

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

**INFERNAL TECHNOLOGY, LLC, and
TERMINAL REALITY, INC.,**

Plaintiffs,

v.

CRYTEK GMBH,

Defendant.

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C.A. No. 2:18-cv-00284-JRG-RSP

Jury Trial Demanded

PLAINTIFFS’ AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Infernal Technology, LLC and Terminal Reality, Inc. file this Amended Complaint against Crytek GmbH and allege as follows.

PARTIES

1. Plaintiff Infernal Technology, LLC (“Infernal Technology”) is a Texas Limited Liability Company located at 18484 Preston Road, Suite 102-189, Dallas, Texas 75252.

2. Plaintiff Terminal Reality, Inc. (“Terminal Reality”) is a Texas Corporation with its address at P.O. Box 271721, Flower Mound, Texas, 75027-1721. Terminal Reality, a video game development and production company, was formed in 1994 in Lewisville, Texas. Terminal Reality developed a number of video games, such as *Nocturne*, *Bloodrayne*, *Ghostbusters: The Video Game*, *Kinect Star Wars*, *The Walking Dead: Survival Instinct*, and many others. Terminal Reality also developed a video game graphics engine, called the “Infernal Engine,” used in many of Terminal Reality’s games. In addition to using the “Infernal Engine” in its own games, Terminal Reality successfully licensed the “Infernal Engine” to other video game developers for use in their

video games. On June 3, 2014, Terminal Reality granted Infernal Technology an exclusive license to a number of patents, including the patents asserted in this case, and the exclusive right to enforce same. Infernal Technology and Terminal Reality are collectively referred to herein as “Plaintiffs.”

3. Defendant Crytek GmbH (“Crytek”) is a corporation organized and existing under the laws of the Federal Republic of Germany, with its principal place of business at Grüneburgweg 16-18, 60322 Frankfurt am Main, Germany.

JURISDICTION AND VENUE

4. This is an action for patent infringement arising under the patent laws of the United States of America, Title 35, United States Code. This Court has original jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

5. Crytek is engaged in the business of developing, testing, publishing, distributing, and selling video games. Video games employ a video game engine which is software that provides game creators with the necessary set of features to build games quickly and efficiently. A game engine lays the software framework to build and create video games and provides features from animation to artificial intelligence. Game engines are responsible for rendering graphics, collision detection, memory management, and many more functions.

6. Crytek’s video games employ the “CryEngine” video game engine, which infringes one or more claims of the patents asserted in this amended complaint. The CryEngine is a video game engine that is capable of performing deferred rendering, deferred shading, and/or deferred lighting used in video games developed, published, distributed, and/or sold by Crytek. The video games developed, published, distributed, and/or sold by Crytek that use the CryEngine include, but are not limited to, Crysis, Crysis 2, Crysis 3, Warface, Ryse: Son of Rome, The Climb, and Robinson: The Journey. These games developed, published, distributed, and/or sold by Crytek

that use the CryEngine are referred to herein as the “Accused Games.” Crytek has developed, published, distributed, used, offered for sale and sold the Accused Games in the United States, including within this District.

7. The CryEngine and Accused Games are collectively referred to herein as the “Accused Instrumentalities.”

8. Rule 4(k)(2) of the Federal Rules of Civil Procedure allows a court to exercise personal jurisdiction over a defendant if (1) the plaintiff’s claim arises under federal law, (2) the defendant is not subject to jurisdiction in any state’s courts of general jurisdiction, and (3) the exercise of jurisdiction comports with due process. Rule 4(k)(2), therefore, serves as a federal long-arm statute, which allows a district court to exercise personal jurisdiction over a foreign defendant whose contacts with the United States, but not with the forum state, satisfy due process.

9. Since 2012 (when the six-year damages period begins), Crytek has been selling, offering to sell and using the Accused Instrumentalities in the United States constituting infringement of the patents asserted in this case. Since 2012, Crytek has been importing into the United States the Accused Instrumentalities also constituting infringement of the patents asserted in this case. Since 2012, Crytek, with knowledge of the patents asserted in this case, also has induced other persons to use the Accused Instrumentalities in the United States constituting infringement of the patents asserted in this case.

10. In particular, Crytek has entered into partnerships with Electronic Arts, Microsoft and Sony for these companies to sell Accused Games to customers in the United States. Crytek has made its Accused Games available for sale in the United States through established distribution channels by placing Accused Games into the stream of commerce with the expectation that they would be purchased in the United States through retail outlets such as Amazon. Crytek has

imported the Accused Games into the United States so that they could be sold in the United States through these distribution channels. Crytek has directed substantial marketing and promotion efforts and activities to persons in the United States to induce them to purchase and use the Accused Games. Since 2012, Crytek has demonstrated the Accused Games in the United States. Since 2012, Crytek also has engaged in substantial business dealings with AMD, Intel, and Nvidia to develop processors for use in video gaming consoles and personal computers to play Accused Games. Since 2012, therefore, Crytek consistently directed substantial infringing business activities at the United States.

11. Upon information and belief, Crytek has annual revenues in the many tens of millions of dollars. Thus, the burden on Crytek to defend this lawsuit in this district is not significant. Indeed, Crytek has prosecuted substantial litigation in federal court in California for the last several years. *See Crytek, GMBH v. Cloud Imperium Games Corp., et al.*, Case 2:17-cv-08937-DMG-FFM (C.D. Cal.). Any burden on Crytek is substantially outweighed by the interest of the United States in adjudicating the dispute and the interest of Infernal Technology, a United States company enforcing United States patent rights, in obtaining effective and convenient relief. Infernal Technology has a paramount interest in obtaining convenient and effective relief in a United States court.

12. Therefore, Rule 4(k)(2) of the Federal Rules of Civil Procedure, Crytek is subject to this Court's specific personal jurisdiction.

13. Plaintiff Crytek is a German corporation with its principal place of business in Frankfurt, Germany. Crytek, as a foreign corporation, is subject to suit in any judicial district.

THE PATENTS-IN-SUIT

14. On March 26, 2002 the United States Patent and Trademark Office issued United States Patent No. 6,362,822 (the “’822 Patent”) entitled “Lighting and Shadowing Methods and Arrangements for use in Computer Graphic Simulations.” A true and correct copy of the ’822 Patent is attached as Exhibit 1.

15. On June 13, 2006, the United States Patent and Trademark Office issued United States Patent No. 7,061,488 (the “’488 Patent”) entitled “Lighting and Shadowing Methods and Arrangements for use in Computer Graphic Simulations,.” The ’488 Patent is a continuation-in-part of the ’822 Patent. A true and correct copy of the ’488 Patent is attached as Exhibit 2. The ’822 and ’488 Patents are collectively referred to as the “Asserted Patents.”

16. Infernal Technology is the exclusive licensee of the ’822 and ’488 Patents and has the exclusive right to sue for and recover all past, present and future damages for infringement of the Asserted Patents.

17. The Asserted Patents are directed to methods and arrangements for use in rendering lighting and shadows in computer graphic simulation. As the specification of the ’822 Patent states, “[t]he present invention relates to computer graphics and, more particularly, to improved methods and arrangements for use in rendering lighting and shadows in computer graphic simulations, such as, for example, interactive computer graphics simulations of multi-dimensional objects.” ’822 Patent at 1:6-11. At the time of the invention of the ’822 patent, computer generated graphics were becoming popular due to increased processing capabilities of personal computers. *Id.* at 1:14-24. In particular, virtual three-dimensional (3D) worlds were being created for computer games that could be interactively explored by a user. These virtual 3D worlds consist of a plurality of 3D objects, which are typically modeled by one or more polygons. *Id.* at 1:25-38.

These objects are displayed to a user by projecting the objects onto a 2D frame as viewed from a particular viewpoint. *Id.*

18. The goal of 3D graphics rendering is to provide “a realistic, interactive virtual 3D world to the user.” *Id.* at 1:53-56. Because there is a limit to the amount of processing that a computer can provide, there has always been a need for faster, more efficient and higher quality means for producing the 3D to 2D renderings. *Id.* at 1:53-56. As the ‘822 patent explains, “simplifications or other compromises often need to be made in modeling a 3D world,” and “[o]ne of the unfortunate compromises made in the past, has been in the area of lighting and, more particularly, in the area of rendering shadows cast by lighted 3D objects.” *Id.* at 1:49-50, 57-59. This is because “[m]any shadow rendering processes have been considered too compute intensive for most lower-end computer applications.” *Id.* at 1:59-63. The Asserted Patents, therefore, sought to provide improved shadow rendering methods and arrangements that would “support real time interactive graphics on conventional PCs and the like, and allow for multiple light sources to be modeled in a more efficient and realistic manner.” *Id.* at 2:66-3:3. This improved rendering is accomplished by operating on rendered pixels in 2D space and using a separate buffer to accumulate light falling on each pixel from multiple light sources.

19. Thus, the invention of the Asserted Patents provides improved methods and arrangements for use in producing lighting and shadows that operate in the 2D domain, after the three-dimensional scene has been rendered. The claimed methods and arrangements were not well-understood, routine, and conventional activities commonly used in industry. The graphics industry immediately recognized the groundbreaking innovations described in the ‘822 Patent, commenting on the lighting and shadows rendered by Mr. Randel’s Nocturne game using the patented invention: “[a]ll the hype surrounding the lighting in the game was for a really good

reason -- Nocturne pushes videogame lighting to new heights, with shadows that are so inventive and interactive that you'll swear you're actually watching a film at times.”¹

CRYTEK'S KNOWLEDGE OF THE PATENTS-IN-SUIT

20. In February 2003, Crytek applied for a patent addressing a “Method and Computer Program the Product for Lighting a Computer Graphics Image and a Computer.” The patent application number was 10/360,036 (the “Crytek Patent Application”).

21. On April 7, 2005, during the prosecution of the Crytek Patent Application, the examiner at the United States Patent and Trademark Office (the “USPTO”) assigned to the Crytek Patent Application cited the ‘822 Patent as relevant prior art. The examiner rejected the pending claims of the Crytek Patent Application based upon the disclosure in the ‘822 Patent.

22. Crytek made amendments to the pending claims of the Crytek Patent Application in order to distinguish the invention claimed in the Crytek Patent Application from the ‘822 Patent. On September 22, 2005, the USPTO issued a notice of allowance relating to the pending claims of the Crytek Patent Application. On February 22, 2006, the USPTO issued United States Patent No. 7,006,090 based upon the Crytek Patent Application.

23. Not coincidentally, Martin Mittring, the named inventor of the invention disclosed in the Crytek ‘090 Patent, was instrumental in the development of the CryEngine which uses the deferred rendering technology disclosed in the ‘822 Patent.

THE ESTABLISHED VALIDITY OF THE PATENTS-IN-SUIT

24. On April 21, 2016, Electronic Arts Inc. (“Electronic Arts”) petitioned the U.S. Patent Trial and Appeal Board (“PTAB”) for *inter partes* review of the ‘822 and ‘488 Patents (IPR2016-00928, IPR2016-00929, IPR2016-00930Z). In the IPR petitions, Electronic Arts relied

¹ <http://www.ign.com/articles/1999/11/23/nocturne>.

upon the following prior art references: (1) Segal, *et al.*, “Fast Shadows and Lighting Effects Using Texture Mapping,” *Computer Graphics Proceedings*, Volume 26, Number 2, July, 1992 (“Segal”); and (2) McReynolds, “Programming with OpenGL: Advanced Rendering,” SIGGRAPH ’96 Course, August, 1996 (“McReynolds”). With respect to the ’822 Patent, Electronic Arts asserted that Claims 1-10 and 39-48 were unpatentable under 35 U.S.C. § 103 in view of Segal, and that Claims 1-20 and 39-48 were unpatentable under 35 U.S.C. § 103 as obvious over the combination of Segal and McReynolds. With respect to the ’488 Patent, Electronic Arts argued that Claims 1-10, and 27-62 were unpatentable under Section 103 in view of Segal and that Claims 1-20 and 27-36 were unpatentable under Section 103 in view of Segal in combination with McReynolds.

25. On October 25, 2016, the PTAB instituted IPR proceedings as to all challenged claims of the ’822 and ’488 Patents. In addition to the Segal and McReynolds references asserted by Electronic Arts in its petitions, the PTAB instituted IPR based on an additional prior art reference: James D. Foley, *et al.*, *COMPUTER GRAPHICS, PRINCIPLES AND PRACTICE*, 2^d ed. (1997) (“Foley”). Oral argument was heard by the PTAB on July 18, 2017. On October 19, 2017, and on October 23, 2017, the PTAB issued its Final Written Decisions in the IPR proceedings rejecting all of Electronic Arts’s challenges to the patentability of all claims of the ’822 and ’488 Patents in view of Segal, alone or in combination with McReynolds and/or Foley. Shortly thereafter, Electronic Arts settled Plaintiffs’ patent infringement claims and entered into a formal settlement agreement with Plaintiffs.

INFERNAL’S NOTICE TO CRYTEK OF ITS INFRINGEMENT

26. In May 2016, in connection with Infernal Technology’s patent infringement lawsuit against Electronic Arts, Infernal Technology served Crytek USA Corp., a now defunct subsidiary of Crytek, with a subpoena seeking documents relating to the CryEngine.

27. After Crytek USA was served with the subpoena, an attorney for Crytek responded and informed Infernal Technology's counsel that Crytek USA had shut down all business operations in the United States. Infernal Technology's counsel informed Crytek's counsel that "[t]he CryENGINE games *Crysis*, *Crysis 2*, and *Crysis 3* are among the accused instrumentalities Defendant EA has published, distributed, and/or sold." Infernal Technology's counsel provided Crytek's counsel with claim charts showing how the Crytek games infringed the Asserted Patents.

28. Notwithstanding this knowledge of the Asserted Patents and the evidence that the Crytek games infringed those patents, Crytek continued to sell these games and to develop and sell other infringing games.

CLAIM 1 -- INFRINGEMENT OF U.S. PATENT NO. 6,362,822

29. Plaintiffs incorporate paragraphs 1 through 28 as though fully set forth herein.

30. Upon information and belief, Crytek has been and is now directly infringing one or more of the method claims of the '822 Patent in the United States, by using those methods through, among other things, testing, displaying and demonstrating the Accused Instrumentalities in violation of 35 U.S.C. § 271(a). The Accused Instrumentalities perform the lighting and shadowing methods described and claimed in one or more of the method claims of the '822 Patent.

31. Each of the Accused Instrumentalities performs a shadow rendering method for use in a computer system.

32. Each of the Accused Instrumentalities provides observer data of a simulated multi-dimensional scene.

33. Each of the Accused Instrumentalities provides lighting data associated with a plurality of simulated light sources arranged to illuminate the simulated multi-dimensional scene, said lighting data including light image data.

34. For each of the plurality of light sources, each of the Accused Instrumentalities compares at least a portion of the observer data with at least a portion of the lighting data to determine if a modeled point within the scene is illuminated by the light source, and stores at least a portion of the light image data associated with the modeled point and the light source in a light accumulation buffer.

35. Each of the Accused Instrumentalities combines at least a portion of the light accumulation buffer with the observer data.

36. Each of the Accused Instrumentalities displays the resulting image data to a computer screen.

37. Because the CryEngine performs deferred rendering/shading/lighting, and/or physically based shading/rendering, all Accused Games employing the CryEngine infringe one or more of the method claims of the '822 Patent in a manner substantially the same as discussed above.

38. Crytek has been and is now indirectly infringing one or more of the method claims of the '822 Patent by inducing third-party end users of the Accused Games and third-party developers using the CryEngine to develop video games which directly infringe one or more of the method claims of the '822 Patent in violation of 35 U.S.C. § 271(b) by playing the Accused Games using the CryEngine.

39. Upon information and belief, Crytek has promoted use of the Accused Instrumentalities, which perform one or more methods claimed in one or more of the method claims of the '822 Patent, by third-party end users and third-party video game developers of the Accused Games and the CryEngine. Crytek has promoted such use of the Accused Instrumentalities with the knowledge that such use would result in performance of one or more

methods of one or more of the method claims of the '822 Patent. Performance of the lighting and shadowing methods claimed in one or more of the method claims of the '822 Patent is an essential part of the functionality of the Accused Instrumentalities. Upon information and belief, Crytek provides third-party end users with instructions regarding how to install and play Accused Games with the knowledge that doing so will result in performing one or more of the methods claimed in the method claims of the '822 Patent. Upon information and belief, Crytek has intended, and continues to intend, to induce third-party end users and video game developers to use the Accused Games or the CryEngine to perform one or more of the methods claimed in the method claims of the '822 Patent.

40. Upon information and belief, Crytek has had knowledge that its conduct of designing, developing, promoting, providing and selling the Accused Instrumentalities would cause third-party end users and third-party video game developers to perform one or more methods claimed in one or more of the method claims of the '822 Patent, or has been willfully blind to the possibility that its acts would induce such direct infringement. On information and belief, Crytek is or should be aware that the Accused Instrumentalities perform one or more of the lighting and shadowing methods of one or more of the method claims of the '822 Patent and, therefore, that third-party end users and video game developers using the Accused Instrumentalities will directly infringe the '822 Patent by using the Accused Instrumentalities.

41. Plaintiffs have been damaged by Crytek's activities infringing the '822 Patent.

42. As alleged above, Crytek has had actual notice of the existence of the '822 Patent since at least 2005 and has been intimately familiar with the nature and scope of the claims of the '822 Patent. Crytek has designed the Accused Games using the CryEngine for the specific purpose of performing one or more of the methods claimed in the method claims of the '822 Patent and

enabling users of these Accused Games and the Accused Games to perform those infringing methods. Crytek also has promoted use of the Accused Games performing the methods of the asserted method claims of the '822 Patent by customers and end users of the Accused Games with the knowledge that such use of the Accused Games would result in performance of the methods of the asserted method claims of the '822 Patent by customers and end users of the Accused Games. Crytek, by virtue of its prosecution of the Crytek Patent Application and other knowledge, has understood that there is no prior art that invalidates the asserted method claims of the '822 Patent. Crytek's knowing infringement of one or more of the method claims of the '822 Patent has been egregious and willful. Plaintiffs, therefor are entitled to enhanced damages pursuant to 35 U.S.C. § 284.

CLAIM 2 – INFRINGEMENT OF U.S. PATENT NO. 7,061,488

43. Plaintiffs incorporate paragraphs 1 through 28 as though fully set forth herein.

44. Upon information and belief, Crytek has been and is now directly infringing one or more of the method claims of the '488 Patent in the United States, by using those methods through, among other things, testing, displaying and demonstrating the Accused Instrumentalities in violation of 35 U.S.C. § 271(a). The Accused Instrumentalities perform the lighting and shadowing methods described and claimed in one or more of the method claims of the '488 Patent.

45. Each of the Accused Instrumentalities performs a shadow rendering method for use in a computer system.

46. Each of the Accused Instrumentalities provides observer data of a simulated multi-dimensional scene.

47. Each of the Accused Instrumentalities provides lighting data associated with a plurality of simulated light sources arranged to illuminate the simulated multi-dimensional scene, said lighting data including light image data.

48. For each of the plurality of light sources, each of the Accused Instrumentalities compares at least a portion of the observer data with at least a portion of the lighting data to determine if a modeled point within the scene is illuminated by the light source, and stores at least a portion of the light image data associated with the modeled point and the light source in a light accumulation buffer.

49. Each of the Accused Instrumentalities combines at least a portion of the light accumulation buffer with the observer data.

50. Each of the Accused Instrumentalities outputs the resulting image data.

51. Because the CryEngine performs deferred rendering/shading/lighting, and/or physically based shading/rendering, all Accused Games employing the CryEngine infringe one or more of the method claims of the '488 Patent in a manner substantially the same as discussed above.

52. Crytek has been and is now indirectly infringing one or more of the method claims of the '488 Patent by inducing third-party end users of the Accused Games and third-party developers using the CryEngine to develop video games which directly infringe one or more of the method claims of the '488 Patent in violation of 35 U.S.C. § 271(b) by playing the Accused Games using the CryEngine.

53. Upon information and belief, Crytek has promoted use of the Accused Instrumentalities, which perform one or more methods claimed in one or more of the method claims of the '488 Patent, by third-party end users and third-party video game developers of the

Accused Games and the CryEngine. Crytek has promoted such use of the Accused Instrumentalities with the knowledge that such use would result in performance of one or more methods of one or more of the method claims of the '488 Patent. Performance of the lighting and shadowing methods claimed in one or more of the method claims of the '488 Patent is an essential part of the functionality of the Accused Instrumentalities. Upon information and belief, Crytek provides third-party end users with instructions regarding how to install and play Accused Games with the knowledge that doing so will result in performing one or more of the methods claimed in the method claims of the '488 Patent. Upon information and belief, Crytek has intended, and continues to intend, to induce third-party end users and video game developers to use the Accused Games or the CryEngine to perform one or more of the methods claimed in the method claims of the '488 Patent.

54. Upon information and belief, Crytek has had knowledge that its conduct of designing, developing, promoting, providing and selling the Accused Instrumentalities would cause third-party end users and third-party video game developers to perform one or more methods claimed in one or more of the method claims of the '488 Patent, or has been willfully blind to the possibility that its acts would induce such direct infringement. On information and belief, Crytek is or should be aware that the Accused Instrumentalities perform one or more of the lighting and shadowing methods of one or more of the method claims of the '488 Patent and, therefore, that third-party end users and video game developers using the Accused Instrumentalities will directly infringe the '488 Patent by using the Accused Instrumentalities.

55. Plaintiffs have been damaged by Crytek's activities infringing the '488 Patent.

DEMAND FOR JURY TRIAL

56. Plaintiffs, under Rule 38 of the Federal Rules of Civil Procedure, request a trial by jury of any issues so triable.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs request the following relief:

1. A judgment in favor of Plaintiffs that Defendant has directly infringed, and/or has indirectly infringed by way of inducement, one or more claims of the Asserted Patents;
2. A judgment and order requiring Defendant to pay Plaintiffs damages adequate to compensate for infringement under 35 U.S.C. § 284, which damages in no event shall be less than a reasonable royalty for the use made of the inventions of the Asserted Patents, including pre- and post-judgment interest and costs, including expenses and disbursements;
3. A judgment and order requiring Defendant to pay Plaintiffs enhanced damages pursuant to 35 U.S.C. § 284; and
4. Any and all such further necessary relief as the Court may deem just and proper under the circumstances.

Dated: November 8, 2018

Respectfully submitted,

BUETHER JOE & CARPENTER, LLC

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**ATTORNEYS FOR PLAINTIFFS
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CERTIFICATE OF SERVICE

The undersigned hereby certifies that all counsel of record who are deemed to have consented to electronic service are being served with a copy of this document via the Court's CM/ECF system per Local rule CV-5.1(d) on this 8th day of November, 2018.

/s/ Eric W. Buether

Eric W. Buether