

Ergonomic Controlled Natural Language for Requirement Writing

Extended Abstract

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1 Introduction

The importance of specifications (and particularly of the requirements that are part of them) for the success of large-scale projects is indeed widely acknowledged. Similarly the main risks associated with the use of natural language are relatively well identified: ambiguity, vagueness, incompleteness, ... In this context, we have developed a solution to be used by the engineers at CNES and based on a Controlled Natural Language (CNL) – i.e. a set of linguistic rules constraining the lexicon, the syntax and the semantics – that remains close enough to natural language. It relies on both a pragmatic approach (as it is based on previous rules or recommendations for technical writing; many of them were inspired from the *ASD Simplified Technical English* and in the *INCOSE Guide for Writing Requirements*, and some were defined by CNES and ADS engineers) and a linguistic analysis.

2 Methods

The developed solution combined both :

- A set of recommendations for writing better requirements, it's a CNL called LCEE (Langage Con and that is a subset of a natural language (in our case there's recommendations for French and English) that must be known to produce correct utterances. We wanted this controlled natural language to be ergonomic: it must be helpful, not unnecessarily constraining.
- A tool, SEMIOS, that is an AI solution (automatic natural language processing) from the market that performs semantic analysis of technical documents to improve their editorial quality. LCEE recommendations have been implemented in Semios to help CNES Engineers.
- A training for CNES Engineers

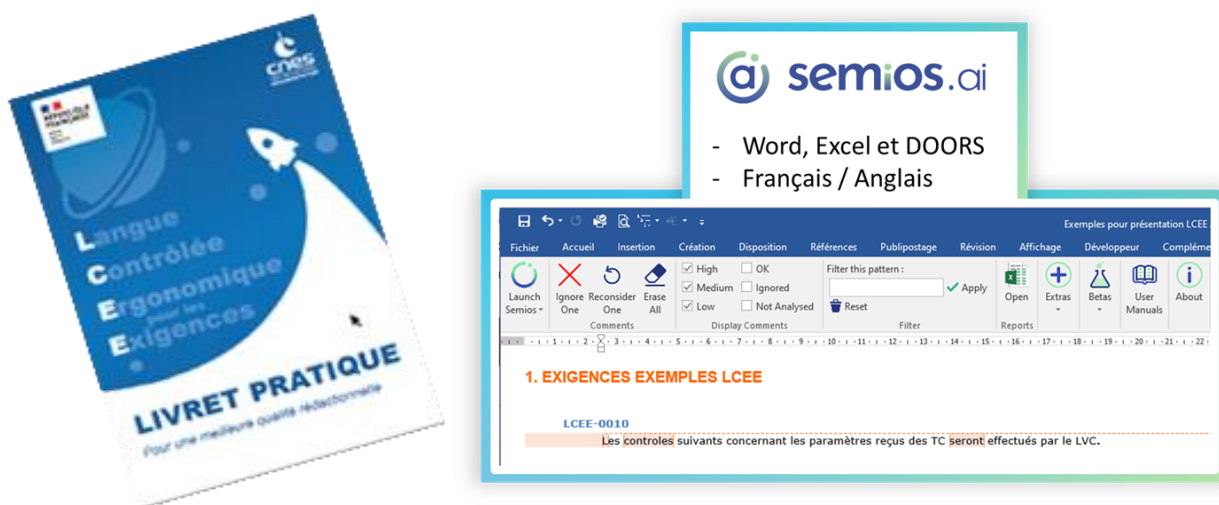


Figure 1: Figure caption

3 Results

1 pilot project, 5 space projects interested, 40 users trained in the use of LCEE and Semios, 80% of LCEE recommendations integrated into Semios, regular exchanges with the publisher leading to improvements in the Semios tool.

Project user feedback :

“Including LCEE in the editorial process (both in the writer's head and by using SEMIOS) brings strong added value. Over time, it becomes a reflex rather than an effort. You need to know how to compromise with the rules in order to adapt to your partners.

Progressive consideration of batches of rules can lead to greater team acceptance. We need to distinguish between the pedagogical progressiveness of LCEE via the proposed groups and the prioritization of their implementation.”

4 Discussion

The interest shown by the CNES engineering community in improving the quality of requirements writing is clear and that confirms our initial hypothesis. Now that the need for and quality of the LCEE solution have been recognized, we need to enter a wider deployment phase, with the help of internal CNES sponsors who can support its distribution to space project managers.

There are several ways of improving the current solution:

- LCEE recommendations: currently, they only concern the statement of requirements, but it is considered that they will be supplemented by recommendations on other requirement attributes (identifier, verification method, etc.) and/or by recommendations at specification level (consistency, completeness of a set of requirements), or even at requirements referential level.
- Continued implementation of recommendations in tooling
- Improved tooling: the editor is working on an AI functionality that will enable reformulation proposals to be made on the basis of alerts received on a given requirement.
- Improved training: an e-learning version can be proposed to be used for initial training or post-training reminders.

References

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