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|  | **Technical Handbooks of FRM4VEG Instrumentation**  **(TR-1): GPS Garmin Etrex 30**  version 1.0  National Physical Laboratory  University of Southampton  EOLAB  28 May 2020 |
| [Related image](https://www.google.co.uk/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwjRx6alu5PYAhXL1xQKHcWbBx4QjRwIBw&url=https://www.bodet.co.uk/news/269-the-national-physical-laboratory-selects-bodet-to-provide-a-wireless-time-solution.html&psig=AOvVaw3HTJAk3pVRL7SYyC5vdX23&ust=1513683146214264) | This document was produced as part of the ESA-funded project “Fiducial Reference Measurements for Vegetation Phase 2 (FRM4VEG 2)” under ESA contract number: 4000129823/20/I-NS |

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# Acronyms

|  |  |
| --- | --- |
| **Abbreviation** | **Stands for** |
| ESA | European Space Agency |
| FRM4VEG | Fiducial Reference Measurements for Vegetation |
| GLONASS | Global Navigation Satellite System |
| GPS | Global Positioning System |

# Introduction

## Purpose and Scope

This document forms part of deliverable D-60 of the European Space Agency (ESA) project ‘Fiducial Reference Measurements for Vegetation (FRM4VEG)’ and it should be used as a guide to operate the GPS Garmin Etrex 30. Its purpose is to provide an instrument technical description, together with information about maintenance and calibration history, pre-deployment uncertainties estimates, and steps required to achieve the FRM status.

The document is organized into 6 key sections:

* **Section 1** provides a summary of the document.
* **Section 2** overviews the technical characteristics of the instrument.
* **Section 3** ….
* **Section 4** describes all the procedures that need to be followed when using the instruments in the field.
* **Section 5** lists useful advices for care and storage of the instruments as provided by the manufacturer.
* **Section 6** …

# Technical Description

## Overview

A close up of a cell phone

Description automatically generated

Figure : Device overview[1]

|  |  |
| --- | --- |
| **1** | Zoom keys. Press to zoom in and out. |
| **2** | Back key. Press to return to the previous menu. |
| **3** | Thumb Stick™controller. Move directionally to scroll or highlight an item. Press to select an item. |
| **4** | Menu key. Press to open the menu for a page. Press twice to return to the main menu. |
| **5** | Press to adjust the backlight. Hold to turn the device on or off. |
| **6** | Mini-USB port (under weather cap) |
| **7** | Battery cover. |
| **8** | Battery cover locking ring. |
| **9** | Mounting spine. |

## Theory of Operation

# Calibration History and Uncertainty Budget

## Uncertainty Budget

# Instrument Operation

## Performing Measurements

It may take 30 to 60 seconds to acquire satellite signals.

1. Go outdoors to an open area.
2. If necessary, turn on the device.
3. Wait while the device searches for satellites.

The main menu gives access to tools and setup screens for waypoints, activities, routes, and more.

* Waypoints are locations recorded and stored in the device. Waypoints can mark where you are, where you are going, or where you have been. You can add details about the location, such as name, elevation, and depth. You can save your current location as a waypoint.
* A route is a sequence of waypoints or locations that leads you to your final destination.
* A track is a recording of your path. The track log contains information about points along the recorded path, including time, location, and elevation for each point.
* You can navigate to a route, track, waypoint, geocache, or any saved location in the device. You can use the map or the compass to navigate to your destination.

# Care and Storage

The following care and storage advice is adapted from that provided by the manufacturer[1]:

* For batteries care:

1. Reduce the backlight brightness
2. Reduce the backlight timeout
3. Use battery save mode: the screen shuts off when the backlight times out.
4. Decrease the map drawing
5. Turn off GLONASS
6. Long-Term Storage When you do not plan to use the device for several months, remove the batteries. Stored data is not lost when batteries are removed.

* Avoid chemical cleaners, solvents, and insect repellents that can damage plastic components and finishes.
* Do not store the device where prolonged exposure to extreme temperatures can occur, because it can cause permanent damage.
* The device is water resistant to IEC Standard 60529 IPX7. It can withstand accidental immersion in 1 meter of water for 30 minutes. Prolonged submersion can cause damage to the device. After submersion, be certain to wipe dry and air dry the device before using or charging.
* Thoroughly rinse the device with fresh water after exposure to chlorinated or salt water environments.
* Cleaning the Device: even small amounts of sweat or moisture can cause corrosion of the electrical contacts when connected to a charger. Corrosion can prevent charging and data transfer.

1. Wipe the device using a cloth dampened with a mild detergent solution.
2. Wipe it dry. After cleaning, allow the device to dry completely

# Troubleshooting

# Applicable and Reference Documents

[1] Garmin, “ETREX 10/10/20X/30/30X Owner’s Manual” , Sep-2019.