Scenario Description

Welcome to the Basic Anti-Air Warfare tutorial.
This is the third in a series of tutorials designed to teach players the fundamentals of surface operations in Command. In this tutorial, the following topics will be covered:

- Operate air search radar
- Operate electronic support measures (ESM)
- Engage targets with anti-air gunnery
- Engage targets with surface-to-air missiles
- Engage targets with close-in weapons systems

Pop-ups will appear with important messages during this scenario. You can find a PDF of them in the documents folder that comes with these tutorials. The default location is: C:\Program Files (x86)\Command Modern Operations\Scenarios\Tutorials\Surface Warfare Tutorials\Documents.
For Steam users, they will be located at: C:\Program Files (x86)\Steam\steamapps\common\Command - Modern Operations\Scenarios\Tutorials\Surface Warfare Tutorials.

Scenario Briefing

Welcome to Basic Surface Operations 1.3
In this scenario you will have command of a Taiwanese guided missile destroyer. Using pop-up messages like this, you will be guided through the following topics:

- Operate air search radar
- Operate electronic support measures (ESM)
- Engage targets with anti-air gunnery
- Engage targets with surface-to-air missiles
- Engage targets with close-in weapons systems

Your mission is to detect and destroy a variety of target drones and simulated OPFOR aircraft operating in your area. You will need to make use of your sensors to positively identify air contacts before engaging, while remaining in the time limit.
In this tutorial as with others in this series multiple pop-ups will appear with important messages. If you need to review any of these later, you can open the message history in a second window by pressing Ctrl+M and scrolling to the appropriate message.
This tutorial is designed to stop time compression with pop-ups at important moments. Surface operations can be slow paced due to the speeds and distances involved, so feel free to use time compression in the tutorial knowing that any significant developments will be accompanied by a time-stopping pop-up.

To make use of this in your own gameplay, or fine-tune pop-up settings for this tutorial go to Game > Game Options > Message Log and select 'Raise Pop-Up' for any event that you wish. Useful pop-ups for Surface operations include 'Contact Change', 'New Contact', 'Special Messages' (this should always be on), 'Unit Damage', 'Unit Lost' and 'New Weapon Contact'.
In this scenario pop-ups will appear with important messages. You can find them in the documents that come with the tutorial. The default location is: C:\Program Files (x86)\Command Modern Operations\Scenarios\Tutorials\Surface Warfare Tutorials\Documents.

Message 1

We are currently on station in our assigned exercise area. You may adjust your course and speed as you wish, however the course and speed that has been pre-set is suitable for now.
Your destroyer is currently not operating its radars.
It is usual for units in Command to operate either with all radars on (active) or all radars off (passive/silent). At the moment, however, your destroyer is operating passive. This is achieved by opening the Sensors menu (F9) and un-checking 'Unit obeys EMCON (disables manual sensor control)'. As the label suggests, this option allows manual control of each sensor on the parent platform when unchecked.
Leave the sensor settings at their pre-set state for now and continue to manoeuvre on station in your assigned exercise area.

Message 2

We now have ESM contact with the aircraft. Note that even with your own radars off you are still able to maintain the contact, however as time passes an area of ambiguity will develop around the contact, and we will intermittently regain and lose contact.
We're able to maintain contact with the aircraft because we are detecting its radar emissions with our electronic support measures (ESM) equipment. ESM is a passive sensor type that is automatically activated and does not need to be switched on or off. Incoming radar or other emissions are detected and analysed, which depending on the capabilities of the specific ESM set can give a bearing estimate, range estimate, and in this case, specific identification of the emitter--note that after a minute or so of ESM contact we are able to identify the air contact as a Tu-95RT Bear D, a common maritime patrol and reconaissance aircraft with a powerful long range surface search radar.

ESM detections can be made well beyond the maximum range of an emitting radar. Radar sends out radio energy and detects contacts based on their reflection of that energy, but an ESM set only needs to detect the radiated energy--the detected energy doesn't have to be powerful enough to send a reflection for the ESM set to know that there is a contact out there. This is a very important fundamental principle of modern naval and air warfare, and is the main reason why most aircraft and ships prefer to remain EMCON silent (EMCON stands for **EM**issions **CON**trol; EMCON silent means no active emissions) where possible to avoid giving away their presence, identity and location.

Another important concept is that radar energy is directional. Select the air contact and click on 'Contact Report' in the right hand status bar. The omni-directional surface search radar is detected approximately every 10 seconds as it sweeps our destroyer, but the directional Box Tail [PRS-4 Krypton] Tail Warning Radar is only detected when the aircraft is flying away from us. Note that it is detectable even at over 100nm away, despite having an effective range of approximately 10nm--and this is for a relatively weak tail radar!

Now, we know that we are well within detection range for the Bear D's surface search radar, and we have already been emitting our air search radars. It is practically certain that we have been detected, that our identity has been deduced from our radar emissions, and our position has been determined precisely by the Bear D's surface search radar. We also know that for the purposes of our air warfare exercise that we will soon have incoming air threats, so in this tactical situation we will be better served by the situational awareness that our radars give us than the potential to be more stealthy by leaving them off.

Turn on all of your radars by ensuring that your destroyer is set to 'Unit obeys EMCON' in the Sensor window (F9), and then unchecking 'Inherit from Parent' box in the right hand status bar, before clicking the Active button for Radar.

Message 3

We have detected an air contact with our radar.

Note that we have range and bearing information, but we have no indication of the altitude of the contact. The lack of altitude information is due to the 2D nature of the SPS-49(V)5.

Open the Sensors menu (F9) and turn off the SPS-49(V)5 by unchecking the 'active' box next to its sensor entry. Note that the white air-search range ring around your ship disappears (if the white range ring is not visible, zoom out so you can see at least 260nm from your ship and check that Map Settings > Air Sensors is switched on).

Now switch on the SPS-48E radar by checking the 'active' box next to the sensor entry and note that the range ring is slightly smaller than it was when the SPS-49(V)5 was active. This is because the SPS-48E radar has a shorter range, which is partly because it operates in the E/F band, which is a higher frequency than the C band. Generally speaking, lower frequencies have longer maximum detection ranges at the expense of precise positional information while higher frequencies have more precise positional information at the expense of shorter maximum detection range.

Resume time (Spacebar) and note that after a few seconds altitude information is available. This is from the SPS-48E updating the contact information.

Message 4

We've detected an unknown air contact. Since it is not emitting we're not able to identify it using ESM, and we're currently out of range for our visual sensors to identify the contact.
In this scenario we know that we're expecting air threats, but there could be civilian or neutral aircraft in the area so we need to be careful to identify contacts as a threat before engaging them. In the real world, rules of engagement are clearly defined and usually very prescriptive. In Command, it is up to the scenario designer to give the player rules of engagement and determine whether they should be penalised for shooting indiscriminately or not.
In the absence of any specific direction from the scenario designer, the following are useful criteria for assessing the threat posed by an unidentified air contact--easily recalled using the mnemonic **CRASH**:

- **Consorts:** A lone aircraft is less likely to be a threat than a group of aircraft moving in formation
- **Radiation:** Radar or other emissions (e.g. OECM) can give information as to the possible identity and intentions of detected aircraft; detecting a fire-control radar is cause for immediate alarm.
- **Altitude:** Aircraft that are ascending or at high altitude are less threatening than aircraft that are descending or travelling at low altitude
- **Speed:** Aircraft travelling at slow speed are less likely to be a threat than aircraft travelling at high speed. Supersonic aircraft are nearly always cause for concern.
- **Heading:** Aircraft heading away from your units are less threatening than aircraft headed directly towards your units

Use the above criteria to evaluate air contacts as threats or non-threats in this scenario. For now, we will leave the specifics of any engagments to the AI crew: to order the crew to shoot down an air contact, select your destroyer, press F1 to order an automatic attack and click on the relevant contact. It will be designated hostile, and the crew will open fire with the most appropriate weapon when the contact enters engagement paramaters.
You will be presented with 6 target drones flying at various altitudes towards your ship. Note that all of these drones start an equal distance from your ship and are travelling at the same speed. Because they are flying at different altitudes, your radar will detect

them at different times due to the radar horizon. Drones operating at high altitude will be detected at maximum range, while drones flying at minimum altitude will appear on your tactical map at an uncomfortably close range!
Using the F1 auto attack command (or the Shift-F1 manual attack command if you wish), destroy the two highest-flying drones with SM-2 missiles. **Do not use SM-2s to engage any drones under 10,000ft; wasting your missiles on these lower flying drones will mean you will not be able to shoot down the high flying drones.** We will engage the lower-flying drones with guns and close-in weapons systems (CIWS).

Message 5

Excellent work, you have destroyed all target drones. You will have likely noticed that the CIWS is much more effective at destroying air targets than the 127mm guns. The 127mm guns are excellent for shore bombardment and surface engagements, but lower calibre weapons with higher rates of fire tend to be more effective anti-aircraft weapons.

Message 6

Good work. Two drones have been destroyed. If you have been following instructions, they were the two high flying drones (>5,000ft).
Take a moment to check the arcs of your guns and CIWS mounts by selecting your destroyer, bringing up the Weapons dialog (F8) and checking the 'Show Arcs' box next to the entries for 127mm/54 Mk45 Mod 2 and 20mm/85 Mk15 Phalanx Blk 1 CIWS. Note that one gun covers the forward arc, one gun covers the rear, one CIWS covers the starboard bow and the other covers the port quarter.
For targets outside 5nm it is assumed that the crew perform whatever manoeuvres are necessary to 'unmask' your weapons and these arcs are not taken into consideration. Within 5nm, however, weapons are only able to engage targets within their arcs. Your destroyer is designed to have 360 degree coverage from at least one each of its gun and CIWS mounts, however you can bring the most weapons to bear on targets off the port or starboard waist (2 x 127mm guns and 1 x 20mm CIWS). In this training scenario it is best to turn your ship so that it is presenting a broadside to the incoming threat when preparing to engage a target inside 5nm. When responding to air threats in a non-training environment it may be better to turn head-on to the threat to minimise the radar cross section of your ship. By default, the AI will handle manoeuvring for you while you concentrate on other things.

While we have the Weapons dialog open, note that there are three types of ammunition in your magazines for the 127mm guns: HE-CVT, HE-PD and WP--acronyms for High Explosive-Controlled Variable Time, High Explosive-Point Detonating and White Phosphorous respectively. For anti-air engagements, we want HE-CVT which is loaded by default (incoming air threats is not the time to be switching ammo types!). HE-PD is more effective against surface vessels and shore targets, while WP is effective as an incendiary against soft targets.

Unlike the cannons of the age of sail, our ships 127mm guns are rapid firing, accurate, and can be guided by a variety of radars and electro-optical sensors aboard our destroyer. The Phalanx 20mm CIWS is even more capable against air targets, and since it is able to operate autonomously it has no OODA delay: a huge advantage when dealing with sea-skimming anti-ship missiles travelling at Mach 2+! Like the illumination required to direct your SM-2 missiles to their targets, fire-control sensor activation is taken care of automatically by your crew and requires no action from you.

Remember to manoeuvre to unmask both guns if possible. Note the OODA delay present when using missiles and guns: OODA stands for Observe, Orient, Decide and Act and is the time taken for your crew to organise their response to a detected contact. The Phalanx CIWS operate autonomously and therefore ignore the OODA delay, which when combined with their potent anti-air capability make them very effective for missile defence.

The final line of defence are decoys. Our destroyer is equipped with Mk36 SRBOC (super rapid-blooming offboard chaff) launchers that are also able to launch flares, as well as a Nixie towed torpedo decoy. Decoys are automatically deployed by the crew, and in this case all decoys also operate autonomously and therefore ignore the OODA delay. The effect of decoys is determined as part of the *Weapon Endgame Calculations*. To see these calculations, enable them in the Game > Game Options > Message Log settings and view the message log entries--note that since we are not defending against live missiles in this training exercise, decoys will not be deployed.

Prepare to engage low-flying target drones closing on your ship. Manouevre to expose your weapons, and allocate your guns and CIWS with manual (Shift+F1) or automatic (F1) attacks to destroy them.

Win

Congratulations! You were able to make use of air search radar, ESM, surface-to-air missiles, anti-air gunnery, CIWS and decoys to destroy air targets and defend against a simulated missile attack.