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**Information technology — Coding of  
audio-visual objects —**

Part 11:

**Scene description and application engine**

AMENDMENT 7: ExtendedCore2D profile

*Technologies de l'information — Codage des objets audiovisuels —*

*Partie 11: Description de scène et moteur d'application*

*AMENDMENT 7: Profil ExtendedCore2D*

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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.

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# Information technology — Coding of audio-visual objects —

## Part 11: Scene description and application engine

### AMENDMENT 7: ExtendedCore2D profile

In 7.2, add the following subclauses in node alphabetical order:

#### 7.2.2.ZZ CacheTexture

##### 7.2.2.ZZ.1 Node interface

|                |          |                             |      |
|----------------|----------|-----------------------------|------|
| CacheTexture { |          |                             |      |
| Field          | SFInt32  | <b>objectTypeIndication</b> | 0    |
| Field          | SFString | <b>decoderSpecificInfo</b>  | NULL |
| Field          | SFString | <b>image</b>                | NULL |
| Field          | SFString | <b>cacheURL</b>             | NULL |
| Field          | MFURL    | <b>cacheOD</b>              | []   |
| Field          | SFInt32  | <b>expirationDate</b>       | 0    |
| Field          | SFBool   | <b>repeatS</b>              | TRUE |
| Field          | SFBool   | <b>repeatT</b>              | TRUE |
| }              |          |                             |      |

NOTE For the binary encoding of this node see node coding tables in electronic attachment.

##### 7.2.2.ZZ.2 Functionality and semantics

The CacheTexture allows carriage of visual data embedded inside the BIFS stream rather than using the OD framework. The **objectTypeIndication** field identifies the media type of the visual data. The compressed data is carried in the **image** field, as a single access unit. If a decoder configuration is needed, it may be carried in the **decoderSpecificInfo** field. The node can be used as a texture object in an **Appearance** node. The node can also be used in as a child node of a 2D or 3D container when it is only used for image caching. Additionally, the CacheTexture node allows for caching the embedded image by specifying a **cacheURL** name to be referred to by other nodes in the scene, as well as an **expirationDate** indicating the time in seconds the terminal should keep the data in its cache. If **expirationDate** is 0, the data shall not be cached. If **expirationDate** is strictly negative, the data should be cached for as long as possible. In any case, whether the data is cached or not is implementation specific.

The **cacheOD** field identifies an existing OD in the scene to be cached with the given **cacheName** and **expirationDate**. If **cacheOD** is set, **image**, **decoderSpecificInfo** and **objectTypeIndication** shall be ignored. Results are undefined if the OD indicated by the **cacheOD** is not a still image object such as JPEG or PNG.

The scoping of the CacheTexture node shall be done at the service level (same broadcast channel or same service URL of the initial scene). Sub-scenes opened through inline nodes are part of the same caching scope as the parent scene.

Example of cache usage

```
Shape {
  appearance Appearance {
    texture ImageTexture {
      url "some_cache_url_name"
    }
  }
}
...
CacheTexture {
  objectTypeIndication 0x6D
  image ...
  cacheURL "some_cache_url_name"
  expirationDate 3600 //one hour caching
}
....
```

7.2.2.ZZ EnvironmentTest

7.2.2.ZZ.1 Node interface

```
EnvironmentTest {
  eventIn          SFBool
  exposedField     SFBool
  exposedField     SFInt32
  exposedField     SFString
  exposedField     SFBool
  eventOut         SFBool
  eventOut         SFBool
  eventOut         SFBool
  eventOut         SFString
  evaluate         SFBool
  enabled          TRUE
  parameter        0
  compareValue     NULL
  evaluateOnChange TRUE
  valueLarger
  valueEqual
  valueSmaller
  parameterValue
}
```

NOTE For the binary encoding of this node see node coding tables in electronic attachment.

7.2.2.ZZ.2 Functionality and semantics

The EnvironmentTest node enables testing a **parameter** of the terminal environment, possibly comparing their values with the **compareValue**. The evaluation of the parameter triggers different eventOuts depending on the type of the parameter:

- If the **parameter** type is Boolean, the evaluation triggers a **valueEqual** eventOut, and the **compareValue** field is ignored.
- If the **parameter** type is a number and the **compareValue** represents a number, the two values are compared and the following eventOuts are generated:
  - **valueEqual** if **parameter** and **compareValue** are equal
  - **valueLarger** if **compareValue** is strictly larger than **parameter**
  - **valueSmaller** if **compareValue** is strictly less than than **parameter**

The supported parameter types are defined in Table AMD7.1.

In any case, the **parameterValue** eventOut is triggered after evaluation.

If **evaluateOnChange** is set to FALSE, the node only evaluates upon receiving the **evaluate** eventIn; otherwise, the node evaluates on any change of **parameter** or **compareValue**.

The node evaluates and triggers events only when its **enabled** field is true.

**Table AMD7.1 — Environmental parameters**

| Value                 | Definition  | Type    |
|-----------------------|---|---------|
| 0                     | Display region Aspect Ratio (larger dimension divided by smaller dimension, regardless of screen orientation) | Float   |
| 1                     | Portrait mode of the display region (TRUE if width<height)  | Boolean |
| 2                     | Display region width in pixels  | Integer |
| 3                     | Display region height in pixels   | Integer |
| 4                     | Horizontal DPI  | Integer |
| 5                     | Vertical DPI  | Integer |
| 6                     | Automotive Situation (terminal user drives a moving vehicle)  | Boolean |
| 7                     | User is Visually Challenged   | Boolean |
| 8                     | Touch Screen present on terminal  | Boolean |
| 9                     | Navigation Keypad present on terminal   | Boolean |
| 0x00000007-0xEEFFFFFF | ISO Reserved  |         |
| 0xF0000000-0xFFFFFFFF | User Reserved   |         |

The display region is the area onto which the BIFS content is rendered. This region may be the entire screen, some part of the screen or an off-screen memory region.

## 7.2.2.ZZ KeyNavigator

### 7.2.2.ZZ.1 Node interface

```

KeyNavigator {
  eventIn          SFBool          setFocus
  exposedField     SFNode          sensor           NULL
  exposedField     SFNode          left             NULL
  exposedField     SFNode          right            NULL
  exposedField     SFNode          up                NULL
  exposedField     SFNode          down              NULL
  exposedField     SFNode          select             NULL
  exposedField     SFNode          quit              NULL
  exposedField     SFFloat         step              0
  eventOut         SFBool
}

```

NOTE For the binary encoding of this node see node coding tables in electronic attachment.

### 7.2.2.ZZ.2 Functionality and semantics

The KeyNavigator node enables simple, pre-defined 2D navigation in the scene. Each KeyNavigator is associated with an existing sensor node (TouchSensor, PlaneSensor2D...) through the **sensor** field. The first KeyNavigator node found in the scene is used to determine the initial focusable object. If the attached **sensor** node is NULL or is disabled, the focus is not attached to any visual part of the scene. Focus can be changed by using the navigation pad of the terminal as follows:

- Pressing the left key will move focus to the **left** KeyNavigator node
- Pressing the right key will move focus to the **right** KeyNavigator node
- Pressing the up key will move focus to the **up** KeyNavigator node
- Pressing the down key will move focus to the **down** KeyNavigator node
- Pressing the validation key (OK, Enter, Select...) will move focus to the **select** KeyNavigator node

- Pressing the escape key (escape, back, end call...) will move focus to the **quit** KeyNavigator node
- At any time, a KeyNavigator can be focused by sending the node a **setFocus** eventIn.

Whenever a KeyNavigator node receives the focus, it triggers a **focusSet = true** eventOut. When the KeyNavigator node loses the focus, it triggers a **focusSet = false** eventOut.

A pointing device sensor is controlled through the keypad as indicated in Table AMD7.2, with directions given in the local coordinate system of the sensor node. Processing of keystrokes by the KeyNavigator node is inhibited while the sensor is active.

NOTE The attribution of keys for activation and deactivation of the associated sensor is implementation specific.

The **step** field indicates the horizontal or vertical mouse displacement to simulate when using directional keys, and indicates the displacement in the sensor local coordinate system. If the value of **step** is less than or equal to 0, the mouse displacement is implementation specific.

Table AMD7.2 — Mapping of keys for BIFS sensor nodes

| Sensor Type    | focusIn     | focusOut     | LEFT                   | RIGHT          | UP      | DOWN      |
|----------------|-------------|--------------|------------------------|----------------|---------|-----------|
| TouchSensor    | isOver=true | isOver=false | N/A                    | N/A            | N/A     | N/A       |
| PlaneSensor2D  | N/A         | N/A          | Left move              | Right move     | up move | Down move |
| DiscSensor     | N/A         | N/A          | Counter clockwise move | Clockwise move | N/A     | N/A       |
| PlaneSensor    | N/A         | N/A          | Left move              | Right move     | up move | Down move |
| CylinderSensor | N/A         | N/A          | Counter clockwise move | Clockwise move | N/A     | N/A       |
| SphereSensor   | N/A         | N/A          | I/S                    | I/S            | I/S     | I/S       |

N/A: Non-Applicable - I/S: Implementation Specific.

NOTE 1 Authors should be aware that when activating a TouchSensor node, the focus might automatically be moved to the **select** field of the associated key navigator.

NOTE 2 A terminal handling both key navigation and pointing device should automatically manage the active KeyNavigator node. When the pointing device moves over an active sensor associated with a KeyNavigator node, this KeyNavigator node should become the current focused KeyNavigator node.

NOTE 3 A terminal should trigger the key events on key down and handle key repeat, when the key is not released for some period of time.

### 7.2.2.ZZ Storage

#### 7.2.2.ZZ.1 Node interface

```
Storage {
    eventIn          SFBool          forceSave
    eventIn          SFBool          forceRestore
    exposedField     SFBool          auto           TRUE
    Field            SFInt32         expireAfter    0
    Field            SFString        name           NULL
    Field            MFAttrRef       storageList    []
}
```

NOTE For the binary encoding of this node see node coding tables in electronic attachment.

#### 7.2.2.ZZ.2 Functionality and semantics

The Storage node enables saving and restoring any field values in a scene to a private storage zone of the terminal. The **name** parameter allows defining several storage zones in a single scene. The terminal should keep the stored value for the number of seconds indicated in the **expireAfter** field, or for an undetermined period of time, up to the implementation, if this value is less than or equal to zero. The scoping of the Storage

node shall be done at the service level (e.g., same broadcast channel or same service URL of the initial scene). Sub-scenes opened through inline nodes are part of the same storage scope as the parent scene. In a same service, there shall not be more than one storage node with a given name field.

The set of node fields to be saved or restored is specified in the **storageList** field. Conceptually, saving node fields is equivalent to remembering the number of fields, their types and their values, and restoring is the opposite operation. This allows saving and restoring of node fields independently from node IDs which may vary across different scenes. The target field shall be an SF or an MF field with an underlying SF type equal to SFBool, SFInt32, SFFloat, SFTime, SFString, SFVec3f, SFVec2f, SFColor, and SFRotation. For complexity reasons, storing and restoring of SFNode/MFNode, SFImage/MFImage and SFCommandBuffer fields are not allowed.

Results are undefined if the target field types do not match between the save and the restore operations.

If **auto** is TRUE, then the terminal restores the information after decoding of the Storage object, and saves the information upon exiting the scene. If **auto** is FALSE, the terminal saves the node field values when the eventIn **forceSave** is triggered, and restores them when the eventIn **forceRestore** is triggered.

*In 7.2.2.74.2, add the following:*

If the major mode in the justify field of the layout is "JUSTIFY", then the layout of children starts at the "BEGIN" edge of the layout and ends at the "END" edge of the layout with space adjustments if needed. "BEGIN" and "END" are defined in the FontStyle node semantics. If wrap is false and the line is larger than the layout frame, the terminal may alter the text to indicate it has been truncated.

*At the end of 7.2.2.135.2 before the final example, add the following:*

If the eventIn is inMFString then the outSFString eventOut shall be created by using the first element of inMFString input if the "Sum" field is set to "false", or the concatenation of all strings in the inMFString input if the "Sum" field is set to "true". In this special case, FactorX and OffsetX fields are ignored.

In 7.9.2.3, replace Table 41 with the following:

| Scene Graph Tools        | Scene Graph Profiles |           |         |                  |         |             |             |       |          |          |
|--------------------------|----------------------|-----------|---------|------------------|---------|-------------|-------------|-------|----------|----------|
|                          | Basic 2D             | Simple 2D | Core 2D | Extended Core 2D | Main 2D | Advanced 2D | Complete 2D | Audio | 3D Audio | Complete |
| AcousticScene            |                      |           |         |                  |         |             |             |       | X        |          |
| AdvancedAudioBuffer      |                      |           |         |                  |         |             |             |       |          |          |
| AnimationStream          |                      |           |         |                  |         | X           | X           |       | X        | X        |
| Anchor                   |                      |           | X       | X                | X       | X           | X           |       | X        | X        |
| ApplicationWindow        |                      |           |         |                  |         |             |             |       |          |          |
| AudioBuffer              |                      |           |         |                  |         | X           | X           | X     | X        | X        |
| AudioDelay               |                      |           |         |                  |         |             | X           | X     | X        | X        |
| AudioFX                  |                      |           |         |                  |         |             | X           | X     | X        | X        |
| AudioMix                 |                      |           |         |                  |         |             | X           | X     | X        | X        |
| AudioSwitch              |                      |           |         |                  |         | X           | X           | X     | X        | X        |
| Billboard                |                      |           |         |                  |         |             |             |       | X        | X        |
| BitWrapper               |                      |           |         |                  |         |             |             |       |          |          |
| CacheTexture             |                      |           |         | X                |         |             |             |       |          |          |
| Clipper2D                |                      |           |         |                  |         |             |             |       |          |          |
| ColorInterpolator        |                      |           | X       | X                | X       | X           | X           |       |          | X        |
| ColorTransform           |                      |           |         |                  |         |             |             |       |          |          |
| Collision                |                      |           |         |                  |         |             |             |       |          | X        |
| CompositeTexture2D       |                      |           |         | X                |         |             | X           |       |          | X        |
| CompositeTexture3D       |                      |           |         |                  |         |             |             |       |          | X        |
| Conditional              |                      |           | X       | X                | X       | X           | X           |       | X        | X        |
| CoordinateInterpolator2D |                      |           | X       | X                | X       | X           | X           |       |          | X        |
| CoordinateInterpolator   |                      |           |         |                  |         |             |             |       | X        | X        |
| CoordinateInterpolator4D |                      |           |         |                  |         |             |             |       |          |          |
| CylinderSensor           |                      |           |         |                  |         |             |             |       |          | X        |
| DirectiveSound           |                      |           |         |                  |         |             |             |       | X        |          |
| DiscSensor               |                      |           |         |                  | X       | X           | X           |       |          | X        |
| EnvironmentTest          |                      |           |         | X                |         |             |             |       |          |          |
| Form                     |                      |           |         |                  |         |             | X           |       |          | X        |
| Group                    |                      |           |         |                  |         | X           | X           | X     | X        | X        |
| Inline                   |                      |           | X       | X                | X       | X           | X           |       | X        | X        |
| InputSensor              |                      |           | X       | X                | X       | X           |             |       |          |          |
| KeyNavigator             |                      |           |         | X                |         |             |             |       |          |          |
| Layer2D                  |                      |           |         | X                | X       | X           | X           |       |          | X        |
| Layer3D                  |                      |           |         |                  |         |             |             |       |          | X        |
| Layout                   |                      |           |         | X                |         |             | X           |       |          | X        |
| ListeningPoint           |                      |           |         |                  |         |             | X           | X     | X        | X        |
| LOD                      |                      |           |         |                  |         |             |             |       | X        | X        |
| MediaBuffer              |                      |           |         |                  |         | X           |             |       |          |          |
| MediaControl             |                      |           | X       | X                | X       | X           |             |       |          |          |
| MediaSensor              |                      |           | X       | X                | X       | X           |             |       |          |          |
| NavigationInfo           |                      |           |         |                  |         |             |             |       |          | X        |
| NormalInterpolator       |                      |           |         |                  |         |             |             |       |          | X        |
| OrderedGroup             | X                    | X         | X       | X                | X       | X           | X           |       |          | X        |

| Scene Graph Tools        | Scene Graph Profiles |           |         |                  |         |             |             |       |          |          |
|--------------------------|----------------------|-----------|---------|------------------|---------|-------------|-------------|-------|----------|----------|
|                          | Basic 2D             | Simple 2D | Core 2D | Extended Core 2D | Main 2D | Advanced 2D | Complete 2D | Audio | 3D Audio | Complete |
| OrientationInterpolator  |                      |           |         |                  |         |             |             |       | X        | X        |
| PathLayout               |                      |           |         |                  |         |             |             |       |          |          |
| PerceptualParameters     |                      |           |         |                  |         |             |             |       | X        |          |
| PlaneSensor2D            |                      |           |         |                  | X       | X           | X           |       |          | X        |
| PlaneSensor              |                      |           |         |                  |         |             |             |       |          | X        |
| PositionAnimator         |                      |           |         |                  |         |             |             |       |          |          |
| PositionAnimator2D       |                      |           |         |                  |         |             |             |       |          |          |
| PositionInterpolator     |                      |           |         |                  |         |             |             |       | X        | X        |
| PositionInterpolator2D   |                      |           | X       | X                | X       | X           | X           |       |          | X        |
| PositionInterpolator4D   |                      |           |         |                  |         |             |             |       |          |          |
| ProximitySensor          |                      |           |         |                  |         |             |             |       | X        | X        |
| ProximitySensor2D        |                      |           |         |                  | X       | X           | X           |       |          | X        |
| QuantizationParameter    |                      |           | X       | X                | ?       | X           | X           |       | X        | X        |
| ScalarAnimator           |                      |           |         |                  |         |             |             |       |          |          |
| ScalarInterpolator       |                      |           | X       | X                | X       | X           | X           |       |          | X        |
| Script                   |                      |           |         |                  |         | X           |             |       | X        | X        |
| ServerCommand            |                      |           | X       | X                | X       | X           |             |       |          |          |
| Sound                    |                      |           |         |                  |         |             |             | X     | X        | X        |
| Sound2D                  | X                    | X         | X       | X                | X       | X           | X           |       | X        | X        |
| SphereSensor             |                      |           |         |                  |         |             |             |       |          | X        |
| Storage                  |                      |           |         | X                |         |             |             |       |          |          |
| Switch                   |                      |           | X       | X                | X       | X           | X           |       | X        | X        |
| TemporalTransform        |                      |           |         |                  | X       | X           |             |       |          |          |
| TemporalGroup            |                      |           |         |                  | X       | X           |             |       |          |          |
| TermCap                  |                      |           |         |                  |         | X           | X           |       | X        | X        |
| TimeSensor               |                      |           | X       | X                | X       | X           | X           |       | X        | X        |
| TouchSensor              |                      |           | X       | X                | X       | X           | X           |       | X        | X        |
| Transform                |                      |           |         |                  |         |             |             |       | X        | X        |
| Transform2D              |                      | X         | X       | X                | X       | X           | X           |       |          | X        |
| Transform3DAudio         |                      |           |         |                  |         |             |             |       |          |          |
| TransformMatrix2D        |                      |           |         | X                |         |             |             |       |          |          |
| Valuator                 |                      |           | X       | X                | X       | X           | X           |       | X        | X        |
| Viewpoint                |                      |           |         |                  |         |             |             |       | X        | X        |
| Viewport                 |                      |           |         | X                |         |             |             |       |          |          |
| VisibilitySensor         |                      |           |         |                  |         |             |             |       | X        | X        |
| WorldInfo                |                      |           |         | X                |         | X           | X           |       | X        | X        |
| Node Update              |                      |           | X       | X                | X       | X           | X           |       | X        | X        |
| Route Update             |                      |           | X       | X                | X       | X           | X           |       | X        | X        |
| Scene Update             |                      | X         | X       | X                | X       | X           | X           | X     | X        | X        |
| ROUTE                    |                      |           | X       | X                | X       | X           | X           |       | X        | X        |
| PROTO                    |                      |           |         | X                |         | X           |             |       |          |          |
| Extended Updates         |                      |           |         | X                |         |             |             |       |          |          |
| Interpolator Compression |                      |           |         |                  |         |             |             |       |          |          |
| PredictiveMF coding      |                      |           |         |                  |         | X           |             |       |          |          |

NOTE Extended Updates comprise the following scene updates: PROTOlist, PROTOlistDeletion, removal of all protos, MultipleIndexedFieldReplacement, MultipleFieldReplacement, GlobalQuantizationConfiguration, NodeDeletionEx, ExtendedReplace, ReplaceFromExternalData, ReplaceToExternalData.

In 7.9.2.4, Table 44, replace the line:

|           |                      |   |
|-----------|----------------------|---|
| 0x14-0x7F | reserved for ISO use | - |
|-----------|----------------------|---|

with the lines:

|           |                      |    |
|-----------|----------------------|----|
| 0x14      | ExtendedCore2D       | L1 |
| 0x15-0x7F | reserved for ISO use | -  |

In 7.9.2.4, add the following new subclause:

**7.9.2.4.10 Levels for the ExtendedCore2D Scene Graph Profile**

**7.9.2.4.10.1 Functionalities provided**

The ExtendedCore2D Scene Graph profile comprises all Core 2D Scene Graph functionalities. The ExtendedCore2D Scene Graph profile allows in addition: advanced 2D composition, advanced local interaction.

**7.9.2.4.10.2 Level 1**

The following restrictions apply for the XCore2D Scene Graph Profile at Level 1:

**Table AMD7.3 — Restrictions for ExtendedCore2D Scene Graph Profile at Level 1**

| Nodes                    | Restrictions  |
|--------------------------|---|
| Anchor                   | <i>addChildren</i> and <i>removeChildren</i> not supported<br>31 <i>children</i> maximum allowed  |
| AudioClip                | <i>pitch</i> , <i>description</i> ignored   |
| AudioSource              | <i>addChildren</i> , <i>removeChildren</i> , <i>children</i> , <i>pitch</i> , <i>speed</i> , <i>numChan</i> , <i>phaseGroup</i> not supported (no rewind nor fast forward)  |
| CacheTexture             | <i>repeatS</i> , <i>repeatT</i> not supported   |
| ColorInterpolator        | 255 key-value pairs   |
| CompositeTexture2D       | No scene commands or ROUTEs connected to the node or a node in the subtree of the node; an implementation is allowed to cache the rasterized version of the node and discard the node subtree.  |
| Conditional              | No restriction  |
| CoordinateInterpolator2D | 31 coordinates per <i>keyValue</i><br>255 key-value pairs   |
| EnvironmentTest          | <i>No restrictions</i>  |
| ImageTexture             | <i>repeatS</i> , <i>repeatT</i> not supported   |
| Inline                   | No restriction  |
| InputSensor              | restriction to mice, keyboards, remote controls   |
| Layer2D                  | <i>addChildren</i> , <i>removeChildren</i> not supported<br>31 <i>children</i> maximum allowed<br>Background and viewport nodes only allowed as fields of the Layer2D node. Any Background2D or Viewport node present in the subtree of the Layer2D shall be ignored. |

| Nodes                  | Restrictions   |
|------------------------|--|
| Layout                 | addChildren, removeChildren not supported<br>31 children maximum allowed<br>scroll fields supported ?<br>Only text children are supported. Text children shall only be present once on screen at the same time. Size not animatable nor updatable. |
| MediaControl           | <i>mediaSpeed</i> not supported (no rewind nor fast forward)<br>31 <i>url</i> maximum  |
| MediaSensor            | <i>Info</i> ignored  |
| MovieTexture           | <i>speed</i> ignored (no rewind nor fast forward)<br><i>repeatS</i> , <i>repeatT</i> not supported   |
| Node Update            | Add and remove commands for addChildren and removeChildren fields are not supported  |
| OrderedGroup           | <i>addChildren</i> and <i>removeChildren</i> not supported<br>31 <i>children</i> maximum allowed   |
| PositionInterpolator2D | 255 key-value pairs  |
| QuantizationParameter  | No restriction   |
| ROUTE                  | No restriction   |
| ROUTE Update           | No restriction   |
| ScalarInterpolator     | 255 key-value pairs  |
| Scene Update           | All updates and Extended Updates   |
| ServerCommand          | No restriction   |
| Storage                | No restriction   |
| Sound2D                | <i>Intensity</i> , <i>spatialize</i> , <i>location</i> not supported   |
| Switch                 | No restriction   |
| TimeSensor             | Ignored if <i>cycleInterval</i> < 0.03 second  |
| TouchSensor            | No restriction   |
| Transform2D            | <i>addChildren</i> and <i>removeChildren</i> not supported.<br>31 <i>children</i> maximum allowed.   |
| TransformMatrix2D      | <i>addChildren</i> and <i>removeChildren</i> not supported.<br>31 <i>children</i> maximum allowed.   |
| Valuator               | No restriction   |
| Viewport               | Only 1 Viewport node allowed in a context (a scene, a Layer2D node or a CompositeTexture node)<br><i>set_bind</i> , <i>bindTime</i> , <i>isBound</i> are not supported.  |
| WorldInfo              | No restriction   |
| PROTO                  | Nested proto declarations and nested protos are forbidden. DEF/USE nodes are not allowed within a proto.   |

The maximum number of nodes that is allowed in a scene compliant with the ExtendedCore2D Scene Graph Profile @ Level 1 is 8,191 including all instances of these nodes through Inline, DEF/USE or PROTO mechanism.

In 7.9.3.3, replace Table 61 with the following:

| Graphics Tools             | Graphics Profiles |               |         |                 |             |             |          |          |
|----------------------------|-------------------|---------------|---------|-----------------|-------------|-------------|----------|----------|
|                            | Simple2D          | Simple2D+Text | Core 2D | ExtendedCore 2D | Advanced 2D | Complete 2D | 3D Audio | Complete |
| AcousticMaterial           |                   |               |         |                 |             |             | X        |          |
| Appearance                 | X                 | X             | X       | X               | X           | X           | X        | X        |
| Background                 |                   |               |         |                 |             |             |          | X        |
| Background2D               |                   | X             | X       | X               | X           | X           |          | X        |
| BAP                        |                   |               |         |                 |             |             |          |          |
| BDP                        |                   |               |         |                 |             |             |          |          |
| Bitmap                     | X                 | X             | X       | X               | X           | X           |          | X        |
| Body                       |                   |               |         |                 |             |             |          |          |
| BodyDefTable               |                   |               |         |                 |             |             |          |          |
| BodySegment ConnectionHint |                   |               |         |                 |             |             |          |          |
| Box                        |                   |               |         |                 |             |             |          | X        |
| Circle                     |                   |               | X       | X               | X           | X           |          | X        |
| Color                      |                   |               | X       | X               | X           | X           |          | X        |
| Cone                       |                   |               |         |                 |             |             |          | X        |
| Coordinate                 |                   |               |         |                 |             |             | X        | X        |
| Coordinate2D               |                   |               | X       | X               | X           | X           |          | X        |
| Curve2D                    |                   |               |         | X               | X           | X           |          | X        |
| Cylinder                   |                   |               |         |                 |             |             |          | X        |
| DirectionalLight           |                   |               |         |                 |             |             |          | X        |
| ElevationGrid              |                   |               |         |                 |             |             |          | X        |
| Ellipse                    |                   |               |         | X               |             |             |          |          |
| Expression                 |                   |               |         |                 |             |             |          | X        |
| Extrusion                  |                   |               |         |                 |             |             |          | X        |
| Face                       |                   |               |         |                 |             |             |          | X        |
| FaceDefMesh                |                   |               |         |                 |             |             |          | X        |
| FaceDefTable               |                   |               |         |                 |             |             |          | X        |
| FaceDefTransform           |                   |               |         |                 |             |             |          | X        |
| FAP                        |                   |               |         |                 |             |             |          | X        |
| FDP                        |                   |               |         |                 |             |             |          | X        |
| FIT                        |                   |               |         |                 |             |             |          | X        |
| Fog                        |                   |               |         |                 |             |             |          | X        |
| FontStyle                  |                   | X             | X       | X               | X           | X           |          | X        |
| Hierarchical3Dmesh         |                   |               |         |                 |             |             |          |          |
| IndexedFaceSet             |                   |               |         |                 |             |             | X        | X        |
| IndexedFaceSet2D           |                   |               | X       | X               | X           | X           |          | X        |
| IndexedLineSet             |                   |               |         |                 |             |             |          | X        |
| IndexedLineSet2D           |                   |               |         |                 | X           | X           |          | X        |
| LineProperties             |                   |               |         | X               | X           | X           |          | X        |
| LinearGradient             |                   |               |         | X               |             |             |          |          |
| Material                   |                   |               |         |                 |             |             |          | X        |
| Material2D                 |                   | X             | X       | X               | X           | X           |          | X        |
| MaterialKey                |                   |               |         |                 | X           |             |          |          |
| MatteTexture               |                   |               |         |                 | X           |             |          |          |
| Normal                     |                   |               |         |                 |             |             | X        | X        |
| PixelTexture               |                   |               | X       | X               | X           | X           |          | X        |
| PointLight                 |                   |               |         |                 |             |             |          | X        |
| PointSet                   |                   |               |         |                 |             |             |          | X        |

| Graphics Tools    | Graphics Profiles |                   |            |                    |                |                |             |          |
|-------------------|-------------------|-------------------|------------|--------------------|----------------|----------------|-------------|----------|
|                   | Simple2D          | Simple2D<br>+Text | Core<br>2D | ExtendedCore<br>2D | Advanced<br>2D | Complete<br>2D | 3D<br>Audio | Complete |
| PointSet2D        |                   |                   |            |                    |                | X              |             | X        |
| RadialGradient    |                   |                   |            | X                  |                |                |             |          |
| Rectangle         |                   | X                 | X          | X                  | X              | X              |             | X        |
| Shape             | X                 | X                 | X          | X                  | X              | X              | X           | X        |
| Sphere            |                   |                   |            |                    |                |                |             | X        |
| SpotLight         |                   |                   |            |                    |                |                |             | X        |
| Text              |                   | X                 | X          | X                  | X              | X              |             | X        |
| TextureCoordinate |                   |                   |            |                    | X              | X              |             | X        |
| TextureTransform  |                   |                   |            |                    | X              | X              |             | X        |
| Viseme            |                   |                   |            |                    |                |                |             | X        |
| XCurve2D          |                   |                   |            | X                  |                |                |             |          |
| XfontStyle        |                   |                   |            |                    |                |                |             |          |
| XlineProperties   |                   |                   |            | X                  |                |                |             |          |

In 7.9.3.4, Table 62, replace the line:

|           |                      |  |
|-----------|----------------------|--|
| 0x08-0x7F | reserved for ISO use |  |
|-----------|----------------------|--|

with:

|           |                        |    |
|-----------|------------------------|----|
| 0x08      | ExtendedCore2D profile | L1 |
| 0x09-0x7F | reserved for ISO use   |    |

In 7.9.3.4, insert the following new subclause:

#### 7.9.3.4.8 Levels for the ExtendedCore2D Graphics Profile

##### 7.9.3.4.8.1 Functionalities provided

The ExtendedCore2D Graphics profile comprises all Core 2D Scene Graphics functionalities. The ExtendedCore2D Graphics profile allows in addition the ability to draw ellipses, curves, lines and gradients.

7.9.3.4.8.2 Level 1

The following restrictions apply for the ExtendedCore2D Scene Graphics Profile at Level 1:

**Table AMD7.4 — Restrictions for ExtendedCore2D Graphics Profile at Level 1**

| <b>Nodes</b>     | <b>Restrictions</b>  |
|------------------|--|
| Appearance       | <i>textureTransform</i> not supported  |
| Background2D     | only 1 Background2D node allowed in a context (a scene, a Layer2D node or a CompositeTexture2D node). <i>set_bind</i> not supported  |
| Bitmap           | No restriction.  |
| Circle           | No texture mapping allowed   |
| Color            | 65535 <i>colors</i> maximum in the scene at a time   |
| Coordinate2D     | 65535 <i>points</i> maximum  |
| Curve2D          | 255 <i>Curve2D</i> or <i>XCurve2D</i> nodes maximum in a scene. 65 535 total elements in all type fields in the scene. No texture mapping allowed  |
| Ellipse          | No texture mapping allowed   |
| FontStyle        | No restriction   |
| IndexedFaceSet2D | 255 IndexedFaceSet2D nodes maximum in a scene<br>65 535 total indices maximum in all index fields in the scene<br>Face list shall be well-defined as follows :<br>1. Each face is terminated with -1, including the last face in the array<br>2. Each face contains at least three non-coincident vertices<br>3. A given coordIndex is not repeated in a face<br>4. The vertices of a face shall define a planar polygon<br>5. The vertices of a face shall not define a self-intersecting polygon |
| LineProperties   | No restriction   |
| LinearGradient   | No restriction   |
| Material2D       | No restriction   |
| PixelTexture     | 32x32 maximum image size<br>8 PixelTexture nodes maximum in a scene at a time  |
| RadialGradient   | No restriction   |
| Rectangle        | If a natural texture (image, video) is mapped on the node, rectangle shall not be rotated  |
| Shape            | No restriction   |
| Text             | 6 480 characters maximum in the scene at a time. No texture mapping allowed. No rotations allowed.   |
| XCurve2D         | 255 <i>Curve2D</i> or <i>XCurve2D</i> nodes maximum in a scene.<br>65 535 total elements in all type fields in the scene.<br>No natural textures (image, video) allowed.<br>Segment type "elliptical arc" is not allowed   |
| XLineProperties  | <i>texture</i> and <i>textureTransform</i> are not supported<br>No texturing (gradients or natural images) allowed.<br>No animatable or updatable dash patterns. Dash offset not supported.  |

In 8.2.8, add the following at the end of the subclause:

```
NodeData getNodeFromMFField (FieldData field, int position);
```

Returns the node located at the given position for the MFNode field identified by the specified field.

In 8.6.6.1, add the following cases:

```

case 7:
    ExtendedReplace xReplace();
    break;
case 8:
    ReplaceToExternalData replaceTo();
    break;
case 9:
    ReplaceFromExternalData replaceFrom();
    break;

```

Add the following new subclauses and renumber subsequent 8.6.n subclauses:

## 8.6.13 ExtendedReplace

### 8.6.13.1 Syntax

```

class ExtendedReplace () {
    int position;
    boolean forceSF = false;

    FieldData targetField;
    bit(BIFSConfiguration.nodeIDbits) targetNodeID;
    NodeData targetNode = GetNodeFromID(targetNodeID);
    int(targetNode.nINbits) inID;
    targetField = targetNode.field[ targetNode.in2all[inID] ];

    if (!isSF(targetField) ) {
        bit (1) indexedReplacement;
        if (indexedReplacement) {
            bit (1) dynamicIndex;
            if (dynamicIndex) {
                bit(BIFSConfiguration.nodeIDbits) idxNodeID ;
                NodeData idxNode = GetNodeFromID(idxNodeID);
                int(idxNode.nDEFbits) defID;
                idxField = idxNode.field[ idxNode.def2all[defID] ];
                position = 0;
                switch (idxField.fieldType) {
                    case SFInt32:
                        //if field value is >=0, position is field value, otherwise position is 0
                        break;
                    case SFBool:
                        //if field value is true, position is 1, otherwise position is 0
                        break;
                    case SFFloat:
                        //if field value is >=0, position is floor(field value) , otherwise position is 0
                        break;
                    case SFTime:
                        //if field value is >=0, position is floor(field value) , otherwise position is 0
                        break;
                    default: //other field types default to position = 0
                        break;
                }
            } else {
                bit(2) replacementPosition;
                switch (replacementPosition) {
                    case 0: // replacement at a specified position
                        bit (16) idx;
                        position = idx;
                        break;
                    case 2: // replacement at the beginning of the field
                        break;
                    case 3: // replacement at the end of the field
                        break;
                }
            }
        }
    }
}

```