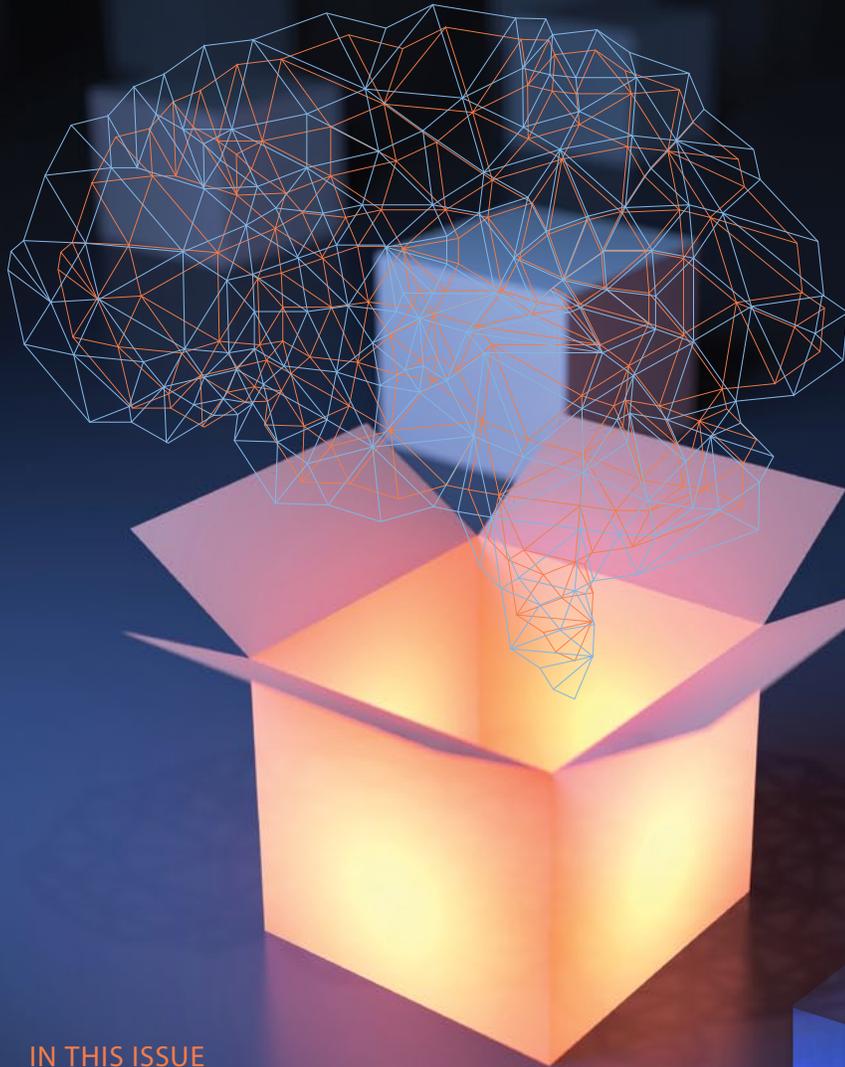


VOLUME 11 ISSUE 1 2014

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NEWS & VIEWS



IN THIS ISSUE

2

Navigating the New BIM Order

As BIM use grows, STV offers a unique philosophy for clients

6

Eyes on Assets

STV supports long-term asset management plans for key clients

DETAILS ON PAGE 8

Scan this cover for Augmented Reality

table of contents

STV GROUP
205 West Welsh Drive
Douglassville, PA 19518
t. 610-385-8200
f. 610-385-8500

STV INCORPORATED
225 Park Avenue South
New York, NY 10003
t. 212-777-4400
f. 212-529-5237
info@stvinc.com
www.stvinc.com

EDITORIAL BOARD
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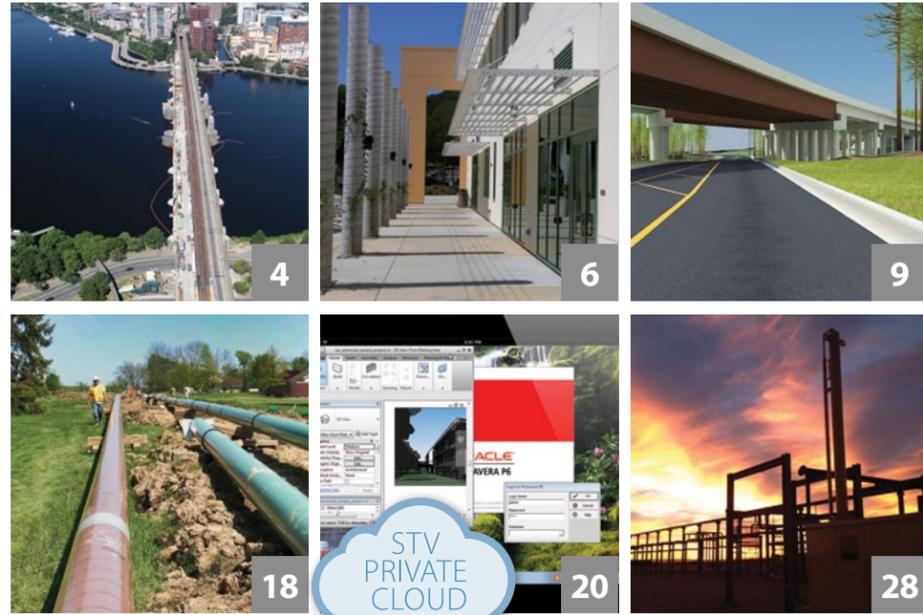
MANAGING EDITORS
Debra Trace
Jill Bonamusa

EDITOR-IN-CHIEF
Mark Ginocchio

CONTRIBUTORS
Joseph McGee

GRAPHIC DESIGN
Jill Moyer

Cover photo and graphics: Shutterstock



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THINKING **OUTSIDE THE BOX** WITH NEW TECHNOLOGY



Today's generation of designers and construction managers have an almost endless array of new technologies at their disposal capable of modeling, managing, scheduling and cost estimating buildings, facilities and other infrastructure. And with the explosive increase in Building Information Modeling (BIM) software, coupled with an industry-wide movement for consultants to deliver projects faster and with more economy, efficiency and flexibility, it is imperative for design and construction firms to be nimble and stay ahead of technological trends by being leaders, not followers.

At STV, our planners, architects, engineers, construction managers and environmental scientists take pride in being at the forefront when it comes to implementing new and emerging technologies and processes. Across all of our core divisions, we have a number of industry-renowned experts on staff who understand the need to be technological trendsetters and think outside the box in how we plan, design and oversee construction in our built environment using these new resources. It's not enough for our team to just use technology for the sake of using it. Instead, we want to find new and innovative ways to provide value for our clients and for them to understand the long-term benefits of having us apply our unique approach to their projects.

2
Navigating the New BIM Order
As BIM use grows, STV offers a unique philosophy for clients

4
BIM Complements Accelerated Bridge Design in Massachusetts

6
Eyes on Assets
STV supports long-term asset management plans for key clients

9
STV Takes Clients on a New Kind of Road Trip

12
Unity 3D
Gives clients new views of facilities

14
A Model Bus Route
STV helps develop massive NYC traffic model for express bus service

18
A Path Forward for Key Pipeline Project

20
STV Ahead in Cloud Collaboration

22
What's New at STV
STV Executive Chairman gives stirring commencement address and STV President/CEO honored by alma mater, award-winning projects

26
STV Gives Back
A look at STV and the communities we serve

28
New Acquisition a Boost for STV Energy Services

29
New Personnel

NAVIGATING THE NEW BIM ORDER

AS BIM USE GROWS, STV OFFERS A UNIQUE PHILOSOPHY FOR CLIENTS



Photos (background and left): Shutterstock

STV's project controls group is pushing the boundaries of BIM application throughout the industry, proving the value of its tools goes beyond three-dimensional models and clash detection.

"Most people's perceptions of BIM is building information modeling," said Christopher Bailey, vice president and national director of project controls in STV's Construction Management Division. "Our group thinks of it more as building information management. What we're doing with BIM goes beyond the model. It's the management of data throughout the lifecycle of a project that is significant."

Over the past decade, BIM use has grown exponentially as more and more clients are requiring consultants to design and manage projects using a BIM process and software. While it was initially a tool utilized mostly by architects and engineers, the construction industry caught up in recent years, as many contractors and construction management firms have embraced BIM for its ability to detect design "clashes" – incidents where different elements of the building's design (structural, mechanical, electrical, plumbing,



Members of STV's project controls BIM team (l to r): Ziad El Bizri, Jolene D'Sa, Dureen Salama, Chris Bailey, Prati Ramesh and Amir Tasbihi.

etc.) inadvertently interfere with each other. BIM's clash-detection abilities can significantly reduce change orders or rework, which, in turn, helps keep a project on schedule and within budget.

As a full-service firm that offers extensive expertise in BIM starting as early as the preliminary design phase, STV's unique approach to implementing total building information management from the early conceptual phases of a project, until well after a facility is constructed and occupied, is providing tremendous value for clients.

The industry refers to this building information management approach as "BIM 456." "4-D" references the linking of the project's construction schedule to data found within the model. From there, STV's BIM

experts run simulations and are able to define points in the model and determine when specific elements will be complete.

The 4-D model can be used to highlight all delayed elements, analyze the production rate in the field, compare the baseline schedule with the contractor's latest updates, and develop earned value curves to track construction progress in real time.

During the construction stage, an STV BIM specialist conducts a site walk-through utilizing the BIM 360 Field iPad application. The BIM specialist can then mark up the model with the day's progress, which is linked in real time to the construction schedule to determine if appropriate deadlines and milestones are being met.

"Through the effective application of this technology, we can provide our clients real-time reporting and mitigate schedule delays within a few days rather than have to wait for a monthly progress report," Bailey said. "We can color the model to show where things are currently, relative to where they were planned to be, and then use that information to determine the best course of action to mitigate delays to the schedule. This is a powerful tool that provides the client with a lot of leverage through comprehensive visual and analytical data."

"5-D" refers to the method of using BIM to link to the project's cost data. Once cost data is linked to a construction simulation, the project controls team has a better understanding of cash flow. During construction, the project team can look at the BIM data and determine how best to keep the initiative on budget.

5-D also refers to extracting quantitative information from a model. With this information, the project controls team can assist in the definition of the scope of work by pulling data out of the model, adding it to a procurement list, and providing verification for both current scope and effective change management.

"6-D" refers to long-term management and maintenance. This is where a project team works with the client to develop asset and proactive facility management strategies that aim to keep a building operating efficiently for years after it's been constructed (For a more in-depth look at STV's asset management expertise, see the article on page 6).

One of the major challenges in the implementation of STV's BIM philosophy is the lack of industry standardized models and object nomenclature.

"5-D" refers to the method of using BIM to link to the project's cost data.

The project controls team is currently working with the firm's own designers to ensure that all objects are coded and identified the same way in each project model. On a broader level, Bailey and Dureen Salama, a project controls specialist in the Construction Management Division, were recently invited to join a New York Building Congress technology panel that will be seeking to develop BIM standards for the city.

When 3-D models are produced by a third-party consultant, STV's project controls team undertakes a process known as conditioning and validation. The team works their way through the model and open all objects to make sure everything that is needed to identify an object is coded in an identical fashion. The team then checks to see if the 3-D model is aligned with a 2-D design. The team continues to extract information from the model on an ongoing basis to track all changes throughout the lifecycle of the design and construction phases.

"Clients like that firms such as ours are using BIM because it is more efficient and saves money, but the concern is that after a project is built, consultants just give them the keys and walk away," Bailey said. "STV has a distinct approach that separates us from many of our competitors. We use a number of different BIM tools in concert with each other, and also have software development capabilities that help us utilize BIM in new and exciting ways." ■

BIM COMPLEMENTS ACCELERATED BRIDGE DESIGN IN MASSACHUSETTS



Photo © Mark Flannery Photography



Rendering © Rosales + Partners

STV was able to design elements of the Longfellow Bridge (left, middle and far right inset photos) and the Fore River Bridge (above) utilizing BIM software.



Photo © Mark Flannery Photography



Photo © Mark Flannery Photography

In Massachusetts, STV's BIM expertise has expedited the design and construction of two significant highway bridge initiatives. The Longfellow Bridge rehabilitation and Fore River Bridge replacement, considered signature projects in the state's \$3 billion Accelerated Bridge Program (ABP), are two of the first bridges in the Bay State to be designed using 3-D modeling. By fostering communication among

clients, designers and contractors, our innovative approach has streamlined the large-scale, design-build process while positioning us as a national leader in accelerated bridge techniques.

"By developing BIM models for these bridges, we can quickly and easily convey information about the designs and their different systems in relation to one another," said Nikole Bulger, P.E.,

indispensable when structural, electrical, mechanical, and plumbing design specialists interact on complex projects such as the Fore River Bridge, a vertical lift span being built between Quincy and Weymouth, MA. While not a replacement for quality 2-D sketches and sections, 3-D model views of the bridge's tower structural elements, mechanical systems, building envelopes, access stairways and platforms, electrical motors, and other components have enabled the team to identify possible conflicts that they can't easily identify with standard drawings. It has been particularly useful for locating architectural components, intricate conduits, and piping around the lift tower's massive frame.

"BIM has allowed us to model various structural column connections and quickly show interested parties where an interference exists," said Michael Camoscio, P.E., LEED® AP BD+C, who has developed the bridge's floor system while also working closely with historic preservation consultants to maintain its iconic look.

"It's really helpful because we've been able to highlight issues that jump right out in a 3-D image but are not as easily explained with 2-D sketches and sections."

Introduced by Massachusetts Governor Deval Patrick in 2008, the ABP encouraged the use of

Bulger added "early identification of these concerns not only reduced the design cost and schedule, it also reduced the owner's risk of cost escalation during construction."

For the Longfellow Bridge project, BIM modeling has been key to restoring the 2,135-foot arch span's load capacity while rehabilitating the structure's ornate metal castings and striking masonry features that the client, Massachusetts Department of Transportation (MassDOT), is preserving as part of the \$255 million rehabilitation.

innovative design to complete projects on time and on budget and with minimum disruption to motorists, pedestrians, bicyclists and commerce. The groundbreaking ABP initiative has reduced the state's deficient bridge inventory from 543 to 456, a decline of 16 percent. Due to its success, where applicable, MassDOT continues to apply lessons learned from both ABP and BIM on current and future projects. ■

EYES ON ASSETS

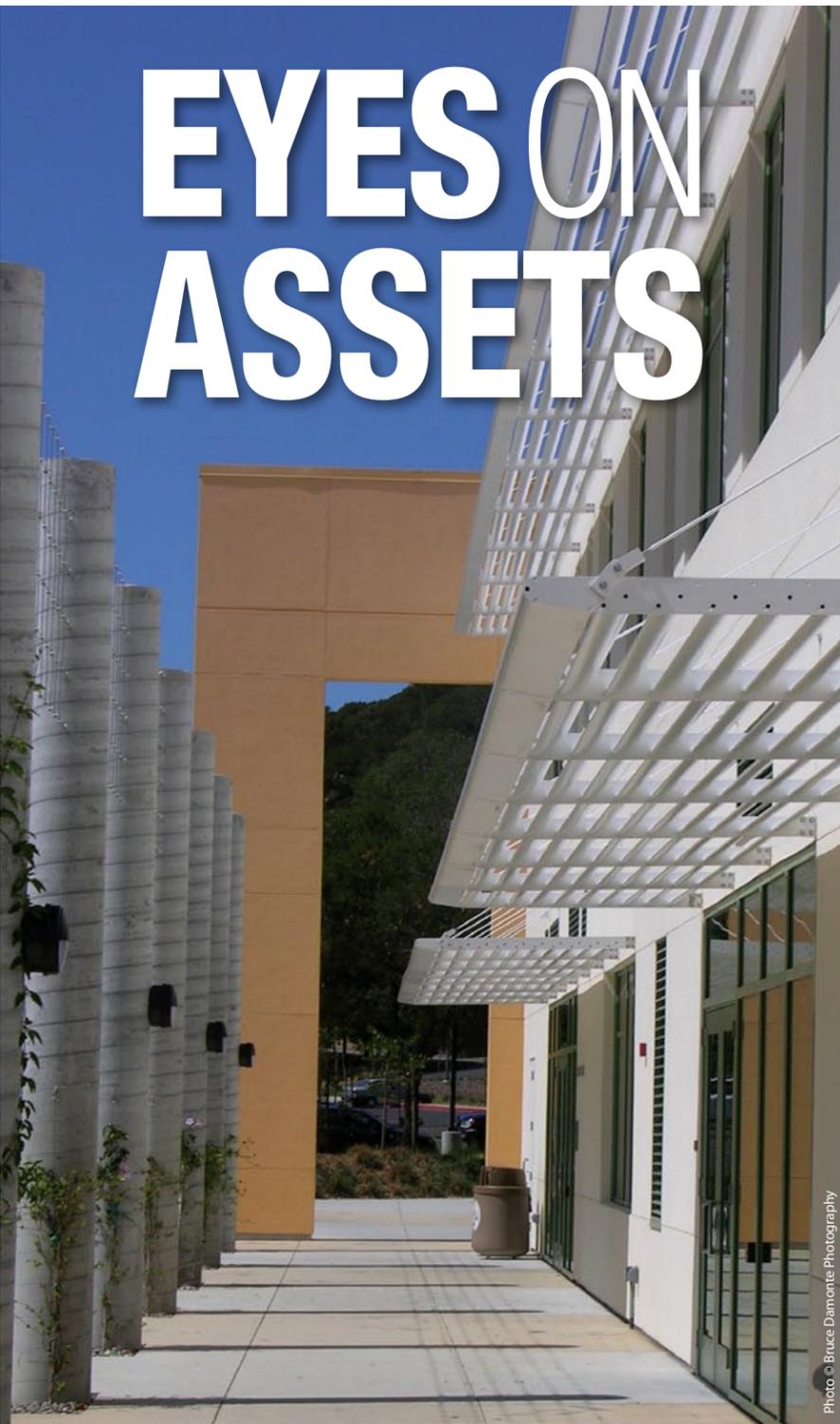


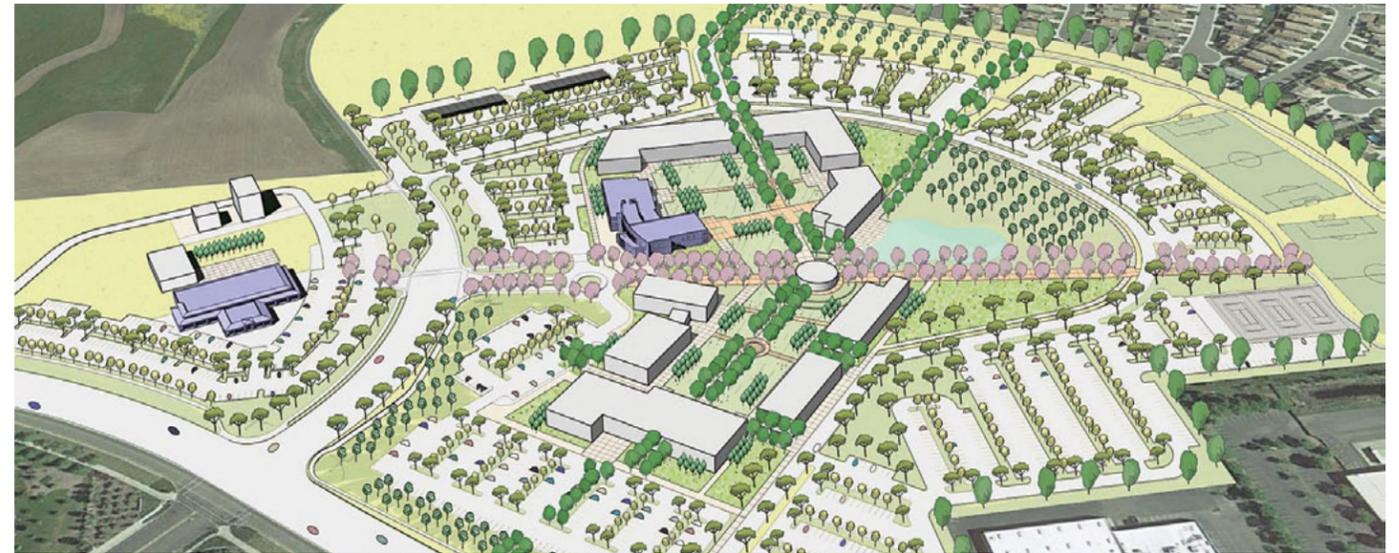
Photo © Bruce Damonte Photography

STV SUPPORTS LONG-TERM ASSET MANAGEMENT PLANS FOR KEY CLIENTS

STV is changing the way clients visualize the physical components of a facility through its mastery of asset management technologies, such as the Onuma System – a web-based software that provides asset management capabilities to project owners for their long-term facility and financial planning.

STV first started using Onuma about four years ago for a number of West Coast community college master planning initiatives, including work at Solano Community College in Fairfield, Vallejo and Vacaville, CA, and at College of Marin in Novato and Kentfield, CA. Since then, the firm's utilization of the software has grown exponentially, as public funding for new facilities and expansion projects becomes scarcer.

“As early as the proposal phase, our clients are looking to develop long-term plans for managing all of their assets. Data behind the cost of custodial labor, building materials, and the number of tasks required to maintain mechanical



STV has used Onuma asset management software as part of a master planning initiative at Solano Community College in California.

equipment is valuable information to our clients,” said Robert Barthelman, AIA, LEED® AP, STV vice president and head of the West Coast educational facility practice.

Barthelman has recently been recognized as a nationally renowned expert in asset management implementation, and has presented papers and spoken at conferences throughout the country about the topic. “The word is now out about our capabilities in asset management and utilizing the Onuma system. Clients are turning to us to help them manage their buildings throughout their lifetimes,” he added.

Onuma is a detailed data-aggregating program that layers building and site data onto imaging obtained through Google Earth and Google Maps. Once the appropriate information has been imported into Onuma, project team members can select specific buildings through a Google Map view. Room uses, finishes and more can be seen as a color-coded floor plan.

From there, a user can highlight a singular room and view all of its components – i.e. the materials that

make up the floors, walls and ceilings, desks and chairs, and anything else the client is interested in tracking. If a user is viewing a mechanical space, like a boiler room, they can select individual pieces of equipment to learn more about the unit, including manufacturer information, service records and links to live operation data. Project site owners can use Onuma to file online work orders for custodial work, building equipment and materials, and can even use the program to assign and prioritize these requests.

STV's work included the first-ever Onuma-based space inventory update through direct collaborations with specialists at the California Community Colleges Chancellor's Office and the Foundation for California Community Colleges at Cabrillo College in Aptos, CA. Data about the college's 800,000 gross square feet of facilities was presented to the district's facilities director using the software.

As part of a recent commission with San Mateo County Community College District in San Mateo, CA, STV conducted a space inventory for more than 1.6 million square feet of

facilities on three college campuses. The report documented the existing gross square footage, the assignable square footage, room use and coding for the taxonomy of programs. That data was then used by the state chancellor's office to justify future state budget allocations. STV customized and implemented the Onuma System work ticketing software for the district's three campuses, linked the Onuma System to the district's room-scheduling software, and developed an additional asset management component to provide the district campuses with valuable data about custodial tasks, staff zoning and annual budgeting.

“Onuma provides us with a vast amount of information, changing huge spreadsheets, databases and paperwork into easy-to-understand, two- and three-dimensional floor plans and instant diagrams,” said Daniel Clayson, a programmer analyst in the Oakland office. “By being on the cutting edge in helping to develop these software technologies, STV is ushering in new and exciting possibilities for our clients and business partners.”



Photo © Bruce Damonte Photography



Photo © Bruce Damonte Photography



Photo © Bruce Damonte Photography



STV was recently contracted by the Maryland Transit Administration to perform planning and implementation services for the agency's Enterprise Level Asset Management system.

ASSET MANAGEMENT IN TRANSPORTATION

Beyond buildings and facilities, more state transportation departments, transit agencies and railroad operators are looking to develop asset management strategies for highways, bridges, rail cars, buses, systems, right-of-ways, stations and maintenance shops and yards.

The transportation sector's prioritization of asset management has been fueled by the 2012 passage of the congressional Moving Ahead for Progress in the 21st Century Act (also known as MAP-21) – a funding and authorization bill that governs United States federal surface transportation spending. One of the provisions of the act calls on states to develop a risk-based asset management plan for the National Highway System. It also requires public transit agencies to keep their systems in a state of good repair by establishing and using an asset management system.

As a response to the sector's needs, STV has recently made some strategic hires with asset management experience in support of transportation systems. John Gasparine, LEED® AP, who has more than 10 years of experience providing performance management, financial planning and

data analysis for mass transportation clients, recently joined us as an asset management and special projects manager, while Eric Pitts, P.E., who oversaw asset management plans for state highway departments in the public sector, was brought on board to provide support in this area for roadways and bridges.

Currently, STV is assisting the Virginia Railway Express commuter rail system with an assessment of 17 stations and two maintenance facilities, providing technical expertise on asset management requirements under MAP-21. The firm is also supporting the Maryland Transit Administration (MTA) with the planning and implementation of an Enterprise Level Asset Management system. This system will look at several lifecycle management plans that can be plugged into the MTA's agency framework in order to optimize cost, risk and performance of critical transit components. "We are providing transportation agencies with both top-down and bottom-up planning assistance for their asset management systems," Gasparine said. "In doing so, we can find significant cost savings, sometimes as much as 20 percent, which adds real value for our clients." ■

AUGMENTING THE SCOPE OF REALITY

STV can create building drawings that can physically jump off the page for a viewer. That's because the firm's design specialists have started to implement augmented reality, or AR, to provide clients and other stakeholders with a unique, three-dimensional perspective of a facility.

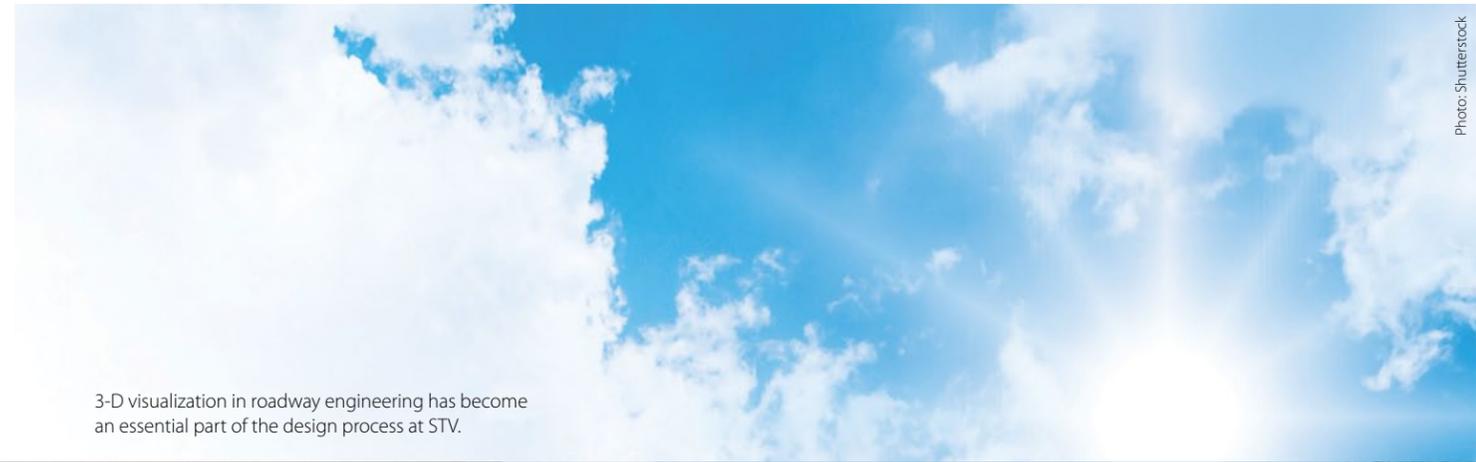
AR is either a live or an indirect view of a physical, real-world environment with elements enhanced by computer-generated input such as sound, video, graphics or GPS data. STV is using the technology to show prospective clients design schematics and virtual walkthroughs of facilities.

"AR demonstrates a natural evolution for the design and construction industry as it helps the viewer to really understand the space of a building," said Daniel Clayson, a programmer analyst in the Oakland office.

For a demonstration of how STV is using AR technology visit this link:

plus.stvinc.com/stvink

Follow the instructions to download an app to your Android or iOS device. Once downloaded, open the app and point your device's camera at the front cover of this magazine to see an interactive model for you to explore.



3-D visualization in roadway engineering has become an essential part of the design process at STV.



STV TAKES CLIENTS ON A NEW KIND OF ROAD TRIP

Chris Parker can take you on a ride down roads, highways and bridges even before they're built.

An engineering designer with more than 20 years of experience providing visualization services for transportation clients throughout the Southeast, Parker

develops animated video presentations, photo-realistic composites, Google Earth overlays and other graphics that bring traditional technical drawings to life. His work helps project stakeholders easily understand complex issues, develop and compare alternatives, and find the right solutions to design challenges. ▶



STV was able to create a dramatic animated model of the I-485/I-85 turbine interchange in Charlotte.

Since 2011, Parker has been showcasing his talents where his efforts have proven instrumental to the success of projects like the ongoing conversion of the I-485/I-85 trumpet interchange in Charlotte to a turbine interchange. His 3-D animation of STV's designs is one of many creations that have made the difference in winning or losing project pursuits and public support.

"From a public involvement point of view, non-engineers who would have difficulty conceptualizing, can relate better through visualization instead of a plan sheet. And it also certainly helps sell the project," said John Johnson, P.E., STV senior project manager and vice president of Transportation & Infrastructure in the Charlotte office.

"Visualization" refers to a combination of CAD design and illustrative art. Designers package any number of imaging and data technologies — including photography, photogrammetry (geographically referenced data derived from aerial photographs), digital imaging, GIS, CAD, and computer graphics — into realistic and informative creations using a

range of leading-edge software. Parker's team uses 3D Studio Max to provide stunningly realistic photo-composites of before and after conditions for proposed projects. OpenRoads is even more dynamic. It's capable of rendering newer types of concepts such as corridor modeling, a powerful tool that allows engineers to design projects and instantly view the results in 3-D. With that kind of immersive technology at hand, design changes can be made quickly to improve quality, reduce rework, and cut costs.

"3-D visualization in roadway engineering has become an essential part of the design process here," said Parker. "This ability allows engineers to bring the public in on the full idea of proposed projects and exchange ideas through realistic 3-D models, leading to a better understanding of the challenges at hand."

Parker is looking to push the bounds of technology even further by implementing Infracore 360 as STV's new standard for early concept renderings. It's just another tool to help clients envision the roads of tomorrow.

"Whether it's a public hearing, municipal meeting, permit acquisition, site study, solar study, aesthetic study or traffic simulation, STV can deliver the right presentation product," Parker said. "We take pride in understanding the proper type of visuals a project requires based on budget and audience, and we can do it all for our clients." ■



Using 3-D software, STV can help clients and other stakeholders visualize roadway upgrades such as bike lanes and new medians.



"The state of technology is constantly evolving and STV is committed to harnessing its power for all it's worth," said Parker, who pioneered the use of 3-D visualization techniques as a former long-time engineering technician in the public sector.

SEEING VEHICLES IN NEW DIMENSIONS

STV's nationally renowned vehicles and systems group is now using 3-D modeling and printing to assist clients in unique ways during the vehicle procurement process.

For years, consultants relied on two-dimensional drawings to provide transit agencies with a sense of what the vehicle was going to look like and what equipment and components would be needed for the finished product. But STV employees found that importing these drawings into 3-D modeling software and/or using a 3-D printer can provide clients with a much more accurate physical representation

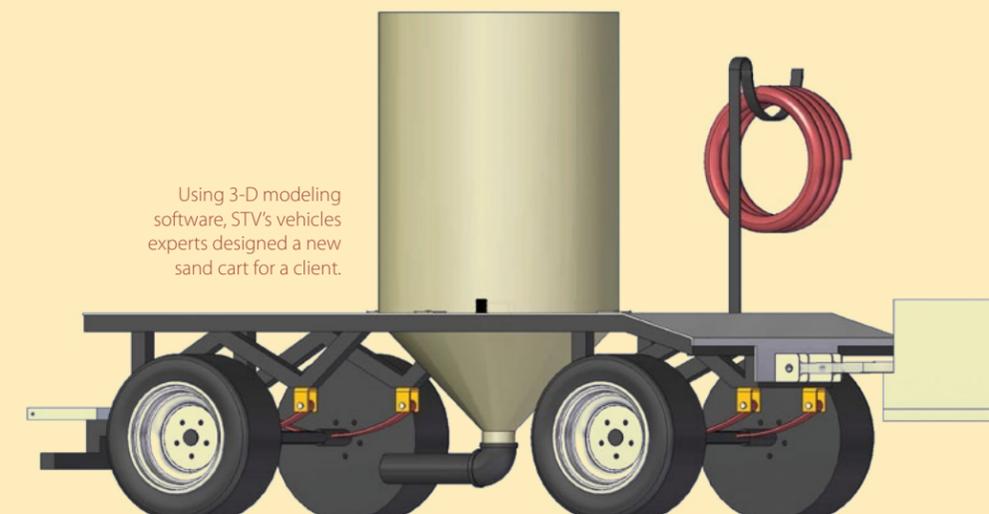
of the vehicle, while potentially saving them money in the process.

"This kind of technology has been traditionally used in our industry by the car builders, but we have found it is equally useful on the procurement side," said James Martin, P.E., PMP, STV vice president and director of rail vehicle engineering. "Now, when we sit down with clients and discuss their options for new or refurbished vehicles, we can offer them a better sense of the size and scope of the project, as well as an idea of the physical relationships between all objects and equipment within the rail car or bus."

For example, if a client wants to modify a vehicle component, the project team is able to use a 3-D printer to produce the redesigned item to scale to make sure it fits spatially. STV's 3-D printers selectively melt plastic filaments in order to create an object. Demonstrating the usefulness of this technology for the Virginia Railway Express (VRE) commuter rail service, STV printed a bracket to function as a prototype, which is currently being used for packaging and mock-up purposes before the final design will be sent out to the casting foundry to be manufactured.

In another VRE project, the client needed a portable cart for replenishing their fleet's sanding equipment. Rather than procuring an entirely new vehicle, VRE used STV's services to design a custom cart in 3-D modeling software to satisfy the request.

"We reached out to four major suppliers who supplied the various sub-components in making this vehicle come together at the fabrication shop," said Austin Longshore, P.E., PMP, a vehicle specialist in the Fairfax, VA, office. "Without 3-D modeling, it would have never have come out as nicely as it did."



Using 3-D modeling software, STV's vehicles experts designed a new sand cart for a client.

UNITY 3D

GIVES CLIENTS NEW VIEWS OF FACILITIES

In STV's Oakland office, Daniel Clayson, a programmer analyst, is developing applications that provide clients with a view of their projects akin to something that could be found in the latest video games. That's because the program, Unity 3D, is exactly that – a video game engine that provides a

“Unity provides our clients with an immersive look at their facilities before they're even built.”

–DANIEL CLAYSON, STV PROGRAMMER ANALYST

three-dimensional perspective of actual projects in a web browser, smart phone, or PC. It's also a catalyst for a host of unique technologies that can give clients and designers previously unattainable virtual perspectives of project sites.

“Unity provides our clients with an immersive look at their facilities before they're even built,” Clayson said. “They can walk around the project site, fly above it, turn buildings and features on and off, and leave comments on what they like or don't like. It lets a person move around a large campus or see the details of the equipment in a single room. It's a more realistic way of seeing a project than what can be found in a predetermined animation or static rendering.”

Unity 3D is one of the bridges that connects STV's expertise in building information modeling/management technology with its utilization of asset management software such as the Onuma System (see articles on pages 2 and 6 for more information about how STV is using BIM and Onuma). BIM models are imported into the Unity engine to give the facility all of

its defined parameters – rooms, floors, doors, equipment, etc. For asset management, equipment can then be linked to equipment schedules, floor plans and product cut sheets, either piece by piece or through connecting to an external service like Onuma or Revit.

In order for clients to view the model, it is uploaded to the web, and a user is able to navigate the project site using an iPad or tablet, a keyboard and mouse, or a custom controller. To provide an even more immersive experience, Clayson is also exploring how virtual reality and three-dimensional scanning technologies can be integrated into Unity. Clayson has modified Unity projects for the Oculus Rift – a forthcoming virtual reality headset that has been developed for use with immersive video games. The Rift gives users a fully immersive, motion-tracked view of a digital space, with 110 degrees of



peripheral vision and nearly undetectable latency between actual motion and virtual motion.

With three-dimensional scanning, specialized cameras and/or laser scanners can collect actual images of an existing facility that can then be converted into a realistic model. From there, the model can be moved into traditional architectural software, mixed with proposed changes, and imported into the Unity viewer. Users can tour the existing space, as well as the proposed changes, with a level of accuracy that would be

impractical to do manually. STV employees are currently working on merging the scanning technology with the Oculus Rift to allow clients and project team members the opportunity to virtually tour a physical representation of current and proposed buildings using the headset.

“There is so much potential in integrating all of these technologies,” Clayson said. “We're giving our clients a level of understanding beyond anything they've ever experienced.” ■



Photo courtesy of the New York City Department of Transportation

A Model Bus Route

STV HELPS DEVELOP MASSIVE NYC TRAFFIC MODEL FOR EXPRESS BUS SERVICE

By gathering data, STV was able to develop a design for new express bus lanes in New York City.

Manhattan's 34th Street corridor runs east and west across the island and is one of the most vital and congested thoroughfares in the nation. Bookended by the Lincoln Tunnel and the Queens-Midtown Tunnel and featuring four subway/rapid transit stops, a major commuter rail hub in Penn Station, and a slew of key businesses, hundreds of thousands of automobiles use the corridor every day. Speedy and efficient bus service along 34th Street remains a great challenge for the New York City Department of Transportation (NYCDOT).

In an effort to improve crosstown bus service, STV was contracted by the NYCDOT to provide preliminary engineering and other design services for the implementation of Select Bus Service – a limited stop service – from the easternmost end of 34th Street all the way to the Hudson River on the west side.



The New York City Department of Transportation wanted to explore how express bus services would impact vehicular and pedestrian traffic along the 34th Street corridor.

A critical component of this endeavor was the development of an ambitious traffic model that would gauge future traffic conditions along 34th Street to determine how Select Bus Service would be used along the corridor. STV performed traffic and pedestrian simulations and studies, and gathered a tremendous amount of data that was then inputted into a computer model designed by a sub-consultant, Cambridge Systematics, using Aimson software.

“It’s one of the most comprehensive analyses of New York City traffic trends and patterns ever performed for the NYCDOT,” said Steven Scalici, P.E., STV’s national traffic planning and analysis manager. “The finished product was built on our firm’s decades of experience in this market area, and helped our client

come to a solution for improving bus service along the corridor.”

STV’s traffic engineers collected data at three levels: “macro,” all major arteries in and out of New York City including crossings in New Jersey, Long Island and Bronx (i.e. tunnels, bridges and major highways); “meso,” all major intersections between 28th and 44th streets; and “micro,” every pertinent intersection and crossing along 34th Street.

Gathering the information to create this model was a herculean task that went well beyond counting cars and pedestrians. Traffic engineers studied the potential impacts of an array of infrastructure elements including median boarding islands, curbside bus stations, neckdowns and other curblane changes, bus-lane

separators, travel lanes on each block, parking and loading spaces, and other concrete areas.

“This model gave us the ability to test a number of design proposals and evaluate how the implementation of each one would not only affect traffic on 34th Street, but all the way out to all of New York City’s critical points of entry and egress,” Scalici said.

In addition, working alongside the NYCDOT’s signals department, STV used information from the model to identify sites throughout New York City that needed additional or relocated traffic and pedestrian signals to maintain street safety. As a result, signal timing changes and other modifications were designed for implementation at 40 intersections surrounding the 34th Street corridor.

Because of the project team’s efforts, STV developed a high level of proficiency in Aimson, and has utilized the innovative software for a variety of other traffic studies.

The comprehensive amount of data contained in the 34th Street model also allows the client to use it as a template for any other intersections that are being considered for similar improvements.

“If the NYCDOT wants to look at bus service options along Fifth Avenue or along 42nd Street, the 34th Street model should provide a roadmap for them in terms of how a design will affect traffic,” Scalici said. “Plus, the data we collected can very easily be imported into other models.” ■

CLOCK STOP

New Countdown Clocks Give Bus Riders the Real Time

Thanks to STV’s intelligent transportation systems (ITS) group, key New York City bus stops are now on the clock.

Led by Charles Ardilio, manager of STV’s ITS group in New York, the firm has been contracted by the New York City Department of Transportation (NYCDOT) to develop solar-powered real-time passenger information signs to display a select bus’s location at various bus stops throughout the five boroughs. Ardilio’s group is leading the field equipment product development from conceptual design through prototype evaluation.

To date, the countdown clocks have been installed at two locations on Staten Island, but more are on the way. The New York City Council recently approved funding for more than 100 new countdown clocks that will be strategically placed throughout the city.

“A survey conducted last year showed that passengers love the clocks and want to see more of them at other key locations,” Ardilio said. “Having the clocks won’t change what time the bus is expected to arrive at the stop, but it does give riders the information they need should they want to switch to taking the subway instead, or use their wait time to get a cup of coffee.”

Route	Stops Away	Destination
s57	█	New Dorp
s78	█	St George
s79	█	Bay Ridge
● ●		Hylan Bl & Reno Av

All New York City bus lines already utilize GPS tracking technology called MTA Bus Time, which provides riders with wait-time information via text message, scanning a QR code or accessing a web site. However, the development of the countdown clocks came in response to the concern that not everyone who uses the bus has a smart phone or any other device that can readily access Bus Time information.

The countdown clocks import MTA Bus Time’s data and then project it on an easy-to-see LED display. Solar units fuel the devices and are designed to gather enough energy to power them 24 hours a day, seven days a week.

One of the hallmarks of STV’s design was the implementation of a scalable management server that supports the utility management of every sign in the system. That way, power consumption can be uniquely altered for each sign based on what’s available via solar exposure and weather conditions.

STV is interviewing prospective fabricators and suppliers to provide production equipment and software development, and is coordinating closely with NYCDOT, New York City Transit, and the New York City Department of Information Technology and Telecommunications, for ongoing testing and approval of communications equipment.

Ardilio was part of a team that presented about the project to the New York Chapter of the Institute of Transportation Engineers in August. ■

A PATH FORWARD FOR KEY PIPELINE PROJECT

As part of a major pipeline initiative that is projected to transport up to 85,000 barrels of refined product every day between Western Pennsylvania and Ohio, STV's Energy Services Division developed a unique solution that made a very critical right-of-way acquisition process more efficient and streamlined for the client and stakeholders. ►

STV's unique solution that streamlined the right-of-way process helped usher a major pipeline project into the construction phase.



► In 2012, STV was contracted by a major energy firm to perform planning, engineering, surveying, permitting and construction phase services for a 160-mile pipeline project that includes new construction and upgrades to existing facilities throughout the corridor. Early in the design stage, the project team discovered there were significant challenges in how landowner parcel data was being tracked and reported. Information was being gathered by two separate firms with no unified format and landowner negotiations were constantly changing the right-of-way document. As a result, requests for land-use variances and exceptions were being submitted to the project team at a very high frequency. STV's response time to the variance requests was critical, as the acquisition of right-of-way established the critical path schedule for the project.

"We quickly realized that standard methods used on most other projects, such as updating a common spreadsheet, would not afford the design and project management team the ability to handle the vast amount of data we were being asked to track," said project

manager Bradley Bonner. "We needed to come up with a cross-platform solution that would be able to quickly process and unify this information and permit immediate responses."

Bonner called in his multifaceted project team, which included James Cunningham, a geographical information systems specialist with a background in relational database management software, and Christopher Skorny, who has extensive experience in surveying and civil design software.

From there, the team created a two-tiered database architecture that utilized Microsoft Access database management software, SQL Reporting, to store and retrieve data upon request, and ArcGIS for mapping and geographic information.

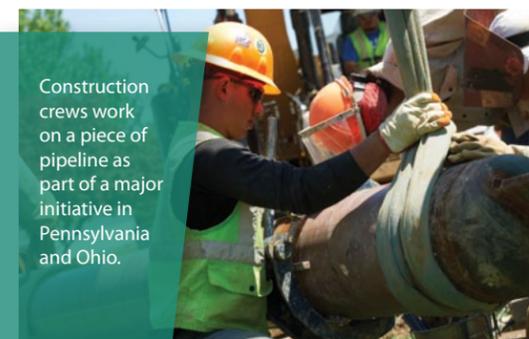
All of this data was then linked to Google Earth software to create a visual reporting tool. A proposed pipeline route was superimposed on aerial photography and mapping to facilitate identification of constraints, evaluation of construction requirements, and establishment

of right-of-way-needs. Local tax maps were accessed to identify parcels and number of tracts, in order to generate the preliminary right-of-way list. STV then mobilized pipeline engineers and environmental scientists to conduct a field verification effort to visually inspect the prime route option. Route refinements and adjustments were made as a result of field investigation activities.

Right-of-way documentation and data was seamlessly transmitted among three firms, enabling right-of-way acquisition and the project to move forward. A similar system was also developed to manage data from multiple subconsultants for STV projects in its other core divisions.

The pipeline project is currently under construction and is expected to be completed by the end of 2014.

"By putting all of our resources together and using a number of software tools in concert with each other, we supported the client and developed a clear and concise path forward for this very vital energy infrastructure initiative," Bonner said. "In return, STV's effort and ingenuity was recognized as we were awarded additional project assignments from this client." ■



Construction crews work on a piece of pipeline as part of a major initiative in Pennsylvania and Ohio.



STV's private cloud brought employees from different firms together for the design and construction of a bus maintenance facility in San Diego.

STV Ahead in Cloud Collaboration

STV is establishing itself as being at the forefront of collaborative work-sharing practice through the implementation of a virtual desktop infrastructure (VDI) system – a private cloud that allows project team members from different offices and organizations to work off the same BIM files and other data in real-time.

VDI was first introduced within STV about three years ago and has already produced results for a number of complex projects involving multiple disciplines. As the name implies, VDI creates a desktop machine whenever accessed by employees. No matter

which office they reside in, they can use Revit and other software in real-time and without data transfer latency issues, allowing the firm to assemble its very best talent for a project team, without needing to consider proximity to a construction site. And considering how large BIM files tend to be – a BIM file stores an exhaustive amount of information about a project's design including all of its physical and functional characteristics – and how frequently they are updated by all of the various team members working on a project, this cloud collaboration has proven to be a major breakthrough for STV and its client base.

“VDI creates a live collaboration on one central file,” said Ed Lick, STV IT director and AEC systems support manager. “It is authentic and honors how Revit naturally works and creates a more efficient work environment that not only benefits our employees, but also our clients.”

Demonstrating the firm's leadership in this arena, Lick and Matthew Dierolf, STV IT coordinator, were invited to speak about VDI collaboration at the prestigious Autodesk University in December – one of the design and construction industry's leading events on BIM and associated technology. The firm also prepared a case study for Unidesk, a leading provider of VDI and desktop management technology.

Interest and investment in cloud technology has grown exponentially in recent years throughout the business and consumer worlds. In simple terms, the cloud is a virtual hard drive/central depository for computer files. People using Apple iOs devices like iPhones and iPads likely back up their music, photos and apps within Apple's cloud.

With the STV cloud, employees can even access VDI using one of these Apple products, such as an iPad and

open up a Revit model without any noticeable drag or delay with the files. “Potentially, employees can go into client meetings or collaborate with other project team members on the road, without the need for a laptop or desktop,” Lick said.

As part of the design-build expansion of the South Bay Bus Maintenance Facility in Chula Vista, CA, for the San Diego Association of Governments, STV's BIM coordinator has used VDI to collaborate with other STV architects and engineers in the firm's Los Angeles, Rancho Cucamonga, Irvine and Oakland offices, as well as with a design architect from an outside firm.

“All of our models and data files are in one central location, which makes coordinating very easy,” said Carlos Ramos, STV's BIM coordinator for the initiative. “We find it to be a very good tool when using it as part of the BIM process. Revit works great on VDI.”

Because the project was procured using the design-build project delivery method, speed and efficiency have been a top priority for everyone involved. With employees in

our various offices and the other firms sharing information, VDI prevents the sometimes cumbersome issue of having too many copies of files scattered across different network servers and computer hard drives.

For another bus maintenance facility – this one for the St. Louis Metro Transit system – STV, in joint venture with KAI & Build, assembled a project team from throughout the United States, including St. Louis, Chicago, Kansas City, California and Texas.

“VDI enabled us to bring together the very best project team irrespective of proximity to St. Louis,” said John Clark, P.E., LEED® AP, BD+C, STV director of civil engineering for the Transportation & Infrastructure Division's Midwest Region. “We can all work together quickly and in real time. VDI has set a new standard for collaboration.” ■



For a new bus maintenance facility in St. Louis, STV used its private cloud system to help project team members collaborate in real time.

WHAT'S NEW AT STV



STV PRESIDENT/CEO HONORED BY ALMA MATER

Milo Rivero, Ph.D, P.E., CCM, STV president and chief executive officer, was honored by Manhattan College at its 2014 De La Salle Medal Dinner. The dinner recognizes people and corporations that embody the principles of excellence, leadership and service to society. Past honorees include Rudolph Giuliani '65, former mayor of New York City; Anne Mulcahy, chairman, Xerox Corporation; Sy Sternberg, chairman and chief executive officer, New York Life Insurance Company; and Eugene McGrath '63, former chairman and chief executive officer, Con Edison.

Rivero received his bachelor's degree in civil engineering from Manhattan College in 1981. He joined STV in 2005 as senior vice president within our Construction Management Division, and became the chief operating officer and executive vice president of the division one year later. He was named president of STV in February 2009 and chief executive officer in 2011.

Milo Rivero (right) with Manhattan College president Dr. Brennan O'Donnell.



STV EXECUTIVE CHAIRMAN GIVES STIRRING COMMENCEMENT ADDRESS

Dominick Servedio, P.E., executive chairman of STV, delivered the keynote address at Manhattan College's 172nd Spring Commencement ceremonies. Servedio also received an honorary doctoral degree in engineering from the school.

The Spring Commencement awards master's degrees to students graduating from the Schools of Business and Engineering; bachelor's and master's degrees to students from the School of Continuing and Professional Studies; and master's degrees and professional diplomas to students from the School of Education and Health.

In his well-received speech, Servedio urged the 2014 graduates to bring all their gifts to their lives: their heart, passion, courage and grit.

"Your service to the profession and to your community is without comparison," the school noted. "You have promoted a vision of a better world through your service to others."

Award-Winning Projects

As a demonstration of STV's visionary approach and leadership in the design and construction industry, the firm was recently honored by a number of organizations for its outstanding project work.



After earning top honors at the regional level, STV sent the following four projects to the American Council of Engineering Companies (ACEC) 2014 National Engineering Excellence Awards. All were recipients of a National Recognition Award from ACEC:

1 For the first phase of the John F. Kennedy Delta Terminal

Redevelopment, in Jamaica, NY, STV provided construction management services in joint venture for the multi-phased renovation and expansion of Terminal 4 at one of the world's largest airports. The joint venture team oversaw contractors and construction teams for three different contracts in the first phase of work, which was achieved without any interruption to airport users.



2 In Pennsylvania, STV performed construction management and construction inspection services in support of the rehabilitation of the Lumberville-Raven Rock Bridge, which spans the Delaware River in Lumberville, PA, and Hunterdon County, NJ. The historic bridge, which was converted into a pedestrian bridge by the renowned John A. Roebling's Sons Company in 1947, required a structural and aesthetic makeover, enhancing the structure's durability and life expectancy. Because this bridge is vital for recreational activities and used by tourists in the summer, construction was completed in two months, right before the start of the summer season.

3 STV also provided construction engineering inspection and resident engineering inspection services for a new commuter train station in West Haven, CT, to be used along Metro-North Railroad's New Haven Line. STV coordinated with all stakeholders, including the client, the Connecticut Department of Transportation and Metro-North, verifying that construction was completed in accordance with all plans and specifications. The station opened last August.

4 The I-385 design-build widening program in Greenville County, SC, is a critical initiative in a region that has been growing exponentially. STV was the lead designer as part of the Lane Construction Co. design-build team. The roadway was widened

from four to six lanes and multiple interchanges and highway bridges were modified to meet growing user demand. The project received a National Recognition Award from ACEC.

On the regional level, three STV projects were honored by local chapters of the Construction Management Association of America (CMAA):

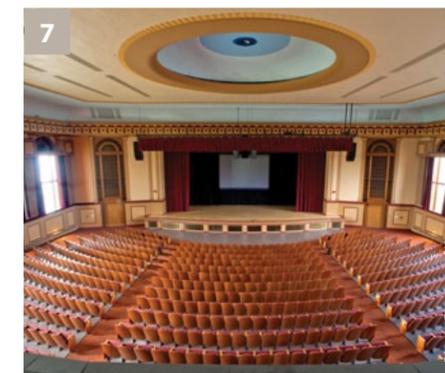
5 The Washington Area Metropolitan Transit Authority Rosslyn Metro won a Project Achievement Award in the "Construction Value Less Than \$50 Million" category from CMAA's National Capital Chapter. STV performed construction management services for this initiative, which included the construction and



installation of brand new high-speed, high-capacity elevators that can serve an additional 2,000 passengers every hour.

6 John R. Briggs Elementary School was recognized by CMAA's New England Chapter with a Project Achievement Award in the "Building Project New Construction Under \$30 Million" category. As owner's project manager, STV guided the client through a feasibility study, CM-at-risk selection and the design development phases for this new 85,000-square-foot facility in the Ashburnham/Westminster Regional School District.

7 At Kutztown University in Kutztown, PA, the Schaeffer Auditorium received a 2014 Project Recognition Award from the CMAA Mid-Atlantic



Chapter in the "Higher Education Renovation Projects Under \$20 Million" category. STV served as owner's representative and provided construction management services for the complete renovation of the 32,000-square-foot building, as well as a 23,000-square-foot addition.

8 On the planning side, STV's work on the Laney College Facilities Master Plan received an Award of Excellence in the Master Planning category of the 2014 Community College Facility Coalition (CCFC) Professional Design Awards Program. The new Facilities Master Plan, developed by STV in collaboration with the Laney Facilities Planning Committee, aims to open up the Oakland, CA, campus to the community and encourage students to successfully pursue their educational goals. ■



- 1 JOHN F. KENNEDY DELTA TERMINAL REDEVELOPMENT**
Jamaica, NY
- 2 LUMBERVILLE-RAVEN ROCK BRIDGE**
Raven Rock, NJ
- 3 WEST HAVEN STATION**
West Haven, CT
- 4 I-385 WIDENING PROGRAM DESIGN-BUILD**
Greenville County, SC
- 5 ROSSLYN METRO**
Arlington, VA
- 6 JOHN R. BRIGGS ELEMENTARY SCHOOL**
Ashburnham, MA
- 7 KUTZTOWN UNIVERSITY SCHAEFFER AUDITORIUM**
Kutztown, PA
- 8 LANEY COLLEGE FACILITIES MASTER PLAN**
Oakland, CA

STV GIVES BACK

A LOOK AT STV AND THE COMMUNITIES WE SERVE

ENERGY SPECIALIST PUTS THE SQUEEZE ON SEEDS

As the adage goes, you can't get blood from a stone, but with some creative thinking, Michael Hahn, an engineering specialist in STV's Douglassville office, learned you can squeeze oil from a seed to create biodiesel.

Hahn recently returned from Burkina Faso in Africa where he was part of a team investigating how oil could be harvested from the seeds of the jatropha plant to produce biodiesel. Hahn first studied the plant and its fuel-producing potential while completing his bachelor of science at Messiah College in Mechanicsburg, PA. He conducted this trip as an exploratory prerequisite for a group of Messiah students. While Messiah College students have experience with



Examples of jatropha seeds, which can be squeezed to produce biodiesel.

pressing oil from sunflower seeds, they have not been able to work with jatropha seeds due to the inability to obtain large quantities of the plant in the US.

"Creating a reliable source of fuel for these communities could really stimulate the economy," Hahn said. "Most people didn't have any electricity where we were in Burkina Faso. Biodiesel could be used for generators to power health clinics, or even as lamp oil for someone's home."

Iowa State University students provide landscape design at the Iowa Correctional Institution for Women.



ARCHITECTS FIND LESSONS IN THE GREAT OUTDOORS

In order to help make a first-of-its kind outdoor space at the Iowa Correctional Institution for Women in Mitchellville, IA, a reality, STV has entered into a unique collaboration with state officials and a landscape architecture program at a nearby university.

For the past three years, landscape architecture students at Iowa State University in Ames, IA, have played a key role in developing the master plan and constructing an outdoor area at the women's correctional facility that aims to therapeutically help rehabilitate offenders and reduce recidivism – the rate at which previously incarcerated offenders return to prison.

The idea was first pitched by David Ziskind, FAIA, NCARB, LEED®AP, STV's chief architect and a worldwide leader in correctional design. A few years earlier, the firm was contracted by the Iowa Department of Corrections to provide planning and design services for a new women's facility that would integrate gender-, health- and age-responsive programming into the fabric of design, making it among the first women's facilities in the country to incorporate this approach. Iowa's goal is to reduce its three-year recidivism rate from 27 percent to 17 percent over the next decade.

But when the state was experiencing budgetary issues for the project's landscape architecture component, Ziskind worked with Iowa's correctional officials to find a university that would be interested in providing its landscape architecture students with hands-on experience in planning, designing and constructing a space.

"The landscaping has always been a very important part of our program at the women's facility, so we wanted to see it move forward," Ziskind said. "After making a presentation to the client, I helped make an arrangement with the facility's warden and with Iowa State University and told them that this would be a great opportunity for the students."

STORAGE SOLUTION FOR COMPUTERS BENEFITS CHILDREN

Information Technology (IT) is a constantly evolving industry, but that doesn't mean older computers and other equipment can't be put to good use.

Over the past year, STV's IT group has spearheaded a massive, company-wide "recycling" effort with the firm's old computers, monitors, printers and related devices for the benefit of elementary and high school students across the country.

STV's equipment is being donated to Computers for Kids (C4K), a nonprofit organization that works with schools in need of new technology as a way to promote digital literacy.

While these older computers don't meet STV's needs anymore, that doesn't mean they can't be useful in a school setting where students will primarily use them for accessing the internet, and other more basic applications. Plus supporting C4K saves the company some money. STV traditionally has to pay companies like Dell to recycle computers and scrub the hard drives of all data. C4K erases any old data, and even sends a truck to pick up donations.

Over the past year, the firm donated more than 200 computers in the New York office alone. Additionally, STV is continuing its support for the Cell Phones for Soldiers program, a nonprofit group that accepts old cell phones and BlackBerrys® and provides them to military personnel and their families overseas as a way for them to communicate, for free.



Computer equipment was recently gathered in the New York office for a donation to the Computers for Kids charity.



STV's acquisition of GWD has augmented its range of energy services throughout the United States.

NEW ACQUISITION A BOOST FOR STV ENERGY SERVICES

STV's acquisition of Denver-based GWD (now doing business as STV/GWD) brings together two culturally aligned firms that have collectively served the energy industry for more than 25 years.

The acquisition augments STV Energy Services' well-established civil/pipeline and environmental strengths in the pipeline transportation market and the firm's instrumentation controls engineering component. The firm now offers a full range of services in support of the U.S. liquid petroleum, natural gas, natural gas liquids and specialty gas, and electrical utility arenas. With this acquisition, STV Energy Services, led by executive vice president Gerald Donnelly, P.E., boasts a skill set that can be applied to projects starting at the extraction point at the wellhead, to the facilities and plants that process, treat and store the products, culminating with the pipelines and associated infrastructure that transport the products.

"With GWD's record of growth in recent years and its broad-based range of services,

it is the perfect complement to our well-established Energy Services Division," said Dominick M. Servedio, P.E., STV's executive chairman. "I am pleased that GWD is now a part of the STV family."

Founded by Gary and Shauna Doven in 2002, STV/GWD has vast experience offering professional services to the midstream natural gas processing market in the Rocky Mountain region and has headquarters in Denver and a second office in Bismarck, ND. In addition to instrumentation and controls engineering, STV/GWD's talented staff members offer strong credentials in process, mechanical, and electrical engineering and programming; construction inspection and field services; as well as procurement and project management. The firm's services have been applied to a wide array of projects covering a range of energy system and facility types that encompass the processing of natural gas and natural gas liquids from the extraction point at the wellhead to delivery of the finished projects as well as the associated water treatment.



"This acquisition is a demonstration of STV's dedication to growing our Energy Services Division and being recognized as national leaders in this marketplace," said Milo E. Rivero, Ph.D., P.E., CCM, STV president and chief executive officer. "Together, STV and GWD will be in a position to offer our combined client base across the United States a broader spectrum of professional capabilities."

Gary Doven has joined STV as a senior vice president. Shauna Doven and Jeffery Carlson, P.E., have joined STV as vice presidents. Jason Pingnot, P.E., has become an STV senior associate.

"We saw this as a very exciting opportunity for our firm," Gary Doven said. "STV is a firm with a rich history supporting a number of world-class projects and vast resources throughout North America. STV/GWD will be able to continue to serve our clients with the service they have become accustomed to in new and more comprehensive ways." ■

NEW PERSONNEL



Thomas Butcher, CPA, recently joined STV as chief financial officer, overseeing the firm's corporate financial management and its information technology department. Butcher brings more than 25 years of experience in corporate finance to STV, most recently in the architectural, engineering and construction management industries. Prior to joining the firm, he was the CFO and treasurer of a privately held civil engineering firm. He also served as the administrator of the employee stock ownership plan and was a member of its 401(k) committee. Butcher is replacing Peter Knipe, who retired from STV as CFO earlier this year after 34 years. Knipe will continue to consult with the firm and will remain a member of STV's Board of Directors.



Michelle Bennett has joined the firm as vice president and chief people officer, and head of our Human Resources department. In this role, Michelle will lead the efforts in meeting STV's growing human resources needs and furthering the department's strategic initiatives. She has more than 20 years of experience as a human resources professional in the design and construction industry. Prior to joining STV, she was with an employee-owned company comprised of engineers, architects and environmental scientists serving the water, energy and resources, environmental, property and buildings, and transportation sectors. There, she headed up the Human Resources department in support of 30 offices and 1,100 employees throughout North and South America.

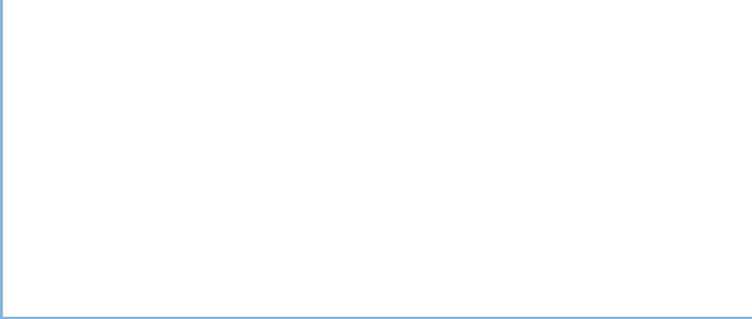


Kenneth Champion has joined STV as vice president in the Construction Management Division. He will serve as the project executive for the firm's work with the Delta Airlines Terminal Redevelopment Program at John F. Kennedy International Airport in Jamaica, NY. Champion has more than 35 years of experience in project management and has supported a variety of high-profile projects including EPCOT Center and Animal Kingdom at Walt Disney World in Orlando, FL, and the redevelopment of Rockefeller Center in New York. His most recent assignment before joining STV was program director for the United Nations' \$2.13 billion Capital Master Plan. The project is the largest and most comprehensive construction and renovation project ever undertaken by the United Nations organization.



Jan Turner, CCM, LEED® AP, was recently brought aboard as vice president and Midwest Territory manager in the Construction Management Division. In this role, she will be responsible for managing the division's projects in this region, as well as business development. She brings more than 40 years of project and program management experience in the higher education, K-12, residential, health care, commercial and hospitality market sectors. Prior to joining STV, Turner worked on a diverse range of assignments, including serving as the principal-in-charge of a five-year sustainable master plan at a college campus in Illinois. She was a member of the national board of directors of the Construction Management Association of America, a board member of One Hope United, and a member of the National Association of Women in Construction.

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