

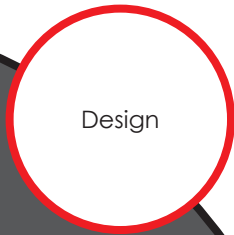


Caltrans Division of Research,
Innovation and System Information

Research



Notes



Design

MAY 2020

Project Title:
Developing a Strategic Roadmap
for Caltrans Implementation of
Virtual Design Construction (VDC)
and Civil Integrated Management
(CIM)

Task Number: 3178

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Developing a Strategic Roadmap for Caltrans Implementation of Virtual Design Construction (VDC) and Civil Integrated Management (CIM)

Evaluate Caltrans' readiness for VDC and CIM solutions for existing process improvements and provide recommendation to develop a Caltrans Strategic Roadmap for VDC/CIM implementations.

WHAT IS THE NEED?

In order to produce high-quality projects and optimize limited transportation funds, Caltrans needs to constantly innovate and improve existing processes and procedures taking advantage of new technologies, such as Virtual Design Construction (VDC) and Civil Integrated Management (CIM).

VDC and CIM are emerging technologies showing benefits in improving transportation project planning and delivery in terms of quality, safety, cost effectiveness and timing.

The need of developing a comprehensive evaluation of use of VDC and CIM within Caltrans and a roadmap for its implementation in Caltrans workflow is especially relevant today, due to availability of several studies on implementation of these technologies in transportation which Caltrans can leverage, such as National Cooperative Highway Research Program (NCHRP) Report 831: CIM for DOT. Several other State DOT's VDC/CIM case studies and solutions are included in the reports written by academia. Caltrans can learn and expand from these studies and include plans for 4D and 5D implementation of VDC and CIM that will include addition of time and project costs respectively, in support of life cycle transportation asset management.



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knowledge that improves
California's transportation system

WHAT ARE WE DOING?

This proposed research is to evaluate Caltrans readiness for VDC and CIM solutions, including the spectrum from 3D to 4D and 5D surveying, engineering and construction models, and identify ways to further incorporate and integrate these solutions into Caltrans transportation project life cycle workflow through a roadmap. This project will determine the Caltrans CIM functions maturity level, and identify gaps based on the comparison of other DOTs, Studies and literature search. The results will be a recommendation for strategic Roadmap for VDC and CIM implementation within Caltrans.

WHAT IS OUR GOAL?

The purpose of this research is to evaluate Caltrans' readiness for VDC and CIM solutions including the spectrum from 3D to 4D and 5D implementations and identify ways to further incorporate and integrate these solutions into Caltrans' transportation project life cycle workflow. The goal is to provide recommendation to develop a Caltrans Strategic Roadmap for VDC and CIM implementation.

WHAT IS THE BENEFIT?

The expected benefits from VDC/CIM integration in relevant to Caltrans operations include:

- Fundamentally changing project delivery and asset management through integrated digital data workflows and 3D to 5D models.
- Improved ability to handle design and engineering changes more efficiently and seamlessly.
- Usage of drones, Light Detection and Ranging, and other surveying new technologies into the planning, design, construction, assets managements, and maintenance phases.
- Reduced waste, inefficiency, rework, cost overruns, etc.
- Implementation of electronic construction and

document management into the Caltrans' workflow.

- Shorter delivery times, while maintaining high quality projects.
- A roadmap for prioritizing capital investment, coordinating teamwork, and VDC/CIM task prioritization.

WHAT IS THE PROGRESS TO DATE?

- Delivered final report to project panel
- Task close-out process in progress

IMAGE

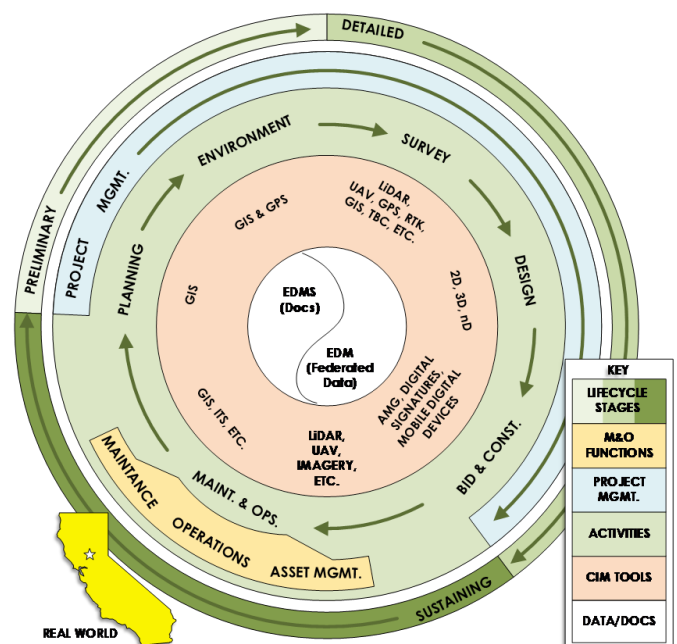


Image 1: Caltrans High Level Strategic Workflow Showing CIM Tools

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