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9 Attorneys for Plaintiffs
REARDEN LLC and REARDEN MOVA LLC

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11

UNITED STATES DISTRICT COURT

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NORTHERN DISTRICT OF CALIFORNIA, OAKLAND DIVISION

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14 REARDEN LLC, a California limited liability
company, and REARDEN MOVA LLC, a
15 California limited liability company,

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Plaintiffs,

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v.

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TWDC ENTERPRISES 18 CORP. f/k/a THE
WALT DISNEY COMPANY, a Delaware
19 corporation, DISNEY STUDIO
PRODUCTION SERVICES CO., LLC f/k/a
20 WALT DISNEY PICTURES PRODUCTION,
LLC, a California Corporation, WALT
21 DISNEY PICTURES, a California
corporation, MARVEL STUDIOS, LLC, a
22 Delaware limited liability company, MVL
FILM FINANCE LLC, a Delaware limited
23 liability company, LUCASFILM LTD. LLC, a
California limited liability company, and
24 DOES 1-10,

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Defendants.

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Case No. 4:22-cv-02464-JST

**SECOND AMENDED COMPLAINT FOR
COPYRIGHT AND PATENT
INFRINGEMENT**

DEMAND FOR JURY TRIAL

1 Plaintiffs Rearden LLC and Rearden Mova LLC (collectively “Plaintiffs”), through their
2 attorneys and for their claims against defendants TWDC Enterprises 18 Corp. f/k/a The Walt
3 Disney Company, Disney Studio Production Services Co., LLC f/k/a Walt Disney Pictures
4 Production, LLC, Walt Disney Pictures, Marvel Studios, LLC, MVL Film Finance LLC
5 (collectively “Disney”), Lucasfilm Ltd. LLC (“Lucasfilm”), and John Does 1-10 (collectively
6 “Defendants”), allege as follows. Marvel Studios, LLC, MVL Film Finance LLC, and their
7 subsidiaries are referred to collectively as “Marvel” herein.

8 INTRODUCTION

9 1. On information and belief, Disney’s *Avengers: Infinity War* (released on April 27,
10 2018) and *Avengers: Endgame* (released on April 26, 2019) are two of the highest grossing
11 movies of all time, each making over \$2 billion in worldwide box office receipts alone, not
12 counting revenue from home video sales and streaming services. They are each in the top 5
13 highest grossing movies of all time and they are the highest grossing two-part series of all time.

14 2. These two movies are centered on a CG (computer graphics) villain, Thanos,
15 played by Josh Brolin, whose character is animated using innovative facial capture technology that
16 was required to translate Brolin’s expressive performance into Thanos’s appearance in the film.

17 3. Disney and its contractor, Digital Domain 3.0 (“DD3”), claimed in numerous
18 publications that they used Disney’s own facial capture technology, the “MEDUSA Performance
19 Capture System,” to create Thanos. *See, e.g.,* [https://studios.disneyresearch.com/medusa-
20 performance-capture-system/](https://studios.disneyresearch.com/medusa-performance-capture-system/).

21 4. As this Court has previously determined, “Rearden, and not ... DD3, owns and at
22 all relevant times has owned the MOVA Assets.” *Shenzhenshi Haitiecheng Science and
23 Technology Co., Ltd. v. Rearden LLC et al*, Case No. 4:15-cv-797 (the “Ownership Litigation”),
24 ECF 427, at 15 (Aug. 11, 2017). As a result, Rearden was given the right to “take possession of
25 the Mova Assets forthwith.” *Id.* at 18. Even before that final determination, DD3 had been
26 preliminarily enjoined from “using, moving, concealing, transferring or otherwise disposing of
27 any MOVA Asset” by this Court as of June 17, 2016. 4:15-cv-797, ECF 188, at 15, 16 (Jun. 17,
28 2016).

1 5. Notwithstanding that the Court entered judgment in the Ownership Litigation
2 nearly four years ago, “[t]he Court retains jurisdiction to enforce its Orders regarding the return of
3 the MOVA Assets to Rearden.” Case No. 4:15-cv-797, ECF 493, at 2 (Aug. 28, 2018). Of
4 particular relevance here, the MOVA Assets that the Court has ordered that DD3 and other entities
5 return to Rearden includes not just the “MOVA Hardware [and] Software,” but also “MOVA
6 Business Records.” Case No. 4:15-cv-797, ECF 449, at 2 (Oct. 2, 2017). The Court appointed a
7 Special Master to supervise “the identification, preservation, and return to Rearden of any and all
8 MOVA Assets in the possession of ... DD3,” including authorizing the Special Master to “oversee
9 any forensic analysis of DD3’s computer systems and services.” Case No. 4:15-cv-797, ECF 529,
10 at 1-2 (Jun. 17, 2019). The Special Master, in turn, appointed DisputeSoft as a forensic expert to
11 assist that effort. Case No. 4:15-cv-797, ECF 534 (Aug. 20, 2019).

12 6. Documents recently identified and returned to Plaintiffs by DisputeSoft and the
13 Special Master – documents, again, that this Court had determined were, in fact, the property of
14 Rearden – indicate that Disney and DD3 lied to the public about having used Disney’s MEDUSA
15 system to create Thanos. To the contrary, those documents indicate that all or part of the work to
16 animate Thanos was in fact performed using Plaintiffs’ MOVA Contour facial capture system and
17 software after DD3 had been enjoined from so doing, and after Disney had actual notice of
18 Rearden’s rights to MOVA. *See, e.g., Rearden LLC et al v. The Walt Disney Company et al*, Case
19 No. 4:17-cv-4006, ECF 1 (Jul. 17, 2017).

20 7. Separately, on information and belief, on or about November 12, 2019, Disney
21 launched its home streaming service, Disney+, to great acclaim and commercial success.
22 According to Disney’s February 9, 2022 quarterly earnings report, Disney+ had 42.9 million paid
23 domestic subscribers at an average monthly revenue of \$6.68 per subscriber as of January 1, 2022,
24 for monthly revenue of about \$287 million and annual revenue of about \$3.44 billion.

25 8. Disney+ streams numerous movies that Disney advertises were made using
26 Disney’s MEDUSA Performance Capture System, including almost every recent Marvel and Star
27 Wars movie. Films listed on Disney Research Studios’ website that were made with Medusa and
28 that have streamed on Disney+ include the “Star Wars” series films *Star Wars: The Force*

1 *Awakens, Star Wars: The Last Jedi, Star Wars: The Rise of Skywalker, Rogue One: A Star Wars*
2 *Story, Solo: A Star Wars Story*; the Marvel films *Doctor Strange, Spiderman: Homecoming, Thor:*
3 *Ragnarok, Ant-Man and the Wasp, Avengers: Infinity War, Avengers: Endgame, and Eternals*; and
4 other Disney films including *Maleficent, The Jungle Book, Pirates of the Caribbean: Dead Men*
5 *Tell No Tales, Aladdin, Maleficent: Mistress of Evil, and Jungle Cruise.*

6 9. Lucasfilm division Industrial Light & Magic (“ILM”) claims to be, together with
7 Disney Research Studios, the “exclusive provider of MEDUSA capture technology.” See
8 <https://www.ilm.com/facial-capture/>.

9 10. Defendants also advertise their use of a system called the “Anyma Performance
10 Capture System” (“ANYMA”), which is used to allow for facial performance capture with fewer
11 constraints on the actor by building an underlying model from a small number of MEDUSA
12 reconstructions. Films listed on Disney Research Studios’ website that were made with ANYMA
13 and that have streamed on Disney+ include *Avengers: Endgame, Aladdin, and Maleficent:*
14 *Mistress of Evil*. Disney Research Studios’ website lists additional films streamed on services
15 other than Disney+ produced with ANYMA including *Terminator: Dark Fate, Space Jam: A New*
16 *Legacy, and No Time to Die.*

17 11. As set forth below, the making and streaming of movies (or any other form of
18 visual media) made using Disney’s MEDUSA capture technology has infringed, and continues to
19 infringe, at least one claim of each of Plaintiff Rearden Mova’s U.S. Patents Nos. 10,825,226 (“the
20 ’226 patent”), 11,004,248 (“the ’248 patent”), 11,024,072 (“the ’072 patent”), and 11,030,790
21 (“the ’790 patent”) (collectively “the Rearden Patents”).

22 12. Where Defendants used the stolen MOVA Contour technology to create movies,
23 they have infringed Plaintiffs’ copyright in the MOVA Contour software. Regardless of whether
24 Defendants used the stolen MOVA Contour technology or their own MEDUSA capture
25 technology to create the many films that are streamed on Disney+, they are infringing the Rearden
26 Patents. Plaintiffs therefore seek all just and equitable copyright and patent remedies on behalf of
27 the authors, inventors, and owners of the Contour program, systems, and methods: namely,
28 Plaintiffs Rearden and Rearden Mova.

THE PARTIES

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2 13. Plaintiff Rearden LLC (“Rearden”) is a California limited liability company having
3 its principal place of business at 211 South Whisman Road, Suite D, Mountain View, CA 94041.

4 14. Plaintiff Rearden Mova LLC (“Rearden Mova”) is a California limited liability
5 company having its principal place of business at 211 South Whisman Road, Suite D, Mountain
6 View, CA 94041. Rearden Mova is wholly owned by Rearden.

7 15. On information and belief, Defendant TWDC Enterprises 18 Corp. f/k/a The Walt
8 Disney Company (“Disney Company”) is a Delaware corporation having its principal place of
9 business at 500 S. Buena Vista Street, Burbank, California 91521.

10 16. On information and belief, Disney Studio Production Services Co., LLC f/k/a Walt
11 Disney Pictures Production, LLC (“Disney Studio”) is a California corporation having its principal
12 place of business at 500 S. Buena Vista Street, Burbank, California 91521. Disney Studio is a
13 wholly-owned subsidiary of defendant Disney Company.

14 17. On information and belief, Defendant Walt Disney Pictures (“Disney Pictures”), is
15 a California corporation having its principal place of business at 500 S. Buena Vista Street,
16 Burbank, California 91521. Disney Pictures is a wholly-owned subsidiary of defendant Disney
17 Company.

18 18. On information and belief, Defendant Marvel Studios, LLC (“Marvel Company”),
19 is a Delaware limited liability company having its principal place of business at 500 S. Buena
20 Vista Street, Burbank, California 91521. Marvel Company is a wholly-owned subsidiary of
21 defendant Disney Company.

22 19. On information and belief, Defendant MVL Film Finance LLC (“MVL”), is a
23 Delaware limited liability company having its principal place of business at 500 S. Buena Vista
24 Street, Burbank, California 91521. MVL is a wholly-owned subsidiary of defendant Disney
25 Company.

26 20. On information and belief, Defendant Lucasfilm Ltd. LLC (“Lucasfilm”), is a
27 California limited liability company having its principal place of business at One Letterman Drive,
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1 Bldg. B, San Francisco, California 94129. Lucasfilm is a wholly-owned subsidiary of defendant
2 Disney Company.

3 21. On information and belief, Defendants sued herein as DOES 1 through 10,
4 inclusive, are unknown to Plaintiffs who therefore use such fictitious designations. Plaintiffs will
5 seek leave of the Court to insert their true names and capacities when ascertained. Plaintiffs are
6 informed and believe that each of the fictitiously designated Defendants is liable for infringement
7 in the same fashion as the identified Defendants.

8 **JURISDICTION AND VENUE**

9 22. This Court has subject matter jurisdiction under 28 U.S.C. § 1331 (federal question
10 jurisdiction), and § 1338 (patent and copyright jurisdiction).

11 23. This Court has personal jurisdiction over all defendants. It has general personal
12 jurisdiction over Disney Studio, Disney Pictures, and Lucasfilm because they are corporations
13 organized and existing under the laws of the State of California. It has general personal
14 jurisdiction over Disney Company, Marvel Company, and MVL because their principal places of
15 business are in the State of California and they have the capacity to sue and be sued in the State of
16 California. And this Court has specific personal jurisdiction over all defendants because they have
17 committed acts in the State of California, including in this District, that give rise to all acts of
18 infringement asserted herein.

19 24. Venue is proper for Plaintiffs' copyright infringement claims under 28 U.S.C. §
20 1400(a) and 1391(b), (c) and (d). Disney Studio, Disney Pictures, Marvel Company, and MVL
21 reproduced, distributed, and authorized the performance and display of *Avengers: Infinity War* and
22 *Avengers: Endgame* throughout this judicial district. All other defendants are residents of the State
23 of California and subject to personal jurisdiction in this judicial district.

24 25. Venue is proper for Plaintiff's patent infringement claims against Defendant
25 Lucasfilm under 28 U.S.C. § 1400(b) because it resides in this District. Venue is proper for
26 Plaintiff's patent infringement claims against both Defendants Lucasfilm and Disney Company
27 under 28 U.S.C. § 1400(b) because both defendants have committed acts of infringement in this
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1 District and, on information and belief, have regular and established places of business in this
2 District.

3 **FACTUAL ALLEGATIONS**

4 **I. The MOVA Contour Technology and Patents**

5 26. The technology at the core of this case includes Contour Reality Capture
6 (“Contour”) technology that was conceived, developed, and authored by plaintiff Rearden and is
7 currently owned by plaintiff Rearden Mova.

8 27. Contour (<http://www.rearden.com/mova.html>) is one of many technologies
9 incubated and offered by Rearden (www.rearden.com), a San Francisco Bay Area company
10 founded in 1999 by Steve Perlman as an incubator for fundamental technology, creative works,
11 and their interplay.

12 28. The Contour program is used to capture high-resolution 3D models of a
13 performer’s face and facial movements as the performer’s skin moves from frame-to-frame. The
14 primary application for these 3D models is to use the movements of a performer’s face to create an
15 animation of a different face with the same movements, whether the different face is that of
16 another actor (as was used in *Harry Potter and the Deathly Hallows, Part I*), a fictional character
17 (as was used to create the “Hulk” in *The Avengers*), or a younger or older version of the same
18 performer (as was used to create an 87-year-old version of Brad Pitt in *The Curious Case of*
19 *Benjamin Button* or a 28-year-younger version of Jeff Bridges in *Tron: Legacy*).

20 29. The Contour program includes a security mechanism that automatically affixes
21 notice of Rearden’s Contour program copyright to its output works. This notice serves as express
22 notification that Rearden LLC is asserting its copyright in the Contour program.

23 30. The Contour program is protected by a portfolio of patents owned by Rearden LLC
24 and/or Rearden Mova LLC, many of which (including the Rearden Patents asserted in this lawsuit)
25 claim priority to U.S. Patent Application No. 11/255,854 (“the ’854 application”), which claims
26 priority to U.S. Provisional Patent Application 60/724,565, which was filed on October 7, 2005.
27 The ’854 application issued on February 25, 2014 as U.S. Patent No. 8,659,668 (“the ’668
28 patent”).

1 31. Plaintiff Rearden Mova owns all rights, title, and interest in, and has standing to sue
2 for infringement of the '226 patent, entitled "Apparatus and Method for Performing Motion
3 Capture Using a Random Pattern on Capture Subjects," which issued on November 3, 2020, and
4 claims priority to the '854 application. A true and correct copy of the '226 patent is attached as
5 Exhibit A.

6 32. Plaintiff Rearden Mova owns all rights, title, and interest in, and has standing to
7 sue for infringement of the '248 patent, entitled "Apparatus and Method for Performing Motion
8 Capture Using a Random Pattern on Capture Subjects," which issued on May 11, 2021, and claims
9 priority to the '854 application. A true and correct copy of the '248 patent is attached as Exhibit B.

10 33. Plaintiff Rearden Mova owns all rights, title, and interest in, and has standing to sue
11 for infringement of the '072 patent, entitled "Apparatus and Method for Performing Motion
12 Capture Using a Random Pattern on Capture Subjects," which issued on June 1, 2021, and claims
13 priority to the '854 application. A true and correct copy of the '072 patent is attached as Exhibit C.

14 34. Plaintiff Rearden Mova owns all rights, title, and interest in, and has standing to sue
15 for infringement of the '790 patent, entitled "Apparatus and Method for Performing Motion
16 Capture Using a Random Pattern on Capture Subjects," which issued on June 8, 2021, and claims
17 priority to the '854 application. A true and correct copy of the '790 patent is attached as Exhibit D.

18 35. The Contour technology was introduced at the Special Interest Group on Computer
19 Graphics and Interactive Techniques ("SIGGRAPH") Conference on July 31, 2006 to wide
20 acclaim, including photographs of Contour's systems and methods on the front page of the *New*
21 *York Times*, page B1 of the *Wall Street Journal*, and *The Hollywood Reporter*, among other
22 publications.

23 36. Between the public announcement of Contour at the 2006 SIGGRAPH Conference
24 and 2012, Contour was used with Plaintiffs' authorization to create numerous movies, including
25 *The Curious Case of Benjamin Button* (2008), *TRON: Legacy* (2010), *Harry Potter and the*
26 *Deathly Hallows, Part I* (2010), *Pirates of the Caribbean: On Stranger Tides* (2011), *John Carter*
27 (2012), and *The Avengers* (2012).

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1 **II. DD3’s Theft of, and Defendants’ Unauthorized Use of, the Contour Software.**

2 37. As set forth in Plaintiffs’ previous amended complaint against Disney that was filed
3 before the release of either *Avengers: Infinity War* or *Avengers: Endgame*, in October 2012, a
4 rogue Rearden employee, Greg LaSalle, stole Plaintiffs’ proprietary Contour software, brought it
5 to DD3, and DD3 contracted with Disney to provide facial capture services using the stolen
6 Contour software for the Disney movies *Beauty and the Beast*, *Guardians of the Galaxy*, and
7 *Avengers: Age of Ultron*. See *Rearden LLC et al v. Walt Disney Co. et al*, No. 3:17-cv-04006-JST,
8 Dkt. No. 63 (First Amended Complaint) at ¶¶ 84-124 (N.D. Cal. Mar. 6, 2018) (the “First Disney
9 Litigation”).

10 38. In the separate Ownership Litigation, *Shenzhenshi Haitiecheng Science &*
11 *Technology Co., Ltd. v. Rearden LLC et al*, Plaintiff Rearden LLC obtained a preliminary
12 injunction against DD3’s parent company on June 17, 2016, prohibiting DD3 from continuing to
13 use its stolen MOVA Contour technology to provide services. Case No. 3:15-cv-797-JST, Dkt.
14 No. 188 (N.D. Cal. June 17, 2016).

15 39. Plaintiffs accordingly believed, until recently, that DD3 had complied with the
16 injunction, and that DD3’s use of Contour to make films for Defendants had ceased.

17 40. In a set of documents identified and returned to Plaintiffs by DisputeSoft and the
18 Special Master in connection with the Ownership Litigation in or around December 2021 (the
19 “DD3 Documents”), Plaintiffs discovered Contour output data files at times corresponding with
20 the production of *Avengers: Infinity War* and *Avengers: Endgame*.

21 41. The DD3 Documents also revealed Contour capture files taken from Josh Brolin,
22 the actor who played Thanos in *Avengers: Infinity War* and *Avengers: Endgame*, as well as files
23 created by the rogue Rearden employee who stole the Contour assets for DD3, created and
24 subsequently modified at times corresponding with the production of *Avengers: Infinity War* and
25 *Avengers: Endgame*.

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1 42. The top images below show Josh Brolin performing as Thanos with a Head
 2 Mounted Camera (“HMC”) and the resulting fully rendered face of Thanos:



11 The grayscale images to the upper-right show Brolin’s performance of four facial expressions and
 12 the resulting Thanos face shape, shown from two angles, from each of the four facial expressions.
 13 The lower images show Greg LaSalle, the Rearden employee that secretly and wrongfully took the
 14 MOVA Assets from Rearden and sold them to DD3 affiliate SHST. The image on the lower-left
 15 shows LaSalle performing with an HMC. The grayscale images to the lower-right show LaSalle’s
 16 performance of four facial expressions and the resulting captured face shape from each of the four
 17 facial expressions. On information and belief, Defendants knew LaSalle was involved in
 18 performing the facial capture visual effects for those two films. Rearden expects that a reasonable
 19 opportunity for further investigation or discovery will supply further evidentiary support for the
 20 allegation that Defendants knew LaSalle was involved in performing the facial capture visual
 21 effects for use in *Avengers: Infinity War* and *Avengers: Endgame*.

22 43. The spreadsheet shown in the image below is a part of a spreadsheet recovered
 23 from DD3 and returned to Rearden on or about December 2021 by forensic expert DisputeSoft
 24 under the Special Master’s supervision:

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 26
 27
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1 "BEAST" (Beauty and the Beast project name) Dan Stevens MOVA data
 2 "MARY" (Avengers Infinity War/Endgame project name) Josh Brolin Thanos head MOVA data

1	path	owner	last_mod_time
6784	/dd/shows/BEAST/SMT/0200/user/work.mclean/RIG/char/dan_stevens_actor/mova/data/	mclean	6/22/2016
6785	/dd/shows/MARY/RD/1010/user/work.mclean/RIG/char/josh_head/mova/data/	mclean	3/14/2017
6788	/dd/shows/MARY/RD/7100/user/work.rickeyc/RIG/char/thanos_head/mova/data/	rickeyc	5/24/2017
6791	/dd/shows/MARY/AKB/4240/user/work.rickeyc/RIG/char/thanos_head/mova/data/	rickeyc	7/12/2017
6792	/dd/shows/MARY/AKB/3080/user/work.rickeyc/RIG/char/thanos_head/mova/data/v004/	rickeyc	7/25/2017
6795	/dd/shows/MARY/AKB/3080/user/work.rickeyc/RIG/char/thanos_head/mova/data/v005/	rickeyc	8/2/2017
6796	/dd/shows/MARY/AKB/3080/user/work.rickeyc/RIG/char/thanos_head/mova/data/neck_test_v001/	rickeyc	8/8/2017
6797	/dd/shows/MARY/AKB/3080/user/work.rickeyc/RIG/char/thanos_head/mova/data/neckTest_v002/	rickeyc	8/9/2017
7002	/dd/shows/MARY/AKB/3080/user/work.rickeyc/RIG/char/thanos_head/mova/data/	rickeyc	8/16/2017
7003	/dd/shows/MARY/AAM/6360/user/work.jonberry/RIG/char/thanos_head/mova/data/	jonberry	10/16/2017
7006	/dd/shows/MARY/AAM/3240/user/work.jonberry/RIG/char/thanos_head/mova/data/	jonberry	11/7/2017
7007	/dd/shows/MARY/AAM/3240/user/work.rickeyc/RIG/char/thanos_head/mova/data/	rickeyc	11/8/2017
7012	/dd/shows/MARY/AKB/4180/user/work.jonberry/RIG/char/thanos_head/mova/data/	jonberry	12/5/2017
7017	/dd/shows/MARY/AVQ/3640/user/work.jonberry/RIG/char/thanos_head/mova/data/	jonberry	12/8/2017
8395	/dd/shows/MARY/AVQ/3640/user/work.rickeyc/RIG/char/thanos_head/mova/data/	rickeyc	12/14/2017

3 Beauty and the Beast MOVA production date
 4
 5 Avengers: Infinity War/Endgame MOVA production dates
 6 Jonathan Berry credited as:
 7 "Facial performance capture artist"
 8 Beauty and the Beast, and
 9 "Lead Facial Motion Capture Artist"
 10 Avengers: Infinity War/Endgame

9 The spreadsheet lists files, the last modify date of the files, and the file’s filepaths in the directory
 10 hierarchy. DD3’s internal project name for each file is outlined in red. “BEAST” is the *Beauty and*
 11 *the Beast* project, and “MARY” is the *Avengers Infinity War* and *Avengers: Endgame* project.

12 44. The BEAST project is shown in the spreadsheet above for comparison because
 13 defendant Disney has admitted in prior litigation that it hired DD3’s to provide motion capture
 14 services using Contour software for actor Dan Steven’s facial performance in the “Beast”
 15 character in *Beauty and the Beast*, and thus the BEAST files and filepaths are known to have been
 16 generated through DD3’s unauthorized use of Contour for the BEAST project.

17 45. The above spreadsheet lines 6785 through 8395 show files and filepaths in which
 18 the project is “MARY” (*Avengers: Infinity War* and *Avengers: Endgame*) and as can be seen on
 19 line 6785, the actor reference outlined in green is “josh_head”, upon information and belief is in
 20 reference to actor Josh Brolin, and “mova/data” file (outlined in blue) that was last modified on
 21 3/14/2017—during the time for production of *Avengers: Infinity War*, and after the entry of the
 22 June 17, 2016 preliminary injunction. The remaining shown spreadsheet entries show
 23 “thanos_head” (outlined in purple), upon information and believe is in reference to the Thanos
 24 character, and “mova/data” file (outlined in blue). The last modify dates for the MARY project
 25 MOVA range from 3/14/2017 to 12/14/2017, which upon information and belief are dates during
 26 the production of *Avengers Infinity War* and *Avengers: Endgame*. Further, these are all dates in
 27 which Disney was aware the Preliminary Injunction Order was in force and/or after the Final
 28

1 Decision that ruled Rearden owned the MOVA Assets at all applicable times. Nonetheless, Disney
2 secretly used Contour software during these dates in contempt of the court’s orders and rulings.

3 46. On information and belief, based on at least the multiple spreadsheet entries for
4 “thanos_head” for the project “MARY” containing the file path portion “mova/data” with dates
5 occurring after the Preliminary Injunction Order and during the filming of *Avengers: Infinity War*
6 and *Avengers: Endgame* show that DD3 operated MOVA to perform facial capture for use in
7 *Avengers: Infinity War* and *Avengers: Endgame*. Rearden expects that a reasonable opportunity
8 for further investigation or discovery will supply further evidentiary support for the allegation that
9 DD3 operated MOVA to perform facial capture for use in *Avengers: Infinity War* and *Avengers:*
10 *Endgame*.

11 47. Additionally, the above spreadsheet’s listed owner for several of the MARY project
12 MOVA files is “jonberry” (outlined in brown) who, upon information and belief, refers to DD3
13 employee Jonathan Berry; who, upon information and belief, is credited as the “Facial
14 Performance Capture Artist: Digital Domain 3.0” for the *Beauty and the Beast* movie, and
15 Defendants have admitted that they used MOVA software for that movie. The same Jonathan
16 Berry is credited as “Lead Facial Motion Capture Artist: Digital Domain” for *Avengers: Infinity*
17 *War*. On information and belief, at least the inclusion of Jonathan Berry in the credits for
18 *Avengers: Infinity War* demonstrates that Defendants knew he performed visual effects work for
19 *Avengers: Infinity War*. Rearden expects that a reasonable opportunity for further investigation or
20 discovery will supply further evidentiary support for the allegation that Defendants knew that Mr.
21 Berry and other DD3 personnel whom Defendants knew had performed visual effects work using
22 MOVA software for other movies, also performed visual effects work for *Avengers: Infinity War*
23 and/or *Avengers: Endgame*.

24 48. The DD3 Documents also indicate that some of the Contour output files used to
25 animate Thanos included the unauthorized Contour output files previously created for the Thanos
26 character in *Guardians of the Galaxy*, as evidenced in the below spreadsheet. Line 3187 of the
27 below spreadsheet shows a file path name including the name “Full Tilt” (which, on information
28

1 and belief, is the DD3 internal project name for *Guardians of the Galaxy*), the date 2014-04-23,
 2 and “JBrolin”:

3 MOVA FACS capture of Josh Brolin reused from
 “Full Tilt”, project name for *Guardians of the Galaxy*

4 “MovaROM” = MOVA “Range Of Motion”

5 Lucio Moser
 Running MOVA software
 (on information and belief)

6 Avengers: Infinity Wars/Endgame
 MOVA production dates

	F	H	I	J
3183	mCap [AD1]\04\HMC\Testing\Test\Compare\MovaROM\t09_to_GapFilled\Lucio\hmcRom_49\cache\hmc_mc_export_2	2/1/2017	7/20/2016	2/1/2017
3184	mCap [AD1]\04\HMC\Testing\Test\Compare\MovaROM\t09_to_GapFilled\Lucio\hmcRom_49\cache\hmc_obj_export_2	2/1/2017	7/20/2016	2/1/2017
3185	mCap [AD1]\04\HMC\Testing\Test\Compare\MovaROM\t09_to_GapFilled\Lucio\hmcRom_49\cache\Lucio Numerics_Hmc49	2/1/2017	7/20/2016	2/1/2017
3186	mCap [AD1]\04\HMC\Testing\Test\Compare\MovaROM\t09_to_GapFilled\Lucio\hmcRom_49\cache\Lucio Numerics_Hmc49\mcx	2/1/2017	7/20/2016	2/1/2017
3187	mCap [AD1]\Completed\Full Tilt\2014-04-23 01\JBrolin\00_0007_438-MovaNeutral\438-438\Work_Files\Vertrax\model	2/7/2017	7/20/2016	2/7/2017
3188	mCap [AD1]\04\HMC\Testing\Deliveries\02\mova_data\Greg\s01_t09_9-361\cache	2/1/2017	7/21/2016	2/1/2017

8 “HMC” = “Head-Mounted Camera”
 used by Josh Brolin
 in *Avengers: Infinity War/Endgame*

9 Josh Brolin
 Thanos Actor

10 Greg LaSalle
 testing HMC

11 MOVA “Vertrax” software used
 to process Brolin facial capture
 post-preliminary injunction

11 Upon information and belief, “JBrolin” is a reference to Thanos actor Josh Brolin and 2014-04-23
 12 refers to a date when Josh Brolin’s facial performance was captured by the Contour system,
 13 including Facial Action Coding System (“FACS”) poses. FACS poses can be used with later facial
 14 performances. “Vertrax”, outlined in blue, is a program that is part of Contour software,
 15 evidencing that Contour Vertrax was used with these files. The dates associated with this file
 16 range from 7/20/2016 and 2/1/2017, which are years after the release of *Guardians of the Galaxy*,
 17 but on information and belief, correspond with production dates for *Avengers: Infinity War* and
 18 *Avengers: Endgame*. The dates are also all after the effective date of the Preliminary Injunction
 19 Order.

20 49. The above spreadsheet also evidences Contour software use with head mounted
 21 cameras (HMC) on or about the same time as the Contour Vertrax software. Lines 3183-3186 list
 22 “HMC”, outlined in red, and “MovaROM”, outlined in blue and “Lucio” outlined in brown. Upon
 23 information and belief, “HMC” refers to “head mounted camera,” “MovaROM” refers to Mova
 24 Range of Motion, and Lucio refers to Lucio Moser, DD3 Head of Research and Innovation who
 25 was directly involved with developing software in connection with the stolen Contour source code
 26 and using Contour software for facial performance capture. The dates of the files correspond with
 27 dates of Contour Vertrax software use on line 3187 and are all dates after the Preliminary
 28

1 Injunction Order was in effect, and which, on information and belief, correspond with production
 2 dates for *Avengers: Infinity War* and *Avengers: Endgame*.

3 50. Upon information and belief, DD3 used an internal messaging system called
 4 “Diffusion” for exchanging messages among staff. DisputeSoft forensically recovered records
 5 from Diffusion that also evidence that Contour software was used in the production of the Thanos
 6 head. The spreadsheet below shows message sent about the “thanos_head”, outlined in purple, in
 7 connection with “mova”, outlined in blue, using Diffusion, outlined in yellow, on dates
 8 corresponding with *Avengers: Infinity War* and *Avengers: Endgame* production dates, all of which
 9 are date after the Preliminary Injunction Order was in effect:

10 Diffusion is an internal messaging system used by DD3 technical staff.

11 Message about thanos_head use with MOVA software.

12

Title	Location	Url	Date
rDD575564: Added thanos_head as a target for the mova deltas voltron handler.	Diffusion	http://phabricator.d2.com/rDD575564	12/15/2016
681 rDD575248: Fix for no offset value on mova data	Diffusion	http://phabricator.d2.com/rDD575248	12/14/2016
682 rDD575061: Parent jaw jnt children to mova joint.	Diffusion	http://phabricator.d2.com/rDD575061	12/13/2016

13

14

15

16 Messages about use of MOVA software. Avengers: Infinity War production dates

18 51. On information and belief, Defendants continued to use the unauthorized Contour
 19 output files created using the stolen and copyrighted Mova software to capture and/or animate
 20 Thanos in *Avengers: Infinity War* and in *Avengers: Endgame*.

21 52. On information and belief, Defendants were fully aware that DD3 used
 22 unauthorized Contour output files created using the stolen and copyrighted Mova software to
 23 capture and/or animate Thanos in *Avengers: Infinity War* and in *Avengers: Endgame*.

24 53. On information and belief, Defendants knew that DD3 continued to use employees
 25 involved with MOVA Technology, including Greg LaSalle, Jonathan Berry, and Lucio Moser, to
 26 perform visual effects work on *Avengers: Infinity War* and in *Avengers: Endgame*, and raised no
 27 objections to their doing so.

28

1 54. Neither Rearden nor Rearden Mova authorized use of the patented Contour systems
2 and methods and copying of the copyrighted Contour program by DD3, Defendant Marvel,
3 Defendant Disney, or any other party for use in *Avengers: Infinity War* or *Avengers: Endgame*.

4 55. Each time that DD3 operated the Contour system, whether to capture performances
5 or to process the captured performances into 3D output works, the computers made a copy of the
6 Contour program in their CPU's RAM without authorization from Rearden. Disney incorporated
7 the output works of the patented Contour systems and methods and copyrighted Contour program
8 to animate CG characters that were reproduced, distributed, displayed, and performed in
9 *Avengers: Infinity War* and *Avengers: Endgame*.

10 **III. Defendants' development and use of the MEDUSA and ANYMA Systems.**

11 56. Defendant Disney's Research Studios division, together with Defendant
12 Lucasfilm's ILM division, advertise a facial capture system they claim to have developed called
13 the "MEDUSA Performance Capture" or "MEDUSA Facial Capture" system. The system is
14 described by Disney as consisting "of a mobile rig of cameras and lights coupled with proprietary
15 software that can reconstruct actor's faces in full motion, without using traditional motion-capture
16 dots." <https://studios.disneyresearch.com/medusa/>

17 57. Disney Research Studios' website states that Thanos in *Avengers: Infinity War* was
18 created using a MEDUSA capture of Josh Brolin: "In order to transfer the performance of Brolin
19 onto Thanos, the visual effects studio relied heavily on technology from Disney Research. Brolin
20 was captured using the Medusa Performance Capture System, a Disney proprietary capture
21 technology that can reconstruct the three-dimensional shape of the human face over time at very
22 high resolution. Based on this data, Digital Domain built a digital double of Brolin, which they
23 control using their in-house tool Masquerade. The technology underneath Masquerade is based on
24 a research project by Disney Research Facial Performance Enhancement Using Dynamic Shape
25 Space Analysis, which allows to control a high-quality face model from sparse input data. This
26 allowed to employ traditional marker-based motion capture from helmet cameras but to achieve
27 much higher capture fidelity."

28

1 58. In other publications, Disney and Lucasfilm revealed that they used MEDUSA
2 together with the ANYMA system to also create the “Smart Hulk” character portrayed by Mark
3 Ruffalo in *Avengers: Endgame*. The ANYMA system has been described as using a set of facial
4 shapes created from a MEDUSA session with the performer (for *Avengers: Endgame*, Mark
5 Ruffalo) in order to map animation generated from those high-definition shapes onto lower-
6 definition head-mounted camera captures allowing the performer to move about the set more
7 freely.

8 59. On information and belief, Defendants have used and continue to use MEDUSA
9 and ANYMA to create films and television programs including but not limited to *Star Wars: The*
10 *Force Awakens*, *Star Wars: The Last Jedi*, *Star Wars: The Rise of Skywalker*, *Rogue One: A Star*
11 *Wars Story*, *Solo: A Star Wars Story*, *Doctor Strange*, *Spiderman: Homecoming*, *Thor: Ragnarok*;
12 *Ant-Man and the Wasp*, *Avengers: Infinity War*, *Avengers: Endgame*, *Eternals*, *The Jungle Book*,
13 *Pirates of the Caribbean: Dead Men Tell No Tales*, *Aladdin*, *Maleficent: Mistress of Evil*, *Jungle*
14 *Cruise*, *Ready Player One*, *Space Jam: A New Legacy*, and *No Time to Die*. These movies include
15 many of the highest grossing films of the past five years.

16 **FIRST CLAIM FOR RELIEF**

17 **Copyright Infringement (17 U.S.C. § 501)**

18 **(Against the Disney Defendants)**

19 60. Plaintiffs incorporate by reference the allegations of paragraphs 1 through 59 as
20 though fully set forth herein.

21 61. The Contour program is an original literary work of authorship by Rearden-
22 employed programmers.

23 62. The Contour program was fixed in a tangible medium of expression when it was
24 stored in non-volatile computer memory and/or media such as computer hard drives, CD, CD-R,
25 DVD, or Blu-ray disks from which it may be perceived, reproduced, or otherwise communicated
26 for a period of more than transitory duration. Accordingly, the Contour program is a proper
27 subject of copyright protection.

28

1 63. Rearden’s programmers duly assigned their copyrights in the Contour program to
2 Rearden. At all material times, Plaintiff Rearden Mova was and is the owner of United States
3 Copyright Registration No. TXu001977151 for the Contour program.

4 64. Each time that DD3 operated the Contour apparatus, whether for facial
5 performance capture or for processing captures into output works, the computers made an
6 unauthorized copy of the Contour program in their central processing units’ (“CPU’s”) random
7 access memory (“RAM”). Each such copy is a violation of Rearden’s exclusive right to authorize
8 copies of its Contour program under 17 U.S.C. § 106 (1), and therefore each copy is an act of
9 direct copyright infringement by DD3.

10 65. Disney had actual knowledge of DD3’s specific acts of infringement at least by
11 virtue of having notice of the Preliminary Injunction Order, and despite that Order continued to
12 induce, cause, and materially contribute to DD3’s infringement.

13 66. Disney, either directly or through entities subject to its direction and control,
14 contracted with DD3 for facial performance capture services and output works using the Contour
15 program for Disney’s films *Avengers: Infinity War* and *Avengers: Endgame*. At all material times
16 during DD3’s performance of the facial performance capture contract, Disney and Marvel were in
17 a position to police DD3 and/or had the right and ability to supervise and control DD3’s
18 performance.

19 67. Disney, either directly or through entities subject to its direction and control,
20 initiated and scheduled each performance in which facial performance capture was used.

21 68. For each performance with facial capture (each “Shoot”), Disney, either directly or
22 through entities subject to its direction and control, supplied performers to provide facial
23 performances for capture.

24 69. For each Shoot, Disney, either directly or through entities subject to its direction
25 and control, supplied a director to control and direct the actions of all parties operating the facial
26 performance capture equipment and/or processing using the Contour program. Acting as Disney’s
27 supervising agent, the director controlled and directed the use of the Contour program during
28 and/or after the Shoot by starting and terminating each Shoot, starting and stopping each take

1 using facial performance capture during the Shoot, ordering additional takes, and choosing
2 “Selects” (the facial performance capture takes which were deemed “good takes” by the director)
3 for further program processing to create program output works, using the Contour program. So
4 extensive is Disney’s directors’ supervision and control over the Shoots, that defendants have
5 contended in other litigation that the directors’ contribution “is substantial and performs ‘the lion’s
6 share of the creativity’ in the facial motion capture,” and that consequently the directors are the
7 authors of the results of the facial motion capture.

8 70. For each Shoot, Disney, either directly or through entities subject to its direction
9 and control, provided various film crew to support and facilitate the facial performance capture
10 and/or processing using the Contour program.

11 71. On information and belief, the contract between DD3 and Disney, or entities
12 subject to its direction and control such as Marvel, grants the unrestricted right to cancel “any
13 portion of the Services” provided by DD3, ILM and others offering facial performance capture-
14 related services (“Facial VFX Companies”) subject only to the duty to pay for costs and services
15 performed before cancellation. Accordingly, Disney, either directly or through entities subject to
16 its direction and control, were in a position to police all Facial VFX Companies’ infringing acts.
17 They had the authority and practical ability to observe and evaluate services provided by Facial
18 VFX Companies and—if defendants deemed those services inadequate, improper, or unlawful—
19 require Facial VFX Companies to remedy the services or cancel Facial VFX Companies’
20 provision of services.

21 72. Disney had an obvious and direct financial interest in exploitation of Rearden’s
22 copyright in the Contour program to use the Contour output works to animate CG characters in
23 *Avengers: Infinity War* and *Avengers: Endgame*, including at least the Thanos character. Disney
24 believed that Contour facial performance motion capture would make the Thanos CG character
25 more believable and compelling, which would in turn draw a wider audience to the films.

26 73. At all material times, Defendant Disney Company dominated and controlled the
27 Disney subsidiary Defendants, including Marvel and Lucasfilm, and had a substantial and
28 continuing connection with them with respect to the infringing acts alleged herein.

1 A method comprising:

2 communicating a digital video stream with at least part of a rendered 3D animated face
3 which includes 3D facial shapes that:

4 are correlated to a plurality of high resolution 3D facial surface shapes that track the high
5 resolution 3D motion of a performer's face from a first facial performance; and that

6 correspond to similar facial expressions of a performer's face from a second facial
7 performance.

8 79. On information and belief, Defendant Disney Company operates Disney+, a
9 streaming home video service that is used to communicate numerous movies created with Disney
10 Company and Lucasfilm's MEDUSA and/or ANYMA facial capture systems.

11 80. Defendant Disney Company's Disney+ service communicates digital video streams
12 with at least part of a rendered 3D animated face (including, for example, "Smart Hulk" in
13 *Avengers: Endgame* and the Genie in *Aladdin*).

14 81. The rendered 3D animated faces created with MEDUSA and subsequently
15 communicated by Defendant Disney Company through Disney+ include 3D facial shapes. For
16 example, Russel Earl of ILM told one journalist in May 2019: "We did a Medusa session with
17 Ruffalo to get a whole set of facial shapes to drive our facial library for Smart Hulk."

18 [https://www.awn.com/vfxworld/ilm-tackles-bruce-banners-smart-hulk-convergence-avengers-](https://www.awn.com/vfxworld/ilm-tackles-bruce-banners-smart-hulk-convergence-avengers-endgame)
19 [endgame](https://www.awn.com/vfxworld/ilm-tackles-bruce-banners-smart-hulk-convergence-avengers-endgame). The "facial library for Smart Hulk" is, on information and belief a set of 3D facial
20 shapes included in the Smart Hulk character.

21 82. The 3D facial shapes included in films created with MEDUSA and streamed on
22 Disney+ are correlated to a plurality of high resolution 3D facial surface shapes that track the high
23 resolution 3D motion of a performer's face from a first facial performance. As the quote from Earl
24 in the previous paragraph explains, the facial library for "Smart Hulk" was created by correlation
25 to high resolution 3D motion of Ruffalo's face from a Medusa facial performance.

26 83. The 3D facial shapes in the final character animated with MEDUSA and
27 subsequently streamed on Disney+ correspond to similar facial expressions of a performer's face
28 from a second facial performance. For example, an article explaining how the MEDUSA system
was used to create the Thanos character in *Avengers: Infinity War* and *Avengers: Endgame*

1 explains that DD3 took frames from a helmet-mounted camera system (the facial expressions of
2 the performer from the second facial performance) and corresponded that capture to the high-
3 resolution facial shapes generated from the MEDUSA scan to create the 3D animated Thanos
4 character. See [https://www.hollywoodreporter.com/behind-screen/how-vfx-teams-brought-josh-
5 broolins-thanos-life-infinity-war-1178231](https://www.hollywoodreporter.com/behind-screen/how-vfx-teams-brought-josh-brolins-thanos-life-infinity-war-1178231).

6 84. Because, as set forth above, and in particular, in Paragraphs 78 through 83, as an
7 illustrative but nonexclusive example, the Disney+ service's streaming of media created with the
8 MEDUSA and/or ANYMA facial capture systems practices each and every limitation of at least
9 claim 1 of the '226 patent, the Disney+ service infringes the '226 patent each time it streams
10 media created with the MEDUSA and/or ANYMA facial capture systems.

11 85. On information and belief, Defendants had actual notice of the '226 patent at least
12 as early as the date on which Defendants received a copy of the original Complaint in this lawsuit.

13 86. Because, as set forth above, and in particular, in Paragraphs 78 through 83, as an
14 illustrative but nonexclusive example and on information and belief, Defendant Lucasfilm creates
15 3D animated faces using MEDUSA and/or ANYMA to be communicated on Disney+, and on
16 information and belief, Defendant LucasFilm had actual notice and knowledge of the '226 patent
17 at least as early as the date on which Defendants received a copy of the original Complaint in this
18 lawsuit, Defendant Lucasfilm provided to Defendant Disney Company a material component of
19 the infringing Disney+ system, and especially made or adapted that material component for use in
20 the infringing Disney+ system.

21 87. Defendants Disney Company and Lucasfilm also provide films made with
22 MEDUSA or ANYMA to other streaming platforms not controlled by Defendants. For example,
23 *Space Jam: A New Legacy* is available through the streaming service HBO Max, and *No Time to*
24 *Die* is available for video on demand purchase through YouTube, Amazon Prime Video, and
25 Apple TV+.

26 88. Films made with MEDUSA or ANYMA, when licensed and delivered to a third-
27 party streaming service, have no substantial non-infringing uses and are especially made or
28 especially adapted for infringement. As set forth in Paragraphs 78 through 83, any time a film that

1 was made with MEDUSA or ANYMA is communicated through a streaming service, the
2 communication of the film through the streaming service directly infringes the method of claim 1
3 of the '226 patent. Therefore, the licensing and delivery of a film on a digital video stream made
4 with MEDUSA or ANYMA to a third-party streaming service both has no substantial non-
5 infringing use and is especially adapted for infringement.

6 89. Because, as set forth above, and in particular, in Paragraphs 78 through 83 and 87,
7 as an illustrative but nonexclusive example and on information and belief, Defendants Lucasfilm
8 and Disney Company create 3D animated faces using MEDUSA and/or ANYMA to be
9 communicated on streaming platforms other than Disney+ (including but not limited to HBO Max,
10 YouTube, Apple TV+, and Amazon Prime Video), and on information and belief, Defendants
11 Disney Company and Lucasfilm had actual notice and knowledge of the '226 patent at least as
12 early as the date on which Defendants received a copy of the original Complaint in this lawsuit,
13 Defendants Disney Company and Lucasfilm provided to those other streaming platforms a
14 material component of the infringing streaming systems, and especially made or adapted that
15 material component for use in the infringing streaming systems.

16 90. Because, as set forth above, and in particular, in Paragraphs 78 through 83 and 87,
17 as an illustrative but nonexclusive example and on information and belief, Defendants Lucasfilm
18 and Disney Company create 3D animated faces using MEDUSA and/or ANYMA to be
19 communicated on streaming platforms other than Disney+ (including but not limited to HBO Max,
20 YouTube, Apple TV, and Amazon Prime Video), and on information and belief, Defendants
21 Disney Company and Lucasfilm had actual notice and knowledge of the '226 patent at least as
22 early as the date on which Defendants received a copy of the original Complaint in this lawsuit,
23 Defendants Disney Company and Lucasfilm specifically intended these other streaming platforms
24 to infringe the '226 patent and knew that the other streaming platforms' acts constituted
25 infringement.

26 91. Defendants' infringement of the '226 patent has been and remains willful and
27 deliberate, starting from at least the date on which Defendants received a copy of the original
28 Complaint in this lawsuit.

1 92. Defendants' activities have been without Rearden Mova's authorization.

2 93. Defendants' have profited through their infringement of the '226 patent.

3 94. As a result of Defendants' infringement, Rearden Mova has been damaged and will
4 be further damaged, and is entitled to be compensated for such damages pursuant to 35 U.S.C. §
5 284 in an amount that presently cannot be ascertained, but that will be determined at trial.

6 **THIRD CLAIM FOR RELIEF**

7 **Infringement of the '248 Patent (35 U.S.C. § 271)**

8 **(Against Defendants Disney Company and Lucasfilm)**

9 95. Plaintiffs incorporate by reference the allegations of paragraphs 1 through 93 as
10 though fully set forth herein.

11 96. Defendants Disney Company and Lucasfilm have infringed and continues to
12 infringe, directly and indirectly, literally or under the doctrine of equivalents, the '248 patent, by
13 using, or by making, importing, offering to sell, and/or selling products or processes that are used
14 to, practice one or more inventions claims in the '248 patent, as well as by knowingly, actively
15 and intentionally inducing others to infringe the '248 patent, including but not limited to other
16 streaming video services and customers, and/or by contributing to the infringement of the '248
17 patent by others, including but not limited to other streaming video services and customers. Such
18 infringing conduct includes, but is not limited to, Defendants' production of movies, television
19 programs, and other media using the MEDUSA facial capture systems after the date of issuance of
20 the '248 patent..

21 97. As an illustrative but nonexclusive example, Defendants' MEDUSA facial capture
22 system infringes, for example, at least claim 1 of the '248 patent. Claim 1 of the '248 Patent
23 recites:

24 Claim 1

25 A system comprising:

26 A plurality of cameras, each capturing a plurality of two-dimensional (2D) frames of some
27 or all of a surface of a performer's face as the performer's face changes in some or all of
the plurality of time intervals;

28

1 a processor that correlates the plurality of 2D frames from the plurality of cameras at the
2 plurality of time intervals to create a high-resolution three-dimensional (3D) mesh
3 corresponding to a 3D shape of some or all of the surface of the performer’s face at some
4 or all of the time intervals;

5 wherein a first plurality of 3D points in the high-resolution 3D mesh automatically track a
6 second plurality of 3D points on the surface of the performer’s face;

7 wherein the second plurality of 3D points on the surface of the performer’s face are not
8 identified by markers applied to the performer’s face.

9 98. Defendants Disney Company and Lucasfilm’s MEDUSA system comprises a
10 plurality of cameras, each capturing a plurality of two-dimensional frames of some or all of a
11 performer’s face as the performer’s face changes in some or all of the plurality of time intervals.
12 For example, an article at FXGuide in 2018 explains that, “[t]he Medusa scanning rig was
13 developed by Disney Research Zurich and it captures an actor with multiple cameras in both still
14 poses (much like a LightStage) but also moving. This time based or 4D capture informs the team
15 with data showing how the face moves between key poses, as well as extremely high resolution
16 3D meshes of the key poses themselves.” See [https://www.fxguide.com/xfeatured/making-thanos-
17 face-the-avengers/](https://www.fxguide.com/xfeatured/making-thanos-face-the-avengers/).

18 99. Defendants Disney Company and Lucasfilm’s MEDUSA system comprises a
19 processor that correlates the plurality of 2D frames from the plurality of cameras at the plurality of
20 time intervals to create a high-resolution three-dimensional (3D) mesh corresponding to a 3D
21 shape of some or all of the surface of the performer’s face at some or all of the time intervals, as
22 set forth in the quote from the previous paragraph.

23 100. In Defendants Disney Company and Lucasfilm’s MEDUSA system, a first plurality
24 of 3D points in the high-resolution 3D mesh automatically track a second plurality of 3D points on
25 the surface of the performer’s face. For example, Disney Research’s website states that: “Medusa
26 delivers high-resolution 3D faces, with the ability to track individual pores and wrinkles over time,
27 and can recover per-frame dynamic appearance (blood flow and shininess of the skin), providing a
28 very realistic virtual face that is ideal for creating digital doubles for visual effects and computer
29 games.” See <https://studios.disneyresearch.com/medusa/>.

1 101. In Defendants Disney Company and Lucasfilm’s MEDUSA system, the second
2 plurality of 3D points on the surface of the performer’s face are not identified by markers applied
3 to the performer’s face. Disney Company and Lucasfilm both advertise on their websites that
4 MEDUSA does not require markers applied to the performer’s face:

- 5 • “The Medusa Facial Capture system, developed by DisneyResearch|Studios, consists of a
6 mobile rig of cameras and lights coupled with proprietary software that can reconstruct
7 actor’s faces in full motion, without using traditional motion-capture dots.” *See*
8 <https://studios.disneyresearch.com/medusa/>.
- 9 • “Originally developed by Disney Research, the Academy Award®-winning MEDUSA
10 system continues to be enhanced by ILM and successfully used on some of the most
11 notable blockbusters of the past few years. The system provides high-fidelity markerless
12 facial capture, for static poses or in motion, and can travel to wherever your key talent is
13 available.” *See* https://www.ilm.com/facial_capture/.

14 102. Because, as set forth above, and in particular, in Paragraphs 96 through 100, as an
15 illustrative but nonexclusive example, the MEDUSA facial capture system practices each and
16 every limitation of at least claim 1 of the ’248 patent, Defendants Disney Company and Lucasfilm
17 infringe the ’248 patent each time they use the MEDUSA system to produce media content.

18 103. Defendants’ infringement of the ’248 patent has been and remains willful and
19 deliberate, starting from at least the date on which Defendants received a copy of the original
20 Complaint in this lawsuit.

21 104. Defendants’ activities have been without Rearden Mova’s authorization.

22 105. Defendants’ have profited through their infringement of the ’248 patent.

23 106. As a result of Defendants’ infringement, Rearden Mova has been damaged and will
24 be further damaged, and is entitled to be compensated for such damages pursuant to 35 U.S.C. §
25 284 in an amount that presently cannot be ascertained, but that will be determined at trial.

26
27
28

FOURTH CLAIM FOR RELIEF

Infringement of the '072 Patent (35 U.S.C. § 271)

(Against Defendants Disney Company and Lucasfilm)

107. Plaintiffs incorporate by reference the allegations of paragraphs 1 through 104 as though fully set forth herein.

108. Defendants Disney Company and Lucasfilm have infringed and continues to infringe, directly and indirectly, literally or under the doctrine of equivalents, the '072 patent, by using, or by making, importing, offering to sell, and/or selling products or processes that are used to, practice one or more inventions claims in the '072 patent, as well as by knowingly, actively and intentionally inducing others to infringe the '072 patent, including but not limited to other streaming video services and customers, and/or by contributing to the infringement of the '072 patent by others, including but not limited to other streaming video services and customers. Such infringing conduct includes, but is not limited to, Defendants' marketing and sale of its Disney+ streaming video service when used to stream movies, television programs, and other media created using the MEDUSA facial capture system.

109. As an illustrative but nonexclusive example, Defendants' Disney+ streaming video service's communication of movies, television programs, and other media created using the MEDUSA facial capture systems infringes, for example, at least claim 9 of the '072 patent. Claim 9 of the '072 patent recites:

Claim 9

A method comprising:

communicating data representing a rendered animated three-dimensional (3D) face;

the data including a rendering of a first plurality of 3D points on at least part of the rendered animated 3D face at a first plurality of time intervals correlated to a high resolution second plurality of 3D points on at least part of a surface of a performer's face at a second plurality of time intervals;

wherein the second plurality of 3D points on the surface of the performer's face were not identified by markers applied to the performer's face; and
wherein a processor automatically tracked the second plurality of 3D points.

1 110. Defendant Disney Company’s Disney+ service communicates data representing a
2 rendered animated three-dimensional (3D) face when it streams media produced with the
3 MEDUSA system (including, for example, “Smart Hulk” in *Avengers: Endgame* and the Genie in
4 *Aladdin*).

5 111. The data communicated by the Disney + service when it streams media produced
6 with the MEDUSA system includes a rendering of a first plurality of 3D points on at least part of
7 the rendered animated 3D face at a first plurality of time intervals correlated to a high resolution
8 second plurality of 3D points on at least part of a surface of a performer’s face at a second
9 plurality of time intervals. As set forth in paragraphs 97 - 99 above, the MEDUSA scanning rig
10 captures a high resolution plurality of 3D points on at least part of a surface of a performer’s face
11 at a plurality of time intervals, and then creates a realistic virtual face (the rendering of the first
12 plurality of 3D points on at least part of the rendered animated 3D face) correlated to the high
13 resolution plurality of 3D points from the performer’s face.

14 112. As set forth in paragraph 100 above, when the MEDUSA scanning rig captures the
15 second plurality of 3D points on at least part of a surface of a performer’s face, and on at least part
16 of the surface of the performer’s those points are not identified by markers applied to the
17 performer’s face.

18 113. As set forth in paragraph 99 above, in media created with the MEDUSA scanning
19 rig, a processor automatically tracks the second plurality of 3D points.

20 114. Because, as set forth above, and in particular, in Paragraphs 107 through 111, the
21 Disney+ service’s streaming of media created with the MEDUSA facial capture systems practices
22 each and every limitation of at least claim 9 of the ’072 patent, the Disney+ service infringes the
23 ’072 patent each time it streams media created with the MEDUSA facial capture systems.

24 115. On information and belief, Defendants had actual notice of the ’072 patent at least
25 as early as the date on which Defendants received a copy of the original Complaint in this lawsuit.

26 116. Because, as set forth above, and in particular, in Paragraphs 107 through 111, as an
27 illustrative but nonexclusive example and on information and belief, Defendant Lucasfilm creates
28 3D animated faces using MEDUSA to be communicated on Disney+, and on information and

1 belief, Defendant LucasFilm had actual notice and knowledge of the '072 patent at least as early
2 as the date on which Defendants received a copy of the original Complaint in this lawsuit,
3 Defendant Lucasfilm provided to Defendant Disney Company a material component of the
4 infringing Disney+ system, and especially made or adapted that material component for use in the
5 infringing Disney+ system.

6 117. Defendants Disney Company and Lucasfilm also provide films made with
7 MEDUSA to other streaming platforms not controlled by Defendants. For example, *Space Jam: A*
8 *New Legacy* is available through the streaming service HBO Max, and *No Time to Die* is available
9 for video on demand purchase through YouTube, Amazon Prime Video, and Apple TV+.

10 118. Films made with MEDUSA or ANYMA, when licensed and delivered to a third-
11 party streaming service, have no substantial non-infringing uses and are especially made or
12 especially adapted for infringement. As set forth in Paragraphs 107 through 111, any time a film
13 that was made with MEDUSA or ANYMA is communicated through a streaming service, the
14 communication of the film through the streaming service directly infringes the method of claim 9
15 of the '072 patent. Therefore, the licensing and delivery of a film on a digital video stream made
16 with MEDUSA or ANYMA to a third-party streaming service both has no substantial non-
17 infringing use and is especially adapted for infringement.

18 119. Because, as set forth above, and in particular, in Paragraphs 107 through 111 and
19 115, as an illustrative but nonexclusive example and on information and belief, Defendants
20 Lucasfilm and Disney Company create 3D animated faces using MEDUSA to be communicated
21 on streaming platforms other than Disney+ (including but not limited to HBO Max, YouTube,
22 Apple TV+, and Amazon Prime Video), and on information and belief, Defendants Disney
23 Company and Lucasfilm had actual notice and knowledge of the '072 patent at least as early as the
24 date on which Defendants received a copy of the original Complaint in this lawsuit, Defendants
25 Disney Company and Lucasfilm provided to those other streaming platforms a material
26 component of the infringing streaming systems, and especially made or adapted that material
27 component for use in the infringing streaming systems.

28

1 120. Because, as set forth above, and in particular, in Paragraphs 107 through 111 and
2 115, as an illustrative but nonexclusive example and on information and belief, Defendants
3 Lucasfilm and Disney Company create 3D animated faces using MEDUSA to be communicated
4 on streaming platforms other than Disney+ (including but not limited to HBO Max, YouTube,
5 Apple TV, and Amazon Prime Video), and on information and belief, Defendants Disney
6 Company and Lucasfilm had actual notice and knowledge of the '072 patent at least as early as the
7 date on which Defendants received a copy of the original Complaint in this lawsuit, Defendants
8 Disney Company and Lucasfilm specifically intended these other streaming platforms to infringe
9 the '072 patent and knew that the other streaming platforms' acts constituted infringement.

10 121. Defendants' infringement of the '072 patent has been and remains willful and
11 deliberate, starting from at least the date on which Defendants received a copy of the original
12 Complaint in this lawsuit.

13 122. Defendants' activities have been without Rearden Mova's authorization.

14 123. Defendants' have profited through their infringement of the '072 patent.

15 124. As a result of Defendants' infringement, Rearden Mova has been damaged and will
16 be further damaged, and is entitled to be compensated for such damages pursuant to 35 U.S.C. §
17 284 in an amount that presently cannot be ascertained, but that will be determined at trial.

18 **FIFTH CLAIM FOR RELIEF**

19 **Infringement of the '790 Patent**

20 **(Against Defendants Disney Company and Lucasfilm)**

21 125. Plaintiffs incorporate by reference the allegations of paragraphs 1 through 121 as
22 though fully set forth herein.

23 126. Defendants Disney Company and Lucasfilm have infringed and continues to
24 infringe, directly and indirectly, literally or under the doctrine of equivalents, the '790 patent, by
25 using, or by making, importing, offering to sell, and/or selling products or processes that are used
26 to, practice one or more inventions claims in the '790 patent, as well as by knowingly, actively
27 and intentionally inducing others to infringe the '790 patent, including but not limited to other
28 streaming video services and customers, and/or by contributing to the infringement of the '790

1 patent by others, including but not limited to other streaming video services and customers. Such
2 infringing conduct includes, but is not limited to, Defendants' marketing and sale of its Disney+
3 streaming video service when used to stream movies, television programs, and other videos
4 created using the MEDUSA facial capture system.

5 127. As an illustrative but nonexclusive example, Defendants' Disney+ streaming video
6 service's communication of movies, television programs, and other media created using the
7 MEDUSA facial capture systems infringes, for example, at least claim 9 of the '790 patent. Claim
8 9 of the '790 patent recites:

9 Claim 9

10 A method comprising:

11 communicating a movie or video that includes a rendered animated three-dimensional (3D)
12 face;

13 at least part of the movie or video including a rendering of a first plurality of 3D points on
14 at least part of the rendered animated 3D face at a first plurality of time intervals correlated
15 to a high resolution second plurality of 3D points on at least part of a surface of a
16 performer's face at a second plurality of time intervals;

17 wherein the second plurality of 3D points on the surface of the performer's face were not
18 identified by markers applied to the performer's face; and

19 wherein a processor automatically tracked the second plurality of 3D points.

20 128. Defendant Disney Company's Disney+ service communicates movies and/or
21 videos that include a rendered animated three-dimensional (3D) face when it streams movies
22 and/or videos produced with the MEDUSA system (including, for example, "Smart Hulk" in
23 *Avengers: Endgame* and the Genie in *Aladdin*).

24 129. The movies and/or videos communicated by the Disney+ service when it streams
25 movies and/or videos produced with the MEDUSA system includes a rendering of a first plurality
26 of 3D points on at least part of the rendered animated 3D face at a first plurality of time intervals
27 correlated to a high resolution second plurality of 3D points on at least part of a surface of a
28 performer's face at a second plurality of time intervals. As set forth in paragraphs 97 - 99 above,
the MEDUSA scanning rig captures a high resolution plurality of 3D points on at least part of a
surface of a performer's face at a plurality of time intervals, and then creates a realistic virtual face

1 (the rendering of the first plurality of 3D points on at least part of the rendered animated 3D face)
2 correlated to the high resolution plurality of 3D points from the performer's face.

3 130. As set forth in paragraph 100 above, when the MEDUSA scanning rig captures the
4 second plurality of 3D points on at least part of a surface of a performer's face, and on at least part
5 of the surface of the performer's face those points are not identified by markers applied to the
6 performer's face.

7 131. As set forth in paragraph 99 above, in media created with the MEDUSA scanning
8 rig, a processor automatically tracks the second plurality of 3D points.

9 132. Because, as set forth above, and in particular, in Paragraphs 124 through 128, as an
10 illustrative but nonexclusive example, the Disney+ service's streaming of movies or videos
11 created with the MEDUSA facial capture systems practices each and every limitation of at least
12 claim 9 of the '790 patent, the Disney+ service infringes the '790 patent each time it streams
13 movies or videos created with the MEDUSA facial capture systems.

14 133. On information and belief, Defendants had actual notice of the '790 patent at least
15 as early as the date on which Defendants received a copy of the original Complaint in this lawsuit.

16 134. Because, as set forth above, and in particular, in Paragraphs 124 through 128, and
17 as an illustrative but nonexclusive example and on information and belief, Defendant Lucasfilm
18 creates 3D animated faces using MEDUSA for movies and videos to be communicated on
19 Disney+, and on information and belief, Defendant Lucasfilm had actual notice and knowledge of
20 the '072 patent at least as early as the date on which Defendants received a copy of the original
21 Complaint in this lawsuit, Defendant Lucasfilm provided to Defendant Disney Company a
22 material component of the infringing Disney+ system, and especially made or adapted that
23 material component for use in the infringing Disney+ system.

24 135. Defendants Disney Company and Lucasfilm also provide films made with
25 MEDUSA to other streaming platforms not controlled by Defendants. For example, *Space Jam: A*
26 *New Legacy* is available through the streaming service HBO Max, and *No Time to Die* is available
27 for video on demand purchase through YouTube, Amazon Prime Video, and Apple TV+.

28

1 136. Films made with MEDUSA or ANYMA, when licensed and delivered to a third-
2 party streaming service, have no substantial non-infringing uses and are especially made or
3 especially adapted for infringement. As set forth in Paragraphs 124 through 128, any time a film
4 that was made with MEDUSA or ANYMA is communicated through a streaming service, the
5 communication of the film through the streaming service directly infringes the method of claim 9
6 of the '790 patent. Therefore, the licensing and delivery of a film on a digital video stream made
7 with MEDUSA or ANYMA to a third-party streaming service both has no substantial non-
8 infringing use and is especially adapted for infringement.

9 137. Because, as set forth above, and in particular, in Paragraphs 124 through 128 and
10 132, as an illustrative but nonexclusive example and on information and belief, Defendants
11 Lucasfilm and Disney Company create 3D animated faces using MEDUSA to be communicated
12 on streaming platforms other than Disney+ (including but not limited to HBO Max, YouTube,
13 Apple TV+, and Amazon Prime Video), and on information and belief, Defendants Disney
14 Company and Lucasfilm had actual notice and knowledge of the '790 patent at least as early as the
15 date on which Defendants received a copy of the original Complaint in this lawsuit, Defendants
16 Disney Company and Lucasfilm provided to those other streaming platforms a material
17 component of the infringing streaming systems, and especially made or adapted that material
18 component for use in the infringing streaming systems.

19 138. Because, as set forth above, and in particular, in Paragraphs 124 through 128 and
20 132, as an illustrative but nonexclusive example and on information and belief, Defendants
21 Lucasfilm and Disney Company create 3D animated faces using MEDUSA to be communicated
22 on streaming platforms other than Disney+ (including but not limited to HBO Max, YouTube,
23 Apple TV+, and Amazon Prime Video), and on information and belief, Defendants Disney
24 Company and Lucasfilm had actual notice and knowledge of the '790 patent at least as early as the
25 date on which Defendants received a copy of the original Complaint in this lawsuit, Defendants
26 Disney Company and Lucasfilm specifically intended these other streaming platforms to infringe
27 the '790 patent and knew that the other streaming platforms' acts constituted infringement.

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