Third
International Symposium on Naturalistic
Driving Research

Development of Distracted Driving Database

TOYOTA
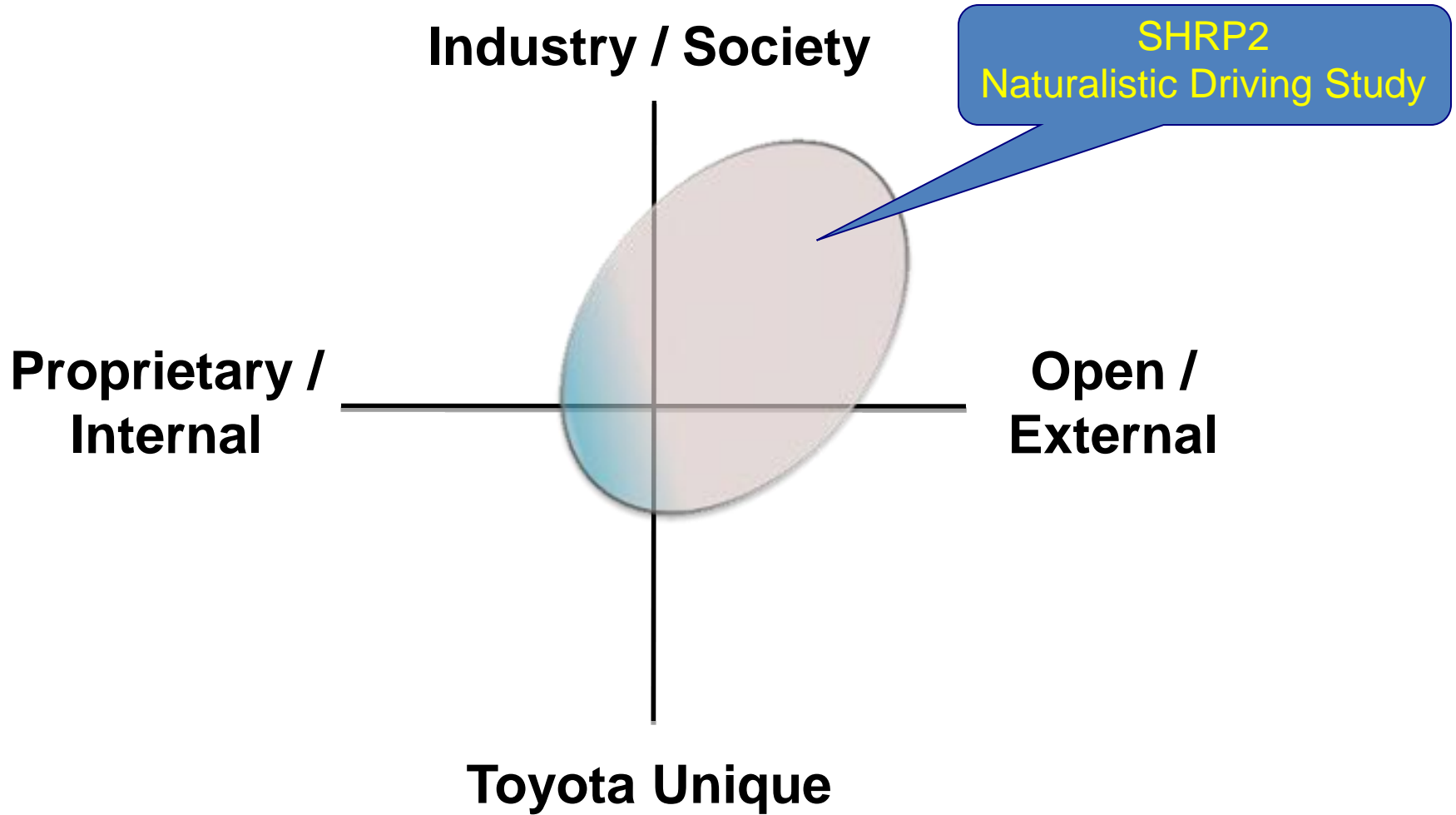Collaborative Safety Research Center

Kazu Ebe

August 28, 2012

1. CSRC Overview

2. Driver Distraction Dataset Creation Project with VTTI

Announced January 2011

- *"Work with leading NA universities, hospitals, federal agencies …"*

- *"… benefit the entire industry."*

- *"… Estimated funding:$50 million over 5 years"*

CSRC — Collaborative Safety Research Center — TOYOTA

VirginiaTech TRANSPORTATION INSTITUTE — DRIVING TRANSPORTATION WITH TECHNOLOGY

Industry / Society

Proprietary / Internal

Open / External

Toyota Unique

SHRP2
Naturalistic Driving Study

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1. Collaborative Research

2. Crash Data Analysis

3. Outreach

Initial Research Focus

- Active Safety

- Driver Distraction

- Vulnerable Populations
  - Children
  - Newly licensed teens
  - Seniors
  - Pedestrians

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2. Driver Distraction Dataset Creation Project with VTTI

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DRIVING TRANSPORTATION WITH TECHNOLOGY

Partner: Virginia Tech Transportation Institute (VTTI)

Co-PI: Dr Linda Angell and Dr Justin Owens

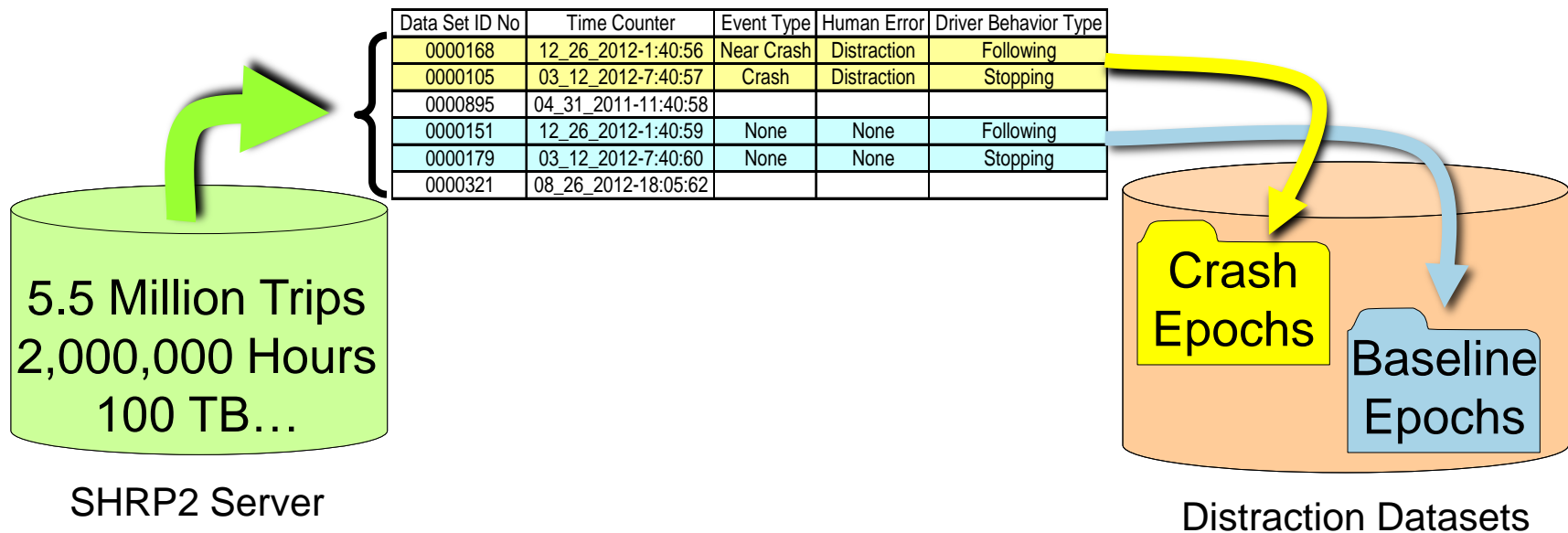**Project Start** – Nov 2011   Duration – 3 years

Creation of Driver Distraction Dataset

Goals
1. Define Driver Distraction Categories
2. Using SHRP2 data develop/refine algorithm for identifying epochs of distraction
3. Construct distraction and baseline datasets
   - The reduced datasets available to all researchers wanting to use SHRP2 data for in-depth study of distraction

Driver Distraction: Dataset Creation

- The first step in planning for analysis of this large database is to reduce the raw data to identify the role of driver distraction in crash causation.

Data Set ID No	Time Counter	Event Type	Human Error	Driver Behavior Type
0000168	12_26_2012-1:40:56	Near Crash	Distraction	Following
0000105	03_12_2012-7:40:57	Crash	Distraction	Stopping
0000895	04_31_2011-11:40:58			
0000151	12_26_2012-1:40:59	None	None	Following
0000179	03_12_2012-7:40:60	None	None	Stopping
0000321	08_26_2012-18:05:62			

5.5 Million Trips
2,000,000 Hours
100 TB…

SHRP2 Server

Crash Epochs

Baseline Epochs

Distraction Datasets

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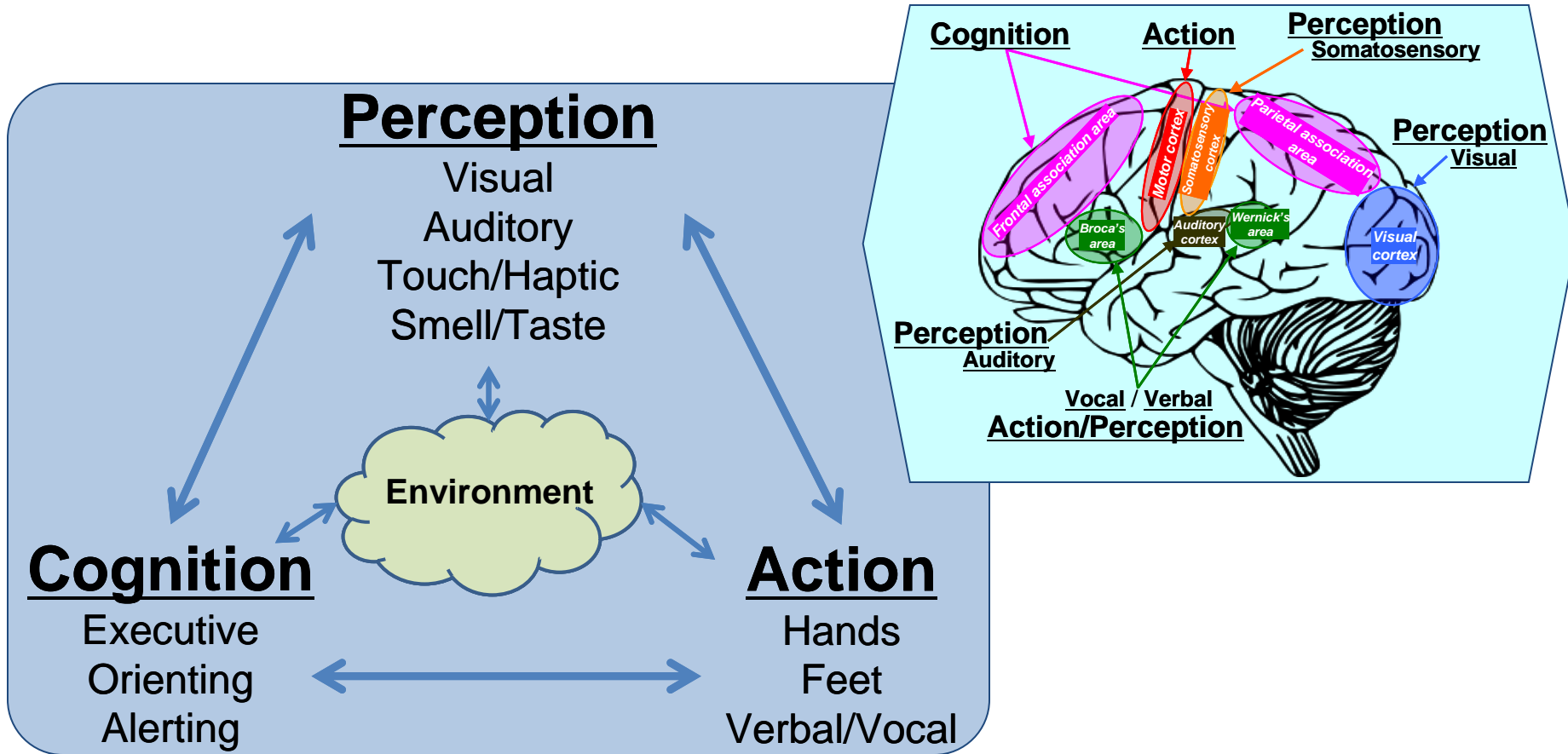DRIVING TRANSPORTATION WITH TECHNOLOGY

- Status
  - Initial definitions have been identified
  - Output of CSRC Driver Distraction Definitions Workshop (D3) provided starting point
    - CSRC Collaborators participated in workshop
    - Definitions for driver distraction, visual-manual & cognitive distractions
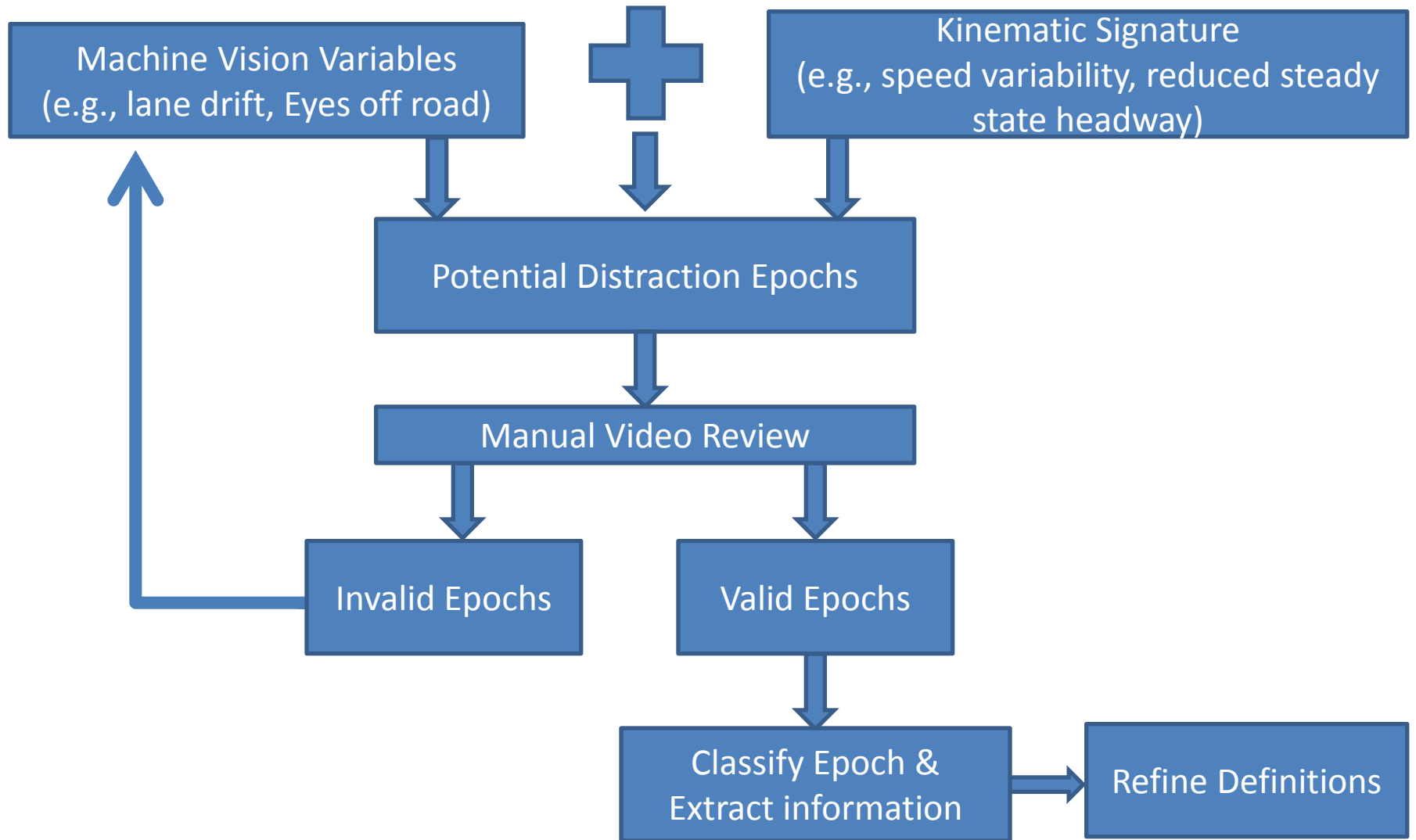- High level definition

"Driver distraction is the diversion of attention away from activities critical for safe driving toward a competing activity, which may result in insufficient or no attention to activities critical for safe driving."
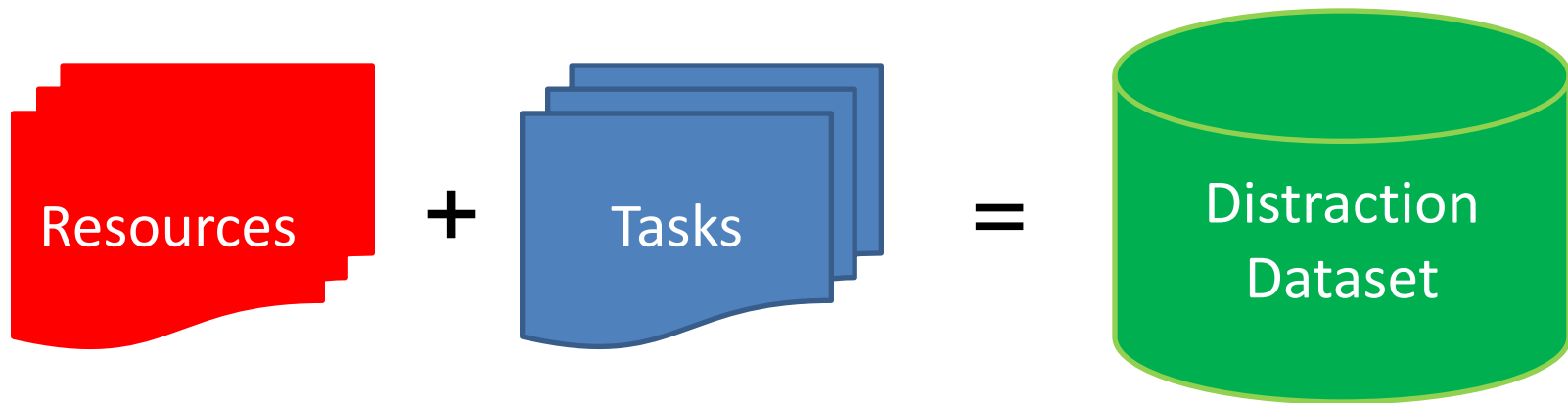
- D3 identified that distraction is a function of driver resources being diverted from the driving task

VTTI Stratified Resource of Distractions

- Main categories of Driver resources:
  - *Perception / Cognition / Action*
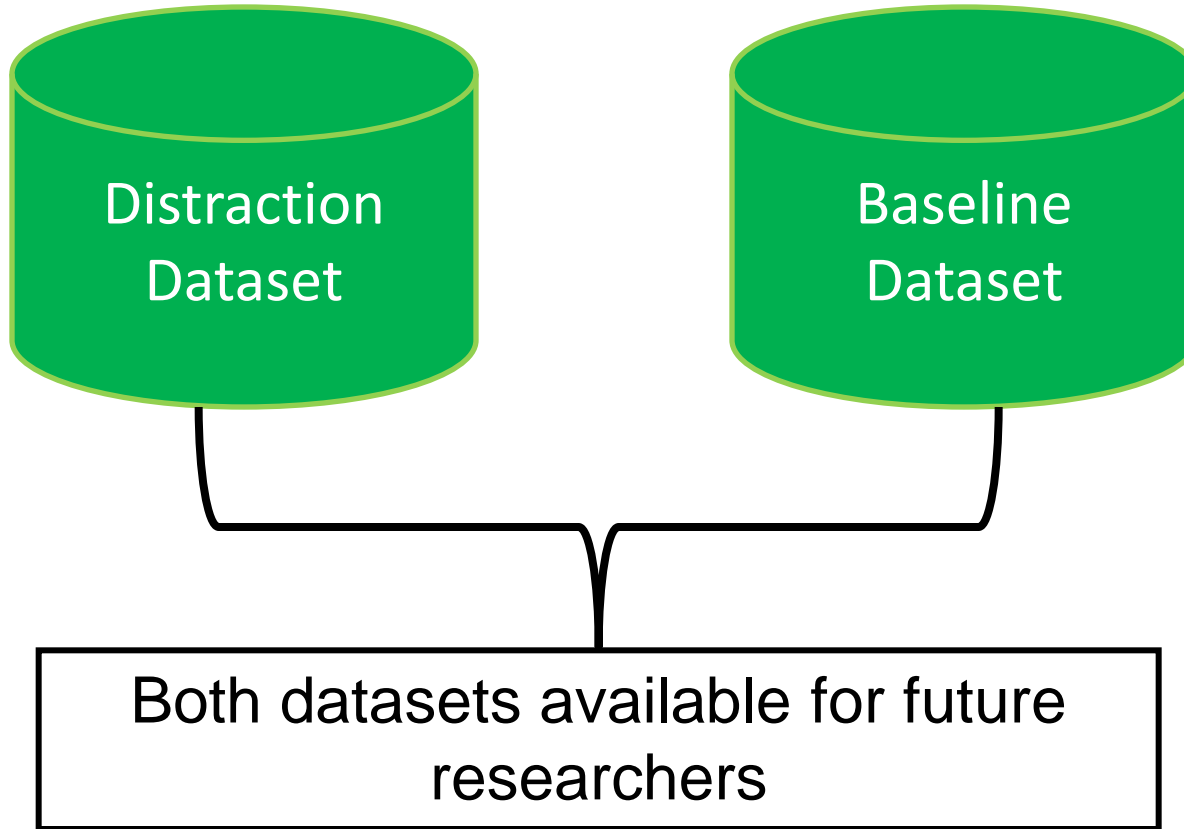   - Defined by incorporating a cognitive neuroscience perspective

- To integrate into a framework useful for operational definitions:
  - Determine how each resource supports various driving tasks
  - Determine which resources are **observable** using variables available in data
  - Use decrements in variables associated with driver resources to identify epochs with possible distraction

Final Distracted Driving Dataset

Resources + Tasks = Distraction Dataset

- The combination of an operational definition with driver resource engagement will allow a more *complete description of secondary task engagement* than has been previously available.

- The dataset comprised of these types of information will allow for more detailed future analyses of SHRP2 distracted driving data.

Note: Project is still in initial phases and there will be sustainable refinement

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Distraction Dataset

Baseline Dataset

Both datasets available for future researchers

Thank you !!