

PLM IT REPORT

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Sensata
Technologies

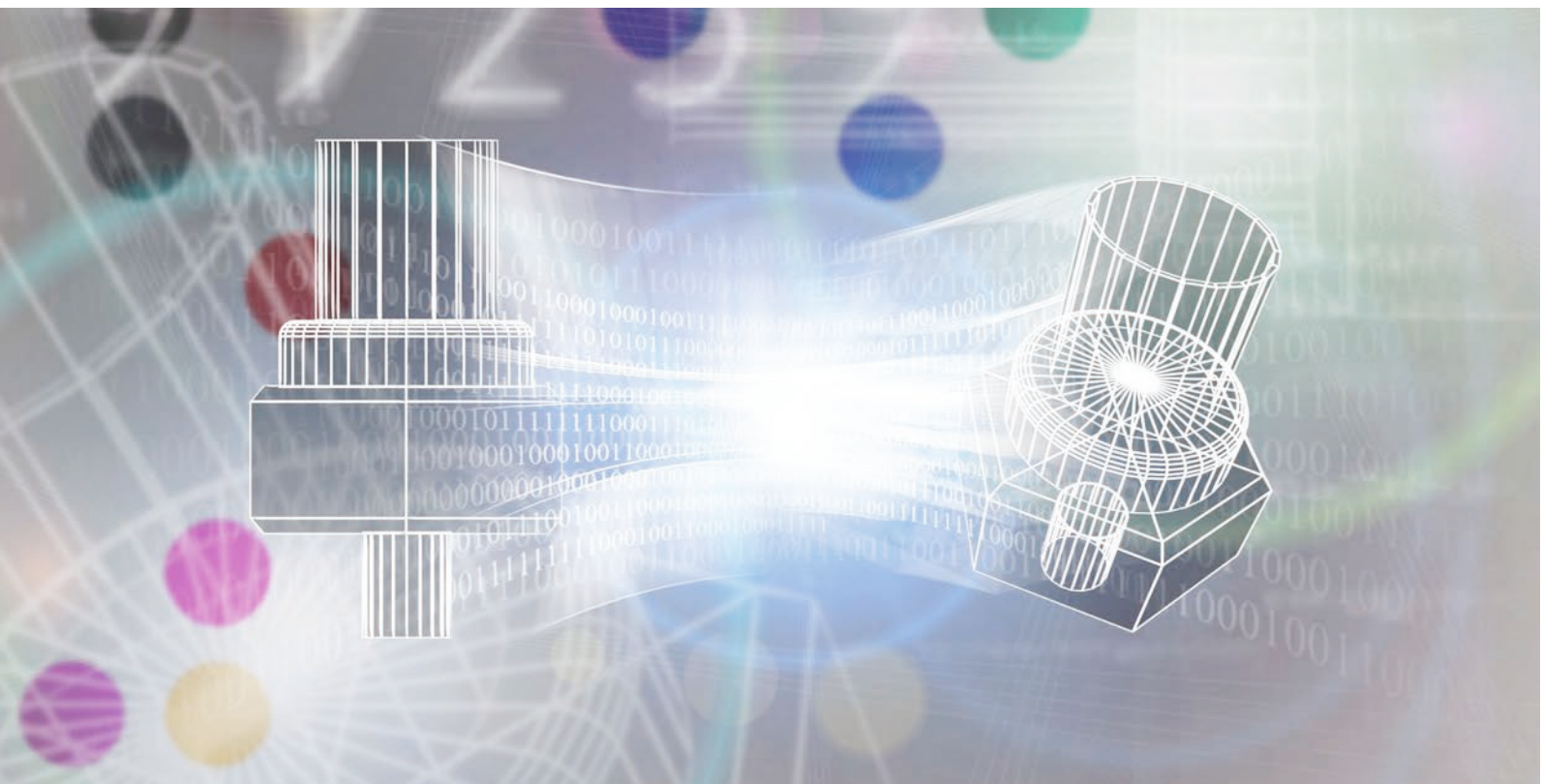


The changing world of sensors

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The changing world of sensors

Many automotive suppliers develop their products using the same CAD systems that their clients use. Sensor manufacturer Sensata Technologies spares itself having to maintain dozens of different CAD systems by having the 3D models and 2D drawings converted by PROSTEP. Ever since they adopted this approach, complaints have been few and far between, even though the expectations of the OEMs are increasing all the time.



Sensor manufacturer Sensata Technologies uses PROSTEP's service OpenDESC.com to convert CAD data.

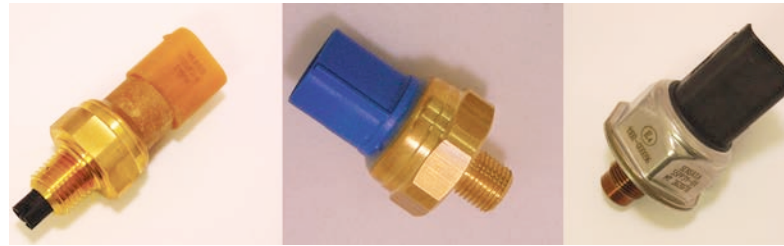
A normal mid-range car is fitted with around 50 different sensors, with this number growing every year. They provide greater driving safety, improve fuel consumption and make for a cleaner environment. One of the leading manufacturers of safety-critical sensors and controllers for the automotive industry as well as other industries such as the aircraft industry, shipbuilding, rolling stock, household equipment, air-conditioning technology, photovoltaics and mobile communications is Sensata Technologies. Headquartered in the USA, the global player has a workforce of some 17,000 and posted revenues of 2.4 billion dollars last year. They

are the world's leading manufacturer of pressure sensors. The growing demand for sensors and a number of strategic acquisitions have led to a period of extremely dynamic growth for Sensata over the past few years. The company's portfolio comprises 17,000 separate articles, 1.3 billion units of which are delivered each year. Sensata recently broke new ground when it developed an innovative pressure sensor designed to be fitted in the cylinder heads of combustion engines in order to optimize compression of the mixture. „The sensor is used in a closed loop combustion strategy; which enables to reduce the raw emissions and to control

engine torque," explains Henry Bouwhuis, supervisor of CAD Engineering at the Business Center in Almelo, the city in the Netherlands where the pressure sensors for the automotive and commercial vehicle sector are developed. Sensata has development and manufacturing facilities in 15 countries. The sensors for the automotive industry are generally custom-developed for a specific model or range of models. The varying installation constraints mean that there are a large number of design variants. The ability to develop these quickly gives the company an important competitive edge. The stringent documentation obligations vis-à-vis their clients pose a major challenge to product developers, since the sensors are used for safety-critical applications and are not permitted to fail.

Stringent documentation requirements

The requirements of automobile manufacturers and their major system suppliers in respect of product documentation have become far more stringent over the past years. „It used to be that we were allowed to supply the CAD data in neutral formats such as STEP," explains Bouwhuis. „Nowadays, when the product is released, most of the OEMs require us to supply not only the 3D models in native formats, but also geometry-associative 2D drawings structured according to their own guidelines." As a consequence, it is not possible to fully automate the process of converting the CAD data to the different customer formats. Sensors are mechatronic products in which the mechanical components play a major part in reliability. At Sensata, they are always designed using the 3D CAD system Solidworks, which is installed on some 100 workstations around the world, or which is available as a floating license. As Bouwhuis explains, the developers can provide their product geometry data in neutral formats during the early design phase in order to speed up the coordination process with the client. But the CAD data must be converted to Catia V5, NX or PTC Creo format upon release of the design at the latest. While their colleagues in the USA convert their own CAD data in house, the European Business Center has always used an outside service provider for data conversion. Nevertheless, they used to have to use their own specially trained staff to transfer the data into the clients' systems and portals. In order to reduce the costs associated with this, Sensata decided four years ago to switch partners and move to PROSTEP's conversion and transfer service OpenDESC.com. As Bouwhuis says, there are not many service providers around who are able to offer both services: „The experts at PROSTEP are familiar with the target systems used by the OEMs, along with their configurations and initial models, and are thoroughly familiar with how our clients need the CAD data to be conditioned. Even when we acquire new clients, we don't need to organize the data transfer process ourselves."



The sensors for the automotive industry are developed specifically for one range of models. The various installation constraints result in a large number of design variants.

Conversion of 2D drawings

Sergej Bondar, the OpenDESC manager responsible for Sensata, explains how the OpenDESC pipeline allows conversion of the 3D models to be largely automated. Even so, adapting the data to the OEM-specific stipulations still requires „manual" intervention from the conversion specialists, who may for instance have to define the relevant initial model or adapt the quality checking profile, depending on the needs of the recipient. They are also responsible for a visual inspection of the data to be converted, which can occasionally be errored in the source system, in which case it needs to be corrected before conversion. The association between the 3D models and the derived 2D drawings is lost during conversion. Because the OEMs are increasingly demanding associative drawings in native formats for documentation purposes, these associations have to be restored after conversion. The experts at PROSTEP have developed templates for the various target systems. These allow partial automation of the process of associating the model and the drawings. But, as Bondar says, „a certain amount of manual intervention is always needed." The users do not send their data directly to PROSTEP. Instead, they place them in a special transfer directory along with information on the intended recipient. The colleague who is responsible for data conversion then picks up the data and uploads it to the OpenDESC.com platform over an encrypted connection. This is where the data is then converted. For quality assurance purposes, the specialists at the Darmstadt-based system house then once again provide the customers with the drawings and models as 2D and 3D PDF documents. At the same time, the converted data is prepared for dispatch and placed on the platform in the CAD format required by the OEM so that it can be sent to the recipients automatically or made available for download once release has been granted. „As a rule, conversion takes no longer than two days," says Bouwhuis.

Growing number of conversion jobs

OpenDESC.com logs the data transfer process and informs senders whether their data has been delivered correctly. Once the data has been successfully



Sergej Bondar (PROSTEP), Henry Bouwhuis (Sensata); Dr. Josip Stjepandić (PROSTEP), left to right. Photo: Wendenburg

transferred to the OEM or the data transfer specialists have received an end-to-end response in the case of an OFTP transfer, they send a timestamped copy of the transferred data to the relevant member of staff at Sensata, who then imports the data into the Agile PDM system. This means that the sensor manufacturer can always provide evidence of what versions have been sent to the customer and when, independently of PROSTEP. Because sensors are not particularly large, the quantity of data to be converted is generally just a few megabytes. The number of conversion jobs, on the other hand, has risen constantly over the past few years, thanks to the growth of the company and the increasing number of development projects. Currently, the offices in the Netherlands, Belgium and France that actively use OpenDESC.com have the data for around 100 new sensors a year converted to the formats

required by the customers. Bouwhuis assumes that the number of conversion jobs will continue to rise as additional locations are integrated in the coming years. The most important advantage of the conversion and transfer service is that no errored data or data that does not meet the formal requirements of the OEM is sent to the client. „The quality of the data has improved considerably since we have been using OpenDESC.com. We can see this in the fact that we hardly ever have data returned by the customers,“ says Bouwhuis. There are two reasons for the improvement in data quality: On the one hand, the conversion team is thoroughly familiar with the requirements of the OEMs, and on the other, the data is subjected to quality assurance prior to conversion. If the data does not meet the quality requirements, the job is simply aborted and then restarted with the corrected data at no extra cost to Sensata. It is not possible to precisely quantify the cost savings to the sensor manufacturer that result from outsourcing this operation. If they wanted to convert and transfer the data themselves, the company would need at least one license for each CAD system and one member of staff familiar with each system. Not only that, trained staff would be needed to keep the IT system environment up to date, as Dr. Josip Stjepandic, Head of OpenDESC.com explains: „GM alone updated its CAD and PDM installation three times last year. Replicating this is a pretty complex task for an individual company, even if you know exactly what needs to be done. This means that it is not only less expensive, but also more reliable to outsource conversion and data transfer.“ -sg- Michael Wendenburg, Sevilla (www.wendenburg.net)

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