COLORADO
Department of Transportation

Identifying and Addressing Non-Technical Key Research Questions: Infrastructure

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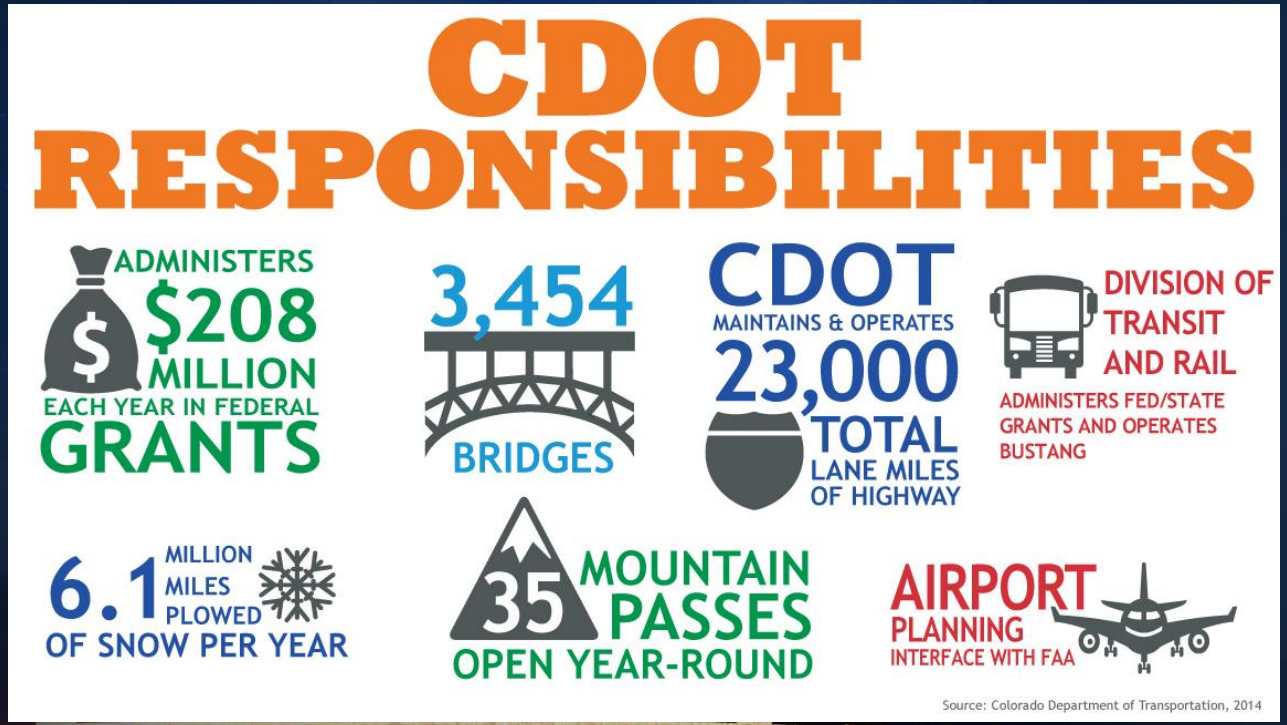
FY 2017-2018
$1.42 Billion Budget



ROADX
ACCELERATING TECHNOLOGY

Purpose

To save lives and make lives better by providing freedom, connection and experience through travel.

2017

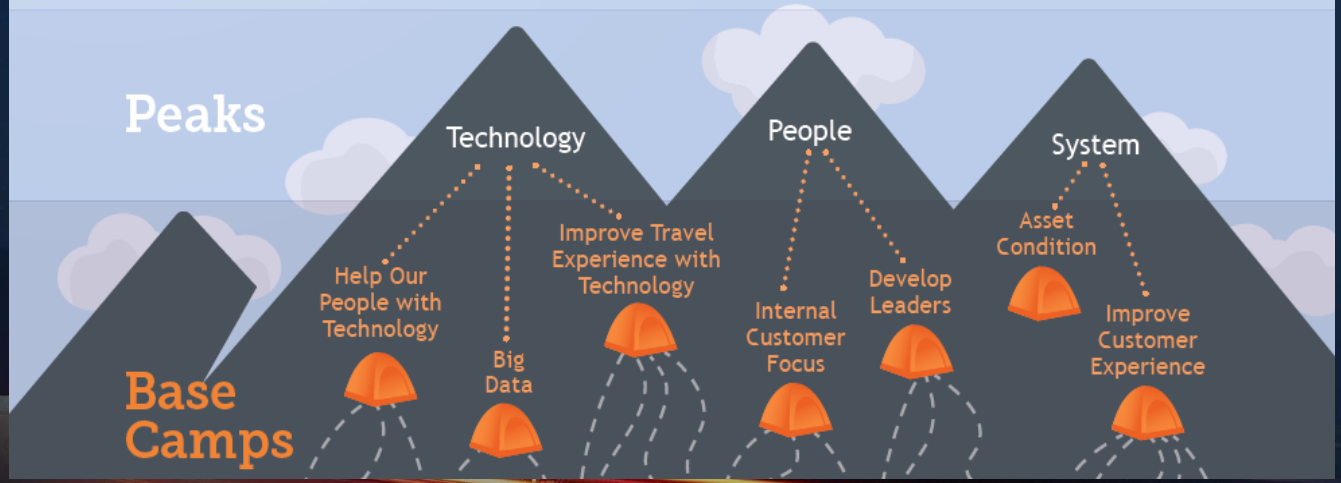
Values

Safety, people, integrity, customer service, excellence and respect are at the heart of all that we do.

Summit

The best DOT in the country for all customers by focusing on our people, leading-edge technology and a healthy multi-modal system.

Peaks



Base Camps

OUR CHALLENGE

Continued Growth

1991	2015	2040
3.3 million	5.4 million	7.8 million
27.7 billion vehicles miles traveled	**50.5 billion vehicle miles traveled**	**72.3 billion vehicle miles traveled**
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$125.70 spent per person	$68.94 spent per person	$41.16 spent per person

All dollar figures adjusted for inflation

ROADX
ACCELERATING TECHNOLOGY

RoadX **VISION**: Crash-free, Injury-free, Delay-free and Technologically-transformed travel in Colorado.

RoadX **MISSION**: Team with public and industry partners to make Colorado one of the most technologically advanced transportation systems in the nation, and a leader in safety and reliability.

Colorado Is Open For Business – Colorado invites partners to join us in accelerating the adoption and deployment of technological solutions.

Why do we need to act?

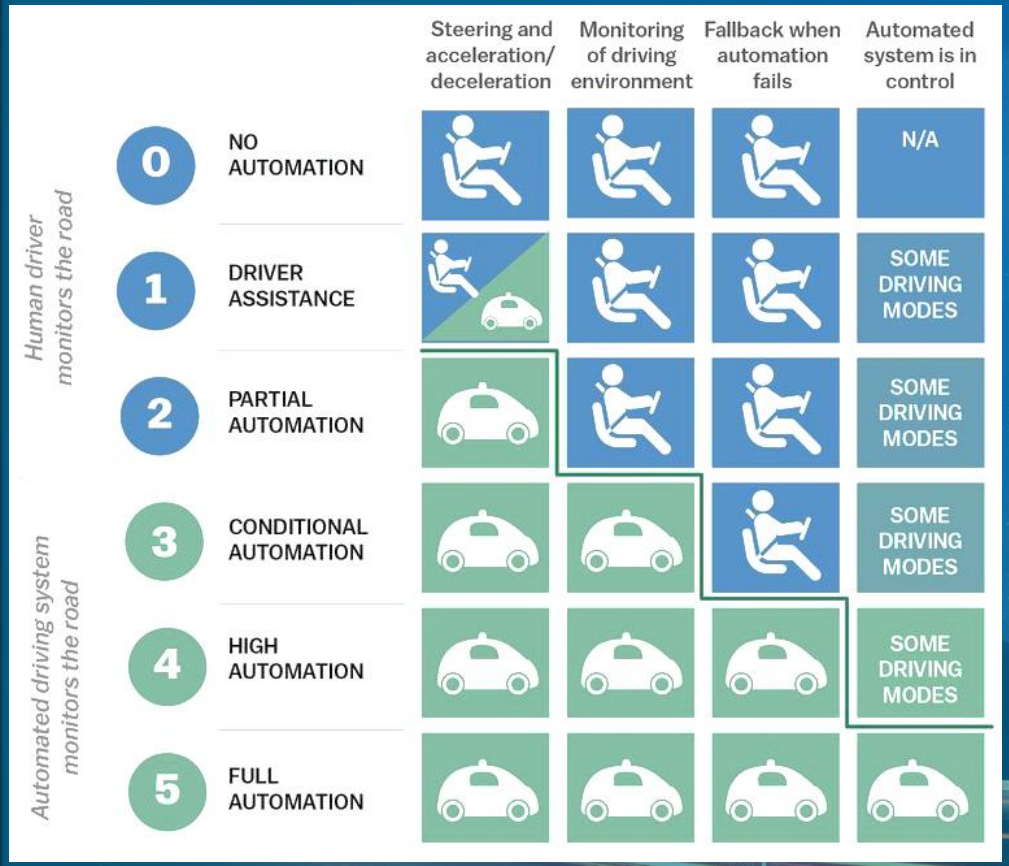
SAFETY

80% reduction in crashes per NHTSA estimates

MOBILITY

40 to 400% increase in capacity

5 levels of driving automation



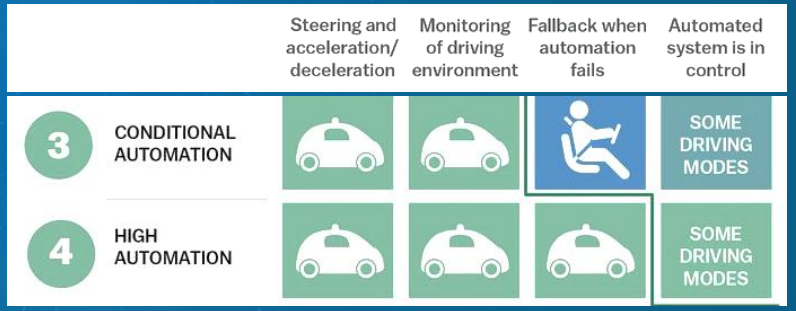
Highly Automated Vehicles (HAVs)

Human driver

Automated system

NHTSA's AV Guidance and ODD

The document identifies **Operational Design Domain (ODD)** as the critical definition of where (such as what roadway types, roadway speeds, etc.) and when (under what conditions, such as day/night, normal or work zone, etc.) an HAV is designed to operate. The importance of communicating the ODD of an HAV to the consumer as part of broader product education is highlighted.



Connected road classification system

Level 1 Unpaved and/or non-striped roads designed to a minimum level of standard of safety and mobility

Level 2 Paved roads designed to AASHTO's standards with MUTCD signage. There is not Intelligent Transportation System (ITS) equipment or infrastructure to collect connected vehicle data (Dedicated Short Range Radio). Access to cellular date service may be available

Level 3 There is Intelligent Transportation System (ITS) equipment operated by a Traffic Operation Center (TOC) and/or, one way electronic data share between DOT/Vehicle/User and/or, mixed use lanes

Connected road classification system

Level 4

Roadway or specific lane(s) has adaptive ITS equipment (i.e. smart signals hold for vehicles, highway lighting that turn on for vehicles, etc.) with Traffic Operations Center override only, and/or two way data share between DOT/Vehicle/User, and/or lanes designated for vehicle levels 3 & 4 only

Level 5

(Advance Guide-way System) roadway or specific lane(s) designed for vehicle level 4 only with additional features that may include inductive charging, advance/enhanced data sharing, etc. Additionally, no roadside signs are needed as all roadway information is direct to vehicles' on-board systems

Level 6

All roadway elements designed for only vehicle level 5 systems – no signs, signals, striping… needed

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Smart Highways

Smart 25
Ridegate to University

Software and sensor upgrades to better manage flow resulting in:

Fall 2017

Smart 70
Golden to Vail

Partnership with Here will provide real time data about hazards such as:

Winter 2016

Smart 70
Panasonic

Self-driving vehicles and infrastructure share data to eventually:

Ongoing

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Innovation

OTTO Transport

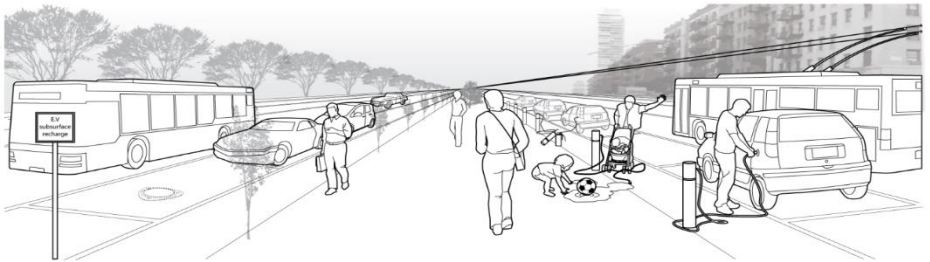
Self driving vehicles, platooning, smart parking

Hyperloop

New way to move people and freight

Smart Powered Lane

Pilot to embed charging in roads to power electric vehicles



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Questions?