

Use Case: Automotive / Plant Construction

From Level to Level

Server-to-Server Solutions for Tier-1 and OEM Parity

VALIANT TMS

As a global supplier of intelligent automation systems, Valiant TMS plays a key role in international automotive plant engineering. Working on mission-critical projects for automotive OEMs around the world means data management and communication is essential to Valiant TMS – it must be accurate and tailored to each customer.

Traditional methods used to track progress throughout a project are inefficient and error prone. Standardization and information control through the COMAN data model within their server architecture allows Valiant TMS to serve their customers at the highest level.

Challenges

- Manual checklists require a lot of effort and are susceptible to errors
- Intense competition between suppliers in automotive plant construction
- Different naming conventions on different servers

Solutions

- Efficiency and clarity with digital data capture
- Benefit of standardizing on a tool that's being adopted by OEMs
- Software as a translator between databases

"Others knowing about our adherence to schedules (...) gives us clear advantages."

Robert Stadler, Group Manager Automation, Valiant TMS

Process Bundling

The construction and commissioning of an automotive production line requires seamless collaboration between many different parties; the OEM as the client, the contractors and numerous additional suppliers. Line builder Valiant TMS supplies automobile manufacturers around the world with exclusive body-in-white systems for their production lines. Valiant TMS takes responsibility for the planning, equipment manufacturing, shipping to the site, installation, setup and production launch support. The coordination, documentation and quality control of all these processes keep those responsible on task. To increase transparency, efficiency, and the degree of automation, analog processes were transformed into digital ones with the help of German project management software COMAN. The experts from Linz were ignoring well-established workflows in the name of innovation and improvement.

Analog Tools

How far are the pipe-fitters in section A? When can the electrician connect the robots? Valiant TMS know the pain associated with the digital gaps between the progress documentation and reality as implemented on-site. These struggles hinder construction site meetings which coordinate the next steps. Robert Stadler, Group Leader Automation at Valiant TMS in Linz, emphasizes the mountains of paperwork that is widespread on construction sites when he says: "In plant engineering, checklists are often found in paper form or on a wide variety of digital lists – this system is not only susceptible to errors, but also takes lots of time to process and maintain."

A large number of checklists are used to document project progress for from devices, welding process, electrical, pneumatics, and robot / PLC programming." For example, the team working on 'Robot 32' often documents their workflow on a paper checklist on-site and ticks off their progress," Valiant TMS commissioning setup engineer Peter Berninger explains. Potential problems become visible when the information recorded is manually transferred into the project data pool: dirty papers, illegible writing, lost logs or input errors. "The paperwork quickly piles up. 400 robots mean 400 pieces of paper," grins Stadler. "They are often casually used as notepaper."

Task	Remark	%	Prozentschritt der Station																
			5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%					
First commissioning	PARC	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Welding executed	Welding robot	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Commissioning screw gun	Screw gun robot	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Calibration	ROSC calibration	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Manual Functions	TTC calibration check	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Manual Functions	Manual function for teach panel	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Weld description	Welder and wire	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Commissioning technologies	Welding, reader, tool	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Program in headend and robot interface	Welding, reading, reading, etc.	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Weld gun qualification programmed	Welding, reading, reading, etc.	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Handshake PLC - Robot	IO between PLC and Robot tested	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Zones robot - robot	All zones between robots programmed and tested	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Mode 12	tested with 30%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Lead data calibration (P/paths)	done and saved on robot	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Weld gun calibration	Current and force	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
General readiness in auto	All necessary service routines are working in auto	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Commissioning errors	During automatic re-commissioning errors should be shown	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Final mode (EIB) done	Automatic tested in 30% self-past	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Automatic external	Automatic tested in 30% self-past	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
DCS - Auto lead to set up correctly	DCS set up in done	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Special functions	Maintenance, sleep position, FFS	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Press pack OK	no force should be put on the press pack, tests robot ok	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Status tracking checklist in Excel before COMAN

Inconsistent naming conventions impede the ability to provide an accurate overview of project progress. Back in 2017, when an employee first spoke about software that reliably depicts the entire project flow of a construction site in just one data model, with the flexibility to provide fully digital documentation, the automation specialist listened.

Digital Consistency

In 2017, Robert Stadler contacted the founders of COMAN Software, who had already invested more than eight years in the development of their construction site management software of the same name. They started with the aim of achieving data consistency on the construction site and thus real-time digital progress recording of all processes, with full transparency - "from delivery to mechanical and electrical assembly, robot programming and commissioning to final approval", says Stadler. The inclusion of different project participants by means of role and rights management, as well as the immediate synchronization of all the applications used, ensures that everyone involved can see the developments on the construction site that are important to them. Together with a major German OEM, Valiant TMS and COMAN Software set up a prototype that was a complete success and resulted in a close partnership. Valiant TMS benefits from the fact that numerous OEMs such as Volkswagen, Daimler, Porsche and BMW are already working systematically with the program. Stadler concretises: "They know the advantages of the software inside out and we also oblige our suppliers to use the tool. Adherence to deadlines and exact quantity structures provides security and give us an advantage over the competition."

- 4 **10RB_300 Roboter [100/100%]**
 - Roboter angeliefert (inkl. Schlauchpaket, RIP, POF-Repeater)
 - Roboter mechanisch montiert
 - Roboter Medien angeschlossen
 - Roboter elektrisch angeschlossen 400V, Systemkabel
 - Erstinbetriebnahmevoraussetzung geschaffen
 - Erst IBN durch Hersteller abgeschlossen
 - Grundinbetriebnahme durchgeführt (Bus, EA-Konfig, Justage)
 - Roboter gependelt (Lastdaten ermittelt)
 - Lastdaten i.O.
 - TCP Referenz mechanisch vorhanden (vor Programmierbeginn)
 - TCP Check Programm erstellt
 - Wartungsposition programmiert
 - Sonderprogramme erstellt und in Funktion
 - Roboter vermessen (kalibriert)
 - Programmierfreigabe von DAI
 - OLP eingespielt
 - OLP abgefahren
 - SPS Programm vorbereitet
 - Schnittstellentest Roboter/ SPS inkl. Verriegelungen
 - Stationsautomatik
 - Taktzeit 100% erreicht
 - Roboterdokumentation erstellt
 - Final Check Schlauchpaket

Object-based status tracking with COMAN

Server to Server

OEMs, plant manufacturers and suppliers need efficient and fact-based collaboration on the construction site. In the best-case scenario, all those involved use the same system for progress documentation and reporting. Two scenarios shape everyday life at Valiant TMS: "If an OEM also uses COMAN, the collaboration runs perfectly thanks to a common means of communication", explains Robert Stadler. Anyone who wants to fully exploit the potential of digital project management should have all facets of data consistency on their radar. For this purpose, chief

developer and COMAN managing director Sven Kägebein works in closely cooperation with Peter Berninger, who is the "software mastermind" at the line builder. Functionality that enables bidirectional digital synchronization of construction site progress between Valiant TMS and OEM servers is defined by the requirements of their partnership. "We work on our server and our customer on theirs", says Berninger about their use of COMAN. "To ensure that one database is updated using information from the other, we need schemes that define the time and frequency of the synchronization."

The forward-thinking plant manufacturers adapted the server synchronization to the cycles of their construction site meetings. A checked-off process in the program at Valiant TMS automatically results in a checked-off process in the OEM's tool; this also applies to delivery dates that change frequently. The transparency provided by the COMAN tool helps those responsible for construction site management, where configurations, assignments, and names of various users often differ. The construction site management software automatically translates released information into the naming conventions of the other party without revealing internal milestones and private notes. The entire team shares one common perspective, while each user remains in control of their respective systems. "With regards to establishing a connection with server synchronization between OEM and supplier databases, we were pioneers in setting up this functionality and data mapping – we were first to bring it to life," recalls Stadler.

Unification as a Virtue

COMAN takes on the role of the control centre, even if all participants are using different software platforms for scheduling and quantity planning. It interfaces with and



Robert Stadler (left) and Peter Berninger (right) work hand in hand, mostly with COMAN on their screens.

supports all commonly used software platforms and data formats ensuring that information flows to targeted elements in the project and into the data model on the customer server. COMAN translates the input, updates the inventory data and, using bidirectional synchronization, delivers analysis back to the suppliers' systems as status messages. "We encourage all parties to use the standardized version of COMAN, as we are convinced of its value and we like to promote transparency, standard documentation requirements and uniformity to our partners and customers," explains Robert Stadler.

Since the partnership began, ten extensive plant construction projects have been successfully completed. The team in Linz have used this knowledge to drive improvements to their own database through software configuration they have set up themselves. The team is confident that these tools will help them successfully manage evolving and complex customer requirements.

VALIANT TMS

Company: Valiant TMS
Global Headquarters: Windsor, Ontario, Canada
European Headquarters: Linz, Austria
Company size: 1,250 Employees

TMS Turnkey Manufacturing Solutions GmbH in Linz, Austria is just one of 20 sites in 14 countries that comprises Valiant TMS. As the Company's organizational nerve centre in Europe they design, build and integrate automated production systems and tooling, specifically equipment to produce automotive body-in-white substructures, super-structures, and the final body.





COMAN
SOFTWARE GMBH

Our project management software connects clients, project managers, employees and suppliers involved in the construction of industrial plants. All these parties can grasp and synchronise their status in real time. With this data continuity, all of them can see the same state of affairs, but the information is tailored to the rights and needs of each user. In this way, transparency is created and complexity reduced.

In addition to the visualisation of the complete construction site activities, all the project data is centralised, regardless of its source. COMAN defines the information and translates it for all parties. This creates standardisation and allows each step to be documented in an audit-proof manner.

The participants needn't change from their familiar software landscape and can even work remotely.

Our solutions originate from close cooperation with distinguished partners from the automotive environment. From the generic approach of many industry representatives, we generated a model that is simple to adapt to other industries. Because no matter where collaborative work is done: lost time, cost explosions and unproductive discussions are to be avoided.

As used by, among others:

SIEMENS



VALIANT TMS



thyssenkrupp

DAIMLER



KUKA



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