



US 20230232050A1

(19) **United States**(12) **Patent Application Publication**
Anderson(10) **Pub. No.: US 2023/0232050 A1**(43) **Pub. Date: Jul. 20, 2023**(54) **IMPROVED SUPERRESOLUTION-ENABLED
(SRE) VIDEO CODEC***H04N 19/167* (2006.01)*H04N 19/172* (2006.01)(71) Applicant: **Dimension, Inc.**, Las Vegas, NV (US)(52) **U.S. Cl.**CPC *H04N 19/86* (2014.11); *H04N 19/117*
(2014.11); *H04N 19/167* (2014.11); *H04N*
19/172 (2014.11)(72) Inventor: **James B Anderson**, Minneapolis, MN
(US)(21) Appl. No.: **17/928,842**(22) PCT Filed: **Jun. 1, 2021**(86) PCT No.: **PCT/US21/35075**

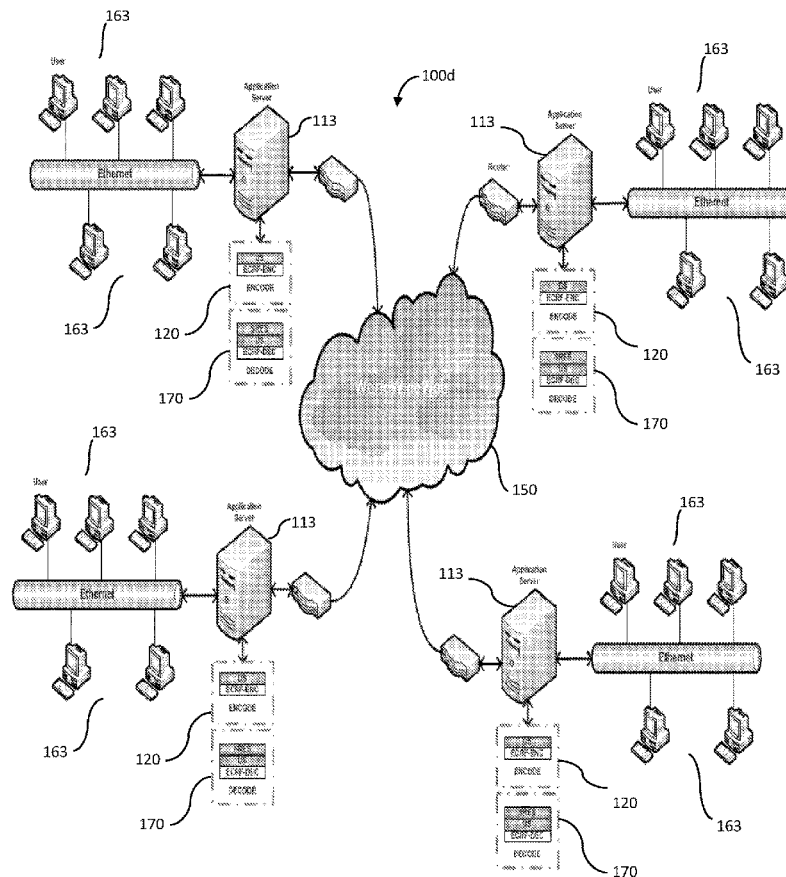
§ 371 (c)(1),

(2) Date: **Apr. 4, 2023****Related U.S. Application Data**(60) Provisional application No. 63/032,722, filed on May
31, 2020, provisional application No. 63/068,993,
filed on Aug. 22, 2020, provisional application No.
63/188,852, filed on May 14, 2021.**Publication Classification**(51) **Int. Cl.***H04N 19/86* (2006.01)*H04N 19/117* (2006.01)

(57)

ABSTRACT

Systems and methods for transmitting source video (305) over a bandwidth-limited network (350). First, high frequency spectral content of the video is encoded into layer-1 data files (330). In parallel, frames of the video are down-sampled (342) and compressed (333) using a lossy CODEC, to define layer-2 data files (335a, 335b) with high-frequency spectral content removed therefrom. The layer-1 and layer-2 data files are interleaved (345a, 345b) and transmitted over the network and are smaller than conventional lossy CODEC compressed files. After receipt, the layer-1 and layer-2 data files are deinterleaved. The layer-2 data is decompressed (353) and upsampled (362) to create a preliminary reconstructed video. The high frequency spectral content is extracted (351) from the layer-1 data files, and photometric warp superresolution processing (370) restores the high frequency spectral content into the preliminary reconstructed video to generate a final, output video (395a, 395b) at resolution at or near the source video for display to a viewer at or downstream from the receiving location.



Exemplary Video Conferencing System SRE/CODEC Implementation