CLAIMS

1. A method implemented by a decoder for decoding a video bitstream, the method comprising:

obtaining the video bitstream, wherein the video bitstream comprises a coded video sequence (CVS) comprising a sequence of access units (AUs) containing a sequence of coded pictures;

decoding from the CVS an indication that a current picture is a gradual decoder refresh (GDR) picture contained in a GDR AU that starts the CVS; and

decoding from a picture header (PH) of the GDR picture an indication of a recovery point in the CVS, wherein the recovery point is associated with the GDR picture and the indication of the recovery point comprises an indication of the position of a recovery point picture in the sequence of coded pictures, wherein

decoding the indication of the recovery point in the CVS from the PH comprises obtaining the indication of the recovery point from a network abstraction layer (NAL) unit of type PH.

2. The method of claim 1, comprising:

determining a position of the GDR picture;

decoding, without outputting, the GDR picture and all pictures, if any, following the GDR picture in decoding order in the sequence of coded pictures until the recovery point picture is identified and decoded; and

outputting the decoded recovery point picture, thereby refreshing a decoding of the video bitstream.

3. The method of claim 1, wherein decoding from the CVS the indication that the current picture is a GDR picture contained in a GDR AU that starts the CVS comprises obtaining the indication from a NAL unit of a type associated with the GDR picture.

4. The method of claim 1, wherein decoding from the CVS an indication that the current picture is a GDR picture contained in a GDR AU that starts the CVS comprises decoding a syntax element from a PH type of NAL unit.

5. The method of claim 1, wherein obtaining the indication from the PH type of NAL unit, comprises decoding a syntax element from the PH type of NAL unit.

6. The method of claim 1, wherein the bitstream contains a syntax element in at least one of a sequence parameter set, SPS, a video parameter set, VPS, and a decoding parameter set, DPS, indicating whether or not a recovery point may be available in the bitstream.

7. The method of claim 1, wherein the indication of the GDR picture and the indication of the associated recovery point are obtained from the GDR AU.

8. The method of claim 1, wherein the GDR picture and/or one or more pictures following the GDR picture and preceding the recovery point picture in decoding order references an unavailable reference picture, and the method further comprises:

generating the unavailable reference picture before decoding the GDR picture and/or the one or more pictures following the GDR picture and preceding the recovery point picture in decoding order referencing the unavailable reference picture.

9. A non-transitory computer readable medium storing a computer program comprising instructions which when executed by processing circuitry of a decoder causes the decoder to perform the method of claim 1.

10. A method for encoding a bitstream, the method comprising:

determining that a coded video sequence (CVS) of access units, AUs, in the bitstream is to begin with a GDR AU containing a GDR picture, the CVS of AUs containing a sequence of coded pictures that begins with the GDR picture and includes an associated recovery point;

encoding in the CVS an indication of the GDR picture; and

encoding in a picture header of the GDR picture an indication of the recovery point associated with the GDR picture, wherein the indication of the recovery point comprises an indication of a position of a recovery point picture in the sequence of coded pictures, wherein

encoding in the picture header of the GDR picture the indication of the recovery point comprises encoding the indication of the recovery point in a network abstraction layer (NAL) unit of type picture header (PH).

11. The method of claim 10, wherein encoding in the CVS the indication of the GDR picture comprises encoding the indication in a NAL unit of a type associated with the GDR picture.

12. The method of claim 10, further comprising encoding in the bitstream a syntax element in at least one of a sequence parameter set, SPS, a video parameter set, VPS, and a decoding parameter set, DPS, indicating whether or not a recovery point may be available in the bitstream.

13. The method of claim 10, comprising encoding the indication of the GDR picture and the indication of the associated recovery point in the GDR AU.

14. A non-transitory computer readable medium storing a computer program comprising instructions which when executed by processing circuitry of an encoder causes the encoder to perform the method of claim 10.

15. A decoding apparatus for decoding a video bitstream comprising a coded video sequence (CVS) of access units (AUs) containing a sequence of coded pictures, the decoding apparatus comprising:

a memory; and

processing circuitry, wherein the decoding apparatus is configured to perform a process that comprises:

obtaining the video bitstream;

decoding from the CVS an indication that a current picture is a gradual decoder refresh (GDR) picture contained in a GDR AU that starts the CVS; and

decoding from a picture header of the GDR picture an indication of a recovery point in the CVS, wherein the recovery point is associated with the GDR picture and the indication of the recovery point comprises an indication of the position of a recovery point picture in the sequence of coded pictures, wherein

decoding the indication of the recovery point in the CVS from the PH comprises obtaining the indication of the recovery point from a network abstraction layer (NAL) unit of type PH.

16. An encoding apparatus for encoding a bitstream, the encoding apparatus comprising:

a memory; and

processing circuitry, wherein the encoding apparatus is configured to:

determine that a coded video sequence (CVS) of access units (AUs) in the bitstream is to begin with a gradual decoder refresh (GDR) AU containing a GDR picture, the CVS of AUs containing a sequence of coded pictures that begins with the GDR picture and includes an associated recovery point;

encode in the CVS an indication of the GDR picture; and

encode in a picture header of the GDR picture an indication of the recovery point associated with the GDR picture, wherein the indication of the recovery point comprises an indication of a position of a recovery point picture in the sequence of coded pictures, wherein

encoding in the picture header of the GDR picture the indication of the recovery point comprises encoding the indication of the recovery point in a network abstraction layer (NAL) unit of type picture header (PH).