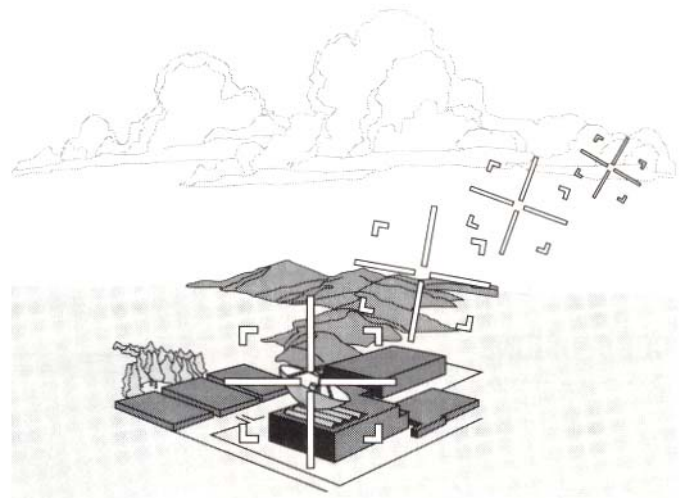


TDA

for

HORNET LEADER



WHAT'S A TDA? In U.S. Air Force parlance, it's a *Tactical Decision Aid*. A TDA is a mission planning tool that aids in selecting munitions and establishing an attack plan based upon the type of target to be attacked, the expected weather conditions, the time of day, and a few other factors. You can bet that when the F-111's raced in low over Tripoli several years ago, or when the Air Force paid a surprise visit to Baghdad in January of 1991, mission planners used TDAs to help them make their decisions.

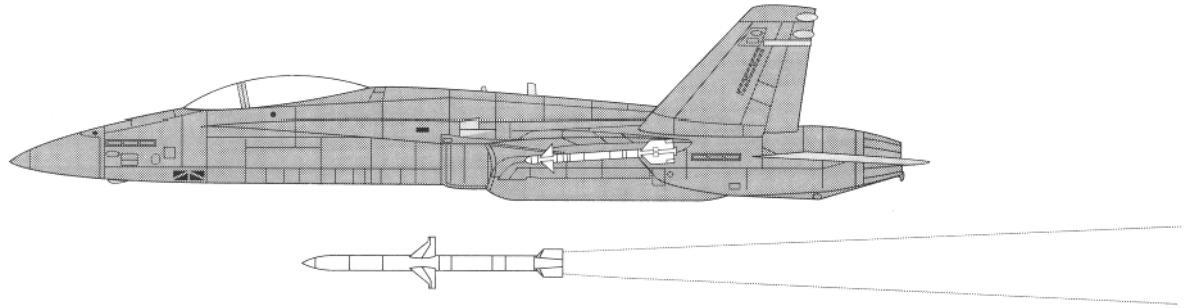
BY JEFF PETRASKA

THE INFORMATION PROVIDED IN THIS TDA WILL MAKE IT EASIER FOR PLAYERS TO WEIGH THE PROS AND CONS OF DIFFERENT WEAPONS, ATTACK TACTICS, AND PAYLOADS, AND TO FLY MORE SUCCESSFUL MISSIONS AND CAMPAIGNS

The single most important role that players of *Hornet Leader* fill is that of mission planner. While execution of the mission is usually determined by the luck of the cards and die rolls, it's a sure bet that a poorly planned mission will have little chance of success. It is entirely appropriate, therefore, that someone should take up the challenge and develop a TDA for *Hornet Leader*. This article is an attempt to do exactly that.

AIR-TO-AIR PLANNING

The focus of this TDA is on planning of the air-to-ground attack on the target site and surrounding areas, since this is where the most critical mission planning must be performed. Air-to-air planning is fairly straightforward in *Hornet Leader*, with the only major decision being how many aircraft to allocate to provide air cover for the ground attack planes. On that decision, I will say only this: *MiGs* have a +4 firing position modifier when attacking ground attack *Hornets*. This should be incentive enough to provide *two Hornets* for air

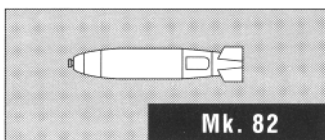


cover against Minimal or Light opposition, and at least four *Hornets* against Moderate or Heavy opposition. The standard weapons loads for all *Hornets* assigned to air cover will be two Sparrows and four Sidewinders. If all three load areas are available for the mission, throw in an E-pod as well.

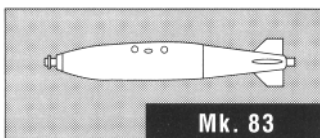
AGW ANALYSIS

There are five air-to-ground weapons (AGW) available in *Hornet Leader*: Mk 82 bombs, Mk 83 bombs, Maverick missiles, Harpoon missiles, and HARM missiles. Of these five, only the HARM cannot be used against the mission target itself, but only the SAM sites defending the target.

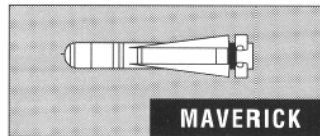
What follows is a brief description of each weapon and its usefulness:



Mk 82 bombs: The *Hornet Leader* rule book describes these as representing standard iron bombs of the 500 lb weight class. They weigh 1 weight point, offer a good hit probability (70% chance of one or more hits), and are always available in quantity. They can only be used against targets in the same area as the *Hornet* carrying them.



Mk 83 bombs: These represent iron bombs of the 1000 lb weight class. They weigh two weight points and offer an increased probability of multiple hits over the Mk 82, without increasing the basic hit probability of 70%. The Mk 83 is the only weapon that is capable, when delivered with an attack modifier of +1 or more, of scoring three hits with a single roll of the die. As with the Mk 82, they can only be used against targets in the same area as the *Hornet* carrying them.

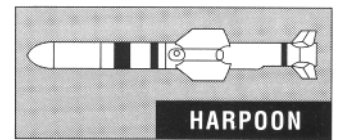


Maverick missile: The Maverick missile is the only weapon that can be used to attack land mission targets from an adjacent area. That is, in fact, its only advantage over Mk 82 bombs. It weighs 1 weight point and has hit probabilities nearly identical to the Mk 82 when fired at a target in the same area as the *Hornet*. When fired from an adjacent area, however, the basic hit probability drops to only 50%, and requires a +2 attack modifier to have any chance of scoring two hits. One task that the Maverick is uniquely suited for is the reduction of target area AAA fire prior to sending the *Hornets* into the area.



HARM missile: The HARM's only function in the game is to reduce and/or knock out SAM sites. Because the HARM is the only AGW that attacks

prior to enemy SAM and AAA fire, it is definitely the weapon of choice for its role. It weighs 1 weight point and has very good hit probabilities against SAM sites in the same area as the *Hornet* (basic 80% chance). Even fired from an adjacent area, the HARM still has a basic hit probability of 70%. The HARM is probably the single most important weapon in *Hornet Leader*.



Harpoon missile: The Harpoon is the largest and heaviest AGW in the game. Although it weighs 2 weight points (same as the Mk 83 bombs), it suffers from a restriction such that a single *Hornet* cannot carry more than two Harpoons, one on each wing load area. Also, the Harpoon can only be used on naval strikes, never against land targets. The Harpoon does have two advantages, however. First, it is the only AGW that can be fired at a target up to two areas away from the launching *Hornet*. Second, it has very good hit probabilities (70% same area, 80% adjacent area, 60% non-adjacent area) and relatively high probabilities of multiple hits. Its best hit probabilities are against targets in adjacent areas, so there is no reason for Harpoon-equipped *Hornets* to face the hell of target area SAM and AAA fire to deliver their weapons for maximum effect.

20mm Cannon: This is purely a weapon of desperation in an AGW role. Because of its very low hit probability (10%), it should never be a factor in mission planning. Therefore, I'll say no more about it.

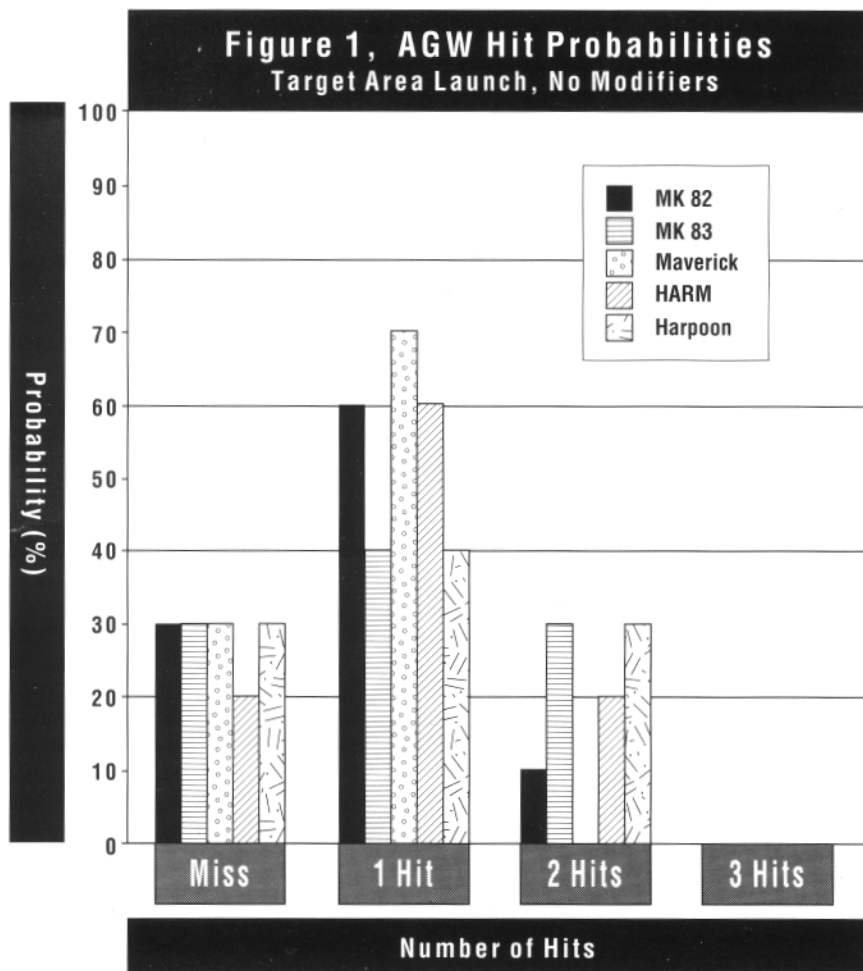


Figure 1 shows the hit probabilities for AGW weapons used against targets in the same area. Figure 2 shows the probabilities for targets in an adjacent area. The data in both figures represent the to-hit values printed on the weapon counters, with no modifiers. Each +1 modifier will reduce a weapon's left most column by 10% and increase its right-most column by 10%. Note that the three-hit probability for Mk 83 bombs and the two-hit probability for the Maverick missile does not appear in Figure 1 because there is no chance of those results occurring without a modifier of +1 or more. The same is true for the Maverick in Figure 2, which requires a modifier of +2 or more to score two hits.

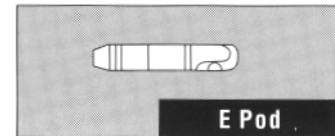
Table 1 (turn page) shows the average number of hits that each individual weapon will inflict on the target. Mavericks and Harpoons are not listed in the "Same Area" section of the table because they offer no benefit from firing them there, compared to other AGWs. When firing multiple weapons, simply

sum the average hits shown in the table to determine the total expected hits. For example, dropping two Mk 83s and two Mk 82s will, on the average score 3.6 hits if there is no attack modifier, 4.6 hits with a +1 modifier, and 5.6 hits with a +2 modifier.

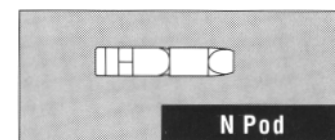
Table 1 also shows some important relationships between different AGW options. For example, if the weapon selection for your Hornets is limited by weight rather than load areas, you are better off taking four Mk 82s than two Mk 83s. Both loads weigh four weight points and consume two load areas, but the Mk 82s will likely result in more hits. Similarly, when attacking naval targets from an adjacent area, two Harpoons is a better choice than four Mavericks. In theory, however, delivering four Mk 82s to the target area is an even better choice.

POD OPTIONS

Hornet Leader includes two different electronics pods that are very useful for ground attack Hornets. Each type of pod weighs one weight point.



E-pods represent various electronic warfare/ electronic countermeasure equipment designed to interfere with SAM acquisition and tracking radars, and possibly jammers or decoys to defeat the seekers on the missiles themselves. Each E-pod carried by a Hornet results in a -3 modifier on the SAM Lock-On Table. A single E-pod, therefore, will negate all small SAM sites and nearly defeat all long range SAMs (10% lock-on probability). Two E-pods will negate all small, medium, and long range SAM sites, and nearly defeat all large and large long SAMs. Unfortunately, this protection applies only to that particular Hornet, so every aircraft has to carry its own E-pods to achieve that level of security.



N-pods are night vision pods (FLIR pods is the more commonly used, real-world term). These pods allow the Hornet crews to see at night, negating the -2 AGW to hit modifier that night missions would otherwise impose. They serve no other purpose, and there is no benefit from carrying more than one N-pod per aircraft. The benefit of carrying an N-pod rather than an additional AGW varies with the number and type of AGW being used, and can be determined using Table 1. For example, it is better for a pilot with a +1 air-to-ground skill to carry three Mk 82 bombs and an N-pod (3 average hits) than four Mk 82 bombs without an N-pod (2.4 average hits).

However, that same pilot is better off carrying two Mk 82s (1.2 average hits) than one Mk 82 and an N-pod (one average hit).

MISSION PLANNING PROCEDURE

There are several fundamental factors that will determine the options for air-to-ground mission plans. These are:

1. Number of Hornets allowable/available for the mission.
2. Enemy resistance (SAM, AAA, and air cover).
3. Day or night mission.
4. Available load areas and weight points.
5. Special mission conditions, if any.

The following is a suggested, step-by-step approach for air-to-ground mission planning that considers the above factors:

STEP 1: ALLOCATE HORNETS TO AIR COVER.

As stated earlier, I recommend allocating *two Hornets* against light or minimal opposition, and four *Hornets* against moderate or heavy opposition.

If enemy *MiGs* are not likely to achieve a cleaner than 2:1 advantage during the mission unless you fare unusually poorly in air-to-air combat. If facing minimal *MiG* opposition, consider using any available load areas of the *Hornets* assigned to air cover to carry additional HARMs or AGWs during later mission planning steps.

STEP 2: EXAMINE THE POTENTIAL USES OF STAND-OFF AGWs.

The safest way to attack a target is from outside the target area where there will be less SAM opposition and no AAA to worry about. It also allows your *Hornets* to carry the maximum amount of AGWs for use against the target itself, rather than carrying lots of HARMs and/or E pods just to penetrate the defenses.

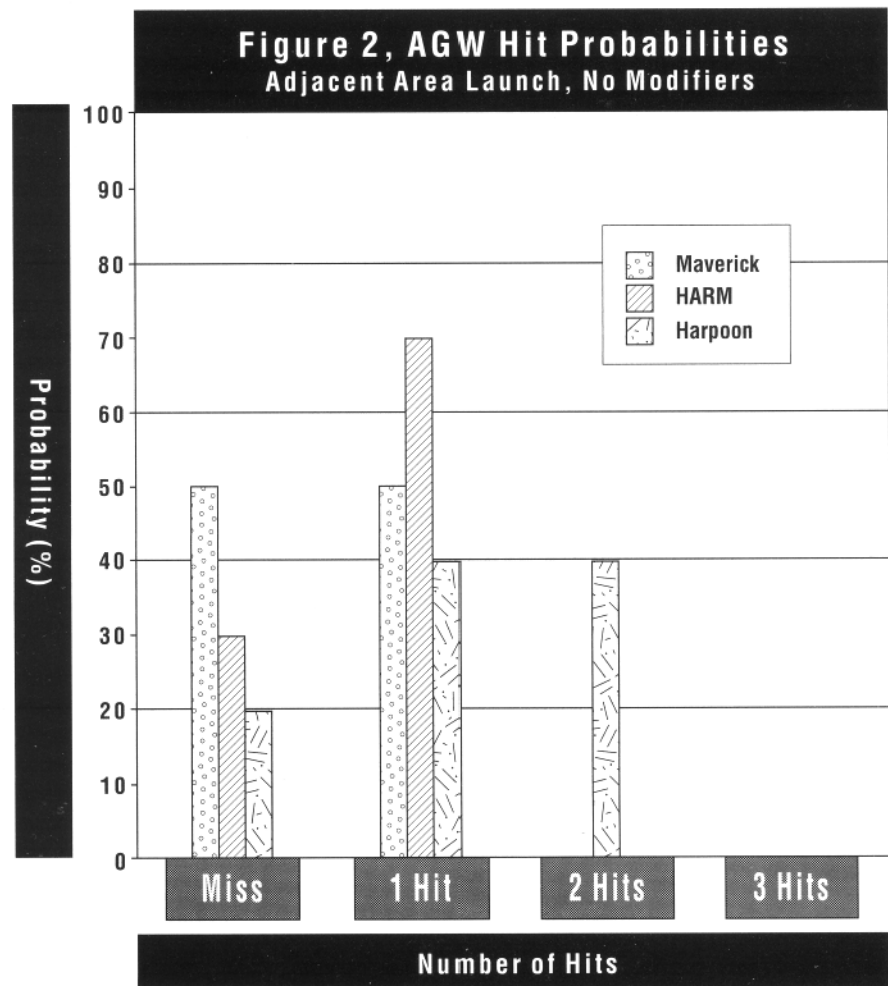
To determine if a stand-off AGW attack is practical, simply use the values in

Table 1 for Maverick or Harpoon missiles and determine how many weapons will probably be needed to score the maximum number of hits on the target, given the air-to-ground skills of the pilots that will be flying the mission, the possible use of N-pods at night, and any AGW modifiers from a special conditions card. Compare the weight points and load area requirements of those weapons (and N-pods, if any) to your mission allowances. If your *Hornets* do not have enough carrying capacity, you will need to consider delivering your attack from the target zone, as described in Step 3, below.

If your *Hornets* are capable of carrying the desired number of AGWs/N-pods, the next step is to determine if they have enough weight points and load areas

remaining to deal with the SAM sites along the least defended approach to the target. If the expected SAM sites are all small or long range, a single E-pod on each *Hornet* may be all that is required to reduce the risk to an acceptable level. If not, determine how many HARMs are likely to be required using the values in Table 1, as before. In this case, however, remember that at least one HARM will be required for each separate SAM site.

If you're lucky, having a short range mission and/or favorable special conditions, the above analysis may prove that a completely successful stand-off attack is possible. If it is, then load up your *Hornets* and proceed to Step 5, below, for some final advice on mission planning. Against land targets, however, your ground attack *Hornets* will usually



Hornet Leader

not be able to carry the desired number of weapons to perform the attack. At this point you need to consider bombing the target.

STEP 3: EXAMINE THE POTENTIAL FOR A BOMBING MISSION.

If a stand-off AGW attack is impractical, then delivering bombs directly on the target is the only alternative. Although bombing has the potential to score numerous hits, HARMs and E-pods will consume more of your *Hornets'* weight and load area allowances.

Nonetheless, these attacks are the most common in *Hornet Leader*. Analysis of bombing attacks is performed the same way as for stand-off AGW attacks, described in Step 2. Use *Table 1* (above) to determine how many Mk 82 and/or Mk 83 bombs are required to score the maximum number of hits on the target, considering pilot skills, N-pods, and special conditions. Different combinations of Mk 82s and Mk 83s will be possible depending upon the weight and load area limitations, so your goal should be to choose the mix that is likely to score the most hits while leaving the most load space free for HARMs and/or E-pods.

Once an initial bomb load has been selected, the load of HARMs and E-pods must be determined. This can again be performed as described in Step 2. You may want to consider trading off bombs for HARMs on the planes flown by highly skilled pilots like *Banzai* (don't you just love this guy?) in an effort to get a little more bang for your buck against larger SAM sites.

One additional factor that must be considered in a bombing attack is AAA in the target zone. Moderate or heavy AAA can spoil an otherwise successful attack, especially since AAA gets to shoot at every *Hornet* in the target zone. If there is still some space available on your aircraft, consider carrying a few Mavericks for use against the AAA. If you don't have room for them, give serious thought to the possibility of replacing a HARM or two with a Maverick. After all, Mavericks can be

Average Number of Hits Per Weapon						
TABLE 1						
TARGET	WEAPON	AGW To-Hit Modifier				
		-2	-1	0	+1	+2
Same Area	Mk 82	0.5	0.6	0.8	1.0	1.2
	Mk 83	0.6	0.8	1.0	1.3	1.6
	HARM	0.6	0.8	1.0	1.2	1.4
Adjacent Area	Maverick	0.3	0.4	0.5	0.6	0.8
	Harpoon	0.8	1.0	1.2	1.4	1.6
	HARM	0.5	0.6	0.7	0.9	1.1
Non-Adjacent Area	Harpoon	0.4	0.6	0.8	1.0	1.2

used against SAM sites, if necessary, while HARMs cannot be used against AAA batteries.

If this analysis results in a weapons load for your ground attack *Hornets* that satisfies your requirements for probable mission success and minimized risk, then you are ready to fly your mission. Step 5, below, will touch on some last minute planning details.

STEP 4: REVISIT YOUR INITIAL PLANS.

Upon reaching this point, you may find that your *Hornets* still come up short of what will probably be needed to execute a completely successful attack. If so, examine the results from Steps 2 and 3 and determine if they offer an acceptable probability of simply a successful mission, rather than a complete success. This usually means scoring one less hit on the target than was planned in the preceding analyses, while not suffering any serious damage or losses to planes or pilots. If prospects of a successful mission look good, then there's probably not much more that can be done except fly the mission as planned and hope for the best.

Often mission conditions will make even a successful mission unlikely. If this is the case, consider adding another pair of *Hornets* to your ground attack force. Doing so usually makes achieving a complete success impossible, but can make a successful mission much more likely. Repeat Steps 2 and 3 with the two additional aircraft, make your ordnance

selection, and fly the mission.

STEP 5: PLAN FOR CONTINGENCIES.

Planning for the unexpected in *Hornet Leader* is difficult because your aircraft usually don't have enough available payload to carry extra weapons for "just in case" situations. Normally these unexpected events arise from Mission Events cards, and their effects on mission performance can be devastating. For example, losing one of only two ground attack aircraft to an engine failure will almost certainly

doom the mission to failure. Likewise, encountering an unexpected SAM site that forces the expenditure of HARMs reduces the chances of successful weapons delivery at the target, and of a safe return for your planes and pilots. Since there is approximately a 50/50 split of "good" and "bad" mission event cards, chances are high that something will go wrong with the mission, either outbound (the worst possible case) or on the return flight.

Nonetheless, there are some things that can be considered in the mission planning stage to help mitigate risk. Carrying extra ordnance has already been mentioned. Another idea is to spread your HARMs and AGWs around the force so that the loss of a single *Hornet* does not doom the entire mission. Remember, however, that missiles and bombs cannot be used in the same step by an individual *Hornet*, so make sure that your bomb-laden *Hornets* use their HARMs prior to entering the target area. Also, if the mission is expected to be a milk run, give *Banzai*, *Wedge*, and *Leader* a break and let some of the lesser skilled pilots fly the mission. There's no sense risking your key pilots when they may end up in Sick Bay when their skills are really required.

STEP 6: FLY THE MISSION.

Once you've planned the mission to the best of your ability, it's time to fly. There are a few things to consider, however. First, if your *Hornets* will be delivering a

stand-off AGW attack, always start them in a pre-approach zone rather than an approach zone. This will allow them to change their approach plans if SAM certainty checks or mission events make the planned approach undesirable. Also, remember that only *Hornets* in the target zone can make high visibility attacks, so this modifier cannot be used in stand-off attacks.

Unless all SAM and AAA fire in the target zone has been eliminated, lingering over the target is a very risky proposition. If one of your *Hornets* is forced to abort its AGW attack due to enemy fire, you should consider the risks and benefits carefully before deciding to stick around and make a second attempt. The +4 SAM and AAA lock-on modifiers will make the second attempt even more difficult than the first, and will involve not only the ordnance-laden *Hornet* but his wingman as well. It may well be better to retreat and accept a failed mission than have one or two *Hornets* damaged or destroyed, resulting in a complete failure plus the loss of capability to perform future missions.

SUMMARY

I want to close with a reminder that this mission planning approach is offered as a tactical decision aid, not a tactical decision maker. It is still up to the players to decide what level of risk and certainty they will accept for their missions, and how to allocate specific mission roles to specific pilots. Hopefully the information provided in this TDA will make it easier for players to weigh the pros and cons of different weapons, attack tactics, and payloads, and to fly more successful missions and campaigns.

Because this TDA represents a first attempt, it will certainly be open to correction and/or improvements. Hopefully some readers will take up the torch where I have left off and propose their own solutions, additions, and corrections. Perhaps collectively we can develop a *Hornet Leader* TDA that would make the Air Force jealous.



Feedback Questions

C3/ Nr.1, Winter 1992

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Please send your Feedback Response and Comments to GMT Games, 310 West Lacey Blvd., Hanford, CA 93230. Thank you.

QUESTIONS

Questions 1 through 17 ask you to rate this issue and its articles (0=no opinion; 1=poor to 5=excellent).

1. Inside GMT
2. Downlink
3. News & Info: In the Pipeline
4. The Battle of Marathon Scenarios
5. **SPQR**: The World According to Polybius
6. GBH Forum: Macedonians vs. Romans
7. **Hornet Leader** Insert: North Korea
8. A Look at **Thunderbolt+Apache Leader**
9. Interview: Dan Verssen
10. Designer's Notebook: **TAL**
11. Interview: Mark Herman
12. Dimensions of **Operation Shoestring**
13. TDA for **Hornet Leader**
14. On the Drawing Board
15. This Issue Overall
16. Graphic Design of Issue Overall
17. On the basis of this issue would you be inclined to resubscribe to C3I/ (Y/N)?
18. Your age: 1 = 13 years old or less; 2 = 14 - 21; 3 = 22 - 31; 4 = 32 - 41; 5 = 42 - 51; 6 = 52 plus
19. Your sex: 1 = Male; 2 = Female
20. Education: 1 = 11 years or less; 2 = 12 years; 3 = 13-15 years; 4 = 13 - 15 years and still in school; 5 = 16 years; 6 = 17 years plus
21. How long have you been playing wargames? 0 = less than 1 year; 1 = 1 year; 2 = 2 years...etc.
22. What is the average number of hours you spend per month playing wargames? 0 = none; 1 = 1 hour or less; 2 = 2-5 hours; 3

= 6-9 hours; 4 = 10-15 hours; 5 = 16-20 hours; 6 = 21-30 hours; 7 = 31-40 hours; 7 = 41 or more.

Questions 20 through 33 ask you to rate each GMT Game or Module you have played with an Overall Rating (0=no opinion, or haven't played; 1=poor to 5=excellent).

23. **Silver Bayonet**
24. **AirBridge to Victory**
25. **Operation Shoestring**
26. **Hornet Leader**
27. **The Great Battles of Alexander**
28. **1863**
29. **Thunderbolt+Apache Leader**
30. **Juggernaut Module**
31. **SPQR**
32. **War Elephant Module**
33. **Arctic Storm**
34. Which period of history would you most prefer to see more games on from GMT? 1 = Ancient (3000-600 AD); 2 = Dark Ages (600-1200 A.D.); 3 = Renaissance (1200-1600); 4 = Thirty Years War (1600-1700); 5 = Pre-Napoleonic (1700-1800); 6 = Napoleonic (1800-1830); 7 = American Civil War (1830-1900); 8 = World War I (1900-1939); 9 = World War II (1939-45); 10 = Korean Era (1946-1960); 11 = Vietnam Era (1960-1980); 12 = Present to Future (1980-2000).

Rate the following types of wargame environments from (1 = dislike environment to 5 = like environment very much).

35. Land Games
36. Naval Games
37. Air Games
38. Combined Environments (Air/ Land/ Sea)

Rate the following wargame combat scales (1 = dislike scale to 5 = like scale very much).

39. Tactical Scale
40. Operational Scale
41. Strategic Scale

Comments Section:

Please note your ideas and suggestions for new games to be published by GMT.

