



Stealth Wildlife Camera Case Study

Customer

Wildlife Conservation Society, India.(WCS)

WCS Global Mission

The Wildlife Conservation Society (www.wcs.org) saves wildlife and wild places worldwide. It does so through science, conservation, education and the management of the world's largest system of urban wildlife parks, led by the flagship Bronx Zoo. Together these activities change attitudes towards nature and help people imagine wildlife and humans living in harmony. WCS is committed to this mission because it is essential to the integrity of life on earth. Wildlife Conservation Society has furthered its global mission in India since 1988 through activities of its staff and partners.

WCS India



Wildlife Conservation Society-India is a national not-for profit organization registered in 2011. However, its roots go back to 1963, to the first-ever scientific study of wild tigers by Dr. George Schaller. Following his footsteps, a quarter century later, WCS scientist Dr. Ullas Karanth initiated the first detailed ecological study of tigers in India employing radio telemetry at Nagarahole, Karnataka.

Project Scope/Business Need

- Design and develop a stealth camera trap that will be able to automatically detect the presence of wild animals (specifically tigers in this context) capture images in day and night modes.
- Device be installed in the forest and operating in extreme weather conditions
- The captured images will be run through a pattern recognition software to uniquely identify the tiger for animal census.

Technical Challenges

- Camera shall operate in stealth mode – no visible/audible indication to animals or humans
- Device shall automatically operate in two modes such as Day Mode and Night mode depending on the intensity of ambient light around the device.
- Capture and storage of high quality images and videos in day and night operations.
- Intelligent Power management and improved power backup for long operation without having to replace battery
- Concealed packaging for protection against extreme weathers.

Avench Systems' Solution

1. *SoC and microcontrollers*

The Camera is implemented around DaVinci DM365 SoC from Texas Instruments. This ARM9-based DM365 device offers speeds upto 300MHz and supports production-qualified H.264, MPEG-4, MPEG-2, MJPEG and VC1/WMV9 codecs making it ideal for the camera development.

MSP430 series microcontrollers were chosen for RTC, PIR sensing, IRDa communication, Battery monitoring, times tamping and system management. These are famous for their excellent low power operation.

The Linux OS was optimized to boot in less than two seconds enabling the camera to capture the target in time.

The standby power consumption of camera is less than 50uA. The camera uses Eight AA size batteries to power the unit for taking more than 2500captures for three weeks.

2. *Flash and ambient light sensing*

940nm IRED (Infra-Red emitting diodes) were chosen for the flash for their brilliant stealth operation. Flash timing and duration are precisely optimised for long battery life. Ambient light sensor and IRDa communication device are seamlessly integrated to the flash module. IRDa communication allows the forest rangers to collect the data from camera without opening the module.

3. *PIR sensing*

PIR sensors are equipped for activating the camera and trigger a capture upon detecting a movement in the field of camera. 2 PIR sensors were strategically placed under cut filters ensuring wide angle coverage.

4. *Lens and CCD module*

Miniature Lens module with f/1.4 aperture and 50mm fixed focal length provides ample coverage of FoV (field of Vision) of the camera. MT9P031I12STC image sensor from Aptina provides exceptional image quality with superior colour accuracy, low-light sensitivity, and low noise level. This cost-effective CMOS imaging solution enables high speed image capture capabilities, and includes variable functions, including gain, frame rate, and exposure while maintaining low power consumption.

5. *Storage and IO*

The camera supported SD card for storing image and camera setting. USB2.0 is cable provided with the camera to copy images to external device. Membrane keys were provided for user control and configuring the camera unit.

6. *Configurable parameters*

Camera is provided with a custom application for generating custom configuration file. Typical configuration parameters are day mode, night mode, file format, shutter speed, delays and other image parameters.

7. *Meta Data*

Every captured image will be stamped with meta data information including date-time, camera name, location information and other camera parameters. Any other information which is critical in wildlife analysis and animal tracking can be added to the the meta data while customizing the solution.

Product Features:

- 5MP Color sensor with Night Vision
- Invisible IR flash for stealth operation
- Battery Life : 2 weeks or 2000 Captures
- High quality images in night mode to enable signal processing for tiger identification
- Motion activated camera trigger
- Cost effective solution compared to the available products in the market

Sample images from Field

