LATEST DEVELOPMENT IN RAYDIST FOR PRECISE POSITION LOCATION IN MARINE NAVIGATION, HYDROGRAPHY, DREDGING AND ELECTRONIC SURVEYING

Simplified Raydist System Allows Highly Accurate Position Location to be Plotted on a Chart or Boat Sheet in Less Than 30 Seconds (No Hyperbolic Computations Required)

Raydist Operates in Hazy and Foggy Conditions

Hastings instrument Company, Inc. Hampton, Virginia.

At the time of our last contact we had three types of Raydist Systems. The type R range equipment, as you know, has been used for speed trials on the S.S. United States and on a number of other vessels. Type E Hyperbolic Raydist has been used for a number of surveying problems, including the use by the Portuguese and the Bahama Survey, with which you are already familiar. Type N Hyperbolic Raydist, which is a moving receiver version of the hyperbolic system, has been in operation very successfully in the Gulf of Mexico for several years. Now we have our newest system, which we have designated as Type ER, as it represents a happy marriage of the Type E and the Type R systems.

The Type ER Raydist combines one range measurement with one or more hyperbolic measurements to give effectively two or three-dimensional range measurements with fewer frequencies and with less equipment than would be required for using two or three Type R range equipments. Further information concerning the Type ER System is attached.

All of these forms of Raydist can be used for hydrographic surveying. The information concerning the number of parts in which the equipment may be broken down for transportation, the weights and sizes of parts are shown in the attached tabulation.

Information concerning antennae and towers is not presented as these will vary from one job to the next. For measurements of short distances, simple lightweight whips are sometimes used, and for surveys of longer distances we at times use the lightweight aluminum sectional towers.

Operation of the system requires setting out the relay stations and turning them on ; they may then be left unattended during the day ; and, in fact, where AC power is available they have been on some occasions left unattended for days and weeks at a time. One person at the master station can operate the equipment there, thus it can be seen that one to three people can normally operate a two-dimensional system. For a major survey project such as the Bahama Survey, six or seven are desirable ; however, in this operation you will note that we were continually moving from one site to another.

The scale of prices for this equipment will vary with the systems used, the amount of power, and the amount of accessory equipment. A 10 Watt Type E Two-Dimensional System sells for less than $ 35,000.00.

The latest development in Raydist Systems, the new two-dimensional range system, furnishes precise, accurate position location in a few seconds by swinging two compas arcs. No hyperbolic computations are required and the plotting of points may be perfomed on maps of any scale.

This simplified plotting procedure (no hyperbolic overlays or special charts required) will save considerable time and money in many navigation and hydrographic, dredging and surveying operations.

Raydist is unaffected by weather and can be operated during hazy and foggy conditions where optical means are ineffective. This system guarantees continued uninterrupted operations with a corresponding high production rate at very low cost.

The equipment is extremely lightweight and portable and requires very little installation time at only *two* shore relay sites. For each Range Relay Station the total weight of all units, including antennas, is less than 150 lbs., the heaviest single item weighing 61 lbs.

The apparatus, including antennas, at the Hyperbolic Relay Station weighs less than 90 lbs., with the main item weighing 66 lbs.

The total weight of the apparatus on the boat is less than 400 lbs. The master station electronic equipment weighs 94 lbs. and in volume is less than 3.6 cu. ft. The power supply for the master station weighs 124 lbs. and is less than 1.75 cu. ft. in volume. The phase indicator weighs 20 lbs., the recorder, including the power unit, weighs 51 lbs., and the transmitter, including the antenna loading unit, weighs 58 lbs.

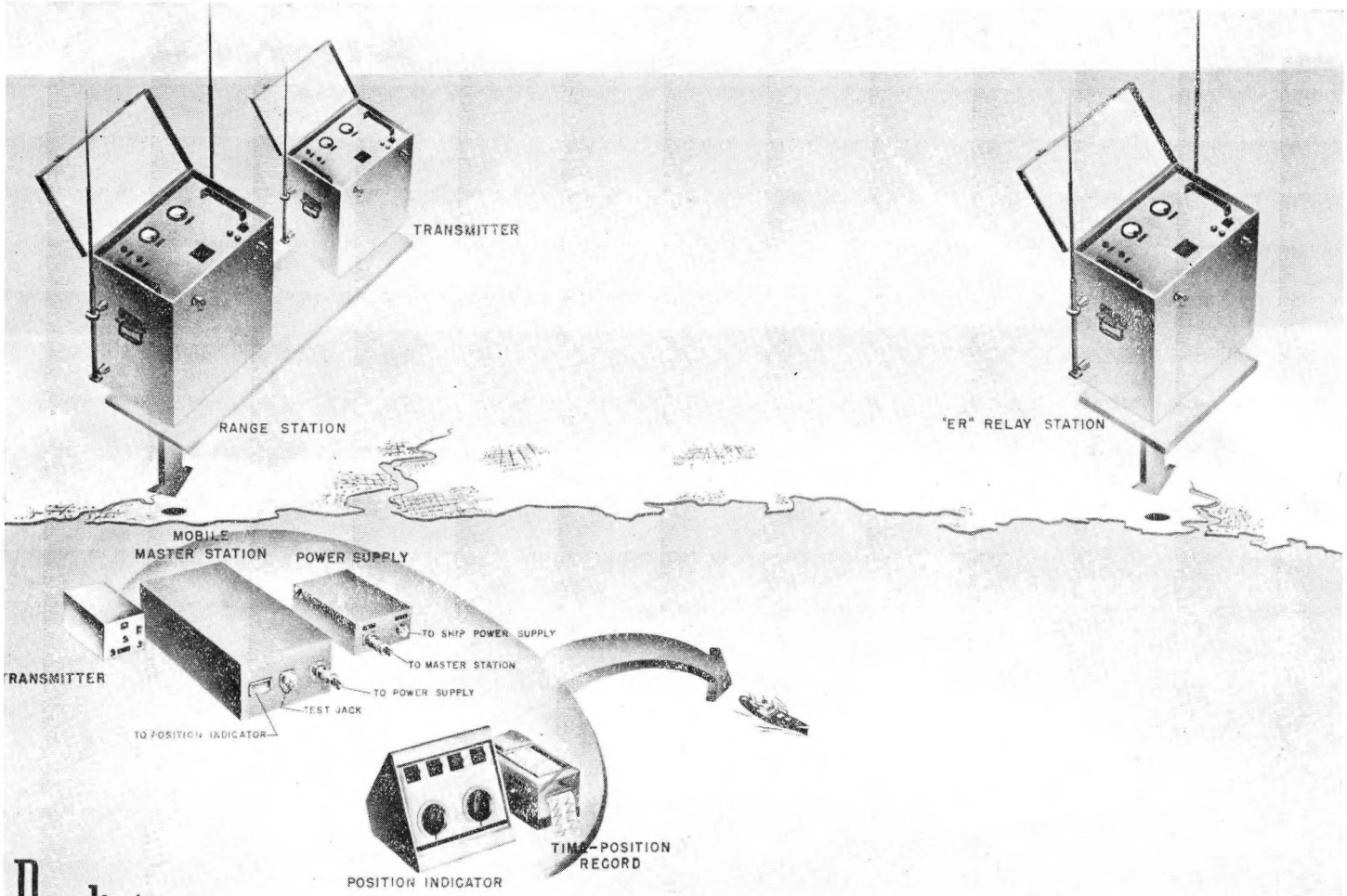
All of the equipment is operated from a 110-V A.C., 60 c.p.s. power source. The miscellaneous antennas in the system are of the light and portable whip antenna type and the length of the longest antenna section when disassembled is 10 feet.

Figure 1 illustrated a typical configuration for the 2-dimensional system and shows the layout of the equipment on the boat, at the range station, and at the hyperbolic relay station on shore.

The mobile transmitter and the master station are usually installed on board ship to provide indication and position location in the vessel. In addition, the master station may be located at a fixed point on the shore and the range relay placed on the vessel to indicate the position of the vessel on the shore. The equipment is lightweight and portable and may be used either way depending on the application.

10 WATT TYPE « R » EQUIPMENT

Phase Indicator	10″ × 9 1/2″ × 10″	Wt. 15 lbs.	1 Reqd.
Master Station	30″ × 17 1/4″ × 10″	Wt. 90 lbs.	1 Reqd.
Power 110 VT AC 250 Watt.			
Transmitter	2F — 11 1/2″ × 17″ × 15″	Wt. 45 lbs.	1 Reqd.
Power 110 VT AC 95 Watt.			
Transmitter	F — 11 1/2″ × 17″ × 15″	Wt. 45 lbs.	1 Reqd.
Power 110 VT AC 95 Watt or Dynamotor.			



Raydist TYPE "ER" SYSTEM

DESIGNED AND MANUFACTURED BY HASTINGS INSTRUMENT COMPANY, INC.
HAMPTON, VIRGINIA

Relay Station ..... 11 1/2" × 17" × 20 5/8" Wt. 61 lbs. 1 Reqd.
Power 110 VT AC 195 Watt.

Recorder ..... 7" × 15" × 7" Wt. 22 lbs. 1 Reqd.
Power 110 VT AC 40 Watt.

Recorder Power unit ..... 8" × 17 1/4" × 8" Wt. 30 lbs. 1 Reqd.
Power 110 VT AC 150 Watt.
Suitable Antennae.

10 WATT TYPE « E » EQUIPMENT (TWO-DIMENSION)

Phase Indicator ..... 14" × 9 1/2" × 11" Wt. 20 lbs. 1 Reqd.

Master Station ..... 35" × 17 1/4" × 10" Wt. 90 lbs. 1 Reqd.

Power Unit ..... 16 3/4" × 17 1/4" × 10" Wt. 124 lbs. 1 Reqd.
Power 110 VT AC 500 Watt.

Mobile Transmitter .. 10 Watt 14" × 9" × 9 1/2" Wt. 18 lbs. 1 Reqd.
Power 6 VT DC 72 Watt.

Reference Transmitter 10 Watt 14" × 9" × 9 1/2" Wt. 22 lbs. 1 Reqd.
Power 110 VT AC 66 Watt.

Relay Stations 10 Watt 11 1/2" × 20" × 20 5/8" Wt. 61 lbs. 1 Reqd.
Power 110 VT AC 195 Watt.

Recorder ..... Dual Channel 7" × 15" × 7" Wt. 22 lbs. 1 Reqd.
Power 110 VT AC 40 Watt.

Recorder Power Unit ..... 8" × 17 1/4" × 8" Wt. 30 lbs. 1 Reqd.
Power 110 VT AC 150 Watt.
Suitable Antennae.

100 WATT TYPE « N » EQUIPMENT

Phase Indicator ..... 14" × 9 1/2" × 11" Wt. 20 lbs. 1 Reqd.

Master Station ..... 39" × 17 1/4" × 10" Wt. 115 lbs. 1 Reqd.

Power Unit ..... 16 3/4" × 17 1/4" × 10" Wt. 124 lbs. 1 Reqd.
Power 110 VT AC 500 Watt.

C.W. Trans. 100 Wt. 11 1/2" × 17" × 26 5/8" Wt. 81 lbs. 1 Reqd.
Power 110 VT AC 330 Watt.

A.M. Trans. 100 Wt. 11 1/2" × 17" × 26 5/8" Wt. 81 lbs. 1 Reqd.
Power 110 VT AC 330 Watt.

Modulator . 100 Wt. 11 1/2" × 17" × 26 5/8" Wt. 81 lbs. 1 Reqd.
Power 110 VT AC 350 Watt.

Relay Station ..... 20" × 17 1/4" × 10" Wt. 44 lbs. 1 Reqd.
Power 110 VT AC 150 Watt.
Suitable Antennae.

10 WATT TYPE « E-R » EQUIPMENT (TWO-DIMENSION)

Phase Indicator	14″ × 9 1/2″ × 11″	Wt. 20 lbs.	1 Reqd.
Master Station	35″ × 17 1/4″ × 10″	Wt. 94 lbs.	1 Reqd.
Power Unit.	16 3/4″ × 17 1/4″ × 10″	Wt. 124 lbs.	1 Reqd.
Power 110 VT AC 500 Watt.			
Transmitter (2F)	11 1/2″ × 17″ × 15″	Wt. 45 lbs.	1 Reqd.
Power 110 VT AC 95 Watt.			
Transmitter (F)	11 1/2″ × 17″ × 15″	Wt. 45 lbs.	1 Reqd.
Power 110 VT AC 95 Watt or Dynamotor.			
« R » Relay Station ..	11 1/2″ × 17″ × 20 5/8″	Wt. 61 lbs.	1 Reqd.
Power 110 VT AC 195 Watt.			
« ER » Relay Station ..	11 1/2″ × 17″ × 20 5/8″	Wt. 63 lbs.	1 Reqd.
Power 110 VT AC 195 Watt.			
Recorder	7″ × 15″ × 7″	Wt. 22 lbs.	1 Reqd.
Power 110 VT AC 40 Watt.			
Recorder Power Unit	8″ × 17 1/4″ × 8″	Wt. 30 lbs.	1 Reqd.
Power 110 VT AC 150 Watt.			

Suitable Antennae.