BY ORDER OF THE COMMANDING OFFICER OF THE 185th VFS

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SOP 9 - 185th TE BUILDING RULES Version 1.4
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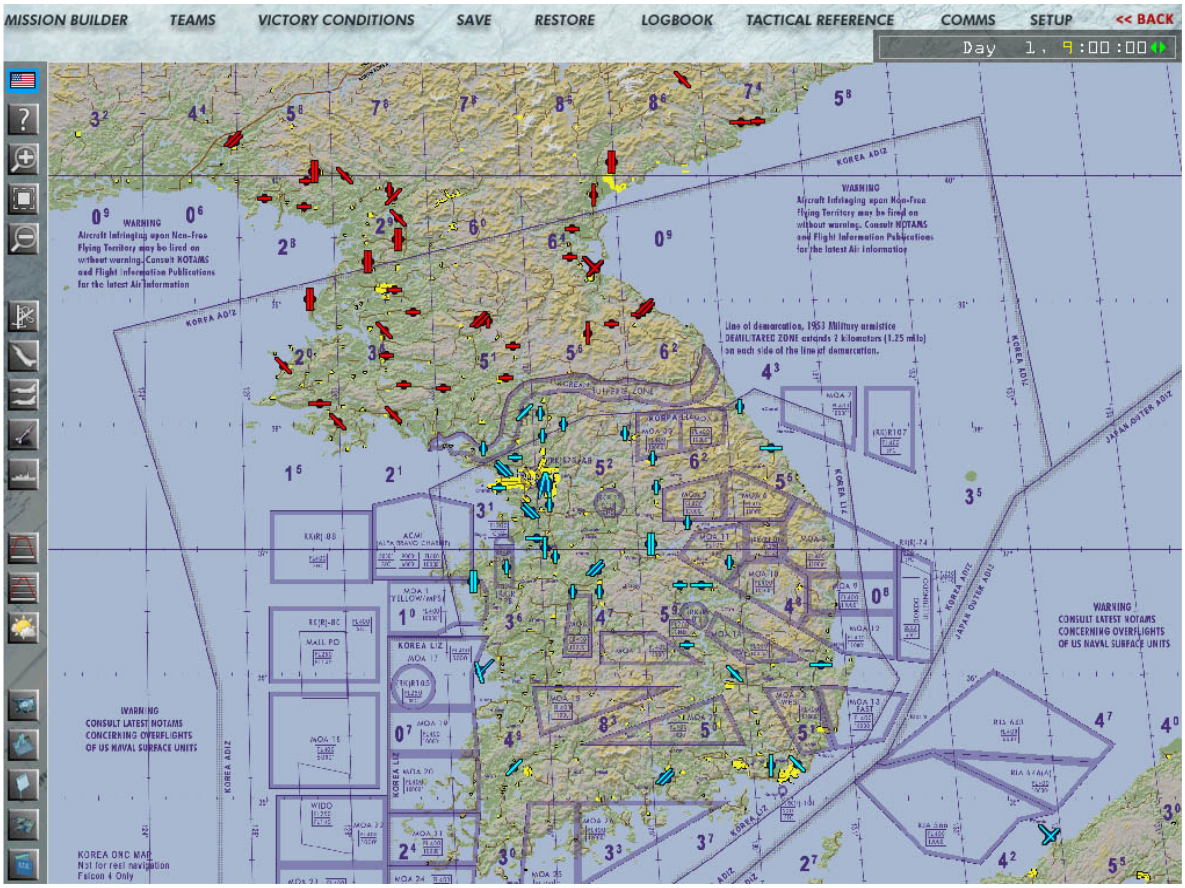
This document details the TE building rules when creating official 185th TEs with Falcon BMS 4.32



INTRODUCTION

This document details the rules that **must** be followed when constructing a TE for 185th Official missions using Falcon BMS 4.32. This is in order to provide an enjoyable experience for those flying the mission and to minimise the chance of any technical problems occurring.

BOOKMARKS

SUMMARY OF TE CREATION RULES

1. Go to the teams tab and set ADA and pilot skills to the desired level for both friendly and enemy forces. The skill level for all human controlled flights must be set to Ace.

2. Victory conditions must not to be built into the tac file.

3. Keep the total time in flight to around 1¼ hours maximum.

4. Ensure there are 2 minutes between takeoff times from the same airbase and 1 minute between takeoff times from different airbases. This applies to all takeoffs regardless if they are friendly or enemy, human or AI.

5. Ensure no airbase closer than 15nm to the edge of the map is used for take-offs by human flights.

6. Any assigned targets must be visible on the mission builder recon screen target list so the mission outcome can be determined.

7. Assigned targets must be no close than 15nm to the edge of the map.

8. No aircraft on the ground is to be assigned as a mission target.

9. For normal scale TEs there should always be between 12 and 16 human F-16 seats available in the TE. These can be split over a maximum of 5 flights and supporting flights should be in the same package as the flight(s) being defended. A human AWACS/JSTARS controller is also authorised. Note that if you want ground movers to be a surprise in your TE then you should **not** include a JSTAR in your TE.

10. The maximum number of aircraft to be active in a TE at any one time is 50, including both friendly and enemy aircraft.

11. No more then 25 ground battalions in a TE with the following restrictions:

    a. No more than 7 long range SAM in a TE (SA-5, SA-10, Carrier Group, Patriot).

12. The following rules apply to the spacing of ground units:

    a. No more than 3 long range SAM systems (SA-5, SA-10, Carrier Group, Patriot) are allowed to overlap the same area of ground.

    b. For ground units other than long range SAMs the only limit on their proximity to each other is that the total number of individual components within a 10 mile radius does not exceed 48. Once the total number of components reaches 48 no other ground units may be placed within that 10 nm radius.

13. Be careful about deploying a friendly ground unit next to a TE target as it may lead to fratricide.

14. Do not make air-to-air refuelling compulsory.

15. **The following rules apply to flight plans**:

    a. Whenever possible ensure you have a free flight plan and leave the timings unlocked apart from the take off time and time over target.

b. Free flights plans don't need to be optimised for threat avoidance but mobile unit threat types should be mentioned in the written brief.

c. There must be sound reasons for a flight plan to be fixed. These reasons do not include being convenient for the TE writer.

d. If steerpoints are fixed, the flight path must be tactically sound.

e. If steerpoints are fixed and the mission builder wants flights to fly that precise route then he should clearly state in the brief that no deviation from the route is allowed except for in-flight tactical reasons. Otherwise a fixed flight plan means steerpoints cannot be moved. Flights are authorised to deviate from the route to avoid or engage a threat.

f. Steerpoint 2 is the push point for the flight and as such it must be placed approximately 10nm from the take-off airfield, on the runway heading and have a maximum speed of 250 knots to stay on caret. The set altitude should be 5000 feet.

Loadouts

Free loadouts are the 185th default as they offer the maximum flexibility for pilots when planning and flying the mission. You are able to deny certain weapons to pilots even with a free loadout simply by the choice of aircraft you assign to a flight. Another option is with the use of Mission Commander to remove the availability of weapons.

16. **The following rules apply to loadouts**:

a. Whenever possible ensure you allow a free loadout.

b. If you assign default ordnance to a human flight when the loadout is free, it does not need to be capable of destroying the assigned target. It is up to a pilot to select the right mission loadout.

c. If the loadout is free you may leave a human flight without weapons so that pilots can choose their own but this must be stated in the brief.

d. Even with a free loadout the TE builder may simulate a shortage of certain stores to prevent their use but any shortage must be stated in the briefing. The use of Mission Commander can be used to actually reduce the availability of certain weapons.

e. Fixed loadouts should be suited for the task. Do not use unsuitable weapons for their 'training' benefit.

f. Fixed loadouts for ground targets must be capable of destroying the target in a single pass.

g. All AI loadouts must be suitable for completing their assigned mission.

h. TE builders must apply to Command for permission to use the B61 nuclear weapon in an official TE.

17. **The following rules apply to TE balancing**:

a. On-line flights often behave significantly differently from off-line flights and are usually more difficult so take this into consideration when making the TE.

b. Don’t rely on friendly AI aircraft doing their job for the human flights to get a mission success. Ensure that the targets are properly assigned in the Flight Planner to ensure the AI uses it’s ordnance.

c. Make the partial and success criteria something that is within the power of the human flights to achieve and make them unambiguous. The use of percentage destruction should be avoided as this is not easily quantified during a mission, making it difficult for pilots to know whether they have done enough to achieve a mission success or partial success. Specific targets, eg, “three evenly spread hits on a runway”, or “2 x Depots and Radar Dome destroyed”, should be used.

d. TE writers cannot make the number of aircraft that RTB a criteria for mission success.

e. Don’t assume that all available human seats will be occupied by human pilots. Often the flights fly without all the seats being filled so ensure your mission is still achievable.

f. Human flights skill level must be set to “veteran” or “ace”.

g. If you want an air defence system to engage aggressively, ensure it’s status is set to “Air Defence” and not “Reserve”. This can be checked by right clicking on the battalion in the mission planner and left clicking on “Status” in the menu that appears.

h. Use AAA and MANPAD units sparingly around the target area unless you want to completely rule out a low-level attack.

i. HARMs should be considered 50% effective so allow 2 for every SAM radar that must be destroyed to achieve the mission.

j. The AI skill level makes very little difference to the accuracy or effectiveness of the AD system. It merely changes how close you can get to a system before it locks you up. Don’t add loads of extra AD threat just because you’ve set the skill level to rookie. You’ll notice very little difference in the air.

k. You should be careful about where you place radar Air Defence units. They can often become embedded in a building or a hillside (or blocked by a fence or trees) and this makes them impossible to destroy with a HARM. Always double check the radar position, especially for mobile units. If any radar cannot be destroyed by a HARM because of this bug (assuming HARMS are authorized for use in the mission) it must not be used. For this reason it is recommended that you save your TE before you place your air defence battalion into the TE.

l. All enemy aircraft should have a skill level of veteran or ace and should be considered a real threat.

m. You should limit the number of enemy aircraft that the package is expected to defeat based on the number of aircraft capable of engaging with them. For example, for a 16 ship package with 8 human escort pilots (this includes SEAD Escort) you should limit the number of enemy aircraft they are expected to destroy to about 12-16, with a mix of high and low threat aircraft. This can be altered when any strike flights you have can go air to air. Accordingly you need to balance the threat based on likely load outs at stages of the flight.

n. To assist in balancing take the following as a guide during any engagement:

i. For semi-active threat aircraft such as the Mig-21 (note the MiG-21-93 is an active threat), Mig-23, Mig-25 and MiG-29A you can have the F-16's outnumbered by up to 2:1.

ii. For active aircraft like the Mig-29S you should have a maximum of parity with the threats.

iii. For superior aircraft such as the Su-30, Su-33, Su-34, Su-35, Su-37 or modern western aircraft being used by the enemy then the F-16 should outnumber the enemy by up to 2:1.

o. Don't just accept the default munitions loadout for enemy aircraft, tailor it to change the threat level. For example, Su-27s invariably come with 6 x AA-12 (R-77) missiles each. A flight of four of these aircraft against even eight F-16's is likely to be too much and could ultimately spoil your TE.

20. **The following rules apply to the written briefing**:

a. Use only .jpg images in the brief to keep the size down to a maximum of 1.5MB.

b. Ensure the briefs are easily understood.

c. Do not use any bad language.

d. Do not use the name of any real person or group in the TE. You can use real Armed Forces and real places but you must not be politically biased in the brief.

e. Send the completed written brief (in both word and pdf format) and tac file to the Operations Officer, making sure that the briefing is clear and readable. Any submissions that do not meet the criteria laid down in this document will be returned for you to amend for re-submission or rejected.

21. The Operations Officer is responsible for ensuring the quality of the Sunday night TE on behalf of all pilots of the 185th VFS. He has the final decision about whether to accept a TE or not, regardless of the level of compliance with this SOP.

22. If a TE writer is about to create a TE which they know will not comply with this SOP then they must contact the Operations Officer to discuss it before hand. Creating the TE and then having it rejected because you didn't follow the rules is wasted effort.

PLANNING

Make sure you plan your TE before you start creating units and packages in the mission builder as this will help to ensure you get it right first time. Always try to make your TE as realistic as you can while ensuring they are still entertaining. Remember that being able to survive the mission is important so while TE's should be challenging, they should not be suicidal. A difficult balance to strike but if done correctly then the TE will surely be one that people remember.

CREATING THE MISSION TAC FILE

Many things need to be considered when constructing a TE for online use. A badly written TE can play havoc with online flights so we must strive to design our TEs to minimise the chances of this happening. Ensure you follow the rules set out here or your TE will be rejected by the Operations Officer. If you need assistance on how to create a TE then you can download PJC's excellent tutorial "A Step by Step Guide to Building Your First TE" from the 185th web-site documents menu here. The IQT lesson on TE creation, which relates to BMS, is available here.

Setting the Skill Level

The is the first thing you must do. If you add a unit to the TE before setting the skill level, the unit will be ROOKIE skill no matter what you do. Note that once the overall skill level is set you can adjust individual skill levels on air units when you add them to the TE. Ground unit skill is determined by the skills settings you chose in the Teams tab. Go to the teams tab and set ada and pilot skills to the desired level for both friendly and enemy forces. The skill level for all human controlled flights must be set to ace.

Victory Conditions

Victory Conditions for the official TE should be determined in the briefing for the mission success/partial success criteria. Adding Victory Conditions in the TE can cause the Victory screen to come up in the mission, which can interfere with the functioning of the TE. The appearance of this screen during the mission also detracts from the realism and when it comes up, it is too easy to hit the wrong button and find you have exited the mission by mistake. Victory conditions must not to be built into the tac file.

Total Flight Time

Many of our pilots are up to 2 hours ahead of the time in the UK and may simply be unable to fly if the flight time is unreasonably long, so keep the total time in flight to around 1¼ hours maximum.

Home Airbases

Choosing which air base (AB) you are going to use as your home plate (HP) important for many reasons, particularly if you are allocating flights to different ABs. Your whole mission will be dependant on timing your flights as well as ensuring that our pilots are not left waiting to enter the cockpit while other flights have been in the air for some time, so careful consideration should be given to that balance.

You should also consider the location of the alternate AB, which is usually allocated by the Mission Planner automatically. Remember that they are for emergencies so you should:

a. ensure they are close enough to the action in order to offer themselves as a safe haven

b. that they have a tower frequency so that emergency refuelling can be given

If you plan to make the weather so bad that ILS landings are needed it is important that:

a. the AB has an active ILS frequency that must be published in your briefing

b. that you have adjusted the weather so that the wind is set for the runway that has an ILS facility. Note that some airbases have ILS for one direction but not the other eg, Kangnung has ILS 111.5 for runway 26 but nothing for runway 08, so if you wanted to use the ILS you must set the wind to Deterministic from between say 200° and 340°.

Takeoff Limitations

There are limits on how close to each other flights can takeoff where the take-off airbase is located. Violating these timings may cause issues with your TE notably having aircraft spawn on top of each other on the ramp and exploding! Ensure there are 2 minutes between takeoff times from the same airbase and 1 minute between takeoff times from different airbases. This applies to all takeoffs regardless if they are friendly or enemy, human or AI. Ensure no airbase closer than 15nm to the edge of the map is used for take-offs by human flights.

Steerpoint Speeds, Timings, Formations and Altitude

This is an aspect of TE building that is not done well by the default mission planner. It will get you to a target at a specified time, but all too often you will find that if you stick to the timing caret for each steerpoint you will be flying at about 240kts most of the way to the target area. Obviously this is too slow, you need to be travelling at a minimum of 350kts for tactical reasons (with the exception of Stp 2) so the speeds need to be increased. Annex A has details on 2 methods for achieving this.

Target Selection

TE builders are not to assign a target as a mission objective that is not listed in the mission builder recon target list screen or any target that is closer than 15nm to the edge of the map due to the risk of graphical issues and CTDs.

Aircraft on the ground are not to be assigned as targets due to issues with them simply disappearing from the TE. Any assigned targets must be visible on the mission builder recon screen target list so the mission outcome can be determined.
Assigned targets must be no closer than 15nm to the edge of the map.
No aircraft on the ground is to be assigned as a mission target.

Human Aircraft

All TEs must be designed with seats for 16 human pilots, all in the F-16[1]. These can be split as appropriate for the mission but the maximum number of human flights in a TE is 5 for CPL coding reasons. All supporting flights should be in the same package as the flight(s) they are assigned to protect. Aircraft other than the F-16 and Mirage 2000 cannot be flown by human pilots, with the exception of a human AWACS/JSTAR controller who may be used in addition to the F-16 pilots. For normal scale TEs there should always be 8 human f-16 seats available in the te, no more, no less. These can be split over a maximum of 3 flights. Supporting flights should be in the same package as the flight(s) being defended.

Total Number of Ground Units

The total number of ground units is another important aspect as it affects frame-rate and multiplayer stability. You should be especially careful about the number of long range SAMs (SA-5, SA-10, SAN-6, Patriot) and high density ground units (>39 vehicles) you place in the TE. You are allowed no more then 25 ground units in a te with the following additional restrictions:

No more than 7 long range SAMs in a TE (SA-5, SA-10, carrier group, patriot).

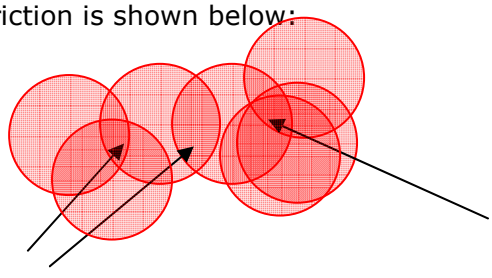
Spacing of Ground Units

The spacing of ground units has a big impact on stability, thanks to the shared bubbles in multiplayer, so keep ground units spaced out from each other so that they don't all get de-aggregated at the same time. Also remember that when human bubbles overlap each other, all units within the overlapping bubbles are de-aggregated for all those humans. The de-aggregation distances varies between units but as guide:

- Aircraft – 35nm
- Objectives (factories, bridges, etc.) – 30nm
- Ground units (excluding SAMs) – 6nm
- SAM units – SAM range plus 10%

The following rules **have** to be followed when placing ground units:

No more than 3 long range sam systems (sa-5, sa-10, carrier group, patriot) are allowed to overlap the same area of ground.
This provides a trade-off between allowing long range SAM threats to overlap and ensuring the large deaggregation range of these systems does not cause technical issues. You can use shorter range SAM system to create more overlapping SAMs. A graphical example of this restriction is shown below:



Allowed – Maximum of 3 long range SAMs overlap the same area of ground

Not allowed – More than 3 long range SAMs are overlaping the same area of ground

[1] Some missions can have the Mirage 2000 flown by human pliots (cockpits are provided in BMS by default) but they must be limited to one flight with a maximum of four pilots.

For ground units other than long range SAMs the only limit on their proximity to each other is that the total number of individual components within a 10 mile radius does not exceed 48 (use the table below to calculate). Once the total number of components reaches 48 no other ground units may be placed within that 10 nm radius.

Ser	Owner	Unit Name	No Vehs
(a)	(b)	(c)	(d)
1	**DPRK**	Spec Ops – AK47	16
2		Tank – T55	43
3		Tank – T62	41
4		HQ – MBP-CMD	30
5		Infantry – AK47	48
6		Mech – BTR-60	30
7		Mech – VTT-323	30
8		Rocket – BM21	30
9		Corp Arty – M-1975	38
10		Sp Guns – M-1974	45
11		FROG – FROG-7	33
12		SCUD - SCUD	27
13		Towed Gun – D-30	46
14	**Chinese**	Tank – Type 85II	42
15		Tank – Type 90II	41
16		HQ – BMP-CMD	21
17		Infantry – AK47	45
18		Infantry – AK74	48
19		Mech – YW-531	32
20		SP Guns – 2S3	44
21		Towed Gun – 2A65	29
22	**Soviet**	Airborne – AK47	15
23		Tank – T-72	43
24		Tank – T-80	41
25		Tank – T-90	40
26		Engineer – MDK-2-D	12
27		HQ – BTR-70	28
28		Motor Rifle – BMP-2	42
29		Infantry – AK74	48
30		Naval Inf – BTR-80	32
31		Motor Rifle – BTR-80	32
32		SCUD - SCUD	15
33		SS Missile – FROG-7	17
34		SP Guns – 2S19	44
35		Rocket – BM21	32
36		Rocket – BM9A52	31
37		Towed Artillery – 2A65	38
38	**ROK**	Armoured – M48A5	46
39		Infantry Light M-16A2	47
40		Elite – Recon Squad	22
41		Mech – M113	46
42		Field Arty Btn–M109	24
43		Lt Art Btn Gen – M198	21
44	**US**	ABN Rlf Platoon-M4	46
45		USMC Sniper-M-40A3	2
46		USMC Sniper-M-82	2
47		USN Seal Team- M4	10
48		Army Delta Force Tm	10
49		Seal Sniper Hvy-M-82	2
50		Army Sniper- M-24	2
51		Seal Sniper Light	2
52		Armored XXI-M1A1	37
53		Armored XXI-M1A2	36
54		Armored XXI M1A1/2	33
55		Heavy Armored-M1A1	39
56		Heavy Armored-M1A2	39
57		Armoured - M60A3	43
58		Cavalry – M3A3	48
59		Engineer – M113	15
60		HQ - M2A2 BCV	34
61		Infantry-Recon Squad	42
62		Infantry Light M-16	47
63		USMC MEU-AAV7-A1	43
64		Infantry Mech XXI-M2	26
65		Artillery Hvy - MLRS	22
66		Artillery - MLRS	25
67		Field Arty XXI-M109	31
68		Lt Arty Btn Gen-M198	21
69		Lt Arty Btn Direct-M119	19
70		Armored – Leopard 2	48
71		Cavalry – M3A3	48
72		Armored- Challanger	48
73		Cavalry - Challenger	48

Deploying Friendly Ground Units
It may be that a friendly unit moves forward and captures the target during the mission. Unless you make the pilots aware in the brief that the ground unit has been tasked with capturing a target then they may inadvertently bomb a friendly unit, with adverse effects on the mission success so be careful about deploying a friendly ground unit next to a target as it may lead to fratricide.

Airborne Re-fuelling
There are not many scenarios where air to air refuelling is required due to the size of the default scenarios and 1¼ hour flying time guidelines, however giving pilots the option to refuel may allow them to carry greater ordnance. If you do add a tanker to your TE, do not make air-to-air refuelling compulsory and ensure that an alternative air base is available.

Free Flight Plans
When building a TE you are trying to provide an entertaining experience, but also trying to set up a challenge. When flying that same TE, part of the fun is to try and outwit the builder so whenever possible ensure you have a free flight plan and leave the timings unlocked apart from the take-off time and perhaps the time over target.

A free flight plan doesn't mean the pilots will be able to avoid all of your threats, for example, you can use mobile threats such as the SA-6 or SA-10 to ambush a flight on what looks like a clear route during planning or if you don't want flights to take what looks like an easier route away from fixed steerpoints and around the more obvious threats, put in a high threat BARCAP or two to cover that route and let them know it will be there in the written brief. If you think somebody might fly to another alternate that looks an easy option for egress, either put some sort of trap in the way or make that an enemy airbase (provided that is consistent with the occupied areas shown on the map).

If Steerpoints are **NOT** fixed the TE builder doesn't need to optimise the flightpath as this can be done by the pilots themselves and you can place enemy ground units under the flightpath, however mobile units will not (or should not) show up on the briefing screen unless you allocate a JSTAR, so your written briefing should given some indication of likely mobile ground threats. Free flights plans don't need to be optimised for threat avoidance but mobile units threat types should be mentioned in the written brief.

Fixed Flight Plans
By default for official missions the flight plan is free so there must be a sound reason for you to fix it eg to escort another flight. **It must not be fixed just so the mission builder can ensure the flight runs into groups of bandits at a certain point**. There must be sound reasons for a flight plan to be fixed. These reasons do not include being convenient for the te writer.

Where flight plans are fixed, flight paths must be optimised to minimise the threat ie it should only pass over a ground threat if there is not a more tactically sensible and safer way of getting past that threat. If it would be safer to fly around a ground unit, the flight path should not be fixed to fly over it. Deploying a AAA/SAM unit at the target is of course okay. If steerpoints are fixed, the flight path must be tactically sound.

When flying with fixed steerpoints the following are considered to be tactically sound methods of dealing with ground threats in order of preference:

- Fly around the threat, outside of it's maximum engagement range. As stated above, this rule must always be applied unless routing around a ground threat is impractical. For example due to other threats, fuel or time considerations.

- Eliminate the threat before entering its engagement envelope, this being done either by the flight that is passing over it or by a SEAD strike/escort (in which case they should be carrying the appropriate ordinance to do the job effectively). This is applicable to single SAM radars but is not to applicable to multiple independent SAMs (e.g. SA-8, SA-11, SA-13, SA-15, SA-17 etc.) or AAA, as eliminating all of them cannot be guaranteed.

- Flying over the threat with a safe margin above it's maximum engagement altitude, making allowance for ground level. Note that this altitude must be easily maintainable with good speed and good manoeuvrability, taking into account the loadout, and with sufficient altitude margin to allow for reacting effectively to air-to-air threats and missile evasion without being trapped by the threat you are passing over.

- Fly over the threat but fly below it's minimum engagement altitude (it is questionable, however, whether this is tactically sound, as it puts you at a disadvantage for air to air combat and another option that maintains altitude may well be more appropriate.

To determine how rigid a fixed flight plan is and how strictly it should be interpreted, ie how much leeway there is for using initiative and common sense to deal with or avoid any threats the following rule must be followed:

> If steerpoints are fixed and the mission builder wants flights to fly that precise route then he should clearly state in the brief that no deviation from the route is allowed expect for immediate tactical reasons while in flight. If any steerpoints can be moved then the ID of the steerpoint and how far it can be moved MUST be stated.

Steerpoint 2

Steerpoint 2 is the push point for the flight and as such it must be placed between 10 and 20 nm from the take-off airfield and have a maximum speed of 250 knots to stay on caret and be at an altitude of 5000 feet. All aircraft should be able to be comfortably in formation by the time they reach steerpoint 2 without having to use burner to catch up.

Free Loadouts

Free loadouts are the 185th default as they offer the maximum flexibility for pilots when planning and flying the mission. You are able to deny certain weapons to pilots even with a free loadout simply by the choice of aircraft you assign to a flight.

Whenever possible ensure you allow a free loadout.

If you assign default ordnance to a human flight when the loadout is free, it does not need to be capable of destroying the assigned target. It is up to a pilot to select the right mission loadout.

If the loadout is free you may leave a human flight without weapons so that pilots can choose their own but this must be stated in the brief.

Even with a free loadout the TE builder may simulate a shortage of certain stores to prevent their use but any shortage must be stated in the briefing. eg the above mentioned SEAD flight has no HARMs, only CBU's. The use of Mission Commander to limit the number of available munitions is a useful tool for this.

Fixed Loadouts

Fixed loadouts are not encouraged as, like fixed steerpoints, they reduce planning options for the flights. If they must be fixed however the following applies:

- Fixed loadouts should be suited for the task. eg sending out a SEAD Escort into a ADA-crammed area without HARMs and CBU's isn't the best thing to do.

- Fixed loadouts for ground targets must be capable of destroying the target in a single pass. For example, there is not much point in striking an underground factory with MK-20s.

AI Loadouts
All AI loadouts must be suitable for completing their assigned mission.

Nuclear Weapons
The B61 nuclear weapon is not authorised for normal use in the 185th VFS. A special order for their deployment is required from Command. TE builders must apply to Command for permission to use the b61 nuclear weapon in an official TE.

GETTING THE DIFFICULTY LEVEL RIGHT
It is always a difficult balance when creating a TE to make it challenging without making it a suicide mission. From the outset you should bear in mind the following rules:

- On-line flights often behave significantly differently from off-line flights and are usually more difficult so take this into consideration when making the TE. Your challenging off-line TE may be a suicide mission on-line. Always try to test fly it on-line to be sure (note this may be done by the Operations Officer. Check with them to see who is responsible for testing it).

- Don't rely on friendly AI aircraft doing their job for the human flights to get a mission success. They are normally unreliable and often fail to achieve their mission.

- Make the partial and success criteria something that is within the power of the human flights to achieve and make them unambiguous. For example don't ask the SEAD Escort to prevent any losses to the Strike flight due to MANPADS.

- TE writers cannot make the number of aircraft that RTB a criteria for Mission Success. This is already taken into consideration in the RTB bonus and you are penalizing a flight twice by adding this to the criteria.

- Don't assume that all available human seats will be occupied by human pilots. Often the flights fly with less pilots so ensure your mission is still achievable.

- Human flights skill level must be set to "Veteran" or "Ace"

Air Defence Threats
There is an issue in Falcon BMS 4.32 that effects all types of AD units. Their status is affected depending on the objective they are positioned on. Some objectives have an "Air Defence" Status and others have a status of "Reserve". When they have a reserve status they will still fire but with reduced frequency and less aggressive tactics. Their status can be checked by calling up the status box in the mission editor. Places which usually have a status of "Air Defence" include Airfields, Army Camps and installations, some factories, radars and Highway Strips. Political objectives and bridges usually have a Reserve status. Use this info to decide on where you want the AD units to be and to help decide their effectiveness. If you want the air defences to engage then they MUST be set to Air Defence.

There is a bug in BMS regarding all ground units in the 2D map. Independent whether JSTAR or AWACS are available, all friendly and enemy ground units are shown on the 2D

in a multiplayer session for all clients. Take that into account, for example, mobile SAM units cannot be hidden anymore in BMS in a TE as in previous versions of Falcon! One possibility to overcome that bug is to use air mobile missions to hide ground units by picking them up before the players entered the TE 2D map. Those units would remain in the "air" as long as the players do not enter the 3D world.

Low-level AD assets such as AAA and MANPADs are lethal in Falcon BMS 4.32. If you take a 4-ship into a target area with heavy low-level AAA/MANPADs expect someone to take a hit. Use AAA and manpad units sparingly around the target area unless you want to completely rule out a low-level attack.

Radar SAM sites are generally more effective than in previous versions of Falcon. They fire a greater number of missiles at aircraft and are quicker to engage multiple targets (where the system is capable). Harms should be considered 50% effective so allow 2 harms for every sam site that must be destroyed to achieve the mission

Note that this does not mean you can only have half the number of SAM sites as you have HARMs. For example if there is an SA-2 and an SA-5 over the target area with an SA-3 some 15 miles South then a good 2-ship SEAD flight will destroy the SA-2 and the SA-5 and inform the strike flight to avoid the SA-3 if they have no HARMS left. It's not the TE builders fault if the SEAD waste their HARMS knocking out the SA-3 and don't have enough left for the SA-2. You also have the option of using CBUs although of course this will mean getting almost on top of the threat.

The AI skill level makes very little difference to the accuracy or effectiveness of the AD system. It merely changes how close you can get to a system before it locks you up. Don't add loads of extra ad threat just because you've set the skill level to Rookie. You'll notice very little difference in the air.

You should be careful about where you place radar air defence units. They can often become embedded in a building or a hillside (or blocked by a fence or trees) and this makes them impossible to destroy with a single HARM. Always double check the radar position, especially for mobile units. If any radar cannot be destroyed by a single HARM because of this bug (assuming HARMs are authorized for use in the mission) it must be mentioned in the brief or the unit removed from the TE.

Air Threats

Air threats are arguably the hardest part of Falcon BMS 4.32 to balance and you should therefore invest a considerable portion of your TE building time into getting the air threat right. You should bear in mind the following points:

- The AI within Falcon BMS 4.32 presents much more of a challenge than in previous versions of Falcon. Long gone are the days when you could take on a 4 ship of MiG-29 single handed and expect to emerge unscathed.

- The skill level of the enemy aircraft makes more of a difference than with the AD but even a rookie can be dangerous. An enemy aircraft with a skill level of veteran or ace should be considered a real threat.

- You can vary the challenge presented to human pilots dependant on the aircraft you put up against them.

- To assist in balancing take the following as a guide during any engagement:

  For semi-active threat aircraft such as the Mig-21(note the Mig-21-93 is an active threat), Mig-23, Mig-25 and Mig-29A you can have the F-16's outnumbered by up to 2:1.

  For active threat aircraft like the Mig-29S and Su -27 you should have a maximum of parity with the threats.

  For superior aircraft such as the Su-30, Su-33, Su-34, Su-35, Su-37 or modern western aircraft being used by the enemy then the F-16 should outnumber the enemy by about 2:1.

- You need to consider not only the type of aircraft you will be employing but also what armament they will be carrying. A MiG-29S with guns only is not a real threat to your F-16 unless he can close to within 2 miles of your aircraft. Armed with the AA-11 and AA-12 he is a lethal threat anywhere from 30 miles inwards. Don't just accept the default munitions loadout for enemy aircraft, tailor it to change the threat level. To achieve this you need to know your weapons. The AA-9 (R-33) and AA-10 (R-27) should be considered high threat while the AA-11 (R-73) and AA-12 (R-77) should be considered very high threat weapon systems. You may wish to limit the number available to the enemy aircraft, depending on the challenge level you want. Check out the Tactical Reference and this section of the 185th web-site for further info on threats.

USING TYPICAL pK of WEAPONS and the DIFFICULTY OF A TE

An alternative method to set the difficulty of a TE is looking at the typical probability of kill (pK) of weapons in BMS when flown by humans and the number of threats. For example, typical pK for the AIM-120B/C is 80% against MIG-21s and MIG-23s, while it typically reduces to 50% against higher threats. Taking these values into account, a 4-ship F-16 flight carrying a total of 24 AIM-120 can destroy about 19 MIG-21s/MIG-23s, but only 12 SU-30s. Setting mission goals, which require to kill or to engage more than such numbers is not realistic. The following table sums up pKs for some weapons carried by the F-16C-52:

Weapon	Min pK	Max pK	Comments
AIM-120B/C	50%	80%	
AIM-9M/X	40%	80%	
Air-to-ground(AD)			
AGM-88	70%	90%	
AGM-65 (all versions)	80%	100%	
Cluster bombs (aginst mobile units)	50%	80%	
Dumb bombs (against mobile units)	40%	70%	
JDAM	80%	100%	

High and low values of pK can be used to set "easy" and "hard" TEs, respectively.

THE BRIEFING

As part of the TE, you are required to produce a written brief that can be sent out to pilots some 24 hours before the mission is flown. It is designed to give them information about the forthcoming mission and allow some initial planning with the aim of minimising the time spent in the Mission Schedule prior to flight.

There is a word template for the briefing available under the TE section of the documents menu on the 185th web-site here. Note the following points:

- Use only .jpg images in the brief, to keep the size down. The briefing shouldn't normally exceed 1.5MB so pilots can easily receive them.
- Ensure the briefs are easily understood, remembering that for many of our pilots, English is not their first language.
- Do not use any bad language. Not only can this offend our members but these briefs and TEs will be placed on the web-site and be available to the public.
- Do not use the name of any real person or group in the TE. You can use real armed forces and real places but you must not be politically biased in the brief.

Feel free to make the background story to the mission as novel and fun as you want as long as the necessary information is passed to the pilots.

DELIVERY OF THE TE AND BRIEFING

Send the completed written brief (in both Microsoft Word and Adobe pdf format), tac file, twx file and ini file to the Operations Officer, making sure that the briefing is clear and

readable. Any submissions that do not meet the criteria laid down in this document will be returned for revision or rejected.

QUALITY CONTROL

The Operations Officer is responsible for ensuring the quality of the Sunday night TE on behalf of all pilots of the 185th VFS. He has the final decision about whether to accept a TE or not, regardless of the level of compliance with this SOP.

CREATING A NON SOP 9 COMPLIANT TE

If a TE writer is about to create a TE which they know will not comply with this SOP then they must contact the Operations Officer to discuss it before hand. Creating the TE and then having it rejected because you didn't follow the rules is wasted effort.

ANNEX A - Steerpoint Speeds and Timings Adjustment

This is an aspect of TE building that is not done well by the default mission planner. It will get you to a target at a specified time, but all too often you will find that if you stick to the timing caret for each Stp you will be flying at about 240kts most of the way to the target area. Obviously this is too slow, you need to be travelling at a minimum of 350 knots for tactical reasons, so the speeds need to be increased. To achieve this:

- First, in the mission editor, after you have added your flight/package, click on one of the Steerpoints (STPs) to call up the Flight Plan page. At the top you will see the STP number and two arrows <> that allow you to change the STP of interest. You will also see below this two padlock symbols, they are to the left of TOS (Time On Steer Point) and Speed respectively, they are **green** when **locked** and **blue** when **unlocked**. To the right of each are more <> adjustment arrows.

- Start by unlocking the TOS padlock for the target STP and lock the Speed Padlock instead. You will now find that you are able to move the STP's virtually anywhere without them going red (red indicates that you have exceeded the ability of the jet/fuel).

- Select STP2 and make sure it is between 10 and 20 miles from the Homeplate then adjust the rest of the STP routes to suit your mission. Once you are happy with the route you have selected return to STP2 and ensure the speed required to get there is not more than 200kts. This will allow a 4 ship human flight to reach the STP on time without excessive use of burner.

- For the rest of the STP's up to the Target/Action STP set the altitudes first (this is especially important for the pure AI flights, as they will fly to this mission plan exactly). Once you have adjusted the altitude profiles of the flights then go through the rest of the STP's from 3 to the action point/'s and increase the speed until it Red's-out then back it off to about 10-20kts less than the Red-out speed. This will ensure that the jets are all flying at a comfortable speed and also shortens the time to reach the Target/Action STP.

- This speed adjustment is not needed for all AI flights but it is a must for Human flights. AI flights that reach the action STP on time can be left or adjusted as the builder sees fit but be aware that Falcon BMS 4.32 can make some flights go at ridiculous altitudes and slow speeds so it is worth checking them all.

- For some missions you will want a package of aircraft to meet at certain points so some additional adjustment of the speed/time may be required to ensure everyone can arrive at the same point, at the same time.

- Having added all the flights/Packages including enemy ones, you need to check the take off timings to ensure there is a minimum of 2 minutes between flights from the same airbase and one minute between those from different airbases, whether friendly or enemy. The easiest way to make these adjustments is to note down the current name/aircraft type/Take-Off time of each individual flight on a piece of paper, then sort out which order you feel would be the best for them to get airborne in. Starting from the flight which is first to go, select STP1 and set the TO time (it is best to set this time to the nearest minute as it makes the working out much easier), then do flight 2/3/etc

- Before you do anything else just run the clock forward and check that all the push points, intercepts etc are working as you desire, you may have to switch some T/O times and maybe even adjust a couple of the STP speeds to get it just so, but once you have it as you'd like put the clock back to the start time and save the TE.

- Now select each flight in turn and unlock the speed and lock up the TOS for the action STP and STP2, Note that it is usually only necessary to do this for STP2 and the action STP to ensure that the AI will do it's best to arrive at each SP on time. If you leave any of the speeds locked and for any reason the AI aircraft get behind schedule, they will continue at the locked speed and not use burner to make up the lost time.

Steerpoint Speeds and Timings - Alternative Method

One alternative method for adjusting STP times that is quick and easy but slightly less precise is to unlock the time and lock the speed for STP 2 and the Action STP, (the rest will be unlocked by default):

- Set STP2 to it's correct/desired position and set the speed to 250kts, now lock the time and unlock the speed of STP2.

- Next set the rest of the ingress STP's to the route you wish them to fly, DO NOT ADJUST THE SPEED OR TIME AT THIS POINT. Then go to the Action STP and unlock the speed and adjust the time backwards (so the flight will arrive earlier and thus fly faster) until the flight plan "Reds out". Now adjust the seconds forward until it goes white again and then add about 15 to 30 seconds more.

- Check the ingress speeds for the STP's and they will be much more realistic and will be adjusted automatically from STP2 up to the target STP.

If you wish to adjust the egress as well then do the same from the action point to the homeplate point and the intermediate points will also automatically adjust.