Graham Taylor discusses a class of vessel which has so far been largely ignored by the model world.

I sometimes wonder how some of the most exciting classes of vessel escape the attention of the model world altogether! The SES is one such example, which I'm sure would make a splendid model subject. Technically the term "surface effect ship", or "SES", refers to a classification which includes all types of air cushion vehicles, but it is becoming increasingly synonymous with one particular type of craft, the non-amphibious "side-wall" hovercraft, or "air cushion catamaran" as they are sometimes called.

The Cirrus 120P "Wight King", at slow ahead leaving port.
As a class of vessel they offer several advantages over others. In many respects they offer efficiencies over planing craft of the same speed and size, particularly as they combine the attributes of both ship and hovercraft to give high speed operation, high payload and good sea keeping.

**General Design Features.**

Although descended from the same concept as the fully amphibious hovercraft, the side-wall hovercraft has evolved to become quite a different animal. At the expense of a small increase in drag, the side-wall hovercraft uses twin asymmetric hulls to contain the air cushion on each side. This is more effective than a full flexible skirt, and so reduces the power requirements of the lift fans. These narrow “deep-vee” hulls enable the craft to be steered in a conventional way, acting like keels which help the craft maintain its heading in a cross wind, essential in congested waters. They also enable the power plants and propulsion machinery to be housed conveniently. Unlike the amphibious hovercraft, the craft’s weight is not supported entirely by the air cushion, but a proportion of the load is carried by the twin hulls. The degree to which the vessel’s displacement is ‘off-loaded’ onto the cushion differs from design to design, as does the resultant performance.

Flexible skirts between the two hulls at the bow and stern seal in the air cushion while responding to wave motion. The bow skirt is normally of segmented design, while a loop/bag skirt is used at the stern. Some vessels, such as those built by Air Ride Craft Inc. (USA) have rigid stern seals which reduce the complexity of the design and the vessels’ maintenance costs.

Deck space created between and above the twin hulls enables maximum payload capacity, as well as a straightforward accommodation layout and a high
bridge position with all round visibility.

Rigid side-wall craft have been in production for several decades, but there have been advances in the scale and popularity of these vessels in recent years, with considerable investment in research and development being made by Norway and The Netherlands, as well as several other European and far eastern countries.

Cowes Express

A couple of summers ago, I went down to the Solent to see some of the latest SES vessels in action between Southampton and the Isle of Wight. Looking like something out of Gerry Anderson’s “Thunderbirds”, the Cowes Express craft were prime examples of this relatively modern but maturing technology.

The Cowes Express started service in 1990, in competition with the FBM Marine RT1 Hydrocat catamarans and Rodrigues hydrofoils of Red Funnel Line. The fleet comprised two Brodrene (Ulstein International) Cirrus 120P craft from Norway and one Royal Schelde 23m Seawisp from The Netherlands.

The Cirrus 120P is certified for 254 passengers and 5 crew, has a 35m LOA with a beam of 11.5m, and draft ‘on cushion’ of 0.70m and is manufactured from fibre reinforced polyester. She is propelled by two KaMeWa 56/562 water jets, one in each hull, each driven by a 2285bhp diesels, giving a top speed of 50 knots and a cruising speed on the Isle of Wight run of around 45 knots. Cushion lift is provided by two 350bhp turbocharger diesels driving centrifugal fans.

Two things that I especially noted about the Cirrus 120P on my Solent crossing were the ride and the handling. The ride was distinctly “hovercraft” with that unmistakable pummelling vibration coming through the cabin floor from the air cushion. Anyone who has ever travelled on a hovercraft will know what I mean! An automatic ride control system manages cushion air pressures in response to the sea state, to make the journey more comfortable for all involved. The handling, however, was much more like a conventional ship. The combination of side-walls and KaMeWa jets gave positive control and plenty of assured manoeuvrability with none of the drifting normally associated with hovercraft.
SES
The Surface Effect Ship.

The port side of the Royal Norwegian Navy's OKSOY class mine countermeasures air cushion catamaran built by Kvaerner Mandal a.s.

Cirrus 120P "Wight Queen" under way in somewhat overcast conditions!

Below, a superb photo of "San Francise", a Cirrus 120P, at high speed. Photo courtesy Virtu Ferries, Malta.

SAN FRANCISSA
VIRTU RAPID
The future of the SES.

Sadly the Cowes Express service has now been withdrawn and the craft have been dispersed to other corners of the globe, as have the Rodrigues hydrofoils. The company had planned to establish a new high speed car/passenger service between Southampton and Le Havre using two SEC 74m SES vessels of awesome proportions, which exceed the SRN4 MK4 cross channel hovercraft in both length and carrying capacity.

Although the rigid side-wall hovercraft is now a fully developed concept it is arguable if the craft has reached its optimum size. Craft of 35m length are already practical for car ferry, assault ship or other applications where high payloads and speeds of up to 70 knots are required.

An SES Model?

Now that we've looked at the full size craft, what about model potential? A skim through Jane's High-Speed Marine Craft will reveal a variety of different SES concepts, from fast ferries to helicopter carrying naval patrol ships on which models could be based. All that is needed is a little ingenuity so I've set out some of my thoughts below.

Most SES designs have a very simple angular box like form, which could be easily modelled from thin plywood around, say, balsa bulkheads and stringers to give a strong lightweight hull. The shape also provides a cavernous hull/superstructure with plenty of room for all motors, batteries and RC equipment.

The flexible skirt could be a little tricky, but is fortunately only present at the front and the rear of the craft. The skirt itself could be made from an old canvas or perhaps tent fabric.

The greatest complexity would no doubt be the lift and propulsion system. Since the typical SES is multiaxial, a model lends itself to electric rather than IC power. For lift, a single fan salvaged from an old hair dryer might do, and for propulsion, how about surface drives in each hull to take advantage of the craft's low drag? It would of course be necessary to check that the position of the centre of gravity coincided with the middle of the air cushion area to ensure even hovering, steering and motor control would otherwise be conventional.

Why Not?

With hundreds of side-wall SES craft in service worldwide, they deserve to be represented in model form. Certainly the SES is an unusual technical challenge and would be sure to draw lots of attention, as well as giving sparkling performance as the real thing. It is certainly worth a try, eh? Well I'm off to search through the garage - I'm sure I've got an old hairdryer round here somewhere....