HMS Churchill, *'Valiant' class SSN, prepares to dive while travelling at speed (MoD 19102).*

The Modern Submarine Service

by Andrew Ambrose

The first, most basic part of any modern submarine warfare, is to learn the differentials between the two fleets which form part of one fleet! That may sound like a rather confusing statement, but it is an important fact that the polaris submarines of any navy, do not form part of an integral fleet. The modern SSBN is a fleet of its own, it does not work in conjunction with other naval units. The SSBN works as a deterrent, and therefore, of necessity, when on patrol it must disappear, and stay on full alert and well away from any item which might give away its presence. Its task is to perform a duty of the highest magnitude; to be publically known to exist, and be ready and capable of launching missiles at any moment. Should the position of the vessel become known, then it becomes vulnerable to anti-submarine attack, and consequently, its deterrent value is severely diminished. Furthermore, the status of the SSBN is such that should a foreign power launch an attack against any vessel of the polaris fleet, then this would be considered as a direct attack on the nuclear forces of the said country, and as such, an out and out attack of worldwide proportions on the basis of a full scale nuclear retaliation would be called for.

The SSBN is therefore, a rather delicate beast. As a consequence, SSBNs do not operate within the fleet, and never work in an area where their presence would be delicately felt. In effect, they would never be used for an alternative purpose. The strength of an SSBN, is to publically disappear from sight, so that it is known that she is out there, cruising silently, deep beneath the surface somewhere! Consequently, in a wargame, her task is simply to stay out of sight. Her opponents task is to locate her. We are not concerned further, as nuclear proliferation is really beyond the scope of this wargame.

Players wishing to simulate the operations of SSBN vessels, will therefore use the same rules as for other submarines, as regards movements etc, but beyond that, little else can faithfully be said, and it will therefore be up to individuals to construct games using missile submarines to their best advantage. Although the US Naval War College enact SSBN deployments everyday at their wargames centres, it can become rather boring for the average player, unless of course, you are particularly keen on trying this ominously silent activity.

Moving on to the conventional wargame, using SSNs and diesel/electric submarines, gives the wargamer much more scope for action therefore, and as such, it is this facet of submarine operations on which we are to concentrate.

The realistic use of submarines in wargames, has always proved something of a problem to simulate in the past without a lot of confusion, so these suggested rules are kept as simple as possible without detracting from the aims of realistic operation.

Before moving on to the actual game and operations, there are certain items of equipment which players will require. Obviously, the first item is the model pieces. Virtually any task can be organised as the object of the game, and therefore models required will differ for whatever operation you plan, but for the purposes of explanation, a task has been set out, and we have decided on the models to be used.

The task in our explanatory game will differ for the two opposing factions, who are the Royal Navy, and Ghorskov's Goons

Airfix's model of a 'Leander' class frigate looking in pristine condition as if it has just come out of dry dock. Cut-down to waterline it is ideal for the sort of wargame described here.

(ie the Soviet Navy). The situation is that of limited warfare against naval forces (not altogether unlikely)! The scene is the Atlantic ocean. The situation at commencement of the game is: A Soviet submarine has made an abortive attack on the US Navies aircraft carrier USS *Forrestal*, and has made off, trying to get back to Murmansk before reprisal action can be taken. A Royal Navy task force on patrol further north, has been asked to locate and destroy the submarine. Player 'A' controls the Royal Navy task force. To complicate matters further, intelligence reports confirm sighting the Soviet *Moskva* ASW carrier travelling south from the Denmark Straits. In addition, the Soviet submarine is in fact part of a force of eight vessels. Player 'B' controls all the Soviet vessels. The object of Player 'A', is the destruction of the Soviet submarines. The object of Player 'B' is to avoid this by using any means at his disposal. Figure 1 shows the events leading up to the game.

The Royal Navy task force known as GP 7 deployment consists of: HMS *Invincible*, HMS *Leander*, HMS *Ajax*, HMS *Alacrity*, HMS *Blake*, and HM submarines *Valiant* and *Swiftsure*. In addition, Stanavforlant
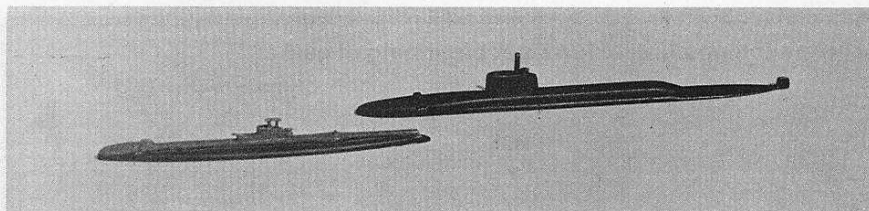
Fleetline and others offer many 1:1200 scale warships for those who prefer the smaller size. Shown here is a 'Royal Sovereign' class SSN and a wartime 'T' class submarine — some of which survived in service into the 1960s.

Having now decided on the vessels taking part, the next step is to complete a ship's data card (SDC) for each vessel, see Fig 3. This card is used to store all the data about the vessels, their equipment and their damage sustained etc. Cards should be ruled up for each ship taking part as per Fig 3, and their respective prototype data is then completed on side B as per the example illustrated. (The easiest way of obtaining these cards is to purchase a 'Kardex' set from your local stationer, which will give you about 100 cards and a plastic box for storage and will cost between £3-£5).
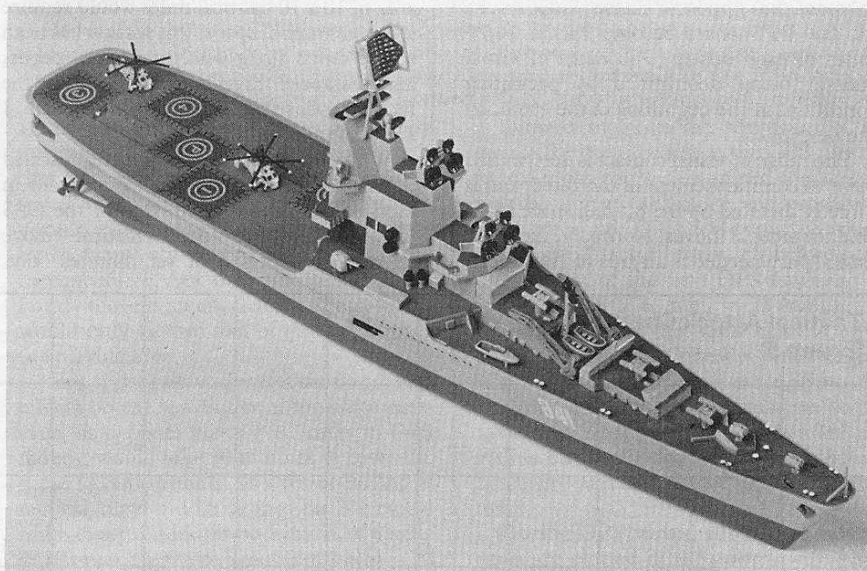
When the cards are complete, some form of clear plastic covers are required to keep

A close-up of the 'Moskva' class ASW Helicopter Carrier providing a good view of the helicopter landing pads. This is the Airfix kit and requires only the removal of the lower hull to adapt it for wargaming.
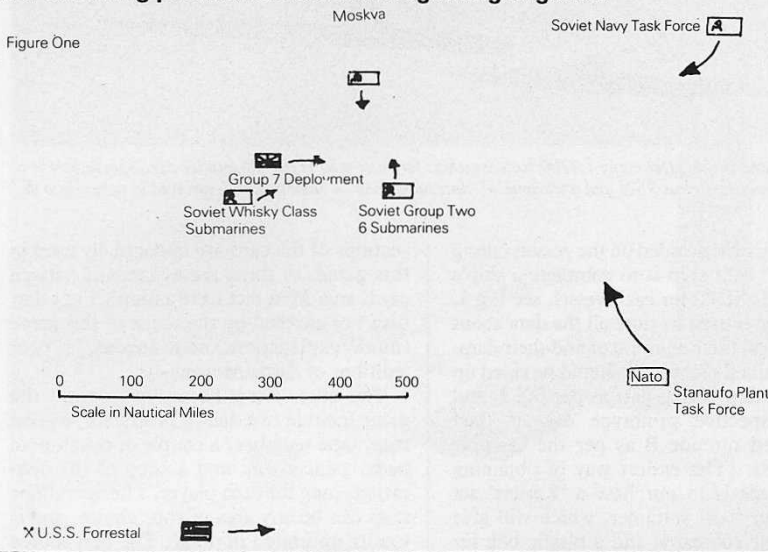
(NATO Standing Naval Force Atlantic) consisting of HM ships *Tiger*, *Arethusa*, *Amazon*, HMAS *Brisbane*, FDRN *Lutjens*, and the USS *Charles F. Adams*, are 600 miles distant and are travelling at flank speed, in order to join up with the ships of the group 7 deployment, and the Soviet vessels *Nikolayev*, *Azov*, *Steregushilly*, *Skory*, *Bditelny* and *Kiev* are steaming south through the Iceland UK Faroes gap, at the time the game commences. In the interests of world stability, both sides wish to terminate the conflict as soon as possible, preferably before surface ships engage each other, as this may cause worldwide ramifications. The Soviet players' eight submarines consists of two 'Whisky' class, two 'Echo II' class, and four 'Charlie' class boats. The positions of all vessels are marked on the OPS map (Fig 2) in their respective places at the commencement of the game.

the cards in during the game, so that damage records, etc, can be noted on the plastic and not the card, this being done with chinagraph pencils or similar. This way the cards can then be used time and time again, each card staying with the model for life. It will be noted that certain

Exocet equipped HMS Alacrity, breaks off from the main fleet and heads North-East on an interception course with the Soviety ASW Carrier Moskva. The Alacrity is a conversion of the Airfix 'Amazon' kit (as detailed in the April 1980 edition of Airfix Magazine).

sections of the card are not actually used in this game, as these are a standard pattern card, and do in fact have a number of other uses not covered by the scope of this game (more explanations may appear in later editions of *Airfix Magazine*).

The other items necessary to enact the game include two dice, a protractor, a good rule, tape measure, a couple of rough note pads, pencils etc, and a copy of the operations map for each player. The operations map can be any area of your choice, and is totally unlimited in range. The best source of OPS maps, is to use the real thing, proper naval charts. These can be obtained from almost any Admiralty Chart Agent, or even the Hydrographics office of the RN at Taunton. Ideally, the 1:250,000 series are best but players requiring a larger field of play will undoubtedly need to use the 1:750,000 scale series in order to widen the scope of movements. These charts cost about £3.80 each, and as each player requires his own, it can become quite expensive if your battle ranges around the world! In order to save considerable pennies, I would personally recommend the reader to write to the RN Hydrographics office, and to ask for any cancelled and out of date charts, such as they sell for practice purposes, as these can be bought for next to nothing, and are every bit as good for our purposes. Finally, one will need to acquire some graph paper for depicting submarine movements. (The pads obtainable from most stationers are ideal, and only cost a few pence each). One is now all set to play the game.

Firstly, one needs to understand the phases of the game. Basically there are two phases of play. Phase one is the operations moves, in which all moves take place on the operations chart (OPS chart), and the movements of vessels do not utilise the models. The second phase is tactical moves, wherein the respective models are used to their full effect, with the exception of submerged submarines.

The game starts in the operational moves

MAP showing position of forces at beginning of game:

Figure One

Moskva

Soviet Navy Task Force

Group 7 Deployment

Soviet Whisky Class Submarines

Soviet Group Two 6 Submarines

Nato

Stanaufo Plant Task Force

0   100   200   300   400   500

Scale in Nautical Miles

X U.S.S. Forrestal

(ops moves) phase, with the players each secretly plotting the starting positions of their models directly on to their own copy of the ops chart. In our explanatory game, the positions of both sides are marked on the ops chart (Fig 2), but during normal games this would not be so. Our starting position as at 10.00 hrs on a chosen date (say 2.8.81) on Fig 2. (NB for players who wish for all their action to take place in deep water, a sheet of graph paper could just as well be used as the OPS chart, such as in Fig 2).

When players have noted their respective starting positions, the third player, whom we haven't mentioned yet, the umpire, looks at both players copies of the OPS map to ascertain start positions, and then starts the game. Each player then plots his respective vessels courses on the map for a move of one hour. Each OPS move represents 'one hour' of game time, and movements are recorded to the scale of the map. Therefore, if a vessel's speed is 20 knots for example, the movement noted will be 20 nautical miles per OPS move, as per the scale of the OPS chart. In our explanatory game, the scale of the OPS chart is dictated by the large squares which represent an area of 10 x 10 nautical miles. Therefore if moving on our scale, the vessel would move two squares in each OPS move. This happens to be the speed of the Group 7 deployment force in its first move on our OPS chart, Fig 2. So the course plotted for the first move, is that up to the 11.00 hrs position. (Note, when two or more vessels are moving in company on the OPS chart, separate courses need not be noted, providing it is made clear to the umpire that the course applies to several vessels, and their names are noted alongside the course).

When players have plotted their move, the umpire checks each OPS chart to establish that the moves have been correctly entered, and to ensure that opponents vessels are not in contact in any way. Then players will move directly on to their 2nd OPS move, and plot a further one hours steaming on their charts, and so on, until contact is established by one or other

player, either visually, or by radar, sonar etc. Visual contact is said to exist, the moment that opposing surface ships tracks on the OPS chart become within 10/20 miles of each other. (The range of visual contact being determined by prevailing conditions at the beginning of the game, by the umpire.

The range of visual contact is determined prior to commencement of the game, and is directly dictated by the playing space available for tactical moves. Normally, the minimum space needed is an area of 10ft x 10ft,
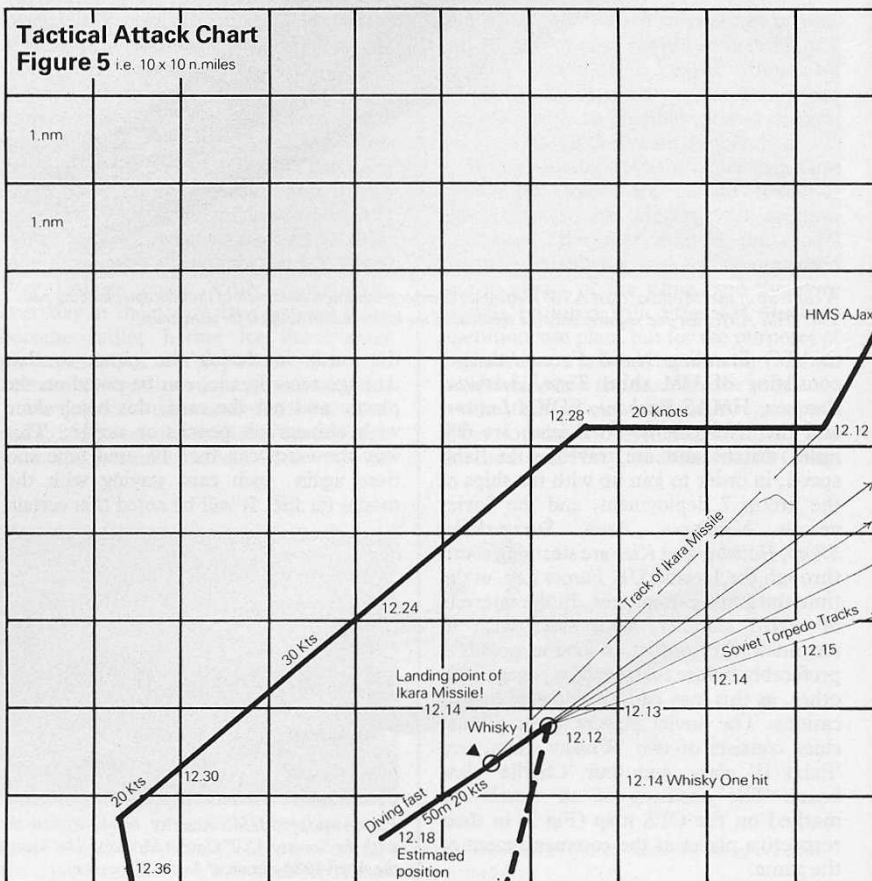
either a large table or area of floor. In this case the visual range would be 10 nautical miles. Should greater space be available, eg 14ft x 14ft, then visual range can be extended to 14 nautical miles and pro-rata. In the explanatory game 10 miles has been used, and the tactical area is 10ft x 10ft.

When contact takes place, the umpire notifies both parties involved, that visual contact is established, and he then tells both players the nature of the contact, (ie quantity and types of ships, etc). Both players then know the identity of their opponents vessels. This may happen at any time during the OPS move, and when it does the OPS move is ceased, and a period of shorter turns take place, called tactical moves. When tactical moves commence, the tactical area is set out on the playing surface, with the respective models and coastline (if any).

Normally (as in the explanatory game), the visibility is 10 nautical miles and the tactical play area is 10ft x 10ft. The tactical play area is said therefore to represent an area of 10 x 10 nautical miles, which is in practice, any one of the 10 x 10 NM squares on the operations chart. As in 1:600 scale an area of 10 x 10 nautical miles would require a vast amount of space, this section has been scaled down along with the vessels speeds, and distances travelled. Therefore, in the tactical phase of play, 1 foot equals 1 nautical mile and so on.

When in tactical moves, the area is scaled down, so also is time. Each movement in tactical play is one tenth that of the OPS move, therefore, each tactical move represents a period of six minutes only.

Tactical Attack Chart
Figure 5 i.e. 10 x 10 n.miles

1.nm

1.nm

HMS AJax

12.28   20 Knots

12.12

Track of Ikara Missile

12.24

Soviet Torpedo Tracks

30 Kts

12.15

Landing point of Ikara Missile!

12.14

12.13

12.14

Whisky 1

12.12

20 Kts   12.30

12.14 Whisky One hit

20 Kts

Diving fast   50m 20 kts

12.18 Estimated position

12.36

Backbone of the hard pressed ASW task force deployments, the Through Deck Cruiser, is equipped with 5 Harriers and 9 Sea King ASW Helicopters, and the World's most advanced ASW warfare kit, including a new type of sensor which can detect the smallest particles of radio-activity at great depths, ie The radio-active 'hot' water, used for reactor cooling on nuclear powered submarines. Seen here is the first ship of the class, HMS Invincible, which can stand up to almost anything the Soviet Navy can throw at her, with the exception of British Government Policy! Her major vulnerability is a successive attack of Politicians (RN 11161A/2).

Likewise, when models are moved, only one tenth of their hourly speed is affected, that is, the distance which the vessel would travel in six minutes. Consequently, the vessels making 20 knots during the OPS move, would still be making 20 knots in the tactical move, but only one tenth of her hourly move is taken, that is 2 knots, which would only be two feet of movement over the playing area.

This scaling down process has no adverse effects on the remainder of the game however, as a vessel making 20 knots in OPS moves, would take 30 minutes to cover the same 10 NM distance, as a vessel moving in tactical play, which is moving 2 nautical miles every 6 minutes (ie 5 moves of 6 mins = 30 mins, therefore 5 moves of 2 NM = 10 NM)! Note that tactical moves only take place when there is visual contact between opposing pieces. When visual contact is lost players remove their models and revert to OPS moves on the chart.

Periods of tactical play can take place at any time, should the tracks of opposing vessels gain contact via the umpire and the OPS charts. When this happens, OPS moves cease, and the tactical play is resolved. If for example, ships meet in the middle of their course plotted on the OPS map, the tactical play commences at this point, and not at the end of the OPS move. The players will delete from their OPS maps, the remainder of the offending vessels plots. Say that vessels became involved at a period of half way through the OPS move, then only half of their projected hours track would be included on the chart, and five tactical turns would need to be played before the next OPS move would take place. When a period of tactical play ends, the ending position of the vessels course is then noted on the OPS chart, and

is allowed to move the remainder of his course for the time left in the OPS turn: If for example, the vessels gained contact half way through an OPS move, and lost contact again after only 2 tactical turns, he would then have 3 tactical turns left before commencement of the next OPS move, so he would plot 3 x 6 mins = 18 minutes of movement on to his OPS chart. Consequently, everybody is ready to move again at the next one hour game move point.

Note that submerged submarines do not appear in tactical moves, as they are not visible obviously. Surfaced submarines do however, and act as for normal surface units.

During OPS moves, submerged submarines are plotted in the normal way, however their plot is shown as dashes instead of a single line. This will signify to the umpire, that the vessel is in fact submerged. During a submerged submarine's passage on OPS moves, her depth is decided by the operator, and is noted alongside her track in metres! (Yes, vertical depth is now in
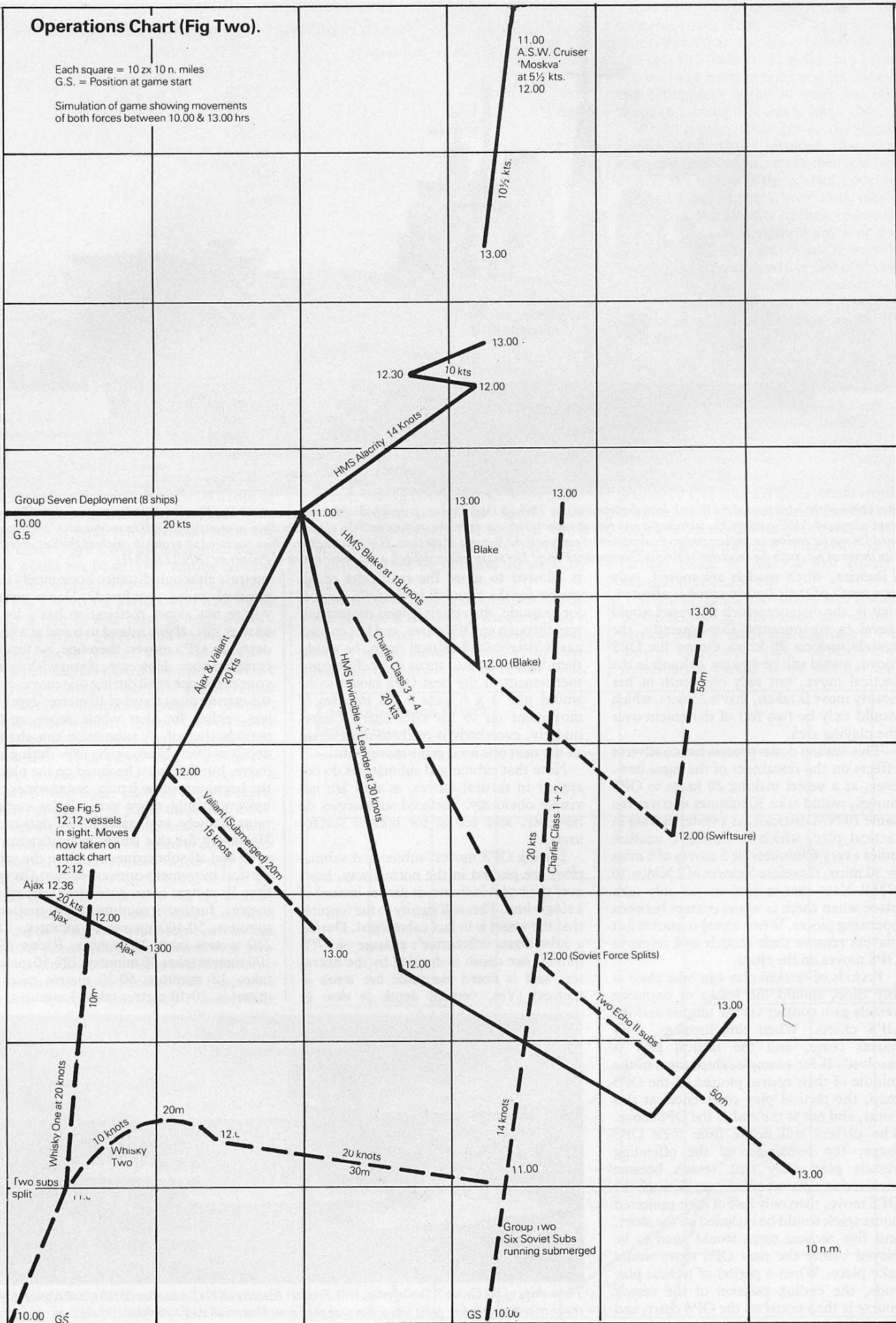
metres, although distance horizontally is in nautical miles, confused? Don't worry, you're not alone, metrication has a lot to answer for!) If you intend to travel at a fixed depth on OPS moves, then fine, no further complications. However, if you wish to use your periscope at all during that move, your submarine must travel at 10 metres depth or less, either for that whole move or for periods thereof. A submarine can change depth as many times as she likes during the move, but this must be noted on the plot at the beginning of each turn. Submarines can however, only move vertically at certain rates, namely, as dictated on the data card. However, for this game, simplification is used and all submarines are given the same vertical movement rates as follows: Diving: first 10 metres takes 3 minutes, second 10 metres, further 3 minutes, 20-50 metres 6 minutes, 50-100 metres 10 minutes, 100-250 metres takes 24 minutes. Rising 250-100 metres takes 30 minutes, 100-50 metres takes 12 minutes, 50-20 metres takes 6 minutes, 20-10 metres takes 3 minutes, 10
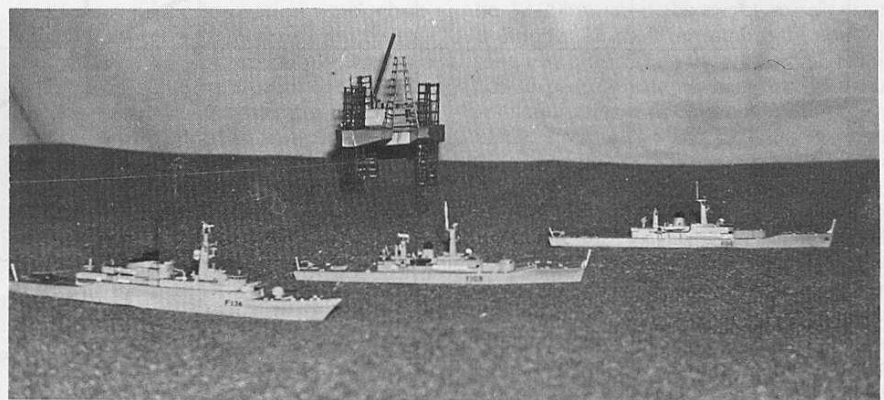
Three ships of the Group 7 Deployment, HM Frigates Alacrity (F174), Leander (F109), and Ajax (F114), cruise in company before going into action with the Soviet Forces (all Airfix models).

Operations Chart (Fig Two).

Each square = 10 zx 10 n. miles
G.S. = Position at game start

Simulation of game showing movements
of both forces between 10.00 & 13.00 hrs

11.00
A.S.W. Cruiser
'Moskva'
at 5½ kts.
12.00

10½ kts.

13.00

13.00

12.30

10 kts

12.00

HMS Alacrity 14 Knots

Group Seven Deployment (8 ships)

10.00
G.5

20 kts

11.00

HMS Blake at 18 knots

13.00

Blake

13.00

Ajax & Valiant
20 kts

Charlie Class 3 + 4
20 kts

12.00 (Blake)

HMS Invincible + Leander at 30 knots

50m

13.00

12.00 (Swiftsure)

12.00

See Fig.5
12.12 vessels
in sight. Moves
now taken on
attack chart
12:12

Valiant (Submerged) 20m
15 knots

Charlie Class 1 + 2

20 kts

Ajax 12.36

Ajax
20 kts

12.00

Ajax

1300

10m

13.00

12.00

12.00 (Soviet Force Splits)

Two Echo II subs

13.00

50m

14 knots

Whisky One at 20 knots

20m

10 knots

12.0

Whisky
Two

20 knots
30m

11.00

13.00

Two subs
split

11.0

Group Two
Six Soviet Subs
running submerged

GS 10.00

10 n.m.

GS 10.00

Admiral Gorschkov's answer to the RN's Submarine Fleet, are these heavily armed ASW Carriers of the 'Kiev' class. If Russia continues to build these carriers at their present speed, by 1992 they will have more Aircraft Carriers than the Royal Navy has Frigates, if present policy prevails (MoD Navy 5030).

metres to surface takes 3 minutes and pro-rata (these figures are not based on real figures too much, but realism results because the game is split into logarithmic moves rather than linear progressive rules, so no loss of realistic action results).

When a submarine is travelling submerged at 10 metres depth or less, he may from time to time, pop his periscope up to look for surface vessels. He does this during his OPS moves by marking a small circle and time mark at various points as he chooses. If in the opinion of the umpire he sights the enemy during one of these peeps, tactical play results, but tactical play with a slight difference.

Although the OPS map plots for the submarine, ceases at this time, it does not for the surface player. As although the submarine has had a visual contact, it does not follow that the surface player has had a visual of the submarine. The surface vessel is therefore not informed. Not yet! If the periscope breaks surface within 3 nautical miles of the surface ship, the umpire will roll a dice, if 5, or 6 results he will then inform the surface player, that he has spotted a periscope wake, whereupon the surface player will cease his OPS move, and set his surface vessels up for a tactical move. The umpire will then tell the surface player, exactly where the scope was sighted, by placing a chip or counter on the surface of the tactical area.

The submarine skipper is then sent out of the room wherein tactical play is taking place, having had a good look at the scene, and his locale in respect of the other forces. In the event that the umpire throws less than 5-6 on the dice, then the surface player is not informed that a submarine is there, (unless he has located it by other means that is, but that follows later). This is to all intents and purposes still in an OPS move, in which case there is no need for the submarine player to leave the room, as no models have been set up for a tactical situation.

In either case, as soon as the umpire decides a visual contact has taken place, he prepares a submarine tactical attack chart, which is a sheet of graph paper, which signifies the 10 x 10 NM tactical play area, see Fig 5. Each square represents one mile. On to this chart, he plots the position of the surface vessel sighted by the submarine and its course in its respective position at the time of the submarines periscope contact. The submarines position is also marked with a cross. The umpire also draws on to the attack chart an arrow, which represents north on the main OPS map.

At this stage, the player operating the submarine decides on his attack plan (if any), and then draws on to the attack chart, the tracks of his torpedos, estimating the position of the opponents ships at a time of one minute later, per nautical mile that the

torpedo has to run (eg if the submarine is eight miles from the target, then his estimation will be for the position of the target in eight minutes time). He then completes for the next six minute move, his submarines course and travel on the attack chart.

The umpire will then calculate by reference to the targets position on the OPS map, whether or not the torpedo tracks as shown on the attack chart, cross the targets plotted track on the OPS map, precisely at the point in time that the torpedos are due to hit, (ie, if the submarine were located visually and his attack commenced at 12.12hrs game time, from a distance of eight miles, the estimated hit point would be 12.20hrs, so if the target vessels exact position at 12.20, is the same as the position shown as hit point on the attack chart, then the torpedo is said to have hit, and the resultant damage is effected on the targets SDC). From Fig 5 and the OPS map, we can therefore see that the torpedo from the 'Whisky' class submarine did in fact miss!

As in our simulation, both the 'Whisky' class and the Frigate *Ajax* sighted each other at the same moment, the submarine player left the room with his attack chart, and *Ajax* alone was positioned on the tactical moves area, with the counter for the submarine sight. Obviously, while the submarine was launching her attack, *Ajax* was

S.D.C. TYPE: 81-NAV-2	S.D.C. NO: 003	NAME OF VESSEL: H.M.S. BLAKE		PENNANT NO: C 99.

LOGISTICS:

FUEL	GEN.SP	ARMS.
UNABLE TO MOVE		

DAMAGE CONTROL:

FLOATATION	SPEED	BRIDGE CONTROL	DAMAGE CONTROL
	31.5	BRIDGE	DAMAGE CONTROL
		STEERING RUDDER	DAMAGE CONTROL
		ENGINE ROOM	FIRE CONTROL
		COMMUNICATE ONE.	CREW
		COMMUNICATE LOCAL.	WEAPONS: 6" x2
		E.C.M.	WEAPONS: 3" x2
		RADAR EW.	WEAPONS: SEACAT (Port)
3 SHIP STATIONARY	3	RADAR S.S.	WEAPONS: SEACAT (Stbd)
2 SHIP ABANDONED	2	SONAR	WEAPONS:
1 SHIP SINKING	1	FLIGHT DECK.	WEAPONS:
0 SHIP SUNK.	0 SHIP STATIONARY	FALL-OUT CAPABILITY	

SHIP CLOSED DOWN FOR NUCLEAR ATTACK:	NO	YES
2925.		

not idle, as she immediately fired an Ikara anti-submarine missile/torpedo at her attacker, at precisely 12.12hrs. She carried this out, by 1: Notifying the umpire that she had fired an Ikara and 2: Placing a symbol or model of the Ikara on to the tactical play area, at the point she expected the submarine to be at, at 20 secs per mile distant, (as with torpedo but, slightly faster as Ikara is a missile) when Ikara hit the water. Therefore, her target estimated time was 6 x 20 = 2 mins from time of firing ie 12.14hrs. Now, the Ikara missile is an active homing device, and as such, will pick up the position of the submarine, when the missile hits the water. This is provided that the target is within range of the Ikara's homing device, which for the purposes of the game is said to be half a mile, (the correct range of the homer is not available, so unfortunately this is a calculated guess. It is definitely no less than half a mile however). As from Fig 5, you can see that the Ikara did land within half a mile, then its homing device locked on to the 'Whisky' class submarine, and a direct hit resulted! The damage done therefore being entered on the submarine SDC, and as such, our first localised tactical battle, ends up with a win for the Royal Navy.

Don't get too confident yet though, as this first explanatory scenario, is rather unrealistic in some ways as we have dealt only with visuals. Although the action's process as above is now used for all combat of this type, we have as yet made no mention of a number of pertinent points which modern submarine warfare is really all about! That is Electronics and Technology.

Radar is the first point, as radar will nearly always pick up the trace of a submarine's periscope. Sonars are the second point, as sonars both from the submarine and the ASW killers, will often detect the presence of each other. Helicopters with dunking sonabuoys are the third point, as these will range far ahead of the surface vessel, and consequently gain contact with the submarine, long before the submarine gains contact with the ship. Ocean excavators are the fourth point (nuclear depth charges), as these are not fussy about hitting the submarine, as one only needs to drop one within a mile or so of the target, and they will lift out a mile radius of water, so you can shoot anti-aircraft missiles at the submarine while its flying through the air! Well, perhaps not quite like that, but they do bring another element into the game, that is, radioactive rain, and of course, in areas of great radio-activity, radars, sonars and communications sometimes disappear altogether! So that becomes our fifth point. Compared to that our sixth point is relatively simple; submarine launched, anti-ship missiles. However, having run out of space again we will have to continue these subjects in the next issue. So for now, good hunting!

SIDE B	PENNANT NO.: C 99	NAME OF VESSEL: H.M.S. BLAKE	CIRCA: 1978	MODEL BUILT: 1978

VESSEL TYPE: ASW CRUISER	OPERATOR: ROYAL NAVY	CLASS: TIGER	OWNER: R.N.

DATE FIRST LAUNCHED + COMMISSIONED 8th MARCH 1961	DATE AND METHOD OF DISPOSAL: RESERVE SHIPS UNIT 1980	CREW CARRIED: 885	TONNAGE: 9.500

MAXIMUM SPEED: 31.5 KNOTS.	MAXIMUM RANGE: 6500 NM. @ 13 knots. 2000NM. @ 30kts.	ARMOUR/ CONSTRUCTION: BELT 3.5" : DECK 2" : TURRET 3"

GROSS SHIP FACTOR:	SURVIVABILITY FACTOR: 2925	

ARMAMENTS:

READY USE:	RELOADS	RELOAD TIME	TYPE+USE	RANGE	EFFICIENY FACTOR	CSV
6" GUN x 2.	280	20 R.P.M.	S.S/AA	½ NM.	1	.85
3" GUN x 2.	900	90 R.P.M.	AA/SS	8 NM	1	40
SEACAT x 4.	24	6 MINS	SAM	12 NM.	7	80
SEACAT x 4.	24	6 MINS	SAM	12 NM	7	80
SEA KING x 4	—	—	ASW/AEW	540		
TORPEDOS (H) x 4cm	0/8	20 MINS	ASSM	7 NM	7	750

ELECTRONICS:

ITEM FITTED	RANGE	SVC.	D.F.	USE
965 RADAR	70		10	SEARCH
992 "	32		10	SEARCH
277 "	300		9	AIR SEARCH
SEA KINGS:—				
BENDIX ASS 13	VIA S/B		N/A	SONAR
AN-13+	35		9	RADAR.
SONABOUYS	3 m		8	SONAR

NOTES: 4 SEA KING ASW HELICOPTERS CARRIED.	PROTOTYPE MODIFICATIONS (MOD. + DATE FITTED) 1972 FITTED AS ASW CRUISER.