Arleigh Burke Class DDG Flight IIA
Integrated Topside (INTOP) Conversion

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With the current number of topside apertures aboard naval platforms, and the rate at which this number is increasing, there is a clear need to focus on the joint development of combined sensor packages. In conjunction with the Office of Naval Research (ONR) and Naval Research Laboratories (NRL), the Integrated Topside (INTOP) Program intends to accomplish this goal through the development of multifunction arrays (MFA). These arrays maximize ship war fighting capability and topside system flexibility, while lowering the overall size, weight, radar cross section (RCS) and cost of topside RF systems. After showing the feasibility of INTOP installation aboard a single class of ship, these organizations can then expend effort in standardizing the conversion process to allow for broad adoption within the Navy.

This conversion study examines the effects of replacing the SPY-1D radar and SHF/EHF communication antennas with three MFAs and two 3-axis gimbals aboard a DDG-51 Flight IIA Arleigh Burke Class Guided Missile Destroyer. The INTOP variant selected for implementation provides the greatest performance value, while minimizing the overall impact to the baseline design. Although a significant alteration to the forward deckhouse is necessary for housing a larger sized array and the additional cooling equipment, the ship's hull shape and equipment configuration below decks does not require direct alteration. Conducting a ship modification in this manner is a technically feasible concept once ship designers develop a practical method for installing the additional electric power necessary to operate the MFAs. As integrating topside radar suites which perform at a high level will remain a priority into the future, follow on research should focus on developing the best method for delivering a higher level of installed power. Once this hurdle is overcome, the INTOP conversion could give the destroyer advantages provided by the INTOP program, as well as supply a good platform for future radar implementation studies.

Ship Characteristics:

Displacement (Full Load): 9276 LT
Displacement (Lightship): 7195 LT
Length Overall: 497 ft

LBP: 471ft	GM_t: 2.7 ft
Beam: 59 ft	Draft: 20.7 ft
Cp: 0.615	Cx: 0.822