

STANDING ON THE SHOULDERS OF VIM

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Abstract – The paper notes the publication of the new edition of the International Vocabulary of Metrology as a significant step in Measurement Science. It argues that vocabularies must evolve with technical progress and with changes in society and economy. It proposes an agenda of future development of concepts and vocabulary in measurement and instrumentation. The main drivers of advance are seen to be the widening and diversification of the applications of measurement and the convergence of measurement and instrumentation and other aspects of information technology. The paper outlines some aspects of the methodology of vocabulary development.

Keywords: Vocabulary, Measurement Science, Instrument Science.

1. INTRODUCTION

This paper is a concise contribution to a discussion of the new edition of the International Vocabulary of Metrology [1].

It welcomes the new edition as a valuable achievement, which marks an important stage in the development of the science of measurement. It recognises the importance of international standards and the accepts the methodology that has been developed to achieve it. It leaves detailed critiques to other contributors.

However, measurement is progressing and diversifying in its capabilities and its applications. So is the technology of the instruments by which measurement is performed. With these developments new concepts will be formed and with them there will be changes of vocabulary. To be successful VIM must be used as a point of departure for new advances, rather than as a constraint to thought. The present paper is an outline of a vision of new developments of concepts and vocabulary in measurement and instrumentation. By standing on the shoulders of VIM it should be possible to see beyond the present vocabulary. For the origin and history of the metaphor see [2]

2. EVOLUTIONARY DEVELOPMENT OF VOCABULARY

2.1 General

While it is recognised that the standard international vocabulary should be used whenever agreed standard terminology is required, it should not be imposed as a restraint on fundamental discussions of concepts and principles of measurement and instrumentation.

The present system of establishing an international standard vocabulary should be supplemented by international learned society activities, aimed at debating

candidate concepts and terminology and arriving at a broad scientific consensus.

2.2 Historical

Two examples may be usefully cited of the historical development of vocabulary in the field of measurement and instrumentation with scientific and technical progress.

The first is in the definition of measurement. It is not practical to discuss the historical development of the definition of measurement, even in outline. There is an extensive literature on the topic [3-5] with a summary given in [6]. The essence is that restrictive definitions of measurement, based on the paradigm of the physical sciences had to yield to wider concepts by the requirements of measurement in psychological, social and like fields of enquiry.[7]

The other is the development of the word instrument from its original meaning of tool or implement, through the notion of a philosophical instrument, then scientific instrument, to its present technical use. For the history of the terms instrument and instrumentation see [8]. For an analysis of the new technical use see [9].

2.3 Prospective lines of advance

Two prospective lines of advance of the general concepts and principles of measurement and instruments can be identified. They will demand the development of appropriate vocabulary.

The first is the continuing expansion of measurement in the wide sense to all domains of human knowledge and discourse. Application of measurement to social and psychological measurement and to diverse like applications uses concepts and terminology that are different from those in the physical sciences and which are the paradigm of measurement in the strict sense. There is a need for the development of a unified measurement science, with concepts and terminology that are appropriate to all applications. VIM has already made an advance in that direction. There is a need to continue that trend and to push it forward vigorously.[7, 10]

The second line of advance will be driven by the fact that there is a convergence between the technology of measurement instrumentation and that of information technology. The basic concepts and principles of measurement, communication, computing and control are forming an integrated discipline and this will lead to integration of vocabularies.[11]

3. METHODOLOGY

3.1 Conceptual analysis

The evolution of new terminology must be based on new analysis of concepts and principles. The view of this author on the directions of advance which this should take are given in [11].

3.2 Scholarly apparatus

Vocabularies and papers analysing concepts are generally stipulative and normative in orientation. They do not in general, adequately discuss alternative concepts, historical developments, or support their view by critique of alternatives. This is certainly true of VIM.

It is suggested that future vocabularies, or papers analysing concepts and proposing terminology, be provided with a scholarly apparatus of references and a critical review of the field.

3.3 Linguistic considerations

One of the features of VIM is that it is a bilingual vocabulary, compiled in both English and French. A vocabulary that has to satisfy the requirements of two languages is difficult to compile.

It is not proposed here to argue the extreme view that the use of a language wholly constraints thought, but language does shape thought. Without being able to review adequately the relevant literature it is useful to refer here to two general works that provide background to the problems of multilingual vocabularies [12, 13].

It is therefore recommended that the development of vocabularies be undertaken in a single language. Given the centrality of English as a tool of science, it is that language which is proposed as the vehicle for the development of metrological vocabularies.

However, it must be recognised that languages other than English may have a major contribution to global science. This is apart from the natural wish of most peoples to preserve, develop and advance their language.

To give an example, the German language has, as a result of the nature of German engineering education, developed a powerful arsenal of concepts of design concepts and a corresponding vocabulary. The work of Pahl and Beitz [14] contributed greatly to design studies. Its translation into English [15] has been a significant contribution to English language thought on the topic.

Thus development of concepts in one language may drive thoughts in another.

3.4 Mechanism of development

The Internet offers convenient ways in which discussions on terminology may be conducted.

It may be possible to organise discussions either by Internet forum, or Web conferencing.

4. CONCLUSIONS

The new edition of VIM should be accepted as a starting point of international learned society activities to

promote further development of the concepts and vocabulary of measurement and instrumentation.

The developments should be evolutionary and there should be no normative constraints on the development of concepts and vocabulary.

Tentative proposals are made for lines of development. It is recommended that the unification of concepts and language across the increasingly extending and diversifying applications of measurement be given special attention. The other lines of development recommended is the integration of concepts and vocabulary of measurement and instrumentation and those of other domains of information and systems.

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