YAGI-UDA ANTENNA ON NAVAL SHIP

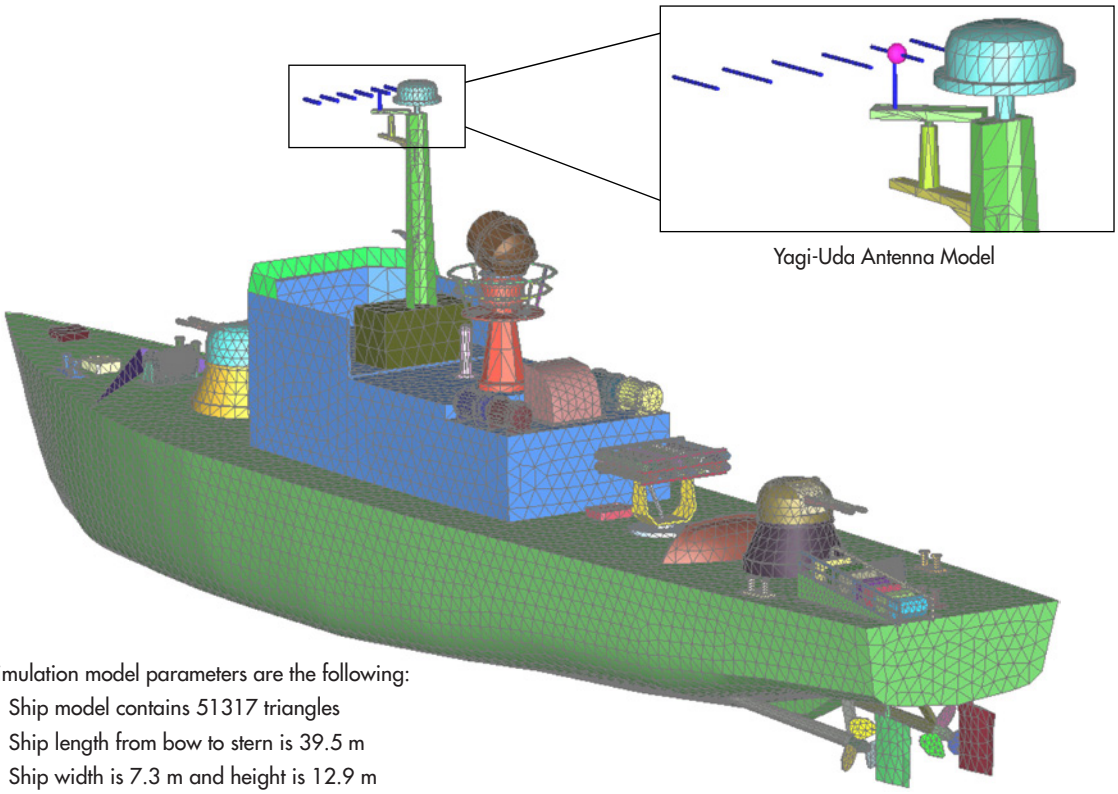
EMC Studio/EMCoS Antenna VLab

Introduction

Investigation of optimal antenna position, analysis of near/far fields generated by antennas placed on large structures (like ships, aircrafts, etc.) plays important role in onboard antennas design and installation. This application demonstrates analysis of Yagi-Uda antenna placed on naval ship simulated at 200 MHz frequency.

Simulation Model Description

Simulation Model View in EMC Studio



Yagi-Uda Antenna Model

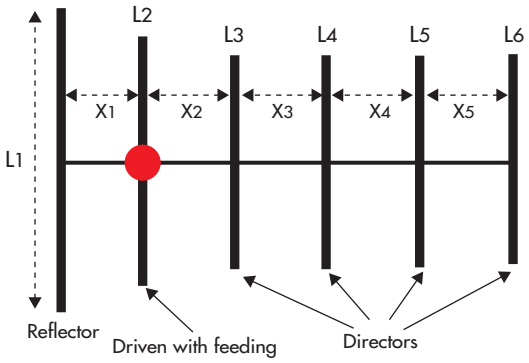
Simulation model parameters are the following:

- Ship model contains 51317 triangles
- Ship length from bow to stern is 39.5 m
- Ship width is 7.3 m and height is 12.9 m
- Simulation frequency 200 MHz

Design of Yagi-Uda Antenna

The parameters of the Yagi-Uda antenna are shown below:

Yagi-Uda Antenna Design



Model Parameters													
Operating freq., [MHz]	Wavelength, lambda	Conductor radius, [m]	L1, [m]	L2, [m]	L3, [m]	L4, [m]	L5, [m]	L6, [m]	X1, [m]	X2, [m]	X3, [m]	X4, [m]	X5, [m]
200	300/freq	0.005*lambda	0.475*lambda	0.46*lambda	0.44*lambda	0.44*lambda	0.43*lambda	0.4*lambda	0.25*lambda	0.31*lambda	0.31*lambda	0.31*lambda	0.32*lambda

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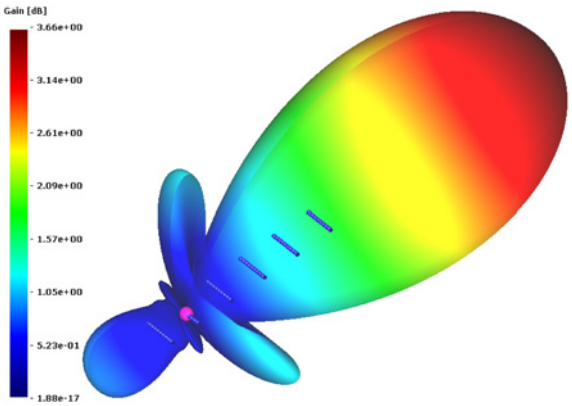
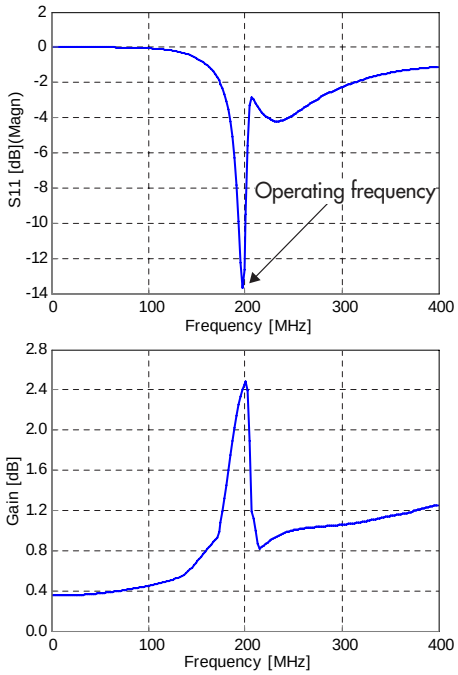
Frequency Characteristics of Yagi-Uda Antenna

Far Field 3D Pattern (200 MHz)



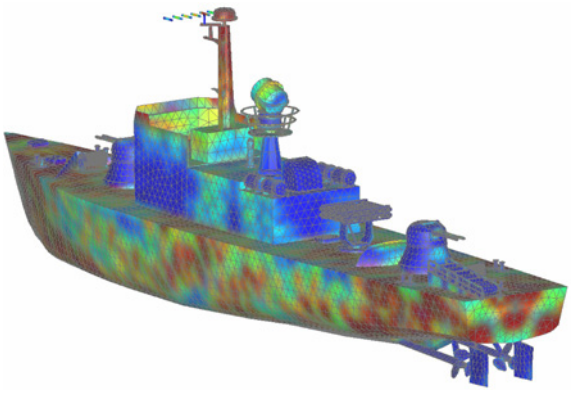
Frequency Characteristics of Yagy-Uda Antenna



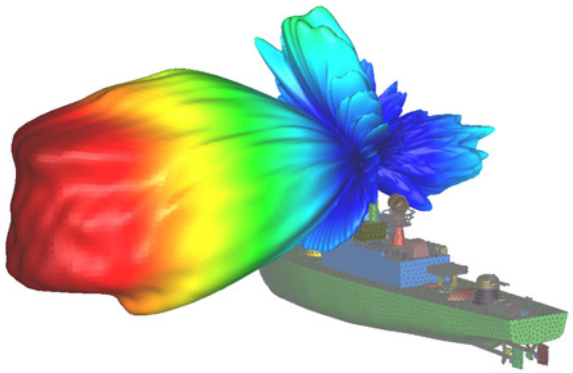
Results

Far field 3D pattern, surface current and total electric field distribution is shown below for 200 MHz frequency:

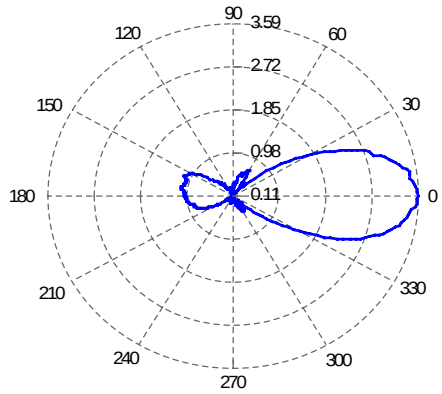
Surface Current (200 MHz)



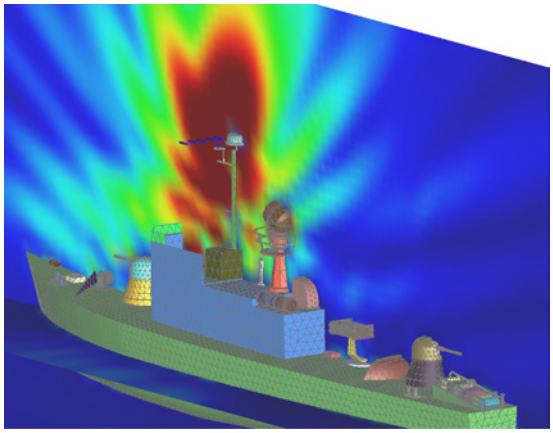
Far Field 2D and 3D Pattern (200 MHz)



Total Electric Field (Total, Magn) [V] vs. Phi [deg]



Total Electric Field Distribution (200 MHz)



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