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## Shaping the Future of Model-Based Engineering

*CEA-List and Obeo have initiated a collaboration to share their extensive, long-term experience in developing model-based software to serve a long-term vision for the web-based engineering tools of the future. The outcome will be multi-enterprise collaborative solutions, offering an augmented user experience and supporting emerging standards, like SysMLv2.*

In many industrial sectors, customers are requesting increasingly connected products. They also have rising expectations concerning safety, sustainability, and cost-effectiveness. Meeting these demands necessitates an exceptionally modular and multidisciplinary approach, resulting in high complexity.

For many years, model-based engineering, which leverages abstraction, computation and visualization, has demonstrated its ability to address this complexity. While many major companies in sectors like aerospace, defense, transportation, and finance have embraced this approach, obstacles still hinder its adoption in other domains, especially among smaller organizations.

In this context, CEA-List and Obeo have joined forces to collaborate on overcoming scientific and technological challenges of holistic engineering.

- **Augmented user experience:** Our goal is to offer disruptive user interfaces for multidisciplinary and collaborative engineering, bolstered by AI, simulation and digital twins.
- **Multi-enterprise collaboration:** We aim to enable multiple actors, spread across various companies and geographically distributed, working consistently and safely on large projects through a digital thread.

Specifically, CEA-List and Obeo advocate for a low-code approach that dramatically reduces the complexity of developing software modeling tools. Based on a generic technology that separates the technical and functional aspects, it allows the creators of such tools to significantly reduce the amount of code they need to write: instead of coding the whole tool, they describe the behavior and the look and feel, and delegate technical complexity to a low-code engine. This fosters innovation, enhances technical stability, and streamlines the maintenance and evolution of software modeling tools.

Utilizing this approach (with Eclipse Sirius Desktop and Eclipse Papyrus Relatives), both CEA-List and Obeo have extensive experience in developing engineering modeling tools, including Eclipse Capella, Obeo SmartEA, Nablabs, IS Designer, PooSL, Papyrus for Robotics, Papyrus for Manufacturing, and more.

In the short term, the collaboration is going to deliver a modernized version of the globally adopted UML product Papyrus, through a migration to Sirius Desktop. This transformation will dramatically reduce the number of Papyrus' specific lines of code, thus improving its maintenance and scalability.

In the medium term, CEA-List and Obeo aim to provide a new generation of open-source model-based solutions based on web technologies, including the development of web editors for Papyrus, as well as new generic and reusable services in Sirius Web to meet the needs of Papyrus.

In the long run, CEA-List and Obeo plan to implement a web-based version of the forthcoming systems engineering standard SysML v2. The outcome will be available in the open-source project SysON hosted by the Eclipse Foundation, and progressively integrated in Papyrus.

In parallel with these efforts, Obeo will develop a commercial offering to support professional adoption and large-scale collaborative usage of these new products and technologies, such as teams management, or role-based access control. Meanwhile CEA-List will drive research and development initiatives to generate collaborative innovation from international industrial and academic partners on topics such as AI for engineering, simulation, digital twins, multidisciplinary design, and graphical user interfaces.

Through this collaboration, CEA-List and Obeo pledge to establish open-source foundations for future engineering modeling platforms, incorporating UML, SysML, the upcoming SysML v2, and domain-specific languages (DSL).

## CEA-List

CEA-List, specialized in smart digital systems, is one of the specialized technological research institutes of CEA (French Alternative Energies and Atomic Energy Commission). It combines scientific excellence in high-tech fields like artificial intelligence, software design, simulation, cybersecurity, and quantum computing with tech transfer to companies and specialized on digital systems.

In particular, CEA-List actively contributes to the dissemination of model-based engineering approaches in the fields of robotics, automotive, railways, energy, industry of the future, and healthcare, providing tailored solutions for each of these domains and contributing to the formation of international ecosystems. CEA-List is a strategic member of the Eclipse Foundation, where it has been leading the Papyrus project for over 10 years, supporting international standards UML and SysML.

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## Obeo

Obeo is an independent software provider and a Strategic Member of the Eclipse Foundation. Obeo develops open-source technologies, such as Eclipse Sirius, enabling the creation of visual and collaborative modeling solutions to meet industrial requirements. Obeo serves over 60 organizations worldwide, spanning various domains including space, transportation, energy, healthcare, finance, and government.

Obeo's core business revolves around supporting these organizations in implementing these solutions, adapting them to specific contexts and needs, and even developing entirely customized solutions when necessary.

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