



ENGINEER-TO-ORDER/
MAKE-TO-ORDER
ETO/MTO

CrescentOne | 2022



ETO/MTO

As an Engineer to Order (ETO) and Make to Order (MTO) manufacturer, your needs have grown more complex and increasingly urgent. You must manage a rapidly growing customized product base. You must respond to customer demands on time and on budget. You must gain visibility into all your operations and synchronize your supply chain. You must also provide immaculate service.

Time to market, response to customer demands, reduced costs and top quality are of increasing importance given the increased emphasis on manufacturing, which yields increased potential for competition. At the same time, this increased emphasis on manufacturing may provide a greater supplier base.

CrescentOne's extended ERP suite can help you achieve these objectives efficiently and cost effectively by enabling you to select from more than 70 modules to fit your manufacturing operating environment. For example, if your customer requires both material and services, such as new engineering design and product installation, CrescentOne's bid and contract management enables you to identify, plan, track and synchronize those demands from the initial contract. At the same time, for those customers requiring only material products you may choose to use sales quotes and orders initially with service specific contracts for follow on services.

The flexibility and adaptability of GLOVIA G2 will allow you to manage and improve every aspect of your business with one proven solution to meet today's business needs and to support your system needs as your company, products and industry grow and change.

We welcome the opportunity to discuss your business issues with you and our potential solutions to those issues. In the interim, we invite you to visit our website at www.CrescentOne.com.

Sincerely,
Your CrescentOne Team



THE CUSTOMER IS ALWAYS RIGHT

But it is incumbent upon the manufacturer to inform the customer of the options and information of which they may not be aware.

As an Engineer-to-Order (ETO) Make-to-Order (MTO) manufacturer, you must not only contend with greater global competition, increasing customer demands, and the need to improve productivity and efficiency, you must also manage bids and estimates for products they have never produced before, manage extremely difficult, ongoing changes in engineering, and control costs, resources, and services for highly complex product lifecycles with long lead times.

CrescentOne's extended enterprise resource planning (ERP) software suite, GLOVIA G2, is a true ETO/ MTO solution designed to meet the complex requirements of the ETO/ MTO industry. Rather than presume one way of manufacturing or forcing a solution through the rigidity of a traditional ERP system, CrescentOne developed a powerful yet flexible solutions framework that supports the actual ways in which manufacturers operate—including concurrent or progressive engineering and simultaneous mixed modes of operation. CrescentOne software reacts to product and project changes in seconds to rebalance supplies, resources, and demands to keep you moving forward.

Manufacturers that use GLOVIA G2 have all the tools to optimize and analyze information in order to realize significant operational benefits, including increased on-time and on-budget deliveries and substantial reductions in customer lead times. State-of-the-art collaborative technology allows you to do real-time business with other divisions as well as external suppliers and partners wherever they are located. GLOVIA G2 is the ideal solution for you to meet everyday ETO/MTO process needs and challenges and remain focused on overall long-term business goals in manufacturing, projects, contracts and services.

CrescentOne's success stems from our decades of experience with engineer-to-order and make-to-order manufacturers. We have always made it a priority to develop the necessary resources to address the growing demands of our customers and the increasing demands put on them by their customers.

“However, the fact is that only a minority of all ERP vendors properly support the ETO environments, let alone with flow manufacturing concepts. CrescentOne would be one possible honorable exception.”

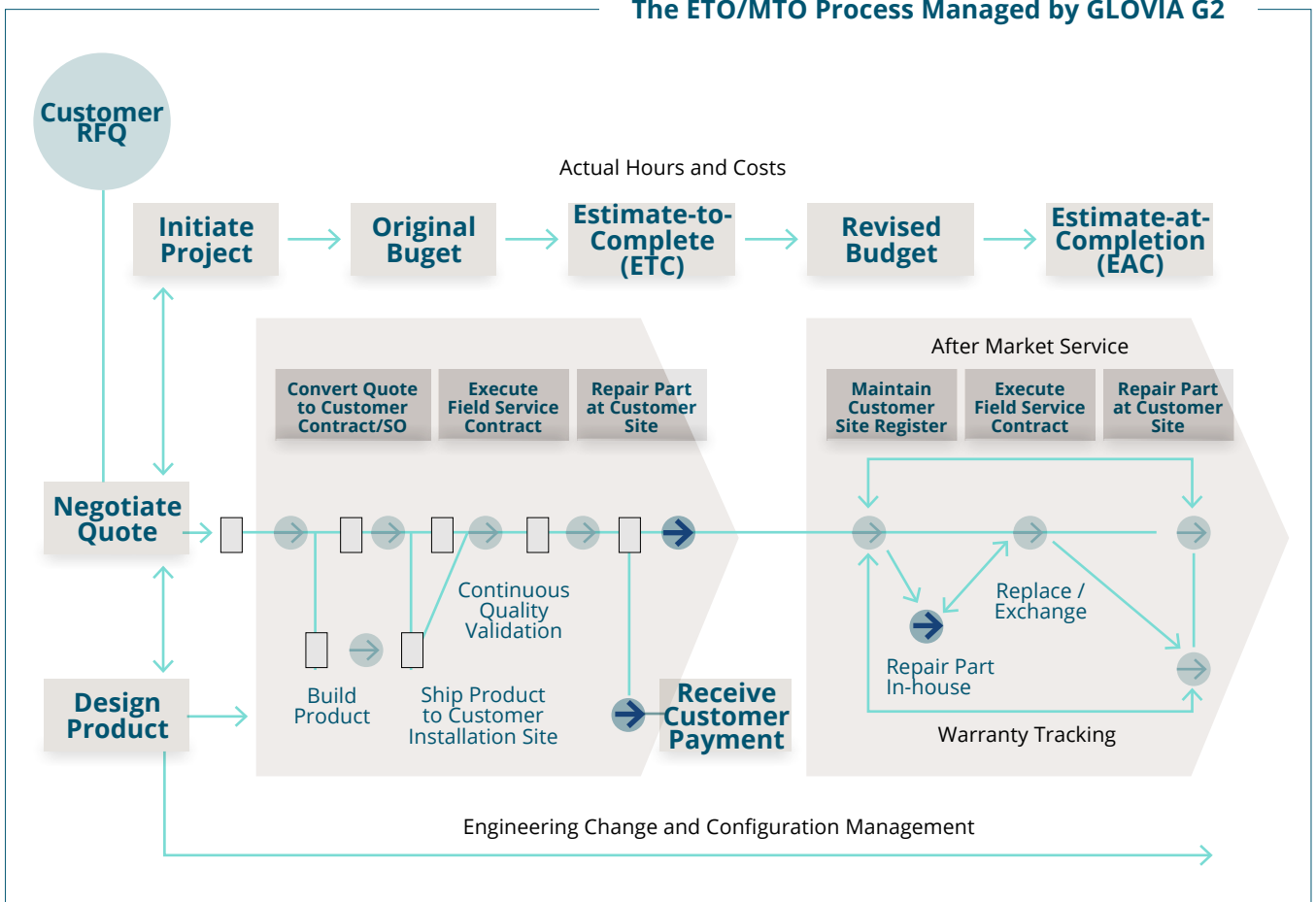
Predrag Jakovljevic, Research Director of Technology Evaluation Centers, Inc.

CHALLENGES IN ETO & MTO MANUFACTURING ENVIRONMENTS

Today's ETO/MTO manufacturers manage an increasingly complex and sensitive balance of priorities in an increasingly complex and demanding marketplace. To be successful, there are five mission-critical areas in which you must excel:

- 1 **Managing Change**
- 2 **Managing Communication**
- 3 **Managing Costs**
- 4 **Managing Resources**
- 5 **Managing Services**

The ETO/MTO Process Managed by GLOVIA G2



FIVE MISSION-CRITICAL AREAS

1 MANAGING CHANGE

ETO/MTO manufacturers must be able to plan for and react to an increasing volume and variety of change. In engineering, the product changes constantly due to material availability and costs, as well as new and enhanced material, all of which impact supply and production. In sales, customers change their minds on the configurations of their order and you must be able to respond in a multitude of ways. Consequently, a huge part of the problem is to keep production synched with engineering and supply synched with production—managing an entire project to deliver a product on time and on budget.

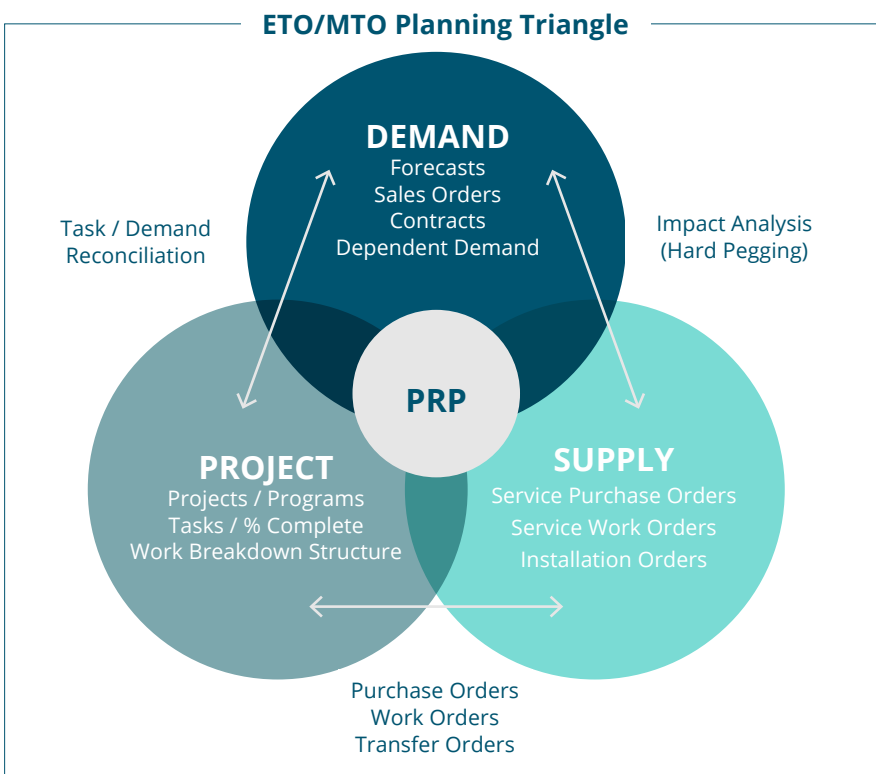
The most accurate, accessible information is useless if the environment it supports is not designed with enough flexibility and integration to accommodate the inevitability of customer and engineering changes.

Any ETO/MTO cycle has three major pull points: Customer and Engineer Demand, Response to Demand (including supplies and 3rd party services), and Project Management and Scheduling. No one part of this demand “triangle” is independent or in charge. Different points assert dominance at different times and change to any one of them can pull things out of balance at any time.

2 MANAGING COMMUNICATION

Complex, long-term ETO/MTO projects inevitably involve numerous departments, groups within departments, and suppliers and subcontractors many of which might operate in various information “silos.”

Whereas previously Engineering would complete the design to customer requirements then forward the Engineering Bill of Materials, the EBOM, to Manufacturing to develop the Manufacturing Bill of Materials, the MBOM, to represent the way the product is to be built - with each department working to their individual projects - today's concurrent engineering / manufacturing mode of operating requires a progressive design/ build environment with all working to the same project. This enables real-time communication and information flow within your company and throughout your entire supply chain.





3 MANAGING COSTS

Today's contracts and sales orders are uncertain, shorter term, smaller in volume and extremely cost sensitive. Because of change and other unknowns in ETO/MTO projects, predicting and managing costs is an inexact science at best. Yet you need to make the fastest, most accurate bids to your customers and prospects and still maximize profitability.

Contract-based manufacturers have little choice but to shore up new business opportunities and increase competitiveness by creating quality products and services in shorter cycle times to meet rapidly changing market conditions and to secure bids with greater confidence. You need visibility and control of all project lifecycle costs—from the suppliers through manufacturing, out to customers and into the aftermarket, including keeping your customers aware of continual product developments and enhancements.

4 MANAGING RESOURCES

ETO/MTO manufacturing is all about balancing interdependent processes that impact each other. The drivers and constraints of projects can be hard to identify and always change as the project proceeds. Initially, design engineering time may change, then frequently critical manufacturing resources may be delayed — for instance, a singular high tolerance machining center, suppliers may deliver late, and so on.

At the same time, experienced installation and field service engineering teams are not being properly scheduled for their functions, which may result in impacts to other customer installations. Usually, both internal and external resources—materials and personnel—are involved in a project and effective scheduling saves time, money, and helps maintain margins. To know that activities will change is one thing. To deduce the impact on related activities and ultimately the full project is the real name of the game.

5 MANAGING SERVICES

Manufacturers are realizing more and more that in addition to installation support, aftermarket product support including field services is critical to win further business and is a major revenue opportunity. Product complexity and channel proliferation have increased the difficulty of maintaining organizational knowledge and competency in all relationships at all times.

Still, competition in this area is cutthroat and the slightest edge in services can mean all the difference in acquiring—and retaining—new and existing customers. ETO/MTO manufacturers need sophisticated tools to manage and track service, materials and personnel over the long, detailed lifecycles of their products.

BUSINESS CHALLENGES & BENEFITS

Day and night, ETO/MTO manufacturers confront important opportunities and high-pressure decisions that have direct and indirect consequences on their bottom line. GLOVIA G2 has innumerable strengths and advantages that automate and enhance the competencies you need to be as successful and profitable as possible:

- Managing the Bid and Estimating Process
- Project Management and Analysis
- Design and Engineering
- Planning and Controlling Key Resources
- Post-Sales Service and Support

Managing the Bid and Estimating Process

ETO/MTO manufacturers often make the error of starting their strategies in a price-centric fashion that is too limited and too internal. When pricing for components is included, it is typically integrated through hand-built integrations that offer only a subset of what is required to price a bill of materials (BOM) accurately during the quoting process. To be effective, you must make pricing a core to your strategy and also scale and extend your strategy outside of the company to channel partners, service organizations and sales operations.

Because rapid responses are routinely an important competitive advantage, GLOVIA G2 helps your company develop accurate, competitive bids faster. You can use existing models, parts, costs, and routings as the baseline and add unique services and materials as required. To compress project lead time, GLOVIA G2 provides worksheets that can be used to develop new and unique items that are not constrained by conventional material planning rules.

You can invoice based on these evolving designs and convert them easily into production items and deliverable services. In addition, if your contract with the customer is established for progress payments, the visibility and control enabled by way of the worksheet allows you to structure your contract for improved cash flow.

CAPABILITIES AND BENEFITS INCLUDE:

- Apply superior estimating tools for manufacturing and service projects
- Respond quickly to Requests for Quotes with bids that accurately reflect customer requirements
- Realize life cycle costing—including standard, actual, and average—and cost visibility
- Define and track your sales proposal activities and convert data into contracts or sales orders
- Quote, sell and deliver complex configured products easily knowing that all required data is identified and maintained
- Bill progressively, based on product delivery, task, percent complete and so on

PROJECT MANAGEMENT AND ANALYSIS

The nature of managing any project is timely coordination of a series of complex, interrelated tasks often performed by a myriad of resources.

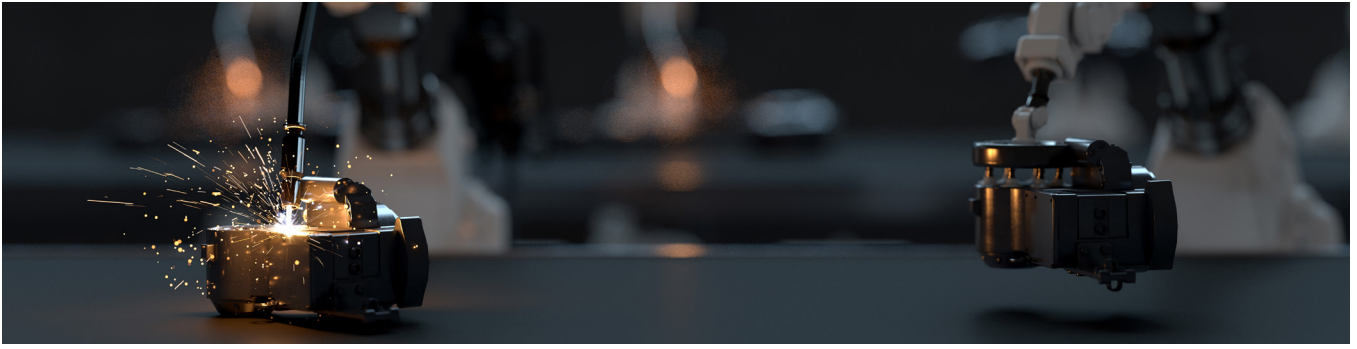
Raise this to the level of the manufacture and installation of a complex piece of equipment or system and you have an enormous job on your hands. Add the fact that most ERP systems are built on a work-order model and you have a project manager's nightmare. A well-designed project plan that provides visibility across the multiple activities and organizations involved in the development, production, and installation of an ETO/MTO product is critical to successful, on-time, on budget completion.

GLOVIA G2 enables you to manage customer projects and contracts profitably by coordinating program resources and activities. Our end-to-end solution manages everything from defining the project and developing realistic estimates and bids to optimizing the use of resources and managing costs. You can begin a product cycle and track all costs while GLOVIA G2 provides you with total, enterprise-wide, real-time visibility into your project status.

Dedicated accounting tools help you avoid runaway costs and enable profitability whether you are managing a single project or a complex, multi-project program. You can also optimize the use of project resources, plan activities and tasks, synchronize dates and determine the impact changes will have on project completion and profitability.

CAPABILITIES AND BENEFITS INCLUDE:

- Report ETC and EAC by project and program at any point in time
- View costs by project and program regardless of fiscal period or by fiscal period for one or more projects
- Deploy project accounting for accurate visibility and control of project performance
- Control integrated project definitions for any type of project no matter how complex
- Enable seamless integration with Microsoft Project using a bi-directional interface, which helps you develop and analyze project plans, create reports and coordinate activities
- Apply data mining to find the detail needed to support all costs
- Apply multi-level planning tools including date synchronization, impact analysis, and simulation



DESIGN AND ENGINEERING

To remain competitive you need to synchronize your engineering, manufacturing, quality and materials teams, as well as your suppliers, with ever-changing product information. The need for excellence in managing change is brought to bear most in engineering, particularly in the design process. Decisions made in this phase affect every downstream process.

The rigidity of traditional systems makes it extremely difficult to configure products and manufacturing processes in an environment where all specifications and parameters are not fixed. A traditional, fixed BOM omits the fact that your projects have hard tangibles and both internal and external skills and services included in delivery. Though you routinely have large engineering items, possibly sub-assemblies with hefty lead times, that are best initiated independent of the other items on the bill that are as yet undefined, the traditional BOM does not allow for this either.

GLOVIA G2 generates a product structure that builds material and service resources progressively for the most efficient and effective planning. With progressive engineering, your planning is not tied up in engineering and you have much greater product flexibility.

GLOVIA G2 helps you manage your product design processes effectively, control costs, coordinate downstream activities, and deliver products on time and on budget. Our solution provides manufacturers with a centralized repository for all product-related data—including specifications, BOMs, routings and resource data, project and asset structures, as well as related documentation—to help speed new product development, compress time-to-market, reduce development costs and manage large product portfolios.

CAPABILITIES AND BENEFITS INCLUDE:

- Increase productivity and efficiency with progressive engineering cutting months out of lead times
- Define service items, including design engineering and product installation, with the same accuracy and precision as your material items and easily incorporate into a single project plan
- Employ the centralized, integrated product information repository that ensures quality and reduces costs
- Apply powerful estimating and simulation capabilities for fast, accurate sales quotes and bids
- Use Local Structures to reduce costs and risks of product and engineering changes
- Support design, engineering, manufacturing, post-sales service and financial accounting processes to provide you with total control of the entire product lifecycle

PLANNING AND CONTROLLING KEY RESOURCES

Material and resource management is highly critical in effective ETO/MTO manufacturing and is one of its biggest challenges. You must know at any given moment exactly what materials, resources and skills are needed, their availability, and exactly how much they will cost.

This crucial information, managed in the planning systems, can change at any time, even up to the day you ship the end product out the door.

The recording of any and all changes to the BOM is imperative. The impacts from these changes must be calculated and analyzed immediately. Unfortunately, in many manufacturing environments—particularly those that incorporate frequent changes into their processes—this vital need goes unmet. In even more cases, the information systems used to communicate with other departments are not updated. These lapses can produce havoc should a product failure occur at the customer site.

GLOVIA G2 provides a sophisticated set of planning tools for material-based, serviceonly, and service plus-material projects. Materials and related skills and services are integrated in local structures kept under an identifier—as opposed to the strict, materialcentric recording in traditional BOMs. Our comprehensive, enterprise-wide solution helps you manage suppliers, control inventory levels, and improve your supplier relationships without risking customer service.

The solution supports the entire procurement process including prioritizing approved suppliers and searching for and selecting new suppliers, developing and executing supplier contracts, managing purchase orders, and supporting outsourcing strategies. GLOVIA G2 balances purchases across multiple suppliers and tracks order status and supplier progress against contracts and sales orders. You get the right materials to the right place at the right time— at the right price while meeting all quality specifications.

CAPABILITIES AND BENEFITS INCLUDE:

- Coordinate the lead times of your suppliers with your manufacturing processes—including sub-assemblies and components—to maximize efficiency and responsiveness
- Enjoy total flexibility in supplier relationships—as manual or as automated as you need them to be
- Match supplies with demands, which helps you negotiate contracts with committed pricing but flexible delivery schedules
- Achieve complete visibility into materials and services as well as the flexibility to define and track both materials and locations, including full lot and serial number traceability
- Plan and re-plan activities and tasks, synchronize task and material/service delivery dates, and perform impact analysis and simulations to improve on-time completions
- Respond immediately and accurately with full visibility to any change to the product structure or project plan.



POST-SALES SERVICE AND SUPPORT

Products built by complex manufacturers are typically revenue-producing machines for their buyers. Your customers want to purchase a good piece of equipment, machine or system at a good price, but also need to know the nature, commitment, and tools that will be used to keep it in production.

Leading manufacturers stress initial product quality as well as responsive and flexible service capabilities for planned support and emergencies. Services can reap tremendous profit. The revenue from aftermarket service activities and field upgrades can equal several times the initial purchase price.

GLOVIA G2 not only helps you win new customers, it can turn your customer service operations into a competitive advantage as well as a lucrative source of revenue. With the CrescentOne solution, you manage all service processes in one integrated system and have total visibility into your activities, status and lifecycle costs.

GLOVIA G2's comprehensive functionality helps you manage all post-sales service activities cost-effectively—including call handling, service quotation, service order management, field service dispatching, installation management, preventative maintenance, service contract management, resource planning, warranty management and so on.

CrescentOne's solution helps you integrate the delivery of projects and products seamlessly and provides customers, service representatives, and field service personnel with real-time, web-based access to urgent and critical information. A "site register" with a dynamic, multi-level BOM, complete with effectivity, lot and serial number, goes live as soon as you install your product at a customer site. Your service technicians can ascertain the detailed history and company knowledge of an entire product and service relationship.

If you generate a product improvement, you can easily find all of the installations for that product and offer an upgrade accordingly.

CAPABILITIES AND BENEFITS INCLUDE:

- Plan and manage services just like materials
- Manage the delivery and procurement of services and monitor costs more efficiently
- Obtain visibility into both existing and planned field service engineer and material availability
- Plan and execute successful product installations by managing the coordination and delivery of materials, services and other resources including sub-contractors
- Respond promptly and profitably to customer needs for repair— manage the entire service and repair cycle
- Track direct and indirect time and costs of field service engineers to contract and project.



BUSINESS CHALLENGES & BENEFITS

Day and night, high-tech manufacturers confront important opportunities and high-pressure decisions that have direct and indirect consequences on their bottom line. GLOVIA G2 has innumerable strengths and advantages that automate and enhance the competencies you need to be as successful and profitable as possible:

- Project Management and Analysis
- Design and Engineering
- Factory Planning
- Planning And Controlling Key Resources
- Post-Sales Service and Support

Project Management & Analysis

The nature of managing any project is timely coordination of a series of complex, interrelated tasks often performed by a myriad of resources. Raise this to the level of the manufacture and installation of a complex piece of equipment or system and you have an enormous job on your hands. Add the fact that most ERP systems are built on a work-order model and you have a project manager's nightmare.

A well-designed project plan that provides visibility across the multiple activities and organizations involved in the development, production, and installation of a high-tech product is critical to successful, on-time, on budget completion.

GLOVIA G2 enables you to manage customer projects and contracts profitably by coordinating program resources and activities. Our end-to-end solution manages everything from defining the project and developing realistic estimates and bids to optimizing the use of resources and managing costs. You can begin a product cycle and track all costs while GLOVIA G2 provides you with total, enterprise-wide, real-time visibility into your project status.

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MANAGE

Manage All Requirements

Including data requirements as well as service and material

Manage All Changes

Full Configuration Management, from:

- **As-Designed** (to meet customer demand);
- **to As-Planned and As-Built** (which reflect the consistency between the demand and supply);
- **to As-Shipped** (ensuring that the correct product – down to lot and serial – is shipped);
- **through As-Installed** (which represents the BOM installed in the customer site register);
- **to As-Maintained** (to ensure that all changes to the As-Shipped/As-Installed are maintained by date, lot and serial)

Manage All Activities

Manage variables by way of Projects and Programs and Project/Program Reporting.

SUMMARY OF BENEFITS

Manage Engineering to Manufacturing Progressively

Define As-Designed/As Required using Progressive Engineering to increase efficiency and productivity.

Manage Customer Billing

Invoice customers using Progress Billing Triggers agreed to and pre-defined on award of contract.

Execute Impact Analysis

Immediately and accurately see changes required to demand/supply throughout the product structure and project plan.

Business Partnership

We know that high-tech manufacturers are not looking for a software supplier as much as a solution partner. From the start, we work to establish a partnership based on the ongoing value that we offer to your business. We provide one of the industry's lowest total costs of ownership.

One customer concluded that their CrescentOne investment was 1/10th what they would have paid for the same solution from another provider.

Professional Services

Our services professionals help you realize immediate and on-going value from your solution. We work closely with you to define your strategic plans, operational tactics, and business requirements. We then bring together an experienced team of professionals to deliver a complete business solution at exactly the pace you want, fully leveraging your existing investments so you gain tangible benefits right away. We come in, get you up and running—and in control.

ABOUT CrescentOne

CrescentOne is the leading supplier of ERP solutions for the discrete manufacturing industry. The GLOVIA G2 ERP platform offers complete solutions for automotive, capital equipment, electronics & electrical engineering, and the high-tech industry. Thanks to these extensive solutions, companies in the manufacturing industry can manage the entire life cycles of their products – from design, production and delivery to installation, maintenance and support and implement Industry 4.0 concepts and solutions.

As of September 2021 CrescentOne is part of FOG and the Constellation family. FOG is an independent operating group of Constellation Software Inc., (“CSI”) which is listed on the Toronto Stock Exchange [TSX:CSU]. CSI and FOG acquires, manages, and builds software companies in a variety of vertical markets. Constellation Software is an international provider of market-leading software and services to a number

of industries. Their mission is to acquire, manage and build market-leading software businesses that develop specialized, mission-critical software solutions to address the specific needs of the particular industries.

The company was founded in 1995 to assemble a portfolio of vertical market software companies that have the potential to be leaders in their particular market. Since then, they have grown rapidly through a combination of acquisitions and organic growth, and established a strong constellation of companies with a large, diverse customer base.

They have six operating groups which currently service customers in over 100 different markets worldwide. With headquarters in Toronto, Canada, and offices in North America, Europe, Australia, South America and Africa, they have over 25,000 employees generating consolidated revenues exceeding US \$4 billion.

CrescentOne

HQ global: Los Angeles, US

HQ EMEA: Eindhoven, the Netherlands

Solutions: Manufacturing ERP software and solutions for discrete manufacturers

Implementations: around 1,000 worldwide

Active member in innovative Industry 4.0 initiatives in the Benelux, such as Industry 4.0, Brainport Industries Campus (BIC), Factory of the future, Smart Connected Supplier Network (SCSN) and PXL Smart Factory (Diepenbeek, Belgium)

Constellation Software, Inc.

- 19.000 Employees
- 1.000+ Offices
- Headquarters in Toronto
- 125.000 Customer in 100+ countries
- 700+ Acquisitions since 1995
- \$ 4.5 Billion in revenue
- 20% 10 year CAGR (Compound Annual Growth Rate)



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