NTSB National Transportation Safety Board

Office of Highway Safety

Collision Warning Systems

Kristin Poland, Ph.D.

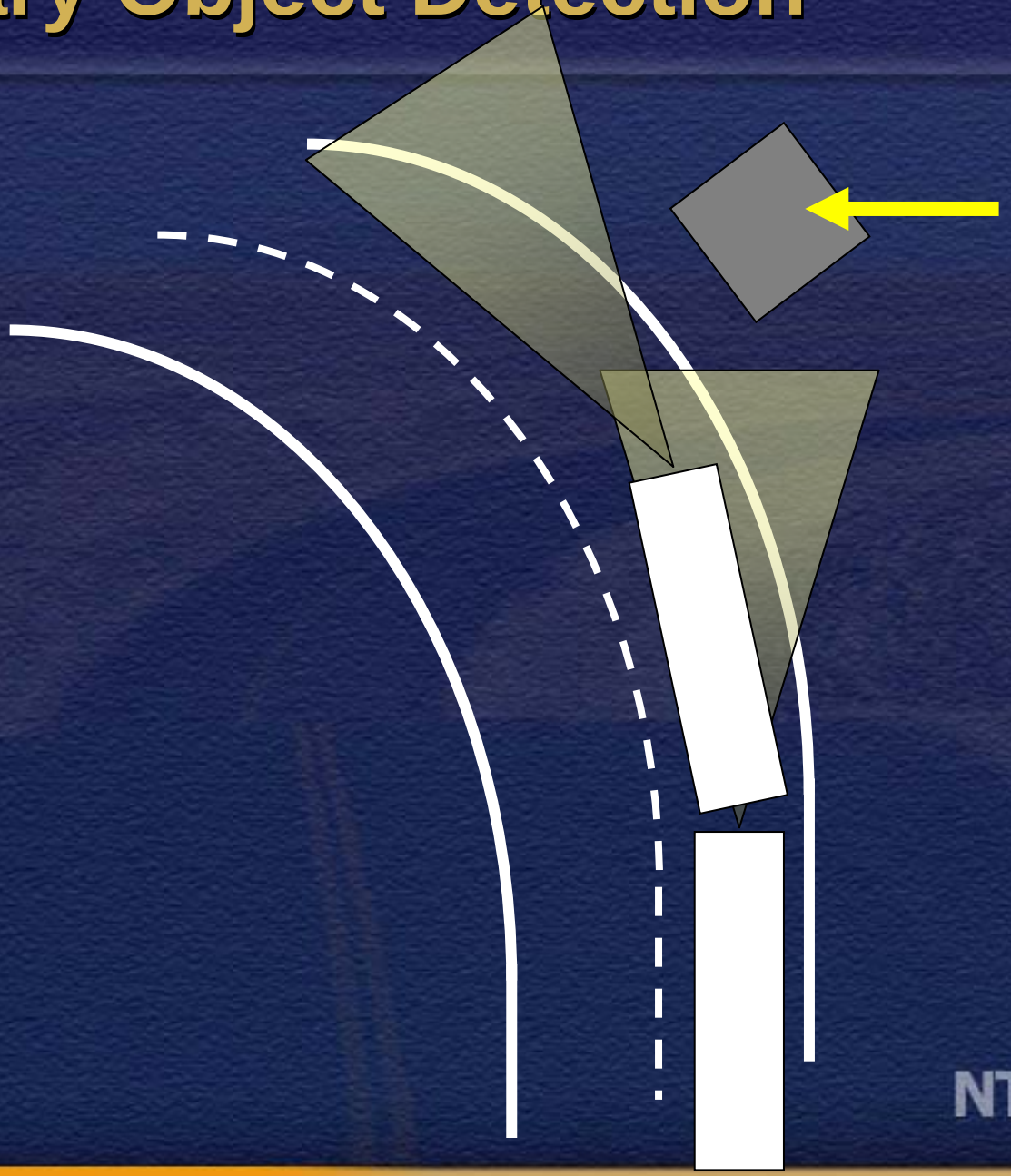

15 JO '05

Collision Warning Systems (CWS)

- Radar based
- Track other vehicles and stationary objects
- Prevent rear-end collisions
- Provide light and sound warnings
- Moving versus stationary objects

NTSB

Stationary Object Detection



NTSB

Perception/Reaction Times and CWS

- At 70 mph:
  - 350 feet warning = 3.4 seconds
  - 220 feet warning = 2.1 seconds
- Average driver reaction time is around 1.5 seconds
- Time for brake pedal application and full brake system pressurization (0.5 seconds)
  - At 70 mph, 2.0 seconds = 205 feet
- Ideal brakes, longest warning time
  - Impact speed = 48.5 mph
- Existing brakes, 220 feet warning time
  - Impact speed = 68.8 mph

NTSB

Active Braking CWS

- Acura RL
- Adaptive cruise control (ACC)
- Active braking collision warning systems controls vehicle automatically
- Benefits may be huge:
  - Ideal brakes, longest warning time
    - Impact speed = 0 mph

NTSB

Vehicle Stability and CWS

- Collision warning systems
  - Severe evasive maneuvers
- Vehicle instability
  - Hard braking on slippery surface
  - Rapid steer maneuver
- Stability control system
  - Roll and directional control

NTSB

Summary

- Collision warning systems
  - Potential to enhance commercial vehicle safety
  - Reduced effectiveness at highway speeds with stopped vehicles
- Active braking collision warning systems
- Electronic stability control (ESC)

NTSB

NTSB