

Transmitters for Simpro

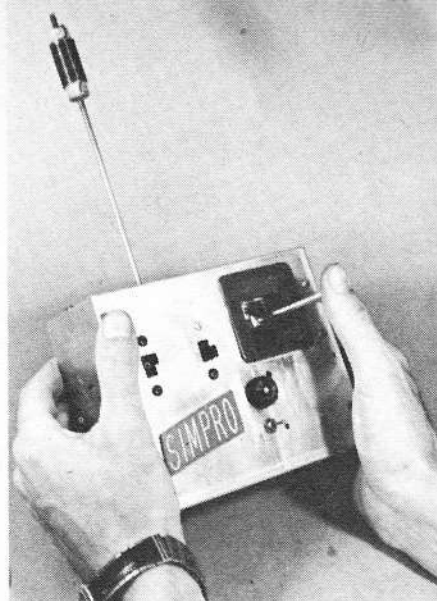
The airborne half of the dual-proportional Simpro system was presented in the January issue. There are many commercial transmitters which may be used with the system after a few easy adjustments to the pulser as described here.

By far the most important feature of the Simpro system is its simplicity plus the fact that it can be assembled with many components already in use and easily obtained at hobby shops. It is based on any single-channel relay set to which is added one more relay, two servos and a pulser to the transmitter. For proper operation the transmitter and receiver must both be capable of following fairly high pulse rates while maintaining the pulse width symmetry. Some older pulsers could not keep an accurate pulse width while varying their pulse rates and vice versa.

As the photographs illustrate, most modern transmitters can be set up with the pulsers now available to give excellent results. Also, most of the commercial Galloping Ghost transmitters can have their pulse rates increased for the Simpro system. This usually involves only a change of one resistor or repositioning of the rate control potentiometer.

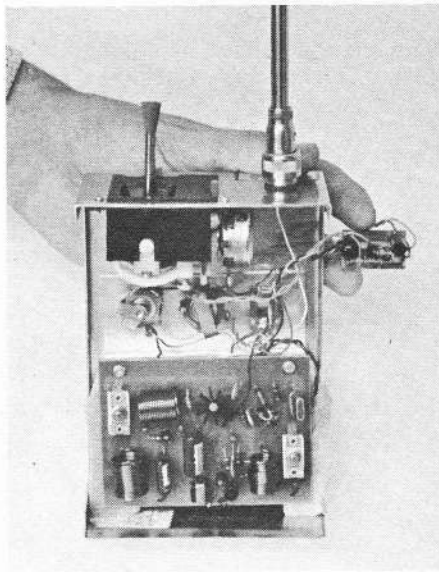
The transmitter originally used during the development of the system re-

quires critical and difficult adjustments as well as some electronic gymnastics and is not recommended as part of the project. Briefly, to operate the Citizen-Ship transmitter it was necessary to use

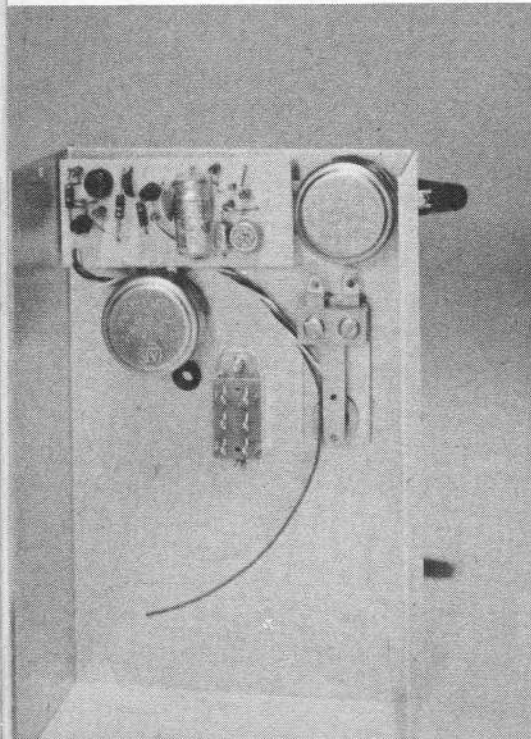


Robelen's original Simpro transmitter.

Below: Homemade Simpro Kraft transmitter using top-mounted Bonner stick.



Below: The popular Mule Mark II transmitter can be equipped with the Controlaire ADD-ON pulser.



a pulser directly operating a relay which, in turn, operated the switch or contacts that operated the transmitter. This set up was necessary because of the polarity of the voltage reference of the transmitters. However, the Citizen-Ship transmitter was originally chosen because of its very clean and high-percentage modulation. It puts out less than 100 mw but its good modulation allows fine range with a carefully tuned receiver.

The following transmitters have been used with Simpro and are highly recommended. Min-X Pulsemite, Airtrol CHD I, Controlaire Galloping Ghost Tx., and the ACE Jansson Tx.

Here are a few things to look out for in setting up any transmitter for use with Simpro. First, the pulse width variation must not be so wide that up elevator occurs (Continued on page 56)

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at extreme rudder stick position. This is cured by either physical stops on the transmitter stick or by reducing the value of the potentiometer to give less width change with a given stick movement. Second, the rate variation from up to down should solidly move the elevator servo to full up or full down. Too much rate change will either cause go-around of the servo or just unnecessary relay pulsing. Also, if the receiver seems not to be able to follow the high rate pulsing at full down movement, find the receiver's comfortable highest rate and then readjust the entire system to use this as down elevator, by lightening the rate relay spring tension or increasing the value of the rate capacitor. The Simpro system can be set up with capacitor values between 30 mf to 120 mf in different elevator neutrals. As a rule of thumb—increasing the capacitance or increasing the applied voltage lowers the pulse rate for neutral.

The Simpro system uses a capacitance that offers the least servo dither and is within the rate following ability of the

SH-100, and allows solid elevator relay action. It is possible to set up the rate relay for lower rates by lightening the relay spring so much that the relay will not drop out firmly and hence will be sensitive to vibration.

The Controlaire Mule transmitter shown is equipped with a pulser that is now available from World Engines as a mod kit. It is the same pulser that is used in the Ghost transmitter. When setting up this pulser for Simpro you might have to add stops to the sticks to limit the width and rate changes.

The Kraft transmitter shown is a home-made modification using a Bonner stick assembly with an ACE commander 9-volt pulser set up with pots for rate-width pulsing. After relocating the antenna to the side of the top of the case and reversing the PC board on its mount you can cut out the necessary hole in the case top for the Bonner stick. An additional hole must be cut for the pot case to protrude from the front of the case. The pulser is wrapped in sponge and stuffed in the case where convenient. The advantage of this transmitter layout is that, with the transmitter held as shown, it provides a comfortable position for balancing the antenna's weight and also a very relaxed position for operating the control stick. The batteries for the unit are behind the PC board.