REMOTE SENSING APPLICATIONS FOR DEVELOPMENT OF ATMOSPHERIC OBSERVATION METHOD

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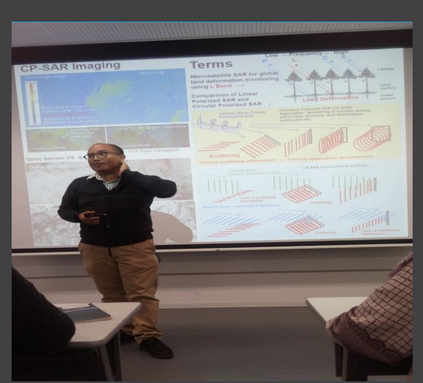
Problem

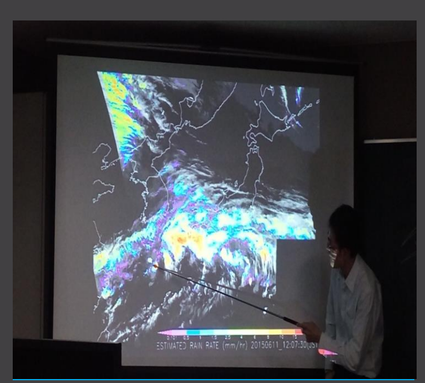
Discussion of the application of remote sensing for atmospheric observation is needed. For this reason, understanding and deepening of this knowledge are needed. It aims to develop remote sensing applications for atmospheric observation. Some applications of remote sensing are LIDAR, RADAR and Satellite.

Proposed Solution

With these needs, the development of radars that can observe precipitation for certain regions is carried out. This aims to obtain valid and precise atmospheric data in a region, so that it can help uncover the phenomena that exist today. From the results of the training to the Chiba Universty, many things can be applied in the office environment, one of which focuses on the radar.

Pictures





Background Research

Observing the atmosphere using weather radar requires a large cost, the solution of these problems is the development of marine radar for precipitation observations. As for the working principle of this radar, it makes radar noise a radar target to measure precipitation. The data that has been generated from the development of the radar found several obstacles including less than optimal data reception because the antenna beam width is too large. Then made the development of antenna.

Design

Figure Radar Marine

- This research starts from studying the character of marine radar and specifications,
- Study of literature related to the development of radar systems.
- Selection of radar to be used
- Radar development
- Validation results of radar development

Data and Method

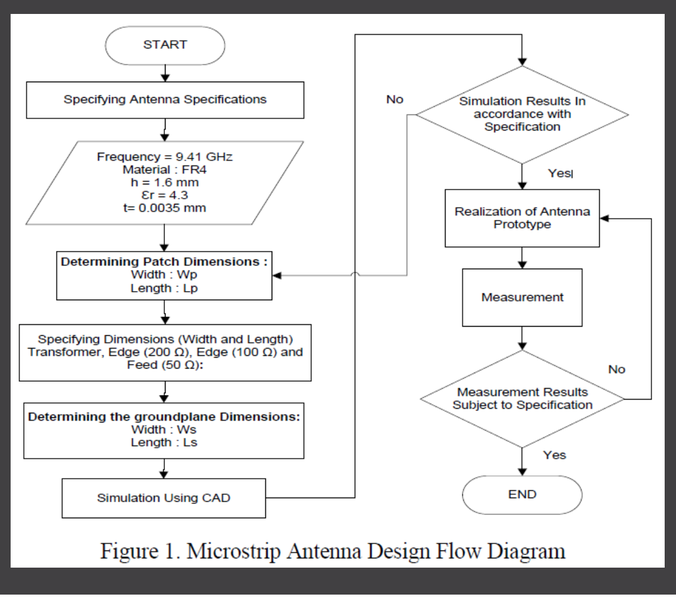


Figure 1. Microstrip Antenna Design Flow Diagram

TABLE 1
ANTENNA SPECIFICATIONS

No	Specification	Information
1	Substrates Materials	FR4 (ε_r= 4.3)
2	Substrate thickness (h)	1.6 mm
3	Copper thickness (t)	0.035 mm
4	Working Frequency (f_0)	9.41 GHz
5	Bandwidth	60 MHz
6	Radiation pattern	Unidirectional
7	Polarization	Linear (Horizontal)
8	VSWR	≤ 2
9	Reflection coefficient / Return Loss	≥ -10 dB
10	Gain	≥ 12 dB

TABLE 2
MATHEMATICAL RESULTS OF MATHEMATICAL ANTENNA PARAMETERS

Microstip Patch Parameters	Simbol	Value (mm)
Value (mm) width of antenna	W	9.8
Dielectric effective constants	ε_{eff}	3.6
Effective Length	L_{eff}	8.4
Length due to fringing effect	ΔL	0.7
Length of the antenna	L	7.7

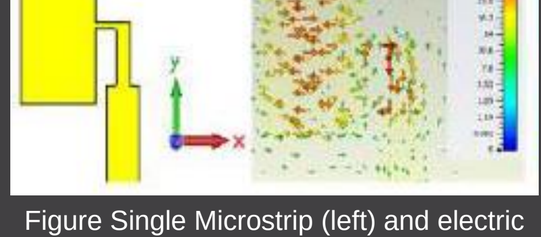


Figure Single Microstrip (left) and electric field direction (right

Output and Benefit

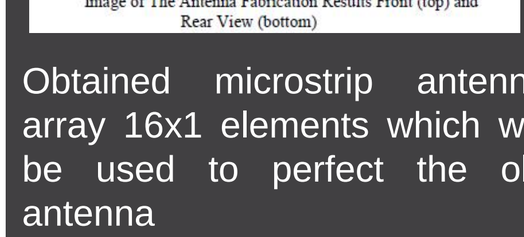


Image of The Antenna Fabrication Results Front (top) and Rear View (bottom)

Obtained microstrip antenna array 16x1 elements which will be used to perfect the old antenna

Conclusion

With the microstrip rectangular patch array antenna 16x1 elements expected to be able to overcome the limitations of existing data reception antenna. So that the data obtained is more perfect and can be utilized by the stakeholders.

Publication

Design Analysis Of Microstrip Rectangular Patch Array Antenna 16x1 on X-Band Radar

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