4.7.11 Fighter

4.7.11.1 Fighter Overview

The fighter ruleset provides the capability of engaging aircraft and tactical missiles. The fighter has the optional ability to engage ground targets. The fighter ruleset uses both local and remote track data to make engagement decisions. The fighter can operate with offboard sensors to provide track information from engagement decision to intercept. For engagements against ground targets, the fighter ruleset utilizes portions of the AGAttacker ruleset.

Fighters performing Boost-Phase- Intercepts(BPIs)against TBMs can adopt BPI routes that allow counter-rotating flight patterns for CAP aircraft, deconfliction among multiple flights on the route, two-stage air-refueling for aircraft on CAP, and the adoption of offboard sensors to provide IFTUs. The flight patterns and air refueling options for BPI routes are discussed in Subsection 5.5.1.

For engagements against ABTs, CMs, or TBMs, interceptors may be implicitly flown or explicitly flown, 3DOF missiles be launched by a Fighter. These explicitly flown missiles are dynamically created platforms that have sensors, communications devices, an airframe, and a ruleset. In some cases, the Fighter provides In-Flight Target Updates (IFTUs)to the explicit missile, guiding it toward intercept with the target. The Fighter may also perform the endgame evaluation of the engagement(kill determination and assessment) once the missile has reached closest approach. These missiles are explicitly flown through space and have a signature. Thus they can be detected, jammed, and even shot down. Subsection 4.13 describes how to set up and use explicit missiles.

The Fighter has the capability to share control of an engagement with designated engagement supporters, which can be Flexible Commanders, Flexible SAMs, or other Fighters. The Fighter launches the missile, and the Fighter and the engagement supporter can optionally share responsibility for providing IFTUs and performing the endgame evaluation on the engagement. Additionally, a Flexible Commander engagement supporter. can command the Fighter to launch a missile, and the Commander then takes over total control of the engagement, allowing the Fighter to perform other engagements

The Fighter ruleset has a User Rules phase that allows event-based sensor management and choice of flight options.

The Fighter ruleset is capable of using a laser weapon in addition to conventional weapons. Engagements made by a laser utilize the lase phase rather than the lock, launch and intercept phases. The handling of the laser engagement is detailed further in Subsection 4.7.11.6

战斗机规则集提供了与飞机和战术导弹交战的能力。战斗机有与地面目标交战的可选能力。战斗机规则集使用本地和远程跟踪数据来做出交战决策。战斗机可以使用非本地传感器来提供从交战决策到拦截的跟踪信息。对于对抗地面目标的战斗，战斗机规则集利用了AGAttacker规则集的一部分。

对战术弹道导弹执行助推段拦截(BPI)的战斗机可以采用BPI路线，该路线允许CAP飞机采用反向旋转飞行（counter-rotating）模式，航线上多个编队之间的冲突消除，CAP飞机两级空中加油，并采用外部传感器提供IFTUs（In-Flight Target Updates）。BPI航线的飞行模式和空中加油选项将在第5.5.1小节讨论。

对于对抗ABTs（空中目标），CMs（巡航导弹），或TBMs（战术弹道导弹），拦截导弹可能被隐式地或显式地飞行，三自由度导弹被一架战斗机发射。这些显式飞行的导弹是动态创建的平台，具有传感器、通信设备、机身和规则集。在某些情况下，战斗机向显式导弹提供编队中的目标更新(IFTUs)，引导它对目标进行拦截。一旦导弹达到最接近目标的点，战斗机也可能执行交战的终局评估(击杀确认和评估)。这些导弹显式地在空间中飞行，并有其特征。因此，它们可以被发现，被干扰，甚至被击落。章节4.13描述了如何设置和使用显式导弹。

战斗机有能力与指定的交战支持者共同控制交战，可以是灵活的指挥官Flexible Commanders、灵活的地对空导弹Flexible SAMs或其他战斗机。战斗机发射导弹，战斗机和交战支持者可以选择性地分担提供IFTUs的责任，并对交战进行终局评估。此外，一个采用灵活的指挥官规则集的交战支持者，可以命令战斗机发射导弹，然后指挥官接管交战的全部控制权，允许战斗机执行其他交战。

战斗机规则集有一个用户规则阶段（User Rules phase），允许基于事件的传感器管理和飞行选项的选择。

战斗机规则集除了常规武器之外还能使用激光武器。激光接合利用的是激光阶段（lase phase），而不是锁定、发射和拦截阶段。激光阶段的使用在第4.7.11.6小节中进一步详细介绍。

4.7.11.2 Fighter Battle Management Phases

The battle management and decision processing for all of the air combat rulesets consists of several phases. The fighter ruleset uses more phases for operations than any other ruleset.

If the Evaluate Ground Targets option has been selected for the fighter ruleset, the fighter will have additional ground battle management phases. These additional battle management phases have identical user interface and processing to the same phases of the AGAttacker ruleset. The ground target select phase may execute simultaneously with the air target select phase or the vector phase. Once the fighter proceeds to the engage phase or the ground lock phase, only one phase will be executed at a time until the intercept is complete and the fighter returns to targe selection.

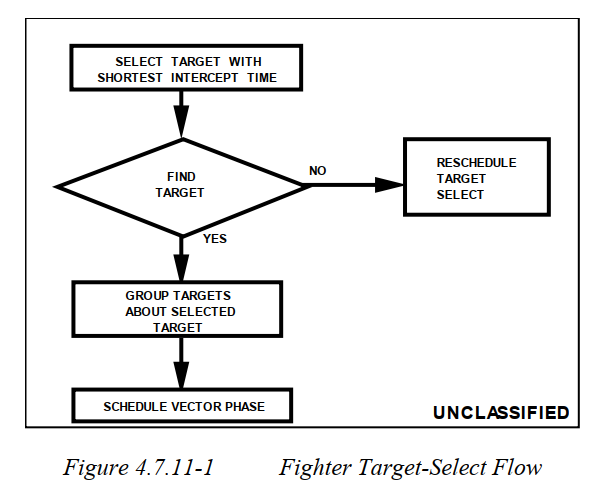
所有空战规则集的作战管理和决策处理由几个阶段组成。战斗机规则集比其他规则集使用更多的阶段进行操作。

如果“评估地面目标（Evaluate Ground Targets）”选项被用户为战斗机规则集勾选，战斗机将有额外的地面战斗管理阶段。这些额外的战斗管理阶段具有与AGAttacker规则集相同的用户界面和相同的阶段处理。地面目标选择阶段（ground target select phase）可以与空中目标选择阶段（air target select phase）或引导阶段（vector phase）同时执行。但是一旦战斗机进入交战阶段（engage phase）或地面锁定阶段（ground lock phase），一次只执行一个阶段，直到拦截完成，战斗机返回目标选择阶段。

4.7.11.2.1 Fighter Target-Select Phase

The target-select phase represents the independent threat assessment and target assignment process of the fighter flight leader. This phase is only executed by the flight’s leader. Figure 4.7.11-1 illustrates the overall flow within this phase.

目标选择阶段代表了战斗机编队长机独立的威胁评估和目标分配过程。这个阶段只由编队的长机执行。图4.7.11-1说明了该阶段的总体流程。



Before entering the actual target-selection process, the fighter ruleset performs current status checking on the platform. If the platform has died and live aircraft still exist in the flight, the target-select phase is scheduled to execute for the chosen flight leader. The target-select phase is scheduled for the new flight leader to execute in 1 sec. If the platform is still alive, a check is made to determine whether the platform is Returning To Base (RTB). If the flight leader is RTB, no further processing is performed, since the entire flight returns to base at the same time.

在进入实际的目标选择过程之前，战斗机规则集在平台上执行当前状态检查。如果该平台已经死亡，而存活飞机仍然存在于编队中，目标选择阶段将被安排由所选择的新的编队长机执行。目标选择阶段在1秒内转由新的编队长机规划执行。如果该平台仍然活着，则进行检查以确定平台是否正在返回基地(RTB)。如果编队长机正在执行RTB，则不执行进一步的处理，因为整个编队同时返回基地。

The fighter also checks information about its mission during the target-select phase. First, the maximum mission time is checked. The mission time is initialized when the fighter becomes active, e.g. scrambles from an airbase or activates at its initial waypoint. When the fighter reaches its maximum mission time, the action Exceed\_Mission\_Time is logged and can be potentially used to trigger the flight to RTB. If maximum mission time is zero, this check is disabled.

战斗机也在目标选择阶段期间检查其任务信息。首先，检查最大任务时间。当战斗机激活时，任务时间被初始化，例如从空军基地紧急起飞或在初始航路点启动。当战斗机达到它的最大任务时间时，动作Exceed\_Mission\_Time被记录下来，并可能被用来触发编队转入RTB。如果最大任务时间为零，则禁用此检查。

The fighter flight leader also checks the number of shots launched by its flight during the mission. After each launch by the flight leader, each received engagement complete report from a wingman, and each launch reliability failure, the number of shots taken by the flight is incremented. If this number exceeds the user-specified maximum number of shots per CAP, action Reached\_Max\_Shots is logged and can be potentially used to trigger the flight to RTB. If the maximum number of shots per CAP is specified as zero, this check is disabled.

战斗机编队长机还检查飞行中发射的炮弹数。在编队长机每次发射后，每次从僚机收到交战完成报告，每次发射可靠性失效，编队发射的次数增加。如果这个数字超过了用户指定的每次CAP（战斗空中巡逻）最大射击数，那么动作Reached\_Max\_Shots就会被记录下来，并可能被用来触发转入RTB的飞行。如果每个CAP上限的最大射击数被指定为零，则禁用此检查。

Once the preliminary status checks have been completed, the fighter begins the target selection process. This process independently selects the targets this flight will engage. A determination is made to decide which of the platform’s tracks and targets pose a threat currently engageable by the platform.

一旦初步状态检查完成，战斗机开始目标选择过程。这一过程可以独立地选择此编队将要接触的目标。然后做出一个决定——当前平台的哪个的跟踪和目标构成一个威胁，并且是可交战的。

The fighter ruleset can operate from perception of a target or truth information on a target. If using perception, the fighter will use the perceived type (ABT, TM, CM, or Ground) and perceived class for its engagement decisions and planning. In either case, the perceived position and velocity information contained in the track file is utilized.

战斗机规则集可以根据对目标的感知（perception）或目标的真实（truth）信息进行操作。如果使用感知，战斗机将使用感知到的类型(ABT、TM、CM或地面)和感知到的类别（class）来进行作战决策和计划。在任何一种情况下，包含在轨迹（track）文件中的所感知到的位置和速度信息被利用。

The fighter ruleset maintains a target list. This list originates from self-assignments, scripted assignments, and vector commands from its commander. If an attempt is made to engage a target that has already been engaged, the commander of the aircraft will send a stop command. Upon receipt of the stop command, the aircraft will disengage from the target and flag the track to be ignored. These targets are ignored for the specified target forbid time. For old ruleset versions for which a target forbid time is not specified, a default of 600 sec is used. The target-selection logic initially checks the target list to determine for which tracks the target forbid time has expired.

战斗机规则集维护一个目标列表。这个列表来自于自身任务、预定任务和指挥官的引导命令。如果试图与已经交战的目标交战，飞机的指挥官将发出停止命令。在收到停止命令后，飞机将脱离目标并标记该目标为要忽略的跟踪。在指定的目标禁止时间内，这些目标被忽略。对于没有指定目标禁止时间的旧规则集版本，默认使用600秒。目标选择的逻辑是首先检查目标列表，以确定哪些跟踪的target forbid时间已经失效。

The target-selection process then makes checks that apply to all types of tracks. If a track has been indicated as a track to ignore, this track will not be assessed further. Depending on the selected weapons state, a comparison is made to determine if the track should be assessed based on the ruleset-defined WCO of Weapons Free, allowing hostiles and unknowns to be assessed for engagements, or a WCO of Weapons Tight, in which only hostiles are assessed for engagements and unknowns are assessed if the fighter has been assigned by its commander. If the ‘Require Hostile ID Under Weapons Tight’ option is active, the fighter will not assess unknowns for engagements even if commanded.

然后目标选择过程进行一些检查，适用于所有类型的跟踪。如果一个跟踪指示为要忽略的跟踪，则不会进一步评估该跟踪。根据所选武器状态,并基于规则集所定义的WCO（武器控制指令）来进行一个比较，以确定一个跟踪是否会被评估。如果WCO是Weapons Free，则允许评估敌方的和不明的跟踪是否可以交战；如果WCO是Weapons Tight，只有敌方的跟踪和指挥官分配的不明跟踪会被评估是否可以交战，如果‘Require Hostile ID Under Weapons Tight’选项被勾选，那么指挥官分配的不明跟踪也不会被评估。

The threats are then assessed against the assigned engagement zones. For aircraft tracks, the track must be in a FEZ or an AOR if any of these are specified for the fighter. If none of these areas are specified, the track is considered a potential threat. If a MEZ is specified for the fighter, it can choose not to initiate an engagement on a threat based on its MEZ avoidance criteria. The MEZ avoidance methodology is described in Appendix B-8. A FEZ can have a specified WCO. This WCO determines whether unfriendly platforms can be engaged within the FEZ. The fighter is allowed to engage both hostiles and unknowns under a "weapons free" WCO in a FEZ. The fighter is allowed to engage hostiles under the "weapons tight" WCO; however, unknowns can be engaged either in self defense or if commanded. If the fighter’s ‘Require Hostile ID Under Weapons Tight’ ruleset option is active, the unknown threat will only be eligible for engagement in self defense. The fighter is allowed to engage only in self defense under an “ID only” WCO. In the case of overlapping FEZs, the most restrictive WCO is applied to the target. The fighter’s weapon state, specified on the ruleset, is only considered if the fighter is not associated with a FEZ.

然后对这些威胁进行指定交战区域的评估。对于飞机跟踪，如果FEZ和AOR中任何一个为战斗机指定的话，跟踪必须在FEZ（战斗机交战区域）或AOR（责任区域）中。如果没有指定这些区域，则认为该跟踪是一个潜在的威胁。如果一个MEZ（导弹交战区域）为战斗机所指定，它可以基于MEZ拒止标准选择不启动对威胁的交战。附录B-8描述了MEZ拒止方法。一个FEZ可以有一个指定的WCO。这个WCO决定了非友方平台是否可以在FEZ内交战。在WCO为 “weapons free”的情况下，战斗机可以与敌方和不明威胁交战。在WCO为“weapons tight”的情况下，战斗机被允许与敌方交战，不明飞机可以出于己方自卫或指挥官指派的原因被交战。但是在WCO为“weapons tight”的情况下，如果战斗机的“Require Hostile ID Under Weapons Tight”的规则集选项被勾选，战斗机将只在自卫的情况下与不明威胁进行交战。在WCO为 “ID only”的情况下，战斗机只允许在进行自卫的情况下与目标交战。如果存在重叠的FEZ，最严格的WCO会被用于目标。只有当战斗机没有关联FEZ时，才会考虑战斗机在规则集中指定的武器状态（weapon state）。

With a fire-and-forget weapon on a fighter, there is a possibility of having an interceptor in the air to a target as evaluations for launching upon another target are evaluated. A check is made to determine if a missile from this platform is already in flight to the target. If so, the track will not be further assessed.

当一架战斗机使用“射后不管”武器时，战斗机有可能可以在评估对某一个目标的攻击的同时，向另一个目标发射拦截弹也已经在飞行中。进行检查以确定从这个平台发射的导弹是否已经在飞向目标。如果是这样，该跟踪将不会再被进一步评估。

 The target selection phase of the fighter includes a target priority list as a function of the target class of interest and time to intercept. During target selection, a higher priority target that meets target selection criteria is selected over a lower priority target. The priorities are specified in the Target Selection phase of the fighter, but apply to Vector and Engage phase operations as well. The Target Priority list contains all ABT, CM, and TM systems and classes, as well as complex weapons. Priority values can range from 1 to 1000, with 1 being the highest priority. When finding a priority for the target, the fighter initially looks on the list for the specific system type. When operating with perceived target information, the fighter will look for the perceived target type in the prioritization list. If the specific system type is not found, the fighter next looks for the class type. If the class type is not found on the list, the fighter then looks for the default system or class type and uses the assigned priority. Finally, if no match is found for the target type, the target is excluded from engagement.

战斗机的目标选择阶段包括一个目标优先级列表，作为目标兴趣类别和拦截时间的函数。在目标选择过程中，将选择满足目标选择条件的高优先级目标，而不是低优先级目标。优先级是在战斗机的目标选择阶段设定的，但也用于引导和交战阶段的操作。目标优先级列表包括所有ABT、CM和TM系统system和类别class，以及复杂武器。优先级值可以从1到1000,1是最高的优先级。为了找到目标的优先级，战斗机首先在列表中寻找特定的system类型。当使用感知到的目标信息进行操作时，战斗机将在优先列表中寻找感知到的目标类型。如果没有找到特定的system类型，战斗机接下来会寻找class类型。如果在列表中没有找到类class类型，则战斗机将查找默认的system类型或class类型，并使用指定的优先级。最后，如果没有找到目标类型的匹配，则将目标排除在交战之外。

 The fighter uses a weighted prioritization table to adjust the priority of targets in evolving situations that may be encountered during the course of a scenario run. This allows the fighter platform to assign greater weight/value to a target that is an imminent threat. As a result the target’s priority increases. This table is used in conjunction with the target priority value described above. The target weighting is accomplished by designating weight values to certain target categories. These categories are self defense target, flight defense target, asset defense target, commanded assignment target, and interceptor target. A target added to the list due to the reception of a commanded assignment message or via a User Rules Launch Weapon response is weighted as a commanded assignment target. The interceptor target weight is applied to all explicit interceptor targets.

战斗机使用一个加权优先级表来调整目标在一个想定运行过程中可能遇到的不断变化的态势下的优先级。这允许战斗机平台分配更高的权重/价值给一个迫在眉睫的威胁目标，目标的优先级相应增加。该表与上面描述的目标优先级值一起使用。目标赋权是通过指定权重值给某些目标类别来实现的。这些类别是自我防御目标、编队防御目标、资产防御目标、命令任务目标和拦截弹目标。通过接收到命令任务消息或通过用户规则中的发射武器（Launch Weapon）响应而添加到列表中的目标作为命令任务目标被加权。拦截弹目标权重应用于所有显式拦截弹目标。

A target may be weighted in only one of the self defense, flight defense, or asset defense categories. A target is classified as a self defense target when the target has caused the fighter to perform a react to engage, react to lock, or react to SAM launch reaction. A target is classified as a flight defense threat when the fighter has received an assignment message for spiked mutual support from a threatened flight member performing a reaction for that target. An additional weight can be applied within the self- and flight-defense categories for targets that currently fall within the critical range of the threatened platform or within the threatening range but not yet within the critical range. A target is considered an asset defense target if it is currently within the threatening or critical range of any of the fighter’s assets but is not marked as a self-defense or flight-defense target. Separate weights are specified for threatening range and critical range, but only one asset defense weight will be applied per target, with critical range considered the higher priority threat type.

一个目标可能只在自我防御、编队防御或资产防御三种类别中选择一个加权。当目标致使战斗机执行“对交战反应”，“对锁定反应”，或“对SAM发射反应”这三个反应中的一个时，一个目标被分类为一个自我防御目标。当战斗机收到来自对该目标正在执行反应的受威胁编队成员的紧急互助任务消息时，该目标被分类为编队防御威胁。当目标在受威胁平台的危急距离内或在威胁距离内但还没有在临界距离内时，额外的权重可以应用在自我防御和编队防御类别的目标上。如果目标在战斗机任何一个资产的威胁或危急距离内，但没有被标记为自我防御或编队防御目标，一个目标被认为是资产防御目标。对威胁距离和危急距离分别指定权重，但每个目标只应用一个资产防御权重，而危急距离被认为是优先级较高的威胁类型。

A target may fall into multiple categories, such as a self defense threat which is within the critical range of the fighter and was also a commanded assignment or an interceptor target which was added as a flight defense threat. In these cases, all applicable weight values are summed together and the summed weight value for a target is then subtracted from the base weight value. That value is then added to the target type priority to achieve the target’s resulting priority. If no weight values are applicable, the base weight value is added to the target type priority for the target’s resulting priority. As described above, **the target with the lowest priority value is considered the highest priority.**

目标可以被分进多个类别，例如一个在战斗机的危急距离内的自我防御威胁，也是一个命令任务目标或作为编队防御威胁添加的拦截弹目标。在这些情况下，将所有适用的权重值加在一起，然后从基准权重值中减去目标的求和权重值。然后将该值添加到目标类型优先级中，以得到目标的最终优先级。如果没有适用的权重值，则将基本权重值添加到目标类型优先级中，作为目标的结果优先级。如上所述，**具有最低优先级值的目标被认为是最高优先级**。

 The base weight is an internally calculated value of the maximum weight sum possible using the entered weighting values for the different target categories. This allows a target that meets all of the possible simultaneous criteria to end up with a weighted priority of 0 and a final priority equal to its target priority, prioritizing it ahead of all other targets except those also meeting the same criteria.

基准权重是可能的最大权重和的内部计算值，是为不同目标类别输入的权重值。这允许所有满足可能同时存在的标准的目标得到一个加权优先级0，那么相应地，目标的最终优先级就等于目标优先级，那么最终优先级就会高于除那些也满足相同全部标准的目标之外的所有其他目标。

The base weight value is calculated as:

基准权重值计算如下所示：

Base Weight = Cmd Wt + Int Wt + MAX (SD Max, FD Max, AD Crit, AD Threat)

with

SD Max = SD Wt + MAX (SD Crit, SD Threat)

FD Max = FD Wt + MAX (FD Crit, FD Threat)

where

Cmd Wt – Commanded Assignment Weight

Int Wt – Interceptor Weight

SD Wt – Self Defense Weight

SD Crit – Self Defense Critical Range Weight

FD Wt – Flight Defense Weight

FD Crit – Flight Defense Critical Range Weight

FD Threat – Flight Defense Threatening Range Weight

AD Crit – Asset Defense Critical Range Weight

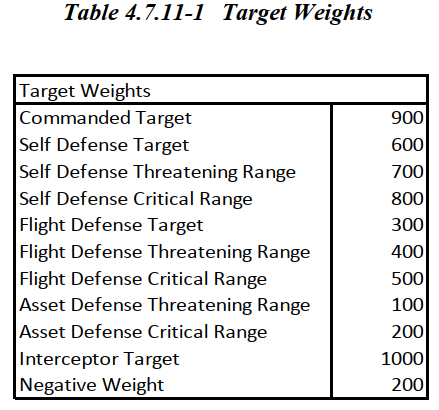
AD Threat – Asset Defense Threatening Range Weight

Additionally, a negative weight table is available to lower the priority of a target that has been engaged previously by a laser weapon, in order to account for repeated engagements of a target due to the variety of aimpoints that may be available and their relative levels of expected damage. The negative weight values are associated to one or more initiators. If a specified initiator has failed on the target due to a previous engagement by the evaluating fighter, the negative weight value is subtracted from the summed weight value described above, thereby reducing the priority of the target. The negative weight value is applied once for every instance the initiator has failed. This result is then added to the target type priority to achieve the target’s resulting priority.

此外，一个负权重表可以降低一个已经被激光武器攻击过的目标的优先级，以解释由于各种可能可用的瞄准点和它们的相对预期损伤水平而导致的目标的重复攻击。负权重值与一个或多个启动器（initiator）关联。如果指定的启动器由于正在执行评估的战斗机之前的交战而在目标上失败，负的权重值从上面描述的权重值的总和中减去，从而降低目标的优先级。对启动器失败的每一个情况，应用一次负权重值。然后将此结果添加到目标类型优先级中，以得到目标的结果（最终）优先级。

Below is a table of example weight values. In addition, three examples are provided in Figure 4.7-2 that show how the resulting priority weighting is calculated based on the categories into which each of the target type example fall. The shown weight result value is then added to the target’s priority to get the resulting priority

下面是一个权重值示例表。此外，图4.7-2中提供了三个示例，展示了如何根据每个目标类型示例所属的类别计算得到的优先级权重。然后将显示的权重结果值添加到目标的优先级，以获得结果优先级。



Based on the values in this table, the base weight is calculated by adding the Self Defense Target (SD Wt) weight and Self Defense Critical Range (SD Crit) weight since this provides the maximum value. Additionally, the Commanded Target and Interceptor Target weights are added to the SD Wt and SD Crit weights to get the resulting base weight value.

根据本表中的值，通过将自我防御目标(SD Wt)权重和自我防御危急距离(SD Crit)权重相加计算出基础权重，因为这是最大值。此外，命令任务目标和拦截弹目标权重被添加到SD Wt和SD Crit权重中以得到最终的基础权重值。

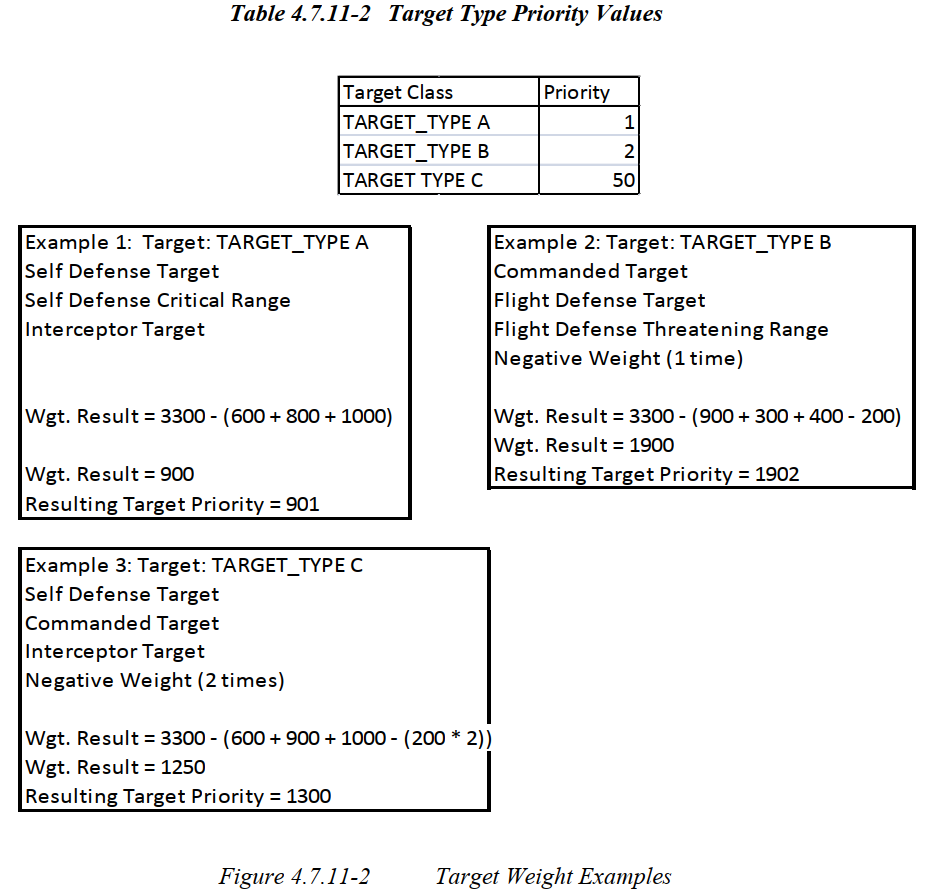
Base Weight = SD Wt + SD Crit + Cmd Wt + Int Wt

Base Weight = 600 + 800 + 900 + 1000

Base Weight = 3300

The table below shows three different target types and their corresponding target type priorities.

下面的表格展示了三种不同的目标类型和他们相关的目标类型优先级。



For a dual-role fighter, if an air-to-ground target is already selected, the air-to-air target must have a higher resultant priority than the air-to-ground target to be selected. The resultant priority is the adjusted priority based upon the priority weightings. Air-to-air targets at the same resultant priority level are selected according to the selected BPI prioritization logic for TBMs and the shortest time to kill for ABTs.

对于一架双用途战斗机，如果一个空对地目标已经被选择，空对空目标必须比被选择的空对地目标有更高的结果优先级。所述结果优先级是基于优先级权重调整后的优先级。具有相同结果优先级的空对空目标，根据为TBM所选的BPI优先级逻辑和ABTs的最短击杀时间进行选择。

The BPI prioritization uses one of the following criteria to prioritize TBM targets with equal target priority values:

BPI优先级使用如下准则中的一个为具有相同目标优先级值的TBM目标进行优先级排序：

1) Shortest time to kill 最短击杀时间

2) Longest time to kill 最长击杀时间

3) Highest altitude 最高高度

4) Lowest altitude 最低高度

5) Highest elevation angle 最高俯仰角

6) Lowest elevation angle 最低俯仰角

7) Shortest time to burnout 最短TBM燃尽时间

8) Track maturity 跟踪成熟度

9) Shortest time from launch 最短发射时间

For TBMs, the user is allowed to choose from the above list to determine how the target priority value is computed. **The default prioritization is the shortest time to kill for TBMs.** **ABTs are always further prioritized by the shortest time to kill**. If an ABT and TM target have the same priority, the target with the shortest time to kill is given priority.

对于TBM，允许用户从上面的列表中选择，以确定如何计算目标优先级值。默认的优先级是击杀TBM需要消耗的最短时间。ABTs总是以最短的时间来划分优先级。如果ABT目标和TM目标具有相同的优先级，则杀伤时间最短的目标具有优先级。

Against aircraft tracks, the intercept time is computed based on straight line of flight of the target, an instantaneous turn of the flight leader to the predicted intercept point, and maximum-speed flight to that point. Against TBMs, the computations described in Appendix B5 are performed for each weapon. This intercept time is limited by the maximum intercept time. For old rulesets for which the maximum intercept time was not specified, a default value of 120 sec is used. Selection of an intercept point is also constrained by the service altitude limit specified on the fighter’s airframe. The intercept point’s altitude must not be greater than the service altitude plus the maximum range of the fighter’s weapons.

针对飞机目标的跟踪，拦截时间是根据目标的直线飞行、编队长机到预测拦截点的瞬时转弯和到该点的最大速度飞行来计算的。对于TBMs，附录B5中描述的计算方式将对每种武器执行。此截获时间受最大截获时间限制。对于未指定最大截获时间的旧规则集，使用默认值120秒。截获点的选择也受到战斗机airframe元素上设定的服务高度限的限制。拦截点的高度必须不大于服务高度加上战斗机武器的最大射程。

The evaluation angle between the fighter and the TBM is actually keyed from the cosine of the elevation angle to avoid unnecessary computation. The cosine of the elevation angle is computed using the following formulas:

战斗机和TBM之间的评估角度实际上是从仰角的余弦“键”来的，以避免不必要的计算。仰角余弦的计算公式如下:

Dx = TBMx -Fx

Dy = TBMy-Fy

Dz = TBMz-Fz

cos (θ) = Fu•Du

where

Dx - x-axis component of the direction vector

Dy - y-axis component of the direction vector

Dz - z-axis component of the direction vector

Du - unit direction vector

TBMx - x-axis component of the TBM’s position vector

TBMy - y-axis component of the TBM’s position vector

Fx - x-axis component of the fighter’s position vector

Fy - y-axis component of the fighter’s position vector

Fz - z axis component of the fighter’s position vector

Fu - unit fighter position vector

Track maturity is defined as the total time the target has been in track. Shortest time to burnout assumes knowledge of expected burnout time and keys from the actual time of burnout.

跟踪成熟度（Track maturity）定义为目标在跟踪中的总时间。最短燃尽时间（Shortest time to burnout）假设从实际燃尽时间中获取预期燃尽时间和关键信息。

 If no targets pass the specified criteria, the target-select phase is rescheduled until targets are selected or other stimuli, such as reactions, break the platform out of the target-selection process.

如果没有目标通过指定的标准，目标选择阶段将重新安排，直到目标被选择或其他刺激，如“反应”，打破该平台目标选择过程。

Once the target with the highest priority is located, lower priority targets are selected based on the user-specified grouping range, angle, and speed relative to the highest priority target. Defaults for these values are 0. All tracks within the grouping range centered at the primary target, and whose velocity vectors are within the specified grouping angle and grouping speed of the primary threat’s velocity vector, are eligible for grouping.

一旦定位到优先级最高的目标，则根据用户指定的、相对于最高优先级目标的分组距离、角度和速度选择优先级较低的目标。这些值的默认值是0。所有以主目标为中心并在分组距离内，且速度矢量在指定的主威胁的速度矢量的分组角度和分组速度范围内的跟踪均有资格进行分组。

If no targets are selected, the target-selection process is rescheduled for the repeat time of the phase. This repeat time represents the length of time for the pilot to carry out other activities and to reevaluate the threat.

如果没有选择目标，那么目标选择过程将在该阶段的重复时间被重新安排。这个重复时间代表飞行员进行其他活动和重新评估威胁的时间长度。

If targets are selected, a multiple-engagement report is sent to the commander as explained in Section 4.7.11.7.6. This message requires a vertical message link. A multiple assignment message is also sent to the other members of the flight. This message requires a horizontal link. The contents of both of these messages include all the targets that have been selected. Since the ruleset has identified its own targets, the vector phase is scheduled immediately for this platform.

如果目标被选择，一份多次交战报告被发送给指挥官，如章节4.7.11.7.6所解释的那样。此消息需要纵向消息链接。多次分配消息也被发送给编队的其他成员。此消息需要水平链接。这两个消息的内容都包含本阶段已选择的所有目标。由于规则集已经确定了自己的目标，vector（引导）阶段将立即针对这个平台被规划执行。

4.7.11.2.2 Fighter Vector Phase

The fighter vector phase is scheduled by either the fighter target-select phase or the fighter message processing when a commanded assignment is received from the fighter’s commander. The vector phase is only scheduled for flight leaders.

战斗机引导阶段由两种计划被规划执行——一是战斗机目标选择阶段，二是从战斗机的指挥官收到一个命令任务时的战斗机消息处理（message processing），当时。引导阶段只安排给编队长机。

If the fighter is on an LLTR, the fighter continues in the vector phase. The vector phase is rescheduled at its repeat time. If the fighter is flying an extension maneuver after passing a commanded intercept point, the vector phase is rescheduled at its repeat time.

如果战斗机在LLTR上，战斗机在引导阶段继续在该路径上。引导阶段在它的重复时间被重新规划执行。如果战斗机在经过一个命令的拦截点后正在进行一个扩展机动飞行，引导阶段在它的重复时间被重新规划执行。

When entering the vector phase, the fighter initializes a time variable to indicate that it has begun vectoring. Each time the vector phase is executed, this time is updated to the current time. Also during vector phase execution, this time is compared with the user-specified resume orbit time. If the aircraft has not proceeded to the engage phase when the resume-orbit time is reached, the flight stops vectoring and returns to its default flight mode. The flight leader then begins executing the target-select phase. If the flight leader decides to return to base during the vector phase, any ongoing engagements are reported and cleared before returning to base.

当进入引导阶段时，战斗机初始化一个时间变量来指示它已经开始进行引导。每次执行引导阶段时，这个时间都会更新为当前时间。同样，在引导阶段执行期间，这段时间将与用户指定的重新开始轨道的时间进行比较。如果到达重新开始轨道的时间时，飞机还没有进入交战阶段，则编队将停止引导并返回到默认飞行模式。然后编队长机开始执行目标选择阶段。如果编队长机决定在引导阶段返回基地，任何正在进行的交战会在返回基地之前被报告和清除。

During the first execution of the vector phase, the fighter’s target list is checked to determine if a valid target is available. Valid targets are those that are not dead, dropped, or marked to be ignored. If no targets are available, the ruleset is revectored using the revector function described in Subsection 4.7.11.7.3. If a valid target is available, the flight leader is vectored to the first valid target in the list. Each of the flight leader’s wingmen not currently involved in an engagement is vectored to the flight leader.

在引导阶段的第一次执行中，战斗机的目标列表被检查以确定是否有有效的目标可用。有效的目标是那些没有标记为死亡、舍弃或被标记为忽略的目标。如果没有可用的目标，则使用4.7.11.7.3小节中描述的revector函数对规则集进行重新引导。如果有效目标可用，则将编队长机引导至列表中的第一个有效目标。每一个目前没有参与交战的编队长机的僚机被引导到编队长机。

The vector phase also determines the time to enter the engage phase. This is accomplished through evaluation of each target on the list. If the target is flagged as dead or dropped, the target is not evaluated further. If the flight leader is vectoring in response to a commanded assignment, only one of the targets on the target list must be detected before the sorting process is performed. Targets that are dead or are running as described in Subsection 4.7.11.7.2 are flagged as dropped. The range from the flight leader to the closest target is also calculated.

引导阶段也决定了进入交战阶段的时间。这是通过评估清单上的每个目标来完成的。如果目标被标记为死亡或舍弃，则不会进一步被评估。如果编队长机是响应上级命令任务，则在分类过程执行之前，只必须检测到目标列表上的一个目标。死亡的目标和按照第4.7.11.7.2小节中所述逃跑的目标被标记为舍弃。从编队长机到最近目标的距离也被计算。

Several actions can result from evaluation of the target list. These actions are different for self-assignments and commanded assignments. If no targets are found during the evaluation, or if the flight leader’s target was dropped, the flight is revectored for the self-assignment case. The same conditions in the commanded-assignment case result in rescheduling the vector phase for the repeat time. For commanded assignments, the vector phase is rescheduled until track is achieved on at least one of the targets. The vector phase in both cases is also rescheduled until the flight leader’s range to the closest target is within the maximum lethal range of the longest range weapon on the flight leader’s platform.

对目标列表的评估可能会导致一些行为。这些行为对于自我分配和命令任务是不同的。对于自我分配情况，如果在评估过程中没有发现目标，或者如果编队长机的目标被舍弃，编队被重新引导。对命令任务情况下，相同的条件会导致在重复时间重新规划执行引导阶段。对于命令任务，引导阶段会持续被重新规划执行，直到在至少一个目标上实现跟踪。在这两种情况下，引导阶段也会持续被重新规划执行，直到编队长机到最近目标的距离在编队长机平台上的最大射程武器的最大杀伤射程内。

The fighter can vector to a target platform or to an intercept point that has been computed. If vectoring to a target, the fighter flies to the target. During the vector to the target, evaluations are made to determine whether the assigned target is dead. This determination is not made until the range from the flight leader to the target is less than the acquisition range of the longest range sensor on the aircraft. If the target is dead, the engagement is stopped and the flight is revectored using the revector function.

战斗机可以引导向目标平台或已计算好的拦截点。如果引导到一个目标，战斗机飞向目标。在引导向目标的过程中，会进行评估以判断指定的目标是否已经死亡。直到编队长机到目标的距离小于飞机上最远距离传感器的捕获距离时，才会停止做出这一评估。如果目标已死亡，交战将停止，编队将使用revector函数被重新引导。

If vectoring to an intercept point, or fuzzy vectoring, the fighter uses the user-defined method to vector to the intercept point. If using an intercept altitude table, the fighter flies at his vector speed as specified by the user in the vector phase. The fighter flies at the commanded altitude selected from a table of user-specified values based on the altitude of both the fighter and its target. If using intercept profiles, the fighter flies at the speed and altitude determined by the current leg of the profile. The current profile is chosen according to the user-specified criteria, whether target altitude, which selects the profile based on the target’s altitude, defined altitude, which selects the profile based on a intercept altitude table, or delta altitude, which selects the profile based on the between the fighter’s altitude and the target’s altitude. The current profile leg is selected according to the range from the fighter to the weapon’s release point. The profile also indicates whether afterburner can be used to achieve the new altitude and speed, and whether the aircraft will fly at a constant altitude rate. The fighter has a third option of vectoring directly to the intercept point at the vector speed. During the flight, the fighter uses its onboard sensors to search for the attacker. While vectoring in response to a command assignment, the fighter operates under the WCO specified in the assignment for the target as it approaches the intercept point. If the target is located inside a FEZ associated with the fighter, the WCO of the FEZ overrides the WCO provided in the command assignment and is used by the fighter to make an engagement determination against the target. The fighter commits to and engages any unfriendly aircraft found before reaching the intercept point based on the fighter’s current WCO for that aircraft.

如果向一个拦截点引导，或进行模糊引导，战斗机使用用户定义的方法向拦截点引导。如果使用**拦截高度表**，战斗机在引导阶段以用户指定的引导速度飞行。战斗机按照命令高度飞行，命令高度是从用户指定的基于战斗机和目标高度的值表中选择的。如果使用**拦截剖面**，战斗机以剖面当前段所确定的速度和高度飞行。当前剖面根据用户指定的标准进行选择,有如下三个准则——目标高度,基于目标的高度选择剖面；定义的高度, 基于一个拦截高度表选择剖面文件；高度差, 根据战斗机的高度和目标的高度选择剖面文件。当前剖面段是根据从战斗机到武器投放点的距离来选择的。剖面图也表明加力燃烧器是否能被用来实现新的高度和速度，以及飞机是否将以恒定高度率飞行。战斗机有第三种选择，以**引导速度直接引导到拦截点**。在飞行过程中，战斗机使用机载传感器搜索攻击者。当引导是响应一个命令任务时，战斗机在接近拦截点时，在（指挥官）分派该目标时设定的WCO下操作。如果目标位于与战斗机相关联的一个FEZ内，FEZ的WCO将覆写（指挥官）分派该目标时设定的WCO，并被战斗机用来对目标作出交战决定。对于在到达拦截点之前发现的非己方飞机，战斗机根据自身当前对该飞机的WCO与之交战。

Fighters that are commanded by Flexible Commanders will receive periodic target position updates if vector updating is specified for the commander. The update message received from the commander contains the latitude, longitude, altitude of the fly-to-position, and WCO. The vector phase will propagate the fighter toward that location until the next update from the commander. The fighter must be configured to use the fuzzy vector logic in order to use the update information. Otherwise, the vector update information is ignored. A fighter will also ignore the vector updates it receives if the update is on a different target than the one being pursued or if it is not in the Vector phase. The WCO received in the vector update is used by the fighter to update the WCO received by the fighter from the original command assignment.

如果引导更新被指定给指挥官，由灵活的指挥官指挥的战斗机将收到定期的目标位置更新。从指挥官接收到的更新消息包含飞往位置的纬度、经度、高度和WCO。引导阶段将把战斗机移动到那个位置，直到指挥官的下一次更新。为了使用更新信息，战斗机必须配置为使用模糊引导逻辑。否则，引导更新信息将被忽略。如果收到的更新不是针对正在追逐的目标的，或者战斗机不是在引导阶段，战斗机也会忽略它接收到的引导更新。战斗机使用引导更新中接收到的WCO来更新战斗机从原始命令任务中接收的WCO。

When selecting targets, the range from the fighter to the platform is computed. Additionally, the range from the fighter to the intercept point is added to the maximum ground range specified in the vector phase of the fighter ruleset. If the range to the platform is greater than the range to the intercept point plus the maximum ground range, then the platform is not considered a valid target for engaging and it is ignored. This test ensures that the fighter does not vector after a platform that could not be the original assessed threat because it is too far away. It allows the fighter to continue looking for the attacker originally assigned by the Flexible Commander.

当选择目标时，从战斗机到平台的距离会被计算。此外，从战斗机到拦截点的距离会与战斗机规则集的引导阶段中设定的最大地面距离相加。如果战斗机到平台的距离大于战斗机到拦截点的距离加上最大地面距离，那么平台不被认为是交战的有效目标并且它被忽略。这个测试确保了战斗机不会引导向一个不是最初评估的威胁平台，因为它太远了。它允许战斗机继续寻找由灵活的指挥官最初分配的攻击者。

If the fighter detects the assigned target or other suitable hostile aircraft and the current WCO allows the fighter to engage, it sends a message to the Flexible Commander and engages the aircraft. Other suitable hostile aircraft available for selection are targets at the same or higher weighted priority as the target to which the fighter is vectoring. If the fighter does not find a target or its current WCO does not allow the target to be engaged by the time it reaches the intercept point, the fighter performs a reattack tactic. This tactic consists of an extension maneuvers: a straight and level, maximum-speed acceleration to a user-defined range followed by a hard 180-deg reversal back toward the attacker’s ingress route.

如果战斗机探测到分配的目标或其他合适的敌方飞机，并且当前的WCO允许战斗机交战，它发送一个消息给灵活指挥官，并和该飞机交战。所谓其他可供选择的适合的敌机指的是与战斗机当前引导的目标具有相同或更高的加权优先级的目标。当战斗机到达拦截点时，如果没有发现一个目标或它当前的WCO不允许目标战斗机被交战，战斗机会执行重新攻击战术。这一战术包括一个扩展机动:一个直线水平、最大速度加速，到用户定义的距离，随后一个硬180度逆转向攻击者的进入路线。

If the fighter finds a target during the turn-in and return to the attacker’s ingress route, it engages the target. If no target is found after completing the turn, the fighter sends a message to the Flexible Commander indicating the target has not been found and heads back toward its CAP station. During this flight the fighter climbs or descends to arrive at the CAP station at the original CAP altitude. While the fighter is returning to its CAP station, after either a missed intercept or engaging a target, the fighter will be available to the Flexible Commander for reassignment.

如果战斗机在转弯和返回到攻击者的进入路线过程中发现一个目标，它就与目标交战。如果在完成转弯后没有找到目标，战斗机会向灵活的指挥官发送一条消息，表明目标没有被找到，并返回到它的CAP station。在这个飞行过程中，战斗机爬升或下降以到达CAP station原来的高度。当战斗机返回到它的CAP station，不管是在错过拦截或是交战目标后，战斗机将可以被灵活的指挥官重新分配。

A fighter can also decide to drop a target and revector if it determines that any MEZ avoidance criteria have been met while in the Vector phase. The fighter will then evaluate the remaining targets on its target list. If no valid targets remain on the list and no additional targets can be found, the fighter will issue a multiple-engagement status report to its commander as explained in Section 4.7.11.7.6, drop all targets from its target list, and return to base or CAP.

如果一架战斗机确定在引导阶段有任何一个MEZ规避准则已经被满足，它也可以决定丢弃一个目标并重新引导。然后战斗机将评估其目标列表上的剩余目标。如果列表中没有有效目标，也没有发现其他目标，战斗机将向其指挥官发出一份多次交战状态报告，如4.7.11.7.6所述，将所有目标从目标列表中删除，返回基地或进行CAP。

Once a commanded target has been found or it is determined that targets are within the sorting range and can be engaged, the engage phase is scheduled for the flight leader at its start time. The first target in the list is evaluated. If the target is an aircraft, the react-to-engage phase is scheduled for that target at its start time. The flight leader then evaluates its available wingmen and schedules the execution of the engage phase for the wingmen. Available wingmen are those currently not being attacked and not out of weapons. As each wingman has the engage phase scheduled, the target type is checked. If the target is an aircraft, the react-to-engage phase for the next target from the target list is scheduled. If there are more targets than aircraft in the flight, only as many targets as there are aircraft in the flight are scheduled to react .

一旦一个指令下的目标被发现或可以确定目标在分类距离内并且可以被交战，交战阶段在它的开始时间为编队长机规划执行。列表中的第一个目标会被评估。如果目标是一架飞机，“对交战反应”阶段会在其开始时间为该目标规划执行。编队长机然后评估其可用的僚机，并为这些僚机规划交战阶段的执行。可用的僚机是指那些目前还没有被攻击并且没有耗尽武器的僚机。当每个僚机都已被规划执行交战阶段，目标类型会被检查。如果目标是一架飞机，从目标列表中规划执行下一个目标的“对交战反应”阶段。如果目标比编队中的飞机数量多，那么只有与编队中的飞机数量相同的目标被安排作出反应。

4.7.11.2.3 Fighter Engage Phase

The engage phase represents the target sorting among the flight members. Unlike the target-select and vector phases, this phase is executed for every member of the flight. The processing is different for flight leaders than for wingmen. In both cases, the target list is evaluated. Valid targets are those not flagged to be ignored, dropped, or dead. If the platform has engaged the threat with a fire-and-forget weapon, the target is not reengaged until completion of the intercept. To be engaged, the target must currently be in track, whether local or remote. If the target is now dead or is determined to be running (as described in Subsection 4.7.11.7.2), it is dropped from the target list.

交战阶段代表在编队成员之间的目标分类。与目标选择和引导阶段不同，这个阶段是为编队中的每个成员执行的。编队长机和僚机的处理过程是不同的。在这两种情况下，都要评估目标列表。有效的目标是那些没有标记为要忽略、舍弃或死亡的目标。如果平台已经用一个射后不管的武器与威胁交战，那么在完成拦截之前该目标不会被重新交战。待交战的目标必须当前处于跟踪中，无论是本地的还是远程的。如果目标现在已经死亡或被确定正在逃跑(如小节4.7.11.7.2所述)，它将从目标列表中删除。

The processing for the flight leader takes a separate path at this point. The first time an engagement is selected by the flight leader for a group of targets, the flight leader selects the highest priority target with the shortest range. The flight leader evaluates all the targets on the target list. Ballistic missiles are prioritized before aircraft with equal priority values. For aircraft targets with equal priority values, bombers are prioritized before non-bombers. If the target is already flagged as engaged—i.e., someone else in the same flight is engaging the target—a determination of whether the target will be resolved is made as described in Subsection 4.7.11.7.4. If the potential dual engagement is resolved, the target is no longer a candidate for engagement.

在这一点上，对编队长机的处理采取单独的路径。当编队长机第一次对一组目标选择交战时，编队长机选择优先级最高且距离最短的目标。编队长机会评估目标名单上的所有目标。具有同等的优先值时，弹道导弹优先于飞机。对于同等优先级的飞机目标，轰炸机优先于非轰炸机。如果目标已经被标记为已被交战——即同一编队中的另一架飞机正在与该目标交战——做出目标是否将被解决的决定，如第4.7.11.7.4小节所述。如果解决了潜在的双重交战，目标就不再是交战的候选对象。

Additional control over how the fighter flies during the engage phase is available. A speed table can be used to determine the aircraft speed while it is in the engage flight mode. The fighter will fly to a commanded speed as determined by the table entry corresponding to the fighters range to the target. The table contains the desired speed, speed multiplier ratio, and a max speed limiter for each range.

在交战阶段战斗机如何飞行有额外的控制可以使用。当飞机处于交战飞行模式时，一个速度表可以用来确定飞机的速度。战斗机将飞到一个命令的速度，这是由表中相应的战斗机到目标的距离所决定的。该表包含所需的速度，速度倍增比，和每个距离的最大速度限制。

The processing for a wingman is similar to that for the flight leader, but it does not use the minimum range as the criterion. The vector between the wingman and his flight leader is determined. The vector between the wingman and its target is also determined. The angle between the vectors is then calculated. The highest priority target with the greatest angle is selected if the target is not engaged or cannot be resolved if previously engaged.

对僚机的处理类似于对编队长机的处理，但它没有使用最小距离作为标准。僚机和他的编队长机之间的向量已经确定。同时僚机和他的目标之间的向量也已经确定。然后计算两个向量之间的夹角。如果目标没有被交战，或者在之前被交战时无法被解决，则选择具有最大夹角的最高优先级目标。

If the engagement of the group of targets is the result of a command assignment, the flight leader and wingmen continue to operate under the WCO specified in the assignment or that of the most recent vector update from the flight’s commander. If the flight has associated FEZs, the members of the target group are evaluated to determine if they are located inside a FEZ. If a target is found inside an associated FEZ, the WCO of that FEZ is used in lieu of the commanded WCO to determine if the target can be selected for engagement. Targets which cannot be engaged due to the flight’s current WCO will remain in the target list until the flight revectors.

如果与目标组的交战是命令任务的结果，飞行指挥官和僚机继续按照分配中指定的WCO或编队的指挥官最新引导更新的WCO操作。如果编队关联有FEZ，则对目标组体的成员进行评估，以确定他们是否位于 FEZ内。如果发现目标在一个关联的FEZ中，则使用该FEZ的WCO会被用来代替指挥官提供的WCO，以确定是否可以选择目标进行交战。由于编队当前的WCO而无法被交战的目标将保留在目标名单中，直到编队重新引导。

If the fighter is launching kinetic weapons with semi-active guidance, an intercept point that is within the field of view of local or IFTU sensors must be computed in order for a target to be selected during the engage phase. The intercept point can be within the field of view of local sensors or user-specified IFTU sensors if the fighter has engagement support platforms available and the weapon can be launched off remote data. A user-specified option on the weapon definition allows weapons to be launched off remote data and defines the minimum remote DFD required to launch from these data. Engagement supporter platforms can be specified for the fighter on either the fighter’s platform definition or on a BPI route definition. Engagement supporters may only be specified for the flight leader; wingmen will use the flight leader’s engagement supporter list. Fighters are not automatically added to their own engagement supporter list. When specifying IFTU platforms for the fighter, the platform must be a Flexible Commander, Flexible SAM, or Fighter ruleset type and must be on the in-flight net with the fighter flight in order to send fighters track data and to send and receive IFTU messages.

如果战斗机发射拥有半主动制导的动能武器，必须计算出一个在本地或IFTU传感器视场内的拦截点，以便在交战阶段选择目标。如果战斗机有交战支持平台可用并且武器可以基于远程数据发射，拦截点可以在本地传感器或用户指定的IFTU传感器的视场内。武器定义界面上的用户指定选项允许武器从远程数据发射，并定义了从这些数据发射所需的最小远程DFD。交战支持平台可以在战斗机的平台定义界面或BPI路线定义界面上为战斗机设定。交战支持者只能指定给编队长机;僚机将使用编队长机的交战支持者名单。战斗机不会自动添加到他们自己的战斗支持者列表中。当为战斗机指定IFTU平台时，该平台必须是灵活的指挥官、灵活的SAM或战斗机规则集类型，并且必须与战斗机编队一同在飞行中网络上，以便向战斗机发送跟踪数据和发送和接收IFTU消息。

The platform providing IFTU must have track forwarding turned on to forward its tracks to the fighters. When the fighter receives track information from platforms specified on its engagement supporter list or associated with the BPI CAP the fighter is flying, the track information is recorded in the fighter’s track file. The fighter maintains the ID of the IFTU platform sending track data as well as the time data were last received for the track from a particular IFTU platform.

提供IFTU的平台必须开启跟踪信息传递，以便向战斗机传递跟踪信息。当战斗机接收到来自其交战支持者列表上指定的平台或与战斗机正在飞行的BPI CAP相关联的平台的跟踪信息时，该跟踪信息被记录在战斗机的跟踪文件中。战斗机维护发送跟踪数据的IFTU平台的ID以及从一个特定的IFTU平台最后接收到跟踪的时间数据。

If a laser weapon is on board the Fighter, evaluation of the laser weapon is included in the weapon selection processing. The laser weapon is evaluated to determine if the target can be engaged by the weapon and the lase time required to achieve the desired level of damage. Some requirements on the laser weapon for engaging the target are having local track on the target and the ability to engage the target within the maximum kill time. The laser weapon evaluation process is further described in Section 4.7.33.2.1.6.

如果激光武器在战斗机上，激光武器的评估包括在武器选择处理中。激光武器会被评估以确定目标是否能被武器交战，以及是否达到期望的伤害水平所需的激光时间。对激光武器用于交战目标的两个要求——在目标上有本地跟踪和有在最大杀伤时间内交战目标的能力。激光武器评估流程见4.7.33.2.1.6。

The fighter has hierarchy weapon selection rules that aid in weapon selection. The hierarchy weapon selection rules are used by the fighter during the engage phase to determine the best weapon type, either laser or kinetic, for the target based on the chosen criteria. The hierarchy weapon selection rules allow the user to specify an ordered list of criteria that are used in choosing the weapon to use against the target. Each selected criteria also has a user specified threshold value. The threshold value allows weapons that meet that value to be considered of equal priority and require evaluation of the next criterion for weapon selection. The fighter’s weapon selection hierarchy criteria are Earliest Intercept Time, Latest Intercept Time, Highest Default Pk, Highest Planned Pk, Weapon Type, Fire and Forget, Weapon Inventory High, and Weapon Inventory Low.

战斗机有帮助武器选择的层次武器选择规则。层次武器选择规则是战斗机在交战阶段使用的，根据选择的标准为目标确定最佳武器类型，无论是激光武器还是动能武器。层次武器选择规则允许用户指定一个排好序的标准列表，用于选择对目标使用的武器。每个选择的准则还具有用户指定的阈值。阈值允许满足该值的武器被认为具有同等的优先级，并要求对下一个武器选择标准进行评估。战斗机的武器选择层次标准是:最早拦截时间、最晚拦截时间、最高默认Pk、最高计划Pk、武器类型、射后不管、武器库存高、武器库存低。

 Additionally, if the Fighter has a laser weapon, there is a shoot look shoot capability for the weapon on the Fighter’s engage phase. This laser firing doctrine option is target type specific and can be used in conjunction with any of the lethality models. Usage of the shoot look shoot option on the Fighter is the same as when used by the Laser ruleset and further details are described in the Laser ruleset description in 4.7.33.2.1.6.

此外，如果战斗机有激光武器，在战斗机的交战阶段该武器有一个shoot look shoot能力。这种激光的发射条令选项是针对特定目标类型的，可以与任何一种毁伤模式一起使用。在战斗机上使用“shoot look shoot”选项与激光规则集使用时相同，更多的细节将在4.7.33.2.1.6激光规则集描述中描述。

Once a target is selected, a single engagement report is generated and sent to the rest of the flight across the horizontal net. If the target was previously engaged, the message is flagged as having attempted resolution. The platform is flagged as engaging on the target, and either the lock or the lase phase is scheduled for its start time, depending on the type of weapon that has been selected for the engagement.

一旦一个目标被选中，就会生成一个单独的交战报告，并通过水平网络发送到编队的其余成员。如果目标先前已被交战，则该消息被标记为已尝试解决。平台被标记为在目标上交战，并且锁定或激光阶段会在其开始时间被规划执行，这取决于为交战选择的武器的类型。

Generally, once the fighter has proceeded to scheduling lock or lase on a target, no other targets will be considered until that engagement has completed, whether by launch of a fire and forget weapon or by intercept completion. However, the Monitor Target List and Evaluate Higher Priority Targets options allow the Engage phase to continue being rescheduled while an engagement proceeds. This allows new targets to be added to the existing target group, additional engagements to be scheduled, and existing engagements to be stopped in order to engage a higher priority target. These options are detailed in Sections 4.7.11.2.3.1 and 4.7.11.2.3.2.

一般来说，一旦战斗机开始对一个目标规划锁定或激光发射，没有其他目标将被考虑，直到交战完成，无论是通过发射一个射后不管武器或通过拦截完成。然而，*监视目标列表*和*评估更高优先目标*选项允许交战阶段在交战进行期间继续重新规划执行。这允许将新的目标添加到现有的目标组、规划额外的交战、停止现有的交战，以便与更高优先级的目标交战。这些选项在4.7.11.2.3.1和4.7.11.2.3.2节中有详细介绍。

The fighter can choose to abort the engagement and return to its base or CAP if it determines that any MEZ avoidance criteria are met while in the Engage phase. If the platform dropped the track it was vectoring, or has only targets that it is not tracking, the platform revectors, unless it is still vectored to its flight leader. Being vectored to its flight leader indicates that the wingman has not passed the engage phase. This results in rescheduling the engage phase for its repeat time. If no targets are left, the flight leader revectors the flight. If the engagement was dropped due to MEZ avoidance criteria, the fighter will also issue a multiple engagement status report to its commander.

如果确定任何一个MEZ规避准则在交战阶段被满足，战斗机可以选择中止交战并返回到它的基地或CAP。如果平台放弃了正在引导的跟踪，或者只有它没有在跟踪的目标，平台将重新引导，除非它仍然引导到它的编队长机。被引导到编队长机，意味着僚机还没有通过交战阶段。这将导致在交战阶段重复时间重新规划执行交战阶段。如果没有目标剩下，编队长机将对整个编队进行重新引导。如果交战是由于MEZ规避准则而取消的，战斗机也将向其指挥官发布多次交战状态报告。

 Once the fighter enters the Engage phase, the target list as decided in the Target Select or Vector phase is fixed except for the addition of targets as part of a defensive reaction or a User Rules response. Selection of the Monitor Target List option allows a flight leader to continue to monitor its track file and add tracks as targets to the already established target group in order to deal with “pop-up threats” in addition to self defense threats which may have been added as part of a React to Engage or React to Lock reaction and targets which may have been added via a User Rules Weapon Launch response. This is accomplished by continuing to reschedule the Engage phase while the fighter moves on to lock or lase on a selected target.

一旦战斗机进入交战阶段，在目标选择或引导阶段确定的目标列表会被固定下来，除非是作为防御反应或用户规则反应的一部分额外添加目标。选择*监控目标列表*的选项允许编队长机继续监控跟踪文件并添加跟踪为目标到已经建立的目标组中，以处理“弹出的威胁”，这类威胁区别于可能作为“对交战反应”或“对锁定反应”反应的一部分而被添加的自卫威胁和可能通过用户规则武器发射反应被添加的目标。这是通过继续重新规划执行交战阶段来完成的，彼时战斗机将继续锁定或激光瞄准一个选定的目标。

 The fighter uses the target selection routines utilized in the target select and vector phases to continue evaluating tracks to add to the target group. This continued monitoring of the target group and addition of higher priority targets to the list occurs within the Engage phase before the target sorting and weapon selection is performed. The target type priority values defined by the user on the Target Select phase, as described in 4.7.11.2.1, are considered when evaluating tracks for addition to the existing target list. If the Fighter is operating in the ground capable mode, then the priority of current ground targets is also taken into consideration. The ground target select phase also has a priority setting for target types and these priority values are weighted equally between air and ground targets and are compared with the weighted air target priority values. A self assigned air target’s priority must be found to be a greater than or equal to any air or ground target on the list before being eligible for addition to the target list.

战斗机使用在目标选择和引导阶段中使用的目标选择流程来继续评估要添加到目标组的跟踪。这种对目标组的持续监测和将更高优先目标往列表上的添加，发生在交战阶段，并且在目标分类和武器选择执行之前。在评估往现有目标列表添加的跟踪时，使用4.7.11.2.1小结中描述的目标类型优先级值，该优先级值是用户在目标选择阶段定义的。如果战斗机在地面作战能力模式下操作，那么当前地面目标的优先级也被考虑在内。地面目标选择阶段也具有一个目标类型的优先级设置，这些优先级值会在空中和地面目标之间使用相同的加权方法，并与加权后的空中目标优先级值进行比较。自身分配的空中目标的优先级必须大于或等于名单上的任何空中或地面目标，才有资格加入目标名单。

A Priority Threshold specification is available to further restrict the targets that are eligible for addition to the target group. The priority threshold is entered as an absolute value and the priority of the target must be equal to or greater than the specified priority threshold value to be eligible for addition to the target group. The absolute value setting of the priority threshold specification allows for the designation that only targets falling into a particular category may be added to the target list when using weighted target priorities.

优先级阈值设定可用于进一步限制有资格添加到目标组的目标。优先级阈值是作为绝对值输入的，目标的优先级必须等于或大于指定的优先级阈值，才有资格添加到目标组。优先级阈值设定的绝对值设置允许指定——只有使用加权目标优先级并属于特定类别的目标才可以添加到目标列表中。

Additionally, a maximum intercept time constraint is applied to higher priority targets that are eligible for addition to the target list. The flight leader’s computed intercept time against a higher priority target must be less than or equal to the entered maximum intercept time to be eligible for addition to the current target list.

此外，最大拦截时间约束可用于有资格额外加入目标列表的更高优先级目标。计算编队长机对优先级更高的目标的截获时间，该时间必须小于或等于输入的最大拦截时间，才有资格添加到当前目标列表中。

Once a track is found to be a selectable high priority target, this track is added to the current target group. The target list monitoring only occurs for fighter flight leaders. If any new targets are added to the target group during a flight leader’s evaluation, a command assignment message is sent to the wingmen to add those targets to the list.

一旦一个跟踪被发现是可选择的更高优先级目标，该轨道将被添加到当前目标组。只有战斗机编队长机可以监视目标名单。在编队长机的评估过程中，如果有任何新的目标被添加到目标组中，就会向僚机发送一个命令任务消息，以将这些目标添加到目标列表中。

4.7.11.2.3.1Evaluate Higher Priority Targets

Similarly to the Monitor Target List option, the Evaluate Higher Priority Target option also allows the Engage phase to be rescheduled while the fighter platform moves on to the Lock or Lase phase. However, this option does not add any targets to the current target list. Instead, if changes do occur to the target list or to the priorities of the targets on the list, it allows the fighter to engage a higher priority target on the list in lieu of the engagement currently being conducted.

与*监视目标列表*选项类似，*评估更高优先目标*选项也允许在战斗机平台进入锁定或激光阶段时重新规划执行交战阶段。但是，该选项不会向当前目标列表添加任何目标。相反，如果目标列表或列表上目标的优先级发生变化，该选项允许战斗机与列表上优先级更高的目标交战，以代替目前正在进行的交战。

Each member of the flight evaluates their target list for targets with a higher priority than those they are currently engaging. The target type priority values defined by the user on the Target Select phase, as described in 4.7.11.2.1, are considered when evaluating the target list for higher priority targets.

编队中的每一个成员都会评估他们的目标名单，以确定是否有目标的优先级高于他们目前正在交战的目标。在为更高优先级的目标评估目标列表时，需要考虑由用户在目标选择阶段定义的目标类型优先级值，如4.7.11.2.1所述。

With each flight member evaluating its own target list for higher priority targets, there is the potential that multiple fighters could break off their individual engagements to all engage the same higher priority target. The Deconfliction Threshold value allows the user to specify a window of time that allows the fighter to wait for communication from other members of the flight before breaking off its current engagement. If the delay will result in loss of the engagement, the fighter will send an engagement report to the rest of the flight, break off its current engagement, and immediately proceed with engaging the higher priority target. If a valid intercept point will still exist after delaying for the deconfliction time, then the fighter can send out an engagement report on the higher priority target immediately but delay initiation of the engagement. If no other engagement reports on the target are received from the flight within the deconfliction time, or if reports are received but the deconfliction probability draw fails, the fighter will proceed with the engagement.

随着每个编队成员为了寻找更高优先级目标而对自己的目标列表进行评估，有可能多个战斗机会中断各自的战斗，而全部与相同的更高优先级目标交战。冲突消除阈值允许用户指定一个时间窗口，允许战斗机在中断当前交战之前等待来自其他编队成员的通信。如果延迟将导致交战损失，战斗机将发送交战报告给编队的其余成员，中断其当前的交战，并立即开始与优先级更高的目标交战。如果一个有效的拦截点在冲突消除时间的延迟后仍然存在，那么战斗机可以立即发送一份对更高优先目标的交战报告，但延迟交战的启动。如果在冲突消除时间内没有从编队中收到关于该目标的其他交战报告，或者如果收到报告但冲突消除概率抽样失败，战斗机将继续战斗。

Once the fighter selects a higher priority target, the fighter then schedules its Lock or Lase phase against the new target and sends an engagement complete message to the flight announcing the broken engagement.

一旦战斗机选择了一个更高优先级的目标，战斗机然后针对新目标规划执行它的锁定或激光阶段，并给编队发送一个战斗完成消息，宣布前一个交战被中断。

The Evaluate Higher Priority Targets option and the Monitor Target List option both result in the rescheduling of the Engage phase, even if the Fighter continues further in its engagement timeline. Each option can be individually selected, however, in order for the Fighter to continually reevaluate its trackfile for higher priority targets, add those to the target group, then continually reevaluate the target group for a higher priority target engagement, both options must be selected. Otherwise, if only the Monitor Target List option is selected the Fighter will add higher priority targets to the target group but cannot stop an engagement to engage the higher priority target. If only the Evaluate Higher Priority Targets option is selected then the Fighter will only evaluate the existing target group for a higher priority target to engage, which may be added to via a React to Lock, React to Engage, or User Rules Weapon Launch response

*评估更高优先目标*选项和*监视目标列表*选项都会导致交战阶段的重新规划执行，即使战斗机继续推进它的交战时间表。每个选项都可以被单独选择，然而，为了战斗机能为更高优先级目标不断地重新评估它的跟踪文件，然后把那些更高优先级目标添加到目标组，然后为更高优先级目标交战不断地重新评估目标组，这两个选项都必须被选择。否则，如果只选择*监视目标列表*选项，战斗机将添加更高优先级目标到目标组，但不能停止当前战斗以交战更高优先级的目标。如果只选择“评估更高优先级目标”选项，那么战斗机将只评估现有的目标组以寻找更高优先级目标，这些目标可以通过“对锁定反应”、“对交战反应”或“用户规则武器发射反应”来添加。

4.7.11.2.4 Fighter Lock Phase

Once a particular target is selected, the lock phase is entered and is executed repeatedly until lock-on-target is achieved. The first check made is to ensure that the lock event has not been canceled in preference of a higher priority engagement, which is possible if the fighter can continue running the Engage phase while proceeding with an engagement. If the lock evaluation can proceed, it is next determined if the target is currently in track. If the target is not in track, the lock phase is rescheduled for the repeat time. The phase repeats until track is achieved or a time-out of 10 sec has elapsed. The fighter can choose to abort the engagement and return to its base or CAP if it determines that any MEZ avoidance criteria are met while in the Lock phase. The fighter will then evaluate the remaining targets on its target list. If no valid targets remain on the list and no additional targets can be found, the fighter will issue a multiple-engagement status report to its commander as explained in Section 4.7.11.7.6, drop all targets from its target list, and potentially return to base or to its CAP.

一旦选择了一个特定的目标，就进入锁定阶段并反复执行，直到实现目标锁定。第一个检查是确保锁定事件没有因为出现更高优先级交战而被取消，因为战斗机可以在进行当前交战的同时继续运行交战阶段（以寻求更高优先级目标）。如果锁定评估可以继续进行，则下一步将确定目标当前是否在跟踪中。如果目标未被跟踪，锁定阶段将在其重复时间重新规划执行。锁定阶段不断重复，直到实现跟踪或超过10秒的时间。如果确定任何一个MEZ规避准则在锁定阶段被满足，战斗机可以选择中止交战并返回到它的基地或CAP。然后战斗机将评估其目标列表上的剩余目标。如果列表上没有有效目标，也没有发现其他目标，战斗机将向其指挥官发布一份多次任务状态报告，如4.7.11.7.6所述，将所有目标从目标列表中删除，并有可能返回基地或其CAP。

The time-out period allows time for temporary loss of track and an attempt to maneuver to regain track. If track is not held and the time-out has been reached, the ruleset returns to the engage phase to look for another target. The ruleset also returns to the engage phase if track is held but the target has died. The engagement on the current target is stopped, a complete message is sent to the rest of the flight, and the platform is revectored. If the track is a known friend, the engagement is stopped and the platform reschedules the engage phase if it is not currently running.

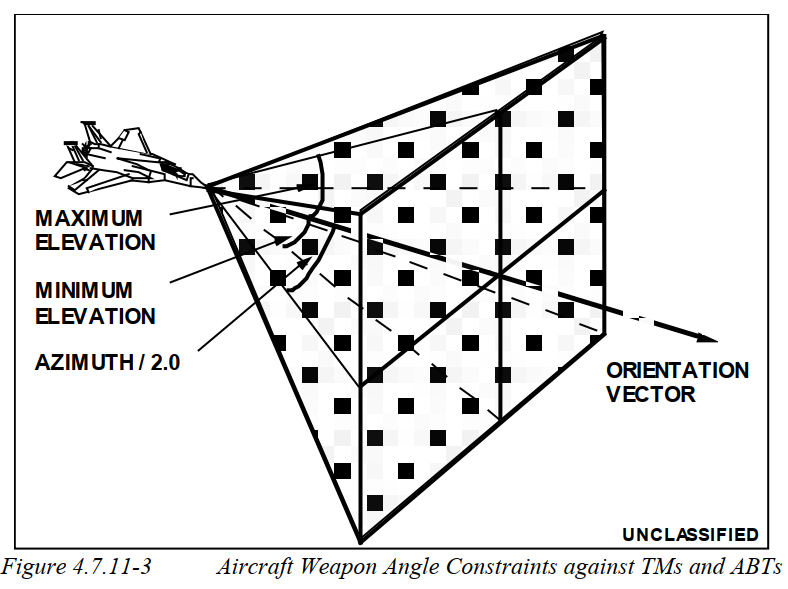
超时时间允许暂时失去跟踪和试图机动以重获跟踪。如果没有保持跟踪，并且达到了超时，则规则集将返回到交战阶段以寻找另一个目标。如果追踪被保持但目标已经死亡，规则集也会返回交战阶段。对当前目标的交战被停止，一个完整的消息被发送到编队的其余成员，平台被重新引导。如果跟踪是一个已知的友军，交战就会停止，如果交战阶段目前没有在运行，平台就会重新规划执行交战阶段。

If the target is found, a flag is set to indicate that the next time through the engage phase will be a repeat engagement. The repeat engagement gives priority to attacking the bombers within targets that are at the same priority level. A test is performed to determine if the target is running. If the target is running, the fighter schedules the engage phase at its start time if the engage phase is not currently running. The target is evaluated next against the available weapons to determine if lock can be achieved. To evaluate a weapon, the range to the target must be within the air-to-air launch envelope of the weapon. The weapon must also be capable against the threat type. When a weapon is selected to engage the target, the target’s React to Lock phase is scheduled.

如果（目标丢失后）找到了目标，将设置一个标志，以表明下一次进入的交战阶段将是一次重复的交战。重复交战优先攻击处于相同优先级的目标内的轰炸机。执行测试以确定目标是否正在运行。如果目标正在运行且交战阶段目前没有运行，战斗机在交战阶段的开始时间重新规划执行。然后根据可用武器评估目标，以确定是否可以实现锁定。为了评估一种武器，对目标的距离必须在武器的空对空发射包线内。武器也必须能够攻击该威胁类型。当一种武器被选择去与目标交战，目标的“对锁定反应”阶段被规划执行。

The weapon’s angle constraints are used to determine if the target’s current position falls within the angle constraints of the aircraft’s selected weapon types. The angle constraints for the selected weapon include a maximum elevation, minimum elevation, and azimuth. Both the maximum and minimum elevations can be defined above or below the horizontal plane of the platform. The maximum and minimum elevations are defined between -180.0 and 180.0 deg. The azimuth is also in the horizontal plane and is defined from 0.0 to 360.0 deg. For aircraft the azimuth is centered on the platform’s orientation vector. The weapon angle constraints are illustrated in Figure 4.7.11-2. These angle constraints can be separately specified as a function of target type through the weapon element definition windows. If the aircraft’s target is not within the aircraft’s weapon angle constraints, then the aircraft continues to head toward the target until the target is within these constraints.

武器的角度约束用于确定目标的当前位置是否在飞机所选武器类型的角度约束范围内。选定武器的角度约束包括最大俯仰角、最小俯仰角和方位角。最大俯仰角和最小俯仰角均可定义在平台水平面之上或之下。最大和最小俯仰角定义在-180.0°和180.0°之间，方位角也在水平面上，定义在0.0°到360.0°之间。对于飞机，方位角以平台的方向向量为中心。武器角度限制如图4.7.11-2所示。这些角度限制可以在武器元素定义窗口，作为目标类型的函数分别指定。如果飞机的目标不在飞机的武器角度限制之内，那么飞机继续朝着目标前进，直到目标在这些限制之内。



For TM targets, weapon launch criteria are evaluated. These user-specified criteria determine at what point in its trajectory the missile can be engaged by the fighter. The user selects these parameters on the weapon element definition.

针对TM目标，对武器发射准则进行了评估。这些用户指定的准则决定了导弹在弹道上的什么点可以被战斗机交战。用户在武器元素定义窗口选择这些参数。

For each of the fighter’s weapons capable against ballistic missiles, an intercept point for the fighter’s weapon against the missile is computed. If at the predicted intercept position the ballistic missile is in boost phase and the weapon requires planned intercepts to occur post-boost, this weapon cannot be used. If at the predicted intercept position the missile is post-boost and the weapon requires planned intercepts to occur during boost, this weapon cannot be used. If at the predicted intercept position the ballistic missile is post-apogee, the weapon must allow planned intercepts to occur post-apogee; otherwise, the weapon cannot be used.

对于战斗机的每一种能够对抗弹道导弹的武器，战斗机武器攻击导弹的拦截点被计算。如果在预测的拦截位置弹道导弹处于助推阶段，并且武器需要在助推段之后进行计划的拦截，那么这种武器不能被使用。如果在预测拦截位置导弹处于助推段之后，而武器需要计划的拦截发生在助推期间，这种武器也不能被使用。如果在预测的拦截位置，弹道导弹处于远地点之后，武器必须允许计划的拦截发生在远地点之后;否则，武器不能使用。

The weapon is selected for the engagement using the weapon selection hierarchy. The default ordering within the weapon selection hierarchy is Fire and Forget, Highest Planned Pk, and Earliest Intercept Time.

使用武器选择层次为交战选择武器。武器选择层次的默认顺序是射后不管、最高的计划Pk和最早的拦截时间。

The fighter contains the option to specify the firing doctrine for a specific weapon type, a specific target type/class, or a specific weapon/target type pairing. The firing doctrine determines how many weapons are launched at a target, allowing specification of a salvo launch. For air to air engagements, a salvo against a single target is also known as ripple fire. After the weapon selection process determines which weapon is best for the engagement, the firing doctrine is evaluated. If the weapon selected has fewer weapons than specified by the firing doctrine, the number of shots at the target is reduced to the number of weapons available. The firing doctrine, which is defined on the ruleset. can be overridden for a specific platform on the Edit/Deploy Platform window.

战斗机包含指定发射条令的选项，该发射条令针对一个特定武器类型、或一个特定目标类型/类别、或一个特定武器/目标类型对。发射条令决定有多少武器发射到一个目标，允许设定齐射发射。对于空对空交战，对单一目标的齐射也被称为ripple fire。在武器选择过程确定哪一种武器最适合作战后，对发射条令进行评估。如果被选择的武器比发射条令规定的武器少，射击目标的次数减少到可用武器的数量。在规则集上定义的发射条令可以在编辑/部署平台窗口中为特定平台覆写。

When evaluating the firing doctrine, a matching weapon/target type pair is selected first. If a matching weapon/target type pair is not found, then a matching weapon type entry is selected. If neither a matching weapon/target pair nor a matching weapon type is found on the firing doctrine list, then a matching target type is selected. A target type is determined to be on the fire doctrine list by the following process. The lookup consists of checking the system type or NCTR determination of the target, and the default or true class of the target. If using perceived information, the classification, which can be a weapon, system, or class, resulting from the NCTR process is checked to determine if it matches the entry on the fire doctrine list. If the NCTR ID does not match, a second check of the entry is performed using the default category of the target, i.e., default TM, default CM, default ABT, default red, or default blue.

当评估发射准则时，首先选择一个匹配的武器/目标类型对。如果没有找到匹配的武器/目标类型对，则选择一个匹配的武器类型条目。如果在发射条令列表中没有找到匹配的武器/目标对，也没有找到匹配的武器类型，那么选择一个匹配的目标类型。通过以下程序确定目标类型是否在发射准则列表上。查询（lookup）包括检查目标的系统类型或NCTR确定，以及目标的默认或真实类。如果使用感知的信息，分类（可以是一个武器，系统，或类，从NCTR过程中产生）被检查，以确定它是否与发射准则列表上的条目相匹配。如果NCTR ID不匹配，则使用目标的默认类别对条目进行第二次检查，即默认TM、默认CM、默认ABT、默认红方或默认蓝方。

 Additionally, the firing doctrine can also specify a salvo delay that is used between launches. This delay indicates how many seconds elapse between subsequent shots at the same target, if more than one shot is fired per target. Each subsequent shot is scheduled when the current shot is launched.

此外，发射条令也可以指定在发射之间使用的齐射延迟。如果对每个目标发射了不止一枚炮弹，那么这个延迟表示对同一目标的连续射击之间间隔的秒数。每次后续射击都是在当前射击发射时规划的。

If lock is achieved, the launch phase is scheduled for the platform at its start time. This start time includes the reaction time to achieving lock on the target and the time required for the missile to launch. If the target is an aircraft, the react-to-lock phase is scheduled for the target for its start time.

如果锁定成功，则在平台发射阶段的开始时间为其规划执行发射阶段。这个开始时间包括对目标实现锁定的反应时间和导弹发射所需的时间。如果目标是一架飞机，在对锁定反应阶段的开始时间为目标规划执行对锁定反应阶段。

If a weapon that requires IFTU is selected, a user-specified IFTU option determines whether IFTU is implicit or message based. If IFTU is implicit, the fighter initiating the engagement schedules a LOCK\_IFTU action for the IFTU platform that has the intercept point of the target in its sensor field of view. If more than one IFTU platform is capable of tracking the intercept, the IFTU platform with the shortest range to the target is selected. The fighter also accesses the IFTU platform’s track file to record the track as engaged. If IFTU is message based, the fighter ruleset sends a commanded assignment to the selected IFTU platform to provide IFTU lock for the engagement and waits for a response from the IFTU platform.

如果选择了需要IFTU的武器，则由用户指定的IFTU选项确定IFTU是隐式的还是基于消息的。如果IFTU是隐式的，发起交战的战斗机为IFTU平台安排一个LOCK\_IFTU行为，该IFTU平台在其传感器视场中有目标的拦截点。如果多个IFTU平台能够跟踪拦截，则选择距离目标最近的IFTU平台。战斗机也访问IFTU平台的跟踪文件来记录跟踪为“被交战”。如果IFTU是基于消息的，战斗机规则集发送一个命令任务到所选的IFTU平台，寻求为交战提供IFTU锁定，并等待来自IFTU平台的响应。

If lock is not achieved, the lock phase is rescheduled for its repeat time.

如果锁定没有实现，锁定阶段会在其重复时间被重新规划执行。

4.7.11.2.5 Fighter Launch Phase

The launch phase evaluates whether the launch occurred. If the platform is no longer tracking the target, the target dies, the launch has been canceled in favor of a higher priority engagement, or the target is a known friend, the launch sequence is stopped. An engagement status report is sent to the other members of the flight and the fighter is revectored.

发射阶段评估发射是否发生。如果平台不再跟踪目标、目标死亡、发射因为更高优先级的交战而取消、或目标是一个已知的友军，发射序列停止。一份交战状态报告被发送给编队中的其他成员，战斗机被重新引导。

For the case of a message-based IFTU engagement, the fighter checks for a response to the IFTU command. If a response is not received by the user-specified IFTU response time or if the fighter receives a CANTCO from the IFTU platform, the fighter terminates the engagement and reschedules the engage phase, if it is not currently running, to select a new target from the group. If a WILCO message is received, the fighter proceeds with the launch phase.

对于基于消息的IFTU交战的情况，战斗机检查IFTU命令的响应。如果用户指定的IFTU响应时间内没有收到响应，或者战斗机从IFTU平台收到一个CANTCO，战斗机终止交战并重新规划执行交战阶段（如果交战阶段目前没有运行），以从目标组中选择一个新的目标。如果收到一个WILCO消息，战斗机将进入发射阶段。

For missile engagements, the launch criteria are evaluated. If the missile is currently in boost and the weapon does not specify that intercepts can occur during boost, the launch is stopped. If the missile is currently post-boost and the weapon specifies that the intercept must occur during boost, the launch is stopped. The intercept time is recomputed. If at the computed intercept position the missile is post-apogee and the weapon specifies that intercepts must occur before apogee, the launch is stopped. If the launch is stopped and the engage phase is not currently running, the engage phase is scheduled for the fighter at its start time to select a new target.

对于导弹交战，要评估发射准则。如果导弹目前在助推段，并且武器没有指定在助推段可以进行拦截，发射被停止。如果导弹目前处于助推后，并且武器指定拦截必须发生在助推段，发射被停止。拦截时间会被重新计算。如果在计算的拦截位置导弹处于远地点之后，同时武器指定拦截必须发生在远地点之前，发射被停止。如果发射停止并且交战阶段目前没有运行，战斗机的交战阶段在其开始时间被重新规划执行，以选择一个新的目标。

For aircraft targets, if track is still held and the target is still alive, the intercept time for the engagement is computed. This intercept time is computed based on the target continuing to fly at a constant velocity along its current velocity vector.

对于飞机目标，如果仍然保持跟踪并且目标仍然存活，则计算交战的拦截时间。这个拦截时间是根据目标沿着当前速度矢量继续以恒定速度飞行计算的。

If the range from the fighter to the computed intercept position is within the range of the selected weapon and the target’s current position is within the selected weapon’s angle constraints, the weapon is launched; otherwise, the launch phase is rescheduled for its repeat time. The weapon angle constraints are illustrated in Figure 4.7.11-2. For the case where the firing doctrine specifies multiple shots, each subsequent shot is scheduled when the current shot is launched.

如果从战斗机到计算的拦截位置的距离在所选武器的射程内，且目标当前位置在所选武器的角度限制内，武器被发射;否则，发射阶段将在其重复时间重新规划执行。武器角度限制如图4.7.11-2所示。对于发射条令指定多次射击的情况，每次后续射击在当前射击发射时被规划执行。

 If the weapon is to be launched, the current position of the fighter is stored—i.e., the position where the weapon started. The intercept phase is scheduled for the computed intercept time for engagements that are not being tracked by IFTU platforms.

如果武器将被发射，战斗机的当前位置被储存（即武器启动的位置）。对于IFTU平台未跟踪的交战，拦截阶段将在计算的拦截时间之后被规划执行。

 For engagements being tracked by IFTU platforms, user-specified update rates on the weapon definition determine how often track information must be evaluated and from whom the weapon expects to receive the updates. The intercept phase is scheduled based on the update rate for the time until intercept. If no update rates are specified, the intercept phase is scheduled for intercept phase start time of the provider or for the scenario interval if the start time is zero. If the weapon expects the IFTU to be provided by the engagement supporter, the intercept phase is scheduled for the IFTU provider. Otherwise, it is scheduled for the launching fighter platform.

对于被IFTU平台跟踪的交战，在武器定义窗口由用户指定的更新率决定了跟踪信息被评估的频率以及武器期望从谁那里接收更新。拦截阶段是根据直至截取时间的更新速率来规划执行的。如果没有指定更新速率，则在提供的拦截阶段开始时间规划执行拦截阶段，或者在开始时间为零的情况下在想定间隔之后规划执行拦截阶段。如果武器期望IFTU由作战支持者提供，为IFTU提供方规划执行拦截阶段。否则，为发射武器的战斗机平台规划执行拦截阶段。

Once all weapons in the salvo have been launched, if the launched weapons are fire-and-forget missiles or the engagement is being tracked by an IFTU platform, the fighter regroups and goes through the revector logic.

一旦齐射的所有武器都发射完毕，如果发射的武器是射后不管导弹，或者交战被IFTU平台跟踪，战斗机就会重组并执行重新引导逻辑。

4.7.11.2.6 Fighter Intercept Phase

The intercept phase evaluates track conditions if the computed intercept time for the engagement has not been reached. If track is lost for non-IFTU engagements, the engagement is logged as a failure due to no track. For IFTU engagements, a coast cycle can be specified on the weapon. If a coast cycle is specified, the intercept phase is rescheduled for the length of the coast cycle. If no coast cycle is specified, the engagement fails due to no track. The launch may also have been canceled prior to intercept in preference of a higher priority engagement if the Evaluate Higher Priority Targets option has been selected on the Engage phase. Note that for any engagement failure, i.e., lost track, failed Pk, failed lethal range, etc., explicit interceptors have the option to fly to impact using a ballistic trajectory from the point of failure.

如果未达到计算的交战拦截时间，拦截阶段将评估跟踪条件。如果在非IFTU交战中丢失了跟踪，则该交战会因为没有跟踪而被记录为失败。对于IFTU交战，可以在武器上指定coast cycle。如果指定了coast cycle，拦截阶段将根据coast cycle的长度重新规划执行。如果没有指定coast cycle，则由于没有跟踪而导致交战失败。如果*评估更高优先目标*选项在交战阶段被选择，发射也可能在拦截之前被取消。注意，对于任何交战失败，例如，失去追踪，因Pk（取样）失败，因为杀伤距离失败等等，显式的拦截弹可以选择使用一个弹道轨迹从失败的点飞到撞击点。

If the target is still in track, the intercept phase is rescheduled based on the smaller of the update rate specified on the weapon and the repeat time of the intercept phase, or the scenario interval if the repeat time is zero .

如果目标仍然在跟踪中，拦截阶段将根据武器上指定的更新速率、拦截阶段的重复时间或者重复时间为零时的想定间隔的较小的值重新规划执行，。

Once the intercept time of the engagement is reached, the intercept phase evaluates the results of the engagement. Several straightforward criteria are evaluated at the beginning of the phase. If the intercept was canceled, the engagement attempt is logged as a failure. If the weapon has semi-active guidance and the fighter is dead, the engagement attempt is also logged as a failure. In both cases, the current intercept event stream ends for the ruleset. If the target has died, the engagement is logged as a failure from death of the target and an engagement status report is sent to the other members of the flight.

一旦达到交战的拦截时间，拦截阶段就会评估交战的结果。在该阶段的开头，评估几个简单的标准。如果拦截被取消，交战尝试将被记录为失败。如果武器有半主动制导且战斗机死亡，交战尝试也被记录为失败。在这两种情况下，规则集的当前截获事件流都将结束。如果目标已经死亡，交战记录为目标死亡的失败，并向编队的其他成员发送交战状态报告。

For ballistic missile engagements, launch criteria are evaluated. If the missile is in boost and the weapon specifies that intercepts cannot occur during boost, the launch fails. If the missile is not in boost and the weapon specifies that intercepts must occur during boost, the launch fails. If the missile is post-apogee and the weapon specifies that intercepts must occur before apogee, the launch fails.

对于弹道导弹交战，要评估发射准则。如果导弹在助推段，并且武器指定在助推段不能发生拦截，发射失败。如果导弹不在助推段，并且武器指定必须在助推段进行拦截，发射失败。如果导弹处于远地点之后，并且武器规定拦截必须在远地点之前进行，那么发射失败。

The intercept phase is rescheduled until the range from the launch position to the target is less than the range that the interceptor missile could have flown if it had flown directly towards the current location of the target. The current position of the target is extrapolated to current simulation time to prevent problems with the granularity of state updates from flight processing. For implicit interceptors, the range that the missile could have flown is computed by multiplying the time since launch of the missile by the weapon’s average velocity. Once the missile range exceeds the range to the target, the engagement is judged to be completed.

拦截阶段被重新规划执行，直到从发射位置到目标的距离小于拦截导弹可能飞行的距离，如果它已经直接飞向目标的当前位置。目标的当前位置被外推到当前的仿真时间，以防止在飞行处理模块的状态更新的粒度上出现问题。对于隐式拦截弹来说，导弹可能飞行的距离是通过导弹发射后的时间乘以武器的平均速度来计算的。一旦导弹射程超过了对目标的距离，交战就被判定完成。

 If the interceptor missile’s range is less than the target’s range, the intercept time is reevaluated. For implicit interceptors, the missile’s current position is determined to be along a vector from the launch position to the current target’s position. The distance of the missile from its launch position is the previously computed maximum distance that the missile could have flown. For implicit interceptors, the time required for the missile to complete the intercept is reevaluated using the same assumptions as initial computation, except for computed current missile position and target position. If the computed intercept point is beyond the maximum lethal range of the weapon, the intercept phase is rescheduled for intercept at the lethal range. The intercept phase is otherwise rescheduled for the computed intercept time.

如果拦截导弹的射程小于对目标的距离，则重新评估拦截时间。对于隐式拦截器，导弹当前位置被确定为沿着一个从发射位置到当前目标位置的矢量。导弹从它的发射位置的距离是先前计算的导弹可能飞行的最大距离。对于隐式拦截导弹，导弹完成拦截所需的时间使用与初始计算相同的假设重新评估，除了计算出的当前导弹位置和目标位置。如果计算的拦截点超过了武器的最大杀伤距离，拦截阶段将被重新规划执行，以在杀伤距离进行拦截。否则，拦截阶段将在计算的拦截时间重新规划执行。

The characterization of the implicit interceptor may utilize a flyout table. In this case, at each execution of the intercept phase, the current location of the target and the launch state of the interceptor is used to look up whether the interceptor could have reached the target if it had flown expecting the target to be at this location at time of intercept. If the interceptor can reach the target by this time based on the flyout table lookup, then the intercept is evaluated to determine if it is a successful intercept. Otherwise, the intercept phase is rescheduled as previously described.

隐式拦截弹的特性可以利用一个飞出表。在这种情况下,在每次执行拦截阶段的时候, 如果是按照在拦截时间目标是在这个位置的期望来飞行的，目标的当前位置和拦截弹的发射状态被用来查询拦截器是否能到达目标。如果根据飞出表的查询结果，拦截器该时刻能够到达目标，则会对拦截进行评估，以确定它是否是成功的拦截。否则，拦截阶段将像前面描述的那样重新规划执行。

For explicit interceptors, at each execution of the intercept phase, the remaining time to intercept is computed based on the target continuing to fly at a constant velocity along its current velocity vector and the interceptor propagated forward as described in Methodology Manual section 5.7.3 until the interceptor has reached closest approach. Once simulation time advances to the computed intercept point, then the endgame determination is made. Until that point, the intercept phase is rescheduled based on the minimum of the update rate, the computed intercept time, and the repeat time of the intercept phase or the scenario interval if the repeat time is not specified.

对于显式的拦截弹, 在每次执行拦截阶段的时候,剩余拦截时间的计算基于（假设：）目标继续飞在一个恒定的速度并沿着其当前的速度矢量，以及拦截器向前传播（如方法手册5.7.3节中描述的），直到拦截器已经达到最接近的路径。一旦模拟时间达到计算的拦截点，则进行终局决定。在此之前，拦截阶段将根据更新速率的最小值、计算的拦截时间和拦截阶段的重复时间(如果重复时间未指定，则为场景间隔)重新规划执行。

If the engagement is completed and the missile range is still not greater than the range to the target, the intercept is judged a failure. For aircraft, the failure is logged as resulting from the drag maneuver of the target, although the drag maneuver is not the only action that could carry the target beyond maximum range of the weapon. If the missile range exceeds the range from launch to the target, the outcome of the engagement is evaluated as described in Subsection 4.7.11.6.5. For explicit interceptors, if the interceptor has reached its closest approach to the target, the target will be evaluated against the weapon’s minimum lethal range and lethal radius. If the range from the interceptor’s point of closest approach to the actual target location, i.e., the miss distance, is greater than the maximum lethal radius, the target will not be destroyed. If the range from the launcher location to the target is less than the minimum lethal range of the weapon against the given target type, the engagement is logged as a failure.

如果交战完成并且导弹射程仍然不大于到目标的距离，则认为拦截失败。对于飞机来说，故障被记录为由于目标的拖拽机动（紧急规避）造成的，尽管拖拽机动不是唯一能够导致目标超过武器最大射程的动作。如果导弹射程超过从发射（点）到目标的距离，交战结果将按照第4.7.11.6.5小节所述进行评估。对于显式的拦截弹，如果拦截弹已经达到对目标的最接近点，目标将根据武器的最小杀伤距离和杀伤半径被评估。如果从拦截弹的最接近点到实际目标位置的距离，即脱靶距离，大于最大杀伤半径，目标将不会被摧毁。如果从发射位置到目标的距离小于武器对给定目标类型的最小杀伤距离，交战被记录为失败。

If the engagement is judged as a failure, the engagement status is cleared on the track to allow future engagement. If it is a success, the target is flagged as dead and the engagement logged as a success. An engagement status message is sent to the other members of the flight upon completion of the evaluation. This message indicates the outcome of the engagement. If the fighter is launching multiple shots at a target, the outcome of the engagement is not reported until the completion of the salvo.

如果交战被判定为失败，交战状态将在跟踪（被跟踪目标）上清除，以允许未来的交战。如果交战被判定为成功，则目标被标记为死亡，交战被记录为成功。评估完成后，将向编队中的其他成员发送交战状态信息。这条信息表明了交战的结果。如果战斗机对一个目标发射了多次射击，直到齐射完成才报告交战的结果。

If the weapon has semi-active guidance and is not tracked by an IFTU platform, the fighter is revectored; otherwise, the fighter is revectored upon launch of the missile.

1. 如果武器有半主动制导并且（战斗机）没有被IFTU平台跟踪，战斗机被重新引导;否则，战斗机在导弹发射后就被重新引导。

2. 如果武器有半主动制导并且武器没有（己方的）IFTU平台提供跟踪信息，那么（发射武器的）战斗机被重新引导；否则，战斗机在导弹发射后就被重新引导。

Upon completion of an IFTU engagement, the fighter must complete the IFTU portion of the engagement. If IFTU is message based, the fighter sends a complete message to the IFTU platform, indicating the engagement is completed. If IFTU is implicit, the fighter schedules a stop action for the IFTU platform providing lock on the target.

在IFTU交战结束后，战斗机必须完成IFTU部分的交战。如果IFTU是基于消息的，战斗机向IFTU平台发送一个“完成”消息，指示交战完成。如果IFTU是隐式的，战斗机向（为导弹）提供目标锁定信息的IFTU平台规划执行一个停止动作（stop action）。

4.7.11.2.7 Fighter React-to-Engage Phase

 This phase is scheduled at its start time by an attacker entering the engage mode against the target: i.e., entering an attempt to lock on the target. This phase has a user-selectable option to disable the reaction. If the disable option is selected, the fighter exits the phase without reacting. Otherwise, current engagement conditions are checked. If the attacker is a known friend, the reaction is terminated. If the fighter is currently engaging on a ground target using a warhead weapon type, the fighter exits the reaction phase and continues its ground engagement. If the fighter is currently executing a drag maneuver, it does not react to the current attacker. If the fighter is rendezvoused with a tanker, the react-to-engage phase will be scheduled for the tanker.

这个阶段在它的开始时间由进入对目标的交战模式的攻击者规划执行，交战模式即，进入一个锁定目标的尝试。这个阶段有一个用户可选择的选项来禁用反应。如果禁用选项被选择，战斗机退出此阶段，不做出反应。否则，将检查当前交战条件。如果攻击者是已知的友军，反应被终止。如果战斗机目前正在使用弹头（战斗部）武器类型与地面目标交战，战斗机退出反应阶段并继续它的地面交战。如果战斗机当前正在执行拖拽机动（紧急规避），它不会对当前攻击者做出反应。如果战斗机与加油机会合，加油机将进入“对交战反应”阶段。

A probability draw is then made to determine if a reaction will be performed. Two user-specified probabilities affect the decision to react. The first probability is used when the fighter has track information on the attacker. Additional knowledge of threats in the area leads to a higher probability of the fighter pilot recognizing a need to react to an attacker entering the lock phase against him. If the fighter does not have track on the attacker, a lower probability should be entered to reflect a lesser situational awareness. If recognition of a need to react is negative, the react-to-engage phase is not rescheduled and no further actions are taken.

然后进行概率抽样，以确定是否会进行反应。两个用户指定的概率影响反应的决策。当战斗机有攻击者的跟踪信息时，使用第一个概率。如果知道该区域威胁的额外信息，将会导致战斗机飞行员有更大的概率认识到需要对进入锁定阶段的攻击者做出反应。如果战斗机没有跟踪攻击者，则应该输入较低的概率来反映较低的态势感知。如果对需要反应的认识是消极的，则“对交战反应”阶段不会重新规划执行，也不会采取进一步的行动。

If the reaction draw is positive, some decision-making is performed. If randomness is eliminated, the fighter will always decide to react. The weapons specified by the user for jettison during the react-to-engage phase are jettisoned. If after jettisoning no air-to-air weapons are left, the fighter exits the react-to-engage phase. If the fighter is already engaged on the attacker or has a fire-and-forget missile in the air to the attacker, no reaction is performed. If the attacker is not already on the fighter’s target list, the attacker is added to the target list for future engagements. If the fighter is already engaged on another target but lock has not been achieved, the ruleset breaks off the engagement. An engagement status report on the engagement is sent to the rest of the flight. If lock is achieved on the target currently being engaged, this phase is rescheduled for its repeat time to allow a reaction once the current engagement is completed. For cases where the Evaluate Higher Priority Targets option is selected in the engage phase, the fighter does not break off the current engagement or reschedule the react to engage phase due to lock being achieved on the currently engaged target. Rather, the attacker is just added to the fighter’s target list within this phase. The decision to break off the current engagement in reaction to the newly added target is made during the continued execution of the engage phase.

如果反应抽样是积极的，就会做出一些决策。如果随机性被消除了，战斗机将总是决定做出反应。由用户指定的在反应-交战阶段投放的武器将会被投放。如果在投放后没有空对空武器剩余，战斗机退出“对交战反应”阶段。如果战斗机已经与攻击者交战，或者在空中对攻击者发射了一枚射后不管的导弹，则不会做出任何反应。如果攻击者还不在战斗者的目标列表中，攻击者将被添加到目标列表中以备将来的交战。如果战士已经在与另一个目标交战，但还没有锁定，规则集就会终止交战。关于交战的一份交战状态报告被发送给编队的其余成员。如果锁定了当前正在交战的目标，那么这个阶段将在其重复时间重新规划执行，以便在当前交战完成后允许（对来袭攻击者做出）一个反应。如果在交战阶段“评估更高优先目标”选项被选择，战斗机不会中断当前交战或重新规划执行“对交战反应”阶段，因为对当前交战目标的锁定已经实现。相反，攻击者只是在这个阶段被添加到战斗机的目标列表中。在交战阶段的继续执行期间，决定中断当前交战以对新添加的目标做出反应。

If the fighter is not engaged on another target or is able to break off its current engagement, the fighter immediately attacks the attacker. The lock phase is rescheduled for its start time and an engagement report is sent to the other members of the flight.

如果战斗机没有与另一个目标交战，或者能够中断当前的交战，战斗机立即攻击来袭攻击者。锁定阶段将在其开始时间重新规划执行，并向编队的其他成员发送一个交战报告。

4.7.11.2.8 Fighter React-to-Lock Phase

The react-to-lock phase is the reaction of the fighter ruleset to being locked on by an attacker’s fire control radar. This phase has a user-selectable option to disable the reaction. If the disable option is selected, the fighter exits the phase without reacting. If the fighter is currently engaging a ground target using a warhead weapon type, it does not react to the current attacker. If the reaction is to proceed, any weapons specified for jettison during the react-to-lock phase are jettisoned.

“对锁定反应”阶段是战斗机规则集被攻击者的火控雷达锁定的反应。这个阶段有一个用户可选择的选项来禁用反应。如果禁用选项被选择，战斗机退出此阶段不做出反应。如果战斗机目前正在使用弹头武器类型与地面目标交战，它不会对当前的攻击者做出反应。如果反应继续进行，在“对锁定反应“阶段指定投放的任何武器都将被投放。

If the attacker is not currently on the fighter’s target list, the attacker is immediately added as a target. If the fighter has already launched at its attacker, a determination is made whether to react. The user-supplied hero time is used. Hero time may be defined as a single default value or in a tabular format containing user-defined values for hero time based on the weapon launched by the fighter and the system type of the attacker. If a hero time table has been specified, for each execution of the react-to-lock phase the system type of the attacker and the weapon launched by the fighter platform are examined. Based on the weapon type used and system or class of the airborne attacker, a look-up is performed on the user-specified table. If a hero time is not found on the table, the single value entered by the user is used. If the fighter has had a missile in flight to the attacker for at least the hero time, then the fighter does not react. If a reaction is taken and the attacker is currently being engaged by the fighter, the engagement of the attacker is stopped. An engagement status message is subsequently sent to the other members of the flight.

如果攻击者当前不在战斗机的目标列表中，则攻击者立即被添加为目标。如果战斗机已经向攻击者开火，则做出是否反应的决定。使用用户指定的英雄时间。英雄时间可以被定义为一个单独的默认值，也可以被定义为一个包含用户自定义的英雄时间值的表格格式，这些值是基于战斗机所发射的武器和攻击者的系统类型的。如果一个英雄时间表已经被指定，那么每次“对锁定反应”阶段的执行，攻击者的系统类型和战斗机平台发射的武器都会被检查。根据所使用的武器类型和空中攻击者的系统或类别，在用户指定的表上执行查找。如果在表中没有找到英雄时间，则使用用户输入的单个值。如果战斗机至少在英雄时间已经有一枚导弹飞向攻击者，那么战斗机不会做出反应。如果一个反应被执行，并且攻击者目前正在被战斗机交战，攻击者的交战会被停止。随后，一个交战状态消息被发送给该编队的其他成员。

If the fighter is currently engaging a target other than its attacker, a determination is made whether or not to break off the current engagement. If the fighter is not evaluating higher priority targets within its engage phase, it breaks off engagements against both air and ground targets. For a ground target the launch is deleted and the fighter performs a stop action on the target. For an air target, the engagement is stopped and an engagement status message is sent to the other members of the flight. The attacker is then flagged as being engaged and an engagement report is sent to the rest of the flight. If the attacker launches an explicit weapon and the explicit missile reaction option is selected, the weapon launched will also be added to the fighter’s target list and reported to the rest of the flight. The drag maneuver phase is then scheduled for the fighter at its start time.

如果战斗机当前正在与攻击者以外的目标交战，则决定是否要中断当前的交战。如果战斗机在交战阶段没有评估优先级更高的目标，它会中断对空中和地面目标的交战。对于地面目标，发射被取消，战斗机在目标上执行停止动作。对于空中目标，交战被停止，一个交战状态消息被发送给编队中的其他成员。攻击者随后被标记为正在被交战，一个交战报告被发送到编队的其余成员。如果攻击者发射一个显式的武器，并且显式导弹反应选项被选择，其发射的武器也会将被添加到战斗机的目标列表并报告给编队的其他成员。拖拽机动（紧急规避）阶段然后在其开始时间为战斗机重新规划执行。

4.7.11.2.9 Fighter Drag Maneuver Phase

The drag-phase processing represents the completion of the drag phase. The fighter continues executing the drag phase until no more missiles to the fighter are in the air. Upon completion, if the fighter no longer has weapons, he is revectored. If the attacker is still alive and track is currently held on the attacker, the fighter immediately goes after the threat by scheduling the lock phase for the current time, unless a fire-and-forget missile has been fired at the attacker. If track is currently not held, the lock phase is scheduled for the attacker at its start time.

拖拽阶段（紧急规避）处理表示拖拽阶段的完成。战斗机继续执行拖拽阶段，直到没有对战斗机的导弹飞在空中。完成后，如果战斗机不再拥有武器，他将被重新引导。如果攻击者仍然活着，并且当前跟踪在攻击者身上，战斗机立即在当前时间调度锁定阶段来追击威胁，除非已经向攻击者发射了一个“发射不管”导弹。如果当前没有保持跟踪，那么锁定阶段将在其开始时间为攻击者规划执行。

4.7.11.2.10 Fighter React to SAM Lock Phase

The processing of this phase is detailed in Section 4.18.2.

4.7.11.2.11 Fighter React to SAM Launch Phase

The processing of this phase is detailed in Section 4.18.3.

4.7.11.2.12 Fighter User Rules Phase

The fighter can execute the User Rules phase in response to events in the scenario, including the death of its commander, or the loss or regaining of its commander through communications checks. Responses include choosing an alternate commander. User Rules phase can also be used for event-based sensor management and for return to base decisions. The User Rules phase is described in Section 4.12.

战斗机可以执行用户规则阶段来响应想定中的事件，包括其指挥官的死亡，或通过通信检查失去或重新获得它的指挥官。响应包括选择一名候补指挥官。用户规则阶段还可以用于基于事件的传感器管理和返回基地决策。用户规则阶段的描述见4.12。

4.7.11.2.13 Fighter Ground Target Select Phase

The fighter ruleset has the optional ability to evaluate ground targets. If selected, four additional phases for the execution of ground engagements are available. The ground target select phase is used by the fighter to evaluate and initiate engagements against ground platforms which have been commanded or detected. The air and ground target selection phases may execute simultaneously. The ground target select phase continues to execute when the fighter self-vectors to an air target, allowing the fighter to continue evaluating possible ground engagements. The ground target select phase ceases when a fighter is commanded against an air target. This forces the fighter to execute its commanded assignments before selecting any ground targets of opportunity. However, the air target select phase does not cease when the fighter is commanded against a ground target. This allows the fighter to continue making self-defense decisions while vectoring to the ground target location. Both target selection phases cease execution when the fighter proceeds to the Engage or Ground Lock phase unless any of the options to continue monitoring for higher priority targets are selected. When a fighter is executing the ground target select phase, an air-to-ground target has to be higher priority than the current air-to-air target for the air-to-ground target to be selected. Once the engagement is completed, both target select phases are rescheduled. Further description of the ground target select phase processing is available in Section 4.7.27.2.1, discussing the details of the target select phase for the AGAttacker ruleset.

战斗机规则集有评估地面目标的可选能力。如果被选中，则有四个额外的执行地面任务的阶段可供选择。地面目标选择阶段被战斗机用来评估和发起对已经被指挥分配的或被探测到的地面平台的交战。空中和地面目标选择阶段可以同时执行。地面目标选择阶段在战斗机自我引导到一个空中目标时继续执行，允许战斗机继续评估可能的地面作战。地面目标选择阶段在战斗机被命令与空中目标交战时停止。这迫使战斗机在选择任何地面目标之前执行它的命令任务。然而，空中目标选择阶段并不会在战斗机被命令与地面目标交战时停止。这允许战斗机在引导到地面目标位置时继续做出自我防御决策。这两个目标选择阶段都会在战斗机进入交战或地面锁定阶段时停止执行，除非选择任何一个选项来继续监视优先级更高的目标。当战斗机执行地面目标选择阶段时，空对地目标必须比当前空对空目标具有更高的优先级才能被选中。一旦交战完成，两个目标选择阶段都将重新规划执行。关于地面目标选择阶段处理的进一步描述可以在4.7.27.2.1节中得到，该节讨论了AGAttacker规则集的目标选择阶段的细节。

4.7.11.2.14 Fighter Ground Lock Phase

The ground lock phase is entered once a particular ground target is selected, and the phase is executed repeatedly until lock-on-target is achieved. This phase represents the process of selecting a weapon and providing the weapon with the required information to reach the target. Upon entering the lock phase, the fighter evaluates the first target currently being engaged. If the target has a specified weapon, this weapon is used for the launch. If the target does not have a weapon, all unscripted weapons within range of the target are evaluated in the same manner as described in Section 4.7.27.2.1.9, discussing the lock phase for the AGAttacker.

一旦选定某一特定地面目标，就进入地面锁定阶段，并反复执行该阶段，直到实现对目标锁定。这一阶段代表了选择武器并为武器提供所需信息以达到目标的过程。进入锁定阶段后，战斗机会评估第一个正在被交战的目标。如果对目标有一个指定的武器，这个武器被用于发射。如果目标没有武器，那么在目标范围内的所有非预定武器将按照第4.7.27.2.1.9节(讨论AGAttacker的锁定阶段)中所描述的方式进行评估。

If no weapon can engage the target, the fighter reschedules the lock phase at its repeat time. If a weapon is available for the launch, the fighter performs the optional IFF at Launch evaluation. If the target is determined to be friendly, the engagement is aborted. Otherwise, the fighter schedules the launch phase at its start time and performs the lock ground action on the target. This scheduling represents the time from completing lock to actual launch against the target, including human reaction time for pulling the trigger. If the Hover for Launch or Retain Profile During Launch options are not selected, the fighter continues to fly toward the target in the engage flight mode as the launch phase is entered. The fighter evaluates any other ground targets for which an engage action has been performed. The fighter performs a lock ground action on each target it is able to lock on, but the launch phase is only scheduled once.

如果没有武器可以攻击目标，战斗机在锁定阶段的重复时间重新规划执行。如果一种武器可用于发射，战斗机在发射评估时执行可选的敌我识别。如果目标被确定为友军，交战将中止。否则，战斗机在发射阶段的开始时间规划执行并在目标上执行锁定地面动作。这个规划表示从完成锁定到针对目标的实际发射的时间，包括人类扣动扳机的反应时间。如果在发射选项中没有选择悬停发射或发射期间保持剖面这两个选项，当进入发射阶段时，战斗机在交战飞行模式中继续飞向目标。战斗机评估任何其他交战行动已经执行的地面目标。战斗机对它能够锁定的每个目标执行一个锁定地面行动，但是发射阶段只规划执行一次。

4.7.11.2.15 Fighter Ground Launch Phase

The ground launch phase performs the actual weapon launch against the selected ground target. Further discussion of the ground launch phase is provided in Section 4.7.27.2.3, discussing the launch phase of the AGAttaker.

地面发射阶段对选定的地面目标执行实际的武器发射。对地面发射阶段的进一步讨论见第4.7.27.2.3节，讨论AGAttaker的发射阶段。

4.7.11.2.16 Fighter Ground Intercept Phase

The ground intercept phase evaluates the results of the ground engagement. Further discussion of the ground intercept phase is provided in Section 4.7.27.2.4, discussing the intercept phase of the AGAttacker.

地面拦截阶段评估地面交战的结果。对地面拦截阶段的进一步讨论将在讨论AGAttacker的拦截阶段的第4.7.27.2.4节中提供。

4.7.11.3 Fighter Received-Message Processing

The received-message processing function of the fighter ruleset is key to coordination of the fighter flight leader with the flight’s commander and with other fighters in the flight

战斗机规则集的接收信息处理功能是战斗机编队长机与编队指挥官以及编队中其他战斗机进行协调的关键。

4.7.11.3.1 Fighter Track Data

The fighter ruleset processes track data as described in Subsection 4.6. The fighter has the ability to process sensor information from onboard sensors and track data received from remote sources.

战斗机规则集处理跟踪数据，如4.6小节所述。战斗机有能力处理来自机载传感器的传感器信息和从远程源接收的跟踪数据。

4.7.11.3.2 Fighter Acknowledgments

The fighter does not receive acknowledgments from its wingmen. The fighter processes two types of acknowledgment messages: IFTU acknowledgments and forwarded multiple acknowledgments. A forwarded multiple acknowledgment is treated as a multiple engagement report. An IFTU acknowledgment is received in response to an engagement support request. If the response is a WILCO, the fighter updates its launch information with the ID of the IFTU provider. A lock action is scheduled for the new IFTU provider. If the WILCO is in response to a hand-off request, the new supporter's launch record is updated with the data from the current supporter's record, and the fighter performs a complete to clear itself as the engagement supporter. If a CANTCO is received, the ID of the IFTU provider is cleared. If this is a response to an initial engagement support request, the fighter's launch record is also cleared, and a stop due to the lack of support is performed. If the CANTCO is a response to a hand-off request, the fighter tries to find another platform to take over the engagement.

战斗机不会从僚机获取确认信息。战斗机处理两种类型的确认消息:IFTU确认和转发的多次确认。转发的多次确认被视为一份多次交战报告。一个IFTU确认被接收，以作为交战支持请求的响应。如果响应是WILCO，战斗机使用IFTU提供者的ID更新其发射信息。为新的IFTU提供平台规划执行了一个锁定行为。如果WILCO是在响应一个移交请求，新支持平台的发射记录将使用来自当前支持者记录的数据进行更新，战斗机将执行一个complete来清除自己作为交战支持者的身份。如果收到一个CANTCO，则清除IFTU 提供平台的 ID。如果这是对初始作战支持请求的响应，战斗机的发射记录也被清除，并且由于缺乏支持而执行一个stop。如果CANTCO是对一个移交请求的回应，战斗机试图找到另一个平台来接管交战。

4.7.11.3.3 Fighter Engagement Reports

Engagement reports are used to report engagements around the battlefield. The two forms of these messages are processed by the fighter ruleset. The multiple-engagement report is received after being forwarded by the flight’s commander. A single-engagement report can be received from another fighter on the same horizontal net or it can be received directly from other sources.

交战报告用于报告战场上的交战情况。这些消息的两种形式由fighter规则集处理。多次交战报告在被编队指挥官转发后收到。单次作战报告可以从同一水平网络的另一名战斗机那里收到，也可以直接从其他来源收到。

For the multiple-engagement report to be processed, the information must be from an engagement by another flight. The fighter will already know what it is engaging. The targets specified in the message will be processed. If the track is not indicated as being engaged, it is marked as engaged and the engaging platform is identified in the track entry.

要处理多次交战报告，信息必须来自另一编队的交战。战斗机将知道其正在与什么平台交战。消息中指定的目标将被处理。如果跟踪没有显示为正在被交战，则将其标记为已被交战，并且正在交战的平台在跟踪条目被识别。

Single-engagement reports are generated by the fighter when initiating an engagement and are sent over the fighter’s horizontal in-flight network. If the fighter receives an engagement report that is not from a member of the same flight or the same BPI CAP, the report is ignored. If the target is not already in the fighter’s target list, it is added to the list. If track is currently held on the target, the track entry is flagged accordingly. If the reported track number is not found in the track file, an update request is sent to the source of the engagement report. Upon receipt of the requested track update, the track entry is flagged as engaged. If the reported target is the only target in the fighter’s list, the ruleset assumes that the fighter must be reacting to an attack by a hostile. For fighters in the same flight, the fighter’s phase is set to the engage phase and he is revectored to the reporting fighter. For fighters on the same route, the fighter’s phase is set to vector to cause the fighter to vector to the target area and also allow him to evaluate any detected tracks as possible targets.

单次交战报告由战斗机在开始交战时生成，并通过战斗机的水平编队中网络发送。如果战斗机收到的交战报告不是来自同一编队的成员或同一BPI CAP，报告将被忽略。如果目标不在战斗机的目标列表中，它将被添加到该列表中。如果跟踪当前在目标上保持，那么跟踪条目将被相应地标记。如果在跟踪文件中找不到所报告的跟踪号，则向交战报告的来源发送一个更新请求。在收到请求的跟踪更新后，跟踪条目被标记为已被交战。如果报告的目标是战斗机列表中的唯一目标，规则集假设战斗机必须对一个敌方的攻击做出反应。对于在同一编队中的战斗机，战斗机的阶段被设置为交战阶段，他被引导到报告的战斗机。对于在同一路线上的战斗机，战斗机的阶段被设置为引导，以使战斗机引导到目标区域，也允许他评估任何探测到的跟踪作为可能的目标。

If the fighter is not currently engaging the target, the target is flagged as engaged by the reporting fighter. If the fighter is currently engaged, the determination is made as to whether the fighter breaks off. If he already has a missile in the air to the target, the fighter continues to engage the target. If the reporting fighter has attempted to resolve the engagement, no further processing is performed and both fighters continue with the engagement.

如果战斗机当前没有与目标交战，目标被进行报告的战斗机标记为已被交战。如果战斗机目前处于交战状态，则确定战斗机是否中断战斗。如果他已经在空中有一枚导弹飞向目标，则战斗机继续与目标交战。如果进行报告的战斗机试图解决交战，则不进行进一步处理，两个战斗机（报告的和接收的）继续交战。

For the case where the reporting fighter has not attempted to resolve the engagement, neither fighter had knowledge of the other’s engagement attempt. A tie-break criterion is used to determine which aircraft will try to resolve the engagement. For engagements against TMs, the aircraft with the longer computed intercept time attempts to resolve the engagement. For engagements of ABTs, the aircraft with the lowest scenario identification number of the platform is used to determine which aircraft will try to resolve the engagement. If track is not held on the target, the engagement is not broken off. Otherwise, a resolution check is made as described in Subsection 4.7.11.7.4. If the resolution fails, no further processing is performed. If the engagement is resolved, the fighter breaks off the engagement and sends an engagement status report to the other members of the flight. The fighter is then revectored.

在进行报告的战斗机没有试图解决交战的情况下，两个战斗机都不知道对方的交战企图。一个决胜标准被用来决定哪架飞机将试图解决交战。对于与TMs交战，具有更长的计算拦截时间的飞机试图解决交战。对于ABTs的交战，拥有平台的最低想定识别号的飞机来确定哪架飞机将尝试解决交战。如果跟踪没有保持在目标上，则交战不能被终止。否则，按照第4.7.11.7.4小节的规定进行解决检查。如果解决失败，则不再执行进一步的处理。如果交战被解决，战斗机将终止交战并向编队的其他成员发送一个交战状态报告。然后这个战斗机被重新引导。

4.7.11.3.4 Fighter Commanded Assignments

Commanded assignments for the fighter rulesets take on the form of a multiple target message. A list of targets to be engaged and a list of the track entry numbers on those targets are included in the message.

战斗机规则集的命令任务以多目标消息的形式出现。消息中包含了要交战的目标列表和这些目标上的跟踪条目编号列表。

If the commanded assignment is not directed to this flight, the message is ignored. A previously received commanded assignment is also ignored. If the fighter already has engageable targets in its target list, the fighter is unable to comply. If he is the flight leader, the assignment came from the flight’s commander. The flight leader then sends a CANTCO to the flight’s commander. If he is not the flight leader, the message is ignored.

如果所命令的任务没有指向该编队，则该消息将被忽略。先前收到的命令任务也会被忽略。如果战斗机已经在其目标列表中有可交战目标，战斗机无法遵守。如果他是编队长机，那么这个任务是由编队指挥官下达的。然后编队长机向编队指挥官发送一个CANTCO。如果他不是编队长机，则该消息将被忽略。

If the assignment is to be accepted, all of the targets except for those flagged to be ignored are removed from the target list. All of the assigned targets are added to the list. If the fighter is not the leader, no further processing of the assignment is performed. The flight leader sends a WILCO response to the flight’s commander. The vector phase is also scheduled for its start time. Since this message came from the commander, the assignment is now forwarded to the other participants on the net.

如果要接受任务，那么除了标记为要忽略的目标外，所有的目标都将从目标列表中删除。所有指定的目标都添加到列表中。如果战斗机不是长机，则不执行进一步的任务处理。编队长机向编队指挥官发送一个WILCO响应。引导阶段也在其开始时间被规划执行。由于此消息来自指挥官，该任务现在被转发给网络上的其他成员。

Fighters functioning as IFTU sensor platforms can receive commanded assignments from fighter or Flexible SAM platforms. If it receives this message, the fighter checks to see if it has track on the target. It also verifies that the intercept point is within its FOV. If it can support the engagement, then it sends a WILCO to the fighter or Flexible SAM that requested the IFTU support. The fighter performs a lock action on the target but continues to fly its deployed flight path. The lock action continues until the fighter receives an engagement-complete message from the launching platform. When the complete is received, the fighter performs a stop action against the assigned target. If it cannot, a CANTCO is sent.

作为IFTU传感器平台的战斗机可以从战斗机或灵活的SAM平台接收命令任务。如果它收到这条消息，战斗机会检查它是否有该目标的跟踪信息。同时验证拦截点是否在FOV内。如果它能够支持交战，那么它将向请求IFTU支持的战斗机或灵活的SAM发送一个WILCO。战斗机对目标执行锁定行为，但继续飞行其部署的飞行路径。锁定动作继续，直到战斗机从发射平台收到交战完成的消息。当接收到完成指令时，战斗机对指定的目标执行停止动作。如果不能，则发送CANTCO。

4.7.11.3.5 Fighter Engagement Status Reports

The fighter ruleset processes both single-engagement status reports and multiple-engagement status reports. Single-engagement reports can be received from many participants. They are primarily used by the fighter rulesets to maintain coordination among flights. Multiple-engagement status reports are forwarded engagement status reports from other flights through the commander ruleset.

战斗机规则集处理单次交战状态报告和多次交战状态报告。单次交战的报告可以从许多成员那里收到。它们主要被战斗机规则集用来保持编队之间的协调。多次交战状态报告是通过指挥官规则集从其他编队转发的作战状态报告。

For the case of a single-engagement report, several possibilities exist. If the reported track number is not found in the fighter’s track file, an update request is sent to the source of the report and processing is delayed until the requested track update has been received. If the target is not a current target of the fighter’s flight and track is not currently held on the target, the message is ignored. If the engagement status was a failure and the reported engager is not currently flagged as the engager, the message is also ignored since someone else is engaging the track. If the engagement was a success, the track is flagged as dead; otherwise, the engagement information is cleared from the track.

对于单次交战报告的情况，存在几种可能性。如果在战斗机的航迹文件中找不到所报告的跟踪号，则向报告源发送一个更新请求，直到收到所请求的跟踪更新才进行处理。如果目标不是战斗机所在编队的当前目标，并且跟踪当前没有保持在该目标上，消息将被忽略。如果参与状态是失败，并且报告的交战者目前没有被标记为交战者，消息也会被忽略，因为其他平台正在与该跟踪进行交战。如果交战是成功，该跟踪会被标记为死亡;否则，交战信息将从跟踪中清除。

If the target is on the fighter’s target list, it is being engaged by the fighter’s flight and different processing is required. If the engagement was a success, both the track and the target are flagged as dead. If the engagement was a failure, the engagement flags are cleared out of the target list if this fighter is not also engaging the target.

如果目标在战斗机的目标列表上，它被战斗机所在编队交战，需要不同的处理。如果交战为成功，跟踪和目标都会被标记为死亡。如果交战为失败，如果这架战斗机也没有与目标交战，那么交战标记将从目标列表中清除。

Multiple-engagement status reports must first be processed by the commander of the flight and will be received from the commander over a vertical net. If the message is received by the flight originating the report, it is ignored. Each target in the list is evaluated. The report on a particular target is ignored if track is not held on that target. If the target is on the target list of the fighter and marked to be ignored, the target is removed from the list of targets.

多次作战状态报告必须首先由编队指挥官处理，并由垂直网络从指挥官处接收。如果发起报告的编队接收到消息，则忽略该消息。对列表中的每个目标进行评估。如果没有跟踪特定目标，则忽略该目标上的报告。如果目标在战斗机的目标列表中并被标记为忽略，则该目标将从目标列表中删除。

4.7.11.3.6 Fighter Stop Commands

Stop commands are used to stop the fighter from continuing with the current engagement. If the fighter has no targets in its target list, the stop command is ignored. If the stop is issued by the flight leader upon completion of an engagement, several actions are taken. The fighter loops through the target list, stops all engagements, and returns to its normal mode of flight. All of the targets are removed from the target list as well. The wingman is taken out of any phase to await further commands from the flight leader.

停止命令用来阻止战斗机继续当前的交战。如果战斗机的目标列表中没有目标，停止命令将被忽略。如果任务完成时由编队长机发出停止命令，则会采取几个行为。战斗机在目标列表中循环，停止所有交战，并返回到它的正常飞行模式。所有目标也从目标列表中删除。僚机被带离任何阶段，等待编队长机的进一步指令。

Each target included in a stop command from the flight commander or forwarded by the flight leader is evaluated. Targets not on the fighter’s target list are ignored. If the target is on the list, it is flagged to be ignored and the time is logged to evaluate the elapsing of the target forbid time. If the platform is currently engaging the target, the fighter is revectored unless a semi-active weapon has been launched at the target. In this case the intercept is allowed to continue to completion. If this message is received by the flight leader, he forwards the message to the rest of the flight across the horizontal net. If the stop command is received because MEZ avoidance criteria have been met, the fighter will respond by sending a multiple-engagement status report to its commander.

从飞行指挥官或飞行指挥官转发的停止命令中包含的每个目标都被评估。不在战斗机目标名单上的目标会被忽略。如果目标在列表中，它将被标记为被忽略，并记录时间以评估目标禁止时间的流逝。如果平台目前正在与目标交战，除非半主动武器已经向目标发射，否则战斗机将被复原。在这种情况下，允许拦截继续完成。如果该消息被飞行队长接收到，他会通过水平网将该消息转发给其余的飞行人员。如果因为MEZ规避标准已经满足而接收到停止命令，战斗机将通过发送多战役状态报告给它的指挥官作出回应。

4.7.11.3.7 Fighter Communications Check

Fighters can verify communications with their commander, the Flexible Commander. Only the flight leader will verify communications. If communication with the commander is lost, the fighter flight leader can optionally execute the User Rules phase to select an alternate commander for the flight.

战斗机可以验证与他们的灵活指挥官的通信。只有长机会验证通讯。如果与指挥官的通信丢失，战斗机编队长机可以选择性地执行用户规则阶段来为编队选择的一个候补指挥官。

4.7.11.3.8 Fighter Vector Updates

The fighter can receive vector update messages from its commander. These messages contain an updated latitude, longitude, and altitude to which the fighter will fly.

战斗机可以从它的指挥官那里收到引导更新信息。这些信息包含更新的战斗机将要飞行的纬度、经度和高度。

4.7.11.3.9 Fighter Update Request Message

When the fighter sends a command message such as an assignment, engagement report or an engagement status report, it contains the number of the track entry on the target. In the case of a multiple-engagement, the message contains a list of track numbers. The receiving platform then attempts to find the commanded track number in its track file. If the track number is not found, the receiving platform sends an update request message back to the fighter for that track number. Upon receipt of the request message, the fighter generates a commanded track update message that contains the track data for the target. The commanded track update also contains all the information of the previous command message, which will then be processed by the receiving platform after the track information has been processed.

当战斗机发送一个命令消息，例如一个任务、交战报告或交战状态报告，它包含在目标上的跟踪条目的数量。在多次交战的情况下，消息包含一个跟踪号列表。然后，接收消息的平台试图在其跟踪文件中找到被命令的跟踪号。如果没有找到跟踪号，接收消息的平台向战斗机发送一条更新请求消息以获取该跟踪号。在收到请求消息后，战斗机生成一条指令的跟踪更新消息，其中包含目标的跟踪数据。命令的跟踪更新还包含前面命令消息的所有信息，然后接收消息的平台将在跟踪信息处理完后对其进行处理。

4.7.11.3.10 Fighter Commanded Track Update

The commanded track update message contains the track data for the requested track number as well as the data contained in the previous command on the track. When the platform receives the update message, it first processes the track information into its track file. The track data is processed in the same way as a track update or a new track, as detailed in Section 4.6. Once the track data has been processed, the platform then processes the original command message for which this track was requested.

命令的跟踪更新消息包含所请求跟踪号的跟踪数据，以及该跟踪上先前命令中包含的数据。当平台接收到更新消息时，它首先将跟踪信息处理到其跟踪文件中。跟踪数据的处理方式对于跟踪更新或新跟踪是相同的，详细情况见4.6节。一旦跟踪数据被处理完，平台就会处理请求该跟踪的原始命令消息。

4.7.11.3.11 Fighter Ground Command Messages

The fighter can process a number of messages pertaining to ground engagements if it is capable of evaluating ground targets. The ground command message types are: commanded assignments, acknowledgements, engagement reports, engagement status reports, and stop commands. These messages are processed the same by both the fighter and the AGAttacker, as detailed in Section 4.7.27.3.

如果战斗机有能力评估地面目标，它可以处理许多与地面作战有关的消息。地面命令的信息类型有:命令任务、确认、交战报告、交战状态报告和停止命令。这些消息由战斗机和AGAttacker进行相同的处理，详见4.7.27.3节。

4.7.11.4 Fighter System Configuration

The fighter ruleset can be used only on aircraft. Sensors, weapons, and communications devices are required. Valid weapon types are towed decoy weapons, anti-weapons, and weapons capable against aircraft and tactical missiles. Explicit air-to-air weapons must operate with a Complex Weapon with a missile airframe, not an aircraft airframe. If the fighter has the Evaluate Ground Targets option selected, air-to-surface weapons may also be used. Explicit air-to-surface weapons must operate with a Complex Weapon using an aircraft airframe, not the missile airframe. The fighter cannot be a commander. The fighter can be commanded by the Flexible Commander. A ground-capable fighter may be commanded by a Ground Attacker Commander. The fighter can be flight leader for other fighters, and can be a wingman to a fighter flight leader. An air-only fighter may process a single scripted air target, although this operation is not recommended. However, if the fighter is ground capable, only ground targets should be added to the scripted target list. Assets are considered by ground-capable fighters for use with the Jamming Control phase.

战斗机规则集只能在飞机上使用。传感器、武器和通信设备是必需的。有效的武器类型是拖曳诱饵武器，反武器，和能够对抗飞机和战术导弹的武器。显式的空对空武器必须是一个使用导弹机身的“复杂武器”，而不是飞机机身。如果战斗机有评估地面目标选项被选择，空对地武器也可能被使用。显式的空对地武器必须是一个使用飞机机身的“复杂武器”，而不是导弹机身。战斗机不能成为指挥官。战斗机可以由灵活指挥官（F Cmdr）指挥。具有地面能力的战斗机可以由地面攻击者指挥官（Ground Attacker Commander）指挥。战斗机可以成为其他战斗机的编队长机，也可以成为战斗机编队长机的僚机。一架仅对空的战斗机可以处理一个单一的预定空中目标，尽管不建议这样做。然而，如果战斗机有地面能力，只有地面目标应该被添加到预定目标列表中。有地面能力的战斗机在干扰控制阶段会考虑使用资产。

If the fighter’s air-to-air weapon is of type complex weapon, meaning it is an explicit missile platform once it is launched, then another requirement exists for the Fighter. If explicit networks are being used, and if propagation is to be used to check connectivity, there must be one communications device for each missile platform that the Fighter is capable of launching. The dynamic network established between the Fighter and the missile platform uses an undedicated communications device to establish the communications link. At the time of the network setup, the pointing mode of the Fighter's communications device is automatically set to the "To Platform" pointing mode, with the missile platform as the target platform.

如果战斗机的空对空武器是复杂武器类型，这意味着它一旦它被发射就是一个显式的导弹平台，那么对战斗机存在另一个要求。如果显式的网络被使用，并且如果传播模型被用来检查连接，必须有一个通信设备用于战斗机能够发射的每个导弹平台。在战斗机和导弹平台之间建立的动态网络使用一个非专用通信设备来建立通信链路。在网络设置时，战斗机通信设备的指向模式自动设置为“对平台”指向模式，其中导弹平台作为目标平台。

4.7.11.5 Fighter Network Recommendations

An N-to-N network with the flight members is recommended. This net should have message classes command and horizontal. An N-to-N network with message classes command and vertical is also recommended for the commander and flight.

建议编队成员建立N-to-N网络。这个网络应该有命令和水平消息类。一个有命令和垂直消息类的N-to-N网络也被推荐给指挥官和编队。

For fighters operating on BPI caps, in-flight networks should include all fighter aircraft on the BPI route as well as on IFTU platforms.

对于在BPI CAPs上限上操作的战斗机，编队内网络应包括BPI航线上的所有战斗机以及IFTU平台上的战斗机。

Fighters that are assigned by a Flexible Commander as part of a multi-flight effort against a target group will be dynamically added to a horizontal communications network containing all flights engaging the target group. If running EADSIM with the propagation model, comm devices for the fighter systems should be common among flights and should be omni-directional to allow communication on the dynamically created network.

由一个灵活指挥官分配的若干战斗机，作为对一个目标群的多编队尝试的一部分，将被动态地添加到包含所有与该目标群交战的编队的水平通信网络中。如果使用传播模型运行EADSIM，战斗机系统的通信设备应该在编队中是通用的，并且应该是全方位的，以允许在动态创建的网络上通信。

For BDA to be performed correctly by ground-capable fighters, all platforms involved must be netted. Two-way communications links should be established between the Intel CAC and the fighters that are providing the BDA surveillance information. A two-way communications network with message classes track and command should link the fighters and their commander.

为了使具备地面作战能力的战斗机能够正确执行BDA，所有涉及的平台都必须联网。Intel CAC（情报收集与分析中心）和提供BDA监视信息的战斗机之间应该建立双向通信链路。一个有跟踪和指挥消息类的双向通信网络应该连接战斗机和他们的指挥官。

4.7.11.6 Fighter Laser Engagements

The fighter can have one laser weapon onboard or can have one laser weapon along with other conventional weapons on board. When a target is chosen in the target select, vector, or engage phases and a laser weapon is on the fighter, the fighter will evaluate the time to slew and time to warm the laser in order to select the best weapon for the engagement. Additionally, the evaluation of whether or not the laser should change states occurs during these phases. Once a decision is made in the engage phase to use the laser, the lase phase is scheduled by the fighter. Engagements using a laser weapon do not go through the fighter’s lock, launch or intercept phases.

4.7.11.6.1 Laser Relays

When a laser weapon is placed on a fighter, the laser relay capability can be used in an engagement. This means that the laser weapon on these platforms can be used in conjunction with a laser weapon on a Laser system that will act as a relay mirror in the engagement. Modeling of a relay mirror in a laser engagement allows for the laser beam to get out of the atmosphere quicker and be delivered to the target with greater intensity.

The time to kill the target is evaluated for each possible path, i.e. direct to the target or through each laser relay to the target during weapon selection. The algorithm assumes that the laser beam will only pass through a single relay. Specification of multiple relays provides multiple one bounce paths to the target. If the fighter platform has a Laser system added to the engagement supporter list and it is determined during planning that the use of the laser relay platform will provide a shorter engagement time and the laser weapon is the best weapon to use, then the relay platform will be used.

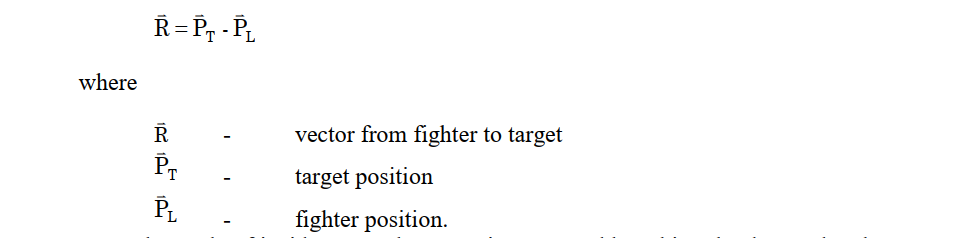
4.7.11.6.2 Weapon Selection

During the target select, vector, and engage phases, the fighter loops through its weapons to determine if there is a weapon on the platform that is able to engage the target. During these phases if a laser weapon is on the fighter, the laser engagement evaluation algorithm will be called for the laser weapon instead of calling the routine to calculate the intercept time on the target. Also during the engage phase, the fighter performs weapon selection for the engagement. Once again, the laser engagement evaluation algorithm is called to determine if the laser weapon is the best weapon to use in the engagement. When the fighter performs weapon selection and a laser weapon is on board, not only will checks be made to determine if the weapon can slew, settle, and lase on the target, but also the amount of time required to kill the target will be computed. Additionally, the fighter’s computation of laser weapon kill time will include the engage phase mean timing delay.

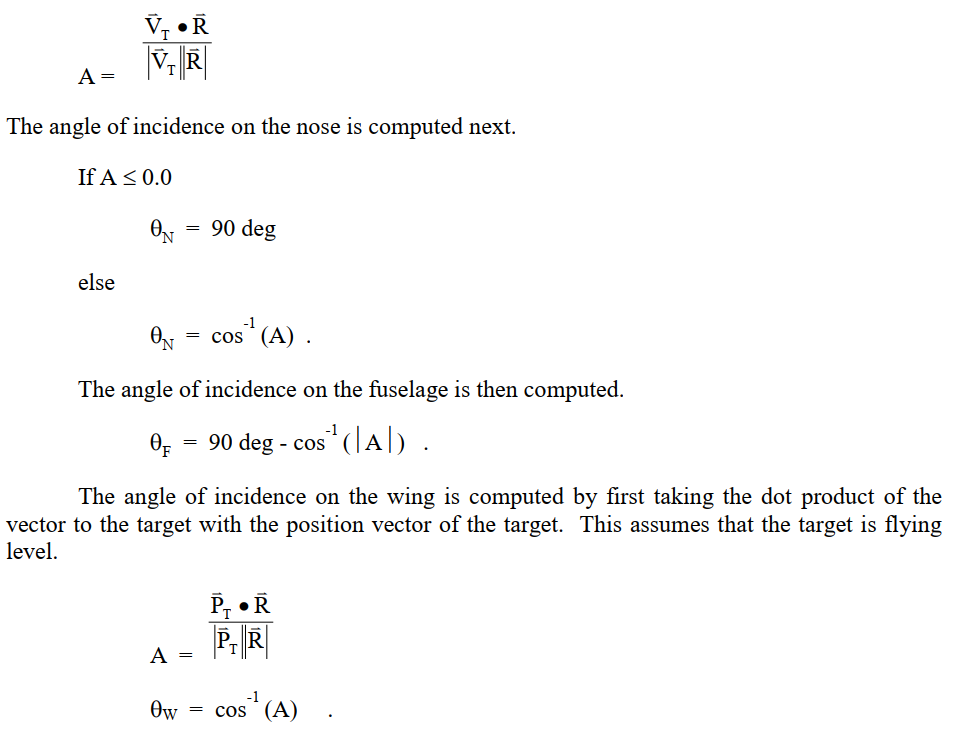
The weapon selection process determines the amount of time necessary to kill the target. If the target cannot be destroyed within the maximum kill time, the laser is prevented from engaging the current target. Before performing the computations, the laser and the target are propagated forward to the expected time of lase initiation. When evaluating the relay mirror configuration, the laser, target, and relay mirror platform are all propagated forward to the expected time of lase initiation. If the target's propagated position is predicted to impact the ground, the laser is also prevented from engaging the target. All entities are first propagated by the lase phase start time.

The lase initiation prediction algorithm then commences to compute the amount of time required to slew to the target. These computations are done consistently with the actual lasing process: i.e., the positions are incrementally flown and the remaining slew time computed. The entities are then propagated by any time remaining to achieve warming of the laser. They are finally propagated by the settle time of the laser. These predicted positions are then used to compute the lase time and aimpoints.

An optimum aimpoint is computed for the weapon by calculating the incidence angles for the nose, fuselage, and wing of the target. Against TMs, only the nose and fuselage angles are considered. When using a relay mirror engagement supporter, the angle of incidence is computed with respect to the relay mirror. First, the vector from the laser platform to the target is computed:



Next, the angle of incidence on the target is computed by taking the dot product between the vector to the target and the velocity vector of the target:



Given the computed angles of incidence, the time required to kill the target, based on the selected vulnerability model, is computed for each angle of incidence. The intensity, I, is computed as described in the Lethality Determination discussion of MM Section 4.7.33.

The remainder of computations to determine if the laser can be used against the specific target are dependent on the vulnerability information for that target. During planning, the calculations utilize the vulnerability data specified for planning. The planning data may be different from the data representing the actual outcome for several reasons. The planning function of the specific laser may not take into consideration some of the target model effects due to complexity of computation or granularity of data storage. The target may have been misidentified causing the planning function to use an incorrect assumption of target characteristics for planning than what actually occurs during lasing on the specific target.

If using perceived target identification and the internal vulnerability model, the planning function first looks for data that has been specified for the specific identified target class and the given aimpoint. Next, it looks for data specified for the default class. Finally, it looks for data specified for the default red or default blue class. If using true target identification, a similar lookup is performed. The algorithm first looks for true target type, followed by true target class, default class, then default red or blue classes.

Having found vulnerability data for the target, the previously computed intensity for the aimpoint must be above the minimum intensity for the aimpoint to be further considered.

If the time required to kill the target for any incidence angle is less than the maximum allowable kill time and the remaining fuel, the laser can be selected for engagement of the target. For TM targets, only the nose angle and the fuselage angle are evaluated. For other targets, the wing angle is also evaluated.

If the option to propagate through engagement completion is not selected on the weapon element definition, the computation of the time to kill and other constraint evaluations are based on the instantaneous conditions at predicted time of lase initiation. The constraints to be applied during planning are optionally selected under the Target Select Constraints button on the weapon element definition. These constraints include dwell time, elevation keep out zone, sun keep out zone, friendly track keep out zones, geometry constraints, minimum intensity, and the ability to maintain slew on the target. These selections may differ from those constraints to be applied during actual lasing that are defined under the Lasing Constraints button on the weapon element definition; however, this could result in breaking lase on a target and immediately attempting to resume the lase. The Keep out zone constraints are discussed further in MM Section 4.7.33. The geometry constraints are the same constraints as those described in Appendix B5.

If the option to propagate through engagement completion is selected on the weapon element definition, the time to kill and other constraint evaluations are calculated as the engagement is propagated through completion. During the propagation, constraints are checked according to the same timing used for actual lasing based on predicted positions of both the lasing platform and the target throughout the engagement. This approach is more computationally intensive, but captures effects of the target being expected to fly out of the engagement volume or through a friendly track keep out zone during the lasing process. This approach also predicts and calculates the total amount of laser fuel available to the laser through the engagement. Laser refueling is discussed in MM 4.7.33.2.1.12.

The laser weapon lases on the target until the target is either dead or some other constraint on the engagement is reached, e.g., maximum kill time. During planning, a planning level must be used to initiate the engagement. For fluence based vulnerability data, the time required to kill the target is computed from the input energy required at the spot edge of the aimpoint divided by the current intensity on the target. For the intensity data, the default probability of kill setting for the target and aimpoint is used to access the tLETHAL from the vulnerability data. When using intensity based data, Probability of Kill should be one on the criteria defining the lethality.

Once it is established that the calculated kill time of the laser for the target is not above maximum kill time, additional requirements must also be met. In order for the fighter to use the laser weapon, the track data must meet the minimum engage DFD specification of the laser weapon. If any Air-to-Air Envelop Launch Angle and Launch Range values are defined for the weapon, these restrictions must also be met in order to use the laser weapon in the engagement.

The fighter then chooses from among the weapons available to engage the target using the weapon selection hierarchy criteria defined by the user. The low inventory threshold parameter on the laser weapon specifies a fuel level where the weapon is considered to have a low weapon inventory. This parameter is used when the weapon inventory low or weapon inventory high weapon selection criteria is used by the fighter.

4.7.11.6.3 Slewing and Warming

If the laser weapon is selected for the engagement, the laser slewing and warming routines are scheduled out of the engage phase for the fighter. Laser slewing and warming are not initiated until the laser is specifically selected by the fighter to conduct the engagement. Laser warming is the process of heating up the laser from a cold state in preparation to begin lasing. The time to perform warming is a user-specified input on the laser weapon. The laser slewing computations are detailed further in the Laser Slewing Computations section of MM Section 4.7.33.

4.7.11.6.4 State Changes

The following laser states exist in the laser battle manager: Standby, Arm, Ready and Fire. In order for a laser weapon to begin lasing on a target, the laser must be in the Fire state. A user defined table provides the conditions required to transition from each state and any transition times associated with changing states. When those conditions are met, the laser begins transitioning up to the Fire state.

The initial state of the laser is Standby. Since a fighter platform can contain other conventional weapons, engagement of a target does not necessarily have to come from the laser. Therefore, the laser weapon when used by the fighter does not begin state transitions until the target is at least within maximum range capability of the laser weapon.

State change transition checks are in the fighter’s target select, vector, engage, and lase phases. During the target select phase, the fighter state transition checks are made after a target is chosen and the target is within maximum range of the laser weapon. The vector phase check is also made after a valid target is found. During the engage phase, the state transition checks are made after a laser weapon is chosen for the engagement. Additionally, state change transition checks continue to be made at the beginning of the lase phase for the fighter.

The decision for the laser to transition to the Arm, Ready, or Fire States depends on a user defined set of inputs. The user options include:

a) Obtaining remote track

b) OAT Track SettleTime Complete

c) Track Declaration as Threat

d) Target within the Engagement Window

e) SAT Track Settle Time Complete

f) Laser Slewing Complete

g) Laser Warming Complete

h) Laser Settling Complete

All state change constraints available to the Laser ruleset are available to the fighter except the constraint Visual ID Complete. The Remote Track constraint limits state transitions unless the fighter holds hostile tracks. The Fine Track Settle Complete limits state transitions until the sensor’s fine tracker delay time has expired. The Track Declaration of Hostile constraint limits state transitions until the fighter has a target. The Target in the Engagement Volume constraint limits state transition beginning with the Arm state until the target is within the engagement window. In other words, this constraint will limit the state transitions until the target is close enough to be engaged and not within any keep out zones. Keep out zones are detailed further in the Keep Out Zone discussion of MM Section 4.7.33.

The Coarse Track Settle Complete constraint limits state transitions until the sensor’s coarse tracker delay time has expired. The Slewing Complete constraint limits the state transitions until the slewing to the target is complete. The In Warm State constraint limits the state transitions until the laser warming has completed. Finally, the Settle Complete constraint limits the state transitions until the laser has settled on the target.

An additional requirement for entering the Ready State deals with the earliest time that a target can be engaged (TEarly). TEarly is the first time during the missile trajectory that all geometric conditions for lasing will be met. The laser will not transition from the Arm State until the transition time to move from Arm to Ready to Fire will have the Fire State occur on or after TEarly.

For each State there is an associated Expire Time. If the user-defined conditions are not met to proceed to the next State before the associated Expire Time elapses, the laser transitions back to the previous State. The transition time to go to the next State and back to the previous State are separate times. If the laser begins a transition to the previous or next State that transition must complete before any other transition may occur. In the instance that the laser makes the decision to return to a previous State and before the transition is complete the conditions to maintain the higher State are met, the laser must first complete the transition downward.

During the Fire State, the laser is always emitting energy. For this reason if a delay is encountered during lasing the laser transitions back to the Ready State during the delay. It is important for the user to realize that this causes an additional delay to return to the lasing process if the transition time from the Ready State to the Fire State is non zero and larger than the KOZ-Out Time associated with the delay.

In order to properly model weapon fuel expenditure, the user is able to select which Laser States consume fuel. Since the Fire State always expends weapon fuel the Fuel Expenditure option is ghosted. If the laser is transitioning to a state that is selected to expend fuel, the laser consumes fuel. Otherwise, fuel is not consumed during the transitions. The laser weapon also has the ability to refuel at a static or dynamic linear rate. The dynamic rate is used for the states in which fuel is expended and the static rate is used otherwise. Laser refueling is discussed in MM 4.7.33.2.1.12.

4.7.11.6.5 Lasing and Settling

The lase phase is scheduled by the fighter from the engage phase when a laser is chosen for the engagement. The process of slewing to and settling on a target at the beginning of the lase phase is analogous to the process of locking on the target for the other weapon types.

Several evaluations are made in the lase phase to determine if the engagement will proceed. The engagement is aborted if the track on the target is older than the purge time specified for the platform or if the engagement has been determined to be a friend. The platform must have local track on the target. If local track is not held, the engagement is coasted for the user-specified number of coast cycles. The frequency of these cycles is the repeat time of lase phase. If local track is not obtained, the engagement attempt is aborted. If the target is a ballistic missile, the TM engage options are evaluated to determine if the current state of the target ballistic missile meets the criteria for engagement. The criteria include whether the missile is boosting or not and whether the missile is pre-apogee or not. If the failure conditions are passed, an engagement begins. The lase phase also contains checks to determine if the laser weapon has completed slewing, settling, and state changes. If slewing, settling, warming, or state changes have not completed, the lase phase is rescheduled. The reschedule time of the lase phase is dependent on whether or not slewing, settling, state changes, or lasing are occurring. If slewing is not complete, the projected time of slewing completion or the phase repeat timing, whichever is the minimum amount of time is the reschedule time. If settling is not complete, the minimum of either projected time of settling completion or the phase repeat timing is used as the reschedule time. The laser settle time is discussed further in the Laser Settle Time section of MM Section 4.7.33. Also within the lasing function, the laser state changes continue to proceed. If the laser is not within the Fire state when the laser has completed slewing and settling, the lase phase is rescheduled at the minimum of the phase repeat time or completion of state transition. Lasing on the target begins after completion of laser slewing, settling, and state changes.

Each time the lase phase executes, the kill against the target is accumulated. The aimpoint remains constant throughout the lasing on the target. The kill methodologies are described in the Lethality Determination section of MM Section 4.7.33. The first time through this logic occurs once settling is completed, thus no lasing has been performed. If the internal vulnerability model is used, the first time through establishes the kill level required for this specific target. For example, a random draw from a uniform distribution is taken. If this draw is .75, then this target requires the 75th percentile kill accumulation to be destroyed. If randomness is eliminated, the random draw always is a 0.0 and the target is destroyed using the minimum level of kill accumulation.

Once the percentile for this target is established, the lasing process begins. When the laser initially starts to emit energy the laser is dithered to determine if the correct aim point has been achieved. During the dither process lethal energy is not accumulated on the target. A High Energy Laser (HEL) settle delay is used to model the dithering process. Accumulation begins after the HEL settle delay time has elapsed. The lase phase is then rescheduled for the minimum of the remaining lase time and the integration interval. The lase phase repeat time is used as the largest possible integration interval under this scheme.

On subsequent executions, the kill is accumulated as described in the Lethality Determination section of MM Section 4.7.33. The amount of laser fuel is calculated at this time based on time spent lasing and the dynamic linear refuel rate. The lasing process aborts if the time spent lasing exceeds the maximum kill time or maximum dwell time against the target type or the laser depletes its laser fuel supply. Maximum Kill Time is the amount of time spent lasing on the target and does include the HEL Settle Delay time even though energy is not being deposited on the target during this time. On the other hand, Maximum Dwell Time is the amount of time the laser has spent actually depositing energy on the target. This value does not include the HEL Settle Delay time thus allowing for sensor cueing and fine track sensing before lasing starts and the laser energy is accumulated. The process keeps repeating at the minimum of the user specified integration interval and the remaining time to lase until the required energy is deposited on the target.

Once lasing is complete, the outcome of the engagement is reported. If the specific percentile is reached before stopping the engagement for some other reason, the engagement is a success. If the engagement stops for some other reason than death of the target, the engagement is a failure. The fighter always correctly assesses the outcome of the engagement. Since the fighter is only able to make one engagement at a time, a revectoring function is called to find new targets at engagement completion.

4.7.11.6.6 Returning to the Rest Position and Cooldown

The fighter evaluates the laser weapon at the end of an engagement to determine when the laser needs to cool and slew back to the rest position. At the end of an engagement if there are no longer engageable targets, the laser cooling initiation is scheduled for the cooldown delay time. Slewing initiation is also scheduled for the resume rest time.

Fighter platforms using the laser weapon can have a cool down time for the laser after an engagement. The allow cooldown delay determines the amount of time that must pass after the last shot is fired before the laser can begin cooling. The assumption has been made that the cooldown time is the same as the warm-up time and is linear. Once the laser has started the warm-up phase, it runs to completion. However, the cooling phase does not have to run to completion. If a target is selected during the cooldown phase, the laser is required only to warm for the amount of time that has elapsed during the cooling process. An engagement action is logged at the beginning of the warm-up period, when the laser is warm, at the beginning of the cooldown phase, and when the laser is cold. The lase phase is rescheduled at the completion of the warm-up process.

The laser and, if used, the relay mirror are returned to their rest position if an engagement has not occurred within the specified resume rest. Once the resume rest time threshold has been reached, the laser and relay mirror will begin slewing to their rest positions. The computations for slewing of the laser are described in the Laser Slewing Computations section of MM Section 4.7.33. The target vector for the computations is determined by specifying the laser rest position angles. The laser rest position can be defined by angular settings or by an absolute latitude and longitude. Angular modes define an azimuth and elevation that points either in an absolute ENU coordinate frame or relative to the platform's orientation. The latitude and longitude mode allows setting of the aimpoint to a specific location in the theater.

4.7.11.7 Engagement Utility Functions

The air combat rulesets make use of several common routines and functions throughout the phases. This subsection describes many of these functions.

空战规则集在整个阶段中使用了一些常见的流程和功能。本小节描述了其中的许多功能。

4.7.11.7.1 New Flight Leader Selection

There are several conditions under which a new flight leader must be chosen. For example, if a flight leader has depleted his weapons, a new flight leader is chosen. The new flight leader is chosen by evaluating the wingmen. The first choice for a new flight leader is the first wingman in the subordinate list that is not dead and has weapons. The second choice is the last wingman in the list that is not dead but does not have weapons. The new flight leader then takes over the flight leader activities for the flight. The subordinate structures for the entire flight are set to indicate the new flight leader for the flight. The structure for the flight’s commander is also set to indicate the new flight leader. If the new flight leader is out of weapons, the entire flight is out of weapons and the platform transitions to the RTB ruleset.

在以下几个条件下，必须选出新的编队长机。例如，如果一个编队长机耗尽了他的武器，一个新的编队长机就会被选中。通过评估僚机，选出新的编队长机。新编队长机的第一选择是下属名单中第一个没有死亡并拥有武器的僚机。第二个选择是列表中最后一个没有死亡但没有武器的僚机。新的编队长机然后为编队接管编队长机的活动。整个编队的下属结构被设置为能表明该编队的新编队长机的形式。编队指挥官的结构也被设置为能表明新的飞行指挥官的形式。如果新的编队长机没有武器，整个编队也就没有武器，平台将过渡到RTB规则集。

If the new flight leader has weapons, several different actions can occur. If he is currently vectored to a target but not in the engagement phase, he is revectored using the revector function. If he is currently engaging, no further actions are performed. If he is not currently vectored, his target-selection process is rescheduled at its start time to allow independent actions to be taken.

如果新的编队长机有武器，几种不同的行为会发生。如果他目前被引导向一个目标，但不在交战阶段，他将使用重新引导函数被重新引导。如果他目前正在交战，则不会执行进一步的行为。如果他目前没有被引导，他的目标选择过程将其开始时重新规划执行，以允许采取独立的行为。

4.7.11.7.2 Target Running Determination

Tests to determine if a target is running are performed during the fighter’s vector, engage, and lock phases. If the target is a ballistic missile, a determination is made as to what point in its trajectory the missile is currently flying. This is compared with the launch criteria of the weapon that specify if the weapon can be launched while the missile is in boost, post-boost, pre-apogee, or post-apogee. If the missile has already flown beyond the point at which the fighter’s weapons can engage, the missile is considered to be running.

确定目标是否正在运行的测试在战斗机的引导、交战和锁定阶段执行。如果目标是一枚弹道导弹，则确定导弹当前正在飞行于弹道上的哪个点。这是与武器的发射准则相比较的，该准则规定当导弹处于助推段、助推段后、远地点前或远地点后时，武器是否可以发射。如果导弹已经飞过了战斗机的武器能够交战的点，则认为导弹正在运行。

For weapons that can engage the missile at its current position in the trajectory, an intercept time is computed for the weapon. If weapons are able to intercept, the target is considered to not be running and the fighter selects the weapon with the shortest intercept time to the target. If no weapons are found that can intercept the missile, the missile is considered to be running.

对于能够在弹道中当前位置与导弹交战的武器，将计算武器的拦截时间。如果武器能够拦截，则认为目标没有在运行，战斗机选择对目标拦截时间最短的武器。如果没有发现能拦截导弹的武器，导弹被认为正在运行。

For aircraft targets, the aspect angle, vertical release angle, closing speed, and delta altitude to the target is determined. The aspect angle is the angle between the target body roll axis and the line of sight from the target to the attacker. (An aspect angle of zero corresponds to a nose-on view.) The vertical release angle is the attacker’s pitch angle relative to its local horizontal. The closing speed is the rate at which the attacker is closing on the target. The delta altitude is the difference in altitude between the attacker and the target. The air-to-air launch envelope in the weapon element definition allows the user to specify the maximum range of the weapon being fired as a function of one or more of these criteria. This maximum range is then used in the intercept computations.

对于飞机目标，确定了目标的方位角、垂直释放角、接近速度和与高度差。方位角是目标机体滚动轴和从目标到攻击者的视线之间的角度。(方位角为零对应机头朝向视角。)垂直释放角是攻击者相对于其当地水平平面的俯仰角。接近速度是指攻击者接近目标的速度。高度差是攻击者和目标之间的高度差。在武器元素定义中的空对空发射包线允许用户指定作为一个或多个这些准则的函数的被发射武器的最大射程。这个最大射程然后用于拦截计算。

The computed criteria are compared with the user-specified criteria in the air-to-air launch envelope. The method used to extract a maximum range value from the table is dependent on whether or not interpolation is enabled. If interpolation is not enabled, the maximum range is selected based on the closest criterion values in the table that are less than the calculated criterion values. If interpolation is enabled, the maximum range value is interpolated based on criterion values in the table that are adjacent to the calculated criterion. If no maximum range can be found for the evaluated criterion, a maximum range of zero will be used. The resulting maximum range value from either method is then be used in the intercept calculations.

将计算出的准则与用户在空对空发射包线内指定的标准进行比较。从表中提取最大射程值的方法取决于是否启用插值。如果未启用插值，则根据表中**小于**计算的准则值的**最近**的准则值来选择最大射程值。如果插值被启用，最大射程值将根据与计算的准则值相邻的表中的准则值进行插值。如果未找到该评价准则的最大射程，则最大射程使用0。两种方法所得的最大距离值将用于拦截计算。

The intercept time is computed. If intercept is possible and the intercept point is within the specified maximum range, the time to intercept is compared with the user-specified maximum intercept time. If the intercept time is less than the maximum time, the target can be engaged and is therefore not running.

计算拦截时间。如果拦截是可能的，并且拦截点在指定的最大射程内，拦截时间将与用户指定的最大拦截时间进行比较。如果拦截时间小于最大时间，目标可以被攻击，且因此不运行。

4.7.11.7.3 Platform Revectoring

The revectoring function provides a central functionality to revector platforms operating under a fighter ruleset. The processing is dependent on whether the platform is the flight leader or a wingman. If the platform is a wingman, it is vectored back to its flight leader. The engage phase is then rescheduled for the wingman. The processing for the flight leader is more complex.

重新引导功能为在战斗机规则集下操作的重新引导平台提供了一个中心功能。处理过程取决于平台是编队长机还是僚机。如果平台是僚机，它将被引导回它的编队长机。然后再为僚机重新规划执行交战阶段。长机的处理过程更为复杂。

Since the flight may need to be vectored to new targets and targets on the current list may no longer be forbidden, the status of the target list is updated. The forbidden status is removed for forbidden tracks for which the target forbid time has expired.

由于编队可能需要引导到新的目标，并且当前列表上的目标可能不再被禁止，因此目标列表的状态得到更新。对于目标禁止时间已过的被禁止跟踪，禁用状态被移除。

The remainder of the processing in the revector function is dependent on the status of the weapons available to the flight. If the platform is out of weapons and there are still targets to be engaged, a new flight leader is chosen as described in Subsection 4.7.11.7.1. This platform now becomes a wingman to the new flight leader. Since it is out of weapons and can no longer engage, it is vectored to follow his flight leader and no further processing is performed.

引导功能中处理的其余部分取决于编队中可用武器的状态。如果平台没有武器，且仍有目标需要攻击，则按照第4.7.11.7.1小节的规定选择新的编队长机。这个平台（前长机）现在成为了新的编队长机的僚机。因为它没有武器，不能再交战，它被引导跟随他的编队长机，没有进一步的处理被执行

The revector function determines when engagements against a target group are complete. If all targets in the group have been intercepted, the fighter can delete this target group from its target list and return to the target-select phase to select a new target. The ground target select phase will be scheduled for ground-capable fighters.

重新引导功能决定针对目标组的交战何时完成。如果组中的所有目标都被拦截，战斗机可以从它的目标列表中删除这个目标组并返回到目标选择阶段来选择一个新的目标。对于地面能力战斗机，地面目标选择阶段将被规划执行。

If fire-and-forget missiles have been launched at all engageable targets in the group or IFTU platforms are tracking engagements against the targets in the group, the fighter can optionally continue to vector to this same target group or select a new target group. This is the New Target Group option specified on the fighter launch phase definition.

如果“射后不管”导弹已经发射到组内所有可交战目标，或者IFTU平台正在跟踪对组内目标的交战，战斗机可以选择继续引导到这个相同的目标组或选择一个新的目标组。这是在战斗机发射阶段定义中指定的*新的目标组*选项。

4.7.11.7.4 Engagement Resolution Calculations

The resolution of a dual engagement is based on a probability of resolution and a random draw against this probability. The probability of resolution can be user-specified on the fighter engage phase definition. The probability is based on the number of targets in the target group. If randomness is eliminated, then dual engagements will always be resolved.

双重交战的解决是基于解决的概率和对这个概率的随机抽样。解决的概率可以在战斗机交战阶段定义上由用户指定。概率基于目标组中的目标数量。如果随机性被消除了，那么双重交战就总是会得到解决。

If probabilities are not specified by the user, the resolution probability by number of targets is:

如果用户没有指定概率，那么解决的概率由目标的数量决定：

Resolution Probability = (11 - N) /10

4.7.11.7.5 Engagement Evaluation

The evaluation of the final outcome is driven by probabilities. Weapon roll-off is applied when using a single-value Pk. The Pk is the user-specified Pk out of a user-defined percentage of the weapon’s lethal range. The Pk decreases linearly from the specified value at the user-defined percentage of the weapon’s lethal range to a second user-defined percentage of the specified value at the lethal range of the weapon. The default values for the user-defined percentages are 80 and 50, respectively. The geometry-based Pk tables are discussed in Appendix B6.

对最终结果的评估是由概率驱动的。当使用单值Pk时，使用武器衰减。该Pk是用户指定的Pk，超出用户定义的武器杀伤距离百分比。Pk从用户定义的武器杀伤距离百分比的指定值线性下降到第二个用户定义的武器致命距离百分比的指定值。用户自定义百分比的默认值分别为80和50。基于几何的Pk表在附录B6中讨论。

If the target is reacting, defensive countermeasures other than maneuvers are evaluated as Pk reduction factors. These defensive countermeasures are referred to as anti-weapons in the EADSIM and are used to model such capabilities as flares and chaff. The particular anti-weapon used is the one that provides the greatest effectiveness against the given weapon type. The Pk of the weapon is then reduced by the effectiveness of the selected anti-weapon, [R(eff)]. The reduction is computed as:

如果目标正在反应，除机动外的防御性反制对策Pk减少因子来评估。这些防御性反制对策在EADSIM中被称为反武器，并被用于对曳光弹和箔条等能力进行建模。所使用的特定反武器是能对给定的（敌方）武器类型提供最大效能的武器。武器的Pk会因为所选反武器的效能而降低[R(eff)]。减少的计算方法如下:

Pk(eff) = Pk [1.0 - R(eff)]

The outcome of the engagement is evaluated by taking a random draw between zero and one. If the number is less than the effective Pk, the engagement is judged a success; otherwise, the engagement is a failure. With randomness eliminated, engagements are always a success.

通过在0和1之间随机抽样来评估交战的结果。如果抽样的数值少于有效的Pk (eff)，则判定交战成功;否则，这一交战就是失败。如果排除了随机性，交战就总是会成功。

4.7.11.7.6 Reporting of Engagements

The Fighter ruleset sends engagement report and engagement status (complete) messages to report the ongoing status of its engagements. The engagement messages have a status action associated with them and a new message is sent when the engagement progresses to each new action. Engagement reports can have actions of Investigating/Interrogating, Weapon Assigned, Tracking/Locked On/Ready to Fire, or Firing/Missile in Flight. Engagement complete messages can have actions of Effective/Target Destroyed, Not Effective, or Engagement Broken. The fighter begins reporting an Investigating/Interrogating message when it receives a commanded assignment and schedules the Vector phase. Once the commanded target is detected or the fighter selects a target on its own it sends a Weapon Assigned report. When the fighter proceeds to the Engage phase it reports a status of Tracking/Locked On/Ready to Fire. A report of Firing is sent when the Fighter proceeds to the Launch phase and determines that a weapon can be launched at the target. Once the intercept completes, an Engagement Complete message is sent. A successful engagement is reported as Effective/Target Destroyed while an unsuccessful engagement is reported as Not Effective. If the engagement is terminated for any reason before the Intercept phase has been scheduled, a status of Engagement Broken is reported. A status of Engagement Broken is also reported when upon intercept evaluation the Fighter finds the target killed by another platform.

战斗机规则集发送交战报告和交战状态(完成)消息来报告交战的持续状态。交战消息有一个与之相关联的状态行为，当交战进展到每个新的行为时，一个新的消息被发送。交战报告可包括的行为有——Investigating/Interrogating（调查/询问）、Weapon Assigned（分配武器）、Tracking/Locked On/Ready to Fire（跟踪/锁定/准备发射）或Firing/Missile in Flight（发射/导弹飞行中）。交战完成消息可能包含的行为有——Effective/Target Destroyed（有效/目标被破坏），Not Effective（无效）或Engagement Broken（交战中止）。当战斗机收到一个命令任务和规划执行引导阶段的时候，战斗机开始报告一个Investigating/Interrogating调查/询问消息。一旦所命令的目标被探测到，或者战斗机自己选择一个目标，它就会发送一份Weapon Assigned武器分配报告。当战斗机进入交战阶段时，它报告Tracking/Locked On/Ready to Fire跟踪/锁定/准备开火的状态。当战斗机进入发射阶段并确定一件武器可以向目标发射时，Firing发射报告被发送。一旦拦截完成，就会发送一条Engagement Complete交战完成消息。成功的交战被报告为Effective/Target Destroyed有效/目标被摧毁，而失败的交战被报告为Not Effective无效。如果在规划执行拦截阶段之前，交战因任何原因终止，则报告Engagement Broken交战中止状态。当拦截评估时，战斗机发现目标被另一个平台击毁时，Engagement Broken交战中止也被报告。

Engagement status reports may be sent once when a new action occurs or periodically. An option is available to send periodic engagement status messages at a user-specified update rate. The periodicity of the messages is specifiable as a table of number of updates vs. update rate. This allows the user to send, for instance, two initial transmissions of the engagement status at a 6-second rate and then continue with additional transmissions at a 30-second rate. The last entry in the table is used for the remainder of the updates, regardless of the number of updates specified. The status messages begin when the platform selects a target for engagement and continue until the engagement is broken off or track is lost on the target, with the exception of a message with an engagement status of Engagement Broken. The Engagement Broken message is only sent for the number of updates specified in the first row of the table.

交战状态报告可以在新行为发生时发送一次，或者周期性发送一次。可以使用一个选项以用户指定的更新速度发送定期的交战状态消息。消息的周期性可指定为更新数与更新速率的表。例如，这允许用户以6秒的速率发送两个初始传输，然后以30秒的速率继续发送额外的传输。表中的最后一个条目用于其余的更新，而不管指定的更新次数。状态消息从平台选择交战的目标开始，并一直持续到交战被中止或目标上的跟踪丢失，但交战状态为Engagement Broken交战被中止的消息除外。Engagement Broken交战被中止消息只在表的第一行指定的更新数下发送。