CLAIMS

What is claimed is:

1. A method of aligning across layers in a coded video stream, executable by a processor, comprising:

decoding a video bitstream having multiple layers;

identifying one or more subpicture regions from among the multiple layers of the decoded video bitstream;

aligning the one or more subpictures across the multiple layers;

wherein, based on a network abstraction layer (NAL) unit having a nal_unit_type equal to STSA_NUT, a TemporalID of a NAL unit in a reference picture list is greater than a TemporalID of the NAL unit having the nal_unit_type equal to STSA_NUT, wherein the NAL unit in the reference picture list comprises a picture parameter set (PPS) NAL unit, and wherein the NAL unit having the NAL unit type equal to STSA_NUT comprises a coded slice NAL unit.

2. The method of claim 1, wherein the PPS NAL unit and the coded slice NAL unit are included in a same access unit (AU).

3. The method of claim 1, wherein a first access unit includes the PPS NAL unit and a step-wise temporal sublayer access (STSA) NAL unit, and a second access unit includes the coded slice NAL unit.

4. The method of claim 1,wherein a nuh_layer_id of the NAL unit in the reference picture list is different from a nuh_layer_id of the NAL unit having the nal_unit_type equal to STSA_NUT.

5. The method of claim 1, wherein layout information of subpicture regions is signaled by parameter set data.

6. The method of claim 6, wherein the layout information comprises a size and a position

associated with the subpicture regions.

7. The method of claim 6, wherein the subpicture regions may be relocated and displayed based on the layout information.

8. The method of claim 1, wherein each subpicture region may be coded as an independent layer corresponding to a local region having a unique layer identification value.

9. The method of claim 9, wherein each of the subpicture regions corresponding to the independent layers has a unique picture order count value within a respective access unit.

10. A computer system for aligning across layers in a coded video stream, the computer system comprising:

one or more computer-readable non-transitory storage media configured to store computer program code; and

one or more computer processors configured to access said computer program code and operate as instructed by said computer program code, said computer program code including:

first decoding code configured to cause the one or more computer processors to decode a video bitstream having multiple layers;

identifying code configured to cause the one or more computer processors to identify one or more subpicture regions from among the multiple layers of the decoded video bitstream; and align the one or more subpictures across the multiple layers; wherein, based on a network abstraction layer (NAL) unit having a nal_unit_type equal to STSA_NUT, a TemporalID of a NAL unit in a reference picture list is greater than a TemporalID of the NAL unit having the nal_unit_type equal to STSA_NUT, wherein the NAL unit in the reference picture list comprises a picture parameter set (PPS) NAL unit, and wherein the NAL unit having the NAL unit type equal to STSA_NUT comprises a coded slice NAL unit

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11. The computer system of claim 10, wherein the PPS NAL unit and the coded slice NAL unit are included in a same access unit (AU).

12. The computer system of claim 10, wherein a first access unit includes the PPS NAL unit and a step-wise temporal sublayer access (STSA) NAL unit, and a second access unit includes the coded slice NAL unit.

13. The computer system of claim 10, further comprising:

wherein a nuh_layer_id of the NAL unit in the reference picture list is different from a nuh_layer_id of the NAL unit having the nal_unit_type equal to STSA_NUT.

14. The computer system of claim 10, wherein layout information of subpicture regions is signaled by parameter set data.

15. The computer system of claim 14, wherein the subpicture regions may be relocated and displayed based on the layout information.

16. The computer system of claim 10, wherein each subpicture region may be coded as an independent layer corresponding to a local region having a unique layer identification value.

17. The computer system of claim 16, wherein each of the subpicture regions corresponding to the independent layers has a unique picture order count value within a respective access unit.

18. A non-transitory computer readable medium having stored thereon a computer program for aligning across layers in a coded video stream, the computer program configured to cause one or more computer processors to:

decode a video bitstream having multiple layers;

identify one or more subpicture regions from among the multiple layers of the decoded video bitstream;

align the one or more subpictures across the multiple layers;

wherein, based on a network abstraction layer (NAL) unit having a nal_unit_type equal to STSA_NUT, a TemporalID of a NAL unit in a reference picture list is greater than a TemporalID of the NAL unit having the nal_unit_type equal to STSA_NUT, wherein the NAL unit in the reference picture list comprises a picture parameter set (PPS) NAL unit, and wherein the NAL unit having the NAL unit type equal to STSA_NUT comprises a coded slice NAL unit