidance on Cognitive Workload and Distraction of LRT Operators using In-Cab RWP Technology

- Criteria/Methodology
  - Include operator adaption to in-cab equipment
  - Include cognitive load and distraction
- Key Takeaways
  - Need complete cognitive workload research
  - Need guidance to limit cognitive distractions
- Information Gaps
  - Need review of existing cognitive workload distraction including FRA information
  - Need research on cognitive workload and distraction specific to RTA in-cab technology
  - Lack of guidance on training and mitigation of in-cab cognitive workload issues



RWP Recommendation #8 – Behavior-Based Safety Systems for RWP



- Criteria/Methodology
  - Look at casualty reduction behavior
- Key Takeaways
  - RWP safety depends on individual behavior
  - Positive reinforcement is more successful
  - RTAs benefit from applied behavior science
  - Root cause analysis can reveal behavioral underpinnings of errors and mistakes
- Information Gaps
  - Need program-level detail on BBS safety program implementation and maintenance
  - Nee full inventory of behavior and psychological science relating to safety culture/SMS
  - Insufficient information to produce any final report on BBS in the rail/transit industry

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