User Manual:
Yarn Mesh TrapNode for AT520-AI

“Automate operations, remove targets, protect native species”

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1 Getting Started

The Yarn Mesh TrapNode (AT520-AI) is the frontline of the Yarn Mesh wireless sensor network. It is a rugged, solar-powered, AI-integrated predator control system that sends trap status, kill notifications, and lure levels in near real-time from remote locations—like native bush or high-country stations—directly to the customer's phone or computer (via Yarn Manager, IMS, or Faarm).

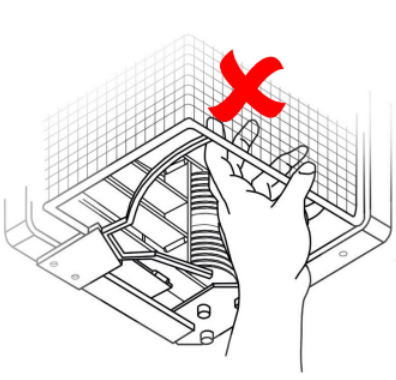
It eliminates the need for manual, time-consuming trap checks, provides immediate situational awareness across your entire network, and features on-board edge-AI for automated species classification, ensuring precision engagement and effective conservation outcomes.

2 Safety & Introduction

2.1 Important Safety Information

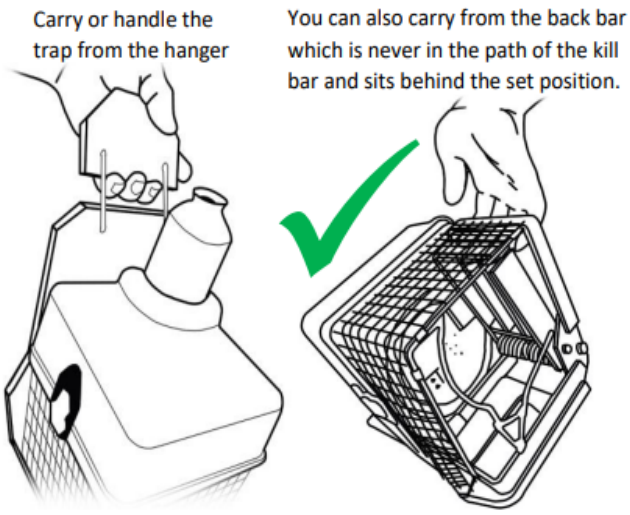
The AT520-AI is a high-power predator control device engineered for the most demanding environmental conditions. The internal kill-bar activates with significant force and near-instantaneous speed. **Complacency is the greatest risk in the field; always prioritize safety over speed.**

- **WARNING:** Never place hands or fingers inside the trap housing under any circumstances. The mechanism is designed to strike with enough force to cause severe injury.
- **Always treat the trap as armed**, even if you believe the battery is disconnected or the kill-bar is in the "down" position. Internal components can hold residual energy, and mechanical sensors can be highly sensitive.
- **Safe Handling:** Only carry the trap by the designated hanger or the back bar. These specific handling points are engineered to remain clear of the kill-bar's travel path, ensuring your safety during transport and mounting.



Even if not set, the mechanism should be treated with an adequate level of vigilance .

WARNING: NEVER PLACE A HAND OR FINGER INTO THE INSIDE OF THE TRAP UNDER ANY CIRCUMSTANCE



Always use the hanger or back bar for transport.

DANGER: Keep all limbs clear of the internal housing.

Infrared (IR) Safety The device contains infrared (IR) illumination sources used for low-light imaging. Avoid looking directly into the IR emitters at close range while the device is powered. The IR system is intended for normal outdoor operation within the enclosed trap housing and is not designed for direct visual inspection at close distances.

Battery Safety This product is powered by a rechargeable lithium-polymer battery. Do not short-circuit, puncture, crush or expose the battery to excessive heat. If the battery requires replacement, only use a battery approved by Yarn Mesh. Dispose of old batteries in accordance with local regulations.

This equipment is intended for professional installation in remote conservation environments and is not a consumer household product.

2.2 What is the TrapNode?

The Yarn Mesh TrapNode is the "brain" of your AT520-AI trap. It acts as a sophisticated communication bridge between the physical trap hardware and the Yarn Mesh wireless network. This allows for real-time reporting of critical data—such as confirmed kills, battery health, and lure levels—directly to your IMS dashboard.

Beyond reporting, the TrapNode provides the system's core intelligence. It utilizes edge-processing to detect approaching species, capture high-speed imagery, and run AI-based classification. This ensures that the trap distinguishes between target pests and non-target native species, ensuring only intended targets are engaged.

3 Getting Started - Component Checklist

Before heading into the field, ensure your kit is complete.

Item	Component	Note
1	**AT520-AI Trap**	Main housing with pre-calibrated TrapNode.
2	**Battery Pack**	Integrated power source with yellow plug.
3	**Antenna**	White high-gain antenna for mesh communication.
4	**Solar Panel & Bracket**	Ruggedized panel for remote sustainability.
5	**Bait Pouch**	Mayonnaise-based lure.

Pro Tip: Field Prep: To simplify transport, pack the antenna, solar panel bracket, and bait pouch directly under the trap lid. Secure the lid with the clips and rubber straps. This keeps all essential components in one self-contained unit ready for deployment.

Required Tools (Not Included):

- Wooden running board/ramp.
- Impact driver or drill.
- **Hex Driver Bits:** 5/16" and 3/8".
- **Smartphone:** With the **Yarn Companion App** installed.
- **Mounting Screws:** Tek Type 17 Hex Head screws are recommended.
    - **4 x 65mm Tek Screws:** For mounting the trap and solar panel.
    - **2 x 100mm Tek Screws:** For mounting the running board.
    - *Note: Standardizing on 3/8" head size for all screws is recommended for ease of maintenance.*

4 Field Installation

4.1 Mounting the Hardware

1. **Trap Location:** Select a sturdy tree with a relatively flat trunk at the mounting height to ensure a stable, flush fit.
2. **Height:** Mount the trap precisely **1.2m – 1.5m** above the ground for optimal sensor detection.
3. **The Ramp:** Secure the running board **300mm** below the trap entrance.
    - **Weka Habitats:** Mount the ramp at a **55-degree angle** to prevent interaction or unintended harm to Weka.
    - **Kiwi Habitats / General:** Mount at a minimum of **45 degrees**. (Note: While lower angles are possible, they increase non-target risks).
4. **Securing & The Rat Strap:** Place the **Rat Strap** between the ramp and the tree trunk before securing the ramp.
    - **The entry ladder:** The strap's textured surface provides critical grip for smaller predators (rats/mice), allowing them to bridge the gap into the trap.
    - **Swing Freedom:** It is vital to maintain **slack** in the Rat Strap. This allows the trap to swing freely during an interaction; this prevents predators from gaining leverage to escape or damage the housing.
    - **Stability Check:** Ensure there is no wobble in the ramp itself.

4.2 Solar Alignment

- **Orientation:** In the Southern Hemisphere, the panel must face **North**. Ensure it faces the strongest midday sun and is clear of dense canopy shadows.
- **Strain Relief:** Loop the cable through the bracket's strain relief channel before plugging it in to protect the junction box.
- **Drip Loop:** Use excess cable to create a "drip point" below the entry port to prevent rainwater from tracking into the electronics.

4.3 Powering On (Critical Sequence)

Follow this order exactly. Powering without an antenna attached can permanently damage the radio circuitry.

1. **Antenna First:** Carefully screw the white antenna onto the threaded mount until snug.
2. **Connect Battery:** Open the lid and connect the yellow keyed battery plug. If it feels resistant, re-check alignment; never use force.
3. **Solar Connection:** Plug the cable into the DC port. This requires **3-5 full turns** (push and turn) to ensure a weatherproof seal.

Important Note: Wait for Trap Reset: After connecting the battery, the AT520-AI trap will auto-reset (auto-arm), this takes approximately 2 minutes to complete. The trap may auto-fire to calibrate itself after performing the initial auto-reset, if this happens the trap will auto-reset again. Wait for the trap to complete auto-resetting before commissioning and testing with the Yarn Commissioner app as the auto-reset process prevents (successful) trap testing when the reset motor is running.

5 Operation & Maintenance

5.1 Lure Priming

1. Connect the lure pouch to the internal feed tube (ensure an airtight fit).
2. Press the **Function Button 3 times** (LED turns **Amber**).
3. **Hold the button** until lure drips onto the **centre of the ramp**.
4. **Centring:** A centred landing point ensures the lure remains accessible even if the trap shifts slightly during a catch interaction.

Pro-Tip: Lure Centring: Once the trap is mounted and the trap is hanging freely, make sure the lure lands on the centre of the ramp. This is crucial to achieving maximum trapping efficacy with the AT520-AI. If the lure does not land on the centre of the ramp adjust the trap and/or ramp position accordingly until it is properly centred.

5.2 Function Button & LED Reference

These indicators refer to the **AT520-AI trap controller**. Network and mesh status must be verified via the app.

Action	Result
1 Click	**Status Check:** LED flashes the current battery/charge state.
2 Clicks	**Test Fire:** Manually triggers kill-bar. **STAY CLEAR.**
3 Clicks	**Lure Mode:** Enables manual pump priming.
4 Clicks	**Reset:** Returns the device to autonomous Auto-Mode.

Table 1 – AT520-AI Controller Function Button

LED Colour	Status
Green (Flashing)	Armed ready to Trigger
Green (Solid)	Auto Reset Mode

Red (Flashing)	Controller Error
Red (Solid)	Manual Trigger Mode (Trap will Fire)
Amber (Solid)	Manual Bait Pump Mode (Press and Hold to pump bait)

Table 2 – AT20-AI Controller LED Status Indicator

6 Commissioning & Testing

6.1 The 30-Minute Window

The TrapNode enables Bluetooth pairing for **30 minutes** after the battery is connected. If this window expires, the Bluetooth signal will shut off. You must unplug and reconnect the battery to "wake" pairing mode for the Yarn Companion App.

6.2 Using the Yarn Companion App

Because the TrapNode is fully enclosed, all network and diagnostic status information is displayed solely via the app.

1. **Scan & Test:** Open the app and select your device ID. The app will perform an automated "Health Check."
    - **Green:** Systems healthy.
    - **Yellow/Orange:** Operational, but potential sensor degradation—check placement.
    - **Red:** Critical failure. **Do not leave the site** until the issue is resolved and the indicator turns Green.
2. **Naming Convention:** Register the device using the format: 26T-ABCD-LOCATION-####
    - **26:** Year of deployment.
    - **T:** Device type (Trap).
    - **ABCD:** Unique Customer ID.
    - **LOCATION:** Descriptive string (e.g., Gully-East).
    - **####:** Unique four-digit index (e.g., 0001).

7 Technical Specifications

7.1 Parts List

Please verify that your package contains the following items:

1. **AT520-AI AutoTrap** (x1)
2. **Antenna** (x1)
3. **Battery (blue)** (x1)
4. **Solar Panel** (x1)
5. **Solar Panel Bracket** (x1)
6. **Bait Pouch** (x1)

Figure 1 - What's in the Box: NZ AutoTraps AT520-AI (powerd by the Yarn Mesh TrapNode)

8 Regulatory and Compliance Information (Australia and New Zealand)

This device complies with the Radiocommunications Act 1992 and applicable standards administered by the Australian Communications and Media Authority (ACMA). The product is labelled with the Regulatory Compliance Mark (RCM) following registration of the Responsible Supplier.

The TrapNode RC6 has been tested as a complete end product and complies with:

- AS/NZS 4268 – Radio equipment and systems – Short range devices
- AS/NZS CISPR 32 – Electromagnetic compatibility (Class B)
- AS/NZS 2772.2 – Radiofrequency fields – Human exposure

This device complies with radiofrequency (RF) exposure limits for general public exposure as defined in AS/NZS 2772.2 and Radiation Protection Standard RPS S-1.

The device must be installed and operated with a minimum separation distance of **20 cm** between the antenna and all persons.

This equipment has been evaluated for use with the supplied external antenna only. Maximum permitted antenna gain is **5 dBi**. Substitution with higher gain or directional antennas is not permitted. Use of non-approved antennas may invalidate regulatory compliance.

Changes or modifications not expressly approved by FTP Solutions Pty Ltd may void the user's authority to operate this equipment and invalidate regulatory compliance.

Responsible Supplier:

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