

# FROM DOCUMENT-CENTRIC TO MODEL-CENTRIC

[ Innovative Systems ]  
Plastic Omnium  
And Papyrus Create  
Reliable Products

## The Business

Plastic Omnium, through its Auto Inergy division, is the global market leader for fuel systems. For the past 10 years, the company has developed an onboard AdBlue storage and delivery system, which enables the use of Selective Catalytic Reduction (SCR), a key technology to reduce NOx emissions of diesel engines.

## The Challenge

To meet customers demand, Plastic Omnium must develop products that conform to safety standards and requirement tracking methodology (such as ISO26262 / ISO15504), starting from system design all the way through to a fully-fledged Autosar implementation.

## The Solution

Plastic Omnium decided changing from a document-centric to a model-centric methodology based on the industry-standard SysML modeling language and the open-source Papyrus tool. This is done to avoid vendor lock-in while remaining flexible in the face of potential upgrades and extensions to their development methodology.

## The Benefit

By applying model-driven solutions using Papyrus, Plastic Omnium is now able to more easily bridge the semantic and technological gaps that existed between the different stages of their system design process. It is now possible to provide complete traceability between requirements and code, thereby greatly facilitating the certification processes. By utilizing an open-source strategy for the tooling, Plastic Omnium is able to generate a highly-customized solution in a very agile manner.

# & The Business & The Challenge



« Products conforming to numerous environmental and safety standards »

*[In 2014, Plastic Omnium's 33 plants produced 18,4 million plastic fuel tank systems.]*  
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## The Business

**P**lastic Omnium Auto Inergy is the world-leading producer of blow-molded fuel systems. In 2014, its 33 plants produced 18,4 million plastic fuel tank systems, representing a 21% share of the overall world market.

In addition to fuel systems, Plastic Omnium is one of the main suppliers of anti-pollution systems that reduce the levels of nitrogen oxides in exhaust gases (Selective Catalytic Reduction). Plastic Omnium's products include fluids management functions such as filling, storage, venting, gauging, feeding, and control.

## The Challenge

**T**he products manufactured by Plastic Omnium are used to equip a large number and a wide variety of vehicles. This means that they must comply with numerous environmental norms and safety standards, such as ISO26262. The processes used to specify and validate these products must also be certified to be compliant with the ISO15504 standard for process evaluation.

To address such stringent quality and certification requirements, Plastic Omnium had been using a traditional document-based process, relying on commercial tools for requirements management and the generation of functional specifications that are passed on to their software and hardware components suppliers.

In the past, control software for a particular hardware component was provided by the supplier of the hardware component. However, the recent introduction of the model-based Autosar standard in the automotive industry has

led to a separation between software and hardware components.

This allows a given software component to support multiple functionally-compatible hardware components. But, it has also led to a separation of the software documentation from the hardware.

To ensure consistency between the two in a document-centric system required extensive manual intervention, which entailed significant maintenance overhead and had a resulting negative impact on both development and certification costs.

# The Solution

«From document to model»

[" In addition to reducing ambiguity, models can provide formal traceability links from high-level specifications. "]

THIBAUD THOMAS (SYSTEM ARCHITECT) - PLASTIC OMNIUM

**T**o overcome the aforementioned challenges, Plastic Omnium decided to migrate from their document-centric approach to a model-driven one, based on the industry-standard modeling language, SysML, and relying on the open-source Papyrus tool. This transition was performed in the context of a tightly-knit partnership between the methodology and tool teams of Plastic Omnium and the LISE team of the List Institute of CEA Tech, which provided its expertise

in model-driven development as well as its deep knowledge of the Papyrus tool.

The model-based approach allows a seamless process, starting from a combination of informal natural-language text and drawings to a semi-formal specification based on models. The models combine textual and graphical specifications with internal links between related elements, which

can be traversed automatically by software. This enables traceability across the entire development cycle from high-level specifications all the way through to the detailed Autosar software design. This greatly simplifies impact and coverage analyses during design. It also enables automatic generation of justifications for product and development process certifications.

[One in every five cars produced in the world is equipped by Plastic Omnium]

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# The Benefits

« Plastic Omnium is now able to easily bridge the gap between the different stages of their system design process. »

*[Reducing polluting emissions is a development issue for society and for the automotive industry.]*  
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[" The use of industry standards like SysML makes it easier to find and hire qualified staff with the requisite technical skills while also reducing training costs and time. "]

GUILLAUME ZELLER (CONTROLLED SYSTEMS DIRECTOR) - PO

**B**y applying model-driven solutions, Plastic Omnium is now able to more easily bridge the gap between the different stages of their system design process, thereby ensuring full traceability from requirements to code. This greatly simplifies the certification processes. Another

important benefit of using models, is that they can be formally analyzed to predict key characteristics of new design proposals, which can significantly reduce development time and effort. Relying on an open-source strategy for the

**About Plastic Omnium – Auto Inergy Division**  
**Web site :** <http://www.plasticomnium.com/en/automotive-equipment/auto-inergy-division.html>  
**Domain :** Automotive industry  
**Products :** Automotive Equipment (N°1 Worldwide in Fuel Tank Systems)  
**Employees :** 6 500 in 19 countries

tooling enabled Plastic Omnium to build, in a very agile manner, a solution that was highly customized to their specific needs. Moreover, the use of industry standards such as SysML makes it easier to find and hire qualified staff with the requisite technical skills while also reducing training costs and time. As a result, Plastic Omnium are much better positioned to cope with potential future changes in their methodology as well as to extend its scope to cover additional system concerns, such as dependability, product variants, or validation and verification.



## PAPYRUS CASE STUDY SERIES

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