

# Industrial Workshop on Requirements for R & D in Requirements Engineering

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**Introduction.** This paper describes one of the activities of the Dependable Software Applications (DSA) sector at the Joint Research Centre in Italy. The activity is part of their support work to DGIII of the European Commission (EC). It reflects an aspect of DSA's continuous support process and mirrors our beliefs in the process of enhancing European industrial competitiveness by defining research needs based on technology observation. This presentation summarizes a report written for the EC describing industrial needs in Requirements Engineering as well as the mechanisms used to generate and validate the report. The report will be used by DGIII to define future research calls and for assessing research proposals in Requirements Engineering.

**Defining R & D Needs.** We briefly describe the industrially-driven workshop, used as the mechanism, for defining the industrial needs in RE. We outline the participant selection criteria, number of participants, their application domains, and their roles in those domains. We then discuss the seven domain areas identified by the industrial participants as requiring further research in Requirements Engineering: Requirement Elicitation, Requirements Specification, Requirements Management, Application Process, Requirements Validation and Verification, Process Improvement, and Framework Issues.

For each domain area the report provides the following elaboration:

- *Domain Description:* Description of the research area as defined by the industrial workshop participants
- *Rationale:* Identified problems in the area
- *Needs:* Research goals for the area addressing the identified problems
- *Drivers:* Industrial drivers are for these needs
- *Implementation mechanisms* What type of research and development is required to satisfy the needs
- *Success criteria:* How the research progress can be measured.
- *Downstream activities:* What other activities could be done upon completion of this research

This section concludes with the priority ratings assigned by the industrialists to each of the above research domains.

We then provide a description of the ways in which the DSA will promote industrial involvement in the Requirements Engineering domain and the perceived benefits to industrialists, researchers, and the EC research administration.

## SOFL: A Formal Engineering Methodology for Industrial Applications

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A major challenge for formal methods is to effectively address the needs of industry and achieve wide acceptance. This challenge remains unmet, as formal methods are difficult to use and their application consumes prohibitive amounts of resource. Much research on the integration of available formal methods (e.g. Z, VDM, B-Method) and either Structured Methodology or Object-Oriented Methodology has been conducted to make formal methods more practical, but with limited success. No attempt has yet been made to integrate the three approaches of formal methods, structured methodology and object-oriented methodology to take advantage of the desirable features of the three approaches.

As one approach to the solution of these problems, we propose a language called SOFL (Structured Object-Oriented Formal Language) for system development. It supports the concept that a system can be constructed using the structured methodology in the early stages of its development, and by using object-oriented methodology at later, more detailed levels. During the complete system development process, formal methods are applied in a manner that best uses their capabilities.