

School of Physical Sciences

**A SCIENTIFIC INVESTIGATION  
INTO  
THE SAILING PERFORMANCE  
OF  
HM BARK *ENDEAVOUR***

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This thesis is presented in partial fulfilment  
of the requirements for the award of the degree of  
Master of Science  
of

**Curtin University of Technology**

**January 1994**

## SUMMARY

Construction of the H.M. Bark *Endeavour* replica at Fremantle in Western Australia has prompted an investigation of the sailing performance of an eighteenth century vessel of great scientific and historical significance. The research which this thesis reports combines numerical modelling techniques and archival research to gain an improved understanding of the original vessel's sailing performance.

An existing velocity prediction program (VPP) written for 12-m yachts (Klaka 1988c) was adapted to suit vessels similar to the *Endeavour* by replacing hydrostatic, hydrodynamic and aerodynamic formulations. Although some formulations within the *Endeavour* velocity prediction program (VPP) are indeed *Endeavour* specific, the program lends itself to ready adaptation to vessels similar to the *Endeavour*. This versatility of the VPP has been a priority of the research project which this thesis reports.

Comparison of VPP results with archival records indicates a broad agreement with some notable exceptions. Whilst the VPP over predicts boatspeeds at true wind speeds over 30 knots, the close hauled leeway angles and apparent wind angle at which maximum boatspeed occurs are well predicted over the range of true wind speeds considered.

The work reported in this thesis represents a first step towards the establishment of a VPP which maritime historians can usefully access in their quest for knowledge of the sailing performance of the subjects of their research.