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In the frequency range for which US Navy shipboard fan antennas are designed, 2–6 MHz, the whole ship is in fact the antenna. This makes for a very large and complex numerical modeling problem. This paper describes an effort concentrated on a destroyer, the *Spruance* (DD–963), for which NOSC has a 1/48 scale brass model to make measurements on for comparison with the calculations. The antenna characteristics used for judging the accuracy of the numerical model with regards to measured data were the feedpoint impedance and the voltage across the insulator at the apex of the fan.

NEC–3–VLF was used on a 719 segment model. To make a good comparison between measured and calculated data, the code was run for 51 frequencies between 1.5 and 6.5 MHz. The computer used was a Convex C210 which has close to the performance of a single processor on the Cray X/MP–48. The code was compiled to take advantage of the vector architecture of the Convex and its 64 bit word size.

There was a very good match between the antenna characteristics of the numerical model and the measurements from the brass model, showing NEC to be a viable tool for modeling a complex structure with reasonable engineering effort and use of computer resources.

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MODELING A SHIPBOARD FAN ANTENNA

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Abstract

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