



Case Study

“ The most comprehensive online project status tracking system in any state DOT. ”

Engineering News Record
on VDOT's Dashboard,
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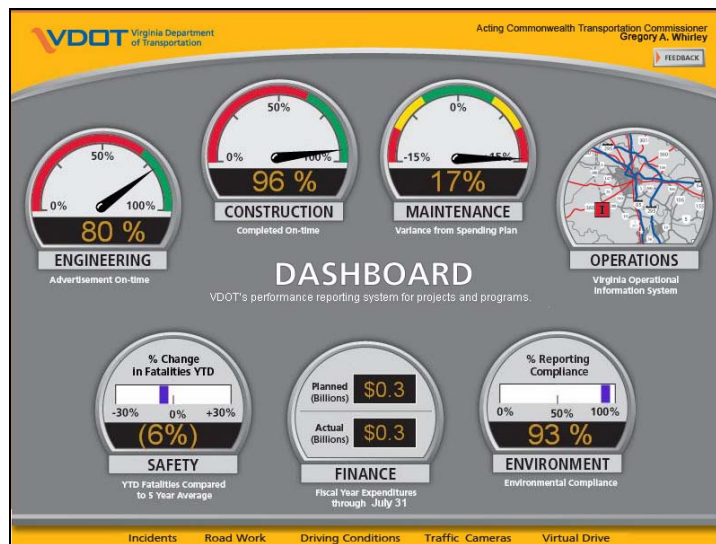
IndigeTech has been working with the Virginia Department of Transportation (VDOT) to give the Agency more control of its information. To do this we improve reporting and analysis capabilities, integrate existing information and software systems, while streamlining business processes.

The IndigeTech team has developed multiple web-based applications including applications for programming and project management and enhanced a cost estimation system for use statewide. The efforts have led to improved project management, better cost estimates and enhanced transparency and accountability to Virginia's citizens.

The impact of IndigeTech's work at VDOT has been recognized by the agency and beyond. The Dashboard also received first place in the 2006 CodeCharge Studio Developer awards and the Center for Digital Government's 2005 Best of the Web award. IndigeTech's QMAC (Quality Assurance, Management and Compliance) development team received the 2005 Commissioner's Award for Excellence for innovation and quality improvement. Our Cost Estimation System Development Team also received the Commissioner's Award for Excellence in 2003. The success of the Dashboard was written about in multiple state and national publications including "Red Light, Green Light," an article in the June 2003 issue of *Government Technology* magazine.

> Dashboard

The Dashboard is VDOT's web-based performance reporting system. VDOT employees and Virginia citizens can access the Dashboard at <http://dashboard.virginiadot.org>. Version 2 was launched in July 2005 and expanded the original Project Dashboard to cover all of VDOT's operations including construction, maintenance, engineering, finance, safety, operations and environment. Users can customize reports to see statewide statistics or learn about specific projects. A data warehouse stores the information that the Dashboard displays. The data comes from various VDOT applications like the financial, construction management and utilities management systems. It can be sorted by region or a project's size and is updated daily.



The Dashboard's main screen provides a visual summary of all VDOT's operations. Clicking on any area reveals more details.

>>> Major Project Results

<i>System</i>	<i>Function</i>	<i>Results</i>
Project Dashboard	Single location for checking the status of all projects	Over 3 times as many projects are within budget and schedule
Six Year Improvement Plan	Online access to the Agency's plan for future projects	No more looking at multiple paper reports and calculating cumulative totals
Cost Estimation System	Standard state-wide process for estimating construction project costs	Estimates are now within 10% of actual cost
InsideVDOT Portal	Improved collaboration and document management	Eliminated over 10 custom intranet sites
Quality Management, Assurance, and Compliance	Standard state-wide quality assurance process and trend analysis	Projects that don't meet standards are flagged automatically
Construction Advertisement Bulletin Board	Web access for contractors to find bid requests	Contractors access the bid board from anywhere and easily see updates

This table shows a summary of the key systems that IndigeTech has developed with VDOT.

> Dashboard Continued

The primary goal of the original Project Dashboard was to get VDOT construction projects on time and budget and to hold the agency accountable for its performance. The system color codes projects like a traffic signal; green, yellow or red, according to the current status. Green means that the project is on time and within budget. Yellow means that the project is at risk or slightly off track. Red means the project is behind schedule, over budget or has too many work orders. This visual method of displaying the status is simple for the general public and provides VDOT employees with a broad, cumulative view of VDOT's performance.

Before the Dashboard, VDOT used two mainframe systems to track projects. One system tracked projects before advertisement. The other tracked monthly payments to contractors. VDOT employees had to manually calculate project totals by collecting information from both systems. The process was time consuming and VDOT desperately needed a better management and reporting tool.

The original Dashboard launched internally in August 2002 and to the public in March 2003. While the main reason for the system is to give VDOT employees a way to keep track of project progress, the benefits of releasing the Dashboard to the public are huge. Citizens can email the VDOT engineer responsible for the project and immediately receive an automated reply with a tracking number. A personal response follows later. There is also a FAQ (frequently asked questions) section for users to learn more. VDOT's Public Dashboard received 82,348 hits (314,280 page views) in 2004, so citizens are taking notice. Overall, citizens feel better informed about VDOT's operations as a whole and also the status of particular projects that impact their daily lives.

The number of VDOT's projects finishing within budget rose to 68% for the first half of fiscal year 2005, from just 22% four years ago.

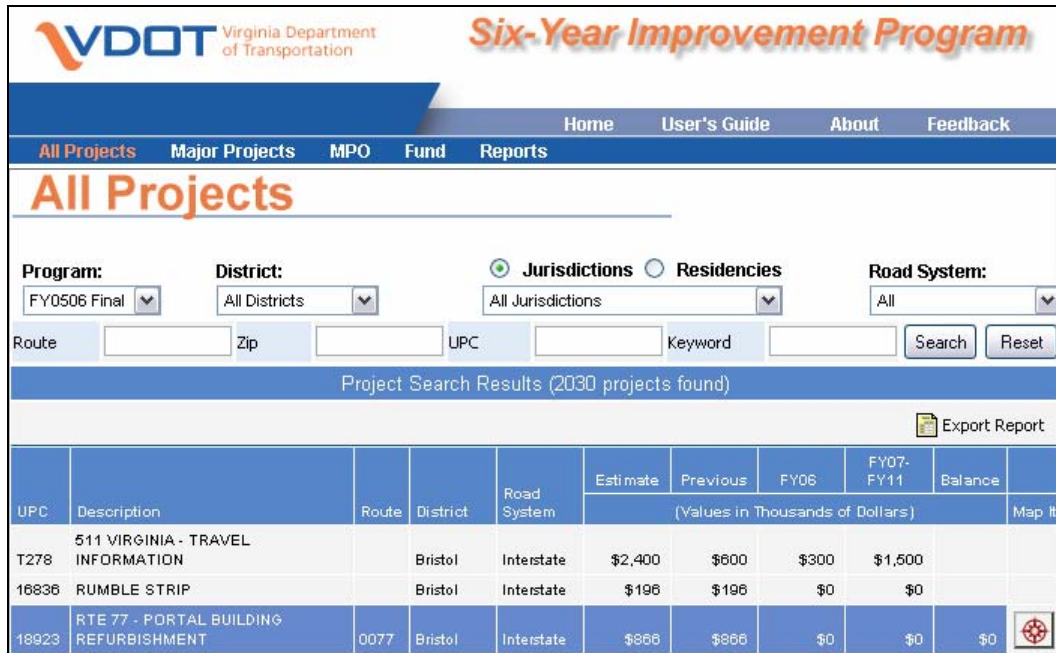
Internally, Dashboards have transformed VDOT's project management. The number of projects finishing within budget has risen to 68% (in the first half of fiscal year 2005) from just 22% four years ago. "Many projects have fallen from about 200 percent over their original estimated time frames to about 30 percent over their time frames" Commissioner Shucet stated in the *Daily Press*. For fiscal year 2006, 84% of projects were on-time and 86% were on budget.

> Six Year Improvement Program

The Six Year Improvement Program (SYIP) provides online access to VDOT's Six Year Program for planning future projects at <http://syip.virginiadot.org>. The benefit of having the program online is two-fold: the public has easy access to the information and VDOT can manage the program more effectively.

IndigeTech provided VDOT with the first entirely electronic version of the Six Year Program. Before the integrated version was available, information had to be gathered from multiple disparate systems and paper versions of past programs. The new SYIP is user-friendly and flexible. Information in the program can be accessed anytime from anywhere and downloaded in various formats to suit a user's needs.

The SYIP provides information on VDOT's budgeting and scheduling for projects over the next six years. Construction projects can be searched and sorted by district, project size, zip code, internal project code or keyword. Some projects contain links to maps highlighting the area of construction. Reports and a User Guide are also available to better analyze data and understand the application.



The screenshot shows the VDOT Six-Year Improvement Program web application. It features a navigation menu with options like 'Home', 'User's Guide', 'About', and 'Feedback'. Below the menu, there are search filters for 'Program', 'District', 'Jurisdictions', 'Residencies', and 'Road System'. A search bar includes fields for 'Route', 'Zip', 'UPC', and 'Keyword', with 'Search' and 'Reset' buttons. Below the search filters, it displays 'Project Search Results (2030 projects found)' and an 'Export Report' button. A table lists project details:

UPC	Description	Route	District	Road System	Estimate	Previous	FY06	FY07-FY11	Balance	Map It
T278	511 VIRGINIA - TRAVEL INFORMATION		Bristol	Interstate	\$2,400	\$600	\$300	\$1,500		
16836	RUMBLE STRIP		Bristol	Interstate	\$196	\$196	\$0	\$0		
18923	RTE 77 - PORTAL BUILDING REFURBISHMENT	0077	Bristol	Interstate	\$866	\$866	\$0	\$0	\$0	

The six-year program allocates funding for rail, public transit, bicycle, pedestrian and primary and interstate highway improvement projects over a six-year period. The online program includes a "Map It" feature which displays the project's specific location.

> Cost Estimation System

IndigeTech worked with VDOT to enhance a cost estimation system for construction projects that was originally developed in one of the Agency's districts. The new system is web-based so everyone working on a project has access to the estimates. For VDOT, having good cost estimates for construction projects is critical. The cost estimates are used in developing the schedule and budget for all of its operations.

Before the web-based system was developed, there was no standard estimation tool or process used at VDOT. Different districts used different methods, many of which were manual in operation. Cost estimates were often very low which caused projects to go over budget and fall behind schedule. This adversely effected VDOT's reputation with the legislature, contractors and Virginia's drivers.

The IndigeTech team worked with VDOT staff and enhanced the cost estimation system in just 134 days. The new system went into use statewide in January 2003. It produces estimates for construction projects including scoping, preliminary engineering, right of way and utility costs. The

IndigeTech was awarded the 2003 Commissioner's Award for Excellence for VDOT's Cost Estimation System.



estimates are based on information that engineers know early on, not specific figures that often change as a project progresses. Regional price differences and inflation are automatically included in the estimates, providing standardization across the state. The system uses spreadsheets as a familiar interface for users. A worksheet is completed and uploaded to the Internet and the information is gathered in a database.

The cost estimation system produces estimates that are an average of 10% within actual costs on every project. This is a tremendous improvement over VDOT's past estimates where one project was originally estimated at one-third of the actual cost. The system is still a work-in-progress. Historical trends and factors specific to certain regions are being fine-tuned. VDOT anticipates that the cost estimation system will eventually produce estimates that are within 5 percent of a project's actual costs. Improved estimates have already led to smoother internal operations and better relations with the state and its citizens.

> Inside VDOT Portal

IndigeTech worked with VDOT to provide a single enterprise-wide portal for collaboration and document management to VDOT's 10,000 employees. The portal is based on an off-the-shelf product and then customized to fit VDOT's specific needs.

The portal replaced over ten independently maintained custom intranet sites. These sites were filled with redundant information, difficult to maintain and resource intensive. They did not convey a standard VDOT brand.

Having a single portal serve as VDOT's state-wide intranet allows them to post important announcements and news in one place. The portal has a document library that can be searched enterprise-wide. Every user has a personal page that they customize for their job functions. Team sites can be developed within the portal for specific projects.

The portal is able to be maintained by the people responsible for the content and customized by users themselves. It enhances communication by providing VDOT with a unified location for sharing news and announcements. Most importantly, it serves as an enterprise-wide document library, eliminating duplication of maintenance effort and information.

> Quality Management, Assurance, and Compliance (QMAC)

Quality Management, Assurance, and Compliance is VDOT's automated quality inspection system. The purpose of QMAC is to automate the inspection process and allow trend analysis of the information over time. VDOT's inspectors review randomly-selected construction project plans and evaluate them according to established design guidelines and specifications. Each project has a checklist and inspectors assign ratings of 1 to 3 for each item. The system assigns a cumulative project score and flags projects not meeting established standards.

Prior to QMAC, the evaluation system was paper-based with minimal standardization of data capture or automation of processes. The inspectors entered their reports into Excel spreadsheets. There was no aggregate data to see overall reports or trends.

IndigeTech developed the system using standard coding languages, databases and ETL (extract, transform, and load) tools. It features an intuitive interface, advanced analysis capabilities like OLAP (online analytical processing) cube reports and trending. An example of trends that can be viewed is average quality rating per consulting company. While gathering requirements for the system, some process challenges were identified and addressed. QMAC was built to meet a new, streamlined process.

VDOT now has a standard way to enter and capture the results of the random quality assurance testing. Consistent information from districts around the state is stored in a single database for reporting.

The QMAC team was awarded the 2005 Commissioner's Award for Excellence in innovation and quality improvement.



> Construction Advertisement Bulletin Board (CABB)

IndigeTech developed an online construction advertisement bulletin board for VDOT. It is available at <http://cabb.virginiadot.org/cabb>. This database driven system is searchable, easily maintainable to VDOT, and accessible to contractors. Updates are entered through a user-friendly data entry screen.

The purpose of CABB is to post questions and receive answers about construction advertisements. The system allows contractors to get quick answers to questions regarding advertisements without having to call, email, or fax any VDOT personnel. The system also ensures that every potential bidder sees the same, consistent answers and VDOT has a record of postings.

Order #	Notices	E-Plan	Plan Holders	Let Date	State Project #	Route #	Federal Project #	County/City	Project Length/Type	Begin Site	End Site	Showing	Time Limit	DBE %	MBE %	WBE %	Award Process
655	No Notices		A	09/28	0658-038-244.N502	658/18961	STP-038-1 (129)	GRAYSON	2.20 Mi. Grade, Drain & Asp. Pave.	Rte. 611	Rte. 670	Yes, Req	11/01/06	5			RAAP
656	No Notices		A	09/28	0634-098-P02.N502.D646	634/18073		WYTHE	2.03 Mi. Grade, Drain & Precast DBL 10' X 8' Box Culvert	Rte. 606		Yes, Req	10/01/06		1	3	RAAP

The Construction Advertisement Bulletin Board provides contractors with easy web-based access to advertisements.

IndigeTech continues to work with the Virginia Department of Transportation to improve the Agency's operations through technology. VDOT's management realizes that strategic, productivity-enhancing IT investments will help reduce government costs and raise revenue.

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