

ABSTRACT

Indonesia is an archipelago with inter-regional transportation routes dominated by air and sea transportations. A good navigation system is needed to support the density of Indonesia's air and sea transportation activities. Airborne surveillance radar technology, which is a radar system that is used to track and visualize the on going flight positions, makes it possible to monitor flight and shipping activities that take place in the territory of Indonesia. Antennas are a crucial component in radar technology systems.

In this research, microstrip antenna 8x1 diamond patch array for air surveillance radar with S-Band frequency was designed. Diamond patch is a patching method of square patch rotated by 90°. This antenna supposed to work at 2,8 Ghz frequency with ≥ 6 dB gain, 60 MHz bandwidth for return loss ≤ -10 dB and VSWR (Voltage Standing Wave Ratio) ≤ 2 , also has linear polarization. This antenna is a microstrip antenna with diamond patches that were arranged by array method. Array method was applied to increase the value of gain. Each antenna patch is given the same power so that the antenna is uniformly arranged. S-Band frequency is suitable for object and weather observation at far distance.

The designing of the antenna was done by software simulation and realized FR-4 Epoxy substrate that has dielectric constant $\epsilon_r = 4,6$ and thickness $h = 1,6$ mm. From the simulation result, when the antenna worked at middle frequency 2,8 GHz it resulting gain value of 6,66 dB and axial ratio of 40 dB, therefore the antenna is a linear polarized antenna. On the realized antenna, the result of the return loss is -19,4 dB and the VSWR (Voltage Standing Wave Ratio) is 1,24 at the middle frequency. Also, at the realization measurement the bandwidth resulted was 104 MHz on return loss ≤ -10 dB and VSWR (Voltage Standing Wave Ratio) ≤ 2 , the gain is 5,78 dB, and ellipse polarization with axial ratio is 13,3 dB dB.

Keywords: *Antenna Microstrip, Array 8 × 1, Patch Diamond, Air Surveillance Radar S-Band*