

WILDLIFE MIGRATION & FIRE DETECTION SYSTEM

Programmable wide-area coverage.



PROGRAMMABLE PAN EXPANDS THE FIELD OF VIEW

A single Tura camera sweeps a user-defined sector to capture a wider view of wildlife activity.
Fire and Wildlife Detection Capable

TURA CAMERA PAN CONCEPT (Dual FOV shown)

- Single Thermal Sensor
- Optional Visible Camera
- IP6K9K for all Weather
- Tura Heated Window
- Shutterless Requires Slow Motion from Pan
- Tilt Adjustment at Installation
- QC8550: Prism AI & ISP

UP TO 180°



Programmable sweep angle
Motor + belt drive

SYSTEM HIGHLIGHTS

- Detects wildlife, fire and smoke
- Tracks movement and fire spread
- Time/date stamped events
- Filters by species or heat event
- Exports data for mapping/analysis
- Supports habitat and fire studies

TYPICAL APPLICATIONS

- Migration path studies
- Habitat utilization
- Population monitoring
- Corridor identification
- Wildfire detection
- Conservation planning

HOW IT WORKS

1

DETECT w/ Prism AI

Tura captures thermal video of the scene.



Deer Detection

2

PAN

Motor and belt sweep the camera(s) left and right.



Fire Detection

3

CONTROL

Software sets the sweep angle up to 90°.



Record

4

RECORD

8550 ECU records video

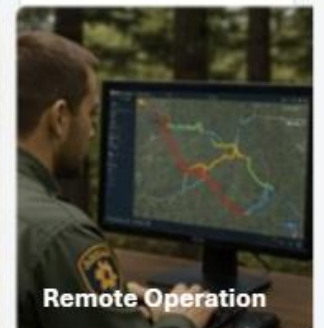


User Config

5

ANALYZE

Data supports post processing and transmit



Remote Operation

KEY BENEFIT

Wider monitoring coverage with one Tura camera and a compact, programmable, all weather pan mechanism.

Project Overview

- **Autonomous Wildlife and Fire Detection Monitoring** – Operates 24/7 to detect, track, and record animal movement and fire without human intervention.
- **Dual Cameras** – Visible and thermal coverage enables detection in daylight, darkness, fog, and low-visibility conditions.
- **AI-Based Detection & Tracking** – Automatically identifies wild fires and animals and tracks their movement through the monitored area.
- **Solar-Powered Operation** – Off-grid power system with solar charging and battery backup for remote deployments.
- **Local Data Storage** – Records images, events, timestamps, and tracking data to removable SD card storage.
- **LTE** – Cellular communication for transmitting data to central database, fire notifications. Potential for other transmission methods (mesh, etc).
- **Rugged Outdoor Design** – Weather-resistant enclosure designed for rain, snow, dust, and temperature extremes.
- **Wildlife Movement Analytics** – Captures migration paths, direction of travel, event frequency, and habitat usage patterns.
- **Low-Maintenance Deployment** – Designed for long-duration field operation with periodic data collection and system health checks.

Mechanical Engineering

- Camera coverage layout: Determine mounting height, camera angles, field of view, overlap, and target detection area.
 - We probably want to design a pan function for this system, or at least do a trade study, this will include slip ring design with EEs
- Camera mounts: Design rigid, adjustable brackets with locking features and repeatable alignment.
- Enclosure design: Package the ECU, battery, power electronics, connectors, wiring, and removable SD card.
- Environmental sealing: Select gaskets, sealed connectors, cable glands, vents, and drainage features for outdoor operation.
- Thermal management: Analyze internal heat, solar loading, cold start, condensation, and battery temperature limits.
- Pole and foundation: Size the pole, clamps, base, anchors, or foundation for system weight, wind, and overturning loads (optional, this will be user dependent)
- Solar-panel mount: Design an adjustable, wind-resistant bracket with suitable orientation and protected cable routing.
- Materials and corrosion: Select UV-resistant materials, coatings, fasteners, gaskets, and galvanically compatible interfaces.
- Manufacturing documentation: Produce CAD, assembly drawings, bracket drawings, tolerances, torque requirements, and mechanical BOM.
- Mechanical testing: Verify alignment, stiffness, wind loading, sealing, temperature performance, vibration, installation, and serviceability.

Electrical Engineering

- System architecture: Define connections among the two thermal cameras, ADK 8550 ECU, battery, solar panel, charge controller, and SD card.
 - Slip ring connection design with EE'sif pan feature is needed
- Power budget: Measure typical, peak, startup, daytime, and nighttime loads, including conversion losses and design margin.
- Solar and battery sizing: Select panel wattage, battery chemistry and capacity, charge controller, and required sunless autonomy.
- Power distribution: Design voltage conversion, fusing, filtering, reverse-polarity protection, surge protection, and low-battery shutdown.
- Camera interfaces: Configure both camera streams, video format, frame rate, synchronization, timestamps, gain, AGC, and NUC/FFC behavior.
- Detection and tracking: Configure animal detection, classification, confidence thresholds, track IDs, direction, speed, and event triggers.
- Data storage: Define recording format, event metadata, SD-card capacity, file rollover, missing/full-card behavior, and power-loss protection.
- System monitoring: Measure battery, solar input, temperatures, camera status, available storage, uptime, faults, and tamper or water intrusion.
- Harness and firmware: Produce sealed cable assemblies, connector pinouts, startup control, watchdog recovery, fault logging, and maintenance access.
- Electrical testing: Verify runtime, charging, startup current, brownout recovery, dual-camera recording, data integrity, thermal performance, and outdoor operation.

Software Engineering – (most of this is existing data that we have from FLIR Prism software)

- Animal Detection AI: Develop and tune the deer/elk detection algorithm using thermal imagery
- Object Tracking: Track animals across multiple frames and maintain a unique track ID.
- Data Logging: Record detections, timestamps, track data, and system health information to the SD card.
- User Interface & Analysis Tools: Create a PC application or dashboard to visualize detections, tracks, heat maps, and migration paths (not existing, stretch goal)
- System Control & Health Monitoring: Manage startup, watchdog recovery, camera status, storage status, battery monitoring, fault logging, and low-power operation.