ITU Telecommunication Standardization Sector
Study Group 15
Experts Group for Video Coding and Systems in
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TITLE: VFS C&I semantics and procedures
PURPOSE: Proposal

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1. Introduction

Following the syntax for video frame synchronous command and indication (VFS C&I) agreed in the Yokosuka meeting[1], the sematntics of VFS C&I is proposed in this document.

2. Syntax of VFS C&I

The syntax for VFS C&I is shown in Table 1. ASN.1 PER (Packed Encoding Rule) is used as in H.245[2]. This information is packed in PES packets, and Program Time Stamp (PTS) is used for timing the event. Multiple **VideoFrameSynchronousCandIPDUs** can exist in a single PES packet. The PES packets including VFS C&I information are transmitted in the video synchronous subchannel of the ITU H.222.1 type C elementary stream as specified in H.222.1.

VFS C&I information is byte alligned by adding less than eight "0"s at the end of the encoded data in a PES packet. If this information is delivered in a Transport Stream (TS), the **stuffing_byte** field in the TS adaptation_field() defined in H.222.0 is used for alignment with the TS packets.

3. Semantics and procedures of VFS C&I

3.1 Specification of elementary streams

resourceID is present only in the case when a VFS C&I is applied to an Elementary Stream (ES) included in a different TS or Program Stream (PS).

An ES to which the VFS command or indication is applied (target ES) is specified using **ts-PID** if it is included in a TS. This field has the identical value with the **PID** field of the target ES, which is specified in H.222.0 Table 2-3[3].

A target ES included in a PS is specified using **streamID**. If the target ES is an ITU-T Rec H.222.1 type A-E stream, **StreamIDExtension** is used additionally. These fields have identical values with the **stream_id** and **stream_ID_extension** fields of the target ES, which are specified in H.222.0 Table 2-34 and H.222.1 Table 2[4].

3.2 Usage of individual VFS C&Is

"video freeze picture release control", "split screen indication", "document camera indication", and "closed caption" are currently defined as VFS C&Is. For the C&Is which can be signified at the video stream level (e.g. "video freeze picture release control", "split screen indication", and "document camera indication" fields are provided in H.261[5] and H.263[6] streams), the video synchronous subchannel is not used for transmission. The following are the usage of these VFS C&Is:

(a) Freeze picture release control

This command is signified by **videoFreezePictureReleaseControl** or the video freeze picture release control signal embedded in the video ES (i.e. H.261 or H.263). When a decoder receives **videoFreezePicture** specified in H.245, it should complete updating of the current video frame but subsequently display the frozen picture. The picture is frozen until **videoFreezePictureReleaseControl** is received or a timeout period of at least six seconds has expired (this specification is same as H.230 [7]). If a terminal or a multipoint control unit (MCU) wishes to continue the freezing of the picture at the remote end more than six seconds, it should sent **videoFreezePicture**/H.254 repeatedly with an appropriate period.

NOTE- When H.262 streams are switched by an MCU, the switched stream should start with an H.262 sequence_header().

Table 1. VFS C&I syntax.

```
VideoFrameSynchronousCandIPDU       ::=SEQUENCE SIZE (1.. 65535) OF
{
  elementaryStream                  CHOICE
  {
      ts-PID                        INTEGER (1..8191) OPTIONAL,
      ps-StreamID                   SEQUENCE OPTIONAL
      {
          streamID                  INTEGER (0..255),
          streamIDExtension         INTEGER (0..255) OPTIONAL
      }
    },
  resourceID                        INTEGER (0..65535) OPTIONAL,
  videoFrameSynchronousCommand      VideoFrameSynchronousCommand OPTIONAL,
  videoFrameSynchronousIndication   VideoFrameSynchronousIndication OPTIONAL,
  ...
}

VideoFrameSynchronousCommand        ::=SET
{
  nonStandard                       NonStandardParameter OPTIONAL,
  videoFreezePictureReleaseControl  NULL OPTIONAL, -- not used for H.261 or H.263 streams
  closedCaption                     OCTET STRING OPTIONAL,
  ...
}

VideoFrameSynchronousIndication     ::=SET
{
  nonStandard                       NonStandardParameter OPTIONAL,
  splitScreenIndication             NULL OPTIONAL, -- not used for H.261 or H.263 streams
  documentCameraIndication          NULL OPTIONAL, -- not used for H.261 or H.263 streams
  ...
}

-- The following lines are quoted from H.245

NonStandardParameter                ::=SEQUENCE
{
  nonStandardIdentifier             NonStandardIdentifier,
  data                              OCTET STRING
}

NonStandardIdentifier               ::=CHOICE
{
  object                            OBJECT IDENTIFIER,
  h221NonStandard                   SEQUENCE
  {
      t35CountryCode                INTEGER (0..255),
      t35Extension                  INTEGER (0..255),
      manufacturerCode              INTEGER (0..65535)
  }
}

END
```

(b) Closed caption

This information is trasmitted using the **closedCaption** field in the **OCTET STRING** format. The detailed usage of this command is defined in the specification of each individual application. The receiving terminal at least needs to have the ability to decode and ignore this information.

(c) Split-screen indication

This indication is signified by **splitScreenIndication** or the split screen indication signal embedded in the video ES (i.e. H.261 or H.263). The indication can be transmitted when the transmitted picture is in the split-screen state defined in H.100 [8]. An example of the response to this indication at the receiving terminal is presenting each of the splitted picture on separate monitors. The receiving terminal at least needs to have the ability to decode and ignore this indication.

(d) Document camera indication

This indication is signified by **documentCameraIndication** or the document camera indication signal embedded in the video ES (i.e. H.261 or H.263). The indication can be transmitted when the transmitted frame includes still picture information, e.g. documents. An example of the response to this indication at the receiving terminal is holding and presenting the still picture on a separate monitor. The receiving terminal at least needs to have the ability to decode and ignore this indication.

4. Conclusion

The semantics and procetures for VFS C&I has been proposed. In summary, the following VFS C&I functions are suggested to be mandatory for the H.310 terminal:

- The ability to respond correctly to the freeze picture release control signal as spcecified in 3.2 (a) of this document.
- The ability to at least decode and ignore the closed caption, split screen indication, and document camera indication signals.

References

[1] AVC-835, "Syntax for video frame synchronous C&I", Japan, Oct. 1995.
[2] ITU-T Draft Recommendation H.245, Oct. 1995.
[3] ITU-T Draft Recommendation H.222.0, Jan. 1995.
[4] ITU-T Draft Recommendation H.222.1, Oct. 1995.
[5] ITU-T Recommendation H.261, 1993.
[6] ITU-T Draft Recommendation H.263, Nov. 1995.
[7] ITU-T Recommendation H.100, 1988.
[8] Draft revision of ITU-T Recommendation H.230, Apr. 1994.

END