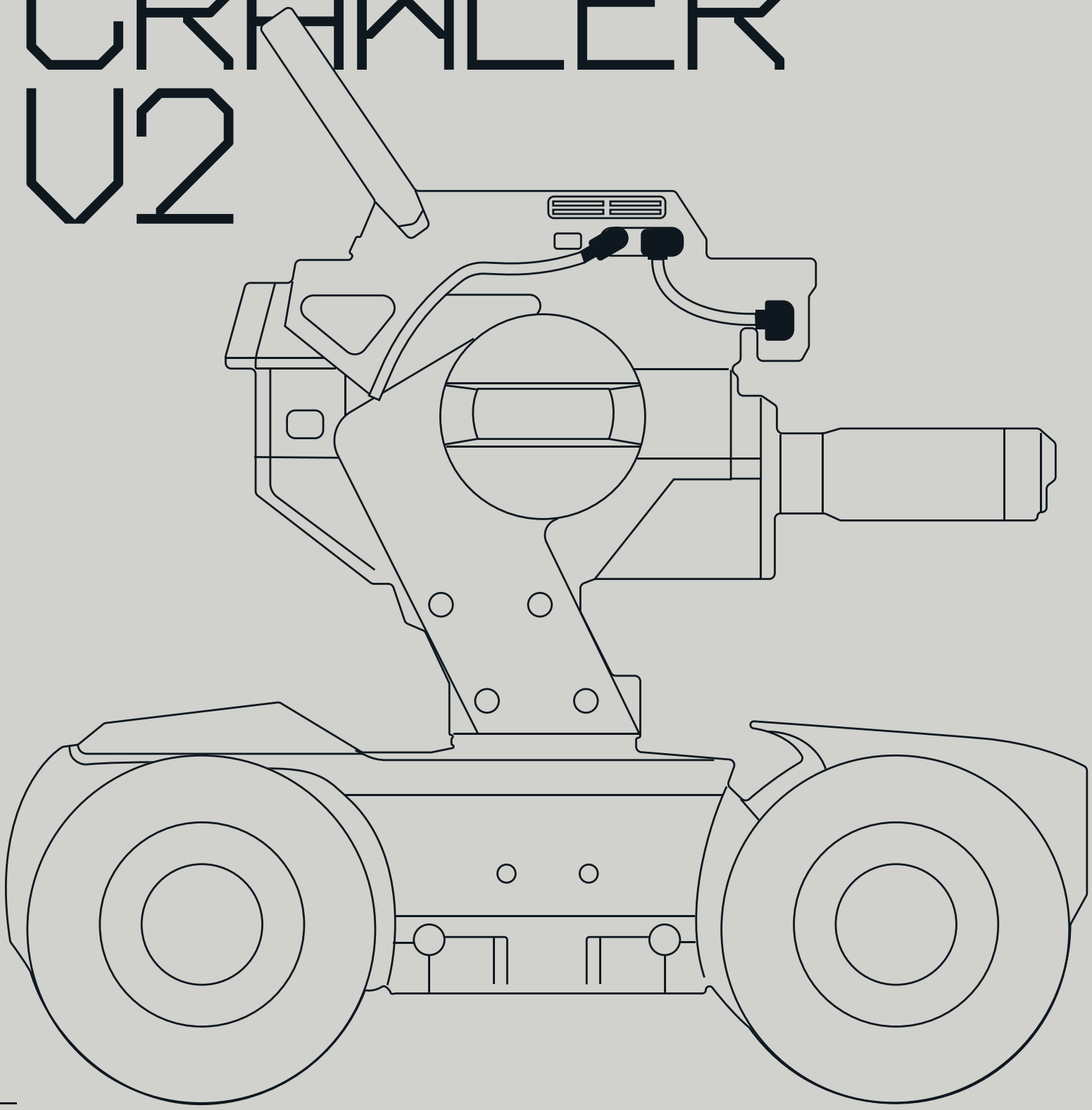
CAVE CRAWLER V2



CAVECRAWLER V2 REMOTE INSPECTION UNIT

AVOID CRASHING INTO OBJECTS AT HIGH SPEED

1 CONTENTS

1 USING THIS USER MANUAL

1. UTILIZATION OF OPERATIONAL DOCUMENTATION

The following instructional materials have been compiled to ensure optimal deployment of your CaveCrawler V2 Remote Inspection Unit:

1. Safety Protocols and Liability Waiver
2. Expedited Initialization Protocol
3. Comprehensive Operational Guidebook

Verify the completeness of all components and prepare for assembly by reviewing the CaveCrawler V2 Expedited Initialization Protocol. Consult this Comprehensive Operational Guidebook for detailed specifications and procedures. It is imperative that all instructional holo-vids be viewed in their entirety prior to unit activation.

2 CAVECRAWLER V2 OVERVIEW

2.1 OVERVIEW

The CaveCrawler V2 offers unparalleled control and an immersive exploration experience, thanks to its rugged all-terrain chassis, adaptive wheel system, and flexible camera mount. Our state-of-the-art image transmission ensures you see what the CaveCrawler sees, in real-time and crystal clear.

We've outfitted the CaveCrawler V2 with a precision laser measuring tool for accurate distance calculations. The unit's body is reinforced with impact-resistant plating, each section equipped with sensors to detect and report any collisions to the control unit.

The laser measuring tool provides pinpoint accuracy, thanks to its stabilized mounting system. The targeting assist feature gives operators a clear visual guide for precise measurements.

The control unit is the brains of the operation, integrating multiple systems including video transmission, data collection, and our proprietary TerraScript programming interface. It includes six smart modules: terrain recognition, geological marker identification, object detection, sound-based navigation, gesture control, and multi-unit coordination.

2.2 POWERING THE CAVECRAWLER

Follow these steps to bring your CaveCrawler V2 to life:

1. Locate the access panel release on the rear of the unit and press firmly to open the main compartment.
2. Insert the PowerCore into the designated energy bay.
3. Activate the PowerCore by pressing and holding the power initiation button until the indicator illuminates.
4. Secure the main compartment by closing the access panel until you hear it click into place.

Remember, your CaveCrawler V2 is a precision instrument. Treat it with care, and it'll be your eyes and ears in the tightest spots underground.

2.3 CAVECRAWLER V2 POWER SYSTEMS

Your CaveCrawler V2 harnesses cutting-edge power technology to keep it running in even the most demanding underground environments:

- PowerCore: High-density energy cells provide long-lasting power for extended missions. These rugged power units are built to withstand the rigors of subterranean exploration.
- Direct Link Option: For stationary applications or extended operations, the CaveCrawler V2 can be connected to a continuous power source via its universal power port.
- Adaptive Power Management: The CaveCrawler V2 seamlessly switches between PowerCore and direct link power, ensuring uninterrupted operation regardless of your power setup.

Power means productivity, and the CaveCrawler V2 is engineered to keep going as long as you do.

OPTIMIZING THE BATTERY

In order to fully calibrate the power, you need to connect to the device through a terminal. Use the SSH command followed by the device's IP address, in order to connect to the device.

3 MOTION CONTROLLER

3.1 INTRODUCTION

The CaveCrawler V2 chassis is a marvel of all-terrain engineering, featuring our patented OmniTread wheel system. This advanced mobility platform allows the unit to navigate the most challenging underground environments with ease.

3.2 CENTRAL CONTROL UNIT

The heart of the CaveCrawler V2 is its Advanced Control Module (ACM), a sophisticated system that orchestrates all aspects of the unit's operation. This central hub manages:

- Video transmission for real-time underground visualization
- Integration with the articulated camera mount
- Power distribution from the PowerCore
- Coordination of the impact-resistant plating
- Control of the OmniTread wheel system

The ACM incorporates our proprietary TerraNav algorithm for unparalleled subterranean navigation, an intelligent power management system, motor control protocols, and overall chassis operation oversight.

This integrated approach ensures that your CaveCrawler V2 operates as a cohesive unit, ready to tackle the challenges of underground exploration with efficiency and reliability. Trust in our engineering to keep you connected to your CaveCrawler, no matter how deep you go.

CaveCrawler V2 ACM Installation

- Connect the power and data cables to their color-coded ports on the ACM.
- Ensure the ACM is securely fastened before operation. Double-check that all screws on the rear access panel are tightened to specification.
- After any ACM reinstallation, run a full system calibration if prompted by the TerraLink app. For detailed calibration procedures, consult the "System Alignment and Calibration" section.
- When accessing the rear compartment, lift the panel gently to avoid disturbing the ACM's positioning.

Remember, a properly installed ACM is crucial for optimal CaveCrawler V2 performance. Take the time to do it right, and your unit will serve you well in the field.

3.3 OMNITREAD SYSTEM

The OmniTread wheel system is the cornerstone of the CaveCrawler V2's superior mobility in challenging underground environments. This advanced locomotion solution comprises two distinct wheel types: left-spiral and right-spiral. The CaveCrawler V2's chassis requires a set of four OmniTread wheels - two of each type.

This configuration allows for unparalleled maneuverability in tight spaces, enabling your CaveCrawler V2 to navigate even the most complex subterranean terrains with ease and precision.

3.4 SI SYSTEM

Access six SI modules via TerraLink app's Lab > GeoScript. See "Support Intelligent Systems" in your manual for examples.

> Note: SI performance may decrease if: a. Object is obstructed b. Extreme lighting (< 300 or > 10,000 lux) c. Sudden light changes d. Object blends with environment

Assess conditions before deployment for optimal SI function.

3.5 OBJECT TRACKING

The CaveCrawler V2 can identify and monitor any designated object within its field of view. This feature enhances precision in geological surveys and obstacle avoidance during subterranean navigation.

3.6 PATH TRACKING

In Survey Mode, program your CaveCrawler V2 to automatically follow ground-level markers. The unit recognizes guide lines in red, green, or blue.

> Note: The system cannot detect lines of other colors. This feature ensures efficient and precise navigation through pre-mapped underground routes.

3.7 GESTURE RECOGNITION

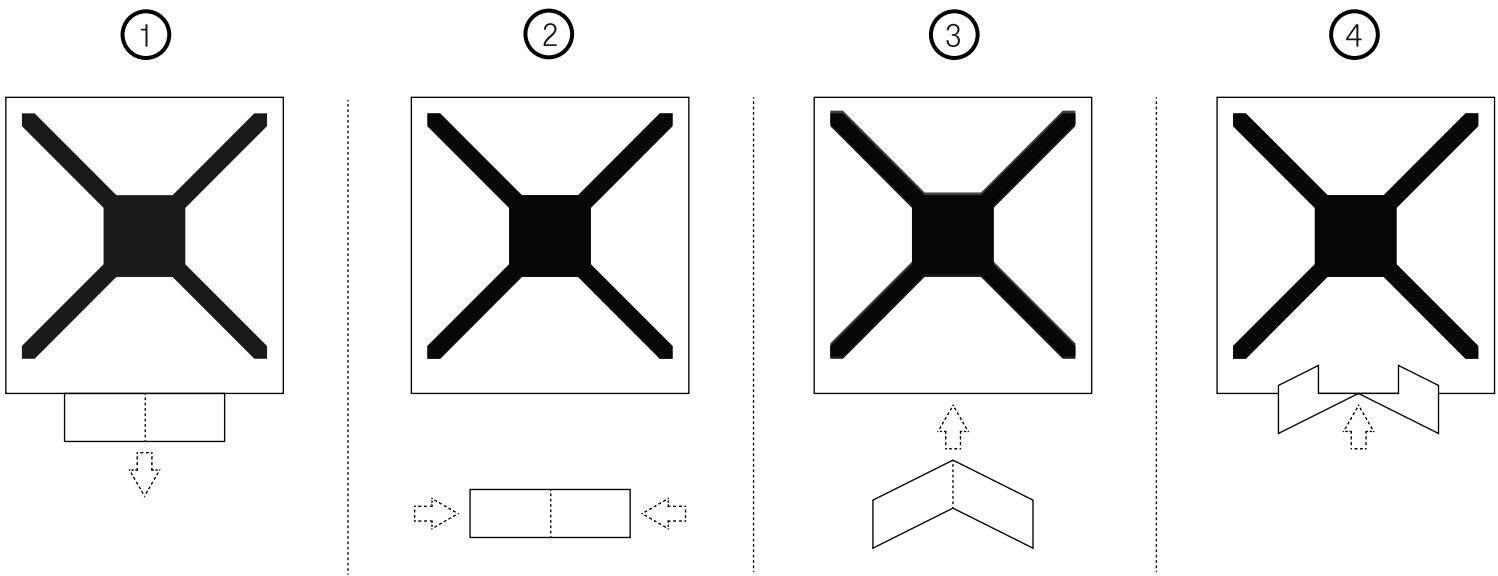
The user can program the CaveCrawler V2 to perform unique responses when identifying physical gestures.

3.8 CLAPPING RECOGNITION

The user can program the CaveCrawler V2 to perform unique actions in response to clapping. Only claps within an effective distance of 2 meters can be identified. Identified clapping sequences include two consecutive claps and three consecutive claps.

3.9 VISON MARKER RECOGNITION

Program your CaveCrawler V2 to execute specific actions when it detects approved visual markers. These include numerals, letters, and specialized symbols. Markers must be within 3 meters for reliable detection. Only official markers are compatible. For detailed marker specifications and placement guidelines, consult the documentation provided with your GeoMarker kit.



3.10 AUTONOMOUS PROGRAM

You can designate a program for autonomous execution on the CaveCrawler V2.

When disconnected from TerraLink: Initiate the program by pressing the auto-run button on the control unit. Press again to terminate.

When connected to TerraLink, autonomous mode is accessible only from: (1) TerraLink home screen (2) Solo exploration view (3) GeoLab interface.

This feature allows your CaveCrawler V2 to perform pre-programmed tasks independently, enhancing efficiency in repetitive survey operations.

3.11 ADVANCED PROGRAMMING

Access the Python interface in GeoLab for custom programming.

In the Python section, create bespoke scripts for your CaveCrawler V2. These can be set as Autonomous Programs or Custom Skills for execution in the field.
For those new to Python, our GeoScript-to-Python converter translates visual programs into Python code, providing a learning bridge. View source code to understand the underlying logic.

For comprehensive guidance, consult your CaveCrawler V2 Programming Manual.

4 OPERATING YOUR CAVECRAWLER V2

4.1 OPERATING YOUR CAVECRAWLER V2

Ensure your control unit is properly synced with the CaveCrawler V2's receiver before field deployment. For detailed syncing procedures, refer to the receiver's documentation in your operations manual.

The S-Bus port on the CaveCrawler V2's Advanced Control Module (ACM) corresponds to specific control channels. To configure your control unit's channel mapping, consult its manual and align it with the ACM's channel layout as outlined in the technical specifications.

Proper setup ensures optimal control and responsiveness during subterranean exploration missions.

4.2 CONTROL OPTIONS

The CaveCrawler V2 offers flexible control configurations using the TerraTouch Pad connected to your mobile device:

1. TerraTouch Pad with mobile device
2. TerraTouch Pad with mobile device and mouse
3. TerraTouch Pad with mobile device, mouse, and keyboard

These options allow you to tailor your control setup to your specific operational needs and preferences, ensuring efficient navigation and data collection in diverse underground environments.

4.3 TERRATOUCH PAD SETUP

Connect your mobile device to the TerraTouch Pad's data port using a standard micro USB cable (not provided).

Secure your device in the adjustable clamp. Ensure the device is oriented with its connection port facing the control sticks, as illustrated in the diagram.

Power on the TerraTouch Pad by pressing the power button. To shut down, press and hold the same button.

This configuration provides a robust, integrated control interface for your CaveCrawler V2, enhancing your ability to navigate and operate in challenging subterranean environments.

4.4 TERRATOUCH PAD BASIC OPERATIONS

When connected to your mobile device, the TerraTouch Pad's control sticks govern the CaveCrawler V2's movement: forward, reverse, and lateral. Note that chassis control via the TerraLink app is disabled in this mode.

The TerraTouch Pad's buttons activate various CaveCrawler V2 functions. These actions remain accessible through the TerraLink app interface as well, offering flexibility in operation.

This dual-control system allows for precise maneuvering in confined spaces while maintaining access to advanced functions through your mobile device.

4.5 DUAL CONTROL SYSTEM

The TerraTouch Pad's control sticks are dedicated to the CaveCrawler V2's chassis movement. For camera mount adjustments and operation of the laser measuring tool, use the TerraLink app interface.

> Note: When the TerraTouch Pad is active, chassis control via the TerraLink app is disabled.

This configuration allows for precise navigation using physical controls while maintaining access to advanced functions through your mobile device, optimizing your control over the CaveCrawler V2 in complex underground environments.

4.6 TERRATOUCH PAD AND MOUSE INTEGRATION

When your TerraTouch Pad is linked to a mobile device, you can enhance control by connecting a computer mouse. In this setup:

- TerraTouch Pad control sticks manage chassis movement
- Mouse provides additional control functions
- TerraLink app retains control over camera mount and measurement tool, but mouse takes priority

This multi-input configuration offers precise control for navigating complex terrains while allowing quick access to advanced functions, optimizing your CaveCrawler V2's performance in challenging subterranean environments.

4.7 ADVANCED CONTROL: TERRATOUCH PAD, MOUSE, AND KEYBOARD

For maximum control precision, integrate a wireless mouse and keyboard with your TerraTouch Pad setup:

1. Connect the wireless receiver to the TerraTouch Pad.
2. Chassis control: Use TerraTouch Pad sticks or keyboard (A, W, S, D keys).
3. Mouse functions: See action list below for enhanced control options.
4. TerraLink app: Retains camera mount and measurement tool control, but mouse takes priority.
5.

This tri-input system provides unparalleled control flexibility, allowing for precise navigation, efficient data collection, and rapid response to changing underground conditions. Ideal for complex exploration missions where multitasking is essential.

4.8 TERRALINK CHAT COMMAND INTERFACE

For remote collaborative control, the CaveCrawler V2 supports TerraLink Chat Commands.

To steer via TerraLink Chat: Type directional commands in the chat interface (e.g., "forward", "left", "right", "reverse"). The CaveCrawler V2 will respond to valid commands, allowing for remote operation and team coordination during complex subterranean explorations.

This feature enables unprecedented collaborative control and is ideal for multi-operator scenarios or remote guidance situations.

Commands	**Cave CrawlerV2 Action**
Forward	Go forward
Left	Go left
Right	Go right