

Establishing a process for collaborative development of guidelines and standards

NIKOLAOS PARTARAKIS¹, CONSTANTINA DOULGERAKI¹, ALEXANDROS MOUROUZIS¹, DIMITRIS GRAMMENOS¹, CONSTANTINE STEPHANIDIS^{1,2}

¹ *Institute of Computer Science, Foundation for Research and Technology-Hellas, Greece*

² *Department of Computer Science, University of Crete*

e-mail: [\[partarak, cdoulger, mourouzi, gramenos, cs\]@ics.forth.gr](mailto:[partarak, cdoulger, mourouzi, gramenos, cs]@ics.forth.gr)

Abstract: Guidance and standardization are gaining increasing importance worldwide. This paper presents a generic approach for the *Collaborative Development of Guidelines and Standards* (CDGS), including their maintenance once published. This process has been elaborated in the context of a European project as a strategy for supporting the appropriate development of high quality guidelines and standards for VR technologies and applications. For the needs of the same project, this process will then be implemented in the form of an online collaborative tool. The paper starts with a brief analysis of background and related work. Then, it introduces the structures and the stakeholders involved in the CDGS Process. Additionally, it describes in detail the steps involved and the potential types of guidelines and standards-type documents that can be produced. Finally, the practical impact of this work is briefly discussed leading to specific needs and plans regarding future work.

1. Introduction

Guidelines and standards are gaining increasing importance worldwide. Guidelines, as directives to people in order to perform certain tasks effectively and efficiently, can help to provide a framework that can guide designers and developers towards making appropriate decisions. On the other hand, *standards*, as a stricter form of guidelines in terms of preparation, presentation and use, aim at transforming values criteria such as quality, ecology, safety, economy, reliability, compatibility, interoperability, efficiency

and effectiveness into real attributes of products and services that are manufactured, delivered, bought, used at work or home, or at play. In general, the role of guidelines can be multifold, including: (a) *raising awareness of new concepts*, (b) *assisting in design choices*, (c) *offering strategies for solving design and development problems*, and (d) *supporting evaluation*. On the other hand, standards and standards-type documents support (a) *facilitation of global trade*, (b) *improvement of quality, safety, security, environmental and consumer protection, as well as the rational use of natural resources*, and (c) *global dissemination of technologies and good practices*, all of which contribute to economic and social progress.

For many years guidelines and standards have constituted an inexpensive and widely used tool. However, despite the indisputable value and importance of such knowledge, several studies investigating the use of guidelines and standards by designers and developers (e.g., Wandke & Hüttner, 2001) have concluded that they are frequently ignored. This is partly attributed to the fact that such knowledge is not easily exploitable (Tetzlaff & Schwartz, 1991), and partly due to their incarnation medium (i.e., paper based-manuals) that usually raises issues of ineffectiveness and lack of user-friendliness (e.g. Bevan & Macleod, 1994; Grammenos, Akoumianakis & Stephanidis, 1999). These limitations in combination with the emerging need for interactive tools to support development activities, have given rise to a new generation of tools, which are usually referred to as *Tools for Working with Guidelines* (TFWWGs). As a TFWWG can be considered any interactive software application or service that offers support for the use and integration of guidelines-related knowledge at any stage of an IT product development life-cycle. In this direction, preliminary efforts were targeted to the integration of guidelines into hypertext-based tools, which allow software designers to access design guidelines organised either as a database or hypertext (e.g., Perlman, 1987; Vanderdonckt, 1995) or using a digital library that facilitates *design time assistance*, such as *i-dove* (Karampelas, Grammenos, Mourouzis & Stephanidis, 2003). Furthermore TFWWGs such as Sherlock (Grammenos, Akoumianakis & Stephanidis, 2000) were designed to assist the user interface usability inspection process and therefore provide active support to various phases of the development process.

Overall, R&D efforts in the field of TFWWGs have focused on the effective and efficient delivery of such knowledge to potentially interested parties, putting limited attention to the process of its development. For instance, guidelines and standards represent a level of know-how and technology which renders the inclusion of industry in its preparation cycle indispensable. To address such issues, this paper presents a generic approach for the *Collaborative Development of Guidelines and Standards* (CDGS), including their maintenance once published. This process has been elaborated in the context of the European Network of Excellence (NoE) *INTUITION* (see acknowledgments) as a strategy for supporting the appropriate development of high quality guidelines and standards for virtual reality (VR) technologies and applications. For the needs of the same project, this process will then be implemented in the form of an online collaborative tool. This paper describes in detail the proposed CDGS process, which at a later stage will be integrated in and supported by the tool in question. The structures and the stakeholders involved in the CDGS Process are introduced along with the steps involved and the potential types of guidelines and standards-type documents that can be produced. Finally, the practical impact of this work is briefly discussed leading to specific needs and plans regarding future work.

2. The CDGS Process

A thorough review was conducted into the processes followed by a number of international and established bodies (e.g., ISO, WSSN, AECMA-STAN, ANSI, ECSS, W3C) in order to derive the CDGS. The next two sections present the main terms of structures and stakeholders involved in the CDGS process as well as an overview of the overall procedure. Specific attentions has been paid in aligning the process with the available human resources within INTUITION consortium members (VR and guidelines experts), as well as through potential liaisons with external parties (user forum mainly industry driven) and experts (standardization bodies etc.).

2.1 Key stakeholders in the CDGS Process

As stakeholder is considered anyone involved in the preparation of a guidelines or standards-type document prior its final publication. In these terms, in the proposed process there are several stakeholders participating. In order to address the need of INTUITION NoE towards the cooperative development of guidelines and standard, the roles involved in the proposed approach are to be assigned to specific Intuition consortium members and a number of outsider parties (e.g., members of the INTUITION forum). The responsibilities and characteristics of each stakeholder involved are briefly analysed below.

Thematic Area Members (TAMs): Research and development of guidelines and standards over a large area, such as VR, can be organised into general *Thematic Areas* (TAs) in order to allow coherent coordination, planning and programming of all activities in the context of the CDGS Process. Thematic Area Members are persons or organisations with expertise or direct interest in a specific TA and who can potentially participate in new *CDGS Projects*¹. TAMs are also responsible for conducting, in a collaborative manner, analysis of the state of the art within the TA in question, and brainstorm ideas for *New Work Proposals*² (NWPs).

Thematic Area Coordinator (TAC): A TAC is assigned to each TA. This is a person or organisation delegated to moderate (invite, accept, etc.) the TAMs, as well as co-ordinate technically all CDGS Projects within the corresponding TA. Each of the established TAs shall be led by a TAC.

Originator: A person or organisation proposing the preparation of a new set of guidelines or standards (i.e., a new CDGS Project). This is achieved by means of editing and submitting a NWP to a relevant TA.

Editor: This is typically the same person or organisation with the Originator of a NWP and, upon the approval of the NWP, is responsible for drafting the new set of guidelines or a standard, i.e., for running a new CDGS Project and editing the corresponding *CDGS*

¹ *CDGS Project*: A project for the Collaborative Development of Guidelines / Standard.

² *New Work Proposal (NWP)*: Is an abstract document that specifies the objectives of a new *CDGS Project* suggesting potential authors for the corresponding *CDGS Report*.

*Report*³. To this end, the editor is also responsible for co-ordinating the work of all involved Authors (see below).

Authors: Upon approval of a NWP within a particular TA, the corresponding TAC specifies the team of experts (i.e., persons or organisations) who will participate to the new CDGS Project and shall contribute to the preparation of the corresponding CDGS Report in due time.

Board of Executives (BoE): A group of persons or organisations who are responsible for the operational work issues and general decision making with regards to the CDGS Process. The responsibilities of the BoE include:

- the overall management of the TAs structure (including the assignment and replacement of TACs)
- the establishment and dissolution of TAs
- the delineation of TAs' scope
- coordination issues

External Experts: Persons or organisations that are not Thematic Area Members with technical expertise related to the theme of a CDGS Project, who are willing to review and provide comments upon (draft versions of) the corresponding CDGS Report.

Interested Parties: Persons or organisations who represent the target market for CDGS Reports of a particular TA. Interested Parties are offered the right to vote and comment upon NWPs and (draft versions of) new CDGS Reports emerging from the corresponding TA.

Focal Points: Persons or organisations within a TA (i.e., TAMs), nominated by the corresponding TAC, to administrate and act as contact persons to the TA's Interested Parties.

Guidelines & Standardisation Specialists: Persons or organisations with expertise in procedural and normative matters. These people are mainly responsible for the quality of the CDGS Report delivered by Editors.

³ CDGS Report: This is the main outcome of a CDGS Project, i.e., a collection of guidelines **or** (a set of recommendations for) a standard.

2.2 Overview of the CDGS Process

This section provides a brief overview of steps involved in the CDGS process (see [Figure 1](#)):

1. **Brainstorming.** During this first phase⁴ of the CDGS Process, the members of a TA (i.e., the TAMs) participate to special interest discussions that focus on reviewing the state of the art within the corresponding TA (in terms of requirements for guidelines and/ or standards) and thereby brainstorm ideas for new proposals (i.e., NWPs).
2. **New Proposal Preparation.** Once a new concept for a CDGS Project has been formed by an Originator, the preparation of the corresponding NWP is initiated:
 - a. First, the Originator drafts a NWP (see footnote 2) and submits it to the TAC of a relevant TA. The NWP must specify the Editor and the Author(s) for the new CDGS Project.
 - b. Then, the NWP is assessed by the corresponding TAC and BoE.
 - c. Finally, upon approval by the corresponding TAC, the NWP is also assessed by Interested Parties⁵.
3. **New Project Set-up.** Upon approval of a NWP by the Interested Parties, the TAC announces the launch of new CDGS Project. At this phase, the Editor, in communication with the Authors, formulate an appropriate work plan (i.e., tasks, deliverables and deadlines).
4. **Development of Working Draft (WD).** The Editor along with Authors develop and submit for review, the first draft of the CDGS Report, namely the *Working Draft* (WD).
5. **Development of Consensus Draft (CD).** The WD undergoes a review by External Experts, Guidelines & Standardisation Specialists and the relevant TAC. The comments of these people are then addressed, leading (through a number of iterations) to the *Consensus Draft* (CD).

⁴ The Brainstorming phase is launched upon the generation of a new TA and ends upon withdrawal of the TA in question.

⁵ This is introduced to ensure the commercial usefulness of the proposed project

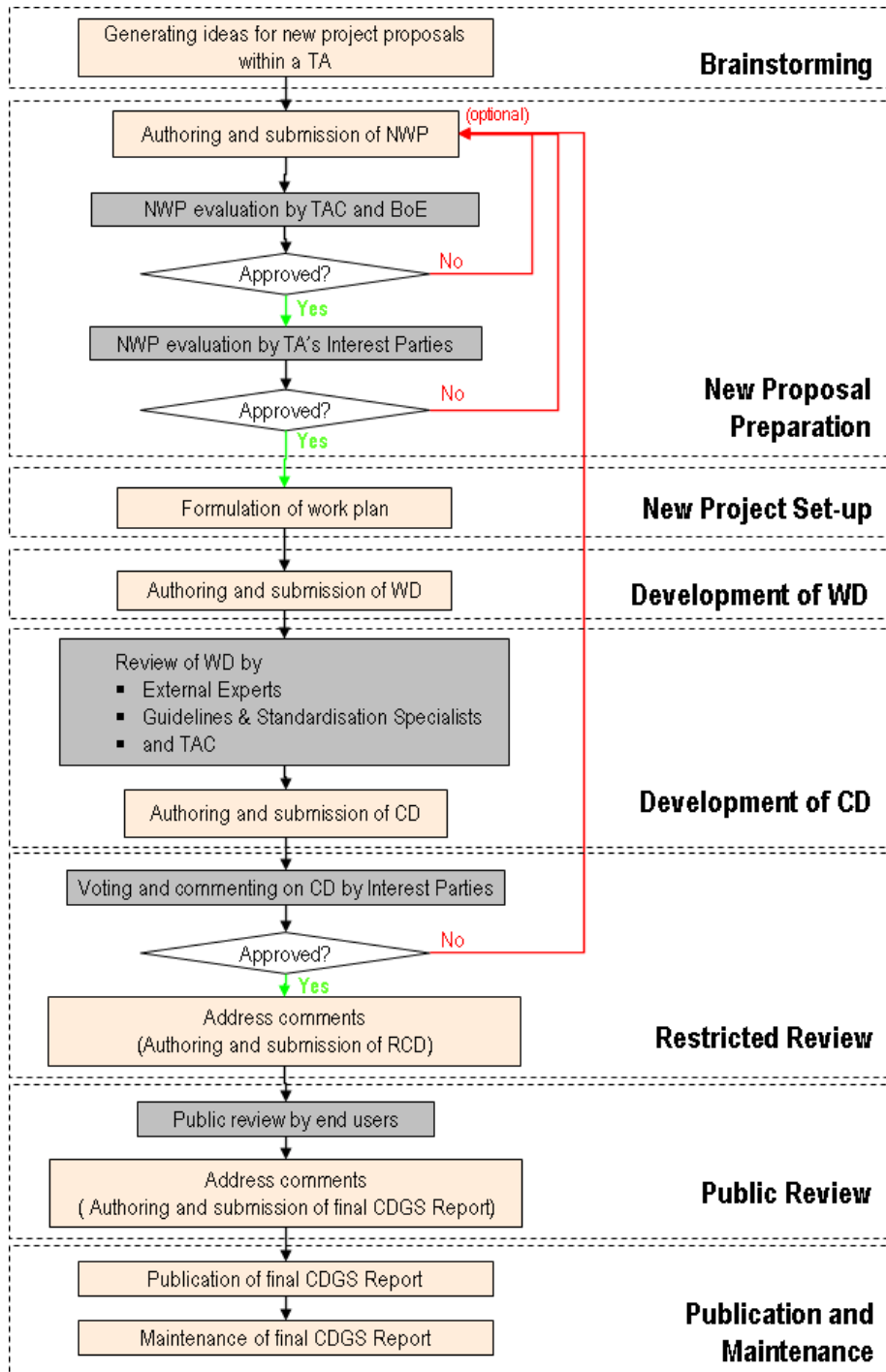


Figure 1: Overview of the CDGS Process

6. **Restricted Review.** The CD is put to the ballot among Interest Parties gathering their comments. The outcome of this phase is the *Revised Consensus Draft* (RCD).

7. **Public Review.** The RCD is made publicly available (e.g., to industrial users) for gathering further comments and proceed to the creation of the *Final CDGS Report*.
8. **Publication and Maintenance.** This is the final stage of the CDGS Process. Publication is concerned with making the Final CDGS Report available for public use, and -if appropriate- submitting it to external standardisation body-ies. At this stage, only minor editorial changes, if and where necessary, are introduced into the final text. On the other hand, maintenance is concerned with keeping a Final CDGS Report up-to-date. A published Final CDGS Report should not be considered to be closed in terms of content and applicability, as guidelines and standards in the field of computer science, and especially in VR, are often revised in order to address new needs or are withdrawn as not applicable. To this end, Final CDGS Reports should be often re-evaluated (e.g., annually). Depending on the results of (annual) evaluations, one of the following processes can be initiated:
 - a. *Collaborative Revision of Guidelines and Standards (CRGS).* This process aims at revising rather than developing a CDGS Report and is very similar to the CDGS Process.
 - b. *Withdrawal.* This involves archiving and removing the Report from public view / use.

Guidelines- and standards-type documents produced by means of the CDGS process are developed according to strict rules to ensure that they are transparent and fair. The reverse side of the coin is that it can take time to develop consensus among the interested parties and for the resulting agreement to go through the public review process. For some users of such documents, particularly those working in fast-changing technology sectors, it may be more important to agree on a technical specification and publish it quickly, before going through the various checks and balances needed to win the status of a fully reviewed document. Therefore, to meet such needs, a range of different "deliverables", or different categories of specifications, are proposed allowing publication at an intermediate stage of development before full consensus:

- Publicly Available Specification (PAS). A normative document representing the consensus within a working group. Such documents can be the alternative outcome of the “Development of WD” stage.
- Technical Specification (TS). A normative document representing the technical consensus within an INTUITION committee. Such documents can be the alternative outcome of the “Development of CD” stage.
- Technical Report (TR). An informative document containing information of a different kind from that normally published in a normative document. Such documents can be the alternative outcome of the “New Proposal Preparation” stage.
- International Workshop Agreement (IWA). Essentially this will be through an open workshop mechanism whereby market players will be able to negotiate in a workshop setting the contents of particular normative documents. Such documents can be the alternative outcome of the “Brainstorming” stage.

3. Future work

We have briefly described a generic process for *Collaborative Development of Guidelines and Standards* (CDGS), furthermore the main terms of stakeholders involved in the CDGS Process. The presented process will be appropriately supported by an interactive tool which will also be developed in the context of the INTUITION NoE.

In this context, ongoing and future work includes:

- Developing and launching version 1.0 of the support tool (including the end-user functionality and interface).
- Setting-up the necessary expert groups and working teams in order to initiate the process of collaborative development of guidelines and standards.
- Launching the first call of proposals for new CDGS Projects (suggesting potential authors for the corresponding CDGS Reports), submission of proposals, and notification of acceptance.

- Launching a number of “group projects” that will lead to concrete sets of guidelines and/or recommendations for standards.

Acknowledgements

The INTUITION project (IST-NMP-1-507248-2) is partly funded by the Information Society Technologies Programme of the European Commission – DG information Society.

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