

# THEATER MODIFICATIONS (Revised)

## More Expansions for B-17

### AIRCRAFT MODIFICATIONS

The B-17E version was the model first used by the 8th Air Force over Europe. At this time, the Americans were experimenting with unescorted long-range bombing missions. High losses resulted as soon as German fighter pilots discovered that the B-17E was vulnerable to a frontal attack. The B-17E is identical to the aircraft normally used in B-17 except that it lacks cheek guns and the nose gun was a originally a .30-caliber light machine gun; the drawbacks were obvious—lack of range and insufficient hitting power. If flying the 17E (e.g., August 1942 missions), institute the following changes:

1. There is no firing of cheek guns.
2. Due to lack of range, a “6” is required to hit an incoming enemy fighter on the M-1 Defense Fire Table from the nose position.
3. Due to insufficient hitting power, apply a “-1” modifier to the M-2 Table die roll for hits from the nose gun.
4. The US Army Air Corps started its bombing offensive by sending unescorted formations of B-17Es to attack Europe. To simulate this early doctrine (which was replaced only after heavy losses), do not use Table M-4 unless ordered to do so by the Random Events Table. Never use a die roll modifier of + 1.
5. Should a #9 be rolled on the B1-1 Wings Damage Table, after determining which engine is affected and rolling again, if “Superficial Damage” is rolled for, roll a second time. If “Superficial Damage” is again rolled for, then proceed no further. Otherwise, determine damage normally.
6. Should #10 be rolled on the B1-1 Wings Damage Table, roll one die to determine which fuel tank is hit: “1-2” = Superficial Damage; “3-4” = outboard tank; “5-6” = inboard tank. Damage is then determined normally.

Following the retirement of the B-17F (the model found in the game), the definitive production model rolled off the assembly lines. This was the vaunted B-17G, which was slightly heavier and slower than its predecessors but which featured a heavier armament. The B-17G started to arrive in the European Theater in September 1943. The major feature about the B-17G model to note was a chin turret under the nose of the aircraft. While the chin turret was a major improvement, other changes were also implemented. Ammunition was increased by 50% for the cheek guns and 100% for the waist guns. The tail guns were fitted with an improved sight and given a better field of fire. Modifications for use of the B-17G in combat are as follows:

1. The chin turret may attack fighters approaching from both 10:30 Level and Low, all levels of 12:00, and both 1:30 Level and Low. Enemy fighters are hit on a die roll of “5” or “6”. Chin turrets are affected by all hits that would otherwise affect the nose gun except fighters attacking from 12:00 *High* may not knock out the chin turret. Ammunition supply is the same as for the nose gun post.
2. With ammunition increased by 50%, the number of shots by the cheek guns is changed from 10 to 15.
3. With ammunition increased by 100%, the number of shots by the waist guns is changed from 20 to 40.

4. With improved sights, a “+1” modifier is applied by the tail gunner to the M-1 Defensive Fire die roll. Due to improved field of fire, this modifier (non-cumulative) is also applied to all passing shots.

### TARGET WEATHER FORECAST

Occasionally, the target designated could not be attacked, due to weather or other reasons. Hence, an alternative target was always selected for this contingency. Once you have determined your primary target, select an alternative target along the route to it as your secondary target. (See “Bombing the Secondary Target” below).

Weather forecast for the target should be rolled for on Table O-1 during the briefing before the mission rather than when entering the Designated Target Zone. (Uncertainty over the actual conditions over the target at the time of arrival is reflected in the “Actual Weather over the Target” rules below). Note that the weather forecast above applies to both Primary and Secondary targets. Also, see “Mission Recall” rule below.

### ALTERNATE FIGHTER ATTACK AND REMOVAL

To reflect greater realism concerning the weight of *Luftwaffe* opposition at different points of the war, use the three Revised B-3 Tables (in place of the normal B-3 table) for determining German fighter appearance. A “Mission Resistance Level” is rolled for at the start of the mission to determine which Revised B-3 Table (based on time period of the war) is used.

Before rolling for Mission Resistance Level (but after determining target weather forecast), roll one die for “enemy fighter weather” (i.e., to determine how weather all throughout the target region might impact German fighter resistance): “0 or less” = “BAD”, “1-4” = “POOR”, “5-6” = “GOOD.” Subtract “1” from this roll if the weather over target is forecast to be “POOR”; subtract “2” from this roll if the weather over target is forecast to be “BAD.” Note that the only purpose of this roll is to determine if there is a modifier to the roll for Mission Resistance Level

When rolling for Mission Resistance Level, apply the following modifiers (cumulative):

- +1 if the primary target for the mission is asterisked on the Mission Targets Table
- -1 if the primary target for the mission is in Italy (15<sup>th</sup> Air Force missions)
- +1 if “enemy fighter weather” is “GOOD”
- -1 if “enemy fighter weather” is “BAD”

A roll of less than “1” is treated as “1”; a roll of more than “6” is treated as “6.”

### SINGLE WAIST GUNNERS

Beginning later in the war, B-17 units often sent up their bombers with only one waist gunner. Although manpower shortages may have played a factor in this decision, the primary reason appears to be that, for the little value provided (the waist guns were inefficient in combat), it wasn’t worth the risk of adding names to the aircrew casualty lists, especially as

losses due to flak increased relative to losses due to enemy aircraft.

To simulate this rule, beginning in October 1944, a waist gunner who is killed, seriously wounded and sent home, or completes his required tour of duty is not replaced (exception: on a given mission, if both waist gunners are killed, wounded and sent home, or complete their required tour of duty, then one must be replaced). Also, new crews that begin a tour of duty in October 1944 or later will carry only one waist gunner. In either case, for subsequent missions, place only one waist gunner counter on the Crew Placement Board, either port or starboard.

A single waist gunner may switch from port to starboard guns any number of times during a mission. A waist gunner may change positions at the beginning of each turn. Also, if the intercom is functional, the waist gunner may change positions *immediately* after any roll on Table B-3 (Revised) and *immediately* after German fighters are placed for any successive attacks. If the intercom is not functional, then the waist gunner may change positions immediately before (but not after) any roll on Table B-3 (Revised). He may not change positions for a successive attack. (Note that this rule should be used anytime there is only one functional gunner in the waist compartment.)

Note that another crewmember (e.g., the radio operator) may occupy the other waist gun position per the normal crew movement rules (see 14.1).

## GROUP FORMATIONS

When the B-17 first flew in combat against targets in Europe in August 1942, a six-plane squadron formation was used for combat. When a bombardment group (two or more squadrons) were sent aloft, the group formation had a lead six-plane squadron, followed by the second squadron at a three-mile distance. The other squadrons involved were spaced four miles apart at the midpoint between lead and tail squadrons. While risk of collision was low, the squadrons were usually unable to get a concentrated bomb pattern on the target or to support each other with defensive fire.

In September 1942, a new group combat formation was instituted, based on a nine-plane line-abreast squadron organization. The group formation consisted of a high squadron, with a lead squadron offset to the left and some 500 feet lower. While more compact than the previous formation, flexibility suffered. Collision risks were higher with pilots unused to rigors of formation flying (a specialized skill) and the fire from the waist gunners was greatly restricted to reduce the risk of hitting neighboring friendly aircraft. Also, in the early missions, aircraft aborts due to mechanical failure were so common that these formations were often terribly disrupted even before reaching the French coast.

Colonel Curtis LeMay, commander of the 305<sup>th</sup> Bombardment Group (Heavy), noted the flaws in the group formations his men were using. Being new to the theater, he didn't immediately speak up, but, after flying several practice flights and some combat missions, he introduced in early 1943 what would be known as the "high-lead-low" group combat formation. While harder to fly, demanding better pilots, the new formation was much improved in two respects. The gunners were able to fire in all directions unimpeded, or to concentrate fire on a single target if the need arose. And the bombing pattern was relatively compact, enabling more substantial damage to the target.

Here are some modifications to the rules of B-17 for those who might wish to use these earlier formations to simulate the historic first missions:

1. Since group defensive fire, for the most part, will be ineffective against enemy fighters—when rolling for any fighters on Table B-3, ignore results of "16", "36", and "56" and roll again if not using the April 1943 (LeMay) formation.
2. With the August 1942 formation, bombing accuracy will not be as effective. Apply a "-1" modifier to the Table O-6 die roll.

## LEAD CREWS

Another significant problem for the 8<sup>th</sup> and 15<sup>th</sup> Air Forces in the early days of operations, one totally unforeseen, was that of target identification. In the early days of daylight bombing, each bombardier sighted for his individual aircraft through the famous Norden Bombsight. However, there was a significant difference in finding a town in America, with easy checkpoints on training runs, and finding one in wartime Europe where the close proximity of towns to each other and enemy action sometimes meant the wrong target got bombed.

LeMay devised the solution. He started a "Lead Crew" school that taught teams of bombardiers and navigators to recognize certain sets of targets from the air. If a target that a particular "lead crew" was familiar with was selected for a mission, they were placed in the lead bombers on the belief that they would most readily recognize it—and thus that the entire group would bomb it with a reasonable chance of success. And it worked, as these specialists became an elite and important facet of the American effort. LeMay's new formation meant that, instead of each plane dropping its bombs individually, all bombardiers released their bombs when they saw the bombs leave the bay of the lead aircraft. This was called "Dropping on lead's command." (Note that late in the war, the bombardier was replaced with a togglier. Where the bombardier was a commissioned officer, the toggliers were enlisted men. When a togglier was on the aircraft, it did not carry a Norden Bombsight.) Modifications for recreating the impact of lead crews, beginning with missions in April 1943\*, are:

1. Your bombardier will drop on lead's command unless your bomber is flying as *lead* bomber in the *middle* squadron *or* is bombing the target while out of formation. (If using a togglier, your bomber will never fly as lead; if formation casualties cause your bomber to take lead in the middle formation, then mission must be aborted; if out of formation, any bomb run would be automatically off-target but bombload may be jettisoned.) If "dropping on lead's command", roll normally on Table O-6 during the bomb run. However, a roll of "2" on Table P-1 (damage to the Norden bombsight) no longer has any effect on bombing accuracy.
2. Similarly, if the navigator is killed or seriously wounded, the bomb run is no longer automatically off-target when

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\* To simulate using a togglier: beginning in **June 1944**, a bombardier who is killed, seriously wounded and sent home, or completes his required tour of duty is replaced by a togglier instead, unless the aircraft is a "Pathfinder" (see new rule below) and/or carries a *veteran* navigator (ten or more missions) with a designated target system bonus. Also, roll a die for new crews that begin a tour of duty in June 1944 or later: on a result of "1-4", the crew will carry a togglier vice bombardier, and is not eligible to become a lead crew.

“dropping on lead’s command.” If the bombardier (or toggler) is killed or seriously wounded, a “-1” modifier (cumulative with any other modifiers) is applied to Table O-6, *unless* one or both of the following have occurred: (1) the navigator is also killed or seriously wounded *or* (2) the bombardier’s wound or death occurs from flak on the bomb run—in either of these latter two cases, the bomb run is automatically off-target). Otherwise, ignore notes (a) and (c) on Table O-6.

3. If “dropping on lead’s command”, apply a “-1” modifier (cumulative with any other modifiers) if the “loose formation” random event is in effect. Apply a “+1” modifier if “tight formation” random event is in effect.
4. If flying as lead bomber in the lead (middle) squadron, then apply P-1 effects normally. Note, however, that any damage, casualty or mechanical failure which would cause the bomb run to automatically be off-target means that your bomber will drop out of lead position (not out of formation)—*unless the damage or casualty is caused by flak during the bomb run* (in which case it’s too late)—and one of the deputy leads will take over (the formation had a couple of deputy leads who could take the lead if for some reason the lead bomber or bombardier was unable to do the job.)
5. If your bomber is lead and your bombardier has flown in the lead bomber position in the lead (middle) squadron against the *same* target at least twice before, you are entitled to a “+1” modifier to the O-6 Table die roll.
6. Anyone using the lead crew concept can designate the target system they wish to use the bonus (“+1” modifier to the O-6 Table die roll) against (i.e., marshalling yards, industries, dockyards) during a campaign. The bonus may be used when flying in the lead bomber position in the lead (middle) squadron (non-cumulative with the bonus in #1 above). This bonus selection may only be changed if the bombardier and/or navigator are replaced for any reason. Aircraft with a *novice* (five or fewer missions; see below) bombardier and/or navigator may not designate a target system bonus.

## CREW EXPERIENCE

Pilot experience was a major factor in formation flying. Flight schools in the US had concentrated on the basics, and did not teach the finer points of flying, leaving indoctrination to formation combat flying to the group theater schools. Subsequently, the first few missions of a new pilot were somewhat riskier in terms of possible collision. Implement the following:

1. If the bombardier and navigator have both flown six or more missions (or if flying the B-17E), the bomber will assume “Lead bomber” position on a dice roll of “2-3” (vice just “2”) on Table G-4 Formation Position.
2. Any *novice* pilot (five or fewer missions) must apply a “+1” modifier to the die roll of Event 12 of the Random Events Table.
3. Any *veteran* pilot (ten or more missions) can apply a “-1” modifier to the die roll of Event 12 of the Random Events Table.

Gunner experience was also a prime factor in air-to-air combat, when the bomber was beset by the enemy. Lack of adequate training stateside led to some gunners who simply didn’t understand the fine points of their trade, or how to use their guns effectively against enemy fighters. After a few missions (and intensive theater training), aerial gunnery

always improved remarkably for those crewmen who survived. The modifications:

1. If the tail gunner has flown six or more missions (or if flying the B-17E), the bomber will assume “Tail bomber” position on a dice roll of “11-12” (vice just “12”) on Table G-4 Formation Position.
2. Any *novice* gunner (five or fewer missions) applies a modifier of “-1” to the M-1 Defensive Fire Table die roll (an unmodified “6” is always a hit).
3. If a novice gunner rolls an unmodified “1” on his M-1 die roll, roll again. A result of “1-3” jams his gun (“4-6” is no effect). A repair die roll of “1” clears the jammed gun and a “6” permanently breaks it; any other result has no effect. Only one repair attempt is allowed per zone entered, immediately after entry into that zone.

Experience could be helpful in other ways as well. When introducing any new crewmember roll two dice. If the result is “2”, then this crewmember had some medical training before joining. He must spend at least two turns with a seriously wounded crewmember to treat him and not perform any other duties. If ditched in the water, the time awaiting the rescue ship/plane is sufficient time for the modifier to be used. For each treated crewmember, modify the recovery roll by -1.

Similarly, when introducing a new bombardier (*not* toggler) or navigator, roll one die. On a result of “1”, the crewmember is a pilot candidate washout with previous flying experience. If both pilots are incapacitated, this crewmember must take over the controls before any other crewmember, if able. Roll two dice prior to landing. Subtract one if the pilot and/or co-pilot are *not* KIA (here we’re assuming that one or the other is able to render at least some assistance, even if just moral support). Subtract an additional one from the dice roll for *each* previous successful landing the crewmember has made. The landing modifier for this crewmember is equal to the result of the dice roll (or the normal -11, whichever is lower).

Along the same lines, if the flight engineer has flown between 11 to 25 missions and he is attempting to land the plane, his modified landing modifier is -10, not the regular -11. If he has more than 25 missions, the modifier is -9. Reduce the modifier by one if the pilot and/or co-pilot are *not* KIA (again we’re assuming that one or the other is able to render at least some assistance, even if just moral support). Reduce the modifier by an additional one for *each* previous successful landing the flight engineer has made.

## TAKE-OFF

In the game, a safe take-off is always assumed. In reality, getting a heavy bomber, fully loaded with bombs and fuel, off the ground could be a dicey affair. Even after takeoff, safe formation assembly (particularly in the foggy skies of England) was a dubious prospect, too. Accordingly, at the start of a mission, roll two dice and consult the following:

“2” = Engine malfunction during take-off attempt. Roll two dice again. On a roll of “2-3”, roll on Table G-9 and subtract “10” (-10) from the roll (subtract an additional one from the roll for a *novice* pilot; add one for a *veteran* pilot). On a roll of “4-12”, follow the procedures for the “Engine Failure” event (#5) on the “Mechanical Failure” chart below to determine whether the mission may continue or must be aborted. If mission is continued, roll on the Take-Off Chart again. (If engine failure occurs again, mission is automatically and safely aborted.)

“3” = If “Weather Over Base” is “BAD”, there is a formation accident (otherwise, no event). Roll one die: on a result of “1-2”, see “Mid-air Accident” random event (#12); on a result, of “3” see “Formation Casualties” random event; on a result of “4-6”, see “Loose Formation” random event (#4).

“4” = Trouble assembling the formation. See “Loose Formation” random event (#4).

“5-9” = No Event

“10” = Trouble assembling the formation. See “Loose Formation” random event (#4)

“11” = If “Weather Over Base” is “BAD” or “POOR”, there is a formation accident (otherwise, no event). See dice roll #3 above.

“12” = Mid-air accident. See random event #12. For this roll (only), add 1 (+1) to note (g) dice roll if “Weather over Base” is “POOR,” or add 2 (+2) to note (g) dice roll if “Weather over Base” is “BAD.”

For this rule only, in the event of mid-air accident destroys the B-17, entire crew is KIA (there is not enough altitude to safely bail out).

### MISSION RECALL

After take-off, if weather over target was forecast to be “POOR” then roll two dice when entering any and all zones *prior* to the Designated Target Zone (*non-inclusive*). On a roll of “2-3”, the Group is recalled due to weather. Mission is immediately aborted. If weather over target was forecast to be “BAD”, then the mission is aborted on a roll of “2-4.” (Do not make this roll if out of formation and radio is out).

### MECHANICAL FAILURE

While the B-17 was a reliable aircraft, the English (or Mediterranean) weather often had a frustrating effect on the engines, turbo-chargers, and other systems of the aircraft. Upon reaching Zone 1, and every *turn* thereafter, roll two dice. On a roll of “12”, a mechanical failure has occurred in your plane. Roll two dice and consult the table below.

“2” = Landing Gear Failure. Manual lowering may be attempted. A functioning crewmember must spend at least one turn (performing no other duties) in the bomb bay to manually lower the landing gear on a die roll of “1-5” (one attempt only). If manual lowering cannot be performed (either because crewmember is unavailable or flak BIP has occurred in the bomb bay, thus damaging the manual crank), then apply the -3 landing modifier on Table G-9. (No additional effect if already rolled for.)

“3” = Oil Tank Failure. Roll two dice to determine engine:

“2”, “3”, or “7” = engine #1

“4”, “10”, or “11” = engine #2

“5”, “6”, or “12” = engine #3

“8” or “9” = engine #4

Aircraft must drop out of formation, and pilot may abort mission. Roll one die: “1-3” = fire, engine out, roll to extinguish (see Table B1-1); “4-6” = leak, engine feathered and plane’s speed reduced to two turns per zone, beginning immediately. (This failure may be rolled again for any operating engine; no effect for a previously failed engine.)

“4” = Turbo-Supercharger Failure. Roll two dice to determine engine as above. Aircraft cannot fly as far or as high, and must drop out of formation. Pilot may abort mission. (This failure may be rolled again for any operating engine; no additional effect if a previously failed engine is rolled for.)

“5” = Engine Malfunction. Roll two dice to determine engine as above. Then roll one die: “1-3” = engine returned to full operation; “4-5” = engine running but not at full power (may stay in formation only by jettisoning bomb load; pilot may choose to abort mission); “6” = engine out. (*Exception:* if Fuel Transfer Pump has been damaged [Table P-3] or failed [see below] *and* manual transfer has not been accomplished or failed, then engine is *automatically out* [simulated out of gas]—if manual fuel transfer is later completed successfully, a restart attempt may be made if engine is required for landing or continued flight; make the die roll above to determine if engine restarts, even if engine prop was feathered [see below—emergency unfeathering was possible]; if engine restarts after leaving formation, plane may not rejoin formation.) If engine is out, roll for feathering according to Note (c), Table B1-1. Pilot may abort mission for any engine not at full operation. (This failure may be rolled again for any operating engine; no additional effect if a previously failed engine is rolled for.)

“6” = Top Turret Power Failure. Top turret gunner cannot traverse or elevate his guns. Gunner may manually traverse and elevate on a die roll of “1-2” (one attempt only). If manual attempt successful, gunner hits on Table M-1 with a die roll of “6.” (No additional effect if already rolled for.)

“7” = Roll on Table B1-2 “Instruments” (treat as one shell hit on rolled-for area). (This failure may be rolled for any number of times.)

“8” = Ball Turret Power Failure. Ball turret gunner cannot traverse or raise/lower turret. Gunner may manually traverse and raise/lower turret on a die roll of “1” (one attempt only). If manual attempt is successful, the gunner hits on Table M-1 with a die roll of “6”. If unable to raise turret, a “-1” modifier is applied to landing roll on Table G-9 or G-10; gunner is trapped inside. Pilot may abort mission. (No additional effect if already rolled for.)

“9” = Heat Suit System Failure. Power is lost to all heat suits. May drop out of formation, or must risk frostbite for the engineer, ball turret gunner, waist gunners, and tail gunner. Pilot may abort mission. (No additional effect if already rolled for.)

“10” = Bomb Release Mechanism Failure. Bombs fail to drop during bomb run. Bombardier may manually release bombs on a die roll of “1-3” but the bomb run is automatically off-target. If unsuccessful in manual attempt, plane must leave formation and attempt to jettison (successful on die roll of “1-3”); may attempt once per zone entered. If bombs are still on-board upon reaching home base, apply a “-4” modifier to the landing roll on G-9 and pilot must remain aboard for landing attempt (remainder of crew may bail out). If bombs are still aboard in a ditching attempt, apply a “-4” modifier to the landing roll on G-10 but entire crew may bail out. (No additional effect if already rolled for.)

“11” = Fuel Transfer Pump Failure. The crew may only attempt to use the hand transfer pump to transfer fuel from one tank to another or to the engines. At the earliest opportunity, a functioning crewmember should spend one turn (performing no other duties) in the bomb bay to manually operate the pump (this must be done immediately in the event “Fuel Tank Leakage” occurs on Table B1-1). Only one manual attempt is permitted and is successful on a roll of “1-4.” If this cannot be successfully performed (either because of failed die roll, crewmember is unavailable, or flak BIP has occurred in the bomb bay thus damaging the manual controls), *and* “Fuel Tank Leakage” has occurred then roll one die to determine

remaining fuel available (beginning with the next turn): “1-2” = four turns; “3-4” = three turns; “5-6” = two turns (this supercedes the number of turns indicated as remaining on Table B1-1). Pilot may abort mission. Upon exhaustion of remaining fuel, the plane must either be landed (Table G-9 or G-10), or crew bailed out. (No additional effect if already rolled for.) Also, see “Engine Malfunction” above.

“12” = Electrical System Failure. Chin turret (if applicable) is inoperable, top turret guns are inoperable, ball turret mechanism is inoperable (gunner is trapped in turret, may not fire or bail out), autopilot is out (see Table B1-2), intercom system is out (gunners may hit on Table M-1 only with a “6”; tail gunner with “5-6”), and bomb release mechanism is out (bombs are automatically off-target). Aircraft cannot fly as far or as high, and must drop out of formation. Propeller feathering capability is degraded—crew must immediately bailout on Table G-6 (G-7 for pilot) in case of a subsequent runaway engine result from Table B1-1. In addition, see “Fuel Transfer Pump” failure above. Pilot may abort mission. Landing gear, flaps, and bomb bay doors can only be operated manually. A functioning crewmember must spend at least one turn (performing no other duties) in the bomb bay to manually lower the landing gear and secure the bomb bay doors (if necessary), one turn in the radio compartment to lower the flaps, and one turn in the tail compartment to lower the tailwheel (these activities can be performed simultaneously by different crewmembers). Only one manual lowering attempt is permitted in each case and is successful on a roll of “1-5.” If these activities cannot be successfully performed (either because of failed die roll, crewmember is unavailable, or flak BIP has occurred in the applicable section thus damaging the manual controls), then apply the appropriate modifiers on landing (-3 for landing gear, -1 for flaps, -1 for tailwheel). In addition, when landing (Table G-9 or G-10), roll one die and halve the result (round down), and subtract this number on the landing roll (cumulative with any other modifiers)—this reflects impact from possible effects of hydraulic system failure and/or icing. (Note that the radio is still considered operational, unless otherwise damaged, using an emergency gasoline-driven generator in the rear of the fuselage, *unless* a flak BIP has occurred in the waist section). If this failure is rolled for a second time, crew must immediately bail out and abandon aircraft due to other connected failures.

Also, more limited failures may occur as a result of RANDOM EVENTS:

Replace random event #7 (“Rabbit’s Foot”) to read: **“Oxygen malfunction for individual crewman (e.g., hose is perforated or blocked). Roll one die to determine the affected crewman (disregard if aircraft is ≤ 10,000 feet):**

“1” = Nose. Roll one die again: “1-3” bombardier is affected, “4-6” navigator is affected.

“2” = Pilot Compartment. Roll one die: “1” pilot is affected<sup>+</sup>, “2-3” copilot is affected, “4-6” engineer is affected.

“3” = Radio operator is affected.

“4” = Ball turret gunner is affected.

“5” = Waist Compartment. Roll one die: “1-3” port gunner is affected, “4-6” starboard gunner is affected.

“6” = Tail gunner is affected.

After determining the affected crewmember, roll another die. On a roll of “1-5”, condition is discovered in time to successfully revive and/or move him to another oxygen line. On a roll of “6”, crewman’s condition is discovered too late, he has died as a result of anoxia (KIA).

Similarly, replace random event #8 (“Tight Formation”) to read: **“Heat suit for individual crewman fails. May drop out of formation, or must risk frostbite for the affected crewmember. Pilot may abort mission. Roll one die to determine the affected crewman:**

“1” = Engineer is affected.

“2” = Ball turret gunner is affected.

“3” = Port waist gunner is affected.

“4” = Starboard waist gunner is affected.

“5” = Tail gunner is affected.

“6” = Roll again.

## CONTRAILS

At certain altitudes and conditions, the engine exhaust of a B-17’s engines became visible to the naked eye. “Contrails” (as these came to be called) tended to attract enemy fighters and helped flak crews determine the bombers’ altitude. Accordingly, upon reaching Zone 2 (only), roll one die: “1-4” = no contrails; “5-6” = contrails form. If contrails form, apply a “+1” modifier to the die rolls of Tables B-1, B-2, and O-2 for the remainder of the mission.

## NAVIGATOR

*“The navigator’s job is to direct your flight from departure to destination and return. He must know the exact position of the airplane at all times.” - Pilot Training Manual for the B-17 Flying Fortress.* If your bomber is flying as *lead* bomber in the *middle* squadron or is out of formation, upon entry into each zone, a check must be made to verify the bomber is on course. Roll one die and apply the following modifiers (cumulative):

- 2 if Navigator equipment is inoperable (from roll “10” on Table P-1) \*

- 2 if Navigator is killed or seriously wounded \* (subtract an additional one if *all* officers on the airplane are KIA/SW)

**Note: if both Navigator equipment is out and navigator is KIA/SW, cumulative modifier is -3 vice -4**

- 1 if Radio is out (from roll “4, 5” on Table P-4) \*

- 1 if Navigator is a *novice* (five or fewer missions) (disregard if KIA or SW)

+1 if Navigator is a *veteran* (ten or more missions) (disregard if KIA or SW)

- 1 if Navigator performed duties outside of the nose or pilot compartment the previous zone (disregard if KIA or SW)

- 1 if weather over current destination (target or base) is “BAD” (as rolled for on Table O-1 during the briefing before the mission, as modified for “Weather at Landing” if applicable, see below) (disregard on PFF ships—see below—if radar is operational).

+ 1 if weather over current destination (target or base) is “GOOD” (as rolled for on Table O-1 during the briefing before the mission, as modified for “Weather at Landing” if applicable, see below).

If the result is **less than 1 (“0” or less)**, plane is *off course* in that zone.

Note, that in the event any asterisked modifier above becomes applicable, your bomber will drop out of lead position if applicable (not out of formation).

Effects of being “off course” are as follows:

<sup>+</sup> If pilot is affected, immediately go to “Mid-air Accident” random event (#12)

- Subtract one (-1) to any roll on Table G-5 (Fighter Cover) for that zone (reflecting reduced chances of successful rendezvous with escort).
- If destination is designated target zone, apply a negative modifier on Table O-6 equal to the number of zones B-17 was off course on the outbound leg, cumulative with any other modifiers (e.g., if bomber was off course in zones 3 and 4 while traveling to target in zone 5, O-6 modifier would be -2). This modifier *can* be negated by “Going Around” (see below).
- If destination is base for landing, B-17 must spend two turns in Zone 2—roll twice for enemy fighter waves, no fighter cover is possible. In addition, (after rechecking for navigation in zone 2 and resolving any and all combat in that zone), roll two dice: if the result is less than or equal to the number of zones B-17 was off course on the homeward leg of the mission (i.e., beginning with first zone entered after bombing/aborting), then your B-17 is considered “lost,” see below.

Effects of being “lost” are as follows:

- If B-17 is out of formation *and* radio is out, roll one die. Subtract one (“-1”) if weather over base as determined on Table O-1 (before mission begins) was “BAD.” Add one (“+1”) from the roll above if weather over base as determined on Table O-1 (before the mission) was “GOOD.” If the result is less than the highest zone number traveled on this mission (i.e., normally the number of the designated target zone unless plane aborted), your bomber must land immediately (zone 2) or crew must bail out and abandon aircraft (you have wandered long enough and ran out of fuel). Otherwise, see next bullet.
- If condition(s) above do not apply, B-17 may move to zone 1 and roll for landing on Table G-9. However, landing die roll modifiers for weather are *doubled* (e.g., -2 for POOR weather, -4 for BAD weather); see “Weather at Landing” rule below. As always, crewmembers may voluntarily bail out (Table G-6) before attempting a dangerous landing.

## EVASIVE ACTION

Upon initial entry into the skies above Europe by the B-17, the theory was that flying straight and level on the bomb runs was simple asking for the flak guns to send you and your aircrew an invitation to joint the *Luftstalags*—or worse. So evasive action by the formation was standard tactic on the bomb run. While certainly good for morale, these was one major drawback: dropping bombs while jinking to evade flak sent the bomb-accuracy rate way down.

Once again, it was LeMay who set the new standard. He established (and enforced) the rule that evading flak on the bomb run was forbidden. On the very next mission, personally commanding his group, he flew a straight-in bomb approach. It was a practical and effective solution. While flak damage to aircraft rose, so did accuracy. For those who, playing 1942 scenarios, wish to recreate the option to evade flak common to all pilots, here are the modifications:

1. While using evasive action, you may apply a “-2” modifier to the O-2 Flak Table die roll.
2. While using evasive action, you must apply a “-3” modifier to the O-6 Bomb Accuracy Table die roll.

## FORMATION DEFENSIVE GUNNERY

Occasionally, the tight formations produced accidental hits on a B-17 by the guns of another. When rolling for enemy fighters on Table B-3, should a “16”, “26”, “36”, “46”, or “56” be rolled, roll one die and check for possible hits from friendly fire: “1-5” = no hits, “6” = hits. Should a “6” result, roll for number of hits and location using two dice and the table below:

<i>Hits by Friendly Fire:</i>	<i>Location of Hits:</i>
“2” = two hits	“2” = Nose
“3-11” = one hit	“3” = Pilot Compartment
“12” = two hits	“4” = Bomb Bay
	“5” = Radio Room
	“6” = Wing
	“7” = Waist
	“8” = Wing
	“9” = Tail
	“10” = Bomb Bay
	“11” = Pilot Compartment
	“12” = Nose

## LONG RANGE MISSIONS

For extra-long range missions, one or two fuel tanks were occasionally carried in the bomb bay. Helpful as this was, these tanks were not self-sealing. And the close proximity of aviation fuel and high explosives had many crews wondering about the benefits of fuel in the bomb bay. Should a “3”, “9” or “11” be rolled on the P-3 Bomb Bay Damage Table on the outbound leg of a mission of extreme range (**Zone 8 or beyond**) (if plane is homeward bound, then “No Effect”) roll one die: “1-3” = check bombs normally; “4-6” = bomb bay hit and roll one die. If the roll is greater than or equal to the current zone number occupied by the B-17, bomb bay tanks have been hit with fuel remaining. Roll again. A roll on this second check of “1-4” means “leakage”, a “5-6” means fire (immediate bail out of crew and loss of plane). If a leak occurs, should the tank(s) be hit again with fuel remaining before the bomb run, roll one die: “2-5” = fire and bailout; “6” = bombs explode with loss of plane and crew.

If a leak occurs without a subsequent hit, plane may be gasping for fuel on return to base. Just prior to rolling for landing (Table G-9), roll one die and halve the result (round down—round *up* if Fuel Transfer Pump has been damaged [Table P-3] or failed [see above]), and subtract this number on the landing roll (cumulative with any other modifiers). Do not apply this modifier if plane aborted before reaching designated target zone *unless* plane is “lost” (see above).

## ACTUAL WEATHER OVER TARGET

Regardless of weather forecast, bombers crews often arrived over the target to find it was obscured by cloud cover and/or smoke, forcing a “timed bomb run” with a far greater chance for error and misses. Just prior to resolving the bomb run, roll one die on the following table (note that this roll does not replace the Table O-1 roll for the target before the mission):

“0” = Clear Conditions apply. Apply a “+1” modifier on Tables O-2 and O-6 (cumulative with any other modifier).

“1-2” = Haze Conditions. No additional modifiers.

“3-4” = 50% cloud cover; apply a “-1” die roll modifier on Tables O-2 and O-6 (cumulative with any other modifier).

“5-6” = 100% cloud cover; apply a “-2” modifier on Tables O-2 and O-6 (cumulative with any other modifier). Secondary target may be attacked instead.

“7” = Storm conditions. No bomb run (or flak) allowed. Secondary target may be attacked if desired but no fighter protection is possible in secondary target zone.

**Add one (“+1”)** if weather over target as determined on Table O-1 (before mission begins) was “BAD.” **Subtract one (“-1”)** from the roll above if weather over target as determined on Table O-1 (before the mission) was “GOOD.” (*Exception:* beginning in June 1943, roll one die before applying this modifier; subtract one (“-1”) from the result if the target is asterisked on the Mission Targets Table—on a modified result of “1” or less, smoke from an earlier raid or from a deliberate German smoke screen is obscuring the target; do not apply the “GOOD” weather modifier.)

Note that the result of the Table O-1 roll for the target before the mission is *no longer used* to determine any modifier for fighter waves (Table B-2); “POOR” or “BAD” weather over the target also no longer modifies Table O-2 or O-6. (Weather at altitude was frequently clear even if the target was clouded over.)

## BOMBING THE SECONDARY

If bombing the secondary target, subtract one (“-1”) when rolling for fighter cover on Table M-4 when entering and exiting the secondary designated target zone. If the secondary target is in the *same* zone as the primary, then apply a “+1” modifier (cumulative with other modifiers) to Table B-2 both before and after the bomb run of the secondary target (in this case, use Table B-2 only once between the primary and secondary targets if a bomb run was made—and then aborted—on the primary). Do not roll again on Table O-1 for the *same* zone (but do roll again on the new weather table below). Aborting a bomb run on the secondary target *and* returning to the primary is not an option.

## GOING AROUND

If 50% cloud cover is rolled for during the bomb run on the Theater Modification weather table (above) against a target in Zone 9 or less, there is a chance that the Group leader will elect to take the formation around for another run in hopes of getting a better look at the target. Roll two dice: on a result of “2,” the leader has elected to do just that. (This decision cannot be made against targets in Zone 10 and beyond because of fuel considerations; going around is not an option in 100% cloud cover or storm conditions as the chances of better visibility appearing anytime sooner are slim). Alternatively, if your bomber is lead bomber in the lead (middle) squadron, you can make the decision to go around yourself (also, see “Navigator” rule above). This decision can only be made after resolving flak (Table O-2) for the first bomb run.

Going around means spending an extra turn in the zone (this is not an option if plane is already required to spend an extra turn in the zone). A dice roll is made to check for Mechanical Failure prior to the second bomb run (if using the chart above). A roll is not made on Table B-2 prior to the second bomb run. A new roll is made on the Theater Modification weather table—the same modification (if any) used on the first roll from Table O-1 is applied again. If target is still partially or completely obscured, going around a second time is not an option (bombing the secondary target is permissible, if available). On Table O-2 on the second bomb run, a “+1” modifier is applied for flak, cumulative with any other applicable modifiers (the flak crews on the ground are now better prepared). Following turn-around, roll two dice: on a result of “4” apply the effects of the “Loose Formation”

random event (in this case, going around has somewhat disordered the group); any other result is NO EFFECT. Also, a “+1” modifier is automatically applied in-zone on Table B-2 (the Luftwaffe has had more time to assemble a ‘reception committee’ for the run away from the target) cumulative with any other modifiers (including “Loose Formation”). Finally, a “-1” modifier is applied on fighter cover on Table M-4 (if applicable), cumulative with any other modifier. (Thus, it can be seen that the decision to go-around is not to be taken lightly. The group leader can expect to not be very popular with the other crews after getting home!)

## ADDITIONAL FLAK

Flak wasn’t just a threat over the target. Dependent on flight path, a bomber formation could be fired at from any defended location along the way. Roll two dice in any zone (except the designated target zone) over enemy land territory (including partial land) where enemy fighter waves are rolled for but do not appear (*exception:* do not roll if current zone is “Alps” per Flight Log Gazetteer for 15<sup>th</sup> Air Force missions). Apply a modifier equal to the *inverse* of the fighter wave die roll modifier on the Flight Log Gazetteer for this mission (e.g., if the Gazetteer calls for a -1 modifier in this zone, then apply a +1 modifier to this dice roll). Also, if your bomber is flying as *lead* bomber in the *middle* squadron *or* is out of formation, apply a “-1” modifier for any *novice* navigator (five or fewer missions) or a “+1” modifier for any *veteran* navigator (ten or more missions). If the modified result is less than the current zone number, then the bomber/formation encounters flak. Roll on Table O-2; apply a -1 die roll modifier *unless* contrails formed (then no modifier). Note that this procedure is in addition to the light flak automatically received if the bomber is out of formation below 10,000 feet.

Also, bomber formations could continue to be a target for flak on the run out from the target, after bombs away. Accordingly, immediately after completion of the bomb run, roll again on Table O-2, except apply a “-2” modifier (the formation has some flexibility to maneuver at this point). This modifier is cumulative with any other modifiers used on the first Table O-2 roll (going to the target).

Note: if using the “Go Around” rule above, a roll *is* made after the first (aborted) bomb run (with the “-2” modifier) prior to all rolls for the second bomb run.

## WEATHER AT LANDING

Weather over England needs to be handled more realistically. While it could be clear for takeoff, the weather there often deteriorated in a few short hours to an alarming degree. Accordingly, upon return to England (entry into Zone 1), make another die roll and apply the following: “1-4” = POOR weather for landing, “5-6” = BAD weather for landing.

## TOURS OF DUTY

The minimum of 25 missions to complete a tour of duty changed as the war situation changed. Accordingly:

- 8AF crewmen who fly any mission between **8/42-2/44** must fly **25** missions to complete their tour.
- 8AF crewmen who fly any mission between **3/44 -5/44** must fly **30** missions to complete their tour.
- 8AF crewmen who fly any mission between **6/44-5/45** must fly **35** missions to complete their tour.
- 15AF crewmen must fly **50** missions to complete their tour, up until **9/44** when the minimum is reduced to **35**.  
*Important Note:* as long as the 15AF tour of duty is 50

missions (vice 35), some missions may count as “two” missions completed vice just one. To determine if a mission counts as two, at the end of each mission, obtain a numeric value for the German “Mission Resistance Level” for that mission: Light = “1”, Medium = “2”, Heavy = “3”. Add that number to the Zone number of the target that was bombed. If the result is “8” or higher, credit may be awarded for two missions if bomber did not abort before bombing.



### PATHFINDER (PFF) SHIPS

Inclement weather and the usual cloud cover above the European continent often obscured the targets of AAF Bomb Groups, thereby limiting bombing effectiveness. The effort to compensate culminated in the development of an airborne RADAR set designated as APS15 by its developer (the Massachusetts Institute of Technology), but known to the Air Forces as H2X (and later H2S), or its more commonly used name of “Mickey.” (The name “Mickey” came from the giant mouse-like appearance of the large circular antennas of the first operational radar set.) With the introduction of H2X radar, radar-equipped B-17 “Pathfinder” (PFF-Pathfinder Force) ships could more easily pick out targets through overcast conditions than bombers relying simply on visual bombsights. From the spring of 1944 on, nearly every bombing mission was led by a “Mickey” equipped Pathfinder. (The Norden was still more accurate than radar, but the AAF preferred to have 40-50% accuracy at the primary target versus 100% accuracy at the secondary.)

On “Pathfinder” ships, the ball turret was replaced by a fiberglass radome, which housed the receiver and the rotating antenna. It could be cranked down on the mission and of course cranked back up for landing. The transmitter was on the right side of the fuselage right behind the rear bulkhead of the radio room. The radar operator sat in the radio room opposite the radio operator. Experiments with radar operations first began at Alconbury Field in the late summer of 1943. The 482nd Bomb Group was created specifically to develop Pathfinder techniques. The 482nd provided the Pathfinder lead ships to the other bomb groups from the winter of 1943 to March 1944. As the war progressed and radar equipped aircraft became more available, the Pathfinders were doled out to the individual groups and that is where they would stay.

For players who desire to simulate flying these vital “Pathfinder” ships, implement the following rules changes:

1. Only B-17Gs fly as PFF ships. A PFF ship may fly only with a *non-novice* pilot, navigator, and bombardier (i.e., each must each have more than five missions). Pathfinder ships always flies as the *lead* bomber in the *middle* squadron.
2. Use the “Lead Crew” rules above. A change is that a crew who has flown in the lead bomber position in the lead squadron against a target of the same target *system* (e.g., marshalling yards, industries, dockyards) during a campaign at least *twice* before is entitled to a “+1” modifier to the O-6 Table die roll (this modifier does not replace the modifiers given in the “Lead Crew” rules but is *non-cumulative* with them—thus, there are several different ways to earn the bonus).
3. On a PFF aircraft, there are no Ball Turret guns. The Ball Turret gunner is replaced by a Radar Operator who sits in the Radio Room with the Radio Operator (for ease of reference, you can place counters for each side by side on the Crew Placement Board).

4. Radar Bombing. If weather over target zone is POOR (or if there is 50% cloud cover over the target using the Theater Modification rules), roll one die immediately before rolling on Table O-6 (“Bomb Run”). If the result is “1-3”, then no modifier is applied to the Table O-6 roll for weather. If the result is “4-6”, then the -1 modifier to O-6 is applied normally. If weather over target zone is BAD (or if there is 100% cloud cover over the target using the Theater Modification rules) then a -1 (vice -2) modifier is applied to Table O-6 for weather.
5. Change the following dice roll entries on Table P-4 (“Radio Room”) as follows:
  - #7 = Superficial Damage
  - #8 = Radar Operator. Roll for wound on Table B1-4. If Radar Operator is KIA or seriously wounded, radar bombing is not allowed.
  - #9, 10 = Radar equipment is out. Radar bombing is not allowed.
6. Change the following dice roll entries to Table P-5 (“Waist”) as follows:
  - #9 = Radome. Roll 1D: 1-2 = Superficial damage; 3-4 = Radar equipment out, radar bombing not allowed; 5-6 = Radar equipment out, radar bombing not allowed, radome may not be raised (a “-1” modifier is applied to landing roll on Table G-9 or G-10)
7. On the Mechanical Failure chart of the Theater Modification Rules (if used), a dice roll of “8” is changed to read: “Radome Power Failure. Crew cannot raise/lower radome. Radar operator may attempt to manually raise/lower radome on a die roll of ‘1’ (one attempt only). If unable to lower radome, radar bombing is not allowed. If unable to raise radome, a ‘-1’ modifier is applied to landing roll on Table G-9 or G-10.”
8. Note that if the Bombardier is KIA or seriously wounded, or if the Norden Bombsight is knocked out (Table P-1), the bomb run would *still* be automatically off-target (see the “Lead Crew” rules) (the Mickey operator worked directly with the bombardier in feeding drop angles to the Norden bombsight optics).
9. A PFF pilot, navigator, or bombardier who is killed, seriously wounded and sent home, or completes his required tour of duty, may be immediately replaced by a *non-novice* crew member for subsequent missions.