

Customer Case Study

- CNES in Toulouse has been using SEMIOS since 2017, has evaluated and customized it on dozens of requirement documents
- Acknowledged strengths: reliability of results and ease of use due to its integration with authoring tools (MS Word and IBM DOORS)
- In 2022, CNES will integrate SEMIOS into their technical writer's tool box
- For use on the fly while writing requirements, in addition to the use while reviewing them

ABOUT CNES

Created 60 years ago, the Centre National d'Etudes Spatiales (CNES) is the French Space Agency with the mission to drive France's space policy. Moreover, it is a great research center for innovation in its fields of intervention: launchers, scientific missions, Earth observation, telecommunications and defense.

CNES employs 2500 people among which 1500 are in Toulouse.

IDENTIFIED PROBLEMS, STEP BY STEP

1. With his partner ADS (Airbus Defense and Space): too much time has been spent in documentary review, back and forth dialogue for modifications and verifications, which leads to technical risks and bad quality in the phases downstream.

2. Following the definition of best practices (56 writing rules*) in 2016:
 - Very important number of flaws identified in the statement of requirements
 - Difficulty for the writer to master and apply these rules
3. In the search for an automated rule verification tool:
 - How to proceed for the tool to be perceived positively by the writer:
 - As a helping and not a "policing" tool
 - Efficient in its analysis
 - Easy to use
 - How to ensure interoperability with partners, alignment of practices

THE APPLIED SOLUTION

Since 2017, CNES Toulouse has chosen SEMIOS.AI for its artificial intelligence solution for all that produce requirements documents.

The SEMIOS solution is composed of:

- Its software suite performing automated analysis of requirements, acronyms and similarity, following quality standards such as IEEE, INCOSE, ARP, MIL-STD...
- Professional services like training, support and adaptation to specific needs

The software is installed in CNES' own hosting infrastructure. It is integrated with CNES authoring tools, i.e. Word or Excel on small projects and IBM DOORS on big projects.

Hundreds of documents have been analyzed per year. A collaborative and continuous effort between the SEMIOS.AI team and the Quality department of Nicolas Deslandres has been done, to:

- Fine-tune results, mostly with the help of a test dataset linked to the 56 writing rules*,
- Enhance SEMIOS and customize it with the addition to CNES' lexicon of 11,000 expressions and acronyms.



SEMIO.S STRENGTHS ACCORDING TO CNES

- **Reliability of alerts** with very few false positives, elevating the trust in the efficiency of its analysis
- **Alignment** with CNES **terminology** and with **quality standards**, facilitating comprehension by their partners
- Incitements to challenge the **domain engineering** by revealing, for example, ambiguities and incompleteness that lead to investigate and then clarify the expectations
- SEMIO.S' **ease of use on the fly**, in a timely manner during the authoring of specifications and not only during the review phases, essential to **empower writers** and help them identify the problems in the early stages of the process, before the reviews.

THE PERSPECTIVES

In 2022, CNES Toulouse will integrate SEMIO.S in the technical writer's tool box, with the objective of convincing all to take advantage of the requirements document's automated verification. A prerequisite is a series of trainings to requirements writing quality leveraging LCEE*.

Beyond this step, a possible perspective is the extension of SEMIO.S usage to other CNES sites and to operational procedures documents, addressed by SEMIO.S.AI since its creation in 2010.

« I have been convinced for a long time that requirements writing quality is a major factor of success in engineering projects. Semios contributes very largely to it by bringing this quality without restraining the writer's creativity. »

« SEMIO.S integration with our different requirements authoring tools brings a comfort of use essential to its adoption by the teams. »

« Reliability of the analysis findings, thanks to a collaborative work with the Semios.ai team, generates trust in the tool. The addition of CNES domain lexicon has been a great achievement. It is essential to insure the generalization and to achieve engagement of all users. »

« SEMIO.S analysis alerts open discussion on domain engineering problems. It really goes further than the writing problems. »

Nicolas DESLANDRES

in charge of Requirements Engineering Support for Orbital Systems at CNES Toulouse Spatial Center

(*) : To address the knowledge assimilation problem linked with the 56 writing rules, CNES launched in 2021, with help from a CNRS linguist, an Ergonomic Controlled Language for the writing of requirements (LCEE), in both English and French, gathering 23 recommendations and 37 pieces of advice..