ISTITUTO AFFARI INTERNAZIONALI
ROME

INTERNATIONAL INSTITUTE
FOR STRATEGIC STUDIES
LONDON

THE ATLANTIC ALLIANCE, SOUTHERN EUROPE AND THE MEDITERRANEAN

Technological and Military Changes affecting the Maritime Balance in the Mediterranean Sea

by Maurizio CREMASCO

Castelgandolfo
10/11 April 1978

INTRODUCTION

This paper will be divided into two sections, the first of which will examine the most recent technological developments in naval warfare and weapons systems, with particular reference to achievements by the United States, and the second a number of related questions. Here, special attention will be given to the Mediterranean as a source of points for discussion and debate.

The Soviet Navy

Over the last twenty years, the Soviet Navy has been transformed, from a force capable merely of defending sea zones around the Soviet Union, into one which can not only "show the flag" in all the world's seas, but can make its presence felt in concrete terms and thus exercise political and military pressure in any zone of interest to the Soviet Union, in crisis areas or in regions where there exists a naval vacuum. The Soviet Navy is today a force which, in a conflict, could effectively oppose allied naval forces and threaten the viability of maritime lines of communication essential for Europe and the United States' survival, while, at the same time, maintaining its coastal defense capability intact. It is a force which has acquired a capability to intervene with steadily improving amphibious forces, at least in areas close to Soviet territory. Using the Soviet mercantile marine, which has expanded at an equally rapid rate, the Soviets can maintain sea supplies, at an adequate level, to countries involved in regional conflicts which request aid from the Soviet Union.

Nonetheless, in certain fields the Soviet Navy still has its weaknesses: her ASW capabilities remain inadequate; her submarines

./.

are still relatively noisy; she lacks adequate air defense; she has a poor capability for sustained combat operations; many of her missile systems lack a reload capability; she has a limited ability to provide logistic support to her forces at sea and her logistic ships are highly vulnerable; she has little capability to project power ashore in distant areas because she has no sea-based tactical air power and her amphibious forces are mostly designed for short duration amphibious lift near the homeland.

Technological Developments

Technology has had many varied effects on the evolution and strengthening of naval forces. Nuclear power made it possible for vessels to operate for long periods without refuelling and to maintain unusually high speeds. Particularly for submarines, the use of nuclear power implied a high degree of operational flexibility.

Improvements in conventional drive systems connected with special construction techniques - hydrofoils, hovercrafts, surface effect ships - have increased speeds and thereby mobility and the capacity to intervene rapidly. This is very useful in anti-submarine warfare and, at the same time, decreases these vessels' vulnerability.

The development of even more precise and sophisticated ship-to-ship and ship-to-air missiles has given even small vessels, and thus relatively small navies, significant strike power, not only in offensive terms (the ability to inflict significant damage on larger warships) but also for defense. When this is combined with increased speed and manoeuvrability, this makes these small vessels difficult and expensive to attack and destroy.

The development of helicopter and verticle take-off air-

./.

craft and their improved ability to operate from relatively small vessels, even in adverse sea conditions, has increased the potential for surveillance, offense and defense both by single units and by naval forces in general. This makes it easier for escort units to defend logistic units and convoys and increases naval forces' ability to give support to amphibious operations.

Developments in electronics and computers have made it possible to improve the accuracy of search and localization systems, command systems and semi- or fully automatic fire control centres, especially well adapted to facing a complex, diversified missile or air threat.

At the same time, technology has made it possible to improve the kind of coordination between ships, aircraft and helicopters, essential for efficient operation, especially in anti-submarine warfare.

Naval Building

Let us consider the various sectors and their development trends. As far as naval building is concerned, the United States are planning:

- nuclear strike cruisers (CSGN), equipped with the Aegis anti-aircraft and anti-missile system, capable of operating either as an integral part of nuclear carrier task forces or alternatively as independent units. This latter capability being due to their high performance, minimal dependency on logistic support and offense and self-defense capabilities;
- guided missile destroyers (DDG-47 class), equipped with the Aegis

./.

anti-aircraft and anti-missile system, for use with conventional task forces and for support for amphibious forces or logistic units in high threat density areas;

- guided missile frigates (FFG-7 class) for use as escort units, especially for logistic units and convoys in areas with a lower threat. This building programme is a typical example of programmes being carried out by many Western navies for which guided-missile frigates are becoming basis units (e.g. the Italian "Lupo" class and the Dutch "Kortenaer" class frigates; the NATO frigate 122 which is to be adopted by the GFR);
- a limited number of "Pegasus" class hydrofoils (PHM-1). The number of vessels to be constructed has been reduced from the 30 originally planned to 6 owing to rapidly rising costs. The first vessel was delivered to the US Navy in June 1977. It is the UN Navy's intention to use the 6 PHMs as a tactical squadron of small, high speed, high firepower vessels to develop advanced tactics and gain technological experience, for a better understanding of the employment opportunities for these units and of the optimum characteristics for hydrofoils of the future.

The techical success of the PHM is reported to have removed all doubts as to the technical viability of larger hydrofoils, with nearly 1000 tons displacement, a transoceanic capability and for 90% of the time, a velocity of more than 40 knots in all seas;

- new helicopter carriers (LHA's). These, given their size and displacement (similar to those of the Soviet aircraft carrier, the Kiev), could, in certain circumstances, replace aircraft carriers as on-scene ready forces. If we consider the (fixed and rotating

./.

wing) aircraft with which they are equipped and the Marines units they carry, it is clear that they are suitable for a wide range of functions and that, in particular, they could partially fulfil the forward deployment commitments previously fulfilled almost exclusively by strike carriers.

For the future, the United States are studying whether it would be possible, within acceptable cost/effectiveness ratios, to build, on the one hand, larger, more capable versions of the Sea Control Ships (now designated as the V/STOL Support Ship or VVS) - a ship of this kind has been included in the building programme for fiscal 1980 - and on the other, Surface Effect Ships, which, with displacements of several thousand tons and speeds in excess of 80 knots, could significantly increase the operational flexibility of escort forces, particularly in anti-submarine roles. This kind of vessel could be operational towards the end of the 1980's.

Meanwhile, the Soviet Union has built:

- the aircraft carrier "Kiev" (officially designated as an anti-submarine cruiser), which, quite apart from its significant defensive and offensive missile weaponry, is equipped with KA-25 "Hormone" helicopters and Yak-36 V/STOL "Forger" aircraft. The ship is capable of undertaking anti-submarine operations and of giving support to amphibious operations;
- an improved version of the "Kara" class cruiser, a unit first assigned to the Soviet Navy in 1972, one of the most technologically advanced of Soviet surface ships;
- an improved version of the "Krivak" class guided-missile destroyer;

./.

- the'Nanucka"class guided-missile patrol gunboat, another technologically advanced ship. Relative to its displacement, the "Nanuchka" is the most heavily armed warship in the world. She is equipped with six anti-ship cruise missiles and a SAM system as well as guns. She also carries a complement of equipment for electronic and radar countermeasures;
- the "Boris Chilikin" class replenisher oiler (AOR). This ship is especially significant as it could significantly improve the Soviet Navy's poor alongside, underway replenishment capability. As is well know for support operations, the Soviets are extremely dependent on the availability of mobile bases. These bases, composed of merchant tankers and/or naval auxiliaries, are normally located in anchorages in international waters to provide limited logistic support and minor maintenance.

Anti-Submarine Warfare

As far as anti-submarine warfare is concerned, technology offers good prospects for the future even though there has yet to be a breakthrough capable of significantly facilitating the struggle against modern nuclear and conventional submarines.

In the undersea surveillance field, the United States are planning two new systems, the SURTASS (Surveillance Towed Array Sensor) and the MSS (Moored Surveillance System).

The former gives fleet commanders a highly effective mobile sensor, allowing surface vessels in tactical escort roles to increase their cover of those areas enemy submarines would have to cross to launch missile or torpedo attacks.

./.

The second system, which involves the deployment of passive sensors by aircraft, submarines, or surface vessels in a distributed pattern in the area of interest, will provide surveillance in areas where coverage cannot be achieved by other methods.

In the sensors field, major improvements are predicted in the AN/SQS-26 surface ship sonar and the provision of the TACTAS (Tactical Towed Array Sensor) to the combatant ships; both systems will be integrated with the LAMPS III helicopters. Furthermore, the new AN/BQQ-5 submarine sonar will be installed on the new "Los Angeles" (SSN-688) class attack submarines.

In the field of anti-submarine weapons, it is planned to improve the MK-46 torpedo (Mk-46 Neartip) and to develop a new advanced light weight torpedo (ALWT) which will have a more powerful warhead, greater speed and greater depth capability than the Mk-46 Neartip. As far as ASW mines are concerned, it is planned to develop the "Quickstrike" family of air and submarine-laid mines, which are economical, operationally flexible and resistent to countermeasures, as well as the propelled rocket ascent mine (PRAM) which will not, however be ready for procurement until the late 1970's. Both systems will help to increase the anti-submarine capability of the "Captor" mine, which is already operational.

As far as regards aerial vectors, we may quote the improvements achieved in the technological sophistication of the search, localization and tracing systems used by the "Orion" maritime patrol aircraft, the entry into service of the new "Viking" S-3A anti-submarine aircraft carried by aircraft carriers (a great improvement over the old S-2) and the planned entry into service, in a few years time,

./.

of the new LAMPS Mk-III helicopter.

Naval Weapons

As far as naval weapons are concerned, the real revolution has been the introduction of the anti-ship missile which has now become a typical weapons for all kinds of surface vessel, including vessels with relatively low displacements, and which can even be mounted on submarines (and launched from a submerged position) as well as on attack aircraft (the air-to-surface version).

In this field, the Soviet Union is several years ahead of the United States. Whereas the Soviet surface fleet is now fully missile equipped, the United States, although possessing a stronger naval air arm, will only achieve a complete balance when the "Harpoon" missile and the tactical version of the "Tomahawk" cruise missile are fully operational.

Not only will "Harpoon" be used to equip practically all new surface vessels, it will also be mounted on MAP P-3C "Orion" aircraft, on the S-3A "Viking" anti-submarine aircraft and on carrier-borne attack aircraft.

With "Harpoon", attack aircraft will have stand-off ranges greater than the range of Soviet defensive missile systems. In particular, all weather A-6E aircraft configured with "Harpoon" will outrange even the most advanced Soviet anti-ship missile. In other words, carrier attack aircraft will be able to attack Soviet surface ships at distances sufficient to ensure that these cannot effectively threaten nuclear carrier task forces with surface-to-surface missiles.

./.

As well as the improvements which have been made to the second version of the SS-N-2 "Styx" missile (which has been used to arm "Osa" units in the Algerian and Libyan as well as in the Soviet Navies), the Soviet Union has developed a series of naval surface-to-surface missiles: the SS-N-9 mounted on "Nanuchka" class units; the SS-N-10 (or SS-N-14) mounted on "Kara", "Kresta" and Krivak II" class units; the SS-N-11 mounted on the most recent versions of the "Osa" class and a number of modified "Kashin" class units; the SS-N-12 mounted on "Kiev" class units.

Aerial Vectors

In the aerial vectors field, the most significant American innovation has been the entry into service on aircraft carriers of the new F-14 fighter interceptor armed with "Phoenix" air-to-air missiles. The most important Soviet innovation has been the introduction of the new "Backfire" bomber which, on account of its range (around double that of the subsonic "Badger" which it is to replace), its supersonic speed, its improved electronic warfare capability, and the possibility of equipping it with the most recent AS-6 air-to-surface missiles, represents a qualitative leap in terms of potential threat and the Soviets ability to guarantee adequate air cover even in areas not covered by "Badgers".

Anti-Aircraft Defense

In the anti-aircraft defense sector, the United States are developing the Aegis system, which is to be mounted, as we said earlier, on the CSGN's and on DDG-47 class destroyers.

In its functions as a fully integrated detection-to-kill air

./.

defense system, Aegis offers extremely fast reaction times, significant resistance to jamming and the ability to oppose high density attacks. In its functions as a command and control system, it allows the commander of the task force to coordinate the various air defense weapons, in the units under his command, with a high degree of effectiveness.

Other planned developments include: Standard Missile (SM-2); improvements to provide a mid-course command guidance capability; improvements of the ECCM features of the SAM systems; improvements of the intercept performances in a jamming environment, as well as the purchase of the "Phalanx" CIWS (Close-In Weapon System), a low-cost, high rate-of-fire, 20 mm gun system which will provide the surface ships a limited endurance defense against the majority of existing Soviet missiles.

Two further sectors should also be mentioned:

Fuel Air Explosives

The first of these is Fuel Air Explosives (FAE). FAE weapons enclose a highly inflammable mix of hydrocarbons in internal tanks. On impact, this mix is freed and vaporizes spontaneously, forming a cloud with a diameter of around 16 metres and a thickness of 3 metres. This cloud (in the aerosol state) is then detonated, provoking a shock wave whose destructive power is much higher than that of a TNT bomb.

Reportedly, FAE's have been used as anti-ship weapons during operational trials and the results have proved extremely interesting. When a second generation FAE charge on a barge was exploded close to

./.

target, a US Navy destroyer, the damage inflicted was sufficient to sink the vessel.

The use of FAE charges as anti-ship weapons appears especially promising. On-board superstructures (radar and communications antennae, electronic warfare and flight assistance systems) as well as aircraft and helicopters on deck are especially vulnerable to the effects of the shock wave. It is believed that an over-pressure of 0.42 Kg/cm^2 would be more than enough to inflict sufficient damage on a warship to decisively reduce its operational capability. If we bear in mind that third generation FAE charges should lead to over-pressures of around 0.9 Kg/cm^2 with a charge of 500 Kg of methane, at a distance of 100-130 metres from the edge of the gas cloud, and a residual pressure of 0.42 Kg/cm^2 at 170-190 metres, we can easily realize the importance which these weapons could assume in naval warfare, particularly if and when third generation FAE charges are applied to hig-precision anti-ship missiles. This does not, however, seem to be the trend.

Remotely Piloted Vehicles

The second sector is RPV and mini-RPV (remotely piloted vehicles). These may be used as vectors for surveillance and reconnaissance missions and as laser indicators for laser-guided shells, fired by the naval cannon of the major combatants.

This is a sector in which research and development is extremely intensive. Nonetheless, particularly in naval applications, there are still serious problems to be resolved before these weapons can be used in war with operationally valid results.

The main problem is in launch systems and in systems for the

./.

recovery of RPV once their mission has been concluded. For naval units, this has proved to be a difficult and complex operation.

Having summarized the technological changes affecting both the naval confrontation between the two superpowers and naval warfare in general, let us now examine the specific effects in the Mediterranean area.

The Mediterranean Theatre

Technological progress in naval warfare and weapons systems; the qualitative strengthening of the fleets of the superpowers and their respective naval air arms; the purchase by North African countries of naval units equipped with anti-ship missiles and the decision of certain of these countries to buy advanced technology aircraft possessing an extended range of action and a high weapon load, poses complicated questions concerning future trends in the Mediterranean area, which a series of political factors may well render even more complex.

An overall examination of these questions and the way in which they are tied to specific politico-military scenarios, lies outside the scope of this paper. In practice, the formulation of confrontation and conflict scenarios in the Mediterranean area could easily become a never-ending exercize. At the same time, whereas the consideration of specific scenarios might facilitate analysis, it could well prove to be an over-restrictive approach.

Here, I will limit myself to posing these questions, which can serve as a basis for a full and interesting discussion. At the same time, however, we must be aware that the list of questions dealt with here is in no way an exhaustive one.

./.

The first question is the missile capability of Soviet surface ships and the Soviet naval air arm. What we must ask is whether these forces would be capable of inflicting sufficient losses on the VI fleet to reduce the latter's ability to fulfil its double mission: control over the Mediterranean and support for ground operations on the Southern flank. In other words, would these forces be able to oppose the VI fleet's control over certain areas in the Mediterranean (considering a VI fleet made up of two carrier task forces and support ships), and thus reduce if not interrupt the flow of supplies through the Mediterranean? This question is directly tied to that of the vulnerability, that is the survival capability of the VI fleet and, in particular, its most important component, namely the carrier task forces.

There can be no doubt that, in absolute terms, aircraft carriers, like any major combatant, are vulnerable to a concentrated missile attack from surface ships, submarines and aircraft, particularly if this were a surprise attack, launched with minimal warning and timed so as to be as effective as possible, making it difficult for the defense to counter such a diversified threat. Here the Soviets are favoured by the fact that their ocean surveillance satellites keep them continually informed of the position of United States' fleets.

The attack would be less effective if the element of surprise were wholly or partially lacking or if it were impossible to concentrate a sufficient number of missiles on the same target. At the same time, the entry into service of the new nuclear strike cruisers and of DDG-47 class destroyers, both equipped with the Aegis anti-ship missile defense system, would further complicate the planning of this kind of attack, increasing the number of vectors which would have to

./.

be targetted against each priority target and complicating calculations of risk margins and of military cost effectiveness ratios.

In other words, were there to be advanced warning, a far from improbable hypothesis given that the Soviet Mediterranean fleet would have to be strengthened with surface ships and submarines from the Black Sea and the Atlantic fleets brought in through the Bosphoros and through the Straits of Gibraltar - the kind of movement which could not pass unobserved - and given that the re-deployment of Badger and Backfire aircraft to bases closer to the zone of operations, so as to exploit their range better, would also be visible, it seems less likely that the VI fleet could be neutralized as an operational force in the Mediterranean.

At the same time, if we consider the vulnerability problem in relative terms, carriers and strike cruisers, because of their size and displacement, possess significant self-protection and armour features. Furthermore, they have a great deal of redundancy and highly effective damage control systems.

Although we should bear in mind that evidence given during Hearings is motivated by prestige factors and by the need to justify programmes and funding and to reaffirm the armed forces traditional roles and missions, it is worthwhile quoting the Department of the Navy response to a question by Senators Nunn and Culver during hearings before the Senate Committee on armed services for the fiscal year 1977 authorization for military procurement. The question concerned the vulnerability of carrier task forces. The answer read as follows:

"Aircraft carriers operated in flexible task forces which combine the various kind of offensive and defensive systems in mu-

./.

tual support, routinely deploy in forward area. Further, task forces are capable of tactical surveillance to the extent that the effect of surprise should be blunted. Task force airborne early warning and fighter aircraft can engage incoming raids hundreds of miles from the task force and well beyond Soviet anti-ship missile range. Given adequate intelligence, along with on-board capabilities for long range surveillance and reconnaissance, naval tactical commanders would use the mobility inherent in carrier task forces to maintain the tactical advantage over opposing forces.

Thus, carrier task forces tend to be less vulnerable as isolated naval units than the underway replenishment groups which support them. Carriers themselves are less vulnerable than other surface combatants, across the spectrum of warfare, because of their size and compartmentation. For example, during training exercises in 1969, the nuclear carrier Enterprise endured accidental explosions of 9 major caliber bombs (equivalent in explosive power to 6 anti-ship cruise missiles) on her flight deck. All essential ship systems remained operable, effective damage control contained the effects of the fires, and the ship could have resumed air operations within hours".

As far as the second question is concerned, namely the Soviet Eskadra's ability to interrupt lines of communications (LOC's) in the Mediterranean, various arguments should be borne in mind.

During the Second World War, in the period from 1940 to 1943, British air and sea forces failed to cut logistic supply links between Italy and North Africa. The statistics here are extremely interesting, showing that, for all kinds of load and for all destinatory countries,

./.

the majority of the load arrived at its destination.

Load	Destination	% Arriving at Destination
Men	Libya	91.6
Materials	"	85.9
Fuel	"	80.0
Men	Tunisia	93.0
Materials	"	71.0
Fuel	"	71.0

This success was achieved despite the fact that Britain had an important strategic stronghold in Malta as well as easy access to the Mediterranean for her naval forces, the advantages accruing from superiority in radar and acoustic detection devices and advanced knowledge of convoy movements derived from the decoding of Italo-German communications, and despite the fact that the Italians lacked adequate air cover and that Italian escort unit were often too few and of insufficient quality.

Clearly, these statistics are not conclusive. Surface ships and attack submarines have been drastically improved since the Second World War, both in terms of speed and offensive capability. The offensive capability of attack aircraft has also increased enormously. At the same time, however, there have been improvements in the anti-aircraft and anti-submarine capabilities of escort units.

What is more, the majority of maritime traffic is through the Western Mediterranean, that is in a zone where sea control and

./.

the maintenance of logistic flows should be relatively easy, particularly if the Soviet Union lacked naval and/or air bases in the Western North African countries.

It might be easier for the Soviet Union to attempt to interrupt maritime traffic towards Europe outside the Mediterranean: in the Indian Ocean, along the sea routes to the South of the Cape of Good Hope or in the Atlantic. This would be particularly true if, as does not seem entirely improbable, the Soviets were able to use ports and airports in African countries (Mozambique, Angola, Guinea). The use of "Backfire" from African bases in an anti-ship role might well be facilitated by the almost total lack of a Western interception capability. It is through the Atlantic that the majority of material and men would have to pass to reach the central front. In this context, it appears significant that all the more important Soviet naval exercises in which a predominant role was assigned to the cutting of the sea lanes, have been held in the Atlantic and especially in a broad area to the North of Great Britain. Obviously, if Libya and Algeria, as well as offering port and airport facilities to the Soviet Union, participated with their naval and air forces in operations against allied forces (the Libyan TU-22 "Blinders" and Mig-23 "Floggers" could play a significant role here), this would change the terms of the question (even after having taken account of the low operational effectiveness of these forces).

The third question concerns the Soviet fleet's ability, given the increased cover and offensive support offered by the new "Backfire" bomber, to deny control of the Mediterranean to the VI fleet. Normally, this question is answered in the affirmative. In

./.

the hearings for fiscal year 1977 authorization, the Navy Department, in an answer to a specific question by Senator Stennis, was fairly explicit:

"In the event of conflict, we could retain control of the North Atlantic Sea lanes to Europe, but would suffer serious losses to both US and allied shipping in the early stages; our ability to operate in the Eastern Mediterranean at best, would be uncertain".

Other experts have gone so far as to state that:

"It seems unwise to count on extensive VI fleet operations in the Mediterranean for very long after major hostilities start. Nor does it seem likely that Italy, Turkey or Greece could hold out long under present concepts of operation without VI fleet and other US support. The Mediterranean may be untenable for surface combat or supply ships in the event of hostilities".

Nonetheless, the concept that allied fleets would be unable to operate in the Mediterranean is a credible hypothesis only in certain specific conditions. The concept requires that the Soviets would have full control over the Dardanelles and thus that Soviet submarines and surface vessels would be able to pass freely from the Black Sea into the Mediterranean. This implies that the land battle on the Greek-Bulgarian and the Turkish-Bulgarian borders would result in Warsaw Pact troops reaching the Aegean Sea and the Sea of Marmara as well as penetrating Turkish territory to the East of the Straits. Nonetheless, even if Western control over the Straits were lacking, would it not be possible to block them with a vast mining operation, using the extremely effective mines provided by modern technology?

./.

Acceptance of the concept means accepting that Soviet naval and air untis would be able to use Syrian and/or Egyptian and/or Libyan and/or Algerian ports and airport facilities. It means accepting that the Turkish air defense system would be unable to oppose overflight by Soviet aircraft and that the (limited) Turkish and Greek navies would be unable to play any significant role. Of course, as far as Turkey is concerned, it is always possible to hypothesize a confrontation between the two superpowers in which the Soviet Union, using politico-military pressure and/or the promise of support against Greece in the dispute over the Aegean continental shelf, convinced Turkey to open her air space to Soviet penetration. This hypothesis appears, however, to be unrealistic, at least in the present situation and for the foreseeable future.

Acceptance of the idea that the VI fleet would be unable to operate in the Mediterranean implies belief in a high survival rate for Soviet "Backfire" aircraft against E-2C and F-14's (armed with "Phoenix" missiles capable of locking on as many as 6 targets simultaneously and with an anti-cruise missile capability), with a long range (the F-14 can maintain station 500 miles from the carrier), which can, if necessary, be extended by in-flight refuelling and the use of airports in Greece and in Turkey (unless these had been closed by the destruction of equipment and infrasturctures) and perhaps in Israel.

It means accepting that it would be impossible to use Italian (or Spanish) airports for B-52's armed with GBU-15 guided bombs (8 per B-52). These aircraft were used as conventional bombers over North Vietnam with very low losses despite the fact that the density of air defense systems was many times higher than the level possible

./.

for Soviet naval units. These bombers with their highly effective ECM stand-off capability, the extreme precision of the GBU-15 (which uses both electro-optical guidance and infra-red imaging - IIR) and the possibility of a fighter escort supplied by the carriers, could play an important anti-ship role.

I believe then that prospects for Soviet control of the Mediterranean should be looked at in closer detail than is usual and that this analysis should be made to depend on an objective evaluation of whether certain conditions are likely to be fulfilled. In other words, Soviet control cannot be excluded "a priori"; just as it cannot be regarded as an "a priori" certainty.

One has the impression that in a conventional conflict - that is the assumption on which this paper is based - excluding the possibility of a surprise attack catching allied forces completely unprepared (as has been hypothesized in Central Europe), and destroying the more significant elements in the VI fleet, and assuming that the Soviet fleet would be unable to use bases in North Africa and Middle Eastern countries, it would have difficulties in fulfilling its sea denial mission and in accomplishing its task of drastically reducing the viability of LOC in the Mediterranean.

Success would be easier against surface ships than against nuclear and conventional attack submarines. Anti-submarine Warfare (ASW) has its own intrinsic difficulties which are especially serious in a "noisy" sea such as the Mediterranean.

These Soviet difficulties would obviously be worsened if, as seems reasonable, both the French fleet (which today concentrates its best forces in the Mediterranean) and the Italian fleet participated in the conflict. Both fleets are, at present, being moder-

./.

nized and strengthened (increased offensive missile capability, increased defense capability against cruise missiles, a more sophisticated and diversified anti-submarine capability). At the same time, our evaluation must include the weaknesses of the Soviet fleet mentioned earlier. Nonetheless, it is clear that the VI fleet can only fulfil its task of giving support to the land battle once it has won its battle in the Mediterranean.

Other questions concern the entry into service of the Soviet aircraft carrier, the "Kiev". Despite its undoubted offensive and defensive firepower and the anti-submarine capability provided by its 20-25 Ka-25 "Hormone" helicopters, we must ask whether it can really be considered as a unit capable, on an enormously reduced scale, compared to US carriers, of projecting power ashore? Could it not it not be what the Soviets have claimed it to be, namely a ship designed primarily for anti-submarine operations, especially against American nuclear missile-launching submarines?

Perhaps it is too early to give a definitive answer, particularly if we consider that the "Kiev" is a prototype and that the "Forgers" with which it is equipped are also at an experimental stage.

It should be noted, however, that the 15-20 "Forgers" on board do not seem to possess a search or intercept radar and are equipped merely with a small ranging radar for air-to-surface use. Given its limited range (it has been estimated that with 2 450 litre pylon tanks and 2 air-to-air missiles, "Forger" could circle for an hour at about 100 miles from the carrier), it seems as if "Forger" is ill-suited for sea surveillance missions, for ship defense or for attacks against enemy aircraft. "Forger" could, however, be used as an

./.

attack vector (guided by radar on the carrier) against MAP aircraft, using air-to-air missiles, for mid-course guidance for SS-N-12 surface-to-surface missiles, as a fighter bomber supporting amphibious operations or for interdiction missions against targets close to coast (4 wing pylons for a mix of air-to-surface weapons and a gunpack, possibly the twin-barrel 23 mm GSh-23 gun beneath the fuselage).

Overall, it seems as if the "Kiev" could act as the nucleus for a task force, similar, on a very reduced scale, to American task forces, the aim being to increase the weight in terms of intervention capability, flexibility and the range of aircraft, of the Soviet naval presence in peace time and in crisis areas.

Whatever evaluation we give of the "Kiev's" effective capability, which for the moment appears to be limited, it is, in any case, significant that the Soviets have decided to construct an aircraft carrier.

It will be interesting to follow developments, particularly if V/STOL aircraft are built with a more sophisticated avionics, improved range and a higher weapons load, capable of using the whole deck length for take off and thus of accomplishing missions assigned them more effectively than is possible at present.

A further question concerns the development of the navies of the Mediterranean countries. Today, these are equipped with fast vessels carrying surface-to-surface missiles capable of representing a significant threat to larger, better-armed units. Has this development reduced, or annulled the possibility of using "Gunboat diplomacy" in the Mediterranean area? In other words, have the risks, connected with the use of naval forces as a means of politico-military pressure,

./.

now become so great, in the face of the light missile boats, as to exclude many of the courses of action which until now the two superpowers have had open to them?

In practice, it seems probable that, although this kind of action has become more risky than in the past, it is still possible. The possession of fast missile boats is insufficient if the country in question lacks an adequate surveillance capability, significant air cover and a command and control system capable of managing the crisis without engaging in excessive reactions. What is more, the country against which the superpower pressure is being directed, must be able to make a military evaluation of the risks and consequences of a response and a political evalutation of the degree of international support on which it can count.

The two superpowers are able to match the naval forces they deploy to the kind of presence desired, that is, to the kind of pressure they wish to exert without exposing their most important units to unnecessary risks. The United States could, for example, use their new general purpose helicopter assault ships (LHA's). Equivalent in size to the old WWII "Essex" class carriers, they match the size of the Soviets' "Kiev", and, while not as formidable as a carrier in some respects, could perform a wide range of functions in a crisis. These could represent a basic element in any deployment of forces, without exposing aircraft carriers as hostages. Carriers could be kept in a safer position in the rear, while still maintaining a certain intervention capability with their attack aircraft.

The last question, though others are bound to be raised during the debate, concerns the role of Western countries in the Mediterranean.

./.

Are these countries, and especially those with the keenest interest in keeping open communications lines vital for their survival, fully aware of the changes which have occurred in the area? Is there any preparation to face these changes at a political and at a military level? Unfortunately, the answer appears to be that there is not. There seems to be a complete lack of coordination, both in foreign and military policy. Defense budgets continue to give priority to ground rather than to air or naval forces, even in countries like Italy where there are no grounds for this kind of attitude. There is no will to pursue weapon and equipment standardization with the vigour necessary for the allied forces to operate together without the danger of sinking each other's ships and shooting down each other's aircraft. There seems to be a continuing trend to delegate action in the Mediterranean to the United States, without any great effort to devise techniques and tactics better adapted to more active European participation.

There is, however, another question mark hanging over the role of the Western countries. Supposing the Soviets, given the difficulties, decide to avoid the attempt to cut the traffic to the Southern flank countries in the Mediterranean, and try to cut lines of communication in the Indian Ocean, to the South of the Cape of Good Hope and along the Atlantic routes, how should these countries react?

Should they attempt to build up the capability to control the Mediterranean on their own, thus allowing the deployment of American task forces were the threat is thought to be most serious? Should they unconditionally accept Southern African support, together with all the inevitable political repercussions on the African continent and

./.

the possibility that even non-aligned countries could concede bases to the Soviet Union? At the same time, is there any politically and economically viable alternative which might allow naval forces belonging to Western countries to operate outside the Mediterranean?

As we have already stated, the Mediterranean is not of fundamental importance for the survival of the Soviet Union, in the sense that the closure of the sea to Soviet mercantile traffic would not have a determining effect on the country's economic and industrial life. For the European countries, on the other hand, free passage through the Mediterranean is vital. Their traffic can, however, be threatened long before it reaches the Straits of Gibraltar. Any naval and/or air bases the Soviet Union might procure in Africa, would give her a degree of flexibility which would undoubtedly increase the vulnerability of the Southern flank.

WEAPONS SYSTEMS CHARACTERISTICS.

A. U.S. SHIPS.

1. Nuclear Strike Cruiser (CSGN)

Displacement: about 17.000 tons.
Nuclear propulsion.
Aegis System with Advanced Standard Surface-to-Air Missile (SM-2).
Ability to carry 8 "Tomahawk" cruise missiles (300 NM range).
Ability to carry 16 "Harpoon" missiles (60 NM range).
One 8 inch gun.
One "Phalanx" Close-In Intercept System.
Ability to handle 2 VTOL aircraft or LAMPS helicopters.
TACTAS System and SQS-53 hull-mounted sonar.
Fragmentation protection in vital areas.
Minimum dependence on logistic support which permits to operate in remote locations and remain for extended periods.
Uniquely suited for indipendent missions.

2. DDG-47 Class Guided Missile Destroyer

Displacement: about 9.000 tons.
Gas Turbine propulsion.
Aegis System.
2 twin launchers for SM-2 MR missiles.
8 "Harpoon" missiles.
1 twin 127 mm (5 inch) rapid fire gun mounting.
2 LAMPS helicopters plus ASW sensors.

3. FFG-7 Class Guided Missile Frigate

Displacement: about 3,600 tons
Gas Turbine propulsion.
MK-92 fire control system plus Standard Missiles to provide AAW/ASMD.
"Harpoon" missile capability.
2 LAMPS helicopters plus hull sonar and potential for Towed Array.
1 single 76/62 mm gun mounting.
1 "Phalanx" System.
2 triple launchers for MK-32 torpedo.

4. Patrol Hydrofoil Missile Ship (USS "Pegasus" PHM-1)

Displacement: about 235 tons.
MK-94 fire control system.
8 "Harpoon" missiles.
1 single 76/62 mm rapid fire gun mounting.

5. "Tarawa" Class General Purpose Helicopter Assault Ship (LHA)

Displacement: about 39.000 tons.
About 30 troop helicopters or "Harrier" AV-8 V/STOL aircraft in place of some helicopters.
3 single 127/54 mm gun mountings.
2 BPDMS (Basic Point Defense Missile System) launchers firing "Sea Sparrow" missiles.
Ability to transport and land a unit of about 1900 Marines fully equipped.

LAMPS = Light Airbone Multupurpose System.

B. URSS SHIPS.

1. "Kiev" Class ASW Cruiser.

Displacement: about 40.000 tons.
20-25 Ka-25 "Hormone" helicopters.
15-20 Yak-36 "Forger" VTOL aircraft.
4 twin launchers for SS-N-12 surface-to-surface missile.
2 twin launchers for SA-N-3 surface-to-air missile.
2 twin retractable launchers for SA-N-4 surface-to-air missile.
2 twin 76 mm dual-purpose gun mountings.
12 tube ASW rocket launchers.
4 tube "chaff" launchers.

2. "Kara" Class Cruiser.

Displacement: about 10.000 tons full load.
2 quadruple launchers for SS-N-10 (SS-N-14) surface-to-surface missile.
2 twin launchers for SA-N-3 surface-to-air missile.
2 twin retractable launchers for SA-N-4 surface-to-air missile.
2 twin 76 mm dual-purpose gun mountings.
4 twin 23 mm anti-air gun mountings.
2 six-tube rocket launchers.
2 five-tube launchers for dual-purpose torpedo.
1 Ka-25 "Hormone" helicopter.

3. "Krivak" Class Missile Destroyer.

Displacement: about 4.000 tons full load.
1 quadruple launcher for SS-N-10 (SS-N-14) surface-to-surface missile.
2 twin launchers for SA-N-4 surface-to-air missile.
2 twin 76 mm dual-purpose gun mountings.
4 30 mm anti-aircraft guns.
2 four-tube launchers for torpedo.

4. "Nanuchka" Class Guided Missile Patrol Gunboat.

Displacement: about 850 tons.
2 triple launcher/containers for SS-N-9 surface-to-surface missile.
1 twin retractable launcher for SA-N-4 surface-to-air missile.
1 twin 57 mm anti-aircraft gun mounting.

C. URSS - SURFACE-TO-SURFACE MISSILES.

1. SS-N-9 shipborne surface-to-surface missile.

Carried in 2 triple launcher/containers aboard the "Nanuchka" class missile patrol boat. No pictures or official detail of the missiles have been made public. Estimated range up to 150 NM with external mid-course guidance by cooperating aircraft or helicopter. A normal operating range of about 40 NM seems likely. Mid-course guidance probably by autopilot with terminal guidance probably by active radar homing.

2. SS-N-10 (SS-N-14) surface-to-surface missile.

Carried in new launcher/containers aboard "Kara", "Kresta II" and "Krivak" class vessels. No pictures or official detail of the missile have been made public. Estimated range of about 30 NM but this figure is thought to be applicable only to the maximum autonomous range, without the assistance of an aerial vector for mid-course guidance.
Terminal guidance is most likely active radar homing.

3. SS-N-11 surface-to-surface missile.

Carried in new launcher/containers aboard the latest version of the "Osa II" class missile FPB. Are generally believed to be an advanced version of the SS-N-2 "Styx" missile with better guidance techniques. No pictures or official detail of the missile have been made public. Range is estimated as about 20 NM maximum.

4. SS-N-12 surface-to-surface missile.

Carried by the "Krev" aircraft carrier. Estimated range about 250 NM.

D. URSS - AIR-TO-SURFACE MISSILES.

1. AS-4 KITCHEN.

The air-to-surface missile which arms the Tu-22 "Blinder".
Is reported to be at present carried, singly, recessed under the belly, by the "Backfire" bomber as an interim weapon until the AS-6 is operational.
Estimated range varies from 300 Km to 800 Km. A UK MOD report quoted a maximum range of 298 Km.

2. AS-5 KELT.

The air to surface missile used by "Badger" bombers.
Estimated range varies between 160 Km and more than 320 Km. However a UK MOD report gave the former figure as the maximum range.

3. AS-6 KINGFISH.

Reported to be under development. Probably is the air to surface missile which will arm the "Backfire" bomber.
Maximum range has been quoted in a report issued by the UK MOD report as 135+ statute miles (220 Km).

E. USA - AIR-TO-SURFACE MISSILES.

1. "Harpoon" Missile (AGM-84).

Produced by Mc Donnel Douglas Astronautics. Anti-ship, supersonic missile, with all-weather performance, a range of 60 NM and a 500 lbs warhead with a pre-explosion penetration capability.
It is reported that the missile can make in-flight turns of up to 90°, fly toward the target few meters above sea level, and climb rapidly close to the target so as to strike from above, thereby increasing its attack capability against fast-moving vessels.
For mid-course guidance the "Harpoon" uses a system comparable to an inertial navigation system, composed essentially of a radio--altimeter and a digital computer, which uses velocity data from 3 axis given by a gyroscope system, to calculate the signals to be given to the missile's mobile surfaces.
For final guidance the missile is equipped with an active radar system, resistent to electronic counter-measures.

F. USA - AIR DEFENSE AND ASW SYSTEMS.

1. AEGIS.

The Aegis weapon System MK 7 is a fast-reaction, high fire power shipboard Anti-Air-Warfare weapon system, possessing a high degree of system availability, able to counter massed attacks using the SM-2 Standard Missile. The system will be particularly effective against highly coordinated attacks of low-altitude, high-speed aircraft and missiles, air-to-surface missiles, and surface-to-surface missiles. In addition the system has a significant capability against small surface targets without compromise to the primary AAW capability.
Aegis provides the following key performance factors:

1. Low Past Reaction Time, particularly against low altitude attacks.
2. High Fire Power to prevent system saturation by a massed attack.
3. High Electronic Countermeasures and Clutter Resistance to include a capability to over-coming extensive jamming and land-weather, and sea clutter.
4. High Availability to ensure system operation when needed.
5. Extended Coverage to defend other ships in the area.
6. Efficient, Effective and Designed Integration with other ship systems, of the Aegis armed combatants, and with other fleet combatants (Aegis or non-Aegis) by data-links.

The Aegis system is based on the use of a AN/SPY-1A phased array radar to automatically detect and track multiple targets simultaneously while directing the engagement of a significant number of intercept missiles.
The system is also capable of acquiring, tracking and controlling multiple missiles simultaneously. It can be reprogrammed to fire new missiles.

2. PHALANX (CIWS).

This system will provide the fleet with a close-in last-ditch defense against the air threat in general and the Soviet anti-ship cruise missile in particular.
It adapts the Army's "Vulcan" 20 mm six-barrel gun mount to Navy use, and incorporates a fully automatic aim correction feature, and an autonomous threat evaluation that commences fire when a valid target is within range.

3. STANDARD MISSILE - 2 (SM-2).

SM-2 Medium Range. Speed above 2 Mach.
Estimated range = 18 Km.

SM-2 Extendend Range. Speed above 2.5 Mach
Estimated range = 55 Km.

4. CAPTOR MINE (ENCAPSULATED TORPEDO).

Is a deep water mine that consists of a modified MK-46 torpedo housed in a capsule which contains its own acoustic detection and classification system. When a submerged target comes within range of its sensor and is classified as enemy, the Captor releases the M-46 torpedo.
Owing to the mobility of the torpedo, the Captor mine has a damage radius several orders of magnitude greater than any conventional mine.