V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSION

The wetted surface area of the SLICE hull form is radically different from a full displacement monohull and also varies significantly from the SWATH hull. Because of this, standard procedures for predicting ship resistances from model test tank data cannot be used.

The thesis decomposed the total resistance into pod and strut components and further divided these into frictional, form and wave making components. Additionally, the resistances were categorized as functions of the Reynolds and Froude Numbers. The Hughes method provided the means by which the residual resistance was divided into form and wave making components. Ship scaling processes do not usually decompose the form drag, but in the case of the SLICE, two factors lead to a further investigation of the form drag. First, the model had a large form factor which meant that the form drag was almost equal to the frictional resistance. Second, the geometry of the wetted surface area provided a natural separation of the hull for unattached strut and pod analysis.

A large difference between the ITTC and Hughes predictions existed so a modified Hughes method was developed which combined ideas from both processes. In particular, the pod form drag was Reynolds scaled according to the Hughes and the strut form drag was Froude scaled as in the ITTC method. The hybrid procedure examination results fell in between the ITTC and Hughes estimates.

Concerning the design criterion that the ship go at least thirty knots, only the classical ITTC single length determined that the ship required more power. But, as previously stated, the ITTC single length resistance was concluded to be an overestimate. Assuming the propulsive coefficient does not vary much from the designer's value of 0.73, the Hughes and the modified Hughes method predict that thirty knots is achievable.

B. RECOMMENDATIONS FOR FURTHER RESEARCH

Follow-on research should include further investigation of the breakup of the form drag. In particular, a computational fluid dynamic study of the struts and pods as separate entities could be done to validate the modified Hughes method. This analysis might lead to a different division of Reynolds and Froude scaled quantities.

It would be beneficial to include the stabilizers and canards in resistance calculations. This was not done here because the dimensions of these were not known since they were not on the ship drawings. These components would most likely be Reynolds scaled since they are similar to flat plates. Additionally, the effect of varying the angles of the stabilizers and canards could be studied via computational fluid dynamics.