IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

L-3 COMMUNICATIONS CORPORATION	:	
Plaintiff,	:	
v.	:	Civil Action No. 10-734-RGA
SONY CORPORATION, SONY ELECTRONICS INC., and SONY ERICSSON MOBILE COMMUNICATIONS (USA) INC,	:	
Defendant.	:	

CLAIM CONSTRUCTION MEMORANDUM OPINION

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June 22, 2012

Wilmington, Delaware

Andrews, United States District Judge:

Plaintiff L-3 Communications Corporation brings an infringement suit of Patent Number 5,452,004 ("'004 Patent") and Patent Number 5,541,654 ("'654 Patent") against Defendants Sony Corporation, Sony Electronics Inc., and Sony Mobile Communications (USA) Inc. These two patents are related and share a common specification. The patents claim inventions in the field of electronic imaging technology. The inventions use imaging arrays to convert invisible light to electrical signals that create a viewable image. The imaging arrays are formed by combinations of image elements, or pixels, which are further composed of various circuit components. This memorandum opinion provides claim construction of the disputed terms.

1. "Provide" and "Providing"

Sony's Proposed Construction:	"Provide" means "generate," "providing" means "generating."
L-3's Proposed Construction:	No construction necessary.
Court's Construction:	No construction necessary.

The parties dispute the construction of "provide" and "providing" as the terms are used throughout the claims of both patents. The Court holds that both terms are to be construed by their plain and ordinary meaning. The broadness and flexibility of "provide" and "providing" appropriately encompass the multiple contexts where these terms appear within the claims. Further, "provide" and "providing" are not used in a technical manner. Sony's proposal of "generate" and "generating" is more restrictive and is offered without intrinsic evidence in justification. Finally, there is no intrinsic evidence justifying a departure from the ordinary

meaning. For these reasons, the Court holds that "provide" and "providing" need not be construed.

2. "Image element"

Sony's Proposed Construction:	An "image element" refers to the non-shared circuit components that make up a single pixel.
L-3's Proposed Construction:	No construction necessary.
Court's Construction:	An "image element" refers to the circuit components that make up a pixel. Circuit components may be shared between multiple "image elements," but the circuit components must be located within the "image element" or "image elements."

The parties dispute the construction of "image element" as used in independent claim 16 of the '004 patent and independent claims 1 and 15 of the '654 patent. "Image elements" are arranged in rows to form the imaging array, which detects incident light and creates output signals that are processed into the image scene. The specification defines "pixel" as synonymous for "image elements." *See, e.g.*, '654 Patent, ll. 4:44. Each independent claim has a differently formulated list of circuit sub-components that together form the respectively claimed "image element."[1] Sony argues that each individual "image element" has individualized circuit components, i.e., the circuit components are "non-shared." Further, Sony argues that the sub-components themselves must be spatially located "within the 'image element.'" L-3 disagrees, contending that these restrictions are artificial and that "image element" deserves its plain and ordinary meaning.

[1] For example, claim 1 of the '654 patent discloses that the "image elements each include means for photovoltaically producing an electrical charge [and] storage means for storing said charge [and] means for draining stored charge [and] charge draining means [that] includes a logic gate, and a conductor carrying an analogue voltage level."

An issue relevant to the dispute is whether the preamble to claim 16 of the '004 patent is limiting. The preamble is: "An imaging device having an image element, said image element comprising." The claim then lists the sub-components that make up the "image element." If the preamble is limiting, it suggests that the circuit sub-components are structurally subordinate to the larger structure of the "image element" and thus strengthens Sony's position that they are within the "image element." The general rule is that a preamble is not a limiting feature of a claim. *See Med. Sys., Inc. v. Biolitic, Inc.*, 618 F.3d 1354, 1358-59 (Fed. Cir. 2010). When, however, the preamble recites essential structure or steps, or if it is necessary to give life, meaning, and vitality to the claim, it may be limiting. *See id.* The preamble here offers important structural context for the claim. It both locates the "image element" within the imaging device and locates listed circuit sub-components within the "image element" itself. Without the preamble, Claim 16 would recite a listing of disconnected electronic elements divorced from any structural context. The preamble emphasizes that the sub-components are the building blocks of the "image element." For these reasons, the Court agrees with Sony and finds the preamble a limiting part of the claim.

The Court further agrees with Sony that the sub-components of an "image element" must be included within an "image element." The independent claims state that the sub-components are (1) 'at' the "image element;" (2) that the "image element" 'includes' the sub-components; (3) and that the "image element" is 'comprised' of the sub-components. These phrases support the idea that there is an actual spatial relationship between the "image element" and its sub-components. The specification further supports this construction by describing the "image elements" as existing in "rows" to form the image array within the "Summary of the Invention." '654 Patent, ll. 1:15-18. "Image elements" can only be arranged in rows if they are more or less

spatially definable; to form a row, one must be able to locate where one "image element" begins and the next one ends. The sub-components are the "image element's" entire substance, and if they are not required to be spatially 'included' within the "image element," the entire image array would be a mish mash of circuit components. It would be impossible for "image elements" to be discretely arranged in rows. For these reasons, the Court agrees that the sub-components are within the "image element."

This does not mean, however, that circuit sub-components are necessarily non-shared. The claims and specification show that the "image elements" can be formed individually in rows while still having certain components in common. The analogue voltage conductor listed in claim 1 of the '654 patent is explicitly shared among the "image elements."[2] Sony argues that the conductor is merely a power connector and is not a circuit component. According to Sony, the circuit components, not the connecting wires, do the specialized work of the "image element." Thus, only the non-shared circuit components need be accounted for within the construction. Sony's construction is problematic in that it is inconsistent with the way the claims treat the analogue conductor, which is clearly disclosed as part of the "image element" by claim 1. In addition, the claim language does not signal that the circuit components are non-shared, just as it does not signal that the analogue conductor is shared. The latter is only established within the specification.[3] The specification, however, further undercuts Sony's argument that the "image element" is comprised only of "non-shared" circuit components, as at least one disclosed embodiment can be fairly read to encompass a group of pixels that share a single

[2] The specification states that this conductor is "common to all of the pixels on the array." *Id.* at ll. 5:21-22.
[3] "Wherein said image elements each also include means for draining stored charge from said charge storage means, in response to an element resetting signal; and wherein said charge draining means includes a logic gate and a conductor carrying an analogue voltage level." *Id.*

resetting gate and output toggling transistor.[4] *See id.* at ll. 13:60-65. Sony's argument that the patentee mistakenly omitted the plural form of "gate" and "transistor" to indicate multiple (and thus non-shared) components would require considerable intrinsic support that is nowhere to be found in the patents. Thus, Sony's argument that circuit components must be "non-shared" would exclude this preferred embodiment. For all these reasons, the Court will not restrict "image element" to "non-shared circuit components."

3. "Charge storage element"

Sony's Proposed Construction:	A "charge storage element" is a circuit component, separate and distinct from the photoresponsive element, that receives and stores charge from the photoresponsive element. The "charge storage element" must also be located within the image element.
L-3's Proposed Construction:	No construction necessary. If construed, "an element that holds charge for some period of time that receives and stores electric charge from said photoresponsive element."
Court's Construction:	A "charge storage element" is a circuit component, separate and distinct from the photoresponsive element, that receives and stores charge provided from the photoresponsive element. The "charge storage element" must be located within the image element.

"Charge storage element" is construed as used in claim 16 of the '004 Patent, along with the phrase "storing electric charge from said photovoltaic element" as used in claim 15 of the '654 Patent.[5] The parties dispute whether the "charge storage element" is a separate and distinct from the photoresponsive element. L-3 maintains that the photoresponsive element may serve the dual functions of producing the electrical charge in response to light and storing that same charge within its inherent capacitance. Sony insists that the claim language and specification do not allow for the photoresponsive element to serve both purposes. That element produces the

[4] "In this case each group of pixels, rather than each pixel, would have an associated access trace 56 and 58, with the resetting gate 64, and output toggling transistor 76 of the grouped pixels all connected together in connection with the respective access traces." *Id.* at ll. 13:61-66.

[5] This construction is also relevant for the construction of the "storage means for storing said charge" phrase term of claim 1 of the '654 patent.

charge, but does not store the charge. The parties also disagree over whether the "charge storage element" must be "within" the image element.

A natural reading of the plain language of the claims suggests that the "charge storage element" is a distinct structure from the "photoresponsive element." The relevant excerpt of Claim 15 of the '004 patent is:

> An imaging device having an image element, said image element comprising:
> a photoresponsive element providing electric charge in response to incident light flux,
> a charge storage element receiving and storing electric charge from said photoresponsive element . . . .

The corresponding excerpt of Claim 16 of the '654 patent is:

> A method of providing an image of a scene, said method comprising the steps of:
> providing an image element including a photovoltaic element which provides electric charge in response to light flux incident thereon,
> storing electric charge from said photovoltaic element at said image element. . . .

Both claims describe the electrical charge as moving to the storage element "from" the photovoltaic element. This suggests physical separation between two distinct components, as "from" indicates that the charge is transported between two different locations. Further, if the "photoresponsive element" was capable of both providing and storing charge, the patentee could have simply said so within the claim. The fact that a photoresponsive element with such dual capability may have been known to exist at the time of prosecution[6] is not determinative when it is inconsistent with the most natural reading of the claims. Further, Claim 1 of the '654 patent discloses a "gain control element interposed between said photoresponsive element and said storage element." If the photoresponsive element and the storage element were one and the same, it would be impossible for the gain control element to be interposed between them. The

[6] *See* U.S. Patent Number 4,942,473 (D.I. 64, Exhibit I).

specification further supports this construction, as both Figures 2 and 9 show a distinct "charge storage element."

L-3 argues that requiring the photoresponsive component to be incapable of storing charge excludes a preferred embodiment, because transistor 74 of Figure 9 is capable of also storing a charge. Transistor 74, however, is not the photoresponsive element. The fact that this transistor can store charge does not require finding that the photoresponsive element stores charge. For these reasons, the Court rules that the "charge storage element" must be distinct from the photoresponsive or photovoltaic elements. In addition, consistent the Court's construction of "image element," the "charge storage element" must be located "within" the image element.

4. "Storage means for storing said charge at said image element"

Sony's Proposed Construction:	This element is a means-plus-function element. Function: The storage means must store the electrical charge generated by the means for photovoltaically producing an electrical charge. Specification Structure: Capacitor 44, 44', located within the image element [FIGS. 2, 9].
L-3's Proposed Construction:	This element is a means-plus-function element. Function: Storing said charge at said image element. Structure: a capacitance, either a distinct element or inherent in another element, such as a transistor, and equivalents.
Court's Construction:	Function: The storage means stores the electrical charge provided by the means for photovoltaically producing an electrical charge. Structure: Capacitor 44, 44' (FIGS. 2, 9) and transistor 74 (FIG. 9) located within the image element.

Both parties agree that the "storage means for storing said charge at said image element" excerpt of claim 1 of the '654 Patent is a means-plus-function element. For the reasons already discussed, the Court holds that the "means for storing said charge" must be composed of a structure distinct from the photovoltaic element. The function of the "storage means" is thus

construed as "the storage means stores the electrical charge provided by the means for photovoltaically producing an electrical charge." The corresponding structures are the capacitor 44 (FIGS. 2, 9) and the transistor 74 (FIG 9). '654 Patent, l. 7:17, ll. 11:49-51.

5. "Gain control element"

Sony's Proposed Construction:	A "gain control element" is a circuit component that is continuously engaged and controls the amount of charge stored at the charge storage element in response to a given output from the photoresponsive element. The gain control element component must be located within the image element.
L-3's Proposed Construction:	No construction necessary. If construed, "an element interposed between said photoresponsive element and said storage element that controls the amount of charge provided."
Court's Construction:	A "gain control element" is a circuit component of the image element that controls the amount of charge provided from the photoresponsive element to the charge storage element. The "gain control element" is not a switch and is located within the image element.

The construction of "gain control element" as used in claim 16 of the '004 Patent is disputed. Sony offers a construction requiring the "gain control element" to be "continuously engaged," while L-3 argues that such a limitation is an artificial restriction. This disagreement boils down to whether the "gain control element" may function as a switch, i.e., it is either turned on or off. According to Sony, if the "gain control element" cannot be a switch, it is then "always on" and thus "continuously engaged." The patent uses switch explicitly as to the charge drainage switch and the output switch. The patent does not, however, use switch in connection with the "gain control element." This suggests that the "gain control element" is not a switch. This inference is supported by contrasting the specification's description of how switches work with how the "gain control element" works. Switches are either completely opened or completely closed, i.e., on or off, as controlled by the logic signals. *See id.*at ll. 8:44-51. The "gain control element," on the other hand, functions on a continuum, becoming more or less

conductive depending on the amount of bias voltage applied. *See id.* ll. at 5:10-16. This is different from the "all or nothing" function of a switch. The Court, however, is not convinced that "continuously engaged" is a correct limitation for "gain control element," as the "gain control element" can be fairly said to be not engaged when no bias voltage is being applied.

For these reasons, the Court construes "gain control element" to be "a circuit component of the image element that controls the amount of charge provided from the photoresponsive element to the charge storage element. The gain control element is not a switch and is located within the image element."

6. "Charge drain"

Sony's Proposed Construction:	A "charge drain" is a low voltage source that depletes charge at the charge storage element when connected thereto by the charge drainage switch.
L-3's Proposed Construction:	No construction necessary. If construed, "a switch that when closed connects the charge storage element to a charge drainage element that removes the charge difference created by the photoresponsive element."
Court's Construction:	A "charge drain" is a low voltage source that depletes charge at the charge storage element when connected thereto by the charge drainage switch.

The parties dispute the construction of "charge drain" as used in claim 16 of the '004 patent. The entire phrase is "a charge drainage switch when closed connecting said charge storage element to a charge drain therefor." The parties disagree over how the charge drain accomplishes its goal of resetting the charge storage element. Sony argues that the "charge drain" resets the charge storage element by depleting the charge via a connection to a low voltage source or ground. L-3 maintains that such a definition misapprehends the reset function, as the charge drain works by removing the charge differential. L-3 states that the drainage differential can be removed by adding positive charge to a negatively charged element and vice-

versa. But that is inconsistent with the language of the claim. Nowhere does the claim mention adding charge. Further, the specification only speaks about draining charge: "[t]hat is, whatever charge has accumulated on the capacitor 44 is drained to the trace 54." '004 Patent, ll. 7:11-20. The "charge drain" thus removes charge accumulation; it does not add charge. The Court construes "charge drain" as "a low voltage source that depletes charge at the charge storage element when connected thereto by the charge drainage switch."

7. "Means for draining stored charge from said charge storage means in response to an element resetting signal"

Sony's Proposed Construction:	Sony contends that this is a means-plus-function element. Function: The means for draining must deplete stored charge to a low voltage reference (e.g., ground) Specification structure: Logic gate 64, 64' and input contacts 60, 60' and 62, 62', switch 70, 70' and Vssa voltage (ground), all located within the image element [FIGS. 2, 9]
L-3's Proposed Construction:	No construction necessary. This is not a means-plus-function element. If construed as a means-plus-function, then as follows: Function: removing the charge difference created by the photovoltaic element from the charge storage means in response to a signal that causes an element to be reset to a prior state. Structure: circuit connecting capacitor to voltage reference (6:66-7:4)
Court's Construction:	This is a means-plus-function element. Function: The means for draining must deplete stored charge to a low voltage source. Specification structure: Logic gate 64, 64' and input contacts 60, 60' and 62, 62', switch 70, 70' and Vssa voltage (ground), all located within the image element [FIGS. 2, 9].

The parties dispute whether the "means for draining stored charge" phrase used in claim 1 of the '654 patent is a means-plus-function element.[7] The claim's use of "means" gives rise to the presumption that it is a means-plus-function element. *TriMed, Inc. v. Stryker Corp.*, 514 F.3d 1256, 1259 (Fed. Cir. 2008). This presumption can be overcome when the claim itself discloses

[7] The "draining stored charge" means is construed consistently with "charge drain." It refers to the removal of charge by connection to a low voltage source.

sufficient structure. "Sufficient structure exists when the claim language specifies the exact structure that performs the functions in question without need to resort to other portions of the specification or extrinsic evidence for an adequate understanding of the structure." *Id.* at 1259-60.

The structure disclosed in connection with the "means for draining stored charge" follows: "wherein said charge draining means includes a logic gate, and a conductor carrying an analogue voltage level." L-3 insists that this structure is sufficient to overcome the presumption. A logic gate and a conductor are not sufficient structure. They do not disclose the moving parts key to charge drainage, at least according to the specification. "The one of these two selected pixels which is not to supply image information is reset by connecting the negative plate of capacitor 44 to trace 54 carrying reference voltage signal 'VSSA', via the FET 70 under control of the NOR gate 64. That is, whatever charge has accumulated on the capacitor 44 is drained to the trace 54." '654 Patent, ll. 6:66-7:4. Further, the specification discloses, "[b]ecause of the connection of each reset/select buffer with each of the decoder and latch pairs (100, 104) and (102, 106), two rows of pixels on the array 12 may be accessed simultaneously for purposes of resetting one pixel in the row identified with the address..." *Id.* at ll. 6:55-59. Finally, the specification discloses, "[i]n the P-type material 180 of substrate 14, the excess charge is represented schematically with the arrows 194. In the P-type material 180 of substrate 14, the excess charge from diode 42 is combined with the majority carriers and flows to the charge drain represented by the connection with Vdbi, as is depicted with arrow 196."

The specification describes structure in much greater detail than that included within the claim. L-3 argues that a person skilled in the art would be able to adequately understand the function of the means based on the structure within claim language alone (D.I. 63, p. 21), but that

argument is not persuasive. Thus, L-3 has not overcome the means-plus-function presumption. L-3's claim construction brief proves the point. When L-3 makes its in-the-alternative arguments based on the contingency that its means-plus-function position is unsuccessful, it is forced to identify every important circuit in addition to the analogue conductor and logic gate as corresponding structures: (1) a circuit connecting a capacitor to a voltage reference; (2) a circuit having a conductor that affects a logic gate to switch the stored charge to an analogue voltage reference; (3) a switch connecting the stored charge to a reference voltage level; (4) a circuit connecting the semiconductor substrate to a voltage reference; and (5) a switch that drains stored charge when closed. (D.I. 63, p. 21). Thus, the claim does not provide the "exact structure" required to drain storage and the means-plus-function presumption is not overcome. *See TriMed, Inc. v. Stryker Corp.*, 514 F.3d at 1259.

The Court construes the charge drain function here consistent with its previous construction of "charge storage element:" "the means for draining must deplete stored charge to a low voltage source." Further, the corresponding specification structures are the logic gate 64, input contacts 60 and 62, switch 70, and trace 54 Vssa Voltage. '654 Patent, FIGS. 2, 9. These structures must be located within the image element.

8. "Logic gate having a pair of inputs"

Sony's Proposed Construction:	A "logic gate having a pair of inputs" is a circuit component that performs an elementary combinatorial logic operation (e.g., AND, OR, NAND, NOR) from two inputs. The logic gate component must be located within the image element. The "controlling ..." limitation requires that the logic gate place the charge drainage switch in a first state (e.g., on or off) when the two inputs to the logic gate are the same and place the charge drainage switch in a different state (e.g., off or on) when the two inputs to the logic gate are different.
L-3's Proposed Construction:	The phrase means "an element having at least one pair of inputs and an output that is a result of a logical operation on the inputs and that controls said charge drainage switch dependent on

	whether the inputs are alike or dissimilar."
Court's Construction:	A "logic gate having a pair of inputs" is a circuit component that performs an elementary combinatorial logic operation from two inputs. The inputs control the charge drainage switch dependent on whether the inputs are alike or dissimilar. The logic gate component must be located within the image element.

The phrase "a logic gate having a pair of inputs...controlling said charge drainage switch dependent on whether said pair of inputs carry like or dissimilar signals" appears in claim 16 of the '004 patent. Sony argues that "logic gate" should be restricted to performing elementary combinatorial logic operations from two inputs. According to Sony, "logic gate" needs to be distinguished from a "logic circuit," as a "logic circuit" is much more complex structure formed by a combination of many "logic gates." Further, the logic gate should be limited to only a pair of inputs. L-3 disagrees and maintains that such restrictions are unsupported by the claim or specification. The parties resort to extrinsic evidence to determine whether a "logic gate" can perform more than elementary combinatorial logic, i.e., whether "logic gate" encompasses a logic circuit. Sony cites *IEEE*'s definition most applicable dictionary definition of "gate:" "A combinational circuit that performs an elementary logic operation. *Note*: Usually involves at least one input and one output. *Synonym:* logic gate; logic element." (D.I. 66, Exh. I at 476). Sony uses this definition in support of its argument that "logic gate" in the claim is not equivalent to combinations of logic gates, i.e., a logic circuit.

L-3 argues that Sony's dictionary contains alternative definitions consistent with L-3's construction. L-3 further cites a dictionary definition that treats "logic gate" and "logic circuit" as synonyms and does not draw Sony's distinction. (D.I. 64, Exh. F at 9). Sony counters these points by referencing one of L-3's sources as encompassing Sony's preferred construction, which states that "combinational circuits can be constructed with gates alone." (D.I. 70, Exh. N

at 491). This last phrase is telling. In the same way that a brick can be combined with other bricks to form a wall, a logic gate can be combined with other logic gates to form a logic circuit. A single brick, however, is not a wall, and a single logic gate is not a logic circuit. The weight of the extrinsic evidence favors Sony's construction. Absent suggestions in the claims or specification envisioning a combination of "logic gates," it would be error to construe "logic gate" as encompassing a "logic circuit."

The parties further dispute whether "logic gate" is limited to a single pair of inputs. Sony argues that the claim language states that the logic gate must "control[] said charge drainage switch dependent upon whether said pair of inputs carry like or dissimilar signals." In other words, a switch can only be controlled in two ways (on or off) and a logic gate can only have two outputs (high or low). The logic gate controls the switch based on these two inputs, and the claim does not permit contribution from other input signals. L-3 cites case law stating that the indefinite article "a" is presumed to mean 'one or more.' *KCJ Corp. v. Kinetic Concepts, Inc.*, 223 F.3d 1351, 1356 (Fed. Cir. 2000). The exception to the rule requires a clear intent to limit 'a' to 'one.' *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1342 (Fed. Cir. 2008). According to L-3, the patent demonstrates no such intention to limit "logic gate" to a single pair. This rule, however, applies "[u]nless the claim is specific as to the number of elements." *KCJ Corp.*, 223 F.3d at 1356. Here, the claim states "a pair" of inputs, meaning two outputs. Thus, the claim falls within the exception and is limited to two inputs. Further, the Court agrees with Sony's analysis that because the switch can only be turned on or off, and only two input signals are required to perform this function, there is no need for the logic gate to have more than one pair of inputs. Finally, the Court rules that the "logic gate" must be included within the image element.

9. "An output switch having a control input which is one of said pair of inputs and when closed connecting said output voltage level to an output signal conductor"

Sony's Proposed Construction:	An output switch having a control input which is one of said pair of inputs.
L-3's Proposed Construction:	No construction necessary. If construed, "a switch that when closed connects an output voltage to an output signal conductor and that has an input signal that controls the state of the switch and is electrically and logically coupled to one of the inputs to the logic gate."
Court's Construction:	No construction necessary.

Claim 16 of the '004 patent uses the term "control input" in the following phrase: "an output switch having a control input which is one of said pair of inputs and when closed connecting said output voltage level to an output signal conductor." Sony argues that the plain language of claim 16 requires the output switch and the logic gate to share a common input because it describes the logic gate as "having a pair of inputs" and further states the output switch has "a control input which is one of said pair of inputs." Sony supports this argument by pointing to the specification. Sony's construction, however, would deprive the patentee of the full scope the claim language and limit the claim language to the preferred embodiment. For these reasons, the Court declines to construe "control input" and gives it its ordinary meaning.

10. "Means for randomly accessing said image elements"

Sony's Proposed Construction:	This element is a means-plus-function element. Function: The means must drive control signals to the array to access either a single pixel or a pre-wired group of pixels. The means must be capable of performing both functions (individually and pre-wired groups), but not at the same time. Means must access individual groups of image elements according to a random pattern. Specification structure: A pair of traces 56, 58 that traverse the array and a pair of decode and latch circuits 22, 24 that respectively drive traces 56, 58. A unique combination of traces 56, 58 is provided for every pixel that is accessed individually and a unique combination of traces 56, 58 is provided for every group

	of pixels.
L-3's Proposed Construction:	No construction necessary. If construed as a means-plus-function claim, Function: sequentially or otherwise accessing the image elements either individually or in groups of less than the full plurality of elements on the array. Structure: conductors associated with the element or group (col. 13 l. 51- col.14 l. 9; col. 5 ll.24-37) and decode and latch circuits associated with the element or group (col. 5 l. 55 – col. 6 l. 65, Claim 9) or control, decode, and latch circuits associated with the element or group (col. 9 ll. 46-59, col. 12 l. 39 – col. 13 l. 15, Claim 8, Claim 10); process (Claim 24, Claim 26); and equivalents.
Court's Construction:	This element is a means-plus-function element. Function: Accessing the image elements either individually or in groups of less than the full plurality of elements on the array. Structure: A pair of traces 56, 58 that traverse the array and a pair of decode and latch circuits 22, 24 that respectively drive traces 56, 58. '654 Patent, ll. 5:23-40, 13:60-14:1. When accessing the pixels in groups, each group would have an associated access trace 56 and 58, with the resetting gate 64 and output toggling transistor 76 of the grouped pixels all connected together in connection with the respective access traces.

The Court construes "means for randomly accessing said image elements individually or in groups of less than the full plurality of elements on said array" as used in claim 1 of the '654 patent. The parties dispute whether the phrase is a means-plus-function element. Although the claim itself does contain some structure, the structure provided is insufficient to overcome the means-plus-function presumption. To overcome this presumption, a party must show that the claim discloses the "exact structure" allowing an adequate understanding of the structure without resorting to the specification or extrinsic evidence. *See TriMed*, 514 F.3d at 1259. The claim discloses "a plurality of first and a plurality of second conductors traversing said array, each individual image element or group of image elements being associated with a respective one of said plurality of first conductors and a respective one of said plurality of second conductors." L-

3 argues that presumption has been overcome, but the Court is not persuaded that a person skilled in the art would adequately understand the structure based on the claim language. The specification discloses additional structures in connection with the "means for randomly accessing" function. These include the control, decode, and latch circuits associated with the element or group. *Id.* at ll. 9:46-59, 12:39-13:15; 4:55-6:65. These structures are nowhere to be found within the claim itself. Therefore, the term is construed as a means-plus-function claim.

The exact function performed by this term is disputed between the parties. L-3 argues that the claim covers both sequential and random accessing of pixel elements, while Sony maintains that it claims random accessing alone. The specification itself explicitly states that that the device may employ the "row by row" accessing consistent with sequential access. [8] Therefore, the Court will not limit the function of this term to random access. Sony further argues that the means must access pixels individually or as pre-wired groups, but not at the same time. Sony argues that this limitation is driven by the fact that the circuits can only accept one address at a time, but this limitation appears to be grafted onto the claim language from the specification without justification. *Id.* at ll. 5:29-32, 14:35-51. The Court will not limit the claim language based on these preferred embodiments. Sony further argues that the function must contain "drive control signals to the pixel to access the individual pixel or pixel groups." While these control signals may be necessary structural components to accomplish the means, they are not a part of the function itself and should not be forced into the functional construction. For all these reasons, the Court construes the function as "accessing the image elements either individually or in groups of less than the full plurality of elements on the array."

[8] "The device includes an architecture which allows individual image elements, or pixels, of the device to be randomly accessed individually or in groups. Consequently, the pixels of the device may be scanned individually row by row like a conventional focal plane array imaging device, or the pixels may be accessed individually or in groups to define one or more windows on the array in which an image or images of interest are located." *Id.* at 1:15-22.

The specification discloses the following structure. "In connection with accessing individual pixels, a pair of traces 56, 58 that traverse the array and a pair of decode and latch circuits 22, 24 that respectively drive traces 56, 58." '654 Patent, ll. 5:23-40, 13:60-14:1. "In connection with accessing the pixels in groups, each group has an associated access trace 56 and 58, with the resetting gate 64 and output toggling transistor 76 of the grouped pixels all connected together in connection with the respective access traces." *Id.* at ll. 13:60-14:1.

11. "Means for photovoltaically producing an electrical charge in response to incident light"

Sony's Proposed Construction:	This element is a means-plus-function element. Function: The means must generate electrical charge, as opposed to deplete charge, in response to incident light. Structure: A forward biased InSb photodiode 42, 42' located within the image element [FIGS. 2, 9.]
L-3's Proposed Construction:	No construction necessary. This is not a-means-plus-function element. If construed as such, it should be construed as follows: Function: producing an electrical charge in response to incident light. Structure: photovoltaic photoreceptor; photodiode; P-type InSb photodiode; and equivalents.
Court's Construction:	This element is a means-plus-function element. Function: producing an electrical charge in response to incident light. Structure: photovoltaic photoreceptor; photodiode; P-type InSb photodiode; and equivalents.

The parties dispute whether the "means for photovoltaically producing an electrical charge in response to incident light" phrase from claim 1 of the '654 patent is a means-plus-function element. The language of the phrase gives rise to the means-plus-function presumption. To overcome this presumption, L-3 must show that the claim language itself contains sufficient structure to accomplish the means. *TriMed,* 514 F.3d at 1259. L-3 argues that the "photovoltaically producing" words themselves connote the structure to overcome this

presumption. This is because "photovoltaic" means "capable of generating a voltage as a result of exposure to visible or other radiation." Therefore, "photovoltaically producing an electrical charge" means "producing an electrical charge with an element that is capable of generating a voltage as a result of exposure to visible or other radiations." Adopting L-3's position would have the strange result of giving contradictory effects to the term, as "a means for photovoltaically producing" would serve as both the phrase triggering and overcoming the means-plus-function presumption. This conflicts with the ordinary use of the word "means" in claim construction. The word "means" is the generic subject of the sentence and is a stand-in for the structure that accomplishes the specific function. The function is disclosed by the verbal phrase of the sentence, here, "photovoltaically producing." The specific structure that forms the "means," however, is not ordinarily disclosed by the verb phrase of the "means" sentence itself; the structure is disclosed elsewhere in the patent (whether in the specification or in the claim if the presumption is overcome). L-3's construction of "means" is inconsistent with this ordinary understanding of claim construction and is therefore incorrect. "Photovoltaically producing" cannot serve as both the verb specifying the function and the structure accomplishing the function itself. The means-plus-function presumption has not been overcome.

The Court must now decide whether "photovoltaically producing" should be construed as "generating electrical charge, as opposed to depleting charge." For the same reason that the Court declined to construe "providing" as generating, it declines to construe "producing" as "generating electrical charge, as opposed to depleting charge." Producing is an everyday word used in a nontechnical manner and there is no reason to limit the claim language as requested by Sony. Thus, the function here is defined as "producing an electrical charge in response to incident light."

The Court next must locate the structure corresponding to the means in the specification. L-3 provided evidence indicating that photodiodes are generally reverse biased and that nothing in the specification suggested otherwise.[9] The diode will not be limited as forward biased. The specification discussed a photoreceptor structure at ll. 1:32-33. While the photoreceptor is not discussed in detail, it is mentioned in the context of the present invention and is a corresponding structure.[10] Photodiode 42 is further a corresponding structure, as disclosed at ll. 7:6-9. The specification further discloses a P-type InSb material that defines a metallurgical junction and provides an electron flow in response to light. *Id.* at ll. 10:25-30. This does not require every corresponding photoreceptor to be made of this material, however, as InSb is used as an exemplary material to accomplish only infrared detection. *See id.* Finally, any "photovoltaically producing" structure must be located within the image element.

12. "Connecting said stored charge to an output device only in response to an interrogation signal to said image element."

Sony's Proposed Construction:	The "connecting" step requires the stored charge to be applied to an amplifier only in response to an interrogation signal. "Connecting" requires a switch/transistor that has the option of not connecting to an output device.
L-3's Proposed Construction:	No construction necessary. If construed, "providing a conductive path electrically coupling the stored charge to the output device only in response to an interrogation signal to said image element."
Court's Construction:	No construction necessary.

The phrase "connecting said stored charge to an output device only in response to an interrogation signal to said image element" is used in claim 15 of the '654 patent. Sony urges the

[9] "[D]etector diodes are normally operated reverse biased. If a detector diode is incorrectly installed in a circuit so that it is forward biased . . . the detector will behave like any other forward-biased junction." (D.I. 64, Exh. G at 14-15).

[10] The photodetector discussed at ll. 2:56, however, is discussed generally in the context of past technologies and does serve as a corresponding structure.

Court to require the "connecting" step to include a switch or transistor that has the option of not connecting to an output device. Sony's construction, however, has two problems. Sony points to Figure 9 and transistor 200 to illustrate the necessity of that transistor, but this is an example of a preferred embodiment that should not limit the claim. *See Phillips*, 415 F.3d at 1320. Second, Sony relies on the unilateral remarks of the PTO examiner, who stated that "transistors # 26 and #28 do not have the option of not connecting to the output device and thus [are] not capable of connecting to the output device only in response to an interrogation signal." (D.I. 66, Exh. F at 18-19). The unilateral remarks of an examiner cannot narrow the claim. *See Cree, Inc. v. SemiLEDs*, 2012 WL 975697, at *17 (D. Del. March 21, 2012). For these reasons, the Court declines to limit this term as necessarily having a switch or transistor. It must, however, be located "within" the image element.

13. "Wherein said step of providing said output amplifier includes providing a transistor at said image element"

Sony's Proposed Construction:	The "connecting" step requires the stored charge to be applied to an amplifier only in response to an interrogation signal. "Connecting" requires a switch/transistor that has the option of not connecting to an output device.
L-3's Proposed Construction:	No construction necessary. If construed, "providing a conductive path electrical coupling the stored charge to the output device only in response to an interrogation signal to said image element.
Court's Construction:	This step must occur "at" the image element. No further construction is necessary.

The phrase "wherein said step of providing said output amplifier includes providing a transistor at said image element" appears in claim 15 of the '654 patent. The parties dispute the construction of this phrase. Sony argues that the transistor must be physically distinct from the output amplifier and bases this on statements made by the Patent Office Examiner. (D.I. 66, Exh. F at 16). These statements, however, are unilateral in nature and cannot be used to limit the

claim. *Cree*, 2012 WL 975697, at *17. Further, unlike the "charge storage" term, nothing in this claim language strongly suggests a physical separation. In fact, the language reads otherwise, as the "providing" of the output amplifier "includes" providing a transistor, suggesting that the "providing" of the amplifier may share structure with the transistor itself. For these reasons, the Court declines to require the transistor to be distinct from the output amplifier. In addition, the step must occur "at" the image element.