

OPERATIONAL AND SCIENTIFIC NOTES

USE OF GLOBAL POSITIONING NAVIGATIONAL SYSTEMS IN MOSQUITO CONTROL

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ABSTRACT. The use of a global positioning navigational system (G.P.S.) as a navigational tool to identify "no spray" and specialized treatment sites during annual spraying operations of Edmonton's mosquito abatement program is discussed.

The city of Edmonton annually provides mosquito larval control over a 1,720 km² area, treating up to 30,000+ ha of water annually. Edmonton is located in the center of Alberta where typical prairie pot and kettle topography prevails. *Aedes vexans* (Meigen) is our principal pest species, however in some years high populations of *Aedes spencerii* (Theobald), *Aedes dorsalis* (Meigen), *Aedes euedes* Howard, Dyar, and Knab, and *Aedes excrucians* (Walker) are also found. When larviciding is required, most of the area is

treated aerially using as many as 6 helicopters equipped with dry granular seeders that apply granular formulations of Dursban® and *Bacillus thuringiensis* (H-14) (*B.t.i.*).

With increasing public concern and potential legal action from inappropriate pesticide application, the city began "flagging" no spray, restricted application sites such as apiaries, and specific chemical-use sites on its aerial spray maps. The growing number of such sites along with the difficulties in manually locating the sites

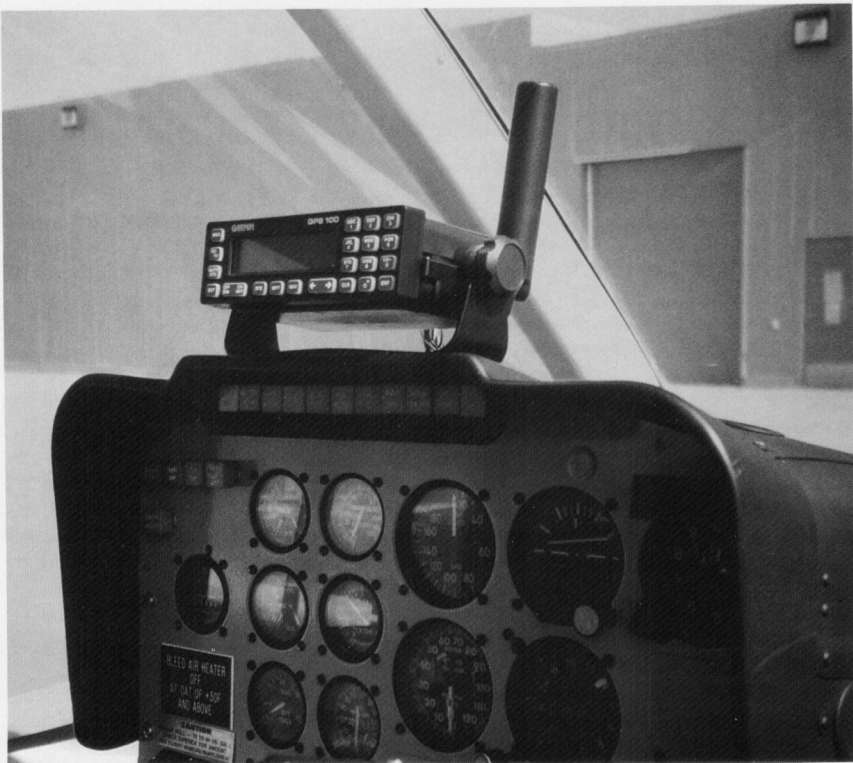


Fig. 1. A global positioning navigational system mounted on the slant panel of a Bell 206 Jet Ranger helicopter.

from the air increased the risk of an accidental treatment. The desire for a more foolproof method led us to look at the use of global positioning navigational system (G.P.S.) technology.

Global positioning navigational systems or G.P.S.s determine position by measuring the distance from a group of satellites in space, which act as precise reference points. This type of satellite navigation is not affected by weather or aircraft-induced interferences and provides quick and very accurate determination of location. Developed by the U.S. Military, the G.P.S. is now being used as a marine and aviation navigational aid. There are several manufacturers that currently market G.P.S. receivers. The units that the city of Edmonton uses were produced by Garmin International Incorporated located in Lenexa, KS, and were purchased at a cost of approximately \$2,000.00.

The units used by the city have the capacity to store up to 250 locations or waypoints. Waypoints may be selected by an identifier, plain language name, or a city location that we have chosen. The receiver stores this information along with the site's longitude and latitude. The system has a signal alert that warns the pilot that he is in the vicinity of a designated area and provides a coded display as to its type and its range and bearing in proximity to the flight path of the aircraft. The receiver also allows us to enter a radius around a specific waypoint so that the

pilot is prewarned of the site before he enters its airspace. The units are accurate to within about 15 m of a waypoint. Information stored in the receivers can be downloaded or uploaded into a computer for permanent record keeping or to enter new sites as they are received.

Individual receivers are compact and have been designed for both portable and fixed operations. They are easily mounted on any type of fixed wing or rotary aircraft. Our units were mounted on the slant panel of our Bell 206 Jet Ranger and Hiller UH12E helicopters and powered from the electrical system of each aircraft (Fig. 1). For hand-held operations, the receivers were powered by rechargeable battery packs that were included with each unit at the time of purchase.

We have used the G.P.S. for 2 years and found it helps take the guesswork out of spotting areas such as dairy, fur, and poultry farms, apiaries, environmentally sensitive areas, or other high risk sites (i.e., the human error factor is significantly reduced). This greatly assists in reducing accidental spraying and the potential for litigation for damage/loss claims due to chemical trespass. It has also become a useful tool for training new pilots who are unfamiliar with our program. Our mosquito control program is considering the purchase of additional units for its ground-based operations to record similar sites and to determine route lists.