Far Field Target Image by Near Field RCS Measurement

蔡明哲、張道治

E-mail: 9121547@mail.dyu.edu.tw

ABSTRACT

The experiment in this paper is conducted with Electromagnetic Anechoic chamber, HP8722D (Vector Network Analyzer), and near field measurement system to recover the microwave image of the test target. In far field RCS (radar cross section area) measurement, there are weather and multipath problems during measuring. These problems can be resolved by measuring test target in near field range. This thesis provides methods to obtain a target far field radar cross section. The methods will include, (1)establishing the near field data for receive power decrease with distance to compensate the near field range power decay, (2)providing a way to obtain a target far field image, and (3)rotating the target with small angle used in ISAR (Inverse Synthetic Aperture Radar) to resolve the serious quadratic phase error which effect the defocus of the image. The result of down range prediction is agreed to that of GTD prediction. In the simulation cases, the signal to noise ratio for compensation images are greater than 20dB. In the experimental cases, the compensation images are all clear. Keyword: near field small rotating angle scan

Keywords : RCS Measurement ; Target Image by RCS Measurement

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REFERENCES

[1] 王振宇 ”利用近場量測獲得微波影像 ” 2000 [2] Dean L. Mensa “ High Resolution Radar Imaging ” ARTECH HOUSE 1991 [3] HEWLEET PACKARD “ User ’ s Guide HP8719D/20D/22D Network Analyzer ” 1998 [4] Chris Oliver, Shaun Quegan “ Understanding Synthetic Aperture Radar imaging ” 1998 [5] Dau-Chyrh Chang, “ Special Topic of EM Theory PO, GO, GTD ” 2001 [6] C. A. Balanis, Antenna Theory: Analysis and Design, 2nd ed, John Wiley & Sons, New York, 1997.

[7] 林丁丙 “ 多向微波成像系統-原理，方法與實驗 ” 1993