INTERNATIONAL STANDARD

ISO/IEC 13522-5

First edition
1997-04-15

Information technology — Coding of multimedia and hypermedia information —

Part 5:
Support for base-level interactive applications

Technologies de l'information — Codage de l'information multimédia et hypermédia —

Partie 5: Support pour applications interactives de niveau fondamental

Reference number
ISO/IEC 13522-5:1997(E)

Contents

1 Scope 1
1.1 Specificity of the scope 1
1.2 Issues outside the scope of this part of ISO/IEC 13522 1

2 Normative References 1

3 Terms and definitions 2

4 Conformance 4
4.1 Conformance of MHEG-5 objects 4
4.2 Conformance of MHEG-5 engines 4

5 Overview of the MHEG-5 Classes 8
5.1 Root 9
5.2 Group 9
5.3 Application 9
5.4 Scene 9
5.5 Ingredient 10
5.6 Link 10
5.7 Action 10
5.8 Program 10
5.9 Palette, Font, and CursorShape 11
5.10 Variable 11
5.11 Presentable 11
5.12 TokenGroup 12
5.13 ListGroup 12
5.14 Stream 12
5.15 Audio 12
5.16 Interactible 12
5.17 Visible 13

6 Structure of this part of ISO/IEC 13522 14

7 Notations 15
7.1 Attributes 15
7.2 Events 15
7.3 Internal behaviours 16
7.4 Effect of MHEG-5 actions 16
7.5 Formal description 16

8 Root Class 17
8.1 Attributes 17
8.2 Events 18

© ISO/IEC 1997
All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

ISO/IEC Copyright Office • Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

8.3 Internal behaviours 18
8.4 Effect of MHEG-5 actions 20
8.5 Formal description 20

9 Group Class 21
9.1 Attributes 21
9.2 Events 22
9.3 Internal behaviours 22
9.4 Effect of MHEG-5 actions 23
9.5 Formal description 23

10 Application Class 25
10.1 Attributes 25
10.2 Events 28
10.3 Internal behaviours 28
10.4 Effect of MHEG-5 actions 28
10.5 Formal description 34

11 Scene Class 35
11.1 Attributes 35
11.2 Events 36
11.3 Internal behaviours 37
11.4 Effect of MHEG-5 actions 37
11.5 Formal description 41

12 Ingredient Class 42
12.1 Attributes 42
12.2 Events 44
12.3 Internal behaviours 44
12.4 Effect of MHEG-5 actions 44
12.5 Formal description 47

13 Link Class 48
13.1 Attributes 48
13.2 Events 49
13.3 Internal behaviours 49
13.4 Effect of MHEG-5 actions 49
13.5 Formal description 50

14 Program Class 51
14.1 Attributes 51
14.2 Events 51
14.3 Internal behaviours 52
14.4 Effect of MHEG-5 actions 52
14.5 Formal description 54

15 ResidentProgram Class 55
15.1 Attributes 55
15.2 Events 55

15.3 Internal behaviours 55
15.4 Effect of MHEG-5 actions 55
15.5 Formal description 55

16 RemoteProgram Class 56
16.1 Attributes 56
16.2 Events 56
16.3 Internal behaviours 56
16.4 Effect of MHEG-5 actions 57
16.5 Formal description 57

17 InterchangedProgram Class 58
17.1 Attributes 58
17.2 Events 58
17.3 Internal behaviours 58
17.4 Effect of MHEG-5 actions 58
17.5 Formal description 58

18 Palette Class 59
18.1 Attributes 59
18.2 Events 59
18.3 Internal behaviours 59
18.4 Effect of MHEG-5 actions 59
18.5 Formal description 59

19 Font Class 60
19.1 Attributes 60
19.2 Events 60
19.3 Internal behaviours 60
19.4 Effect of MHEG-5 actions 60
19.5 Formal description 60

20 CursorShape Class 61
20.1 Attributes 61
20.2 Events 61
20.3 Internal behaviours 61
20.4 Effect of MHEG-5 actions 61
20.5 Formal description 61

21 Variable Class 62
21.1 Attributes 62
21.2 Events 62
21.3 Internal behaviours 63
21.4 Effect of MHEG-5 actions 63
21.5 Formal description 64

22 BooleanVariable Class 65
22.1 Attributes 65
22.2 Events 65

22.3 Internal behaviours 65
22.4 Effect of MHEG-5 actions 65
22.5 Formal description 65

23 IntegerVariable Class 66
23.1 Attributes 66
23.2 Events 66
23.3 Internal behaviours 66
23.4 Effect of MHEG-5 actions 66
23.5 Formal description 68

24 OctetStringVariable Class 69
24.1 Attributes 69
24.2 Events 69
24.3 Internal behaviours 69
24.4 Effect of MHEG-5 actions 69
24.5 Formal description 70

25 ObjectRefVariable Class 71
25.1 Attributes 71
25.2 Events 71
25.3 Internal behaviours 71
25.4 Effect of MHEG-5 actions 71
25.5 Formal description 71

26 ContentRefVariable Class 72
26.1 Attributes 72
26.2 Events 72
26.3 Internal behaviours 72
26.4 Effect of MHEG-5 actions 72
26.5 Formal description 72

27 Presentable Class 73
27.1 Attributes 73
27.2 Events 73
27.3 Internal behaviours 73
27.4 Effect of MHEG-5 actions 73
27.5 Formal description 74

28 TokenManager Class 75
28.1 Attributes 75
28.2 Events 76
28.3 Internal behaviours 76
28.4 Effect of MHEG-5 actions 77
28.5 Formal description 78

29 TokenGroup Class 79
29.1 Attributes 79
29.2 Events 79

29.3 Internal behaviours 80
29.4 Effect of MHEG-5 actions 80
29.5 Formal description 80

30 ListGroup Class 82
30.1 Attributes 82
30.2 Events 85
30.3 Internal behaviours 86
30.4 Effect of MHEG-5 actions 87
30.5 Formal description 92

31 Visible Class 93
31.1 Attributes 93
31.2 Events 94
31.3 Internal behaviours 94
31.4 Effect of MHEG-5 actions 95
31.5 Formal description 99

32 Bitmap Class 100
32.1 Attributes 100
32.2 Events 101
32.3 Internal behaviours 101
32.4 Effect of MHEG-5 actions 101
32.5 Formal description 101

33 LineArt Class 103
33.1 Attributes 103
33.2 Events 105
33.3 Internal behaviours 105
33.4 Effect of MHEG-5 actions 105
33.5 Formal description 107

34 Rectangle Class 108
34.1 Attributes 108
34.2 Events 108
34.3 Internal behaviours 108
34.4 Effect of MHEG-5 actions 108
34.5 Formal description 109

35 DynamicLineArt Class 110
35.1 Attributes 110
35.2 Events 110
35.3 Internal Behaviours 110
35.4 Effect of MHEG-5 Actions 110
35.5 Formal description 116

36 Text Class 117
36.1 Attributes 117
36.2 Events 120

36.3 Internal behaviours 120
36.4 Effect of MHEG-5 actions 120
36.5 Formal description 121

37 Stream Class 123
37.1 Attributes 123
37.2 Events 125
37.3 Internal behaviours 126
37.4 Effect of MHEG-5 actions 126
37.5 Formal description 129

38 Audio Class 130
38.1 Attributes 130
38.2 Events 131
38.3 Internal behaviours 131
38.4 Effect of MHEG-5 actions 131
38.5 Formal description 132

39 Video Class 133
39.1 Attributes 133
39.2 Events 133
39.3 Internal behaviours 133
39.4 Effect of MHEG-5 actions 134
39.5 Formal description 134

40 RTGraphics Class 135
40.1 Attributes 135
40.2 Events 135
40.3 Internal behaviours 135
40.4 Effect of MHEG-5 actions 136
40.5 Formal description 136

41 Interactible Class 137
41.1 Attributes 137
41.2 Events 138
41.3 Internal behaviours 139
41.4 Effect of MHEG-5 actions 139
41.5 Formal description 141

42 Slider Class 142
42.1 Attributes 142
42.2 Events 144
42.3 Internal behaviour 144
42.4 Effect of MHEG-5 actions 145
42.5 Formal description 147

43 EntryField Class 148
43.1 Attributes 148
43.2 Events 149

43.3 Internal behaviours 150
43.4 Effect of MHEG-5 actions 150
43.5 Formal description 151

44 HyperText Class 153
44.1 Attributes 153
44.2 Events 153
44.3 Internal behaviours 153
44.4 Effect of MHEG-5 actions 154
44.5 Formal description 154

45 Button Class 155
45.1 Attributes 155
45.2 Events 156
45.3 Internal behaviours 156
45.4 Effect of MHEG-5 actions 156
45.5 Formal description 157

46 Hotspot Class 158
46.1 Attributes 158
46.2 Events 158
46.3 Internal behaviours 158
46.4 Effect of MHEG-5 actions 158
46.5 Formal description 159

47 PushButton Class 160
47.1 Attributes 160
47.2 Events 161
47.3 Internal behaviours 161
47.4 Effect of MHEG-5 actions 161
47.5 Formal description 162

48 SwitchButton Class 163
48.1 Attributes 163
48.2 Events 163
48.3 Internal behaviours 163
48.4 Effect of MHEG-5 actions 163
48.5 Formal description 165

49 Action Class 166
49.1 Attributes 166
49.2 Own internal attributes 166
49.3 Formal description 166

50 Referencing Objects, Content, Values, Colour and XYPosition 168
50.1 ObjectReference 168
50.2 ContentReference 168
50.3 GenericObjectReference 168
50.4 GenericContentReference 168

50.5 GenericInteger 169
50.6 GenericBoolean 169
50.7 GenericOctetString 169
50.8 Colour 169
50.9 XYPosition 169
50.10 Resolution of generic values 170

51 Referencing MHEG-5 Objects 171

52 Name Spaces, RemoteProgram Calls and Connections 172

53 Event Handling 173
53.1 Types of events 173
53.2 Synchronous events and asynchronous events 173
53.3 Event handling and Links 174
53.4 User input 174
53.5 User interaction 175
53.6 Cursor Events 175
53.7 Error Handling 175

54 Rendering Visibles 175
54.1 Coordinate system 175
54.2 Bounding box 175
54.3 Display stack 176
54.4 Transparent objects 176
54.5 Pixel aspect ratio 177

Annex A 178

Annex B 212
B.1 General Definitions 212
B.2 Definitions of Symbols 213
B.3 Terminal Symbols 213
B.4 MHEG-5 Object Definitions 215

Annex C 235

Annex D 236
D.1 Object interchange format 236
D.2 Set of classes 236
D.3 Set of features 236
D.4 Content data encoding 236
D.5 UserInput registers 237
D.6 Semantic constraints on the MHEG-5 applications 238
D.7 EngineEvent 238
D.8 GetEngineSupport 239
D.9 Protocol mapping and external interaction 239

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialised system for worldwide standardisation. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organisation to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organisations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting vote.

International Standard ISO/IEC 13522-5 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information.*

ISO/IEC 13522 consists of the following parts, under the general title *Information technology – Coding of multimedia and hypermedia information*:

– *Part 1: MHEG object representation – Base notation (ASN.1)*

– *Part 3: MHEG script interchange representation*

– *Part 4: MHEG registration procedure*

– *Part 5: Support for base-level interactive applications*

– *Part 6: Support for enhanced interactive applications*

Annexes A and B form an integral part of this part of ISO/IEC 13522. Annexes C and D are for information only.

Information technology — Coding of multimedia and hypermedia information —

Part 5:

Support for base-level interactive applications

1 Scope

This part of ISO/IEC 13522 specifies semantics and final-form interchange syntax for MHEG-5 objects, based on concepts defined in ISO/IEC 13522-1. These objects are intended for use in the domain of simple client/server interactive multimedia applications, e.g. (Near) Video on Demand applications, navigation and browsing applications.

1.1 Specificity of the scope

Since it is expected that this part of ISO/IEC 13522 be used for interoperability of applications across platforms, the scope focuses on a specific and precise definition of MHEG-5 classes. This part of ISO/IEC 13522 recognises the semantics implied by the specification of the MHEG-5 objects and by interpretation of MHEG-5 behaviours within the using system.

1.2 Issues outside the scope of this part of ISO/IEC 13522

The scope excludes any standardisation of models, services, systems, protocols or applications that are likely to make use of MHEG-5 objects.

The coded representation of content data is not in the scope of this part of ISO/IEC 13522.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 13522. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 13522 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of ISO and IEC maintain registers of currently valid International Standards.

— ISO/IEC 646:1991: *Information technology – ISO 7-bit coded character set for information interchange.*

— ISO/IEC 8824-1:1995 | ITU-T Recommendation X.680 (1994): *Information technology -- Abstract Syntax Notation One (ASN.1): Specification of basic notation.*

— ISO/IEC 8825-1:1995 | ITU-T Recommendation X.690 (1994): *Information technology -- ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER).*

— RFC 1521:1993: *MIME (Multipurpose Internet Mail Extensions) Part one: Mechanisms for specifying and describing the format of Internet message bodies.*