

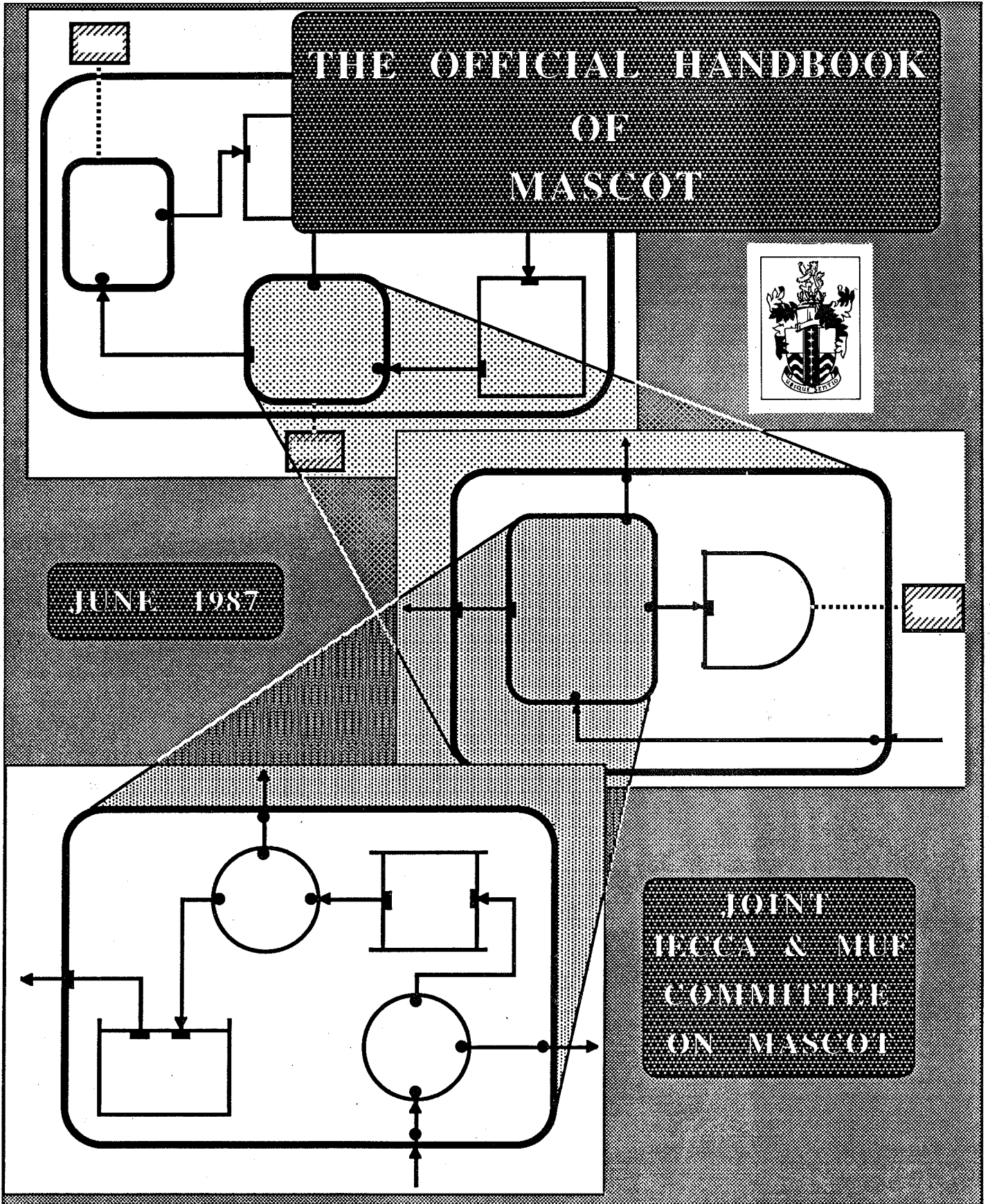
UNLIMITED

THE OFFICIAL HANDBOOK OF MASCOT



JUNE 1987

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ON MASCOT





THE OFFICIAL HANDBOOK OF MASCOT

VERSION 3.1

ISSUE 1

JUNE 1987



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1. The first part of the document discusses the importance of maintaining accurate records.

2. It then goes on to describe the various methods used to collect and analyze data.

3. The results of the study are presented in the following table:

Year	Value
1990	100
1991	110
1992	120
1993	130
1994	140
1995	150
1996	160
1997	170
1998	180
1999	190
2000	200

4. The data shows a steady increase in the value over the period from 1990 to 2000.

5. This increase is attributed to several factors, including improved technology and increased investment.

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AUTHOR'S PREFACE

'Lastly, I stand ready with a pencil in one hand, and a sponge in the other, to add, alter, insert, expunge, enlarge and delete, according to better information. And if these my pains shall be found worthy to pass a second impression, my faults I will confess with shame, and amend with thankfulness to such as will contribute clearer intelligence unto me'

Preface to 'The History of the Worthies of England'

Thomas Fuller (1662)

Such, as technical author of the Official Handbook of Mascot Version 3.1, has been my attitude over the past two and a half years to the scientific worthies of the Mascot 3 Definition Team; albeit my pencil and sponge are of an electronic variety. Some sections of the handbook, having stimulated particular controversy among the Team or having been more than normally misunderstood by me or having been especially savaged by the pre-publication reviewers, have been 'found worthy' of a whole long series of impressions. But it has all been well worth the effort from my point of view. When, in 1984, I commenced work as a freelance lecturer and writer, I could hardly have expected the good fortune of becoming involved in such a stimulating and rewarding project. I am grateful to all concerned.

I would like to express my thanks, first of all, to the Royal Signals and Radar Establishment for financing the task of writing the Handbook. My gratitude is specially due to Ken Hayter and Keith Oliver who shared the job of Technical Authority for the project. I would also like to thank the Royal Military College of Science, and particularly Tony Sammes as head of the Computing Science Group, for performing project administration. To the members of JIMCOM I am greatly obliged for their faith in ratifying my original appointment as author and for their forbearance in accepting a series of revised target completion dates which seemed at times to be diverging to infinity. I would like to thank all those who, in the course of the limited public review of the draft Handbook, provided helpful comments leading to clearer exposition and pointed out many typographic, grammatic and orthographic errors.

Finally, to the members of the Definition Team itself and especially to Hugo Simpson, Ken Jackson, Tony Riddiough and Bill Taylor, I owe an immense debt of gratitude. Throughout my period of involvement in the work, they have striven to communicate their ideas to me and to correct my misconceptions with unflinching patience. While rightly insisting that the concepts of Mascot 3 be presented to the world with technical accuracy and appropriate relative emphasis, they have allowed me to take full responsibility in matters of presentation and have tolerated my occasional stylistic idiosyncrasy with commendable resignation.

George Bate

Wantage, May 1987

PREFACE

The development of complex, computer based systems poses major problems to the people involved. These problems encompass both managerial aspects, concerned with control of the overall development, and technical aspects concerned with the interaction of the individually designed components of the system. Mascot offers a wide-ranging and homogeneous approach to the development of such systems. It provides significant contributions to the solution of both managerial and technical problems.

Historical Background

Mascot was originated by Ken Jackson and Hugo Simpson over the period 1971 to 1975. After the initial implementation work was completed, the Royal Signals and Radar Establishment (RSRE) formed the Mascot Suppliers Association (MSA) in order to effect the transfer of Mascot technology into industry. The MSA, which consisted of individuals from several companies and MOD establishments, produced, in 1978, an 'Official Definition of Mascot'. This document described what came to be known, retrospectively, as Mascot 1 and provided a definitive reference for implementors and teachers of Mascot while ideas and methods continued to evolve.

In 1980 a sub-committee of the MSA, drawing its membership from the following:

- Admiralty Surface Weapons Establishment
- Royal Military College of Science
- Royal Signals and Radar Establishment
- Computer Analysts and Programmers (Reading) Ltd
- Ferranti Computer Systems Ltd
- GEC Computers Ltd
- Software Sciences Ltd
- Systems Designers Ltd

drafted a much more comprehensive presentation of the Mascot concepts as 'The Official Handbook of Mascot'. This handbook, which was reissued in 1983, constitutes the standard reference for Mascot 2 and has received an extensive distribution. A companion volume to the 1983 issue, 'Additional Features to Integrate Mascot with Coral 66', provides a formal syntactic description of a set of extensions to the MOD standard programming language which make it a suitable vehicle for Mascot applications. This language was named AF Coral 2.

The drafting of these documents was one of the last actions of the MSA before it was disbanded, having achieved its major objectives. Responsibility for maintaining the Mascot standard, in so far as it is intended

for use in government projects, was taken over by the Inter Establishment Committee on Computer Applications (IECCA). A joint committee of the MOD and the DoI, IECCA is composed wholly of official representatives. In order that the liaison with industry and the computing community generally, so successfully initiated by the MSA, could be maintained and extended, another organisation, the Mascot Users' Forum (MUF), was set up in 1980. Informal symposia, open to all actual and potential Mascot users, suppliers and supporters, are arranged by the MUF and some 80 official, industrial and academic bodies have been represented.

To provide a convenient basis for the continued technical development of Mascot, IECCA and the MUF formed, in 1981, the Joint IECCA and MUF Committee on Mascot (JIMCOM). It is under the aegis of JIMCOM that the work on Mascot 3, the subject of this present version of the Official Handbook, has been carried out. This new Mascot definition has been developed by a team in which the following have been principal contributors:

Lawrence Collingbourne (Systems Designers plc)
Gerry Docherty (YARD Ltd)
Giles Forster (MOD -EQC)
Ken Jackson (Systems Designers plc)
Tony Riddiough (Software Sciences Ltd)
Hugo Simpson (British Aerospace plc)
Bill Taylor (Ferranti Computer Systems Ltd)

The enormous contribution of George Bate who was the technical author responsible for translating the ideas from the development team into a consistent, coherent text is gratefully acknowledged. Acknowledgement is also due for the support of RSRE. Finally the contribution of the people who commented on the draft versions of the Handbook is gratefully acknowledged.

Handbook Organisation and Conventions

This Handbook has been written principally for the benefit of users and potential users of Mascot. The presentation is therefore broadly tutorial. However, within this general approach an attempt has been made to be as helpful as possible both to the implementors of Mascot and to those concerned with assessing and evaluating the resulting implementations. There are three major sections. The first of these is introductory, providing the background to the present stage of Mascot development and presenting, in an informal manner, the main innovations of Mascot 3. Then follows the Official Definition which is the essential core of the book. It contains both descriptive passages suitable for those requiring an overall understanding of the ideas and rather more formal material intended to be used for reference purposes. Finally, there is a section devoted to guidance in the use of Mascot. It is of course only through practical experience that the optimum application of the Mascot 3 features will emerge but the advice given here reflects the rationale upon which they have been devised.

The new concepts which this handbook introduces into the Mascot philosophy demand an extended technical vocabulary for their description. Devising acceptable and consistent terminology has not proved easy. There are a limited number of possible words available (if we reject the idea of coining entirely new ones) and they are all inseparable from their existing associations in both technical and everyday usage. The importance of the glossary which appears at the end of the handbook can, therefore, hardly be emphasised too strongly. It contains definitions of all the Mascot technical terms. In order that the reader will be aware that a word is being employed in a precise sense, all such instances are signalled throughout the Definition by the use of **bold type**. This will help to make more comprehensible those passages in which technical terms have had to be used before being fully explained in the text. It will be advisable, even for those already familiar with earlier versions of Mascot, to consult the glossary regularly while reading through the handbook for the first time.

The only other typographical convention is the use of ***bold italic*** for text which would otherwise need to be in quotation marks. Examples include identifiers used in sample program fragments and names invented for the syntactic elements of the design representation language.

Mascot designs have two parallel forms of representation: graphical and textual. The former presents no problem here. Its conventions are well defined and are summarised in an appendix. There is no barrier to their standard use in all Mascot applications. The textual form, however, does raise difficulties. The Mascot tradition of programming language independence is retained in Mascot 3 even though, for many, the choice in the past has been 'any language provided it is Coral' and in the future will presumably be 'any language as long as it is Ada*'. Neither of these languages is ideal as a vehicle for expressing the textual form of the Mascot design representation though either will serve in practical use.

The solution adopted has been to invent a design representation language to fulfil a twofold purpose. First, it serves here to define and explain the design constructs in a rigorous and consistent manner and can be used for a similar purpose in future publications. Second, it is proposed as the notation in terms of which practical Mascot 3 designs will actually be devised and communicated. While it is very desirable that some automatic means of translation, such as a pre-processor, should be made available for mapping these designs into particular programming languages, there is no implication that this is an essential prerequisite to the use of Mascot. Experienced programmers have long recognised that the language 'in which they program' need not be the (more or less inadequate) implementation language which has to be used for other, often non-technical, reasons. The same considerations apply here and the sole criterion must be, as in the past, that the concepts described in the Mascot Definition are capable of being expressed in the chosen implementation language.

The design representation language is broadly Pascal-like in that, where a suitable Pascal convention exists, it has been adopted. This choice was made partly on the grounds that Pascal is widely familiar to the international computing community and partly because of its use as the base language in the

development of the NATO preferred programming language, Ada^{*}. The syntax of the language itself has been defined by means of the type of syntax diagrams first employed by Wirth to describe Pascal. The author's experience of teaching programming languages at a variety of levels has produced a strong conviction that such diagrams provide the best available means of combining rigour with comprehensibility. A complete set is presented, for ease of reference, in appendix A which also presents the syntax in BNF together with an index to the Handbook itself. Where differences occur between the syntax diagrams used in the text and the corresponding diagrams in Appendix A, those in the appendix constitute the full definition.

* Ada is a registered trademark of the U.S. Government - Ada Joint Program Office