

## FIELD RESEARCH ON WILD BIRDS USING INSTRUMENTATION

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Ringed birds for scientific purposes was started in 1899 by Danish school-teacher Christian Mortensen. This quickly evolved internationally, and was a dominating research and monitoring tool for almost a century. In the last couple of decades, marking and the following of individual birds has developed along with the miniaturization of electronic devices. VHF radio transmitters for birds were developed in the late 1970s/early 80s, and satellite transmitters in the late 80s/early 90s. VHF transmitters have become tiny, but satellite-based research on birds is currently restricted by their size and weight to relatively large species, but miniaturization development makes many smaller species available at a steady rate. The smallest available units now weigh 9 grams, and prototypes down to 5 g are being tested. Battery power was long the main limiting factor, but small solar panels present a solution to this problem. There are mainly four types of satellite transmitters for birds; Argos PTTs, Argos/GPS PTTs, archival GPS and GPS/GSM. The use of GPS units in connection with the SMS service gives promise for future tag development, but at present they are only available for very large birds. Archival tags on birds' legs is a light-weight and cheap alternative for mapping large-scale movements and behaviour of birds that can be recaptured at a predictable rate for tag recovery. An overview of studies using telemetry on birds is presented, and positive and negative effects are discussed. Some examples of NINA's use of these technologies in research on birds are presented.