THEOMETRICS

Is the art and science of precision measurement and navigation in and on construction sites.

"There is little benefit from Innovations without Implementation. Technology drives business only when it's implemented."

Sam Stathis
Founder & CEO - Theometrics

BACKGROUND

The architecture, engineering, and construction (AEC) industry operates in a project environment, in which a collective achievement by a diverse team of participants is required. These team members represent different disciplines with varied educational backgrounds, skills and occasionally, even different objectives. Successful completion of a construction project depends on accurate, effective, and timely communication, and the ongoing exchange of critical information.

INACCURATE MEASUREMENTS

The process of field measuring buildings and producing accurate design drawings is not an easy task. Capturing data accurately is nearly impossible using conventional measuring methods of tape measures and strings, especially when measuring curved or non-orthogonal spaces. Errors and omissions are so common that special contingencies are allocated for construction budgets and separate insurance policies are required to address the repercussions from these mistakes. The real estate and construction industries suffer great losses from relying on obsolete record drawings and inaccurate design representations resulting from incorrect measurements of existing building space. Industry experts agree that measurement errors are the primary cause of many change orders, delays, conflicts, and the inevitable litigation that follows. The exact financial and environmental impact attributable to inaccurate measurements are somewhat unquantifiable, but loses are estimated to be tens of billions of dollars annually.

LACK OF INTEROPERABILITY

Interoperability is the ability to effectively communicate and manage electronic product and project data among collaborating professionals. The lack of interoperability is crippling the construction industry and is increasing the demand towards a technological solution. The National Institute of Standards and Technology estimates that capital facilities lose about $60 billion each year due to the lack of interoperability. These estimates are for losses incurred during the design and coordination phases of the project, with added costs averaging 3.2% of the total construction budget. A greater challenge encountered by the construction industry is the lack of interoperability between the design team and the construction team and these losses are exponentially higher.

Theometrics is able to bridge the communication gap between the design professionals and the construction teams and thus prevents these losses and reduce the costs associated with the inefficiencies in the present construction processes. Utilizing state-of-

the-art computers, lasers and robotic technology, Theometrics translates and directly transfers the design professional intent directly to the construction team. In addition to potentially saving billions of dollars each year the seamless information exchange has countless environmental benefits which are discussed herein.

THE MISSING BRIDGE

Since 1980, construction labor costs have more than doubled while Architectural and Engineering (A&E) fees have seen minimal increases. One reason for this is that A&E firms have adopted modern technology to save time and money. Hand drafting has become a thing of the past and firms have become entirely dependent on Computer Aided Design (CAD) software. CAD software packages are the basic platform tools that enable architects and engineers to design complex modern structures with precision accuracy previously inconceivable with manual drafting. CAD software has grown into a multi-billion dollar industry. While CAD has broad 3D capabilities, most A&E designs are created as 2D plan views, sections or elevations. Cutting-edge firms are now advancing to 3D modeling & coordination software; Building Information Modeling, (BIM), led with Revit by Autodesk, and Microstation by Bentley. In addition to speed and accuracy, the "next generation" software empowers A&E firms to push design complexities to their limits.

Unfortunately, there is a wide technological gap between the CAD and BIM tools available for designers and the tools available to the tradesmen. Without any significant advances in technology, labor costs continue to skyrocket and the gap continues to widen as contractors are limited to using the same archaic measurements and layout methods employed for hundreds of years. The designers speed and accuracy achieved by using CAD or BIM cannot be completed on a project using conventional construction means of; axis lines, strings and tape measures. As designs have become more complex, these gaps, labor costs, and risks have increased exponentially.

Errors increase the developer's and contractor's costs and expose the entire project team to risk, including the insurance, banking and bonding companies. In order to minimize cost, errors and risks, these archaic practices have to be replaced and a new standard has to be developed. Clearly, there is a need for a technological bridge.

THE COMPANY

Theometrics is the first and only company in the world to develop and implement the "THE MISSING BRIDGE" between CAD or BIM design and construction. Our products and services revolutionize the way architectural and construction measurements are performed. We replace antiquated blue prints, axis lines, strings and tape measures with state-of-the-art, laser-accurate and computer-controlled equipment that seamlessly integrates CAD or BIM designs and construction job-sites. We have developed and implemented "Disruptive Technology" and "The Technological Bridge" between the design software and the physical environment to perform the following:

1. Measurement and Consulting Services: Risk Assessment, Dimensional Control Risk Management and Quality Control

a. *As-Built Study:* Capture the physical space while generating in real-time the line work to a CAD drawing with precision accuracy. Drawings can be created as two-dimensional (2D) plan views and elevations or three-dimensional (3D) models.

b. *Pre-Construction*: Prepare CAD overlays and compare design documents to the actual field conditions (Deviation Studies) streamlining the work flow and minimizing field coordination, Requests for Information (RFI's) and Change Orders (CO's).

c. *Construction Layout:* Transfer any CAD design or shop drawing directly from a computer into the physical space (Architectural Navigation ™). In real-time, our products will navigate a user from any point in a CAD design to the corresponding location in or on buildings or construction sites with precision accuracy.

d. *Forensic Analysis:* Provide expert testimony and documented site deviations to support litigation claims.

2. First to Create and Implement

a. "A standardized method of measurement."

b. The Best Means & Methods for dimensional accuracy and dimensional control.

c. The technological bridge to transfer the accuracy of architects' and engineers' CAD and BIM designs to tradesmen in the field.

d. Technology to enable "sustainable design" to become "sustainable construction."

e. A process to generate documentation to support all work with laser accurate as-built drawings.

f. A revolutionary technology platform with more than (50) patents pending to protect a proprietary measurement standard, best means & methods, in addition to proprietary hardware & software

RISK MANAGEMENT & QUALITY CONTROL

As experts in the industry, we trust you will find that Theometrics is a "better means and methods" than the existing processes. The savings realized from increased efficiency and accuracy is obvious. Equally important are the extensive intangibles and risk mitigation benefits for the developer, insurance companies, and construction teams.

• Clearly, laser equipment and CAD or BIM systems are **infinitely more accurate and efficient** than antiquated blueprints, strings and tape measures.

• We provide greater accuracy and a higher degree of data sharing capabilities that unquestionably equates to **less risk** of error and trade conflict. A faster process and shorter project life-cycle assure less change orders, earlier completion, better coordination, less interest expense, earlier use of space, sustainable construction, and many additional benefits. Furthermore, our Forensic capabilities and immediate verification of the architectural design vs. the as-built condition is a powerful tool for performing site deviation analysis.

EDUCATION & CAREER DEVELOPMENT

It is no secret, that America is at risk of losing its leadership in information technology and innovation which affect today's global economy. Today's generation must refocus their

energy towards emerging technologies and innovations. Industry leaders must revamp their strategy of attracting today's tradesmen through 21st century technology. Many trades are now faced with the challenge of replacing their aging workforce with today's techno savvy youth. Unfortunately, the loss of these retirees also means the loss of years of experience and expertise. Now companies are faced with the greater challenge of not only replenishing the workforce and closing the gap caused by the retirees but to also educate and attract today's generation towards the trades.

Theometrics has embraced this challenge and created a new industry, a new profession and a new trade; **"Architectural Navigation", "Theometrics consultants," "Theo Techs" and "Layout Artisans;"** all are trademarks of Theometrics**.** Using our methods and technology a young person could learn the art of their trade in half the time or less of those with traditional, "On Job Training Methods."

The career benefits cross many strata in that tradesmen will have new paths to pursue with enhanced capabilities. Technical and commercially-oriented schools will have new fields of study to offer to a wider base of the student body. Moreover these occupations require less physical demand and better quality of life over the traditional construction techniques. Our technology will open up the job-site to a diverse group of candidates crossing both genders, and offering those with physical handicaps to outperform the current standard. These positions can fulfill the criteria under new technology job-creation and minority-oriented career development funding programs with broad appeal to diversity groups.

THEOMETRICS GREEN: ENHANCING SUSTAINABILETY

Sustainable design also referred to as *"green design"* is the art of designing buildings and structures in a way that reduces use of non-renewable resources, minimizes environmental impact and relates people with the natural environment. Sustainability is a delicate balance of *economic, social and ecological impact. T*he U.S. Green Building Council (USGBC) is an organization that promotes sustainability and is best know for the development of Leadership in Energy and Environmental Design (LEED) rating system. Despite the increase of energy cost and the public awareness of global warming the construction industry has been to respond to the cause.

Through the use of technology in recent years, all non farming industries have enjoyed nearly 200% productivity gains. During the same 25 year period in construction the lack of innovation and slow adoption of technology has caused a 25% productivity decline. Similarly, compared to the progress of green design very little has been done for creating standards in the construction process to enhance sustainability or promote "Green Construction."

Theometrics will reduce change orders and shorten the project life-cycle while reducing job-site carbon footprint associated with energy as well as reducing labor and material waste. Additional green benefits include the move toward paperless jobs with reduction of millions of blue prints; as tradesman can work directly from CAD or BIM files and elimination of airborne particles resulting from repeating work resulting from measurement errors.

A key initiative for Theometrics is to accelerate the adoption of technology simultaneously bridging green design with "green construction." The utilization of Theometrics technologies will financially and environmentally benefit the design and construction process as well as the operation of facilities for generations to come. We call this initiative Theometrics Green and it is greener, faster & cheaper.

Theometrics Green will bridge the technological gap between design and construction and will enable "sustainable design" to become "sustainable construction."

SUMMARY OF KEY BENEFITS

- New Industry
- New Profession
- New Trade
- Revolutionary Dimensional Control
- Best Means & Methods
- New Standards
- Financial Savings
- Environmental Impact
- Risk Mitigation