

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF GEORGIA**

3SHAPE A/S

Plaintiff,

v.

CARESTREAM DENTAL, LLC,
DENTAL IMAGING TECHNOLOGIES
CORP., AND DENTAL IMAGING
TECHNOLOGIES CORP. d/b/a DEXIS

Defendants.

C.A. No. 1:22-cv-01829-WMR

JOINT CLAIM CONSTRUCTION CHART

Pursuant to Patent Local Rule 6.3 and the Scheduling Order in this case (D.I. 090), Plaintiff 3Shape A/S (“3Shape”) and Defendants Carestream Dental, LLC, Dental Imaging Technologies Corp., and Dental Imaging Technologies Corp. d/b/a DEXIS (collectively, “Defendants”), submit the following Joint Claim Construction Charts for U.S. Patent Nos. RE48,221, 10,695,151, 10,076,146, and 11,368,667 (collectively, the “Asserted Patents”).

Pursuant to Patent Local Rule 6.3(b)(3), the parties agree that three (3) hours would be appropriate for the claim construction hearing. The parties also jointly propose allocating one (1) hour for a technology tutorial prior to the hearing. The

parties agree that the time permitted by the Court for both the claim construction hearing and technology tutorial be divided equally between the two sides.

1. Agreed Constructions

Claim Term	Agreed Construction
“3D environment” (’221 Patent, claims 1, 19, 33)	A constellation of physical objects each having a 3D geometry in a three-dimensional space
“determined one or more points on the tooth” (’151 Patent, claim 12, 13)	Determined for one or more points on the tooth
“texture information” (’151 Patent, claims 7 and 14-17)	Information comprising at least one of tooth color or surface roughness

2. U.S. Patent No. RE48,221

Claim Term	Plaintiff’s Proposed Construction	Plaintiff’s Identification of Intrinsic and Extrinsic Evidence	Defendants’ Proposed Construction	Defendants’ Identification of Intrinsic and Extrinsic Evidence
“physical 3D environment” (claims 1, 19, 33)	Plain and ordinary meaning.	1:55-63 2:8-12 4:4-9 8:52-60 9:49-58 13:23-29 16:6-10 FIGS. 1 and 4	Indefinite	1:55-63; 1:64-67; 2:08-13; 4:04-10; 8:52-60; 9:49-58; 12:31-34; 13:22-29; 15:46-55; and Expert Declaration of Dr. Bergeron

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
		U.S. Patent App. No. 13/991,513 prosecution history, Amendment filed Dec. 9, 2015. Expert Declaration of Dr. Xiong.		
“wherein the at least one motion sensor is a sensor that directly detects motion” (claims 1, 19)	Plain and ordinary meaning.	3:21-23 3:26-28 3:50-58 4:17-20 4:43-47 5:57-60 6:64-7:10 7:16-20 7:53-56 9:6-7 10:28-29 10:62-11:4 FIGS. 2a-2b	Indefinite	3:17-23; 4:43-46; 5:57-60; 6:64-7:10; 7:53-60; 8:07-10; 10:18-20; 10:62-11:04; 14:10-16; 14:20-22; July 30, 2019 Preliminary Amendment; October 28, 2019 Second Preliminary Amendment; and Expert Declaration of Dr. Bergeron

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
		PTAB-IPR2018-00197-5, Patent Owner's Preliminary Response to the Petition for IPR at 32-37, 42 PTAB-IPR2018-00197-11, Patent Owner's Response to the Petition IPR at 14-31 U.S. Patent App. No. 16/526,281 reissue prosecution history, Preliminary Amendment filed July 30, 2019 and Second Preliminary Amendment filed Oct. 28, 2019.		

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
		Expert Declaration of Dr. Xiong		
“the at least one display is adapted for visually representing the physical 3D environment” (claims 1, 19, 33)	Plain and ordinary meaning.	2:13-19 4:10-11 5:4-12 5:32-38 5:45-50 6:5-18 6:24-25 7:38-40 8:8-10 8:11-14 8:15-17 8:18-20 8:29-42 8:52-60 9:32-36 10:1-5 10:8-12 11:26-36 11:58-12:4 12:27-42 FIGS. 1-4	Indefinite	1:55-63; 13:22-29; and Expert Declaration of Dr. Bergeron

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
		Expert Declaration of Dr. Xiong		
“sensor fusion” (claim 22)	Plain and ordinary meaning.	7:16-21 14:14-16 Expert Declaration of Dr. Xiong	Indefinite	7:16-21; 14:14-16; July 30, 2019 Preliminary Amendment; October 28, 2019 Second Preliminary Amendment; and Expert Declaration of Dr. Bergeron
“the at least one motion sensor and/or the user-interface element are utilized in a workflow” (claim 28)	the system is configured to utilize the at least one motion sensor and/or the user-interface element in a sequence of tasks implemented in software	7:36-60 11:4 12:26-44 FIG. 4 Expert Declaration of Dr. Xiong	Indefinite	7:36-52; 7:53-60; July 30, 2019 Preliminary Amendment; October 28, 2019 Second Preliminary Amendment; and Expert Declaration of Dr. Bergeron

3. U.S. Patent No. 10,695,151

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
"shape data" (claims 1, 13, 14)	Plain and ordinary meaning.	Abstract 2:23-25 2:35-36 2:46-50 2:64-3:2 3:13-21 8:47-51 8:58-62 9:4-10 9:53-55 10:29-31 10:45-48 11:38-59 12:51-53 14:37-39 15:50-16:51 FIGS. 1-8D Expert Declaration of Dr. Xiong and/or Dr. Shah	Data expressing the shape of the tooth	2:32-36; 2:46-50; 9:01-07; 11:57-59; 12:48-53; Expert Declaration of Dr. Schonfeld

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
“texture data” (claims 1-3, 7, 10, 13-15)	Plain and ordinary meaning.	2:32-34 2:39-50 3:9-12 3:17-21 4:20-22 4:27-45 4:51-56 4:59-6:4 7:34-38 8:15-17 8:24-32 8:50-51 8:58-62 11:51-62 12:48-58 14:10-16 14:42-44 15:50-17:17 FIGS. 1-9B Expert Declaration of Dr. Xiong and/or Dr. Shah	Data expressing the texture of the tooth	2:32-36; 2:46-50; 8:52-62; 9:01-07; Expert Declaration of Dr. Schonfeld

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
		Edward Angel, Dave Shreiner, Interactive Computer Graphics (6th Ed.) Computer Graphics Principles and Practice (3rd Ed.)		
"deriving a certainty score" (claim 1)	determining an accuracy value based on the tooth shade value, the texture data, and/or texture information	6:25-27 6:28-33 6:37-48 6:52-60 6:66-7:38 7:58-63 8:16-23 9:17-19 12:63-67 13:32-50 13:66-14:9 14:16-34 18:33-19:11 FIGS. 1-9	Plain and ordinary meaning.	6:25-27; 9:17-19; 6:28-33; 6:52-56; 6:66-7:06; 18:27-32; 18:33-38; Expert Declaration of Dr. Schonfeld

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
		Expert Declaration of Dr. Xiong and/or Dr. Shah		
“the certainty measure” (claim 7)	measure of the certainty score	6:66-7:38 13:32-50 13:66-14:9 14:16-34 18:33-19:11 FIGS. 2-4 Expert Declaration of Dr. Xiong and/or Dr. Shah	Indefinite	Expert Declaration of Dr. Schonfeld
“the sub-scan texture information” (claim 7)	texture information (e.g., color information or surface roughness information) of a sub-scan	2:37-38 3:4-8 3:9-12 4:27-32 4:35-40 4:41-45 12:41-53 15:5-27 15:50-17:17 16:44-51 20:48-50	Indefinite	Expert Declaration of Dr. Schonfeld

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
		FIGS. 1-9B Expert Declaration of Dr. Xiong and/or Dr. Shah		
"the amount of texture information" (claim 7)	an amount of texture information	7:31-33 7:34-38 FIGS. 1-9B Expert Declaration of Dr. Xiong and/or Dr. Shah	Indefinite	Expert Declaration of Dr. Schonfeld
"the texture information" (claim 11)	the texture data	2:32-34 2:39-45 2:46-50 3:9-12 4:20-22 4:33-40 4:41-45 4:51-56 5:14-19 7:9-13 7:34-38	Indefinite	2:36-38; 4:20-61; 16:33-51; Claims 7, 14-17; Expert Declaration of Dr. Schonfeld

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
		8:24-32 8:15-17 8:26-32 8:50-51 8:58-62 9:50-60 11:51-67 12:48-51 12:54-58 14:10-15 14:42-47 20:3-7 20:48-51 FIGS. 1-9B Expert Declaration of Dr. Xiong and/or Dr. Shah		
“wherein the tooth shade profile comprises a one or more tooth shade regions on the tooth surface where an	Plain and ordinary meaning.	2:57-3:2 3:22-59 3:60-4:19 7:28-30 12:63-67 13:1-32	Indefinite	Expert Declaration of Dr. Schonfeld

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
average tooth shade is derived for each region from tooth shade values determined for a number of points within the region” (claim 13)		13:51-66 14:16-34 20:55-59 FIGS. 2-4 Expert Declaration of Dr. Xiong and/or Dr. Shah		
“geometry information” (claim 14)	Plain and ordinary meaning.	2:46-56 3:3-8 8:42-46 8:47-51 8:52-57 10:43-48 11:31-37 15:5-17:11 20:61-67 FIGS. 1-9B Expert Declaration of Dr. Xiong and/or Dr. Shah	Information concerning the geometry of the tooth	11:31-37; Expert Declaration of Dr. Schonfeld

4. U.S. Patent No. 11,076,146

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
“a pattern generator configured to generate, using a light source, a probe light with a plurality of configurations in the form of a time-varying illumination pattern” (claim 1)	Plain and ordinary meaning. <i>If subject to 35 U.S.C. § 112(6):</i> Function: “generate, using a light source, a probe light with a plurality of configurations in the form of a time-varying illumination pattern” Structure: “a segmented LED with control electronics” (’146 patent at 8:10-36, FIG. 3b, 28:14-23)	3:9-14 3:25-46 3:59-4:9 7:65-67 8:9-38 8:38-57 9:25-37 10:33-37 10:57-11:7 12:1-5 12:29-50 13:14-38 13:56-14:41 21:6-13 21:36-50 28:4-23 29:47-30:6 33:46-36:48 37:56-59 FIGS. 2, 3a, 3b, and 8-12	Subject to 35 U.S.C. § 112(6) Function: “generate, using a light source, a probe light with a plurality of configurations in the form of a time-varying illumination pattern” Structure: “a transparent wheel with an opaque mask in the form of spokes pointing radially from the wheel center and rotated with a motor” (’146 patent at 28:5-13, FIG. 3a, 21:6-13)	21:06-13; 28:05-13; 8:38-57; 4:59-65; Fig. 3A Expert Declaration of Dr. Schonfeld

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
	“at least one translucent and/or transparent pattern element with a motor” (’146 patent at 8:38-57) “a transparent wheel with an opaque mask in the form of spokes pointing radially from the wheel center and rotated with a motor” (’146 patent at 8:42-46, 13:14-16, 28:5-13, FIG. 3A) “a glass plate with an opaque mask with a motor” (’146 patent at 8:46-57)	Expert Declaration of Dr. Xiong and/or Dr. Vakoc		

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
	“a Ronchi ruling with a motor” (’146 patent at 13:29-31.) “an array of LEDs with a controller” (’146 patent at 13:34-36, FIG. 3B.) “a LCD or DLP based projector” (’146 patent at 13:37-38)			
“time-varying illumination pattern” (claims 1, 13, 15, 21, 27, 29)	Plain and ordinary meaning.	3:9-14 3:59-4:4 4:59-67 5:1-8 8:10-57 10:57-11:7 12:29-50 13:14-38 14:7-41 15:15-24 17:16-33	A pattern that varies in time, i.e., the embedded spatial structure varies in time	3:11-14; 4:59-65; 8:13-18; 8:38-57; 38:29-33; 38:37-41; 40:11-17; 40:21-24; Expert Declaration of Dr. Schonfeld

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
		21:36-39 27:59-28:27 29:47-30:6 33:46-36:48 FIGS. 2, 3a, 3b, and 8-12 Expert Declaration of Dr. Xiong and/or Dr. Vakoc		
“a tip configured to be inserted into the oral cavity” (claim 1)	Plain and ordinary meaning.	5:51-55 19:14-33 20:30-35 27:16-27 27:44-45 31:46-32:25 36:49-60 FIGS. 1, 4-6, and 17 Expert Declaration of Dr. Xiong, Dr. Vakoc, and/or Dr. Shah	Indefinite	5:51-55; 19:12-20; 23:04-09; 27:22-28; 34:25-31; Expert Declaration of Dr. Schonfeld

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
“wherein the intraoral scanner is wireless” (claim 1)	Plain and ordinary meaning.	8:59-9:23 36:50-60 38:10-15 38:16-22 38:23-25 39:21-26 39:27-40:5 40:6-8 FIG. 17 Microsoft Computer Dictionary, Fifth Ed., 2002 at 572 (“wireless <i>adj.</i> Of, pertaining to, or characteristic of communications that take place without the use of interconnecting wires or cables, such as by radio, microwave, or infrared light”).	Indefinite	9:16-23; 38:10-25; 39:21-40:8; Expert Declaration of Dr. Schonfeld

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
		Expert Declaration of Dr. Xiong, Dr. Vakoc, and/or Dr. Shah		
“optical path” (claims 1, 21)	Plain and ordinary meaning.	3:25-33 5:32-39 6:45-49 8:50-53 26:64-27:7 27:20-55 33:46-36:48 FIGS. 1, 2, and 4-11 Expert Declaration of Dr. Xiong, Dr. Vakoc, and/or Dr. Shah	The path of the light from the light source to the object and back to the camera	27:48-55; 5:32-39; Expert Declaration of Dr. Schonfeld
“high-speed camera” (claims 1, 16, 22)	Plain and ordinary meaning.	2:46-47 5:59-62 8:1-8 10:33-44 11:15-25 17:53-60	A camera accommodating multiple A/D converters per line of pixels	8:04-08; Expert Declaration of Dr. Schonfeld.

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
		38:42-45 Boyd Fowler, Abbas El Gamal & David Yang, Techniques for Pixel Level Analog to Digital Conversion (1998) Phantom Flex, Data Sheet, Vision Research (2010) Fastcam BC2 HD, High Speed Camera System for Broadcast Application, Photron HiSpec 1, Innovative Low-Light High-Speed Camera, Fastec Imaging (2012)		

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
		Expert Declaration of Dr. Xiong and/or Dr. Vakoc		
“switching on and off the at least three monochromatic light sources” (claim 6)	switching on and off one or more of the at least three monochromatic light sources	20:36-43 20:47-57 21:14-22 32:17-25 Expert Declaration of Dr. Xiong and/or Dr. Vakoc	Plain and ordinary meaning.	21:25-50; Expert Declaration of Dr. Schonfeld
“wherein the probe light is directed towards the object in a direction substantially parallel with the longitudinal axis of the tip” (claim 8)	Plain and ordinary meaning.	5:40-50 19:12-33 22:41-47 23:14-29 25:1-7 27:48-55 Expert Declaration of Dr. Xiong and/or Dr. Vakoc	Indefinite	5:40-42; 19:12-14; 23:16-29; Expert Declaration of Dr. Schonfeld.
“data for the 3D geometry”	the data for the 3D geometry.	2:43-45 4:28-35 25:1-26 38:10-15	Indefinite	38:10-22; 38:26-28; 39:21-40:05; Expert

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
(claims 12, 24)		Expert Declaration of Dr. Xiong and/or Dr. Vakoc		Declaration of Dr. Schonfeld
“a temporal correlation measure is computed with sensor signals, in the at least one camera” (claims 13, 27)	a temporal correlation measure is computed from sensor signals recorded by the at least one camera	10:33-48 11:15-18 13:40-55 15:16-34 28:29-37 Expert Declaration of Dr. Xiong and/or Dr. Vakoc	Plain and ordinary meaning	5:63-67; 9:38-57; 10:33-36; 10:54-56; 11:15-25; 28:29-37; 28:38-40; 38:37-41; 40:21-24; Expert Declaration of Dr. Schonfeld
“the data for the 3D geometry” (claim 21)	data for the 3D geometry	2:43-45 4:28-35 25:1-26 38:10-15 Expert Declaration of Dr. Xiong and/or Dr. Vakoc	Indefinite	39:17; 39:21-40:8 Expert Declaration of Dr. Schonfeld

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence
“a tip of intraoral scanner inserted into the oral cavity” (claim 21)	Plain and ordinary meaning.	5:51-55 19:14-33 20:30-35 27:16-28 27:44-45 31:46-32:25 36:49-60 FIG. 17 Expert Declaration of Dr. Xiong, Dr. Vakoc, and/or Dr. Shah	Indefinite	5:51-55; 19:12-20; 23:04-09; 27:22-28; 34:25-31; Expert Declaration of Dr. Schonfeld

5. U.S. Patent No. 11,368,667

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence ¹
“a pattern generator configured to generate, using a light source, a probe light with a plurality of configurations in the form of a time-varying illumination pattern” (claims 1, 14, 26)	Plain and ordinary meaning. <i>If subject to 35 U.S.C. § 112(6):</i> Function: “generate, using a light source, a probe light with a plurality of configurations in the form of a time-varying illumination pattern” Structure: “a segmented LED with control electronics” (’667	3:12-17 3:28-49 3:62-4:7 4:64-67 8:1-3 8:11-40 8:40-59 9:27-40 10:28-33 10:53-11:3 11:64-12:1 12:26-47 13:14-38 13:56-14:41 21:34-48 28:14-38 29:46-30:6 33:49-36:51 FIGS. 2, 3a, 3b, and 8-12	Subject to 35 U.S.C. § 112(6) Function: “generate, using a light source, a probe light with a plurality of configurations in the form of a time-varying illumination pattern” Structure: “a transparent wheel with an opaque mask in the form of spokes pointing radially from the wheel center and rotated with a motor” (’146 patent	21:06-13; 28:05-13; 8:38-57; 4:59-65; Fig. 3A ; Expert Declaration of Dr. Schonfeld

¹ Defendants’ patent citations are to the ’146 patent unless specified otherwise.

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence ¹
	patent at 8:11-38, FIG. 3b, 28:14-23) “at least one translucent and/or transparent pattern element with a motor” (’667 patent at 8:40-59) “a transparent wheel with an opaque mask in the form of spokes pointing radially from the wheel center and rotated with a motor” (’667 patent at 8:45-48, 13:14-16, 28:4-12, FIG. 3A) “a glass plate with an opaque mask with	Expert Declaration of Dr. Xiong and/or Dr. Vakoc	at 28:5-13, FIG. 3a, 21:6-13)	

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence¹
	a motor” (’667 patent at 8:48-60) “a Ronchi ruling with a motor” (’667 patent at 13:28-31.) “an array of LEDs with a controller” (’667 patent at 13:34-36, FIG. 3B.) “a LCD or DLP based projector” (’667 patent at 13:37-38)			
“time-varying illumination pattern” (claims 1, 14, 26)	Plain and ordinary meaning.	3:10-17 3:62-4:7 4:61-67 5:3-10 8:11-59 10:53-11:3 12:26-48 13:14-38	A pattern that varies in time, i.e., the embedded spatial structure varies in time	3:11-14; 4:59-65; 8:13-18; 8:38-57; Expert Declaration of Dr. Schonfeld

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence¹
		14:7-41 15:15-24 17:16-33 21:34-37 27:58-28:27 29:46-30:6 33:49-36:51 FIGS. 2, 3a, 3b, and 8-12 Expert Declaration of Dr. Xiong and/or Dr. Vakoc		
“a tip configured to be inserted into the oral cavity” (claims 1, 14, 26)	Plain and ordinary meaning.	5:51-55 19:13-31 20:28-33 27:14-26 27:43-44 31:50-32:29 36:52-63 FIGS. 1, 4, 5, 6, and 17	Indefinite	5:51-55; 19:12-20; 23:04-09; 27:22-28; 34:25-31; Expert Declaration of Dr. Schonfeld.

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence¹
		Expert Declaration of Dr. Xiong and/or Dr. Shah		
“optical path” (claims 1, 14, 26)	Plain and ordinary meaning.	3:28-36 5:34-41 6:47-51 8:52-55 26:62-27:5 27:19-54 33:50-36:51 FIGS. 1, 2, and 4-11 Expert Declaration of Dr. Xiong and/or Dr. Vakoc	The path of the light from the light source to the object and back to the camera	27:48-55; 5:32-39; Expert Declaration of Dr. Schonfeld.
“wherein the intraoral scanner is wireless” (claims 1, 14, 29)	Plain and ordinary meaning.	8:61-9:26 36:53-63 38:7-22 38:56-39:12 40:37-45 Fig. 17 Microsoft Computer Dictionary, Fifth	Indefinite	9:16-23; 38:7-22 ('667 Patent); 40:37-45 ('667 Patent); Expert Declaration of Dr. Schonfeld.

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence ¹
		Ed., 2002 at 572 (“wireless <i>adj.</i> Of, pertaining to, or characteristic of communications that take place without the use of interconnecting wires or cables, such as by radio, microwave, or infrared light”). Expert Declaration of Dr. Xiong and/or Dr. Vakoc		
“switching on and off the at least three monochromatic light sources” (claims 3, 20)	switching on and off one or more of the at least three monochromatic light sources	20:34-40 20:45-55 21:12-20 32:14-20 FIG. 6	Plain and ordinary meaning.	21:25-50; Expert Declaration of Dr. Schonfeld; February 21, 2022 Preliminary Amendment and Claims.

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence¹
		Expert Declaration of Dr. Xiong and/or Dr. Vakoc		
“wherein the optical system is [further] configured to direct the probe light towards the object in a direction substantially parallel with the longitudinal axis of the tip” (claims 5, 22)	Plain and ordinary meaning.	5:42-52 19:10-31 22:39-45 23:12-27 24:65-25:1 27:47-54 Expert Declaration of Dr. Xiong and/or Dr. Vakoc	Indefinite	5:40-42; 19:12-14; 23:16-29; Expert Declaration of Dr. Schonfeld; February 21, 2022 Preliminary Amendment and Claims.
“data for the 3D geometry” (claims 8, 15)	the data for the 3D geometry	2:46-48 4:30-37 24:65-25:24 25:32-26:8 38:7-22	Indefinite	38:7-26 ('667 Patent); 39:7-9 ('667 Patent); 39:14-16 ('667 Patent); 40:37-45 ('667 Patent); Expert Declaration of Dr. Schonfeld; February 21, 2022 Preliminary

Claim Term	Plaintiff's Proposed Construction	Plaintiff's Identification of Intrinsic and Extrinsic Evidence	Defendants' Proposed Construction	Defendants' Identification of Intrinsic and Extrinsic Evidence¹
		Expert Declaration of Dr. Xiong and/or Dr. Vakoc		Amendment and Claims.

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CERTIFICATE OF SERVICE

I hereby certify on this 2nd day of December, 2022, the foregoing was electronically filed with the Clerk of the Court using the CM/ECF System, which will send a notification of such filing to all counsel of record.

/s/ Puja Patel Lea

Puja Patel Lea

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF GEORGIA**

3SHAPE A/S

Plaintiff,

v.

C.A. No. 1:22-cv-01829-WMR

CARESTREAM DENTAL, LLC,
DENTAL IMAGING
TECHNOLOGIES CORP., and
DENTAL IMAGING
TECHNOLOGIES CORP. d/b/a
DEXIS

Defendant.

**PLAINTIFF 3SHAPE A/S'
OPENING BRIEF ON CLAIM CONSTRUCTION**

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A	2019-05-29 Final Written Decision for Case IPR2018-00197
B	2018-08-20 Patent Owner's Response to the Petition for <i>Inter Partes Review</i> for U.S. Patent No. 9,329,675
C	Excerpt of File History for U.S. RE48,221
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E	FastCam BC2 HD: High Speed Camera System for Broadcast Application
F	Fastec Imaging: High Speed Imaging in the Palm of Your Hand
G	Vision Search Phantom Flex Data Sheet (Rev Oct. 2010)
H	Excerpt of Microsoft Computer Dictionary, Fifth Edition

TABLE OF ABBREVIATIONS

<u>Abbreviation</u>	<u>Description</u>
'221 Patent	U.S. Patent No. RE48,221
'151 Patent	U.S. Patent No. 10,695,151
'146 Patent	U.S. Patent No. 11,076,146
'667 Patent	U.S. Patent No. 11,368,667
'675 Patent	U.S. Patent No. 9,329,675
2D	Two-dimensional
3D	Three-dimensional
3Shape	Plaintiff 3Shape A/S
Asserted Patents	U.S. Patent Nos. RE48,221, 10,695,151, 11,076,146, and 11,368,667
Defendants	Carestream Dental, LLC, Dental Imaging Technologies Corp., Dental Imaging Technologies Corp. d/b/a DEXIS
IPR	<i>Inter partes</i> review
POSITA	Person of ordinary skill in the art
PTAB	Patent Trials and Appeals Board

I. INTRODUCTION

Almost every disputed claim term fall into one of two categories: (i) no construction is necessary or (ii) minor wording clarifications are needed. The terms Defendants desire to construe are not technical, idiosyncratic words. The claims already set forth understandable meanings using plain terminology. The jury will have no difficulty understanding and applying these claims.

Recognizing that the claims are easily understood—and readily applicable to their infringing products—Defendants ignore the context of the claim wording and focus on claim fragments in isolation to manufacture noninfringement arguments. Contrary to nearly every canon of claim construction, Defendants ask the Court to rewrite the claims, ignore definitions in the body of the claim, render claim terms superfluous or redundant, import limitations from the specification, and exclude preferred embodiments. The Court should reject Defendants’ proposals; no constructions are necessary.

II. CLAIM CONSTRUCTION STANDARD

Claim interpretation is a matter of law. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976-77 (Fed. Cir. 1995). In construing claims, district courts give claims “the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention... .” *Phillips v. AWH Corp.*, 415 F.3d

1303, 1313 (Fed. Cir. 2005). “[T]he claims themselves provide substantial guidance as to the meaning of particular claim terms,” as does the context of the surrounding claim language. *Id.* at 1314. Claims are part of a “fully integrated written instrument” and, therefore, “must be read in view of the specification, of which they are a part.” *Id.* at 1315. Nevertheless, the Court must be careful not to read a limitation into a claim from the specification. *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 904 (Fed. Cir. 2004).

III. OVERVIEW OF THE PATENTS

’221 Patent. The ’221 patent discloses a hand-held optical scanner for scanning a 3D environment that includes a motion sensor for remotely controlling a display. *See, e.g.*, ’221 Patent, 1:56-67. In particular, the ’221 patent discloses using the motion detected by the motion sensor to control (*e.g.*, rotate) the 3D environment represented on the display. *See id.*, 3:8-32. The advantages of this remote control functionality include avoiding the risk of cross-contamination from user interfaces (*e.g.*, mice, touch screens) and providing seamless intraoral scanning and control of the virtual model display via a convenient user interface. *Id.*, 4:13-28.

’151 Patent. The ’151 patent discloses methods and systems for determining the shade of a patient’s tooth. *See, e.g.*, ’151 Patent, 2:6-16. In

particular, the '151 patent uses a digital 3D representation of the tooth that includes shape data and texture data to determine a tooth shade value for at least one point on the tooth based on the texture data. *See, e.g., id.*, 2:6-31. This tooth shade determination allows a dental restoration to be designed and manufactured based on the shape and shade of the patient's natural teeth, so the restoration aesthetically matches the patient's natural smile. *See, e.g., id.*, 1:23-31.

'146 and '667 Patents. The '146 and '667 patents disclose inventions related to a 3D intraoral scanner apparatus and method for optical 3D scanning of intraoral objects including teeth and surrounding soft tissue. *See, e.g., '146 Patent*, 2:38-3:6.¹ The 3D scanning techniques described include determining 3D geometry and obtaining the color of the scanned surfaces. *See id.*, 1:44-45, 20:46-57. For example, the specification discloses the use of a time-varying illumination pattern transmitted onto an object to determine the 3D geometry of the object. *See, e.g., id.*, 3:59-4:5. The patents also disclose capturing images of an object illuminated with different colors at different times and combining the different colors to obtain the color of the surface of the object. *See, e.g., id.*, 21:6-50.

Further, the '146 and '667 patents also disclose that the 3D scanner can be

¹ The '146 and '667 patents have substantially identical drawings and specifications, and so all citations herein are to the '146 patent only unless a particular distinction between the patent's disclosures warrants mentioning.

wireless to “simplify handling and operation of the scanner and increasing accessibility under difficult scanning situations,” such as intraoral scanning.” ’146 Patent, 9:17-22. The patents recognize, however, that such wireless capability “may further increase the need for local data processing to avoid wireless transmission of raw 3D data.” *Id.* at 9:22-24.

IV. AGREED UPON TERMS

3Shape respectfully requests the Court adopt the agreed upon constructions.

Claim Term	Agreed Construction
“3D environment” (’221 Patent, Cls. 1, 19, 33)	A constellation of physical objects each having a 3D geometry in a three-dimensional space
“determined one or more points on the tooth” (’151 Patent, Cls. 12, 13)	Determined for one or more points on the tooth
“texture information” (’151 Patent, Cls. 7, 14-17)	Information comprising at least one of tooth color or surface roughness

V. U.S. PATENT NO. RE48,221

A. “physical 3D environment” (cls. 1, 19, 33)

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
Plain and ordinary meaning.	Indefinite

The term “physical 3D environment” is definite and should be afforded its plain and ordinary meaning. A POSITA, reading the term in the context of the claims and specification and the claims would understand this term to refer to the physical environment in which the scanner operates.

The plain and ordinary understanding of “physical 3D environment” is evident from the claim language itself. For example, claim 1 recites “scanning a 3D environment” and “performing at least one scanning action *in* a physical 3D environment,” thus showing the “3D environment” is what is scanned and the “physical 3D environment” is the location where the scanning occurs.

Further, the specification confirms this plain and ordinary understanding. For example, the specification discloses that:

“The system may be adapted for switching between performing the at least one action *in the physical 3D environment*, and remotely controlling the view with which *the 3D environment is represented on the display*.”

’146 Patent, 1:64-67 (emphasis added throughout unless noted otherwise); *see also* cl. 19 (reciting similar subject matter). In fact, both 3Shape’s and Defendants’ identified passages in the specification for this term confirm the plain and ordinary meaning. *See, e.g.*, ’146 Patent, 1:55-67; 2:08-13; 4:04-10; 8:52-60; 9:49-58; 12:31-34; 13:22-29; 15:46-55.

Defendants cannot establish by clear and convincing evidence that this term is indefinite. The plain meaning of the term is readily apparent from the claims and specification, and Defendants’ indefiniteness allegation should be rejected.

B. “wherein the at least one motion sensor is a sensor that directly detects motion” (cls. 1, 19)

Plaintiff's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning.	Indefinite

The claimed motion sensor is a sensor that “directly detects motion.” A POSITA, reading the term in the context of the intrinsic record, would readily understand that this language distinguishes between a motion sensor that directly detects motion and a sensor that may indirectly detect motion. For example, a sensor may indirectly detect motion by directly detecting a different quantity, like position or orientation, from which motion information can be derived. This claim language covers only a sensor that directly detects motion. It is definite.

The '221 patent is a reissue of the '675 patent, which was invalidated in an IPR proceeding. *See* Ex. A, 2. During that proceeding, 3Shape attempted to distinguish claims reciting a “motion sensor” from a prior art reference’s disclosure of a position sensor. *See* Ex. B, 15-31 (providing pages of argument regarding distinctions between motion sensors and position sensors). In finding the claims unpatentable, the PTAB extensively discussed the scope of “motion sensor” under the broadest reasonable interpretation standard (as this was one of the primary disputes of the IPR proceeding) finding it “does not exclude sensors that collect position and orientation data.” *See* Ex. B, 14-24, 51-54.

The reissue application leading to the '221 patent was filed shortly after the

IPR ruling finding the '675 claims unpatentable ruling. '221 Patent, Cover. The reissue application amended claim 1 to add, *inter alia*, “the at least one motion sensor is a sensor that directly detects motion.” Ex. C, 3. When addressing the support for this limitation, 3Shape identified claims 1 and 4 of the '675 patent, as well as passages from the specification referring only to “motion sensors” (and not any of the language that could be interpreted to include position sensors). *See* Ex. C, 12 (referring, *e.g.*, to the '675 patent at 6:46-50, which describes accelerometers, gyroscopes, and magnetometers as examples of motion sensors).

In the context of the intrinsic record, it is apparent that “the at least one motion sensor is a sensor that directly detects motion” was recited to distinguish over sensors that do not “directly detect” motion, such as position sensors or other sensors from which motion may be derived. This term is definite.

VI. U.S. PATENT NO. 10,695,151

A. “shape data” (cls. 1, 13, 14) / “texture data” (cls. 1-3, 7, 10, 13-15)

Plaintiff's Construction	Defendants' Construction
Plain and ordinary meaning.	Data expressing the shape of the tooth / Data expressing the texture of the tooth

The plain meaning of “shape data” and “texture data” is readily understood from the claims and specification. Starting with the claims, the independent claims of the '151 patent (claims 1, 13, and 14) explain that the “shape data” and the

“texture data” relate to the digital 3D representation of the tooth. *See* ’151 Patent, cls. 1, 13, 14 (“digital 3D representation of the tooth, where the digital 3D representation comprises shape data and texture data for the tooth.”). With respect to “shape data,” the plain and ordinary meaning is evident from the claim language itself, namely that it is data referring to the shape of the digital 3D representation.

Similarly, the plain and ordinary meaning of “texture data” is evident from the claim language itself. In addition to explaining that the “texture data” relates to the digital 3D representation of a tooth, the independent claims further describe that “texture data” is used to “determin[e] a tooth shade value for at least one point on the tooth.” ’151 Patent, cls. 1, 13, 14. From this context, it is readily apparent that texture data is referring at least to the color of the digital 3D representation, as the texture data is being used to determine a tooth shade value. As such, “texture data” does not require further construction beyond its plain meaning. The specification further confirms the plain meaning of “shape data” and “texture data” is consistent with the claim recitations. *See, e.g., id.*, 2:33-38, 5:51-54.

There does not appear to be a genuine dispute about the meaning or scope of this term. Rather, Defendants simply seek to interject their preferred wording for that of the claim drafter. This is improper. *See, e.g., Luminara Worldwide, LLC v. Liown Elecs. Co. Ltd.*, No. 14-cv-3103, 2016 WL 706190, at *12 (D. Minn. Feb.

22, 2016) (“Replacing ‘chaotic’ with ‘unpredictable’ ... simply substitutes equally-understandable words for the inventor's already-understandable claim language and is unnecessary.”) Such rephrasing is needlessly introduces complexity and is unhelpful to the fact finder. *See Kimberly-Clark Corp. v. Extrusion Grp., LLC*, No. 1:18-cv-04754, 2021 WL 302889, at *5 (N.D. Ga. Jan. 29, 2021) (rejecting defendant’s construction because it “merely replaces the claim language with a similar phrase that does not improve comprehension”).

Further, Defendants’ constructions render the surrounding claim language superfluous by specifying that the shape and texture data is “of the tooth.” For example, claim 1 recites: “the digital 3D representation comprises shape data and texture data for the tooth.” ’151 Patent, cl. 1. Defendants’ constructions would render the claim language “for the tooth” superfluous. *Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) (reversing a construction that rendered additional claim language superfluous). Accordingly, Defendants’ constructions should be rejected.

B. “deriving a certainty score” (claim 1)

Plaintiff’s Construction	Defendants’ Construction
determining an accuracy value based on the tooth shade value, the texture data, and/or texture information	Plain and ordinary meaning

3Shape’s construction of “deriving a certainty score” helps clarify the proper scope and meaning of the term as properly understood in the context of the claims and specification. Starting with the claims, the claims explain that the certainty score is used to “express[] the certainty of the determined tooth shade value.” *See* ’151 Patent, cl. 1. The specification provides further clarity as to what it means to “express[] the certainty of the determined tooth shade value.”

As an initial matter, the specification explains that deriving a certainty score is advantageous because it provides a measure of how accurate a tooth shade value is, which can then be used to indicate whether the tooth shade value is acceptable to determine the tooth shade color or whether further scanning is required to obtain a more precise tooth shade value. *See, e.g., id.*, 6:28-36, 6:52-7:6. The specification then explains how the certainty score can be derived based on tooth shade value, texture data, or texture information. For example, with respect to *tooth shade value*, the specification explains in some embodiments the certainty score expresses “the certainty of the *determined tooth shade value*.” *Id.*, 6:25-27. With respect to *texture data* and *texture information*, the specification explains in one embodiment that a measure of the certainty score “relates to the amount of texture information used to derive the texture data at the point,” with less texture information indicating a less reliable tooth shade value. *Id.*, 7:31-38. 3Shape’s

proposed construction of “deriving a certainty score” properly provides further clarity as to how the certainty score is derived, consistent with the specification.

Defendants’ proposed construction should not be adopted here, particularly considering their allegations that the claims are invalid for reciting patent ineligible subject matter under 35 U.S.C. §101. As noted in 3Shape’s briefing on the §101 issue, Defendants improperly over-simplify the claims and fail to interpret the claims consistent with their plain language as understood from the context of the specification. 3Shape’s proposed construction provides clarity as to the proper scope and meaning of the term and should be adopted.

C. Antecedent Basis Terms

Claim Term	Plaintiff	Defendants
the certainty measure (claim 7)	measure of the certainty score	Indefinite
the sub-scan texture information (claim 7)	texture information (e.g., color information or surface roughness information) of a sub-scan	Indefinite
the amount of information (claim 7)	an amount of texture information	Indefinite
the texture information (claim 11)	the texture data	Indefinite

3Shape’s constructions of “the certainty measure,” “the sub-scan texture information,” “the amount of information,” and “the texture information” clarify the meaning and scope of those terms as properly understood in light of the claims and specification. Defendants, on the other hand, contend that each of these terms

are indefinite, apparently on the basis that these terms do not have proper antecedent basis because they appear for the first time in the claims with “the” instead of “a” or “an.” But a POSITA would have no trouble understanding the meaning of the claims. Claims are not indefinite for lack of antecedent basis when a POSITA would reasonably understand the meaning of the claim in light of the specification. *Epic Tech, LLC v. Penn-Tech Assocs., Inc.*, No. 1:20-cv-02428, 2022 WL 3212728 at *10 (N.D. Ga. June 3, 2022) (quoting *Energizer Holdings, Inc. v. Int'l Trade Comm'n*, 435 F.3d 1366, 1370 (Fed. Cir. 2006)).

A POSITA would understand these four terms. First, a POSITA would understand “the certainty measure” to refer to “a measure of the certainty score.” In particular, “the certainty measure” appears in claim 7, which depends from claim 1. And claim 1 recites the term “certainty score.” A POSITA would understand based on the claim dependency that “the certainty measure” is merely referring to a measure of the certainty score recited in claim 1. Further, the specification uses the term “certainty measure” to refer to a measure of the certainty score. *See, e.g.*, '151 Patent, 6:66-7:38 (discussing examples involving the certainty measure being a measure of how uniform data is, how close the texture data is to the determined tooth shade value, or how close a parameter of the color data is to the corresponding parameter of the determined tooth shade value).

Second, a POSITA would understand “the sub-scan texture information” to “refer to texture information (*e.g.*, color information or surface roughness information) of a sub-scan.” As explained in the specification, texture information relates to color information and/or surface roughness information. *See* ’151 Patent, 2:37-45. The patent further explains texture and geometry information are used to obtain a digital 3D representation of the tooth. *Id.*, 3:3-8. When used together, the sub-scan texture information simply means the texture information of a sub-scan. *See also id.*, 4:20-40 (discussing examples where texture data is derived from texture information of overlapping sub-scans to provide more reliable data).

Third, a POSITA would readily understand “the amount of information” to refers to an amount of texture information the scanner collects to derive texture data at a point. This plain and ordinary understanding is further confirmed by the specification, which explains that the reliability of the derived texture data depends on the amount of texture information collected. *See id.*, 7:31-38.

Finally, a POSITA would understand “the texture information” to refer to “the texture data.” In particular, “the texture information” appears in claim 11, which depends from claim 1. And claim 1 recites “the texture data.” Because of dependency, a POSITA would have readily understood “the texture information” in claim 11 to refer to “the texture data” recited in claim 1. *See Phillips v. AWH*

Corp., 415 F.3d 1303, 1315-16 (Fed. Cir. 2005) (stating there is a presumption that the dependent adds a limitation to the independent claim).

Accordingly, because a POSITA would have understood these terms based on the context of the claims, the terms should be construed in the manner as proposed 3Shape and not found indefinite as alleged by Defendants.

VII. U.S. PATENT NOS. 11,076,146 AND 11,368,667

- A. “a pattern generator configured to generate, using a light source, a probe light with a plurality of configurations in the form of a time-varying illumination pattern” (’146: cl. 1; ’667: cls. 1, 14, 26)

Plaintiff’s Construction	Defendants’ Construction
Plain and ordinary meaning. <i>If subject to 35 U.S.C. § 112(6):</i> Function: “generate, using a light source, a probe light with a plurality of configurations in the form of a time-varying illumination pattern” Structure: “a segmented LED with control electronics” (’146 Patent, 8:10-36, FIG. 3b, 28:14-23) “at least one translucent and/or transparent pattern element with a motor” (<i>Id.</i>, 8:38-57) “a transparent wheel with an opaque mask in the form of spokes pointing radially from the wheel center and rotated with a motor” (<i>Id.</i>, 8:42-46, 13:14-16, 28:5-13, FIG. 3A) “a glass plate with an opaque mask with a motor” (<i>Id.</i>, 8:46-57) “a Ronchi ruling with a motor” (<i>Id.</i>, 13:29-31)	Subject to 35 U.S.C. § 112(6) Function: “generate, using a light source, a probe light with a plurality of configurations in the form of a time-varying illumination pattern” Structure: “a transparent wheel with an opaque mask in the form of spokes pointing radially from the wheel center and rotated with a motor” (’146 patent at 28:5-13, FIG. 3a, 21:6-13)

“an array of LEDs with a controller” (<i>Id.</i> , 13:34-36, FIG. 3B) “a LCD or DLP based projector” (<i>Id.</i> , 13:37-38)	“a segmented LED with control electronics” (’146 patent at 28:14-23, Fig. 3b, 8:32-34)
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A “pattern generator” is a structural component that does not invoke means-plus-function interpretation. As the term does not use “means” or any other nonce term, Defendants bear the burden to overcome the presumption that §112(6) does not apply. The specification, surrounding claim language, and extrinsic evidence, however, collectively illustrate that Defendants cannot overcome this presumption. To the extent “pattern generator” is found to be subject to §112(6), Defendants identified corresponding structure fails to properly capture all of the disclosed corresponding structures described in the specification (which 3Shape’s proposed construction properly identifies). Defendants’ cherry-picked embodiments in its §112(6) construction reflect an improper attempt to avoid infringement and should be rejected.

No construction necessary. The plain meaning of “pattern generator” is evident from the claim language itself. In particular, the independent claims specify that the pattern generator is configured to generate a time-varying illumination pattern using a probe light, and that the time-varying illumination pattern generated by the pattern generator is transmitted through the optical

system. *See, e.g.*, '146 Patent, cls. 1, 21; '667 Patent, cls. 1, 14, 26. A POSITA would readily understand that the “pattern generator” is simply referring to the device that generates an illumination pattern. *See also* Ex. D, ¶¶20-26. There is no need to provide further construction where the meaning of the claims is apparent from the plain language.

§112(6) is inapplicable. Because “pattern generator” does not use the word “means,” there is a presumption that the term does not invoke §112(6). *Zeroclick, LLC v. Apple Inc.*, 891 F.3d 1003, 1007 (Fed. Cir. 2018). Defendants cannot overcome this presumption because they cannot show “that the claim term fails to recite sufficiently definite structure[.]” *Zeroclick*, 891 F.3d at 1007.

The claimed “pattern generator” recites sufficiently definite structure, particularly in the context of the claims. For example, the independent claims of the '146 and '667 patent recite that the “pattern generator” generates, using a light source, “a probe light with a plurality of configurations in the form of a time-varying illumination pattern.” '146 Patent, cls. 1, 21; '667 Patent, cls. 1, 14, 26. A POSITA would understand from the context of the claims that the “pattern generator” refers to a class of structures (*e.g.*, LCD or DLP projector, controlled array of LEDs, etc.) that can be used to generate a time-varying illumination pattern. Ex. D, ¶25. In addition, the dependent claims highlight the structural

nature of the “pattern generator” by specifying, for example, that the “pattern generator” is a “translucent and/or transparent pattern element” or a “liquid crystal display (LCD) projector or a digital light processing (DLP) projector.” ’146 Patent, cls. 2-3. A POSITA reading the claims would thus understand “pattern generator” to connote sufficiently definite structure. Ex. D, ¶24.

Moreover, the structure connoted by the “pattern generator” is reflected in the specification. *See* Ex. D, ¶¶23, 26. In evaluating whether a term is subject to §112(6), it is proper to consult the specification, as claims are properly read in light of the specification – and not in a vacuum. *See Coprecitec v. Brinkmann Corp.*, 2013 U.S. Dist. LEXIS 203383, at *5 (N.D. Ga. Nov. 20, 2013) (citing *Inventio AG v. ThyssenKrupp Elevator Ams. Corp.*, 649 F.3d 1350, 1357 (Fed. Cir. 2011)). Here, the specification describes numerous structures connoted by the claimed “pattern generator,” including, for example, “a segmented LED with control electronics,” “at least one translucent and/or transparent pattern element with a motor,” “a transparent wheel with an opaque mask in the form of spokes pointing radially from the wheel center and rotated with a motor,” “a glass plate with an opaque mask with a motor,” “a Ronchi ruling with a motor,” “an array of LEDs with a controller,” and “a LCD or DLP based projector.” *See, e.g.*, ’146 Patent, 8:10-36, FIG. 3b, 28:14-23; 8:38-57; 8:42-46, 13:14-16, 28:5-13, FIG. 3A; 8:46-

57; 13:29-31; 13:34-36, FIG. 3B; 13:37-38. The specification’s description of these structures for the claimed “pattern generator” confirm that the term connotes sufficiently definite structure, rendering the application of §112(6) improper. *See* Ex. D, ¶¶22-23, 26 (confirming a POSITA would have the same understanding).

3Shape’s alternative §112(6) construction is the correct one. Even if “pattern generator” is found to invoke §112(6), 3Shape’s alternative construction should be adopted over Defendants’ construction because it improperly limits the corresponding structure to two embodiments from the specification to the exclusion of the five other alternative corresponding structures described in the specification. *See also*, Ex. D, ¶¶ 21, 27. There is no legal basis for such a limiting construction. *Micro Chemical, Inc. v. Great Plains Chemical Co., Inc.*, 194 F.3d 1250, 1258-59 (Fed. Cir. 1999) (adopted §112 ¶6 construction found improper where it excluded alternative embodiments disclosed in the specification.)

Further, Defendants’ §112(6) construction is contrary to the claim language. For example, claim 3 of the ’146 patent recites that “the pattern generator is based on a projector, such as a liquid crystal display (LCD) projector or a digital light processing (DLP) projector.” *See* ’146 Patent, cl. 3. Defendants’ identified §112(6) construction would erroneously exclude such a corresponding structure for the claimed “pattern generated.” Defendants improper attempt to exclude subject

matter *recited in a dependent claim* must be rejected. *See Littelfuse, Inc. v. Mersen USA EP Corp.*, 2022 F.4th 1376, 1380 (Fed. Cir. 2022) (“if a dependent claim reads on a particular embodiment of the claimed invention, the corresponding independent claim must cover that embodiment”). Accordingly, Defendants’ §112(6) should be rejected.

B. “a time-varying illumination pattern” (’146: cls. 1, 13, 15, 21, 27, 29; ’667: cls. 1, 14, 26)

Plaintiff’s Construction	Defendants’ Construction
a pattern that varies in time, <i>i.e.</i> , the embedded spatial structure of the probe light varies in time	a pattern that varies in time, <i>i.e.</i> , the embedded spatial structure varies in time

The “time-varying illumination pattern” refers to the spatial structure of the pattern of the probe light generated from the pattern generator. 3Shape’s construction reflects this meaning as set forth in the specification. Defendants’ construction, on the other hand, fails to properly capture the scope and meaning of the term as set forth in the claims and specification, and thus, should be rejected.

The plain language of “time-varying illumination pattern” makes clear that the pattern is referring to structure of the illumination (*i.e.*, of the probe light). Ex. D, ¶¶28-39. The surrounding language in the independent claims recite a pattern generator configured to “generate a probe light with a plurality of configurations in the form of a time-varying illumination pattern.” ’146 Patent, cls. 1, 21; ’667

Patent, cls. 1, 14, 26. The plain language of the claims thus means the time-varying illumination pattern is of the probe light.

The specification further confirms 3Shape’s proposed construction. *See* Ex. D, ¶30. Under the heading “Definitions,” reads:

Pattern: A light signal comprising an embedded spatial structure in the lateral plane. May also be termed “illumination pattern”.

Time varying pattern: A pattern that varies in time, i.e., the embedded spatial structure varies in time. May also be termed time-varying illumination pattern. In the following also termed “fringes”.

’146 Patent, 4:58-65. Defendants’ construction incorporates “the embedded spatial structure” out of context by failing to address that the “pattern” definition introduces the embedded spatial structure as part of a *light signal*. In the context of the claims, the light signal is the “probe light.” Therefore, the embedded spatial structure is *of the probe light* as accurately reflected in 3Shape’s construction.

In attempting to adopt a portion of the definition in isolation, Defendants’ construction introduces ambiguity as to what the “embedded spatial structure” refers to, and thus, should be rejected. Such a construction would be problematic, particularly to the extent Defendants seek the embedded spatial structure to be something other than a spatial structure of the probe light. Accordingly, 3Shape’s construction should be adopted.

C. “wherein the intraoral scanner is wireless” (’146: cl. 1; ’667: cls. 1, 14, 29)

Plaintiff’s Construction	Defendants’ Construction
Plain and ordinary meaning	Indefinite

The term “wherein the intraoral scanner is wireless” is plain on its face and does not require construction. The concept of a “wireless” device is well understood in the art and requires no further construction. *See, e.g.*, Ex. E, Microsoft Computer Dictionary, Fifth Ed., 2002 at 572 (defining wireless as “[o]f, pertaining to, or characteristic of communications that take place without the use of interconnecting wires or cables, such as by radio, microwave, or infrared light”); *see also* Ex. D, ¶¶32-34 (explaining a POSITA would have readily understood the meaning of “wireless”). Further, the specification uses the term consistent with its plain and ordinary meaning. *See* ’146 Patent, 8:59-9:23, 36:50-60. Indeed, a POSITA would understand this term to refer to an intraoral scanner that is configured to function without a wired connection. *See* Ex. D, ¶¶32-34.

Defendants cannot show by clear and convincing evidence that this claim term is indefinite. Rather, the specification is consistent with the plain and ordinary meaning of the term, as evidenced by Defendants’ own citations to the intrinsic record describing a wireless intraoral scanner. *See* D.I. 146, 19

(Defendants citing '146 Patent, 9:16-23, 38:10-25, 39:21-40:8, which describe and/or claim aspects of a wireless intraoral scanner).

D. “optical path” ('146: cls. 1, 21; '667: cls. 1, 14, 26)

Plaintiff's Construction	Defendants' Construction
Plain and ordinary meaning	The path of the light from the light source to the object and back to the camera

The claimed “optical path” carries its plain and ordinary meaning and refers to the path of the probe light towards the object in the context of the claims. Defendants’ proposed construction injects ambiguity into the claim and thus should be rejected. *See, e.g., Honeywell Intern. Inc. v. Universal Avionics Sys. Corp.*, 488 F.3d 982, 993 (Fed. Cir. 2007) (adding limitations through claim construction is unnecessary when “the claim itself provides considerable information about its meaning”).

The plain language of the claims specifies the optical path. For example, claim 21 recites in part:

transmitting the probe light, through a tip of intraoral scanner inserted into the oral cavity, towards the object along an optical path, thereby illuminating at least a part of the object with the time-varying illumination pattern;

transmitting at least a part of the light returned from the object to at least one camera accommodating an array of sensor elements to form a plurality of 2D images;

See '146 Patent, cl. 21; *see also id.* at cl. 1 (reciting similar claim language); '667 Patent at cls. 1, 14, 26 (same). The claims describe that the probe light is transmitted “towards the object along an optical path thereby illuminating at least a part of the object.” The claims further recite that light is “returned from the object to at least one camera.”

Defendants’ construction unnecessarily and needlessly defines the path of the light which is already specified by the claims themselves. First, the claims already specify that the probe light (which the claim describes as being generated by the light source) travels along the optical path to the object. As such, the first portion of Defendants’ construction would render the surrounding claim language superfluous. Second, the claim language itself does not specifically refer to the optical path when describing the light returned from the object to the camera. *See* '146 Patent, cls. 1, 21. Defendants’ attempts to include the return light path as part of the construction of “optical path” is contrary to the plain claim language. There is no reason to re-write an understandable claim limitation to inject ambiguity. *See e.g., Ironburg Inventions Ltd. v. Collective Minds Gaming Co. Ltd.*, No. 1:16-cv-4110, 2018 WL 2999615, at *4 (N.D. Ga. Jun. 15, 2018) (rejecting defendant’s construction as “an unjustified rewriting of the claim language” despite similar specification wording because “[t]he plain language contained in the claim

language is not confusing or ambiguous, and there is no reason to completely redefine the claim language.”)

E. “high-speed camera” (’146: cls. 1, 6, 22)

Plaintiff’s Construction	Defendants’ Construction
Plain and ordinary meaning	A camera accommodating multiple A/D converters per line of pixels

“High-speed camera” is a term of art that should be given its plain and ordinary meaning and would be readily understood by a jury. Defendants’ construction should be rejected, as it improperly imports an embodiment from the specification and is inconsistent with the well-understood meaning to a POSITA.

A POSITA would understand a high-speed camera to simply refer to a camera that captures images at a high speed relative to a regular camera. *See* Ex. D, ¶¶35-36 (explaining a POSITA would have understood this term “to mean a camera that can capture images at a higher framerate than a regular camera”). The plain meaning comports with the function and purpose of the high-speed camera described in the specification: high-frame rate image acquisition required to effectively generate 3D scans. *See, e.g.,* ’146 Patent, 8:1-8, 11:15-34, 17:53-60, cl. 16. This is in contrast to regular cameras, which typically have much lower frame rates of, *e.g.,* 24 or 30 frames per second. *See* Ex. D, ¶36. The term “high speed

camera” is used in the art and has a plain meaning. *Id.*, ¶37 (explaining Exs. E, F, and G provide examples showing use of the term “high-speed camera”).

Defendants’ construction improperly limits “high-speed camera” to a camera with multiple A/D converters per line of pixels. But the specification merely describes such an implementation of a high-speed camera as one possible embodiment. *See* ’146 Patent at 8:3-8 (describing that the camera *may* be a standard camera with a standard CCD or CMOS chip or *may* comprise a high-speed camera accommodating multiple A/D converters per line of pixels.)

Defendants’ attempts to read in this *exemplary embodiment* of a high-speed camera into the claims is contrary to established claim construction principles. *See, e.g., Apple Inc. v. Wi-LAN Inc.*, 25 F.4th 960, 968 (Fed. Cir. 2022) (improper to limit a claim to a specific embodiment unless clear intent shown to limit).

A POSITA would not have understood a “high-speed camera” to be limited to a camera with multiple A/D converters per line of pixels. For example, a POSITA would have understood that a high-speed camera can be implemented in other ways, including with one A/D converter per pixel or with one A/D converter per row or column of pixels. *See* Ex. D, ¶38 (citing additional materials and showing a POSITA would not understand a “high-speed” camera to be limited to multiple A/D converters per line of pixels). As such, the understood structure of

high speed cameras in the art further compels against an interpretation of “high speed camera” suggested by Defendants.

F. “switching on and off the at least three monochromatic light sources” (’146: cl. 6; ’667: cls. 3, 20)

Plaintiff’s Construction	Defendants’ Construction
switching on and off one or more of the at least three monochromatic light sources	Plain and ordinary meaning.

3Shape’s construction reflects the proper meaning of this term as understood in light of the intrinsic evidence. In particular, the claims recite that “the hardware processor is configured to selectively switch the color of the probe light by switching on and off the at least three monochromatic light sources,” meaning that individual monochromatic light sources are switched on and off to change the color. ’146 Patent, cl. 6; ’667 Patent, cls. 3, 20. Further, consistent with the claim language, the specification explains that probe light switches between two or preferably three colors (e.g., red, green, and blue) is done by “switching on and off different monochromatic light sources (having one only light source turned on at a time)” ’146 Patent, 21:25-32; *see also id.* at 20:64-66 (describing switching between different probe light colors to illuminate the object with different colors).

The specification and claim language confirm one or more of the monochromatic light sources are switched on and off to switch the color.

- G. “wherein the probe light is directed towards the object in a direction substantially parallel with the longitudinal axis of the tip” (’146: cl. 8) / “wherein the optical system is configured to direct the probe light towards the object in a direct substantially parallel with the longitudinal axis of the tip” (’667: cls. 5, 22)**

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
Plain and ordinary meaning	Indefinite

A POSITA would readily understand the scope and meaning of directing the probe light “in a direction substantially parallel with the longitudinal axis of the tip” from the plain language of the of the claims. Ex. D, ¶40. In particular, this claim language specifies the path of the probe light to allow for the scanning of an intra-oral cavity. *See, e.g.*, ’146 Patent, 19:13-33, 20:40-46, 23:14-29, Figs 2, 6, 8.

Defendants cannot establish by clear and convincing evidence that this claim term is indefinite. To the extent Defendants contend that the use of the term “substantially parallel” renders the term indefinite, this argument should be rejected. The word “substantially” can be used by patentees to “accommodate ... minor variations” and to “avoid a strict numerical boundary to the parameter” it describes; use of the term is definite if a POSITA would reasonably understand the scope of the claimed invention. *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 1120 (Fed. Cir. 2002) (internal citations omitted). Here, the claim’s recitation of “substantially parallel” describes the path of the projected probe light through the

tip to enable the scanning of an intra-oral cavity. As further explained by the specification, directing the probe light substantially parallel to the tip further allows the probe light to be redirected (*e.g.*, via a mirror) to be better adapted to the scanning activity. *See, e.g.*, '146 Patent, 19:13-33; *see also* Ex. D, ¶¶39-40.

H. “data for the 3D geometry” ('146: cls. 12, 24; '667: cls. 8, 15) / “the data for the 3D geometry” ('146: cl. 21)

Claim Term	Plaintiff's Proposed Construction	Defendants' Proposed Construction
data for the 3D geometry	the data for the 3D geometry	Indefinite
the data for the 3D geometry	data for the 3D geometry	Indefinite

The meaning of the term “data for the 3D geometry” is readily apparent from the claim language itself. Defendants apparently contend that these terms are indefinite because they lack antecedent basis. However, claims are not invalid for lack of antecedent basis when a POSITA would reasonably understand the meaning of the claim in light of the specification. *Epic Tech, LLC.*, 2022 WL 3212728 at *10 (quoting *Energizer Holdings, Inc.* at 1370).

The claims and specification consistently use the term “data for the 3D geometry” to distinguish from the raw 3D data, which is the underlying 2D image data used to generate the 3D geometry data. This is reflected, for example, in the language of the claims, which recite that the “raw 3D data” is processed into “data

for the 3D geometry.” *See, e.g.*, ’146 Patent, cls. 9, 12, 24; ’667 Patent, cls. 8, 15. The specification likewise consistently uses data of the 3D geometry to distinguish it from raw 3D data. *See, e.g.*, ’146 Patent, 8:59-9:24. The data for 3D geometry remains the same in every instance.

Defendants cannot establish by clear and convincing evidence that “data for the 3D geometry” is indefinite. A POSITA would readily understand the scope and meaning of the term from the context of the claims and specification. As such, Defendants’ indefiniteness allegations should be rejected.

VIII. CONCLUSION

For the reasons stated above, the Court should adopt Plaintiff’s positions.

Date: January 30, 2023

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CERTIFICATE OF COMPLIANCE

Pursuant to Local Rule 7.1(D), the foregoing complies with the font and point selection approved by this Court in Local Rule 5.1 (B). This paper was prepared on a computer using Times New Roman fourteen-point font, double-spaced.

/s/ Puja Patel Lea

Puja Patel Lea

State Bar No. 320796

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF GEORGIA**

3SHAPE A/S,

Plaintiff,

v.

CARESTREAM DENTAL, LLC,
DENTAL IMAGING
TECHNOLOGIES CORP., and
DENTAL IMAGING
TECHNOLOGIES CORP. d/b/a
DEXIS

Defendants.

Civil Action No. 1:22-cv-01829-
WMR

CERTIFICATE OF SERVICE

I hereby certify on this 30th day of January, 2023, the foregoing was electronically filed with the Clerk of the Court using the CM/ECF System, which will send a notification of such filing (NEFF) to all counsel of record.

/s/ Puja P. Lea
Puja P. Lea

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF GEORGIA**

3SHAPE A/S

Plaintiff,

v.

CARESTREAM DENTAL, LLC,

DENTAL IMAGING
TECHNOLOGIES CORP., and
DENTAL IMAGING
TECHNOLOGIES CORP. d/b/a
DEXIS

Defendants.

C.A. No. 1:22-cv-01829-WMR

**PLAINTIFF 3SHAPE A/S'
RESPONSIVE BRIEF ON CLAIM CONSTRUCTION**

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EXHIBITS¹

<u>Exhibit</u>	<u>Description</u>
A*	2019-05-29 Final Written Decision for Case IPR2018-00197
B*	2018-08-20 Patent Owner's Response to the Petition for <i>Inter Partes</i> Review for U.S. Patent No. 9,329,675
C*	Excerpt of File History for U.S. RE48,221
D*	2023-01-30 Declaration of Dr. Xiong
E*	FastCam BC2 HD: High Speed Camera System for Broadcast Application
F*	Fastec Imaging: High Speed Imaging in the Palm of Your Hand
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L	12-21-2022 Petition for <i>Inter Partes</i> Review filed in IPR2023-00400 (Excerpt)

¹ Exhibits A-H were previously filed with 3Shape's Opening Claim Construction Brief on January 30, 2023 (Def. Br., 156-1 through Def. Br., 156-8).

TABLE OF ABBREVIATIONS

<u>Abbreviation</u>	<u>Description</u>
'221 Patent	U.S. Patent No. RE48,221
'151 Patent	U.S. Patent No. 10,695,151
'146 Patent	U.S. Patent No. 11,076,146
'667 Patent	U.S. Patent No. 11,368,667
'675 Patent	U.S. Patent No. 9,329,675
2D	Two-dimensional
3D	Three-dimensional
3Shape	Plaintiff 3Shape A/S
Asserted Patents	U.S. Patent Nos. RE48,221, 10,695,151, 11,076,146, and 11,368,667
Def. Br.	Defendants' Opening Claim Construction Brief
Defendants	Carestream Dental, LLC, Dental Imaging Technologies Corp., Dental Imaging Technologies Corp. d/b/a DEXIS
IPR	<i>Inter partes</i> review
POSITA	Person of ordinary skill in the art
PTAB	Patent Trials and Appeals Board

I. INTRODUCTION

3Shape’s proposed constructions either allow the plain language of the claims to dictate their well-understood meaning or provide clarifications consistent with their plain meaning. In contrast, Defendants seek to introduce ambiguity or narrow claim scope to the exclusion of disclosed embodiments to manufacture non-infringement positions. Defendants’ positions here starkly contrast with their parallel IPR petitions, where Defendants asserted “no construction was necessary” for any claim term across all four patents.

Moreover, Defendants’ indefiniteness accusations here fall flat in light of their IPR petitions, which provided no explanation or context regarding any of the purportedly indefinite terms and instead simply directly mapped elements in the alleged prior art to the claims. 3Shape’s constructions are consistent with the specifications and are based on how a POSITA would understand the meaning of these claims. 3Shape’s proposed constructions should be adopted.

II. U.S. PATENT NOS. 11,076,146 AND 11,368,667

A. “a pattern generator configured to generate, using a light source, a probe light with a plurality of configurations in the form of a time-varying illumination pattern” (’146: cl. 1; ’667: cls. 1, 14, 26)

1. “Pattern generator” does not invoke §112(6).

Defendants cannot overcome the presumption that “pattern generator” is not subject to § 112(6) as it connotes sufficiently definite structure to a POSITA, particularly as read in light of the claims and specification. *Apple, Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1299 (Fed. Cir. 2014) (“A limitation has sufficient structure [to not invoke § 112(6)] when it recites a claim term with a structural definition that is either provided in the specification or generally known in the art.”) The claims recite a “pattern generator configured to generate, using a light source, a probe light with a plurality of configurations in the form of a time-varying pattern.” ’146 Patent, cl. 1; ’667 Patent, cls. 1, 14, 26. That “pattern generator” connotes sufficiently definite structure is confirmed by the specification, which provides numerous structural embodiments of the pattern generator. *See id.*, 8:10-57, 13:14-38, 28:5-13. A POSITA would readily understand from the plain language of the claims the class of structures connoted by “pattern generator.” Ex. I, ¶¶7-10

Indeed, where the surrounding claim language and specification provide “detail as to how the [generator term] interacts with other components of the claimed invention” district courts have consistently found that claiming a “generator” term does not invoke § 112(6). *See Maxell Ltd. v. Apple Inc.*, Case No. 5:19-cv-00036, 2020 WL 10456875 at *13 (E.D. Tex. Mar. 18, 2020); *see also*

Harmonic Design, Inc. v. Hunter Douglas, Inc., 88 F.Supp.2d 1102, 1105 (C.D. Cal. 2000) (finding “control signal generator” to connote sufficient structure where the claim language and specification identified the location of the “control signal generator” within the invention); *Datatreasury Corp. v. Ingenico S.A.*, Case No. 5:02-cv-00124, 2003 WL 25832277, at *23-24 (E.D. Tex. Aug 19, 2003) (finding “report generator,” in the context of the specification, provided sufficiently definite structure to avoid §112(6)).

Defendants’ reliance on *Advanced Ground Info Systems* is misplaced because the claims recited a “symbol generator” to “generate symbols” with no further description to provide context, connection, or interaction with the other recited components of the invention. *See Advanced Ground Sys., Inc. v. Life360, Inc.*, 830 F.3d 1341, 1346 (Fed. Cir. 2016). In contrast, where claim language connects the claim term to structure and corresponding descriptions in the specification, means-plus-function interpretation is not necessary or appropriate. *See, e.g., Maxell*, 2020 WL 10456875 at *13-14 (“ringing sound generator” does not invoke § 112(6) because of claimed structure connecting it to its sources, controller, and output and the described class of structures in the specification) (citing *Personalized Media Commc’ns, LLC v. ITC*, 161 F.3d. 696, 705 (Fed. Cir. 1998) (“even though the term ‘detector’ does not specifically evoke a particular

structure, it does convey to one knowledgeable in the art a variety of structures known as ‘detectors’”).

Unlike the “symbol generator” in *Advanced Ground Info Systems*, the “pattern generator” claimed in the ’146 and ’667 Patents is described in terms of its inputs, outputs, and interaction with other claimed elements. *See* ’146 Patent, cls. 1, 21 (describing the light source input, time varying illumination pattern output, and optical system configured for transmitting and receiving the resulting pattern); ’667 Patent, cls. 1, 14, 26 (same). Moreover, the specification describes a class of structures (*e.g.*, LCD or DLP projector, controlled array of LEDs, etc.) used to generate the pattern. *See, e.g.*, ’146 Patent, 8:10-57; 13:14-38; 28:5-13.

Finally, Defendants’ argument that the specification’s use of the term “pattern generation means” supports finding “pattern generator” invokes §112(6) is inapposite. The claims here are drafted without the word “means,” highlighting the patentee’s intent to *not* invoke §112(6). Nothing about the specification’s reference to a “pattern generation means” takes away from the structural description provided in the claims and specification. Nor does it take away what a POSITA would understand the “pattern generator” to connote. *Ex. I*, ¶¶11-12.

2. *Each structure disclosed in the specification is explicitly linked to the claimed function.*

Defendants acknowledge that the specification lists out several structures

that they exclude from their §112(6) construction. Defendants claim that this is because the specification does not link the structure clearly enough to the function. Def. Br., 4. Defendants’ arguments are internally inconsistent and contradicted by governing case law.

A POSITA would understand that each of the embodiments listed in the specification are clearly linked to and could be used to perform the claimed function. Ex. I, ¶13. Defendants’ first argument is that “at least one translucent and/or transparent pattern element with a motor” should be excluded because it “omits an opaque mask” from the function. Def. Br., 5 (citing ’146 Patent, 8:38-45). The passage Defendants rely upon, however, makes clear that the use of an opaque mask is optional, specifying that “an opaque mask *can* be used” to “generate[] a time varying pattern” with “at least one translucent and/or transparent pattern element.” ’146 Patent, 8:38-45.² Nothing in the specification states that the use of an opaque mask is the only way to generate a time varying pattern or that it *must* be used with the translucent and/or transparent pattern element. Defendants’ expert likewise does not make such a claim. Def. Br., Ex. 1 ¶ 36. To the contrary, a motor with a “translucent and/or transparent pattern element” can

² All emphasis is added in quotations unless noted otherwise.

sufficiently, on its own, generate a time varying illumination pattern. Ex. I, ¶15. Pattern elements with variations in the degree of translucency, or a combination of translucent and transparent sections, could perform the claimed function, even without an opaque mask element. *Id.*, ¶¶14-15.

Defendants’ second argument is that “a glass plate with an opaque mask with a motor” would only generate a static pattern. Def. Br., 5. Defendants are incorrect. The specification actually says: “[f]or generating a static pattern a glass plate with an opaque mask can be used.” ’146 Patent, 8:46-48 (*i.e.*, no mention here of a “motor”). The specification then goes on to say that the “time varying pattern can be generated by *rotating* and/or *translating* the pattern element.” *Id.*, 8:54-55. This is why the identified structure is “a glass plate with an opaque mask *with a motor*”; *i.e.*, the *motor* in conjunction with components that form a static pattern are collectively able to generate a probe light with a time-varying illumination pattern. Further, a POSITA would understand that this apparatus would work much the same way as the translucent and/or transparent pattern element with a motor. Ex. I, ¶¶16-19.

Defendants’ third argument relies on the specification’s use of “varying” rather than “time-varying” to argue that the “Ronchi ruling” and “LCD or DLP based projector” embodiments are not linked to the function of generating a time-

varying illumination pattern. The best Defendants can muster is a claim that the reference to “varying illumination pattern...does not *necessarily* relate to a time-varying pattern.” Def. Br., 6. But Defendants admit that “varying” as used in the specification includes both time and spatial variation. *Id.* Defendants’ own citation explains that the “varying illumination pattern ... generated by an LCD or DLP based projector” (or by a Ronchi ruling) may be either spatially varying or time varying. Def. Br., 6 (quoting ’146 Patent, 3:11-14 (“The variation/oscillation in the pattern may be spatial, *e.g.*, a static checkerboard pattern, and/or it may be time varying, for example by moving a pattern across the object being scanned.”)). Accordingly, the structures identified in 3Shape’s alternative §112(6) construction are sufficiently linked to the claimed “pattern generator.”

Defendants also appear to take issue with the description of the Ronchi ruling with a motor and LCD or DLP based projector by claiming the description of these embodiments is too short. But there is no requirement that the specification teach what is already known in the art. *See, e.g., Lawther v. Hamilton*, 124 U.S. 1, 9 (1888) (“These several steps being well known in the art when the patent was applied for, required no particular explanation.”); *see also, e.g., D.M.I, Inc. v. Deere & Co.*, 755 F.2d 1570, 1574 (Fed. Cir. 1985) (“there is and can be no requirement that applications describe or predict every possible

means for accomplishing that function”). A POSITA would understand that a Ronchi ruling, placed in the path of the probe light, is manipulable by a motor to generate the claimed time-varying illumination pattern. Ex. I, ¶¶ 20-21; *see also*, ’146 Patent, 13:29-31. Likewise, a POSITA would understand that both LCD and DLP based projectors turn on and off pixels in an array of pixels to create time varying illumination patterns. Ex. I, ¶¶ 22-27. A POSITA would understand how to use either an LCD or DLP based projector to generate a time-varying illumination pattern. ’146 Patent, 13:37-38; *see also* Ex. I, ¶¶ 22-27.

Accordingly, because: (i) the specification clearly links each of the recited structures to the claimed function, and (ii) a POSITA would understand how each embodiment performs the claimed function, each of 3Shape’s identified structures in its alternative § 112(6) construction should be included.

B. “a time-varying illumination pattern” (’146: cls. 1, 13, 15, 21, 27, 29; ’667: cls. 1, 14, 26)

Defendants claim that their proposed construction “tracks the definition provided in the Definition section of the common specification verbatim.” Def. Br., 7. This is not correct. Defendants rely on the definition of “[t]ime varying pattern.” Def. Br., 7 (quoting ’146 Patent at 4:63-65). But the term at issue here is “time-varying *illumination* pattern.” Defendants’ construction would improperly read out the claims’ recitation of “illumination.”

Defendants improperly seek to construe the term from a single sentence in the specification without regard to the context of the other portions of the specification (and claims). Courts have recognized this is improper. *See, e.g., Shire Development LLC v. Teva Pharms. USA, Inc.*, Case No. 1:17-cv-01696, 2019 WL 969638 at *9-10 (D. Del. Feb. 28, 2019) (rejecting an attempt to limit a construction to a single sentence in a definition section, and instead including surrounding context). Here, under a “Definitions” heading, the specification defines “pattern” as “a light signal comprising an embedded spatial structure in the lateral plane,” and then defines “time varying pattern” as “a pattern that varies in time; i.e. *the* embedded spatial structure varies in time.” ’146 Patent, 4:59-63. This definition shows the embedded spatial structure is part of *the light signal*. It explicitly says the light signal “comprises” the embedded spatial structure. The addition of the word “illumination” in the actual claim term confirms that the construction must capture the light signal. And, in the context of all independent claims where this term appears, the “light signal” is the probe light. *See* ’146 Patent, cls. 1, 21; ’667 Patent, cls. 1, 14, 26.

This is also consistent with how a POSITA reading this term in the full context of the specification and the independent claims—rather than reading one sentence in isolation as Defendants propose—would have understood that what

varies in time is an embedded spatial structure *of the probe light*. See Ex. D, ¶¶28-31. There is no “confusion” created by 3Shape’s proposal as Defendants allege (Def. Br., 7); the embedded spatial structure is what varies in time and “of the probe light” provides proper context for what the embedded spatial structure is, *i.e.*, it is a spatial structure in a light signal (the probe light) as defined in the specification. ’146 Patent, 4:59-60.

C. “wherein the intraoral scanner is wireless” (’146: cl. 1; ’667: cls. 1, 14, 29)

The term “wireless” is not indefinite. It is a commonly used term understood by those of skill in the art. Defendants’ argument, to the extent it has any basis, appears to be a misunderstanding of the law and specification. Defendants argue it is unclear “what aspect of the intraoral scanner must be wireless.” Def. Br., 8. If the claim intended to limit the meaning of “wireless” to a particular aspect, it would have done so. That such a limitation is not specified, means that the plain and ordinary meaning of “wireless” applies and, if the accused scanner meets that definition, it infringes. *Nervo Corp. v. Boston Scientific Corp.*, 955 F.3d 35, 39 (Fed. Cir. 2020) (finding claims are not indefinite where infringement must be determined on a case-by-case basis).

Defendants’ indefiniteness argument appears to be wholly based on a misreading of the relevant passage from the specification, which provides two

examples. Def. Br., 8. Again, if the claims intended to select between these two examples or otherwise limit the meaning of “wireless” to only specific functions, it would have done so. That the claims do not specify, means that either example given in the specification would satisfy the “wireless” limitation, as would other commonly understood and well-known ways a device can be wireless. Indeed, Defendants’ own IPR challenges did not raise any construction issues with respect to “wireless” nor appear to have any difficulty mapping elements in the alleged prior art to the claims. *See* Ex. J, 2-7, 11; *see also* Ex. K, 2-7, 10, 13.

Accordingly, the “wireless” term should be given its plain and ordinary meaning: a scanner capable of operating without a wired connection. While operating without a wired connection may encompass multiple embodiments – scanners Defendants describe as both cordless and capable of transmitting data wirelessly, *e.g.*, with an internal power source, such as a battery – the claim’s scope does not render it indefinite.

D. “optical path” (’146: cls. 1, 21; ’667: cls. 1, 14, 26)

The most important context for this dispute is what the claims *already define*. Defendants’ attempt to manufacture a non-infringement argument by re-defining the transmission path of the light (in a manner inconsistent with what the claims already recite) should be rejected.

All five of these independent claims recite “transmit[ting] the probe light towards the object along the optical path” and separately recite “transmit[ting] the probe light back to the camera” (without mentioning the term “optical path” in the latter recitation). *See* ’146 Patent, cls. 1, 21; ’667 Patent, cls. 1, 14, 26.

Defendants’ proposed construction thus injects ambiguity because it is unclear whether multiple probe light transmissions to the camera are now required (contrary to the plain language of the claims or any embodiment in the specification), and if not, Defendants’ construction is improper because it renders the second “transmit[ting]” element superfluous. *See, e.g., Power Mosfet Techs. LLC v. Siemens AG*, 378 F.3d 1396, 1410 (Fed. Cir. 2004).

Defendants allege that patentee “defined” this term at column 27 lines 51-53 of the ’146 Patent. Def. Br., 9. This is wrong. The specification defines “optical path” in a definition section in column 5. ’146 Patent, 5:32-33. Regardless, no definition need be imported into the claims here because, as explained above and in the opening brief, the claims ***already define*** the light transmission paths.

Defendants’ suggestion that the optical path of the light transmission to the camera must be *the same* as the optical path of the light transmission to the object (Def. Br., 10), is not captured even under their proposed construction, let alone the actual claim language. Further, the specification illustrates an embodiment where

the optical path of the light transmission from the object to the camera is not the same as the optical path for the transmission from the light source to the object. *See* '146 Patent, FIG. 2 (showing different optical paths); Ex. I, ¶¶ 37-40 (explaining same). The specification also explains different embodiments can utilize different optical systems and/or optical axes for transmitting the probe light towards the object and from the object to the camera. *See* '146 Patent, 3:25-29, 5:24-27 (“[t]here may be more than one optical axis”). Any descriptions regarding use of the “same” optical axis are clearly only referring to exemplary embodiments. *See, e.g., id.*, 3:29-33 (“*preferably* along the same optical axis”); 5:33-39 (“a *part* of the optical path *preferably* coincides with the optical axis” which is “*preferably* a straight line”); 27:20-28 (describing “[t]he scanner *embodiment* illustrated in FIG. 1”). It violates black-letter claim construction rules to read specific embodiments into the claims. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1323-27 (Fed. Cir. 2006) (en banc) (limiting the claimed “baffle” to only disclosed embodiments is improper).

E. “high-speed camera” ('146: cls. 1, 6, 22)

A POSITA would understand that “high-speed camera” is a term of art, indicating any camera with a high framerate for capturing images faster than a normal camera. Accordingly, Defendants' argument should be rejected since

"high-speed camera" would be well understood by a POSITA and is therefore not a term of degree.

But, even if such objective bounds are required, the parties diverge, over what aspect of a "standard digital camera" should provide the yardstick against which "high-speed" is measured. Defendants' contention that a "high-speed" camera is defined by its A/D converter architecture is contrary to the language of the claims, the specification, and the knowledge of a POSITA.

Tellingly, when the "minimum conditions" for the high-speed camera are identified in dependent claims, as cited by Defendants, the claims use the camera *framerate*, not the A/D converter design. Def. Br., 12. This is consistent with how a POSITA would understand the term to be based on framerate. Ex. I, ¶¶28-29, 33. This is further consistent with the specification's disclosure of framerate as an important aspect of 3D scanner design. *See* '146 Patent, 8:1-8, 11:15-34, 11:66-12:1, 17:53-60 (illustrating framerate is a factor in increasing exposure time and decreasing motion blur and is a core part of the correlation measure algorithm). Further, the passage Defendants cite in support of an A/D converter-based construction itself suggests a framerate-based reading of the term. Specifically, a "standard digital camera" may be used, but "to increase the frame rate [of] the scanner," the specification recommends a high-speed camera. *Id.*, 8:1-8. Only

then is the specific A/D converter architecture disclosed, as *one potential implementation* of a “high-speed camera.” *See id.*

Defendants’ construction also limits the definition of “high-speed camera” to a small subset of what a POSITA would consider to be “high-speed” cameras. Defendants’ attempt to narrow the claims to one specific embodiment, under the guise of providing “boundaries” for what constitutes “high-speed,” is improper because it reads out of the claims cameras that would be considered “high-speed” by a POSITA. Ex. I, ¶¶30-32. Specifically, a POSITA would have understood the class of high-framerate cameras required by the specification to include cameras with column-parallel A/D converters (*i.e.*, cameras incorporating only one A/D converter per line of pixels). *Id.* (discussing image sensors with column-parallel architecture capable of achieving speeds of up to 1000 frames per second.) Because the plain and ordinary meaning of the term is consistent with the disclosure in the specification and with a POSITA’s understanding of a “high-speed camera,” no construction is needed.

F. “switching on and off the at least three monochromatic light sources” (’146: cl. 6; ’667: cls. 3, 20)

The dispute between the parties is whether all of the at least three monochromatic light sources must be switched on and off together. 3Shape’s proposed construction clarifies that either switching all the light sources off and on

together or a subset thereof is permitted by the claim language.

While claiming to apply the plain and ordinary meaning, Defendants actually seek to narrow the claim to exclude embodiments. Collectively switching *all* of the at least three monochromatic light sources on and off is contradicted by the surrounding claim language, which specifies that “the hardware processor is configured to selectively *switch the color* of the probe light by switching on and off the at least three monochromatic light sources.” ’146 Patent, cl. 6; ’667 Patent, cls. 3, 20. If all three monochromatic light sources have to be turned on and off together, the color will always remain constant. *See Paragon Solutions, LLC v. Timex Corp.*, 566 F.3d 1075, 1088 (Fed. Cir. 2009) (refusing to construe “displaying real-time data” as requiring “literally instantaneous [display], because the claims themselves require a transmission that necessarily takes some time”).

3Shape’s construction—“switching on or off *one or more* of the at least three monochromatic light sources”—reflects the meaning of this claim term because the *color of the probe light* must be switched. Simply turning *all* of the light sources on and off does not “selectively switch the color” of the probe light. *See, e.g., Phillips*, 415 F.3d at 1314 (“the context in which a term is used in the asserted claim can be highly instructive”). The specification confirms the switching on and off is of one or more of the monochromatic light sources (and not

all of them, collectively). *See* '146 Patent, 20:62-64, 21:25-32.

G. “wherein the probe light is directed towards the object in a direction substantially parallel with the longitudinal axis of the tip” ('146: cl. 8) / [similar language] ('667: cls. 5, 22)

The “substantially parallel” term is not indefinite because a POSITA would understand the scope of the term based on the specification’s guidelines and examples; accordingly, it should be given its plain and ordinary meaning.

Defendants’ reliance on *Enzo BioChem* is misplaced. Defendants focus on the statement that terms of degree require “some standard for measuring that degree,” and entirely ignore the qualifying language that “some standard” can be provided by the specification’s “general guideline and examples *sufficient to enable a person of ordinary skill in the art to determine the scope of the claims.*” *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1332-35 (Fed. Cir. 2010). Here, the specification meets that standard.

Not only does the specification provide “general guidelines” on the path and direction the probe light follows through the scanner, (*see, e.g.*, '146 Patent, 19:13-33, 22:41-47, 23:14-29, 25:48-55), but the figures provide further examples and embodiments showing the path of light. *Id.*, Figs. 2, 6, 8. A POSITA would understand, based on these examples and general guidelines, the scope of “substantially parallel.” Ex. D, ¶¶39-40; *see also Verve, LLC v. Crane Cams, Inc.*,

311 F.3d 1116, 1120 (Fed. Cir. 2002) (the relevant question is whether a claim’s “scope would be understood by persons in the field of the invention.”).

Defendant’s argument that the “wherein” phrase renders the claim inoperable is equally unavailing. The plain language of the claim discloses that the probe light travels “in a direction substantially parallel with the longitudinal axis of the tip,” before being “further reflected towards the object by a single reflective mirror.” ’146 Patent, cl. 8. That the probe light may travel along the body of the scanner, generally in the direction of the teeth, before being redirected by a mirror to point directly at the tooth to be scanned, does not render the claim inoperable. The path of the probe light through the scanner would be well-understood by a POSITA, and Defendants’ attempts to manufacture inoperability and ambiguity should be ignored. Ex. D, ¶¶39-40. Accordingly, the “substantially parallel” term is definite, and should be given its plain and ordinary meaning.

H. “data for the 3D geometry” (’146: cls. 12, 24; ’667: cls. 8, 15) / “the data for the 3D geometry” (’146: cl. 21)

The meaning of “data for the 3D geometry” is clear from the claims and the specification. While the terms “data for the 3D geometry” and “the data for the 3D geometry” arguably lack proper antecedent basis, the terms are not indefinite because a POSITA would readily understand the meaning of the terms from the claim language, especially when read in light of the specification.

Defendants seek to manufacture ambiguity where there is none by reading into the specification an undisclosed embodiment with two separate data pipelines. This embodiment is a fiction, created exclusively to support Defendants' argument that (contrary to precedent) a minor antecedent basis issue should result in an indefiniteness finding. *Epic Tech, LLC v. Penn-Tech Assocs., Inc.*, Case No. 1:20-cv-02428, 2022 WL 3212728 at *10 (N.D. Ga. Jun. 3, 2022).

The specification describes processing raw 3D data to generate “data for the 3D geometry.” *See, e.g.*, '146 Patent, 2:65-3:6, 8:59-9:24, 31:14-35. The only data pipeline described in the specification starts with 2D images that are processed to “extract in-focus information.” '146 Patent, 8:59-9:24. This processing step transforms “raw 3D data” into “3D real world coordinates.” *Id.*, 8:59-9:24, 2:65-3:6. The claims are consistent with this single data pipeline. *See e.g., id.*, cl. 9 (“wherein the hardware processor is further configured to locally ***process raw 3D data into data for the 3D geometry.***”). Because the claims describe raw 3D data being processed into “data for the 3D geometry,” consistent with the disclosure in the specification, there is no ambiguity, and a POSITA would understand the claims to match the embodiment described in the specification. Ex. I, ¶¶42-43. Therefore, all of these claims should be construed to correct antecedent basis informalities.

III. U.S. PATENT NO. RE48,221

A. “physical 3D environment” (cls. 1, 19, 33)

Defendants’ indefiniteness arguments ignore the actual language of the claims and the understanding of those of skill in the art. Defendants acknowledging that “a POSITA might initially surmise that the ‘physical 3D environment’ relates to the actual area to be scanned (*e.g.*, the patient’s mouth).” Def. Br., 19. This illustrates that the physical 3D environment has a plain and ordinary meaning and is not ambiguous. It is exactly as explained in the 3Shape opening brief: the “physical 3D environment” is the environment in which the scanner operates. The “3D environment”—which Defendants rely upon in an attempt to inject ambiguity—is the portion of the “physical 3D environment” that is scanned and displayed. The specification sections Defendants cite support this distinction. *See* ’146 Patent, 2:10-13, 8:52-60, 10:25-26 (illustrating the “physical 3D environment” is the physical location where scanning occurs and “3D environment” is what is scanned and displayed).

This plain and ordinary meaning is further supported by the parties’ agreed upon construction of “3D environment:” “[a] constellation of physical objects each having a 3D geometry in a *three-dimensional space*.” *See* Def. Br., 5. The *three-dimensional space* in which the constellation of physical objects exists is the

“physical 3D environment” claimed. Contrary to Defendants’ assertion, other claim recitations of a display “adapted for visually representing the physical 3D environment” does not contradict this meaning. The display is adapted *for* representing the “physical 3D environment.” The portion of the “physical 3D environment” actually represented on the display is the portion actually scanned (the “3D environment”).

Defendants have not met their heavy burden of proving that the claims of the ’221 Patent are indefinite. *Microsoft Corp. v. i4i Ltd. P’ship*, 564 US 91, 95 (2011) (party challenging patent must prove invalidity by clear and convincing evidence). The “physical 3D environment” is not indefinite and no further construction is necessary.

B. “wherein the at least one motion sensor is a sensor that directly detects motion” (cls. 1, 19)

Defendants attempt to manufacture ambiguity where this is none. The plain language of the claims calls for a sensor to “directly” detect motion. Defendants’ argument is that “directly” is a term of degree like “elongated” or “fragile.” Def. Br., 22. This argument makes no sense. Nothing in “direct” indicates degrees or shades of grey. Rather, this is a term that specifies the manner in which motion must be detected: directly, instead of indirectly. *See, e.g., 3M Co. v. Kerr Corp.*, No. 17-1730-LPS, 2019 WL 2411736 at * 3 (D. Del. June 7, 2019) (Stark, J.)

(finding “fully densified” not term of degree because it is “binary.”); *FloodBreak, LLC v. Art Metal Industries, LLC*, No. 3:18-cv-503, 2020 WL 45458084 at *14 (D. Conn. Aug. 6, 2020) (finding “not obstructing” is not term of degree). Defendants’ indefiniteness arguments therefore fail.

Defendants are also wrong that the claims and specification provide no clarity on the meaning of “directly.” First, Defendants’ claims that the term “directly” must be used verbatim in the specification is contrary to established precedent. *See, e.g., Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1345 (Fed. Cir. 2016). Defendants recognize that the specification has met this standard, explaining “the specification again provides examples of motion sensors, such as accelerometers, gyros, and magnetometers (which detect rotations, lateral motion and/or combined rotation).”

Defendants’ arguments relying on dependent claims 8 and 20 (Def. Br., 22-23) confirm, rather than refute, this understanding. The reexamination certificate (showing changes relative to the ’675 Patent claims) shows claim 8:

8. The *scanning* system according to claim **[4]** 1, wherein the [user-interface is other than the at least one motion sensor] *handheld device further comprises at least one of an infrared sensor, a range sensor, or a proximity sensor.*

Claim 8 thus adds an additional recitation to the scanning system of claim 1 that the handheld device *further comprises* at least one of these three types of sensors.

Claim 8 does *not* recite, as Defendants seem to allege, that the motion sensor *is* one of these three sensors. Rather, claim 8 requires: (i) a motion sensor that directly detects motion; and (ii) at least one *additional* sensor. Claim 8 further confirms the distinction between motion sensors that directly detect motion and sensors that may not necessarily directly detect motion, such as infrared, range, or proximity sensors.

Claim 20 makes this distinction even more apparent. Claim 20 recites “the at least one motion sensor *is* an accelerometer, gyro, or magnetometer.” Claim 20 thus enumerates three specific known motion sensors; *i.e.*, an accelerometer which detects acceleration (relative change in linear position), a gyro which detects relative change in orientation, and a magnetometer which detects relative change in gravitational field. Ex. I, ¶¶46-47. A POSITA would recognize these particular sensors as the three most common motion sensors. *Id.*, ¶¶44-45. The detection of *relative* position or orientation changes—as opposed to merely detecting an absolute value, such as position, and being able to indirectly derive motion—is exactly the failed argument from the ’675 Patent (the direct predecessor of the ’221 Patent) IPR that led to this recitation of “directly” detecting motion introduced in reexamination. *See, e.g.*, Ex. B, 25-28 (arguing alleged prior art “Serra’s tracking system detects *absolute values*, whereas *the motion sensor* of the ’675 Patent

detects relative values”); Ex. C, 4-8 (showing the claims filed immediately after ’675 Patent invalidity). Defendants have not shown by clear and convincing evidence this term is indefinite.

IV. U.S. PATENT NO. 10,695,151

A. “shape data” (cls. 1, 13, 14) / “texture data” (cls. 1-3, 7, 10, 13-15)

The terms “shape,” “texture,” and “data” are commonly used terms, used consistent with their normal definitions in the specification and claims. There is no “express definition” in the specification as alleged by Defendants. Def. Br., 24. Rather, the specification provides explanatory language about shape and texture data in relation to the digital 3D representation. *See* ’151 Patent, 2:32-54. Accordingly, there is no need for a construction, let alone Defendants’, which merely rearranges the plain claim language and does not provide any further insight regarding the meaning of the term.

Defendants also claim that a construction is necessary to “eliminate ambiguity by specifying that the data relates to the [shape or texture] ‘of the tooth.’” Def. Br., 24. But, as 3Shape explained in its opening brief, the claim already does this, stating, “where the digital 3D representation comprises shape data and texture data *for the tooth*.” ’151 Patent, cls. 1, 13, 14. Claim construction “is not an obligatory exercise in redundancy;” rather, it “is a matter

of resolution of disputed meanings and technical scope, to clarify and *when necessary* to explain what the patentee covered by the claims.” *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008). As Defendants merely seek to reword the claims, construction is improper. *Kason Inds., Inc. v. Component Hardware, Grp., Inc.*, No. 3:13-cv-00012, 2014 WL 10588312 at *5 (N.D. Ga. Jan. 31, 2014) (“the Court need not provide a new definition or rewrite a term when the Court finds the term's plain and ordinary meaning is sufficient”) (internal quotation omitted).

B. “deriving a certainty score” (claim 1)

Defendants wrongly claim that *Straight Path IP Group v. Sipnet EU S.R.O.* stands for the proposition that “where ... the *claim language* provides a definition, there is no ‘basis for reasonably adopting a construction that contradicts the plain meaning.’” Def. Br., 25 (citing 806 F.3d 1356, 1361 (Fed. Cir. 2015)). What *Straight Path* actually says is “[h]ere, *the specification does not provide a basis for reasonably adopting a construction that contradicts the plain meaning.*” 806 F.3d at 1361 (also applying the broadest reasonable standard not applicable here).

Defendants then wrongly conclude that because the specification defines “certainty score,” no construction is necessary. Def. Br., 24-26. That is not the standard. Unlike the commonly used terms like shape, texture, and data,

discussed above, “deriving a certainty score” is not a term generally used by those skilled in the art. Defendants do not claim they are and, moreover, fail to state what the “plain and ordinary meaning” supposedly is. *See generally* Def. Br., 10-12; *see also Mobile Telecomms. Techs., LLC v. United Parcel Service, Inc.*, No. 12-cv-3222, 2014 WL 1274003 at *6 (N.D. Ga. Mar. 17, 2014) (simply arguing the ordinary meaning applies “does not necessarily mean that the Court should not supply to the jury such an ordinary meaning”) (internal citation omitted).

3Shape’s construction should be adopted because it clarifies the scope and meaning of the term and will therefore be of more assistance to the jury.

3Shape’s proposed construction provides information on what the “certainty score” is – an “accuracy value” – and specifies from what information it is “derived” – “determin[ed] ... based on the tooth shade value, the texture data, and/or the texture information.” In claiming that 3Shape’s proposed construction “merely replaces the claim language with a similar phrase that does not improve comprehension” (Def. Br., 25-26), Defendants entirely ignore the part of 3Shape’s construction that describes the sources from which the value is derived – *i.e.*, the tooth shade value, the texture data, and/or texture information.

Therefore, 3Shape’s construction should be adopted.

C. Antecedent Basis Terms

Defendants nitpick the improper use of “the” when it is apparent that these terms merely should have been drafted to introduce the terms for the first time. Defendants’ assertions of ambiguity are undercut by their IPR petition, which asserts: (i) no construction is necessary for any of these terms; and (ii) all of these features can be readily mapped to purported corresponding aspects in other references. *See* Ex. L, 2-3, 6-8. It is improper to construe the terms one way for invalidity and another for infringement. *Data Engine Techs. LLC v. Google LLC*, 10 F.4th 1375, 1381 (Fed. Cir. 2021).

Despite Defendants’ attempt to manufacture ambiguity over formal antecedent basis, they acknowledge that the surrounding claim language and specification makes the meaning of the claim terms clear. In discussing “the certainty measure,” Defendants undermine their own position by acknowledging that the specification defines “certainty measure” and that that definition is consistent with how the term is used in claim 7. Def. Br., 27. Defendants are correct that the specification explains that the “certainty measure relates to how uniform the sub-scan texture information is at the point.” *Id.* (citing ’151 Patent, 6:25-27, 7:7-8). That is consistent with what claim 7 says: “wherein the certainty measure relates to how uniform the sub-scan texture information is at the point and/or to how close the texture data is to the known texture value.” ’151 Patent, cl.

7. Defendants offer conclusory arguments that because “the certainty measure” is not interchangeable with the “certainty score,” it must be ambiguous. Def. Br., 27. But the point of dependent claims is to narrow the independent claims. “Certainty measure” as used in claim 7 narrows “certainty score” by specifying that it “relates to how uniform the sub-scan texture is at that point.”³

Defendants’ reliance on *Haliburton Energy Servs. v. M-I, LLC*, is also misplaced. 514 F.3d 1244, 1256 (Fed. Cir. 2008). Contrary to Defendants’ assertion, the *Haliburton* holding is ***not related to antecedent basis issues***. Instead, it considers the term “fragile gel” where none of the three definitions proposed by the patentee provided boundaries with which a POSITA could distinguish the term from the prior art or ascertain the “fragile gel’s” properties. *Id.* *Haliburton*’s only discussion related to antecedent basis is a general statement that a claim can be indefinite for lack of antecedent basis “where such basis is not *otherwise present by implication* or the meaning is not *readily ascertainable*.” *Id.* at 1249. Defendants’ brief acknowledges that both are present here. Def. Br., 27.

Defendants’ arguments regarding “the sub-scan texture information” and

³ While Defendants consistently cite expert testimony to support their positions, the expert reports submitted add little substantive evidence. Specifically, both expert declarations appear to be mainly repackaged attorney argument and should be given no weight.

“the amount of information” similarly fall flat. *Haliburton* is again inapt as it has nothing to do with the antecedent basis issues here. Defendants bear the burden of proving indefiniteness by clear and convincing evidence. *BASF Corp. v. Johnson Matthey Inc.*, 875 F.3d 1360, 1365 (Fed. Cir. 2017). They cannot meet that burden with conclusory statements that it is unclear what “the sub-scan texture information” and “the amount of texture information” refer to. Def. Br., 28; *Williamson v. Google*, No. 15-cv-00966, 2017 WL 3232582 at *10 (N.D. Cal. July 27, 2017) (conclusory assertions that a term is unclear are insufficient to prove indefiniteness).

Finally, claim 11 must be interpreted in the context of its dependence from claim 1. “The texture information” refers to claim 1’s disclosed “texture data.” Defendants’ assertion that the two terms have different meanings in the specification is unavailing because the relevant standard is whether a POSITA would have reasonably understood the claim, not whether a POSITA could have come up with a distinct meaning that, if adopted, would render the claim indefinite.

V. CONCLUSION

For the reasons stated above, and in 3Shape’s Opening Claim Construction Brief, the Court should adopt Plaintiff’s positions.

Date: February 16, 2023

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

Pursuant to Local Rule 7.1(D), the foregoing complies with the font and point selection approved by this Court in Local Rule 5.1 (B). This paper was prepared on a computer using Times New Roman fourteen-point font, double-spaced.

/s/ Puja Patel Lea

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF GEORGIA**

3SHAPE A/S,

Plaintiff,

v.

CARESTREAM DENTAL, LLC,
DENTAL IMAGING
TECHNOLOGIES CORP., and
DENTAL IMAGING
TECHNOLOGIES CORP. d/b/a
DEXIS

Defendants.

Civil Action No. 1:22-cv-01829-
WMR

CERTIFICATE OF SERVICE

I hereby certify on this 16th day of February, 2023, the foregoing was electronically filed with the Clerk of the Court using the CM/ECF System, which will send a notification of such filing (NEFF) to all counsel of record.

/s/ Puja Patel Lea