INTERNATIONAL STANDARD

ISO/IEC
14496-5

Information technology — Coding of audio-visual objects —

Part 5:
Reference software

AMENDMENT 29: Reference software for LASeR presentation and modification of structured information (PMSI) tools

Technologies de l'information — Codage des objets audiovisuels —

Partie 5: Logiciel de référence

AMENDEMENT 29: Logiciel de référence pour la présentation LASeR et la modification des outils d'information structurée (PMSI)

Foreword

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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.

Amendment 29 to ISO/IEC 14496-5:2001 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This Amendment introduces Reference Software for LASeR PMSI Tools. This Amendment deals with the reference software of ISO/IEC 14496-20:2008/Amd.3.

Information technology — Coding of audio-visual objects —

Part 5:
Reference software

AMENDMENT 29: Reference software for LASeR presentation and modification of structured information (PMSI) tools

At the end of Clause 5, add the following line:

Systems/LASeR_RS_v3/src   LASeR and SAF decoder for Presentation and Modification of Structured Information

At the end of B.3, add the following line:

Systems/LASeR_RS_v3/M3RP   LASeR and SAF renderer for Presentation and Modification of

Change Annex F to Annex G.

Change Annex G to Annex H.

Add the following new Annex F before Annex G:

Annex
(informative)

Guidance of reference software for LASeR presentation and modification of structured information tools

F.1 Introduction

This is the description of the reference software for ISO/IEC 14496-20:2009/Amd.3 (LASeR PMSI: Presentation and Modification of Structured Information). The LASeR AMD3 Reference software is attached to this Part of ISO/IEC 14496. The reference software consists of the following tools:

- LASeR decoder, which is to generate LASeR XML files from LASeR binary stream.

- LASeR file parser, which is to manage the scene tree and events from LASeR XML files.

- LASeR renderer, which is to render and play a LASeR scene.

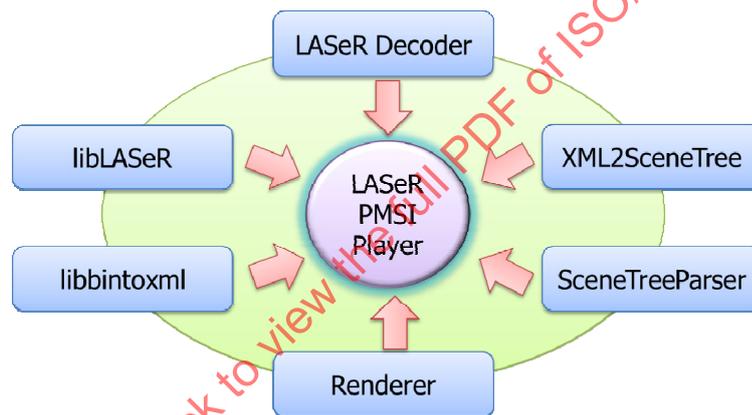The structure of LASeR PMSI reference software is as follows.

Figure F.1 — Structure of LASeR PMSI Reference Software

The LASeR player is linked with two static libraries such as libLASeR and libbintoxml, and the other dynamic ones such as LASeRDecoder, XML2SceneTree, SceneTreeParser and Render as shown in Figure F.1. By using these libraries, the LASeR player produces SceneTree from different file types such as xml, lsr files, and then, converts the SceneTree into a LASeR SceneTree. Finally, the player renders the scene according to the LASeR SceneTree.

F.2 Reference Software

The PMSI mechanism provides two distinctive functionalities for Structured Information (SI): presentation and modification. Therefore, the LASeR PMSI Reference Software can access SI from PI (Presentation Information) by two functionalities as follows:

- READ: Accessing SI from PI to reuse what is already defined in SI.

- WRITE: Updating SI from PI to reflect what happens in the scene.

Also, the elements provided by the LASeR PMSI Reference Software are as follows:

- **mpeg-pmsi() scheme**: Pointing scheme using XPath-based addressing.
- **SVG tref element:** Referencing the textual content
- **LASeR externalReference element:** Updating enclosed elements and attributes periodically.
- **LASeR externalUpdate element:** Modifying defined structured information.
- **LASeR xmlUpdate event**: Informing the update of structured information

F.3 Description of how to compile and run the LASeR PMSI Reference Software

F.3.1 How to build the code

This program has been developed using Microsoft's Visual studio 2008 under Windows XP or above OS. To build the program,

1)   Unzip a LASeR_RS_v3.zip file.

2)   Double-click on a M3R.sin file in the '\build \VC9' folder

3)   Right button click on the LASeRPlayer in the solution explorer

4)   Choose the 'Set as Start Up' menu

5)   Click on the 'solution build' menu (F7)

6)   Copy the files (libcairo-2.dll, libpng12-0.dll, zlib1.dll) in the '\dll' folder

7)   Paste the files (libcairo-2.dll, libpng12-0.dll, zlib1.dll) in the '\bin \w32rel folder

8)   Copy the files (libDeSAF.dll, libMP4.dll) in the '\dll \VC9' folder

Paste the files (libDeSAF.dll, libMP4.dll) in the '\bin \w32rel folder

F.3.2 How to run the code

To run the program,

1)   Double-click on the LASeRPlayer.exe

2)   Choose the 'File' menu

3)   Click on the xml content (.xml) or the binary stream content (.lsr)

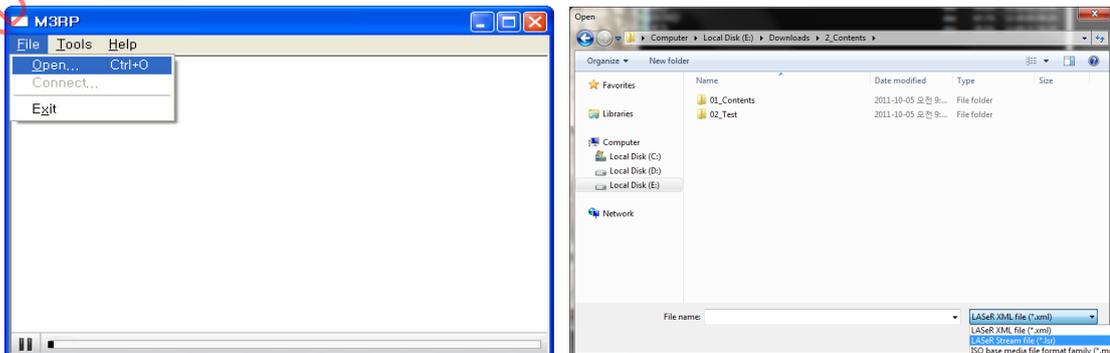Figure F.2 shows the graphic user interface of LASeR PMSI Reference Software.

Figure F.2 — GUI of LASeR PMSI Reference Software

F.4 Demonstration

F.4.1 externalReference.lsr

Figure F.3 shows an example for referencing mechanism using LASeR externalReference element. It presents the local or remote metadata separately from the scene description in a scene.

```
LASeRML

<lsr:externalReference id="2" updateInterval="10">
  <text font-family="Tahoma" font-size="14" fill="rgb(0,0,0)" x="10" y="40">This is a PMSI 'externalReference' example.</text>
  <text id="3" fill-opacity="1" font-family="Tahoma" font-size="20" fill="rgb(255,0,0)" x="10" y="80">
    <tref xlink:href="c:/Resource/test_DI.xml#pmsi(//mpeg7:FreeTextAnnotation/text())" />
  </text>
</lsr:externalReference>
```

```
Metadata – test_DI.xml

<Description xsi:type="CreationDescriptionType">
  <CreationInformation>
    <Creation>
      <Title type="main" xml:lang="ko">EBS</Title>
      <Title type="secondary" xml:lang="ko">1-subject</Title>
      <TitleMedia>
        <TitleImage>
          <MediaUri>c:/Resource/shrek.png</MediaUri>
        </TitleImage>
      </TitleMedia>
      <Abstract>
        <FreeTextAnnotation xml:lang="en">This is the ISO/IEC 14496-20 AMD3 Ref. software</FreeTextAnnotation>
      </Abstract>
```
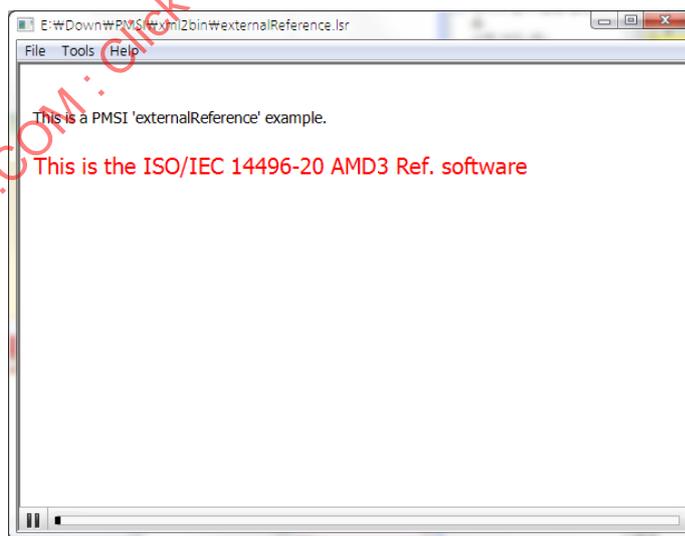

Figure F.3 — An Example of the LASeR externalReference element

F.4.2 externalUpdate.lsr

Figure F.4 shows the modification of the local or remote metadata using LASeR externalUpdate element.

- If the '1' or '2' keys are pressed, the referenced structured information will be changed to new one assigned to each key press action.
- If the '3' key is pressed, the referenced structured information will be removed.

LASeR ML

```
<lsr:externalUpdate id="3" updateInterval="none" type="replace" attributeName="textContent" value="This is the ISO/IEC
    14496-20 AMD3 Ref. software" xlink:href="c:/Resource/test_DI.xml#pmsi(//mpeg7:FreeTextAnnotation/text())" />
<lsr:externalUpdate id="4" updateInterval="none" type="replace" attributeName="textContent" value="This is an english
    language education program." xlink:href="c:/Resource/test_DI.xml#pmsi(//mpeg7:FreeTextAnnotation/text())" />
<lsr:externalUpdate id="5" updateInterval="none" type="delete" attributeName="textContent"
    xlink:href="c:/Resource/test_DI.xml#pmsi(//mpeg7:FreeTextAnnotation/text())" />
</g>
<ev:listener event="accessKey(1)" handler="#3" enabled="true" />
<ev:listener event="accessKey(2)" handler="#4" enabled="true" />
<ev:listener event="accessKey(3)" handler="#5" enabled="true" />
```

(a) LASeRML

Metadata - The '1' key is pressed.

```
<Description xsi:type="CreationDescriptionType">
 - <CreationInformation>
   - <Creation>
       <Title type="main" xml:lang="ko">EBS</Title>
       <Title type="secondary" xml:lang="ko">1-subject</Title>
     - <TitleMedia>
       - <TitleImage>
           <MediaUri>c:/Resource/shrek.png</MediaUri>
         </TitleImage>
       </TitleMedia>
     - <Abstract>
         <FreeTextAnnotation xml:lang="en">This is the ISO/IEC 14496-20 AMD3 Ref. software</FreeTextAnnotation>
       </Abstract>
```
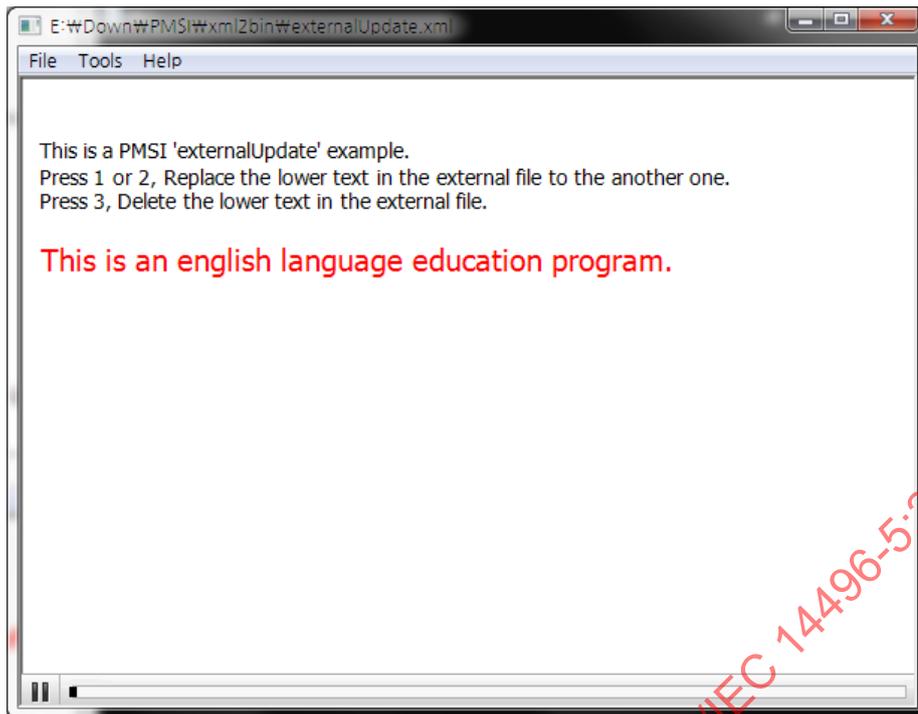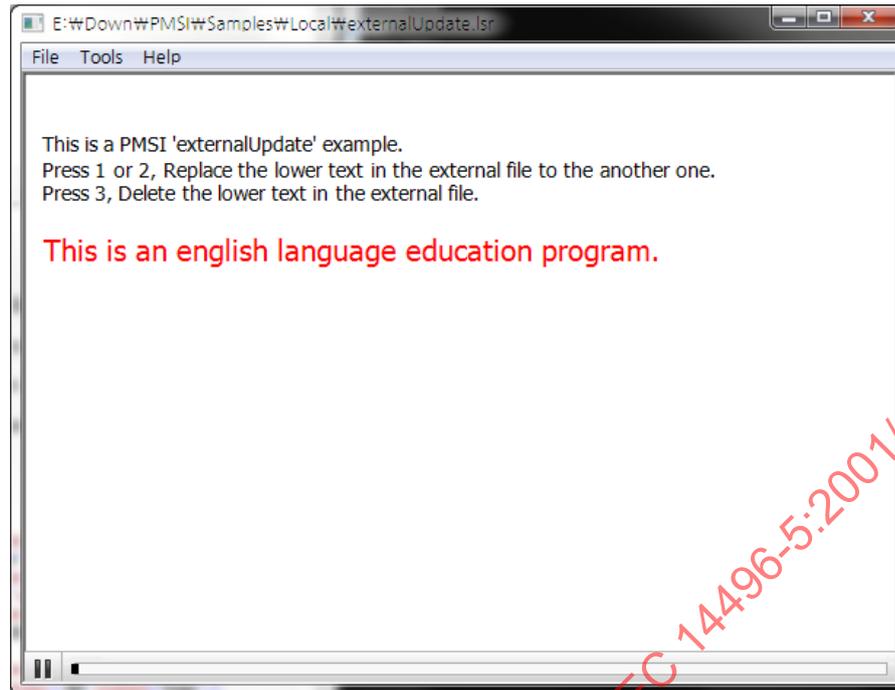
(b) An example when the '1' key is pressed

Metadata - The '2' key is pressed.

```
<Description xsi:type="CreationDescriptionType">
 - <CreationInformation>
   - <Creation>
       <Title type="main" xml:lang="ko">EBS</Title>
       <Title type="secondary" xml:lang="ko">1-subject</Title>
     - <TitleMedia>
       - <TitleImage>
           <MediaUri>c:/Resource/shrek.png</MediaUri>
         </TitleImage>
       </TitleMedia>
     - <Abstract>
         <FreeTextAnnotation xml:lang="en">This is an english language education program.</FreeTextAnnotation>
       </Abstract>
```
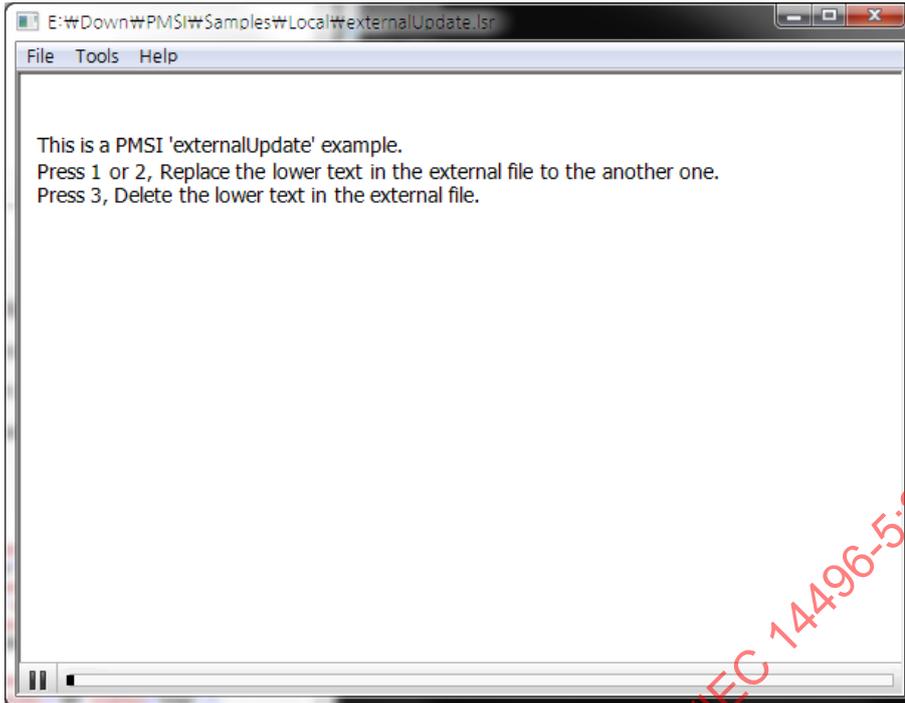
(c) An example when the '2' key is pressed

Metadata - The '3' key is pressed.

```xml
<Description xsi:type="CreationDescriptionType">
 - <CreationInformation>
   - <Creation>
      <Title type="main" xml:lang="ko">EBS</Title>
      <Title type="secondary" xml:lang="ko">1-subject</Title>
    - <TitleMedia>
      - <TitleImage>
         <MediaUri>c:/Resource/shrek.png</MediaUri>
        </TitleImage>
      </TitleMedia>
    - <Abstract>
       <FreeTextAnnotation xml:lang="en" />
      </Abstract>
```

This is a PMSI 'externalUpdate' example.
Press 1 or 2, Replace the lower text in the external file to the another one.
Press 3, Delete the lower text in the external file.

(d) An example when the '3' key is pressed

Figure F.4 — An Example of the LASeR externalUpdate element

F.4.3 safRSH_image.lsr, safRSH_video.lsr

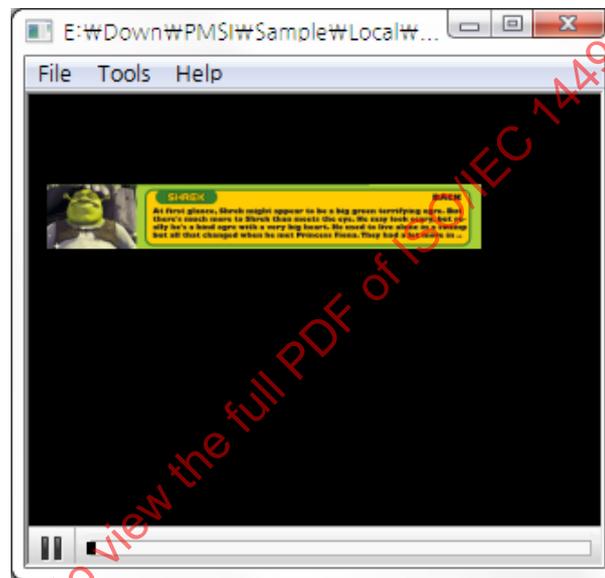Figure F.5 shows the image or video rendering using the referenced metadata information.

```
LASeR ML

<saf:RemoteStreamHeader streamID="Stream1" objectTypeIndication="108" streamType="4" source="c:/Resource/test_DI.xml#pmsi
  (//mpeg7:TitleMedia/mpeg7:TitleImage/mpeg7:MediaUri/text())" />
<saf:sceneUnit>
 - <lsr:NewScene>
  - <svg id="1" height="240" viewBox="0 0 320 240" width="320">
   - <g>
      <image id="2" height="36" type="image/jpg" width="240" x="10" y="50" xlink:href="stream:Stream1" />
```

Metadata

```
<Description xsi:type="CreationDescriptionType">
 - <CreationInformation>
   - <Creation>
       <Title type="main" xml:lang="ko">EBS</Title>
       <Title type="secondary" xml:lang="ko">1-subject</Title>
     - <TitleMedia>
       - <TitleImage>
           <MediaUri>c:/Resource/shrek.png</MediaUri>
         </TitleImage>
       </TitleMedia>
```
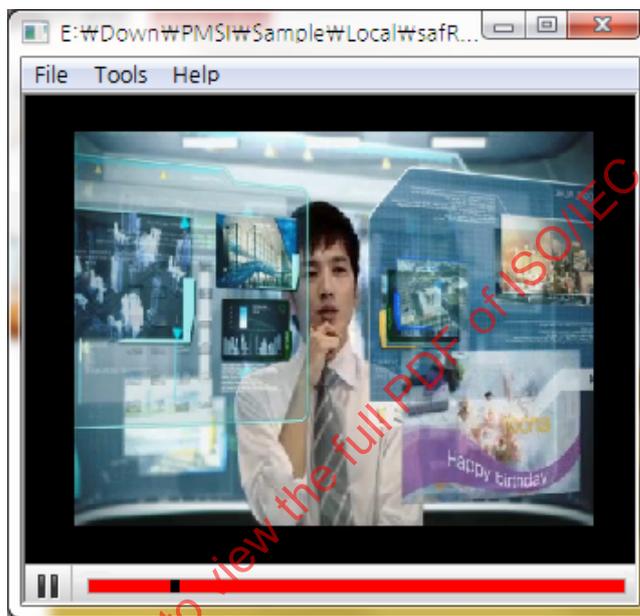

(a) Image rendering using PMSI

LASeR ML

```
<saf:RemoteStreamHeader streamID="Stream1" objectTypeIndication="33" streamType="4" source="c:/Resource/test_RV.xml#pmsi
    (//mpeg7:Target/mpeg7:Video/mpeg7:MediaLocator/mpeg7:MediaUri/text())" />
<saf:sceneUnit>
  <lsr:NewScene>
  - <svg id="1" height="260" width="340">
    - <g>
        <video id="2" height="240" width="320" x="10" y="10" xlink:href="stream:Stream1" />
```

Metadata

```
<Description xsi:type="ViewDescriptionType">
 - <View xsi:type="ResolutionViewType">
   - <Target>
     - <Video>
       - <MediaLocator>
           <MediaUri>c:/Resource/etri.mp4</MediaUri>
         </MediaLocator>
       </Video>
     </Target>
```


(b) Video rendering using PMSI

Figure F.5 — An Example of the pmsi scheme

F.4.4 xmlUpdate.lsr

Figure F.6 shows the demonstration for the LASeR xmlUpdate event. When the referenced metadata information is changed, the client updates the scene information.

LASeR ML

```
 - <text id="1" font-family="tahoma" font-size="20" fill="rgb(255,255,255)" x="10" y="80">
     <tref id="2" xlink:href="c:/Resource/test_DI.xml#pmsi(//mpeg7:FreeTextAnnotation/text())" />
   </text>
</g>
<ev:listener event="xmlUpdate" handler="#1" observer="2" enabled="true" />
```

(a) LASeRML

Metadata

```
<Description xsi:type="CreationDescriptionType">
- <CreationInformation>
  - <Creation>
    <Title type="main" xml:lang="ko">EBS</Title>
    <Title type="secondary" xml:lang="ko">1-subject</Title>
    - <TitleMedia>
      - <TitleImage>
        <MediaUri>c:/Resource/shrek.png</MediaUri>
      </TitleImage>
    </TitleMedia>
    - <Abstract>
      <FreeTextAnnotation xml:lang="en">This is the ISO/IEC 14496-20 AMD3 Ref. software</FreeTextAnnotation>
    </Abstract>
```
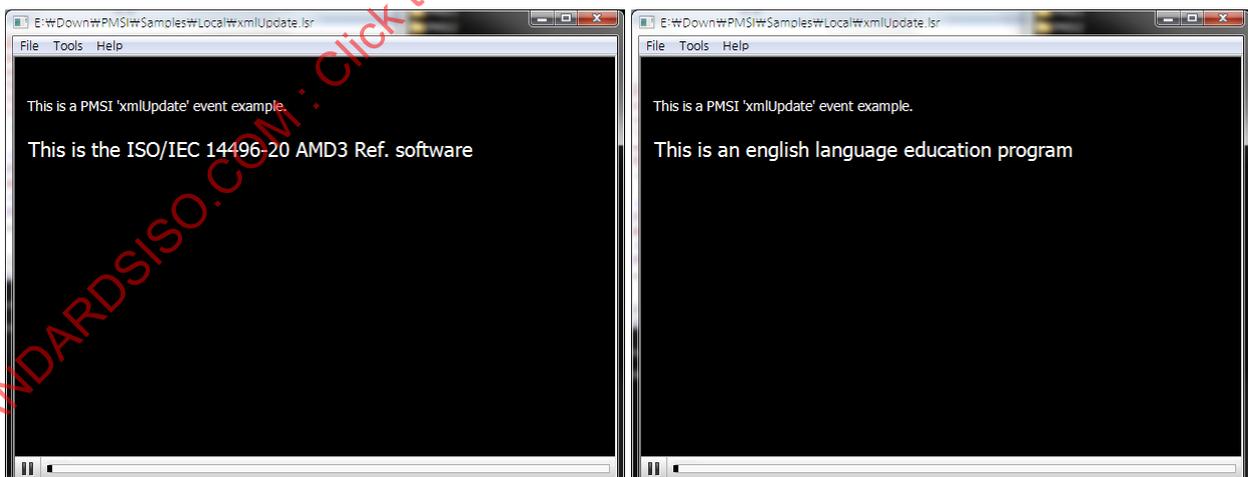
(b) Orginal metadata

```
<Description xsi:type="CreationDescriptionType">
- <CreationInformation>
  - <Creation>
    <Title type="main" xml:lang="ko">EBS</Title>
    <Title type="secondary" xml:lang="ko">1-subject</Title>
    - <TitleMedia>
      - <TitleImage>
        <MediaUri>c:/Resource/shrek.png</MediaUri>
      </TitleImage>
    </TitleMedia>
    - <Abstract>
      <FreeTextAnnotation xml:lang="en">This is an english language education program.</FreeTextAnnotation>
    </Abstract>
```

(c) Changed metadata

(d) Results when metadata is changed

Figure F.6 — An Example of the xmlUpdate event

F.4.5 epg.lsr

Figure F.7 shows an electronic program guide example using LASeR PMSI as a scene description and T-DMB metadata as structured information.

1) Click the 'myTV' button for EPG serivces as shown in Figure F.7(c).

2) Select the program that you want in the EPG menu. The detailed information will be displayed as shown in Figure F.7(d).

3) If you click the play button, the video will be started as shown in Figure F.7(e).

LASeR ML

```
<saf:RemoteStreamHeader streamID="Stream3" objectTypeIndication="108" streamType="4" source="c:/Resource/ETRI_PBS1.xml#pmsi
  (//dtva:ProgramInformation1/dtva:BasicDescription/dtva:MediaTitle/dmpeg7:TitleImage/dmpeg7:MediaUri/text())" />

<image id="9" fill-opacity="1" height="200" type="image/jpg" width="265" x="59" y="156" xlink:href="stream:Stream3">
 <set attributeName="visibility" begin="8.click" fill="freeze" to="visible" enabled="true" />
 <set attributeName="visibility" begin="10.click" fill="freeze" to="hidden" enabled="true" />
 <set attributeName="visibility" begin="11.click" fill="freeze" to="hidden" enabled="true" />
 <set attributeName="visibility" begin="12.click" fill="freeze" to="hidden" enabled="true" />
 <set attributeName="visibility" begin="13.click" fill="freeze" to="hidden" enabled="true" />
 <set attributeName="visibility" begin="14.click" fill="freeze" to="hidden" enabled="true" />
 <set attributeName="visibility" begin="15.click" fill="freeze" to="hidden" enabled="true" />
 <set attributeName="visibility" begin="16.click" fill="freeze" to="hidden" enabled="true" />
 <set attributeName="visibility" begin="17.click" fill="freeze" to="hidden" enabled="true" />
 <set attributeName="visibility" begin="18.click" fill="freeze" to="hidden" enabled="true" />
 <set attributeName="visibility" begin="5.click" fill="freeze" to="hidden" enabled="true" />
</image>
<textArea id="19" fill-opacity="1" font-family="Tahoma" font-size="18" font-weight="normal" fill="rgb(255,255,255)" height="47" width="171" x="596" y="187">
 <tref xlink:href="c:/Resource/ETRI_PBS1.xml#pmsi(//dtva:ProgramInformation1/dtva:BasicDescription/dtva:Title/text())" />
 <set attributeName="visibility" begin="3.click" fill="freeze" to="visible" enabled="true" />
 <set attributeName="visibility" begin="5.click" fill="freeze" to="hidden" enabled="true" />
 <set attributeName="visibility" begin="6.click" fill="freeze" to="visible" enabled="true" />
```

(a) LASeRML

Metadata

```
<dtva:ProgramInformation1 programId="01">
 - <dtva:BasicDescription>
    <dtva:Title xml:lang="en">My Pitiful Sister</dtva:Title>
   - <dtva:MediaTitle>
     - <dmpeg7:TitleImage>
        <dmpeg7:MediaUri>c:/Resource/PMSI1/ETRI_PMSI1_1.png</dmpeg7:MediaUri>
      </dmpeg7:TitleImage>
    </dtva:MediaTitle>
    <dtva:Synopsis xml:lang="en">A heartwarming family story unfolds, revolving around the eldest sister who makes sacrifices for
      her younger sisters. In-ok, the eldest of three sisters becomes the breadwinner of a poverty-stricken family at the age of
      thirteen when her parents passed away. Despite abject poverty, In-ok is always optimistic and confident, and lives her life to
      the fullest. Much to her great disappointment, however, she finds that her second youngest sister, In-su, has a baby out of
      wedlock. After giving birth to a baby girl, In-su leaves for Germany to pursue her dream of becoming a doctor, leaving the
      burden of raising her child to In-ok alone. This is a tribute to every woman in the world who has struggled to endure all
      hardships and taken good care of family by sacrificing her own life.</dtva:Synopsis>
   - <dtva:Genre href="urn:tva:metadata:cs:ProgramGenreCS:2006:3.1">
      <dtva:Name>Drama</dtva:Name>
    </dtva:Genre>
   - <dtva:ParentalGuidance>
     - <dmpeg7:ParentalRating href="urn:tva:metadata:cs:ParentalRatingCS:2006:3">
        <dmpeg7:Name>12세이상시청가</dmpeg7:Name>
      </dmpeg7:ParentalRating>
    </dtva:ParentalGuidance>
   - <dtva:RelatedMaterial>
     - <dtva:MediaLocator>
        <dmpeg7:MediaUri>c:/Resource/PMSI1/a2.mp4</dmpeg7:MediaUri>
      </dtva:MediaLocator>
    </dtva:RelatedMaterial>
    <dtva:ProductionLocation>kr</dtva:ProductionLocation>
  </dtva:BasicDescription>
</dtva:ProgramInformation1>
```

(b) Metadata

(c) Initial screen

(d) EPG using LASeR PMSI

(e) Video rendering

Figure F.7 — An Example of the electronic service guide using LASeR PMSI

F.4.6 ETRI_book.lsr

Figure F.8 shows an electronic book serivce example using LASeR PMSI. If you press the specific key, the related page can be offered as shown in Figure F.8 (c)-(e).

(a) LASeRML

Metadata

```
<Creation>
  <Title1 type="main1" xml:lang="en">ETRIs Vision 2020</Title1>
  <Title2 type="main2" xml:lang="en">3 Major Goals</Title2>
- <TitleMedia>
  - <TitleImage>
      <MediaUri>c:/Resource/Rbook/Rbg1.png</MediaUri>
      <MediaUri1>c:/Resource/Rbook/cover_end.png</MediaUri1>
    </TitleImage>
  </TitleMedia>
- <Abstract>
    <FreeTextAnnotation1 xml:lang="en">The Worlds best leader in human technology</FreeTextAnnotation1>
    <FreeTextAnnotation2 xml:lang="en">The Leader in pleasant, convenient, and safe human-oriented IT convergence technology</FreeTextAnnotation2>
  </Abstract>
```
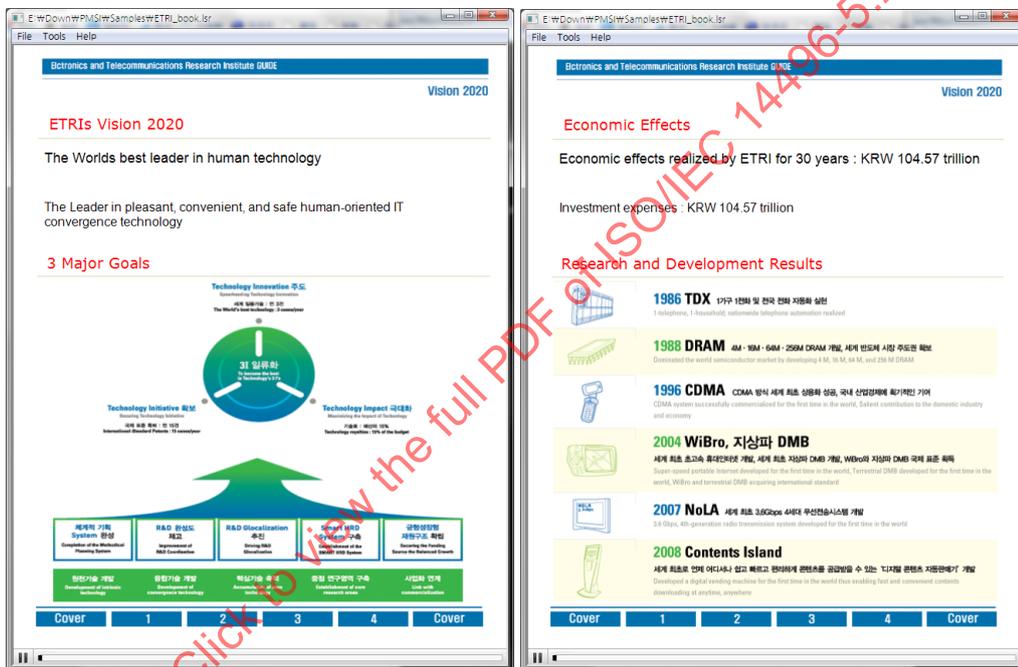
(b) Metadata