



## A Microvideo Camera for Inspecting Nests

Study of breeding birds often requires periodic monitoring of nests. Biologists have used pole-mounted mirrors to examine the contents of overhead noncavity or cupped nests. A mirror attached to the end of a pole is raised above the nest where the image reflected in the mirror reveals the contents of the nest. As the distance to the mirror increases, however, the reflected image becomes more difficult to discern; for higher nests this becomes an obvious problem. Dense vegetative cover associated with some nests can make mirrors impractical. We use microvideo cameras for nest monitoring in our studies of birds nesting in bottomland hardwood forests. These small, lightweight, rugged units are efficient for inspecting nests.

### Design of Microvideo Camera

We attach a microvideo camera to a fiberglass pole extendible to 13.6 m (Crain Ent. model number MR-STD-13.6). The video image is transmitted to a portable hand-held monitor at ground level. Both camera and monitor are powered by a small rechargeable 7.2-V battery (typically found in hobby shops). We mount the camera to a 20-cm length of 1.25-cm diameter flexible copper tubing with two

large rubber bands and attach the tubing to the end of the pole with hose clamps so that approximately half of its length extends beyond the pole. The flexible tubing allows the camera to be easily turned in any direction.

The camera is a SuperCircuits model PC-3 (7 cm [H] × 4.6 cm [W] × 2.3 cm [D] and weighs 37.5 g). The camera has a minimum focal length of 15.25 cm (but may be adjusted to shorter lengths), a horizontal resolution of 240 lines, and is operable under light conditions between 2 and 100,000 lux. The PC-3 is black and white, but more expensive color models are available. The monitor is an LCD Citizen M329 Mark II. The screen size is 57.1 × 42.6 mm with 94,608 pixels. It is 80 mm (H) × 91 mm (W) × 27.1 mm (D) and weighs approximately 130 g. Both monitor and camera are wired with plug-in connections that hook to the battery source. We use a Tandy 7.2-V, 1200-mAh rechargeable Ni-Cad battery pack (Tandy cat. no. 23-230A) that provides over 1 h of use. It is compact (13 cm [L] × 5 cm [W] × 2 cm [D]), lightweight (315 g), and easily carried in the field. A slightly larger 8.6-V battery will power the system for about 3.5 h.

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The camera at the top of the extendible pole is connected to the monitor and battery with flexible wire. We recommend multistranded wire that can withstand the bending and unbending associated with operation of the unit. We coil the wiring between two pegs mounted on the bottom section of the pole. The total cost was approximately \$760. The pole cost \$320, the camera was \$210, the monitor was \$195, and the battery cost \$14. The rest was for miscellaneous wiring.

### **Field Operation**

One observer raises the camera into position above the nest while a second observer uncoils the wire to the camera and views the monitor. After observing the contents, the process is simply reversed to lower the camera. We used this system to monitor nests as high as 13 m in bottomland hardwood forests in Louisiana. The response of the birds to the camera was minimal, and sometimes the birds had to be flushed from the nest to view the contents. Use of mirrors usually resulted in flushed birds that sometimes attacked the mirror. The weight of the camera was much less than the weight of the mirrors we have used. Use of mirrors with the higher nests made it difficult to control the

mirror. The camera provided the option of videotaping the nest contents for further study and documentation.

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