PUMA: An Introduction

- **P**arallel **U**nstructured **M**aritime **A**erodynamics.
- Computer program for analysis of internal and external non-reacting compressible flows over arbitrarily complex 3D geometries.
- Written entirely in ANSI C using MPI library for message passing and hence highly portable giving good performance.
- Based on Finite Volume method and supports mixed topology unstructured grids composed of tetrahedra, wedges, pyramids and hexahedra (bricks).
- May be run so as to preserve time accuracy or as a pseudo-unsteady formulation to enhance convergence to steady-state.
- Uses dynamic memory allocation, thus problem size is limited only by the amount of memory available on the machine.
- Needs 582 bytes/cell and 634 bytes/face using double precision variables (not including message passing overhead).
- The development of PUMA was highly motivated by the lack of work that compares the performance of several different algorithms on the same problem. Hence PUMA implements a range of time-integration schemes like *Runge-Kutta*, *Jacobi* and various *Successive Over-relaxation Schemes (SOR)*, as well as both *Roe* and *Van Leer* numerical flux schemes. It also implements various monotone limiters used in second-order computations (*Venkatakrishnan, Barth, Van Albada, Superbee*).