

# HMS INVINCIBLE

With the Falklands Crisis having bought the Royal Navy once again into the forefront of the public's gaze, it is not surprising that a large proportion of the attention is focused on the modern ASW Carriers, HMS *Invincible*. Aside from the fact that she has on board a member of the Royal Family as one of her ASW Helicopter aircrews, and members of the Press, (factors which automatically assure her prom-

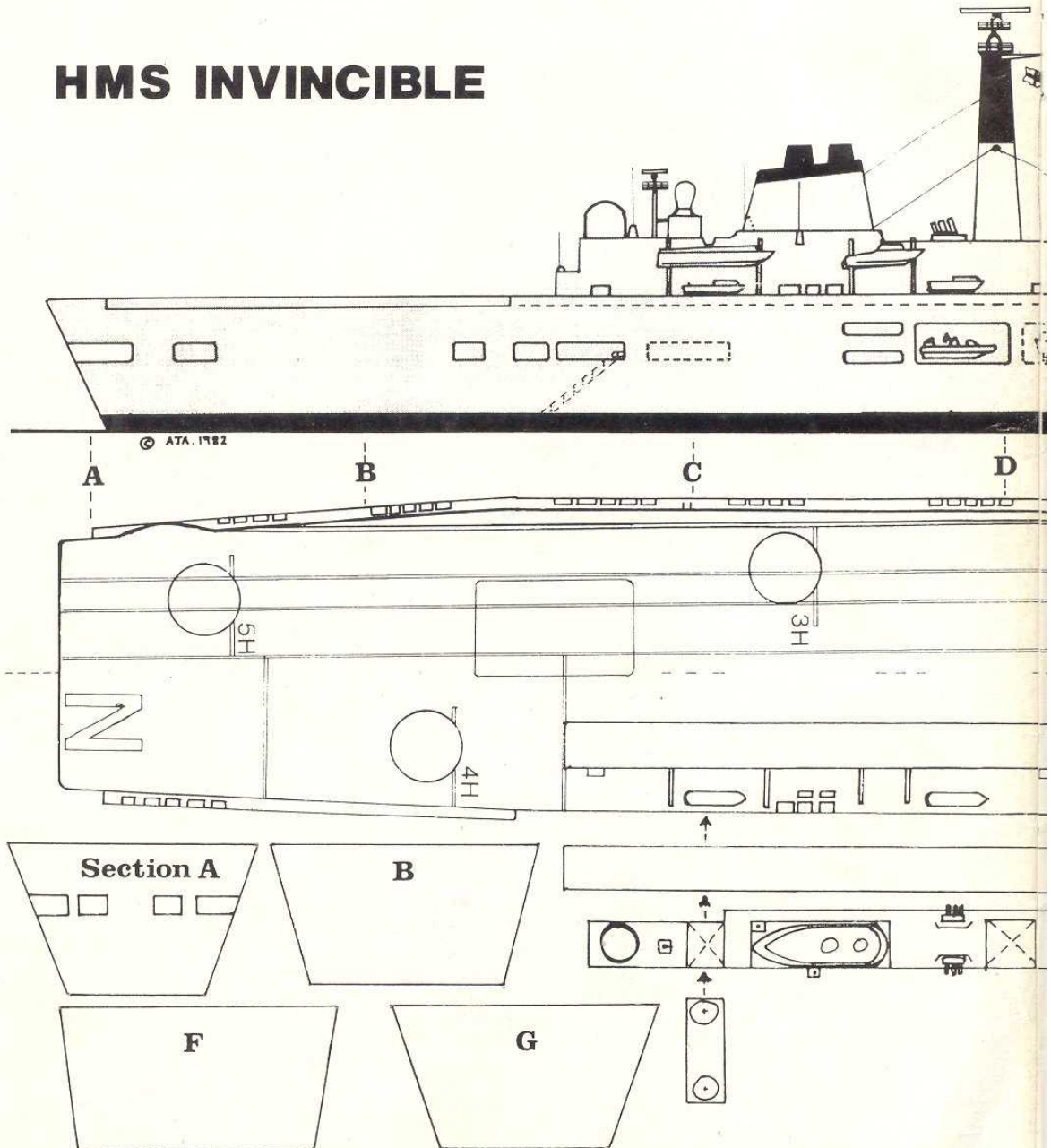
inent press coverage), she will also be closely followed by those with a more technical interest in her attributes, such as the Royal Australian Navy, and indeed, the Communist Bloc Navies.

Looking back on the history of *Invincible*, it is surprising that she does in fact exist at all as defence policies are always changing according to the political and economic climate of the day, causing the future of

various ships to always remain uncertain.

The story really starts back in 1965, when under the Wilson/Healey government defence cuts, the replacement Aircraft Carrier for the late *Ark Royal*, namely project CVA-01, was cancelled. Readers will no doubt recall that amongst the other defence projects which were cancelled around that time, were the 'TSR2', the Supersonic version of the Harrier, and

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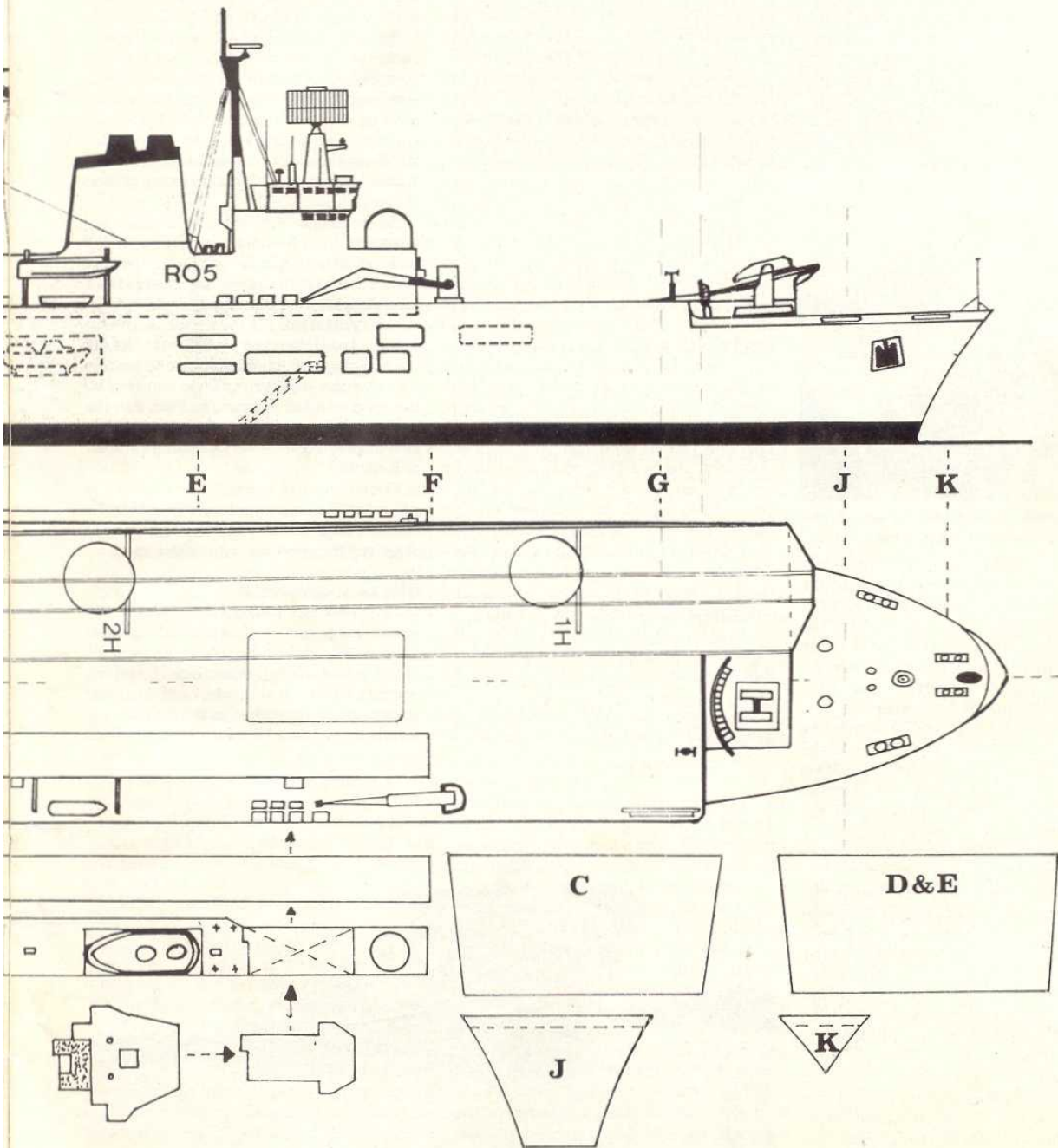
# Andrew Ambrose models the ship in 1:600 scale

numerous other items, including the development of a British 'ship to ship' missile, (presumably so that Britain could buy these items from abroad at much increased cost). Is it not strange that the same Mr Dennis Healey who savagely annihilated Britain's defences in the sixties, appeared on television to say how disgusted he was with the way that the Falkland Crisis had been handled to date.

*Invincible* was laid down on 20 June 1973 at Vickers Shipyard at Barrow, in order to attempt in a small way, to cover the gap left in the fleet when the conventional carriers were retired. Initially, *Invincible* was to be followed by a further two ASW Cruisers of similar type, one of which was due to have been laid down soon after the first, at Swan Hunters, Wallsend, to be followed by a third whose keel was to have been laid

directly after the launch of the first at Barrow. However, those plans did not come into being until 1978, (over a year after the launch of the first hull) when the third was eventually ordered.

These three new carriers, which became the *Invincible*, *Illustrious*, and *Ark Royal*, were a complete concept away from earlier aircraft carriers in that they had little value in long range force projection, and as such



were principally not designed to undertake that role anyway. The task for which they were originally designed, was as an ASW equipment platform, capable also of operating a limited number of Harrier aircraft in order to give the fleet some intrinsic measure of airborne interception ability. It was a widely held belief at the time by certain politicians, that the Royal Air Force would be capable of providing the entire fleet with effective air cover, but in fact no Royal Air Force aircraft type had the required range capability, which has in recent days become only too apparent.

As an aircraft carrier, the 'Invincible' class was therefore not comparable with even the old *Ark Royal* (deceased 1980), as it could not operate the equivalent quantity or type of fixed wing aircraft, and therefore fell far short of the government's presumed



**HMS Invincible on her launching day, with an eager crowd anxious to see her off.**

expectations. In the force projection role, the McDonnell F4K Phantoms aboard the *Ark*, could operate at speeds in excess of 1600 mph, could carry many times the payload of the Harrier, and had a vastly superior range. Whilst the *Buccaneer*, an immensely robust aircraft, could carry comparatively massive payloads at low level, hence avoiding and/or confusing radars, and do so at ranges far in excess of any naval aircraft now operating (excluding the US Navy). These factors were essential for any aircraft carrier operating in the projection/interdiction tasks, and frankly the Harrier just could not compete, due to its low payload/range characteristics.

On the other hand, when the 'Invincible' class and the FRS-1 Sea-Harrier are considered in respect of the job for which both were originally designed and built, a vastly different story emerges. Forgetting the traditional view of an aircraft carrier and instead, looking at them as Anti Submarine Warfare Carriers, one can immediately realise their true value.

Originally, the 'Invincible' class were destined to be equipped with a bank of four Exocet missiles. These however, were omitted due to financial stringencies, but even if they had been fitted, it is doubtful if they would have been of any use as their

range was very short — only 23 miles. Most Soviet vessels which the carrier might have to deal with, possess missiles of far greater range, and so would not need to approach the carrier to sink it, and as a result, in order for the carrier to engage in surface action, she would need to be the hunter and try and get the hostile unit within the range of her Exocets. This simply is not the role of a carrier as it puts a large and costly vessel at too much of a risk, and so policy appeared to favour the use of escort vessels and aircraft to take over all SSM (surface to surface) duties of these ships. Another rumour which circulated in the late 70's was that a long range tactical cruise missile such as the US Navy's 'Tomahawk', or a long-range missile with 'bridge guidance' (directed by a suitably positioned helicopter) would be fitted, but none of these have as yet appeared, if indeed they ever will.

As regards her air defence capability *Invincible* is fairly well off. She has a twin Sea-Dart launcher mounted at the forward end of the flight deck, and in trials this has proved to be an extremely effective system, with medium range and a very high efficiency factor. Most of her air defence capability will be provided by her FRS-1 Sea Harriers, which, equipped with sidewinder or Skyflash missiles, and the Harriers 'exclusive' abilities in aerial manoeuvre, will undoubtedly prove successful against most of the opposition she would ever be likely to meet. One factor which is a little questionable however, is exactly how the Navy intend to cope with the very high speed, Soviet Naval Air Force's 'Backfire B' with its stand off missiles, now that the Phantom F4K is no longer with the fleet. Certainly, the Sea-Dart and, more likely, Sea-Wolf equipped escorts will put up a good show against the incoming missile, but as far as the 'Backfire' herself, we do not seem to have an effective 'go-getter', such as the amazing Tomcat-Phoenix combo of the US Navy; or even the Tomcat and conventional missile of the 'Nimitz 2 — Libya O' confrontation. However, the Navy must have obviously thought about this point, and have suitable contingency plans.

As regards the ASW equipment deployed and carried aboard the *Invincible*,

she is probably the finest anti-submarine vessel in existence as the technology incorporated in her is vastly superior to the usual run of the mill ASW fits.

For sensors she mainly uses her helicopters, as her hull set/s are limited by the turbulence created by her speed. Her computer is really sophisticated, in that it receives, collates, updates, stores and projects, not only the information received from her Sea-King ASW helicopters, but also, information gained from all friendly sources; be they Hydrophone arrays laid on the ocean beds, maritime recce and AEW aircraft such as the Nimrods, or any other source in her operations zone. All this information is collated, and displayed on her various screens, with all known information regarding any particular contact, being continually updated as new reports come in. From this data the computer compiles a picture of the entire undersea area, and presents it, showing the relative level of vulnerability of attack, from each contact. Quite frankly, the *Invincible's* ASW capabilities would fill all the pages of *Airfix Magazine*, so instead, let us look at the model.

As a model, the 'Invincible' class are attractive vessels indeed, and due to the lack of commercially available subject matter, must therefore be made from scratch, utilizing spare bits and pieces from various *Airfix* kits. Using plastic card built around a skeleton, the model is thankfully not too difficult, as she does not possess many of the awkward reverse cambers so common on other carriers, and whether the model is built as a wargame unit or simply as a display piece, a very pleasing product will ensue.

Construction of the model covers several phases of manufacture, so in order to make the drawings easier to follow a system of stage construction was embarked upon.

#### Stages of construction

(1) The first task is to obtain a sheet of 020 plastic card, and cut out the hull sections 'A' to 'K' inclusive. These are cut as drawing size. Note that sections 'J' and 'K' are cut to the level of the deck only, and not to the top as with other sections. The next step is to cut out a base for the model from



**Escorted out to sea, HMS Invincible is about to try out her paces as an Anti-Submarine Warfare Carrier.**

the .020 plastic card once again. This base should be 50mm wide by 325mm long, and a centre line should be marked along its length with a pencil, at exactly 25mm from each side.

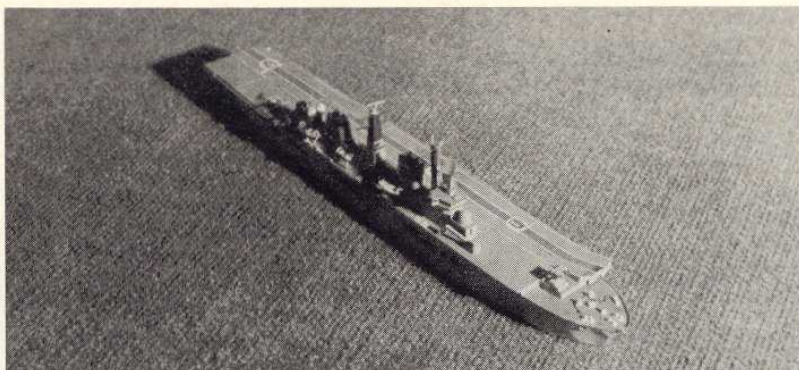
(2) On all the hull sections previously cut out, mark with a pencil the centre points both top and bottom. Then mark on the base plate the exact positions of the various hull sections. Then cement the hull sections to base. Make sure that the centre line on the hull sections is exactly in line with the centre lines on the base, and that sections are positioned at right angles to the base centre line. Using small offcuts of plastic card, make up sections running fore and aft to hold the hull cross members/sections in place. These should be 25mm high, so that they do not protrude above the level of the hull sides. A set square should be used to ensure that these parts are all square, as otherwise, the hull of the model when complete, will take on rather unusual dimensions.

(3) Next item on the agenda is to cut out the flight deck. This is done by cutting out a section of .020 plastic card, 312mm by 54mm overall, and then marking in the outline of the flight deck with a pencil, and cutting off all the waste. A suggested method for this process is to hold the drawing up to a window overlaid with the plastic card and trace the flight deck shape on to it. Having cut the flight deck out to its final sizes, the corners should all be rounded off slightly with a piece of fine sandpaper. Using a straight edge, mark on to the base section the bottom line of the hull using the hull sections as a guide. Then the waste can all be removed with a sharp knife or a pair of scissors.

(4) Cut out a strip of plastic card 14mm wide by 49mm long. This is to be fixed along the centre line of the base, between sections 'A and B'. Therefore, the aft end of the strip must be cut down to the angle of the stern. Cut out two more identical strips, and affix in position either side, leaving a gap of 8mm between them and the centre section. These strips act as supports for the quarter deck which can now be cut out and affixed in position on top. Check now, that section 'A' (the stern), is at the correct angle to the base.

(5) Cut a plastic card section of the bow profile between section 'J' and the bow, and affix in position along the centre line of the base, in front of and securely attached to, section 'J'. Then cut section 'K' in half, and cement in position either side of the bow profile as shown. Cut out, and cement into position, the fore deck section between section 'G' and the bow. Now, from a 4mm wide strip of plastic card, cut out and fix in position the forward bulkheads on the forward deck. These follow the line of the flight deck edge at the extreme forward end.

(6) The next step is to fit the hull sides. For this .015 plastic card is used. Cut out two strips of this material 28mm wide and form the stern; from section 'A' forwards to section 'C' on the starboard side, cut out the various openings. Do not cut further forward at this stage as to do so would make



Above and Below: Two views of HMS Invincible in model form in 1:600 scale. Note the boats on the side, from the Airfix Victorious, Tiger and Devonshire kits.



the openings out of alignment as you move further down the flex in the hull side. The two hull sides can now be fixed into place. Working from the stern again, align the cut-outs with the quarter deck openings and cement this section in place from the base upwards and forwards. When the first section has dried, move forwards along the model, bending and cementing one section area at a time, allowing each to dry before proceeding any further. This practice must be followed in order to alleviate the hull sides from springing off again once stuck.

(7) Having finished the hull sides, you will probably find that the sheet was not long enough to plate in the sides in one whole section. This is no problem, as an additional section for the bows can be fixed in later. When both sides are completed, the bow section can be plated in using a thinner grade sheet, such as .005. This is applied in two sections (one either side), and overlaps the existing hull sides where joins have to take place. Application of a full brush of solvent cement down the join, will allow the thin sheet to melt. When this takes place, run your finger or another piece of plastic down the joint. The thinner plastic card will then melt into the existing hull sides so leaving a flush joint.

(8) When the whole assembly so far has dried, any protruding edges of the base plate can be trimmed down to size with the modelling knife, sanding down any left overs with a fine piece of sandpaper.

(9) The next stage before adding the flight deck is to complete the cut-outs in the hull side and box in the openings with plastic strips. This must be done with an extremely sharp knife in order to prevent the hull sides from buckling in with the pressure applied when cutting. If you don't want to go as far as making the cut-out sections and boats therein, this stage can be left out and you can paint in the detail later with black paint. However, in all honesty, this detracts from the appearance of the finished model, and at worst, this process should be reserved for the smallest cut-outs only.

(10) The top of the hull sides should now be trimmed down to the required level in order for the flight deck to be a snug fit. A pair of scissors is the best tool for this job, and a pencil line drawn at the required level will also assist to a great degree. Before fitting the flight deck, however, a pencil line should be made on both the top and the bottom showing the vessels centre line (see drawings). This will assist greatly in aligning the deck when fitting.

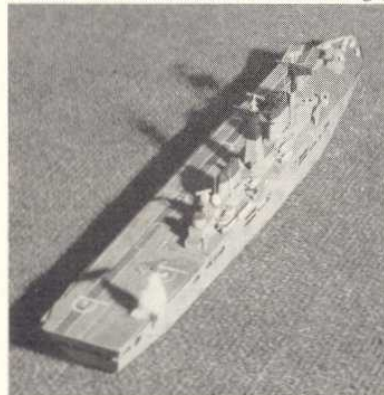
One other item will need attending to before any other assembly takes place, and that is painting. Paint in all the openings and where the box sections are. The sides are Airfix M13 Light Grey Matt, and the decks are Olive Green Matt with the exception of the quarter deck, which should be finished in a dark brown to give the effect of wood planking.

(11) The flight deck can now be fitted into position on the hull. Take care to ensure that the centre lines of both hull and flight deck are in line with each other and the centre line markings on the hull sections. Any gaps left between hull and flight deck at this stage can be filled in with a model filler or the ordinary type of non-solvent plastic cement. Note also that the starboard edge of the flight deck between sections 'C and E', should be flush with the hull side and not overhanging in any way.

(12) Work on the superstructure can now be commenced. Firstly, mark on to the deck with a pencil the positions of the superstructure assembly, and all other parts to be fitted, such as the ski-jump and the Sea Dart launcher. From your sheet of .020 plastic card cut out two strips 159mm long and 17mm wide, on to which are marked the superstructure. Note that the starboard side extends upwards only as far as the funnel bases. Do not therefore attempt to include the funnels in this section. The port side follows the same pattern as the starboard, but at a position directly aft of the bridge superstructure, the port side follows the line of the dipped section between the funnels, not taking into

this cutout, the funnel bases (ie this section is only 9mm high from the bridge aft, to a line square with the little cutting on the starboard side). This difference is due to the .02 deck overhanging the superstructure sides, on the inboard port side.

(13) Now cut out a piece of .020 plastic card to form -01 deck as shown on the drawings,



A rear view of the model with all details completed.

but make it a fraction thinner than shown, to allow for the thickness of the superstructure sides. A strip 7mm wide should be ideal. Affix this section into position between the superstructure sides at -01 deck level. This will act not only as a deck, but also as a support for the two sides. Now cut out a strip 7mm wide, and cut it into small pieces and affix into positions as vertical strengtheners and ends/decks etc. Cut out another section, but this time

10½mm wide. This will form -02 deck, and should be cut and positioned as shown on the drawings, so that the inner port side becomes the overhang.

(14) When this has been completed, the next step is to make the funnel bases and bridge structures. As regards the funnel bases, these are made from layered plastic card, which is then sanded to shape. Following a similar pattern, cut out several sections of plastic card to the profiles of the funnels, then once again layer these and affix to each other, and leave to dry. When dry, these can be sanded down to the shape of the funnels and fixed into the correct position. The bridge structure is made from thin 4mm wide strips of plastic card which are built up to provide the sides and wings etc. The top and base of -04 deck being cut from the .020 sheet again, as before. The exhaust ducting on top of the funnel can be made from biro refill cut to size and packed with filler or plastic cement to give the curvature and flaring required.

#### Detailing the model

On the tip of the bridge structure, the necessary aerials etc, can now be added, which include a type 965M radar scanner, which is acquired from the Airfix *Devonshire* kit (parts 20 and 21). The scanner is, in fact, two of the single scanners supplied with the kit which are trimmed down and cemented together. While in the process of scrounging bits from other kits, the crane just forward of the bridge is acquired from the Airfix *Victorious* kit, as are most of the ship's boats.

Moving forward to the fore deck, the detail thereon is made from scraps of plastic card and plastic rod. There are four sets of bollards, two anchor winches, and various other oddments which can be obtained from the spares box. In addition, two anchors are required which fit either side of the bow, as shown on the drawings.

Davits, which are positioned down the starboard of the superstructure are once again obtained from the Airfix *Devonshire* box. The boats are acquired from the Airfix *Victorious* and *Tiger* kits as well as the *Devonshire*. However, you will need to make these bits and pieces from scratch, if they cannot be otherwise obtained.

The larger radomes mounted fore and aft are from suitably carved plastic rod of the appropriate dimensions (see drawing). The smaller ones, however, are from either match heads, or the... yes... you guessed it... Airfix *Devonshire* again! The saluting guns just abaft the bridge are made from thin sections of plastic rod, as are the rocket launchers which are mounted abaft the main mast.

The Sea Dart missile launcher, ski-jump ramp, and the various other bits and pieces including the main mast, can now be added. They are all from plastic card once again. Finally, there is only the painting and final assembly to be undertaken, which is fairly simple with the exception of the flight deck, which needs either considerable patience, or a quantity of white Letraset lining tape to complete.

The only stage now left to model is the aircraft which will appear in a later edition.