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AUTOMATED CONTROL SYSTEM RADAR WORK

A considerable attention is now being paid to multipositional radar stations (MRS) with equidistant flat digital antenna arrays (EFDAA). MRS together with EFDAA is a multichannel analyzer of radar situation in the MRS activity area [1, 2]. The multipositional system is built using several MRS with EFDAA and special algorithms to measure parameters of signals reflected from an air target (AT). EFDAA is a high frequent (HF) information and control device, which determines the amplitude and phase of the echo signal from any direction. So EFDAA can be considered as a digital HF amplifier (DHFA) in a multipositional system (MPS) of the determination of AT coordinates.

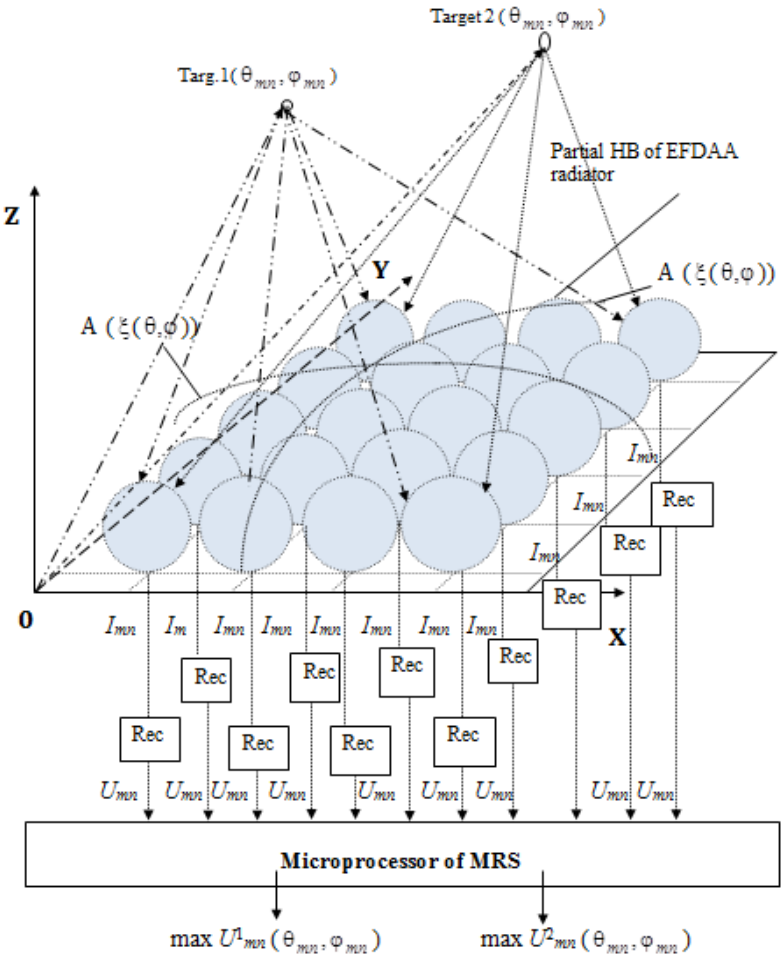

Fig. 1 EFDAA-DHFA is in the mode of MRS on reception (fragment)

Purpose of the study. The purpose of this research is the formalization of the algorithm of angular coordinate measurement of air objects in radar multipositional information and control systems when applying digital highly frequent amplifier and automatic monitoring of the angular distribution of the field radiation phase component of EFDAA-DHFA.

The research method. To achieve this goal it is necessary to solve the following tasks: to develop a systematic methodology of algorithm of angular coordinates of measurement of air objects in multipositional radar information and control systems; to conduct synthesis of multipositional information and control systems of radar stations with equidistant flat digital antenna arrays using the proposed algorithm. The amplitude HB of each EFDAA-DHFA radiator is "carded", which is "pressed" from the XOY plane and has the appearance of a perfect “circle”. It is also necessary to take into account the mutual influence of the radiators in the receiving mode, which is determined according to Fig. 1 by the formula:

$$|Z_{mn}| \cdot |I_{mn}| = |U_{mn}|, \qquad (1)$$

where $|Z_{mn}|$ is the matrix of own and mutual impedances of the radiators for each target; $|I_{mn}|$ – is a vector-column-row of complex amplitudes of the currents of the radiators in X or Y coordinates; $|U_{mn}|$ – is a vector-row-column of complex voltages of the radiators in X or Y coordinates

List of references

1. Parhomey, I.R., Boiko, J.M. (2015). Features of objects radar systems ranging from low reflection surface. *Herald of Khmelnytskyi National University, scientific journal, Technical sciences*. Issue 1, (Vol. 5), (pp. 194-201), [in Ukraine] ISSN 2307-5732.

2. Parhomey, I.R., Boiko, J.M., Eromenko, A.I. (2016). Development models of signal processing radar remote sensing. *Herald of Khmelnytskyi National University, scientific journal, Technical sciences*. Issue 1, (Vol. 233), (pp. 17-23), [in Ukraine] ISSN 2307-5732.