Catapult Vector User Manual

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CATAPULT

1. OUTLINE

The Catapult Vector S7device is a professional-grade GNSS system designed to measure the performance of elite athletes within individual and team sports. This document introduces the Vector S7 hardware components and provides an explanation of functionality and general operation.

The OpenField software system Data is collected live and downloaded to the OpenField console and can then be uploaded to the OpenField cloud post session. To store the collected data on the OpenField cloud, data must be synced from the console to the cloud over a solid internet connection. Users have the option to use the OpenField+ mobile/iPad app to view live data through a mobile or an iPad over a local Catapult Wi-Fi. This improves accessibility as it enables users to be more mobile around the pitch and to share live data more easily with coaches and players.

The hardware components of the Vector system include the Vector devices, a wireless UWB receiver(s) for GPS/GNSS and RTLS tracking.

2. VECTOR S7 DEVICE

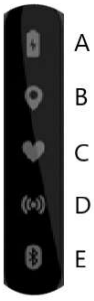
The **Vector S7** is a wearable (combined) GNSS / LPS device with embedded microsensors that is used to measure the performance of elite athletes, in both real-time and post session.
The Vector S7 device contains the following measurement sensors and components:

- GNSS module (10Hz GNSS / 18Hz GPS)
- GNSS antenna
- RTLS antenna
- Tri-axial Accelerometer (up to 1000 Hz)
- Tri-axial Gyroscope (up to 1000 Hz)
- Tri-axial Magnetometer (up to 1000Hz)
- Magnetic Heart Rate Receiver
- ECG heart rate board (up to 250Hz)
- Bluetooth Low Energy
- Device status LED's
- Haptic feedback via vibration unit
- UWB Antenna

All sensors are sampling continuously, and data is logged onto an onboard SD card as well as transmitted live via ultra-wide-band (UWB) or Bluetooth (BLE).

Figure 1. – Vector S7 wearable Device

DEVICE ICON/LED FUNCTIONALITY



A: Indicates the state of the battery (charging, low battery, ect)

B: Indicates a connection to the sateliete (GNSS) or ClearSky RTLS system.

C: Indicates a connection to Heart Rate

D: Indicates use of ultra-wide band.

E: Indicates a connection to Bluetooth.

Vector S7 Device Operation Overview:

1. **Charging:** Each Vector S7 device is charged and configured, prior to use, using the specifically designed Vector Dock. This is a 24-device tray that connects to mains supply mains supply for the purpose of Vector S7 charging.
2. **Configuration:** Configuration of the Vector S7 occurs via USB serial connection from the dock to the desktop software (OpenField) where athlete and device settings are transferred and stored on the Vector S7 device. This process occurs automatically as the devices are recognized by the system and as each device is assigned to an athlete.
3. **Assigning Athletes to Devices:** after logging in and pressing start, navigating to the settings menu will show athletes. Pressing '*auto-assign*' will assign device ID's to players and will then transfer this configuration to the devices as described above
4. **Starting a live session:** Connect the Vector Anchor via USB. In the software from the main screen, press the 'quick start' icon to start a live session. Vector S7 devices will show in 'active players' once they obtain GNSS lock and data transmission will begin. You can check if data is incoming by checking the orange and black bar in the top right corner of the interface. Press 'All' in active

players box then press '+period' to start recording. To end the live session, press the stop icon

5. **Download Session:** Turn the devices off by pressing the button on the side of the device for 2 seconds and release. Place Vector S7 devices in Vector Dock press the dock 'ignition button' and connect USB to PC. Press settings then transfer. Press begin transfer. Once display says 'finished', data can be viewed from calendar.

DEVICE CONNECTORS & FEATURES

Top Charging LED: Located on the top of the device is a LED used to indicate the charging and enumeration state of the device.

Power Button: The power button has been placed on the edge of the device to make the device harder to press during play and thus minimizing accidental device turn offs.

HR pins: Allows the user to clip the device into a vest to collect HR data using an intergrated heart rate vest.

Charging Pins: Allows the device to connect to the Vector Dock which enables the device(s) to charge and connect / data transfer to the PC.

FIRST USE AND CHARGE

Ensure the devices are fully charged before using them to collect data for a session. To charge the devices, connect the Vector Dock to a power supply and then place the devices into an individual dock slot on the Vector charging dock. The top LED charging light will flash when the device is charging. The top battery LED turns solid green when the device is fully charged. To turn the device on, press the button on the side of the device or set an alarm in the console.

VEST POUCH INSERTION

The device is placed into the device pocket located on the back of the vest. It is clipped into the vest via the HR Clips located on the back of the device. Please ensure the device has been turned on the power button prior to inserting the device into the vest. The device is now ready to record your player's data.

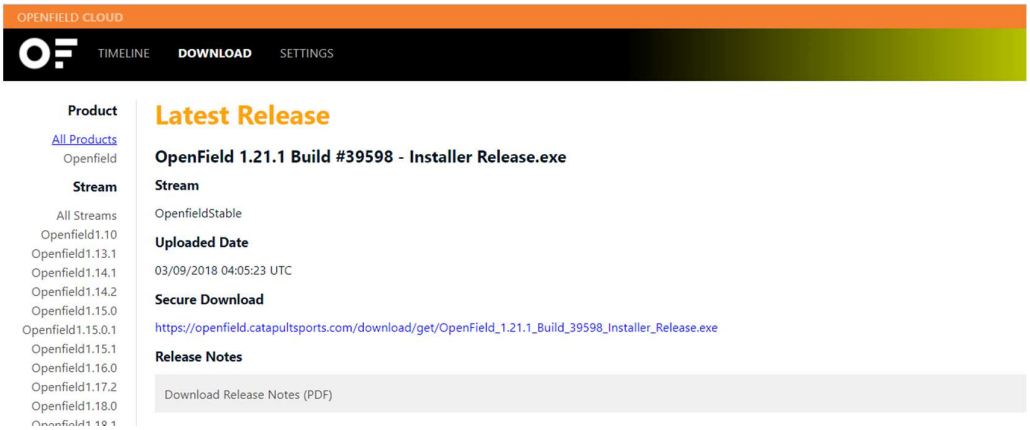
3. SYSTEM LOGIN

The software components of the Vector system consist of a cloud account and a downloadable console.

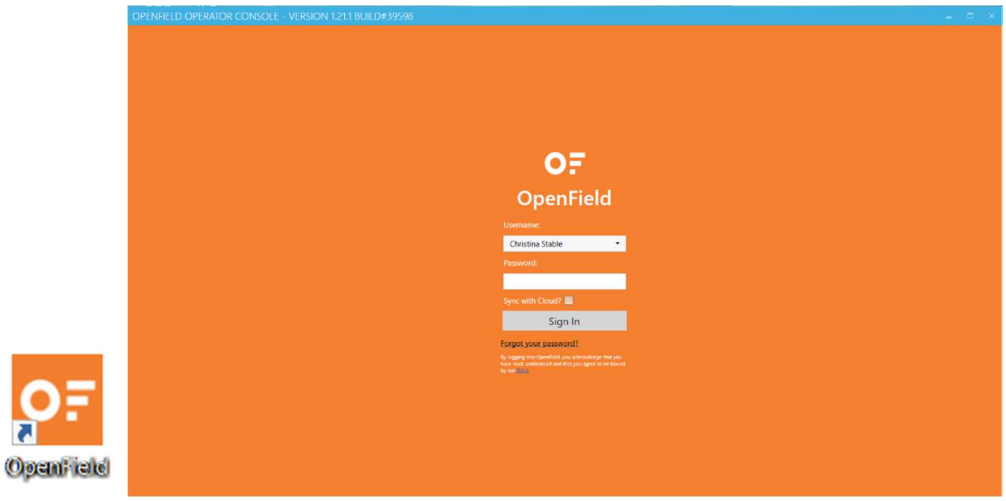
1) Each user will receive a unique username and password from a Catapult representative to log into their OpenField Cloud account. Each user can login to the cloud Account through one of the following URLs depending on their geographical location:

- APAC (Australia Pacific and Asia): https://openfield.catapultsports.com
- EMEA (Europe, Middle East and Africa): https://eu.catapultsports.com
- US (North and South America): https://us.catapultsports.com

2) The OpenField Console Software can be downloaded from the OpenField Cloud. Login to the OpenField cloud with the account credentials and click the Downloads tab. Click the link under 'Secure Download' to download the latest version of the OpenField Console. You'll also find release notes regarding installations, changes, bugs, and improvements of the newest build.



3) Once the Open Field console is downloaded, click the desktop Icon to open the console. Log into the console with the same account credentials used to log into the cloud.



4. COLLECTING DATA

COLLECTING LIVE DATA (GPS/GNSS)

A Live Activity is an Activity being analysed in real time whilst the Devices are being used; this is achieved via Data being collected through the Vector receiver (GNSS) or Anchors (LPS). Live Activities are extremely useful to be able to provide real time feedback on Athlete Performance.

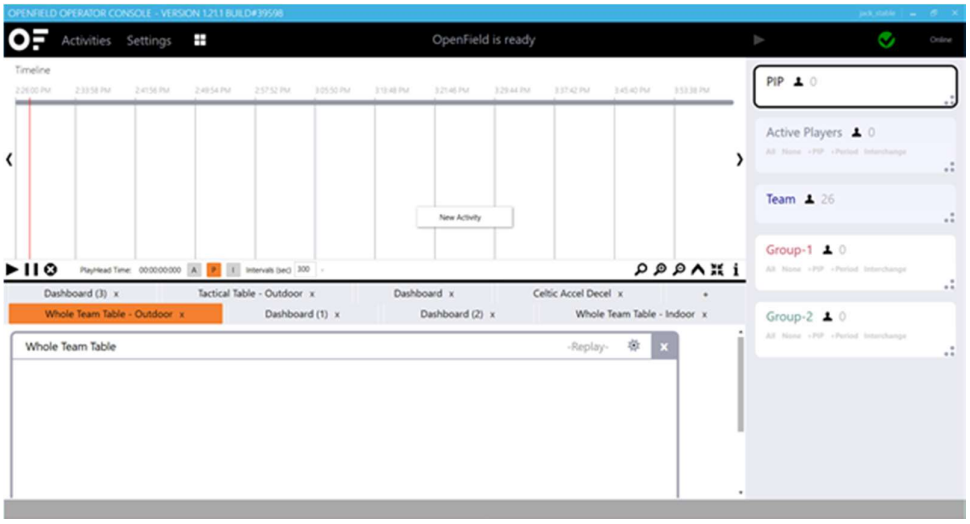
1. Ensure the devices, console and receiver are all set to indoor or outdoor mode.

2. Turn on the wireless receiver(s) and the Vector devices.

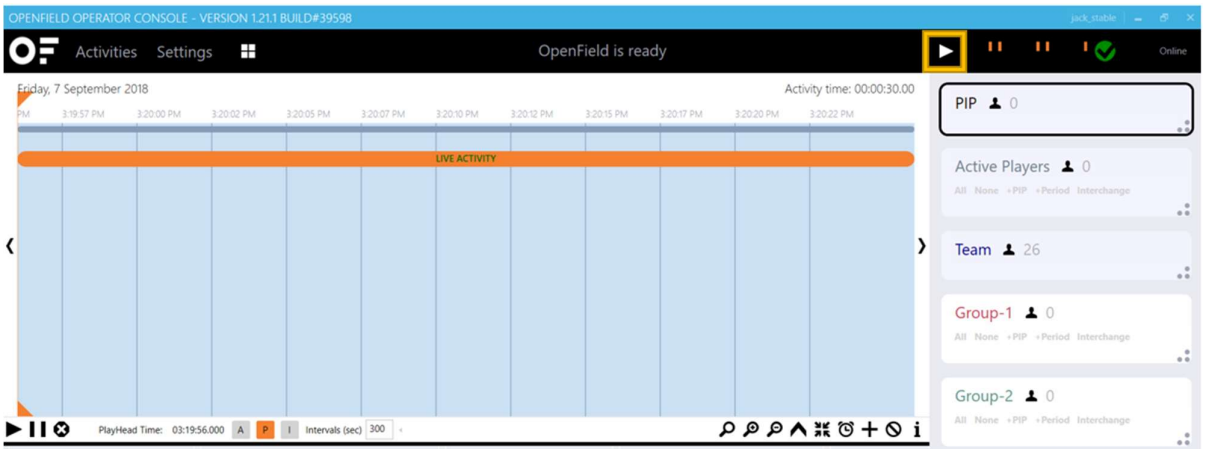
3. Map each of the devices to their corresponding athlete via the Settings menu – Mappings Tab in the console.

4. From the main user interface in the console, select Start to begin a new Live Activity.

5. Create a New Activity via the Activity Timeline by right clicking in the timeline area and selecting New Activity. From the new activity menu, fill in all of the details for the session such as Name, device type, venue, teams, ect. Select 'Create Activity'.



6. Hit the 'Play' Button up the top right of the User Interface; Once hit the button will change to a 'Pause' Button



7. Start a New Live Period and PIP Athletes as necessary. See our Periods article for more information on how to create and stop Periods.

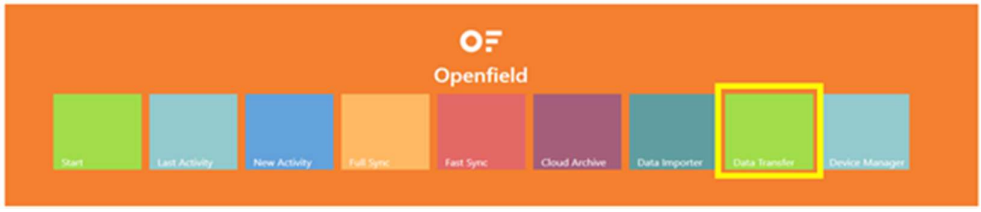
8. When the Activity is completed, stop all live Periods and press the pause button.

5. DOWNLOADING DATA

Data is recorded on the Device in a 'Raw File', which is created every time the Device is turned on; up to 31 Raw Files can be stored on a Device at once. Downloading Data from the Devices is an important step in getting the most out of the metrics recorded on the Device. It is necessary to apply Sport Specific Algorithms (GK Dives, QB Throws etc.), for IMA metrics to be calculated and more.

1. After a session is completed, collect all the devices from athletes, turn them off and connect the devices to the PC through the Vector Dock.

2. Open up the OpenField console and select ‘Data Transfer’ from the Console Tile Screen.



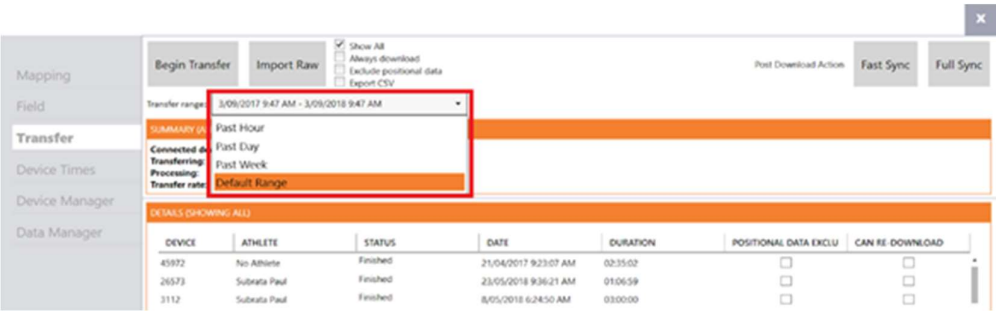
3. The units connected to the PC will automatically begin downloading (beginning with the most recent file, moving back) when the 'Data Transfer' tile is selected.

OR

1. To reach the Data Transfer screen without an automatic download, click 'Start' from the Console Tile Screen, then click 'Settings' in the top left of the console screen. From the settings menu, select the 'Transfer' tab.

2. Connect the Devices to the PC, then in the 'Data Transfer' screen, ensure the correct number of devices are connected.

3. Select the Transfer Range of the sessions you want to download. NOTE: The Default Range enables the user to download all of the sessions that haven't been previously downloaded from the device.



4. Select 'Begin Transfer' to start downloading the devices.

6. SOFTWARE USER GUIDE LINKS

1. How to create a new widget - Console Widgets
2. Know live vs replay widget options - Console Widgets
3. How to create a new dashboard on the cloud - Cloud Dashboards
4. How to create a new widget on the cloud - Cloud Widgets
5. How to customize a widget on the cloud - Cloud Widgets
6. How to create a PDF report - Generating a PDF report
7. How to create a bulk PDF report - Bulk Export PDF Reports
8. How to export a CTR report - CTR Reports

7. Vector Anchor & Vector Dock

VECTOR ANCHOR

Anchor Specification:

- Wi-Fi (dual band 2.4GHz and 5GHz)
- UWB Antenna (3774.0 MHz to 4243.2 MHz)

The water-resistant wireless receiver design is built to pick up devices for professional sports player data capture in a ~250meter range by using ultra-wide band communication (4.0 GHz). The ultra-wide bandwidth provides more robust communication between devices and receiver(s) and improves immunity to third party environmental interference such as, Wi-Fi. The receiver is also integrated into a Wi-Fi network that wirelessly links the OpenField console and mobile applications within a 50m range. This improves accessibility as a local Catapult Wi-Fi enables users to be more mobile around the pitch and to share live data more easily with coaches and players. Users have the option to add multiple anchors to the same system to improve live data capture capabilities. The GNSS antenna contained within the anchor serves the purpose of GNSS augmentation.

The Vector Anchor may be operated by mounting it on a tripod, which improves portability and allows it to be placed in the most optimal position. It can also be temporarily mounted on a pole to improve coverage.

The Vector Anchor antenna must be connected by a professional installer and only the antennas that were granted approval for this device may be used.

VECTOR DOCKING

Dock Specification:

- Ethernet connectivity
- 6 Hour battery life
- USB Connectivity
- Wi-Fi connectivity
- On board memory

The Vector Smart Docking Station consists of 24 individual device slots, an 'ignition' button, a USB port and a power supply port. The ignition button functionality gives the user the ability to turn on or off all connected devices with one button press. The USB port connects the devices to the PC via a USB cord to enable device configuration and downloading of the raw files on the devices. The Vector Dock is built to last up to 6 hours without a power supply with use of an onboard battery. This allows for pitch-side USB downloading and device configuration. The travel case for the Vector Smart Docking Station is built to accommodate all the system's wires, receivers and devices.

To operate, plug dock into mains power with cables provided and press the silver 'ignition' button. Insert devices to charge. Enumerated devices will display a flashing green light on top. Charging devices will display an amber light on top.

8. SUPPORT & HELP

Any questions or requests for help with the OpenField software system or the VECTOR devices should be sent by email. The support email required is dependent on the user's geographical location:

APAC: apac_support@catapultsports.com

EMEA: emea_support@catapultsports.com

AMERICAS: us_support@catapultsports.com

LATAM: latam_support@catapultsports.com

Please provide us with contact details including your name and your preferred email address. Let us know what the problem is and what equipment (computer & browser) you are using to access the site.

Users can also request help through the online cloud platform. From the OpenField cloud main user interface, select **Request Help** in the top right corner of the page. The user will be prompted with a form. Please fill out this form to provide us with the necessary details to fix the issue.

Note that there is knowledge center available at https://wearables.catapultsports.com/hc/en-us that includes multiple getting started, how to and troubleshooting articles.

Regulatory Notices

USA

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and must not be co-located or operating in conjunction with any other antenna or transmitter.
For body worn operation, this device has been tested and meets FCC RF exposure guidelines. When used with an accessory that contains metal may not ensure compliance with FCC RF exposure guidelines.

Canada

CAN ICES-3 (B)/NMB-3(B)

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IMPORTANT NOTE:

Radiation Exposure Statement

For body worn operation, this device has been tested and meets RF exposure guidelines when used with an accessory that contains no metal. Use of other accessories may not ensure compliance with RF exposure guidelines.

Déclaration d'exposition aux radiations RF:

Pour une utilisation sur le corps, cet appareil a été testé et respecte les directives sur l'exposition aux RF lorsqu'il est utilisé avec un accessoire sans métal. L'utilisation d'autres accessoires peut ne pas garantir la conformité aux directives d'exposition aux RF.