IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

DYNAMIC DATA TECHNOLOGIES, LLC, *Plaintiff,* v. NVIDIA CORPORATION, *Defendant*.	C.A. No._____ **JURY TRIAL DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

Dynamic Data Technologies, LLC ("Dynamic Data") bring this action and make the following allegations of Patent infringement relating to U.S. Patent Nos.: 6,421,090 (the "'090 Patent"); 8,135,073 (the "'073 Patent"); 8,073,054 (the "'054 Patent"); 6,774,918 (the "'918 Patent"); 8,184,689 (the "'689 Patent"); 6,996,177 (the "'177 Patent"); 7,010,039 (the "'039 Patent"); 8,311,112 (the "'112 Patent"); 7,894,529 (the "'529 Patent"); 7,542,041 (the "'041 Patent"); 7,571,450 (the "'450 Patent"); and 7,750,979 (the "'979 Patent") (collectively, the "Patents-in-suit"). Defendant NVIDIA Corporation ("NVIDIA" or "Defendant") infringes each of the Patents-in-suit in violation of the patent laws of the United States of America, 35 U.S.C. § 1 *et seq*.

INTRODUCTION

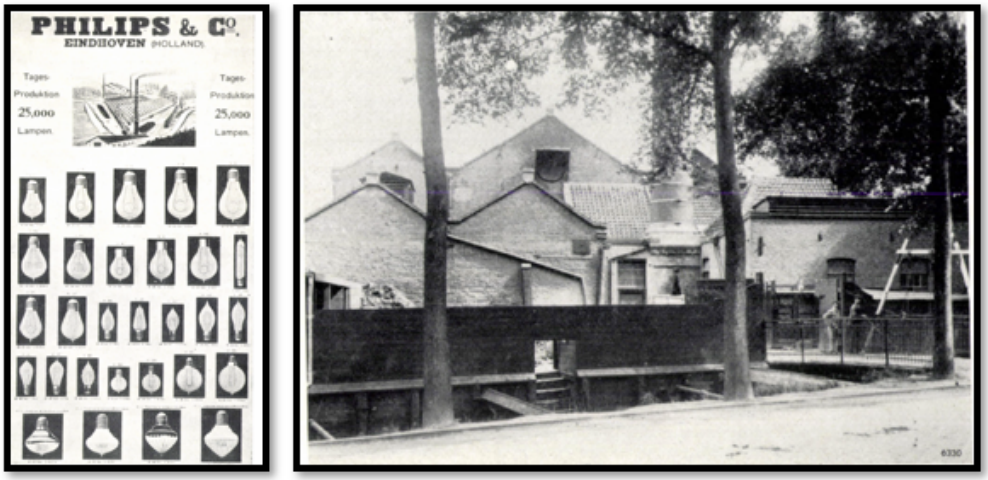
1. Dynamic Data's portfolio of over 1,000 patent assets encompasses core technologies in the field of image and video processing. Dynamic Data's patents arose from the research and development efforts of Koninklijke Philips N.V. ("Philips"). Founded in 1891, for well over a century, Philips pioneered ground breaking technologies, including compact audio cassettes, magnetic resonance imaging (MRI) machines, and compact discs.

2. In an effort to facilitate the licensing of Philips' foundational technology, Dynamic Data is pursuing remedies for infringement of its patents in venues throughout the world. Contemporaneous to the filing of this Complaint and complaints against other companies selling the technologies claimed by Dynamic Data's patent portfolio, Dynamic Data filed patent enforcement actions against Google LLC,[1] Advanced Micro Devices, Inc.,[2] and Microsoft Corporation[3] in the Peoples Republic of China before the Nanjing Specialized Intellectual Property Tribunal. In addition, Dynamic Data has filed a patent enforcement action against Apple, Inc. in Düsseldorf, Germany.[4]

DYNAMIC DATA'S LANDMARK INVENTIONS

3. The groundbreaking inventions in image and video processing taught in the Patents-in-suit were pioneered by Philips. Video and image processing were at the heart of Philips' business for over fifty years. In 1891, Philips, then known as Philips & Company, was founded in Eindhoven, Netherlands to manufacture carbon-filament lamps.[5] In the 1920s, Philips began to produce vacuum tubes and small radios, which would augur Philips' later entry into video and audio processing.

[1] Asserting Patent Nos. CN1266944C; CN1333373C; and CN1329870C (南京专业知识产权法院).
[2] Asserting Patent Nos. CN1303818C; CN1333373C; and CN1266944C (南京专业知识产权法院).
[3] Asserting Patent Nos. CN1266944C, CN1329870C, and CN1333373C (南京专业知识产权法院).
[4] Asserting Patent No. EP1520409 (Landgericht Düsseldorf).
[5] Gerard O'Regan, A BRIEF HISTORY OF COMPUTING at 99 (2012).



N.A. Halbertsma, *The Birth of a Lamp Factory In 1891*, PHILIPS TECHNICAL REVIEW, Vol. 23 at 230, 234 (1961).

4. In 1962, Philips introduced the first audio cassette tape.[6] A year later, Philips launched a small battery-powered audio tape recorder that used a cassette instead of a loose spool.[7] Philips C-cassette was later used as the first mass storage device for early personal computers in the 1970s and 1980s.

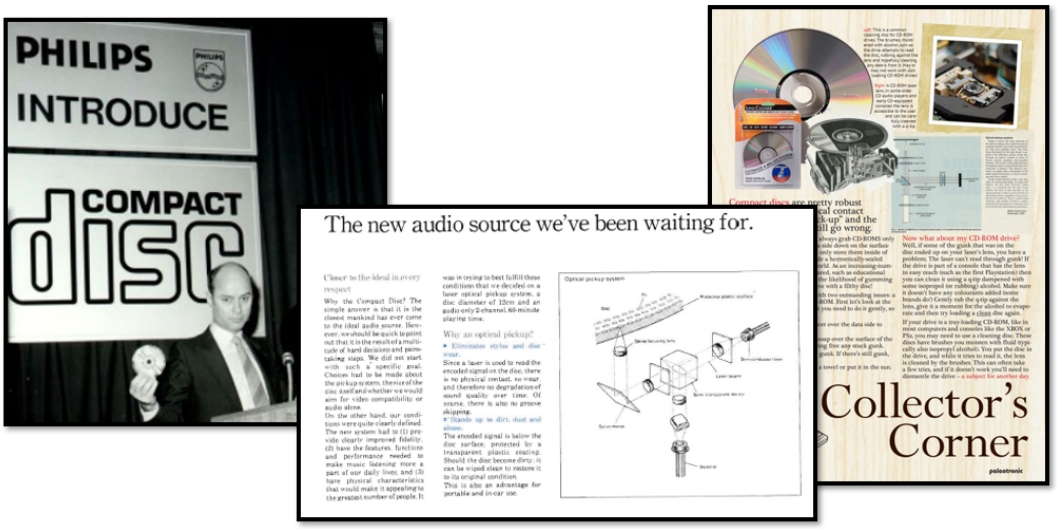
THE ROTARIAN MAGAZINE, Vol. 101 No. 6 at 70 (December 1962) (advertisement showing Philips Norelco device which used cassettes for recording audio for transcription); Fred

[6] Gerard O'Regan, PILLARS OF COMPUTING: A COMPENDIUM OF SELECT, PIVOTAL TECHNOLOGY FIRMS at 172 (2015) ("Philips invented the compact cassette for audio storage in 1962.")

[7] Anthony Pollard, GRAMOPHONE: THE FIRST 75 YEARS at 231 (1998).

Chandler, *European Mfrs. Bid For Market Share*, BILLBOARD MAGAZINE AT P-6 (April 8, 1967) (image of the Philips EL 3300 battery-operated tape recorder which was released in 1963); Jan Syrjala*, Car Stereo: How Does The Music Sound?,* N.Y. TIMES at 2-M (September 25, 1966) (showing Philips's Norelco Cassette "the Philips device has two tiny reels inside it, with the tape traveling from one to the other").

5. In 1971, Philips demonstrated the world's first videocassette records (VCR). A year later, Philips launched the world's first home video cassette recorder, the N1500. In 1982, Philips teamed with Sony to launch the Compact Disc; this format evolved into the DVD and later Blu-ray, which Philips launched with Sony in 1997 and 2006 respectively.



Hans Peek, Jan Bergmans, Jos Van Haaren, Frank Toolenaar, and Sorin Stan, ORIGINS AND SUCCESSORS OF THE COMPACT DISC: CONTRIBUTIONS OF PHILIPS TO OPTICAL STORAGE at 15 (2009) (showing image of Joop Sinjou of Philips introducing the compact disc in March 1979); Advertisements for Philip's Compact Disc Products (1982).

6. In the late 1990s and early 2000s, Philips pioneered the development of technologies for encoding and decoding of video and audio content. At the time most of the technologies claimed by the patents in Dynamic Data's portfolio were invented, Philips' subsidiary primarily responsible for Philips' work in this field, Philips Semiconductor was the

world's sixth largest semiconductor company.[8] The video encoding technologies developed by Philips Semiconductor enable video streaming on set-top boxes, smartphones, popular gaming consoles, Internet-connected computers, and numerous other types of media streaming devices.

7. Philips Semiconductor dedicated significant research and development resources to advancing the technology of video compression and transmission by reducing file sizes and decreasing the processing resources required to transmit the data.[9] Philips Semiconductor was among the first companies aggressively driving innovation in the field of video processing:

> The late 1980s and early 1990s saw the announcement of several complex, programmable VSPs. Important examples include chips from Matsushita, NTT, Philips [Semiconductors], and NEC. All of these processors were high-performance parallel processors architected from the ground up for real-time video signal processing. . . . The Philips VSP-1 and NEC processor were probably the most heavily used of these chips.[10]

8. Starting in the 1960s Philips pioneered the development of audio and video technologies that would establish itself as a leader in the field that would later develop into the audio and video encoding fields. Continuing Philips' pioneering history in these fields, the Patents-in-suit disclose cutting-edge video compression and transmission technologies.

DYNAMIC DATA'S PATENT PORTFOLIO

9. Dynamic Data's patent portfolio includes over 1,000 patent assets, with over 400 issued Patents granted by patent offices around the world. Dynamic Data owns numerous patents issued by the United States Patent and Trademark Office, including each of the Patents-

[8] *Company News; Philips in $1 Billion Deal for VLSI Technology*, THE NEW YORK TIMES (May 4, 1999), *available at*: https://www.nytimes.com/1999/05/04/business/company-news-philips-in-1-billion-deal-for-vlsi-technology.html.

[9] HU, YU HEN, PROGRAMMABLE DIGITAL SIGNAL PROCESSORS: ARCHITECTURE, PROGRAMMING, AND APPLICATIONS, at 190 (Dec. 6, 2001) ("Philips Semiconductors developed early dedicated video chips for specialized video processors.").

[10] *Id.* at 191.

in-suit, The State Intellectual Property Office of the People's Republic of China,[11] the European Patent Office,[12] the German Patent and Trademark Office,[13] the Japan Patent Office,[14] and many other national patent offices.

10. Philips Semiconductor's pioneering work in the area of video processing and encoding has resulted in various inventions that are fundamental to today's video processing technologies. Dynamic Data is the owner by assignment of over 1,000 of these patent assets, which include over 400 patents issued by patent offices around the world.

11. Highlighting the importance of the Patents-in-suit is the fact that the Patents-in-suit have been cited by over 400 U.S. and international patents and patent applications by a wide variety of the largest companies operating in the field. For example, the Patents-in-suit have been cited by companies such as:

- Samsung Electronics Co., Ltd.[15]
- Qualcomm Inc.[16]
- Google LLC[17]
- Intel Corporation[18]
- Broadcom Corporation[19]
- Microsoft Corporation[20]
- Sony Corporation[21]

[11] *See, e.g.,* CN100504925C; CN100438609C; CN1679052B; CN1333373C; CN1329870C; CN1303818C.

[12] *See, e.g.,* European Patent Nos. EP1032921B1; EP1650978B1; EP1213700B1; EP1520409B1.

[13] *See, e.g.,* German Patent Nos. DE60120762; DE50110537; DE60126151; DE60348978; DE602004049357.

[14] *See, e.g.,* Japanese Patent Nos. JP4583924B2; JP5059855B2; JP5153336B2; JP4637585B2.

[15] *See, e.g.*, U.S. Patent Nos. 6,930,729; 7,911,537; 7,532,764; 8,605,790; and 8,095,887.

[16] *See, e.g.*, U.S. Patent Nos. 7,840,085; 8,649,437; 8,750,387; 8,918,533; 9,185,439; 9,209,934; 9,281,847; 9,319,448; 9,419,749; 9,843,844; 9,917,874; and 9,877,033.

[17] *See, e.g.*, U.S. Patent No. 8,787,454 and U.S. Patent Appl. No. 10/003,793.

[18] *See, e.g.*, U.S. Patent Nos. 7,554,559; 7,362,377; and 8,462,164.

[19] *See, e.g.*, U.S. Patent Nos. 8,325,273 and 9,377,987.

[20] *See, e.g.*, U.S. Patent Nos. 7,453,939; 7,670,227; 7,408,986; 7,421,129; 7,558,320; and 7,929,599.

[21] *See, e.g.*, U.S. Patent Nos. 7,218,354 and 8,174,615.

- Fujitsu Ltd.[22]
- Panasonic Corporation[23]
- Matsushita Electric Industrial Company Limited[24]

THE PARTIES

DYNAMIC DATA TECHNOLOGIES, LLC

12. Dynamic Data Technologies, LLC ("Dynamic Data" or "Plaintiff") is a limited liability company organized under the laws of Delaware.

13. In an effort to obtain compensation for Philips' pioneering work in the fields of video data encoding, decoding, and transmission, Dynamic Data acquired the Patents-in-suit along with the several hundred additional issued United States and international patents.

14. Dynamic Data pursues the reasonable royalties owed for NVIDIA's use of the inventions claimed in Dynamic Data's patent portfolio, which primarily arise from Philips' groundbreaking technology, both here in the United States and throughout the world.

NVIDIA CORPORATION

15. On information and belief, NVIDIA Corporation ("NVIDIA"), is a Delaware corporation with its principal place of business at 2701 San Tomas Expressway, Santa Clara, CA 95050. NVIDIA may be served through its registered agent – Corporation Service Company, 251 Little Falls Drive, Wilmington, DE 19808.

[22] *See, e.g.*, U.S. Patent Nos. 7,092,032 and 8,290,308.
[23] *See, e.g.*, U.S. Patent Nos. 8,164,687 and 8,432,495.
[24] *See, e.g.*, U.S. Patent Nos. 7,362,378 and 7,423,961.

JURISDICTION AND VENUE

16. This action arises under the patent laws of the United States, Title 35 of the United States Code. Accordingly, this Court has exclusive subject matter jurisdiction over this action under 28 U.S.C. §§ 1331 and 1338(a).

17. Upon information and belief, this Court has personal jurisdiction over NVIDIA in this action because NVIDIA has committed acts within the State of Delaware giving rise to this action and has established minimum contacts with this forum such that the exercise of jurisdiction over NVIDIA would not offend traditional notions of fair play and substantial justice. Defendant NVIDIA, directly and/or through subsidiaries or intermediaries (including distributors, retailers, and others), has committed and continues to commit acts of infringement in this District by, among other things, offering to sell and selling products and/or services that infringe the Patents-in-suit. Moreover, NVIDIA actively directs its activities to customers located in the State of Delaware.

18. Venue is proper in this district under 28 U.S.C. §§ 1391(b)-(d) and 1400(b). Defendant NVIDIA resides in the State of Delaware, upon information and belief, has transacted business in the State of Delaware, and has committed acts of direct and indirect infringement in the State of Delaware.

THE ASSERTED PATENTS

U.S. PATENT NO. 6,421,090

19. U.S. Patent No. 6,421,090 entitled, *Motion And Edge Adaptive Deinterlacing*, was filed on August 27, 1999. Dynamic Data is the owner by assignment of all right, title, and interest in the '090 Patent. A true and correct copy of the '090 Patent is attached hereto as Exhibit 1.

20. The ‘090 Patent discloses novel methods and apparatuses for interpolating a pixel during the deinterlacing of video signals. The various embodiments of the ‘090 Patent utilize multiple, interlaced scan lines of video signal, with each scan line including a series of pixels with intensity values.

21. The ‘090 Patent discloses generating a motion value representative of the motion between successive frames about the pixel by segmenting an image into multi-pixel segments and comparing the differences with respect to each segment in successive frames.

22. The ‘090 Patent discloses detecting an edge direction about the pixel and performing an edge adaptive interpolation at the pixel using a generated motion value.

23. The ‘090 Patent further discloses generating a motion value by comparing segments of pixels about the pixel from at least three successive frames.

24. The ‘090 Patent and its underlying patent application have been cited by 86 patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the ‘090 Patent and its underlying patent application as relevant prior art:

- Samsung Electronics Co., Ltd.
- LG Electronics Inc.
- Qualcomm Inc.
- Microsoft Corporation
- Panasonic Corporation
- STMicroelectronics SRL
- Matsushita Electric Industrial Company Ltd.
- Sanyo Electric Company Ltd.
- Fujitsu Limited
- AVerMedia Technologies Inc.
- Sony Corporation
- Himax Technologies Inc.
- Mitsubishi Electric Corporation
- Hewlett-Packard Development Company L.P.
- MediaTek Inc.
- Realtek Semiconductor Corp.
- Imagination Technologies Limited

- Integrated Device Technology Incorporated
- Intel Corporation
- MStar Semiconductor Incorporated

U.S. PATENT NO. 8,135,073

25. U.S. Patent No. 8,135,073 entitled, *Enhancing Video Images Depending On Prior Image Enhancements*, was filed on December 12, 2003, and claims priority to December 19, 2002. The '073 Patent is subject to a 35 U.S.C. § 154(b) term extension of 1,799 days. Dynamic Data is the owner by assignment of all right, title, and interest in the '073 Patent. A true and correct copy of the '073 Patent is attached hereto as Exhibit 2.

26. The '073 Patent discloses novel methods and systems for enhancing subsequent images of a video stream in which frames are encoded based on previous frames using prediction and motion estimation.

27. The inventions disclosed in the '073 Patent reduce the processing capacity required for providing video enhancements to video processing through re-mapping of previous frames for subsequent frames.

28. Accordingly, the technologies disclosed in the '073 Patent enable the provision of enhanced video pictures with minimal additional hardware costs for the components required to successfully process the video data.

29. The '073 Patent discloses a video decoder comprising an input for receiving a video stream containing encoded frame based video information including an encoded first frame and an encoded second frame.

30. The '073 Patent discloses a video decoder comprising an input for receiving video information wherein the encoding of the second frame depends on the encoding of the first frame, the encoding of the second frame includes motion vectors indicating differences in positions between regions of the second frame and corresponding regions of the first frame, the

motion vectors define correspondence between regions of the second frame and corresponding regions of the first frame.

31. The '073 Patent discloses a video decoder comprising a decoding unit for decoding the frames, wherein the decoding unit recovers the motion vectors for the second frame.

32. The '073 Patent discloses a video decoder comprising a processing component configured to determine a re-mapping strategy for video enhancement of the decoded first frame using a region-based analysis, re-map the first frame using the re-mapping strategy, and re-map one or more regions of the second frame depending on the re-mapping strategy for corresponding regions of the first frame.

33. The '073 Patent and its underlying patent application have been cited by 36 patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the '073 Patent and its underlying patent application as relevant prior art:

- Canon Inc.
- Microsoft Corporation
- International Business Machines Corporation
- Qualcomm Inc.
- Digital Fountain Incorporated
- Samsung Electronics Co., Ltd.
- SK Planet Co. Ltd.

U.S. PATENT NO. 8,073,054

34. U.S. Patent No. 8,073,054 entitled, *Unit For And Method Of Estimating A Current Motion Vector*, was filed on December 12, 2002, and claims priority to January 17, 2002. The '054 Patent is subject to a 35 U.S.C. § 154(b) term extension of 1,162 days. Dynamic Data is the owner by assignment of all right, title, and interest in the '054 Patent. A true and correct copy of the '054 Patent is attached hereto as Exhibit 3.

35. The ‘054 Patent discloses novel methods and apparatuses for estimating a current motion vector for a group of pixels of an image.

36. The inventions disclosed in the ‘054 Patent enable motion estimation with a relatively fast convergence in finding the appropriate motion vectors of the motion vector fields by adding a further candidate motion vector to the set of candidate motion vectors.

37. The ‘054 Patent discloses a motion estimation unit comprising a generating unit for generating a set of candidate motion vectors for the group of pixels, with the candidate motion vectors being extracted from a set of previously estimated motion vectors.

38. The ‘054 Patent discloses a motion estimation unit comprising a match error unit for calculating match errors of respective candidate motion vectors.

39. The ‘054 Patent discloses a motion estimation unit comprising a selector for selecting the current motion vector from the candidate motion vectors by means of comparing the match errors of the respective candidate motion vectors, characterized in that the motion estimation unit is arranged to add a further candidate motion vector to the set of candidate motion vectors by calculating the further candidate motion vector on basis of a first motion vector and a second motion vector, both belonging to the set of previously estimated motion vectors.

40. The ‘054 Patent discloses a motion estimation unit that calculates the further candidate motion vector on basis of the first motion vector and the second motion vector, with the first motion vector belonging to a first forward motion vector field and the second motion vector belonging to a second forward motion vector field, with the first forward motion vector field and the second forward motion vector field being different.

41. The '054 Patent discloses a motion estimation unit that arranges to calculate the further candidate motion vector by means of calculating a difference between the second motion vector and the first motion vector.

42. The '054 Patent and its underlying patent application have been cited by 14 patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the '054 Patent and its underlying patent application as relevant prior art:

- Canon Inc.
- Huawei Technologies, Ltd.
- Imagination Technologies Ltd.
- MediaTek Inc.
- Panasonic Corp.
- Samsung Electronics Co., Ltd.
- Siemens Healthcare GmbH
- Tencent Technology (Shenzhen) Co., Ltd.

U.S. PATENT NO. 6,774,918

43. U.S. Patent No. 6,774,918 entitled, *Video Overlay Processor with Reduced Memory And Bus Performance Requirements*, was filed on June 28, 2000. The '918 Patent is subject to a 35 U.S.C. § 154(b) term extension of 591 days. Dynamic Data is the owner by assignment of all right, title, and interest in the '918 Patent. A true and correct copy of the '918 Patent is attached hereto as Exhibit 4.

44. The '918 Patent claims specific methods and systems for providing an overlay such as a cursor in an on-screen display in a consumer electronic device. On-screen display (OSD) data for generating an image on a display device are downloaded to an OSD unit on an integrated circuit.

45. The '918 Patent discloses downloading on-screen display (OSD) data for generating an image on a display device.

46. The ‘918 Patent further discloses downloading the on-screen display (OSD) data in segments separated by gaps.

47. The ‘918 Patent further discloses, during a gap in downloading the on-screen display data, downloading an amount of overlay data for generating an overlay on the image generated on a display device.

48. Further, the ‘918 Patent discloses that the overlay data downloaded during a gap comprises a portion of the overlay data.

49. The inventions disclosed in the ‘918 Patent improve the operation and efficiency of computer components because only a portion of the overlay data is downloaded during each burst gap, thus reducing the amount of memory needed to store the overlay data. The inventions disclosed in the ‘918 Patent further eliminate the requirement that on-chip memory be large enough to hold the data needed for an entire overlay. Instead, only one line or a part of one line of the overlay needs to be stored on-chip.

50. The ‘918 Patent claims a technical solution to a problem unique to video processing.

51. The ‘918 Patent has been cited by several United States patents and patent applications as relevant prior art. Specifically, patents issued to Realtek Semiconductor Corp., Samsung Electronics Co., Ltd., and Thomson Licensing SA have all cited the ‘918 Patent as relevant prior art.

U.S. PATENT NO. 8,184,689

52. U.S. Patent No. 8,184,689 entitled, *Method Video Encoding And Decoding Preserving Cache Localities*, was filed on August 7, 2006, and claims priority to August 17, 2005. The ‘689 Patent is subject to a 35 U.S.C. § 154(b) term extension of 948 days. Dynamic

Data is the owner by assignment of all right, title, and interest in the '689 Patent. A true and correct copy of the '689 Patent is attached hereto as Exhibit 5.

53. The '689 Patent discloses novel methods and apparatuses for encoding and decoding video data.

54. The inventions disclosed in the '689 Patent processing time and power consumption associated with encoding and decoding video stream data is reduced by reducing off-chip memory accesses through using simultaneous encoded/decoded images as a reference image for encoding/decoding at least one of the other simultaneously encoded/decoded images.

55. The '689 Patent discloses a method for encoding and decoding a video stream, including a plurality of images in a video processing apparatus having a processing unit coupled to a first memory, further comprising a second memory.

56. The '689 Patent discloses a method for encoding and decoding a video stream comprising providing a subset of image data stored in the second memory in the first memory.

57. The '689 Patent discloses a method for encoding and decoding a video stream comprising simultaneous encoding/decoding of more than one image of the video stream, by accessing said subset, wherein the simultaneously encoding/decoding is performed by access sharing to at least one image.

58. The '689 Patent and its underlying patent application have been cited by several patents and patent applications as relevant prior art. Specifically, patents issued to Fujitsu Ltd., Qualcomm Inc., Sony Corporation, Sun Patent Trust, and VIXS Systems Incorporated have all cited the '689 Patent and its underlying patent application as relevant prior art.

U.S. PATENT NO. 6,996,177

59. U.S. Patent No. 6,996,177 entitled, *Motion Estimation*, was filed on July 24, 2000, and claims priority to August 22, 1999. The '177 Patent is subject to a 35 U.S.C. § 154(b) term extension of 1,103 days. Dynamic Data is the owner by assignment of all right, title, and interest in the '177 Patent. A true and correct copy of the '177 Patent is attached hereto as Exhibit 6.

60. The '177 Patent claims specific methods and devices for motion estimation and motion-compensated picture signal processing.

61. The '177 Patent discloses a motion vector estimation method and device that carries out a block-based motion vector estimation process that involves comparing a plurality of candidate vectors to determine block-based motion vectors.

62. The '177 Patent discloses a motion vector estimation method and device that determines at least a most frequently occurring block-based motion vector.

63. The '177 Patent discloses a motion vector estimation method and device that carries out a global motion vector estimation process using at least the most frequently occurring block-based motion vector to obtain a global motion vector.

64. The '177 Patent discloses a motion vector estimation method and device that applies the global motion vector as a candidate vector to the block-based motion vector estimation process.

65. The inventions disclosed in the '177 Patent improve the operation of the computer components necessary to the performance of picture signal processing by reducing the load on the central processing unit.

66. The '177 Patent has been cited by 16 United States and International patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the '177 Patent as relevant prior art:

- Qualcomm Incorporated
- LG Electronics
- Microsoft Corporation
- Samsung Electronics Co., Ltd.
- VIXS Systems Incorporated
- General Instrument Corporation

U.S. PATENT NO. 7,010,039

67. U.S. Patent No. 7,010,039 entitled, *Motion Estimator for Reduced Halos in MC Up-Conversion*, was filed on May 15, 2001, and claims priority to May 18, 2000. The '039 Patent is subject to a 35 U.S.C. § 154(b) term extension of 768 days. Dynamic Data is the owner by assignment of all right, title, and interest in the '039 Patent. A true and correct copy of the '039 Patent is attached hereto as Exhibit 7.

68. The '039 Patent claims specific methods and apparatuses detecting motion at a temporal intermediate position between previous and next images. The inventions disclosed in the '039 Patent solve a problem wherein an estimator estimating motion between two successive pictures from a video sequence cannot perform well in areas where covering or uncovering occurs.

69. The '039 Patent solves this problem by carrying out the optimization at the temporal position of the next image in covering areas and at the temporal position of the previous image in uncovering areas.

70. The '039 Patent discloses a method and apparatus for detecting motion at a temporal intermediate position between previous and next images.

71. The ‘039 Patent discloses the use of a criterion function for selecting and optimizing candidate vectors.

72. The ‘039 Patent further discloses a criterion function that depends on data from both previous and next images and in which the optimizing is carried out at the temporal intermediate position in non-covering and non-uncovering areas, characterized in that the optimizing is carried out at the temporal position of the next image in covering areas and at the temporal position of the previous image in uncovering areas.

73. The ‘039 Patent and its related patents have been cited by 30 United States and International patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the ‘039 Patent family as relevant prior art:

- Qualcomm Incorporated
- Panasonic Corporation
- Samsung Electronics Co., Ltd.
- Matsushita Electric Industrial Co., Ltd.
- Sharp Kabushiki Kaisha
- Integrated Device Technology, Inc.
- Zoran Corporation

U.S. PATENT NO. 8,311,112

74. U.S. Patent No. 8,311,112 entitled, *System And Method For Video Compression Using Predictive Coding*, was filed on December 31, 2008. The ‘112 Patent is subject to a 35 U.S.C. § 154(b) term extension of 847 days. Dynamic Data is the owner by assignment of all right, title, and interest in the ‘112 Patent. A true and correct copy of the ‘112 Patent is attached hereto as Exhibit 8.

75. The ‘112 Patent discloses novel methods and systems for video compression.

76. The ‘112 Patent discloses novel technologies for video compression that perform predictive coding on a macroblock of a video frame such that a set of pixels of the macroblock is

coded using some of the pixels from the same video frame as reference pixels and the rest of the macroblock is coded using reference pixels from at least one other video frame.

77. The '112 Patent discloses a system for video compression comprising an intra-frame coding unit configured to perform predictive coding on a set of pixels of a macroblock of pixels using a first group of reference pixels, the macroblock of pixels and the first group of reference pixels being from a video frame.

78. The '112 Patent discloses a system for video compression comprising an inter-frame coding unit configured to perform predictive coding on the rest of the macroblock of pixels using a second group of reference pixels, the second group of reference pixels being from at least one other video frame.

79. The '112 Patent and its underlying patent application have been cited by 10 patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the '112 Patent and its underlying patent application as relevant prior art:

- British Broadcasting Corporation
- Google LLC
- Megachips Corp.
- Olympus Corp.
- Samsung Electronics Co., Ltd.
- Sony Corporation
- Toshiba Corporation

U.S. PATENT NO. 7,894,529

80. U.S. Patent No. 7,894,529 entitled, *Method And Device For Determining Motion Vectors*, was filed on June 1, 2006, and claims priority to June 3, 2005. The '529 Patent is subject to a 35 U.S.C. § 154(b) term extension of 1,301 days. Dynamic Data is the owner by assignment of all right, title, and interest in the '529 Patent. A true and correct copy of the '529 Patent is attached hereto as Exhibit 9.

81. The ‘529 Patent discloses novel methods and apparatuses for determining motion vectors that are each assigned to individual image regions.

82. The inventions disclosed in the ‘529 Patent enable an increase in the resolution of video and image signals during the motion estimation process.

83. The ‘529 Patent discloses a method for determining motion vectors which are assigned to individual image regions of an image.

84. The ‘529 Patent discloses a method wherein an image is subdivided into a number of image blocks, and a motion estimation technique is implemented to assign at least one motion vector to each of the image blocks where a modified motion vector is generated for at least a first image block.

85. The ‘529 Patent discloses a method that determines at least a second image block through which the motion vector assigned to the first image block at least partially passes.

86. The ‘529 Patent discloses a method that generates the modified motion vector as a function of a motion vector assigned to at least the second image block.

87. The ‘529 Patent discloses a method that assigns the modified motion vector as the motion vector to the first image block.

88. The ‘529 Patent and its underlying patent application have been cited by multiple patents and patent applications as relevant prior art. Specifically, patents issued to Fujifilm Corp., and Samsung Electronics Co., Ltd. have cited the ‘529 Patent and its underlying patent application as relevant prior art.

U.S. PATENT NO. 7,542,041

89. U.S. Patent No. 7,542,041 entitled, *Runtime Configurable Virtual Video Pipeline*, was filed on April 2, 2004, and claims priority to April 3, 2003. The ‘041 Patent is subject to a

35 U.S.C. § 154(b) term extension of 288 days. Dynamic Data is the owner by assignment of all right, title, and interest in the '041 Patent. A true and correct copy of the '041 Patent is attached hereto as Exhibit 10.

90. The '041 Patent discloses novel systems for dynamically configuring a multi-pipe pipeline system.

91. The inventions disclosed in the '041 Patent enable a multiple-pipeline system that is dynamically configurable to effect various combinations of functions for each pipeline.

92. The inventions disclosed in the '041 Patent teach a multiple pipeline system that includes a pool of auxiliary function blocks that are provided as required to select pipelines.

93. In one embodiment of the '041 Patent, each pipeline of the multiple-pipeline system is configured to include a homogenous set of core functions. A pool of auxiliary functions is provided for selective insertion of auxiliary functions between core functions of select pipelines.

94. In one embodiment of the '041 Patent, each auxiliary function includes a multiplexer that allows it to be selectively coupled within each pipeline.

95. The '041 Patent discloses, in one embodiment, a processing system that includes a plurality of pipelines, with each pipeline of the plurality including a plurality of core pipeline elements that are configured to sequentially process data as it traverses the pipeline.

96. The '041 Patent discloses, in one embodiment, a processing system that includes a plurality of auxiliary elements, each auxiliary element of the plurality of auxiliary elements being configured to be selectively coupled to multiple pipelines of the plurality of pipelines.

97. The '041 Patent discloses, in one embodiment, a processing system wherein the auxiliary elements are responsive to external coupling-select signals.

98. The ‘041 Patent discloses, in one embodiment, a processing system wherein a plurality of auxiliary elements are within a selected pipeline of the multiple pipelines, between a pair of core pipeline elements of the plurality of core pipeline elements to process the data as it traverses between the pair of core elements.

99. The ‘041 Patent has been cited by several United States patents and patent applications as relevant prior art. Specifically, patents and patent applications issued to Microsoft Corporation, Xilinx Inc., Canon Inc., Intel Corporation, and Nokia Oyj have cited the ‘041 Patent and its underlying patent application as relevant prior art.

U.S. PATENT NO. 7,571,450

100. U.S. Patent No. 7,571,450 entitled, *System For And Method Of Displaying Information*, was filed on February 12, 2003, and claims priority to March 11, 2002. The ‘450 Patent is subject to a 35 U.S.C. § 154(b) term extension of 846 days. Dynamic Data is the owner by assignment of all right, title, and interest in the ‘450 Patent. A true and correct copy of the ‘450 Patent is attached hereto as Exhibit 11.

101. The ‘450 Patent discloses novel methods and systems for displaying information. The inventions disclosed in the ‘450 Patent enable methods and systems wherein a user does not need to make a new selection after being switched from one service to a second service.

102. The inventions disclosed in the ‘450 Patent permit a user of an information display system to have selections made on a first service also presented when the user switches to a second service without requiring the user to browse through the menus to define the type of information to be displayed a second time.

103. In one embodiment of the ‘450 Patent, the user selection being made on the basis of the provided options while the first service was selected is use to select the appropriate data elements of the stream of the second service.

104. The inventions disclosed in the ‘450 Patent enable various content sources to share similar information models.

105. The ‘450 Patent, in one embodiment, discloses a method of displaying information on a display device wherein receiving a transport stream comprises services, with the services having elementary streams of video and of data elements.

106. The ‘450 Patent, in one embodiment, discloses a method of displaying information on a display device wherein user actions of making a user selection of a type of information to be displayed on the device are received.

107. The ‘450 Patent, in one embodiment, discloses a method of displaying information on a display device wherein filtering to select a data element of a first one of the services on the basis of the user selection is performed.

108. The ‘450 Patent, in one embodiment, discloses a method of displaying information on a display device wherein rendering to calculate an output image to be displayed on the display device, on the basis of the first data element selected by the filer is performed.

109. The ‘450 Patent, in one embodiment, discloses a method of displaying information on a display device wherein switching from the first one of the services to a second one of the services, characterized in comprising a second step of filtering to select a second data-element of the second one of the services, on basis of the user selection is performed.

110. The ‘450 Patent, in one embodiment, discloses a method of displaying information on a display device wherein being switched from the first one of the services to the

second one of the services, with the data-element and the second data-element being mutually semantically related and a second step of rendering to calculate the output image to be displayed on the display device, on basis of the second data-element selected by the filter is performed.

111. The '450 Patent and its underlying patent application have been cited by several patents and patent applications as relevant prior art. Specifically, patents issued to AT&T Intellectual Property I LP, Nokia Oyj, Samsung Electronics Co., Ltd., and ZTE Corporation have all cited the '450 Patent and its underlying patent application as relevant prior art.

U.S. PATENT NO. 7,750,979

112. U.S. Patent No. 7,750,979 entitled, *Pixel-Data Line Buffer Approach Having Variable Sampling Patterns*, was filed on October 26, 2001. The '979 Patent is subject to a 35 U.S.C. § 154(b) term extension of 2,749 days. Dynamic Data is the owner by assignment of all right, title, and interest in the '979 Patent. A true and correct copy of the '979 Patent is attached hereto as Exhibit 12.

113. The '979 Patent discloses novel methods and systems for motion compensation in video signal processing.

114. The '979 Patent discloses methods and systems that use line buffers that are decoupled and that can deliver a fixed number of pixels, as may be required by a video processing stage, using a sampling pattern that is defined as one among several selectable sampling windows.

115. The '979 Patent discloses a video processing circuit having an input stream of pixels corresponding to an array of video pixels.

116. The '979 Patent further discloses having a variable window size for sampling subsets of the array as a two-dimensional window that spans the pixels in the array.

117. The ‘979 Patent further discloses having a video processing stage that inputs pixels using a fixed number of pixels.

118. The ‘979 Patent further discloses a method for delivering the input stream of pixels to the video processing stage.

119. The ‘979 Patent further discloses a method comprising establishing a window size and a sampling-window size, such that the window size is a multiple of the sampling-window size and the sampling-window size defines the fixed number of pixels.

120. The ‘979 Patent further discloses a method comprising storing pixels from the input stream into a first set of line butters, the pixels stored in the first set of line butters including pixels for the established window size.

121. The ‘979 Patent further discloses a method comprising prefetching the stored pixels from the first set of line butters into a second set of line buffers, the second set of line buffers being sufficiently long to store at least the pixels corresponding to the established sampling-window size.

122. The ‘979 Patent further discloses a method comprising fetching the fixed number of pixels from the second set of line buffers for the video processing stage.

COUNT I
INFRINGEMENT OF U.S. PATENT NO. 6,421,090

123. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

124. NVIDIA designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for interpolating a pixel during the interlacing of video signals.

125. NVIDIA designs, makes, sells, offers to sell, imports, and/or uses NVIDIA GTX graphics cards, including the: GeForce GTX 1080 Ti; GeForce GTX 1080; GeForce GTX 1070 Ti; GeForce GTX 1070; GeForce GTX 1060 Ti; GeForce GTX 1060; and NVIDIA Titan Xp (collectively, the "NVIDIA '090 Product(s)").

126. On information and belief, one or more NVIDIA subsidiaries and/or affiliates use the NVIDIA '090 Products in regular business operations.

127. On information and belief, one or more of the NVIDIA '090 Products include technology for interpolating a pixel during the interlacing of a video signal.

128. On information and belief, one or more of the NVIDIA '090 Products process a video signal including at least two fields of interlaced scan lines, with each scan line containing a series of pixels having intensity values.

129. On information and belief, one or more of the NVIDIA '090 Products generate a motion value representative of the motion between successive frames about the pixel.

130. On information and belief, one or more of the NVIDIA '090 Products detect an edge direction about the pixel.

131. On information and belief, one or more of the NVIDIA '090 Products perform a motion adaptive interpolation at the pixel.

132. On information and belief, the NVIDIA '090 Products are available to businesses and individuals throughout the United States.

133. On information and belief, the NVIDIA '090 Products are provided to businesses and individuals located in Delaware.

134. On information and belief, NVIDIA has directly infringed and continues to directly infringe the '090 Patent by, among other things, making, using, offering for sale, and/or

selling technology for interpolating a pixel during the deinterlacing of a video signal, including but not limited to the NVIDIA '090 Products.

135. On information and belief, the NVIDIA '090 Products interpolate a pixel during the deinterlacing of video signals.

136. On information and belief, the NVIDIA '090 Products process video signals that include at least two fields of interlaced scan lines. Each scan line in the video signal includes a series of pixels having respective intensity values.

137. On information and belief, the NVIDIA '090 Products generate a motion value representative of the motion between successive frames about the pixel by segmenting an image into a plurality of multi-pixel segments and compares the differences with respect to each segment in successive frames.

138. On information and belief, the NVIDIA '090 Products detect an edge direction about the pixel.

139. On information and belief, the NVIDIA '090 Products perform an edge adaptive interpolation at the pixel using the detected edge direction.

140. On information and belief, the NVIDIA '090 Products perform a motion adaptive interpolation at the pixel using the generated motion value by comparing segments of pixels about the pixel from at least three successive frames.

141. By making, using, testing, offering for sale, and/or selling products and services for interpolating a pixel during the interlacing of a video signal, including but not limited to the NVIDIA '090 Products, NVIDIA has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '090 Patent, including at least claim 5 pursuant to 35 U.S.C. § 271(a).

142. On information and belief, NVIDIA also indirectly infringes the '090 Patent by actively inducing infringement under 35 USC § 271(b).

143. NVIDIA has had knowledge of the '090 Patent since at least service of this Complaint or shortly thereafter, and on information and belief, NVIDIA knew of the '090 Patent and knew of its infringement, including by way of this lawsuit.

144. On information and belief, NVIDIA intended to induce patent infringement by third-party customers and users of the NVIDIA '090 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. NVIDIA specifically intended and was aware that the normal and customary use of the accused products would infringe the '090 Patent. NVIDIA performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '090 Patent and with the knowledge that the induced acts would constitute infringement. For example, NVIDIA provides the NVIDIA '090 Products that have the capability of operating in a manner that infringe one or more of the claims of the '090 Patent, including at least claim 5, and NVIDIA further provides documentation and training materials that cause customers and end users of the NVIDIA '090 Products to utilize the products in a manner that directly infringe one or more claims of the '090 Patent.[25] By providing instruction and training to customers and end-users on how to use the NVIDIA '090 Products in a manner that directly infringes one or more claims of the '090 Patent, including at least claim 5, NVIDIA specifically intended to induce infringement of the '090 Patent. On information and belief, NVIDIA engaged in such inducement to promote the sales of the NVIDIA '090 Products, e.g.,

[25] *See, e.g.*, *Release 396 Graphics Drivers for Windows, Version 399.07*, RELEASE NOTES (Aug. 27, 2018); *Release 390 Graphics Drivers for Windows, Version 390.77*, RELEASE NOTES (Jan. 29, 2018); *NVIDIA GeForce GTX 1080*, NVIDIA WHITEPAPER (2016); *GeForce GTX 1060*, NVIDIA USER GUIDE (2016); *GeForce GTX 1070*, NVIDIA USER GUIDE (2016); *Titan Xp*, NVIDIA USER GUIDE (2017).

through NVIDIA user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '090 Patent. Accordingly, NVIDIA has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '090 Patent, knowing that such use constitutes infringement of the '090 Patent.

145. The '090 Patent is well-known within the industry as demonstrated by multiple citations to the '090 Patent in published patents and patent applications assigned to technology companies and academic institutions. NVIDIA is utilizing the technology claimed in the '090 Patent without paying a reasonable royalty. NVIDIA is infringing the '090 Patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

146. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '090 Patent.

147. As a result of NVIDIA's infringement of the '090 Patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for NVIDIA's infringement, but in no event less than a reasonable royalty for the use made of the invention by NVIDIA together with interest and costs as fixed by the Court.

COUNT II
INFRINGEMENT OF U.S. PATENT NO. 8,135,073

148. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

149. NVIDIA designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for enhancing subsequent images of a video stream in which frames are encoded based on previous frames using prediction and motion estimation.

150. NVIDIA designs, makes, sells, offers to sell, imports, and/or uses NVIDIA products, including the following: GeForce GT 1030, GeForce GTX 1050 / 1050 Ti, GeForce GTX 1060, GeForce GTX 1070 - 1080, GeForce GTX 1080 Ti, GeForce GTX Titan X Titan Xp, Titan V, Quadro P400 - P1000, Quadro P2000, Quadro P4000 / P5000, Quadro P6000, Quadro GP100, Quadro GV100, Tesla M4, Tesla P4 / P6, Tesla P40, Tesla P100, Tesla V100, GeForce GTX 750 GeForce GTX 950 - 960, GeForce GT 1030, Quadro M2000, Quadro P400, Quadro P600, Quadro P620, and Quadro P1000 (collectively, the "NVIDIA '073 Product(s)").

151. On information and belief, one or more NVIDIA subsidiaries and/or affiliates use the NVIDIA '073 Products in regular business operations.

152. On information and belief, one or more of the NVIDIA '073 Products include technology for enhancing subsequent images of a video stream in which frames are encoded based on previous frames using prediction and motion estimation.

153. On information and belief, NVIDIA has directly infringed and continues to directly infringe the '073 Patent by, among other things, making, using, offering for sale, and/or selling technology for enhancing subsequent images of a video stream in which frames are encoded based on previous frames using prediction and motion estimation, including but not limited to the NVIDIA '073 Products.

154. On information and belief, one or more of the NVIDIA '073 Products reduce the processing capacity required for providing video enhancements to video processing through re-mapping of previous frames for subsequent frames.

155. On information and belief, one or more of the NVIDIA '073 Products enable the provision of enhanced video pictures with minimal additional hardware costs for the components required to successfully process the video data.

156. On information and belief, one or more of the NVIDIA '073 Products include an input for receiving a video stream containing encoded frame based video information including an encoded first frame and an encoded second frame.

157. On information and belief, one or more of the NVIDIA '073 Products include a video decoder comprising an input for receiving video information wherein the encoding of the second frame depends on the encoding of the first frame, the encoding of the second frame includes motion vectors indicating differences in positions between regions of the second frame and corresponding regions of the first frame, the motion vectors define correspondence between regions of the second frame and corresponding regions of the first frame.

158. On information and belief, one or more of the NVIDIA '073 Products include a video decoder comprising a decoding unit for decoding the frames, wherein the decoding unit recovers the motion vectors for the second frame.

159. On information and belief, one or more of the NVIDIA '073 Products include a video decoder comprising a processing component configured to determine a re-mapping strategy for video enhancement of the decoded first frame using a region-based analysis, re-map the first frame using the re-mapping strategy, and re-map one or more regions of the second frame depending on the re-mapping strategy for corresponding regions of the first frame.

160. On information and belief, the NVIDIA '073 Products are available to businesses and individuals throughout the United States.

161. On information and belief, the NVIDIA '073 Products are provided to businesses and individuals located in Delaware.

162. By making, using, testing, offering for sale, and/or selling products and services for enhancing subsequent images of a video stream in which frames are encoded based on previous frames using prediction and motion estimation, including but not limited to the NVIDIA '037 Products, NVIDIA has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '073 Patent, including at least claim 14 pursuant to 35 U.S.C. § 271(a).

163. On information and belief, NVIDIA also indirectly infringes the '073 Patent by actively inducing infringement under 35 USC § 271(b).

164. NVIDIA has had knowledge of the '073 Patent since at least service of this Complaint or shortly thereafter, and on information and belief, NVIDIA knew of the '073 Patent and knew of its infringement, including by way of this lawsuit.

165. On information and belief, NVIDIA intended to induce patent infringement by third-party customers and users of the NVIDIA '073 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. NVIDIA specifically intended and was aware that the normal and customary use of the accused products would infringe the '073 Patent. NVIDIA performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '073 Patent and with the knowledge that the induced acts would constitute infringement. For example, NVIDIA provides the NVIDIA '073 Products that have the capability of operating in a manner that infringe one or more of the claims of the '073 Patent, including at least claim 14, and NVIDIA further provides documentation and training materials

that cause customers and end users of the NVIDIA '073 Products to utilize the products in a manner that directly infringe one or more claims of the '073 Patent.[26] By providing instruction and training to customers and end-users on how to use the NVIDIA '073 Products in a manner that directly infringes one or more claims of the '073 Patent, including at least claim 14, NVIDIA specifically intended to induce infringement of the '073 Patent. On information and belief, NVIDIA engaged in such inducement to promote the sales of the NVIDIA '073 Products, e.g., through NVIDIA user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '073 Patent. Accordingly, NVIDIA has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '073 Patent, knowing that such use constitutes infringement of the '073 Patent.

166. The '073 Patent is well-known within the industry as demonstrated by multiple citations to the '073 Patent in published patents and patent applications assigned to technology companies and academic institutions. NVIDIA is utilizing the technology claimed in the '073 Patent without paying a reasonable royalty. NVIDIA is infringing the '073 Patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

167. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '073 Patent.

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[26] *See, e.g.*, *NVIDIA Quadro P4000*, NVIDIA DATASHEET (2017); *The Right Tools for Professionals: NVIDIA Workstation GPUs*, NVIDIA PROFESSIONAL SOLUTION GUIDE (2017); *NVIDIA GeForce GTX 1080*, NVIDIA WHITEPAPER (2016); *GeForce GTX 1060*, NVIDIA USER GUIDE (2016); *GeForce GTX 1070*, NVIDIA USER GUIDE (2016); *Titan Xp*, NVIDIA USER GUIDE (2017); *NVIDIA Tesla P40 GPU Accelerator*, NVIDIA DATASHEET (2017); *GRID Virtual GPU*, NVIDIA USER GUIDE (Nov. 2016); *Virtual GPU Software*, NVIDIA USER GUIDE (Oct. 2018); *NVIDIA Tesla M60 GPU Accelerator*, NVIDIA DATASHEET (2016); *Real Interactive Expression: NVIDIA Quadro M6000*, NVIDIA DATASHEET (2015); *NVIDIA Tesla V100 GPU Architecture*, NVIDIA WHITEPAPER (2015).

168. As a result of NVIDIA's infringement of the '073 Patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for NVIDIA's infringement, but in no event less than a reasonable royalty for the use made of the invention by NVIDIA together with interest and costs as fixed by the Court.

COUNT III
INFRINGEMENT OF U.S. PATENT NO. 8,073,054

169. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

170. NVIDIA designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for estimating a current motion vector for a group of pixels of an image.

171. NVIDIA designs, makes, sells, offers to sell, imports, and/or uses NVIDIA Products containing H.265 encoding technology, including: GeForce GTX 1050 / 1050 Ti, GeForce GTX 1050 / 1050 Ti, GeForce GTX 1060, GeForce GTX 1060, GeForce GTX 1070 - 1080, GeForce GTX 1080 Ti, GeForce GTX Titan X, Titan Xp, Titan V, Quadro P400 - P1000, Quadro P2000, Quadro P4000, Quadro P5000, Quadro P6000, Quadro GP100, Quadro GV100, Tesla P4 / P6, Tesla P40, Tesla P100, Tesla V100, GeForce GTX 960 Ti - 980, GeForce GTX 980 Ti, GeForce Quadro M4000, Quadro M5000, Quadro M6000, Quadro M2000, Quadro P400, Quadro P600, Quadro P620, Quadro P1000, Quadro P2000, Quadro P4000, Quadro P5000, Quadro P6000, Tesla M4, Tesla M40, Tesla M6, Tesla M60, Tesla P4, Tesla P6, Tesla P40, Tesla P100, and Tesla V100 (collectively, the "NVIDIA '054 Product(s)").

172. On information and belief, one or more NVIDIA subsidiaries and/or affiliates use the NVIDIA '054 Products in regular business operations.

173. On information and belief, one or more of the NVIDIA '054 Products include technology for estimating a current motion vector for a group of pixels of an image.

174. On information and belief, NVIDIA has directly infringed and continues to directly infringe the '054 Patent by, among other things, making, using, offering for sale, and/or selling technology for estimating a current motion vector for a group of pixels of an image, including but not limited to the NVIDIA '054 Products.

175. On information and belief, one or more of the NVIDIA '054 Products enable motion estimation with a relatively fast convergence in finding the appropriate motion vectors of the motion vector fields by adding a further candidate motion vector to the set of candidate motion vectors.

176. On information and belief, one or more of the NVIDIA '054 Products include a motion estimation unit comprising a generating unit for generating a set of candidate motion vectors for the group of pixels, with the candidate motion vectors being extracted from a set of previously estimated motion vectors.

177. On information and belief, one or more of the NVIDIA '054 Products include a motion estimation unit comprising a match error unit for calculating match errors of respective candidate motion vectors.

178. On information and belief, one or more of the NVIDIA '054 Products include a motion estimation unit comprising a selector for selecting the current motion vector from the candidate motion vectors by means of comparing the match errors of the respective candidate motion vectors, characterized in that the motion estimation unit is arranged to add a further candidate motion vector to the set of candidate motion vectors by calculating the further

candidate motion vector on basis of a first motion vector and a second motion vector, both belonging to the set of previously estimated motion vectors.

179. On information and belief, one or more of the NVIDIA '054 Products include a motion estimation unit that calculates the further candidate motion vector on basis of the first motion vector and the second motion vector, with the first motion vector belonging to a first forward motion vector field and the second motion vector belonging to a second forward motion vector field, with the first forward motion vector field and the second forward motion vector field being different.

180. On information and belief, one or more of the NVIDIA '054 Products include a motion estimation unit that arranges to calculate the further candidate motion vector by means of calculating a difference between the second motion vector and the first motion vector.

181. On information and belief, the NVIDIA '054 Products are available to businesses and individuals throughout the United States.

182. On information and belief, the NVIDIA '054 Products are provided to businesses and individuals located in Delaware.

183. By making, using, testing, offering for sale, and/or selling products and services for estimating a current motion vector for a group of pixels of an image, including but not limited to the NVIDIA '054 Products, NVIDIA has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '054 Patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

184. On information and belief, NVIDIA also indirectly infringes the '054 Patent by actively inducing infringement under 35 USC § 271(b).

185. NVIDIA has had knowledge of the '054 Patent since at least service of this Complaint or shortly thereafter, and on information and belief, NVIDIA knew of the '054 Patent and knew of its infringement, including by way of this lawsuit.

186. On information and belief, NVIDIA intended to induce patent infringement by third-party customers and users of the NVIDIA '054 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. NVIDIA specifically intended and was aware that the normal and customary use of the accused products would infringe the '054 Patent. NVIDIA performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '054 Patent and with the knowledge that the induced acts would constitute infringement. For example, NVIDIA provides the NVIDIA '054 Products that have the capability of operating in a manner that infringe one or more of the claims of the '054 Patent, including at least claim 1, and NVIDIA further provides documentation and training materials that cause customers and end users of the NVIDIA '054 Products to utilize the products in a manner that directly infringe one or more claims of the '054 Patent.[27] By providing instruction and training to customers and end-users on how to use the NVIDIA '054 Products in a manner that directly infringes one or more claims of the '054 Patent, including at least claim 1, NVIDIA specifically intended to induce infringement of the '054 Patent. On information and belief,

[27] *See, e.g.*, *NVIDIA Quadro P4000*, NVIDIA DATASHEET (2017); *The Right Tools for Professionals: NVIDIA Workstation GPUs*, NVIDIA PROFESSIONAL SOLUTION GUIDE (2017); *NVIDIA GeForce GTX 1080*, NVIDIA WHITEPAPER (2016); *GeForce GTX 1060*, NVIDIA USER GUIDE (2016); *GeForce GTX 1070*, NVIDIA USER GUIDE (2016); *Titan Xp*, NVIDIA USER GUIDE (2017); *NVIDIA Tesla P40 GPU Accelerator*, NVIDIA DATASHEET (2017); *GRID Virtual GPU*, NVIDIA USER GUIDE (Nov. 2016); *Virtual GPU Software*, NVIDIA USER GUIDE (Oct. 2018); *NVIDIA Tesla M60 GPU Accelerator*, NVIDIA DATASHEET (2016); *Real Interactive Expression: NVIDIA Quadro M6000*, NVIDIA DATASHEET (2015); *NVIDIA Tesla V100 GPU Architecture*, NVIDIA WHITEPAPER (2015); *Release 387 Graphics Drivers for Windows, Version 388.71*, RELEASE NOTES (Dec. 20, 2017).

NVIDIA engaged in such inducement to promote the sales of the NVIDIA '054 Products, e.g., through NVIDIA user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '054 Patent. Accordingly, NVIDIA has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '054 Patent, knowing that such use constitutes infringement of the '054 Patent.

187. The '054 Patent is well-known within the industry as demonstrated by multiple citations to the '054 Patent in published patents and patent applications assigned to technology companies and academic institutions. NVIDIA is utilizing the technology claimed in the '054 Patent without paying a reasonable royalty. NVIDIA is infringing the '054 Patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

188. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '054 Patent.

189. As a result of NVIDIA's infringement of the '054 Patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for NVIDIA's infringement, but in no event less than a reasonable royalty for the use made of the invention by NVIDIA together with interest and costs as fixed by the Court.

COUNT IV
INFRINGEMENT OF U.S. PATENT NO. 6,774,918

190. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

191. NVIDIA designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for image processing.

192. NVIDIA designs, makes, sells, offers to sell, imports, and/or uses NVIDIA products that support overlay functionality, including the following products: GeForce GT 1030, GeForce GTX 1050 / 1050 Ti, GeForce GTX 1060, GeForce GTX 1070 - 1080, GeForce GTX 1080 Ti, GeForce GTX Titan X, Titan Xp, Titan V, Quadro P400 - P1000, Quadro P2000, Quadro P4000 / P5000, Quadro P6000, Quadro GP100, Quadro GV100, Tesla P4 / P6, Tesla P40, Tesla P100, Tesla V100, GeForce GTX 750 GeForce GTX 950 - 960, Quadro M2000, Quadro P620, Quadro P1000, Quadro P6000, and Quadro GP100 (collectively, the "NVIDIA '918 Product(s)").

193. On information and belief, one or more NVIDIA subsidiaries and/or affiliates use the NVIDIA '918 Products in regular business operations.

194. On information and belief, one or more of the NVIDIA '918 Products include technology for image processing.

195. On information and belief, the NVIDIA '918 Products are available to businesses and individuals throughout the United States.

196. On information and belief, the NVIDIA '918 Products are provided to businesses and individuals located in Delaware.

197. On information and belief, NVIDIA has directly infringed and continues to directly infringe the '918 Patent by, among other things, making, using, offering for sale, and/or selling video processing technology, including but not limited to the NVIDIA '918 Products.

198. On information and belief, one or more of the NVIDIA '918 Products provide an overlay such as a cursor in an on-screen display in a consumer electronic device.

199. On information and belief, one or more of the NVIDIA '918 Products enable downloading on-screen display (OSD) data for generating an image on a display device.

200. On information and belief, one or more of the NVIDIA '918 Products download the on-screen display (OSD) data in segments separated by gaps.

201. On information and belief, one or more of the NVIDIA '918 Products download, during a gap in downloading the on-screen display data, an amount of overlay data for generating an overlay on the image generated on a display device.

202. On information and belief, one or more of the NVIDIA '918 Products contain overlay data downloaded during a gap that comprises a portion of the overlay data.

203. On information and belief, the NVIDIA '918 Products comprise a computer-usable medium having computer-readable program code embodied therein for causing a video processor to download on-screen display (OSD) data for generating an image on a display device, with said downloading occurring in segments separated by gaps.

204. On information and belief, the NVIDIA '918 Products comprise a computer-usable medium having computer-readable program code embodied therein for causing a video processor to download an amount of overlay data for generating an overlay on an image during a gap in downloading the on-screen display (OSD) data, wherein the amount of overlay data comprises a portion of said overlay.

205. By making, using, testing, offering for sale, and/or selling products and services, including but not limited to the NVIDIA '918 Products, NVIDIA has injured Dynamic Data and is liable for directly infringing one or more claims of the '918 Patent, including at least claim 18, pursuant to 35 U.S.C. § 271(a).

206. On information and belief, NVIDIA also indirectly infringes the '918 Patent by actively inducing infringement under 35 USC § 271(b).

207. On information and belief, NVIDIA has had knowledge of the '918 Patent since at least service of this Complaint or shortly thereafter, and on information and belief, NVIDIA knew of the '918 Patent and knew of its infringement, including by way of this lawsuit.

208. On information and belief, NVIDIA intended to induce patent infringement by third-party customers and users of the NVIDIA '918 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. NVIDIA specifically intended and was aware that the normal and customary use of the accused products would infringe the '918 Patent. NVIDIA performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '918 Patent and with the knowledge that the induced acts would constitute infringement. For example, NVIDIA provides the NVIDIA '918 Products that have the capability of operating in a manner that infringe one or more of the claims of the '918 Patent, including at least claim 18, and NVIDIA further provides documentation and training materials that cause customers and end users of the NVIDIA '918 Products to utilize the products in a manner that directly infringe one or more claims of the '918 Patent.[28] By providing instruction and training to customers and end-users on how to use the NVIDIA '918 Products in a manner

[28] *NVIDIA Quadro P4000*, NVIDIA DATASHEET (2017); *The Right Tools for Professionals: NVIDIA Workstation GPUs*, NVIDIA PROFESSIONAL SOLUTION GUIDE (2017); *NVIDIA GeForce GTX 1080*, NVIDIA WHITEPAPER (2016); *GeForce GTX 1060*, NVIDIA USER GUIDE (2016); *GeForce GTX 1070*, NVIDIA USER GUIDE (2016); *Titan Xp*, NVIDIA USER GUIDE (2017); *NVIDIA Tesla P40 GPU Accelerator*, NVIDIA DATASHEET (2017); *GRID Virtual GPU*, NVIDIA USER GUIDE (Nov. 2016); *Virtual GPU Software*, NVIDIA USER GUIDE (Oct. 2018); *NVIDIA Tesla M60 GPU Accelerator*, NVIDIA DATASHEET (2016); *Real Interactive Expression: NVIDIA Quadro M6000*, NVIDIA DATASHEET (2015); *NVIDIA Tesla V100 GPU Architecture*, NVIDIA WHITEPAPER (2015); *Release 396 Graphics Drivers for Windows, Version 399.07*, RELEASE NOTES (Aug. 27, 2018); *Release 390 Graphics Drivers for Windows, Version 390.77*, RELEASE NOTES (Jan. 29, 2018).

that directly infringes one or more claims of the '918 Patent, including at least claim 18, NVIDIA specifically intended to induce infringement of the '918 Patent. On information and belief, NVIDIA engaged in such inducement to promote the sales of the NVIDIA '918 Products, e.g., through NVIDIA user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '918 Patent. Accordingly, NVIDIA has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '918 Patent, knowing that such use constitutes infringement of the '918 Patent.

209. The '918 Patent is well-known within the industry as demonstrated by multiple citations to the '918 Patent in published patents and patent applications assigned to technology companies and academic institutions. NVIDIA is utilizing the technology claimed in the '918 Patent without paying a reasonable royalty. NVIDIA is infringing the '918 Patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

210. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '918 Patent.

211. As a result of NVIDIA's infringement of the '918 Patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for NVIDIA's infringement, but in no event less than a reasonable royalty for the use made of the invention by NVIDIA together with interest and costs as fixed by the Court.

COUNT V
INFRINGEMENT OF U.S. PATENT NO. 8,184,689

212. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

213. NVIDIA designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for encoding and decoding video data.

214. NVIDIA designs, makes, sells, offers to sell, imports, and/or uses NVIDIA processing units, including: GeForce GTX Titan Z, GeForce GTX Titan Black, GeForce GTX Titan, GeForce GTX 780 Ti, GeForce GTX 780, GeForce GT 640 (GDDR5), GeForce GT 630 v2, GeForce GT 730, GeForce GT 720, GeForce GT 710, GeForce GT 740M (64-bit, DDR3), GeForce GT 920M, GeForce GTX 750 Ti, GeForce GTX 750, GeForce GTX 960M, GeForce GTX 950M, GeForce 940M, GeForce 930M, GeForce GTX 860M, GeForce GTX 850M, GeForce 845M, GeForce 840M, GeForce 830M, GeForce GTX 870M, Titan Xp, Titan X, GeForce GTX 1080 Ti, GTX 1080, GTX 1070 Ti, GTX 1070, GTX 1060, GTX 1050 Ti, GTX 1050, GT 1030, MX150, Titan V, GeForce RTX 2080 Ti, RTX 2080, RTX 2070, Quadro K6000, Quadro K5200, Quadro M6000 24GB, Quadro M6000, Quadro M5000, Quadro M4000, Quadro M2000, Quadro M5500, Quadro M5000M, Quadro M4000M, Quadro M3000M, Quadro GP100, Quadro P6000, Quadro P5000, Quadro P4000, Quadro P2000, Quadro P1000, Quadro P600, Quadro P400, Quadro P5000 (Mobile), Quadro P4000 (Mobile), Quadro P3000 (Mobile), Quadro GV100, Quadro RTX 8000, Quadro RTX 6000, and Quadro RTX 5000 (collectively, the "NVIDIA '689 Product(s)").

215. On information and belief, one or more NVIDIA subsidiaries and/or affiliates use the NVIDIA '689 Products in regular business operations.

216. On information and belief, one or more of the NVIDIA '689 Products include technology for encoding and decoding video data.

217. On information and belief, NVIDIA has directly infringed and continues to directly infringe the '689 Patent by, among other things, making, using, offering for sale, and/or selling technology for encoding and decoding video data, including but not limited to the NVIDIA '689 Products.

218. On information and belief, one or more of the NVIDIA '689 Products reduce processing time and power consumption associated with encoding and decoding video stream data by reducing off-chip memory accesses through using simultaneous encoded/decoded images as a reference image for encoding/decoding at least one of the other simultaneously encoded/decoded images.

219. On information and belief, one or more of the NVIDIA '689 Products perform a method for encoding and decoding a video stream, including a plurality of images in a video processing apparatus having a processing unit coupled to a first memory, further comprising a second memory.

220. On information and belief, one or more of the NVIDIA '689 Products perform a method for encoding and decoding a video stream comprising providing a subset of image data stored in the second memory in the first memory.

221. On information and belief, one or more of the NVIDIA '689 Products perform a method for encoding and decoding a video stream comprising simultaneous encoding/decoding of more than one image of the video stream, by accessing said subset, wherein the simultaneously encoding/decoding is performed by access sharing to at least one image.

222. On information and belief, the NVIDIA '689 Products are available to businesses and individuals throughout the United States.

223. On information and belief, the NVIDIA '689 Products are provided to businesses and individuals located in Delaware.

224. By making, using, testing, offering for sale, and/or selling products and services for encoding and decoding video data, including but not limited to the NVIDIA '689 Products, NVIDIA has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '689 Patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

225. On information and belief, NVIDIA also indirectly infringes the '689 Patent by actively inducing infringement under 35 USC § 271(b).

226. NVIDIA has had knowledge of the '689 Patent since at least service of this Complaint or shortly thereafter, and on information and belief, NVIDIA knew of the '689 Patent and knew of its infringement, including by way of this lawsuit.

227. On information and belief, NVIDIA intended to induce patent infringement by third-party customers and users of the NVIDIA '689 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. NVIDIA specifically intended and was aware that the normal and customary use of the accused products would infringe the '689 Patent. NVIDIA performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '689 Patent and with the knowledge that the induced acts would constitute infringement. For example, NVIDIA provides the NVIDIA '689 Products that have the capability of operating in a manner that infringe one or more of the claims of the '689 Patent, including at least claim 1, and NVIDIA further provides documentation and training materials

that cause customers and end users of the NVIDIA '689 Products to utilize the products in a manner that directly infringe one or more claims of the '689 Patent.[29] By providing instruction and training to customers and end-users on how to use the NVIDIA '689 Products in a manner that directly infringes one or more claims of the '689 Patent, including at least claim 1, NVIDIA specifically intended to induce infringement of the '689 Patent. On information and belief, NVIDIA engaged in such inducement to promote the sales of the NVIDIA '689 Products, e.g., through NVIDIA user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '689 Patent. Accordingly, NVIDIA has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '689 Patent, knowing that such use constitutes infringement of the '689 Patent.

228. The '689 Patent is well-known within the industry as demonstrated by multiple citations to the '689 Patent in published patents and patent applications assigned to technology companies and academic institutions. NVIDIA is utilizing the technology claimed in the '689 Patent without paying a reasonable royalty. NVIDIA is infringing the '689 Patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

229. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '689 Patent.

230. As a result of NVIDIA's infringement of the '689 Patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for

[29] *See, e.g.*, *Release 410 Quadro, Tesla, and Notebook Drivers for Windows, Version 411.81*, RELEASE NOTES (Oct. 23, 2018) NVIDIA *GeForce GTX 1080*, NVIDIA WHITEPAPER (2016); *GeForce GTX 1060*, NVIDIA USER GUIDE (2016); *GeForce GTX 1070*, NVIDIA USER GUIDE (2016); *Titan Xp*, NVIDIA USER GUIDE (2017); *NVIDIA Tesla V100 GPU Architecture*, NVIDIA WHITEPAPER (2015).

NVIDIA's infringement, but in no event less than a reasonable royalty for the use made of the invention by NVIDIA together with interest and costs as fixed by the Court.

COUNT VI
INFRINGEMENT OF U.S. PATENT NO. 6,996,177

231. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

232. NVIDIA designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for motion estimation.

233. NVIDIA designs, makes, sells, offers to sell, imports, and/or uses NVIDIA Products containing H.265 encoding technology, including: GeForce GTX 1050 / 1050 Ti, GeForce GTX 1060, GeForce GTX 1070 - 1080, GeForce GTX 1080 Ti, GeForce GTX Titan X, Titan Xp, Titan V, Quadro P400 - P1000, Quadro P2000, Quadro P4000, Quadro P5000, Quadro P6000, Quadro GP100, Quadro GV100, Tesla P4 / P6, Tesla P40, Tesla P100, Tesla V100, GeForce GTX 960 Ti - 980, GeForce GTX 980 Ti, GeForce Quadro M4000, Quadro M5000, Quadro M6000, Quadro M2000, Quadro P400, Quadro P600, Quadro P620, Quadro P1000, Quadro P2000, Quadro P4000, Quadro P5000, Quadro P6000, Tesla M4, Tesla M40, Tesla M6, and Tesla M60 (collectively, the "NVIDIA '177 Product(s)").

234. On information and belief, one or more NVIDIA subsidiaries and/or affiliates use the NVIDIA '177 Products in regular business operations.

235. On information and belief, one or more of the NVIDIA '177 Products include technology for motion estimation and motion-compensated picture signal processing.

236. On information and belief, the NVIDIA '177 Products are available to businesses and individuals throughout the United States.

237. On information and belief, the NVIDIA '177 Products are provided to businesses and individuals located in Delaware.

238. On information and belief, NVIDIA has directly infringed and continues to directly infringe the '177 Patent by, among other things, making, using, offering for sale, and/or selling products and services for motion estimation and motion-compensated picture signal processing.

239. The NVIDIA '177 Products comprise methods and devices for motion estimation and motion-compensated picture signal processing.

240. The NVIDIA '177 Products incorporate a motion vector estimation method and device that carries out a block-based motion vector estimation process that involves comparing a plurality of candidate vectors to determine block-based motion vectors.

241. The NVIDIA '177 Products determine at least a most frequently occurring block-based motion vector.

242. The NVIDIA '177 Products carry out a global motion vector estimation process using at least the most frequently occurring block-based motion vector to obtain a global motion vector.

243. The NVIDIA '177 Products applies the global motion vector as a candidate vector to the block-based motion vector estimation process.

244. By making, using, testing, offering for sale, and/or selling products and services, including but not limited to the NVIDIA '177 Products, NVIDIA has injured Dynamic Data and is liable for directly infringing one or more claims of the '177 Patent, including at least claim 1, pursuant to 35 U.S.C. § 271(a).

245. On information and belief, NVIDIA also indirectly infringes the '177 Patent by actively inducing infringement under 35 USC § 271(b).

246. On information and belief, NVIDIA has had knowledge of the '177 Patent since at least service of this Complaint or shortly thereafter, and on information and belief, NVIDIA knew of the '177 Patent and knew of its infringement, including by way of this lawsuit.

247. On information and belief, NVIDIA intended to induce patent infringement by third-party customers and users of the NVIDIA '177 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. NVIDIA specifically intended and was aware that the normal and customary use of the accused products would infringe the '177 Patent. NVIDIA performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '177 Patent and with the knowledge that the induced acts would constitute infringement. For example, NVIDIA provides the NVIDIA '177 Products that have the capability of operating in a manner that infringe one or more of the claims of the '177 Patent, including at least claim 1, and NVIDIA further provides documentation and training materials that cause customers and end users of the NVIDIA '177 Products to utilize the products in a manner that directly infringe one or more claims of the '177 Patent.[30] By providing instruction and training to customers and end-users on how to use the NVIDIA '177 Products in a manner that directly infringes one or more claims of the '177 Patent, including at least claim 1, NVIDIA

[30] *See, e.g.*, *NVIDIA Quadro P4000*, NVIDIA DATASHEET (2017); *The Right Tools for Professionals: NVIDIA Workstation GPUs*, NVIDIA PROFESSIONAL SOLUTION GUIDE (2017); *NVIDIA GeForce GTX 1080*, NVIDIA WHITEPAPER (2016); *GeForce GTX 1060*, NVIDIA USER GUIDE (2016); *GeForce GTX 1070*, NVIDIA USER GUIDE (2016); *Titan Xp*, NVIDIA USER GUIDE (2017); *NVIDIA Tesla P40 GPU Accelerator*, NVIDIA DATASHEET (2017); *GRID Virtual GPU*, NVIDIA USER GUIDE (Nov. 2016); *Virtual GPU Software*, NVIDIA USER GUIDE (Oct. 2018); *NVIDIA Tesla M60 GPU Accelerator*, NVIDIA DATASHEET (2016); *Real Interactive Expression: NVIDIA Quadro M6000*, NVIDIA DATASHEET (2015); *NVIDIA Tesla V100 GPU Architecture*, NVIDIA WHITEPAPER (2015).

specifically intended to induce infringement of the '177 Patent. On information and belief, NVIDIA engaged in such inducement to promote the sales of the NVIDIA '177 Products, e.g., through NVIDIA user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '177 Patent. Accordingly, NVIDIA has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '177 Patent, knowing that such use constitutes infringement of the '177 Patent.

248. The '177 Patent is well-known within the industry as demonstrated by multiple citations to the '177 Patent in published patents and patent applications assigned to technology companies and academic institutions. NVIDIA is utilizing the technology claimed in the '177 Patent without paying a reasonable royalty. NVIDIA is infringing the '177 Patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

249. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '177 Patent.

250. As a result of NVIDIA's infringement of the '177 Patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for NVIDIA's infringement, but in no event less than a reasonable royalty for the use made of the invention by NVIDIA together with interest and costs as fixed by the Court.

COUNT VII
INFRINGEMENT OF U.S. PATENT NO. 7,010,039

251. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

252. NVIDIA designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for detecting motion.

253. NVIDIA designs, makes, sells, offers to sell, imports, and/or uses Products containing H.265 encoding technology, including: GeForce GTX 1050 / 1050 Ti, GeForce GTX 1060, GeForce GTX 1070 - 1080, GeForce GTX 1080 Ti, GeForce GTX Titan X, Titan Xp, Titan V, Quadro P400 - P1000, Quadro P2000, Quadro P4000, Quadro P5000, Quadro P6000, Quadro GP100, Quadro GV100, Tesla P4 / P6, Tesla P40, Tesla P100, Tesla V100, GeForce GTX 960 Ti - 980, GeForce GTX 980 Ti, GeForce Quadro M4000, Quadro M5000, Quadro M6000, Quadro M2000, Quadro P400, Quadro P600, Quadro P620, Quadro P1000, Tesla M4, Tesla M40, Tesla M6, and Tesla M60 (collectively, the "NVIDIA '039 Product(s)").

254. On information and belief, one or more NVIDIA subsidiaries and/or affiliates use the NVIDIA '039 Products in regular business operations.

255. On information and belief, one or more of the NVIDIA '039 Products include technology for detecting motion.

256. On information and belief, the NVIDIA '039 Products are available to businesses and individuals throughout the United States.

257. On information and belief, the NVIDIA '039 Products are provided to businesses and individuals located in Delaware.

258. On information and belief, NVIDIA has directly infringed and continues to directly infringe the '039 Patent by, among other things, making, using, offering for sale, and/or selling technology for detecting motion, including but not limited to the NVIDIA '039 Products.

259. On information and belief, the NVIDIA '039 Products detect motion at a temporal intermediate position between previous and next images.

260. On information and belief, the NVIDIA ‘039 Products carry out the optimization at the temporal position of the next image in covering areas and at the temporal position of the previous image in uncovering areas.

261. On information and belief, the NVIDIA ‘039 Products detect motion at a temporal intermediate position between previous and next images.

262. On information and belief, the NVIDIA ‘039 Products utilize a criterion function for candidate vectors that is optimized.

263. On information and belief, the NVIDIA ‘039 Products utilize a criterion function that depends on data from both previous and next images and in which the optimizing is carried out at the temporal intermediate position in non-covering and non-uncovering areas, characterized in that the optimizing is carried out at the temporal position of the next image in covering areas and at the temporal position of the previous image in uncovering areas.

264. By making, using, testing, offering for sale, and/or selling products and services, including but not limited to the NVIDIA ‘039 Products, NVIDIA has injured Dynamic Data and is liable for directly infringing one or more claims of the ‘039 Patent, including at least claim 1, pursuant to 35 U.S.C. § 271(a).

265. On information and belief, NVIDIA also indirectly infringes the ‘039 Patent by actively inducing infringement under 35 USC § 271(b).

266. On information and belief, NVIDIA has had knowledge of the ‘039 Patent since at least service of this Complaint or shortly thereafter, and on information and belief, NVIDIA knew of the ‘039 Patent and knew of its infringement, including by way of this lawsuit.

267. On information and belief, NVIDIA intended to induce patent infringement by third-party customers and users of the NVIDIA ‘039 Products and had knowledge that the

inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. NVIDIA specifically intended and was aware that the normal and customary use of the accused products would infringe the '039 Patent. NVIDIA performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '039 Patent and with the knowledge that the induced acts would constitute infringement. For example, NVIDIA provides the NVIDIA '039 Products that have the capability of operating in a manner that infringe one or more of the claims of the '039 Patent, including at least claim 1, and NVIDIA further provides documentation and training materials that cause customers and end users of the NVIDIA '039 Products to utilize the products in a manner that directly infringe one or more claims of the '039 Patent.[31] By providing instruction and training to customers and end-users on how to use the NVIDIA '039 Products in a manner that directly infringes one or more claims of the '039 Patent, including at least claim 1, NVIDIA specifically intended to induce infringement of the '039 Patent. On information and belief, NVIDIA engaged in such inducement to promote the sales of the NVIDIA '039 Products, e.g., through NVIDIA user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '039 Patent. Accordingly, NVIDIA has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '039 Patent, knowing that such use constitutes infringement of the '039 Patent.

[31] *See, e.g.*, *NVIDIA Quadro P4000*, NVIDIA DATASHEET (2017); *The Right Tools for Professionals: NVIDIA Workstation GPUs*, NVIDIA PROFESSIONAL SOLUTION GUIDE (2017); *NVIDIA GeForce GTX 1080*, NVIDIA WHITEPAPER (2016); *GeForce GTX 1060*, NVIDIA USER GUIDE (2016); *GeForce GTX 1070*, NVIDIA USER GUIDE (2016); *Titan Xp*, NVIDIA USER GUIDE (2017); *NVIDIA Tesla P40 GPU Accelerator*, NVIDIA DATASHEET (2017); *GRID Virtual GPU*, NVIDIA USER GUIDE (Nov. 2016); *Virtual GPU Software*, NVIDIA USER GUIDE (Oct. 2018); *NVIDIA Tesla M60 GPU Accelerator*, NVIDIA DATASHEET (2016); *Real Interactive Expression: NVIDIA Quadro M6000*, NVIDIA DATASHEET (2015); *NVIDIA Tesla V100 GPU Architecture*, NVIDIA WHITEPAPER (2015).

268. The '039 Patent is well-known within the industry as demonstrated by multiple citations to the '039 Patent in published patents and patent applications assigned to technology companies and academic institutions. NVIDIA is utilizing the technology claimed in the '039 Patent without paying a reasonable royalty. NVIDIA is infringing the '039 Patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

269. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '039 Patent.

270. As a result of NVIDIA's infringement of the '039 Patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for NVIDIA's infringement, but in no event less than a reasonable royalty for the use made of the invention by NVIDIA together with interest and costs as fixed by the Court.

COUNT VIII
INFRINGEMENT OF U.S. PATENT NO. 8,311,112

271. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

272. NVIDIA designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for video compression.

273. NVIDIA designs, makes, sells, offers to sell, imports, and/or uses Products containing H.265 encoding technology, including: GeForce GTX 1050 / 1050 Ti, GeForce GTX 1060, GeForce GTX 1070 - 1080, GeForce GTX 1080 Ti, GeForce GTX Titan X, Titan Xp, Titan V, Quadro P400 - P1000, Quadro P2000, Quadro P4000, Quadro P5000, Quadro P6000, Quadro GP100, Quadro GV100, Tesla P4 / P6, Tesla P40, Tesla P100, Tesla V100, GeForce

GTX 960 Ti - 980, GeForce GTX 980 Ti, GeForce Quadro M4000, Quadro M5000, Quadro M6000, Quadro M2000, Quadro P400, Quadro P600, Quadro P620, Quadro P1000, Tesla M4, Tesla M40, Tesla M6, and Tesla M60 (collectively, the "NVIDIA '112 Product(s)").

274. On information and belief, one or more NVIDIA subsidiaries and/or affiliates use the NVIDIA '112 Products in regular business operations.

275. On information and belief, one or more of the NVIDIA '112 Products include technology for video compression.

276. On information and belief, NVIDIA has directly infringed and continues to directly infringe the '112 Patent by, among other things, making, using, offering for sale, and/or selling technology for video compression, including but not limited to the NVIDIA '112 Products.

277. On information and belief, one or more of the NVIDIA '112 Products perform predictive coding on a macroblock of a video frame such that a set of pixels of the macroblock is coded using some of the pixels from the same video frame as reference pixels and the rest of the macroblock is coded using reference pixels from at least one other video frame.

278. On information and belief, one or more of the NVIDIA '112 Products include a system for video compression comprising an intra-frame coding unit configured to perform predictive coding on a set of pixels of a macroblock of pixels using a first group of reference pixels, the macroblock of pixels and the first group of reference pixels being from a video frame.

279. On information and belief, one or more of the NVIDIA '112 Products include a system for video compression comprising an inter-frame coding unit configured to perform predictive coding on the rest of the macroblock of pixels using a second group of reference pixels, the second group of reference pixels being from at least one other video frame.

280. On information and belief, the NVIDIA '112 Products are available to businesses and individuals throughout the United States.

281. On information and belief, the NVIDIA '112 Products are provided to businesses and individuals located in Delaware.

282. By making, using, testing, offering for sale, and/or selling products and services for interpolating a pixel during the interlacing of a video signal, including but not limited to the NVIDIA '112 Products, NVIDIA has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '112 Patent, including at least claim 11 pursuant to 35 U.S.C. § 271(a).

283. On information and belief, NVIDIA also indirectly infringes the '112 Patent by actively inducing infringement under 35 USC § 271(b).

284. NVIDIA has had knowledge of the '112 Patent since at least service of this Complaint or shortly thereafter, and on information and belief, NVIDIA knew of the '112 Patent and knew of its infringement, including by way of this lawsuit.

285. On information and belief, NVIDIA intended to induce patent infringement by third-party customers and users of the NVIDIA '112 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. NVIDIA specifically intended and was aware that the normal and customary use of the accused products would infringe the '112 Patent. NVIDIA performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '112 Patent and with the knowledge that the induced acts would constitute infringement. For example, NVIDIA provides the NVIDIA '112 Products that have the capability of operating in a manner that infringe one or more of the claims of the '112 Patent,

including at least claim 11, and NVIDIA further provides documentation and training materials that cause customers and end users of the NVIDIA '112 Products to utilize the products in a manner that directly infringe one or more claims of the '112 Patent.[32] By providing instruction and training to customers and end-users on how to use the NVIDIA '112 Products in a manner that directly infringes one or more claims of the '112 Patent, including at least claim 11, NVIDIA specifically intended to induce infringement of the '112 Patent. On information and belief, NVIDIA engaged in such inducement to promote the sales of the NVIDIA '112 Products, e.g., through NVIDIA user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '112 Patent. Accordingly, NVIDIA has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '112 Patent, knowing that such use constitutes infringement of the '112 Patent.

286. The '112 Patent is well-known within the industry as demonstrated by multiple citations to the '112 Patent in published patents and patent applications assigned to technology companies and academic institutions. NVIDIA is utilizing the technology claimed in the '112 Patent without paying a reasonable royalty. NVIDIA is infringing the '112 Patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

[32] *See, e.g.*, *NVIDIA Quadro P4000*, NVIDIA DATASHEET (2017); *The Right Tools for Professionals: NVIDIA Workstation GPUs*, NVIDIA PROFESSIONAL SOLUTION GUIDE (2017); *NVIDIA GeForce GTX 1080*, NVIDIA WHITEPAPER (2016); *GeForce GTX 1060*, NVIDIA USER GUIDE (2016); *GeForce GTX 1070*, NVIDIA USER GUIDE (2016); *Titan Xp*, NVIDIA USER GUIDE (2017); *NVIDIA Tesla P40 GPU Accelerator*, NVIDIA DATASHEET (2017); *GRID Virtual GPU*, NVIDIA USER GUIDE (Nov. 2016); *Virtual GPU Software*, NVIDIA USER GUIDE (Oct. 2018); *NVIDIA Tesla M60 GPU Accelerator*, NVIDIA DATASHEET (2016); *Real Interactive Expression: NVIDIA Quadro M6000*, NVIDIA DATASHEET (2015); *NVIDIA Tesla V100 GPU Architecture*, NVIDIA WHITEPAPER (2015).

287. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '112 Patent.

288. As a result of NVIDIA's infringement of the '112 Patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for NVIDIA's infringement, but in no event less than a reasonable royalty for the use made of the invention by NVIDIA together with interest and costs as fixed by the Court.

COUNT IX
INFRINGEMENT OF U.S. PATENT NO. 7,894,529

289. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

290. NVIDIA designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for determining motion vectors that are each assigned to individual image regions.

291. NVIDIA designs, makes, sells, offers to sell, imports, and/or uses Products containing H.265 encoding technology, including: GeForce GTX 1050 / 1050 Ti, GeForce GTX 1060, GeForce GTX 1070 - 1080, GeForce GTX 1080 Ti, GeForce GTX Titan X, Titan Xp, Titan V, Quadro P400 - P1000, Quadro P2000, Quadro P4000, Quadro P5000, Quadro P6000, Quadro GP100, Quadro GV100, Tesla P4 / P6, Tesla P40, Tesla P100, Tesla V100, GeForce GTX 960 Ti - 980, GeForce GTX 980 Ti, GeForce Quadro M4000, Quadro M5000, Quadro M6000, Quadro M2000, Quadro P400, Quadro P600, Quadro P620, Quadro P1000, Tesla M4, Tesla M40, Tesla M6, and Tesla M60 (collectively, the "NVIDIA '529 Product(s)").

292. On information and belief, one or more NVIDIA subsidiaries and/or affiliates use the NVIDIA '529 Products in regular business operations.

293. On information and belief, one or more of the NVIDIA '529 Products include technology for determining motion vectors that are each assigned to individual image regions.

294. On information and belief, NVIDIA has directly infringed and continues to directly infringe the '529 Patent by, among other things, making, using, offering for sale, and/or selling technology for determining motion vectors that are each assigned to individual image regions, including but not limited to the NVIDIA '529 Products.

295. On information and belief, one or more of the NVIDIA '529 Products enable an increase in the resolution of video and image signals during the motion estimation process.

296. On information and belief, one or more of the NVIDIA '529 Products perform a method for determining motion vectors which are assigned to individual image regions of an image.

297. On information and belief, one or more of the NVIDIA '529 Products perform a method wherein an image is subdivided into a number of image blocks, and a motion estimation technique is implemented to assign at least one motion vector to each of the image blocks where a modified motion vector is generated for at least a first image block.

298. On information and belief, one or more of the NVIDIA '529 Products perform a method that determines at least a second image block through which the motion vector assigned to the first image block at least partially passes.

299. On information and belief, one or more of the NVIDIA '529 Products perform a method that generates the modified motion vector as a function of a motion vector assigned to at least the second image block.

300. On information and belief, one or more of the NVIDIA '529 Products perform a method that assigns the modified motion vector as the motion vector to the first image block.

301. On information and belief, the NVIDIA '529 Products are available to businesses and individuals throughout the United States.

302. On information and belief, the NVIDIA '529 Products are provided to businesses and individuals located in Delaware.

303. By making, using, testing, offering for sale, and/or selling products and services for interpolating a pixel during the interlacing of a video signal, including but not limited to the NVIDIA '529 Products, NVIDIA has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '529 Patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

304. On information and belief, NVIDIA also indirectly infringes the '529 Patent by actively inducing infringement under 35 USC § 271(b).

305. NVIDIA has had knowledge of the '529 Patent since at least service of this Complaint or shortly thereafter, and on information and belief, NVIDIA knew of the '529 Patent and knew of its infringement, including by way of this lawsuit.

306. On information and belief, NVIDIA intended to induce patent infringement by third-party customers and users of the NVIDIA '529 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. NVIDIA specifically intended and was aware that the normal and customary use of the accused products would infringe the '529 Patent. NVIDIA performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '529 Patent and with the knowledge that the induced acts would constitute infringement. For example, NVIDIA provides the NVIDIA '529 Products that have the capability of operating in a manner that infringe one or more of the claims of the '529 Patent,

including at least claim 1, and NVIDIA further provides documentation and training materials that cause customers and end users of the NVIDIA '529 Products to utilize the products in a manner that directly infringe one or more claims of the '529 Patent.[33] By providing instruction and training to customers and end-users on how to use the NVIDIA '529 Products in a manner that directly infringes one or more claims of the '529 Patent, including at least claim 1, NVIDIA specifically intended to induce infringement of the '529 Patent. On information and belief, NVIDIA engaged in such inducement to promote the sales of the NVIDIA '529 Products, e.g., through NVIDIA user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '529 Patent. Accordingly, NVIDIA has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '529 Patent, knowing that such use constitutes infringement of the '529 Patent.

307. The '529 Patent is well-known within the industry as demonstrated by multiple citations to the '529 Patent in published patents and patent applications assigned to technology companies and academic institutions. NVIDIA is utilizing the technology claimed in the '529 Patent without paying a reasonable royalty. NVIDIA is infringing the '529 Patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

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[33] *See, e.g.*, *NVIDIA Quadro P4000*, NVIDIA DATASHEET (2017); *The Right Tools for Professionals: NVIDIA Workstation GPUs*, NVIDIA PROFESSIONAL SOLUTION GUIDE (2017); *NVIDIA GeForce GTX 1080*, NVIDIA WHITEPAPER (2016); *GeForce GTX 1060*, NVIDIA USER GUIDE (2016); *GeForce GTX 1070*, NVIDIA USER GUIDE (2016); *Titan Xp*, NVIDIA USER GUIDE (2017); *NVIDIA Tesla P40 GPU Accelerator*, NVIDIA DATASHEET (2017); *GRID Virtual GPU*, NVIDIA USER GUIDE (Nov. 2016); *Virtual GPU Software*, NVIDIA USER GUIDE (Oct. 2018); *NVIDIA Tesla M60 GPU Accelerator*, NVIDIA DATASHEET (2016); *Real Interactive Expression: NVIDIA Quadro M6000*, NVIDIA DATASHEET (2015); *NVIDIA Tesla V100 GPU Architecture*, NVIDIA WHITEPAPER (2015).

308. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '529 Patent.

309. As a result of NVIDIA's infringement of the '529 Patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for NVIDIA's infringement, but in no event less than a reasonable royalty for the use made of the invention by NVIDIA together with interest and costs as fixed by the Court.

COUNT X
INFRINGEMENT OF U.S. PATENT NO. 7,542,041

310. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

311. NVIDIA designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for dynamically configuring a multi-pipe pipeline system.

312. NVIDIA designs, makes, sells, offers to sell, imports, and/or uses NVIDIA graphics processing units, including: GeForce 700 series (GeForce GTX 745, GeForce GTX 750, GeForce GTX 750 Ti, GeForce GTX 760 192-Bit, GeForce GTX 760, GeForce GTX 760 Ti, GeForce GTX 770, GeForce GTX 780, GeForce GTX 780 Ti, GeForce GTX Titan, GeForce GTX Titan Black, GeForce GTX Titan Z); GeForce 800M series (GeForce 800M, GeForce 820M, GeForce 830M, GeForce 840M, GeForce GTX 850M, GeForce GTX 860M, GeForce GTX 870M, GeForce GTX 880M); GeForce 900 series (GeForce GTX 950, GeForce GTX 960, GeForce GTX 970, GeForce GTX 980, GeForce GTX 980 Ti, GeForce GTX Titan X); GeForce 10 series (GeForce GT 1030, GeForce GTX 1050, GeForce GTX 1050 Ti, GeForce GTX 1060, GeForce GTX 1070, GeForce GTX 1070 Ti, GeForce GTX 1080, GeForce GTX 1080 Ti, Titan

X, Titan Xp); and GeForce 20 Series (GeForce RTX 2070, GeForce RTX 2080, GeForce RTX 2080) (collectively, the "NVIDIA '041 Product(s)").

313. On information and belief, one or more NVIDIA subsidiaries and/or affiliates use the NVIDIA '041 Products in regular business operations.

314. On information and belief, one or more of the NVIDIA '041 Products include technology for dynamically configuring a multi-pipe pipeline system.

315. On information and belief, NVIDIA has directly infringed and continues to directly infringe the '041 Patent by, among other things, making, using, offering for sale, and/or selling technology for dynamically configuring a multi-pipe pipeline system, including but not limited to the NVIDIA '041 Products.

316. On information and belief, one or more of the NVIDIA '041 Products enable a multiple-pipeline system that is dynamically configurable to effect various combinations of functions for each pipeline.

317. On information and belief, one or more of the NVIDIA '041 Products include a multiple pipeline system that includes a pool of auxiliary function blocks that are provided as required to select pipelines.

318. On information and belief, one or more of the NVIDIA '041 Products consist of a multiple-pipeline system wherein each pipeline is configured to include a homogenous set of core functions.

319. On information and belief, one or more of the NVIDIA '041 Products include a pool of auxiliary functions is provided for selective insertion of auxiliary functions between core functions of select pipelines.

320. On information and belief, one or more of the NVIDIA '041 Products includes auxiliary functions wherein each auxiliary function includes a multiplexer that allows it to be selectively coupled within each pipeline.

321. On information and belief, one or more of the NVIDIA '041 Products contain a processing system that includes a plurality of pipelines, with each pipeline of the plurality including a plurality of core pipeline elements that are configured to sequentially process data as it traverses the pipeline.

322. On information and belief, one or more of the NVIDIA '041 Products contain a processing system that includes a plurality of auxiliary elements, each auxiliary element of the plurality of auxiliary elements being configured to be selectively coupled to multiple pipelines of the plurality of pipelines.

323. On information and belief, one or more of the NVIDIA '041 Products contain a processing system wherein the auxiliary elements are responsive to external coupling-select signals.

324. On information and belief, one or more of the NVIDIA '041 Products contain a processing system wherein a plurality of auxiliary elements are within a selected pipeline of the multiple pipelines, between a pair of core pipeline elements of the plurality of core pipeline elements to process the data as it traverses between the pair of core elements.

325. On information and belief, the NVIDIA '041 Products are available to businesses and individuals throughout the United States.

326. On information and belief, the NVIDIA '041 Products are provided to businesses and individuals located in Delaware.

327. By making, using, testing, offering for sale, and/or selling products and services for dynamically configuring a multi-pipe pipeline system, including but not limited to the NVIDIA '041 Products, NVIDIA has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '041 Patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

328. On information and belief, NVIDIA also indirectly infringes the '041 Patent by actively inducing infringement under 35 USC § 271(b).

329. NVIDIA has had knowledge of the '041 Patent since at least service of this Complaint or shortly thereafter, and on information and belief, NVIDIA knew of the '041 Patent and knew of its infringement, including by way of this lawsuit.

330. On information and belief, NVIDIA intended to induce patent infringement by third-party customers and users of the NVIDIA '041 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. NVIDIA specifically intended and was aware that the normal and customary use of the accused products would infringe the '041 Patent. NVIDIA performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '041 Patent and with the knowledge that the induced acts would constitute infringement. For example, NVIDIA provides the NVIDIA '041 Products that have the capability of operating in a manner that infringe one or more of the claims of the '041 Patent, including at least claim 1, and NVIDIA further provides documentation and training materials that cause customers and end users of the NVIDIA '041 Products to utilize the products in a

manner that directly infringe one or more claims of the '041 Patent.[34] By providing instruction and training to customers and end-users on how to use the NVIDIA '041 Products in a manner that directly infringes one or more claims of the '041 Patent, including at least claim 1, NVIDIA specifically intended to induce infringement of the '041 Patent. On information and belief, NVIDIA engaged in such inducement to promote the sales of the NVIDIA '041 Products, e.g., through NVIDIA user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '041 Patent. Accordingly, NVIDIA has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '041 Patent, knowing that such use constitutes infringement of the '041 Patent.

331. The '041 Patent is well-known within the industry as demonstrated by multiple citations to the '041 Patent in published patents and patent applications assigned to technology companies and academic institutions. NVIDIA is utilizing the technology claimed in the '041 Patent without paying a reasonable royalty. NVIDIA is infringing the '041 Patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

332. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '041 Patent.

333. As a result of NVIDIA's infringement of the '041 Patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for

[34] *GeForce GTX 980*, INSTALLATION GUIDE (2014); *NIVIDIA GeForce GTX 750 Ti*, NVIDIA WHITEPAPER (2014); *NVIDIA GeForce GTX 1080*, NVIDIA WHITEPAPER (2016); *GeForce GTX 1060*, NVIDIA USER GUIDE (2016); *GeForce GTX 1070*, NVIDIA USER GUIDE (2016); *Titan Xp*, NVIDIA USER GUIDE (2017); *Release 396 Graphics Drivers for Windows, Version 399.07*, RELEASE NOTES (Aug. 27, 2018); *Release 390 Graphics Drivers for Windows, Version 390.77*, RELEASE NOTES (Jan. 29, 2018); *Titan X*, NVIDIA USER GUIDE (2016).

NVIDIA's infringement, but in no event less than a reasonable royalty for the use made of the invention by NVIDIA together with interest and costs as fixed by the Court.

COUNT XI
INFRINGEMENT OF U.S. PATENT NO. 7,571,450

334. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

335. NVIDIA designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for displaying information.

336. NVIDIA designs, makes, sells, offers to sell, imports, and/or uses NVIDIA products, including the: GeForce GTX 750, GeForce GTX 950 - 960, GeForce GT 1030, GeForce GTX 1050 / 1050 Ti, GeForce GTX 1060, GeForce GTX 1070 - 1080, GeForce GTX 1080 Ti, GeForce GTX Titan X, Titan Xp, Titan V, Quadro P400 - P1000, Quadro P2000, Quadro P4000 / P5000, Quadro P6000, Quadro GP100, Quadro GV100, Tesla P4 / P6, Tesla P40, Tesla P100, Tesla V100, Tesla M4, Quadro M2000, Quadro P400, Quadro P600, Quadro P620, and Quadro P1000 (collectively, the "NVIDIA '450 Product(s)").

337. On information and belief, one or more NVIDIA subsidiaries and/or affiliates use the NVIDIA '450 Products in regular business operations.

338. On information and belief, one or more of the NVIDIA '450 Products include technology for displaying information.

339. On information and belief, NVIDIA has directly infringed and continues to directly infringe the '450 Patent by, among other things, making, using, offering for sale, and/or selling technology for displaying information, including but not limited to the NVIDIA '450 Products.

340. On information and belief, one or more of the NVIDIA '450 Products enable methods and systems wherein a user does not need to make a new selection after being switched from one service to a second service.

341. On information and belief, one or more of the NVIDIA '450 Products permit a user of an information display system to have selections made on a first service also presented when the user switches to a second service without requiring the user to browse through the menus to define the type of information to be displayed a second time.

342. On information and belief, one or more of the NVIDIA '450 Products enable a user selection being made on the basis of the provided options while the first service was selected is use to select the appropriate data elements of the stream of the second service.

343. On information and belief, one or more of the NVIDIA '450 Products enable various content sources to share similar information models.

344. On information and belief, one or more of the NVIDIA '450 Products perform a method of displaying information on a display device wherein receiving a transport stream comprises services, with the services having elementary streams of video and of data elements.

345. On information and belief, one or more of the NVIDIA '450 Products perform a method of displaying information on a display device wherein user actions of making a user selection of a type of information to be displayed on the device are received.

346. On information and belief, one or more of the NVIDIA '450 Products perform a method of displaying information on a display device wherein filtering to select a data element of a first one of the services on the basis of the user selection is performed.

347. On information and belief, one or more of the NVIDIA '450 Products perform a method of displaying information on a display device wherein rendering to calculate an output

image to be displayed on the display device, on the basis of the first data element selected by the filer is performed.

348. On information and belief, one or more of the NVIDIA '450 Products perform a method of displaying information on a display device wherein switching from the first one of the services to a second one of the services, characterized in comprising a second step of filtering to select a second data-element of the second one of the services, on basis of the user selection is performed.

349. On information and belief, one or more of the NVIDIA '450 Products perform a method of displaying information on a display device wherein being switched from the first one of the services to the second one of the services, with the data-element and the second data-element being mutually semantically related and a second step of rendering to calculate the output image to be displayed on the display device, on basis of the second data-element selected by the filter is performed.

350. On information and belief, the NVIDIA '450 Products are available to businesses and individuals throughout the United States.

351. On information and belief, the NVIDIA '450 Products are provided to businesses and individuals located in Delaware.

352. By making, using, testing, offering for sale, and/or selling products and services for displaying information, including but not limited to the NVIDIA '450 Products, NVIDIA has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '450 Patent, including at least claim 8 pursuant to 35 U.S.C. § 271(a).

353. On information and belief, NVIDIA also indirectly infringes the '450 Patent by actively inducing infringement under 35 USC § 271(b).

354. NVIDIA has had knowledge of the '450 Patent since at least service of this Complaint or shortly thereafter, and on information and belief, NVIDIA knew of the '450 Patent and knew of its infringement, including by way of this lawsuit.

355. On information and belief, NVIDIA intended to induce patent infringement by third-party customers and users of the NVIDIA '450 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. NVIDIA specifically intended and was aware that the normal and customary use of the accused products would infringe the '450 Patent. NVIDIA performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '450 Patent and with the knowledge that the induced acts would constitute infringement. For example, NVIDIA provides the NVIDIA '450 Products that have the capability of operating in a manner that infringe one or more of the claims of the '450 Patent, including at least claim 8, and NVIDIA further provides documentation and training materials that cause customers and end users of the NVIDIA '450 Products to utilize the products in a manner that directly infringe one or more claims of the '450 Patent.[35] By providing instruction and training to customers and end-users on how to use the NVIDIA '450 Products in a manner that directly infringes one or more claims of the '450 Patent, including at least claim 8, NVIDIA specifically intended to induce infringement of the '450 Patent. On information and belief, NVIDIA engaged in such inducement to promote the sales of the NVIDIA '450 Products, e.g.,

[35] *See, e.g.*, *NVIDIA Quadro P4000*, NVIDIA DATASHEET (2017); *The Right Tools for Professionals: NVIDIA Workstation GPUs*, NVIDIA PROFESSIONAL SOLUTION GUIDE (2017); *NVIDIA GeForce GTX 1080*, NVIDIA WHITEPAPER (2016); *GeForce GTX 1060*, NVIDIA USER GUIDE (2016); *GeForce GTX 1070*, NVIDIA USER GUIDE (2016); *Titan Xp*, NVIDIA USER GUIDE (2017); *NVIDIA Tesla P40 GPU Accelerator*, NVIDIA DATASHEET (2017); *GRID Virtual GPU*, NVIDIA USER GUIDE (Nov. 2016); *Virtual GPU Software*, NVIDIA USER GUIDE (Oct. 2018); *NVIDIA Tesla M60 GPU Accelerator*, NVIDIA DATASHEET (2016); *Real Interactive Expression: NVIDIA Quadro M6000*, NVIDIA DATASHEET (2015); *NVIDIA Tesla V100 GPU Architecture*, NVIDIA WHITEPAPER (2015).

through NVIDIA user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '450 Patent. Accordingly, NVIDIA has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '450 Patent, knowing that such use constitutes infringement of the '450 Patent.

356. The '450 Patent is well-known within the industry as demonstrated by multiple citations to the '450 Patent in published patents and patent applications assigned to technology companies and academic institutions. NVIDIA is utilizing the technology claimed in the '450 Patent without paying a reasonable royalty. NVIDIA is infringing the '450 Patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

357. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '450 Patent.

358. As a result of NVIDIA's infringement of the '450 Patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for NVIDIA's infringement, but in no event less than a reasonable royalty for the use made of the invention by NVIDIA together with interest and costs as fixed by the Court.

COUNT XII
INFRINGEMENT OF U.S. PATENT NO. 7,750,979

359. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

360. NVIDIA designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for motion compensation in video signal processing.

361. NVIDIA designs, makes, sells, offers to sell, imports, and/or uses NVIDIA System on Chip products, including: Tegra 4, Tegra 4i, Tegra K1, Tegra X1, and Tegra X2 (collectively, the "NVIDIA '979 Product(s)").

362. On information and belief, one or more NVIDIA subsidiaries and/or affiliates use the NVIDIA '979 Products in regular business operations.

363. On information and belief, one or more of the NVIDIA '979 Products include technology for motion compensation in video signal processing.

364. On information and belief, NVIDIA has directly infringed and continues to directly infringe the '979 Patent by, among other things, making, using, offering for sale, and/or selling technology for motion compensation in video signal processing, including but not limited to the NVIDIA '979 Products.

365. On information and belief, one or more of the NVIDIA '979 Products use line buffers that are decoupled and that can deliver a fixed number of pixels, as may be required by a video processing stage, using a sampling pattern that is defined as one among several selectable sampling windows.

366. On information and belief, one or more of the NVIDIA '979 Products have a variable window size for sampling subsets of the array as a two-dimensional window that spans the pixels in the array.

367. On information and belief, one or more of the NVIDIA '979 Products have a video processing stage that inputs pixels using a fixed number of pixels.

368. On information and belief, one or more of the NVIDIA '979 Products performs a method for delivering the input stream of pixels to the video processing stage.

369. On information and belief, one or more of the NVIDIA '979 Products performs a method comprising establishing a window size and a sampling-window size, such that the window size is a multiple of the sampling-window size and the sampling-window size defines the fixed number of pixels.

370. On information and belief, one or more of the NVIDIA '979 Products performs a method comprising storing pixels from the input stream into a first set of line butters, the pixels stored in the first set of line butters including pixels for the established window size.

371. On information and belief, one or more of the NVIDIA '979 Products performs a method comprising prefetching the stored pixels from the first set of line butters into a second set of line buffers, the second set of line buffers being sufficiently long to store at least the pixels corresponding to the established sampling-window size.

372. On information and belief, one or more of the NVIDIA '979 Products performs a method comprising fetching the fixed number of pixels from the second set of line buffers for the video processing stage.

373. On information and belief, one or more of the NVIDIA '979 Products performs a method wherein storing pixels from the input stream into a first set of line butters, the pixels stored in the first set of line butters including pixels for the established window size, prefetching the stored pixels from the first set of line butters into a second set of line buffers, and fetching the fixed number of pixels from the second set of line buffers for the video processing stage are performed concurrently.

374. On information and belief, the NVIDIA '979 Products are available to businesses and individuals throughout the United States.

375. On information and belief, the NVIDIA '979 Products are provided to businesses and individuals located in Delaware.

376. By making, using, testing, offering for sale, and/or selling products and services for motion compensation in video signal processing, including but not limited to the NVIDIA '979 Products, NVIDIA has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '979 Patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

377. On information and belief, NVIDIA also indirectly infringes the '979 Patent by actively inducing infringement under 35 USC § 271(b).

378. NVIDIA has had knowledge of the '979 Patent since at least service of this Complaint or shortly thereafter, and on information and belief, NVIDIA knew of the '979 Patent and knew of its infringement, including by way of this lawsuit.

379. On information and belief, NVIDIA intended to induce patent infringement by third-party customers and users of the NVIDIA '979 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. NVIDIA specifically intended and was aware that the normal and customary use of the accused products would infringe the '979 Patent. NVIDIA performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '979 Patent and with the knowledge that the induced acts would constitute infringement. For example, NVIDIA provides the NVIDIA '979 Products that have the capability of operating in a manner that infringe one or more of the claims of the '979 Patent, including at least claim 1, and NVIDIA further provides documentation and training materials that cause customers and end users of the NVIDIA '979 Products to utilize the products in a

manner that directly infringe one or more claims of the '979 Patent.[36] By providing instruction and training to customers and end-users on how to use the NVIDIA '979 Products in a manner that directly infringes one or more claims of the '979 Patent, including at least claim 1, NVIDIA specifically intended to induce infringement of the '979 Patent. On information and belief, NVIDIA engaged in such inducement to promote the sales of the NVIDIA '979 Products, e.g., through NVIDIA user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '979 Patent. Accordingly, NVIDIA has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '979 Patent, knowing that such use constitutes infringement of the '979 Patent.

380. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '979 Patent.

381. As a result of NVIDIA's infringement of the '979 Patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for NVIDIA's infringement, but in no event less than a reasonable royalty for the use made of the invention by NVIDIA together with interest and costs as fixed by the Court.

[36] *See, e.g.*, *NVIDIA Tegra 4 Family CPU Architecture*, NVIDIA WHITEPAPER (2013); Salini Gupta, *Introduction to OpenCV for Tegra*, GPU TECHNOLOGY CONFERENCE PRESENTATION; *NVIDIA Tegra K1 Mobile Processor*, NVIDIA TECHNICAL REFERENCE MANUAL (Oct. 15, 2014); *NVIDIA Tegra X1 Mobile Processor*, NVIDIA TECHNICAL REFERENCE MANUAL (Dec. 6, 2016); *NVIDIA Jetson TX2*, NVIDIA OEM PRODUCT DESIGN GUIDE (Sept. 12, 2017).

PRAYER FOR RELIEF

WHEREFORE, Dynamic Data respectfully requests that this Court enter:

A. A judgment in favor of Dynamic Data that NVIDIA has infringed, either literally and/or under the doctrine of equivalents, the '090, '073, '054, '918, '689, '177, '039, '112, '529, '041, 450, and '979 Patents;

B. An award of damages resulting from NVIDIA's acts of infringement in accordance with 35 U.S.C. § 284;

C. A judgment and order finding that NVIDIA's infringement was willful, wanton, malicious, bad-faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate within the meaning of 35 U.S.C. § 284 and awarding to Dynamic Data enhanced damages.

D. A judgment and order finding that this is an exceptional case within the meaning of 35 U.S.C. § 285 and awarding to Dynamic Data its reasonable attorneys' fees against NVIDIA.

E. Any and all other relief to which Dynamic Data may show themselves to be entitled.

JURY TRIAL DEMANDED

Pursuant to Rule 38 of the Federal Rules of Civil Procedure, Dynamic Data Technologies, LLC requests a trial by jury of any issues so triable by right.

Dated: November 1, 2018

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