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Inventor(s)	Doyle; Spencer M.

Flag Football Notification Device

Abstract

A flag football system includes a belt device on a flag football belt and a flag coupling detachably engaged between a flag and the belt device. The flag coupling allows the flag to be coupled to the belt device and decoupled therefrom by pulling during play. The belt device includes an electronic system with a microcontroller, a flag detection system to detect a flag coupling status and send a flag coupling status signal, and a notification system to issue audible, visual, tactile, and/or wireless signals when the flag is decoupled. The flag detection system includes a sensor to detect presence or absence of the flag coupling on the flag. The notification system controls lights to be illuminated or doused, a speaker for sound to be emitted, and wireless signal transmission via a wireless communications subsystem. Devices can be electronically paired with the belt device, including a helmet and mobile devices.

Inventors: **Doyle; Spencer M. (Southlake, TX)**

Applicant: **Fast Advanced Sport Technologies LLC** (Southlake, TX)

Family ID: **1000008494922**

Assignee: **Fast Advanced Sport Technologies LLC (Southlake, TX)**

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Background/Summary

REFERENCE TO RELATED APPLICATIONS [0001] This application claims priority to, and incorporates in their entirety, U.S. provisional application No. 63/551,341 entitled “A flag football belt device with visual and/or auditory feedback” and provisional application No. 63/701,936 entitled “A flag football belt device capable of visual and auditory feedback, with wireless signal transmission.”

FIELD OF THE INVENTION
[0002] The invention relates to flag football, which is a form of American football in which players wear a belt on which flags are attached, and detachment of the flag controls the play of the game. Knowledge that detachment has occurred is thus important.
BACKGROUND OF THE INVENTION
[0003] In the game of flag football, the offense, or team that possesses the football, attempts to move the ball down to the opponent's endzone, by running or passing the football on each play. Defensive players will attempt to stop the offensive player that is in possession of the ball on each play. During a play in the game, defensive players attempt to remove one or both of the flags from the offensive ball-carrier's belt. This action of pulling the flag will cause the play to be stopped, which fixes the position of the ball for the next play. Any delay in stopping the play can affect the game outcome. Similarly, where the flag pull occurred affects the game outcome. Once the flag is pulled and the defender holds the flag for officials to see, the officials will whistle the play dead, or stopped, until the next offensive play. Similarly, during practice, coaches will need to instruct and monitor players' flag pulls to whistle practice exercises dead or stopped.
[0004] The flag football equipment primarily consists of the adjustable belt around each player's waist. Flags will typically be attached to the belt with a coupling assembly similar to U.S. Pat. No. 6,241,631 B1 (a pop socket flag), which is incorporated herein in its entirety, a ball and socket connection, or a hook-and-loop connection between the belt and flag.
[0005] Several factors affect the process of stopping play because of removal/detachment of a player's flag, including: (1) defensive players recognizing that they have pulled the offensive player's flag, and then raising the flag to show the officials, coaches, or other players; (2) the ability of officials, coaches, or other players to see that a flag has been pulled, and then using a whistle or device or other signal to indicate play should be stopped; (3) players seeing a flag pull, or hearing the whistle that stops play.
[0006] Players, coaches, and officials thus need some indication or notification that the flag has been detached. Those signals may be auditory, visual, and/or tactile, and may be local and/or remote.
[0007] Existing auditory signals, such as the sound of the pop socket flag decoupling from the belt, or the ball and socket flag decoupling from the belt, or the tear sound of the hook-and-loop flag separating from the belt, typically do not provide enough auditory cues to change player behavior. Even when heard, this may be because players are taught to “play to the whistle”—that is to play until the official whistles the play dead, even if other indicators suggest the play might be over. Continued play as players run to the ball increases the likelihood of collision and injury, so play should be stopped as quickly as possible.
[0008] Existing visual signals may also be missed. During games, officials are responsible not only for monitoring flag pulls, but adherence to numerous other rules and procedures for proper play.

Likewise, coaches during practice must monitor player instruction and development, in addition to stopping play during scrimmages.

[0009] Existing or additional auditory and visual signals may not alert players who are hearing-impaired.

BRIEF STATEMENT OF THE INVENTION

[0010] In an embodiment, the invention includes a device that attaches to a flag football belt (“belt device”) and one or more flags for coupling thereto. The belt device allows the flags to be coupled (attached) and decoupled (detached, or pulled) using a flag coupling that connects the flag to the belt device. The coupling may be a ball-and-socket connection, a pop-socket (or suction) connection, or other female-male connection. The coupling may have a belt device portion and a flag portion that are coupled and decoupled from one another to couple/decouple the flag from the belt device. In an embodiment, the belt device has a socket for each flag, and each flag has a ball for detachable engagement with the socket (or receptacle), where the ball may include a magnet for interaction with a sensor. In an embodiment, the ball and socket are reversed. In an embodiment, the belt device has a patch of one of the hook-and-loop fabrics for each flag, and each flag has a patch of the other of the hook-and-loop fabrics for detachable engagement with other patch. In an embodiment, the belt device has suction coupling, including suction cup for each flag, and each flag has suction cup for detachable engagement with the other suction cup, where a first of those suction cups has an outer diameter which complements the inner diameter of the second suction cup so that one suction cup is snugly received within the other suction cup. This detachable engagement includes sufficient retention by the coupling retaining the flag during running or other motions but detaching the ball from the socket when a firm pull is applied to the flag away from the belt. When at least one flag is detached from the belt device, that belt device will display one or more lights, emit one or more sounds, create a vibration or other tactile signal, or send a wireless transmission, or any combination thereof. That notification emitted by the belt device is intended to better indicate a flag pull than the current process, so that officials will be more quickly able to blow the whistle, and nearby players can stop gameplay earlier.

[0011] In an embodiment, the invention is a flag football belt device to attach to a flag football belt via a belt loop. A belt loop physically supports the belt device from a flag football belt. The belt device will feature one or more female receptacles for male connectors on flags.

[0012] The belt device will feature an electronic system to detect when a flag is coupled, and when a flag is decoupled, thus it is detecting the flag coupling state, e.g. coupled or decoupled. The belt device electronic system will include a power supply subsystem, including a battery, optionally a battery charging port and subsystem, and a battery indicator for indicating status. The power supply subsystem may include components for a rechargeable battery, or for a replaceable battery. The belt device electronic system will include a microcontroller, which will handle the flag detection logic, control the lights which can be illuminated, control the speaker or buzzer for sound to be emitted, and can manage the wireless signal transmission, including but not limited to Bluetooth or Wi-Fi. The belt device electronic system will include a flag detection system, which incorporates a switch or sensor, an example of which is a Hall-effect sensor and magnet. A flag detection system may include a Hall-effect sensor and magnet to output a low signal (decoupled flag) or a high signal (coupled flag). The Hall-effect sensor interacts with the magnet included in the ball to detect whether the ball is present or absent and to create a flag coupling state signal. An example of a suitable presence sensor is a photo sensor to detect the presence or absence of the flag, such as a photo interrupt sensor (PIR sensor). A PIR sensor may include a light emitting device to emit light and a receiving device to measure the amount of received light (reflected or transmitted) emitted from the light emitting device to determine whether an object is present or absent in a particular nearby position. The belt device electronic system will include a power switch or button, to turn the belt device electronic system on or off. The belt device may also include a location subsystem, such as one using GPS, to transmit a player's location when the flag is detached.

[0013] In an embodiment, the belt device electronic system may include a notification system. That notification system can include one or more lights, to indicate the presence of a coupled flag and of a decoupled flag, thus showing the flag coupling state. The flag detection system will communicate with the microcontroller, such as by sending a flag coupling state, which will communicate with the notification system. The notification system can create various types of signals, such as audible, visual, and/or tactile, via signal systems. Signal systems include lights, sound-emitting devices, and wireless communication systems. The notification system will control the illumination of the "coupled flag" light(s) and the "decoupled flag" light(s). The belt device notification system optionally will control one or more speakers or buzzers, to indicate the detection of a coupled or decoupled flag, typically by activating the speaker/buzzer only on one of the states, e.g. on the decoupled state. The flag detection subsystem will communicate with the microcontroller, which will communicate with the notification system to control the sound emitted by the speaker or buzzer. The belt device notification system can include one or more wireless communication subsystems, to transmit a signal upon the detection of a coupled or decoupled flag. The flag detection subsystem will communicate with the microcontroller, which will communicate with the notification system, which will control the type of signal and signal payload that is transmitted. A wireless communication subsystem may include one or more wireless antennas, and a pairing button or switch. That pairing switch or button is to engage a device pairing process with the microcontroller and another Bluetooth or Wi-Fi signal reception device or process.
[0014] In an embodiment, the one or more lights may include one or more LEDs that illuminate or flash for a programmed period of time, or until the flag is replaced, getting the attention of nearby players and officials. The belt device may include one or more light indicators for indicating all flags are coupled, a light on/off switch, and one or more decoupling indicator lights.
[0015] In an embodiment, the sounds should be produced by a speaker such as a piezoelectric buzzer or similar sound-emitting component, at 85-95 dB for a programmed period of time, or until the flag is replaced. The sound will also get the attention of the player with the football, nearby players, and officials. The belt device may include a sound on/off switch, and a speaker or buzzer for issuing a decoupling audible signal.
[0016] In an embodiment, the wireless signal should be emitted by a microcontroller in the device, such as in the wireless communication subsystem of the notification system. Communication protocols include Bluetooth signals, but could be Wi-Fi, near-field communication (NFC), or low power wide area network (LoRa). Bluetooth, governed by the Bluetooth SIG, offers reliable short-range communication, while LoRa, defined by the LoRa Alliance, provides extended range capabilities suitable for various applications. The wireless communication subsystem may include one or both, such as incorporating Bluetooth modules for short-range communication and LoRa modules for long-range data exchange, ensuring versatile connectivity across diverse environments.
[0017] In an embodiment, a microcontroller manages a flag detection subsystem. A flag detection subsystem includes a Hall-effect sensor and magnet to output a low signal (decoupled flag) or a high signal (coupled flag) as an output of a flag coupling state signal, where low/high are flag coupling states of a decoupled state and a coupled state. A flag detection subsystem may also or alternatively include a photo interrupt sensor to output a low signal (decoupled flag) or a high signal (coupled flag) as an output of a flag coupling state signal, where low/high are flag coupling states of a decoupled state and a coupled state. A notification system includes: a lighting subsystem, including a light that can be illuminated when the flag detection subsystem indicates a coupled flag and can be doused when the flag detection subsystem indicates a decoupled flag, and a light (for instance in a contrasting color) that can be illuminated when the flag detection subsystem indicates a decoupled flag and can be doused when the flag detection subsystem indicates a coupled flag; a controllable speaker or buzzer to emit sound when the flag detection subsystem indicates a decoupled flag; and a wireless communications subsystem with a Bluetooth antenna to transmit a signal when the flag detection subsystem indicates a coupled or decoupled flag. The device

contains an On-Off-(On) power switch that can turn the device on or off, or toggle Bluetooth pairing, which is managed by the microcontroller. The power management subsystem contains a battery that can be charged with an external port (USB-C, for example) through a charging integrated circuit, and can power the microcontroller with a voltage converter.

[0018] In an embodiment, the invention includes paired devices, which communicate with one or more of the belt devices on the players on the field and are on the player bearing the belt device in question (player paired devices). A paired device may be paired using the wireless communication protocol to the belt device. Paired devices may include helmets, which could respond to signals from the belt devices by creating tactile signals (e.g. vibrations from a vibrator), audible signals using sound by a speaker or signals to cochlear implants, and/or visual signals using lights or more complex heads-up display (HUD). Other devices may be player paired devices, such as smart glasses or goggles including speakers and/or a HUD, or cochlear implants. These would assist players to receive notification (or signal) that a play was over.

[0019] In an embodiment, paired devices may also include computers, apps, and/or mobile devices that are not on the player (non-player paired devices or officiating devices). These officiating devices may be paired using the wireless communication protocol to the belt device (as well as other belt devices). Based on the signals received by the officiating device, the signals could be used to track the time of the end of a play, and the position of the ball-carrier when the play is over (which may occur when a flag is pulled).

[0020] In an embodiment, a belt device using a Bluetooth wireless signal would include a power supply, a rechargeable lithium-ion battery, a USB-C charging port with charging circuitry, a voltage regulation system to supply 3.3V to the system, an On-Off-(On) switch for power and Bluetooth pairing, a microcontroller that handles logic, controls LEDs and buzzer, and manages Bluetooth communication, a Hall-effect sensor that detects the presence of a magnet (flag coupled or decoupled) on the flag coupling, LEDs including a blue LED to be illuminated when the flag is coupled, and an orange LED that flashes when the flag is decoupled, and a piezoelectric buzzer that is activated (sounds) when the flag is decoupled. The power supply has a battery that provides power to the buck-boost converter when the power switch is On, and the converter outputs a regulated voltage supply. The microcontroller is powered by the voltage supply. The Hall-effect sensor detects the magnet and sends a digital signal to the microcontroller (high/low to indicate whether the flag is coupled or decoupled). Based on the sensor input, the microcontroller controls the LEDs and buzzer accordingly. The microcontroller manages Bluetooth communication, with microcontroller Bluetooth pairing is controlled by the power switch momentary (On). The logic used by the Hall-effect sensor is: (i) Magnet Detected (Flag Coupled) means the sensor output is LOW and the microcontroller turns ON the blue LED; and (ii) Magnet Not Detected (Flag Decoupled) means the sensor output is HIGH and the microcontroller turns OFF the blue LED, flashes the orange LED, activates the buzzer, and emits a Bluetooth signal.

[0021] In an embodiment, a belt device using a Bluetooth wireless signal would include a power supply, a rechargeable lithium-ion battery, a USB-C charging port with charging circuitry, a voltage regulation system to supply 3.3V to the system, an On-Off-(On) switch for power and Bluetooth pairing, a microcontroller that handles logic, controls LEDs and buzzer, and manages Bluetooth communication, a PIR sensor that detects the presence of a flag portion of a flag coupling (flag coupled or decoupled), LEDs including a blue LED to be illuminated when the flag is coupled, and an orange LED that flashes when the flag is decoupled, and a piezoelectric buzzer that is activated (sounds) when the flag is decoupled. The power supply has a battery that provides power to the buck-boost converter when the power switch is On, and the converter outputs a regulated voltage supply. The microcontroller is powered by the voltage supply. The PIR sensor detects the presence or absence of the flag portion of the flag coupling and sends a digital signal to the microcontroller (high/low to indicate whether the flag is coupled or decoupled). Based on the sensor input, the microcontroller controls the LEDs and buzzer accordingly. The microcontroller manages Bluetooth

communication, with microcontroller Bluetooth pairing is controlled by the power switch momentary (On). The logic used by the PIR sensor is: (i) Flag Portion Detected (Flag Coupled) means the microcontroller turns ON the blue LED; and (ii) Flag Portion Not Detected (Flag Decoupled) means the microcontroller turns OFF the blue LED, flashes the orange LED, activates the buzzer, and emits a Bluetooth signal.

Description

BRIEF DESCRIPTION OF THE FIGURES

[0022] FIGS. **1**A-**1**B are, respectively, a left, and a left, front, top oblique view of an embodiment of flag football system.

[0023] FIG. **2** is a right, front, bottom oblique view of an embodiment of a flag football system.

[0024] FIG. **3** is a schematic of an embodiment of a component of a flag football system.

[0025] FIGS. **4**-**7** show embodiments of a flag football system and their use.

[0026] FIG. **8** shows the steps of methods of a flag football system.

DETAILED DESCRIPTION OF THE INVENTION

[0027] Turning to FIGS. **1** & **4**-**7**, in an embodiment, flag football device **1** includes flag football belt **2**, belt device **20** supported on flag football belt **2**, flag **15**, flag coupling **40** between flag **15** and belt device **20**, and one or more paired devices **110** paired to belt device **20**.

[0028] In use, player **8** wears belt device **20** on flag football belt **2**, with flag **15** coupled via flag coupling **40** with flag **15** available to be pulled (decoupled) to effect a tackle (stop of play) on field **6**. Belt device **20** creates a signal **84** upon flag **15** being pulled, and may communicate with one or more of paired devices **110**.

[0029] Belt device **20** includes belt loop **22**, one or more antennas **23**, button **24**, power switch **26**, charging port **29**, and battery **28** (on FIG. **3**). Belt device **20** also includes belt device portion **41** of flag coupling **40**, and electronic system **50**.

[0030] Flag coupling **40** comprises belt device portion **41** thereof and flag portion **42** thereof, which connect to one another to form flag coupling **40**. Flag portion **42** is fixed to one end of flag **15**, leaving the other end free to be pulled. Belt device portion **41** is fixed to a lower, front of belt device **20** to allow flag **15** to be accessible. Flag coupling **40** comprises ball-and-socket coupling **43**, where flag portion **42** is ball **44** fixed to one end of flag **15** and belt device portion **41** is socket **45**. Socket **45**, and if needed, ball **44**, have sufficient give so that ball **44** can be coupled to socket **45** (and thus flag **15** to belt device **20**) and putting flag **15** in coupled state **68**, while permitting a sufficient pull of flag **15** to decouple ball **44** from socket **45** (and flag **15** from belt device **20**) and putting flag **15** in decoupled state **69**. Flag **15** is shown in decoupled state **69** (in FIG. **1**B) with coupled state **68** shown via the movement arrow. Flag **15** includes flag portion **42** of flag coupling **40**.

[0031] Belt device **20** includes electronic system **50**, which includes flag detection system **60**, notification system **80**, and wireless communications system **100**. Electronic system **50** includes microcontroller **56** to handle flag detection logic, as well as notifications, and communications, as well as appropriate wiring and circuitry for intersystem communications **54** between and among flag detection system **60** and notification system **80**.

[0032] Flag detection system **60** incorporates sensor **62** which is Hall-effect sensor **63** in belt device **20** on or adjacent to socket **45** to facilitate detection of presence of ball **45** or absence of ball **45**. When ball **45** is present, sensor **62** detects coupled state **68** and outputs high signal (coupled flag) as flag coupling state signal **52**. When ball **45** is absent, sensor **62** detects decoupled state **69** and outputs low signal (decoupled flag) as flag coupling state signal **52**. Flag detection system thus detects flag coupling state **67**. Flag detection system **60** is configured to detect flag coupling state **67** and to create flag coupling state signal **52**. Flag coupling state signal **52** is communicated by

inter-system communication **54** to notification system **80**.
[0033] Sensor **62** can detect flag coupling state **67** because ball **44** includes magnet **64** which interacts with Hall-effect sensor **63** to create flag coupling state signal **52**. Magnet **64** may be considered part of flag detection system **60**.
[0034] Notification system **80** includes one or more signal systems **85** and wireless communication subsystem **100**.
[0035] Signal systems **85** are for creating signal **84**, and can control the lights which can be illuminated, control the speaker or buzzer for sound to be emitted, and/or vibrations to be emitted. Lighting subsystem **88** includes lights **89** to emit light **90** in contrasting colors as signal **84**. This includes one color light when flag detection system **60** indicates coupled state **68** and contrasting color light when flag detection system **60** indicates decoupled state **69**. The first color light **89** is illuminated and the contrasting light **89** doused for coupled state **68** and illumination and dousing reversed for decoupled state **69**. Controllable speaker **92** emits sound **93** as signal **84** when flag detection system **60** indicates decoupled state **69**. Vibrator **95** emits vibrations **96** as signal **84** when flag detection system **60** indicates decoupled state **69**. Lighting subsystem **88** is configured to control illumination of lights **89**, while controllable speaker **92** is configured to control emission of sound **93**, and vibrator **95** is configured to control emission of vibrations **96**, all of which notification system **80** is configured to control.
[0036] Electronic system **50** may include more than one wireless communication subsystem **100**. Wireless communication subsystem **100** is for communication with optional paired devices **110**, to transmit a signal upon detection of coupled state **67** or decoupled state **68** by via antenna **23** and permit paired devices **110** to create signal **84** or carry out other functions. Wireless communication subsystem **100** uses antenna **23** to send wireless signal **102** using communications protocol **103**, including Bluetooth, to pair with and to communicate with one or more paired devices **110**.
[0037] Paired devices **100** communicate with one or more of belt devices **1** of players **8** of field **6** and include player paired devices **112** and officiating devices **118**. Player paired devices **112** and officiating devices **118** may communicate with one another.
[0038] Player paired devices **112** are on the same player **8** bearing belt device **20** and are paired thereto using communication protocol **103**. Player paired devices **112** worn by player **8** include helmets **113**, smart glasses **116**, and cochlear implants **114**. Helmet **113** and smart glasses **116** receive wireless signal **102** from wireless communication subsystem **100** upon detection of coupled state **67** or decoupled state **68** and communication of flag coupling state signal **52** between flag detection system **60** and notification system **80**. Helmet **113** and smart glasses **116** can respond by creating signal **84**, including one or more of light **90**, sound **93**, and vibrations **96**. Helmet can also have HUD **115** for creating signal **84**. Cochlear implant **114** receives wireless signal **102** from wireless communication subsystem **100** upon detection of coupled state **67** or decoupled state **68** and communication of flag coupling state signal **52** between flag detection system **60** and notification system **80**. Cochlear implant **114** can respond by creating signal **84** for player **8**.
[0039] Officiating devices **118** are not on the player **8** bearing belt device **20**, and may be on official **9**, but are paired to multiple belt devices **20** of players **20** using communication protocol **103** (which may be different than protocol **103** used for player paired devices **112**). Officiating devices **118** include computers **119** (PCs and/or mobile devices) that may use apps **120**. Officiating devices **118** may reflect game data **13** including time **11** and position **12** and/or other data such as team names, score, etc. Officiating devices **118** receive wireless signal **102** from wireless communication subsystem **100** upon detection of coupled state **67** or decoupled state **68** and communication of flag coupling state signal **52** between flag detection system **60** and notification system **80**. Officiating devices **118** can respond by creating signal **84**, including one or more of light **90**, sound **93**, and vibrations **96**, or by displaying flag coupling state **67** (or other game data **13** on a display, or by further communicating such data to other devices. Based on data received by officiating device **118**, official **9** can track time **11** of the end of a play, and the position of the ball-

carrier (player **8**) on field **6** when the play is over.
[0040] Turning to FIG. **2**, another embodiment of flag coupling **40** is shown, which still comprises belt device portion **41** and flag portion **42**, but in which flag coupling **40** comprises a suction coupling **49**, where flag portion **42** is suction cup **46** fixed to one end of flag **15** and belt device portion **41** is suction cup **46**, and in which suction cups **46** have complementary inner diameter (ID) **47** and outer diameter (OD) **48** so that one of suction cups **46** is snugly received within the other. Suction cups **46** have a cylindrical side wall which is relatively thin and a base to connect them to flag **15** and belt device **20**. An air hole may be formed in one or both of the bases so that when the suction cups are inserted and pressed together, air trapped within the confines thereof vents through the air hole as the suction cups are axially slid together. When the suction cups are decoupled by pulling on flag **15**, there is audible report or "pop" as one of suction cups **46** rapidly disengages from the other suction cup **46**. ID **47** and OD **48**, and as needed, material and surface finishes, are designed that suction cup **46** can be coupled to suction cup **46** (and thus flag **15** to belt device **20**) and putting flag **15** in coupled state **68**, while permitting a sufficient pull of flag **15** to decouple suction cup **46** from suction cup **46** (and flag **15** from belt device **20**) and putting flag **15** in decoupled state **69**. Flag **15** is shown in decoupled state **69** with coupled state **68** shown via the movement arrow. Flag **15** includes flag portion **42** of flag coupling **40**.
[0041] FIG. **2** reflects features in FIGS. **1**A-**1**B but also shows belt device **20** mounted on belt **2**, and vibrations **96** issuing as signal **84** from vibrator **95**. Sensor **62** in this embodiment is photo interrupt sensor **65** which can detect flag coupling state **67** because the presence or absence of suction cup **46** forming flag portion **42** interacts with photo interrupt sensor **65** to create flag coupling state signal **52**.
[0042] Referring to FIG. **8**, in use there is a method of **130** signaling the state of a flag football flag, which may include step **132** detecting a flag coupling state using a flag detection system of an electronic system on a belt device. Detecting step **132** may include detecting either a decoupled state or a coupled state, step **135** operating a sensor, and step **133** outputting a flag coupling state signal from the sensor. In addition, detecting step **130** may include **150** detecting a coupled state of a flag portion of a flag coupling when the flag portion is coupled to a belt portion and **151** detecting a decoupled state of the flag portion of a flag coupling when the flag portion is decoupled from a belt portion. The method of **130** signaling may also include the step of **136** creating one or more signals showing the flag coupling state using a notification system of the electronic system. The creating step **136** may include the step of **140** illuminating one or more lights depending upon a flag coupling state signal, and may include the step of illuminating or light when the decoupled state is detected, and illuminating a second light when the coupled state is detected, or illuminating a first light and dousing a second light when the first state is detected, and illuminating the second light and dousing the first light when the second state is detected. The creating step **136** may also include **141** controlling illumination of lights depending upon a flag coupling state signal. The creating step **136** may also include **142** emitting an audible signal using a controllable speaker depending upon a flag coupling state signal. The creating step **136** may also include **144** communicating a wireless signal disclosing a flag coupling state via a wireless communications subsystem depending upon a flag coupling state signal. The method of signaling **130** may include the step of **146** pairing one or more paired devices to the belt device by the wireless communications subsystem.
[0043] There is a method of **160** controlling play, which may include the step of **163** receiving wireless communications from one or more belt devices connected to a flag football flag, where controlling step **160** may include **163** receiving time, position, and/or other game data, as well as a signal of a flag coupling state. Controlling step **160** may also include the step of **166** officiating play based, in-part or in-whole, on information received via receiving step **163**. Officiating step **166** may include **169** stopping play and **172** controlling time.

Claims

1. A flag football system to attach to a flag football belt via a belt loop, comprising: a belt device, comprising a belt device portion of a flag coupling; and an electronic system, comprising a flag detection system to detect a flag coupling state; a notification system to create one or more signals showing the flag coupling state.
2. The flag football system of claim 1, the belt device portion of the flag coupling selected from the group comprising a suction cup and a portion of a ball and socket coupling.
3. The flag football system of claim 2, further comprising a flag comprising a flag portion of a flag coupling.
4. The flag football system of claim 1, the notification system comprising one or more lights showing the flag coupling state.
5. The flag football system of claim 4, the flag coupling state comprising a decoupled state and a coupled state; the notification system comprising a first light and a second light; the first light being illuminated when the decoupled state is detected, and the second light being illuminated when the coupled state is detected.
6. The flag football system of claim 4, the flag coupling state comprising a first state and a second state; the notification system comprising a first light and a second light; and the first light being illuminated and the second light being doused when the first state is detected, and the second light being illuminated and the first light being doused when the second state is detected.
7. The flag football system of claim 4, the notification system further comprising a controllable speaker; the speaker emitting an audible signal controlled by the flag coupling state.
8. The flag football system of claim 4, the notification system further comprising a wireless communications subsystem that communicates a signal disclosing the flag coupling state.
9. The flag football system of claim 8, further comprising one or more paired devices paired to the belt device by the wireless communications subsystem.
10. The flag football system of claim 1, the flag detection system comprising a sensor; the sensor configured to output a flag coupling state signal.
11. The flag football system of claim 1, further comprising a flag comprising a flag portion of the flag coupling; the flag coupling state comprising a decoupled state and a coupled state; the flag detection system detecting a coupled state when the flag portion is coupled with the belt portion; and the notification system detecting a decoupled state when the flag portion is decoupled from the belt portion.
12. The flag football system of claim 11, the notification system comprising at least two signal systems selected from the list composed of a light, a controllable speaker, a vibrator, and a wireless communications subsystem.
13. A method of signaling the state of a flag football flag, comprising: detecting a flag coupling state using a flag detection system of an electronic system on a belt device; creating one or more signals showing the flag coupling state using a notification system of the electronic system; and the belt device comprising a belt device portion of a flag coupling.
14. The method of claim 13, the detecting step comprising detecting either a decoupled state or a coupled state; the creating step comprising illuminating a first light when the decoupled state is detected, and illuminating a second light when the coupled state is detected.
15. The method of claim 13, the detecting step comprising detecting either a first state or a second state; the creating step comprising illuminating a first light and dousing a second light when the first state is detected, and illuminating the second light and dousing the first light when the second state is detected.
16. The method of claim 13, the detecting step comprising detecting a decoupled state; and the creating step comprising creating a visual signal using one or more lights and emitting an audible

signal using a controllable speaker;

17. The method of claim 13, the creating step comprising communicating a signal disclosing the flag coupling state via a wireless communications subsystem.

18. The method of claim 17, further comprising pairing one or more paired devices to the belt device by the wireless communications subsystem.

19. The method of claim 13, the detecting step comprising operating a sensor; and outputting a flag coupling state signal from the sensor.

20. The method of claim 13, further comprising a flag comprising a flag portion of a flag coupling; and the detecting step comprising detecting a coupled state of the flag portion coupled to the belt portion; and detecting a decoupled state of the flag portion decoupled from the belt portion.