

Petition for *Inter Partes* Review of  
U.S. Patent No. 10,269,222 B2

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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META PLATFORMS, INC.,  
Petitioner

v.

IMMERSION CORPORATION,  
Patent Owner

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Case IPR2023-00944  
U.S. Patent No. 10,269,222 B2  
Issue Date: April 23, 2019

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**PETITION FOR *INTER PARTES* REVIEW  
OF U.S. PATENT NO. 10,269,222 B2**

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**List of Exhibits**

| <b>Exhibit No.</b> | <b>Description of Document</b>                                                                                                                                               |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1001</b>        | U.S. Patent No. 10,269,222 B2 to Allan Visitacion et al. (filed July 24, 2015, issued April 23, 2019) (“ <b>’222</b> ” or “ <b>’222 patent</b> ”)                            |
| <b>1002</b>        | Declaration of Jeremy Cooperstock, Ph.D. (“ <b>Cooperstock</b> ”)                                                                                                            |
| <b>1003</b>        | U.S. Patent Application Publication No. 2009/0289955 A1 to Stephan Douris et al. (filed May 22, 2008, published November 26, 2009) (“ <b>Douris</b> ”)                       |
| <b>1004</b>        | U.S. Patent Application Publication No. 2012/0028577 A1 to Tony F. Rodriguez and William Y. Conwell (filed June 30, 2011, published February 2, 2012) (“ <b>Rodriguez</b> ”) |
| <b>1005</b>        | Excerpts from <i>Microsoft Computer Dictionary</i> (5th ed. 2002)                                                                                                            |
| <b>1006</b>        | Joint Claim Construction Statement filed in <i>Immersion Corp. v. Meta Platforms, Inc.</i> , No. 6:22-cv-00541-ADA (filed January 21, 2023)                                  |
| <b>1007</b>        | Prosecution history of the ’222 patent                                                                                                                                       |
| <b>1008</b>        | Affidavit of Service, ECF No. 6, dated June, 2, 2002, filed in <i>Immersion Corp. v. Meta Platforms, Inc.</i> , No. 6:22-cv-00541-ADA (W.D. Tex.)                            |

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**I. MANDATORY NOTICES UNDER §42.8(A)(1)**

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

Meta Platforms, Inc. is the real party-in-interest to this IPR petition.

**B. Related Matters Under §42.8(b)(2)**

The '222 patent is the subject of the following pending litigation involving  
Petitioner: *Immersion Corp. v. Meta Platforms, Inc.*, No. 6:22-cv-00541-ADA  
(W.D. Tex.). Petitioner was served with the Complaint in that action on May 27,  
2022. (EX1008, p.001.)

**C. Lead and Back-Up Counsel under §42.8(b)(3)**

Petitioner provides the following designation of counsel.

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**D. Service Information**

This Petition is being served by Federal Express to the attorneys of record for the '222 patent, 34300 - Immersion / Kilpatrick Townsend and Stockton, Mailstop: IP Docketing – 22, 1100 Peachtree Street, Suite 2800, Atlanta, GA 30309. This Petition is also being served on litigation counsel identified in the Certificate of Service. Petitioner consents to electronic service at the addresses provided above for lead and back-up counsel.

**E. Power of Attorney**

Filed concurrently per 37 C.F.R. § 42.10(b).

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**II. FEE PAYMENT**

Petitioner requests review of eleven claims, with a \$41,500 payment.

**III. REQUIREMENTS UNDER §§ 42.104 AND 42.108 AND CONSIDERATIONS UNDER §§ 314(A) AND 325(D)**

**A. Standing**

Petitioner certifies that the '222 patent is available for IPR and that Petitioner is not barred or otherwise estopped.

**B. Identification of Challenge**

Petitioner requests institution of IPR based on the following grounds:

| Ground | Claims                                       | Basis under §103            |
|--------|----------------------------------------------|-----------------------------|
| 1      | 1, 2, 5, 7, 10,<br>11, 15, 17, 18,<br>21, 23 | Douris in view of Rodriguez |

Submitted herewith is a Declaration of Jeremy Cooperstock, Ph.D. (EX1002) (“Cooperstock”), a qualified technical expert. (Cooperstock, ¶¶1-7, Ex. A.)

**C. §§314(a) and 325(d)**

Petitioner respectfully submits that no basis exists under either §314(a) or §325(d) for discretionary denial of this Petition. Petitioner reserves its right to respond to any discretionary denial arguments later presented by Patent Owner.

**§ 314(a)**: Petitioner has not previously filed an IPR petition against the '222 patent, and is unaware of any other prior IPR petition filed against the '222 patent

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by any party. In the pending litigation, the district court has continued the claim construction hearing several times, and as of the filing of this Petition, no claim construction or other substantive rulings have issued. A trial date has been set for February 20, 2024, but Petitioner has filed a motion to transfer the case to the Northern District of California (which remains pending as of the filing of this Petition). In the event of IPR institution, moreover, Petitioner intends to file a motion to stay the litigation pending the outcome of the IPR. In order to address any concerns regarding duplication of efforts, Petitioner hereby provides a *Sotera* stipulation that, in the event of IPR institution, Petitioner will not pursue in the district court any grounds of invalidity against the challenged claims that were raised or reasonably could have been raised in IPR.

**§ 325(d):** None of the prior art cited in any of the grounds identified in **Part III.B** above was previously presented during prosecution of the '222 patent.

#### **IV. OVERVIEW OF THE '222 PATENT**

##### **A. Level of Ordinary Skill in the Art**

A person of ordinary skill in the art would have possessed a bachelor's degree in electrical engineering or computer science (or an equivalent degree), and two years of practical or industry experience in the field of human computer interaction, including implementation of computer-based systems and software for providing haptic feedback effects to a user and for processing images captured by a device

(such as detecting objects in digital images captured by a camera). (Cooperstock, ¶¶12-13.) A person could also have qualified with more formal education and less practical or industry experience, or vice versa. (*Id.*)

## **B. Specification Overview**

The '222 patent states that it “relates to a system with a wearable device, a second device, and a haptic output device that is configured to generate feedback based on an event that occurs in an environment related to the wearable device and/or the second device.” ('222, 1:14-18.) The “Background” section states that “[a]ugmented reality devices provide an augmented reality environment in which physical objects in a physical space are concurrently displayed with virtual objects in a virtual space.” ('222, 1:22-25.)

The '222 patent goes on to describe “a wearable device that is configured to generate feedback based on an event that occurs in an environment related to the wearable device.” ('222, 1:42-44.) The wearable device “may be configured as eyewear” and configured to display an “AR [augmented reality] environment via one or both lenses of the eyewear.” ('222, 5:4-11, 5:60-62.) The wearable device may be in communication with a server and/or another device. ('222, 2:46-49.) The wearable device may include a haptic output device configured to provide haptic feedback based on an event in an environment of the wearable device. ('222, 7:1-9;

*see also id.*, 2:20-31 (listing examples of an event).) The wearable device may provide different haptic feedback in response to different events. ('222, 10:30-41.)

## V. CLAIM CONSTRUCTION

No claim construction rulings have issued in the pending litigation. Proposed constructions have been exchanged between Petitioner and Patent Owner for the term “**augmented reality**” in the challenged claims. (EX1006, p.003.) Petitioner does not believe any of these terms requires express construction for purposes of IPR because, as demonstrated below, the claims are obvious under any of the constructions proposed in the pending litigation, or under any other reasonable construction. Petitioner reserves its right to respond to any claim construction arguments later presented by Patent Owner.

## VI. THE CHALLENGED CLAIMS ARE UNPATENTABLE.

### A. Overview of the Grounds of Unpatentability

The '222 patent attempts to lay claim to well-known techniques for producing haptic feedback for wearable and augmented reality devices based on events occurring in the user's environment. These techniques are disclosed and rendered obvious by the prior art. All grounds rely primarily on Douris (EX1003), which discloses a wearable device referred to as a “reality overlay device” that may take the form of glasses. (Cooperstock, ¶¶42-43.)

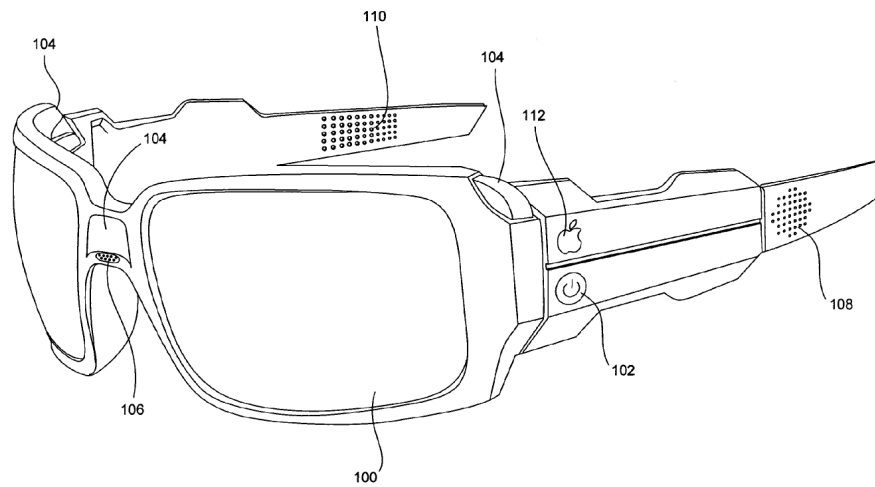


**FIG. 1**

(Douris, Fig. 1.) The reality overlay device as shown in Figure 1 includes transparent lenses **100** that allow the wearer to view their surroundings. (Douris, ¶0022.) But these lenses **100** can also function as screens for overlaying or superimposing additional visual images to provide information pertinent to the user's physical surroundings. (Douris, ¶¶0022, 0030.) In one example in Figure 5, the device shows overlays identifying restaurants in the physical vicinity of the wearer:

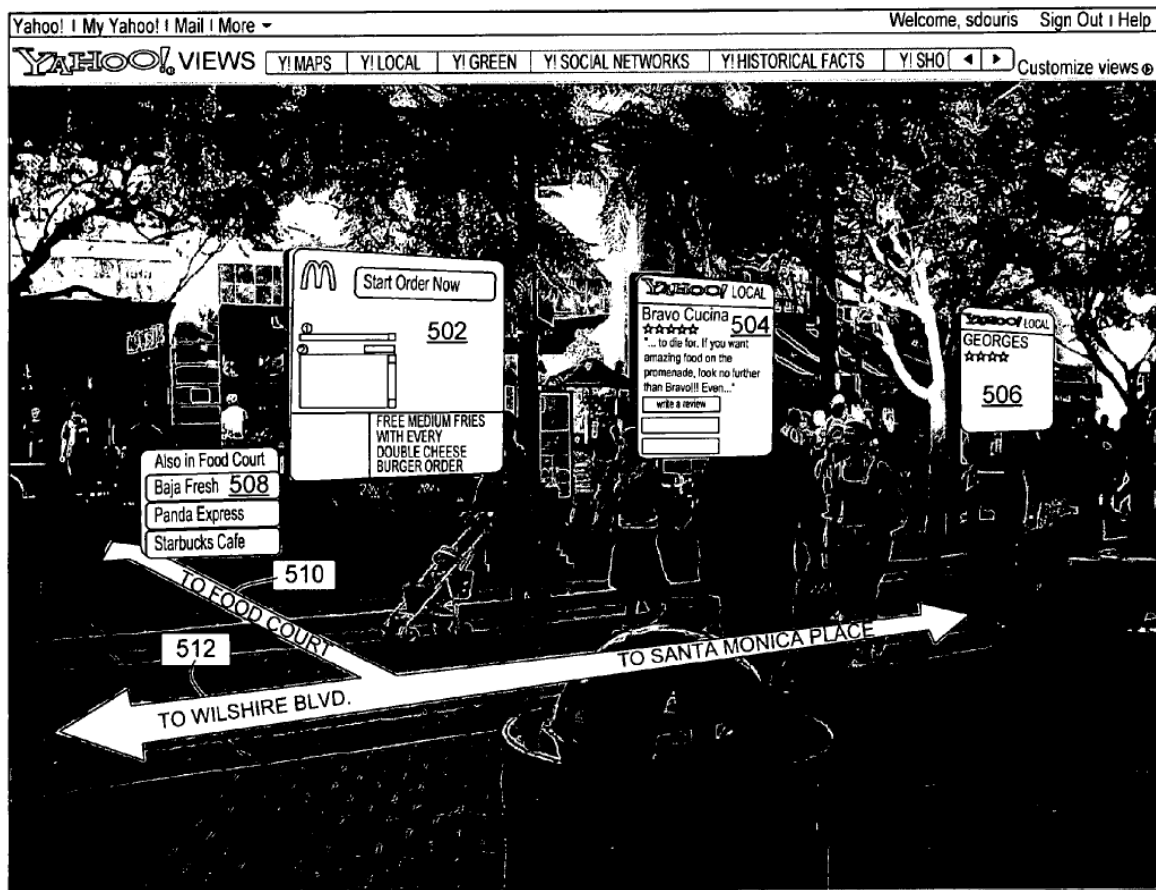


**FIG. 5**

(Douris, Fig. 5; *see also id.*, ¶¶0051-0053.) Figure 6 provides a similar example of overlay information, but for people in the vicinity of the wearer of the reality overlay device. (Douris, Fig. 6, ¶¶0058-0060.) Douris is a strong reference that discloses and renders obvious the majority of the claim limitations, as demonstrated below.

Petitioner has cited Douris in combination with **Rodriguez** (EX1004), for limitations in the challenged claims reciting control signals and providing haptic feedback signals. Rodriguez discloses a system similar to Douris that can deliver information to a user based on recognizing, for example, that the user is in the

vicinity of a particular person or other entity. (Cooperstock, ¶¶45-48.) Rodriguez further discloses the ability to provide haptic feedback to the user. The combination of Douris and Rodriguez therefore discloses and renders obvious all limitations of the challenged claims. Douris and Rodriguez qualify as prior art to the '222 patent under at least 35 U.S.C. § 102(b) (pre-AIA) because they are patent applications published more than one year before the filing date of the '222 patent.<sup>1</sup>

**B. Ground 1: Claims 1, 2, 5, 7, 10, 11, 15, 17, 18, 21, and 23 Are Obvious Over Douris in View of Rodriguez.**

**1. Independent Claim 1**

The preamble of claim 1 simply recites “[a] **system comprising...**” The proposed combination of Douris and Rodriguez renders obvious a system that includes the limitations recited in the claim as explained below.

**(a) “a wearable device;” (Limitation 1[a])**

Douris discloses “**a wearable device**” in the form of a reality overlay device. (Douris, ¶0005 (“In one embodiment, the reality overlay device is a wearable device that may be worn on the face of the user of the device.”).) Figure 1 shows one example of a reality overlay device in the form of wearable eyeglasses:

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<sup>1</sup> Because the '222 patent is a continuation of a patent application filed on March 15, 2013, the “first-to-invent” provisions of pre-AIA law apply.

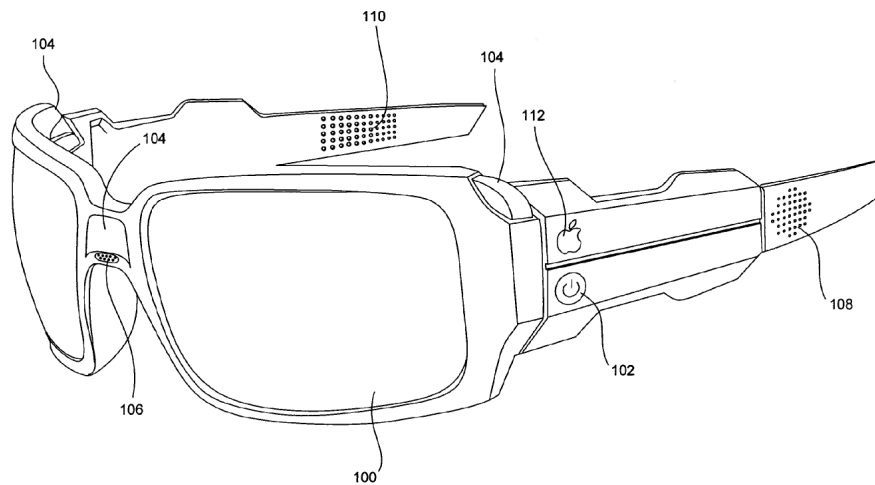


**FIG. 1**

(Douris, Fig. 1.) Douris explains that the reality overlay device may be shaped in the form of glasses or sunglasses, and has the ability to superimpose a transparent overlay of information pertinent to the wearer's surroundings. (Douris, ¶¶0022, 0005-0006.) Petitioner will discuss additional aspects of the Douris reality overlay device in the discussion of other limitations below.

**(b) “a second device remote from and in communication with the wearable device;” (Limitation 1[b])**

Petitioner notes that the claimed “**second device**” is not referenced in claim 1 after limitation 1[b], but is referred to in certain dependent challenged claims. The “**second device**” can be mapped to Douris in two separate and independent ways, each satisfying limitation 1[b].

**First mapping:**

Under a first mapping, the “**second device**” corresponds to a second reality

overlay device worn by a second user. *Petitioner will use this first mapping for dependent claims 2 and 5 below.*

A reality overlay device, as explained in Douris, “may be connected to another device via a physical or wireless connection for providing output.” (Douris, ¶¶0045, 0023.) For example, “users of different overlay devices may connect to one another for purposes of sharing the same experience (e.g., visiting a city or playing a game).” (Douris, ¶0045; *see also id.*, ¶0064 (“For example, as illustrated in FIG. 9, implementations are contemplated in which a user implementing a reality overlay device 1000 interacts with a diverse network environment which may include other reality overlay devices...”).)<sup>2</sup> The “**second device**” under this first mapping thus corresponds to a second reality overlay device, which is “**in communication with**” the first reality overlay device (“**the wearable device**”).

This second reality overlay device may also be “**remote from**” from the first reality overlay device. This is because reality overlay devices can be connected to each other over a variety of networks capable of connecting devices that are “**remote from**” each other. For example, “[t]he reality overlay device may support

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<sup>2</sup> Except as otherwise noted, all underlining and other emphasis added to quotations was added by Petitioner for emphasis.

connection to a wireless network such as a cell phone network,” “Worldwide Interoperability for Microwave Access (Wi-MAX),” among others. (Douris, ¶0023.) “The invention may also be practiced in a wide variety of network environments,” including “TCP/IP-based networks,” among others. (Douris, ¶0066.) Cell phone networks, TCP/IP-based networks, and Wi-MAX provide well-known examples of networks capable of connecting devices that are remote from each other. (Cooperstock, ¶55.)

It therefore would have been apparent and obvious that the first reality overlay device (“**wearable device**”) and the second reality overlay device (“**second device**”) in Douris would have been “**remote from and in communication with**” each other. For example, this would have enabled the user of the first overlay device who is visiting a city to share their experience with a friend back home who is wearing the second reality overlay device, or to enable the two users to play a game or exchange messages. (Cooperstock, ¶55 (citing Douris, ¶¶0045 (“[U]sers of different overlay devices may connect to one another for purposes of sharing the same experience (e.g., visiting a city or playing a game).”), 0062 (“[A] user may display a message directed to a specific set of one or more individuals.”)).)

**Second mapping:**

Under a second mapping, “**a second device**” corresponds to a remote network

server. *Petitioner will use this second mapping for dependent claim 7.* The “**second device**” under this mapping thus corresponds to a remote network server, which is “**in communication with**” the first reality overlay device (“**the wearable device**”).

For example, a reality overlay device “may include one or more transparent lenses **100** that enable a user to view his or her surroundings through the transparent lenses **100**,” and may also “function as screens that enable a transparent overlay to be displayed.” (Douris, ¶0022.) As Petitioner will explain in greater detail below, a reality overlay device can also obtain and display “overlay information” that is pertinent to the user’s surroundings. (Douris, ¶¶0005-0006, 0028-0030.) Douris further explains that the reality overlay device (“**wearable device**”) may receive this “overlay information” from a remote server (“**second device**”) over a network:

The reality overlay device may obtain overlay information for use in generating and providing a transparent visual overlay and/or audio overlay via the device using at least a portion of the information that the reality overlay device has captured. The overlay information may be obtained locally via one or more local memories and/or processors. The overlay information may also be obtained **remotely** from one or more servers using an Internet browser via a wireless connection to the Internet.

(Douris, ¶0028.) The remote server (“**second device**”) also receives information from the reality overlay device (“**wearable device**”), such as information pertinent

to the physical surroundings, which the server uses to retrieve or generate the appropriate overlay information. (Douris, *e.g.*, ¶¶0046-0048, Fig. 3.)

Petitioner will provide a far more detailed description of these processes below. But for purposes of limitation 1[b], these disclosures amply disclose a remote server (“**second device**”) and overlay device (“**wearable device**”) that are “**remote from and in communication with**” each other. (Cooperstock, ¶57.)

- (c) “**a processor configured to generate at least a first control signal and a second control signal representative of a first event and a second event, respectively, occurring in an environment related to the wearable device and/or the second device, the first event and the second event being different events; and**” (Limitation 1[c])

The claimed “**processor**” for limitation 1[c] corresponds in Douris to a processor included in a reality overlay device. Douris explains that a reality overlay device may use “one or more local memories and/or processors” to obtain overlay information to provide a transparent visual overlay. (Douris, ¶0028; *see also id.*, ¶0009 (“the invention pertains to a device comprising a processor, memory, and a display”).) It would have been apparent and obvious that a reality overlay device includes at least one processor. (Cooperstock, ¶59.)

Before addressing the claimed “**first control signal**” and “**second control signal**,” Petitioner will first explain how the prior art discloses and renders obvious

a first and second event “**occurring in an environment related to the wearable device and/or the second device.**” The ’222 patent does not expressly define “**event**” but describes it by reference to a number of examples including “an indication of a physical object within a predetermined proximity of the wearable device,” “an interaction between the wearable device and an object in the environment,” “an indication that the wearable device recognizes an object in the environment, a navigation event, and/or another event occurring in an environment related to the wearable device.” (’222, 2:20-31.)

Douris discloses several examples of “**event[s]...occurring in an environment related to the wearable device and/or the second device,**” that mirror examples in the ’222 patent. The events include, for example, the wearer of a reality overlay device being in proximity of a particular person, business or other entity, which may cause particular overlay information to be displayed by the reality overlay device. For example, Figure 5 overlay information for three restaurants in the vicinity of the wearer of the reality overlay device:

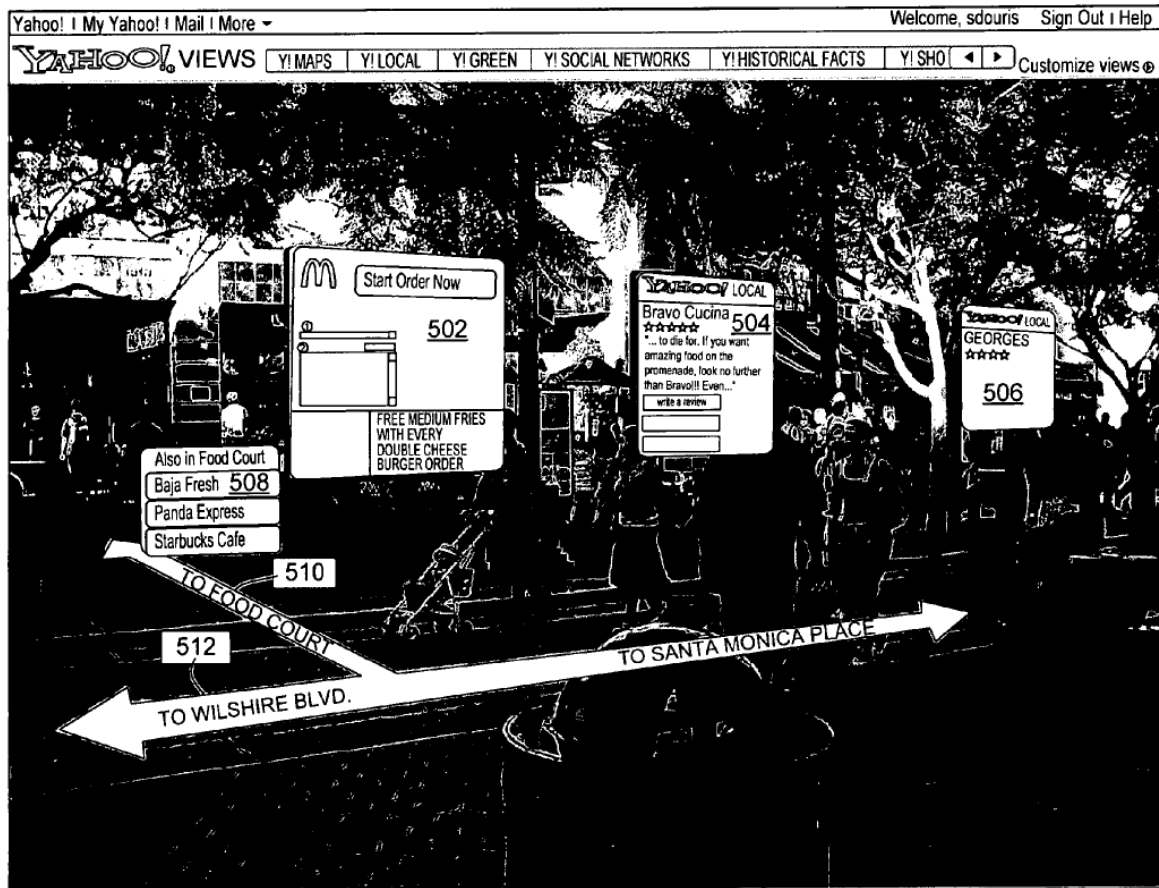


**FIG. 5**

(Douris, Fig. 5.) “In this example, the transparent overlay includes three different virtual billboards, which are placed in front of a business with which it is associated, such as a restaurant. The first virtual billboard **502** is a billboard associated with a McDonald's restaurant, the second virtual billboard **504** is a billboard associated with Bravo Cucina restaurant, and the third virtual billboard **506** is associated with Georges restaurant **508**.” (Douris, ¶0051; *see also id.*, ¶¶0050-0053 (describing Fig. 5), 0040 (“the overlay information may identify restaurants that the user may be interested in within the context of the surroundings.”).)

Another example in Figure 6 depicts overlay information for people in the vicinity of the wearer of the reality overlay device:



**FIG. 6**

(Douris, Fig. 6; *see also id.*, ¶¶0058 (“The social view may provide information associated with one or more individuals.”), 0027 (“[E]ntities that are recognized may also include people or animals.”); Cooperstock, ¶61.)

Douris therefore discloses at least “a first event and a second event... occurring in an environment related to the wearable device and/or the second device,” as claimed. In the first example above shown in Figure 5, the wearer of the

reality overlay device was in the vicinity of one or more businesses (“**first event**”), and in the second example shown in Figure 6, in the vicinity of one or more particular persons (“**second event**”). It would have been obvious that these qualify as “**different events**” because they could have occurred at different places and/or different times, and the events involve the wearer being in the vicinity of different types of objects (*e.g.*, businesses vs. persons). (Cooperstock, ¶62.) Both of these events occur in an “**environment related to the wearable device and/or the second device,**” because they occur in the environment of the user wearing the reality overlay device (*e.g.*, which could be either “**the wearable device,**” or under the first mapping of limitation 1[b] above, the “**second device**”).

Petitioner will next address how the prior art renders obvious the processor generating at least a “**first control signal**” and a “**second control signal**” representative of, respectively, the first and second events. Petitioner notes that the next limitation 1[d] below requires that the first and second control signals be used to provide respective haptic feedback signals using a haptic output device. Because Douris does not expressly disclose haptic feedback controls or a haptic output device, Petitioner has combined Douris with Rodriguez for the claimed first and second control signals, and thus, will describe the combination here.

Rodriguez explains that haptic devices are becoming more widespread

including in augmented reality (AR) systems. (Rodriguez, ¶¶0003, 0009-0010; Cooperstock, ¶¶47, 65.) Rodriguez describes techniques similar to Douris for recognizing that a user of a mobile device is in the vicinity of a particular person or other entity/object, but as demonstrated below, also discloses providing haptic feedback to the user in response to such events. Although one example in Rodriguez involves a mobile phone, Rodriguez confirms that its haptic feedback techniques can be applied to “all manner of devices,” including “wearable computers,” among others. (Rodriguez, ¶0092; *see also id.*, ¶0074 (noting that haptic feedback devices can be positioned “on the bridge of the user’s nose, as by eye wear.”).)

In order to provide haptic feedback to the user in response to recognizing that the user is in the vicinity of a particular object, Rodriguez provides a “haptic signature” that can describe, for example, the waveform, amplitude, frequency, and duration of haptic feedback:

A method according to one aspect of the present technology includes using a mobile device to capture image data representing a physical object. This data is then processed (e.g., by the mobile device, and/or by a remote system) so as to obtain metadata that corresponds to the object. This metadata is transmitted to a remote system. In response, data is received indicating a haptic signature that is associated with the object. This haptic signature is presented to a user of the mobile device, e.g., through one or more onboard or linked haptic actuators.

The metadata can indicate one of plural classes to which the physical object belongs. If it belongs to a first class, one haptic signature can be rendered; if it belongs to a second class, a different haptic signature can be rendered. These signatures can differ in one or more of, e.g., waveform, amplitude, frequency, and duration. The classes can be classes such as a class of persons, a class of books, a class of DVDs, a class of barcodes, a class of printed text, a class of landmarks such as buildings, a class of logos, a class of works of art, and a class of product containers. Or each class can comprise a unique physical object.

(Rodriguez, ¶¶0018-0019; *see also id.*, ¶¶0022 (“[W]hen imagery captured by the mobile device includes visual stimulus of that first class, a corresponding type of haptic signal is output to the user.”), 0050.)

Rodriguez discloses specific haptic signatures corresponding to the same types of events described in Douris above (*e.g.*, vicinity to persons or businesses). For example, Rodriguez discloses that a specific haptic signature can be provided to “indicat[e] proximity to social network friends.” (Rodriguez, ¶¶0075, 0085 (“haptically indicate the presence of friends with the user’s social network at such location, by a distinctive ‘friend(s) here’ signature when that location of the map is sensed (or when the user approaches that physical location in the festival)”).) As another example, a haptic signature may “indicate[] (e.g., by amplitude or frequency) the relative popularity of one of the establishments based [on] the number

of mobile devices currently inhabiting that location.” (Rodriguez, ¶0085.)

Rodriguez further teaches that, in order to output haptic feedback in accordance with a haptic signature, the mobile device’s processor is configured to generate “**control signals**” that instruct the device’s haptic output device (such as an actuator) to provide feedback in accordance with the haptic signature:

Haptic actuators are responsive to electrical control signals—commonly governed by a programmable processor (often in conjunction with digital-to-analog converter circuitry). While software instructions to control the haptic actuators may be written from scratch, the artisan will most commonly use one of the existing toolkits designed for this purpose.

(Rodriguez, ¶0071; *see also id.*, ¶¶0063 (“Or the actuators **102** may be of a plural-axis variety, configured so that they can move in two or more orthogonal planes, responsive to appropriate control signals.”), 0050 (“Once identification data has been obtained for a nearby object, the phone can determine what haptic signature to render.”).) As noted above, the haptic feedback in Rodriguez can be applied to “all manner of devices,” including “wearable computers,” among others. (Rodriguez, ¶0092; *see also id.*, ¶0074 (noting that haptic feedback devices can be positioned “on the bridge of the user’s nose, as by eye wear.”).)

***Manner, Rationale and Motivation to Combine (Douris with Rodriguez):*** It would have been obvious to combine Douris with Rodriguez, predictably resulting

in the system of Douris in which a reality overlay device would have incorporated a haptic output device (such as an actuator) to deliver haptic feedback based on haptic signatures as described in Rodriguez. The combination would have predictably resulted in the processor of Douris's reality overlay device being configured to generate different control signals representing different events occurring in the vicinity of the reality overlay device. (Cooperstock, ¶69.)

More specifically, under the proposed combination, the processor in Douris's reality overlay device would have been configured to generate “**a first control signal**” when the reality overlay device was in the vicinity of one or more businesses (“**the first event**”), and “**a second control signal**” when the reality overlay device was in the vicinity of one or more persons (“**the second event**”). (Cooperstock, ¶70.) As explained for limitation 1[d] below, these control signals would in turn have resulted in haptic feedback signals via a haptic output device.

Douris and Rodriguez are analogous references in the same field of the '222 patent of wearable devices capable of generating feedback for a user based on events occurring in the user's environment. (Cooperstock, ¶71; '222, 1:14-32, 1:42-44.) Douris and Rodriguez both disclose wearable devices that augment their wearer's interactions with their environment. As such, these references would also have been reasonably pertinent to a number of problems facing the '222 patent inventors, such

as techniques for allowing wearable devices to present feedback information to the user (visually for Douris and haptically for Rodriguez) based on events occurring in the user's environment. (Cooperstock, ¶71.)

An ordinarily skilled artisan would have had clear and straightforward motivations to combine in the manner described above. (Cooperstock, ¶¶72-73.) First, the proposed combination would have provided a clear enhancement to the visual overlay capabilities of the Douris reality overlay device by allowing the device to present information using an additional modality – the sense of touch. (Cooperstock, ¶73.) This would have provided an effective way of getting the user's attention which, in some situations, would have been superior to the video overlay information disclosed in Douris. (Cooperstock, ¶73.) For example, haptic feedback could have been provided without impacting the user's field of vision, and would have been useful for vision-impaired users. (*Id.*)

The reality overlay device in Douris can also present audio overlay information, but this feature only further enhances the proposed combination. (Douris, ¶¶0031, 0063; Cooperstock, ¶73.) Douris explains that presenting audio overlay information has the benefit over visual information of “not impact[ing] the user's field of vision.” (Douris, ¶0031.) This same advantage not only applies to haptic feedback, as noted, but haptic feedback provides additional advantages over

audio. For example, haptic feedback would have been superior when a quiet environment must be observed or when it was too noisy to hear audio. (Cooperstock, ¶73.) Rodriguez’s disclosures thus confirm that it would have been obvious to use known haptic feedback techniques to improve Douris’s similar reality overlay devices in the same way, providing a further motivation to combine. (*Id.*)

An ordinarily skilled artisan would have had at least a reasonable expectation that the combination would have been successful. Use of control signals to provide haptic feedback was well-known, as Rodriguez itself acknowledges. (Cooperstock, ¶74 (citing Rodriguez, ¶¶0003, 009-0010, 0071).) A person of ordinary skill in the art would have found the disclosures of Douris and Rodriguez more than sufficient to implement the relied-upon teachings, using conventional techniques and without undue experimentation. (Cooperstock, ¶74.)

(d) **“a haptic output device configured to provide a first haptic feedback signal and a second haptic feedback signal based on the first control signal and the second control signal, respectively.” (Limitation 1[d])**

Petitioner addressed most of limitation 1[d] in the analysis of limitation 1[c] provided above. As explained, it would have been obvious to include a **“haptic output device”** in the reality overlay device, and an ordinarily skilled artisan would also have been amply motivated to do so. (Cooperstock, ¶¶72-73, 75.)

Rodriguez identifies various devices that an ordinarily skilled artisan would

have understood as providing a **“haptic output device”** – such as “vibratory electric motors using an offset mass,” and actuators “based on electroactive polymers, piezoelectrics, acoustic radiation pressure, and electrostatic surface actuation.” (Rodriguez, ¶0015.) These devices are consistent with the exemplary haptic output devices identified in the ’222 patent. (’222, 3:14-23; Cooperstock, ¶76.) The reality overlay device in Douris, under the proposed combination of Douris and Rodriguez, would therefore have included **“a haptic output device.”**

Under the proposed combination of Douris and Rodriguez, the haptic output device included would also have been **“configured to provide a first haptic feedback signal and a second haptic feedback signal,”** *i.e.*, signals for providing distinct haptic feedback, **“based on the first control signal and the second control signal, respectively,”** *i.e.*, by delivering different haptic feedback in accordance with the different control signals. (Cooperstock, ¶77.) For example, when the reality overlay device was in the vicinity of one or more businesses (**“first event”**), the haptic output device would have provided a first haptic feedback signal based the **“first control signal,”** and when the reality overlay device was in the vicinity of one or more persons (**“second event”**), the haptic output device would have provided a second haptic feedback signal based the **“second control signal,”** as discussed for limitation 1[c]. (Cooperstock, ¶¶69-70, 77.)

2. **Claim 2: “The system according to claim 1, wherein the second device is a second wearable device.”**
3. **Claim 5: “The system according to claim 1, wherein the second device comprises the haptic output device.”**

Because these claims are related, Petitioner will address them together.

Starting with claim 2, as explained for limitation 1[a], Douris’s reality overlay device is a “**wearable device.**” (Cooperstock, ¶52.) As also explained in the discussion of limitation 1[b], the claimed “**second device**” can be mapped (under the *first* mapping) to a second reality overlay device that is remote from the “**wearable device,**” with the two reality overlay devices being in communication with each other. Under this mapping, the “**second device**” is a “**second wearable device.**” (Cooperstock, ¶¶54-55, 78.)

Moving to claim 5 and using this same mapping, it would have been obvious that the reality overlay device would have included a haptic output device, as explained for limitation 1[c]-[d]. (Cooperstock, ¶¶69-70, 76-77.) The rationale and motivations to include a haptic output device in the “**wearable device**” of claim 1 would have applied equally to the “**second device.**” It therefore would have been obvious that, when the “**second device**” was a second reality overlay device, the second device would have had the same functionality as the first reality overlay device, including also having a haptic output device. (Cooperstock, ¶79.)

Petitioner notes that claim 5 recites the second device “**comprises the haptic**

**output device,”** referring back to the **“haptic device”** in claim 1 that provides a first and second haptic feedback signal in response, respectively, to first and second control signals. This provides no obstacle to obviousness because limitation 1[c] recites in pertinent part, **“a processor configured to generate at least a first control signal and a second control signal representative of a first event and a second event, respectively, occurring in an environment related to the wearable device and/or the second device,”** and thus, allows the generated control signals to relate to either the wearable device or the second device. Moreover, limitations 1[c] and 1[d] do not specify whether the **“wearable device”** or the **“second device”** comprises the claimed **“processor”** (1[c]) or **“haptic output device”** (1[d]), and thus, either the wearable device or the second could comprise these components.

For purposes of claim 5, therefore, the **“second device”** would have comprised both the processor and the haptic output device of claim 1. Under this mapping, the **“processor”** would have generated control signals representative of the claimed first and second events occurring in the environment of the wearer of the second reality overlay device (**“second device”**), for the same reasons as those provided for the claimed **“wearable device”** as fully described in the discussion of limitation 1[c] above. And under this mapping, the **“haptic output device”** would have generated haptic feedback signals based on those control signals, for the second

device, as fully described for limitation 1[d] above. (Cooperstock, ¶80.)

**4. Claim 7: “The system according to claim 1, further comprising:”**

As explained for limitation 1[b] above, the “**second device**” could also be mapped (second mapping) to a remote network device/server in communication with a reality overlay device (the “**wearable device**”). (Cooperstock, ¶¶56-57.) That mapping applies to Petitioner’s analysis of claim 7.

**(a) “a communication port configured to establish a wireless or wired communication channel between the wearable device and the second device,” (Limitation 7[a])**

An ordinarily skilled artisan would have understood and found it obvious that Douris’s reality overlay device (“**wearable device**”), as well as the network server with which the reality overlay device communicates (“**second device**”), would have each included the claimed “**communication port**.” The claimed recitation of a “**communication port**,” as explained below, merely recites a known and standard component that provides nothing of patentable significance.

The ’222 patent does not expressly define “**communication port**,” but describes it as an interface through which communication with another device can be established and maintained. (’222, *e.g.*, 1:59-61, 3:48-49.) The ’222 patent also confirms that a communication port can provide an interface via wireless communication channels. (’222, 12:22-29.) This description is generally consistent

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with the plain and ordinary meaning of the term to a person of ordinary skill in the art. (Cooperstock, ¶83; *see also Microsoft Computer Dictionary* (5<sup>th</sup> ed. 2002) (EX1005), p.0025 (“**port**<sup>1</sup> *n.* An interface through which data is transferred between a computer and other devices (such as a printer, mouse, keyboard, or monitor), a network, or a direct connection to another computer.”).)

As noted for limitation 1[b] above, Douris discloses that a reality overlay device communicates via a network with a remote server. (Douris ¶¶0028 (“The overlay information may also be obtained remotely from one or more servers using an Internet browser via a wireless connection to the Internet.”), 0039 (“The overlay information may be obtained locally via a memory and/or remotely from a server via the Internet.”).) It would have been apparent and obvious that, in order for the reality overlay device and server to communicate with each other via a network – as Douris confirms they can – both devices would have included a “**communication port**” in the form of an interface including hardware and/or software enabling the reality overlay device and server to communicate over the network. (Cooperstock, ¶84.) Petitioner notes that limitation 7[a] only requires a single “**communication port**,” but both devices would have had at least one such port. (*Id.*)

It would also have been apparent and obvious that the “**communication port**” would have been “**configured to establish a wireless or wired communication**

**channel between the wearable device** [*i.e.*, reality overlay device] **and the second device** [*i.e.*, remote server].” The term “**communication channel**,” like communication port discussed above, adds nothing of patentable significance. The term is generally understood as referring to a path or link through which information passes between two devices. (Cooperstock, ¶85; *see also Microsoft Computer Dictionary* (5<sup>th</sup> ed. 2002), EX1005, p.008 (“**channel n. 1.** A path or link through which communication passes between two devices.”).) One common example of a “**wireless or wired communication channel**” would have included a TCP/IP network connection between two devices. As noted, the reality overlay device in Douris can communicate with a remote server via TCP/IP-based networks, such as the Internet. (Douris, ¶¶0028 (“The overlay information may also be obtained remotely from one or more servers using an Internet browser via a wireless connection to the Internet.”), 0066 (“The invention may also be practiced in a wide variety of network environments... including, for example, TCP/IP-based networks...”).) All of the exemplary network connections in Douris, identified above, would have provided a wireless or wired communication channel between the reality overlay device and the server. (Cooperstock, ¶85.) This is also consistent with embodiments in the ’222 patent. (’222, *e.g.*, 1:59-61 (“The communication port may include an interface through which a communication channel may be

maintained with, for example, a server, and/or other devices.”).)

- (b) **“wherein the processor is configured to receive a signal representative of the first and second events occurring at the wearable device or the second device via the wireless or wired communication channel and generate the control signal based on the received signal.” (Limitation 7[b])**

Limitation 7[b] provides additional detail applicable to the generation of the claimed control signals of limitation 1[c], and as such, Petitioner will briefly summarize the analysis of limitation 1[c] above. The **“processor”** for limitation 1[c] refers to a processor in a reality overlay device of Douris which would have been, in this mapping, in communication with a remote server (**“second device”**) over the communication channel described above. As also explained for limitation 1[c], **“the first and second events occurring at the wearable device,”** correspond in Douris to the reality overlay device (**“wearable device”**) being in the vicinity of one or more businesses (**“first event”**) and one or more persons (**“second event”**). As further explained for limitation 1[c], when the reality overlay device is in the vicinity of a particular business (**“first event”**), the device may generate the **“first control signal”** to provide haptic feedback based on that event, and when the wearer is in the vicinity of one or more persons (**“second event”**), the device may generate the **“second control signal”** to provide different haptic feedback for that event, based on the combination of Douris and Rodriguez. (Cooperstock, ¶¶69-70.)

Now turning to limitation 7[b], the processor in the reality overlay device is **“configured to receive a signal representative of the first and second events occurring at the wearable device,”** when the reality overlay device receives at least the reality overlay information from the remote server, the overlay information being representative of the remote server determining that the reality overlay device is in the vicinity of particular businesses (**“first event”**) or persons (**“second event”**). (Douris, *e.g.*, ¶0039 (“The overlay information may be obtained... remotely from a server via the Internet... The overlay information may identify one or more entities such as physical locations, buildings, or individuals, as well as information associated with these entities.”), *see also id.*, ¶¶0028, 0030, 0036-0037, 0040.) It would have been obvious that this information would have been received by the **“processor”** in the reality overlay device because the processor would have been responsible for presenting the overlay information to the user. (Cooperstock, ¶87.) It would also have been obvious that the information received by the reality overlay device would have qualified as one or more **“signals,”** as the information would have been conveyed over the network using signals. (*Id.*)

It would also have been obvious that the processor in the reality overlay device would have **“generate[d] the control signal based on the received signal,”** as claimed. Petitioner notes that limitation 7[b] refers to **“the control signal”** but does

not specify which signal from limitation 1[c] (*i.e.*, the claimed first or second control signals) must be generated based on the received signal, but it would have been obvious that both control signals would have been generated based on the received signal. (Cooperstock, ¶88.) For example, under the proposed combination, the processor would have generated the “**first control signal**” if the received overlay information pertained to particular businesses, and generated the “**second control signal**” if the received overlay information pertained to particular persons. The reality overlay device, in turn, would have provided distinct haptic feedback to the user corresponding to those control signals as described for limitation 1[d] above.

An ordinarily skilled artisan could have implemented this combination in a number of straightforward ways. (Cooperstock, ¶89.) In one example, the “**received signal**” from the server under the proposed combination would have included additional overlay information indicating the appropriate haptic signature to use to provide haptic feedback to the user (*e.g.*, based on whether the device was in the vicinity of businesses or persons). Rodriguez itself expressly suggests such an implementation by disclosing a remote system transmitting, to the mobile device, data indicating a haptic signature based on the object in the user’s vicinity:

A method according to one aspect of the present technology includes using a mobile device to capture image data representing a physical object. This data is then processed (*e.g.*, by the mobile device, and/or

by a remote system) so as to obtain metadata that corresponds to the object. This metadata is transmitted to a remote system. In response, data is received indicating a haptic signature that is associated with the object. This haptic signature is presented to a user of the mobile device, e.g., through one or more onboard or linked haptic actuators.

(Rodriguez, ¶0018.)

It would have been obvious to incorporate similar functionality into the remote server of Douris, predictably resulting in the remote server generating not only visual overlay information in response to recognizing one or more businesses or persons, but also generating an indication of the appropriate haptic signatures associated with the recognized business(es) and person(s). (Cooperstock, ¶89.) A skilled artisan would have been motivated to implement the proposed combination in this way because the server in Douris has already determined whether businesses or persons are in the vicinity of the device, has already generated visual overlay information in response to those events, and thus would have been readily able to also generate the first and second control signals. This would have relieved the processor in the overlay device from the burden of analyzing the received visual overlay data to select the appropriate haptic signature. (*Id.*)

## **5. Independent Claim 10**

The preamble of claim 5 simply recites “[a] **system comprising....**” The

proposed combination of Douris and Rodriguez renders obvious a system that includes the limitations recited in the claim as explained below.

- (a) **“an augmented reality device configured to generate an augmented reality environment comprising an augmented reality space and a physical space, the augmented reality device comprising” (Limitation 10[a])**

The claimed **“augmented reality device”** in Douris takes the form of a remote network server, which is in communication with a reality overlay device. As explained in detail below, the remote network server in Douris processes information about a physical space to generate information (“overlay information”) to generate an augmented reality space in an augmented reality system.

Petitioner notes that claim 10 does not require that the claimed **“augmented reality device”** itself be a wearable device that produces a display for the user (such as a reality overlay device as described in Douris). This is consistent with limitation 10[c] below addressed below, which recites a **“wearable device remote from and in communication with the augmented reality device,”** making clear that the claimed augmented reality device is separate from the claimed wearable device. Claim 10 itself requires only that the augmented reality device **“generate an augmented reality environment,”** which the server in Douris does as explained below. The claim does not require that the augmented reality device itself physically display that environment (or anything else) to the user. (Cooperstock, ¶94.)

This is consistent with the '222 patent, which explains that key modules for performing augmented reality functionality can be distributed across processors that are located remotely from one another, including event handler module **211**, control signal generation module **212**, feedback control module **213**, communication module **214**, object recognition module **215**, and an object generation module **216**. ('222, 27:52-57 (“It should be appreciated that although modules **211**, **212**, **213**, **214**, **215**, and **216** are illustrated in FIG. 2 as being implemented within a single processing unit, in implementations in which processor **210** includes multiple processing units, one or more of modules **211**, **212**, **213**, **214**, **215**, and **216** may be implemented remotely from the other modules.”).)

The remote server in Douris is also “**configured to generate an augmented reality environment**,” because it generates transparent overlay information comprising imagery and associated position information based on recognized objects in the physical surroundings to transmit to a reality overlay device so that the wearer “may view real world images through the lenses **100** while simultaneously viewing the transparent overlay.” (Douris, ¶¶0028-0030; *see also id.*, ¶¶0013, 0039, 0041 (“the transparent images may be two-dimensional or three-dimensional images”).) As Douris explains:

The server may obtain (e.g., retrieve and/or generate) overlay information for use in generating a transparent overlay via the device

using at least a portion of the captured information and/or at least a portion of any user information that has been received at **304**, wherein the transparent overlay provides one or more transparent images that are pertinent to the physical surroundings.

(Douris, ¶0047.) The augmented reality environment is transmitted to a reality overlay device where it is displayed, as explained. (Douris, *e.g.*, ¶¶0028 (“The overlay information may also be obtained remotely from one or more servers using an Internet browser via a wireless connection to the Internet.”), 0039 (“The overlay information may be obtained locally via a memory and/or remotely from a server via the Internet.”).) As explained in detail below, the overlay information generated by the server and transmitted to the reality overlay device provides an **“augmented reality environment comprising an augmented reality space and a physical space,”** as claimed.

For example, Douris explains that overlay information “may include a variety of information that may be used to generate a transparent overlay.” (Douris, ¶0036.) For example, the overlay information may include “the actual transparent image(s) to be displayed in order to superimpose the transparent overlay.” (Douris, ¶0036.) These images may be “static images or video images” (Douris, ¶0041) and “may be generated locally or remotely” (Douris, ¶0030). The overlay information may also include “directions to the identified entities, maps, descriptions, reviews,

advertisements, menus, offers, etc.” (Douris, ¶0036.) It may also “indicate a placement of one or more transparent images (e.g., advertisements, menus, maps, directions, reviews) with respect to and in correlation with the identified entities in the captured information (e.g., visual information), as perceived by the user of the reality overlay device.” (Douris, ¶0036; *see also id.*, ¶0029 (“The overlay information may also specify placement of visual overlay information within the transparent visual overlay (e.g., with respect to identified entities).”).)

Figures 5 and 6 of Douris illustrate exemplary displays of an augmented reality environments presented via a reality overlay device:

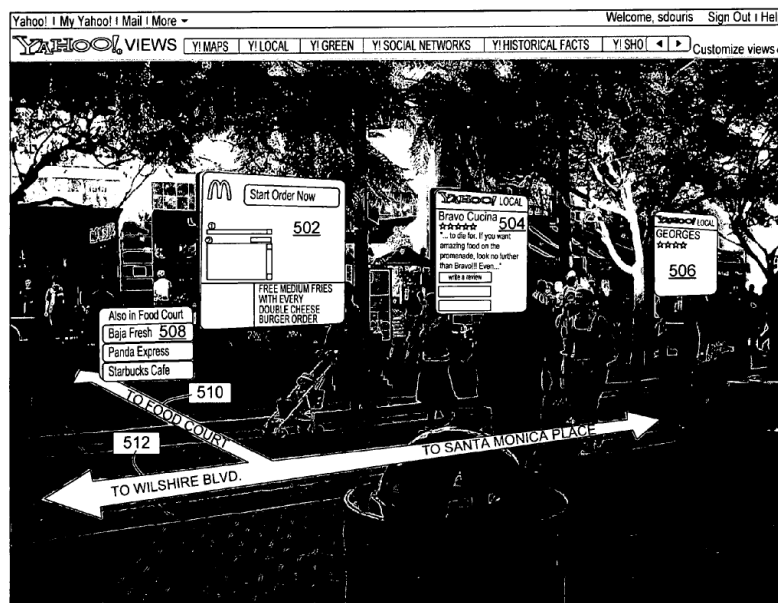


**FIG. 5**



**FIG. 6**

(Douris, Figs. 5 & 6; *see also id.*, ¶¶0051-0052 (describing Figure 5), 0058 (describing Figure 6).)

The “**augmented reality environment**” in Douris thus corresponds to the transparent overlay information for a reality overlay device generated by the server and provided for display to the reality overlay device. That information includes “**an augmented reality space**,” which includes at least the additional information associated with entities identified in the user’s physical surroundings, as discussed in detail above. (Cooperstock, ¶96; Douris, *e.g.*, ¶0037 (“The overlay information that is obtained may include information that is pertinent to the identified entities. For instance, the overlay information may include directions to the identified entities, maps, descriptions, reviews, advertisements, menus, offers, etc.”).)

The “**augmented reality environment**” generated by the server in Douris also comprises “**a physical space**” because the overlay information specifies where the additional information about the identified entities in the physical world (*e.g.* business or persons) will be displayed within the transparent overlay. Douris explains that “[t]he overlay information may also specify placement of visual overlay information within the transparent visual overlay (*e.g.*, with respect to identified entities).” (Douris, ¶0029; *see also id.*, ¶0047 (“... the overlay information indicates the desired placement of visual overlay information within the transparent overlay.”).) These identified entities for which additional information is displayed (*e.g.*, businesses or persons), will of course also be visible (at least in part) to the user within the augmented reality environment. (Cooperstock, ¶96.) In Figures 5 and 6 above, for example, the overlay information is displayed in positions near or in association with the identified identities to which the information relates.

Additionally, in one embodiment, the overlay information can also include “transparent images” that will be presented to the user on the transparent overlay. (Douris, ¶0006; *see also id.*, ¶¶0036 (“[T]he overlay information may include, but need not include, the actual transparent image(s) to be displayed in order to superimpose the transparent overlay.”), 0037 (“Moreover, the overlay information may indicate a placement of one or more transparent images (*e.g.*, advertisements,

menus, maps, directions, reviews) with respect to and in correlation with the identified entities in the captured information (e.g., visual information), as perceived by the user of the reality overlay device.”); 0041 (“The transparent images may be static images or video images. Moreover, the transparent images may be two-dimensional or three-dimensional images.”).) Under this further embodiment, the “**augmented reality environment**” generated by the server further comprises “**a physical space**” because the overlay information would also have included actual images displayed to the user, placed “with respect to and in correlation with the identified entities in the captured information (e.g., visual information), as perceived by the user of the reality overlay device” (Douris, ¶0037), thus further defining an augmented reality environment comprising both an augmented reality space and a physical space. (Cooperstock, ¶96.)

The augmented reality environment in Douris closely tracks the exemplary environment described in the ’222 patent. The ’222 patent discusses “AR environment **500**,” which like Douris, “may include the physical space **520** and the AR space **510**” in which “the display is configured as an at least partially transparent display (e.g., a lens) through which the physical space **520** may be viewed” so that one or more virtual objects **510a**, **510b**, . . . **510n** may be displayed coincident with or in association with one or more physical objects **520a**, **520b**, . . . **520n** that exist

in the physical space **520**, thereby augmenting the one or more physical objects **520a**, **520b**, . . . **520n** in the AR environment **500**.” (’222, 18:18-33.)

As noted in **Part V** above, the term “**augmented reality**” is subject to a claim construction dispute in the pending litigation, but that dispute is immaterial here because Douris satisfies all of the proposed constructions. Petitioner asserts that “augmented reality” means “*one or more physical objects in a real-world, physical space are concurrently displayed with one or more virtual objects in a virtual space,*” while Patent Owner asserts that the term should be given its plain and ordinary meaning, and to the extent a construction is necessary, “*an environment comprising a physical space of one or more physical objects and a virtual space of one or more virtual objects that are displayed coincident with or in association with one or more physical objects in the physical space.*” (EX1006, p.003.) Both constructions are readily satisfied because the transparent overlay information for a reality overlay device in Douris (“**augmented reality environment**”) generated by the server (“**augmented reality device**”) provides an environment where physical objects in a user’s physical surroundings (“*one or more physical objects in a real-world, physical space*” / “*a physical space of one or more physical objects*”) are displayed simultaneously with overlay imagery that is positioned in space from the device wearer’s perspective based on associated physical objects (“*concurrently*

*displayed with one or more virtual objects in a virtual space” / “a virtual space of one or more virtual objects that are displayed coincident with or in association with one or more physical objects in the physical space”).* (Cooperstock, ¶98.)

Limitation 10[a] concludes by reciting, “**the augmented reality device comprising**” the components in limitation 10[b]. The remote server in Douris includes each of those components, as explained below.

(b) “**a processor configured to detect a plurality of events that occur in the environment related to a wearable device, the processor configured to generate the augmented reality space coincident with the physical space,**” (Limitation 10[b])

It would have been obvious that the remote server in Douris that generates an augmented reality environment includes “**a processor.**” (Cooperstock, ¶100.) Douris explains the server may be a general purpose computer. (Douris, ¶0067.) An ordinarily skilled artisan would have appreciated that a processor is a key component of a computer. (Cooperstock, ¶100.) A skilled artisan would have understood and found it obvious that the server’s processor – as the component responsible for executing the instructions of computer programs – would have been configured to carry out the functions of limitation 10[b]. (Cooperstock, ¶¶100-102, 104-105.)

The processor in the server of Douris “**detect[s] a plurality of events that occur in the environment related to a wearable device.**” As explained above for

limitation 1[c], Douris discloses various events occurring in the environment related to a reality overlay device (“**wearable device**”), such as the wearer of the reality overlay device being in physical proximity to a particular person, business or other entity, which may cause particular overlay information to be displayed by the reality overlay device. (Douris, *e.g.*, Figs. 5 & 6, ¶¶0051-0053, 0058-0060, 0027-0030, 0035-0038.) Douris explains that the server may detect such events by using information received from the reality overlay device:

The server may obtain (e.g., retrieve and/or generate) overlay information for use in generating a transparent overlay via the device using at least a portion of the captured information and/or at least a portion of any user information that has been received at **304**, wherein the transparent overlay provides one or more transparent images that are pertinent to the physical surroundings. For instance, the server may identify one or more entities in the visual information using at least a portion of the received information. Thus, the server may support pattern recognition, as well as other features. The server may obtain information that is pertinent to the identified entities (e.g., from one or more databases) and/or ascertain a desired placement of the overlay information with respect to the identified entities, where the overlay information indicates the desired placement of visual overlay information within the transparent overlay. The server may then transmit the overlay information to the device at **306**.

(Douris, ¶0047; *see also id.*, ¶¶0028 (“[I]n order to obtain the overlay information,

the reality overlay device or a remotely located server may identify one or more entities in the information that the reality overlay device has captured.”.) The processor in Douris is thus **“configured to detect a plurality of events that occur in the environment related to a wearable device.”** (Cooperstock, ¶101.)

Douris also discloses that the server **“generate[s] the augmented reality space coincident with the physical space.”** As discussed above, Douris explains that the server “ascertain[s] a desired placement of the overlay information with respect to the identified entities, where the overlay information indicates the desired placement of visual overlay information within the transparent overlay.” (Douris, ¶0047; *see also id.*, ¶¶0029 (“the location of the entities in the visual information may be used to determine an optimum placement of the visual overlay information within the transparent visual overlay”), 0030 (“The positioning of the transparent images may depend upon the location of any identified entities in the user’s field of vision (e.g., to reduce obstruction of the user’s field of vision).”).) Thus, by positioning imagery of the transparent overlay information so that the imagery is displayed in association with identified physical objects, the server **“generates the augmented reality space coincident with the physical space.”**

Figure 6 of Douris, for example, illustrates augmented reality space coincident with the physical space:

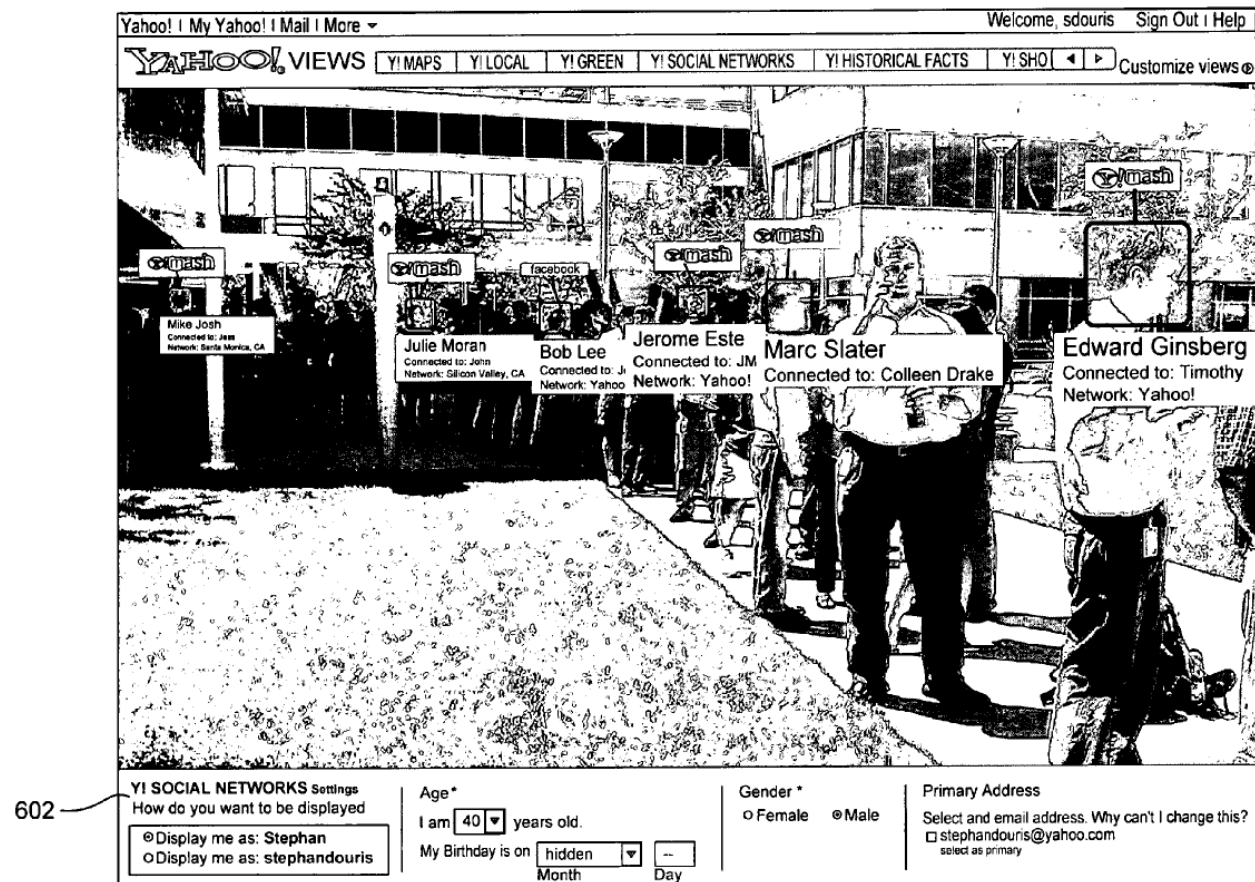


**FIG. 6**

(Douris, Fig. 6; *see also id.*, Fig. 5.)

- (1) “recognize at least one physical object in the physical space and augment the at least one physical object with one or more virtual objects in the augmented reality space, and” (Limitation 10[b][1])

As discussed above, the server in Douris can “recognize at least one physical object in the physical space” of a reality overlay device, using for example, processing images of device’s surroundings using pattern recognition. (Douris, ¶¶0027-0028, 0047; Cooperstock, ¶¶101-103.)

As also discussed, the server in Douris **“augment[s] the at least one physical object with one or more virtual objects in the augmented reality space”** by generating transparent overlay information that a reality overlay device displays in association with the identified physical objects. (Douris, ¶¶0029, 0030, 0041 (“transparent images may be two-dimensional or three-dimensional images”), 0047, Figs. 5 & 6.) The **“one or more virtual objects”** in Douris corresponds to the additional information and/or transparent images included in the overlay information generated by the server to augment one or more identified entities (**“at least one physical object”**), as fully explained for limitation 10[a] above. (Douris, *e.g.*, ¶¶0036 (“Thus, the overlay information may include... the actual transparent image(s) to be displayed in order to superimpose the transparent overlay.”), 0037 (“[T]he overlay information may indicate a placement of one or more transparent images (e.g., advertisements, menus, maps, directions, reviews) with respect to and in correlation with the identified entities in the captured information (e.g., visual information), as perceived by the user of the reality overlay device.”).)

**(2) “determine an event associated with the augmented reality environment, and”  
(Limitation 10[b][2])**

As explained above, the server in Douris detects various events, such as the wearer of the reality overlay device being in physical proximity to businesses or

persons. The server further determines that such an event is “**associated with the augmented reality environment**” by identifying overlay information to provide in response to detecting the event, as explained. (Douris, *e.g.*, ¶¶0028-0030, 0036-0037, 0047.) It would have been obvious that, in order for the server in Douris to produce the transparent overlay information (“**the augmented reality environment**”) associated with the overlay device being, for example, in the vicinity a particular business or person (“**an event**”), the server would have to determine that that event had occurred. (Cooperstock, ¶105; Douris, *e.g.*, ¶¶0028 (“[I]n order to obtain the overlay information, the reality overlay device or a remotely located server may identify one or more entities in the information that the reality overlay device has captured.”), 0029 (“For example, where one of the entities is a restaurant, the visual overlay information associated with the restaurant may be placed immediately next to or in front of the restaurant.”), 0036 (“The reality overlay device obtains overlay information for use in generating a transparent overlay via the device using at least a portion of the captured information at **204**... In order to obtain the overlay information, one or more entities in the surroundings or in nearby locations may be identified in the captured information. For example, entities such as businesses, other buildings or physical landmarks may be identified using pattern recognition software, RFID and/or GPS location.”).)

(3) “generate a control signal based on the determined event;” (Limitation 10[b][3])

This function would have been obvious based on Douris in view of Rodriguez, as fully explained for limitations 1[c]-[d] and limitation 7[b] above.

As discussed, it would have been obvious to combine Douris with Rodriguez’s teachings about haptics in mobile devices and haptic signatures. And as explained for limitation 7[b], it would have further been obvious for Douris’s server, under the proposed combination, to have generated and transmitted overlay information that would be used, at the reality overlay device, to generate the haptic feedback for the user. The “**control signal**” for purposes of limitation 10[b][3], under the proposed combination, corresponds to the signal generated and transmitted by the server in Douris, which indicates the haptic signature to use based on the determined event, *e.g.*, whether a business or entity was in the vicinity of the wearer of the reality overlay device. (Cooperstock, ¶¶87-89; Rodriguez, *e.g.*, ¶¶0018-0019.) The control signal is thus generated by the server “**based on the determined event.**”

As also explained for limitation 7[b], it would have been obvious that the information generated and transmitted by the server in Douris would have taken the form of a “**signal**” as claimed. (Cooperstock, ¶¶87, 107.) A person of ordinary skill in the art would have also regarded the signal as a “**control signal**” because it would have been used to control the receiving reality overlay device by directing it to

display visual overlay information and provide haptic feedback in accordance with the signal. (Cooperstock, ¶107; Rodriguez, *e.g.*, ¶¶0018-0019.)

(c) **“the wearable device remote from and in communication with the augmented reality device;” (Limitation 10[c])**

As fully explained for limitation 1[b], a reality overlay device (“**the wearable device**”) is “**remote from and in communication with**” the server in Douris (“**augmented reality device**”). (Cooperstock, ¶¶56-57.)

(d) **“a remote device remote from and in communication with the wearable device and the augmented reality device; and” (Limitation 10[d])**

As discussed above for limitation 1[b], Douris discloses that, in addition to communicating with a remote server, a reality overlay device can also communicate with another reality overlay device, and makes clear that the devices can be remote from each other. (Cooperstock, ¶¶55, 110; *see also* Douris, ¶¶0045 (“[U]sers of different overlay devices may connect to one another for purposes of sharing the same experience (e.g., visiting a city or playing a game).”), 0022-0023, 0062, 0064, 0066.) The claimed “**remote device**” therefore corresponds in Douris to a second reality overlay device that is “**remote from and communication with**” a first reality overlay device (“**the wearable device**”) and the server (“**the augmented reality device**”). (Cooperstock, ¶110.)

- (e) **“a haptic output device configured to provide a plurality of haptic feedback signals based on the control signal.”**  
**(Limitation 10[e])**

As fully explained in the discussion of limitations 1[c] and 1[d], it would have been obvious under the proposed combination of Douris and Rodriguez that the reality overlay device in Douris would have also included a **“haptic output device”** such as an actuator. (Cooperstock, ¶¶69-70, 75-77.) Under the proposed combination, the haptic output device would have been configured to **“provid[e] a plurality of haptic feedback signals based on the control signal,”** by providing different haptic feedback signals for different events (*e.g.*, the reality overlay device being in the vicinity of one or more businesses or persons), based on the control signals corresponding to those events. (*Id.*) Moreover, the haptic output device of a reality overlay device, by using a control signal corresponding to a particular haptic signature, would have been configured to provide a plurality of haptic feedback signals based on the control signal. (Cooperstock, ¶126; *see also* Rodriguez, ¶0019 (“These [haptic] signatures can differ in one or more of, *e.g.*, waveform, amplitude, frequency, and duration.”).)

6. **Claim 11: “The system according to claim 10, wherein the remote device is a second wearable device.”**

As discussed for limitation 10[d], the **“remote device”** corresponds to another reality overlay device. A reality overlay device, as explained, is a **“wearable**

**device.”** (Cooperstock, ¶¶52, 112.)

**7. Claim 15: “The system according to chain [sic; claim] 10, wherein the wearable device comprises the haptic output device.”**

As discussed above for limitations 10[c] and 10[e], under the proposed combination the reality overlay device (“**the wearable device**”) would have included “**the haptic output device**” in order to provide haptic feedback to the device wearer regarding people, businesses, and other entities in their vicinity. (Cooperstock, ¶¶69-70, 75-76.)

**8. Independent Claim 17**

The preamble of claim 17 simply recites “[a] **method comprising....**” The proposed combination of Douris and Rodriguez renders obvious a method that includes the steps recited in the claim as explained below.

**(a) “detecting an event in an environment, the detecting performed at least in part with a processor,” (Limitation 17[a])**

As explained for limitation 1[c], Douris discloses various “**event[s] in an environment,**” such as the wearer of the reality overlay device being in proximity of businesses or persons, which may cause particular overlay information to be displayed by the reality overlay device. (Cooperstock, ¶¶61-62; Douris, ¶¶0027-0030, 0035-0038, 0040 (“the overlay information may identify restaurants that the user may be interested in within the context of the surroundings.”), 0051-0053

(describing Fig. 5), 0058-0060 (describing Fig. 6), Figs. 5 & 6.)

Douris discloses that a reality overlay device “**detect[s] an event in an environment... with a processor.**” For purposes of limitation 17[a], “a processor” corresponds to a processor in the reality overlay device. As explained for limitation 1[c], Douris makes clear that a reality overlay device in fact includes a processor. (Cooperstock, ¶59; *see also* Douris, ¶0028; *see also id.*, ¶¶0009, 0067.) With respect to the claimed detecting step, Douris explains that a reality overlay device itself may analyze information about the device’s physical surroundings to detect that a person or business is in the vicinity of the device (“**an event in an environment**”):

[I]n order to obtain the overlay information, the reality overlay device or a remotely located server may identify one or more entities in the information that the reality overlay device has captured. This may be accomplished by accessing a map of the location in which the reality overlay device is being used, using RFID, and/or by using pattern recognition, as set forth above. Information that is pertinent to the identified entities may then be obtained.

(Douris, ¶0028; *see also id.*, ¶0039 (“For instance, pattern recognition capabilities may be supported locally or remotely at a remotely located server.”)).) A skilled artisan would have understood and found it obvious that this functionality would have been performed with the reality overlay device processor. (Cooperstock, ¶118.)

Petitioner notes that for purposes of limitation 17[a], Petitioner mapped the

claimed “**a processor**” to the processor of the reality overlay device that performs the detecting step, whereas for limitation 10[b], the “**processor**” that performs event detection corresponds to a processor of a remote server. (Cooperstock, ¶¶100, 118.) This difference is immaterial to the proposed combination because, as noted, Douris confirms that the detecting step can be performed either by the reality overlay device or the remote server. (Douris, *supra*, ¶¶0028, 0039.) And nothing in combination of Douris and Rodriguez depends on where the detection step physically occurs. (Cooperstock, ¶118.) Rodriguez, for its part, similarly discloses that the user device itself may perform processing as an alternative to relying on a remote system. (Rodriguez, ¶¶0018-0019 (“This data is then processed (e.g., by the mobile device, and/or by a remote system) so as to obtain metadata that corresponds to the object.”).) Moreover, the proposed combination does not preclude the reality overlay device of Douris, after it detects an event from the environment, from obtaining overlay information from a remote server over a network. (Cooperstock, ¶118; Douris, *e.g.*, ¶¶0028, 0030, 0039, 0060.)

- (b) **“generating a control signal representative of an event occurring in the environment related to a wearable device and/or a second device with the processor, the generated control signal being a first control signal selected from at least first and second available control signals, the first control signal representative of the event, the second control signal representative of a different event; and” (Limitation 17[b])**

Limitation 17[b] was largely covered by the discussion of limitations 1[c]-[d] above. The **“wearable device”** here corresponds to a reality overlay device in *Douris*. For the first part of this limitation, **“generating a control signal representative of an event occurring in the environment related to a wearable device and/or a second device with the processor,”** under the proposed combination of *Douris* and *Rodriguez* as fully explained above for limitations 1[c], the processor in the reality overlay device would have **“generat[ed] a control signal”** to instruct the device’s haptic output device (such as an actuator) to provide haptic feedback. That control signal would have been representative of a detected event, such as the reality overlay device being in proximity of one or more businesses or persons (**“representative of an event occurring in the environment related to a wearable device and/or a second device with the processor”**). (*Cooperstock*, ¶¶69-70; *Rodriguez*, *e.g.*, ¶¶0071 (describing “control signals”), 0063, 0050.) For the same reasons discussed above, a skilled artisan would have understood and found it obvious that the control signal would have been generated **“with the processor”**

of the reality overlay device. (Cooperstock, ¶124.)

Petitioner notes that limitation 17[b] recites “**a second device**,” which like the “**second device**” recited in limitation 1[b], is not referenced later in claim 17. But in order to account for recitations of “**the second device**” in dependent claims 18, 21, and 23 addressed below, as with the analysis provided for limitation 1[b], it can be mapped in Douris two different ways. Under the first mapping, consistent with limitation 1[b], the “**second device**” is simply a second reality overlay device worn by a different user. *Petitioner uses this mapping in the analysis of dependent claims 18 and 21 below.* Under the second mapping, also consistent with limitation 1[b], the “**second device**” corresponds to a remote network device/server. *Petitioner uses this mapping in the analysis of dependent claim 23 below.*

Turning back to limitation 17[b], the remaining portions of this claim limitation recite: “**the generated control signal being a first control signal selected from at least first and second available control signals, the first control signal representative of the event, the second control signal representative of a different event.**” The “**first control signal**” thus corresponds to the generated control signal representative of “**the event**,” as discussed above. For purposes of limitation 17[b], “**the event**” corresponds either to the reality overlay device being in proximity of one or more businesses or one or more persons. The first control

signal is also selected from “**at least first and second available control signals**,” because as explained for limitation 1[c], the reality overlay device under the proposed combination would have had at least two “**available control signals representative of**” different events, *e.g.*, a control signal when the reality overlay device was in vicinity of one or more businesses, and a different control signal when the device was in the vicinity of one or more persons. (Cooperstock, ¶¶65-66; Rodriguez, ¶¶0018-0019, 0022, 0050, 0075, 0085.)

(c) “**providing a plurality of haptic feedback signals based on the control signal with a haptic output device.**”  
(Limitation 17[c])

As explained for limitation 1[c]-1[d], it would have been obvious to provide a “**haptic output device**,” such as an actuator, in a reality overlay device, as taught by the combination of Douris and Rodriguez. (Cooperstock, ¶¶69-70, 75-76, 126.)

As discussed above for limitation 1[d], because the reality overlay device would have included a plurality of available control signals, it would also have “**provid[ed] a plurality of haptic feedback signals**” that are based on and correspond to those control signals. (Cooperstock, ¶¶69-70, 77.) This would have resulted, for example, in different haptic feedback signals (and thus different haptic feedback to the user) when the reality overlay device was in vicinity of one or more businesses versus one or more persons, based on the control signal. (Cooperstock,

¶77.) Moreover, as discussed, the haptic output device of a reality overlay device (either as the claimed **“wearable device”** or as the claimed **“second device”**), by using a control signal corresponding to a particular haptic signature, would have been configured to provide a plurality of haptic feedback signals based on the control signal. (Cooperstock, ¶126; *see also* Rodriguez, ¶0019 (“These [haptic] signatures can differ in one or more of, e.g., waveform, amplitude, frequency, and duration.”).)

9. **Claim 18: “The method according to claim 17, wherein the second device is a second wearable device.”**
10. **Claim 21: “The method according to claim 17, wherein the second device comprises the haptic output device and the haptic feedback is provided at the second device.”**

Because these claims are related, Petitioner will address them together.

Claim 18 is substantially similar to claim 2, addressed above. As discussed, under a *first* mapping in which **“the second device”** is another reality overlay device, it would have been **“a second wearable device.”** (Cooperstock, ¶¶78, 122, 127.)

Claim 21 is similar to claim 5. Under this mapping, the second device would have also comprised **“the haptic output device,”** and the haptic feedback would thus have been **“provided at the second device.”** Claim 21 is obvious for the same reasons as provided for claim 5 above. (Cooperstock, ¶¶79-80.)

11. **Claim 23: “The method according to claim 17, further comprising:”**

Claim 23 is similar in many respects to claim 7. As explained below, claim

23 would have been obvious over Douris in view of Rodriguez. Petitioner’s analysis of claim 23, as noted above, relies on the *second* mapping in which the claimed “**second device**” corresponds to a remote network device/server in communication with a reality overlay device (the “**wearable device**”). (Cooperstock, ¶¶56-57, 122.)

- (a) “**establishing a wireless or wired communication channel between the wearable device and the second device with a communication port; and**” (Limitation 23[a])

As explained for limitation 7[a], it would have been apparent and obvious to an ordinarily skilled artisan that Douris’s reality overlay device (“**wearable device**”), as well as the network server with which the reality overlay device communicates (“**second device**”), would each include the claimed “**communication port.**” (Cooperstock, ¶¶82-85.)

- (b) “**receiving a signal representative of at least one of the event and the different event occurring at the wearable device or the second device via the wireless or wired communication channel and generate the control signal based on the received signal with the processor.**” (Limitation 23[b])

Limitation 23[b] is substantially similar to limitation 7[b]. (Cooperstock, ¶131.) This limitation would have been obvious for the same reasons provided for limitation 7[b]. (Cooperstock, ¶¶86-89, 131.)

## VII. CONCLUSION

Petitioner respectfully requests institution of review on the challenged claims.

Petition for *Inter Partes* Review of  
U.S. Patent No. 10,269,222 B2

Dated: May 26, 2023

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Petition for *Inter Partes* Review of  
U.S. Patent No. 10,269,222 B2

**CERTIFICATE OF COMPLIANCE WITH WORD COUNT**

Pursuant to 37 C.F.R. § 42.24(d), I certify that this petition complies with the type-volume limits of 37 C.F.R. § 42.24(a)(1)(i) because it contains 11,721 words, according to the word-processing system used to prepare this petition, excluding the parts of this petition that are exempted by 37 C.F.R. § 42.24(a) (including the table of contents, a table of authorities, mandatory notices, a certificate of service or this certificate word count, appendix of exhibits, and claim listings).

DATED: May 26, 2023

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Petition for *Inter Partes* Review of  
U.S. Patent No. 10,269,222 B2

**CERTIFICATE OF SERVICE**

I hereby certify, pursuant to 37 C.F.R. Sections 42.6 and 42.105, that a complete copy of the attached **PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 10,269,222 B2**, including all exhibits (**Nos. 1001-1008**) and related documents, are being served via Federal Express on the 26th day of May, 2023, the same day as the filing of the above-identified document in the United States Patent and Trademark Office/Patent Trial and Appeal Board, upon Patent Owner by serving the correspondence address of record with the USPTO as follows:

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