Claims

1. Video data stream having video content ~~(16)~~ encoded therein in units of sub-portions ~~(24)~~ of pictures ~~(18)~~ of the video content ~~(16)~~, each sub-portion ~~(24)~~ being respectively encoded into one or more payload packets ~~(32)~~ of a sequence ~~(34)~~ of packets of the video data stream ~~(22)~~, the sequence ~~(34)~~ of packets being divided into a sequence of access units ~~(30)~~ so that each access unit ~~(30)~~ collects the payload packets ~~(32)~~ relating to a respective picture ~~(18)~~ of the video content ~~(16)~~, wherein the sequence ~~(34)~~ of packets has interspersed thereinto timing control packets ~~(36)~~ so that the timing control packets ~~(36)~~ subdivide the access units ~~(30)~~ into decoding units ~~(38)~~ so that at least some access units ~~(30)~~ are subdivided into two or more decoding units ~~(38)~~, with each timing control packet ~~(38)~~ signaling a decoder buffer retrieval time for a decoding unit ~~(38)~~, the payload packets ~~(32)~~ of which follow the respective timing control packet ~~(38)~~ in the sequence ~~(34)~~ of packets.

2. Video data stream according to claim 1 wherein the sub-portions ~~(24)~~ are slices, and each payload packet ~~(32)~~ encompasses one or more slices.

3. Video data stream according to claim 2 wherein the slices comprise independently decodable slices and dependent slices allowing, for WPP processing, decoding using entropy and predictive decoding beyond slice boundaries.

4. Video data stream according to any of claims 1 to 3 wherein each packet of the sequence ~~(34)~~ of packets may be assigned to exactly one packet type out of a plurality of packet types with payload packets ~~(32)~~ and timing control packets ~~(36)~~ being of different packet types, wherein occurrences of packets of the plurality of packet types in the sequence ~~(34)~~ of packets are subject to certain limitations which define an order among the packet types which is to be obeyed by the packets within each access unit ~~(30)~~ so that access unit borders are detectable using the limitations by detecting instances where the limitations are objected to, and remain at the same position within the sequence of packets, even if packets of any removable packet type are removed from the video data stream, wherein payload packets ~~(32)~~ are of a non-removable packet type, and timing control packets ~~(36)~~ are of the removable packet type.

5. Video data stream according to any of claims 1 to 4 wherein each packet comprises a packet type indicating syntax element portion.

6. Video data stream according to claim 5 wherein the packet type indicating syntax element portion comprises a packet type field in a packet header of the respective packet, the content of which differs between payload packets and timing control packets, and, for timing control packets, a SEI packet type field differentiating between the timing control packets on the one hand and SEI packets of different type on the other hand.

7. Encoder for encoding into a video data stream ~~(22)~~ video content ~~(16)~~ in units of sub-portions ~~(24)~~ of pictures ~~(18)~~ of the video content ~~(16)~~, with respectively encoding each sub-portion ~~(24)~~ into one or more payload packets ~~(32)~~ of a sequence ~~(34)~~ of packets of the video data stream ~~(22)~~ so that the sequence ~~(34)~~ of packets is divided into a sequence of access units ~~(30)~~ and each access unit ~~(30)~~ collects the payload packets ~~(32)~~ relating to a respective picture ~~(18)~~ of the video content ~~(16)~~, the encoder being configured to intersperse into the sequence ~~(34)~~ of packets timing control packets ~~(36)~~ so that the timing control packets ~~(36)~~ subdivide the access units ~~(30)~~ into decoding units ~~(38)~~ so that at least some access units ~~(30)~~ are subdivided into two or more decoding units ~~(38)~~, with each timing control packet ~~(36)~~ signaling a decoder buffer retrieval time for a decoding unit ~~(38)~~, the payload packets ~~(32)~~ of which follow the respective timing control packet ~~(36)~~ in the sequence ~~(34)~~ of packets.

8. Encoder according to claim 7 wherein herein the encoder is configured to, during encoding a current picture of the video content,

encode a current sub-portion ~~(24)~~ of a current picture ~~(18)~~ into a current payload packet ~~(32)~~ of a current decoding unit ~~(38)~~,

transmit, within the data stream, the current decoding unit ~~(38)~~ prefixed with a current timing control packet ~~(36)~~ with setting a decoder buffer retrieval time signaled by the current timing control packet ~~(36)~~, at a first time instant; and

encode a further sub-portion of the current picture at a second time instant, later than the first time instant.

9. Method for encoding into a video data stream ~~(22)~~ video content ~~(16)~~ in units of sub-portions ~~(24)~~ of pictures ~~(18)~~ of the video content ~~(16)~~, with respectively encoding each sub-portion ~~(24)~~ into one or more payload packets ~~(32)~~ of a sequence ~~(34)~~ of packets of the video data stream ~~(22)~~ so that the sequence ~~(34)~~ of packets is divided into a sequence of access units ~~(30)~~ and each access unit ~~(30)~~ collects the payload packets ~~(32)~~ relating to a respective picture ~~(18)~~ of the video content ~~(16)~~, the method comprising interspersing into the sequence ~~(34)~~ of packets timing control packets ~~(36)~~ so that the timing control packets ~~(36)~~ subdivide the access units ~~(30)~~ into decoding units ~~(38)~~ so that at least some access units ~~(30)~~ are subdivided into two or more decoding units ~~(38)~~, with

each timing control packet ~~(36)~~ signaling a decoder buffer retrieval time for a decoding unit ~~(38)~~, the payload packets ~~(32)~~ of which follow the respective timing control packet ~~(36)~~ in the sequence ~~(34)~~ of packets.

10. Decoder for decoding a video data stream ~~(22)~~ having video content ~~(16)~~ encoded therein in units of sub-portions ~~(24)~~ of pictures ~~(18)~~ of the video content ~~(16)~~, each sub-portion being respectively encoded into one or more payload packets ~~(32)~~ of a sequence ~~(34)~~ of packets of the video data stream ~~(22)~~, the sequence ~~(34)~~ of packets being divided into a sequence of access units ~~(30)~~ so that each access unit ~~(30)~~ collects the payload packets ~~(32)~~ relating to a respective picture ~~(18)~~ of the video content ~~(16)~~, the decoder comprising a buffer for buffering the video data stream or a reconstruction of the video content obtained therefrom by the decoding of the video data stream and configured to look for timing control packets ~~(36)~~ interspersed into the sequence of packets, subdivide the access units ~~(30)~~ into decoding units ~~(38)~~ at the timing control packets ~~(36)~~ so that at least some access units are subdivided into two or more decoding units, and empty the buffer in units of the decoding units.

11. Decoder according to claim 10, wherein the decoder is configured to, in looking for the timing control packets ~~(36)~~, inspect, in each packet, a packet type indicating syntax element portion with, if a value of the packet type indicating syntax element portion equals a predetermined value, recognize the respective packet as a timing control packet ~~(36)~~.

12. Method for decoding a video data stream ~~(22)~~ having video content ~~(16)~~ encoded therein in units of sub-portions ~~(24)~~ of pictures ~~(18)~~ of the video content ~~(16)~~, each sub-portion being respectively encoded into one or more payload packets ~~(32)~~ of a sequence ~~(34)~~ of packets of the video data stream ~~(22)~~, the sequence ~~(34)~~ of packets being divided into a sequence of access units ~~(30)~~ so that each access unit ~~(30)~~ collects the payload packets ~~(32)~~ relating to a respective picture ~~(18)~~ of the video content ~~(16)~~, the method using a buffer for buffering the video data stream or a reconstruction of the video content obtained therefrom by the decoding of the video data stream and comprising looking for timing control packets ~~(36)~~ interspersed into the sequence of packets, subdividing the access units ~~(30)~~ into decoding units ~~(38)~~ at the timing control packets ~~(36)~~ so that at least some access units are subdivided into two or more decoding units, and emptying the buffer in units of the decoding units.

13. Network entity for transmitting a video data stream ~~(22)~~ having video content ~~(16)~~ encoded therein in units of sub-portions ~~(24)~~ of pictures ~~(18)~~ of the video content ~~(16)~~, each sub-portion being respectively encoded into one or more payload packets ~~(32)~~ of a

sequence (34) of packets of the video data stream (22), the sequence (34) of packets being divided into a sequence of access units (30) so that each access unit (30) collects the payload packets (32) relating to a respective picture (18) of the video content (16), the decoder being configured to look for timing control packets (36) interspersed into the sequence of packets, subdivide the access units into decoding units at the timing control packets (36) so that at least some access units (30) are subdivided into two or more decoding units (38), derive from each timing control packet (36) a decoder buffer retrieval time for a decoding unit (38), the payload packets (32) of which follow the respective timing control packet (36) in the sequence (34) of packets, and perform the transmission of the video data stream dependent on the decoder buffer retrieval times for the decoding units (38).

14. Method for transmitting a video data stream (22) having video content (16) encoded therein in units of sub-portions (24) of pictures (18) of the video content (16), each sub-portion being respectively encoded into one or more payload packets (32) of a sequence (34) of packets of the video data stream (22), the sequence (34) of packets being divided into a sequence of access units (30) so that each access unit (30) collects the payload packets (32) relating to a respective picture (18) of the video content (16), the method comprising looking for timing control packets (36) interspersed into the sequence of packets, subdivide the access units into decoding units at the timing control packets (36) so that at least some access units (30) are subdivided into two or more decoding units (38), deriving from each timing control packet (36) a decoder buffer retrieval time for a decoding unit (38), the payload packets (32) of which follow the respective timing control packet (36) in the sequence (34) of packets, and performing the transmission of the video data stream dependent on the decoder buffer retrieval times for the decoding units (38).

15. Video data stream having video content (16) encoded therein, using predictive and entropy coding, in units of slices (24) into which pictures (18) of the video content (16) are spatially sub-divided, using a coding order among the slices (24), with restricting predictions of the predictive coding and/or entropy coding to the inner of tiles (70) into which the pictures of the video content are spatially sub-divided, wherein the sequence of the slices (24) are packetized into payload packets (32) of a sequence of packets of the video data stream in the coding order, the sequence (34) of packets being divided into a sequence of access units (30) so that each access unit collects the payload packets (32) having packetized thereinto slices (24) relating to a respective picture (18) of the video content (16), wherein the sequence (34) of packets has tile identification packets (72) interspersed thereinto between payload packets of one access unit, identifying one or more tiles (70) overlaid by any slice (24) packetized into one or more payload packets (32)

immediately following the respective tile identification packet ~~(72)~~ in the sequence ~~(34)~~ of packets.

16. Video data stream according to claim 15 wherein the tile identification packets ~~(72)~~ identify the one or more tiles ~~(70)~~ overlaid by any slice ~~(24)~~ packetized into exactly the immediately following payload packet.

17. Video data stream according to claim 15 wherein the tile identification packets ~~(72)~~ identify the one or more tiles ~~(70)~~ overlaid by any slice ~~(24)~~ packetized into the one or more payload packets ~~(32)~~ immediately following the respective tile identification packet ~~(72)~~ in the sequence ~~(34)~~ of packets until the earlier of an end of the current access unit ~~(30)~~, and the next tile identification packet ~~(72)~~, respectively, in the sequence ~~(34)~~ of packets.

18. Network entity configured to receive a video data stream according to any of claims 15 to 16 and identify, based on the tile identification packets ~~(72)~~, tiles ~~(70)~~ which are overlaid by slices ~~(24)~~ packetized into one or more payload packets ~~(72)~~ immediately following the respective tile identification packet ~~(72)~~ in the sequence of packets.

19. Network entity according to claim 18 wherein the network entity is configured to use a result of the identification so as to decide on transmission tasks pertaining the video data stream.

20. Network entity according to claim 18 or 19 wherein the transmission tasks comprise re-transmission requests concerning defect packets.

21. Network entity according to claim 18 or 19 wherein the network entity is configured to handle different tiles ~~(70)~~ with different priority by assigning a higher priority to tile identification packets ~~(72)~~ and the payload packets immediately following the respective tile identification packet ~~(72)~~ having slices packetized thereinto which overlay tiles ~~(70)~~ identified by the respective tile identification packets, for which the priority is higher, then to tile identification packets ~~(72)~~ and the payload packets immediately following the respective tile identification packet ~~(72)~~ having slices packetized thereinto which overlay tiles ~~(70)~~ identified by the respective tile identification packets, for which the priority is lower.

22. Network entity according to claim 21 wherein the network entity is configured to first request a retransmission of payload packets having the higher priority assigned

thereto, before requesting any retransmission of payload packets having the lower priority assigned thereto.

23. Method comprising receiving a video data stream according to any of claims 15 to 16 and identifying, based on the tile identification packets ~~(72)~~, tiles ~~(70)~~ which are overlaid by slices ~~(24)~~ packetized into one or more payload packets ~~(72)~~ immediately following the respective tile identification packet ~~(72)~~ in the sequence of packets.

24. Video data stream having video content ~~(16)~~ encoded therein in units of sub-portions ~~(24)~~ of pictures ~~(18)~~ of the video content ~~(16)~~, each sub-portion ~~(24)~~ being respectively encoded into one or more payload packets ~~(32)~~ of a sequence ~~(34)~~ of packets of the video data stream ~~(22)~~, the sequence ~~(34)~~ of packets being divided into a sequence of access units ~~(30)~~ so that each access unit ~~(30)~~ collects the payload packets ~~(32)~~ relating to a respective picture ~~(18)~~ of the video content ~~(16)~~, wherein at least some access units have the sequence ~~(34)~~ of packets has interspersed thereinto ROI packets ~~(64)~~ so that the timing control packets ~~(64)~~ subdivide the access units ~~(64)~~ into decoding units ~~(38)~~ so that at least some access units ~~(30)~~ have ROI packets ~~(64)~~ interspersed between payload packets ~~(32)~~ relating to the picture of the respective access unit, with each ROI packet relating to one or more following payload packets in the sequence ~~(34)~~ of packets, following the respective ROI packet, and identifying as to whether the sub-portions ~~(24)~~ encoded into any of the one or more payload packets to which the respective ROI packet relates, overlay a region of interest of the video content.

25. Video data stream according to claim 24 wherein the sub-portions are slices and the video content is encoded into the video data stream using predictive and entropy coding with restricting the predictive and/or entropy coding to the inner of tiles into which the pictures of the video content are divided, wherein each ROI packet additionally identifies the tiles within which the sub-portions ~~(24)~~ encoded into any of the one or more payload packets to which the respective ROI packet relates, overlay the region of interest.

26. Video data stream according to claim 24 or 25 wherein each ROI packet relates to the immediately following payload packet exclusively.

27. Video data stream according to claim 24 or 25 wherein each ROI packet relates to all payload packets immediately following the respective ROI packet in the sequence of packets until the earlier of an end of the access unit within which the respective ROI packet is arranged , and the next ROI packet, respectively.

28. Network entity configured to receive a video data stream according to any of claims 24 to 27 and identify, based on the ROI packets, the ROI of the video content.

29. Network entity according to claim ~~27~~ 28 wherein the network entity is configured to use a result of the identification so as to decide on transmission tasks pertaining the video data stream.

30. Network entity according to claim 28 or 29 wherein the transmission tasks comprise re-transmission requests concerning defect packets.

31. Network entity according to claim 28 or 29 wherein the network entity is configured to handle the region of interest ~~(70)~~ with increased priority by assigning a higher priority to ROI packets ~~(72)~~ and the one or more payload packets following the respective ROI packet ~~(72)~~, to which the respective ROI packet relates, which ROI packets signal an overlay of the region of interest by the sub-portions ~~(24)~~ encoded into any of the one or more payload packets to which the respective ROI packet relates, than to ROI packets and the one or more payload packets following the respective ROI packet ~~(72)~~, to which the respective ROI packet relates, which ROI packets signal no overlay.

32. Network entity according to claim 31 wherein the network entity is configured to first request a retransmission of payload packets having the higher priority assigned thereto, before requesting any retransmission of payload packets having the lower priority assigned thereto.

33. Method comprising receiving a video data stream according to any of claims 23 to 26 and identifying, based on the ROI packets, the ROI of the video content.

34. Computer-program having a program code for performing, when running on a computer, a method according to claim 9, 12, 14, 23 or 33.