Paper No. __

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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WAVELYNX TECHNOLOGIES CORP.
Petitioner,

v.

ASSA ABLOY AB
Patent Owner.

_____

Case No. IPR2023-01018
Patent No. 8,943,562

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PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42.1 *et seq.*

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I. INTRODUCTION

WaveLynx Technologies Corp. ("Petitioner") requests *inter partes* review ("IPR") of claims 1-14 (the "Challenged Claims") of U.S. Patent No. 8,943,562 ("the '562 patent") (EX1001).

II. MANDATORY NOTICES

A. Real Party-In-Interest – §42.8(b)(1)

Petitioner is the real party-in-interest.

B. Related Matters – §42.8(b)(2)

The '562 patent is asserted in *HID Global Corp., et al. v. WaveLynx Technologies Corp.*, No. 22-362-GBW (D. Del.), which was transferred to the District of Colorado, No. 23-1256 (D. Colo.) (the "District Court Litigation"). Petitioner is unaware of any other matter that would affect, or be affected by, a decision in this proceeding.

C. Counsel and Service Information – §42.8(b)(3) and (b)(4)

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Powers of attorney are submitted herewith. Counsel for Petitioners consent to all documents being served via electronic mail.

III. CERTIFICATION OF STANDING

Petitioner affirms that it is not barred or estopped from requesting this IPR. 37 C.F.R. §42.104(a).

IV. THE ’562 PATENT

A. Overview

The ’562 patent is purportedly directed towards a method and system “that enhances the security of unidirectional communication protocols used in access

control systems, such as the Wiegand protocol." EX1001, Abstract; *see also id.* 1:16-18. As explained by the '562 patent:

> The electrical aspect of the Wiegand protocol uses five wires. Two of these wires are used to provide power to the reader. The remaining three wires are used for data communication and signaling . . . . Two of the three data communication and signaling wires are used by the reader to transmit data to an upstream device e.g., control panel, intermediate device, routing device, lock control mechanism, computing platform, host, or the like. These two wires are referred to as DATA0 and DATA1. As the names suggest, the DATA0 signal transmits the "0" bits of the data stream to the upstream device, and the DATA1 signal transmits the "1" bits. … The third data communication and signaling wire is used by the upstream device to signal the reader. This wire is called LEDCTL because it is often used by the upstream device to control a light-emitting diode (LED) in the reader and provides feedback to the card holder.

EX1001, 1:63-2:26.

The '562 patent notes that "the electrical and logical aspects of the Wiegand communication protocol are codified in the Security Industry Association (SIA) standard AC-01 entitled 'Access Control Standard Protocol for the 26-Bit Wiegand Reader Interface,'" which was published in 1996. *Id.*, 1:33-36, (56); *see infra* §VII.B.

The ’562 patent asserts that prior art “Wiegand wires provide only a one-way channel for the communication of digital data, namely from the card reader to the upstream device.” EX1001, 11:1-4. Thus, according to the ’562 patent, “without true bi-directional data communication, there is no way that a reader can receive new configuration data, keys, or firmware without human intervention” at the physical location of the reader. *Id.,* 11:48-54; *see also id.,* 12:50-65.

The ’562 patent therefore purports to teach:

> [S]ystems and methods … that allow existing physical access control systems using Wiegand wires for communication between readers and upstream system components such as control panels to be modified to also support data communication from the upstream components back to the readers…. As an immediate consequence of the application of these inventive means, methods and systems, two-way[] communication may be realized between card readers and upstream devices.

EX1001, 9:57-10:59; *see also id.,* 11:5-8. The ’562 patent teaches using the Weigand LEDCTL line to send “packets of data … from an upstream device to a reader.” *Id.,* 12:38-44.

The ’562 patent describes a reader capable of “modal communication,” by which the reader may change “from one mode to the other and then optionally back to the original mode” if the reader “detect[s] the request to change [] communication

[modes] on the LEDCTL wire." *Id.* 17:14-32, 18:37-38; *see also id.*, 17:33-18:57. The '562 patent discloses that "[o]ne mode is the communication of the current art according to the SIA standard," and the other mode can be either "the advanced two-way packet-mode of communication described herein" or "the secure Wiegand mode." *Id.,* 17:9-14.

B. Challenged Claims

Independent claim 1 recites a "communication method" in a "credential reader" that is connected to an "upstream device," such as a control panel. The reader of claim 1 is capable of operating in a first mode—a "non-secure Wiegand mode"—and in a second mode, which is "at least one of a secure Wiegand mode and a packet-mode." The method of claim 1 requires that the reader: receive a message from the upstream device, determine that the message came from the upstream device, and then based on the determination, "transition[]" the credential reader from the first mode to the second mode. The other independent claims (claims 6 and 11) recite similar functionality but instead of a communication method, recite a "non-transitory computer-readable medium" comprising processor executable instructions (claim 6), and a credential reader (claim 11).

The dependent claims either specify that the communication protocol that the reader uses to communicate with the upstream device is a unidirectional protocol, such as the Wiegand protocol, or specify that the length of the message from the

upstream device to the reader is for a "predetermined amount of time," such as "10 ms."

C. Prosecution History

The 13/689,088 application (the "'088 application") that issued as the '562 patent was filed on November 29, 2012. EX1002. It is a divisional of the 12/539,431 application (the "'431 application"), filed on August 11, 2009, which later issued as U.S. Patent No. 8,358,783 ("the '783 patent"), and claims priority to a provisional application filed on August 11, 2008. EX1001, (62), (60).

1. Prosecution of the '783 Patent

On April 13, 2012, the examiner issued a non-final office action rejecting all pending claims. Of relevance, the examiner rejected claims 9-13 over U.S. Pub. No. 2009/0128392 ("Hardacker") (EX1019) in view of U.S. Patent Publication No. 2006/0123466 ("Davis '466"). EX1003, 1485-86.

On August 13, 2012, the applicant incorporated the limitations of the rejected, then-pending claims 9, 12, and 13 into pending claim 1. Thus, amended claim 1 recited:

1. (Currently Amended) A communication method, comprising:

obfuscating data transmitted in a first message from a first communication device to a second communication device, wherein the first and second communication devices communicate using a unidirectional communication protocol and wherein the obfuscation of the data is effected with a predetermined code wherein the first communication device is upstream of the second communication device, the method further comprising:

determining that the message received at the first communication device was transmitted by the second communication device, wherein determining is performed by one or more of (i) analyzing an out-of-band communication received at the first communication device from the second communication device and (ii) analyzing a special code that identifies the second communication device is an advanced communication device in an advanced communication mode; and

based on determining that the message was transmitted by the second communication device, transitioning the first communication device from a first mode of operation to a second mode of operation, wherein the first mode comprises a Wiegand-format mode and the second mode comprises a packet-mode.

Id., at 1514.

Applicant argued in support of the patentability of the amended claims that Davis '466 "only discloses the concept of a 'Wiegand Extension' where extension bits are transmitted between a reader and a panel" and that "there is absolutely no disclosure in Davis '466 of causing a reader to transition from a first mode of operation to a second mode of operation where the first mode comprises a Wiegand-

format mode and the second mode comprises a packet-mode."[1] EX1003 at 1520. Applicant made other (incorrect) arguments concerning Davis '466, including that: "[t]here is no disclosure of causing a reader to perform [a transitioning function] by transmitting messages of [*sic*] a Wiegand wire, namely the LEDCTL line of the Wiegand wire." EX1003 at 1521.

After subsequent examiner amendments, the '783 patent issued on January 22, 2013. *Id.* at 1548-52; EX1011, (45).

2. Prosecution of the '562 Patent

New claims that eventually issued in the '562 patent were submitted on November 29, 2012, and were examined by a different examiner than the examiner of the application that issued as the '783 patent. EX1002 at 7-63, 171-182. These new claims were substantially broader than those considered during prosecution of the '431 application. *Compare* EX1002, at 59-62 *with* EX1003, at 47-49 (claims 9-13).

[1] As explained below, Davis, which has a substantively identical specification to Davis '466, does teach the "transition from a first mode of operation to a second mode of operation where the first mode comprises a Wiegand-format mode and the second mode comprises a packet-mode." *See infra* §VIII.

On January 17, 2014, the examiner issued a non-final office action, rejecting all pending claims (1-20) under the doctrine of obviousness-type double patenting as being unpatentable over claims 1-27 of the '783 patent. EX1002, at 171-175. The new examiner did not reference Davis '466 but did reject claims 1-5, 8-12, and 15-18 as being anticipated by International Publication No. EP1760985 (the '985 publication) (EX1010).[2] EX1002, at 179-81. The examiner found that the claimed mode-switching capabilities were taught by the '985 publication's disclosure that "the control panel could inform the reader to change how it is working…with a prompting signal send via an LED control signal." EX1002, 180 (quoting EX1010, ¶[0045]).[3] The examiner also rejected claims directed to the alteration of a control line signal for a predetermined amount of time over the following disclosure of WO 02/082367 (EX1008):[4]

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[2] Other claims were rejected under 35 U.S.C. 112, second paragraph and and/or 35 U.S.C. § 101. EX1002, at 175-78.

[3] As explained below, Davis discloses the mode-changing capability with even more detail than the '985 publication's teaching. *See infra* §VIII.

[4] WO 02/082367 (EX1008) is the international equivalent publication of Davis (EX1006). Davis (EX1006) is incorporated into EP1760985 by reference. (EX1010, ¶[0013].)

> The panel system in the preferred embodiment is able to switch a Wiegand generator from the basic protocol to the extended protocol as follows. Note that this procedure will typically be run when the panel is initialized. The panel will drop the LEDCTL signal low three times within a one-second interval. The Wiegand generator starts an interval timer when the first pulse is received, and then checks to see if it receives two additional pulses within the one-second period from the first pulse. If it receives exactly three pulses as described, then it sends the Wiegand extension message "Capable of Using the Wiegand Extension" in message group 0. The panel then will send out the "Use Wiegand Extension" command to the Wiegand generator, and the Wiegand generator sends the "Command received and executed" message in group 0 and sets a flag in non-volatile memory to use the Wiegand extension (even if power is lost and subsequently restored).

EX1008, at 13; EX1002, at 180-81 (citing EX1008, at 13).

Applicant responded on April 21, 2014, amending the pending independent method claim to read as follows:

1. (Currently Amended) A communication method, comprising:

operating a credential reader in a first mode of operation, the credential reader comprising at least one of a microprocessor and firmware that enable the credential reader to operate in the first mode of operation;

receiving, at a communication interface of the credential reader, a message from an upstream device;

determining, by the credential reader, that the message was transmitted by the upstream device; and

based on determining that the message was transmitted by the upstream device, transitioning the credential reader from the first mode of operation to a second mode of operation, wherein the first mode comprises a non-secure Wiegand mode and wherein the second mode comprises at least one of a secure Wiegand mode and a packet-mode.

EX1002 at 320.

Applicant argued that the addition of the first mode and second mode definitions (underlined above), which the examiner had indicated were allowable, rendered the pending claims patentable. EX1002, at 320-323, 325, 181. The Applicant did not provide any arguments regarding the disclosure of WO 02/082367 noted above. EX1002, at 324-26.

After the applicant submitted a terminal disclaimer following a final rejection for double patenting, a notice of allowance issued on September 16, 2014. EX1002, at 335-40, 372, 382. The ’562 patent issued on January 27, 2015. EX1001, (45).

D. Priority

The prior art relied on in the grounds is 102(b) art to even the earliest filing date in the '562 patent's family. Therefore, the priority date is assumed solely for the purposes of this petition to be August 11, 2008. EX1001, (60).

E. Level of Ordinary Skill in the Art

A person having ordinary skill in the art ("POSITA") at the time of the alleged invention would have had at least an undergraduate degree in electrical engineering, or equivalent education, and at least two years of work experience in the field of access control. EX1004, ¶31. More education can supplement practical experience and vice versa.

The Petitioner is supported by the expert declaration of Emmanouil Tentzeris, PhD, whose experience and qualifications exceed those of a POSITA. EX1004, §II.

V. CLAIM INTERPRETATION

Claims are construed according to their ordinary meaning in light of the specification and prosecution history. 37 C.F.R. §42.100(b). For this proceeding, Petitioner proposes the following claim constructions.

A. "non-secure Wiegand mode" / "secure Wiegand mode"

As explained below, the claim language "non-secure Wiegand mode" should be construed as the "legacy Wiegand communication protocol with no added security features," as described in the 1996 SIA standard. And, consistent with the

claim language, "secure Wiegand mode" should be construed as the "legacy Wiegand communication protocol with one or more added security features."

For "non-secure Wiegand mode," the specification clearly and consistently indicates that the term means the legacy Wiegand communication protocol as described in the 1996 SIA standard, without any added security features. *See* EX1001, 17:9-12 ("**One mode is the communication of the current art according to the SIA standard**. The other mode is the advanced two-way packet-mode of communication described herein");[5] 17:12-14 ("[O]**ne mode is the standard Wiegand communication mode** and the other mode is the secure Wiegand mode."); *id.* 17:17-22 ("In the teachings of the current disclosure, either the card reader or the upstream device can initiate mode change from Wiegand-format mode to packet-mode or from **legacy Wiegand mode to secure Wiegand mode** (i.e., the secure use of rolling codes in accordance with the Wiegand mode)."); *see also id.* 1:22-24 ("The Wiegand protocol is the predominant method by which physical access control card readers communicate with upstream devices. . . .").

Similarly, for "secure Wiegand mode," the specification also is clear that this term means the legacy Wiegand communication protocol with one or more added security features. *See* EX1001, 17:12-22 ("**[O]ne mode is the standard Wiegand**

[5] All emphasis added unless otherwise noted.

communication mode and the other mode is the secure Wiegand mode. . . . In the teachings of the current disclosure, either the card reader or the upstream device can initiate mode change from Wiegand-format mode to packet-mode **or from legacy Wiegand mode to secure Wiegand mode** (i.e., the secure use of rolling codes in accordance with the Wiegand mode)."), 18:45-49 ("Furthermore, once the reader is in **a secure Wiegand mode** (i.e., a packet transmission mode or **any other secure Wiegand mode discussed herein)**…"),[6] 3:43-9:55 (describing prior art

[6] Although the '562 patent uses "i.e." to describe secure Wiegand mode as both "the secure use of rolling codes in accordance with the Wiegand mode" and "a packet transmission mode or any other secure Wiegand mode discussed herein," that the '562 patent uses "i.e." in these two separate, unrelated statements shows that it is not using "i.e." to provide a definition for "secure Wiegand mode." Indeed, these two statements, when read together, contradict each other and themselves. To narrowly define secure Wiegand mode only as "secure use of rolling codes in accordance with the Wiegand mode" would negate the '562 patent's statement that it can be "any other secure Wiegand mode discussed herein," such as encryption or appending additional bits to the reader-panel transmissions. *See* §IV.A. Likewise, equating the secure Wiegand mode with "a packet transmission mode" does not make sense in

methods to add security to legacy Wiegand communications, including appending additional bits to the reader-panel data transmissions, use of time stamps in messages, encryption, and the use of rolling codes), 22:43-46 ("In accordance with at least some embodiments of the present invention, two devices may be using a synchronized PRNG to, for example, secure the communication between them."), 13:59-17:22 (describing a security mechanism for "obscuring Wiegand Data" and then "Two-Way Packet-Mode Communication"), Title ("Secure Wiegand Communications"), Abstract ("The present invention is directed toward secure access systems."), 6:10-14 ("In accordance with still further embodiments of the present invention, two devices may be enabled to use a synchronized pseudo-random number generator (PRNG) to **secure the communication between them**, for example.").

These constructions are further supported by POSITA's understanding of these terms in the context of the '562 patent. EX1004, ¶¶74-83.

Moreover, Patent Owner's infringement contentions for the '562 patent in the District Court Litigation appear to adopt this interpretation of "non-secure Wiegand mode." EX1013, at 11 (Patent Owner's Infringement Chart accusing Petitioner's

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light of the separate terms and meanings of "packet-mode" and "secure Wiegand mode." *See* §§V.B., V.A.; *see also* Ground 1, Claim 1[D] *infra* §VIII.A.2.e.

products of "switch[ing] from a **defaulted Wiegand mode**."); *see id.* at 10-13; EX1004, ¶83.

B. "packet-mode"

The term "packet-mode" should be construed as "a mode wherein a Wiegand control signal is used to transfer packets of digital data to the reader."

This construction is compelled by the intrinsic record. *See* EX1001, at 11:23-12:11 ("Elements of this particular aspect include electrical and logical digital encoding techniques that enable the transmission of digital data to card readers in access control systems from upstream devices such as control panels. **This is accomplished by utilizing one or more of the Wiegand wires currently defined to carry only a high-low indicator signal with pre-defined semantics to carry packets of digital data**. The existing methods of communication on Wiegand wires as described by the SIA standard only provide for the transmission of a single high-low indicator to be sent from an upstream device to the reader, **in particular on the LEDCTL wire. . . .** In accordance with at least some embodiments of the present invention, additional meaning is given to both the [voltage] levels and transitions of the LEDCTL signal. By programming these additional meanings into the software of the reader, **packets of digital data** can be sent from the upstream components including control panels back to the reader"), 12:38-44 ("The data transmission of packets of data from **an upstream device back to a reader via the Wiegand**

LEDCTL line or any [] other Wiegand control signal is described in the following in three aspects. 1. mode change protocol 2. **data encoding 3. packet structure**"); *see also id.*, 18:33-40 ("A reader implementing the teachings of the current disclosure having detected a voltage level duration on the LEDCTL wire of less than 10 ms sends an acknowledgement message, which may be obfuscated with a rolling code, on the DATA0 and DATA1 wires indicating that it has detected the request to **change to packet-mode communication on the LEDCTL wire and has switched to this mode of reception on the LEDCTL wire.**"), 19:43-21:44 ("Imputing meaning to the bytes in a frame is called packet framing and results in a **packet of data**."), 19:13-57, 21:59-61 ("The intent of the current disclosure is to cover all methods for the serial communication of digital data on the LEDCTL line…."), FIGS. 4, 5.

The proposed construction is further supported by the POSITA's understanding of this term in the context of the '562 patent and that phrase as it was known in the art. EX1004, ¶¶84-89.

C. "at least one of a secure Wiegand mode and a packet-mode"

Consistent with the plain and ordinary meaning of the language "**at least one of** a secure Wiegand mode **and** a packet-mode" of Claims 1, 6, and 11, in the context of the '562 patent, only one of the packet-mode or the secure Wiegand mode need to be present for the limitation to be met. *See, e.g., Rex Med., L.P. v. Intuitive*

Surgical, Inc., No. 19-005 (MN), 2020 U.S. Dist. LEXIS 78782, at *16-17 (D. Del. May 5, 2020) ("It is not uncommon for courts to interpret the [] phrase ["at least one of . . . and"] in the disjunctive when such an interpretation is necessary to accommodate the specification and preferred embodiments.") (collecting cases); *Optis Wireless Tech., LLC v. Apple Inc*., No. 2:19-CV-00066-JRG, 2020 WL 1692968, at *23–24 (E.D. Tex. Apr. 7, 2020); *Valeo North America, Inc. v. Magna Electronics, Inc.*, IPR2015-00251, Paper 18, at 5 (PTAB May 26, 2016).

Indeed, as here, such a reading is consistent with the '562 patent's intrinsic record. To read the claim language of "at least one of a secure Wiegand mode and a packet-mode" to require *both* a secure Wiegand mode and a packet-mode would limit the claimed embodiments to only two modes of operation (the non-secure Wiegand mode and the combined secure Wiegand mode and packet-mode, when the specification instructs that there are "**at least** two modes." EX1001, 17:7-9. Further, the specification explains that there are *two* embodiments—one where "[o]ne mode is the communication of the current art according to the SIA standard" and the "other mode is the advanced two-way packet-mode of communication described herein, and the other in which "one mode is the standard Wiegand communication mode and the other mode is the secure Wiegand mode." *Id.,* 17:9-14. To read the claim language as requiring both a secure Wiegand mode and a packet-mode would consolidate these two separate embodiments into one.

This understanding of this phrase is further supported by the POSITA's understanding of the construed phrase in the context of the '562 patent. EX1004, ¶¶90-91.

VI. IDENTIFICATION OF CHALLENGE

Petitioners request cancellation of the following claims:

Ground	Reference(s)	Claim(s)	Basis
1	U.S. Patent No. 6,988,203 ("Davis") (EX1006)	1-4, 6-9, 11-13	§102(b)
2	Davis	5, 10, 14	§103
3	Davis in view of U.S. Patent No. 7,030,731 ("Lastinger") (EX1022)	5, 10, 14	§103

Davis issued on January 17, 2006, and claims priority to U.S. patent application No. 09/828,395, filed on April 6, 2001. Therefore, Davis is prior art under at least pre-AIA § 102(b).

Lastinger issued on April 18, 2006, from an application filed on June 14, 2002, which claims priority to a provisional application filed June 14, 2001. EX1022. Lastinger is prior art under at least pre-AIA § 102(b).

VII. BACKGROUND AND STATE OF THE ART

A. Access Control Systems

Prior art access control systems in widespread use by the mid-2000s generally comprised cards, card readers, control panels, and host computers. *See* EX1004, ¶33; EX1006, at 1:11-32; EX1001, 1:22-25; EX1010, ¶[0004]; EX1014, ¶[004]; *see also*

EX1025, ¶[0002]. In a common setup, the card reader would have been placed on the unsecured side of a door, and a person seeking to gain access to the secured side must present their card to the be read by the reader. *See* EX1004, ¶33; EX1006, at 1:11-18; EX1010, ¶[0004]; EX1014, ¶[004]; EX1025, ¶[0002]. The reader transmits the card credential data to the control panel located in a secure location, which itself may be connected to a host computer. *See* EX1004, ¶33; EX1006, at 1:18-23; EX1010, ¶[0004]; EX1014, ¶[004]; *see also* EX1025, ¶[0002]. The panel or host computer then evaluates whether access should be granted on that credential data, and if the evaluating devices determines that access should be granted, it will unlock the door to the secured area. *See* EX1004, ¶33; EX1006, at 1:18-23; EX1010, ¶[0004], EX1012, ¶[0004]; EX1014, ¶[004]; EX1025, ¶[0002]. As explained below, in this arrangement of card readers, control panels, and host computers, it was well-known in the prior art that the reader and panel would communicate using the Wiegand interface. *See also* EX1004, ¶¶34-44.

B. Wiegand Wiring and Communication Protocol

The Wiegand *interface* refers to a wiring standard was used in the art to power RFID readers and connect them to control panels. EX1007, at 5-13; EX1006, 1:33-52; EX1014, ¶[026], Fig. 1; EX1020, 3:38-40. The Wiegand *protocol* refers generally to the communications protocol that is used over the Wiegand interface. EX1020, 3:46-49. Both the Wiegand interface and the Wiegand protocol were well

understood in the art and were formally defined in the 1996 publication by the Security Industry Association, "Access Control Standard Protocol for the 26-Bit Wiegand Reader Interface," which is attached as EX1007 (the "SIA Standard"). EX1020, 3:36-38; *see also* EX1006, 1:37-46; EX1007, at 7-8.

As noted, the Wiegand interface is a five-wire interface "to communicate data and provide power to a dedicated card reader as well known in the art." EX1006, 1:34-36; *see also* EX1007, at 8-9. "The five wires are for power, ground, DATA0, DATAl, and LEDCTL." EX1006, at 1:36-37; *see also* EX1007, at 8-9; EX1014, ¶[026], Fig. 1, EX1020, 3:42-67. "The DATAl line is a reader output that delivers pulses [to a panel] that are interpreted as binary ones. The DATA0 line is a reader output that delivers pulses [to the panel] that are interpreted as binary zeros. The LEDCTL line is the panel output that determines the state of the LED contained on the reader (off, red, green, or amber)." EX1006, 1:37-42; *see also* EX1007, at 12. "[T]he Wiegand protocol is a one-way protocol, since the reader can send data to the panel but the panel cannot send any data to the reader except to control the door mechanism and a status LED." EX1006, 1:53-57; *see* EX1007, at 5, 9, 11, 12; EX1012, ¶[0009]. However, it was known in the art before the priority date to use the LED line to send commands or data to the reader, for example, in order to change whether additional data bits are appended to the reader-panel data stream or to enable

security measures in the data communication. EX1006, 2:29-43, 5:18-63; EX1010, ¶[0045]; *see also infra* §VIII.

According to the SIA Standard, "[t]he LED signal is provided by the panel to control the reader LED state." EX1007, at 12. For example, the panel may dictate which color LED is illuminated and the duration of the illumination, and "[t]he meaning of the various LED states shall be defined by the panel manufacturer." EX1007, at 12; *see also id.* at 3; EX1006, at 4:37-44. The legacy Wiegand protocol does not use the LED line to transmit data from the panel to the reader. *See* EX1007, at 7, 9, 12; EX1006, at 4:37-44.

The SIA standard sets out the "minimum set of features a reader or panel must provide to be in compliance. Manufacturers may have additional features as long as they do not conflict with features specified herein." EX1007, at 5.

C. Wiegand Data Communication

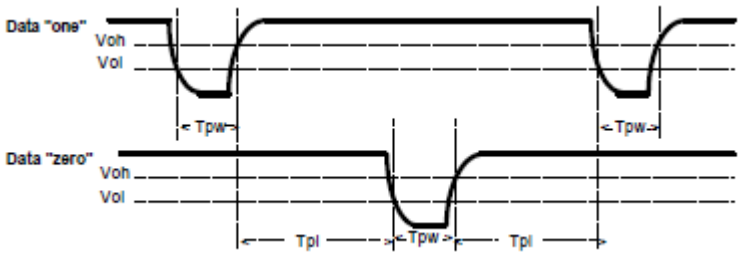
As the '562 patent recognizes, it was known in the prior art that data may be communicated in packets and that additional security mechanisms may be implemented on the Wiegand interface. *See* EX1001, 1:32-47, 2:30-3:22, 18:63-21:58.

1. Data Packets

The transfer of data over the Wiegand interface takes places by the reader sending packets of data to the panel. *See* EX1007, at 13. A "packet" of data refers to

"[a] short section of data of fixed length that is transmitted as a unit." EX1021, at 5 (McGraw-Hill definition of "packet" for communications); *see also* EX1018, at 5; EX1016, at 13; EX1015, at 2.

The aforementioned SIA Standard, published on October 17, 1996, discloses the method of data transfer in the Wiegand protocol. This includes the use of non-overlapping data pulses for the Data One and Data Zero lines, and that data signals are transmitted by holding the signals "at a high logic level until the reader is ready to send a data stream":



EX1007, at 12. Each pulse of data has a "Pulse Width Time," or TPW, and the gap between pulses is defined as the "Pulse Interval time," or TPI. The SIA standard instructs that "[t]he following timing parameters shall be observed":

SYMBOL	DESCRIPTION	MIN	MAX
TPW	Pulse Width Time	20 µs	100 µs
TPI	Pulse Interval Time	200 µs	20 mS

EX1007, at 12. The units "ms" and "µs" (or usecs, *see infra* §VIII.C) respectively refer to milliseconds and microseconds. EX1004, ¶42.

Using these data transfer conventions, the SIA Standard defines a packet data format as including "26 bits of transmission from the reader to the panel consist[ing] of two parity bits and 24 code bits. The bits are transmitted in the order described." EX1007, 13. As shown below, the two rows of numbers above the bits provide number for each bit (read top-down). EX004, ¶42, *see* EX1007, 13. The first and last bits transmitted are parity bits, which provide error detection over the first twelve data bits and the last data bits, respectively. EX1007, 13; *see* EX1021, 6 (McGraw-Hill Definition of "parity bit" as "An additional nondata bit that is attached to a set of data bits to check their validity; it is set so that the sum of one-bits in the augmented set is always odd or always even."); EX1004, ¶43.

CODE FORMAT

									1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2
1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
P1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	P2

PARITY FORMAT

									1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2
1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
P1	E	E	E	E	E	E	E	E	E	E	E	E													
													O	O	O	O	O	O	O	O	O	O	O	O	P2

P1:	First, or even parity bit.
C:	Code bits.
P2:	Second, or odd parity bit.
E:	Bits for calculation of even parity.
O:	Bits for calculation of odd parity.

EX1007, 13.

Outside of Wiegand communication, packet communication of digital data has been well understood since the 1970s. *See, e.g.,* EX1015 (RFC 675, published 1974); EX1016 (RFC 793, published 1981); EX1017 (RFC 1055, published 1988); EX1018 (RFC 1661, published 1994).

2. Security of Wiegand Transmissions

It was known before the priority date that there were several ways to add security to Wiegand packet transmissions, as the ’562 patent recognizes, such as encrypting the transmission, adding time-stamps or rolling codes to the transmission, or appending status data from a tamper device attached to the reader to the transmission. *See* EX1001, 3:44-5:29, 14:9; EX1004, ¶¶49-52.

VIII. UNPATENTABILITY GROUNDS

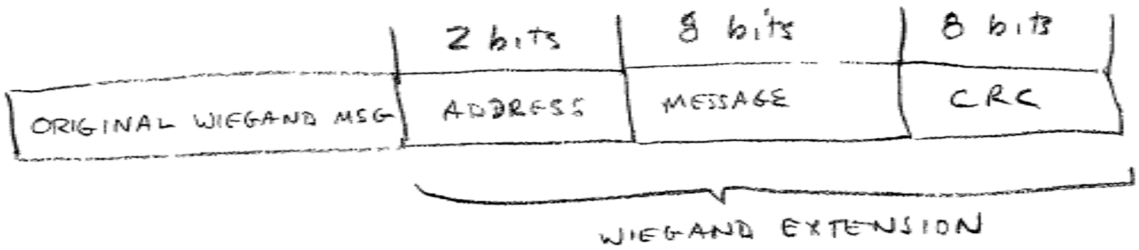
A. Ground 1: Claims 1-4, 6-9, and 11-13 Are Anticipated by Davis

1. Davis (EX1006)

Davis discloses a system and method of “extending” the “industry standard Wiegand protocol for enabling two way extended communication, enhanced error detection, encryption, . . . and enhanced information regarding the embedded data stream between a Wiegand device, such as a card reader and a control panel on the existing 5-wire bus structure without requiring the modification to the existing infrastructure.” *Id.*, Title, Abstract.

Davis recognized "problems" that existed with the legacy Wiegand protocol. *Id.,* 1:53. "For example, the Wiegand protocol is a one-way protocol, since the reader can send data to the panel but the panel cannot send any data to the reader except to control the door mechanism and a status LED." *Id.,* 1:54-57.

As such, Davis disclosed, *inter alia,* a "major improvement" in that "**the LEDCTL line controlled by the panel is now used to transmit data back to the reader**." EX1006, 2:29-31. Thus, in the extended protocol, two-way communication between the reader and panel is enabled, as the panel is able to send data back to the panel over the LEDCTL line and thus send commands back to the reader. *Id.* at 2:64-67, 5:18-45; EX1004, ¶95. This disclosure of Davis is recognized by the '562 patent. EX1001, 4:29-31 ("[Davis] further describes transmitting data back to the reader from the upstream device via an LED control line."). If the "Wiegand extension" is turned on, the reader transmits an extended data field attached to the standard Wiegand message in its transmissions to the panel, as illustrated in Figure 2:



EX1006, at 2:32-4:34, 3:60-5:3, FIG. 2 (disclosing additional fields, including those for address, message, and Cyclic Redundancy Check (CRC)). *Id.* This extended data

field may also include information indicating whether there have been any attempts to tamper with the reader. *Id.* at 3:9-31, 4:15-24.

This LEDCTL line transmission can be used, for example, by the panel to turn on or off the "Wiegand extension." *Id.,* 2:41-43; *see also id.,* 2:64-67*,* 5:18-6:44. The panel system turns the Wiegand extension on by dropping "the LEDCTL signal low three times within a one-second interval." *Id.* 5:50-52. As noted, "[t]he panel system in the preferred embodiment is able to switch a Wiegand generator from the basic protocol to the extended protocol. . . ." *Id.,* 5:47-49. If the Wiegand extension is turned off, for example if a panel does not support the extension, then the extension "is not used and the reader behaves as an existing prior art device." *Id.,* 2:41-43, *see also id.* 1:54-57. Thus, Davis describes a reader that is capable of operation in two modes: as an existing prior art device, or in the Wiegand extension, where data may be transmitted back to the reader from the panel and the messages from the reader to the panel may include additional information, such as information from a tamper sensor attached to the reader. EX1004, ¶97; EX1006, 2:29-31, 2:41-43, 3:9-31, 4:15-24, 5:47-49.

Davis is in the same field as the '562 patent because Davis relates to the electronics and communication protocols used in access control systems. EX1004, ¶98; EX1006 at Abstract, 2:23-3:34. Davis is pertinent to the problems the '562 patent purportedly addresses because Davis is directed to an access control system

wherein a panel is able to change operating modes of a reader by sending a message over the LEDCTL line. EX1004, ¶98; EX1006 at Abstract, 2:23-3:34. Davis is therefore analogous art to the '562 patent.

2. Claim 1

a. 1[pre]: "A communication method, comprising"

To the extent the preamble is limiting, Davis discloses it. EX1004, ¶99. Specifically, Davis discloses a "System and **Method of Extending Communications with the Wiegand Protocol**." EX1006, Title. Davis's communication method provides "[a]n extension of the industry standard Wiegand protocol for enabling two way communication . . . between a Wiegand device such as a card reader and a control panel on the existing 5-wire bus structure without requiring the modification of the existing infrastructure." EX1006, Abstract; *see also id.*, 2:4-8. The communication method of Davis comprises the following steps.

b. 1[A]: "operating a credential reader in a first mode of operation, the credential reader comprising at least one of a microprocessor and firmware that enable the credential reader to operate in the first mode of operation"

Davis discloses this limitation. EX1004, ¶¶100-104. Davis teaches that "[t]he Wiegand extension can be turned on or off, so that if a panel does not support the extension, it is not used and the reader behaves as an existing prior art device." EX1006, 2:41-43. Indeed, a POSITA would have understood Davis's disclosure of a reader behaving "as an existing prior art device" to describe a first a mode of

operation, as opposed to the Wiegand extension mode (the second mode of operation described further below). EX1004, ¶100. *See* §§VIII.A.1, VII.B.

Davis also teaches that the reader has at least one of a microprocessor and firmware that enable it to operate "as an existing prior art device." Davis's reader includes "an RF transmitter/receiver 26 … which is used for reading an access control card when presented thereto." EX1006, 4:12-14. Further, the 5-wire Wiegand interface is implemented in the reader disclosed by Davis, wherein "[t]he transmitter 12 and receiver 14 are connected to the DATA1, DATA0, and LEDCTL wires of the standard Wiegand interface as known in the art" (*Id.* 4:9-12 (emphasis omitted)), and the power (PWR) and ground (GND) are connected to power supply circuit 16 (*id.* 4:6-9). As shown in Figure 3 below, Davis's credential reader 10 also includes processing/logic 24, which is used "is used to read data from the external sources, formulate data to be transferred over the 5-wire interface, and run all other functions that may be required by the reader 10 of the present invention":

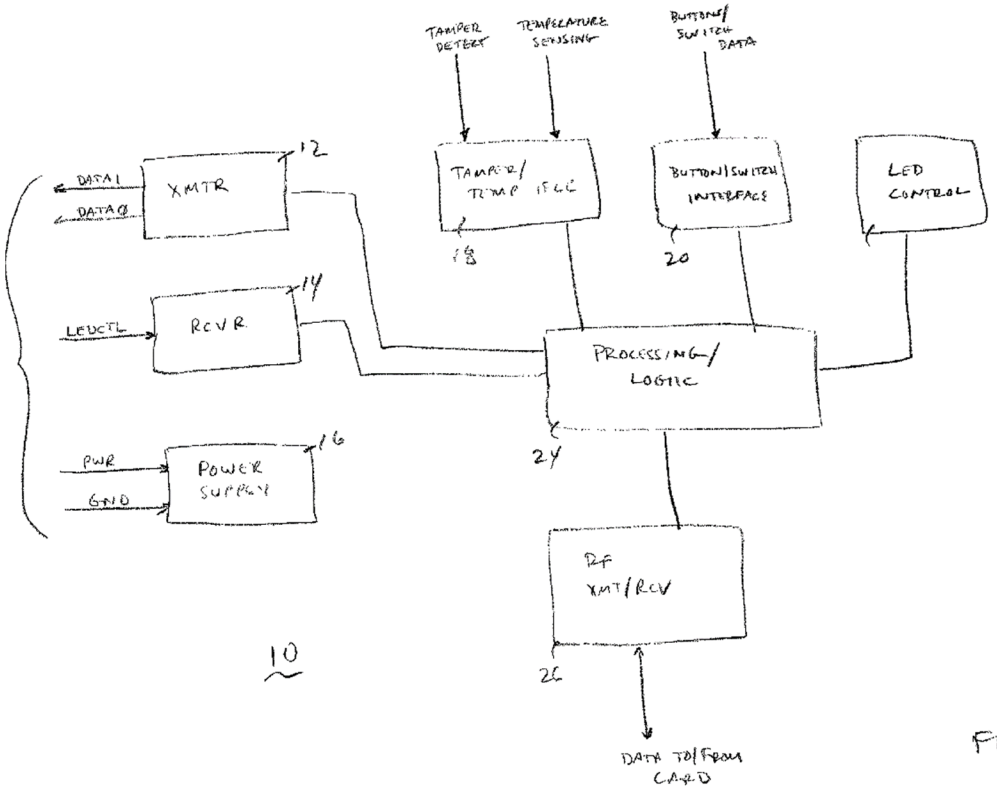


FIG. 3

EX1006, 4:45-48 (emphasis omitted), FIG. 3. A POSITA would have understood processing/logic to comprise a microprocessor. EX1004, ¶¶101-102.

Likewise, Davis teaches that its reader has firmware. EX1006, 2:35-38. A POSITA would have understood that this firmware interacts with the aforementioned hardware to "enable the credential reader to operate in the first mode of operation." EX1006, 2:35-38; EX1004, ¶103.

c. 1[B]: "receiving, at a communication interface of the credential reader, a message from an upstream device;"

Davis discloses this limitation. EX1004, ¶105. Davis discloses a reader ("a Weigand generator," EX1006, 4:52-57) operating in "the basic protocol" (a first mode) receiving a communication from a panel (one possible "upstream device," as

described in the '562 patent EX1001, 1:22-25, 2:10-12, *see also id.* 3:28-30). EX1006, 5:47-63. Specifically, Davis discloses:

> The panel system in the preferred embodiment is able to switch a Wiegand generator from the basic protocol to the extended protocol as follows…. **The panel will drop the LEDCTL signal low three times within a one-second interval. The Wiegand generator starts an interval timer when the first pulse is received, and then checks to see if it receives two additional pulses within the one-second period from the first pulse. If [the Wiegand generator] receives exactly three pulses as described, then it sends the Wiegand extension message "Capable of Using the Wiegand Extension"** in message group 0.[7] **The panel then will send out the "Use Wiegand Extension" command to the Wiegand generator**….

EX1006, 5:47-63. As shown in Figure 3, the signal over the LEDCTL wire is received at the receiver (14), which a POSITA would understand is a communication interface. *Id.*, FIG 3; EX1004, ¶105.

[7] Davis explains that "there are seven groups of messages; each is used for different Wiegand generators. … Group zero is reserved for messages common to all group[s]." *Id.* at 5:12-17.

d. 1[C]: "determining, by the credential reader, that the message was transmitted by the upstream device; and"

Davis discloses this limitation. EX1004, ¶¶106-108. The specification of the '562 patent does not appear to support or otherwise describe the "determining" step. EX1004, ¶106. To the extent the "determining" step is met if the reader merely "listens" for a message from an upstream device, Davis teaches this interpretation. EX1013, at 9-10; EX1004, ¶107. In related litigation Patent Owner has contended that such activity satisfies the determining step. EX1013, at 9-10. A POSITA would have understood the reader "check[ing] to see if it receives two additional pulses within the one-second period form the first pulse" to describe a reader listening for messages from the upstream device because checking is generally synonymous with listening. EX1004, ¶107; EX1006, at 5:52-55.

Even if the claim language of "determining, by the credential reader, that the message was transmitted by the upstream device," requires an additional determination of the origin or command of the received signal, a POSITA would have understood Davis to also disclose it. EX1004, ¶107. Indeed, A POSITA would have understood the Wiegand generator sending the "Capable of Using the Wiegand Extension" message **"[i]f [the Wiegand generator] receives exactly three pulses as described"** to teach the "determining" step because Davis describes a determination by the Wiegand generator that three pulses are received from the panel

before the Wiegand generator changes modes. EX1004, ¶107; EX1006, 5:55-58; *see also id.* at 5:52-55.

Moreover, the message from the panel in the system of Davis sends the command to change modes to the reader over the LEDCTL line. EX1006, 5:47-63; EX1004, ¶108. The signals coming over this line necessarily come from an upstream device, as Davis discloses (and legacy Wiegand requires) that any signal to the reader over the LEDCTL line is from an upstream device. *See* EX1006, 1:40-42, 2:29-31, 2:64-67, 5:19-22; EX1007, at 9, 12; EX1004, ¶108. Thereby, by receiving a message along the LEDCTL line, the reader would necessarily determine that the message came from an upstream device. EX1004, ¶108.

e. 1[D]: "based on determining that the message was transmitted by the upstream device, transitioning the credential reader from the first mode of operation to a second mode of operation, wherein the first mode comprises a non-secure Wiegand mode and wherein the second mode comprises at least one of a secure Wiegand mode and a packet-mode."

Davis discloses this limitation. EX1004,¶¶109-121. Davis discloses that based on a determination that the message was transmitted from an upstream device (i.e., that three pulses were received within 1 second), the "panel system" "is able to switch a Wiegand generator from the basic protocol to the extended protocol." EX1006, 5:47-49. In particular, "**[t]he panel [] sends out the 'Use Wiegand Extension' command to the Wiegand generator, and the Wiegand generator**

sends the 'Command received and executed' … and sets a flag in non-volatile memory to use the Wiegand extension." EX1006, 5:47-63; *see* EX1001, 1:22-25, 2:10-12; *see also id.* 3:28-30. A POSITA would have understood the "basic protocol" and the "extended protocol" to constitute first and second modes, respectively, because each protocol is a different mode of operation. EX1004, ¶110.

Davis further discloses that the first mode comprises a non-secure Wiegand mode. David discloses that the first mode may be the "Wiegand standard protocol:

> One technology in prevalent use for many years is the wiegand protocol, which utilizes five wires to communicate data and provide power to a dedicated card reader as well known in the art. The five wires are for power, ground, DATA0, DATA1, and LEDCTL. The DATA1 line is a reader output that delivers pulses that are interpreted as binary ones. The DATA0 line is a reader output that delivers pulses that are interpreted as binary zeros. The LEDCTL line is the panel output that determines the state of the LED contained on the reader (off, red, green, or amber). The Wiegand standard protocol [is] well known in the art and is described in detail in "Access Control Standard Protocol for the 26-Bit Wiegand Reader Interface," by the Security Industry Association.

EX1006, 1:32-46 (emphasis omitted). Indeed, the Wiegand standard protocol was well known in the art before the priority date. EX1004, ¶111; *see also* §§VII.B*, supra*; EX1001, 1:33-39; EX1006, 1:42-48; EX1008, at 4; EX1011, 1:32-38;

EX1012, ¶[0008]; EX1014, ¶[065]. Thus, Davis teaches the first mode is the non-secure Wiegand mode, when properly construed. *See supra* §V.A.

Davis further discloses that the second mode may comprise a "packet-mode" and/or "a secure Wiegand mode."

As described, "packet-mode" refers to "a mode wherein a Wiegand control signal is used to transfer packets of digital data to the reader." *See supra* §V.B. Davis describes that using the "extended protocol allows more data to be communicated to the reader 10, thus providing more sophisticated LED (or other) outputs as desired." EX1006, 4:39-44. In particular, "Data Transfer from Panel to Reader" under the extended protocol takes place as follows:

> [T]he panel may send data to a reader using an asynchronous serial data stream via the LEDCTL wire at 1200 baud, 8 data bits, 1 stop bit, no parity. All fields in this instance are one byte long. The first byte of a command is divided into two sub-fields. The first two bits are the address field (00-11), and the last six bits contain the command code (000000-111111). The following commands are available in the preferred embodiment:

COMMAND SENT BY PANEL		WIEGAND GENERATOR RESPONSE
00h <CRC>	0 = retransmit last Wiegand data transmission <CRC> = 8-bit CRC	Retransmits last Wiegand data message
01h <address> <CRC>	1 = Return value of selected parameter address <address> = 00 thru FF <CRC> = 8-bit CRC	Parameter value of desired address is transmitted back via the Wiegand extension
02h <address> <data> <CRC>	2 = set value of selected parameter address <address> = 00 thru FF <data> = 00 thru FF <CRC> = 8-bit CRC	Acknowledgement that data was written is transmitted via the Wiegand extension
03h <LEDCTL> <seconds> <CRC>	3 = Turn on LED <LEDCTL> = simulation of LED control signals <# of seconds to keep LED on> <CRC> = 8-bit CRC	Acknowledgement is transmitted via the Wiegand extension

EX1006, 5:19-46; *see also id.* 2:64-67, 2:29-31, 4:39-43.

A POSITA would have understood that the disclosure of "8 data bits, 1 stop bit, no parity" data stream the "the panel may send [] to a reader . . . via the LEDCTL wire" comprises a packet of data that is sent on the Wiegand LEDCTL wire. EX1004, ¶¶114-115; *see supra* §V.B. Moreover, a POSITA would have understood that by sending data down the LEDCTL line is a "control line" and that the data sent down the LEDCTL line are control signals. EX1004, ¶113. Because the panel may transition the reader from the standard Wiegand protocol, where no data is transmitted over the LEDCTL wire, to a mode in which the panel may send these packets of data to the reader over the LEDCTL line, Davis teaches a packet-mode. EX1004, ¶115.

Davis also teaches the "secure Wiegand mode," aspect of the second mode, when properly construed as the "legacy Wiegand communication protocol with one or more added security features." *See supra* §V.A.

Davis teaches this element by disclosing that the Wiegand extension enables "enhanced error correction, **encryption**, . . . **and enhanced information regarding the embedded data stream**." EX1006, Abstract. For example, Davis teaches the use of an "extended data field" on the messages from the reader (also known as "an access interface unit," *see* EX1006, at 4:52-57), to the panel. EX1006, 3:9-13. The extended data field can include information relating to whether any physical tampering with the access interface unit has been detected:

> The access interface unit may also include external status input means for accepting external status data from an external device coupled thereto, and **the status information field of the extended data field then will include the external status data.**... The external device may ... be adapted to detect physical tampering with the access interface unit.

EX1006, 3:22-31; *see also id.* 4:15-24. A POSITA would have understood this to be a *secure* Wiegand mode because Davis teaches the inclusion of data relating to reader security (*i.e.*, physical tampering) in the transmissions from the reader to the panel, thereby enabling more secure Wiegand communication. EX1004, ¶121. Thus, Davis discloses that the second mode comprises a secure Wiegand mode—the legacy Wiegand communication protocol with the added security feature of

additional data relating to security included in the data stream from the reader to the panel. EX1004, ¶¶117-121; *see supra* §V.A.

Moreover, the '562 patent does not purport to have invented anything relating to the use of rolling codes or other security mechanisms, and indeed, the '562 patent sets out multiple prior art security mechanisms. *See* EX1001, at 1:9, 15:4-6, 4:10-5:29, 4:32-48; EX1004, ¶118.

3. Claim 2: "The method of claim 1, wherein the credential reader is in communication with an upstream device utilizing a unidirectional communication protocol."

4. Claim 3: "The method of claim 2, wherein the unidirectional communication protocol is the Wiegand protocol."

Davis discloses these claims. EX1004, ¶122. As discussed above, Davis discloses that the first mode comprises a non-secure Weigand mode—which is a "one-way" (unidirectional) communication protocol in which "**the reader** can send data to **the panel** but the panel cannot send any data to the reader except to control the door mechanism and a status LED." EX1006, 1:54-57; *see also id.* 1:32-37, *Id.* 2:41-43; *supra*, §VII.B. Thus, Davis discloses a credential reader in communication with an upstream device—a panel—via the Wiegand, one way protocol. EX1004, ¶122; EX1001, 1:22-25, 2:10-12; *see also id.* 3:28-30.

5. Claim 4: "The method of claim 1, wherein the message transmitted by the upstream device comprises an alteration of a control line signal between the reader and the upstream device for a predetermined amount of time."

Davis discloses this limitation. EX1004, ¶123-124. The '562 patent states that a signal of a predetermined amount of time to initiate a mode change "is called a START signal," which the '562 patent does not purport to have invented, and indeed, was well known in the art before the priority date. EX1004, ¶123; EX1001, 18:31-32; *see, e.g.*, EX1022, 8:37-40; EX1023, ¶¶[00054], [0063]-[0065], [0076]; EX1024, ¶[0038].The LEDCTL line is a "control line." *See id.*, 4:29-31, 3:23-28, 12:28-41, 17:23-18:57; EX1004, ¶¶113, 124; *see also* EX1031, at 35, 31 ("[The '562 patent] teaches changing from Wiegand/unidirectional mode to bidirectional mode, *e.g.*, **by utilizing an existing Wiegand wire—LEDCTL**."); 34 ("[The '562 patent] utilizes this LEDCTL line for 'Upstream Device-Initiated Mode Change'—in response to a signal 'on the LEDCTL line of less than 10 ms by the upstream device.'") (citing EX1001, 17:23, 17:64-65, 17:52-59).

Davis similarly discloses altering the control line signal between the upstream device (a panel) and the reader for a predetermined amount of time. Specifically, Davis teaches that "**[t]he panel will drop the LEDCTL [wire] signal low three times within a one second interval. The Wiegand generator starts an interval timer when the first pulse is received, and then checks to see if it receives two additional pulses within the one-second period from the first pulse**." EX1006,

5:47-56. A POSITA would have understood that dropping the LEDCTL wire signal low constitutes an alteration of that control line signal, since it is altering the characteristic of the signal. EX1004, ¶124. Indeed, the '562 patent explicitly teaches that an adjusted voltage level, such as dropping the LEDCTL wire signal to a low voltage, as disclosed by Davis, may comprise an alteration of the control line signal. *See* EX1001, 18:11-20. Davis discloses that this alteration is for a predetermined amount of time—1 second or less. EX1006, 5:47-56.

6. Claim 6

a. 6[pre]: "A non-transitory computer-readable medium comprising processor-executable instructions, the processor-executable instructions comprising"

To the extent the preamble is limiting, Davis discloses it. EX1004, ¶¶125-128. Davis discloses, for example, that a panel sends a "'Use Wiegand Extension' command to the Wiegand generator, and the Wiegand generator sends the 'Command received and executed' … and sets a flag in **non-volatile memory** to use the Wiegand extension (even if power is lost and subsequently restored)." EX1006, 5:58-63. A POSITA would have understood a non-volatile memory to be a "non-transitory computer readable medium." EX1004, ¶126; *see also, e.g., Unified Patents Inc. v. KCG Technologies, LLC*, IPR2019-01536, Paper 28, at 12-18 (finding the limitation of a "non-transitory memory" in the challenged claims met by the prior art's disclosure of a "non-volatile memory")

Davis also discloses that a "[p]rocessor 24 is used to read data from the external sources, formulate data to be transferred over the 5-wire interface, and **run all other functions that may be required by the reader 10 of the present invention**." EX1006, 4:45-48. Figure 3 of Davis also discloses a credential reader 10 with processing/logic 24:

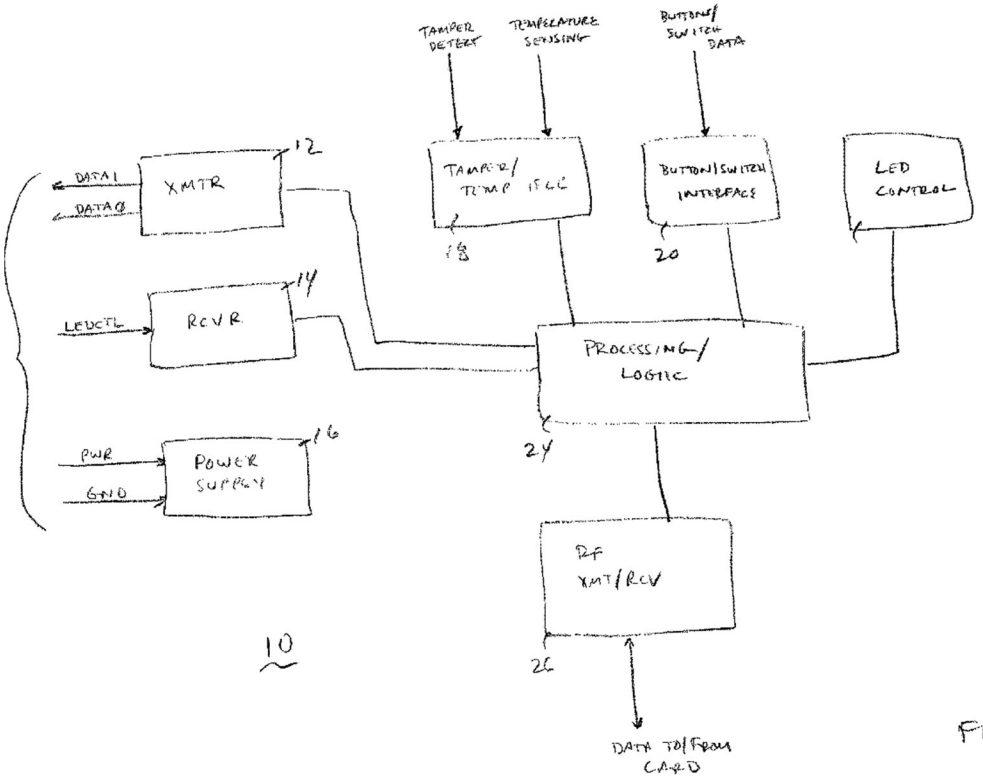


FIG. 3

Thus, a POSITA would have understood Davis's processor to execute any instructions to cause the reader of Davis to operate. EX1004, ¶127. And as described below, the following claimed processor-executable instructions are housed in the non-volatile memory of Davis, as a POSITA would have understood. EX1004, ¶128.

b. 6[A]: "instructions configured to cause a credential reader to operated [*sic*] in a first mode of operation;"

Davis teaches this limitation. *See* EX1004, ¶¶129-132. As described in Claim 1[A], *supra* §VIII.A.2.b, Davis discloses that "the DATA1, DATA0, and LEDCTL," are connected to "[t]he transmitter 12 and receiver 14," which are in turn connected to processing/logic 24, as shown in Figure 3:

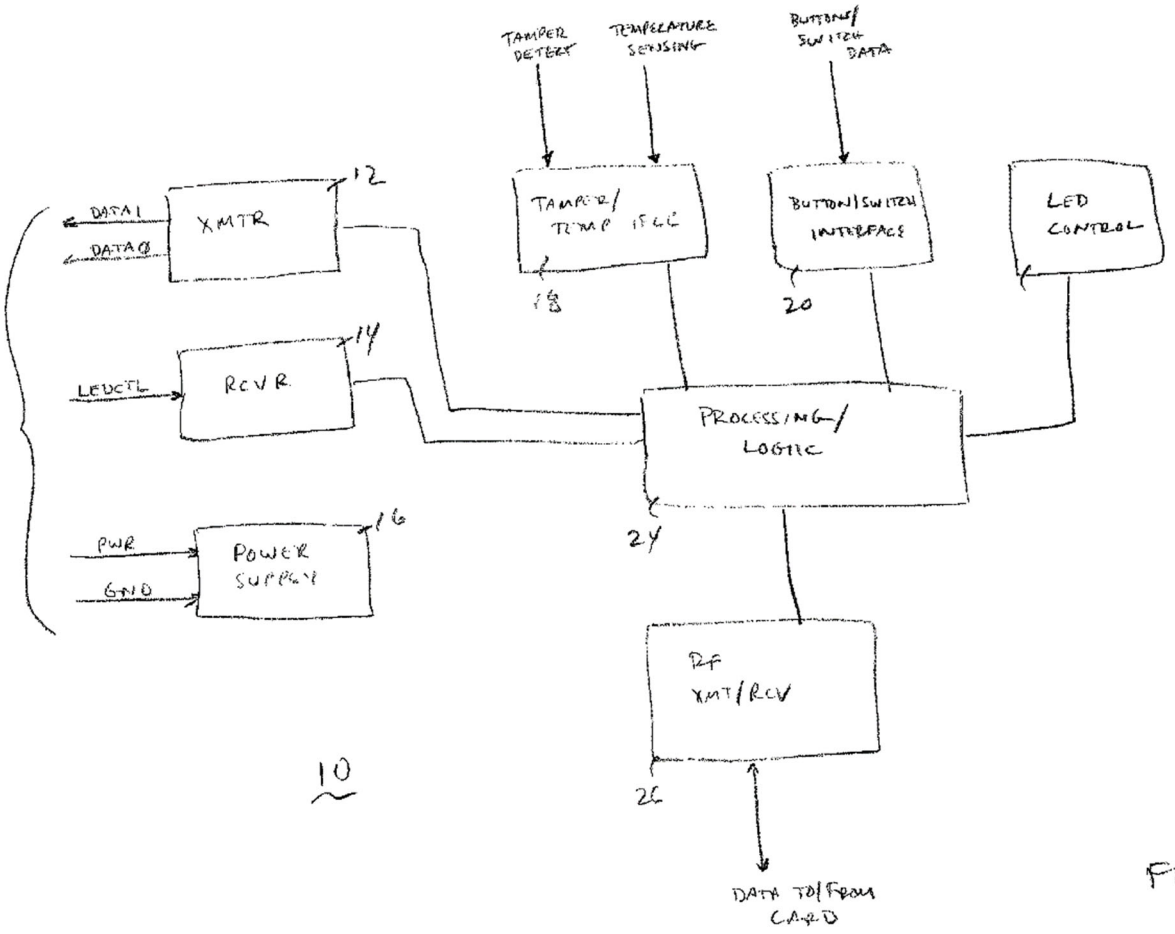


FIG. 3

EX1006, 4:9-14 (emphasis omitted), FIG. 3. The "[p]rocessor 24 is used to read data from the external sources, formulate data to be transferred over the 5-wire interface, and run all other functions that may be required by the reader 10 of the present invention." EX1006, 4:45-48.

As explained above, Davis discloses that the reader may operate using the legacy Wiegand protocol. EX1006, 2:6-43; *see supra* §VIII.A.2.b. For example, Davis discloses that the reader may "behave[] as an existing prior art device" when the Wiegand extension is off. EX1006, 2:41-43. A POSITA would have understood that to "behave[] as an existing prior art device," the reader would have processor-executable instructions stored in its non-volatile memory. EX1004, ¶130. Indeed, it is inherent or suggested that there be processor-executable instructions stored in the non-volatile memory (*i.e.*, non-transitory memory, *see* Claim 6[pre] §VIII.A.6.a., *supra*) of the reader to behave "as an existing prior art device"—the legacy Wiegand reader. EX1004, ¶¶130-131; EX1006, 2:41-43. This is because if they were not stored there, if the reader lost power, it would not be able to operate "as an existing prior art device" if power was restored because the instructions would have been lost with the loss of power. EX1004, ¶131.

c. 6[B]: "instructions configured to receive a message at the reader, the message being received from an upstream device;"

Davis discloses this limitation. EX1004, ¶¶133-136. Davis teaches that if the Weigand generator receives three pulses within one second from the panel, then it will send out the message "Capable of Using the Wiegand Extension.". *See* EX1006, 5:47-64. Thus, Davis discloses "instructions configured to receive a message at the

reader, the message being received from an upstream device." EX1004, ¶134; EX1006, 5:47-58; *see* EX1001, 1:22-25, 2:10-12; *see also id.* 3:28-30.

A POSITA would have understood that these instructions are implemented on the processor of Davis's reader. EX1004, ¶134. Indeed, Davis teaches that "[p]rocessor 24 is used to read data from the external sources, formulate data to be transferred over the 5-wire interface, and run all other functions that may be required by the reader 10 of the present invention." EX1006, 4:45-48. Davis discloses that one function is to receive commands from an upstream device (*id.*, 5:47-64), which a POSITA would have understood to be executed by a processor. EX1004, ¶134.

A POSITA would have understood from these disclosures that these processor-implemented commands would have been stored in the non-volatile memory (*i.e.*, non-transitory memory, *see* Claim 6[pre] §VIII.A.6.a., *supra*) of Davis. EX1004, ¶135-136. This is because if they were not stored there, if the reader lost power, it would not be able to receive and process messages from the panel if power was restored because the instructions to do so would have been lost with the loss of power. EX1004, ¶135-136.

d. 6[C]: "instructions configured to determine that the message was transmitted by the upstream device; and"

Davis teaches this limitation because as described in Claim 1[C], the reader of Davis determines that the message was sent by an upstream device. *See supra* §VIII.A.2.d; EX1004, ¶137-140. A POSITA would have understood that Davis's

disclosures that teach the determining step of Claim 1[C] would have been executed by the processor. EX1004, ¶¶137-138; *see* EX1006, 4:45-48 ("Processor [24] is used to read data from the external sources, formulate data to be transferred over the 5-wire interface, and **run all other functions that may be required by the reader 10 of the present invention**.").

A POSITA would have understood from these disclosures that these processor-implemented commands would have been stored in the non-volatile memory (*i.e.*, non-transitory, *see* Claim 6[pre] §VIII.A.6.a., *supra*) of Davis. EX1004, ¶138-140. This is because if they were not stored there, if the reader lost power, it would not be able to evaluate whether the dropped the LEDCTL line low three times within a second, or otherwise make any determination regarding the origin of a transmission if power was restored because the instructions to do so would have been lost with the loss of power. EX1004, ¶139-140.

e. 6[D]: "instructions configured to transition the credential reader from the first mode of operation to a second mode of operation, wherein the transition from the first mode of operation to the second mode of operation occurs based on determining that the message was transmitted by the upstream device, wherein the first mode comprises a non-secure Wiegand mode and wherein the second mode comprises at least one of a secure Wiegand mode and a packet-mode."

Davis discloses this limitation. EX1004, ¶141-146. As described above in Claim 1[D], Davis teaches "transition[ing] the credential reader from the first mode

of operation to a second mode of operation." *Supra* §VIII.A.2.e. A POSITA would have understood this transition to occur through appropriately configured "commands" implemented by Davis's processor. EX1004, ¶141; EX1006, 4:45-48 ("Processor 24 is used to read data from the external sources, formulate data to be transferred over the 5-wire interface, and **run all other functions that may be required by the reader 10 of the present invention**."); EX1021, at 4; EX1004, ¶137.

As described in Claim 1[D], Davis also teaches transitioning modes "based on determining that the message was transmitted by the upstream device." *See supra* §VIII.A.2.e; EX1004, ¶¶141, 145, 109. A POSITA would have understood that this determination would have been part of the instructions stored in non-volatile memory and that the instructions would have been executed by the processor. EX1004, ¶142-144; EX1006, 4:45-48. And as also described above, Davis discloses that "the first mode comprises a non-secure Wiegand mode and … the second mode comprises at least one of a secure Wiegand mode and a packet-mode." *Supra* §VIII.A.2.e; EX1004, ¶¶146.

7. Claim 7: "The non-transitory computer-readable medium of claim 6, wherein the credential reader is in communication with an upstream device utilizing a unidirectional communication protocol."

8. Claim 8: "The non-transitory computer-readable medium of claim 7, wherein the unidirectional communication protocol is the Wiegand protocol."

See Claims 2-3, *supra* §§VIII.A.2.3-4; EX1004, ¶147.

9. Claim 9: "The non-transitory computer-readable medium of claim 6, wherein the message transmitted by the upstream device comprises an alteration of a control line signal between the reader and upstream device for a predetermined amount of time."

See Claim 4, *supra* §VIII.A.5; EX1004, ¶148.

10. Claim 11

a. 11[pre]: "A credential reader comprising:"

To the extent the preamble is limiting, Davis discloses it. EX1004, ¶¶149-150. Davis discloses "access control groups" that each "contains up to three access interface units (card readers 10)." EX1006, 3:58-60. Each reader in a control group may be configured to read "an access control card, a data transponder, [or] a data-carrying key fob" (*id.* 3:2-5)—which a POSITA would have understood to refer to conventional types of credentials. EX1004, ¶150. The credential reader of Davis comprises the following claimed features.

b. 11[A]: "at least one of a microprocessor and firmware that enable the reader to operate in a first mode of operation,"

See Claim 1[A], *supra* §VIII.A.2.b; EX1004, ¶151.

c. 11[B]: "receive a message from an upstream device,"

See Claim 1[B], *supra* §VIII.A.2.c; EX1004, ¶152.

a. 11[C]: "determine that the message was transmitted by the upstream device, and"

See Claim 1[C], *supra* §VIII.A.2.d; EX1004, ¶153.

b. 11[D]: "in response thereto, transition the credential reader from the first mode of operation to a second mode of operation, wherein the transition from the first mode of operation to the second mode of operation occurs based on determining that the message was transmitted by the upstream device, wherein the first mode comprises a non-secure Wiegand mode and wherein the second mode comprises at least one of a secure Wiegand mode and a packet-mode."

See Claim 1[D], *supra* §VIII.A.2.e; EX1004, ¶154.

11. Claim 12: "The credential reader of claim 11, wherein the credential reader is in communication with an upstream device utilizing a unidirectional communication protocol, and wherein the unidirectional communication protocol is the Wiegand protocol."

See Claims 2 and 3, *supra* §§VIII.A.3-4; EX1004, ¶155.

12. Claim 13: "The credential reader of claim 11, wherein the message transmitted by the upstream device comprises an alteration of a control line signal between the reader and upstream device for a predetermined amount of time."

See Claim 4, *supra* §VIII.A.5; EX1004, ¶156

B. Ground 2: Claims 5, 10, and 14 Are Obvious over Davis

1. Claim 5: "The method of claim 4, wherein the predetermined amount of time is less than 10 ms."

Davis renders this claim obvious. As an initial matter, the duration of the predetermined amount of time for the alteration of the control line signal was a simple design choice, and it would have been obvious to a POSITA to use a time period of less than 10 ms. EX1004, ¶¶157-169. A POSITA would have known that while Davis discloses a duration of 1 second, shorter periods could advantageously be used to initiate a mode switch even faster. *Id.*, ¶¶160-168. Indeed, the '562 patent itself acknowledges that use of a 10 ms signal was known in the art, and generally referred to as a "START signal." *See* EX1001, 18:31-32 "In telecommunications art, the 10 ms signal is called a START signal."); *see* EX1004, ¶158; EX1022, 8:37-40; EX1023, ¶¶[00054], [0063]-[0065], [0076]; EX1024, ¶[0038].[8]

Moreover, Davis teaches that "the panel may send data to a reader using an asynchronous serial data stream via the LEDCTL wire at 1200 baud, 8 data bits, 1 stop bit, no parity…. The first two bits are the address field (00-11), and the last six

[8] Furthermore the '562 patent recognizes, when discussing the use of a 10 ms or less duration of time on the LEDCTL line, that prior art "literature agrees that presentation times below 10 ms may be subliminal or not perceived at all," providing another basis to use such durations. *See* EX1001, 17:44-18:2.

bits contain the command code (000000-111111)." EX1006, 5:19-25; EX1004, ¶160; *see also* Ground 1, Claim 1[D], *supra* §VIII.A.2.e. Davis's teachings of a "1200 baud, 8 data bits, 1 stop bit, no parity" signal describes a 7.5 ms signal (including the stop bit), or 6.67 ms (including only the data bits). EX1004, ¶162; EX1021, at 2. Davis discloses that these signals can be used to send various commands to the reader. EX1006, 5:18-64. Thus, Davis teaches the use of a signal of less than 10 ms to issue commands to a reader.

Although Davis discusses that the mode change command may be initiated by the panel sending three pulses within one second on the LEDCTL signal line, it would have been obvious to use the 8-bit 6.67 ms data signal to effectuate a mode change as well. EX1004, ¶¶163-168. It would have been within the skill of the POSITA to implement an 8-bit command to change modes in the available command codes in Davis's system. EX1004, ¶169. For example, the command designated to act as the START signal would be associated with a processor-executable instruction in the memory of the reader to change mode and would not carry with it any data from the panel to the reader. *Id.* The change in Davis's panel and reader's programming would also have led to predictable results. *See id.*; *see also KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007) ("The Court recognized that when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do

more than yield a predictable result.") (citing *United States v. Adams*, 383 U.S. 39, 50-51 (1966)); *In re Cree, Inc.*, 818 F.3d 694, 698 (Fed. Cir. 2016) (affirming examiner's finding that claims were drawn to "a simple substitution of one known element [] for another known element").

It would have been an obvious extension of the 8-bit commands sent from Davis's panel to the reader to also include an 8-bit start signal command among the predetermined possible commands the panel may send the reader. EX1004, ¶¶163-166. Indeed, excluding the two address bits, the range of 000000 to 111111 provides 63 discrete possible commands, only 4 of which are directly described by Davis, that could be programmed to be associated with a start signal. *See* EX1006, 5:30-46; EX1004, ¶169. It would have been advantageous to use the 8-bit signals to initiate a mode change, for example, because it would simplify the programming within the reader and the panel by eliminating the need to generate the three-pulse-within-a-second (by the panel) and to receive and determine that three pulses were received within a second (by the reader). EX1004, ¶168. Moreover, it would have been obvious to try to implement the mode-changing START signal among the signals Davis's panel sends to its reader. EX1004, ¶168; *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) (explaining that a claim can be invalid for being" obvious to try").

A POSITA would have recognized that implementing this change to Davis's mode-changing procedure would enable faster mode change, which would enable the Wiegand extension more quickly and its benefits of bidirectional communication, extended data field that may include tamper sensor data, and error correction. EX1004, ¶167. This also enables more reader-to-panel transmissions to include the extended data field and further reduces the risk of tampering with the device while the tamper sensor is not transmitting status data, thereby adding security. *Id.* Further, by transitioning modes even faster, this reduces any perceived lag in the reader-panel system, thereby improving the user's experience. *Id.*

2. Claim 10: "The non-transitory computer-readable medium of claim 9, wherein the predetermined amount of time is less than 10 ms."

Davis discloses claim 9 and renders obvious an alteration of a control line signal for a predetermined amount of time of less than 10 ms. *See supra*, §§VIII.A.9, VIII.B.1. Thus, Davis renders claim 10 obvious. EX1004, ¶170.

3. Claim 14: "The credential reader of claim 13, wherein the predetermined amount of time is less than 10 ms."

Davis discloses claim 13 and Davis renders obvious an alteration of a control line signal for a predetermined amount of time of less than 10 ms. *See supra*, §§VIII.A.12, VIII.B.1. Thus, Davis renders claim 14 obvious. EX1004, ¶171.

C. Ground 3: Claims 5, 10, and 14 Are Obvious over Davis in view of Lastinger

1. Lastinger (EX1022)

Lastinger relates to locational monitoring and tracking RFID systems for tracking tagged items within "a warehouse or other facility housing a large number of articles." *Id.* at 2:63-3:3, 3:24-40. As shown in Figure 1A, each location "[m]onitor 140 may be any device or combination of devices for receiving location identification broadcast by tag 130. For example, monitor 140 may be an RF receiver receiving wireless transmissions from tag 130 and/or locators 110, 120." *Id.* at 5:8-12.

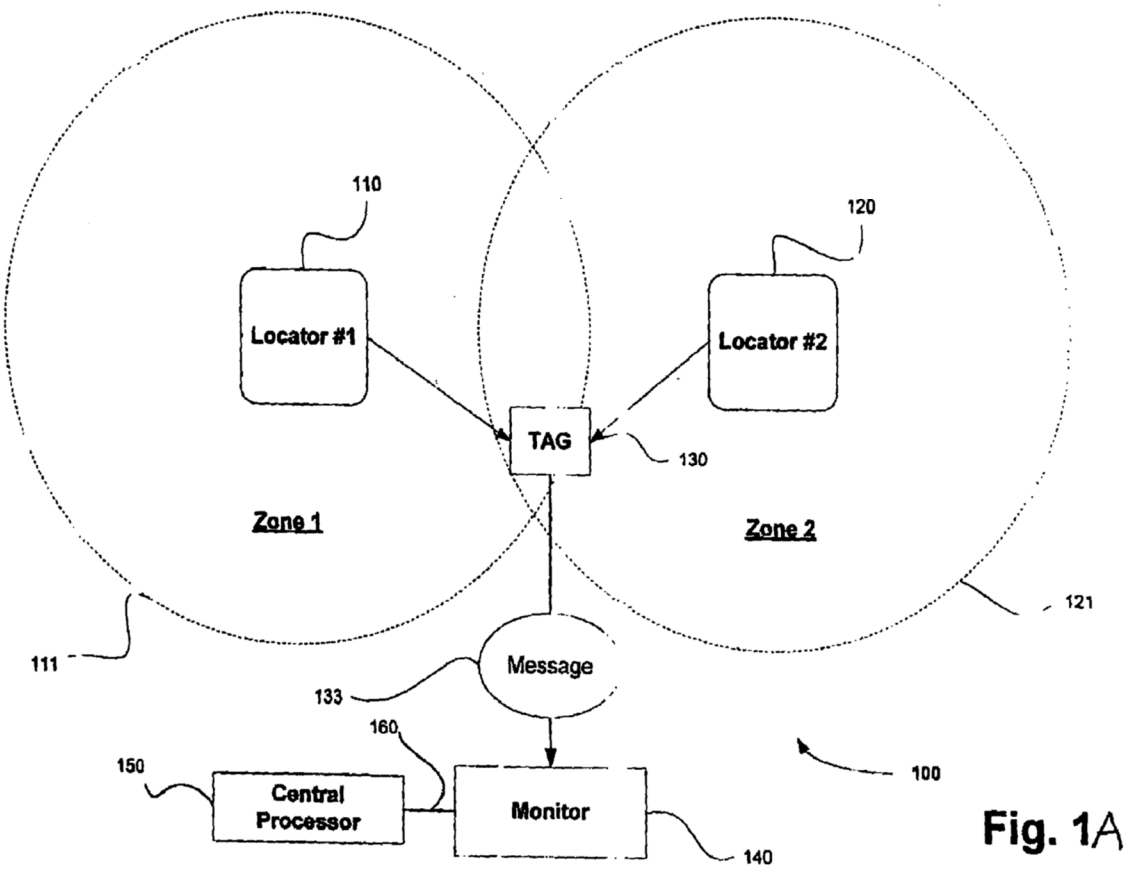
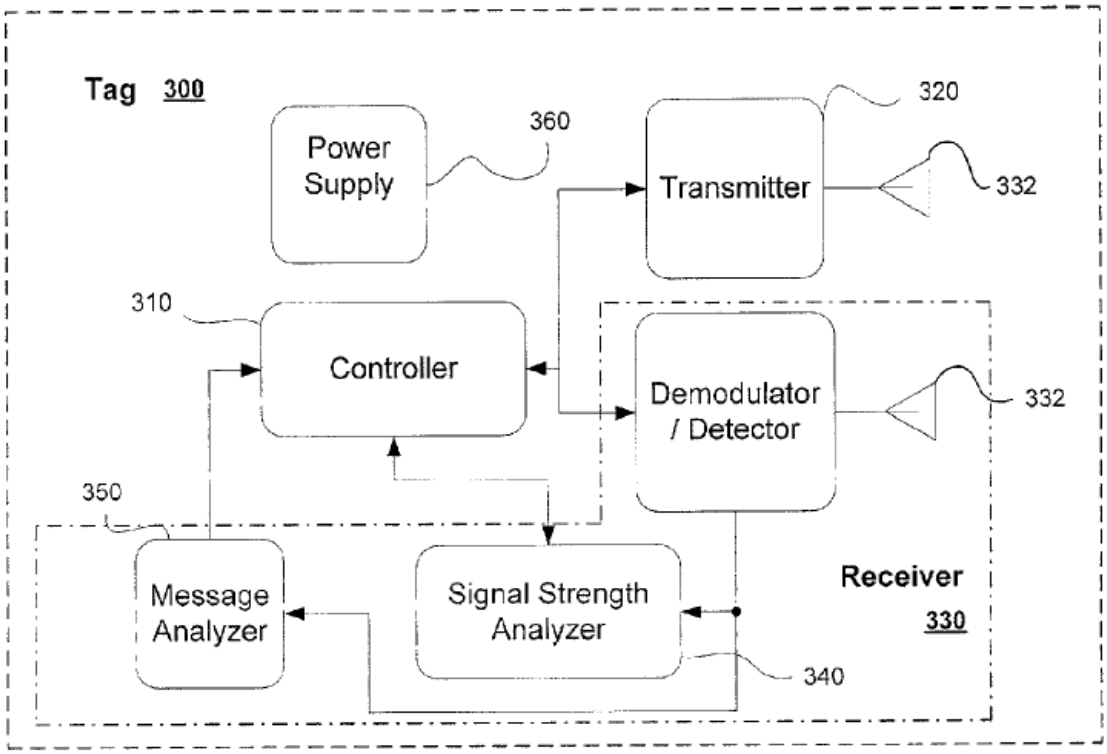


Fig. 1A

Id. at Fig. 1A.

Figure 3 shows a "functional block diagram of a tag according to various aspects of the present invention."



Id., 2:43-44, FIG. 3. Each "[t]ag 300 functions to receive signals having location identification information through receiver 330." *Id.* at 7:4-9. The "[r]eceiver unit 330 [of the tag 300] may be any device or combination of devices for receiving and/or decoding a signal from a tag (e.g., tag 130; FIG. 1)…. Receiver 330 preferably receives a wakeup or start signal of eight bits or more followed by a twenty-four bit word individually or in groups of up to eight words. Receiver 330 optionally operates in sampling mode where receiver 330 turns on and off intermittently. For example, it turns on for 100 usecs every 80 msecs (i.e., 800 to 1)." *Id.* at 8:30-43.

Lastinger teaches that the transmission mode of each tag may be "changed automatically or initiated by, for example, a received transmission commanding the

tag to change." *Id.* at 10:18-22. The modes include a beacon-only output mode or a fast interrogation output mode. *See id.* at 7:28-30, 10:7-12:41.

Lastinger is in the same field as the '562 patent because relates to access control RFID systems and communication protocols used in those systems. EX1004, ¶179; EX1022 at 1:12-24, 2:63-3:23 ("Systems according to various aspects of the present invention . . . provid[e] access to portions of a facility (e.g., unlocking doors for a particular personnel…."). Lastinger is pertinent to the problems the '562 patent purportedly addresses because Lastinger is directed to the start signals known to be used in RFID systems and to changing device operating modes in RFID systems. EX1004, ¶179; EX1022; 8:30-45. Lastinger is therefore analogous art to the '562 patent.

2. Claim 5: "The method of claim 4, wherein the predetermined amount of time is less than 10 ms."

To the extent Davis alone does not render this claim obvious, this claim is also obvious over Davis in view of Lastinger. EX1004, ¶¶180-189.

A POSITA implementing Davis would have been motivated by Latinger's teachings to use a predetermined amount of time of less than 10 ms for the alteration of the control line signal between the reader and upstream device. EX1004, ¶182-189. Lastinger teaches "a wakeup or **start signal of eight bits or more** followed by a twenty-four bit word individually or in groups of up to eight words." EX1022, 6:65-7:3; 8:37-40. The 8-bit start signal of Lastinger is transmitted in 100 usecs

(microseconds), that is, 0.1 ms (milliseconds). *Id.* 8:43-45. A POSITA would have been motivated to combine this teaching of Lastinger with Davis's access control system. A POSITA would have understood that Lastinger provides additional motivation, in addition to that which is discussed in Ground 2, for Davis to use its 8-bit panel-to-reader transmission to initiate a mode change because Lastinger explicitly recognizes that 8-bit signals may be used as START signals. EX1004, ¶182; *see supra* §VIII.B.1. Thus, Lastinger provides additional motivation for Davis use its 8-bit start signal to initiate a mode change, and to transmit it in 6.67 ms, thereby teaching a predetermined time of less than 10 ms.

Furthermore, a POSITA would have known that it would have been advantageous to implement Lastinger's 0.1 ms START signal in the system of Davis, indeed, as doing so would further the benefits described with regard to using Davis's 6.67 ms 8-bit signal, as described in Ground 2, *supra* §VIII.B.1. *See* EX1004, ¶184; *see also KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416, (2007) (citing *United States v. Adams*, 383 U.S. 39, 50-51 (1966)); *In re Cree, Inc.*, 818 F.3d 694, 698 (Fed. Cir. 2016). Indeed, it would further shorten the window during mode change when the Wiegand extension is not enabled and bi-directional communication and error correction is not possible. *See supra* §VIII.B.1; EX1004, ¶184. Further, it reduces the window during which the tamper sensor status data is not included in the Wiegand transmissions. *See id.* This would also improve the user's perceived system

responsiveness. *See id.* Implementing Lastinger's 0.1 ms transmission would thereby teach using a predetermine time of less than 10 ms.

Both Davis and Lastinger relate to radio frequency identification systems and data transmission protocols and are both classified under "H04," so a POSITA considering the data transmission protocol described in Davis would have been motivated to consider the data transmission protocol described in Lastinger for further details as to how to design transmission protocols in a radio frequency identification system. EX1004, ¶¶185-187. In addition, both Lastinger and Davis relate to sending commands in RFID systems, so a POSITA would have been motivated to consider the solutions of Lastinger in conjunction with the transmission protocol of Davis in contemplating the sending of commands over the Wiegand interface. EX1004, ¶¶185, 187.

As explained above, both Lastinger and Davis teach design choices for start signals, and the use of either to initiate a procedure in a credential reader would have been obvious. EX1004, ¶185. It would have been a simple design alternative to substitute Lastinger's start signal of 0.1 ms for the one-second mode-changing signal described by Davis. EX1004, ¶185.

A POSITA would have understood how to program the reader and panel of Davis's system, as programming was well-understood, and the change in Davis's

panel and reader's programming would have led to predictable results. *See* EX1004, ¶188.

3. Claim 10: "The non-transitory computer-readable medium of claim 9, wherein the predetermined amount of time is less than 10 ms."

Davis discloses claim 9 and Davis in view of Lastinger teach an alteration of a control line signal for a predetermined amount of time of less than 10 ms. *See supra*, §§VIII.A.9, VIII.C.2. Thus, Davis in view of Lastinger renders claim 10 obvious. EX1004, ¶190.

4. Claim 14: "The credential reader of claim 13, wherein the predetermined amount of time is less than 10 ms."

Davis discloses claim 13 and Davis in view of Lastinger teach an alteration of a control line signal for a predetermined amount of time of less than 10 ms. *See supra*, §§VIII.A.12, VIII.C.2. Thus, Davis in view of Lastinger renders claim 14 obvious. EX1004, ¶191.

IX. DISCRETIONARY DENIAL IS UNWARRANTED

A. Section 314(a)

As explained below, discretionary denial under *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11, 6 (PTAB Mar. 20, 2020) (precedential) is unwarranted.

1. Factor 1: Stay

This factor is neutral because neither party has yet requested a stay in the District Court Litigation, and it is unknown whether a stay will be granted if requested. *See Sand Revolution II, LLC v. Cont'l Intermodal Grp. – Trucking LLC*, IPR2019-01393, Paper 24, at 7 (PTAB June 16, 2020) (informative).

2. Factor 2: Proximity of Trial Date to Board's Final Written Decision

The Complaint in the District Court Litigation was filed on March 21, 2022. On April 19, 2023, the parties filed a proposed scheduling order, proposing trial to take place on September 29, 2025. EX1029, at 17. However, after filing the proposed scheduling order, the case was transferred to the District of Colorado, which has not entered any scheduling order or conducted any scheduling conference. As of the date of this filing, neither discovery nor claim construction has begun. The likely disposition date, based on a median time from filing to trial in the District of Colorado of 35.9 months, is March 2025 or later. EX1030, at 79. A Final Written Decision here would be anticipated in late-2024. Thus, it is highly likely that the Board would issue its FWD before any trial in the District Court Litigation. This factor thus weighs against discretionary denial.

3. Factor 3: Investment in Parallel Proceeding

The District Court Litigation is still in its earliest stages. No discovery has taken place and no trial date has been set. This also weighs against discretionary denial.

4. Factor 4: Overlap of Issues

Given its early stage, the validity issues in the litigation are unknown. Further, there is not complete overlap of issues because Petitioners are challenging additional claims that have not yet been asserted in the District Court Litigation. A trial before the Board will thus address potentially up to 13 claims that the district court will not address, which weighs against discretionary denial. *Markforged Inc. v. Continuous Composites, Inc.*, IPR2022-00679, Paper 7, at 32-33 (PTAB Oct. 25, 2022).

5. Factor 5: Similarity of Parties

The parties are the same in this proceeding and the litigation.

6. Factor 6: Other Circumstances

"[T]he PTAB will not deny institution based on *Fintiv* if there is compelling evidence of unpatentability," which this Petition provides. Director's Interim Procedure for Discretionary Denials, at 5 (June 21, 2022) ("Interim Procedure"). That is the case here—as explained herein, the Challenged Claims are anticipated by Davis or rendered obvious by Davis in view of Lastinger. Thus, discretionary denial is inappropriate here.

B. Section 325(d)

Discretionary denial under 35 U.S.C. § 325(d) would not be appropriate under at least the second part of the test set forth in *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*: whether Petitioner demonstrated that the Office erred in a manner material to the patentability of the challenged claims. IPR2019-01469, Paper 6, at 7-9 (PTAB Feb. 13, 2020) (precedential).

1. Grounds 1 and 2

With respect to "the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection," *Adv. Bionics*, IPR2019-01469, Paper 6, at 9, n.10 (citing *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8, at 17-18 (Dec. 15, 2017)), Davis was not expressly applied by the examiner as to the claims that eventually issued as claims 1-3, 6-8, and 11-12 of the '562 patent.[9] Moreover, the '985 publication (EX1010) that was applied to the claims that eventually issued as claims 1-3, 6-8, and 11-12 of the '562 patent contained materially different disclosures relating to

[9] For dependent claims 4-5, 9-10, and 13-14, the examiner applied International Publication No. EP1760985 (EX1010) ("the '985 publication"), including a portion of Davis incorporated therein, to reject only the claim features directed to alteration of a control line signal for a "predetermined amount of time." EX1002, 180-181.

the changing of modes, which renders Davis's teachings non-cumulative to the '985 publication's disclosure.

For example, the examiner's cited the '985 publication's teachings that "the reader 112 and the control panel 104 may use a previously agreed upon sequence or list of valid rolling codes. The control panel 104, at any random time, may change the order in which the code generator 148 goes through the list. The control panel 104 could inform the reader 112 to change how it is working through the list with a prompting signal send via an LED control signal…. This ensures that the code generator 148 does not necessarily have to go through a finite list of valid rolling codes in the same order until a new list of codes is provided to the code generator 148" in rejecting the claims that issued as claims 1-3, 6-8, and 11-12. *See* EX1010, ¶[0045]; EX1002, at 180 (citing EX1010, ¶[0045]). This does not teach a change in mode, but rather only teaches changing the order in which events take place (a particular rolling code is used) in a single mode. *See* EX1010, ¶[0045]; EX1004, ¶67. This contrasts with Davis, which directly teaches either operating in a first mode "as an existing prior art device" or operating in a second mode using the "Weigand Extension." *See* EX1006, 2:41-43; *see supra* §§VIII.A.2.c, e. Thus, Davis's teachings are non-cumulative to the '985 publication's disclosures. *Compare* EX1002, 180 (quoting EX1010, ¶[0045]) *with* Ground 1, Claim 1[D]; *see*, *e.g.*, *Keysight Technologies, Inc. v. Centripetal Networks, LLC,* IPR2022-01525, Paper

9, at 58 (PTAB Apr. 17, 2023) ("We disagree with Patent Owner's argument that IPUG is cumulative to Netronome because, although certain aspects of the references are similar, there exist material differences between the disclosures in the references with respect to key disputed features recited in the challenged claims."); *Tesla, Inc. v. Charge Fusion Technologies, LLC,* IPR2023-00062, Paper 13, at 19 (PTAB May 11, 2023).

In addition, Davis was not applied or discussed by the examiner during prosecution of the '783 patent. Davis '466 (EX1009), which is the publication of a continuation application of Davis, was only applied during prosecution of the '783 patent, and only to materially different claims than those recited in the '562 patent. *Compare* EX1003, at 47, 48 (pending claim 9) *with* '562 Patent, Claim 1[B]-[D]; *compare* EX1003, at 47-49 (pending claims 12 and 13) *with* '562 patent Claim 1[D]; and *compare* EX1003, at 47-49 (pending claims 10 and 11) *with* '562 patent claims 4 and 5, 9 and 10, *and* 13 and 14. For example, then-pending claim 9 of the '431 application recites the additional requirements for the determining step of analyzing "an out-of-band communication" and "a special code," which are not claimed in the '562 patent. *Compare* EX1003, at 47, 48 (pending claim 9) *with* '562 Patent Claims.

With respect to "whether petitioner has pointed out sufficiently how the examiner erred in its evaluation of the asserted prior art" and "the extent to which additional evidence and facts presented in the petition warrant reconsideration of the

prior art or arguments," *Becton, Dickenson*, IPR2017-01586, Paper 8, at 18, as described above, Davis clearly anticipates these claims. *See supra*, §VIII.A. Indeed, Davis explicitly discloses that "[t]he panel system in the preferred embodiment is able to switch a Wiegand generator from the basic protocol to the extended protocol"—plainly teaching changing the reader's mode of operation. EX1006, 5:47-49; *see supra* §VIII.A.2.e. Moreover, Davis discloses that the first mode comprises a non-Wiegand mode (basic protocol) and the second mode comprises at least one of a secure Wiegand mode and packet-mode (extended protocol). EX1006, 5:47-49, 4:48-5:63; *see supra* §§VIII.A.2.b, e. Indeed, Davis's mode changing capabilities (between the "existing prior art device" and the Wiegand extension much more clearly and directly teach two separate modes of operation than the disclosures from the '985 publication (EX1010) that the examiner relied on to reject claim 1. *Compare* Claim 1[D], *supra* §VIII.A.2.e *with* EX1002, 180 (quoting EX1010, ¶[0045] ("the control panel [] could inform the reader [] to change how it is working…with a prompting signal send via an LED control signal.")). Thus, Davis is non-cumulative to the '985 publication and it was material error for the examiner to not have applied Davis to the pending claims.

Moreover, Davis also discloses claims 2-3, 7-8, and 12 regarding the use of a unidirectional communication protocol or the Wiegand protocol. EX1006, 1:32-38, 1:54-57, 2:41-43; *see supra* §§VIII.A.3-4, 7-8, 11. Davis also discloses claims 4, 9,

and 13 regarding alteration of a control line signal for a predetermined amount of time, and renders obvious the further limitation of claims 5, 10, and 14 that the predetermined amount of time is less than 10 ms. EX1006, 5:18-63; *see supra* §§VIII.A.5, 9, 12; VIII.B.1-3. By allowing these claims over Davis, the examiner erred.

In addition, to the extent prosecution of the '783 patent is relevant, and to the extent the examiner accepted the applicant's three characterizations of Davis '466 during that prosecution,[10] the examiner erred. First, the applicant contended that Davis "only discloses the concept of a 'Wiegand Extension' where extension bits are transmitted between a reader and a panel." EX1003, at 1520. However, as described in Ground 1, the Wiegand Extension is, in fact, another mode of operation that may be enables the addition of bits of information relating to **security** to be appended to the reader-panel data stream and **panel-to-reader data transmissions**. *See* Ground 1, Claim 1[D], *supra* §VIII.A.2.e. Indeed, the '562 patent's own characterization of Davis shows that Davis does not "only discloses the concept of a 'Wiegand Extension' where extension bits are transmitted between a reader and a panel." The '562 patent instructs that Davis "further describes transmitting data back

[10] There is no indication in the record that the examiner credited applicant's arguments and (wrong) characterization of Davis '466.

to the reader from the upstream device via an LED control line," thereby demonstrating that the applicant's characterization of Davis '466 was incorrect. EX1001, 4:21-31; *see* Ground 1, Claim 1[D], *supra* §VIII.A.2.e; *see also* EX1010, ¶[0013].

Second, the applicant incorrectly asserted that "there is absolutely no disclosure in Davis '466 of causing a reader to transition from a first mode of operation to a second mode of operation where the first mode comprises a Wiegand-format mode and the second mode comprises a packet-mode." EX1003, at 1520. But, as plainly shown above, Davis teaches transitioning between "a first mode of operation to a second mode of operation where the first mode comprises a Wiegand-format mode and the second mode comprises a packet-mode." *See* Ground 1, Claim 1[D], *supra* §VIII.A.2.e.

Moreover, as explained above, claim 1 only requires "one of" a packet-mode or a secure Wiegand mode (*see supra* §V.C), and the applicant did not argue that Davis '466 did not teach a secure Wiegand mode (*see* EX1003, at 1519-21). Thus, it was error for the examiner to have overlooked Davis's teachings of a secure Wiegand mode. *See*, *e.g., Sonos, Inc. v. Google LLC*, IPR2023-00118, Paper 9, at 28 (PTAB May 19, 2023) ("[W]e determine for purposes of this Decision, that (1) the lack of any substantive analysis or discussion of Rosenberger in the examination of the application that matured into the [challenged] patent, (2) the prominent role

of Rosenberger in this large family of related patents, (3) the double patenting rejection establishing a close relationship between the claims of the [challenged] patent and claims that were rejected based on Rosenberger in the [parent to the challenged] patent, (4) the failure to provide a 'suitable' …, substantive reason why the claims were allowed, and (5) our determination that there is a reasonable likelihood that Rosenberger anticipates several claims in the [challenged] patent collectively support Petitioner's assertion that the Examiner overlooked specific material disclosures in Rosenberger."); *Eli Lilly and Company v. Teva Pharmaceuticals International GMBH*, IPR2022-00796, Paper 9, at 12-13 (PTAB Oct. 14, 2022) ("In making this statement, the Examiner appears to have overlooked Sun's suggestion to use an anti-CGRP antibody to treat refractory patients…. Patent Owner does not identify anything in the prosecution history of the '434 patent to suggest that the Examiner accounted adequately for Sun's teachings in allowing the '434 patent to issue.").

Third, the applicant argued that "[t]here is no disclosure of causing a reader… to perform [a transitioning function] by transmitting messages of [*sic*] a Wiegand wire, namely the LEDCTL line of the Wiegand wire" (EX1003, at 1521), but as noted above, Davis explicitly teaches that:

> [t]he panel system in the preferred embodiment is able to **switch a Wiegand generator from the basic protocol to the extended protocol as follows**…. **The panel will drop the LEDCTL signal low**

> **three times within a one-second interval**.… The panel then will send out the "Use Wiegand Extension" command to the Wiegand generator, and the Wiegand generator sends the "Command received and executed" … and sets a flag in non-volatile memory to use the Wiegand extension….

EX1006, 5:46-64; EX1009, ¶[0033]. Therefore, to the extent it was applicant argument as to these limitations, rather than amendment or otherwise, that secured allowance of the claims, it was clear error for the examiner to accept these incorrect arguments regarding the teachings of the Davis '466. *See Versa Prods. v. Varidesk, LLC*, IPR2020-00387, Paper 13, at 14-18 (PTAB July 10, 2020) (concluding that "the Examiner erred in accepting Patent Owner's argument that [] claim 1 would have been obvious over" the prior art because the prior art taught the element that Patent Owner contended was missing from the prior art of record); *Sarepta Therapeutics, Inc. v. Nippon Shinyaku Co., LTD.*, IPR2021-01137, Paper 18, at 26-28 (PTAB Jan. 14, 2022) ("Likewise, to the extent that the Examiner relied upon and was persuaded by Patent Owner's unexpected results arguments as the basis for allowance, we find that to also be a material error.").

2. Ground 3

As to Ground 3, Davis is asserted herein with Lastinger, and this combination was never before the examiner. Thus, the first prong of *Advanced Bionics* (whether the same or substantially the same prior art or arguments were previously presented

to the Office) is not satisfied as to the combination set out in Ground 3. *See, e.g.*, *Thorne Research, Inc. v. Trustees of Dartmouth College*, IPR2021-00491, Paper 18, at 8 (PTAB Aug. 12, 2021) ("The fact that one piece of art from the combination was previously presented and/or argued to the Office alone is insufficient to satisfy the first prong of *Advanced Bionics* two-part test…."); *Nearmap US, Inc. v. Eagle View Technologies, Inc*., IPR2022-01090, Paper 9, at 6-7 (PTAB Jan. 12, 2023).

Moreover, to the extent Part 1 is satisfied with respect to Ground 3, it was material error for the Board to have allowed claims 5, 10, and 14 over the teachings of Davis in view of Lastinger for the reasons set forth above. *See supra* §VIII.C.

X. CONCLUSION

For the foregoing reasons, Petitioner respectfully requests that IPR of claims 1-14 of the '562 patent be instituted and that these claims be determined to be unpatentable.

Dated: June 9, 2023

Respectfully submitted,

/Thatcher A. Rahmeier/

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CERTIFICATE OF SERVICE UNDER 37 C.F.R. §42.6 (E)(4)

I certify that on June 9, 2023, I will cause a copy of the foregoing Petition, including any exhibits or appendices filed therewith, to be served via overnight delivery to the following correspondence address of record for the patent:

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I will further cause a copy of the foregoing Petition, including any exhibits or appendices filed therewith, to be served upon the following additional parties via electronic mail or file transfer:

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24, the undersigned certifies that the foregoing IPR petition contains 13,872 words excluding a table of contents, a table of authorities, Mandatory Notices under § 42.8, a certificate of service or word count, or appendix of exhibits or claim listing. Petitioners have relied on the word count feature of the word processing system used to create this paper in making this certification.

Date: June 9, 2023

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XI. CLAIM LISTING

The following claim listing assigns element labels (e.g., 1[A], 1[B], etc.) to certain claims for clarity.

Claim 1
1[pre] A communication method, comprising:
1[A] operating a credential reader in a first mode of operation, the credential reader comprising at least one of a microprocessor and firmware that enable the credential reader to operate in the first mode of operation;
1[B] receiving, at a communication interface of the credential reader, a message from an upstream device;
1[C] determining, by the credential reader, that the message was transmitted by the upstream device; and
1[D] based on determining that the message was transmitted by the upstream device, transitioning the credential reader from the first mode of operation to a second mode of operation, wherein the first mode comprises a non-secure Wiegand mode and wherein the second mode comprises at least one of a secure Wiegand mode and a packet-mode.
Claim 2
2. The method of claim 1, wherein the credential reader is in communication with an upstream device utilizing a unidirectional communication protocol.
Claim 3
3. The method of claim 2, wherein the unidirectional communication protocol is the Wiegand protocol.
Claim 4
4. The method of claim 1, wherein the message transmitted by the upstream device comprises an alteration of a control line signal between the reader and the upstream device for a predetermined amount of time.
Claim 5
5. The method of claim 4, wherein the predetermined amount of time is less than 10 ms.
Claim 6
6[pre] A non-transitory computer-readable medium comprising processor-executable instructions, the processor-executable instructions comprising:
6[A] instructions configured to cause a credential reader to operated [sic] in a first mode of operation;

6[B] instructions configured to receive a message at the reader, the message being received from an upstream device;
6[C] instructions configured to determine that the message was transmitted by the upstream device; and
6[D] instructions configured to transition the credential reader from the first mode of operation to a second mode of operation, wherein the transition from the first mode of operation to the second mode of operation occurs based on determining that the message was transmitted by the upstream device, wherein the first mode comprises a non-secure Wiegand mode and wherein the second mode comprises at least one of a secure Wiegand mode and a packet-mode.
Claim 7
7. The non-transitory computer-readable medium of claim 6, wherein the credential reader is in communication with an upstream device utilizing a unidirectional communication protocol.
Claim 8
8. The non-transitory computer-readable medium of claim 7, wherein the unidirectional communication protocol is the Wiegand protocol.
Claim 9
9. The non-transitory computer-readable medium of claim 6, wherein the message transmitted by the upstream device comprises an alteration of a control line signal between the reader and upstream device for a predetermined amount of time.
Claim 10
10. The non-transitory computer-readable medium of claim 9, wherein the predetermined amount of time is less than 10 ms.
Claim 11
11[pre] A credential reader comprising:
11[A] at least one of a microprocessor and firmware that enable the reader to operate in a first mode of operation,
11[B] receive a message from an upstream device,
11[C] determine that the message was transmitted by the upstream device, and
11[D] in response thereto, transition the credential reader from the first mode of operation to a second mode of operation, wherein the transition from the first mode of operation to the second mode of operation occurs based on determining that the message was transmitted by the upstream device, wherein the first mode comprises a non-secure Wiegand mode and wherein the second mode comprises at least one of a secure Wiegand mode and a packet-mode.
Claim 12

12. The credential reader of claim 11, wherein the credential reader is in communication with an upstream device utilizing a unidirectional communication protocol, and wherein the unidirectional communication protocol is the Wiegand protocol.
Claim 13
13. The credential reader of claim 11, wherein the message transmitted by the upstream device comprises an alteration of a control line signal between the reader and upstream device for a predetermined amount of time.
Claim 14
14. The credential reader of claim 13, wherein the predetermined amount of time is less than 10 ms