INTERNATIONAL STANDARD

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Information technology — Computer graphics, image processing and environmental data representation — Procedures for registration of items

Technologies de l'information — Infographie, traitement de l'image et représentation des données environnementales — Procédures pour l'enregistrement des articles

Contents

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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 a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 9973 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 24, *Computer graphics, image processing and environmental data representation*.

This third edition cancels and replaces the second edition (ISO/IEC 9973:2006), which has been technically revised.

Introduction

This International Standard provides a set of procedures for managing the International Register of Items. In this context, items are members of classes defined within the standards developed by ISO/IEC JTC 1/SC 24 that may be registered. The set of procedures specified in this International Standard is equally applicable to any standard that includes a provision for registering items in the International Register of Items.

Standards that wish to use the International Register of Items may have certain classes of items in common that are allowed to vary across implementations of those standards. There is a strong incentive for implementations using the same registered items to reference them in the same way. Each such standard has the potential to provide for registration of items of certain classes and expressly identifies those classes of items that may be registered. When such a standard is published, those classes of items identified for registration are automatically added to the International Register of Items.

The procedures in this International Standard are used in preparing, maintaining, and publishing the International Register of Items. The register includes current classes of items from relevant International Standards whose content can be extended through registration. The classes of items are listed within the register and therefore maintained separately from this International Standard. The register also serves as a means to inform all concerned of items already registered and of the specific identifiers assigned to them. Registration provides identification for an item but should not be regarded as a standardization procedure.

Annex A identifies the information needed in submitting item proposals. Annex B contains example proposal forms. Annex C contains language binding guidelines for submission of registration proposals. Annex D contains encoding guidelines for submission of registration proposals.

Information technology — Computer graphics, image processing and environmental data representation — Procedures for registration of items

1   Scope

This International Standard specifies procedures to be followed in preparing, maintaining and publishing the International Register of Items for any standard whose classes of items are applicable to this register. The items that may be registered fall into several broad categories including:

— computer graphics concepts,

— data structures used by relevant standards,

— spatial and environmental concepts, and

— profiles of relevant standards.

2   Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

None.

3   Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
approval body
organization that approves or rejects proposals

3.2
clarification
non-substantive change to a *registered item*

3.3
class
set of *item*s with common properties or that are common in application to a relevant International Standard

3.4
deprecated item
*item*s that have been approved for removal because they were found to be obsolete or in error

Note 1 to entry: Deprecated items are retained in the register, but marked as "deprecated".

3.5
Generalized Drawing Primitive
GDP
primitive required for graphical item registration

3.6
International Register of Items
the set of *class*es and their corresponding *item*s that are covered by this International Standard

3.7
item
a member of a *class* covered by this International Standard

3.8
notification recipients
member bodies of relevant ISO and IEC committees and/or subcommittees, relevant Category A, B and C liaisons, and relevant *sponsoring authorities*

3.9
register identifier
an identifier assigned by the *registration authority* that uniquely identifies an *item* within the scope of a single *class*

3.10
registered item
an *item* approved for inclusion in the *International Register of Items* using the procedures specified in this International Standard

3.11
registration
assignment of a permanent, unique and unambiguous identifier to an *item* with its related descriptive information and placement in the *International Register of Items*

3.12
registration authority
organization to which management of a register has been designated by the ISO Technical Management Board

3.13
section
a group of one or more related *class*es

3.14
sponsoring authority
organization that is authorized to submit *registration* proposals

3.15
standardized item
item specified by the International Standard that defines the *class* to which the *item* has been associated

4 Concepts

4.1 Overview

Standards that include registration provisions, as specified by this International Standard, are supported by the International Register of Items. The International Register of Items provides the following features:

— a register of identifiers and meanings that may be shared between related standards,

— new instances of concepts in the related standards to be specified by registration, and

— a repository where both standardized and registered items may be browsed or searched.

This International Standard specifies procedures that manage the International Register of Items, which is organized into sections. The International Register of Items is maintained by the registration

authority. Proposals related to the International Register of Items are submitted by sponsoring authorities, processed by the registration authority and approved by the relevant approval body.

4.2 Registration authority

4.2.1 Appointment of a registration authority

The registration authority for this International Standard is established in accordance with ISO/IEC Directives, Part 1, Annex H and is approved by the ISO Technical Management Board as part of a ten-year agreement to maintain the International Register of Items. Contact information for registration authorities of International Standards including this one are maintained and available at

http://www.iso.org/iso/standards_development/maintenance_agencies.htm.

4.2.2 Overview of registration authority responsibilities

The registration authority shall maintain the International Register of Items. Upon request, the registration authority shall distribute information including a description of the International Register of Items and how to submit proposals. Additional information on the responsibilities of the registration authority is provided in Clause 5 and Figure 1.

4.3 Sponsoring authorities

4.3.1 Authorized sponsoring authorities

Proposals for changing the content of the register may be made by the following organizations that are authorized to be sponsoring authorities for the purposes of this International Standard:

a) any ISO or IEC Technical Committee or Subcommittee;

b) any P-member or O-member of ISO/IEC JTC 1 or its subcommittees;

c) any international organization having Category A, B, or C liaison status with ISO/IEC JTC 1 or its subcommittees.

4.3.2 Responsibilities of sponsoring authorities

The responsibilities of sponsoring authorities shall be as follows:

a) to receive proposals from within their respective countries or organizations;

b) to coordinate proposals within their respective countries or organizations, as necessary;

c) to ensure that all proposals are complete and conform to the requirements for the class of an item;

d) to ensure, if a language binding and/or encoding is required, at least one language binding and/or data encoding shall be included;

e) to forward to the registration authority proposals that are ready to be submitted;

f) to respond to questions and coordinate changes derived from comments received from the registration authority; and

g) to disseminate the decisions taken on proposals to their respective countries or organizations.

4.4   Items

The International Register of Items operates under the procedures of this International Standard and allows for varied classes of items within the scope of this International Standard including:

— graphical items,

— data structures used by relevant standards,

— environmental data representation items, and

— profiles of standards.

The addition of a new item to the register increases the range of applicability of that standard, but does not change the basic concepts of the standard.

4.5   Sections

A separate section is provided either for a set of classes that are related to a single International Standard or for individual classes related to one or more International Standards. A section is populated by one or more classes. The classes may be populated with standardized and/or registered items as specified by the relevant International Standard(s).

4.6   Registration process

Proposals for the additions of new items to the register are submitted by a sponsoring authority (see 4.3). The proposal is then evaluated by the Subcommittee Secretariat, the relevant Working Group or by a rapporteur to ensure that its content conforms to the guidelines provided by the relevant International Standard.

The steps in the registration process are described in terms of the responsibilities of the registration authority (see 5.2).

4.7   Proposal guidelines and forms

Annex A specifies general information necessary to submit a proposal to the registration authority. Detailed information for a particular class may be obtained from the registration authority or from the relevant International Standard that specifies that class.

Annex B contains example class and registration proposals formatted in forms with supporting text.

Annex C provides guidelines for submitting proposals for language bindings for registered items.

Annex D provides guidelines for submitting proposals for encodings of registered items.

4.8   New or revised International Standards

International Standards that allow registration as specified by this International Standard shall expressly identify classes of items to be included in the register. Upon approval of the new or revised International Standard, the Secretary shall receive from the editor of the relevant International Standard a list of the new classes that are identified for inclusion in the register accompanied by the associated standardized items approved for inclusion in the register. In addition, the editor shall provide a list of deprecated items, if any. The Secretary shall then provide the lists to the registration authority. When a standard is published, the contents of the lists provided to the registration authority shall be automatically added to the register.

The registration authority shall also update the register to include relationships of existing classes to additional standards or parts of standards that use the classes within the scope of this International Standard, as necessary.

5 International Register of Items

5.1 Availability of the International Register of Items

The contents of the International Register of Items shall be available to the public under the terms and conditions set forth by the registration authority. The contents of the register may also be obtained by standards developers at no charge under the terms and conditions set forth by the registration authority.

5.2 Responsibilities of the registration authority

The responsibilities of the registration authority are specified below and depicted in Figure 1:

a) to receive proposals for registration of items or proposals for modification, clarification, or deprecation of registered items from sponsoring authorities (see 4.3);

b) to perform an initial review to ensure consistent and correct proposal content. Criteria for not further processing a proposal include:

1) incomplete or incomprehensible definition of item(s),

2) incorrect or incomplete language binding or data encoding (see Annex C and Annex D),

3) existence of an identical item in the register,

4) item class not in the register, and/or

5) inadequate justification;

c) to attempt to correct deficiencies in a proposal through communication with the sponsoring authority;

d) to assign a tracking identifier to each proposal;

e) to refer proposals to the appropriate approval body to ascertain whether each proposal should be approved, approved with changes, or rejected. The approval body shall attempt to resolve objections raised by negative votes when the proposal has received sufficient votes for approval.

f) to communicate with the sponsoring authority in order to mediate questions and/or concerns raised during step e);

g) to assign a register identifier to each approved item and otherwise update the register to reflect the results of the ballot. The register identifier shall be assigned as specified by the relevant International Standard.

h) to announce to all notification recipients that the proposals have been approved or rejected;

i) to inform the appropriate sponsoring authority of the results when processing of a proposal has been completed;

j) to include standardized items as directed by the International Standard that has created the associated class(es);

k) to provide a means of distinguishing between standardized items and registered items;

l) to provide a means of distinguishing between deprecated and non-deprecated items;

m) to redesignate registered items as standardized items as determined by the relevant International Standard;

n) to add new classes of items to the current list of classes; and

o) to provide copies of the register contents and/or associated documents (including a list of classes) to the public on request.
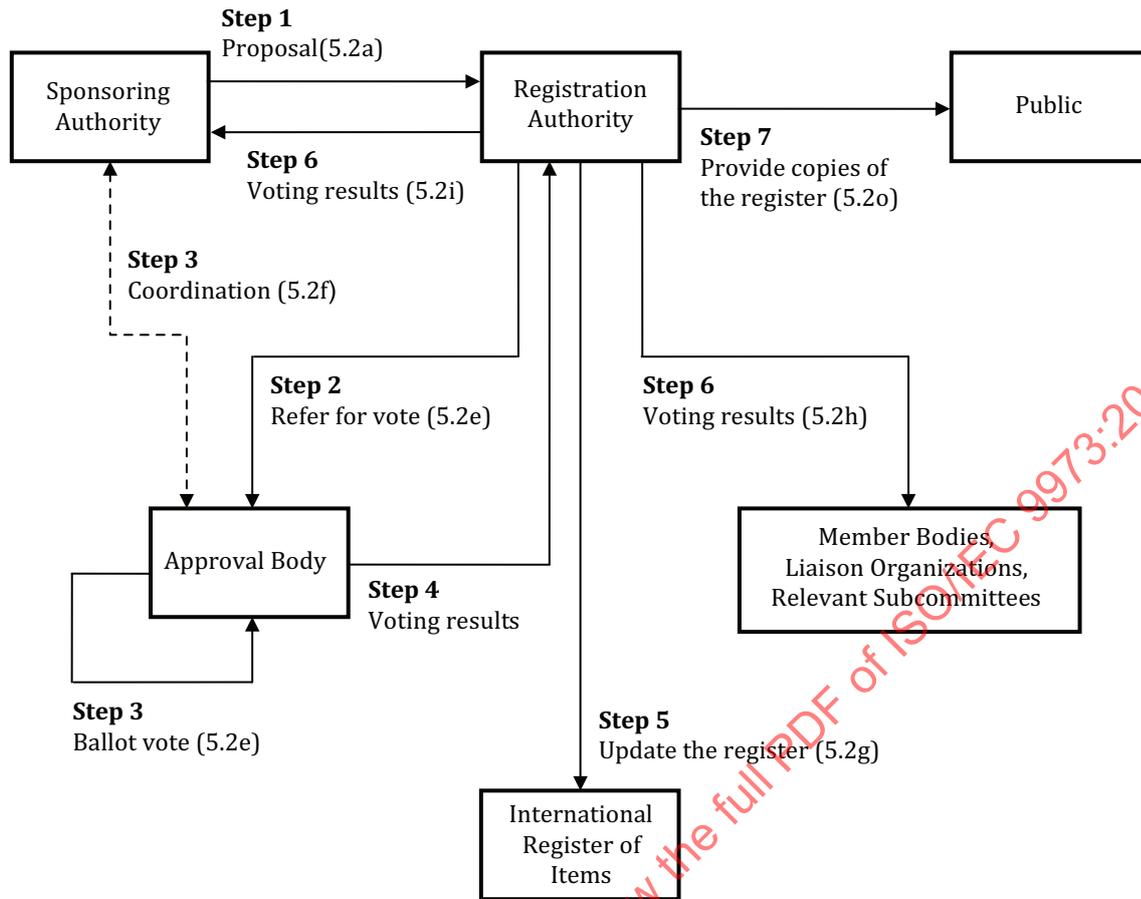
Figure 1 — Registration steps

Step 1: A sponsoring authority submits a proposal for the registration, modification, clarification, or deprecation of item(s) to the registration authority after ensuring the proposal content is complete.

Step 2: After ensuring, in conjunction with the sponsoring authority, that the proposal has been correctly and completely prepared, the registration authority forwards this proposal to the appropriate approval body secretariat for member body vote.

Step 3: The appropriate approval body evaluates the proposal according to its procedures (including coordination with the sponsoring authority to affect any changes) after which the approval body secretary conducts a ballot vote.

Step 4: The appropriate approval body processes the results of the ballot and determines if the proposal is approved or rejected, after which the results are reported to the registration authority.

Step 5: The register is updated as needed to reflect the results of the ballot.

Step 6: The registration authority announces the results of the votes to the appropriate member bodies, sponsoring authority, and liaison organizations.

Step 7: Copies of the updated register are made available to the public according to the terms and conditions defined by the registration authority.

5.3   Recipients of activity notices

All relevant member bodies, liaisons organizations, and subcommittee(s) are notification recipients and shall be provided notification of activity related to the identification of new classes and the initiation, addition, modification, clarification, and deprecation of registered items.

5.4   Addition of classes

International Standards that wish to support registration of items within that standard shall define requirements for registration and new classes of items that can be registered. From these descriptions, the Secretary shall notify the registration authority of class and associated requirements. The registration authority, upon receipt of notification is authorized to expand the list of classes. Such notification to the Secretary and the registration authority shall be made at the time of publication of the International Standard.

Standards may optionally populate the classes with standardized items. Such standardized items (if any) shall be added to the register at the same time as the new classes are added.

5.5   Addition of items

Items may be added to the International Register of Items when proposals for items are approved, or when a new or revised edition of an International Standard is published that includes new items. Each such item shall be placed in the register in the appropriate class, assigned a registration identifier (if not already assigned), and its status marked as either "registered" or "standardized" depending on the source of the item. New items shall not be approved if the corresponding class does not already exist in the International Register of Items. New classes may be added as specified in 5.4.

5.6   Modification/clarification

5.6.1   Modification of registered items

Once a proposal for registration of a particular item has been approved by ballot and the item has been registered, no proposals for modification of that item shall be considered unless provisions for modifications are provided in the relevant International Standard that specifies the class of that item. A modification shall not change the semantic of the registered item, even when such a modification is within the provisions of the relevant International Standard. Otherwise, a modification shall be treated as an addition (see 5.5), which also may or may not require the deprecation of the original item, as specified in 5.8.

Proposals for modification of a registered item to support additional language bindings and/or encodings may be submitted for inclusion. These proposals are handled the same way as proposals for new items to be registered. Additional features of a language binding or encoding shall be added to the existing registered items without change to the existing information.

5.6.2   Clarification of registered items

Sponsoring authorities may submit requests for clarifications of registered items. A clarification shall not cause any change to a registered item. Otherwise it shall be treated as a new item or may be treated as a modification as specified in 5.6.1. Approved technical clarifications shall be promulgated by the registration authority, and shall be treated as additional information attached to a registered item as a note. The registration authority, at its discretion, may directly apply approved editorial clarifications.

5.6.3   Modification/clarification of standardized items

Standardized items may only be modified or clarified by amending or revising the relevant International Standard unless provisions for modifications and/or clarifications are provided in the International Standard that specifies the class of that item.

5.7 Conversion of registered items to standardized items

Registered items may be converted to standardized items if the relevant International Standard, during amendment or revision, elects to incorporate some or all of the registered items. In this case, the registered items in the register are remarked and treated as standardized items. This applies to both non-deprecated and deprecated registered items.

5.8 Deprecation

5.8.1 Deprecation of registered items

No registered items shall be deleted from the International Register of Items. Rather, they shall be retained and marked as deprecated. Proposals for deprecation and comments concerning a proposed deprecation shall be directed to the registration authority for consideration. The responsibilities of the registration authority with regard to deprecation of registered items shall be to:

a) receive proposals for deprecation from sponsoring authorities (see 4.3);

b) inform the sponsoring authority that originally submitted the item for registration that the item is now the subject of a proposed deprecation;

c) forward proposals for deprecation to the Secretariat of the associated subcommittee for a member body vote within the subcommittee to ascertain whether each proposal for deprecation should be approved or rejected;

d) upon approval to change the status of an item to deprecated, continue to include the item in the register, identify its status as deprecated with the date of deprecation, and identify the item that replaces it, if any;

e) announce to notification recipients, items marked as deprecated from the register; and

f) inform the sponsoring authority identified in b) of the results when processing of a proposal for deprecation has been completed.

5.8.2 Deprecation of standardized items

A standardized item is deprecated according to the rules specified in its relevant International Standard. The International Register of Items shall reflect the resulting status (including deletion) as specified by the relevant International Standard (see 4.8).

Annex A
(normative)

Information needed to submit proposals

Items that can be registered, modified, clarified, or deprecated under the procedures of this standard may vary greatly, but are based on standards developed in the relevant subcommittee. In similar ways, the information that is collected and provided for a section of the International Register of Items may vary based on the needs of users. A minimum standard set of information is required to identify a section of the register and support its management.

a) The following information shall be submitted for any proposal:

   1) presentation date of proposal;

   2) sponsoring authority;

   3) class;

   4) name (if appropriate);

   5) description;

   6) picture or graphic depiction (if appropriate);

   7) justification;

   8) at least one language binding or encoding (if appropriate); and

   9) additional supporting comments may be included.

b) Unique information may be necessary for some classes including the following:

1)	Marker Type:	Alignment Point
2)	Prompt & Echo:	Input Class Data Record Information
3)	GDP:	GDP Identifier
4)	Escape:	Specific Escape Function Identifier (or Escape Identifier)
5)	Error:	Message
6)	Echo Type:	Input Class Data Record Information
7)	Measure Format Identifier:	Data Record Information
8)	Interpolated Interior Style:	Reference Geometry Scalars

Additional information may be needed. Proposers should contact the registration authority to obtain the latest list of required information for the type of proposal they will be submitting. Contact information for this International Standard is maintained and available at

http://www.iso.org/iso/standards_development/maintenance_agencies.htm.

Annex B
(informative)

Example forms for proposals to register items

This annex contains example proposal and registration forms for:

a) the proposal of classes, the examples are LINETYPE and ESCAPE;

b) the establishment of specific items under a class, examples are LINETYPE dash-dotted-dotted and ESCAPE Set Dash; and

c) the description of mappings and language bindings to extend existing standards.

These examples, in these cases for graphical items, are hypothetical and are included to illustrate the expectations for documentation which can be included with items registered according to the procedures of this standard. The "Relationship to particular standards" section shall be extended as standards are developed that apply to a registered item; this extension shall be done by the registration authority under the direction of the relevant subcommittee.

The particular forms that follow provide a progression of detail for the items being proposed:

1) Class – LINETYPE

2) Item – Class: LINETYPE: Item: dash-dotted-dotted

3) Class – ESCAPE

4) Item – Class ESCAPE: Item: Map DC Points to WC with attached mappings and language bindings

5)   The Linetype and Escape Sections then define the means of integrating the registered items with each other

PROPOSAL FOR REGISTRATION OF ITEMS

Proposal Number:	

Sponsoring Authority:	
Class of Item:	LINETYPE
Name:	

Description

Additional Comments

Justification for Inclusion

Relationship to Standards

1) ISO/IEC 7942, Information processing systems – Computer graphics – Graphical Kernel System (GKS) functional specification – This proposal contains a specification for registering an item of class LINETYPE as defined in 5.4.1.

2) ISO/IEC 8632-1, Information technology – Computer graphics – Metafile for the storage and transfer of picture description information – Part I: Functional specification (CGM) – This proposal contains a specification for registering an item of class LINETYPE as defined in 5.7.2.

3) ISO 8805, Information processing systems – Computer graphics – Graphical Kernel System for Three Dimensions (GKS-3D) functional description – This proposal contains a specification for registering an item of class LINETYPE as defined in 5.4.1.

4) ISO/IEC 9592-1, Information processing systems – Computer graphics – Programmer's Hierarchical Interactive Graphics System (PHIGS) functional description – This proposal contains a specification for registering an item of class LINETYPE as defined in 5.4.2.

5) ISO/IEC 9636 Parts 1 - 6, Information technology – Computer graphics – Interfacing techniques for dialogues with graphical devices (CGI) – Functional specification – This proposal contains a specification for registering an item of class LINETYPE as defined in 5.3.2 of ISO/IEC 9636-3.

6) ISO/IEC 19775-1, Information technology – Computer graphics and image processing – Extensible 3D (X3D) – Part 1: Architecture and base components – Use of this proposed item of class LINETYPE is specified in 12.4.3.

PROPOSAL FOR REGISTRATION OF ITEMS

Proposal Number:	1

Date of Presentation:	3 June 1986

Sponsoring Authority:	DIN
Class of Item:	LINETYPE

Name:	dashed-dotted-dotted

Description

A repeating pattern of three line segments and three gaps, in which the first line segment is larger than the second and third line segments and the second and third line segments are equal in length. The gaps are equal in length. The intended visual representation of this linetype is illustrated below.

— – – – — – – — – –

Additional Comments

Justification for Inclusion

This linetype is already present in the CGM. The same linetype value should be registered for use by other graphical standards.

Relationship to Standards

1) ISO/IEC 7942, Information processing systems – Computer graphics – Graphical Kernel System (GKS) functional specification – This proposal contains a specification for registering an item of class LINETYPE as defined in 5.4.1.

2) ISO/IEC 8632-1, Information technology – Computer graphics – Metafile for the storage and transfer of picture description information – Part I: Functional specification (CGM) – This proposal contains a specification for registering an item of class LINETYPE as defined in 5.7.2.

3) ISO 8805, Information processing systems – Computer graphics – Graphical Kernel System for Three Dimensions (GKS-3D) functional description – Specifies a standardized linetype defined in 5.4.1.

4) ISO/IEC 9592-1, Information processing systems – Computer graphics – Programmer's Hierarchical Interactive Graphics System (PHIGS) functional description – This proposal contains a specification for registering an item of class LINETYPE as defined in 5.4.2.

5) ISO/IEC 9636 Parts 1 - 6, Information technology – Computer graphics – Interfacing techniques for dialogues with graphical devices (CGI) – Functional specification – This proposal contains a specification for registering an item of class LINETYPE as defined in 5.3.2 of ISO/IEC 9636-3.

6) ISO/IEC 19775-1, Information technology – Computer graphics and image processing – Extensible 3D (X3D) – Part 1: Architecture and base components – Use of this proposed item of class LINETYPE is specified in 12.4.3.

PROPOSAL FOR REGISTRATION OF ITEMS

Proposal Number:	1

Date of Presentation:	3 June 1986

Sponsoring Authority:	
Class of Item:	ESCAPE
Name:	
Description	
Additional Comments	
Justification for Inclusion	
Relationship to Standards	

1) ISO/IEC 7942, Information processing systems – Computer graphics – Graphical Kernel System (GKS) functional specification – This proposal contains a specification for registering an item of class ESCAPE as defined in 5.2.

2) ISO/IEC 8632-1, Information technology – Computer graphics – Metafile for the storage and transfer of picture description information – Part I: Functional specification (CGM) – This proposal contains a specification for registering an item of class ESCAPE as defined in 5.8.1

3) ISO/IEC 8651 (GKS Language Bindings) – Specifies a registered Escape.

4) ISO 8805, Information processing systems – Computer graphics – Graphical Kernel System for Three Dimensions (GKS-3D) functional description – This proposal contains a specification for registering an item of class ESCAPE as defined in 4.13.

5) ISO/IEC 9592-1, Information processing systems – Computer graphics – Programmer's Hierarchical Interactive Graphics System (PHIGS) – Part 1: Functional description – This proposal contains a specification for registering an item of class ESCAPE as defined in 5.14.

6) ISO/IEC 9636-2, Information technology – Computer graphics – Interfacing techniques for dialogues with graphical devices (CGI) – Functional specification – This proposal contains a specification for registering an item of class ESCAPE as defined in 5.5.8.

PROPOSAL FOR REGISTRATION OF ITEMS

Proposal Number:	1

Date of Presentation:	June 1, 1993

Sponsoring Authority:	ANSI
Class of Item:	ESCAPE

Name:	Map DC Points to WC

Description

This escape is used to map a collection of PHIGS DC points to WC values. This would frequently be used when a PHIGS application is displayed in a window system and input values are collected directly from the window system. Using the MAP WINDOW SYSTEM POINTS TO DC Escape along with this escape allows an application to convert the window system coordinates into PHIGS view and WC values.

Additional Comments

This item is intended to be used with other registered items that supply functionality that allows PHIGS to operate in a window system. Those other items are MAP DC POINTS TO WINDOW SYSTEM COORDINATES, MAP WINDOW SYSTEM POINTS TO DC, REDRAW REGIONS, SET PICK MAPPING DATA, INQUIRE PICK MAPPING STATE, INQUIRE PICK MAPPING FACILITIES, MAP DC POINT TO PICK PATHS, and INQUIRE WINDOW SYSTEM COLOUR.

Justification for Inclusion

Many PHIGS applications are using window systems to obtain input values. The values must be mapped to PHIGS values. The capability to map DC values to WC is not included in PHIGS. This Escape provides that mapping to PHIGS values.

Relationship to Standards

1) ISO/IEC 9592-1, Information processing systems – Computer graphics – Programmer's Hierarchical Interactive Graphics System (PHIGS) – Part 1: Functional description – This proposal contains a specification for registering an item of class ESCAPE as defined in 5.14.

2) ISO/IEC 9593-1, Information processing systems – Computer graphics – Programmer's Hierarchical Interactive Graphics System (PHIGS) – Part 1 FORTRAN – This proposal contains a specification for registering the FORTRAN syntax for a registered ESCAPE as defined in 9.1.

3) ISO/IEC 9593-3:1990, Information processing systems – Computer graphics – Programmer's Hierarchical Interactive Graphics System (PHIGS) – Part 3: Ada – This proposal contains a specification for registering the Ada syntax for a registered ESCAPE as defined in 5.13.

4) ISO/IEC 9593-4:1991, Information processing systems – Computer graphics – Programmer's Hierarchical Interactive Graphics System (PHIGS) – Part 4: C – Functional description – This proposal contains a specification for registering the C syntax for a registered ESCAPE as defined in 3.6.

Description

The specified list of DC points is converted to world coordinate (*WC*) values and returned in mapped points. The same procedure used for PHIGS stroke input devices is used for this conversion. This is, the points are transformed to *normalized projection coordinates* by the inverse of the workstation transformation; the highest priority view containing all of the points is determined by searching the workstation's view table in view transformation input priority order, and the inverse view mapping and

orientation transforms of that view are used to transfer the points to *WC*. The function returns the view index of the view used for the transformation.

This function is restricted to OUTPUT only workstations.

Relationship to particular standards:

1) PHIGS Functional Specification

(reference ISO/IEC 9592-1 PHIGS Functional specification)

A functional description of the parameters for this escape is given below:

Name	Values	Data Type
input data record workstation identifier		WI
input data record DC points		L(P3)
error indicator		I
view index	0..n	I
mapped points		L(P3)

Where the Input data record fields have the following meanings:

workstation identifier the identifier of the workstation that shall be used for transformation information

DC points the list of points, in PHIGS DCs, to be converted into WC values

The Output data record fields have the following meanings:

error indicator the mapping can be computed, this value is returned as 0 and the mapping is returned in the other fields. If the mapping cannot be computed, this value indicates the reason for the error and the value of the other fields is implementation-dependent.

view index the index of the view used when converting from *normalized projection coordinates* to *world coordinates*.

mapped points the point list in WCs

Error indicator values:

003 Ignoring function, function required state (PHOP,WSOP,*.*)
054 Ignoring function, the specified workstation is not open
xxx Ignoring function, specified workstation is not of category OUTPUT
xxx Ignoring function, one or more of the input points is outside the workstation window

2) Map DC Points to WC2) PHIGS FORTRAN language binding

(reference ISO/IEC 9593-1 PHIGS Language Bindings; Part 7: FORTRAN)

The following language binding is for the "Pepqrs" form of the Escape, as defined in 9.1 of the PHIGS FORTRAN language binding (pqrs to be assigned by the Registration Authority to correspond to the assigned Register Identifier):

```
SUBROUTINE Pepqrs (WKID, N, DCPTS, ERRIND, VIEW, MPTS)
```

Parameters:

```
INTEGER   WKID   Workstation identifier
INTEGER   N      Number of points
REAL(3*N) DCPTS  DC point list ordered as: X1, Y1, Z1,
                                           X2, Y2, Z2,
```

```
                                            . . .,
                                          Xn, Yn, Zn
```

Output Parameters:

```
  INTEGER  ERRIND  Error indicator
  INTEGER  VIEW    View index used for transformation
  REAL(N)  PXA     The mapped X values
  REAL(N)  PYA     The mapped Y values
  REAL(N)  PZA     The mapped Z values
```

The following parameters are for use when accessing this Escape through the PESC function, as defined in 9.14 of the PHIGS FORTRAN language binding:

Parameters used by the Pack Data Record function for the Input Data Record:

```
  INTEGER IL(2)  Number of integers
  INTEGER IA(1)  ERRIND
  INTEGER IA(2)  WKID
  Map DC Points to WC
```

Parameters returned by the Unpack Data Record function for the Output Data Record:

```
  INTEGER  IL     2         Number of integers
  INTEGER  IA(1)  ERRIND    Error indicator
  INTEGER  A(2)   N         Number of points
  INTEGER  RL     3*IA(2)   Number of reals
  REAL     RA(1)            World Coordinate point list, X1
  REAL     RA(2)            World Coordinate point list, X2
  REAL     RA(3)            World Coordinate point list, X3
  REAL     RA(4)            World Coordinate point list, X4
  REAL     RA(RL)           World Coordinate point list, Zn
  INTEGER  SL     0         Number of strings
```

NOTE   RA elements 1 through IA(2) contain the X components of the list, elements IA(2)+1 through 2*IA(2) contain the Y components of the list and elements 2*IA(2)+1 through 3*IA(2) contain the Z components of the list.

3) PHIGS Ada language binding

(reference ISO/IEC 9593-3, PHIGS Language Bindings; Part 3: Ada)

Registered Escapes are in a library package named PHIGS_ESCAPE. The PHIGS Ada language binding also provides a data type package, PHIGS_TYPES which provides type declarations.

The following language binding is for the separate function form of the escape, as defined in 5.13 of the PHIGS Ada language binding:

```
-- Escape function for MAP DC POINTS TO WC

with PHIGS_TYPES;
use PHIGS_TYPES;
package PHIGS_ESCAPE is
procedure MAP_DC_POINTS_TO_WC (WS               : in   WS_ID;
                               DC_POINTS        : in   DC.POINT_LIST_3
                               ERROR_INDICATOR  : out  ERROR_NUMBER;
                               VIEW_IND         : out  VIEW_INDEX;
                               MAPPED_POINTS    : out  WC.POINT_LIST_3)
end PHIGS_ESCAPE;
```

4) PHIGS C language binding

(reference ISO/IEC 9593-4, PHIGS Language Bindings; Part 4: C)

a) The following language binding is for the separate function form of the Escape, as defined in of the PHIGS C language binding (PQRS to be assigned by the Registration Authority to correspond to the assigned Register Identifier):

```
void pescape_rPQRS(Pint        ws_id,        /* workstation identifier */
                   Ppoint_list3 dc_points,   /* DC point list */
                   Pint        *err_ind,      /* OUT error indicator */
                   Pint        *view_index,   /* OUT view index */
                   Ppoint_list3 *mapped_points) /* OUT mapped points */
```

b) The following language binding is for the separate function form of the Escape, as defined in the
    PHIGS C language binding (PQRS to be assigned by the Registration Authority to correspond to the
    assigned Register Identifier):

```
typedef union {
    struct Pescape_in_rPQRS { Pint        ws_id,      /* Workstation id */
                              Ppoint_list3 dc_points, /* DC point list */
    } escape_in_rPQRS;
} Pescape_in_data:

typedef union {
    struct Pescape_out_rPQRS {Pint         err_ind,      /* Error indicator */
                              Pint         view_index,    /* View index   */
                              Ppoint_list3 mapped_points, /* mapped points */
    } escape_out_rPQRS;
} Pescape_out_data:
```

NOTE   The memory referenced by mapped points is managed by store.

PROPOSAL FOR REGISTRATION OF ITEMS

Escape Section

Specific escape identifier:	
Escape name:	ESCAPE
Sponsoring Authority:	
Date of Registration:	
ISO Approval Date:	
Amendment Record:	

Description

Relationship to Standards
1) ISO/IEC 7942, Information processing systems – Computer graphics – Graphical Kernel System (GKS) functional specification – This proposal contains a specification for registering an item of class ESCAPE as defined in 5.2.
2) ISO/IEC 8632-1, Information technology – Computer graphics – Metafile for the storage and transfer of picture description information – Part I: Functional specification (CGM) – This proposal contains a specification for registering an item of class ESCAPE as defined in 5.8.1.
3) ISO/IEC 8651 (GKS Language Bindings) Specifies a registered Escape.
4) ISO 8805, Information processing systems – Computer graphics – Graphical Kernel System for Three Dimensions (GKS-3D) functional description – This proposal contains a specification for registering an item of class ESCAPE as defined in 4.13.
5) ISO/IEC 9592-1, Information processing systems – Computer graphics – Programmer's Hierarchical Interactive Graphics System (PHIGS) – Part 1: Functional description – This proposal contains a specification for registering an item of class ESCAPE as defined in 5.14.
6) ISO/IEC 9636-2 Information technology – Computer graphics – Interfacing techniques for dialogues with graphical devices (CGI) – Functional specification – This proposal contains a specification for registering an item of class ESCAPE as defined in 5.5.8.

PROPOSAL FOR REGISTRATION OF ITEMS

Escape Section

Specific escape identifier:	1
Escape name:	Set Dash
Sponsoring Authority:	ANSI
Date of Registration:	June 27, 1991
ISO Approval Date:	July 1990
Amendment Record:	
EXAMPLE	
Description	
This Escape function sets the characteristics of the user-specified (registered) linetype. Such a user-specified dash pattern line consists of alternating dashes and spaces. This Escape function allows a user to exercise precise control over important aspects of the appearance of lines of this type. This control includes the ability to select the length of each dash and of each space, the offset to the start of the "dash pattern", and whether the dash pattern is restarted at each portion of a primitive. In addition, linecap, line join, and mitre limit-each of which can be set by a registered Escape function - apply to primitives of this linetype. See attached sheet for additional details. The default value for "continuity" is "restart".	
Relationship to Standards	
1) ISO/IEC 7942, Information processing systems – Computer graphics – Graphical Kernel System (GKS) functional specification – This proposal contains a specification for registering an item of class ESCAPE as defined in 5.2.	
2) ISO/IEC 8632-1, Information technology – Computer graphics – Metafile for the storage and transfer of picture description information – Part I: Functional specification (CGM) – This proposal contains a specification for registering an item of class ESCAPE as defined in 5.8.1.	
3) ISO/IEC 8651 (GKS Language Bindings) This proposal contains a specification for registering an item of class ESCAPE.	
4) ISO 8805, Information processing systems – Computer graphics – Graphical Kernel System for Three Dimensions (GKS-3D) functional description – This proposal contains a specification for registering an item of class ESCAPE as defined in 4.13.	
5) ISO/IEC 9592-1, Information processing systems – Computer graphics – Programmer's Hierarchical Interactive Graphics System (PHIGS) – Part 1: Functional description – This proposal contains a specification for registering an item of class ESCAPE as defined in 5.14.	
6) ISO/IEC 9636-2 Information technology – Computer graphics – Interfacing techniques for dialogues with graphical devices (CGI) – Functional specification – This proposal contains a specification for registering an item of class ESCAPE as defined in 5.5.8.	

Description

Set Dash controls the dash pattern used with line primitives of registered linetype "user-specified dash pattern" (linetype TBD). If the array of *dash pattern lengths* is empty (i.e., the *number of lengths* is zero), the linetype is equivalent to solid. This is the default value. If the array of *dash pattern lengths* is not

empty, line primitives of registered linetype 'user-specified dash pattern" arc drawn with dashes whose pattern is defined by the array of lengths.

Each length in the array of dash pattern lengths must be non-negative. If any length in the dash pattern length array is negative, a length of zero shall be substituted. At least one length in the array must be non-zero. If all lengths are zero, the linetype is equivalent to solid. If the number of lengths is less than zero, a value of zero shall be substituted.

The elements of die array of dash pattern lengths are interpreted in sequence as distances along the primitive. These distances alternately specify the length of a gap between dashes. The contents of the array are used cyclically, that is when the end of the array is reached, the pattern starts over at the beginning.

Dashed lines wrap around curves and comers just as solid lines do. The ends of each dash receive no special treatment. In particular, the "ends" of dashes are not treated with current line cap. No measures other than continuity as described below, are provided to coordinate the dash pattern with features of an output primitive.

The offset value may be thought of as the 'phase" of the dash pattern relative to the start of the path. It is interpreted as a distance into the dash pattern at which the pattern should be started. Before beginning output of the dash pattern, the elements of the array of dash pattern lengths are cycled through, and the distances of alternating dashes and gaps added up, but without generating any output. When the offset distance into dash pattern has been reached, the primitive is drawn (from its beginning) using the dash pattern from the point that has been reached. If the offset is greater than the total length (the sum of all lengths in the dash pattern length array), the lengths in the array shall be re-cycled from the beginning. This process shall be repeated as many times as necessary until the offset distance is reached.

When *continuity* is set to *restart,* each portion of a primitive (e.g. each line segment within a polyline) is treated independently; i.e. the dash pattern is restarted (and *offset* applied) at the beginning of each portion. When *continuity* is set to *continuous,* the dash pattern is not restarted in going from one portion of a primitive to the next. If continuity is neither restart nor continuous, the default value of restart shall be used.

Relationship to particular standards:

1) CGM Functional Specification

(reference lSO 8632 CGM; Part 1: Functional Description)

The elements of the array of dash pattern lengths are interpreted in sequence as distances in VDC units along the primitive. The offset value is in VDC units. A functional description of the Set Dash escape parameters is:

Parameters:

```
escape identifier(I) — value is 1 as assigned by the Registration Authority

data record (D):
   IX  : 1  continuity
   VDC : n+1  offset(1)
             lengths(n)
```

Data Record Description:

   The following continuity types are assigned:

```
   0) restart
   1) continuous
```

2) CGM Encodings

(reference ISO 8632 CGM; Parts 2,3,4)

Each data record as a whole is treated as a string in the CGM encoding being used. The content of the data record is encoded as a group of subsequences of parameters of a given data type. Each such subsequence

is introduced by a header consisting of two items: the first is of data type Index (IX), indicating the data type for the parameters in the subsequence; the second is an Integer (I) count for the number of following parameters of that type. The header is encoded in accordance with the current precision for Index (IX) and Integer (I). The following parameters are encoded in the usual manner according to the encoding rules for parameters of the specified type. In particular, data types subject to type, precision, or a specification mode are encoded in accordance with the prevailing values for the relevant controls.

The data type index assignments for data types for CGI and CGM are:

1:	Data Record (D)	9:	Fixed 16-bit Integer (IF16)
2:	Colour Index (CI)	10:	Fixed 32-bit Integer (IF32)
3:	Colour Direct Value (CD)	11:	Index (IX)
4:	Client Specified Name (CSN)	12:	Real (R) Name(N)
5:	Enumerated (E)	13:	String (S)
6:	Integer (I)	14:	Fixed String (SF)
7:	Input Colour Specifier (ICO)	15:	Viewport Coordinate (VC)
8:	fixed 8-bit Integer (IF8)	16:	Virtual Device Coordinate (VDC)

This list includes additional data type assignments that are added for completeness.

3) GKS Functional Specification

(reference ISO 7942 GKS Functional Description)

The Set Dash Escape is applicable at GKS level 0a and above. A functional description of its parameters is given below:

Name	Values	Data Type	Range
escape function identifier	1	N	
input data record:			
continuity	(RESTART, CONTINUOUS)	E	
offset	WC	R	≥1
number of lengths		I	
dash pattern lengths	WC Array	nxR	
output data record:			
None			

Errors:

8   GKS not in proper state: GKS shall be in one of the states GKOP,WSOP,WSAC, or SGOP

4) GKS FORTRAN language binding

(reference ISO 8651-1, GKS Language Bindings -- Part 1: FORTRAN)

a) The following language binding is registered for the "GEpqrs" form (as defined in 9.1 of the GKS FORTRAN language binding) of the Escape:

```
SUBROUTINE GE1(CONT, OFFSET, DIMLEN, LEN)
```

Input Parameters:

```
INTEGER    CONT         continuity (RESTART, CONTINUOUS)
REAL       OFFSET       offset into dash pattern
INTEGER    DIMLEN       dimension of the dash pattern lengths array
REAL       LEN(DIMLEN)  dash pattern lengths array
```

Output Parameters:

None

b) The following mnemonic FORTRAN names and their values for GKS ENUMERATION type values are added to the list in the GKS FORTRAN binding:

continuity indicator	restart,	continuous
INTEGER	GREST,	GCONT
PARAMETER	(GREST=0,	GCONT=1)

c) The following parameters are registered for use when accessing this Escape through the GESC function of 9.3 of the GKS FORTRAN language binding standard:

Parameters used by the Pack Data Record function for the Input Data Record:

```
INTEGER  IL                                 2
INTEGER  IA(1)                              continuity (RESTART, CONTINUOUS)
INTEGER  IA(2)                              number of dash pattern lengths
INTEGER  RL                                 1+number of dash pattern lengths
REAL     RA(1)                              offset
REAL     RA(2)                              first length
REAL     RA(3)                              second length
…
REAL     RA(1 + number of dash pattern lengths) last length
INTEGER  SL                                 0
```

The Unpack Data Record function is not required by this escape.

5) Pascal language binding

(reference: ISO 8651-2, GKS Language Bindings; Part 2: Pascal)

The following Pascal language binding is registered for the procedure "GEscape" as defined in 6.2 of the GKS Pascal language binding:

```
GEscapeContinuity = (GVEscapeRestart, GVEscapeContinuous);

GREscapeDataIn = RECORD
CASE EscapeId:
  GTEscapeDataTag of 1:(R0001Offset       : REAL
                     R0001Continuity    : GEscapeContinuity;
                     R0001NumberLengths : INTEGER;
                     R0001Lengths       : REAL array  [1..MAX]);
END;
GREscapeDataOut = Record
CASE EscapeID : GTEscapeDataTag of 1: ( ) ;  (*Null Record*)
END;
```