

Ark Royal and her aircraft

What it is like to serve on the carrier and fly with her 'angels'
described by **Richard E. Gardner**

HMS *Ark Royal* is a 50,000 ton manifestation of maritime air power. She is capable of moving over 600 nautical miles in a day and her 'angels' can strike at 90 per cent of the world's built-up areas. In an era where ship and air launched missiles can obliterate sprawling land bases and their long, vulnerable runways, the aircraft carrier remains a comparatively illusive target. In peacetime, 'Ark' can be shadowed by an inquisitive potential enemy, but in war her aircraft can search and strike at forces on, above or below the surface of the oceans. Those who argue against carriers on the grounds of vulnerability ignore the obvious fact that a moving target is harder to hit than one that is known and fixed!

Until the Royal Navy's new aircraft-carrying ships come into service in the late seventies, HMS *Ark Royal* will continue to be the most powerful and impressive surface ship in the Fleet. With this in mind, let us take a closer look at 'Ark' and her mighty angels.

Sea Kings of No 824 Naval Air Squadron pace HMS Ark Royal in the Mediterranean. Visible is half 824's complement of anti-submarine Sea Kings (MoD photo).

My visit to HMS *Ark Royal* started early one foggy morning at RAF Leuchars in Scotland. This northerly airfield is the shore base for *Ark Royal's* Phantom aircraft, as a huge Royal Navy sign proudly proclaims on 892 Squadron's hangar wall. When operating in coastal waters, helicopters are frequently used for carrier onboard delivery (COD) flights between the ship and mainland, carrying newspapers, mail, personnel and the occasional guest. For my trip, one of 824 Squadron's Sea Kings was used as there were several crew members waiting for a 'lift' back to the ship, and the Sea King offered generous seating capacity and a very useful long range capability in the poor weather conditions.

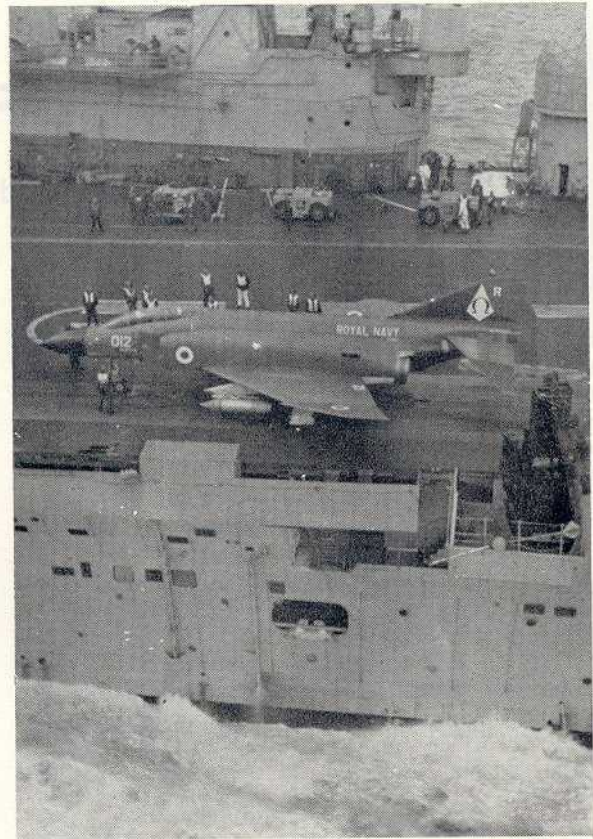
A converted Mk 4 Gannet fixed-wing turbo-prop aircraft is usually employed on COD duties where a small amount of freight is to be delivered, but this ageing aircraft is not really suitable for passenger transport. It only has cramped accommodation for two passengers compared to the voluminous cabin of the Sea King which can easily carry 12 without removing any of the anti-submarine equipment.

The Sea King is a great improvement over earlier helicopters such as the Wessex, not only in range and





Top Buccaneer S2C about to touch-down on Ark Royal's round down. Practice bombs can be seen on the wing pylons. **Above** a rocket-armed Phantom FG 1 about to hit the deck. Large flap area is necessary to reduce the speed of this American fighter for landing on small British carriers. **Right** a Phantom of 892 Squadron is marshalled on to the waist catapult. Towing vehicles can be seen parked by the island structure (Author's photos).



sophistication of equipment but in cockpit and cabin comfort. Like all helicopters, it is pretty noisy inside, although there is remarkably little vibration. One can stand up straight and walk about in the cabin, which is more than can be said for the Wessex or Puma!

As we gently lifted off the pad at Leuchars and headed over the coast, I watched the radar operator plot our route over a completely featureless sea of fog to an area in which *Ark Royal* was known to be steaming. Flying at a steady 90 knots at a height of exactly 1,000 feet, it took us nearly one and a half hours to reach the mother ship. This was a good demonstration of the accurate long range capability of Westland's big twin-engined Sea King. We reduced altitude until the wave crests appeared uncomfortably close and suddenly, through a side window, I saw the superstructure of *Ark Royal* slide into view a few feet below and to the starboard side. A gentle bump and we were on Ark's flight deck. A few minutes later all the passengers were safely in the 'island' structure, stripping off layers of rubber immersion suit, while the Sea King of 'Ark Airways' was already 'folded' and towed away aft out of the way of flying operations which were about to commence.

An aircraft carrier deck is just about the noisiest and busiest piece of real estate that could be found anywhere on earth! Men rush around in brightly-coloured overalls, yellow tractors push and tug at

comparatively huge aircraft, manoeuvring them from one end of the deck to the other. People shout at each other, heads nod, hands signal and young lads scurry about in packs, searching for 'foreign objects' such as bolts and pieces of metal that could maim or kill if caught in the blast of a jet fighter. To the casual observer it seems like a theatrical back-stage scene change or perhaps a gigantic game of chess, but in an office on the flight deck level of the 'island' a deck plan is covered with wax-pencil markings indicating precisely where everything is to be positioned. The plan is placed in a window for the handlers to see. The word 'teamwork' seems to take on a deeper meaning.

Within five minutes or so the crowded deck had been completely rearranged. The aircraft were now grouped either at the rear of the flight deck or beside the island. The brightly painted Wessex Mk 1 plane guard lifted from the 'Fly 3' position and started circling the ship. Flying the plane guard Wessex is one of the most hazardous duties undertaken by any of Ark's aircrew for it entails flying for long periods at ultra low speeds and very low altitude. As the Wessex Mk 1 is only a single-engined machine, any engine failure on plane guard duties would not allow sufficient height or speed for an autorotation recovery. In order to pace the aircraft carrier the Wessex must fly at less than 30 knots and at an altitude of under 100 feet. Frequently the altitude is well below deck

level of the carrier. Trained rescue crew stand by in the cabin ready to snatch to safety any aircrew should an aircraft end up in the water.

With the Wessex taking up its position just off the port side of *Ark Royal*, the first fixed wing aircraft were readied for take-off. The six crew members of two Gannet Mk 3 airborne early warning aircraft clambered into their odd-looking machines and soon the contra-rotating propellers were turning. As the first aircraft moved forward, guided by the flight-deck crew, it slowly spread its wings as if glad to be out of the confines of its below deck hangar. One could almost imagine a final yawn from the Gannet's chin intake as its double-cranked wings locked into position for take-off.

Each fixed-wing aircraft type operating from *Ark Royal* has its own catapult position marked on the deck and, while the retractable blast screen was being raised behind the launch area, a party of white-jacketed deck crew fitted the hold back bar and catapult strop underneath the aircraft. As the noise level rose, the aircraft visibly sat up on its undercarriage oleos, straining to get away. The flight deck officer, who held the pilot's attention, raised his hand, the area was clear for take-off, everything was checked, a green light was given and the hand came firmly down. The catapult slot was filled with white steam and within a couple of seconds the Gannet was away and banking to port as it gained altitude. As soon as the launch had taken place, the blast screen was lowered into its recess ready for the next aircraft waiting on the angled-deck catapult.

As I watched the second Gannet smoothly zip into the air, the first Buccaneer was unfolding its wings and being positioned on the forward catapult. As soon as it had passed over them, the blast screens popped up again and the hold back bar was attached under the tail. A couple of agile deck crew fixed the strop in place and the aircraft came down on to its tail bumper with its nose wheel in the air. This is done in order to maximise the lift available at the crucial launch period, when every square inch of wing surface counts. The moving tail is also adjusted to the horizontal in order to improve the take-off characteristics. The roar of the Buccaneers was tremendous after the comparatively quiet turbo-prop engines of the Gannet and one could understand why the blast screens had to be water-cooled. With maximum power the Buccaneer was launched 'hands off' as this advanced aircraft has its controls pre-set and automatically assumes the correct take-off angle as it leaves the end of the catapult. A trail of smoke in the now clear blue sky gave the last glimpse of the aircraft as it accelerated out of sight.

Having witnessed the rapid launch of several of 809 Squadron's Buccaneers, I noticed with interest that the next aircraft was a McDonnell Douglas Phantom FG 1. This mean-looking multi-rôle fighter is undoubtedly the most impressive carrier-based aircraft ever. The extra-extendable nose-wheel leg serves



Top the aft lift can be clearly seen in this aerial view of *Ark Royal*. **Above** Soviet intelligence-gathering ship photographed by author off the Scottish coast. Similar in appearance to a trawler, the IGS carries numerous 'eavesdropping' aids.

the same purpose as the tail down attitude on the Buccaneer, helping to give extra lift. Just as I was expecting to see the steam billow, the steel strop fell from position and a small army rushed under the aircraft to put things right without undue delay.

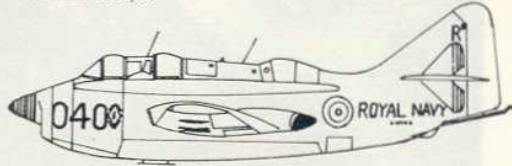
Below jack-stay ship-to-ship transference is regularly practised as a training exercise, as between *Ark Royal* and *HMS Kepple*.



HMS Ark Royal and her aircraft

Drawings by Richard E. Gardner

Ship's Flight Aircraft The Gannet Mk 4 replaced the Grumman Avenger in the COD role and is painted in RAF Blue-Grey, similar to RN helicopters. All markings are in white except for the yellow 'rescue' arrows and the yellow/black stripes on the nose and tail. The ship's badge is painted behind the letter 'R' on the tail and the 'bumble bee' of 849 Squadron is illustrated on a white diamond below the forward cockpit.



Fairey Gannet COD 4 XG790
(Withdrawn from service late in 1972).

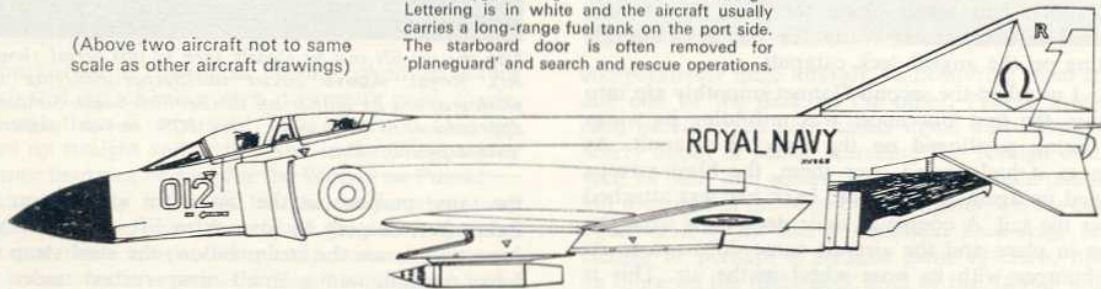
Ship's Flight comprises two Wessex Helicopters.

Westland Wessex HAR 1 X5880



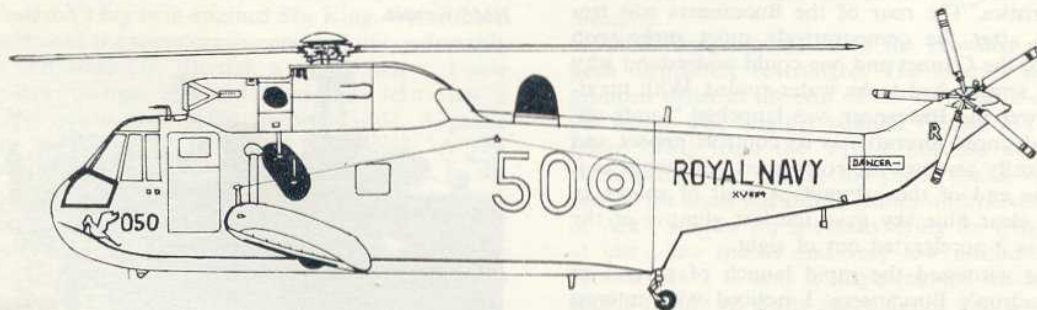
Wessex HAR 1 is in standard blue-grey finish with dayglo orange nose and rear fuselage. Lettering is in white and the aircraft usually carries a long-range fuel tank on the port side. The starboard door is often removed for 'plane-guard' and search and rescue operations.

(Above two aircraft not to same scale as other aircraft drawings)



McDonnell-Douglas Phantom FG1 XV860 of 892 Naval Air Squadron.

Finished in standard RN high gloss extra dark sea grey upper surfaces and white undersurfaces. 892 Squadron markings comprise a black omega on a white and red background.



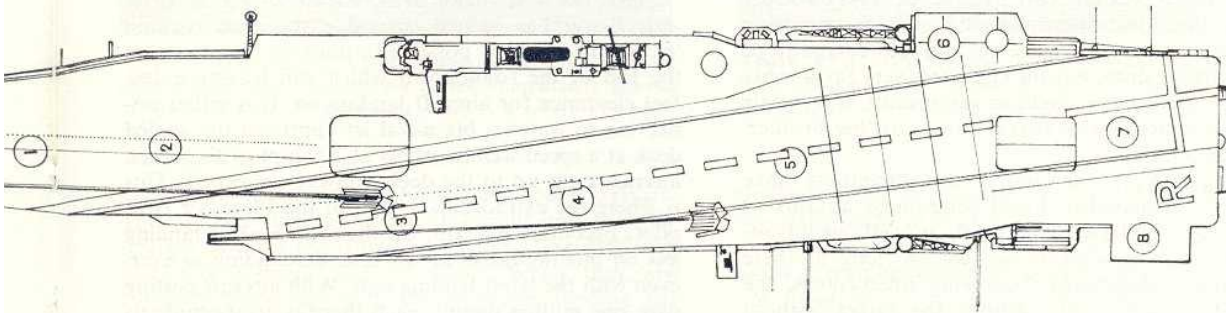
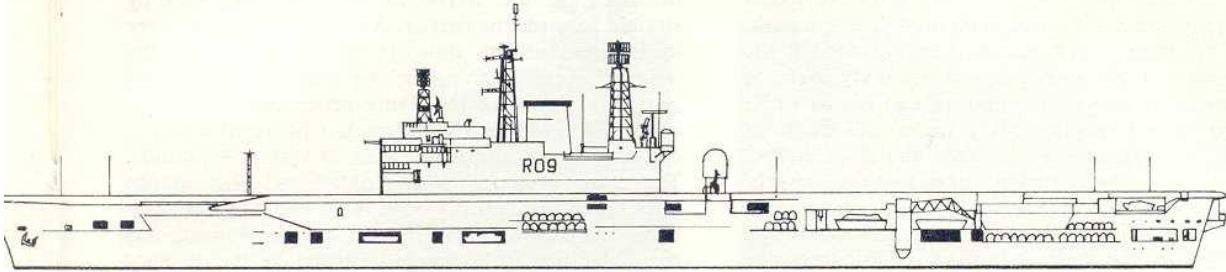
Westland Sea King HAS 1 XV654 of 824 Naval Air Squadron.

Overall blue/grey colour scheme with white codes and 'flying stork' badge on nose.

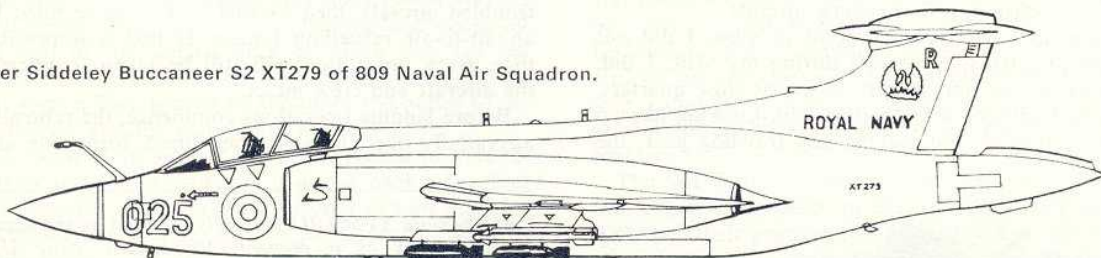
Ship's badge carried by Ship's Flight aircraft



HMS Ark Royal, 50,000 tons.

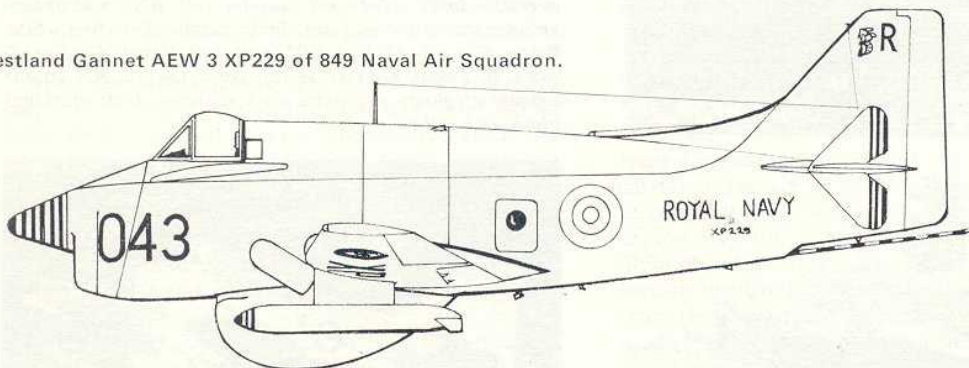


Hawker Siddeley Buccaneer S2 XT279 of 809 Naval Air Squadron.



Overall extra dark sea grey with all codes and serials in light blue. Squadron badge is a yellow firebird over red flames. Aircraft XT279 carries the symbol of Flight Refuelling Ltd on its intake sides to denote its role as an air-to-air tanker. Sidewinder air-to-air missiles can be carried on outer pylons for self-defence.

Westland Gannet AEW 3 XP229 of 849 Naval Air Squadron.



Extra dark sea grey upper surfaces with lower sides and undersurfaces painted sky. Black and yellow stripes are carried on the nose and fins. The 'bumble bee' badge is on the tail. Codes and serials are black.

Before you could say 'Fly Navy' the strop was back and the countdown continued. As the re-heated Rolls-Royce Spey engines reached maximum power, a pink, turning to white hot flame reached out behind the rear fuselage. I felt every bone in my body shake in the presence of such massive power and just as I half expected to start disintegrating under the strain of being so close, there was a 'woosh' and the Phantom was gone! The men working next to these 'angels' must have reinforced frames as well as iron nerves! Within a few minutes the deck had been cleared and eight aircraft had been launched. Considering the large size of the Royal Navy's aircraft and the small size of *Ark Royal* compared to the US Navy's super carriers, the launch was impressive. *Ark* may not have the generous parking space or multiple catapults of the American ships, but she compares very favourably in terms of efficiency, and can get aircraft into the air almost as quickly with two catapults as 'big brother' can with four.

During NATO exercises, *Ark*'s Phantoms have repeatedly intercepted Soviet long-range aircraft at all altitudes and have undoubtedly proved one advantage of retaining aircraft carriers—so long as there are manned ship-based fixed-wing interceptors, the Fleet Commander can identify the target without having to risk destroying an unidentified intruder with a missile. Without *Ark Royal*, the Royal Navy would lack maritime air superiority and would be at the mercy of other hostile maritime aircraft.

Unfortunately, from my point of view, I did not witness any Russian aircraft during my visit. I did, however, get an opportunity to see, at close quarters, a Soviet Intelligence Gathering ship. Looking like an ordinary trawler, but lacking any trawling gear, the

grey and white 'spy' ship was first spotted a couple of miles off the starboard bow of *Ark*, heading straight towards the carrier. As flying operations were in progress at the time, it was obvious that the 'visitors' were listening in' to radio messages and generally observing the flying procedures. Squatting in the cabin of the SAR *Wessex*, I obtained a bird's-eye view as we circled the IGS at very low altitude. The name of the ship was noted and photographs were taken through the open door and window positions. Soon after being buzzed by the *Wessex*, this particular 'spy' ship was left behind by the 30 knot *Ark Royal* and was not seen again.

Since her last major refit, which ended in 1970, *Ark Royal* has gained several extra deck parking 'bays' and it is now possible to position Phantoms on the end of the rounddown whilst still leaving a few feet clearance for aircraft landing on. It is rather unnerving to watch a big naval jet approach the angled deck at a speed well in excess of 100 mph with parked aircraft right up to the deck 'runway' markings. This is where the extraordinary skill of the Fleet Air Arm pilots becomes apparent, for the technique of landing jets on moving decks at sea is as demanding as ever, even with the latest landing aids. With aircraft costing over one million pounds each there is great emphasis on safety aboard *Ark*, and a pilot may be diverted to a shore station if his aircraft suffers a malfunction in the air. If the land bases are beyond range of the troubled aircraft, then its fuel tanks can be filled by an air-to-air refuelling tanker. If this is impossible then every precaution will still be taken to retrieve the aircraft and crew intact.

Before landing operations commence, the returning aircraft fly over the ship, then break formation and



Left Phantom XV569 013 is closely watched by the plane-guard *Wessex* as it prepares for launch. Note USS *Saratoga* marking below the fin, collected during a visit to the US carrier.

Below left HMS *Ark Royal*'s communication Gannet COD XG790 taxis into position. Aircraft is finished in overall glossy blue/grey similar to RN helicopters. Spinner and tail stripes are black/yellow. Lettering white. **Below** Gannet AEW 3 XP229 of 849 Naval Air Squadron's 'B' Flight. Gannet 3s still carry the old RN colour scheme of glossy sky/extra dark sea grey. Unit markings black and yellow.





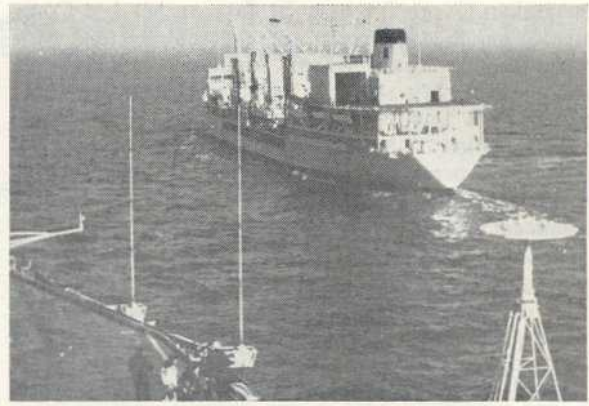
Above *Buccaneer S2C of 809 Squadron on the forward catapult. The blast screens are raised immediately behind the aircraft, and the hold-back stop can be seen beneath the tail.*

lower their flaps, arrestor hooks and undercarriages. They spread themselves out in circuit and then fly straight towards the rounddown, correcting drift and sink rate visually and by radio. When they are correctly 'lined up' with the projector landing aid they know that they can fly straight on to the deck, aiming at the second or third arrestor wire. If the tail hook misses all the wires, this is known as a 'bolter'. The pilot, who has already increased power for the final approach, opens up full throttle and roars off the end of the angled deck to make way for the following aircraft. The moment the hook misses the last wire, a flare is fired to announce the bolter to the deck crew and the planeguard helicopter.

As soon as an aircraft has been brought to a standstill by the arrestor wires, it is drawn back a few feet to release the wire; the hook is raised and the machine taxis off the landing area to park forward with its wings folded. The deck arrestor wire is brought back into position and in the same time it has taken to describe this procedure, the next aircraft is approaching the stern. Should an approach be made too soon, before the flight deck is clear, the aircraft will increase altitude, fly over the carrier, and join the circuit again for another attempt.

Night operations aboard *Ark Royal* are even more spectacular than those during the day. The whole flight deck is bathed in pink illumination from the glow of the Phantoms' re-heated Speys, while the Buccaneers' 'tail-down' attitude results in a highly sparky launch! Aircraft returning at night can best be described as 'arriving' rather than being recovered, for there is little advance visual warning, as they suddenly burst out of the darkness and slam down on to the deck.

Although the carrier cannot be highly illuminated at night, for fear of blinding the pilots, flying operations carry on much the same as in the daylight hours. Landing aids have become much more refined as a result of experience gained on Britain's carriers



Above *RFA Olmeda, one of the Royal Navy's largest Fleet Replenishing Oilers, being approached by Ark Royal prior to refuelling operations taking place.*

throughout the last decade, and as a result of American experience in Vietnam operations.

In the anti-ship rôle, the Buccaneers can carry four lepus flares plus bombs or rockets. The flares, which are fitted with small parachutes, burn for several minutes, producing an intense level of illumination over a considerable area. Target marking naval ships and helicopters are deployed around the target zone and measures are taken to ensure merchant ships do not stray too near. While I was aboard *Ark*, I watched Buccaneers and Phantoms make simulated rocket attacks on a target towed by another Royal Navy ship a couple of miles away. A large 'splash' target is also towed behind *Ark Royal* for similar target practice.

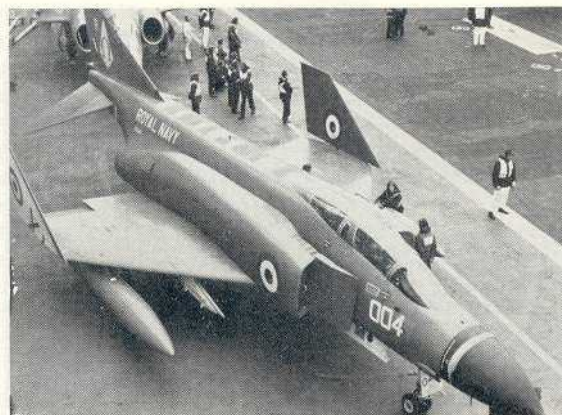
The Sea Kings of the Fleet Air Arm are currently the largest helicopters in the British armed forces. Although their primary rôle aboard *Ark Royal* is that of anti-submarine warfare, they are highly versatile and also serve in the long-range rescue and medium-lift support rôle. The Rolls-Royce Spey engines used by the fixed-wing jet aircraft are too heavy to be air-lifted by the Wessex utility helicopters based on most Fleet Auxiliary vessels, but the Sea King can carry one Spey, slung externally in a special cradle. When operating off the Scottish coast in support of NATO's Northern Flank, Sea Kings from *Ark* can thus keep the ship air supplied with serviced Speys from Leuchars, saving much time and enabling the carrier to remain on station. Several engines in need of servicing were similarly exchanged for 'new' ones during my visit. When taking up the load from the flight deck the rotor blades of the helicopter could be seen to bend under the strain and the journey to and from the shore had to be taken very slowly to avoid load spinning getting out of control.

Ark Royal is not just a floating runway. The carrier is in effect a self-contained mobile mini-air force with enough fuel and supplies to remain at sea indefinitely. Her sister ship, *HMS Eagle*, remained on station in

the Indian Ocean for over 70 days on her last Commission and *Ark Royal* could emulate this with replenishment from Royal Auxiliary tankers and supply ships. The ship has very comprehensive communications and control facilities as well as well-equipped aircraft hangars and maintenance sections. With four operational squadrons, plus the SAR flight, Ark's aircraft complement is larger and better balanced than most shore bases.

In time of international tension, Ark's angels can provide airborne early warning and fighter direction, high or low level interception, medium and long-range strike and reconnaissance over sea or land, and anti-submarine cover over a wide area.

Hostile forces could find *Ark Royal*, and the ships or amphibious forces under her protection, a very difficult target as her aircraft could deal with the short and medium range missile carriers before they could get within range. As most Soviet maritime attack forces are directed by long-range airborne 'control' aircraft, any offensive action would be further frustrated if these machines were eliminated by Ark's Phantoms. The remaining threat, from long-range missiles, would be diminished by the capability of steaming anywhere within a circle of 500 miles within the time required to launch and despatch an ICBM. All in all, HMS *Ark Royal* provides a maritime deterrence value out of all proportion to her size or financial cost. It has taken sixty years of naval flying to perfect the concept of the aircraft carrier. When the time comes to finally withdraw HMS *Ark Royal* from service, it is to be hoped that her successors will



Above Phantom XV592 parked off the flight line out of the way of flying operations. The narrow white line indicates the limit to which parked aircraft can be placed during normal flying operations from the angled deck. **Below** examples of all the carrier's fixed wing aircraft can be seen in this photograph. The aircraft are marshalled into this forward parking area after flying operations. Note the wing stays locking the folded wings of the Gannets (MoD photo).

prove equally versatile. Few could have realised in 1943, when she was originally laid down as HMS *Irresistible*, that thirty years later she would still be the Royal Navy's most powerful ship.

For an annual cost of about £2 million spread over her life to date, she has been a bargain peace keeper! □

