



IntelliDriveSM Safety Program Policy Roadmap

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Two Approaches

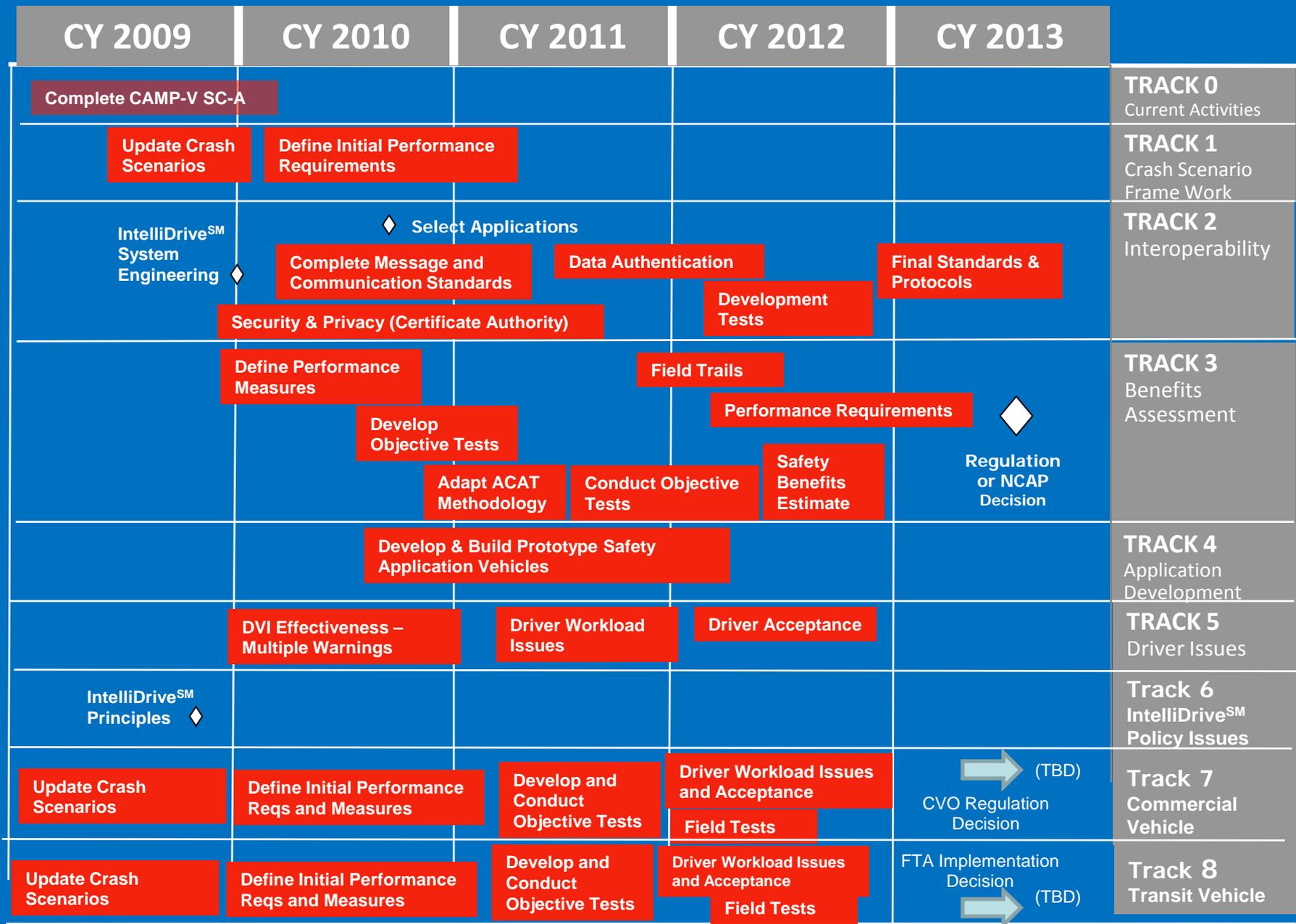
Top-Down:

- Policy Roadmap (version 8), December 2009
- Cross-cutting policy constructs focused on deployment

Bottom-Up:

- Specific technical policy issues focused on supporting ongoing research and major research milestones
- Deconstruct technical research roadmaps

Vehicle to Vehicle Safety Application Research Plan



Safety Program Policy Roadmap

Purpose:

- Outline policy and institutional issues in an organized, structured manner.
- Develop plan for research and analysis that results in options and recommendations in support of V2V and V2I for Safety.
- Research results and decision points are driven by:
 - **Safety Pilot**
 - **The 2013 NHTSA regulatory decision**
 - **Deployment**

Organization:

- Key policy questions
- Specific research tasks
- Stakeholder collaboration
- Stakeholder outreach/education
- Outcomes for major program milestones
- Timeline

Critical Policy Areas

Identified 8 key policy issue areas in collaboration with technical team and stakeholders:

- Device and Equipment Certification
- Certificate Authority for Security
- Risk Allocation and Data Ownership
- Benefit-Cost Analysis in Support of Deployment
- Rules of Operation and Application of Standards
- Spectrum Analysis and FCC Role
- Infrastructure and Deployment
- Governance Structure and Authority

Key Questions to Keep in Mind

- **Are there other policy areas related to research on V2V and V2I for Safety that we have missed? What are they?**
- **Within each area, have we comprehensively identified the issues?**
 - Priorities
 - Constraints on what can be accomplished
- **Next steps are to define a plan for getting results:**
 - What are most efficient strategies for moving forward on research and analysis?
 - What issues affect more than just the Safety program? What are variations? (i.e., data ownership or privacy)
 - Within each area, what are “absolutes” in terms of requirements?
 - Who are experts and how do we engage expertise in complement with stakeholder collaboration?

Device and Equipment Certification

Definition

Certification provides a process that ensures all devices and equipment part of the IntelliDrive system meet specific standards relating to interoperability and performance, security, and privacy.

Objectives

- Define interoperability
- Identify risks and threats that can be addressed through certification versus those that need to be addressed by a governance authority
- Develop policies based on certification processes and management structure
- Evaluate types of impacts the certification process may have on industry or consumers due to access restrictions, costs, or other factors
- Analyze whether self-certification could be an option

Device and Equipment Certification

Expected Outcomes

Safety Pilot

- Initial recommendations on ways of identifying misbehavior and options for enforcement
- Model certification process to be evaluated during Safety Pilot
 - Evaluation of performance, costs, etc.
 - Stakeholder review
- Analysis of lessons learned and gaps
 - Where is further work needed? How will model process expand to include other elements?

NHTSA Regulatory Decision

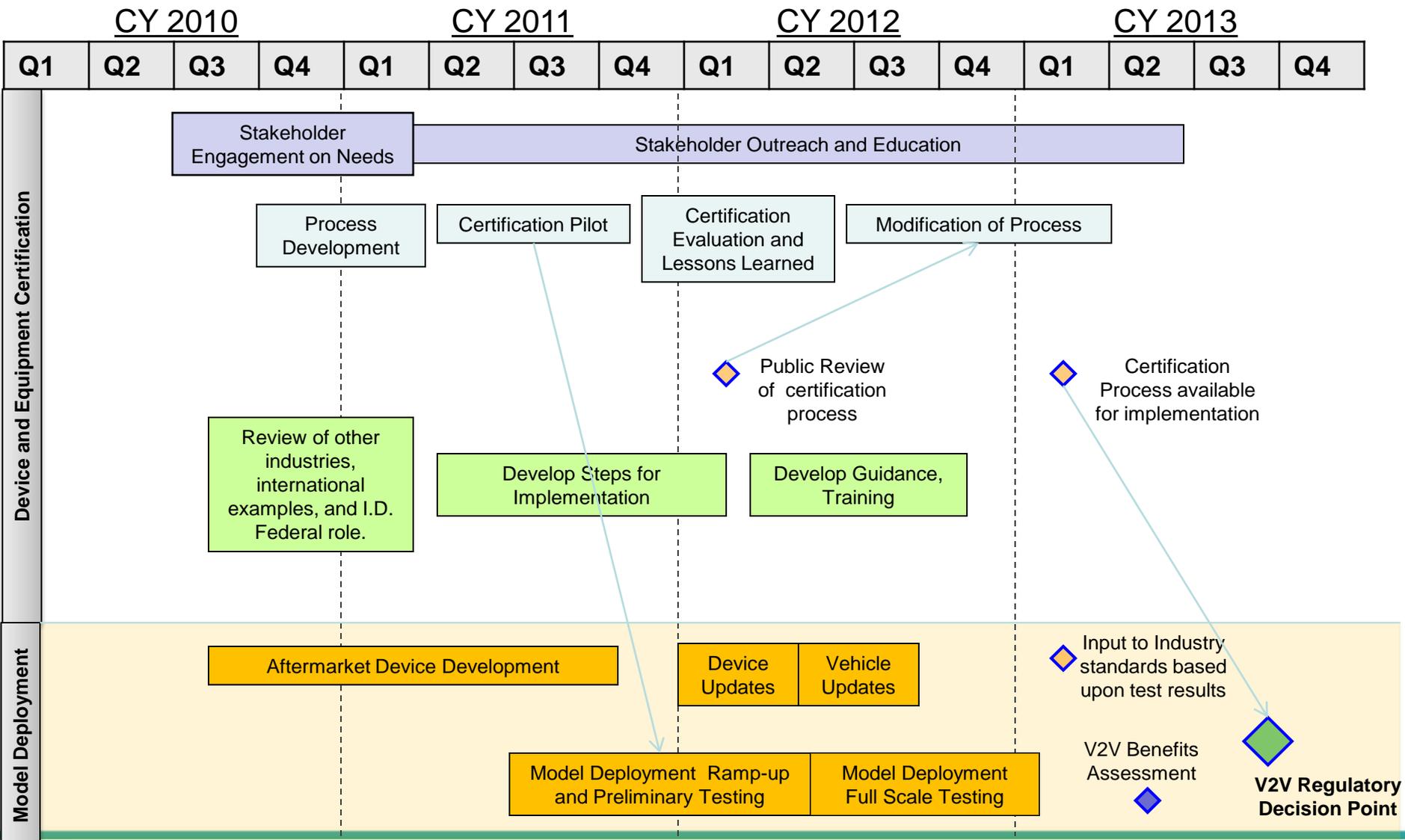
- Analysis of industry impact
- Tested certification process that includes recommendations on certifying entities, roles, and responsibilities

Deployment

- Operational certification and enforcement processes
- Identified laboratories/facilities able to certify devices and equipment
- Guidance and training process for agency personnel

Device and Equipment Certification

Policy team ◆ Milestone, Review Point
SE team ◆ Decision Point
Outreach/Comm Gold=Model Deployment



Questions

- Missing anything?
- Key priorities?
- Ideas on next steps? Experts?
- Comments?

Certificate Authority for Security

Definition

An entity or process for issuing digital certificates that confirm or validate a person, vehicle, organization, and other entity looking to access the system is legitimate. A certificate authority (CA) structure is necessary to provide security and privacy protection.

Objectives

- Assist the technical team in CA design and address questions regarding a “centralized” or “split” CA through a trade-off analysis
- Engage privacy advocates to understand acceptable levels of privacy and gain their ‘buy-in’ to understand impacts on cost, scalability and deployment
- Analyze the trade-offs between security and privacy of the system
- Identify how misbehavior can be addressed and what enforcement mechanisms are feasible

Certificate Authority for Security

Expected Outcomes

Safety Pilot

- Concept of Operations for a CA
- Initial CA design for testing during Safety Pilot including processes for certificate management, issuance, updates, identification of misbehavior, enforcement options, revocation, reinstatement
- Understanding of trade-off issues between security, privacy, and cost
- Evaluation of impact to existing privacy principles

NHTSA Regulatory Decision

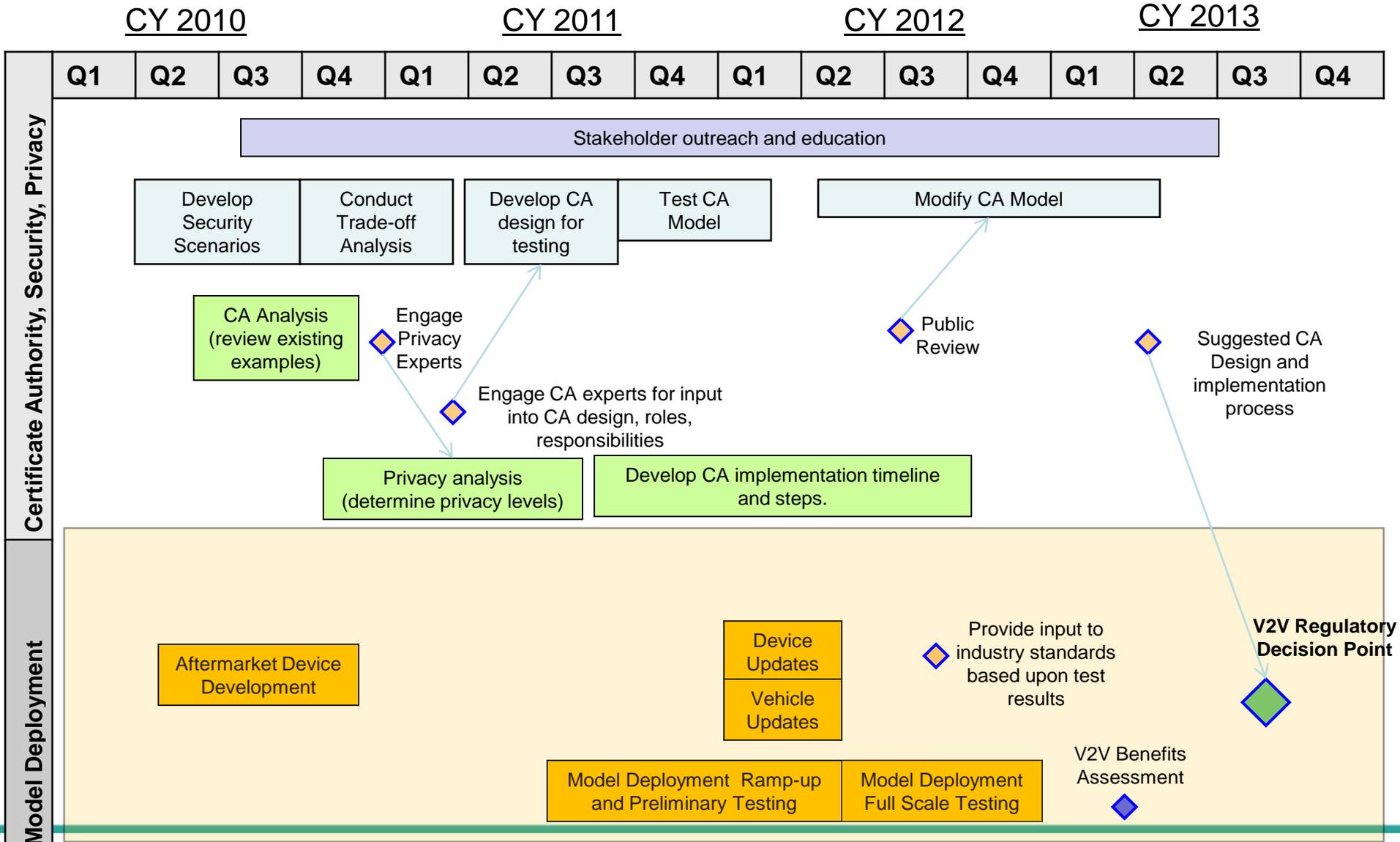
- Feasible CA design and certificate management process with appropriate security and privacy levels
- Identification of additional authorities needed for a CA entity (if any)
- Assessment of privacy issues

Deployment

- Operational CA

Certificate Authority for Security

Green=Policy team
 Milestone, Review Point
 Blue=SE team
 Decision Point
 Pink=Outreach/Comm
 Gold=Model Deployment



Questions

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Risk Allocation and Data Ownership

Definition

Allocation of legal risk and liability between participants of the IntelliDrive system. Cooperative data systems complicate the existing definitions of risk allocation, liability, and data ownership.

Objectives

- Develop definitions of 'risk' and 'data ownership' from the perspective of cooperative systems and multi-source data environments**
- Identify risk/liability associated with software failures, driver behavior (failure to heed warnings), or negligence (updates, failure to use)
- Engage legal expertise to determine current legal precedence and review existing laws on immunity
- Identify impacts to business and risk models, particularly insurance industry models
 - Engage insurance industry and gain acceptance
 - Engage insurance industry on opportunities for incentives with use of cooperative systems for safety

**** This policy area has overlapping issues with the Data Capture and Management Program.**

Risk Allocation and Data Ownership

Expected Outcomes

Safety Pilot:

- Clarity on risk, liability, and data ownership issues (differences) associated with:
 - Cooperative systems
 - Embedded systems, retro-fit systems, aftermarket devices

NHTSA Regulatory Decision:

- Initial model outlining potential risk allocation options
- Analysis of data ownership and data management plan, evaluation of industry impacts
- Legal assessment of government immunities and relevant case examples
- Determination on whether new legislation is necessary for liability issues

Deployment:

- Strategy with insurance industry on incentives, risk models, assessment of liability

Risk Allocation and Data Ownership

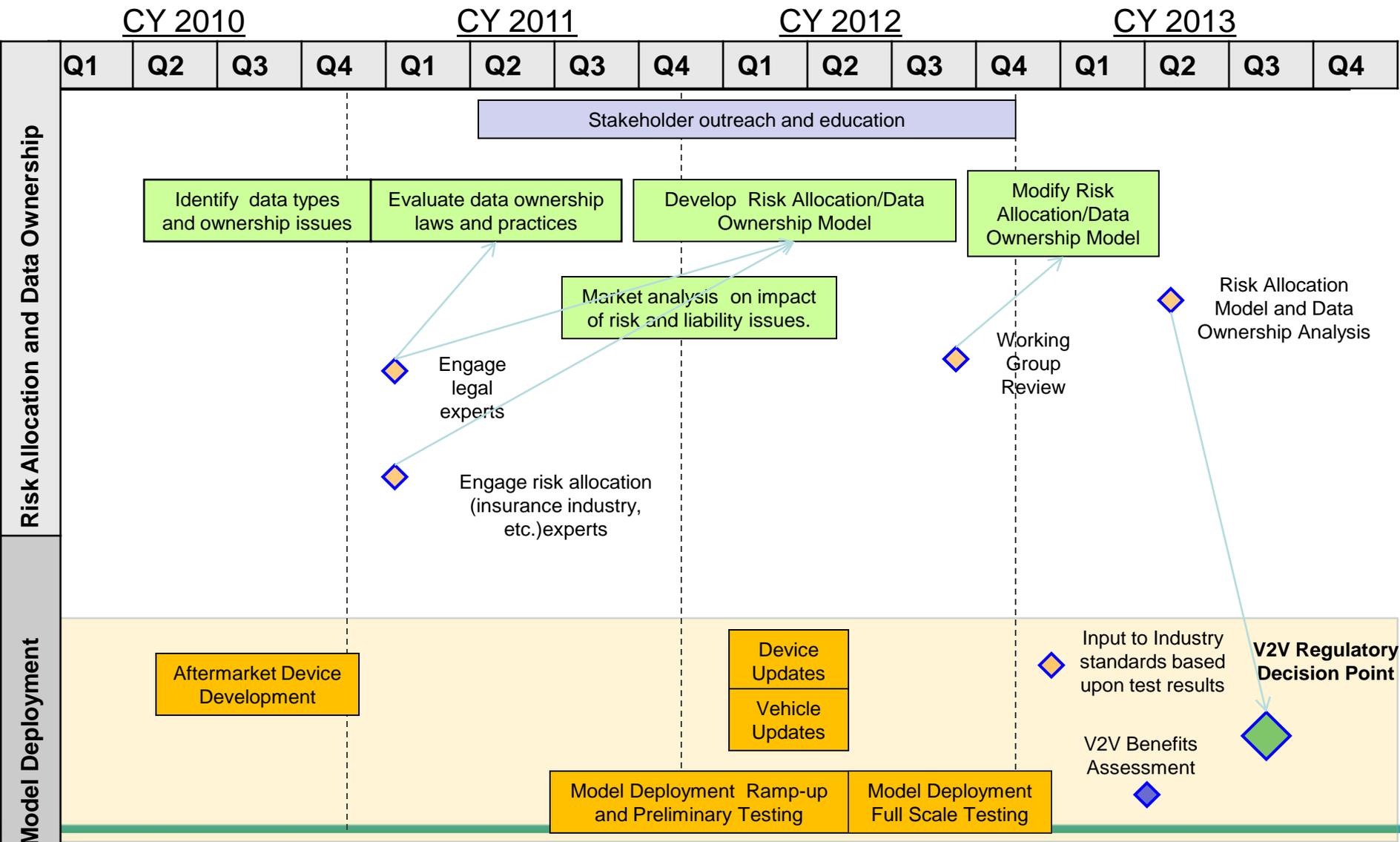
Green=Policy team

Blue=SE team

Pink=Outreach/Comm

◇ Milestone, Review Point
◇ Decision Point

Gold=Model Deployment



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Benefit-Cost Analysis

Definition

Analysis examining all associated ‘costs’ and ‘benefits’ for deployment of IntelliDrive in support of decision making. Benefit-cost analysis (BCA) is necessary for making a regulatory decision and is an important tool for understanding the “value” of IntelliDrive to different audiences.

Objectives

- Develop a vehicle fleet model that includes revised assumptions including a retrofit perspective and current sales projections
- Identify the stakeholder impact/value proposition (e.g. OEMs, State and local transportation agencies, transit agencies, trucking companies..... *who else?*)
- Perform various analyses on IntelliDrive:
 - Value propositions
 - Safety-benefit estimation
 - Costs identification
 - Cost-effectiveness and alternatives analysis for applications
 - Societal benefits / BCA

Benefit-Cost Analysis

Expected Outcomes

Safety Pilot

- Identification of data required for all of the various analyses and identification of which data will be generated from Safety Pilot and which data will be gathered from other sources
- Development of value propositions
- Analysis plan

NHTSA Regulatory Decision:

- NHTSA safety benefits-estimation, cost-effectiveness and alternatives analysis as inputs for decision
- Economic / industry / agency impact analysis

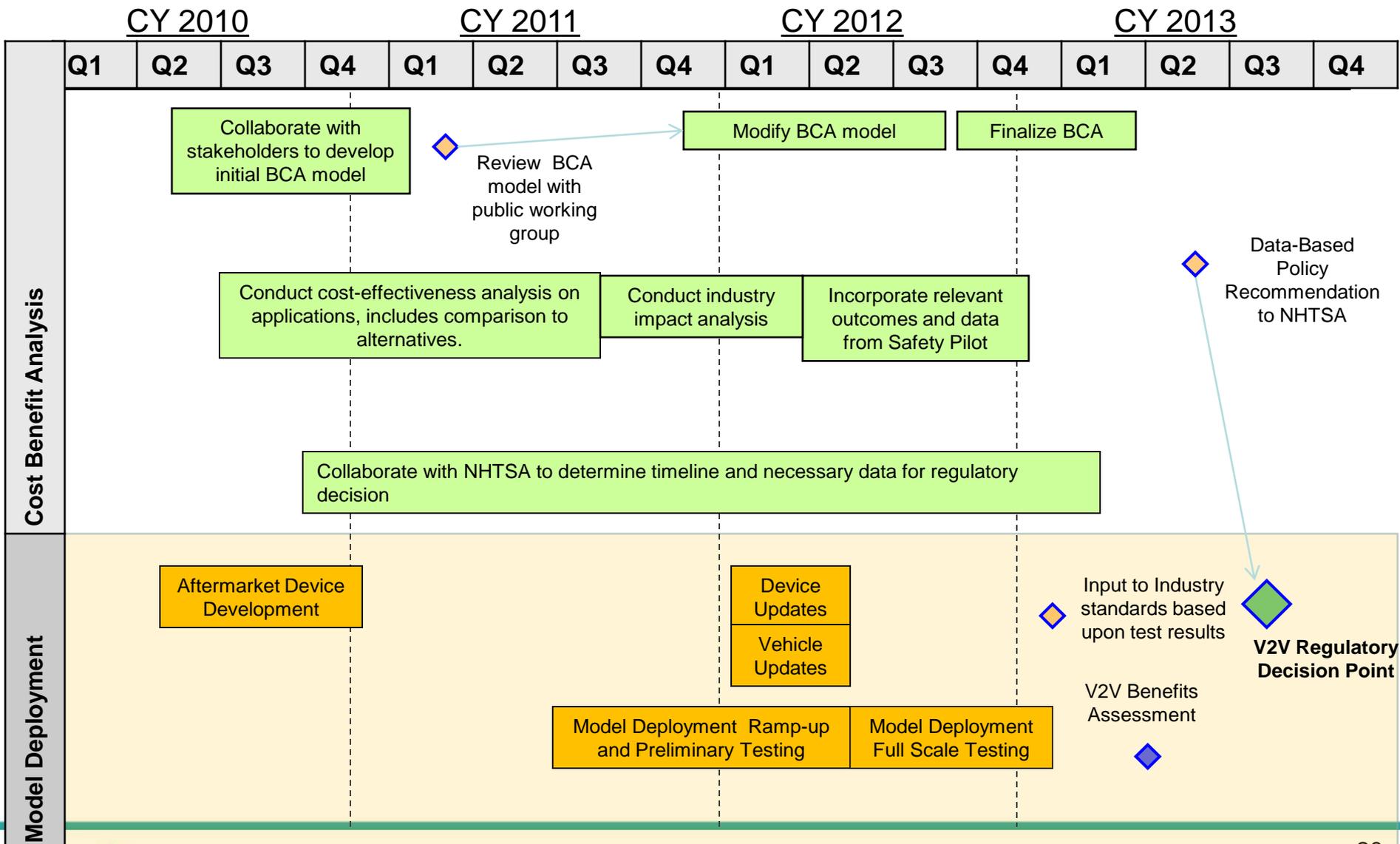
Deployment

- Societal benefits evaluation
- Understanding of potential costs
- Benefits presented for investment decision-making

Benefit-Cost Analysis

Green=Policy team
 Blue=SE team
 Pink=Outreach/Comm
 Gold=Model Deployment

◇ Milestone, Review Point
 ◆ Decision Point



Questions

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Infrastructure and Deployment

Definitions

IntelliDrive Safety will include certain types of infrastructure for both V2V and V2I. Infrastructure here refers to roadside equipment (RSE), back office systems, and the maintenance and operations activities required to implement them – for safety. From a policy perspective, issues regarding infrastructure can be similar to other ITS infrastructure issues but may be tailored to meet the needs of a multi-jurisdictional IntelliDrive system.

Objectives

- Identify minimum level of infrastructure for maximum public benefit and develop deployment guidance:
 - Workforce needs for deployment, operations, and maintenance
 - Procurement guidance
 - Integration with existing systems, upgrade, maintenance, and other procedures
 - Options for financing, deployment, and operations of infrastructure
 - State and local public sector roles versus private sector roles
- Identify costs and financing/funding incentives for deployment

Infrastructure and Deployment

Expected Outcomes

Safety Pilot:

- Preliminary configuration of roadside infrastructure for testing certificate authentication
- Preliminary configuration of roadside infrastructure for testing Safety applications

NHTSA Regulatory Decision and for Deployment:

- Recommendations and input on minimum level of roadside infrastructure necessary to support V2V
- Synergies with potential FHWA Policy decision

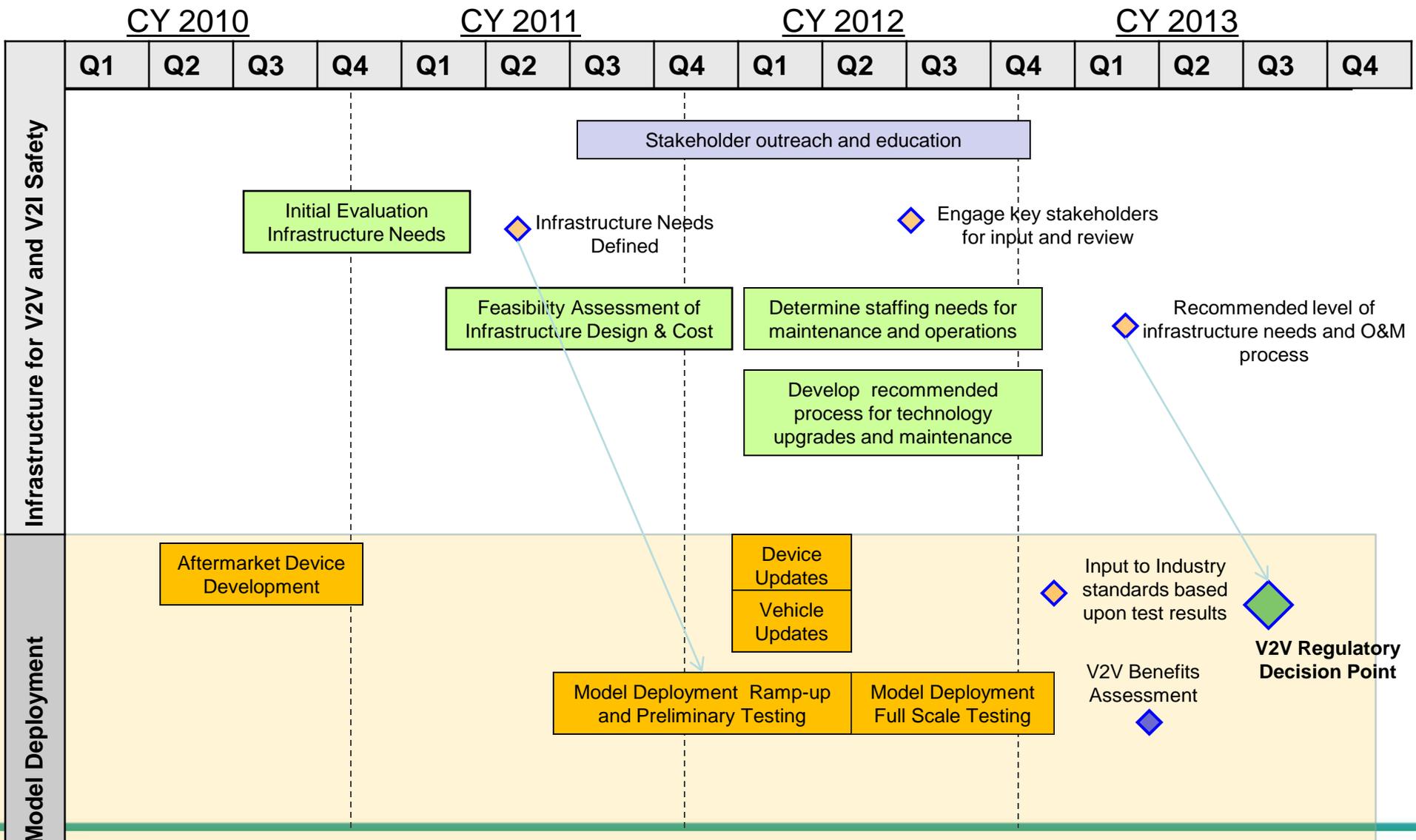
Deployment:

- Guidance on funding, deployment, and maintenance options for roadside infrastructure
- Training for deployers, operators, and technicians

Infrastructure

Green=Policy team
 Blue=SE team
 Pink=Outreach/Comm
 Gold=Model Deployment

◇ Milestone, Review Point
 ◆ Decision Point



Questions

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Rules of Operation & Standards

Definition

Rules of operation and standards provide the nationwide system of IntelliDrive with consistency and interoperability. They outline common standards by which participants of the system must adhere and identify use and enforcement within the context of federal, state, and local laws.

Objectives

- Assess who the system users are and identify their requirements
- Identify existing laws and variations in their application around the Nation
- Define policies and procedures for rules of use, standards, operations, maintenance, and upgrades
- Identify costs and institutional issues
- Define enforcement options, decision making processes, and oversight requirements
- Identify potential entities for decision-making, oversight, dispute resolution, and enforcement

Rules of Operation & Standards

Expected Outcomes

Safety Pilot

- Using ConOps, develop operational scenarios and define decision-making entities and test preliminary rules of operations – *who makes what decisions, when, about what?*
- Develop series of security scenarios for introduction into Safety Pilot to test select enforcement techniques

NHTSA Regulatory Decision

- Recommended rules of operation and standards for input into NHTSA decision

Deployment

- Rules of operations and standards for deployment – guidance documents and training
- Recommended plan for standards harmonization
- Recommended enforcement mechanisms and analysis

Rules of Operation and Standards

Green=Policy team

◇ Milestone, Review Point

◇ Decision Point

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Gold=Model Deployment

CY 2010

CY 2011

CY 2012

CY 2013

Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4

Rules of Operation & Standards

Model Deployment

Review rules of ops for other systems

Develop Preliminary Assessment (enforcement, standards, operational requirements)

Analysis of state and local legislative issues

Analysis of international harmonization of standards

Determine roles and responsibilities

Stakeholder outreach and education

Engage stakeholders and experts

Recommended Rules of Operation

Aftermarket Device Development

Device Updates
Vehicle Updates

Input to Industry standards based upon test results

V2V Benefits Assessment

V2V Regulatory Decision Point

Model Deployment Ramp-up and Preliminary Testing

Model Deployment Full Scale Testing

Questions

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- Key priorities?
- Ideas on next steps? Experts?
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Spectrum Analysis & FCC Role

Definitions

The 5.9GHz space of the communications spectrum that would be used by IntelliDrive is subject to regulations and oversight provided by the FCC. It is necessary to understand the current rules of the spectrum, how they impact industry, and whether/how these rules work for the proposed IntelliDrive system.

Objectives

- Understand existing rules and procedures and determine whether changes are needed in support of IntelliDrive.
- Identify whether V2V and V2I will require the use of a “spectrum manager” and whether this is possible under the current rules.
- Need to work with the FCC on issues such as interference, enforcement, channel switching, valid use, and other issues.
- Identify how this area of the spectrum might be leveraged for commercial purposes once Safety is appropriately addressed.

Spectrum Analysis & FCC Role

Expected Outcomes

Safety Pilot

- Understanding of allowable uses and governance of the 5.9 Ghz spectrum
- Appropriate licensing for Safety Pilot testing

NHTSA Regulatory Decision and for Deployment:

- Recommendation on potential design of roles and responsibilities for IntelliDrive spectrum management (and whether the IntelliDrive goals could be achieved in the absence of a spectrum manager).

Questions

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Governance Structure & Authority

Definitions

A governance structure defines the type and level of authorities needed for deployment, system operations, and enforcement, and defines the roles and responsibilities of the players engaged in the system.

Objectives

- Identify governance structures from other industries and apply lessons learned to IntelliDrive
- Design a governance framework
- Define roles and responsibilities
- Aggregate results of other policy areas into the framework
- Identify whether new legislation or authorities are needed and by whom
- Identify impacts

Governance Structure & Authority

Expected Outcomes

Safety Pilot:

- Concept of Operations for IntelliDrive system and evaluation of what potentially requires governance
- Preliminary identification of what can be governed through standards versus what requires a governance entity(ies)

NHTSA Regulatory Decision:

- Recommended governance structure in support of safety, outlining suggested roles and responsibilities

Deployment:

- Recommended governance entity with associated operations, roles and responsibilities

Governance Structure & Authority

Green=Policy team

◇ Milestone, Review Point

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CY 2010

CY 2011

CY 2012

CY 2013

Q1

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Q4

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Q2

Q3

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Q3

Q4

Governance Structure & Authority

Model Deployment

Stakeholder outreach and education

Assessment
Governance Needs
and Existing Examples

Develop Initial Governance Model

Modify Governance Model

Develop Implementation strategy for governance model

Engage
Governance
Experts

Working
Group
Governance
Workshop

Final Draft
V2V
Governance
Model

Aftermarket Device
Development

Device
Updates
Vehicle
Updates

Input to Industry
standards based
upon test results

V2V Regulatory
Decision Point

Model Deployment Ramp-up
and Preliminary Testing

Model Deployment
Full Scale Testing

V2V Benefits
Assessment

Questions

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Q&A