

# *Evaluation Methodologies Workshop*

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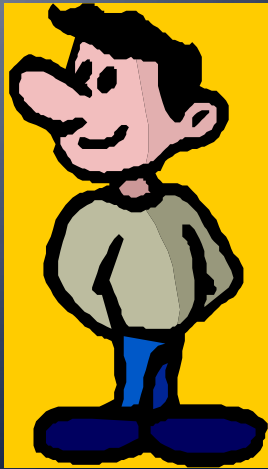
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# *Workshop Goals*

- Provide pointers on conducting evaluations
- Exchange information on successes
- Identify holes in evaluation of rural ITS

# *What do I expect?*



**Evaluator**

- Are there resources I don't know about?
- How do others do evaluations?



**Sponsor**

- What is a good evaluation?
- How much does an evaluation cost?

# *Agenda*

- **Presentation** 20 min
- **Attendee introductions** 10 min
- **Open Discussion** 45 min
- **Wrap-up** 15 min

# *Why Evaluate?*

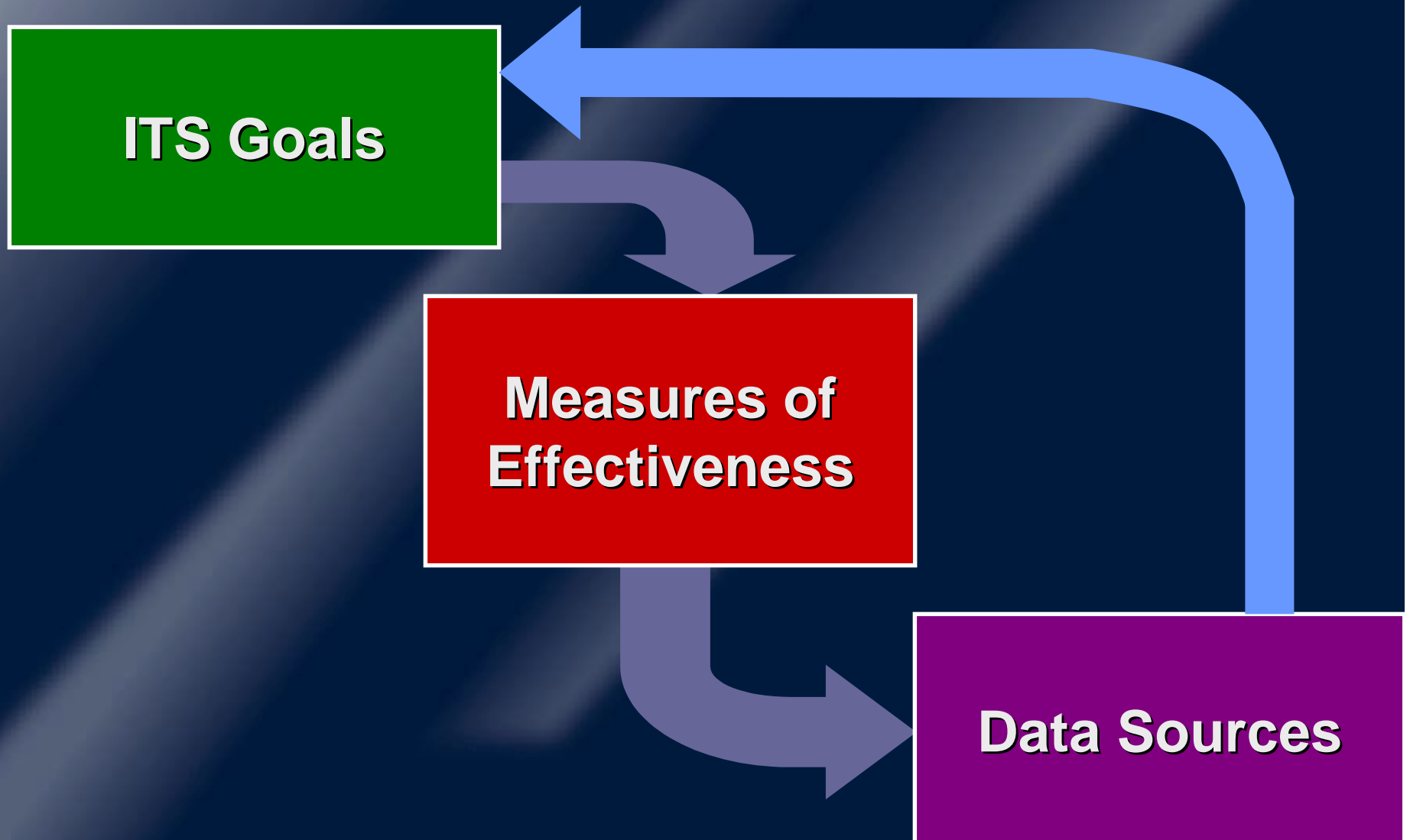
- **Federal mandates**
- **Quantify benefits**
  - **Legislature / public**
- **Identify potential improvements**
- **Determine if project was successful**
- **Guide future planning design and deployment decisions**

# ***FHWA Evaluation Steps***

- **Form Evaluation Team**
- **Develop Evaluation Strategy**
- **Develop Evaluation Plan**
- **Develop Test Plan(s)**
- **Collect & Analyze Data**
- **Final Report**

Source: [http://www.its.dot.gov/EVAL/evalguidelines\\_tea21evalguidelines.htm](http://www.its.dot.gov/EVAL/evalguidelines_tea21evalguidelines.htm)

# *Heart of Evaluation*



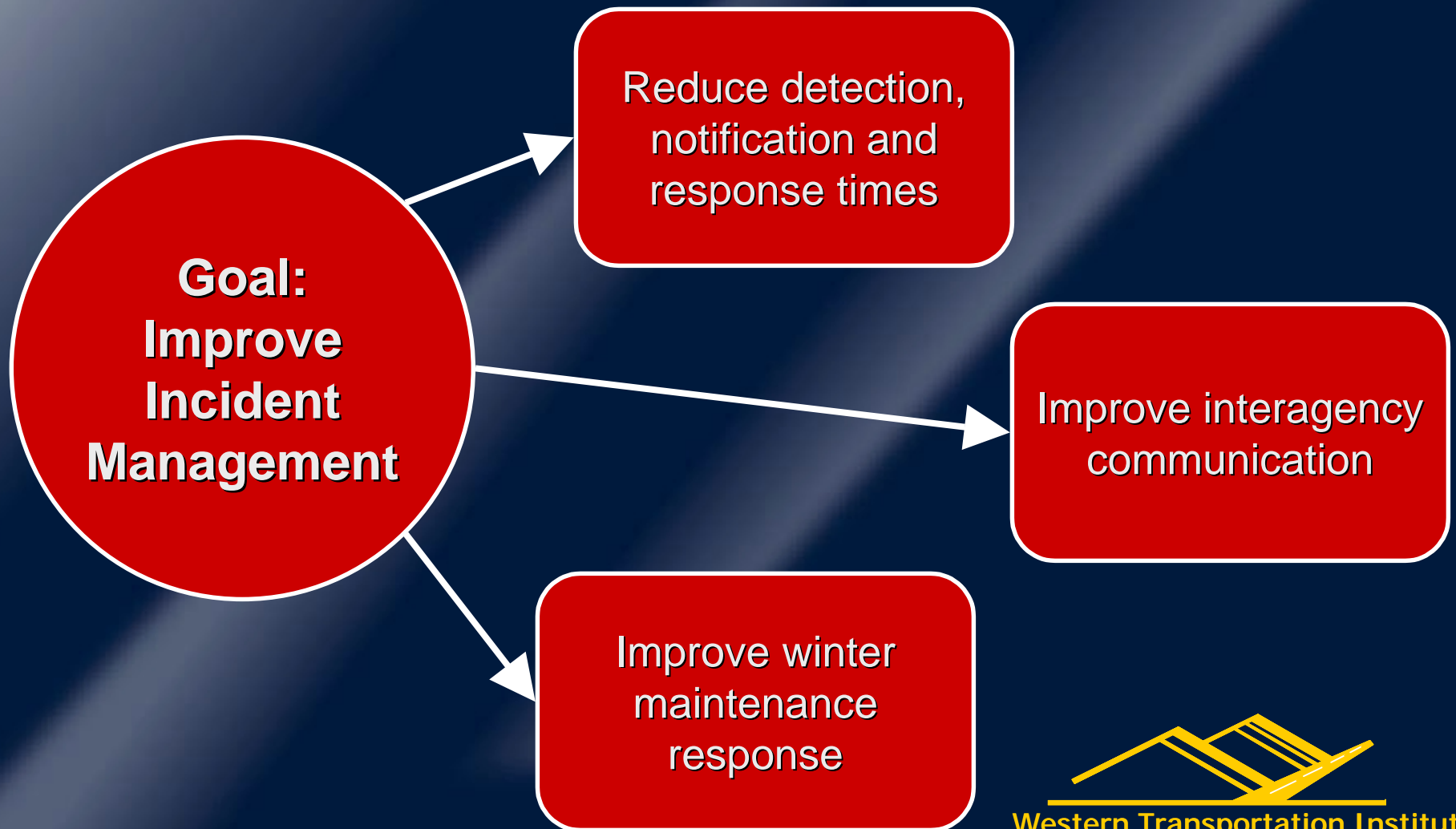
# *Example: Siskiyou Pass Goals*

**Goal:  
Improve  
Incident  
Management**

**Goal:  
Improve  
Traveler  
Information  
Services**

**Goal:  
Enhance  
Traveler  
Mobility**

# *Example: Siskiyou Pass*



# *Example: Siskiyou Pass MOEs*

- Queue length, delay, travel times
- Emergency detection, notification and response time
- Interagency interaction/cooperation
- Winter maintenance effectiveness
- Frequency and duration of road closures
- Chain requirements frequency

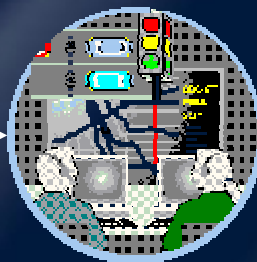
Reduce detection, notification and response times

Improve interagency communication

Improve winter maintenance response

# Example: Siskiyou Pass Data

- Queue length, delay, travel times
- Emergency detection, notification and response time
- Interagency interaction/cooperation
- Winter maintenance effectiveness
- Frequency and duration of road closures
- Chain requirements frequency



DOT Dispatch



Agency surveys



Emergency service records



Traffic monitoring stations

# *Goals of Project*

- **What is the project trying to accomplish?**
  - Address a specific local challenge
  - Improve regional conditions
  - Save money
  - Enhance institutional cooperation
  - Demonstrate new technology

# *How to Define Goals*

- May be deduced from regional ITS
- FHWA goal areas:
  - Traveler Safety
  - Traveler Mobility
  - Transportation System Efficiency
  - Productivity of Transportation Providers
  - Conservation of Energy and Protection of the Environment
  - Others as Appropriate

# *Measures of Effectiveness*

- Break down goals so they can be measured
- MOEs may vary for same goal in different projects
  - Ex. Enhance traveler mobility
    - Increase speeds
    - Reduce stopped delay
    - Increase transit ridership

# *What's a good MOE?*

- Measurable
- Relates to the goal
- Understandable
- Specific
- Comparable to other evaluations

<b>Goal Area</b>	<b>Measure</b>	
<b>Safety</b>	<ul style="list-style-type: none"> <li>■ Crash rate</li> <li>■ Crashes resulting in fatalities</li> <li>■ Crashes resulting in injuries</li> </ul>	
<b>Mobility</b>	<ul style="list-style-type: none"> <li>■ Travel time delay</li> <li>■ Travel time variability</li> <li>■ Customer satisfaction</li> </ul>	<ul style="list-style-type: none"> <li>• Weather events, incidents and road closures</li> <li>• Access issues</li> </ul>
<b>Efficiency</b>	<ul style="list-style-type: none"> <li>■ Freeway and arterial throughput</li> </ul>	
<b>Productivity</b>	<ul style="list-style-type: none"> <li>■ Cost savings</li> </ul>	
<b>Energy and the environment</b>	<ul style="list-style-type: none"> <li>■ Vehicle emissions</li> <li>■ Vehicle energy consumption</li> </ul>	<ul style="list-style-type: none"> <li>• Water quality</li> <li>• Impacts on roadside vegetation</li> <li>• Animal impacts</li> </ul>

# Goals vs. MOE/Data

	Other	Modeling/ Simulation	Travel Times and Delay Measures	Road Closures	Crash Analysis	Speed Studies	Traveler Surveys	DOT/User Interviews
<b>Safety</b>	✓	✓		✓	✓	✓	✓	✓
<b>Mobility</b>	✓	✓	✓	✓		✓	✓	✓
<b>Efficiency</b>	✓		✓					
<b>Productivity</b>	✓	✓		✓				✓
<b>Energy and the Environment</b>	✓	✓	✓	✓				✓

# *DOT/User Interviews and Surveys*

## **Issues**

- Include everyone
- Need prodding

## **Advantages**

- Captures institutional issues
- Good insight

## **Disadvantages**

- Subjective
- Small sample
- Qualitative

# *Traveler Surveys*

## **Issues**

- Beware of leading questions
- Delivery method
- Location
- Representative Sample
- Response Rate

## **Advantages**

- Customer focus
- Determine effect at the source
- Public comment

## **Disadvantages**

- Expensive
- Subjective

# *Speed studies*

## **Issues**

- Need to isolate effects of ITS
- Collection method
- Analysis
  - Distribution vs average

## **Advantages**

- Measurable
- Large sample size

## **Disadvantages**

- Accuracy
- Surrogate measure

# *Crash Analysis*

## **Issues**

- Fatal accidents can skew cost-benefit statistics
- Need to isolate effects of ITS

## **Advantages**

- Easy to explain
- Convert to cost

## **Disadvantages**

- Long time period required
- Inaccuracies in collection
- Small sample size

# Road Closures

## Issues

- May be subjective
- Limited data and difficult to collect

## Advantages

- Critical for rural highway operations

## Disadvantages

- Not readily available
- Inconsistencies

# *Travel Times and Delay Measures*

## **Issues**

- **Less important for rural areas**

## **Advantages**

- **Easy to explain**

## **Disadvantages**

- **Expensive w/o automation**

# *Modeling/Simulation*

## **Issues**

- Do existing tools address rural needs?
- Understanding theory behind model results

## **Advantages**

- Flexible
- May be cheaper than other methods

## **Disadvantages**

- Calibration / verification
- Not real results

## *Other MOEs/Data*

- Transit ridership
- Economic / tourism benefit
- Road treatment material usage
- Animal carcass counts
- ...

# *Data Sources*

- **Data availability limits what the evaluation can conclusively say**
  - Does “before” data exist?
  - Does “without” data exist?
  - What is the cost of data acquisition?
  - Can data be collected in a meaningful way?

# *Balancing Act*

**No. of System Elements**

**Novelty of application**

**No. of Stakeholders**

**Geographic Area Size**

**Quality of Evaluation**



# *Other Considerations*

- **Compatibility of before / after data**
- **Evaluation can cover entire process (design to delivery)**
- **Get the results out there**
- **Qualify why's of "successes"**
  - Is "success" statistically significant?
- **Document why's of "failures"**
  - "Failure" is not a bad thing

# *Resources*

- US DOT guides
- Other guides
- Other evaluations
- Data collection guides
  - Accidents
  - Surveys

# *Discussion Questions*

- **What is not being done?**
  - Applications or technologies
  - Methodologies or sources of information are not being used
- **What challenges have you encountered?**
- **How should evaluations be designed?**
- **How do you know if it is a good evaluation?**
- **How do you know if the item being evaluated is a success?**
- **How much does an evaluation cost?**
- **What resources are available for evaluations?**

# *Attendee Introductions*

- Name
- Agency / Firm
- Two sentences about evaluation experience
- One question to be addressed