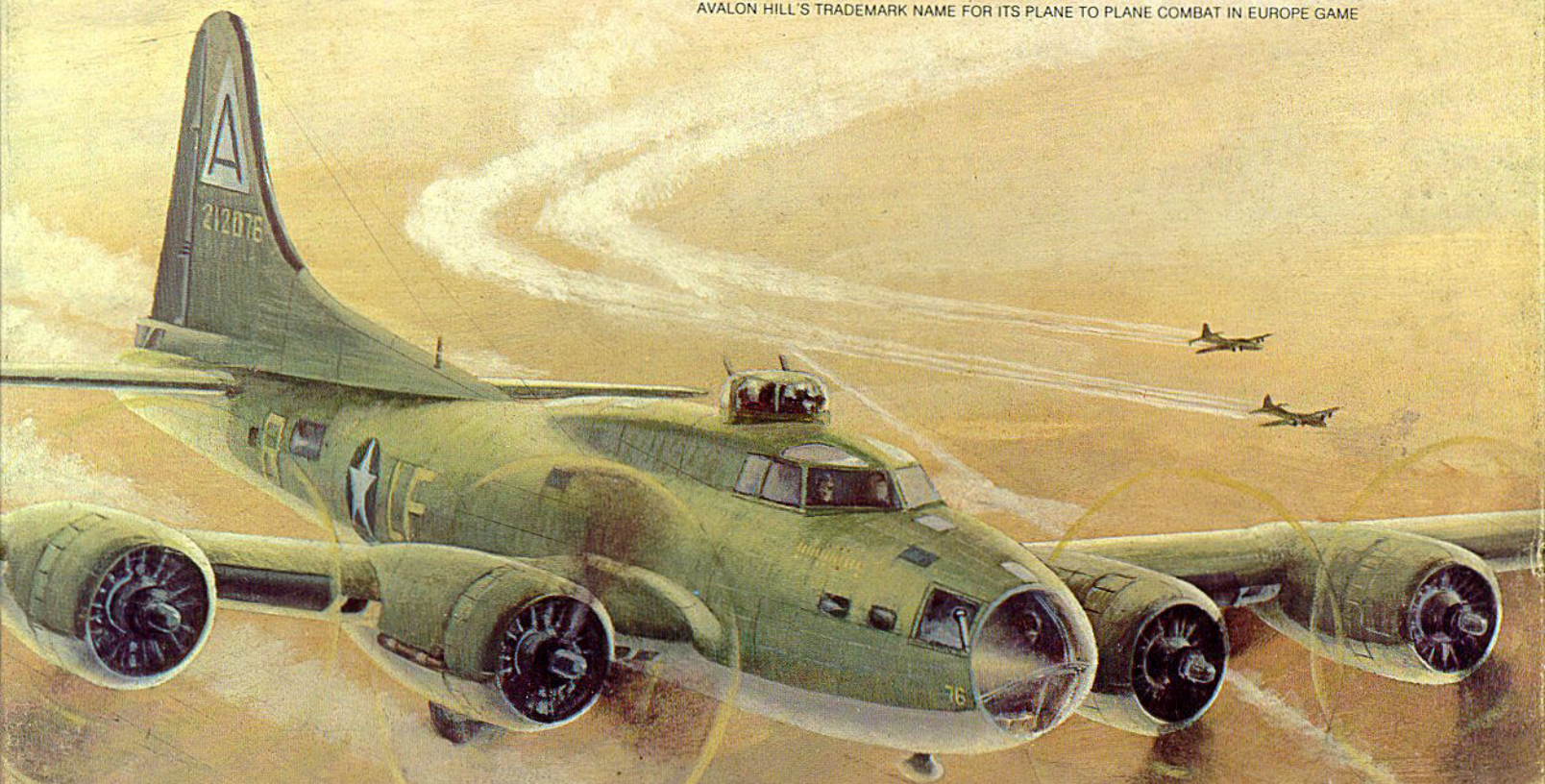


AIR



FORCE

AVALON HILL'S TRADEMARK NAME FOR ITS PLANE TO PLANE COMBAT IN EUROPE GAME



JOE DE MARCO

AIR



FORCE

THE AVALON HILL GAME COMPANY'S TRADEMARK FOR ITS PLANE TO PLANE COMBAT IN EUROPE GAME



Air Force

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Air Force

Aerial Combat over Europe: 1939-1945

INTRODUCTION

AIR FORCE is a tactical-level simulation of combat in the skies of Western Europe during World War II. A number of scenarios present the types of combat situations, into which the players may bring aircraft of their choice. The most important types of aircraft are represented, from the Air Forces of Britain, Germany and the United States. Each Player or team controls an individual aircraft or as many aircraft as determined by the player.

Each aircraft is represented by a single playing piece ("Aircraft") and its corresponding Aircraft Data Card. Each aircraft may be moved across the game map, and may simulate altitude change, according to its own characteristics. An Aircraft moves through the hexagonal grid from one "Hex" to the next, expending one "Movement Point" from its AirSpeed for each Hex entered.

Unlike many games, AIR FORCE requires Players to think in three dimensions, as their aircraft climb and dive, bank their wings, fly inverted, increase and decrease speed and perform a number of maneuvers, all of which are recorded on individual Log Sheets. Forward movement and facing are the only changes in aircraft status displayed on the game map. All movement is first written in a "Log" for each aircraft, then revealed by the Players simultaneously.

I. GAME EQUIPMENT

The following parts are included in a complete game of AIR FORCE. If any of these parts are missing or damaged, write to the address below for a replacement:

Replacement Parts: Air Force
The Avalon Hill Game Co.
4517 Harford Road
Baltimore, MD 21214

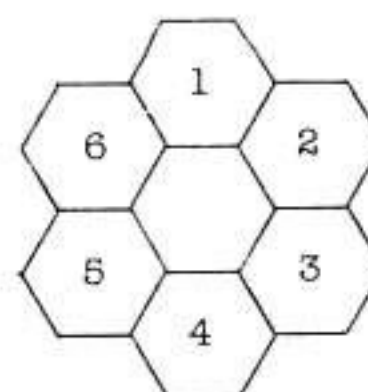
Questions concerning the rules to Air Force must be phrased to be answered in a one-word reply. Send all questions to the address above along with a stamped, self-addressed envelope. Mark inquiries "Air Force Questions."

THE GAME MAP (6 Sections)

The Game Map comes in six (8" X 11") sections which can be joined together in any configuration, and can be removed and re-joined during the course of play so that aircraft never fly off the map edge. To begin each scenario, however, the six sections should be aligned as shown in the following diagram:

II	IV	VI
I	III	V

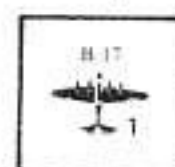
The hexagonal grid printed on the Game Map is used to determine distance of movement and range of guns, and exact location of aircraft. Each hex has a letter/number identification code, used to determine initial placement of aircraft in the scenarios. The six sides of each hexagon are numbered one through six, with respect to the "Compass" printed on each map section.



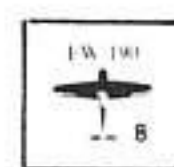
UNIT COUNTERS (255 pieces)

One sheet of die-cut counters is provided; Players must punch out the individual pieces. Each counter is color-coded for nationality: one Player will control the Blue-Gray German counters, the other will control the Lt. Green British and Dk. Green American counters. Neutral counters are printed in other colors, and may be used by either side. The only information printed on aircraft counters is aircraft type and counter i.d. number.

Sample Aircraft Counters:

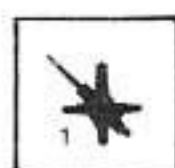


B-17

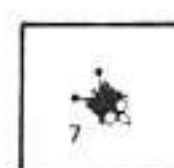


FW-190

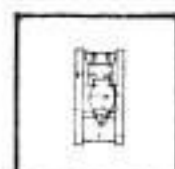
Sample Optional Counters



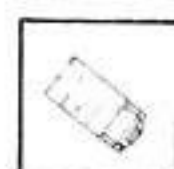
Heavy Flak



Light Flak



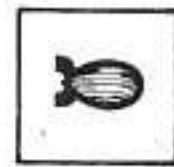
Tank



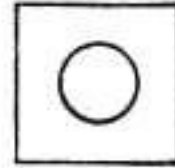
Truck



Target



Barrage Balloon



Sun



Cloud

Hill



OTHER COMPONENTS

Aircraft Data Cards (15 Cards)

All of the important information about the various aircraft, and their performance characteristics, are shown on the Aircraft Data Cards. These are divided into two sections, the Movement Characteristics Section (MC) and the Target Characteristics Section (TC). These cards are printed front and back with different aircraft on either side.

Log Sheet Pad

These sheets are used to record movement plots for the aircraft, and to record damage.

Rules Folder

This folder contains all the rules and scenario information required for play. All Charts and Tables are included at the back of this folder.

Box

Dice (2)

II. SET-UP AND PREPARATION FOR PLAY

(Two pencils with good erasers will be required.) After punching-out the counters, Players may proceed to set-up the game. First a scenario must be selected for play from the Scenario Section of this Booklet. The "V-1 Solitaire Scenario" is provided for new players to gain experience and familiarity with the game. Each Scenario will suggest which aircraft might be involved, and counters and data cards for these aircraft (or aircraft of the Players' choice) must be selected.

GAME MAP SET-UP

Then place the game map on a table (the larger the better) in the center of the table. Set-up each aircraft in the hexes listed in the scenario. Orient the facing of the aircraft to correspond to the numbered compass direction listed (if any).

Each Player needs a single Log Sheet, which must be concealed from the other Player during the Plotting Phase. At that time Players will need easy reference to all Aircraft Data Cards involved. The Combat Tables should be located where easily accessible to both players.

LOG SHEET PREPARATION

To begin, Players will transcribe information from each aircraft's Target Characteristics Chart onto the corresponding Damage Record at the top of the Log Sheet. Each Log Sheet is divided into four columns, or "Logs," and each individual aircraft has a separate Log. Movement is plotted on the numbered lines below the Damage Record. A List of Log Notations is included at the bottom of the Log Sheet.

1

2

3

4

5

6

7

8

Corresponding Aircraft Counter:

P 51

4

4 AIR FORCE

Type: P-51		No: 4	
W	0000	Cn	Mg
F	0000	L	0000
C	0000	C	0000
E	0000	E	0000
G	2-4-4-2		

TURN #

In Speed

In Altitude

In Bank

Moves

Altitude Change

This sample shows the log correctly filled-in for P51 counter no. 4 at the start of the game.

1. The type of aircraft the Log is to be used for is placed in the space labelled "Type."

2. The i.d. number of the counter is placed in the space labelled "No."

3. One open circle is drawn in for each hit the various parts of the aircraft can take, as shown on the Target Characteristics Chart. These circles will later be filled-in to denote hits as they occur.

When a hit is scored on a part of the aircraft, fill-in one of the circles for that part in the Damage Record. The letter-codes stand for the following parts of the aircraft:

W: Wing

F: Fuselage

C: Cockpit (some aircraft have two—pilot and co-pilot).

E: Engine (aircraft may have up to four).

G: Guns. This line is filled-in with numbers copied in order from the aircraft's Target Characteristics Chart. (Each number represents a gun or gun battery.)

Cn, Mg: Optional Ammunition Expenditure Record.

L: Fuel Tank Hits.

4. The Initial Speed of the aircraft at the start of the scenario is entered on line one of the Speed Column. The Initial Speed may be any speed above Stall Speed, not exceeding the maximum Dive Speed.

5. The Initial Altitude is entered on the first line of the Altitude Column. The means of determining Initial Altitude are provided in the scenario instructions.

6. Enter Initial Bank Attitude here. Aircraft may begin the scenario in any bank attitude of the owning Player's choice. The Log is now fully prepared and Players may proceed to play:

7. This is the line where the first movement notation of the game is made. All aircraft are assumed to be in a nose-level attitude (they neither climbed nor dived previous to scenario start) and to have moved a sufficient number of hexes immediately previous to the first turn so that the first maneuver may be plotted without being preceded by its Maneuverability Requirement.

8. Any change of altitude (by diving or climbing) is noted in this column.

Summary of How Aircraft Move

Aircraft move into the hex which they are facing. The Maneuverability Requirement is the minimum number of hexes in a straight line the aircraft must move before it may perform a maneuver. In general, a maneuver will cause the aircraft to change its facing and/or displace into an adjacent hex.

INTERPRETING THE AIRCRAFT DATA CARDS

The aircraft Data Cards contain all the information necessary to control the aircraft. The Tables on the Card are divided into two categories: a) the semi-circular control "screens" which concern Movement Characteristics (#1 Speed Increments Table, #2 Maneuverability Requirements Table, #3 AirSpeed Change Table, #4 Altitude Change Table) and b) the Target Characteristics (and Optional Blind Spots) Tables. There is one card for each type of aircraft, and the same card serves as reference for all aircraft of the same type in use.

Maneuver Characteristics

The four tables concerning Movement Characteristics (together referred to as the "MC") are each presented in a semi-circular, "control screen" arrangement. Altitude

levels are listed at the ends of the concentric bands, and speeds (or dive/climb limit) are listed at the outer edge of the radial columns. At the juncture of column and band will be shown a color or pattern, which is explained in the key to the table in question. The four Screens of the MC are numbered according to the sequence in which they will be used.

The movement characteristics of all aircraft vary depending upon their current altitude. That is, certain altitudes are more advantageous than others, and an aircraft has a complete set of characteristics for each altitude level. Numbers show altitude in thousands of feet (i.e., "24.9" means 24,900 feet). To determine which altitude band to use, find the aircraft's current altitude (as recorded for the current turn on the Log), and find the next listed altitude HIGHER than that figure. EXAMPLE: An Me. 109 at 32,300 feet would use the band labelled "34.9." Even if an aircraft climbs to a different Altitude Level during the turn, it continues to use the Altitude Level recorded on the Log throughout that turn.

Each Screen is divided into Altitude Levels (of 5000 or 10,000 feet each). Blank Altitude bands are ignored. An aircraft may not exceed the maximum altitude ("ceiling") shown in the outermost band labelled.

1. THE SPEED INCREMENT SCREEN.

This Screen shows the maximum speed at each Altitude Level, and divides that speed into a range of three or four increments: Stall Speed, Maneuver Speed, Level Speed, and Dive Speed. Each Speed Increment is represented by a color: Purple, Green, Yellow and Red, respectively. The Speed Increment will affect the aircraft's abilities with respect to Maneuverability Requirements and Altitude Change, and the same colors will be used to represent the Speed Increments on the Maneuverability Requirements and Altitude Changes Screens.

To determine what Speed Increment the aircraft is in, the number of Speed Factors in the current Airspeed should be found in the outer band, and cross-referenced with the current Altitude, as shown on the Log. The color shown at the intersection of any given Altitude band and Speed column indicates which Speed Increment applies. EXAMPLE: A P-47 at less than 10,000 feet, beginning its move at an Airspeed of "4" would be in its "Maneuver Speed" Increment. If its Airspeed were "8" at the same altitude it would be in "Dive Speed."

2. THE MANEUVERABILITY REQUIREMENTS SCREEN.

The outer bands of this screen are color-coded to the Speed Increments found on the Speed Increments Screen. Depending upon which Speed Increment the aircraft is in, the Player will make reference to either the outer Dive, Level, or Maneuver band. These outer bands list Maneuverability Requirement for maneuvers coded in the various radial columns. To use this screen, the Player decides which Maneuver he would like to perform and finds the corresponding pattern-code for that maneuver on the key (above right). He then traces around the band corresponding to his altitude until he hits the space in that band containing the pattern for his chosen maneuver. He then traces up the column to the outer band containing the color for his current Speed Increment. The number in this outer space is the Maneuverability Requirement for the Maneuver in question. The meaning of this number is that the aircraft must expend this number of Movement Points in uninterrupted forward flight before the maneuver may be performed.

Five Maneuvers are shown (in many cases the cost for Turn and Slip Maneuvers are identical, and are shown by a single pattern). EXAMPLE: A P-47 at maneuver speed, coming out of its previous maneuver at 10,000 feet would have to move at least three hexes before it could perform a "turn."

3. THE AIRSPEED CHANGE SCREEN.

This screen shows the maximum number of Power or Brake Factors available to the aircraft at a given altitude during a single turn. To use this screen, the Player locates the band corresponding to his aircraft's altitude and traces around the band until he comes to the rightmost space that has the symbol that he is looking for (Power or Brake Factor). He then traces up the column to the outer band, containing a number. This is the maximum number of power or Brake Factors available to that aircraft this turn.

EXAMPLE: A Hurricane II at 15,000 feet would have two power and two Brake Factors available this turn.

4. THE ALTITUDE CHANGE SCREEN.

There are three outer bands on this screen. The outermost two refer to Airspeed loss and gain, respectively. The third lists the amount of Altitude Change (positive or negative) in thousands of feet (".1" means 100 feet) for each of the radial columns.

The differently-coded areas show the permissible climb range at Maneuver Speed, the increase (if any) when at Level Speed, and the further increase in the aircraft's maximum climb when at Dive Speed (listed on the key as "Dive Speed Climb"). The colors used here correspond to those used for the same increments on the Speed Increments Table. (If Maneuver and Level Climb are the same, the green area refers to both.) Thus, to determine an aircraft's maximum climb, find its Altitude band and trace across to the highest-numbered radial column still containing the color corresponding to its Speed Increment. Example: A P-47D at 16,000 feet, Level Speed, could climb up to 600 feet in a single turn.

The black line pattern covers all dives permissible in a single turn (Maximum dive varies with altitude). Dives not containing the black line pattern exceed the aircraft's capability, and may not be plotted.

In addition, an aircraft will gain Airspeed during a Dive, and reduce Airspeed during a Climb. To determine how much the Airspeed will change, refer to one of the two outer bands, according as whether the aircraft is climbing or diving. Note the (+) or (-) number found in this band opposite the actual Altitude Change shown in the third band. The Airspeed is changed accordingly. EXAMPLE: A Dive of 300 to 500 feet will increase the Airspeed of an Me-109 by one Point. If a P-47D climbed 300 feet, it would lose one Movement Point from its Airspeed. If it dived 600 feet, it would add three Movement Points.

5. THE TARGET CHARACTERISTICS CHART. (TC)

This Chart is used to determine the maximum number of hits which the aircraft can take, and its Gunnery power. This Chart corresponds to the Damage Record on the Log Sheet.

The letters in the top section of the TC represent parts of the aircraft, as explained in the Log Sheet Preparation Section of the rules, above. The numbers next to these letters give the number of hits this part of the aircraft can sustain before the aircraft is destroyed. The numbers next to the letter "G" are the "Gun Factors" of the various guns or batteries of guns found on the aircraft. Each Gun Factor is considered discrete and

cannot be partially reduced: one gun hit takes off the entire Gun Factor of a given gun or battery. (The letters "C" and "M" following the gun factors indicate "cannon" or "machinegun"; explained in Optional Rules).

The parenthesized numbers under the gun factors give the range in hexes of the gun or gun battery above. All aircraft types employed in the Basic Game have "FF" (Fixed Forward) guns. (In Optional Rules other abbreviations tell the location of the gun or battery listed above them.)

Next to the Target Characteristics are the Basic Hit Table Modifiers. The "Silhouette Modifier" affects enemy fire at the plane—it tells how large a target the aircraft presents. The "Fire Modifier" is used when the aircraft is itself firing—it tells how good a gun platform the aircraft is, and how good its gun sights.

GENERAL AND OPTIONAL INFORMATION

The aircraft type and silhouette are shown at the top of the card. The Engine Type is used in an Optional Rule, and the Point Value ("PV") is the value gained by the enemy Player when the aircraft is shot down. (This value considers not only the combat effectiveness of an aircraft, but also its relative cost to build, in terms of scenario victory conditions. The higher the point value, the more valuable and useful, and more costly the aircraft.)

The Blind Spot Modifiers are not used in the Basic Game, but are explained in the Optional Rules.

The notes give general information about the employment of the aircraft, broken down when applicable by series. Different Gun Factors for the variant series are shown at the bottom of the card: these replace the Factors shown on the Target Characteristics Chart.

III. GENERAL COURSE OF PLAY: BASIC GAME

The Basic Game rules cover all the information needed to play the simpler scenarios of AIR FORCE. Once this section of the rules has been read, the new Player should play the Introductory Game the "V-1 Solitaire Scenario" to gain practice in the game mechanics. AIR FORCE requires practice and experience to master. The Basic Game is concerned only with fighter-to-fighter combat. The Optional Rules introduce further complexity (and realism). Only the following aircraft types are used in the Basic Game: Hurricane, Spitfire, Tempest, Me-109, FW-190, P-51, and P-47.

To begin a Game Turn, firing is computed, damage is recorded, and destroyed aircraft are removed from play. Players check the Speed, Altitude and Bank of their various aircraft (already recorded on the Log), as well as determining if previous forward movement has been accumulated to facilitate maneuvering. Comparing this with the aircraft data cards gives them a good idea of the current status of their aircraft, and what maneuvers seem advantageous. Notations are then made in the aircraft Logs, showing all movement and maneuvers, and a new Airspeed, Altitude, and Bank are entered on the next line of the Log. The aircraft are then moved exactly as written.

IV. GLOSSARY

AIR SPEED is the current "Movement Allowance" of an aircraft, quantified in terms of Movement Points. An aircraft must expend all of its initial Air Speed in moving or maneuvering each turn. Air Speed for next turn may be

increased by applying Brake Factors, Climbing, or Maneuvering.

ALTITUDE LEVEL is a discrete performance range as shown on the aircraft MCs. An aircraft's performance characteristics change from one altitude level to the next. Altitude Levels are indicated on the MC by the highest altitude which lies within that Altitude Level.

BANK ATTITUDE is an expression of the aircraft's wing's orientation relative to the ground. Maneuvers such as Roll, Loop and Bank will affect the Bank Attitude.

BRAKE FACTOR is an aircraft's ability to slow itself quantified in terms of Brake Points. The number of Brake Points in the Brake Factor varies according to altitude level, as shown on the MC.

CEILING is the maximum altitude an aircraft may reach, as shown in the highest Altitude Level on the aircraft's MC. The ceiling may never be exceeded.

GUN FACTORS are the numerals printed next to the letter "G" on the aircraft TCs and represent the weight of firepower projected by the aircraft guns. Each aircraft may have several Gun Factors, which are added together to determine Gunnery Strength. One Gunnery Hit eliminates one Gun Factor.

MANEUVERS are performed to turn the aircraft or change its Bank Attitude. There are five maneuvers, each of which must be preceded by a certain amount of forward movement, depending upon the maneuver ability Requirement. When an aircraft is to be moved across the map, its movement must conform to the Requirements and the Maneuver Graphs of the various maneuvers (see "Table of Maneuver Effects").

MANEUVERABILITY REQUIREMENT is the number of hexes of forward movement which must precede the execution of a maneuver. This requirement varies for each aircraft as shown on the MC, and depends upon the maneuver, the altitude and the Speed Increment of the aircraft.

MOVEMENT ALLOWANCE is a quantification of an aircraft's speed, quantified in terms of the number of Movement Points it may expend in a given Game-Turn—"Air-Speed" and "Movement Allowance" are synonymous.

MOVEMENT POINT is the basic unit of maneuver costs and AirSpeed. If an aircraft's AirSpeed is "four," that Aircraft has four Movement Points to expend during that turn. To move forward one hex costs one Movement Point. Each Maneuver except bank, costs one Movement Point.

POWER FACTOR is an aircraft's ability to accelerate by means of increasing throttle, quantified in terms of Power Points. The number of Power Points in the Power Factor varies according to altitude level, as shown on the MC.

SPEED INCREMENTS vary for each aircraft and altitude level. A given AirSpeed must fall within one of the four Speed Increments, as shown on the MC. The Speed Increment in which the AirSpeed is determined to lie affects the maneuverability requirement and also affects Dive Speed climbing ability of the aircraft.

SPEED POINT is the basic unit of Air Speed; reductions or increases of an Aircraft's AirSpeed are given in terms of Speed Points. Speed Points are not expended (as are Movement Points) but can only be added or subtracted via Altitude Change, Speed Change or Maneuvers (see the MC).



V. SEQUENCE OF PLAY

After all set-up and preparation is complete, play begins. The game is played in Game Turns, each of which is divided into four mutual Phases, which must be carried out in the order listed below. Each Game Turn represents approximately ten seconds of actual time, and most scenarios have a maximum length of twenty turns, or about three minutes of actual elapsed time. The Sequence of Play is as follows:

STEP 1: FIRE PHASE

All gunnery fire is resolved, and all hits marked on the Hit Record of the target aircraft, following the Fire Procedure explained in the Fire Phase section of the rules (IX).

STEP 2: ADVANTAGE DETERMINATION PHASE

Note: Skip this step, and all rules concerning "Advantage" if you are playing by mail or if more than five aircraft are in play on each side.

The Players must determine which of their aircraft have an Advantage (see "Advantage Determination"), and which are disadvantaged. Only non-disadvantaged aircraft are plotted and moved: after which, Steps 3 through 5 are repeated for all those aircraft which are Advantaged.

STEP 3: MOVEMENT PLOTTING PHASE

Players secretly write in their proposed movement on the Log Sheet. Plotting the move consists of writing the instructions for each and every aircraft on the current line of their respective logs; the instructions themselves consist of numbers (indicating distance of forward movement) and letters (indicating maneuvers), while change in altitude is indicated by the letters "C" or "D" (for Climb or Dive) followed by a decimal number indicating absolute change in hundreds of feet of altitude. These plotted moves will be executed in Step 5.

Plotting Routine

The following routine should be followed when plotting the movement of each aircraft.

1. Speed Increment

Determine the Speed Increment in which the current Airspeed falls.

2. Maneuverability Requirement

Decide which maneuver(s) the aircraft is to perform, and determine the Maneuverability Requirement(s) (in Hexes). Then plot a number of hexes of forward movement before each maneuver sufficient to fulfill the requirement of each maneuver. (Note that it may already be made up partially or fully by movement in previous game turns.)

3. Speed Change

Apply Power or Brake Factors available as desired.

4. Altitude Change

The aircraft may climb or dive within limits set by its Altitude and Speed Increment.

STEP 4: STATUS DETERMINATION PHASE

After movement is plotted, the next turn's Airspeed, Altitude and Bank for each aircraft is determined and entered on the next line of its Log. These conditions come about as a result of the maneuvers plotted in Step 3, but do not effect movement execution in this turn. Maneuvers reduce Airspeed by up to two Speed Points; Climbs and Dives change speed at varying rates; and Power and Brake Factors add or subtract one Speed Point each.

STEP 5: MOVEMENT EXECUTION PHASE

All non-disadvantaged aircraft are simultaneously moved, exactly as their movement is written in the Log; advantaged aircraft must write their movement plot to follow their disadvantaged object. If they wish, Players may exchange Log Sheets and execute each other's moves. Collisions (these are very rare) are resolved after all aircraft have been moved.

STEP 6: GAME-TURN RECORD

Players record the passage of one Game-Turn, and begin again with Step 1. Note that new aircraft status now goes into effect.

MOVEMENT

Movement in AIR FORCE is accomplished in two steps: first it is plotted, then executed. Movement of both Players aircraft is considered to be simultaneous: all moves are plotted, and then all aircraft counters are moved according to those plots. No combat of any kind occurs until after all movement is executed.

Each aircraft in play must move each turn, and must expend its entire AirSpeed. For purposes of plotting and executing movement, the AirSpeed is divided into individual Movement Points. Each hex of forward movement, and most maneuvers, cost one Movement Point (MP) each. It may expend Movement Points of its AirSpeed in forward movement, or in executing maneuvers, or in any permissible combination. Maneuvers allow the aircraft to change its facing and/or to move to the left or right. Between maneuvers, the aircraft must expend a varying number of Movement Points in Forward movement. In forward movement the aircraft may not change its facing, and may only move to the hex directly to its front (see "Facing"). An aircraft may never move to the left-, center- or right-rear hex.

Each aircraft's AirSpeed for the following turn is determined as a result of the current turn's movement plot. Certain maneuvers, climbs and dives may increase or decrease the current AirSpeed. For purposes of determining the aircraft's AirSpeed, the AirSpeed is divided into individual Speed Points. Thus, a maneuver which reduces the AirSpeed of an aircraft entails a penalty in terms of Speed Points. Movement Points are expended from the current AirSpeed—Speed Points are deducted (or added) to determine next turn's AirSpeed.

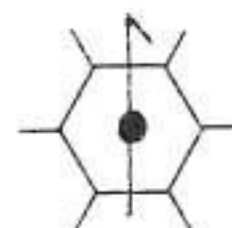
VI. MOVEMENT PLOTTING (HOW TO MOVE)

All aircraft are assumed to be moving simultaneously. The movement of each aircraft must be secretly plotted on its Log before any aircraft are actually moved. (To facilitate changes, Players should use pencil to mark the Log Sheets.) All movement proceeds strictly from the instructions plotted on the Log Sheets, which in turn are constrained by the Conditions of Speed Factor, Altitude and Bank, recorded for each aircraft in the previous turn during the Status Determination Phase. After plotting, check over the plotted moves to ensure that they are correct and represent legal moves.

Generally, aircraft may move from hex to hex, and may move from one altitude level to another. However, there are restrictions on how they may go about this. An aircraft may only move into the hex it is facing (unless it is making the appropriate maneuver). To move from one hex to another requires simply the specification of the number of forward hexes the aircraft will take, and each such hex consumes one Movement Point. To change facing requires the plotting of a maneuver.

FACING

The front of a counter is defined as being the edge to which the aircraft symbol points. All aircraft must be moved with the front of the counter facing towards the direction of movement. Counters must at all times be facing towards a definite adjacent hex. They must not face toward the angle. Be very careful with the placement of counters, to insure that no chance of ambiguity exists.



Correct
Facing a hexside



Incorrect
Facing between 2 hexes.

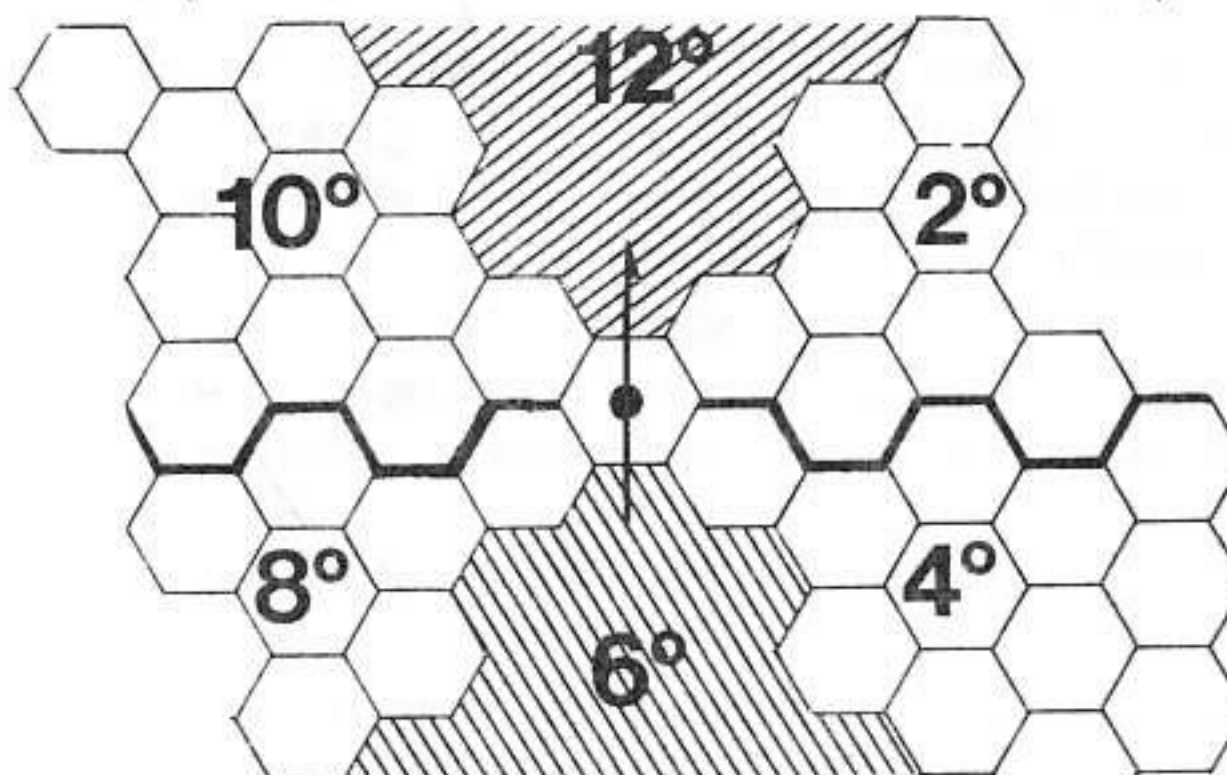
ADVANTAGE DETERMINATION

(This rule should not be used in by-mail play or in games with more than five aircraft per side in play.)

Advantage is a term which refers to an aircraft's ability to respond to the maneuvering of aircraft in its 12 O'Clock Arc, and to make its own maneuvers in response. To represent this Advantage, disadvantaged aircraft are forced to plot and move before advantaged ones.

Clock Reference

Each aircraft is said to have six "Arcs," each composing a sixty-degree field of hexes in one direction from the aircraft, the six arcs together comprising 360 degrees around the aircraft. Illustration of the six arcs is shown below. (The Notation "°" stands for "O'Clock.")



During the Advantage Determination Phase both Players must examine each of their aircraft, and determine which are Advantaged and which are Disadvantaged.

Which Aircraft are Advantaged

An aircraft is Advantaged if: it has an enemy aircraft in its 12 O'Clock Arc, and that aircraft is within six hexes of and no more than 2500 feet of altitude above the friendly aircraft (it may be below). Only one enemy aircraft may be specified as Disadvantaged for each advantaged aircraft. An Advantaged aircraft which is disadvantaged by a third aircraft is not considered advantaged. If two air-

craft have an advantage over each other, neither is considered advantaged.

Which Aircraft are Disadvantaged

A Disadvantaged friendly aircraft is one which: is in the forward arc of an enemy aircraft, and no more than 2500 feet above the enemy aircraft. The Disadvantaged aircraft may not be considered advantaged over some other enemy aircraft. Only one friendly aircraft may be considered disadvantaged by a single enemy aircraft.

How Order of Movement is Determined

First, only those aircraft which are currently specified to be disadvantaged are moved. Therefore, all those aircraft which are judged Advantaged are allowed to wait until the disadvantaged aircraft have been plotted and moved. Then each Advantaged aircraft must attempt to "follow" the same enemy aircraft specified as being at its disadvantage as closely as possible through the same path of hexes, filling-in this move in its plot. This "following" does not restrict altitude changes, Power or Brake applications. Note that advantaged aircraft need not specify disadvantage; this is a Player option.

Friendly Aircraft

An aircraft with only friendly aircraft in its 12 O'Clock Arc is not considered Advantaged. Aircraft are considered Friendly to each other if they are both controlled by the same Player or side.

AIR SPEED

The current speed of an aircraft is called its AirSpeed, which for purposes of Speed Determination consists of a number of Speed Points. The Speed Point is the basic unit of measure and represents a speed of about 50 miles per hour. The AirSpeed of an aircraft is subject to the addition or subtraction of Speed Points as a result of certain maneuvers, or the application of power or Brake Factors. (Such changes take effect in the turn following the action.)

For purposes of movement, the AirSpeed is divided into Movement Points. A number of Movement Points equal in number to the aircraft's Speed Factor—whatever it may currently be—is always expended each turn by moving, maneuvering, or any combination thereof. Movement Points are expended at the rate of one Point per hex of movement, and for turns, slips, half-loops and half-rolls at a cost of one Movement Point each.

EXAMPLE: To execute a Slip costs one Movement Point of the current AirSpeed but reduces the aircraft's AirSpeed by two Speed Points next turn.

SPEED INCREMENTS

There are four Speed Increments: Stall Speed, Maneuver Speed, Level Speed and Dive Speed. The Speed Increments Screen of each Aircraft has four colors corresponding to these Speed Increments. In the outer band are numbers which indicate (at each given altitude) the range of speeds which fall within each increment. The aircraft's AirSpeed (its current Speed, shown in the Log) is located on the outer band, and its maneuverability is affected by the restrictions for the Speed Increment which falls in the space corresponding to its AirSpeed and Altitude Level.

Stall Speed

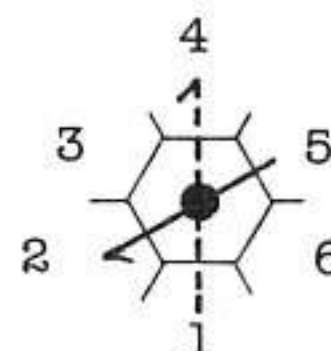
This is the lowest Speed Increment shown on the MC, representing a speed too low to keep the aircraft airborne. Aircraft moving at stall Speed will automatically go into a Spin. (In a Spin they can perform no maneuvers.)

Spin Procedure: Do not plot movement for the aircraft in question. Instead, the word "Spin" should be written on the Log Sheet. The aircraft automatically moves forward its full Airspeed (if zero it remains in place). Then roll the die: the aircraft is then turned so that it is facing in the same direction as the die roll number, as determined by the directional key printed on the mapboard. At the same time, the aircraft automatically dives at its maximum allowable rate. Note that the turns executed count as speed losses as normal turns do. (Don't worry. The Speed gained by this dive will eventually end the spin.)

EXAMPLE:

die roll: 2

facing change:



Maneuver Speed

This is generally the optimal Speed Increment (allowing maximum maneuverability), though usually restricted to a narrow range and the lower altitudes.

Level Speed

This is the highest Speed Increment at which Power Factors may be applied. (An aircraft may add Power Factors to accelerate into Dive Speed, and need not conform to Dive Speed Restrictions until the next turn.)

Dive Speed

Power may not be applied to aircraft while in the Dive Speed Increment. Aircraft at Dive Speed must conform to one or the other of the following conditions, at the owning Player's choice:

1. DIVE during the current game turn, through enough altitude to add at least one Speed Point to its next turn's AirSpeed. (Note that by expending Brake Points at the same time, or executing speed-reducing Maneuvers, the aircraft's AirSpeed next turn need not actually be higher than the current AirSpeed. The intent of the rule is simply to force Players to expend the extra Points if they wish to counteract the acceleration of the dive.)

2. SUBTRACT enough Speed Points during the turn (by braking, climbing, or maneuvering) to drop into one of the slower Speed Increments.

SPEED CHANGE

The AirSpeed of an individual aircraft can vary between zero and its maximum Dive Speed. Power and Brake Points can be used to change the AirSpeed for the following turn: they do **not** count as Movement Points expended against the current Airspeed. Diving, Climbing and certain maneuvers also affect the Airspeed of an aircraft, but again, all of these changes to the Airspeed will take effect only at the start of the following turn. The number of Movement Points in the aircraft's Airspeed in a given turn cannot be changed during that turn; the aircraft must expend all of its current Airspeed in that turn.

All Airspeed changes are cumulative. For example, an aircraft which performed speed-increasing maneuvers worth two Speed Points and then applied three Brake Points, would have its next turn's Airspeed reduced by one Speed Point from its current Speed.

Power and Brake Points may not be accumulated from turn to turn. The maximum number of Factors which may be expended in a single turn is shown on the Airspeed Change Screen, and is available for use on every turn.

Power Factor

Each aircraft has a Power Factor which consists of a number of Power Points specified on the MC. They can be used to compensate for Speed Points lost in a Climb or maneuver, or to increase Airspeed for next Game-Turn. An aircraft may expend any or all of its Power Points in a given turn, or it may expend none at all. Power Points may not be expended by aircraft whose Current Speed is in the Dive Speed Increment. Each Power Point expended adds one Speed Point to the aircraft's Airspeed in the next turn.

Brake Factor

Like the Power Factor, the Brake Factor consists of Points which may be expended at the Player's discretion. Brake Points may be applied at any Speed Increment. They can be used to compensate for Speed Points gained through diving, or to decrease Airspeed for the following Game-Turn. Each Brake Point expended reduces the aircraft's Airspeed next turn by one Speed Point.

ALTITUDE CHANGE

It is possible for two or more aircraft to occupy the same hex, yet still be far apart due to differences in altitude. Altitude Status and Changes are recorded in increments of 100 feet (written "0.1" or ".1"). Thousands of feet are written in whole numbers, and hundreds of feet are written in the first decimal place; thus 3500 feet would be written "3.5." Altitude Levels, shown on the aircraft MCs, are mostly 5000 feet deep, and affect aircraft performance. For every Altitude Level the MC shows a different set of performance characteristics.

Each aircraft type has certain abilities in climbing (adding altitude) and diving (losing altitude). Note that Altitude changes do not require the expenditure of Movement Points. Rather, altitude changes are restricted by the aircraft MCs which show, for each altitude level and speed increment, the maximum altitude change of which the aircraft is capable, and how many Speed Points are lost or gained. The maximum altitude shown on the aircraft MC is the altitude ceiling for that aircraft.

Change in altitude, if any, must be all in the same direction in a given turn; an aircraft may never climb and dive during the same turn.

Climb Rate

The colored areas in the body of the screen tell the maximum amount of altitude an aircraft can climb during one turn, at each altitude level and speed increment. For example, if the radial column labelled ".6" contains the color for the aircraft's current Speed Increment (or a lesser increment), that aircraft can climb 600 feet during one turn; the number ".033" indicates that the aircraft can climb 100 feet every three turns (i.e., you may only plot "C1" in such instances once every three turns). "Dive Speed Climb" is a climb performed when the aircraft is at Dive Speed. NOTE: P47D has "Level Speed Climb" shown by yellow area on Altitude Change Screen.

The Speed Modifier in the outer band of the Altitude Change Screen tells how much speed will be lost when the aircraft climbs. An aircraft loses a number of Speed Points from its AirSpeed equivalent to the Speed Modifier shown in the outer band opposite to the extent of the

climb. For example, "-1" at the outer edge of the radial column corresponding to the climb means that the aircraft will lose one Speed Point from its AirSpeed. No Speed Point loss occurs if "-0" is shown.

REMINDER: any Speed Point losses will apply to the new Initial Speed for the next turn; they will have no effect on the AirSpeed of the aircraft during the turn being plotted.

Note that for each Power Point expended during the Climb, one Speed Point lost due to the climb will be overcome.

Dive Rate

The Speed Modifier in the second band tells how much Speed will be GAINED when the aircraft dives. The Maximum Dive for the aircraft (regardless of its Speed Increment) is shown with a pattern of diagonal lines over the face of the screen. Diving is possible wherever the Dive pattern shows. The maximum dive allowable in one turn, at any given altitude, is the last space at that altitude containing the Dive pattern.

Note that for each Brake Point expended during a Dive, one Speed Point of increase can be negated.

FORWARD MOVEMENT

Each aircraft is required to expend a number of Movement Points in forward movement between maneuvers. This amount is variable, depending upon the altitude and the particular maneuver in question, and depending upon whether the aircraft is at maneuver, level, or dive speed. EXAMPLE: If an Me-109E is to make a turn at 35,000 feet, and its AirSpeed is in the Level Speed increment, it must first move five hexes in consecutive forward movement. This forward movement may be expended in two different Game-Turns, but it must be consecutive, without any other maneuvers intervening.

Each turn, an aircraft must expend a number of Movement Points equal to its current AirSpeed. MPs may be expended either in forward movement, at the rate of one MP per hex, or in maneuvering. Note that banking, diving or climbing does not consume Movement Points.

MANEUVERS

To perform any maneuver, a plane must enter first a number of hexes shown on the Maneuverability Requirements Screen. This number is shown in the outer band corresponding to its Speed Increment, in the same radial column as the pattern for the Maneuver type at the appropriate Altitude Level. (This number is known as the Maneuverability Requirement.)

All maneuvers are plotted on the Log with a single letter code, which will always be preceded by a movement plot (or consecutive movement plots) at least equivalent to the Maneuverability Requirement. The entire Maneuverability Requirement must be plotted subsequent to the last maneuver (excess preceding THAT maneuver may not be carried over). Hexes moved during a previous Turn or Turns MAY be carried over to fulfill Maneuverability Requirements on later turns, if there is no intervening maneuver.

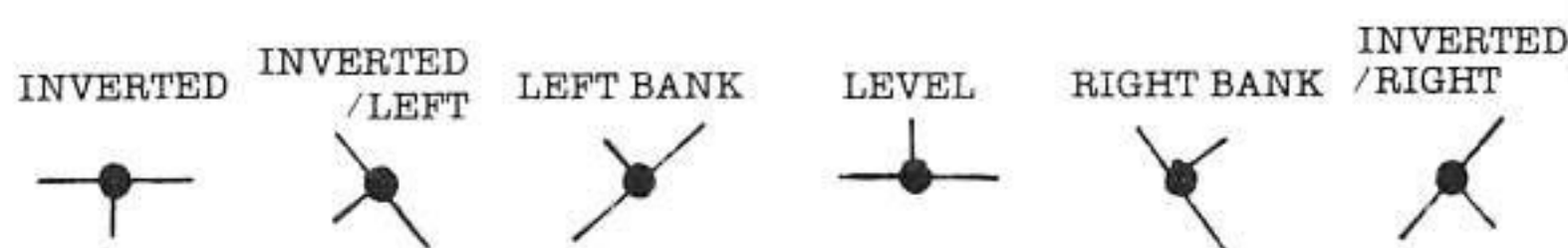
PLAYERS NOTE: When plotting the move, it may be helpful to plot first the maneuvers you wish to perform in the desired order, leaving space for the plotting of forward movement between each maneuver code.

Effects of Speed

Whether an aircraft has an AirSpeed in the Maneuver Speed or Level Speed or Dive Speed Increments, it must find its maneuverability Requirement in the corresponding band in the screen.

Bank Maneuver—Costs Zero MPs. Does not reduce AirSpeed.

There are six bank attitudes: Level, Right Bank, Left Bank, Inverted, Inverted/Right, and Inverted/Left. These tell which of the plane's wings is dipped, and whether the aircraft is level or inverted. Viewed from the rear, a plane would appear as shown in the following diagram in the various banks:



An aircraft which performs a bank maneuver does so relative to its current Bank Status: A Right Bank maneuver would move it one to the right in the above diagram, (i.e., from Left Bank to Level or from Inverted/Right to Inverted); a Left Bank would move it one to the left. The difference between bank **attitude** and a bank **maneuver** must be recalled.

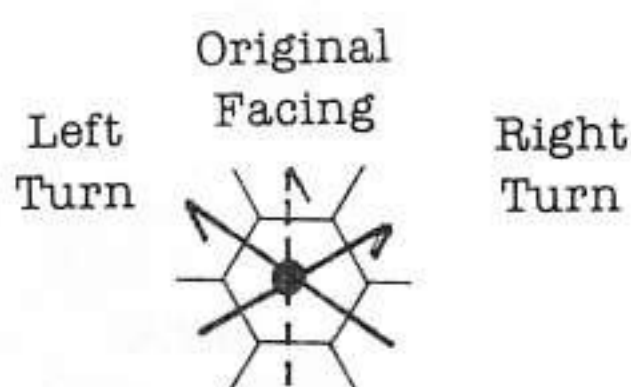
Altitude Loss at Non-Level Bank

An aircraft which ends the Game-Turn in a non-Level Bank attitude must lose 100 feet of altitude unless it performed a non-banking maneuver during that Game-Turn. This altitude loss is determined during the Status Determination Phase following the plot of the non-maneuvering banked aircraft, and affects its next turn's altitude.

Turn Maneuver—Costs One MP. Reduces Speed Factor by One.

An aircraft may make either a right or left turn. However, the aircraft must be in a BANK ATTITUDE corresponding to the direction of its turn (to turn right an aircraft must be in a right bank or inverted/right attitude). Aircraft in Level or Inverted Attitudes cannot perform a turn maneuver.

An aircraft which turns will change its FACING 60° in the direction of the turn.



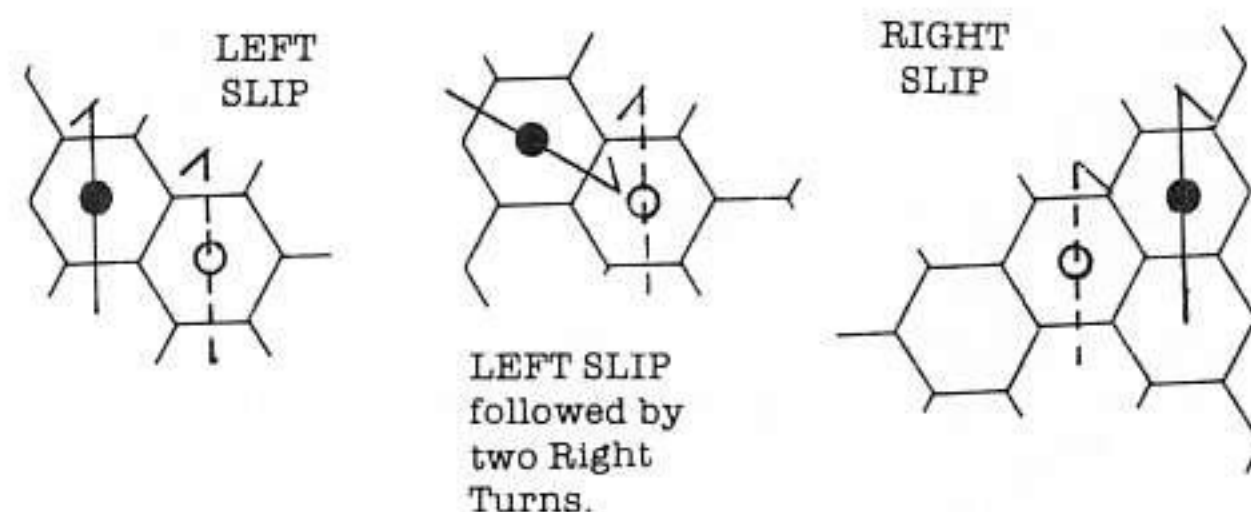
To execute the turn maneuver, shift the front of the counter to face the adjacent hexside as shown in the diagram. (dotted line shows facing before turn.)

Slip Maneuver—Costs One MP. Reduces Speed Factor by Two.

An aircraft may make either a right or left slip. Unlike turns, the aircraft must be in a BANK ATTITUDE OPPOSITE to the direction of its slip (to make a right slip an aircraft must be in a left bank or inverted/left attitude). Aircraft in Level or Inverted Attitudes cannot perform a slip maneuver.

The facing of an aircraft DOES NOT CHANGE, even though in maneuvering the aircraft does move one hex to the side. Note that one or two Turn maneuvers may immediately follow a Slip Maneuver; the ordinary Turn Maneuverability Requirement is considered fulfilled by the Slip Code. These turns must, however, be made in the direction of the aircraft's bank attitude, as usual. (An

aircraft that made a Left Slip could immediately turn right.) If any turn maneuvers are performed at the end of the slip, each turn would cost one MP and reduce the AirSpeed by one as usual; like ordinary turns, the aircraft remains in the hex occupied at the end of the slip (it turns in place).

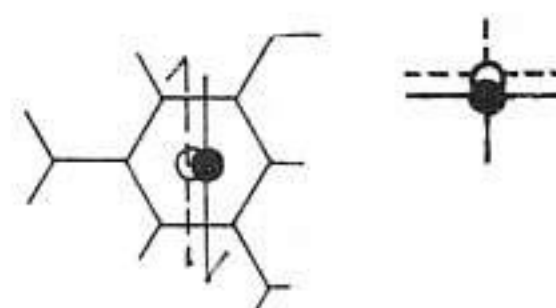


Half-Loop Maneuver—Costs One MP. Reduces Airspeed by Two.

An aircraft may perform a Half-Loop only while climbing or diving its maximum, in any bank attitude. A Half Loop changes the aircraft facing 180°, and changes its bank attitude to the opposite attitude (that is, in the diagram shown under Bank Maneuver, it changes to the attitude three to the right or left of its original attitude). Example: A Plane in a Right Bank Attitude would change to an Inverted/Left Attitude.

Note that if the Maneuverability Requirement is fulfilled over two or more Game-Turns, the aircraft could not climb during one and dive during another of those Game-Turns. The aircraft would have to either dive its maximum during all those turns, or climb its maximum allowable rate throughout them.

An aircraft does not displace during a Half-Loop. The maneuver is completed within the hex in which it began.



Note: This conceptualization is expressed relative to the game board, not the pilot's seat.

Half-Roll Maneuver—Costs One MP, Reduces Airspeed by One.

An aircraft may perform either a right or left half-roll, in any bank attitude. Aircraft FACING is NOT altered, and the aircraft moves one hex to the side (the diagram would look just like a Slip). The bank ATTITUDE of the aircraft is changed to its opposite. That is, in the diagram shown under Bank Maneuver, it changes to the attitude three to the right or left of its original attitude. For example, an aircraft in a Right Bank Attitude would change to an Inverted/Left Attitude.

LOG NOTATION CODES

The Log Sheet is used by each Player for marking the movement and maneuvers of the aircraft under his control. A system of Letter Codes is used in making entries in the Logs of each aircraft. All Players must learn and use this system, so that any other Player examining a Log can understand the entries.

Notations in the "Moves" Section

Under this section of each Log are written the proposed movement and maneuver codes. The notations used in this section are as follows:

- (Nr.) = Movement: The number of hexes the aircraft will fly in a straight line without performing any maneuver.
- B = Right Bank: Indicates the current bank attitude of the aircraft will be changed one to the right.
- N = Left Bank: bank attitude changes one to the left.
- R = Right Turn: Indicates that the aircraft is changing its facing to the right.
- L = Left Turn: Facing changes to the left; aircraft remains in hex.
- S = Right Slip. Note that a combination of notation is used to denote slipping and turning. (Example: "SLL" = Right Slip followed immediately by two Left Turns.)
- T = Left Slip.
- V = Half-Loop.
- H = Right Half-Roll
- E = Left Half-Roll
- SPIN = Spin. Indicates that the plane's airspeed begins the turn at Stall Speed; aircraft will Spin during the turn.
- P = Power. Indicates that one Power Factor is being applied.
- K = Brake. Indicates application of one Brake Factor. Multiple Power or Brake Factors are indicated by a series of "P" or "K" codes.

Notations in the "Altitude Change" Section

Under this section of each Log is written the proposed change in altitude for the aircraft. The letter codes are followed by a decimal number indicating the change in hundreds of feet. For example, the notation "D1.2" indicates a dive of 1200 feet.

D = Dive. Indicates a loss of altitude.

C = Climb. Indicates a gain in altitude.

Notations in the "Initial Speed," "Altitude," and "Bank" Sections

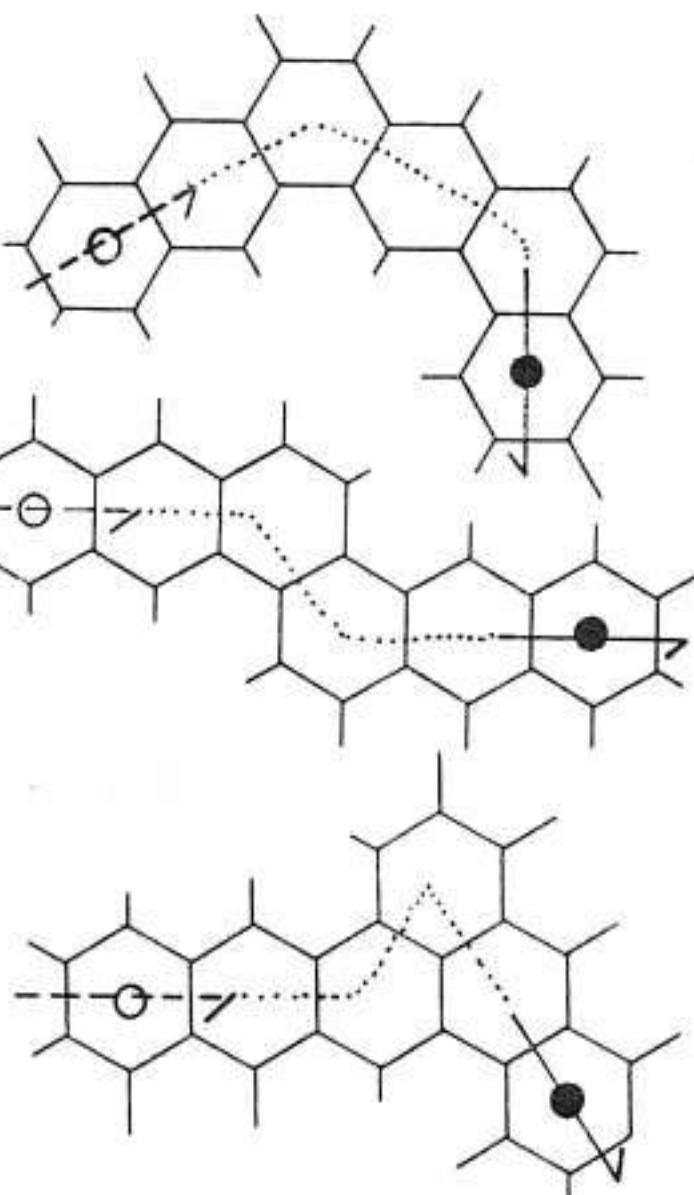
In this section of each Log is written the aircraft's Initial Speed, altitude, and bank, as determined by its previous move. Speed is the aircraft's Airspeed, represented by a whole number. For example, the notation "6" indicates an Airspeed of six Movement Points. Altitude is a decimal number—"22.3" means the aircraft is at an altitude of 22,300 feet. Bank is a one or two letter code using one of the six bank notations shown on the Log Sheet.

Sample Log Notations

| 2R2R1P | D.3 |
Move two hexes; right turn;
move two hexes; right turn;
move one hex; apply one
power factor; dive 300 feet.

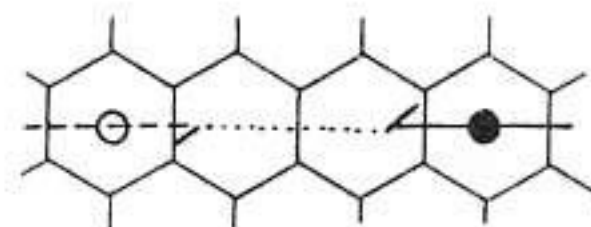
| 2S2K | C.1 |
Move two hexes; right slip;
move two hexes; apply one
brake factor; climb 100 feet.

| 2TR2P | D1.1 |
Move two hexes; left slip
with one right turn; move
two hexes; apply one power
factor; dive 1100 feet.



| R2H2 | - |
Right turn; move two hexes;
right half-roll; move two
hexes.

| 3VPP | D.8 |
Move three hexes; half-
loop; apply two power fac-
tors; dive 800 feet.



ENDLESS GAME MAP

Except for map sections where surface terrain is present, it is possible for Players to avoid flying off the edge of the Game Map by taking an unused Map Section and aligning it up against the edge in question. In this way, a practically "endless" Game Map effect is created.

VII. STATUS DETERMINATION PHASE

After the projected movement of aircraft is plotted, it is time to calculate the effect of these moves on next turn's Air Speed, Altitude and Bank. These are always written in on the line under the movement just plotted, and apply to the aircraft during the following turn's combat and movement.

DETERMINATION OF NEXT TURN'S AIRSPEED

This is computed by subtracting all reductions in Air Speed and adding all increases in Air Speed (accrued as a result of the plotted movement) to the previous (current) recorded Airspeed. For example, an aircraft whose Airspeed is six before commencing movement and which gains three Speed Points for a dive of 900 to 1100 feet has a plotted move of "2TR2P" and a plotted Altitude Change of "D1.1." Speed Points subtracted are two (for the Slip "T"), and one (for the turn "R"). Speed Points added are one (for the Power Point "P") and three (for the dive "D1.1."). The next turn's Airspeed is therefore seven (6 - 3 + 4).

DETERMINATION OF NEXT TURN'S ALTITUDE

This is computed by subtracting all altitude lost through diving, or adding all altitude gained by climbing, to the previous recorded Altitude figure. For example, an aircraft whose Altitude is 6300 feet before moving (written "6.3"), which climbs 400 feet (C.4) during that move, would have an Altitude on the next turn of 6700 feet (written 6.7).

DETERMINATION OF NEXT TURN'S BANK

This is determined by counting up the number of bank maneuvers ("B" and "N" Codes) and all Half-Roll or Loop maneuvers ("H," "E," and "V" Codes), and modifying the existing bank attitude as explained under "Maneuvers—Bank Maneuver." To record the Bank attitude for the next turn, use one of the following six Notation Codes.

Notations in the Bank Section of the Log

L	= Level	I	= Inverted
LB	= Left Bank	IL	= Inverted/Left Bank
RB	= Right Bank	IR	= Inverted/Right Bank

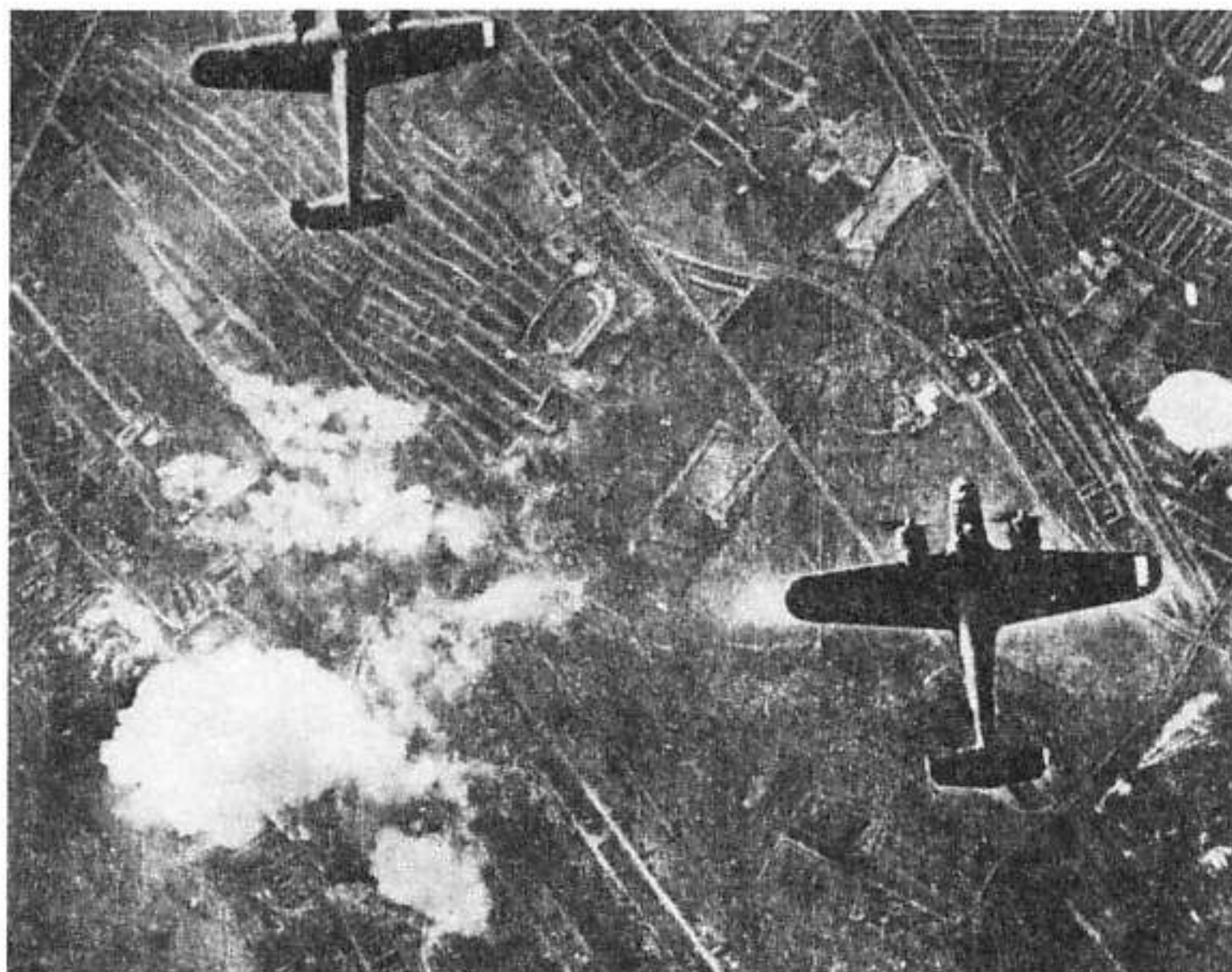
EXAMPLE: An aircraft that began its movement with a Left Bank Attitude and performed a right bank maneuver (Code "B") during that turn would have an attitude of Level for the next turn. An aircraft that began its movement with an attitude of "LB" and performed a Half-Loop maneuver would have an attitude of "IR" for the next turn.

VIII. MOVEMENT EXECUTION PHASE

The aircraft are now actually moved according to their plots through the hexgrid, and any facing changes as a result of maneuvers are made. Before movement execution begins, Players may exchange Log Sheets or place them in full view of both Players. Aircraft counters must be moved through the hexgrid exactly as written in their Logs. All movement is considered to be simultaneous.

ILLEGAL MOVES

From time to time Players will discover aircraft whose Log notations are incorrectly marked or contain maneuvers whose maneuverability requirements have not been fulfilled. Such impossible maneuvers are not allowed to stand; they must be corrected immediately. Log notations should be changed in accordance with the correction chosen from the following, which lists the incorrect move and the remedy which must be applied.



Illegal Move	Remedy
Exceeding recorded Airspeed	Erase the excess portion of the plot starting with the first excessive Movement Point.
Exceeding Climb or Dive Rate	Change the Altitude Change and next turn's Altitude to conform to the maximum rate.
Maneuverability Requirement not fulfilled	Erase the illegal maneuver code and plot the aircraft to expend all remaining MPs in straight-line movement (no further maneuvers).
Exceeding Power or Brake factor	Erase the excess "P" or "K" codes, and alter next turn's Airspeed accordingly.
Error in Airspeed Computation	Alter the Airspeed entry accordingly.
Exceeding Maximum Dive Speed	Aircraft is presumed to break up, and is removed from play.
Attitude (or other require- ment) unfulfilled	Erase the illegal maneuver code and plot the aircraft to expend all remaining MPs in straight line movement (no further maneuvers).
MPs remain unexpended	Add these on at the end of the existing plot as straight-line movement (no further maneuvers).
Exceeding Damage Characteristics	If current speed exceeds maximum lowered due to wing hits, or if maneuver plotted is illegal because of cockpit hits, aircraft is destroyed.
Mid-air Collision	Two aircraft which end their move in the same hex at the same altitude are destroyed.

COMBAT

IX. FIRE PHASE

During the Fire Phase, aircraft fire their guns at enemy aircraft, and damage resulting from this fire is assessed and marked. During the Fire Phase both players may fire the guns of each aircraft under their control. Firing is considered simultaneous—fire damage does not take effect until after the end of the Fire Phase. Thus all aircraft fire, even if fire from another aircraft destroys that aircraft in the same phase.

FIRE DETERMINATION

All firing is conducted from the positions which the aircraft occupy at the beginning of the turn. All fire is considered to be simultaneous; therefore it can be conducted in any convenient order. Ignore the effects of hits until all firing is completed.

Target Selection

Guns must be fired at the nearest enemy aircraft within the Arc of the firing aircraft's guns. If more than one enemy aircraft is at the same range, the firing player chooses between them. Friendly aircraft between the firing and target aircraft do not block the line of fire in any way.

Individual Fire

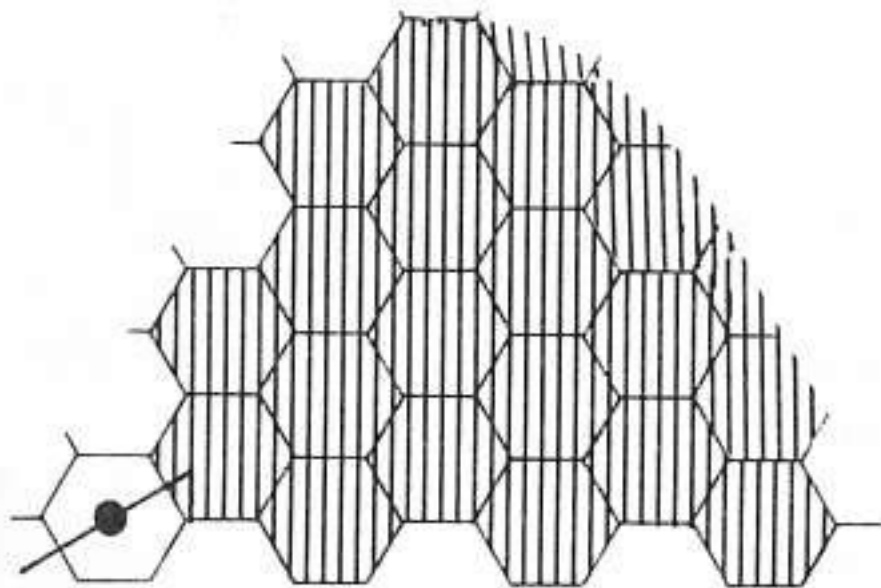
All aircraft fire individually; the firepower of several aircraft cannot be added together in one combined shot. Two or more aircraft may, however, fire separately at the same target. A single aircraft can fire only once per turn, at only one single target aircraft.

Fire Arc of Guns

All aircraft types used in the Basic Game have Fixed Forward ("FF") armament. These guns can only be fired at enemy aircraft within their Fire Arc. The Arc of FF guns is 60°, as shown in the diagram.

Fire Arc of Fixed Forward Guns

Shaded hexes indicate possible target hexes. Note that an aircraft cannot fire at a target in the same hex as the firing aircraft.



Any enemy aircraft that occupies a hex within this arc can be fired upon.

Gun Range

Range of each gun battery is shown in parentheses under the strength of the gun on the aircraft TC. Aircraft beyond the range of a gun may NOT be targets of that gun. Range is determined by counting the hexes from the firing aircraft's hex (exclusive) to the target hex (inclusive), counting the shortest possible path of con-

tiguous hexes. NOTE: If there is an ALTITUDE differential between the aircraft, add one hex to the range for each 500 feet of differential (ignore fractions).

FIRE ROUTINE

The following routine is performed for each aircraft firing. Gunnery Effectiveness is added to the total of all Modifiers: the result is the number of the Hit Table column to use. A die roll in this column gives the result of the fire.

Step 1. Basic Hit Table Modifiers.

(Ignore the Deflection and other Optional Modifiers.) To determine the Modifier, add together all applicable modifiers listed on this table (Nr. 1). See "Basic Hit Table Modifiers," below. Example: an aircraft with a Fire Modifier of +2 fires at a target with a Silhouette Modifier of +3; the Modifier is $2 + 3 = 5$. If the aircraft were firing inverted in the same situation, the Modifier would be $2 + 3 - 3 = 2$.

Step 2. Gunnery Effectiveness.

Add together the number of gun factors from the aircraft's TC. For example, an undamaged P-47 has $4 + 4 + 4 + 4 = 16$ Gun Factors. Then Refer to the Range Attenuation Table Nr. 2. Crossreference the total Gun Strength with the range in hexes. The resulting number is the Gunnery Effectiveness. Example: A P-47 at two hexes range will have an Effectiveness of 12.

Step 3. Hit Table Resolution.

The Gunnery Effectiveness is added to the Hit Table Modifier (which may be positive or negative), and the resulting number is the number of the column on the Hit Table to be used. If the resulting number is zero or less, the effect of that aircraft's fire is nil (it may not choose another target that turn). Roll the die under the appropriate Column on the Hit Table. The series of letter codes shows the number and type of hits scored on the target.

Step 4. Record Damage.

Mark the hits (filling-in one circle per hit) on the target's Damage Record (see "Effects of Damage" below.)

Prohibition on Wasting Time.

Players should not waste time calculating the Gunnery Effectiveness and Modifiers of various shots, when they have several possible targets. Opponents should discourage this by concealing Silhouette Modifiers of their aircraft until a specific "shot" is announced. Once an aircraft "lines-up" a shot by determining its Hit Table column, the aircraft must go through with that shot, even if it has no chance of effect. Not only will this speed play and sharpen a Player's eye; without it, "guaranteed" hits can be secured.

BASIC HIT TABLE MODIFIERS

The preliminary Modifier is derived by adding or subtracting any of the following Basic Hit Table Modifiers which apply.

Fire Modifier

This number, found on the aircraft data card of the firing aircraft, reflects the aircraft's stability as a gun platform, and the quality of its gun sights.

Silhouette Modifier

This number, found on the aircraft data card of the target aircraft, reflects the size of the target.

Firing Inverted

If the aircraft is firing inverted, inverted/right, or inverted/left, subtract three.

EFFECTS OF DAMAGE

Hits are registered on the Damage Record of a target aircraft with one filled-in dot for each hit, in the space to the right of the letter code corresponding to the type of hit. The Damage Record has a space for each of the six different parts of the aircraft that can be hit, each part corresponding to a type of hit found in the Hit Table Results.

In each case, when a hit is made on an aircraft, mark one hit to the right of the corresponding box on the Damage Record for each hit called for on the Hit Table. When the number of hits of any given type (except Gun Hits) equals or exceeds the limit of hits for that type shown on the aircraft's TC, THAT AIRCRAFT IS DESTROYED at the end of the phase and is removed from play.

Wing Hits (W). Reduce Maximum (Dive) Speed by one for every 2 W's.

Wing hits represent damage to the lift capacity and stability of the wings, plus damage to the control elements (the ailerons and flaps).

The aircraft's maximum Dive Speed is reduced by one for every two Wing Hits. For example, an aircraft with a maximum Dive Speed of "9" that had four wing hits accumulated, could not exceed an Air Speed of "7."

Fuselage Hits (F).

Fuselage Hits are the least critical kind of hit, and do not reduce performance characteristics (except, of course, when the limit to Fuselage Hits is equalled or exceeded and the aircraft is destroyed).

Cockpit Hits (C). Restrict Maneuverability.

Cockpit hits represent potential hits on the pilot and on the instruments.

Aircraft with one or more cockpit hits cannot perform Half-Loop or Half-Roll maneuvers. Aircraft with two or more cockpit Hits cannot perform Slip Maneuvers, or move at Dive Speed.

Engine Hits (E). Reduce Power Factors by one for every E.

Engine hits represent damage to the aircraft's power plant, super-charger, etc.

The maximum number of Power Factors the aircraft may apply is reduced by one for each engine hit (although it can never be less than zero).

Fuel Tank Hits (L).

Fuel tank hits represent hits on the aircraft's fuel cells, gas lines, oil pumps, hydraulics, etc.

Gun Hits (G). Remove one Gun battery for each G.

Gun Hits represent hits on the plane's armament, loading equipment, sights, or hits that render these systems inoperable.

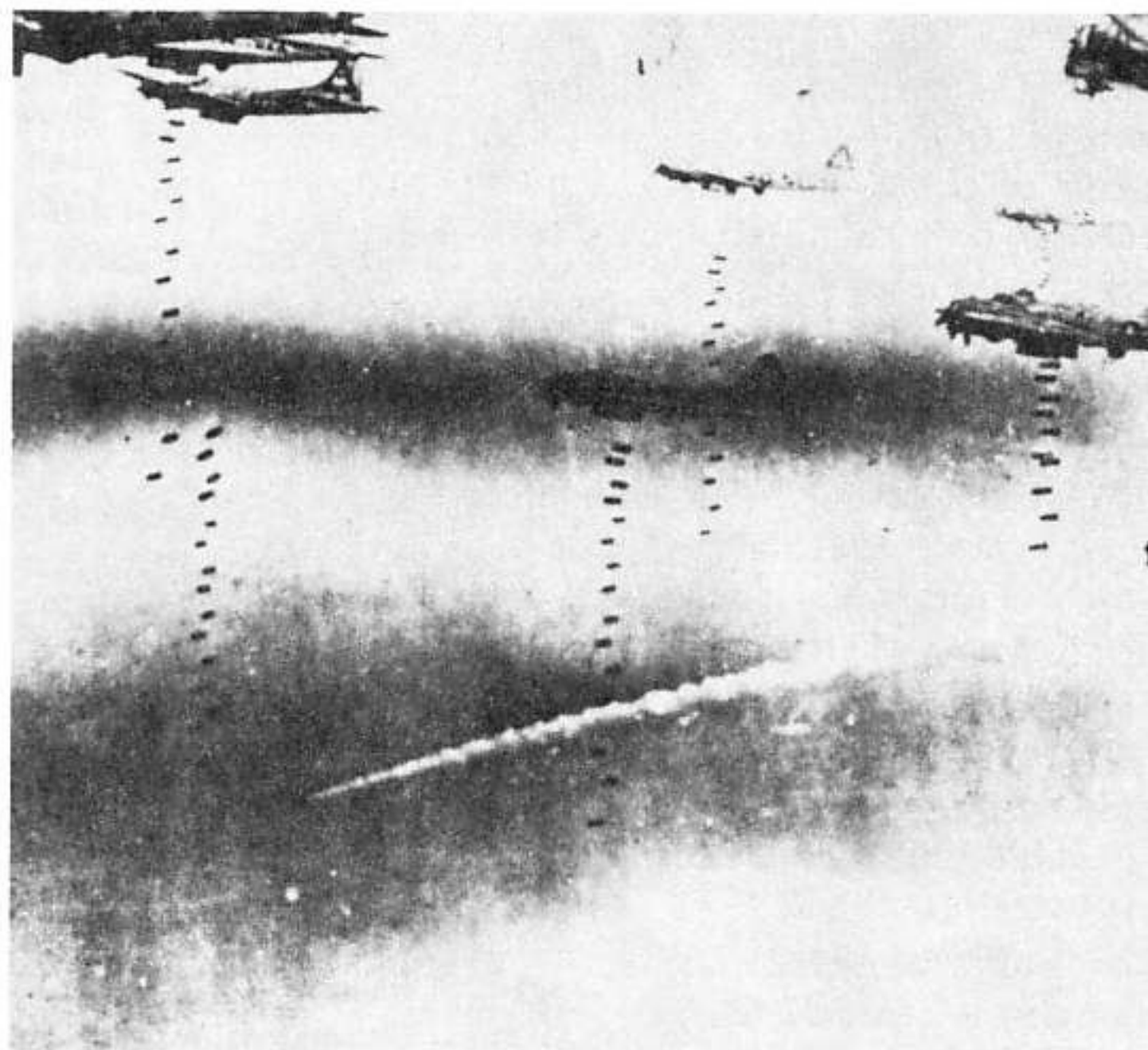
Each individual gun or battery of guns is represented by one of the Gun Factors written on the Damage Chart to the right of the "G" box. A hit is registered by marking through one of these numbers. Note that a single Hit destroys not single Gunnery Points but entire guns or batteries of up to 8 or more Gunnery Points.

Gun Factors which are marked off can no longer be used for firing. HIT PRIORITIES: The Gun Factor CLOSEST to the firing aircraft should be the first one marked off, then the next closest, etc. To determine closest Gun Factor:

1. If the firing aircraft is closest to the right-hand side of the target, the Gun Factor on the right-hand side of the Damage Chart is marked off, then the next one closest to the right-hand side, etc.

2. If the firing aircraft is not closer to one side or the other, the firing player has his choice of which Gun Factor to mark off.

Gun Hits scored after all Gun Factors have been marked off count as Fuselage Hits.



Victory Conditions

Victory Conditions vary depending on the scenario being played. These are explained in the scenario instructions themselves. In most scenarios, the victor is determined by totalling the Victory Points accumulated during the game. The player (or team) with the most Victory Points is declared the winner. The number of Victory Points awarded for specific actions is listed on the Victory Points Chart.

OPTIONAL RULES

Players may wish to use any or all of the following rules after mastering the rules of the Basic Game. These rules can be added in any combination agreeable to both players. Unless stated otherwise, all Basic Game rules apply.

Note that certain scenarios require the use of certain specified optional rules; however, most are provided here for Players who wish increased realism, and do not mind the increased complexity they entail.

X. ADDITIONS TO SEQUENCE OF PLAY

All Optional Rules requiring a separate Phase are included in the Optional Sequence below. Phases concerning Optional Rules not in use are ignored and skipped over. (Optional Phases are marked thus: *)

STEP 1: FIRE PHASE

(Same as Basic Game.) Flak fire is resolved simultaneously with aircraft fire. Resolution of hits on Inline Engines occurs during this Phase.

STEP 2: BOMBING AND ROCKET FIRE PHASE*

Rocket fire and bombing is resolved, and damage resulting is marked and evaluated. Note that aircraft destroyed in Step 1 are eliminated before they may fire rockets or bomb. Bombing and Rocket Firing are considered to occur simultaneously with each other.

STEP 3: BAIL-OUT PHASE*

Attempts to bail out are resolved during this phase.

STEP 4: SPOTTING AND STARTING PHASE*

Attempts are made to "spot" enemy aircraft by consulting the Spotting Table and rolling the die. In addition, attempts are made at this time to "start" the engines of aircraft on the ground prior to take-off.

STEP 5: ADVANTAGE DETERMINATION PHASE

(same as the Basic Game)

STEP 6: MOVEMENT PLOTTING PHASE

(Same as the Basic Game) Dropping of Bombs and Firing of Rockets, must be plotted during this Phase for the next turn.

STEP 7: STATUS DETERMINATION PHASE

(Same as the Basic Game)

STEP 8: UNPLOTTED MOVEMENT PHASE*

Unplotted movement includes the turning of flak counters, and the movement of vehicle counters.

STEP 9: MOVEMENT EXECUTION PHASE

(Same as the Basic Game.) Collisions with hills and barrage balloons are resolved during this phase.

STEP 10: GAME-TURN RECORD

(Same as the Basic Game.)

XI. CLOCK REFERENCE DISPLAY

On each Aircraft Data Card is a circular display labelled "Blind Spot Modifiers" (for aircraft with FF guns only), or "Gunnery Play" (for aircraft with F guns). In the latter case, the aircraft's Blind Spot Modifier is considered

to be "+2" in all directions. Blank spaces read "zero."

Clock Reference is used in the Spotting Procedure and Gun Positions Options (explained in sections XII and XIV below).

Altitude Differential

After determining the clock reference sector, altitude differential must be considered. A target at an altitude at least 500 feet higher than the aircraft spotting or firing is considered to be "High." Similarly, at 500 feet or more below the spotting or firing aircraft, the target is considered "Low." If within 400 feet in altitude, the target is "Medium." If in the same hex, the target may be considered "Above" or "Below."

XII. VISIBILITY OPTIONS

These optional rules simulate the effects of the difficulty pilots may experience in detecting enemy aircraft, especially at great distances, against the vastness of the sky.

BLIND SPOTS

Blind Spots are shown on the clock reference display for aircraft without F guns (see XI.). Determine height of the enemy aircraft being spotted: High, Medium or Low, 12 O'Clock, 2, 4, 6, 8 or 10 O'Clock. Then find the corresponding space on the Clock Reference Display. If there is no number in the space, use the Basic Spotting Table. If there is a number in the space, this number will modify the number rolled on the die when consulting the Spotting Table.

Spotting Procedure:

This procedure is used to attempt to "spot" enemy aircraft (once an enemy aircraft is "spotted", the friendly player may deviate from pre-plotted movement—see "pre-Spotting movement"). Players may make one "Spotting" attempt per aircraft per Game-Turn. The Player specifies which enemy aircraft he will attempt to spot. All modifiers are considered, and their cumulative value determined. The die is rolled, and the Spotting Table is consulted. If the result after modification is "Not Spotted," the attempt is unsuccessful. If the result is "Spotted" the pre-Spot movement restrictions for the spotting aircraft are removed. No aircraft can be fired upon until spotted.

Spotting Modifiers:

These modifiers are cumulative in their effect on the Spotting Die Roll:

1. Blind Spot Modifiers—(already explained).
2. Night—A modifier of -3 applies if the game takes place in darkness.
3. Distance—A modifier of +1 applies if the aircraft is at a distance of ten hexes or less (including altitude differential).
4. Quality—A modifier of +2 applies if the spotting aircraft is flown by an "Ace."

5. Radar—A modifier of +2 applies if the spotting aircraft is equipped with radar, and the aircraft being spotted lies within the Arc of the radar equipment. Radar has an Arc of 12 O'Clock High, Medium and Low to a Range of 15 hexes (including altitude differential).

6. Sun—The Sun counter included in the game can be placed in a hex along one of the edges of the Map. It can hinder spotting. If the aircraft to be spotted is above the spotting aircraft, and the sun is in the same Clock direction as the aircraft to be spotted, a modifier of -3 is applied to the spotting attempt.

7. Surface Units—If using spotting rules with surface units such as vehicles or flak, additional modifiers are required. Surface units modify the die roll by +2 when attempting to spot enemy aircraft. Aircraft attempting to spot surface units must modify the die roll by -1.

8. Aircraft Attitude—The bank the aircraft is in will modify its ability to spot. If the aircraft is in any of the three inverted banking attitudes, a modifier of -2 applies. If the aircraft is in a right bank attitude a modifier of +1 will apply when attempting to spot to the right side of the aircraft, and a modifier of -1 will apply when attempting to spot to the left side of the aircraft. The reverse holds true for aircraft in a left bank attitude.

Pre-Spotting Movement:

The fact that the two sides have not yet spotted each other is simulated by having their respective aircraft perform according to a pre-game plot prepared in advance.

Movement is plotted six Game-Turns in advance. At the start of the Game, Players must plot the first six Turns in the Logs. During the Movement Plotting Phase of Game-Turn One, the movement for Game-Turn Seven would be plotted, etc.

If the aircraft on either side are considered to be ground controlled, these aircraft (only) need to be plotted only three Game-Turns in advance. Thus, during the Movement Plotting Phase of Game-Turn One the movement for Game-Turn Four would be plotted, etc.

Once any enemy aircraft has been spotted, the Player who made the successful spotting may erase all excess movement plots for all his aircraft (including the plot for the current turn), and start to plot his movement from turn to turn in the normal manner.

Until such time as an enemy aircraft is spotted, the aircraft cannot exceed their maneuver speed increment.

Any aircraft which fires is considered automatically spotted.

CLOUDS

The cloud counters are used to mark the center of a cloud mass, but clouds can be defined as occupying any desired area.

Cloud Mass:

The size of a cloud is expressed by stating the altitudes through which it extends, and its size from the spot marked by the cloud counter. For example, the notation (10.0—21.0) X 6 denotes a cloud mass that extends from 10,000 to 21,000 feet, and covers an area six hexes in every direction from the hex containing the cloud counter.

Cloud Effects:

Aircraft may fly through clouds without penalty. However, an aircraft that is located in a cloud cannot fire, nor can it be fired upon. It also cannot be spotted.

Aircraft cannot spot or fire at enemy aircraft if there is part of a cloud mass between firing and target aircraft. To determine this, lay a straight-edge from the center of their two hexes; if the edge crosses any hex occupied by cloud, no spotting is possible.

Cloud Determination:

Cloud mass can be agreed on by the Players prior to the start of a game, or can be randomly determined by use of the die, as follows:

Place the cloud counter on the Map. Roll two dice and multiply the result by 2,000 feet. This gives a basic Reference Altitude for the Cloud. EXAMPLE: a die roll of "8" would give a Reference Altitude of 16,000 feet.

Now roll twice, and multiply both results by 1000 feet. The first roll indicates the depth of the Cloud below its Reference Altitude, and the second indicates the height above Reference. EXAMPLE: Continuing the above example, rolls of six and five, respectively, would indicate a cloud between 10,000 and 21,000 feet, inclusively.

Finally, roll one die. The number rolled is the extent of the cloud in hexes, in every direction from the Reference counter.

XIII. MOVEMENT OPTIONS

LOADED AIRCRAFT

This condition applies to aircraft carrying bombs or rockets. The effects of being Loaded are shown on the Aircraft Data Cards—usually they will indicate an increase in the number indicated for speed increment or Maneuverability Requirement (" +1" etc.), while "P" indicates a maneuver prohibited to Loaded aircraft. The combined Slip-Turn is allowed for Loaded aircraft. Note that **maximum stall speed is not reduced** for Loaded aircraft—therefore maneuver or level speed increments may be eliminated entirely at some altitudes for loaded aircraft. (Also some of the higher altitudes cannot be reached due to Loaded modifiers.)

Example of Loaded Modifiers:

Using the aircraft Data Card for the P47D, examples of the effects of Loaded condition are as follows:

STALL SPEED INCREMENT: This is not reduced. At an altitude of less than "4.9", Stall Speed would be "0-2."

MANEUVER, LEVEL AND DIVE SPEED INCREMENTS: Reduced by "-1". At an altitude of "10" to "14.9" the increments would be "3-4", "5-6", and "7-9" respectively. At an altitude of "20" to "24.9" Maneuver Speed would disappear, and the other increments would be "4-7" and "8-10" respectively.

POWER AND BRAKE FACTORS: No Effect.

CLIMB AND DIVE FACTORS: Reduced by "-.2" and "-.4" respectively. At "10" to "14.9" thousand feet, climb rate would fall from ".5" to ".3" and dive would go from "1.2" to ".8". Note that the change in Climb rate makes it impossible for a loaded Thunderbolt to fly higher than "34.9."

MANEUVERABILITY REQUIREMENTS: for banking, turning, and slipping are increased. Loaded modifiers are added to the cost shown in the band appropriate to aircraft speed increment. Half-loop and Half-roll maneuvers are prohibited.

Illegal Maneuvers

An aircraft that performs maneuvers prohibited due to being Loaded is assumed to be destroyed and removed from play, as if it had performed a move illegal due to damage.

MASS FORMATIONS

This option permits the movement of large numbers of aircraft without the necessity of writing a move for each and every aircraft. It is most useful for the movement of large formations of bombers.

Extra Hit Charts:

Extra Hit Charts are provided at the bottom of the Log Sheet for aircraft whose movement is not individually plotted. On each of these separate Hit Charts, a circled number should correspond to the number of the "lead" aircraft whose movement plot will be followed by that aircraft. Once assigned, the aircraft concerned are said to belong to the same formation, and this number may not be changed. Individual aircraft in a formation may begin at different altitudes, as long as their relative positions remain the same once play begins. Write in the altitude differential, if any, on the separate Hit Chart.

Dropping out of Formation:

Any aircraft which, due to damage, cannot keep up with the lead aircraft is simply removed from the formation, and plotted separately. If the lead aircraft is destroyed, a different aircraft may be assigned as lead. A damaged Lead aircraft may remain as Lead or be replaced, at Player's option. Aircraft in formation may occupy the same hex, if at different altitudes.

TAKE-OFFS AND LANDINGS

These can occur only in scenarios involving Surface Terrain airfield or carrier runways (Used in Dauntless gamette), where aircraft begin the scenario with engines off.

Landings:

To land, an aircraft must complete its move at a speed that falls within its Stall Speed Increment, and at an Altitude of "0" (if at a higher altitude the aircraft "stalls"). An aircraft at altitude "0" and any higher speed suffers a "Terrain Collision" (see under "Surface Terrain").

Airfield Take-Offs:

To take off, an aircraft must start its engine, move down the runway, and finally, climb its maximum (starting at "0" Altitude). First, the aircraft engine must be started: this requires a die roll of "3", "4", "5" or "6". (Add one to die roll for each cockpit and engine hit.) Once this occurs, the aircraft is considered to have one Power Factor—this will give the aircraft an Initial Speed on the following Game-Turn of One. On subsequent turns, the aircraft may apply its maximum Power Factor while taxiing down the runway. Once the aircraft's Airspeed exceeds its Stall Speed, the aircraft must climb. In that turn it may climb 100 or 200 feet only, and is considered airborne, from which moment it may maneuver normally. (see the Take-offs Table.)

Carrier Take-Offs:

(Explained in the rules to the DAUNTLESS gamette.)

OPTIONAL MANEUVERS

Experienced Players may prefer these more realistic, but slightly more complicated rules to those found in the Basic Game. The maneuvers are still handled as given in the Basic Game rules, with the following changes:

Optional Slip Maneuver:

An aircraft can make either a right slip or left slip while in any left or right banking attitude. A slip still cannot be performed in a level or inverted banking attitude.

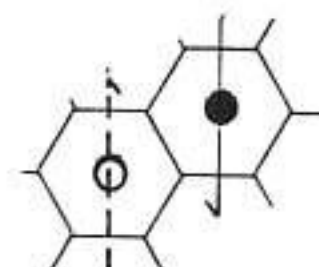
If an aircraft slips in the direction of its bank, no turn maneuver can be performed in succession. Such a slip can only be executed during a Game-Turn in which the aircraft dives at least enough to gain one Speed Point.

If an aircraft slips in the opposite direction from its bank, it **must** perform at least one turn maneuver immediately after that slip.

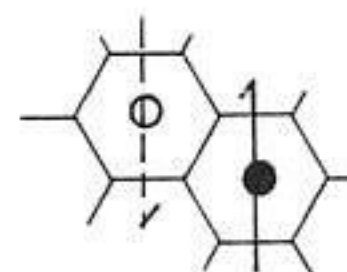
Optional Half-Loop Maneuver:

An aircraft performing a half-loop while banked to one side will move towards that side.

FROM RIGHT OR INVERTED RIGHT BANK: The aircraft will be moved one hex to the right of its original heading when the maneuver is performed.

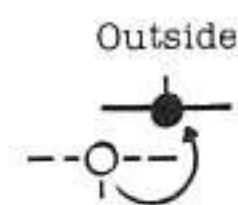
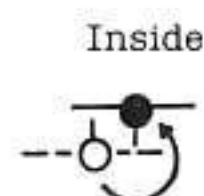


FROM LEFT OR INVERTED LEFT BANK: The aircraft will be moved to the left of its original heading when the maneuver is performed.



Outside Loop

In combat a pilot would not normally perform an outside loop (one in which the cockpit of the aircraft faces outward from the maneuver). This causes unusual stress on the aircraft and pilot.



An aircraft cannot perform an outside half-loop maneuver during a Game-Turn in which the aircraft begins or ends its movement at Dive Speed. This will normally mean that an aircraft performing a diving half-loop maneuver will have to go into an inverted bank before doing so. Aircraft which violate this rule are assumed to be destroyed and removed from play.

XIV. FIRING OPTIONS

These options increase the number of variables to consider when firing, as well as providing for the fire of large-crew bombers.

NOSE ATTITUDE

This rule applies to aircraft firing "FF" guns or Rockets.

Nose-Down Attitude:

An aircraft which did any amount of Diving during the previous Game-Turn has a "nose-down" attitude. It can fire at any enemy aircraft at its altitude or lower, within its normal fire arc, or within its hex and at a lower altitude.

Nose-Up Attitude:

An aircraft which did any amount of Climbing during the previous Game-Turn has a "nose-up" attitude. It can fire at any enemy aircraft at its altitude or higher, within

its normal fire arc, or within its hex and at a higher altitude.

Nose-Level Attitude:

Aircraft which neither climbed nor dived in the previous Game-Turn fire as usual. (NOTE: they may not fire at aircraft in the same hex.)

Same-Hex Restrictions:

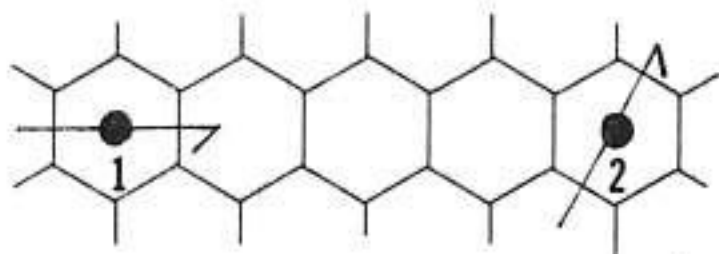
Minimum Range to targets in the same hex is always considered to be at least one hex. Flak Counters may never fire at targets directly above them.

DEFLECTION MODIFIERS

Deflection is the angle formed between the facing of the firing aircraft and the facing of the target aircraft. Firing from certain angles is far more difficult than others, requiring a different "lead" on the target and entailing different rates of relative movement.

The Deflection Modifier

This modifier is used to figure the effect of deflection. To determine the Deflection Modifier, figure the difference of the clock positions of the opposing aircraft relative to each other. Add the modifier shown for the resulting difference to the total Hit Table Modifiers. Add one more if the firing aircraft currently meets Advantage Requirements.



EXAMPLE: Aircraft #1 is firing at aircraft #2. Aircraft #1 lies in #2's 8 O'Clock—#2 lies in the 12 O'Clock of #1. The difference between 8 O'Clock and 12 O'Clock is 20 minutes and the resulting modifier is zero.

Aircraft in Same Hex

If target is above: +2. If below the firing aircraft: +1.

Target Modifiers

Faster moving targets are harder to hit. Therefore, a target moving at an Airspeed of "8" or more has a "-1" modifier (subtract from the Hit Table modifier).

A target which performed a slip maneuver during the previous Game-Turn has a -1 Hit Table modifier.

Fire Modifiers

An aircraft firing while at Dive Speed has a -1 modifier effect on the BHT. If a slip, half-loop or half-roll maneuver was performed during the previous Game-Turn by it, the firing aircraft has a -2 modifier effect on the Hit Table for EACH such maneuver performed. If it was in a Spin during the previous Game-Turn, the aircraft firing has a -4 Hit Table Modifier. Aircraft Cards showing "FF/FH Fire" Modifiers have "F" Fire Modifier of "zero."

STRAFING

When firing at surface targets, an aircraft is always assumed to be firing from a 6° (6 O'Clock) position. Gun Factors enclosed in brackets on the aircraft Data Cards TC may only be used against surface targets. Bracketed Gun Factors may not be fired against aircraft; they are added to any other "FF" gun factors in determining the total gun factors strafing.

TARGET SELECTION

Unlike the Basic Game, all fire does not have to be directed at the closest target. Any target may be fired upon so long as all closer targets are also fired upon during that same Game-Turn. If Players wish, they may require that ALL "shots" be announced before any firing is resolved.

AMMUNITION SUPPLY

Aircraft carried limited amounts of ammunition. Only the ammunition for "FF" and "FH" type guns is considered (see "Gun Positions" below). For aircraft carrying a mixed armament, ammunition is divided into cannon (Cn) and machinegun (Mg) ammunition. The amount is listed on each aircraft type's TC. Each time the guns are fired, place a mark next to the appropriate ammunition type on the TC. Note that it is possible that some guns will exhaust their ammunition sooner than others. When the number of marks equals the number listed on the TC, Gun Factors of that type may no longer be used. (Note Ammo is considered expended even if a Hit Table column of zero or less is achieved.)

VARIANT ARMAMENTS

Many of the aircraft types covered in this game have variant Gunnery Sections listed below their TC. Players are free to substitute the variant Gunnery Factors, making whatever modifications are listed beneath the variant.

GUN POSITIONS

In the Basic Game only aircraft with "FF" (Fixed Forward) guns are considered. This section covers all other types of guns.

Fixed High (FH): 12°H and Above.

FH guns are mounted to fire obliquely upward and forward. These fire in the 12°H Arc and above only. They cannot be fired when the aircraft is in any of the three Inverted Bank Attitudes.

Flexible (F): All Arcs, Variable Strength.

Each Flexible mount requires individual operation by a gun crewman. For simplicity and playability, these crewmen and the individual gun positions are ignored for damage keeping purposes.

The firepower of "F" guns is shown on the Clock Reference Display on the Aircraft Data Cards, as it varies in each Arc. For example, the B-17G has 12 Gun Factors if firing in the 12°H Arc, 8 Gun Factors in the 4°H Arc, etc. These total strengths must be divided into increments of no more than four Gun Factors, and are fired separately at one or more aircraft in the same Arc. (All may fire separately at the same or different aircraft.) Bomber Fire Increments may be directed sequentially at the same or separate targets. (Thus an aircraft with 16 FF Factors in a given arc may fire four times with four Factors at target(s) in that arc.) The "F" armament of an aircraft may only be used against one Arc per turn: once the "F" guns are fired in one Arc, all "F" guns are considered to have fired. Other (non-"F") types of guns on the same aircraft may fire once during the same turn. Gun Hits may affect "F" guns or other Gun Factors. Hits on "F" Guns are marked with a vertical line on the Damage Record. Each Hit reduces the available number of Gun Factors by two in every direction.

Fixed Low (FL): 12°L

These guns are mounted to fire obliquely downward and forward. They have a play of 12° and can fire at any target at a lower altitude. They cannot be fired when the aircraft is in any of the three inverted bank attitudes.

AIRCRAFT IDENTIFICATION

Although not a major problem in plane-to-plane combat, the difficulty in distinguishing friend from foe was a factor for flak gunners. Aircraft operating within range of friendly flak were in constant danger of being mistaken

When Aircraft Identification is Considered

This procedure is ignored when the enemy target aircraft are the same distance from or closer to the flak than any friendly aircraft. The procedure must be consulted when flak guns or the "F" guns of a bomber formation are fired when a friendly aircraft is closer than the enemy target. This procedure is consulted separately for each shot taken.

Procedure

One die must be rolled prior to firing. On a roll of "1-4" the result is "Foe," and the enemy target may be fired at normally. On a roll of "5" or "6" the result is "Friend," and the friendly aircraft **MUST** be fired at. The firing Player may choose which Friendly aircraft to fire on if more than one are at the same range—otherwise the closest friendly aircraft is fired upon. "F" GUNS MODIFIER: Add "one" to Identification die roll for "F" guns.

XV. DAMAGE OPTIONS

MULTI-COCKPIT AND ENGINE AIRCRAFT

Aircraft having more than one engine and/or pilot register hits to Engine and Cockpit in the same manner as Gun hits in the Basic Game: i.e., an aircraft firing at the left-hand side of a target would hit the engine and/or cockpit farthest to the left on the Hit Chart.

Effects of Damage on Dual Cockpit Aircraft

Cockpit hits have no effect until one cockpit has been completely destroyed. Then, hits on the remaining section have the same effects as cockpit hits in the Basic Game.

Damage on Multi-Engine Aircraft

There are two types of multi-engine aircraft in the game—those with two engines, and those with four. The effects vary accordingly:

TWO-ENGINE AIRCRAFT: lose ONE power Factor if there is at least one hit on each engine, and two Power Factors if there are at least two hits on each engine. All Power Factors are lost if one engine is totally destroyed and, in addition, in this case the aircraft must immediately jettison its bombs or rockets—or, if the aircraft is considered loaded due to extra armament it is destroyed. After jettisoning, the aircraft may continue to fly, but retains its "Loaded" characteristics on the MC.

FOUR ENGINE AIRCRAFT: lose ONE Power Factor per Engine destroyed. If two Engines are destroyed, the aircraft is also destroyed IF both are on the same side of the aircraft. If two destroyed Engines are on opposite sides (only), the aircraft must jettison its bombs or rockets (again, aircraft "Loaded" with extra armament are destroyed), retaining its "Loaded" characteristics. If the two remaining engines have one hit apiece, the aircraft is destroyed.

EFFECT ON DIVE SPEED: Aircraft with Multiple Engines have their maximum Dive Speed reduced by one for every THREE Wing Hits (unlike single engine aircraft, which are reduced for every two Wing Hits).

Damage on "F" Gunned Aircraft

The firing Player who scores a "G" hit on aircraft with "F" guns can choose to take the hit on the "F" guns, or on the closest gun of any of the other types (if any).

Damage to Loaded Single-Engine Aircraft

Any damage requires a single engined aircraft to jettison its bomb load; it is **not** considered Loaded thereafter.

INLINE ENGINES

There are two types of Engine: Inline ("I") were favored for their streamlining, but were water-cooled and could be knocked-out by a single bullet in the radiator. (Note: for purposes of the game, the jet engines of the Me-262 are treated as "I" engines.) Radial ("R") engines were air-cooled and rugged.

Inline Engine Table

Each time an Engine Hit is scored on an "I" type aircraft, roll two dice: a roll of "11" means the engine freezes (is destroyed). The second time the Engine Table is consulted for a given aircraft, a die roll of "3" means the entire aircraft is destroyed (regardless of the number of engines), in addition to the "freeze" result. Any other results besides "11" and "3" mean the Engine continues to run (though it has sustained a hit).

XVI. BOMBING OPTIONS

All bombing is conducted before movement, making it necessary to begin the Game-Turn in the hex to be bombed. The dropping of bombs (or torpedos) must be plotted during the Plot Phase, using the notation "BMB". This notation can be augmented by indicating the number of bombs to be dropped (i.e., "BMB-2"). An aircraft cannot fire "FF" or "FH" type guns during the same Game-Turn as it drops bombs.

High-Level Bombing

This type of bombing is done from Higher Altitude Levels, and requires the use of bomb sights. To execute, use the High-Level Bombing Table, noting the modifiers to the die roll due to the altitude of the aircraft, target size, and target visibility. (Visibility can be affected by Night, Clouds or the Smoke from earlier bombings, etc.). The aircraft must end its movement directly over the hex to be bombed. Two dice are rolled once for the aircraft's entire bomb load, regardless of the number of bombs represented.

INDUSTRIAL TARGETS: When bombing industrial and population centers on land, the modified die roll number determines the number of points of damage done to the target. In scenarios where this type of bombing takes place, each point of damage will be worth one Victory Point.

SPECIFIC TARGETS: When bombing specific targets such as bridges, airfields, vehicles, flak guns or ships, an additional die roll is necessary. Roll one die, and multiply the number rolled times the points of damage. The result is the number of hits scored on that specific target.

BOMBING RADAR: Aircraft so equipped gain a +1 modifier to the die roll above **only** in cases of night visibility and/or obscured target.

SIGHTLESS BOMBERS: Aircraft without sights for level bombing may use High Level Bombing, at a -2 modifier, unless one or more of the aircraft in the formation is equipped with Level Bombing sights. In this case, all aircraft in the formation must drop their bombs at the same time, and the -2 modifier can be ignored.

ALTITUDE RESTRICTION: High Level bombing must be performed from an altitude of at least 6000 feet.

BOMB DISPERSAL: For high level bombing, the entire bomb load must be dropped together. For all other types of bombing, the bombs may be dropped individually or in groups.

BANK ATTITUDE: Aircraft must be in a level bank attitude in order to perform high level (or torpedo) bombing.

Glide Bombing

This type of bombing is best carried out by fighter bombers and bombers not using sights. To execute, two dice are rolled (the first "red", the second "white"), and the Bombing Charts consulted, noting that at lower altitudes the chances of accuracy are greater. Use the Dive & Glide Bombing Chart appropriate to the altitude of the aircraft. The Hex on the Chart which contains the arrow is the hex occupied by the aircraft. After any modifiers are added or subtracted, any target in the hex containing the number on the chart corresponding to the die roll is destroyed. Targets adjacent to the destroyed hex are attacked on Hit Table Column Nr. 8. (Note: this secondary effect applies only to targets such as vehicles, flak, and aircraft on the ground.) Dice are rolled once per bomb dropped. (Hits on ships explained in DAUNTLESS rules.)

Dive Bombing

Only aircraft labelled as Dive Bombers may make this kind of attack. Dive Bombing is resolved in the same way as Glide Bombing, only the altitudes are different (see the Bombing Charts), and the attack receives the "+1" Modifier. Dive bombers may bombard while in a level, right or left banking attitude.

Restrictions

Aircraft must be in a level bank Attitude in order to drop bombs. Only one aircraft per hex per Game-Turn may drop bombs. (If two or more aircraft were in the same hex, only one of them could drop bombs during the course of a given turn).

For Glide and Dive Bombing, a bomb hit on a hex that is higher than the aircraft's altitude is ignored, and treated as a "miss." Targets in hexes adjacent to a hit, but at a different elevation from the hex that was hit will not suffer any damage.

Skip Bombing, Torpedo Bombing & Depth Charge Bombing (explained in DAUNTLESS Rules Folder.)

XVII. GROUND TARGETS

AIRSTRIPS AND BRIDGES

Ground target counters can be laid out in a line to represent an air strip or bridge. Airstrips should be at least four hexes long, and bridges one to three hexes. A hit on any bridge or airfield hex will make it unusable.

INDUSTRIAL/POPULATION CENTERS

Ground target counters can be used to mark the center of a large industrial or population target. For instance, the notation "GT-6" would designate a ground target that extends six hexes in every direction from the hex containing the counter inclusive. Such a hex is assigned a Victory Point value (usually 3 to 6 points). High Level Bombing will gain Victory Points equal to the number of points damage scored on a hex. Glide and Dive Bombing hits will completely destroy the hex.

FORTIFICATIONS

Ground target counters can be used to mark the locations of various fortifications (bunkers, pillboxes, etc). These targets require two hits by dive or glide bombing attacks to be destroyed.

SURFACE TERRAIN

Some scenarios call for the use of terrain, in the form of various elevations. These hills are marked by using any counters not needed in the scenario, turning them upside down, marking on the back (in pencil) the altitude of the hill, and placing them on the Map. Surface

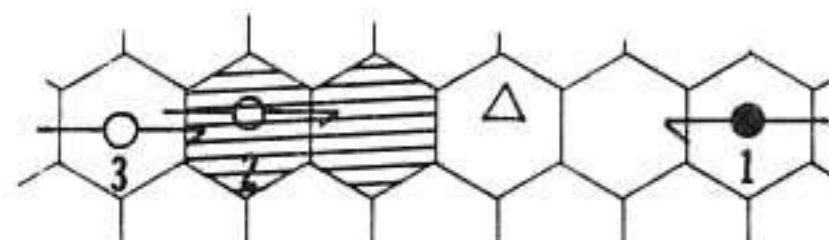
terrain can create "dead zones" where spotting and/or firing at the enemy is impossible. These dead zones are determined by placing a straight edge between the center of the hex containing one unit to the center of the hex containing the other.

Completely Blocked Condition

If the straight edge passes through part of any hex that is higher than BOTH units, no spotting or firing is possible between the units.

Dead Zone Condition

If the straight edge passes through part of any hex that is higher than only ONE of the units, a dead zone exists that is calculated from the position of the highest of the two units being considered. This dead zone is equal to the range from the higher unit to the surface terrain (or, for flak, vice versa). If it is determined that the higher unit is in a position to spot and/or fire, both units may do so. For instance, in the following example, aircraft #1 is at 1000 feet, aircraft #2 and #3 are at 600 feet, and the hill between them is 800 feet high. The range from the highest unit (#1) to the hill is two hexes, therefore the dead zone will extend for two hexes beyond the hill. Thus, #1 and #2 may not spot or fire at each other. The range from the hill to #3, however, is three hexes, so it lies outside of the dead zone: Aircraft #1 and #3 may spot and fire at each other.



Altitude Differential

The dead zone is reduced by one hex for every 1000 feet in altitude difference between the higher unit and the surface terrain. In the example above, if aircraft #1 were at 1800 feet and all other altitudes were the same, the dead zone would be reduced to one hex beyond the hill, and aircraft #1 and #2 could spot or fire at each other.

Hillside Collisions

An aircraft that passes through a hex containing a hill must, at the CONCLUSION of its movement, be at an altitude greater than the hill. If not, it has collided with the side of the hill, and is destroyed and removed from play.

BARRAGE BALLOONS

Barrage balloons were large, gas-filled bags held to the ground by means of stout cables. They were used to discourage low-level raiders, who could be destroyed if they hit the balloon or cable.

Barrage balloon counters are placed in a hex at the start of the game, and cannot be moved after that. They cover that hex from an altitude of 13,000 feet down, and may affect aircraft in that area.

Effects

Any aircraft that enters a hex containing a barrage balloon must conduct the collision procedure. One die is rolled, and if a "5" or "6" is rolled, the aircraft hits the balloon or cable, and is destroyed and removed from play.

Destruction of Balloons: Silhouette Modifier: -2

A barrage balloon can be destroyed by scoring a "c" hit on it. All other types of hits on balloons count as no effect. Balloons have a Silhouette Modifier of "-2".

FLAK

These rules cover the operation of the flak (anti-aircraft) counters in the game. A flak counter may be used to represent any number of actual guns. Each gun factor represents one actual flak gun.

Strength

Heavy Flak guns can Range in value from 5 to 12 Gun Factors each. Light Flak guns can range in value from 1 to 4 Gun Factors each. All Flak has a range up to the maximums listed on their respective range tables.

Placement

Flak counters are placed on the Mapboard at the start of the game, and cannot be moved after that (exception: Light Flak). They may be placed facing in any desired direction. The strength of each counter is indicated by writing the numbers of the Gun Factors found in the counter on an extra Hit Chart; the individual counters are identified by writing the counter number at the top of the Hit Chart. (Note: Dummy counters containing no Gun Factors may be placed.)

Light Flak

Light Flak Counters can be made "movable" if stacked on top of a vehicle counter at the start of the game. If this is done, the flak must remain stacked with that vehicle throughout the game. It can move with the vehicle counter, as well as turning by itself. If the vehicle is destroyed, so is the flak stacked with it. Silhouette Modifier of vehicle is used for combined target.

Facing

Flak can be turned in place. Light flak can be turned one hexside in either direction every Game-Turn. Heavy Flak may be turned one hexside only on even numbered Game-Turns. This turning takes place during the non-plotted Movement Phase, and does not have to be written down. Flak guns are considered to be "FF" type weapons, for purposes of determining their Fire Arc.

Flak Fire. Modifier of Zero.

Flak firing is handled the same as other firing, with the usual modifiers, except that the appropriate Flak Range Attenuation Table Chart is used.

Destruction of Flak. Silhouette Modifier: Zero

Hits scored on a flak counter are handled normally, except that only "G", "E", and "C" hits count, and each hit destroys one gun. Other types of hits have no effect on Flak.

Attitude Differential

Note that Flak units are subject to the usual Range Adjustment for difference in altitude.

VEHICLES

These rules cover the operation of the vehicle counters in the game. A vehicle counter represents a small number of individual vehicles.

Movement

Vehicle counters can be moved around the map during the course of the game. A vehicle can turn one hexside, then move a hex; move a hex, then turn one hexside; either or both, during one Game-Turn. A Truck can move every Game-Turn if moving into a road hex, and can always turn in place. If entering a non-road hex, it can only move on even numbered Game-Turns. A Tank can turn in place during any Game-Turn; it may enter a road hex only on even-numbered turns, and may enter non-road hexes during turns divisible by four. Movement is not required.

Destruction of Vehicles. Silhouette Modifier: -2.

Firing on a vehicle is handled normally, except that only "F" hits count. All other types of hits count as no effect. Machinegun Factors cannot be fired at tanks. One hit will destroy a truck, though two hits are required to destroy a tank. Tanks with one hit should be inverted.

Stacking

Any number of vehicle counters may be stacked together in the same hex. If strafed, the firing player decides which unit in a stack is being fired upon. If bombed, all units in a stack are destroyed; in the case of a bomb hit in an adjacent hex, Hit Table Column #8 is used to determine hits on any one unit of the bombing player's choice.

XVIII. ROCKETS

World War II rockets fell into two categories: Air-to-Air (AA), and Air-to-Ground (A/G) types. Both were quite effective if they scored a hit, but were wildly inaccurate. Therefore, the major considerations when firing rockets are: a) the NUMBER of rockets being fired, and b) the SIZE of the target mass (e.g., a dense formation is a better target than a single aircraft).

FIRING PROCEDURE

Rocket firing takes place after all gunfire is resolved, and simultaneously with bombing.

RANGE: All Rockets have a range of EIGHT hexes.

HIT AREA: All rockets have a Hit Area in which the spread of the Rocket is effective, and may cause a Hit. Air-to-Ground rockets have a Hit area consisting of the target hex plus all adjacent hexes. Air-to-Air Rockets have a larger Hit area to include all airspace within a two hex range of the target hex and altitude. (NOTE: altitude differentials must be considered in determining the Hit area. Thus, an aircraft 1000 feet higher or lower than the TARGET is not within a two-hex Hit Area.)

The Target Hex selected must be directly in front of the firing aircraft, and within eight hexes of its location. The Altitude in the Target hex must also be specified, and must be within 400 feet of the altitude of the firing aircraft. Then, the die is rolled, and the result is modified as explained below. The Rocket Firing Table is consulted to determine the effects of the rocket.

Rocket Fire Modifiers

All modifiers listed under the Rocket Firing Table are considered, their effect being cumulative in determining the total modifier. The modifiers are as follows:

1. Single Target in Hit Area: -2
2. Two or more Targets in Hit Area: +1 each
3. More than six Rockets fired: +1 for every multiple of 12, e.g., 7-12 = +1, 13-24 = +2, etc.
4. Surface Target (Mobile): +1
5. Surface Target (Immobile): +2
(NOTE: Immobile targets are Flak units and engine-off aircraft.)
6. At Range of Four Hexes or Less: +1

Results of Rocket Fire

Each hit scored will totally destroy one unit. A miss has no effect. If more than one target lies in the Hit Area, the player suffering the hits decides which units to remove from play.

Restrictions

Air-to-Air Rockets can only be used against flying targets. Air-to-Ground Rockets can only be used against surface targets.

The numbers and types of rockets an aircraft can carry are listed on its Aircraft Data Card. Aircraft carrying Rockets are treated as being loaded for movement purposes.

An aircraft cannot fire its guns and rockets during the same Game-Turn.

XIX. TRAINING AND EXPERIENCE

The rules so far have considered only the equipment. The following concern the pilots themselves. Excellent equipment cannot make up for unskilled manpower.

QUALITY LEVELS

There are three Quality Levels: Novice, Average, and Ace, in ascending order of skill. These terms can be applied to both aircrews and to anti-aircraft gunners. A high quality pilot or crew will tend to make more efficient use of their equipment.

1. Novice Pilots and Crews: are those whose level of training and/or experience make it impossible for them to make optimum use of their equipment.

2. Average Pilots and Crews: are those with a good degree of training, though their experience is somewhat lacking.

3. Ace Pilots and Crews: are those with the highest level of experience.

Modifier Effects of Quality Levels

The quality of a pilot or crew may affect combat performance.

1. Novice: BHT Modifier -2. Maneuverability Requirement +1.

2. Average: BHT Modifier 0.

3. Ace: BHT Modifier +1 per five kills. Visiblity Option (cf). Concentrated Fire if score is twenty kills or more.

Concentrated Fire

Determine the Hit Table Column in the normal manner, and roll the die. Instead of using the hits listed, just count the number of hits of all types scored. Then roll the die again to determine what kind of hit to record. EXAMPLE: On Hit Table Column #11, a "two" is rolled, resulting in four hits. A roll of "4" results on the Concentrated Fire ("C") Column on the Hit Table. The four hits are all recorded as engine hits.

QUALITY EFFECTS ON BOMBING

(Average crews perform normally.)

High Level Bombing

Add +1 to the die roll for Ace crews, and -1 for Novice crews when determining the points of damage.

Glide and Dive Bombing

Add +1 to the "red" die roll for Ace crews, and -1 for Novice Crews when using the Bombing Charts.

Skip and Depth Charge Bombing

(Explained in the Dauntless Rules book.)

QUALITY EFFECTS ON TARGET SELECTION

When an aircraft counter is designated as an "Ace," it no longer has to fire at the nearest target. It can choose any target within range of its guns.

EARNING QUALITY

Good Pilots and crews result from successful combat records. Players may wish to allow individual Pilots to earn their quality gradually. In this case, Old Log Sheets should be retained to verify kills scored. A given aircraft counter (representing aircraft and pilot together) can continue to earn quality for its crew from game to game, as long as it remains undestroyed.

Initial Ratings

All crews begin the game (or series of games) as Average. Crews that are destroyed are rated as Novice when re-introduced into the game. Novice crews rise to Average after scoring one kill. Average Crews rise to Ace after scoring five (additional) kills.

How Kills are Scored

One kill is scored for each Enemy aircraft destroyed, either in the air or on the ground. One "Kill" is scored for every three successful bombing missions. (Successful means the aircraft's bombs hit a target.) One "Kill" is scored for every four Flak guns and/or vehicles destroyed by strafing. Partial Kills are not assigned: only the last aircraft to fire at a target is awarded the kill (use a die roll to resolve ambiguous cases).

BAILING OUT

If the Training and Experience options are being used, Players may wish to attempt to save the crews of aircraft which are shot down, so that they can continue to be used in future games. Any aircraft which is destroyed may have a bail-out attempt made for it.

Procedure

One die is rolled, and the appropriate column of the Bailing Out Table is consulted. If the result is "Bailed Out" the crew survives. Otherwise the crew is destroyed.

Enemy Territory

Players using this option should determine prior to the start of the game whose territory the battle is fought over. Bailing out over enemy territory will always result in the capture of the crews (considered destroyed). Crews that bail out over friendly territory could often be back in the air in a few hours.

PILOT CHARACTERISTICS

If you are using the suggested procedure of keeping "histories" of pilots, you may wish to use the following option, to determine the Characteristics of an inexperienced pilot. Players are advised to become familiar with the preceding Quality rules before introducing the following.

Characteristics Determination

First, decide upon the nationality of the pilot and the current year of the war being simulated. Then roll the die on the appropriate column of the Pilot Characteristics Determination Table. The letter codes specify which characteristics the pilot has. If "TT" is shown, the pilot doubles the Training benefits listed on the Table of Pilot Characteristics Effects. If "E" is shown, roll the die again: if the result is "1", the pilot is considered an "Ace."

Effects of "Vision" Characteristic

Night or exceptional vision has always been a prerequisite for pilots in any Air Force, though its rarity causes a reduction in vision standards as combat losses take their toll. Pilots with this characteristic have a modifier of "+1" in spotting attempts, in addition to all other spotting modifiers. When firing at enemy aircraft, after determining the Hit Table Column, they shift over to the next column to the right and resolve combat as usual on that column.

Effects of "Reflex" Characteristic

This is the key thing for any pilot—the coordination of hands, feet, and eyes in controlling the aircraft. Pilots with this characteristic may deduct "one" from the Maneuverability Requirement of any one maneuver per Game-Turn, at their option. In addition, any such pilot

who is disadvantaged may conceal the final half (rounding fractions down) of his movement plot from the enemy. Also, he may increase his ammo supply by 2 (reflects use of shorter bursts).

Effects of "Training" Characteristic

This Characteristic simulates technical skills, and is most variable by year. For pilots with a characteristic of "T", allow the negation of one hit per mission flown, of their choice. The Player simply announces that he will not record any one hit on his aircraft as shown on the Hit Table, though he should mark a line in the proper portion of the TC to indicate that this option has been expended for that mission.

In addition, pilot/crew with the "T" characteristic receive a +1 modifier in High Level, Glide and Dive Bombing, in addition to all other modifiers.

Double these effects on damage control and bombing if the characteristic "TT" is shown.

Effects of "Experience" Characteristic

This represents a pilot's or crew's learning ability, conditioned by time. Any pilot under arms before the outbreak of war would be considered experienced, as would most any who had received proper training. Pilots without experience can gain this characteristic simply by completing five missions (they need not score any kills—the first 5 missions are where survival skills are acquired). When determining characteristics, any pilot/crew receiving an "E" should be rolled again: a roll of one the second time means they receive "Ace" status.

This characteristic gives a +1 Modifier for spotting (in lieu of any Ace modifier)—this "+1" is lost when Ace status is attained. It also allows a pilot without the Reflex Characteristic to hide the last 2 MPs of his movement plot when disadvantaged. In addition, such pilots/crews do not begin as novices but are automatically considered "average."

XX. SOLITAIRE PLAY

A solitaire game can never completely duplicate the presence of a live opponent making his own decisions. The following rules for solitaire play provide for "automatic" decision making in a solitaire game.

FLAK GUNS

For solitaire play, do not turn the flak counters until after the aircraft counters have moved. If the flak counter can fire without turning, handle normally. If it has to be turned 60° to fire, use a -2 modifier to its BHT.

"F" GUNS

For solitaire play, "F" guns will always take their best possible shot (i.e., the one with the highest Hit Table number).

SOLITAIRE MOVEMENT TABLE

(This table, for the random movement of vehicles and ships, is provided and explained in the DAUNTLESS gamette.)

SHIPS

(Ship counters and explanations for their use are provided in the DAUNTLESS gamette.)

SCENARIOS

The scenarios presented in this folder provide a representative cross-section of the types of operations carried out by the Air Forces. Further scenarios, or modifications of these scenarios will be presented in the DAUNTLESS and STURMOVIK gamettes. Each scenario is a separate game and provides the information necessary to set up and play. The solitaire scenarios are included for Players who have difficulty finding opponents, or just want to practice. The scenarios are not intended to represent any specific actions, but are designed to capture the "flavor" of each different type of mission, and to provide sufficient flexibility for each game to be totally different. Once Players have played the scenarios given, they are encouraged to try their hand at designing their own scenarios—the possibilities are endless.

SCENARIO FORMAT

Each scenario presentation is composed of two or more variations such as Basic and Advanced, Solitaire and Competition, and so on. Once the variant has been decided upon, Players will find all the necessary information provided in four separate sections.

1. Set Up

Unless otherwise stated, units can be set up facing in any desired direction, Initial Speed, Altitude and Bank Attitude. Surface Terrain is always set up by all Players in an agreed upon manner before the sides are chosen—this assures it will not unduly favor one side. Any variable placement or entry die rolls occur at the beginning of the Game-Turn. Results of the entry die rolls should be recorded on scratch paper, including hex, direction, and altitude. Units can always be moved during the Game-Turn they are placed on the map. Aircraft are always assumed to have moved a sufficient number of hexes prior to entering the map to immediately perform any maneuver.

2. Special Rules

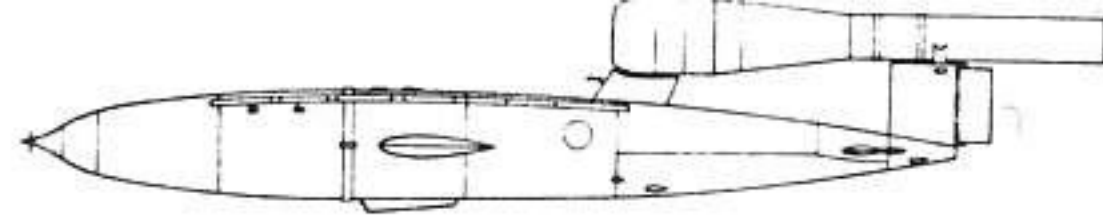
These apply only in the scenario. In all scenarios where the Map sections cannot be moved, an aircraft exiting the Map is out of play and cannot return.

3. Suggested Sides

Here, Players are given some idea of which aircraft types provided in AIR FORCE are good matches. In the gamettes, other matches using aircraft provided therein will be suggested for those scenarios which apply. Other combinations can be substituted for variety. All scenarios except the solitaire scenarios are designed to be playable by one Player on each side. They can be expanded for multi-player use by multiplying the number of units involved.

4. Victory Conditions

Unless otherwise stated, the side that accumulates the most Victory Points is the winner, and points are always awarded for destroying enemy aircraft, flak, vehicles and/or barrage balloons. Some scenarios list Victory Points awarded in a special manner for the specific scenario.



XXI. INTRODUCTORY SCENARIO

The following scenario is provided as a quick introduction to the play of the game, and is intended for solitaire use. The Advanced Player may use this scenario in conjunction with optional rules.

V-1 SOLITAIRE SCENARIO

In mid-June 1944 the Germans began firing their V-1 pilotless bombs at English targets (primarily London). The Allies responded quickly with a defense network of radar, spotters, flak batteries, and fighters. The fighters proved very effective in destroying the "buzz bombs."

Basic Level Introductory Game

This version should be used by Players new to AIR FORCE for practicing the mechanics of the game—learning the sequence of play, proper Log notation, movement restrictions, and firing procedures—prior to playing face-to-face against an opponent.

1. Set Up

Place one V-1 counter on each of hexes I-F1, I-N1, and II-I1, facing in direction "4". These are the hexes the V-1's will enter (exact order of arrival is determined by Special Rule). One fighter plane is set-up in any hex.

2. Special Rules

The order of appearance, speed and altitude of the V-1s will vary, and is determined by rolling the die.

ORDER OF APPEARANCE: V-1s will enter the Mapboard singly on Game-Turns 1, 4 and 7. Exactly which will enter is determined by rolling a die on those turns, and consulting this table (number shown is location of arriving V-1):

V-1 ORDER OF APPEARANCE TABLE

Die	Game-Turn of Die Roll		
Roll	Turn 1	Turn 4	Turn 7
1/2	I-F1	Lowest hex nr.	(Remaining hex nr.)
3	I-N1	Lowest hex nr.	
4	I-N1	Highest hex nr.	
5/6	II-I1	Highest hex nr.	

SPEED AND ALTITUDE: The speed and altitude of each V-1 is determined when it enters the map, by rolling once for speed and once to determine altitude.

V-1 SPEED AND ALTITUDE TABLE

Die	Speed	Die	Altitude
1/2	7	1	1000 feet
3/4	8	2	2000 feet
5/6	9	3	2500 feet
		4	3000 feet
		5	3500 feet
		6	4000 feet

COURSE AND SPEED: The V-1's fly perpendicular to the map edge of entry, on a straight and level course, never changing speed or altitude during their entire flight. Mapboard sections cannot be moved.

V-1 CHARACTERISTICS: V-1s have a Silhouette Modifier of "-4." Two wing, fuselage, or engine hits, or one fuel tank hit, will destroy a V-1. Cockpit and gun hits count as a miss.

3. Suggested Sides

The Spitfire IX, P-51D, P-47D and Tempest V are all types employed against the V-1.

4. Victory Conditions

To win, the Player must destroy all three V-1's before they exit the map.

Advanced Level Introductory Game

For a more challenging solitaire game, add the Deflection Modifier Option plus any other options in which you are interested.

XXII. UNIVERSAL SCENARIOS

These scenarios are applicable to AIR FORCE and the gamettes (with or without some modification). Reference will be made to these scenarios in the gamette scenario sections by scenario number, and all necessary changes will be presented with the gamette scenario information. They are playable without modification with AIR FORCE.

SCENARIO NR. 1: DOGFIGHT

This scenario covers basic fighter-to-fighter combat and is suitable for play with only the Basic Game rules or with the addition of any desired optional rules. The minimum number of aircraft per side should be two, as this was the smallest tactical fighter unit used in the war.

Basic Level Game

This Level is recommended for novice Players, who should use only two aircraft each, and ignore all optional rules. As their expertise grows, they should work their way up to four aircraft each, but should not attempt to introduce options until several playings.

1. Set-Up

Aircraft are set up no more than three hexes from the edge of the map, one side starting on edge "5-6" and the other on edge "2-3." Players should then secretly write down the hex each aircraft will be placed in, and the direction it is facing. Both players then place their aircraft, and roll one die each. The combined total rolled (i.e., 3 + 4 = 7) is multiplied by 2,000 feet (or 14,000 in the example). This will be the initial altitude for all aircraft.

2. Special Rules

Map sections may be rotated as needed.

3. Suggested Sides

Good match-ups include: Spitfire I vs. Me-109E; Spitfire V vs. Me-109F; Spitfire IX, Tempest V, P-47B or D, or P-51B or D vs. Me109G or FW190A.

4. Victory Conditions

The side that has shot down the most enemy aircraft at the end of twenty Game-Turns wins. If the number of aircraft shot down is equal, the side which has shot down aircraft totaling the highest Point total wins.

Advanced Level Game

This game is the same with the addition of any desired optional rules and any variants on the set-up the Players may wish. Aircraft can be placed in any hex on map (hex number and facing being secretly noted before set-up). Collisions resulting from set-up, though rare, can be resolved using the Collision rules. Each Player may roll two dice to determine the altitude of his own aircraft.

SCENARIO NR. 2: MASS BOMBERS

The primary concern of any air defense system was stopping enemy bombers. To play the following, it is necessary to either have a large number of Players to run all the aircraft, or to use the Mass Formation rules.

Solitaire Game

This solitaire version is useful to Players for testing various defensive formations for bombers, and testing tactics for attacking these formations.

1. Set Up

The bombers are set up on board sections I and/or II, facing in direction "4", in any desired formation. The fighters are set up anywhere on board sections V and/or VI. The Player may use any desired altitudes for the aircraft (10 to 25 thousand feet would be common), or use dice to determine altitudes as in Scenario 1.

2. Special Rules

Map sections cannot be moved. Bombers must fly straight and level throughout the game, and maintain a constant speed.

3. Suggested Sides

12 He-111H, Ju-87B, or Ju-88A vs. 4 Spitfire I or Hurricane I. 18 B-17F, or B-24D vs. 8 Me-109F or G, or FW-190A. 18 B-17G or B-24J vs. 8 Me-109G, FW-190A or Me-110G, or 4 Me-262A. Up to 25% of fighters may carry A/A rockets, except for the Me-110s and Me-262s which may be 100% so armed.

4. Victory Conditions

Game ends when the last bomber exits the Map off edge "4", or is shot down. Bombers get 5 Victory Points for each bomber that exits with its bomb load still aboard, plus the normal points for aircraft destroyed.

Competition Game

This is similar to the above, with the addition of the bomber player, who also receives fighter escorts.

1. Set Up

Same as above plus escorts, set up on sections I and/or II.

2. Special Rules

Once vacated, map sections I and II should be moved to butt up against edge "4." The intercepting Player then should place four ground target counters of size GT-6 at least eight hexes between counters on these sections, as well as setting up two heavy flak counters on those sections at least ten hexes apart.

3. Suggested Sides

As above, adding four escorts to the bombers, and doubling the number of interceptors (use two different aircraft types if necessary). The interceptor also has ten heavy flak guns (valued at 6 factors each) which can be placed in two heavy flak counters. Escorting fighters may be of any friendly type.

4. Victory Conditions

Bomber Player gets one Victory Point for each point of damage done to the targets, plus the normal Victory Points awarded both sides for aircraft and flak guns destroyed—no points for exiting the map.

SCENARIO 3: NIGHT FIGHTERS

Much of World War II's air combat took place at night, and the belligerents worked hard to develop good night fighters and bombers. Nocturnal operations developed from crude, amateurish efforts early in the war to sophisticated operations in the later years. The Visibility Options must be used to fully capture the flavor of night combat (note that night fighters were usually ground controlled).

The Kammhuber Line

(Used with modifications as "Night Kamikaze" Scenario in DAUNTLESS gamette.) The first really well-organized night fighter defense system was the Luftwaffe's so-called Kammhuber Line. Prior to the great Hamburg raids of July 1943, RAF night bombers flew singly, or in small groups, making their way independently to the target. The single German "nacht jaeger" patrolling each of the various sectors of the Kammhuber Line could thus handle the relatively small numbers of bombers that would pass gradually through its area.

1. Set Up and Entry

Intruders will enter the Map from edge "1", travelling in direction "4." All intruders must be at the same altitude, determined by the roll of two dice and multiplying by 2000 feet. This altitude is known to both Players. The intruder Player then secretly writes the number of the hex on which each of his aircraft will enter, each of which is at least four hexes apart (each successive hex number should be shown to the interceptor player as the aircraft enter the map). The interceptor Player may place his fighter anywhere on the map. Starting on Game-Turn One, the intruder Player will roll one die for each aircraft not yet on the map. If a "6" is rolled, the aircraft is placed in its hex and begins movement.

2. Special Rules

Map sections cannot be moved.

3. Suggested Sides

4 Wellingtons or Lancasters vs. 1 Ju-88C or Me-110G.

4. Victory Conditions

Intruder Player wins if two or more aircraft can exit the map on edge "4" with their bomb loads aboard. Otherwise, the inteceptor player wins.

Bomber Stream

(Used with modifications as "Superfortress Night Raid" in Dauntless.) Beginning with the Hamburg raids, the tactic of the "bomber stream" was used, with the bombers all flying to the target in a more or less massed group covering a narrow front, to "flood" the defenses. The use of "window" (aluminum strips) jammed radar carried on the night fighters. New night fighter tactics called for entering the bomber stream, moving along with it, and shooting down any bombers encountered.

1. Set Up and Entry

Bombers enter the map from edge "1," travelling in direction "4." Dice determine a "mean" altitude, known to the fighter player: roll two dice and multiply by 1000 feet. The bomber player may set the actual altitudes of his various aircraft as much as 3000 feet higher or lower than this mean altitude. The bomber player divides his aircraft into four groups of three aircraft each, and secretly writes down the hex number of entry for the lead aircraft, each at least six hexes apart (hex numbers are successively revealed as each entry occurs). The fighter player rolls the die once for each of his aircraft—the number rolled gives the edge number of entry. He then secretly writes down the exact hex number

of entry, and direction number (revealed successively upon entry). Altitude is determined at the moment of entry. Starting on Game-Turn One, both Players will roll one die each Game-Turn for each bomber group or individual fighter not yet on the map. If a "5" or "6" is rolled, the unit is placed in its hex, and begins movement.

2. Special Rules

Map Sections can be rotated as needed.

3. Suggested Sides

12 Lancasters or Mosquito IVs vs. 4 Ju-88Cs or Me-110Gs.

4. Victory Conditions

Game lasts twenty Game-Turns. Bombers get 4 Victory Points per bomber still flying loaded at game's end, in addition to points for both sides for aircraft shot down.

SCENARIO 4: LOW LEVEL MISSION

The various Air Forces of World War II were expected to do more than just bomb cities and fight air-to-air combats. One of their more important and hazardous tasks was to make ground attacks in support of tactical ground units.

Solitaire Vehicle Attacks

Fighter bombers and dive bombers saw extensive action strafing and bombing enemy vehicles.

1. Set Up

The following surface terrain counters should be placed anywhere on the Map, in an interesting manner: 5 X 100', 5 X 200', 3 X 300', 5 X 400', 25 X 500', 5 X 600', 5 X 1000', and 2 X 1500'. Roads are assumed to run down the "G" hexrows of every map. Six tanks and six truck counters can be placed anywhere in road hexes in Map sections III and/or IV. The sixteen light flak counters can be placed either on the vehicles, or distributed around the map, at least five hexes apart. These contain 40 light flak guns (valued at 2 factors each). The attacking aircraft can be set up on an edge hex along edges "1" and/or "4," at altitudes of 5000 feet or less.

2. Special Rules

Map sections cannot be moved. The Solitaire Flak rule should be used. Aircraft are carrying either bombs or A/G rockets. Vehicles should move their maximum allowable rate every Game-Turn and must remain on the road.

3. Suggested Sides

The following aircraft types are effective in low level roles (use two of a type): Hurricane II, Tempest V, P-47D, Mosquito F.B. VI, Ju-87B and D.

4. Victory Conditions

To win, the Player must gain at least twenty Victory Points, and have more Victory Points than are lost.

Airfield Raid

This scenario represents a surprise attack on an airfield complex.

1. Set Up

Use the same mix of surface terrain counters as listed above. After determining sides, the defender distributes the sixteen light flak counters, spaced at least four hexes apart, over Map sections III and/or IV. These contain 28 light flak guns valued at two factors each, and 3 light flak guns valued at four factors each. The twelve ground target counters are laid out to form three airfields, each four counters in length. These airfields must be at least twelve hexes apart. One aircraft is placed on each of two

of these airfields, located on one end of the runway, and facing so as to move down the runway in order to take off. The attackers can be set up on edge hexes along edges "1" and/or "4", at an altitude of 2000 feet or less.

2. Special Rules

Map sections cannot be moved. Attacking aircraft can carry bombs and/or be "clean." Defending aircraft must start engines and take-off.

3. Suggested Sides

The attacker has four aircraft, the defender two. 4 P-47B or D, P-51B or D, Tempest V, Spitfire IX or Mosquito F.B. VI vs. 2 Me-109G, FW-190A, or Me-262. Alt: 4 Me-109E or Me-110C vs. 2 Spitfire I or Hurricane I.

4. Victory Conditions

Attacker gets 10 Victory Points for each airfield bombed (at least one direct hit on any counter making up the airfield) plus 30 bonus Victory Points if all three airfields are bombed successfully. The attacker must have at least twenty-five more Victory Points than the defender in order to win. The defender wins if he has at most 24 fewer Victory Points than the attacker. Game ends when all attackers are shot down, or have exited the Map, or at the end of twenty complete Game-Turns.

XXIII. EXCLUSIVE SCENARIO

This scenario is not used in any form in the gamette scenario instructions.

SCENARIO 4: LOW LEVEL MISSIONS, CONTINUED

Ploesti Refinery Raid

The following scenario is based loosely on the attack on the Rumanian oil refineries at Ploesti in August of 1943. This raid, which saw American heavy bombers attacking one of the most heavily defended targets in Europe at low level, in broad daylight, was one of the boldest and unusual raids of the entire war. The plan had been "snafued," and the attackers came at the objective piecemeal and from every direction.

1. Set Up and Entry

The following surface terrain counters should be placed anywhere on the map: 30 X 100', 30 X 200', and 5 X 1000'. After determining sides, the defender distributes five heavy and eleven light flak counters, at least four hexes apart. These contain 10 light flak guns valued at two factors each, 20 light flak guns valued at four factors each, and 8 heavy flak guns valued at six factors each. He can also place six barrage balloons in any hexes. Seven ground target counters of size GT-2 are placed with at least twelve hexes between counters. The attacker divides his aircraft into four formations of at least three aircraft each. (If two or more players on attacking team, divide into eight formations of at least two aircraft each.) Both Players now roll a die once per formation (the defender rolls for individual aircraft). The die roll determines the edge on which they enter. Players then secretly write down the exact hex their aircraft will enter, their direction, and altitude (the attacker writes only for the lead aircraft of each group). Attacking aircraft must be at altitudes of 300 feet or less. This information is shown to the opposing player upon entry of each group. Each formation (individual aircraft or group) is rolled for each Game-Turn, starting on Game-Turn One. If a "6" is rolled, the formation is placed on the map in its specified hex, and begins movement.

2. Special Rules

Map sections cannot be moved. Once any hex of a target has been bombed, the entire target is considered to be "obscured" for any later bombings—obscured targets can be marked by using cloud counters placed over the target counter, their size being (0-1.0)2.

3. Suggested Sides

To represent historical force ratios, give the attackers 18 B-24Ds and the defenders 2 Me-109Fs.

4. Victory Conditions

The game continues until all bombers have exited the map or are eliminated. The attackers get five Victory Points for every target hex bombed (no additional points for hexes hit more than once), plus a 75 Victory Point bonus if all seven targets are hit.

XXIV. CREATING YOUR OWN SCENARIOS

The scenarios included with this game barely scratch the surface of possible scenario conditions. Ideas for additional scenarios can be gleaned from various aviation publications, books, movies, etc., or by just using your imagination. The scenarios provided give Players an idea of the different ways the rules can be used to simulate historical conditions, and should give imaginative players plenty of ideas for devising their own scenarios. Further scenarios will be included with the DAUNTLESS and STURMOVIK gamettes.

The important thing to remember is to give both sides a chance—not necessarily an even chance—but some chance to win. Do not hesitate to try some new situation because it appears to be unbalanced. The most important reason to try a new situation should be because it looks interesting.

There are other points to keep in mind when doing your own scenarios, or even while playing the given ones; points that cannot be completely covered in any set of rules, even a set twice the length of these. These are points of doctrine and tactics, and contrast that which could have been done with that which was actually done. For instance, the different nationalities favored different tactics. The rules cover almost any possible tactic, but allowing all of them to be used in every scenario is not necessarily the most realistic manner of play.

Also not specifically covered in the rules is the influence of range on an aircraft's bomb load. Only the maximum load for each aircraft is given. Actually, the longer the range covered by a mission, the less of a bomb load could be carried (every 60-70 gallons of gasoline means 500 pounds less bombs). If Players wish to simulate a mission flown a considerable distance, each aircraft's bomb load should be reduced to reflect that fact. Another factor of range is the tactics to be used when the target is reached. Medium bombers on low level missions would carry a reserve of fuel to enable them to go full tilt over the target, burning gasoline rapidly to exploit the situation. On the other hand, heavy bombers and medium bombers at level-bombing altitude would carry little reserve fuel since hectic evasive maneuvers are not part of the mission plan. Such aircraft would fly the entire mission at maneuver speeds, counting on their tight formation and altitude for protection. It is not impossible for an aircraft on such a mission to use high speeds and hectic maneuvers to protect itself, but it would be unusual. Also, aircraft on such a mission could either fly further or carry a larger bomb load than aircraft on a low level mission.

Edward Jablonski's AIRWAR, is a two-volume book that provides an excellent general history of World War II in the air.

XXV. PLAYERS NOTES

AIR FORCE effectively simulates air warfare in the Second World War to the extent that the aircraft closely duplicate many of the important capabilities of their real-life counterparts. The tactics which were successful in actual air battles are those which are successful in the game. To play AIR FORCE well, a Player must develop mental attitudes and tactics similar to those of the actual combat pilots of the time.

For air-to-air combat in Air Force, an adjunct to success as important as good tactics is having the right frame of mind. Although there is a place for defensive-minded admirals and land commanders, history records no instances of successful defensively-oriented fighter pilots. Even fighters engaged in defensive operations must employ aggressive tactics to be effective. The primary objective of a fighter pilot is to destroy enemy aircraft without being destroyed in return, if possible. Bomber pilots must be equally aggressive, though in a different way. Even in bomber operations where tight defensive formations are used to repel enemy interceptors, the mission is an offensive one, and the targets must be bombed if the mission is to be successful. You must be aggressive. You must enter every game with the determination of shooting at and/or bombing the other guy—thoughts that he will be shooting back should get only secondary consideration. In the long run, if you can shoot more often and more effectively than the other fellow, you will inflict greater losses than you will suffer.

An aggressive attitude must be coupled with effective tactics in order to achieve maximum results. Of course, everyone will develop his own "style" and a number of favorite "tricks," but there are several important points that all players should understand and try to put into practice.

Point Nr. 1: Coordination

Players must learn to coordinate the movements of their various aircraft to achieve their maximum combined effect. Heavy bombers should operate in tight mutually-supporting formations for the maximum impact of their combined firepower. Medium and light bombers, lacking this massive defensive firepower, but having superior maneuverability, should operate in smaller, looser formations in which they can employ evasive movements. A two-aircraft element of fighters should not be used so much as two separate aircraft flying as one team. Their maneuvers should be coordinated so as to trap enemy aircraft in a deadly crossfire, and to cover each other's tails. When engaging enemy fighters, employ a loose, flexible formation, usually with the aircraft two to four hexes apart, and possibly staggered somewhat. Keep at least a hundred-foot difference in altitude to avoid possible collisions. Using this formation, it is usually possible to cover any maneuvers by an enemy fighter to ensure that at least one aircraft will have a shot, and/or will be in a position to pursue. When attacking powerful formations of bombers, employ a tight formation to mass the firepower where desired. When attacking ground targets, have one aircraft (or formation) go after the other target while another aircraft (or formation) supports and covers the attack by strafing the local flak positions.

Point Nr. 2: Maximize Each Aircraft's Advantages

Players should derive the maximum potential from the particular aircraft being used. What are the characteristics of the aircraft as compared to the enemy aircraft? Is it more maneuverable, faster, able to climb and/or dive better, have superior firepower, or possess the ability to absorb more damage? How can these advantages be maximized, and the disadvantages minimized? What tactics will give the best chances for success? Experience provides the answers to many of these questions, as does practice and familiarity with the rules. Although a Player may have a favorite type of aircraft he likes to use, other types should be used from time to time just for familiarity. This can be a great help later when facing those types.

Point Nr. 3: Use Altitude to Advantage

An aircraft with an altitude advantage of several thousand feet can dive rapidly to the attack whenever convenient, while it is impossible to make an effective attack from a position at a much lower altitude. Interceptors at lower altitudes than the bombers they seek may find it difficult to catch even a slow-moving formation if the altitude differential is great against them. A height advantage gives the initiative to the higher aircraft, allowing the luxury of deciding when and where to attack. Even a slight altitude advantage can be used to maintain speed while performing a series of speed-consuming maneuvers. Climb whenever possible, even if only a hundred feet or so. This extra altitude may prove very useful later. Remember that altitude is much easier to lose than it is to gain.

Point Nr. 4: Face the Enemy

Always keep the nose of a fighter pointed at the enemy. Even a head-on pass is preferable to turning away from an approaching enemy fighter, and finding him on your tail! In other words, always turn into an attack, not away from it. When attacking bombers, try to attack from the position where the firepower is least effective, and where the fewest return shots can be made. Tough, heavy fighters with lots of firepower are best for bomber interceptions, but less suitable types must perform them if they are all that are available. Bombers often

their best firepower located elsewhere than the nose. These aircraft should react to an attack by turning to present their most powerful firepower to an oncoming enemy. Bomber units should be formed so that the various aircraft in formation can cover each other's weak spots.

Point Nr. 5: Speed

Bombers flying in tight formations should not move at their maximum rate as this will cause damaged aircraft to drop out of formation and be destroyed. For fighters, it is important to remember that speed is easy to lose, if necessary, but hard to regain in a hurry without a great loss in altitude. Although high speed hinders maneuverability, the faster aircraft is harder for an opponent to predict. Properly exploited, a speed advantage can be used in a similar manner to an altitude advantage—to gain initiative.

Point Nr. 6: Plan Ahead

Try not only to visualize the possible positions of the aircraft at the conclusion of movement, but also the possibilities for the next Game-Turn. Can an aircraft be positioned or banked more effectively, so that it can fire on this Turn and also be in a good position to pursue on the following Turn? Keep in mind the relative positions, speeds, attitudes, and altitudes of the aircraft, their capabilities, and the normal tactics of your opponent. This can increase your opportunities.

Point Nr. 7: Terrain

When at low level over land, plan an approach and an exit route that takes maximum advantage of all available terrain. When placing flak around a land target, place light flak near all heavy flak positions to defend the big guns from enemy aircraft too close for the heavy flak to hit.

Point Nr. 8: Surprise

All the preceding are only ideas and suggestions, not hard and fast rules. There are times when a Player will wish to try something different, and be totally unorthodox. Surprise can be a deadly weapon in your arsenal of tricks, too! The only hard and fast rule in aerial combat is to never become too predictable—a pilot who has become predictable will soon become a casualty.

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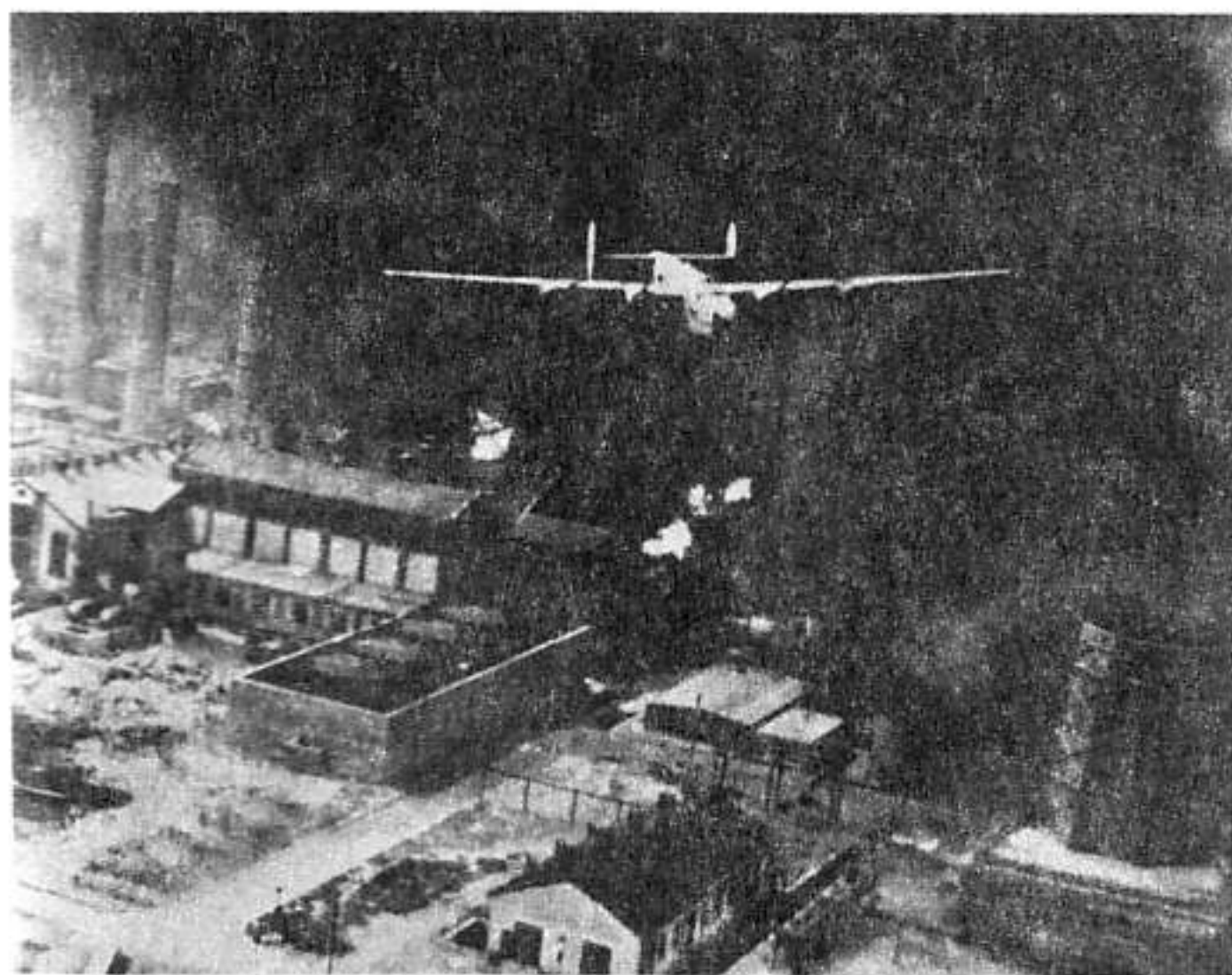
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Nr. 2 RANGE ATTENUATION TABLES

2a Aircraft Gunnery Effectiveness

Total Gun Factors	Range in Hexes					
	1	2	3	4	5	6
1-2	-1	-1	-2	-2	-3	-3
3-4	1	0	0	-1	-2	-2
5-6	2	2	1	1	0	-1
7-8	5	4	3	2	0	-1
9-10	8	5	5	2	2	-1
11-12	10	8	6	4	2	0
13-15	11	9	7	6	3	1
16-18	15	12	9	7	4	2
19-22	16	13	10	7	5	2
23-26	18	14	11	8	5	3
27+	20	16	13	9	7	4

2b Light Flak Gunnery

Total Gun Factors	Range in Hexes					
	1	3	5	7	9	13
1-2	-2	-2	-2	-3	-3	-4
3-4	0	0	-1	-1	-2	-3
5-6	2	2	1	0	-1	-3
7-8	4	4	2	1	0	-2
9-10	7	5	3	2	1	-2
11-12	9	8	4	3	1	-1
13-15	10	9	5	4	1	0
16-18	14	12	6	5	2	1
19-22	15	13	8	5	2	1
23-26	17	14	9	5	3	2
27+	18	16	9	7	4	3

2c Heavy Flak Gunnery

Total Gun Factors	Range in Hexes					
	1	13	25	37	49	61
1-2	Not Allowed					
3-4	Not Allowed					
5-6	NA	-1	-1	-1	-2	-2
7-8	NA	0	0	0	-1	-2
9-10	NA	1	1	1	-1	-1
11-12	NA	2	2	2	0	-1
13-15	NA	3	2	2	1	0
16-18	NA	4	4	3	1	1
19-22	NA	5	4	4	1	1
23-26	NA	5	5	4	2	2
27+	NA	7	5	5	3	2

How to Use: First you must find the total number of modifiers applicable to your combat using the Hit Tables Modifier Chart. Then Cross-reference the Range between target and firing aircraft (or Flak counter), with the total Gun Factors firing. The resulting number is added to, or subtracted

from, the total modifiers to give you the Hit Table Column on which to resolve the fire.

Range: Use the closest lower range column to the actual range.

Nr. HIT TABLE: Roll one die and cross reference on

Die Roll	C	1	2	3	4	5	6	7	8	9	10	11
1	W	F	FL	FE	FCL	FCG	WEG	WWCE	WWFG	FCGL	FFCL	WFGL
2	F	W	F	WE	WFF	WCL	FFL	FCE	WCEL	FFEE	FEFG	FEEL
3	C	O	W	CG	CE	FFE	WWF	CGL	FFE	WFL	FCGL	WWWG
4	E	O	E	FF	EG	WFE	FCE	WFE	WCE	WWC	WWWL	WFFC
5	G	O	C	L	WW	WW	WCL	WFL	FCL	WCE	WFE	FCEL
6	L	O	O	W	E	E	FE	FF	FE	WFE	WCE	FCE

W: WING HIT: The max. dive speed is reduced by one per 2 hits (one per 3 hits on two or four engine planes. Destroyed when the # of wing hits equals the "W" # on plane's TC.

F: FUSELAGE HIT: Destroyed when the # of fuselage hits equals the "F" # on plane's TC.

C: COCKPIT HIT: With one or more hits no half-loop or half-roll maneuvers. With two hits no slips or movement in the dive speed increment. No effects on dual cockpit planes until one "C" section is destroyed. Destroyed when the # of cockpit hits equals the "C" # on plane's TC.

E: ENGINE HIT:
SINGLE ENGINE: Lose one power factor per "E" hit.

TWO ENGINE: Lose one power factor if both engines have one hit, two power factors if both engines have two hits. All power factors are lost if one engine is destroyed (jettison bomb load, and fly as if loaded).

FOUR ENGINE: Lose one power factor per engine destroyed. Must jettison bomb load if two engines are destroyed, and fly as if loaded.

Plane destroyed if two engines on the same side are gone. Plane destroyed if any two engines gone + one hit on each of the other engines. Plane destroyed when the # of engines hit equals the "E" # on plane's TC.

G: GUN HIT: Each hit on "FF" or "FH" guns causes loss of one gun factor number. Each hit on "F" guns causes loss of one gun factor in every direction. Excess gun hits count as fuselage hits.

L: FUEL TANK HIT: Destroyed when the # of fuel tank hits equals the "L" # on plane's TC.

BARRAGE BALLOONS: Have Sil. of "2". Only "C" hits count. One hit destroys.

FLAK: Has Sil. and Fire Mod. of "O". Only "C", "E", and "G" hits count. Each hit destroys one gun factor number.

VEHICLES: Have Sil. of "-2". Only "F" hits count. Armored counters require two hits to destroy, unarmored counters require one hit to destroy. Flak stacked on a vehicle is destroyed with the vehicle.

O: Miss.

Nr. 1 HIT TABLE MODIFIER CHART		BOMBING CHARTS (OPT)	
1a Basic Modifiers		High Level Bombing Table	
Fire	As given	Modified Die Roll	Points Damage
Silhouette	As given	0 or less	0
Inverted Firing	-3	1-2	1
1b Optional Modifiers		3-4	2
Target Speed 8 +	-1	5-6	3
Ace (per 5 kills)	+1	7-8	4
Novice	-2	9-10	5
1c Optional Deflection Modifiers		11+	6
(Difference between Clock Positions)		High Level Modifiers	
no difference	-3	Each adjacent	
(both at 12° =	-4)	target hex: +1 (each)	
10 minutes	-2	per 5000 feet	
20 minutes	0	Over 20,000: -1 (each)	
30 minutes	+1	Night visibility: -3	
"advantage" bonus	+1	Obscured Target: -2	
Explanation: Determine direction of opposing aircraft relative to each other and figure the difference of their clock positions. Example: Target at firing unit's 12°, firing unit at target's 8°, difference of 20 minutes, modifier zero.		(Per 4000 lbs bombs) +1	
		Dive & Glide Bombing Charts	
		Dive & Glide Bomb Modifiers	
		Dive Bomb Attack: +1 to 2nd die	
		Bombing Vehicle: -1 to 2nd die	
		Target Obscured: -1 to 2nd die	

3
proper column to determine the types of hits.

12	13	14	15	16	17	18	19	20
FFEE	WFCGL	WFCEE	WCEEL	WWWFF	WFFCEL	FFFCCL	WFFCCE	WWWFFE
FCGL	FFEL	WWWFF	WFCEG	WCCEG	WFCEEL	WWFCEL	WFCEEE	WFCCCEG
WWWC	WWWC	FFEG	WWWEG	FCEGL	WFFEL	WWWEG	WWWFFF	WWFFEL
FFGL	FCEL	WWEL	FFCE	WFFEL	WWWEG	WFFEG	WWCEGL	WFCELL
WWCE	WEEG	CEGL	FFEL	FFEEL	WFFEG	WCEEL	WFEGLL	WEEEGL
WFEL	WFFE	FCEL	WFFL	WCEL	CCGL	WFFEG	FFEGL	WFFCG

Nr. 4 Rocket Firing Table (OP.)		Rocket Fire Modifiers		BAILING OUT (OPT)			
Modified Die Roll	Results			Die	0 "C" Hits	1 "C" Hits	2 "C" Hits
5 or more	Miss	Single Target	-2	1	Bail Out	Bail Out	Bail Out
6-8	1 Hit	Range of 4 or less	+1	2	Bail Out	Bail Out	Bail Out
9-12	2 Hits	Mobile Ground target	+1	3	Bail Out	Bail Out	Failure
13+	3 Hits	Immobile target	+2	4	Bail Out	Bail Out	Failure
Spotting Modifiers		(per target in hit area)	+1	5	Bail Out	Failure	Failure
Aircraft Modifiers (on card)		7-12 Rockets Fired	+1	6	Failure	Failure	Failure
On-Ground Target	-1	13-24 Fired	+2	Note: roll one die: one chance only			
Night	-3	25-36 Fired	+3	VICTORY POINTS			
Out of Sun	-3	37-48 Fired	+4	Aircraft Destroyed (on card)			
Range of 10 or less	+1	SPOTTING TABLE (OPT)		Lt Flak Gun Factor ½ VP			
Spotting from Ground	+2	Modified Die Roll	Results	Hvy Flak Gun Factor 1VP			
Ace Spotting	+2	3 or less	Do Not Spot	Truck Destroyed 2VP			
Radar (12°, 15 hex range)	+2	4 or more	Spot	Tank Destroyed 5VP			
				Barrage Balloon 2VP			
				INLINE ENGINES (OPT)			
				11 = Engine Freezes			
				other result = eng OK			
				2nd time add. result:			
				3 = Aircraft destroyed			

AIR FORCE TABLE OF MANEUVER EFFECTS

Top View:	Rear View:	Type	Code	Req. Bank	M.P. Cost	Speed Effect	Special Conditions
		Power	P	none	none	+ 1	May not be applied at Dive Speed
		Brake	K	none	none	- 1	
		Climb	C	none	none	see MC	
		Dive	D	none	none	see MC	
		Right Turn	R	IR or RB	1	- 1	Change facing 60° to Right
		Left Turn	L	IL or LB	1	- 1	Change facing 60° to Left
		Right Slip	S	IL or LB	1	- 2	may be followed immediately by L or LL
		Left Slip	T	IR or RB	1	- 2	may be followed immediately by R or RR
		Right Bank	B	none	none	none	
		Left Bank	N	none	none	none	
		R. Half-Roll	H	none*	1	- 1	* a/c flips over during Roll
		L. Half-Roll	E	none*	1	- 1	* a/c flips over during Roll
		Spin	Spin	†	none	none	a/c must dive during Spin
		Drop Bombs	Bmb				
		Fire Rocket	Rct				
		Half-Loop	V	*	1	- 2	* a/c reverses direction and bank — must be diving or climbing max; see rules.

NOTES: ° = prior location • = final location → = facing "a/c" = aircraft

In addition to the above requirements, note that each aircraft MC shows a number of hexes of forward movement which must precede codes in **Bold** (note the exception made in the case of turns executed in conjunction with a slip).

Key: E = Experience (roll again to determine ace)
T = Training
R = Reflex
V = Vision
• = no characteristics

Experience Notes: Pilot without experience gains same after five missions. * Ace modifier of + 2 supersedes this benefit (is not added to it). ** Reflex benefit supersedes this benefit.

PILOT CHARACTERISTICS DETERMINATION TABLE (OPT)

Find Year on Line corresponding to Nationality

Nationality				
GERMAN	1939-42	early '43	late '43-'44	1945
AMERICAN	late '43-'45	late '42-'43	early '42	
BRITISH	39 & late '42-'45	1940-early '42		
Die: 1	ETTRV	ETTRV	ETRV	ETRV
2	ETRV	ETRV	ETR	T
3	ETTR	TR	T	RV
4	ETT	ET	RV	R
5	RV	RV	R	•
6	R	•	•	•

PILOT CHARACTERISTICS TABLE OF EFFECTS (OPT)

Effects of Characteristics on . . .

	Spotting	Firing	Maneuverability	Advantage	Damage	Quality	Bombing
VISION	+ 1 Modif	Shift 1 col.	none	none	none	none	none
REFLEX	none	inc. ammo by 2	- 1 MP/Game-Turn	hide half of plot	none	none	none
TRAINING	none	none	none	none	negate one hit	none	+ 1 modif
EXPERIENCE	+ 1 modif *	none	none	hide last 2MP of plot**	none	considered "average"	none

Airforce Counter Sheet

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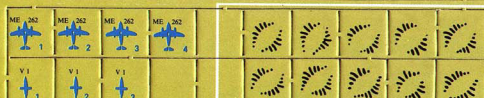
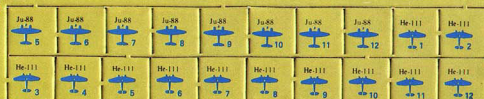
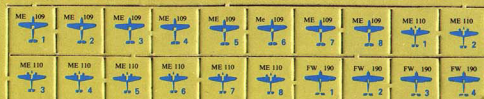
BRITISH



AMERICAN

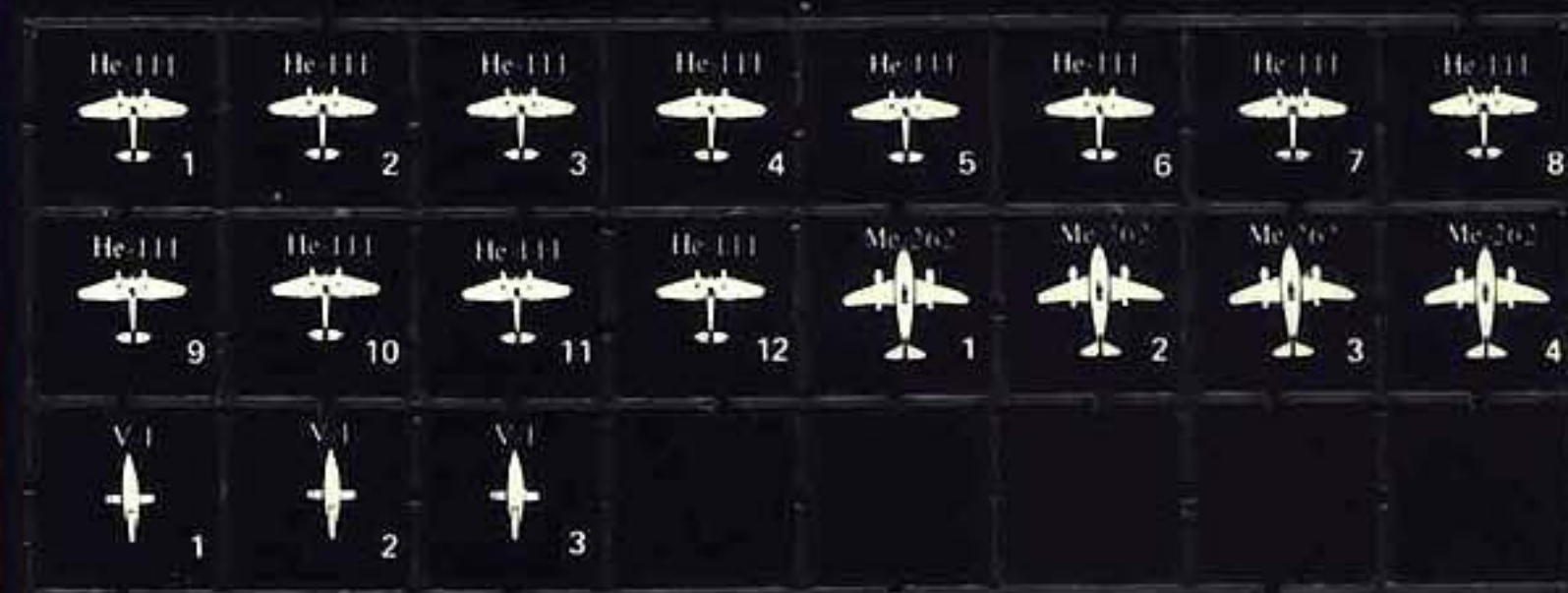
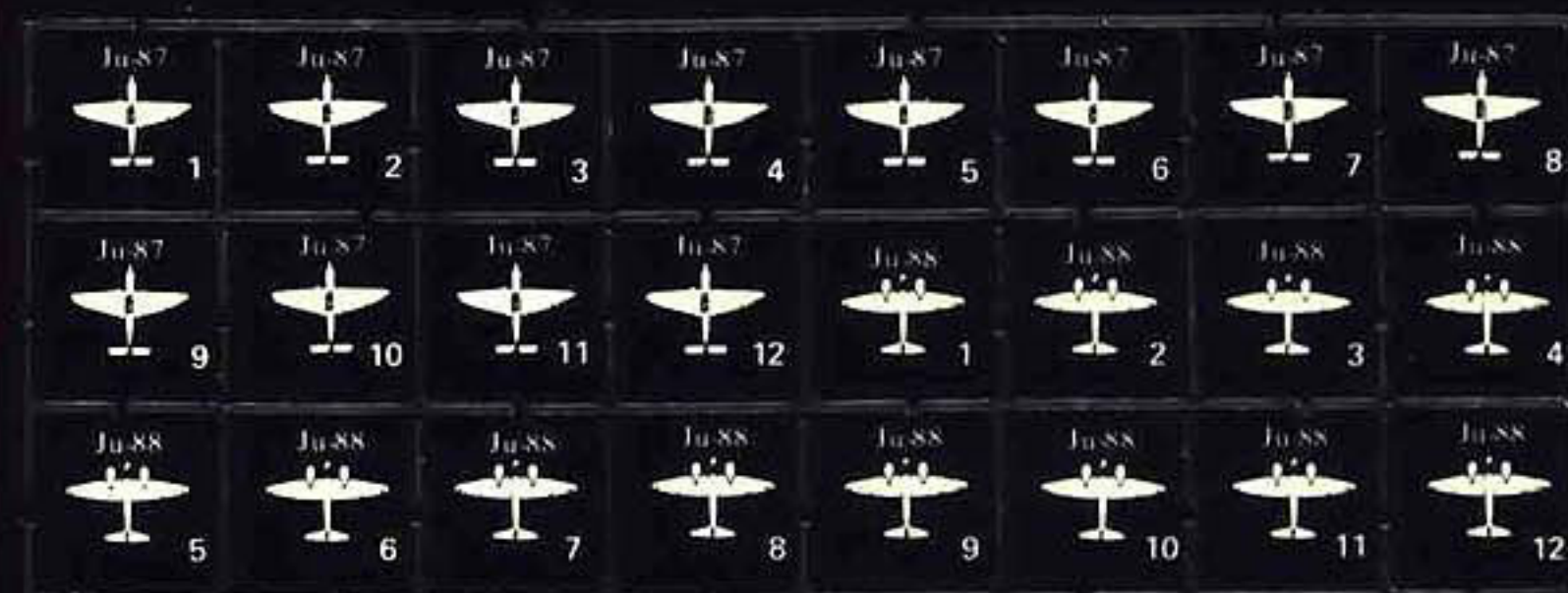
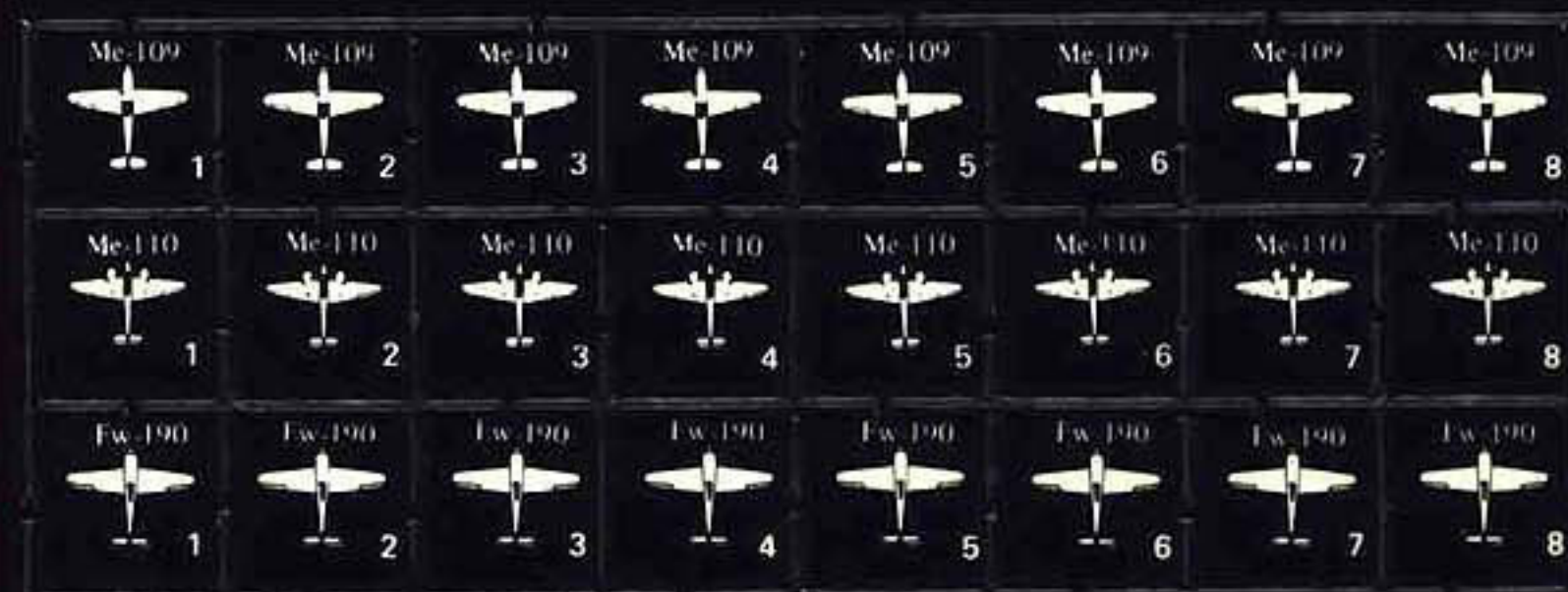
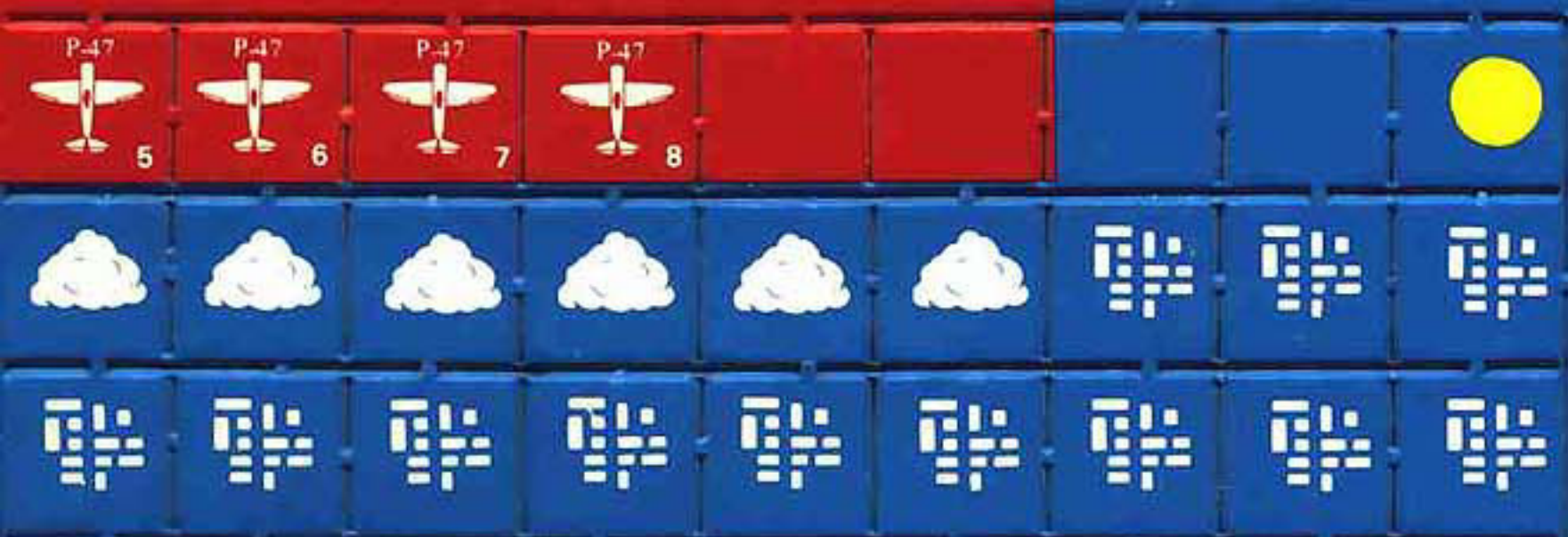


GERMAN



NEUTRAL MARKERS





LOG SHEET

TURN #	Type:		No:		Type:		No:		Type:		No:		Type:		No:		TURN #			
	W		Cn	Mg	W		Cn	Mg	W		Cn	Mg	W		Cn	Mg				
	F		L		F		L		F		L		F		L					
	C		C		C		C		C		C		C		C					
	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E				
	G				G				G				G							
In. Speed	In. Altitude	In. Bank	Moves	Altitude Change	In. Speed	In. Altitude	In. Bank	Moves	Altitude Change	In. Speed	In. Altitude	In. Bank	Moves	Altitude Change	In. Speed	In. Altitude	In. Bank	Moves	Altitude Change	
1																				1
2																				2
3																				3
4																				4
5																				5
6																				6
7																				7
8																				8
9																				9
10																				10
11																				11
12																				12
13																				13
14																				14
15																				15
16																				16
17																				17
18																				18
19																				19
20																				20

LOG NOTATIONS:

P = Power
K = Brake
C = Climb
D = Dive
R = 60° Right Turn
L = 60° Left Turn

S = Right Slip
T = Left Slip
B = Right Bank
N = Left Bank
H = Right Half-Roll
E = Left Half-Roll

Spin = Spin
Bmb = Drop Bombs
Rct = Fire Rockets
V = Half-Loop

BANK NOTATIONS



MANEUVER COST:

Turn: Counts 1 hex; -1 Speed
Slip: Counts 1 hex; -2 Speed
Bank: No Costs
Half-Loop: Counts 1 hex; -2 Speed
Half-Roll: Counts 1 hex; -1 Speed

Type:	No:	Type:	No:	Type:	No:	Type:	No:	Type:	No:		
W	Cn	Mg	W	Cn	Mg	W	Cn	Mg	W	Cn	Mg
F	L		F	L		F	L		F	L	
C	C		C	C		C	C		C	C	
E	E	E	E	E	E	E	E	E	E	E	E
G			G			G			G		

Type:	No:	Type:	No:	Type:	No:	Type:	No:	Type:	No:		
W	Cn	Mg	W	Cn	Mg	W	Cn	Mg	W	Cn	Mg
F	L		F	L		F	L		F	L	
C	C		C	C		C	C		C	C	
E	E	E	E	E	E	E	E	E	E	E	E
G			G			G			G		

Type:	No:	Type:	No:	Type:	No:	Type:	No:	Type:	No:		
W	Cn	Mg	W	Cn	Mg	W	Cn	Mg	W	Cn	Mg
F	L		F	L		F	L		F	L	
C	C		C	C		C	C		C	C	
E	E	E	E	E	E	E	E	E	E	E	E
G			G			G			G		

Me-110G

Messerschmitt Bf. 110G-4/R3 Night Fighter

Operational in Summer '43. About 700 G-series built.

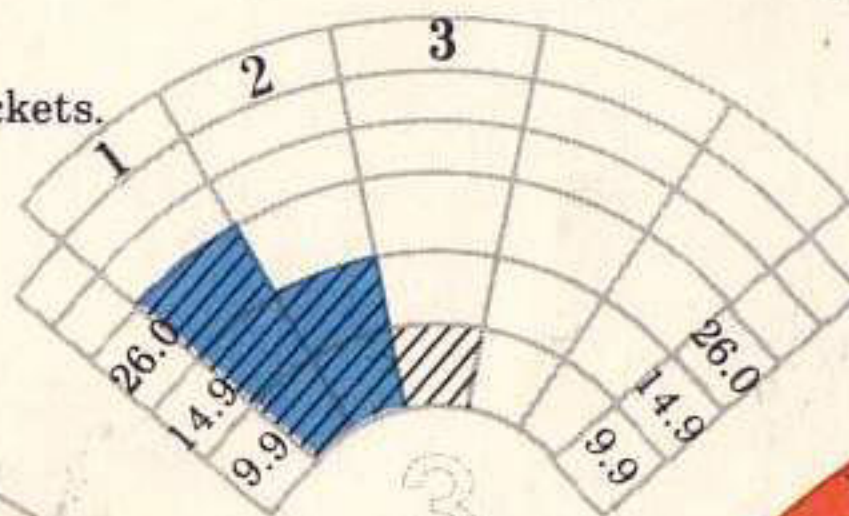
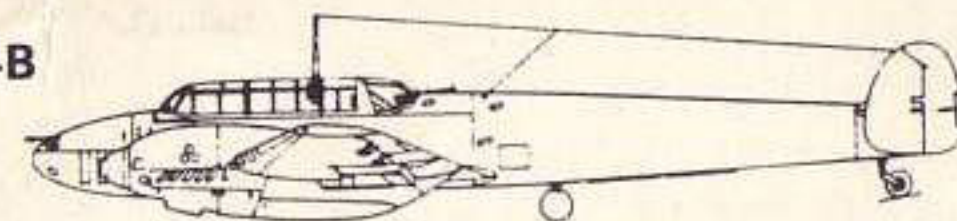
Equipped with Radar.

Loaded: Could carry up to 3 bombs or 4A/A or A/G rockets.

Stall Speed	
Maneuver Sp.	
Level Speed	
Dive Speed	
Loaded (Opt.)	-1

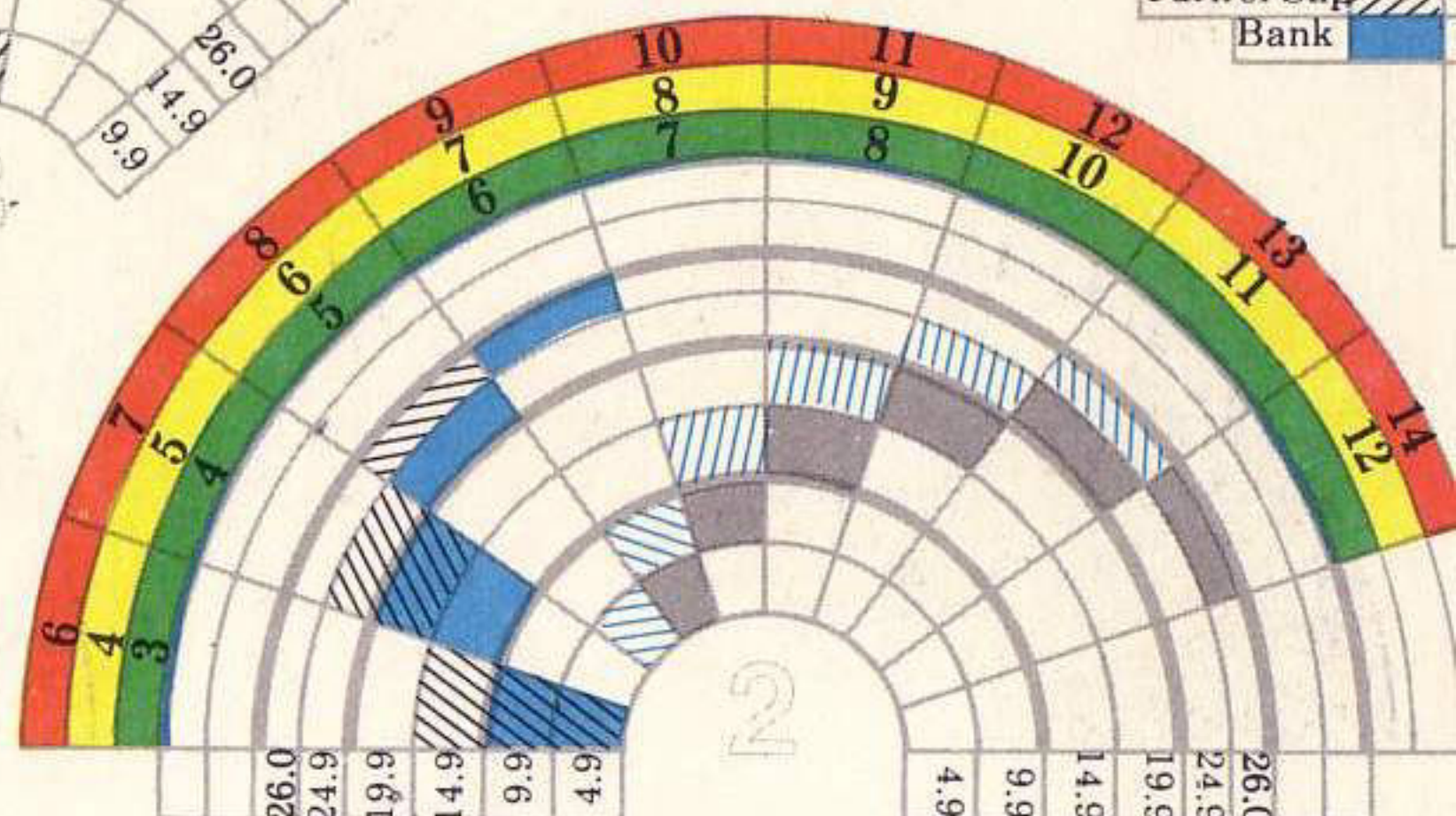
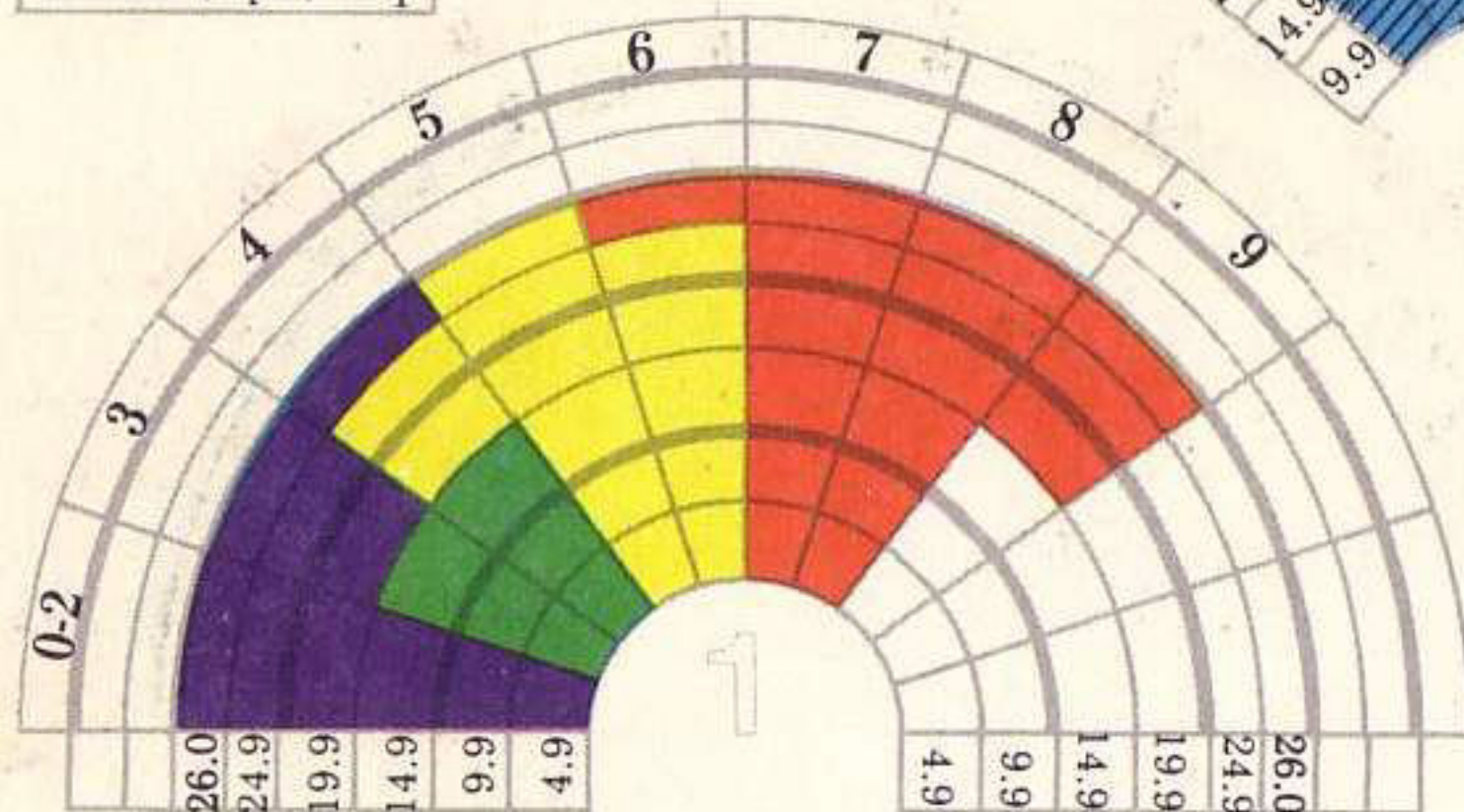
AIR FORCE DATA CARD 14B

Speed Change



Power Factors	
Brake Factors	

Half Loop	
Half Roll	
Turn or Slip	
Bank	

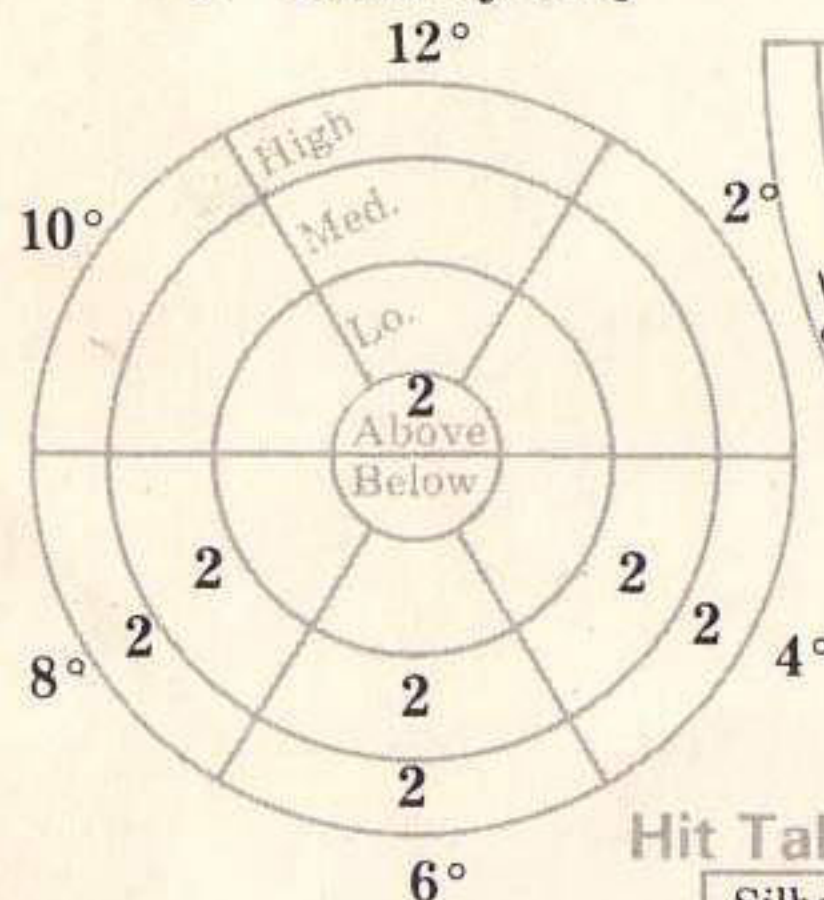


Speed Increments

Altitude Change

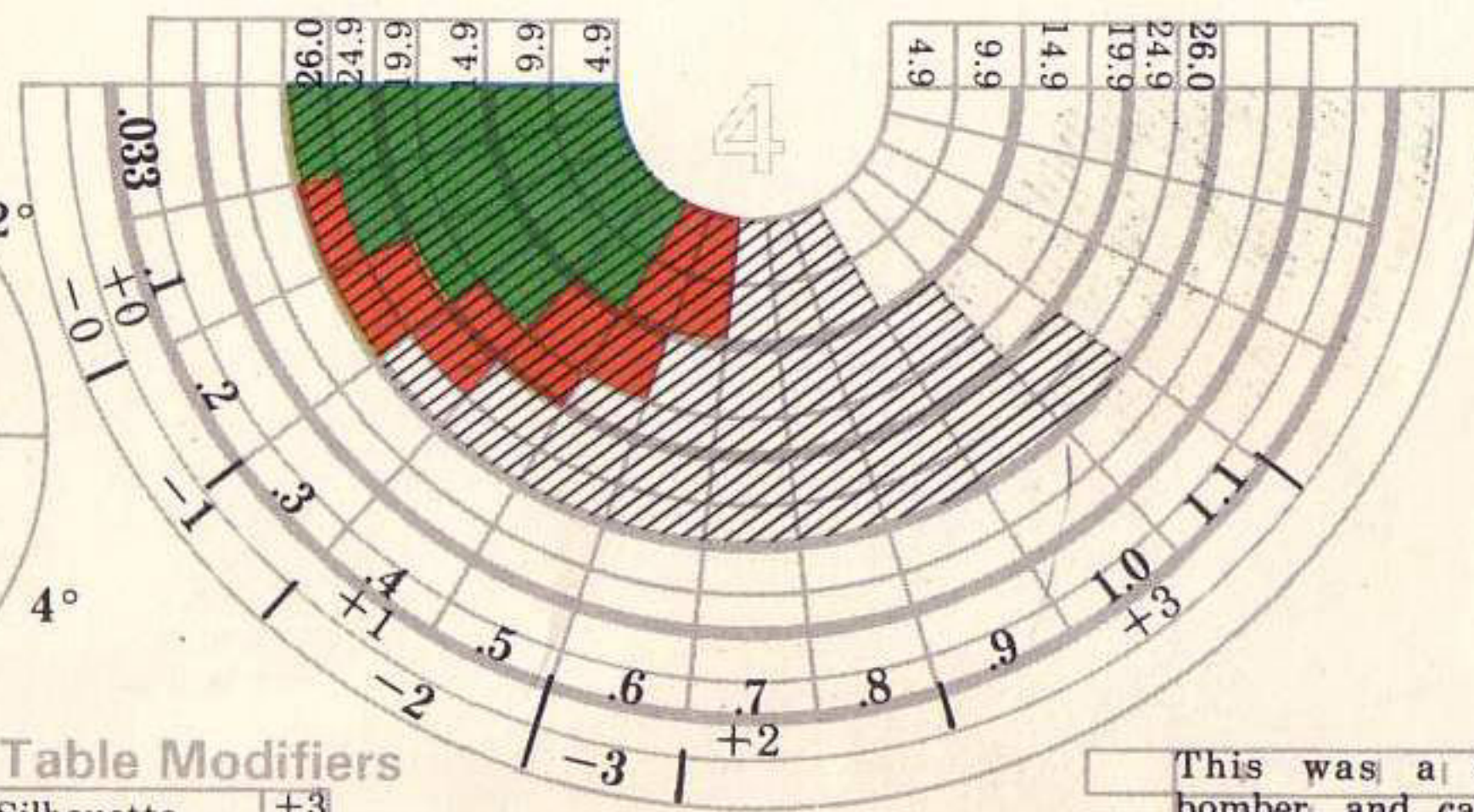
Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+3
FF/FH Fire	+2



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	
Dive Sp. Climb	
Max Climb	

Target Characteristics

W	7	Cn	6	Mg
F	6	L	3	
C	3	C	-	
E	3	E	-	E
G	4M 8C 3M	3M 8C 4		
	(6) (6) (3) (5) (3) (6)			
	FF FF FH F FH FF			

Variants

G-2/R3. PV: 25

G	4M 8C 4M	4M 8C 4
	(6) (6) (6) (5) (6) (6)	
	FF FF FF F FF FF	

This was a fighter-bomber, and carried no radar.

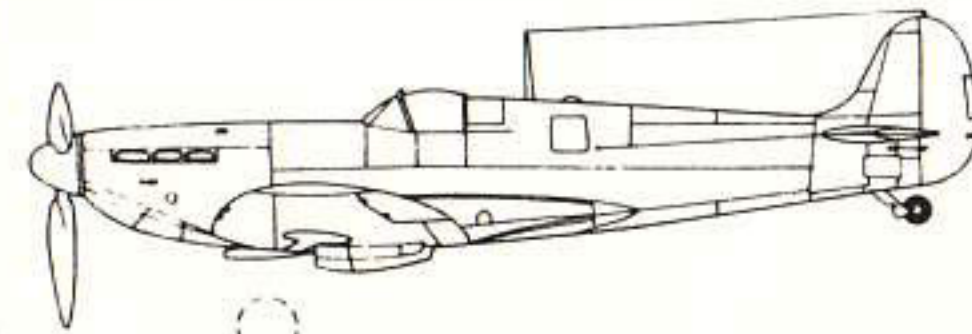
Loaded: Could carry one bomb or 4 rockets.

Spitfire I

Supermarine Spitfire I.A. Day Fighter

PV: 16. Engine Type I. Producer: Great Britain

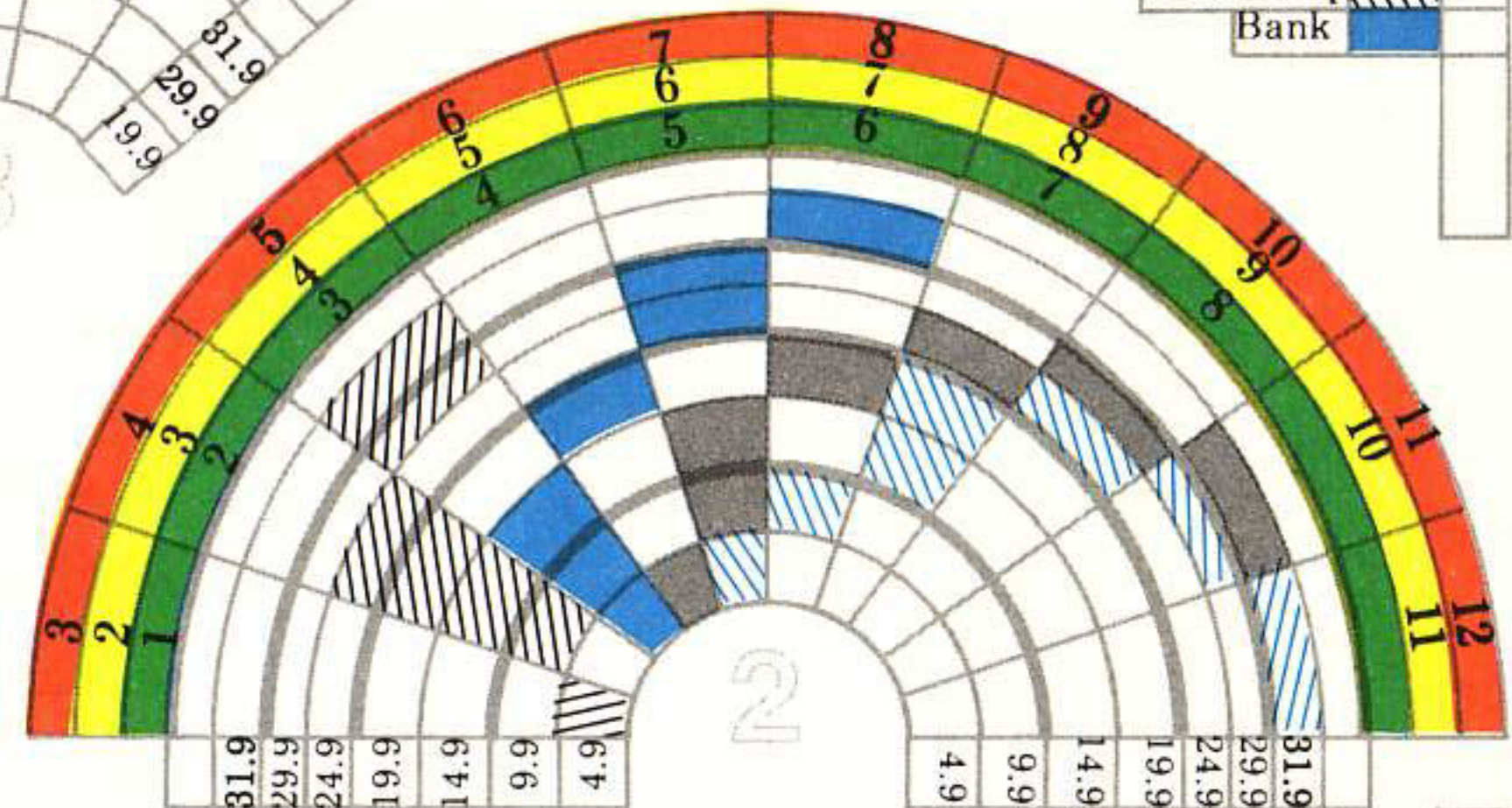
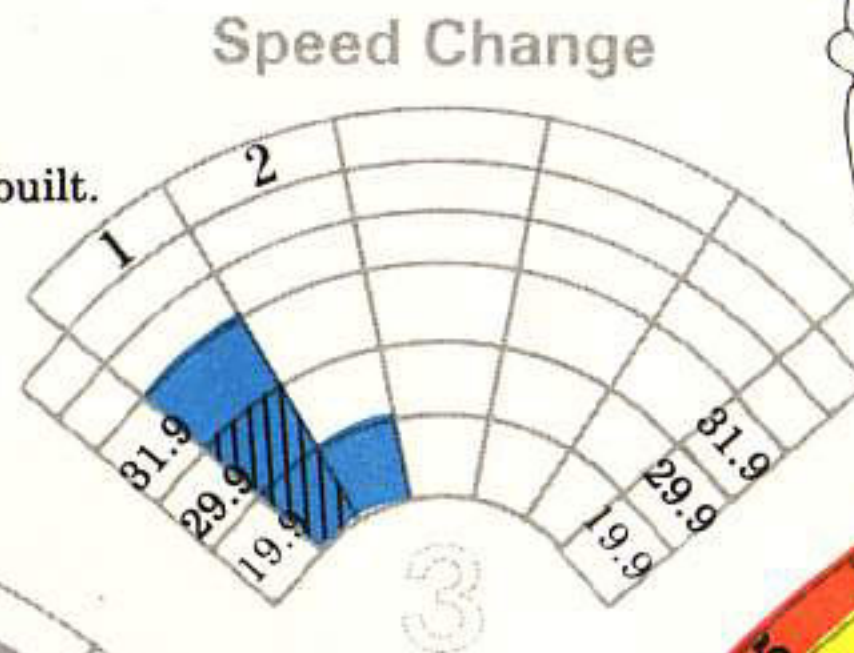
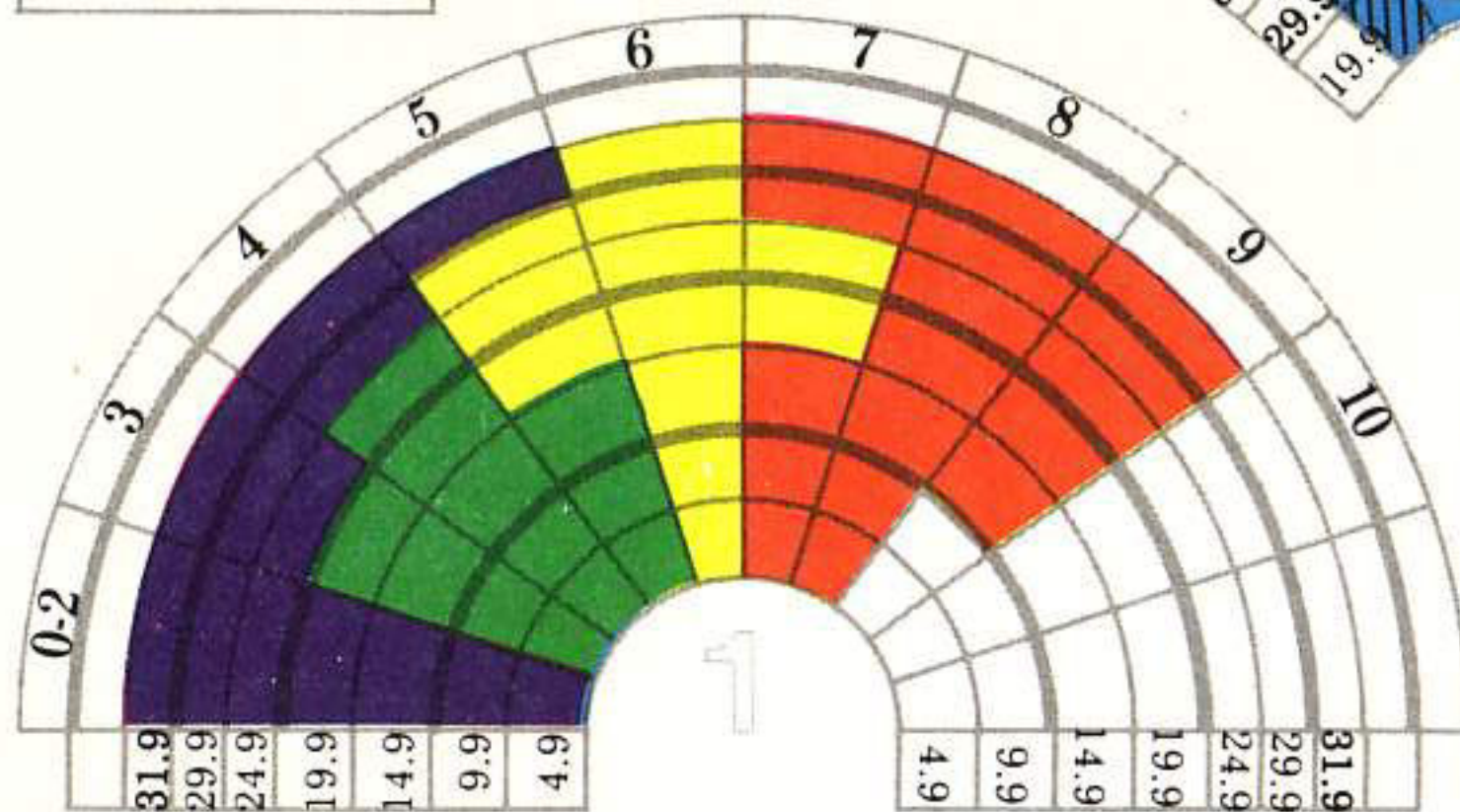
Deliveries started in May '38. A total of 1566 series-I built.



Stall Speed	Dark Purple
Maneuver Sp.	Green
Level Speed	Yellow
Dive Speed	Red

Power Factors	Diagonal Lines
Brake Factors	Blue

Half Loop	Grey
Half Roll	Blue
Turn or Slip	Diagonal Lines
Bank	Blue

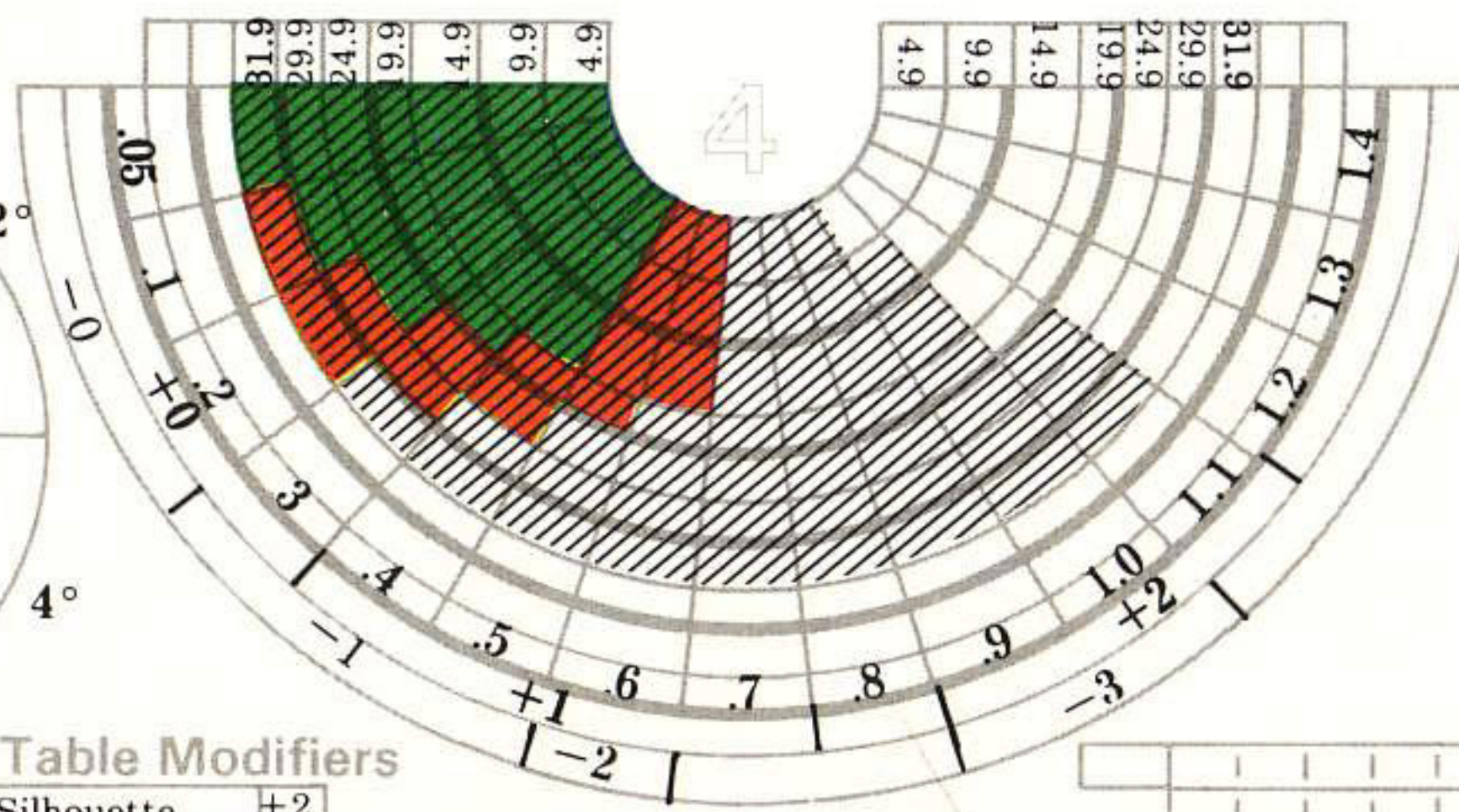
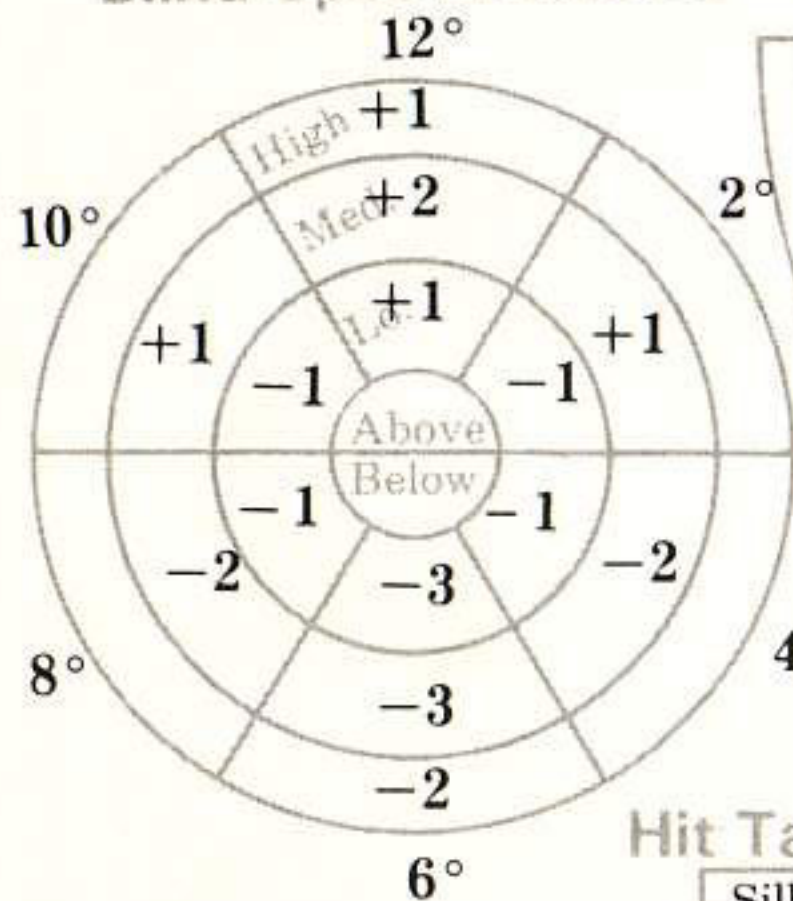


Speed Increments

Altitude Change

Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+2
Fire	+2

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	Diagonal Lines
Dive Sp. Climb	Red
Max Climb	Green

Target Characteristics

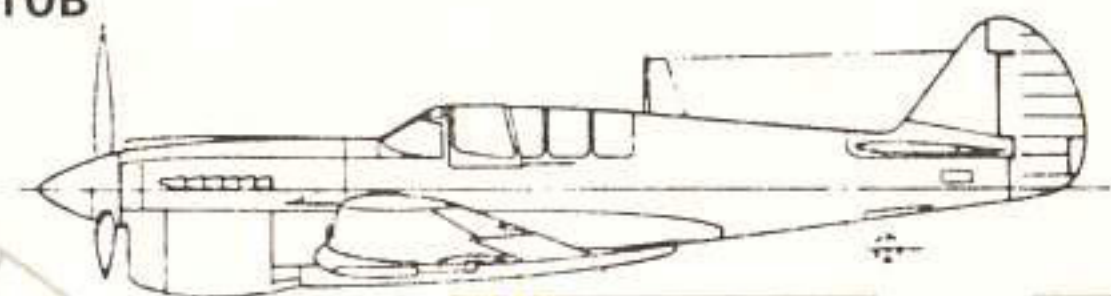
W	5	Cn	-	Mg	4
F	5	L	3		
C	3	C	-		
E	3	E	-	E	-
G	2M	2M		2M	2M
	(4)	(4)		(4)	(4)
FF					FF

Variants

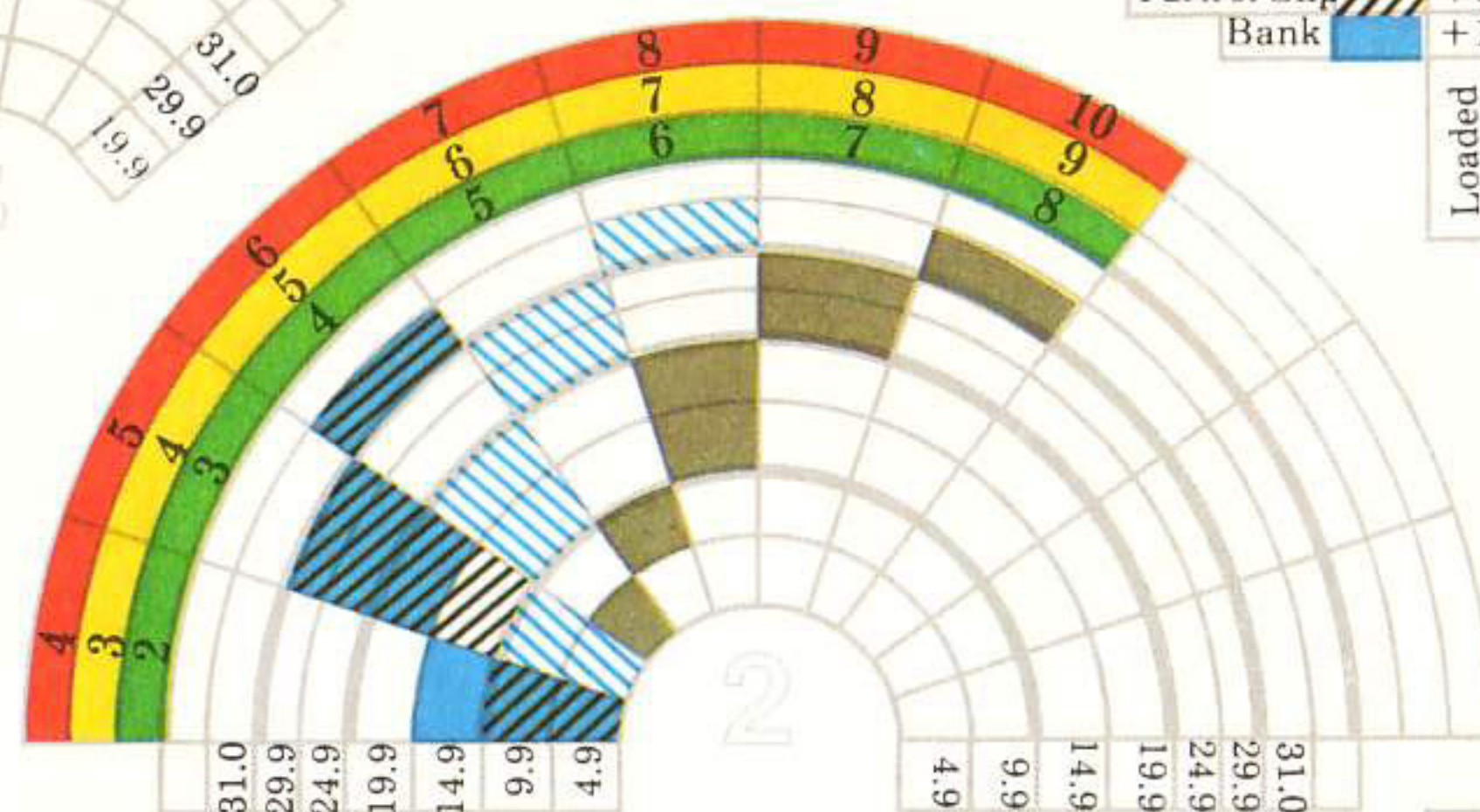
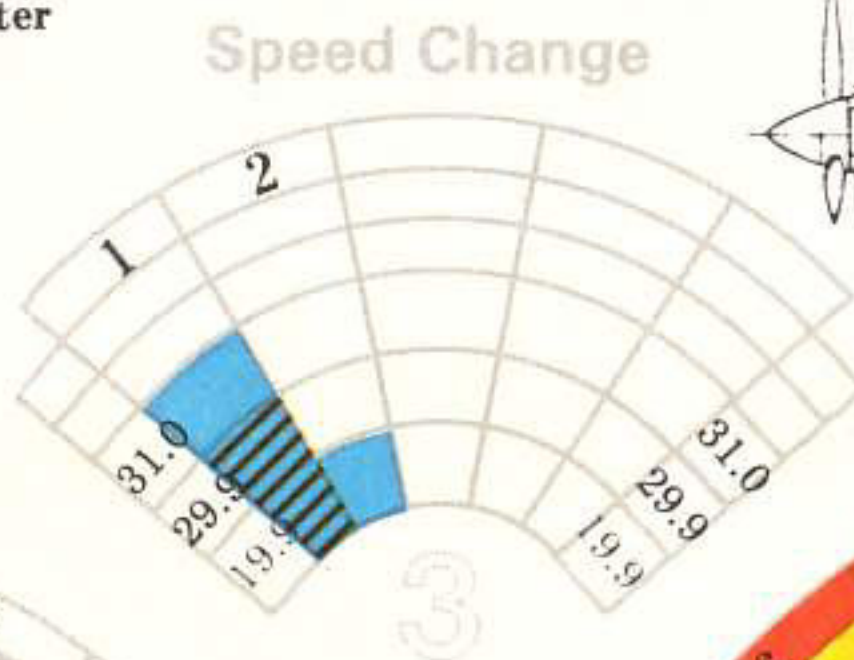
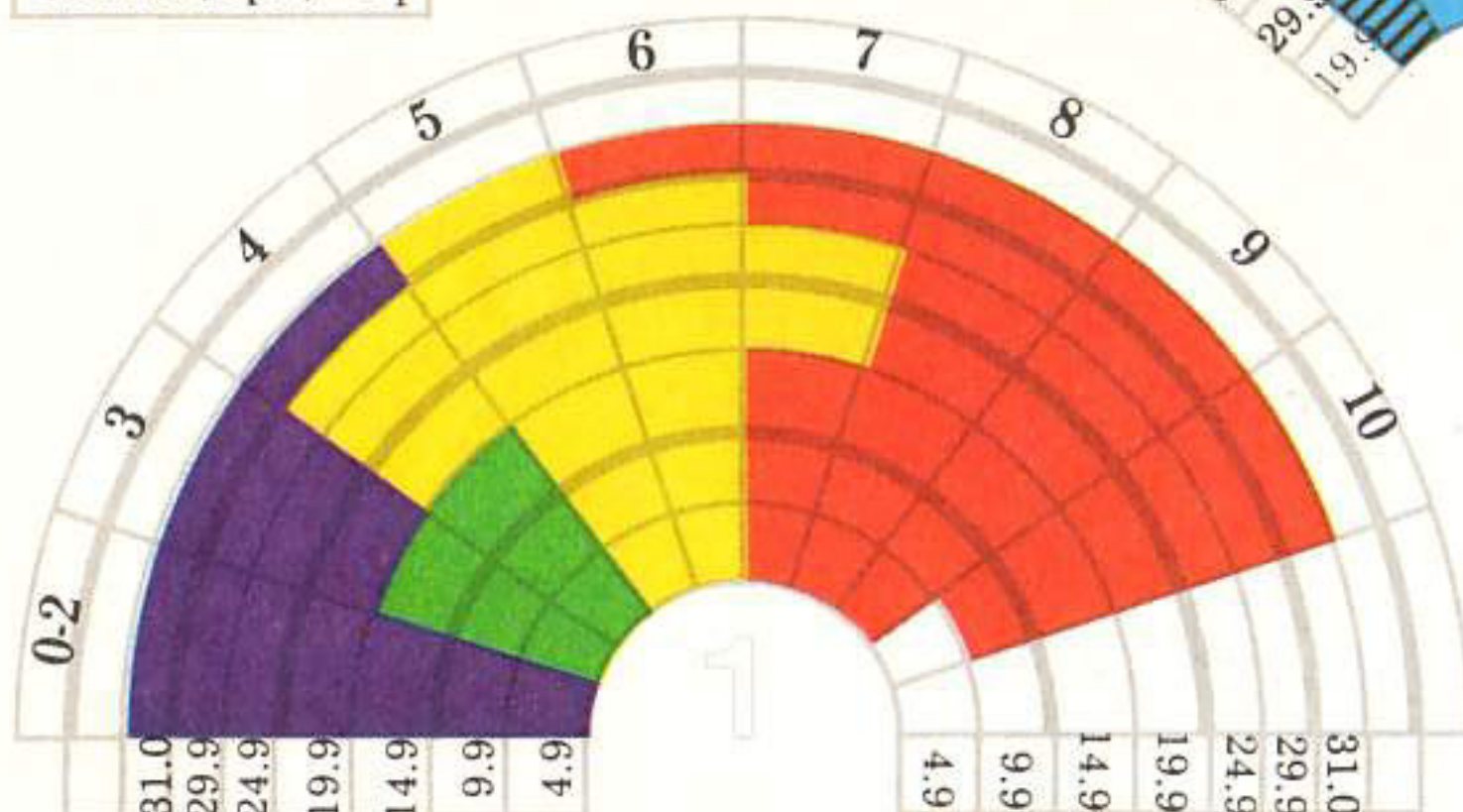
P-40N

Curtiss P-40N "Warhawk" ("Kittyhawk IV") Day Fighter
 PV: 17 Engine Type: I Producer: USA
 Deliveries started in March '44. A total of 5219 built.
 Loaded: Can carry one bomb.

DAUNTLESS DATA CARD 10B



Stall Speed	0.2
Maneuver Sp.	0.3
Level Speed	0.4
Dive Speed	0.5
Loaded (Opt.)	-1



Power Factors	+
Brake Factors	-

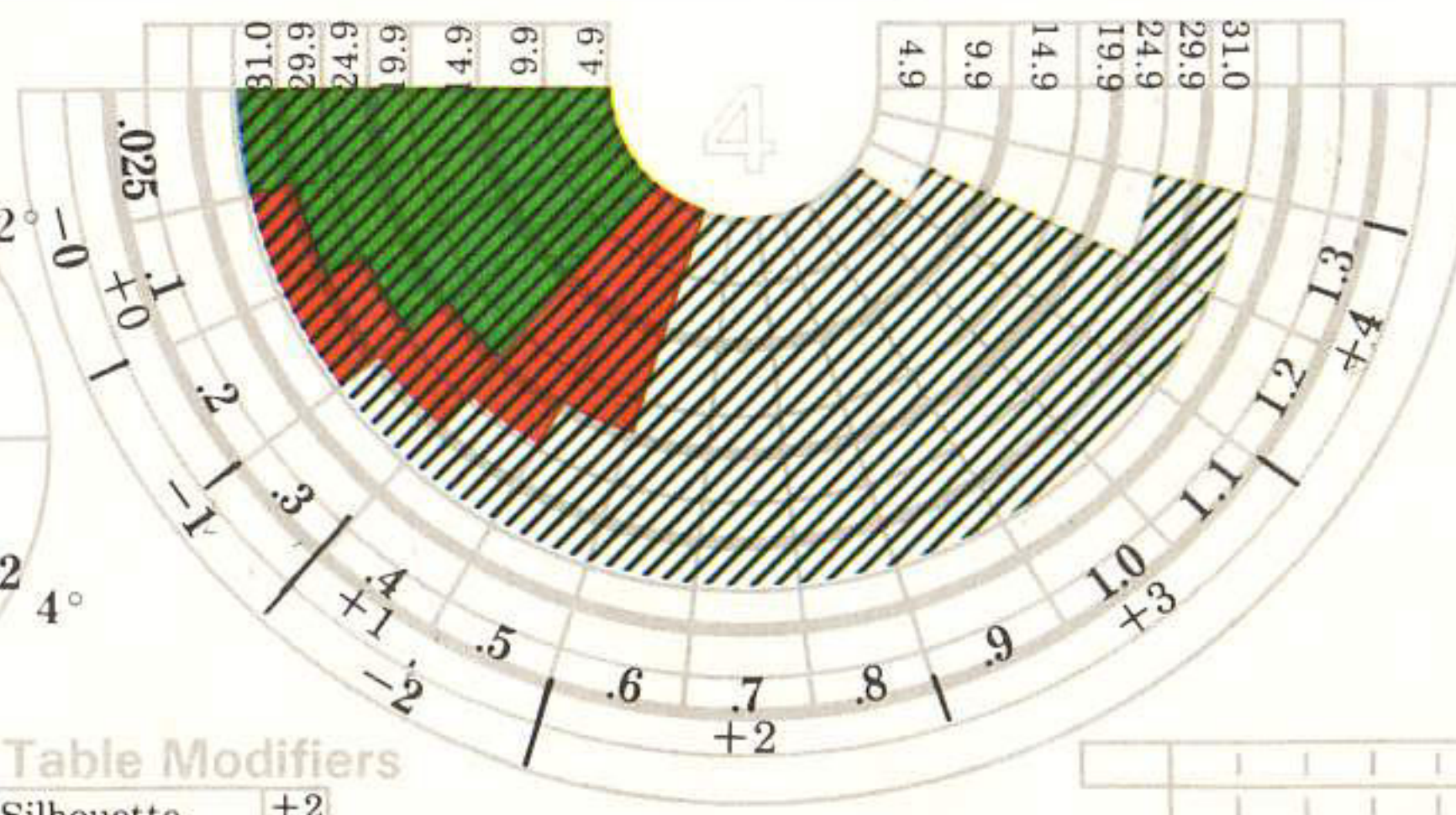
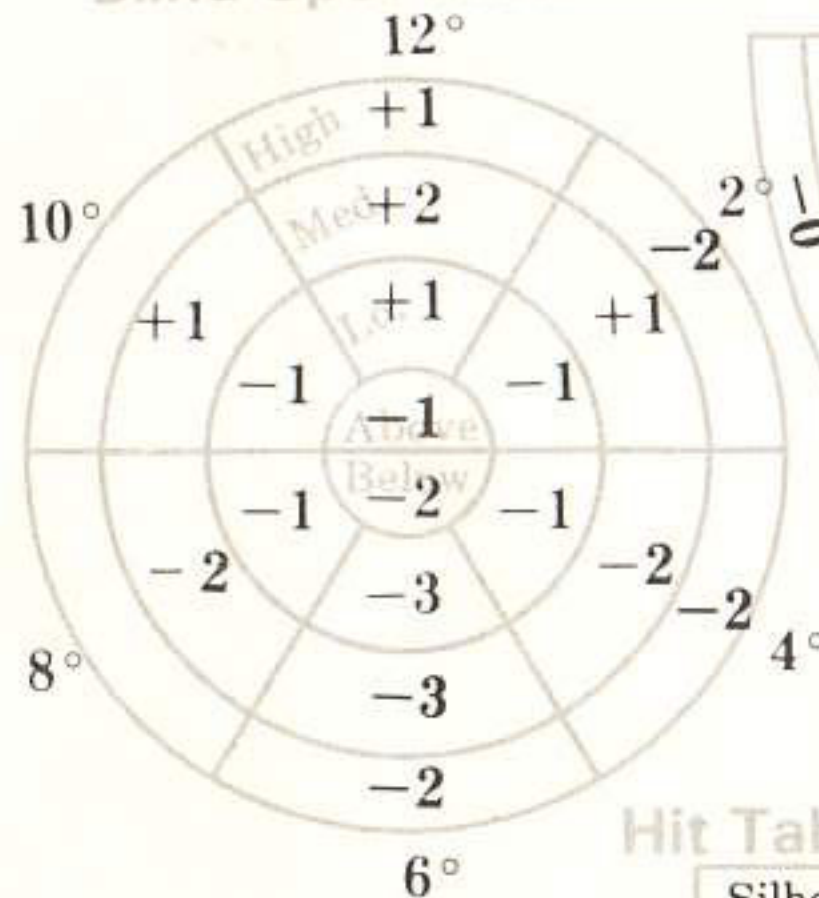
Half Loop	P
Half Roll	P
Turn or Slip	+2
Bank	+1
Loaded	

Speed Increments

Altitude Change

Maneuverability Requirements

Blind Spot Modifiers



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-0.3
Dive Sp. Climb	-0.1
Max Climb	-0.1

Hit Table Modifiers

Silhouette	+2
Fire	+2

Target Characteristics

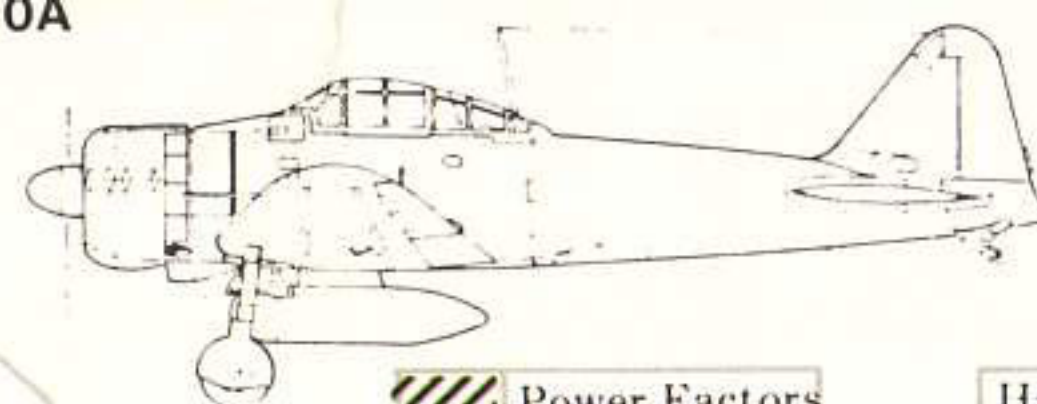
W	6	Cn	-	Mg	5
F	7	L	3		
C	3	C	-		
E	3	E	-	E	-
G	2M 4M			4M 2M	
	(5) (5)			(5) (5)	
	FF			FF	

Variants

Zero

Mitsubishi A6M2 Model 21 "Reisen" ("Zeke") Carrier Day Fighter
 PV: 16 Engine Type: R Producer: Imperial Japan
 Operational in 1940. A total of 740 built.
 Loaded: Can carry one bomb.

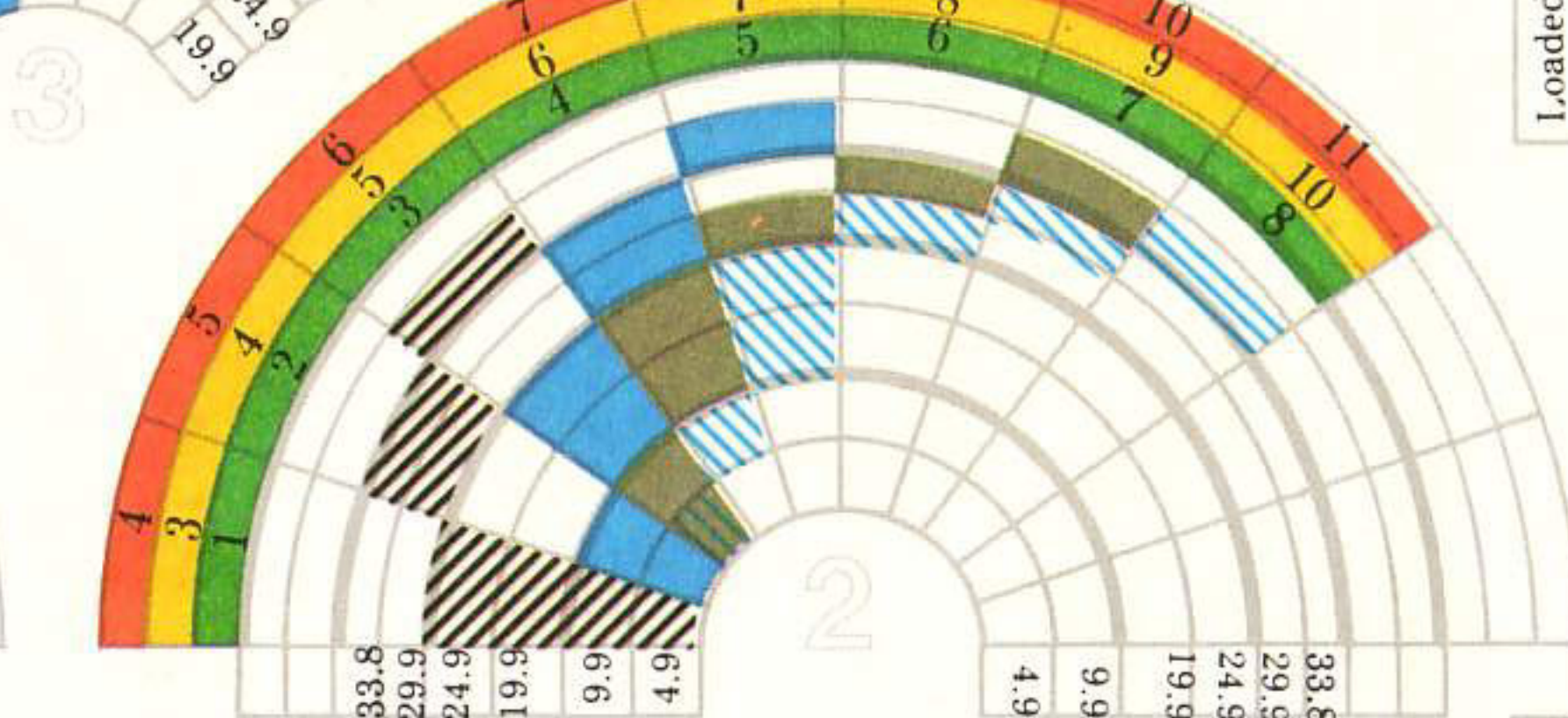
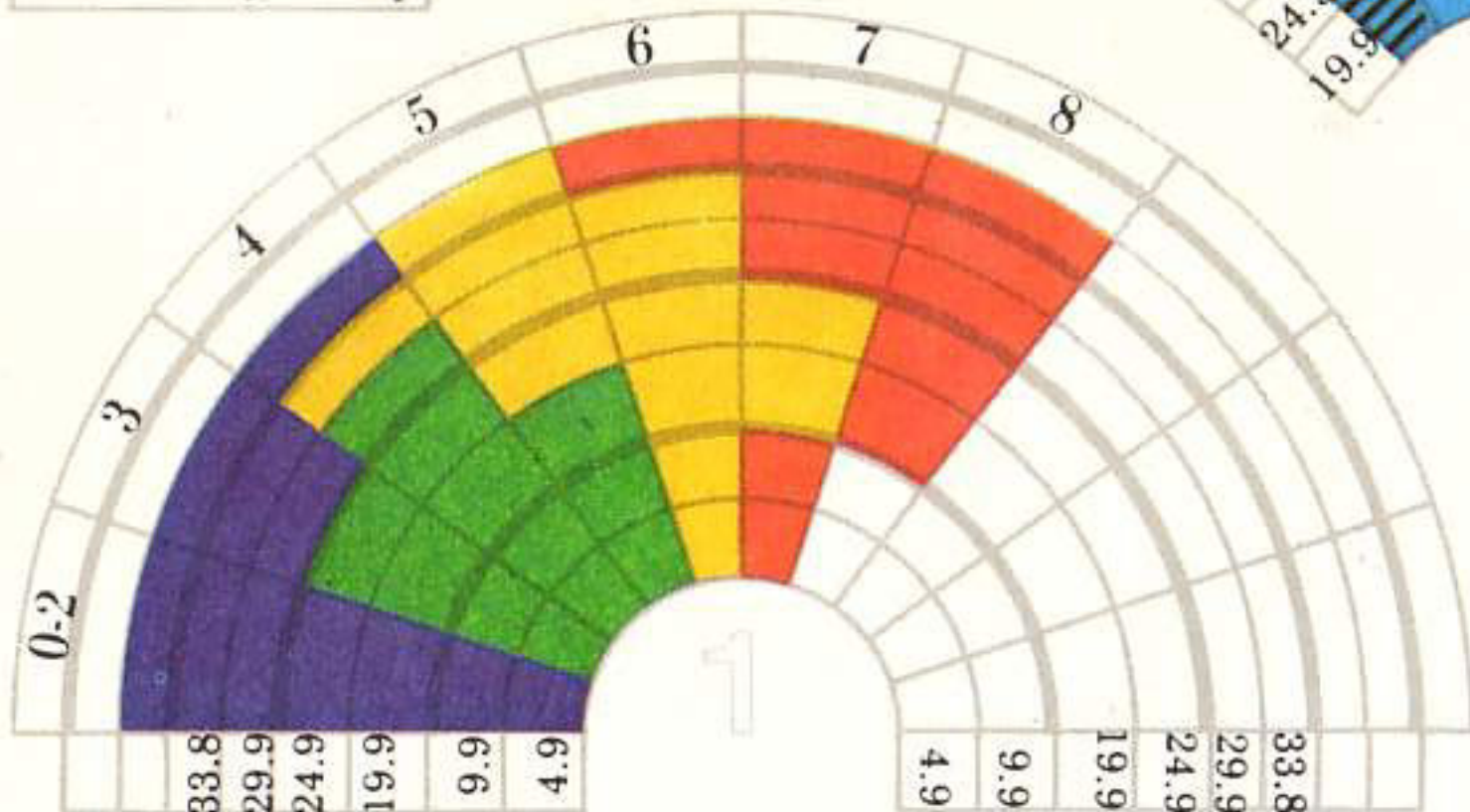
DAUNTLESS DATA CARD 10A



Power Factors
 Brake Factors

Half Loop P
 Half Roll P
 Turn or Slip +2
 Bank +1
 Loaded

Stall Speed
 Maneuver Sp.
 Level Speed
 Dive Speed
 Loaded (Opt.) -1

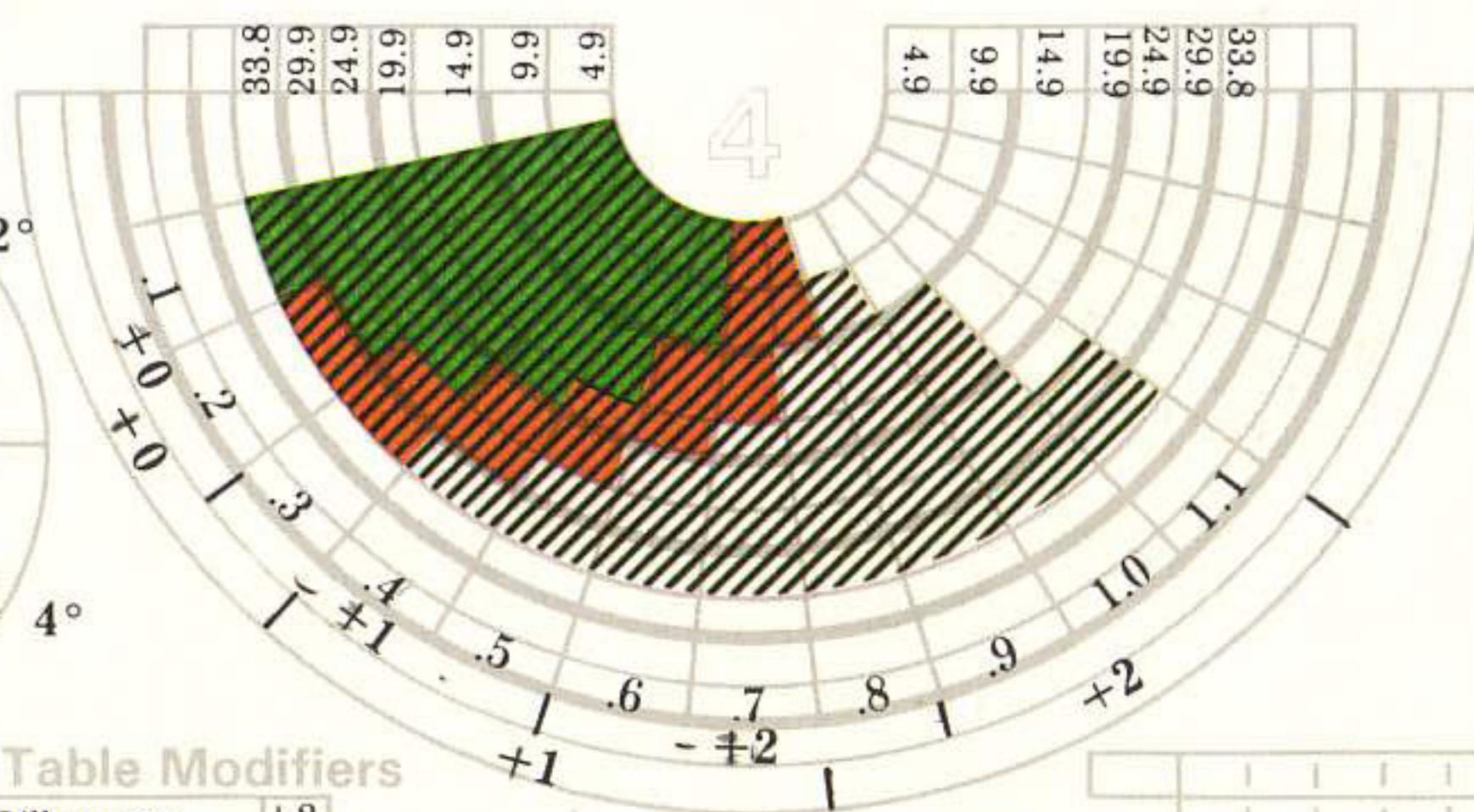
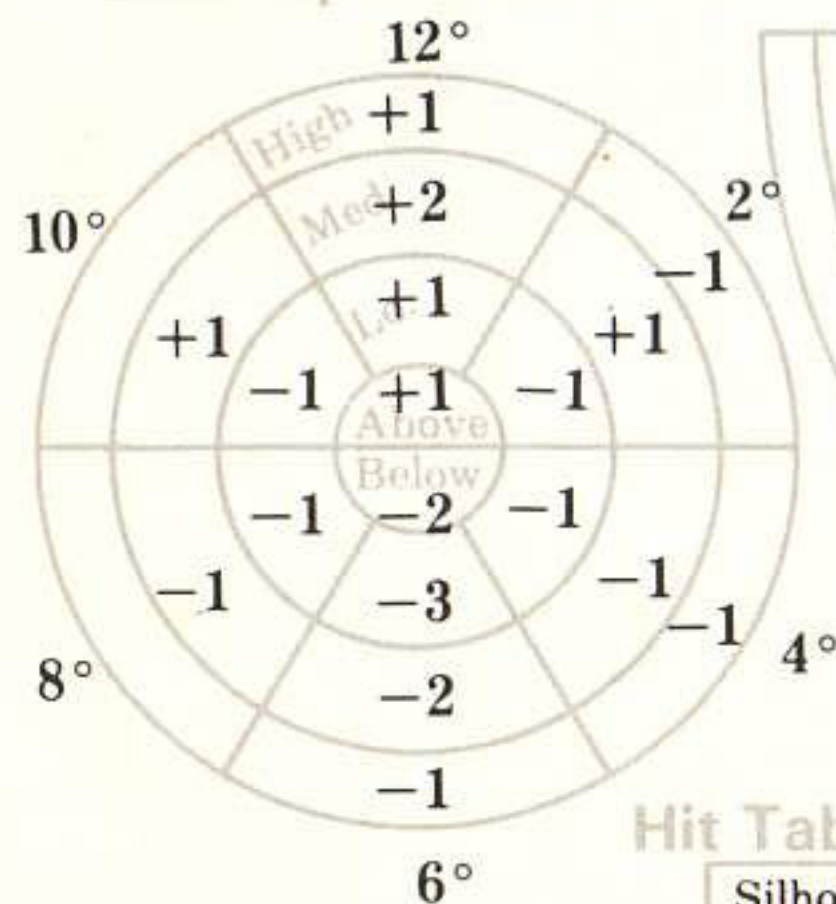


Speed Increments

Altitude Change

Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette +2
 Fire +2

Dive Acceler. +1
 Climb Deceler. -1
 Max Dive -0.4
 Dive Sp. Climb -0.2
 Max Climb -0.2
 Loaded

Target Characteristics

W	4	Cn	3	Mg	6
F	4	L	2		
C	2	C	-		
E	3	E	-	E	-
G	3C	1M	1M	3C	
	(4)	(5)	(5)	(4)	
FF	FF	FF	FF	FF	

Variants

N Model II "Rufe" PV: 16.
 Floatplane, can take off and
 land on water. Treat as
 loaded.

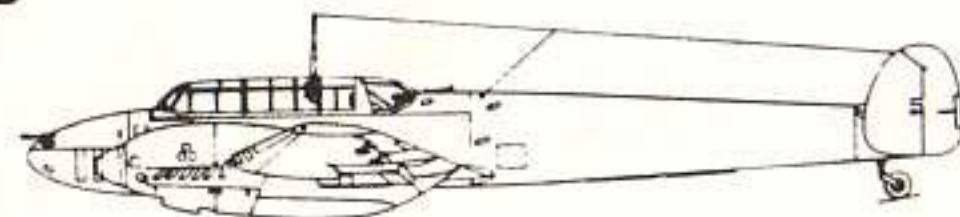
Me-110C

Messerschmitt Bf.110C-1 Day fighter and fighter bomber.
 PV: 20. Engine Type: I. Producer: Third Reich
 Operational in Spring '39. About 800 C-series built.
 Loaded: Could carry one bomb.

Stall Speed	Dark Purple
Maneuver Sp.	Green
Level Speed	Yellow
Dive Speed	Red
Loaded (Opt.)	-1

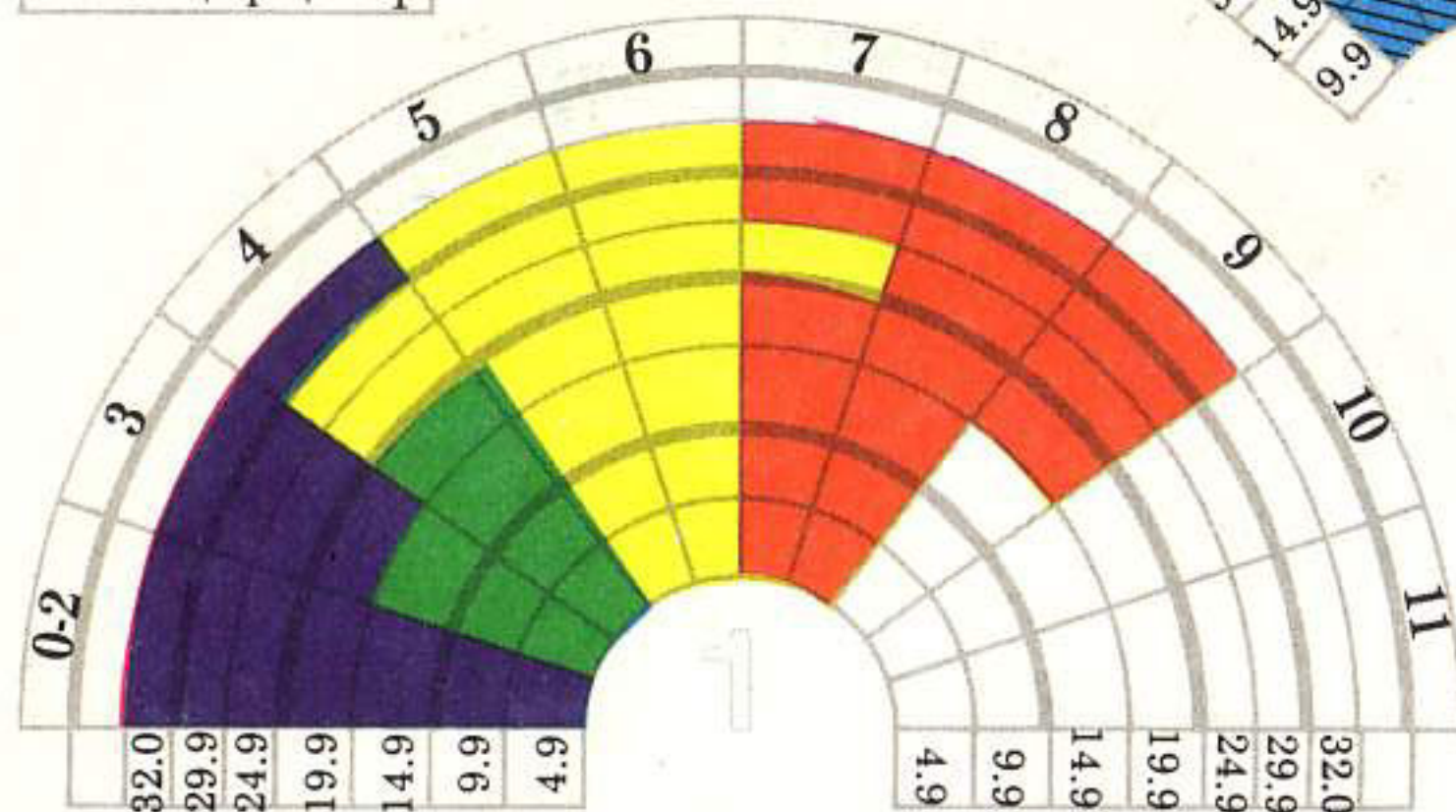
AIR FORCE DATA CARD 13B

Speed Change

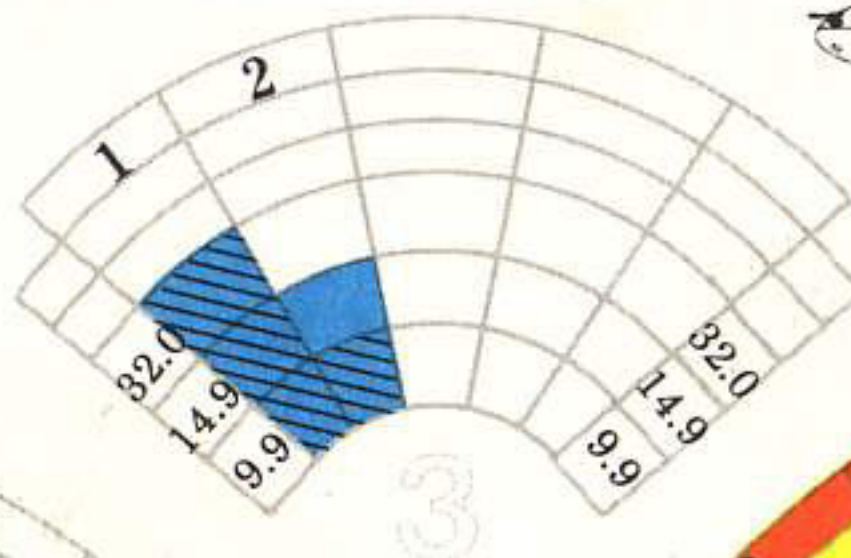


Power Factors	Diagonal Hatching
Brake Factors	Blue

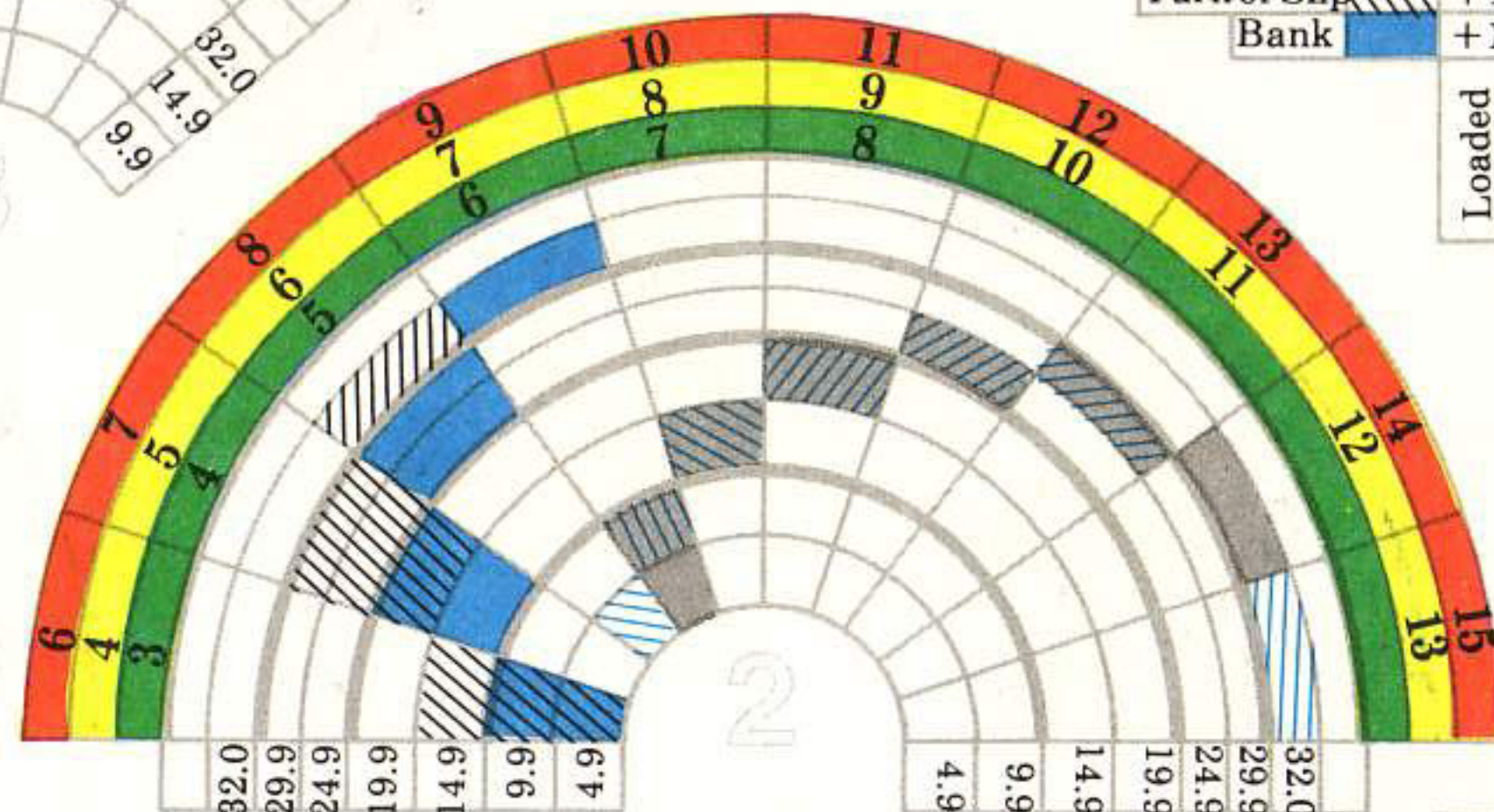
Half Loop	Grey	P
Half Roll	Blue Hatching	P
Turn or Slip	Diagonal Hatching	+1
Bank	Blue	+1
Loaded		



Speed Increments

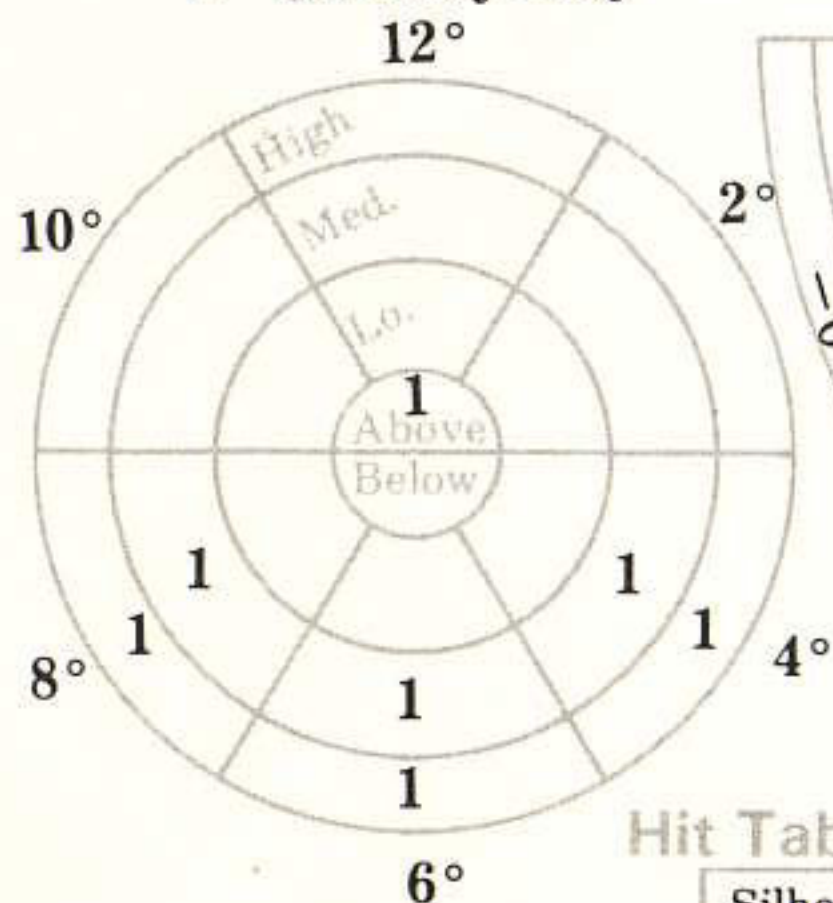


Altitude Change



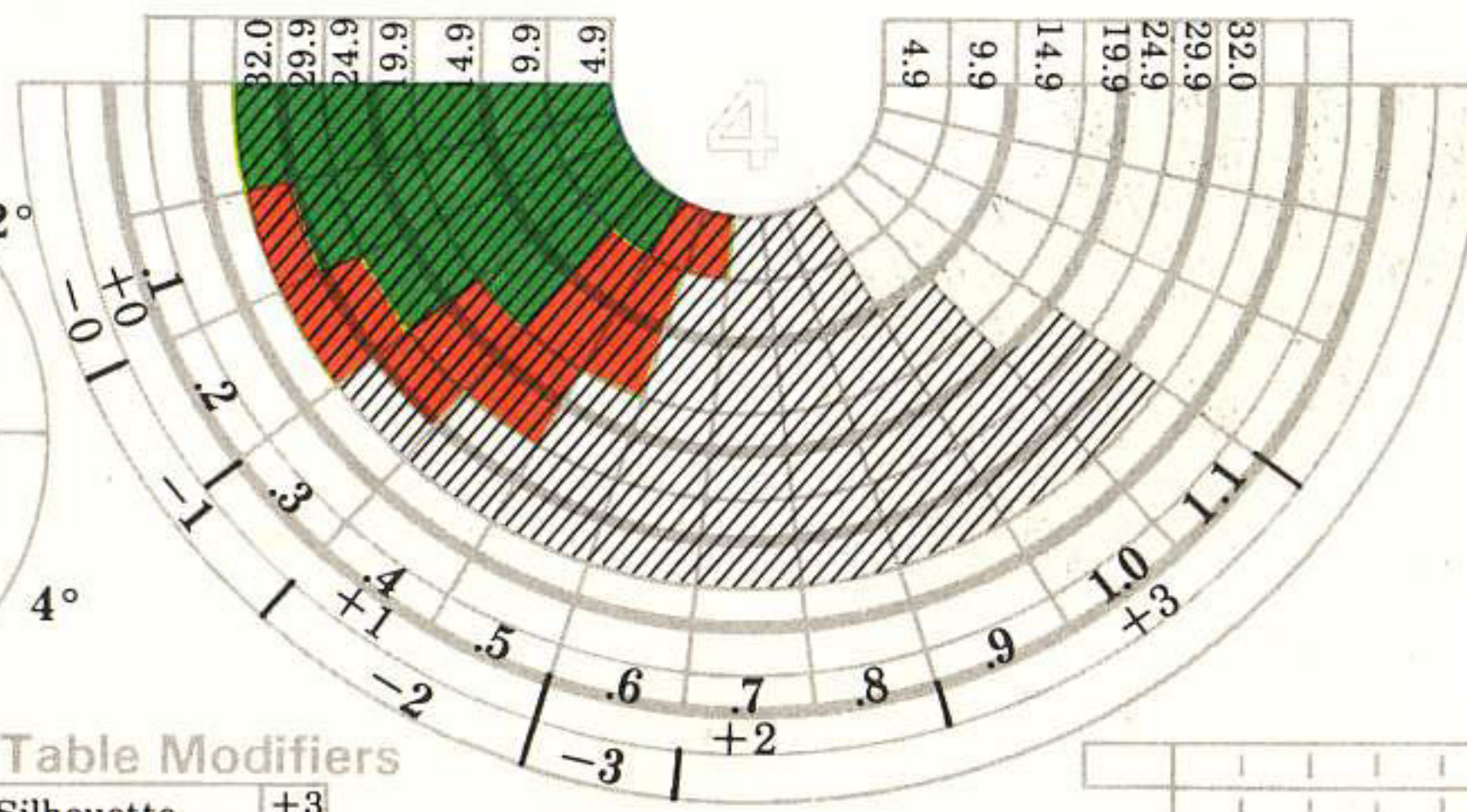
Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+3
FF Fire (F=0)	+2



Dive Acceler.	+1	Loaded
Climb Deceler.	-1	
Max Dive	Diagonal Hatching	-1
Dive Sp. Climb	Red	-1
Max Climb	Green	-1

Target Characteristics

W	7	Cn	9	Mg	12
F	5	L	3		
C	3	C	-		
E	3	E	-	E	3
G	2M	3C		3C	2M
	(5)	(4)	(5)	(4)	(5)
FF		F		FF	

Variants

Tempest V

Hawker Tempest V. Series-2 Day Fighter

PV: 23. Engine Type: I. Producer: Great Britain

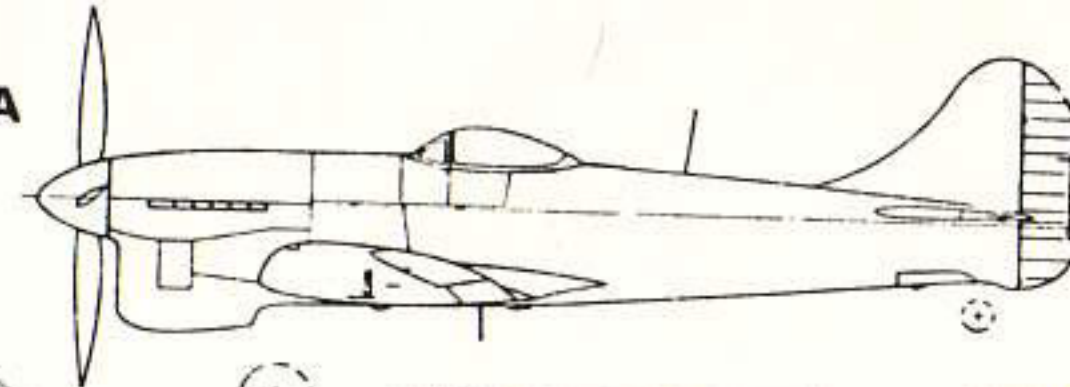
Entered Service in Spring '44. 805 series-V built.

Loaded: Can carry up to two bombs, or 8 A/G rockets.

Stall Speed	Dark Purple
Maneuver Sp.	Green
Level Speed	Yellow
Dive Speed	Red
Loaded (Opt.)	-1

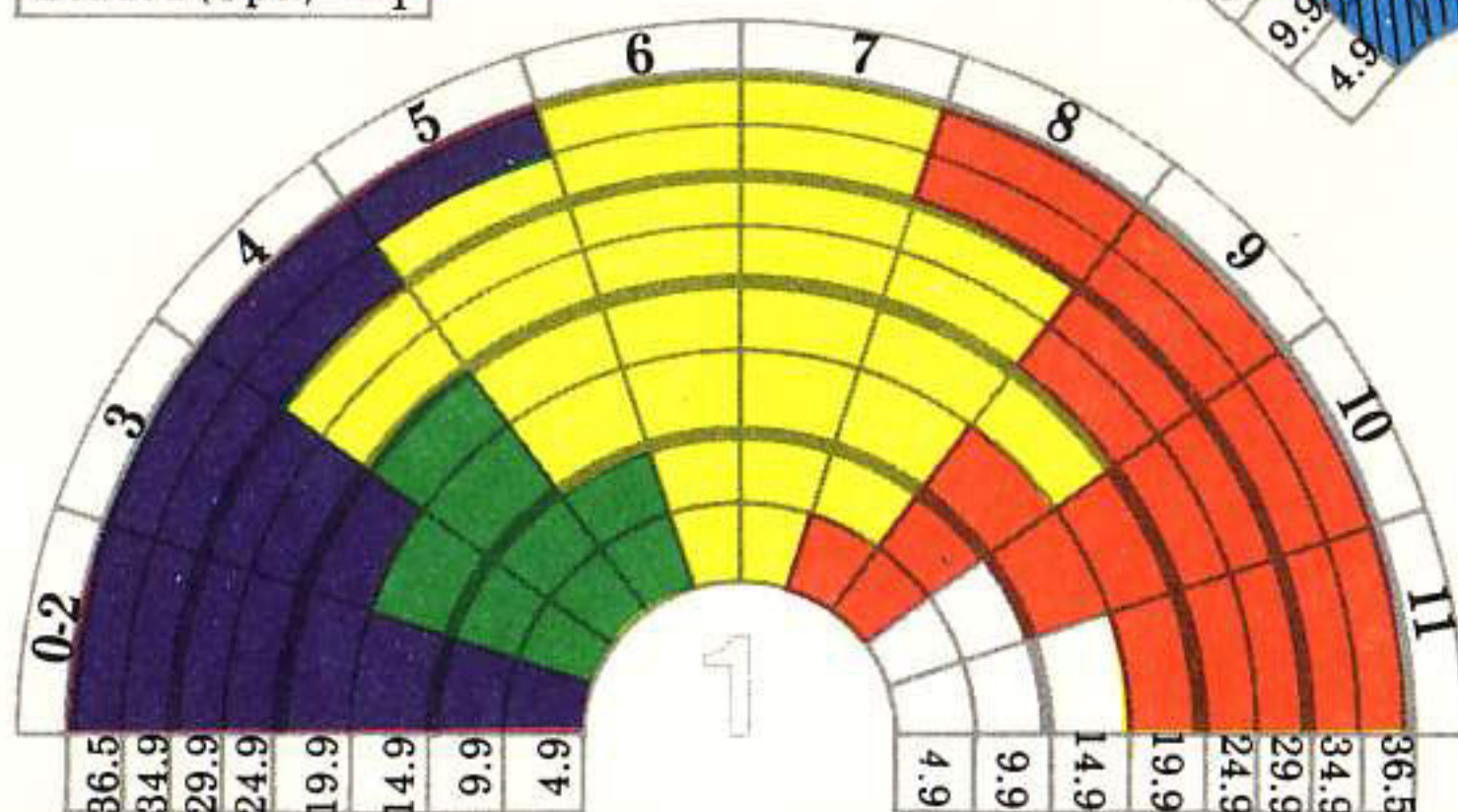
AIR FORCE DATA CARD 13A

Speed Change

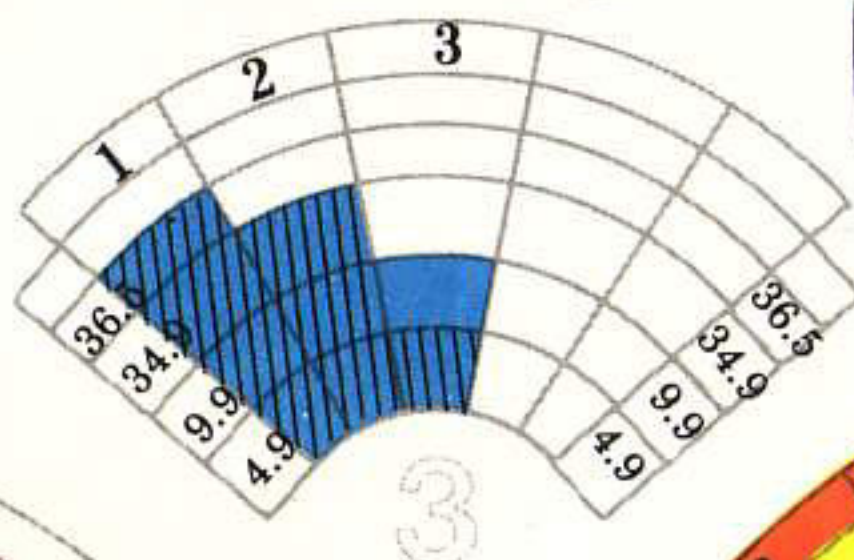


Power Factors	Diagonal Hatching
Brake Factors	Blue

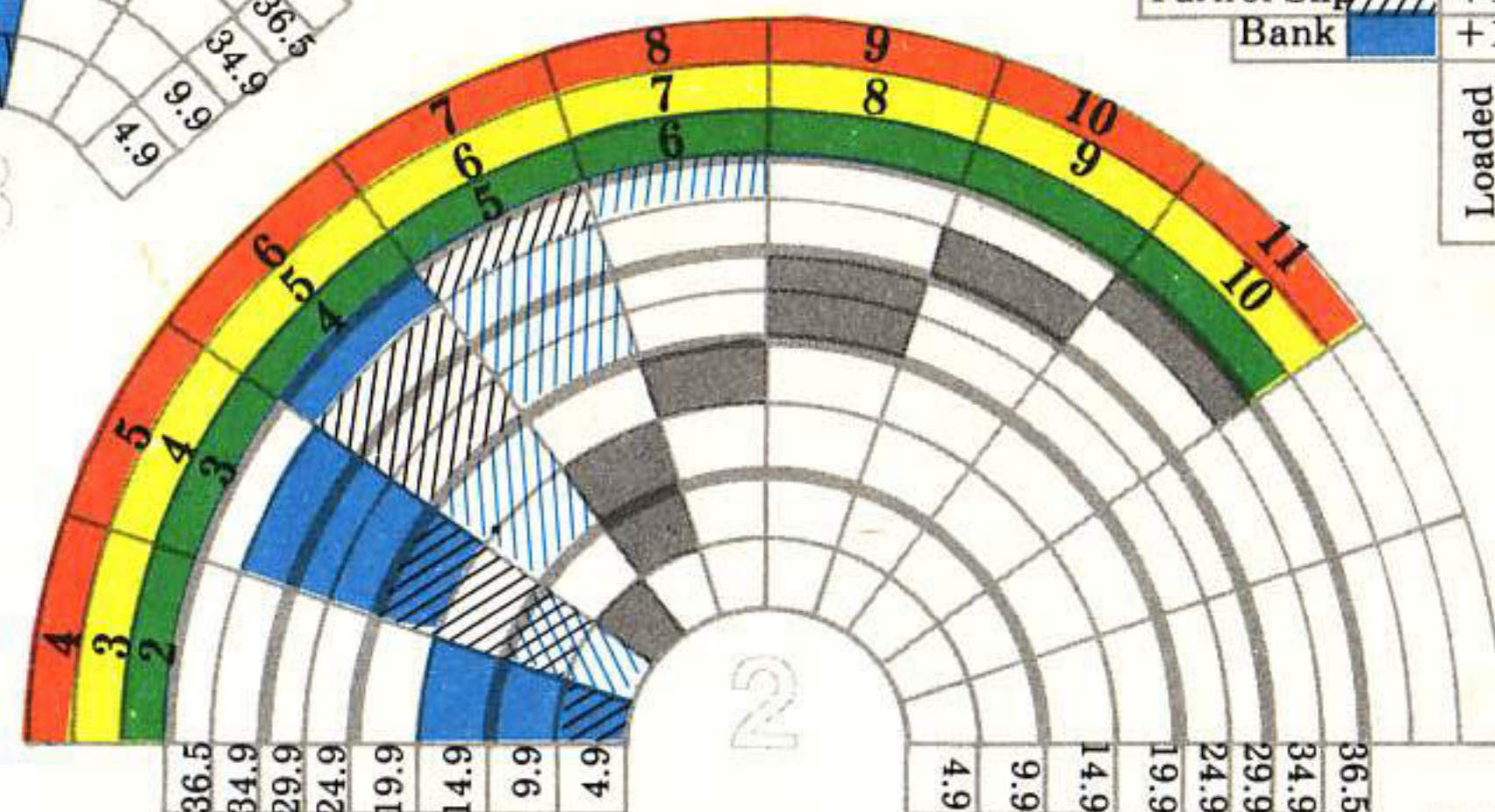
Half Loop	Dark Grey	P
Half Roll	Blue Hatching	P
Turn or Slip	Diagonal Hatching	+1
Bank	Blue	+1
Loaded		



Speed Increments

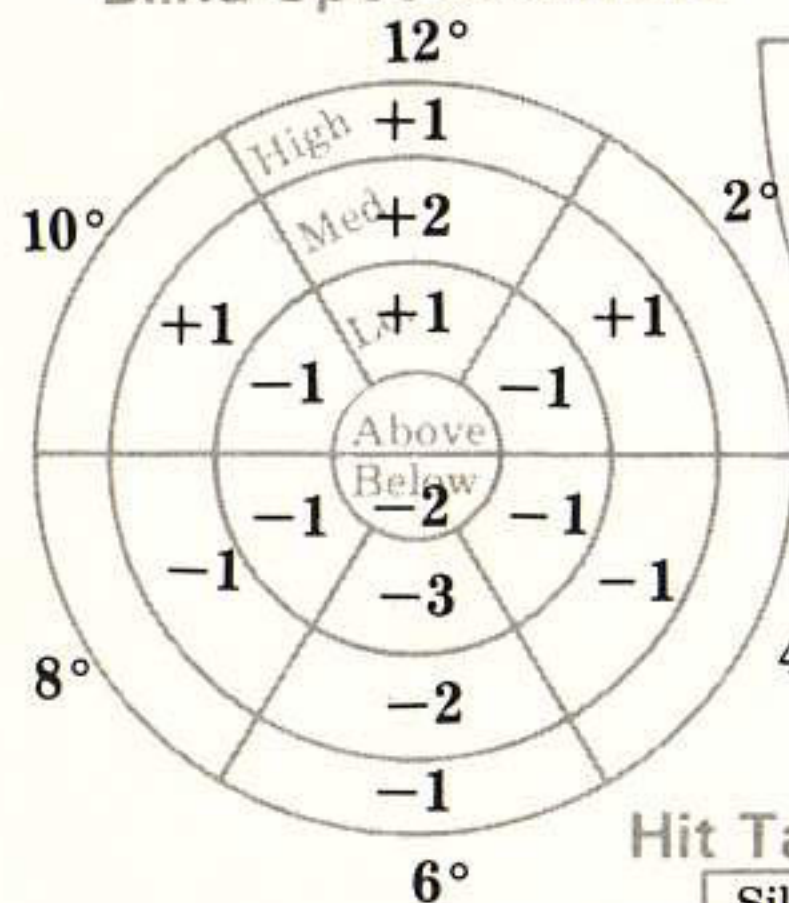


Altitude Change



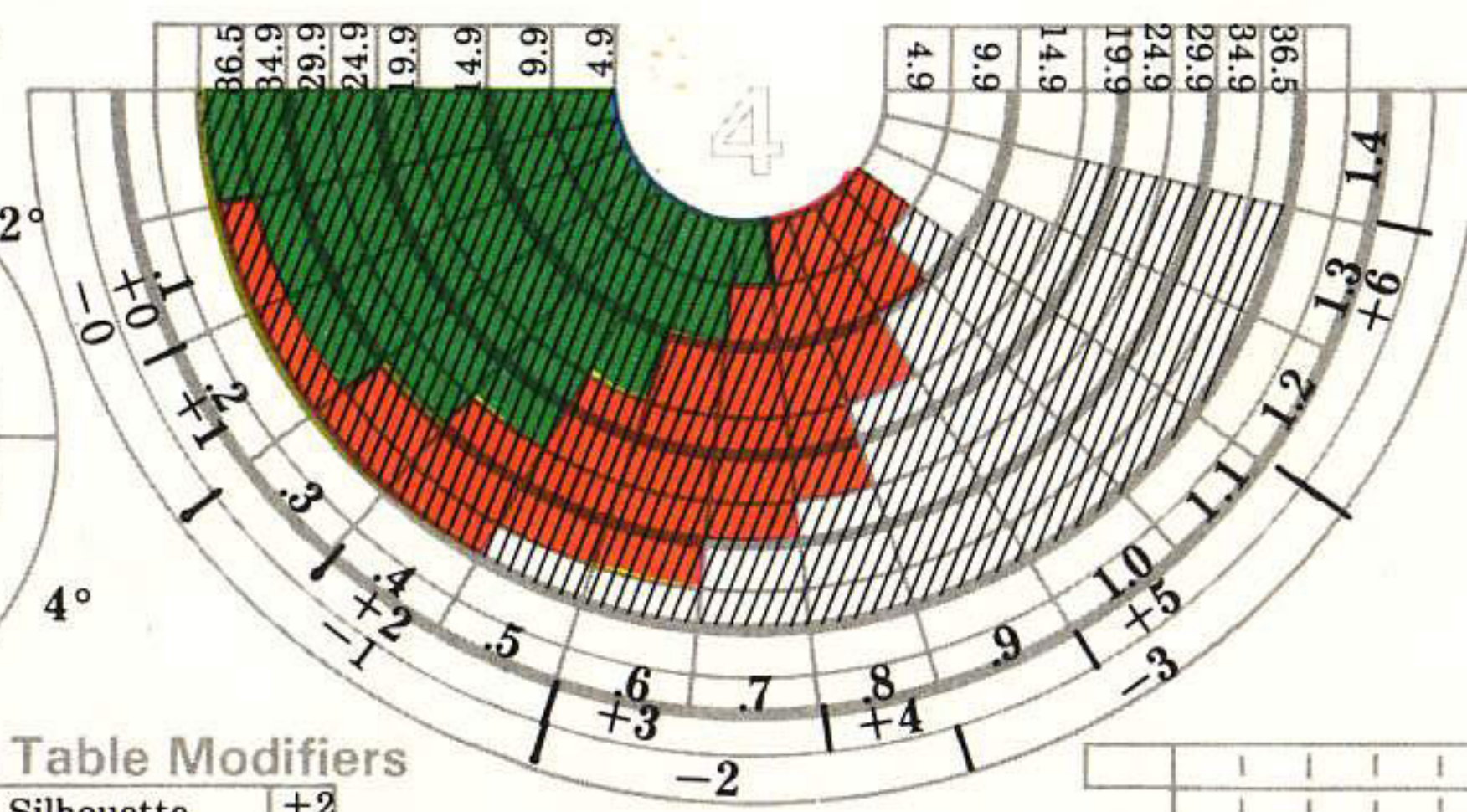
Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+2
Fire	+2



Dive Acceler.	+1	Loaded
Climb Deceler.	-1	
Max Dive	Diagonal Hatching	-0.4
Dive Sp. Climb	Red	-0.2
Max Climb	Green	-0.2

Target Characteristics

W	6	Cn	6	Mg	-
F	9	L	4		
C	3	C	-		
E	3	E	-	E	-
G	4C	4C		4C	4C
	(5)	(5)		(5)	(5)
FF					FF

Variants

Ju-88C

Junkers Ju.88C-6c Night Fighter

PV: 27. Engine Type: I. Producer: Third Reich

Operational in October '43. Over 2000 C-series built.

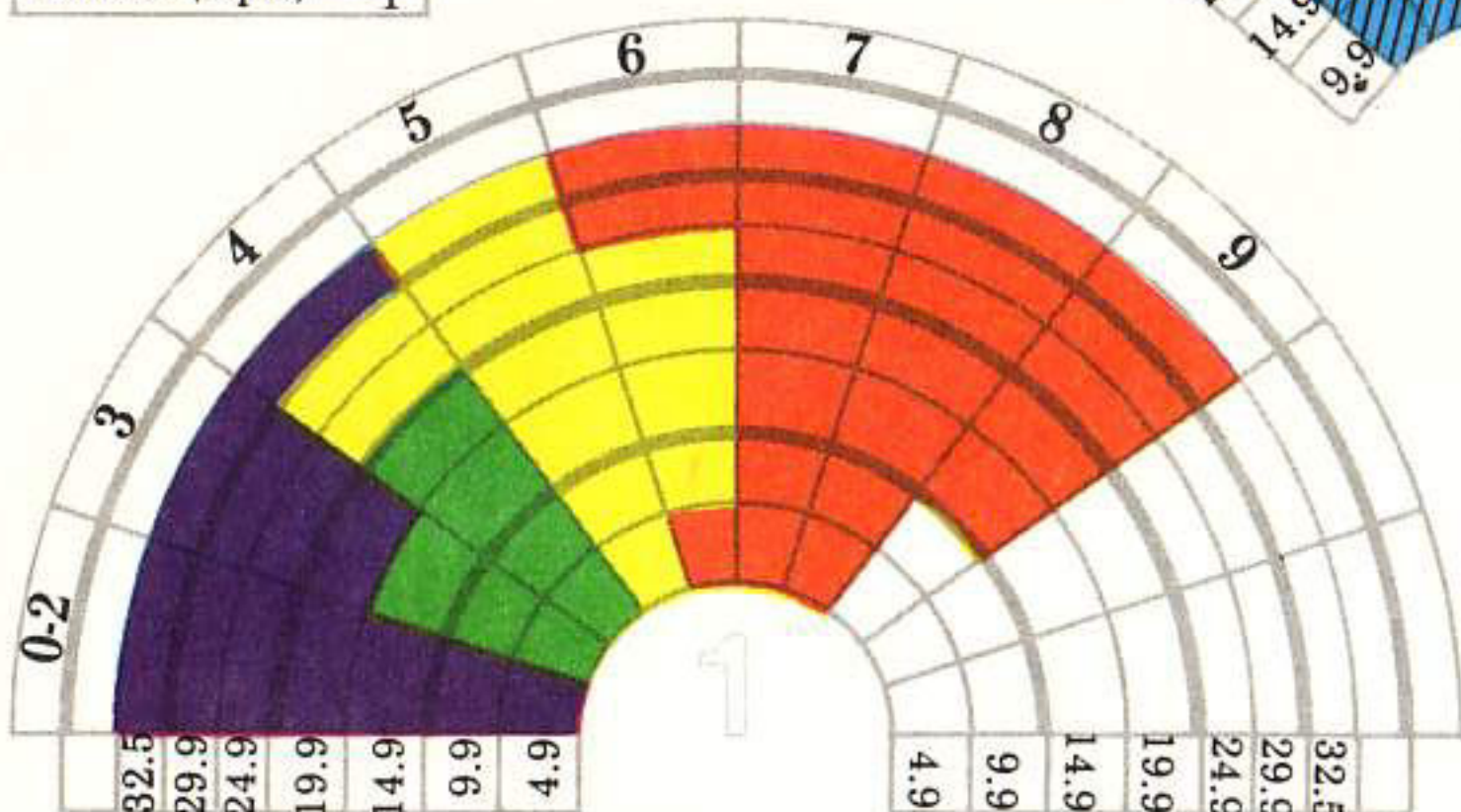
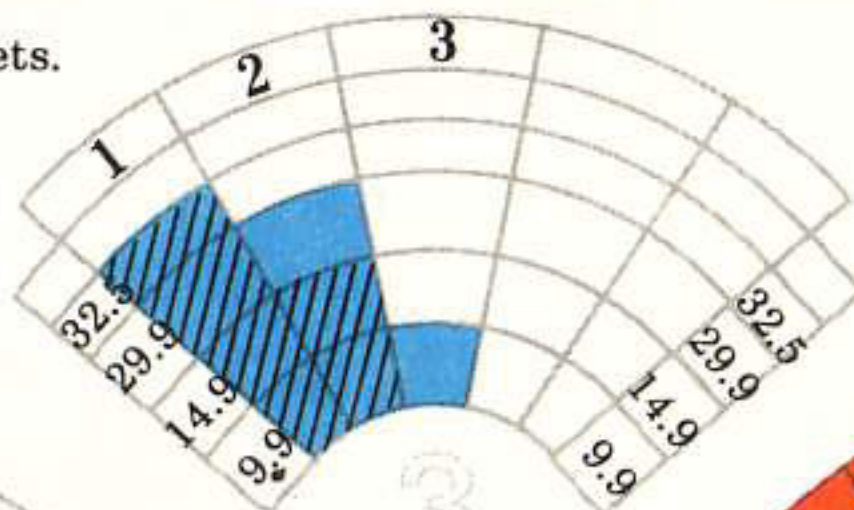
Loaded: Could carry 1 bomb or up to 4 A/A or A/G rockets.

Equipped with Radar.

Stall Speed	4.9
Maneuver Sp.	6.6
Level Speed	9.9
Dive Speed	14.9
Loaded (Opt.)	-1

AIR FORCE DATA CARD 1B

Speed Change

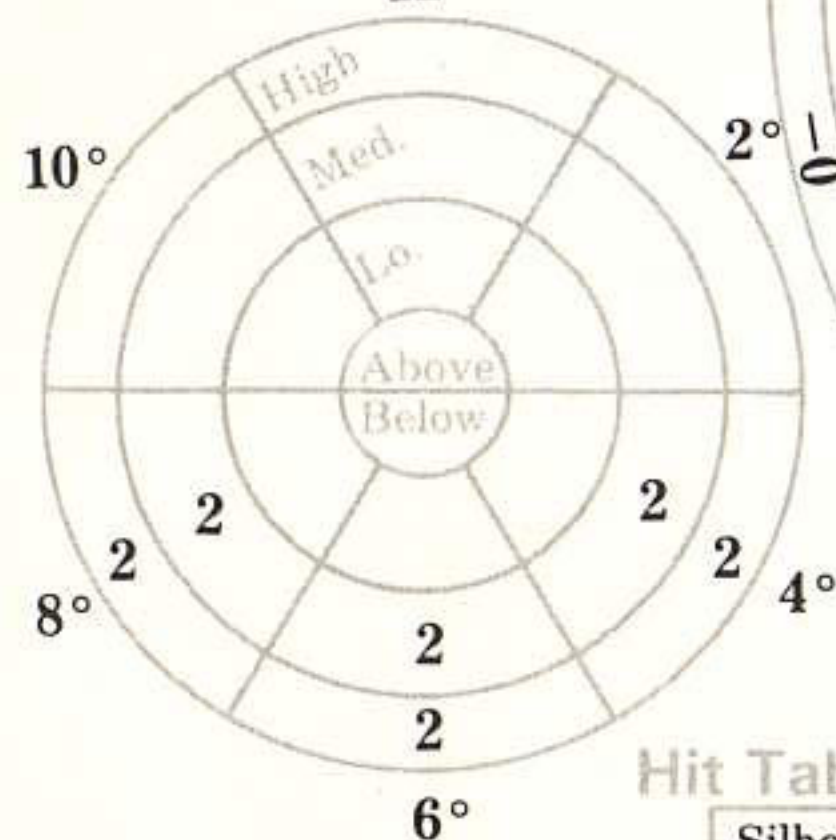


Speed Increments

Altitude Change

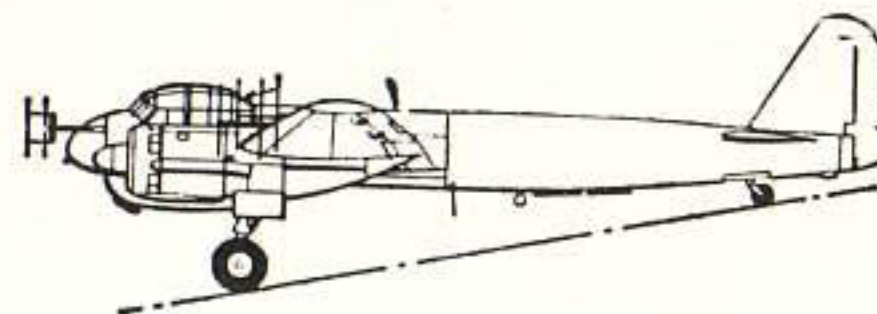
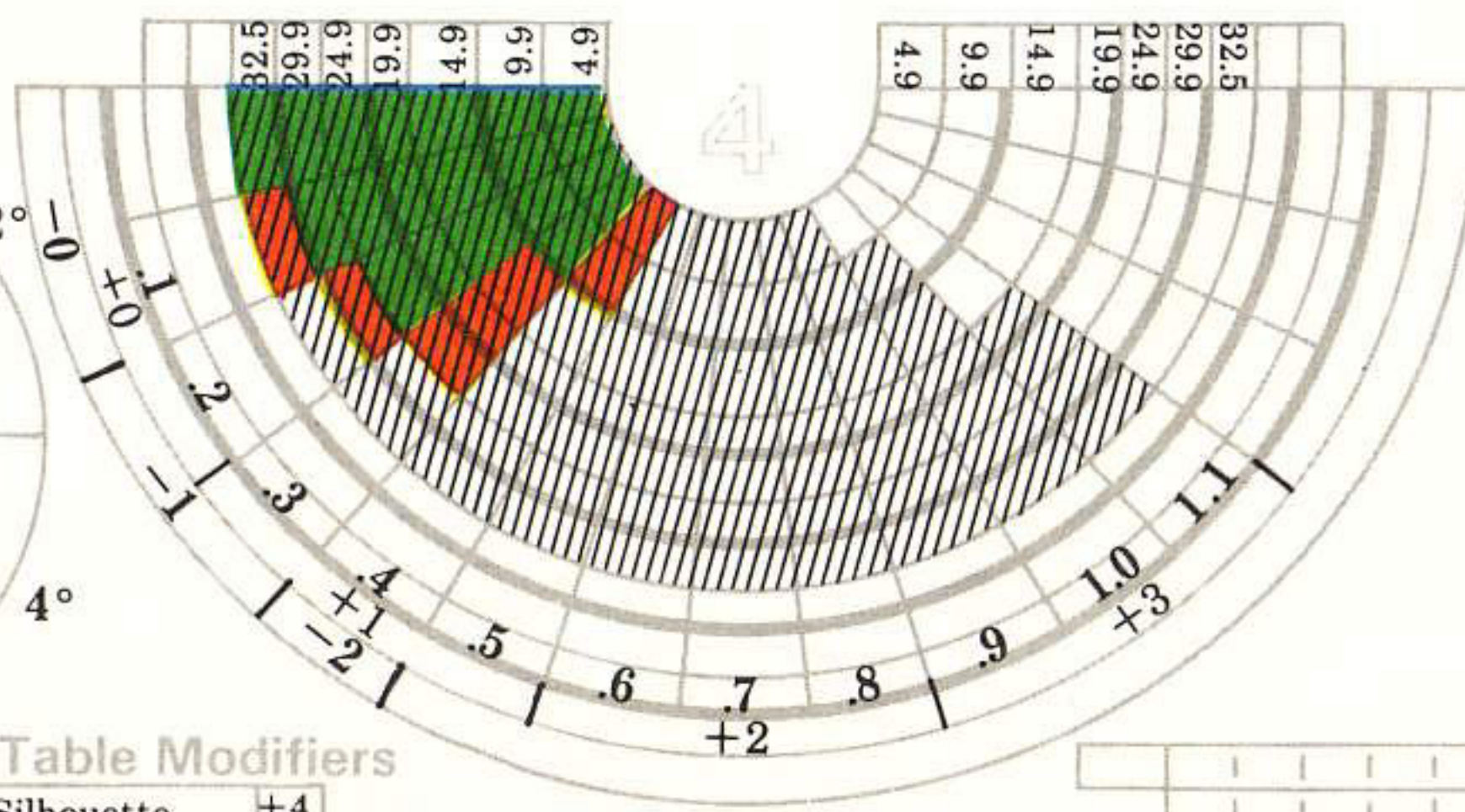
Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+4
FF/FH Fire	+2



Power Factors	P
Brake Factors	P

Half Loop	P
Half Roll	P
Turn or Slip	+1
Bank	+1

Loaded

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-0.3
Dive Sp. Climb	-0.1
Max Climb	-0.1

Target Characteristics

W	8	Cn	6	Mg	10
F	9	L	3		
C	3	C	-		
E	3	E	-	E	3
G	2M	4C	4C	4C	4C
	(5)	(4)	(4)	(5)	(4)
	FF	FH	F	FH	FF

Variants

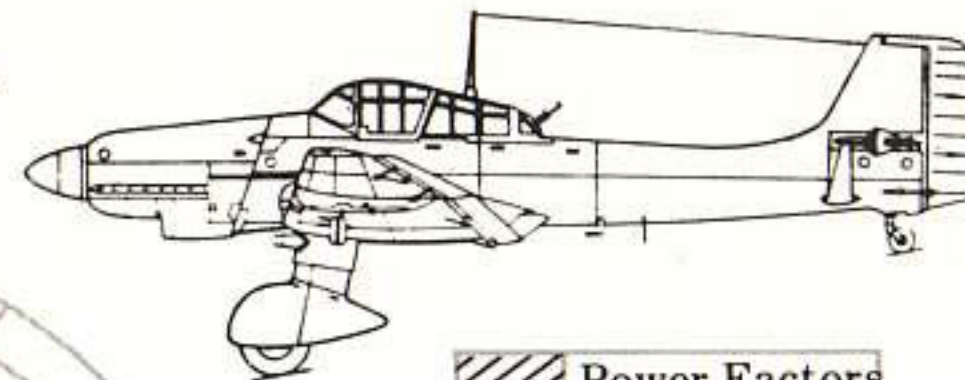
Ju-87D

Junkers Ju.87D-5 "Stuka" Close Support Bomber.
 PV: 15. Engine Type: I. Producer: Third Reich.
 Operational in Spring '43. About 2500 series-D built.
 Loaded: Could carry up to 3968 pounds of bombs (3 bombs at low level). Has sights for use as a dive bomber.

Stall Speed	
Maneuver Sp.	
Level Speed	
Dive Speed	
Loaded (Opt.)	-2

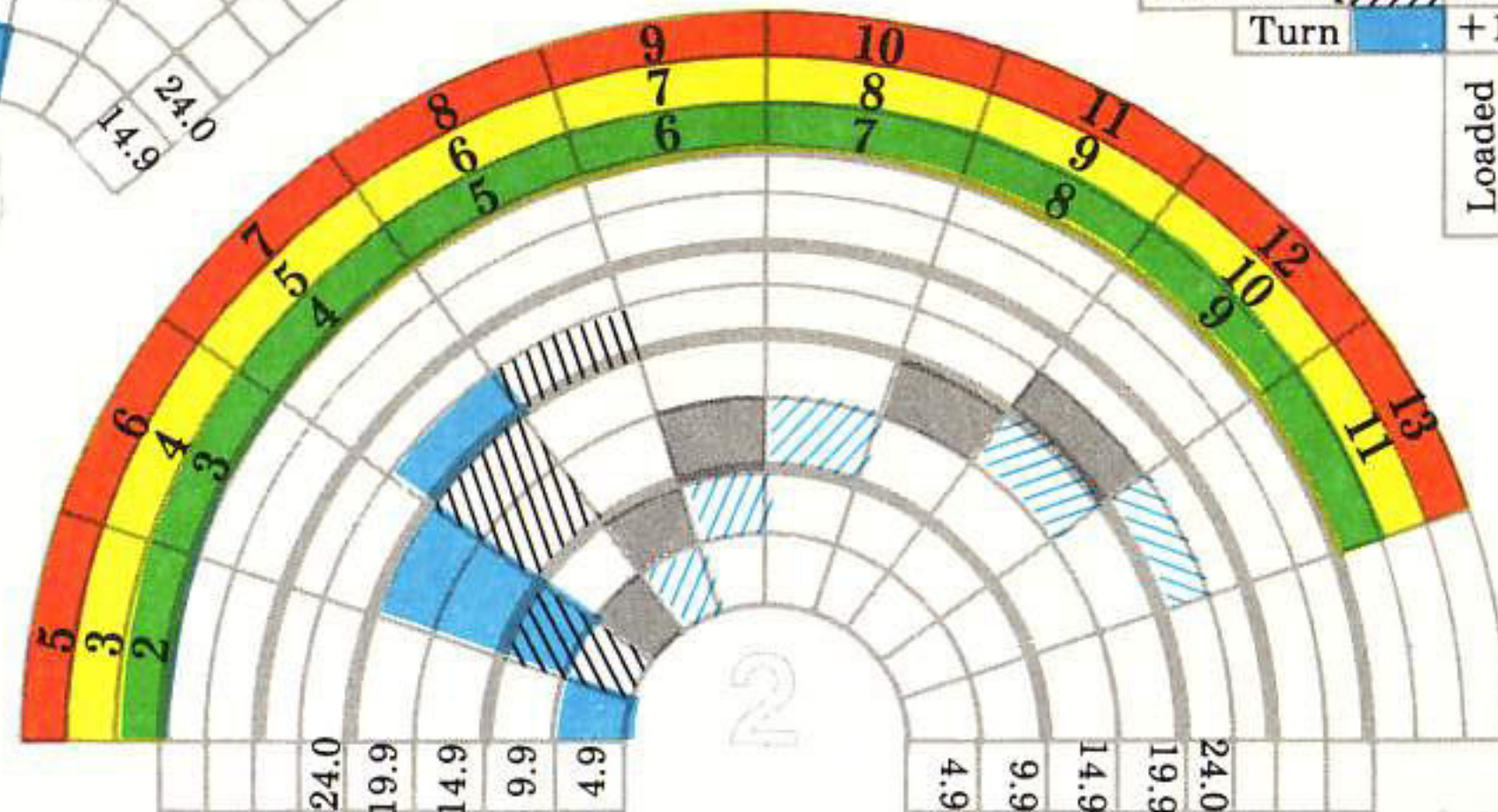
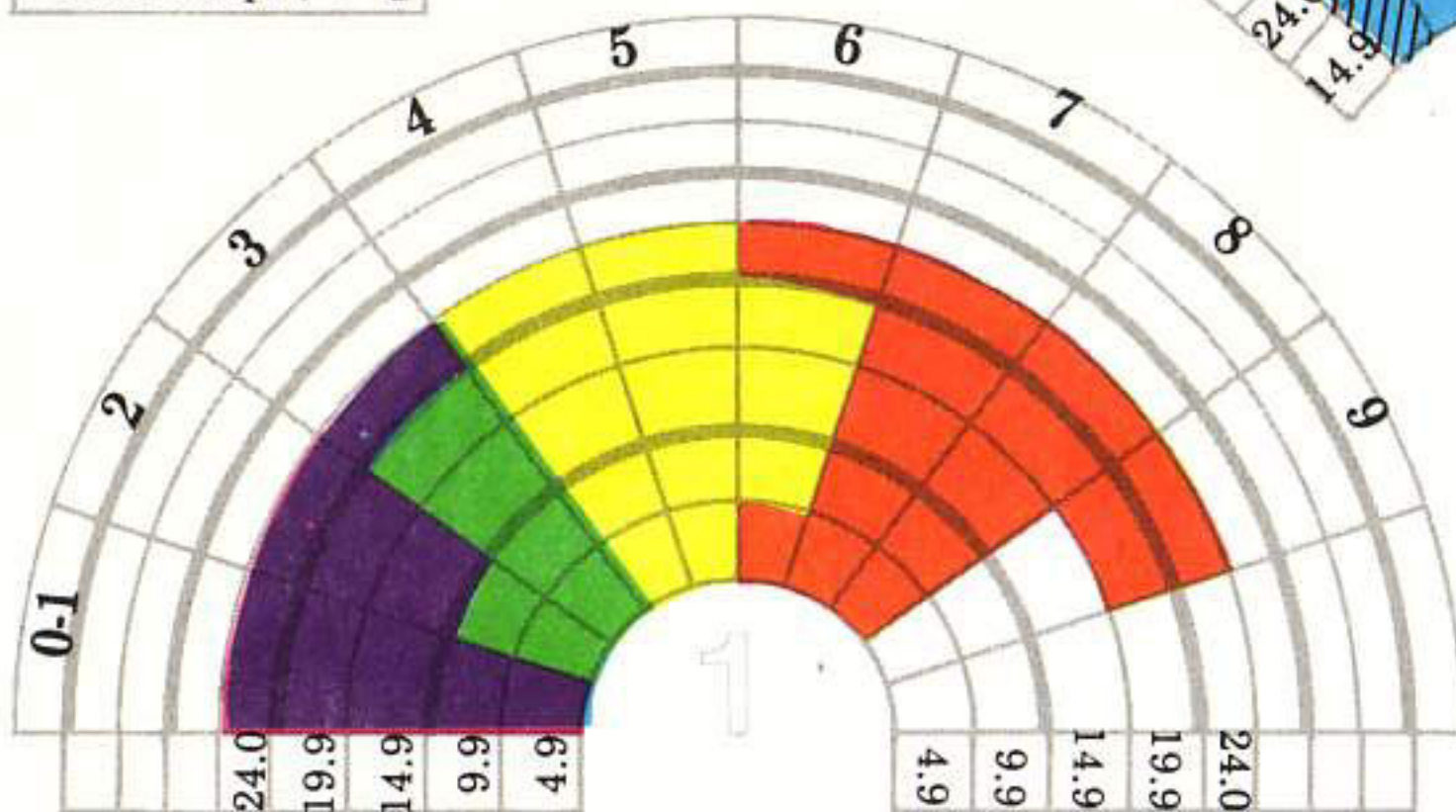
AIR FORCE DATA CARD 1A

Speed Change



Power Factors	
Brake Factors	

Half Loop	P
Half Roll	P
Bank or Slip	+1
Turn	+1
Loaded	



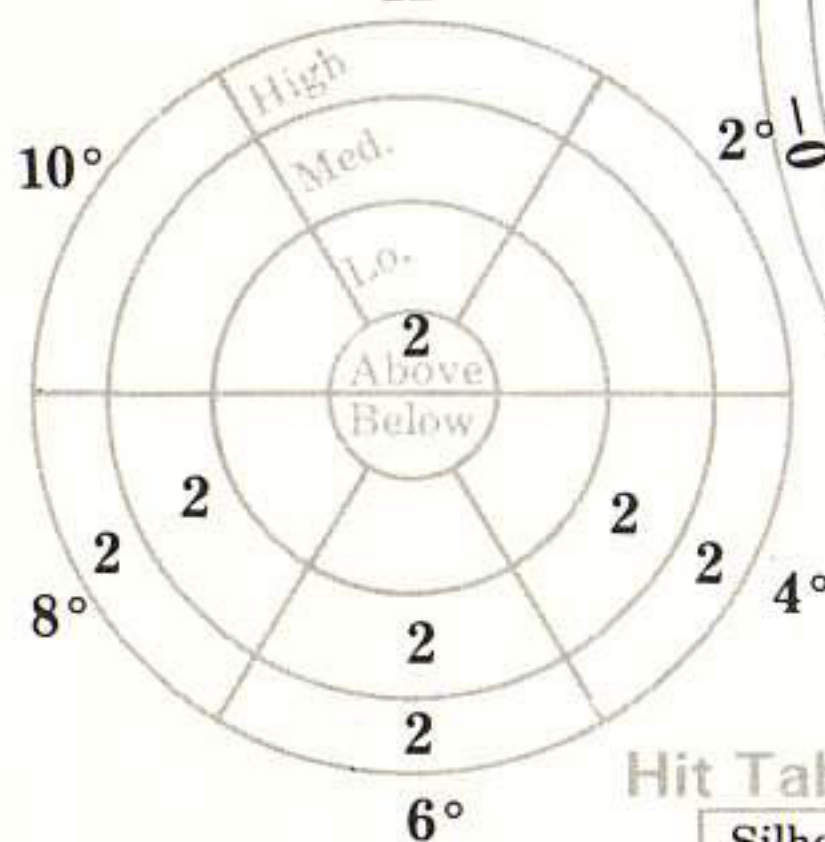
Speed Increments

Altitude Change

Maneuverability Requirements

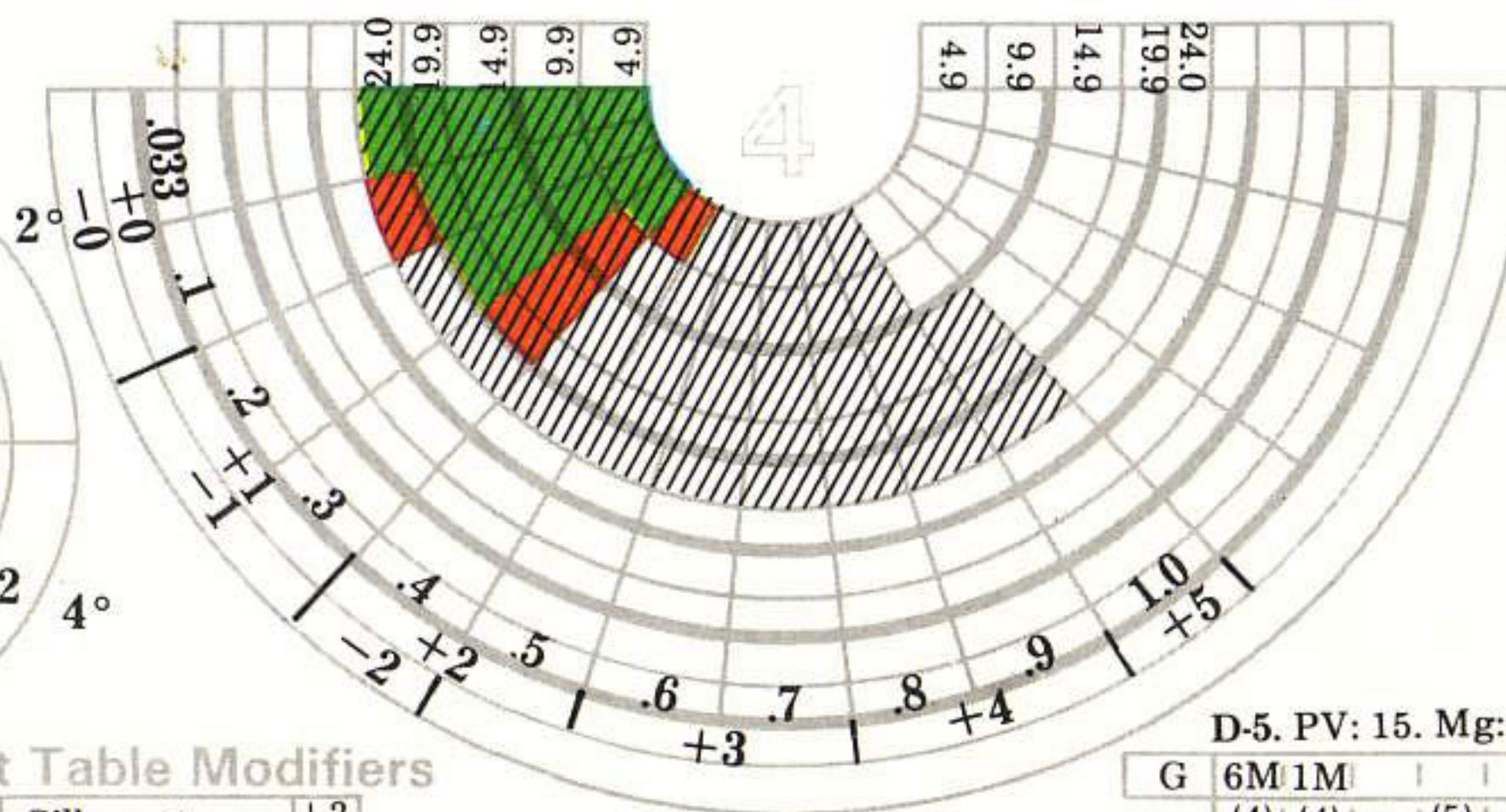
"F" Gunnery Play

12°



Hit Table Modifiers

Silhouette	+3
Fire	+1



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-2
Dive Sp. Climb	-1
Max Climb	-1
Loaded	

Target Characteristics

W	6	Cn	-	Mg	10
F	7	L	3		
C	3	C	-		
E	3	E	-	E	-
G	1M				1M
	(4)		(5)		(4)
	FF		F		FF

D-5. PV: 15. Mg: 5

G	6M	1M			1M	6M
	(4)	(4)		(5)	(4)	(4)
	FF			F		FF

(has WB81 weapons containers.)

G-1. PV: 16. Cn: 10

G	5C				5C
	(6)		(5)		(6)
	FF		F		FF

treat as loaded in either configuration.

Me-109F

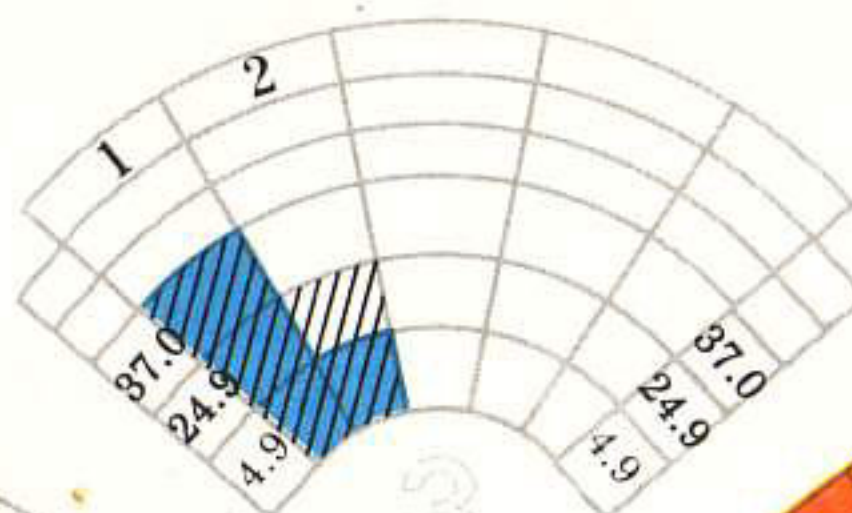
Messerschmitt Bf. 109F-3 Day Fighter
 PV: 16. Engine Type: I. Producer: Third Reich
 Introduced in Spring '42. 2700 F-series built.
 Loaded: could carry one bomb.

AIR FORCE DATA CARD 6A

Speed Change

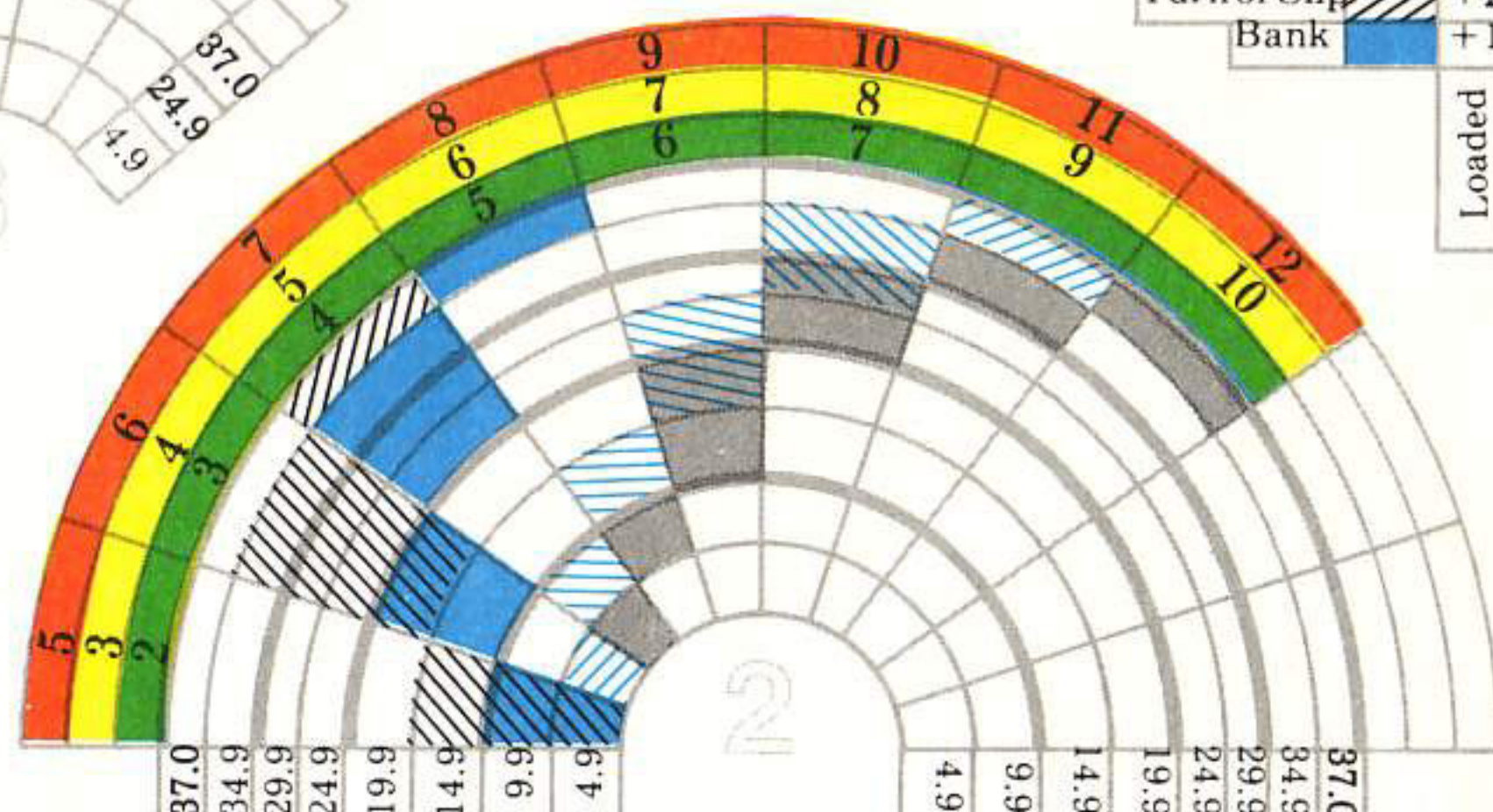
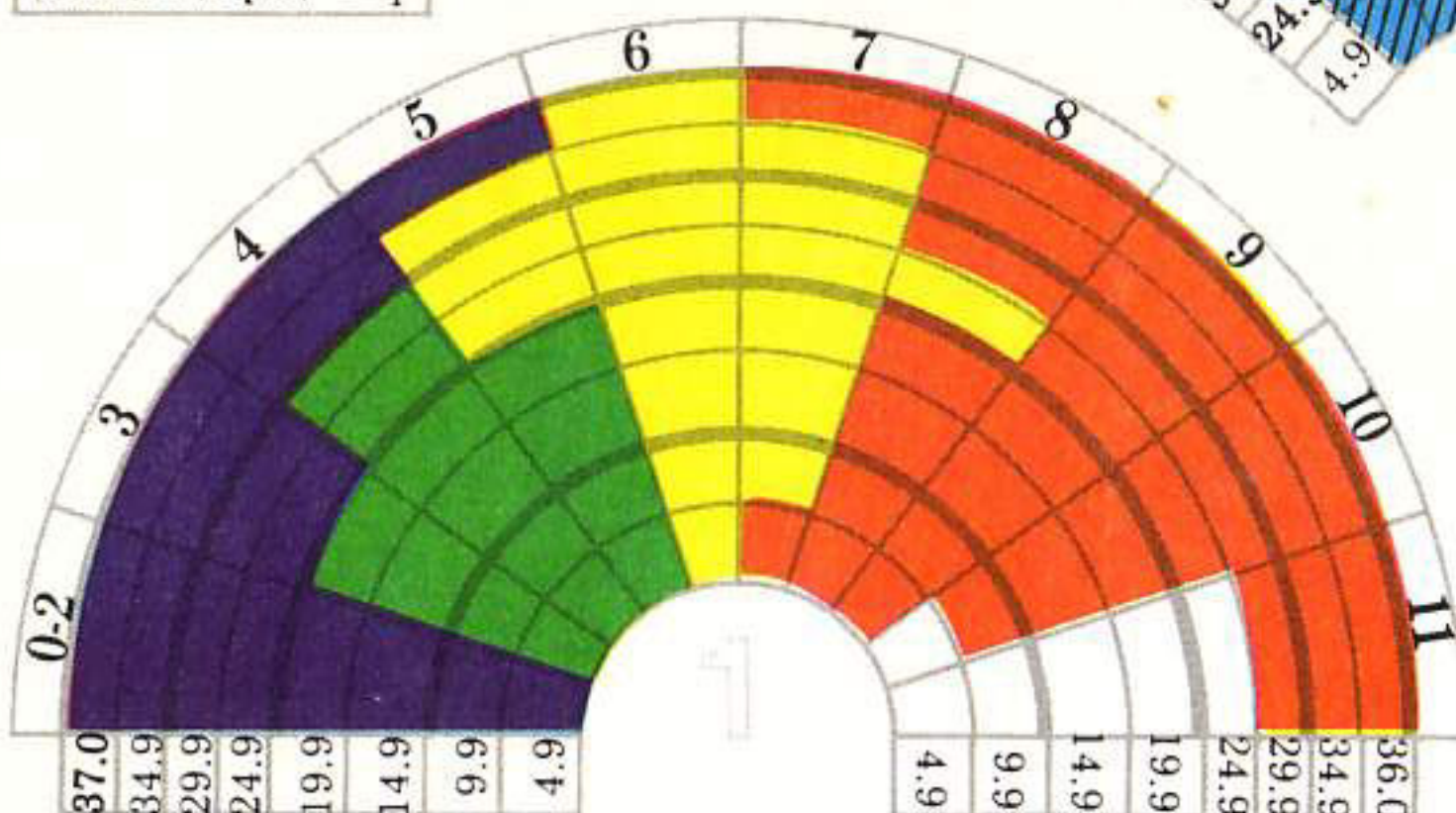


Stall Speed	0.2
Maneuver Sp.	3
Level Speed	4
Dive Speed	5
Loaded (Opt.)	-1



Power Factors	1
Brake Factors	2

Half Loop	P
Half Roll	P
Turn or Slip	+2
Bank	+1
Loaded	

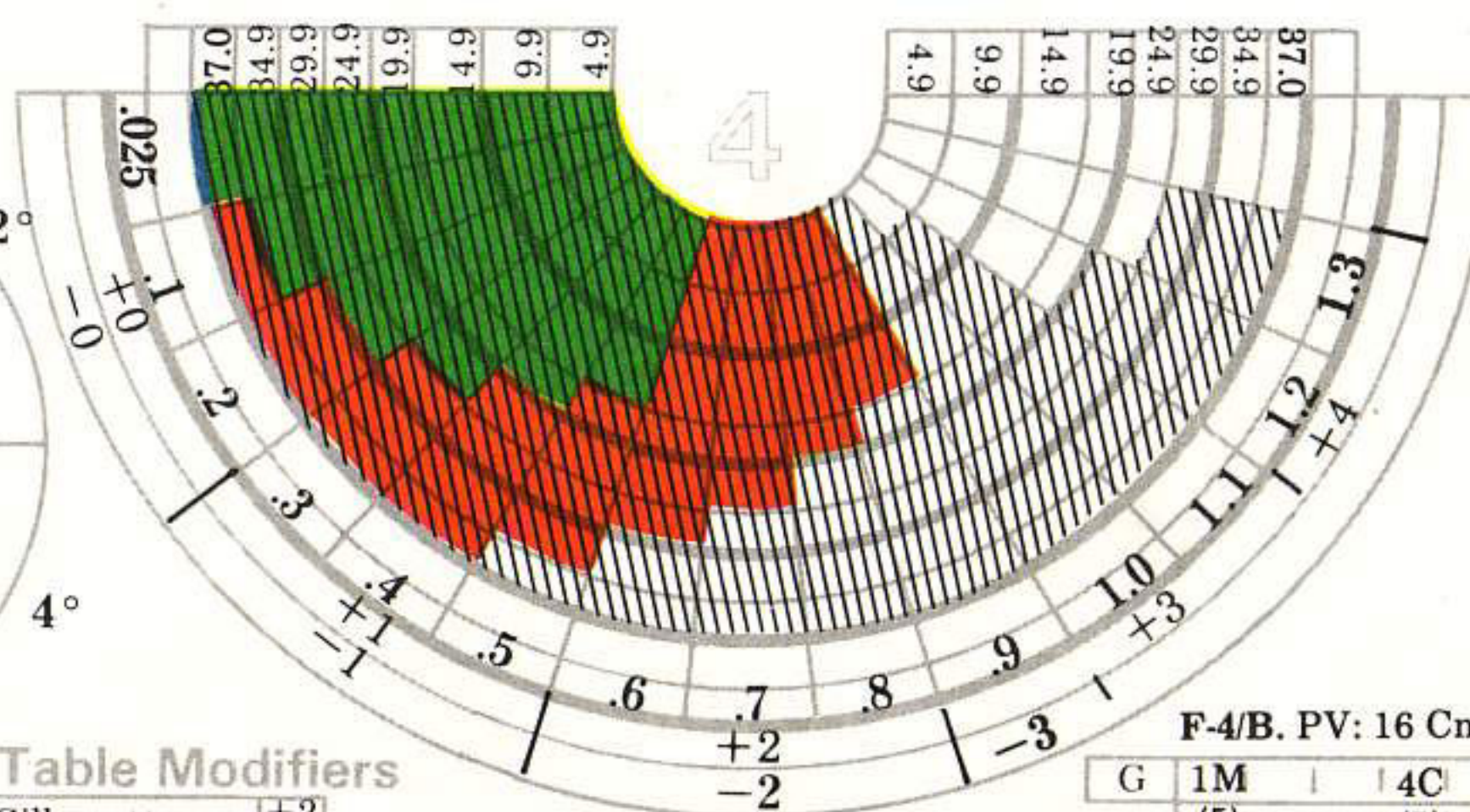
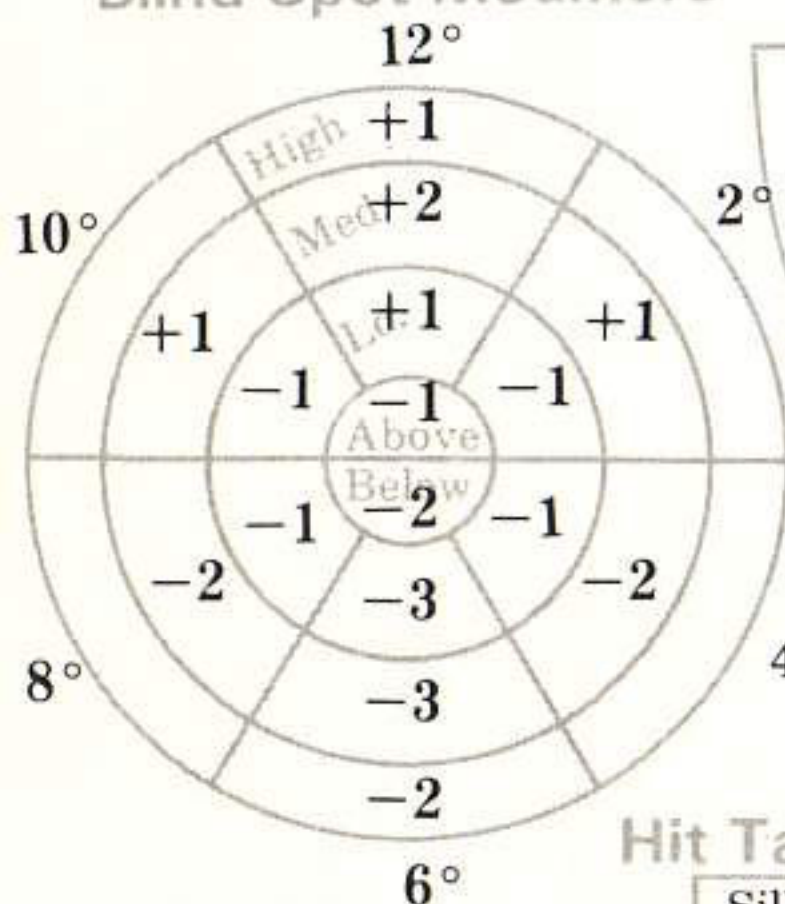


Speed Increments

Altitude Change

Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+2
Fire	+2

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-2
Dive Sp. Climb	-1
Max Climb	-1
Loaded	

Target Characteristics

W	5	Cn	8	Mg	6
F	4	L	3		
C	3	C	-		
E	3	E	-	E	-
G	1M	3C		1M	
	(5)	(6)		(5)	
	FF	FF		FF	

F-4/B. PV: 16 Cn: 5

G	1M	4C	1M
	(5)	(5)	(5)
	FF	FF	FF

Loaded: could carry one bomb.

F-4/R1. PV: 16 Cn: 4

G	4C	1M	4C	1M	4C
	(4)	(5)	(5)	(5)	(4)
	FF	FF	FF	FF	FF

Treat as loaded in this configuration.

P-47D

Republic P-47D and P-47G (bubble canopy)

"Thunderbolt II" Day Fighter

PV: 23. Engine Type: R. Producer: USA

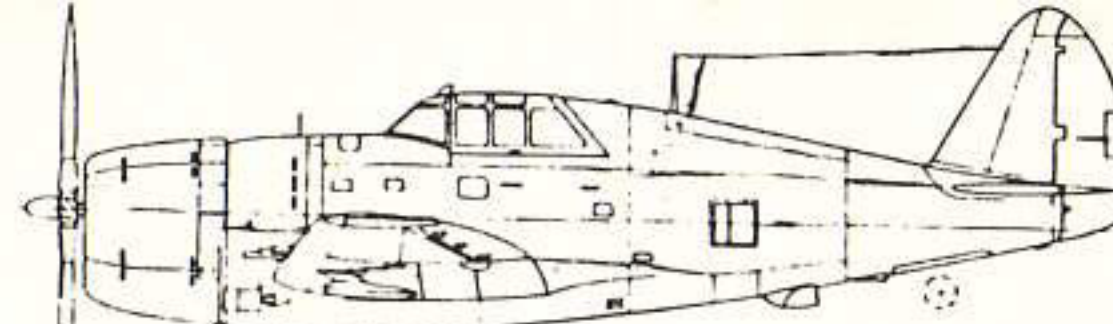
Introduced in Fall '43. 7179 built with bubble canopy (12,602 total D-models built).

Loaded: Can carry up to 3 bombs or 10 A/G rockets.

Stall Speed	0-2
Maneuver Sp.	3-5
Level Speed	6-8
Dive Speed	9-12
Loaded (Opt.)	-1

AIR FORCE DATA CARD 6B

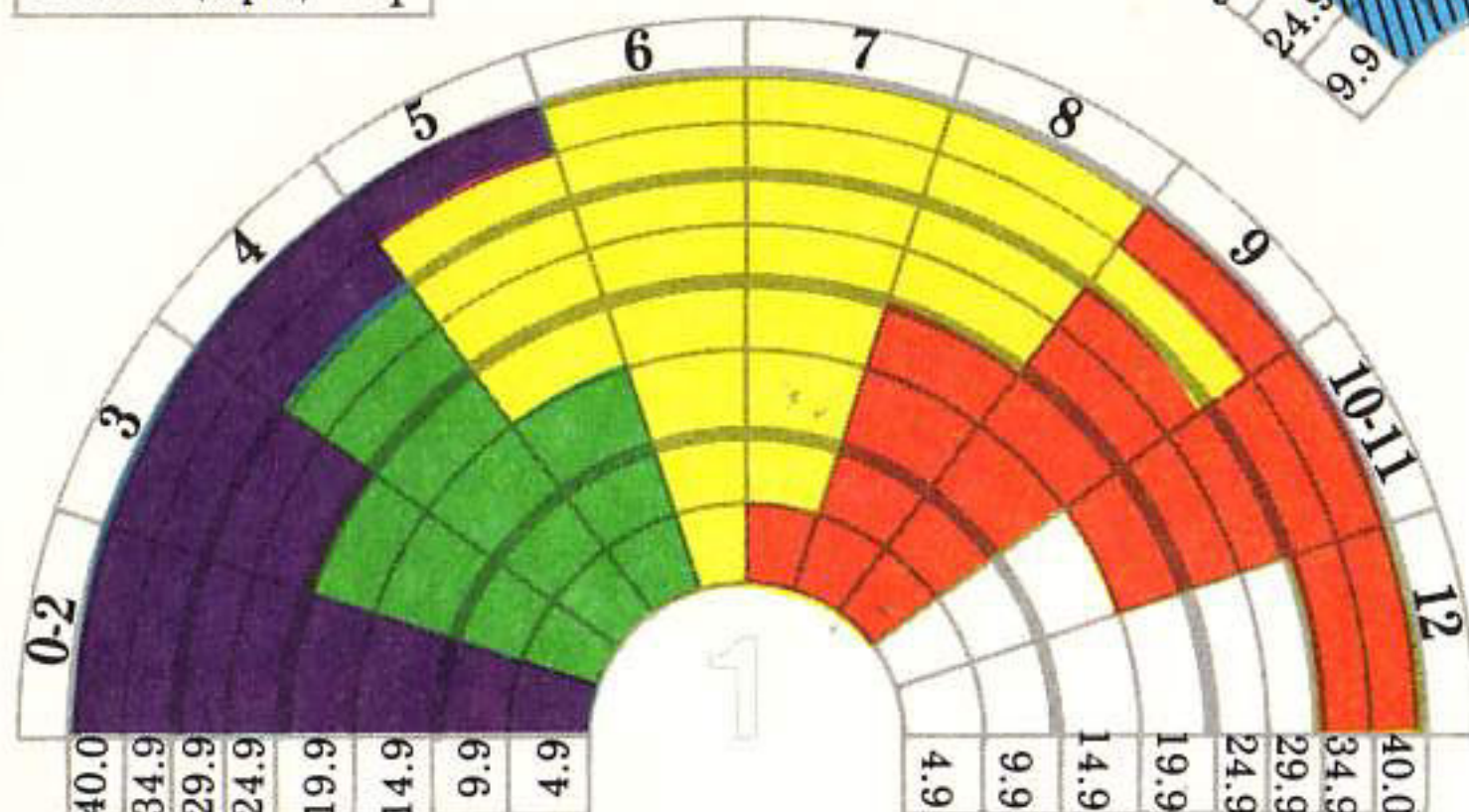
Speed Change



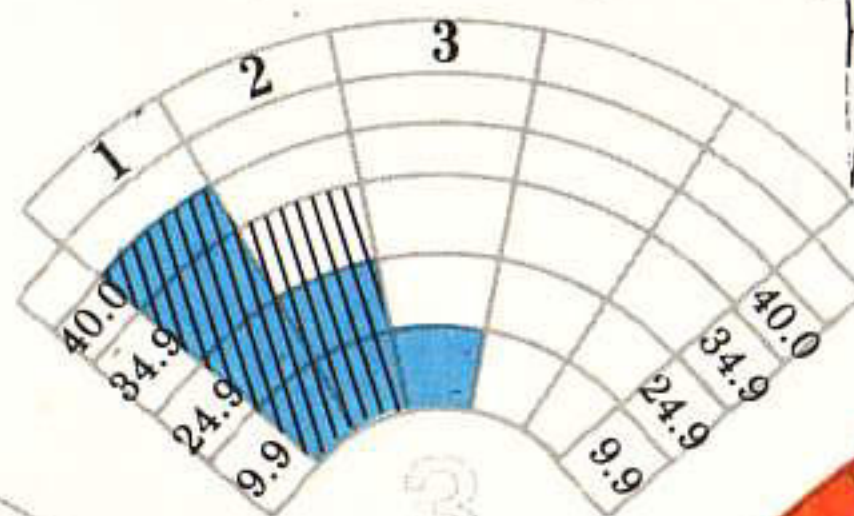
Power Factors	1-3
Brake Factors	4-6

Half Loop	P
Half Roll	P
Turn or Slip	+2
Bank	+1

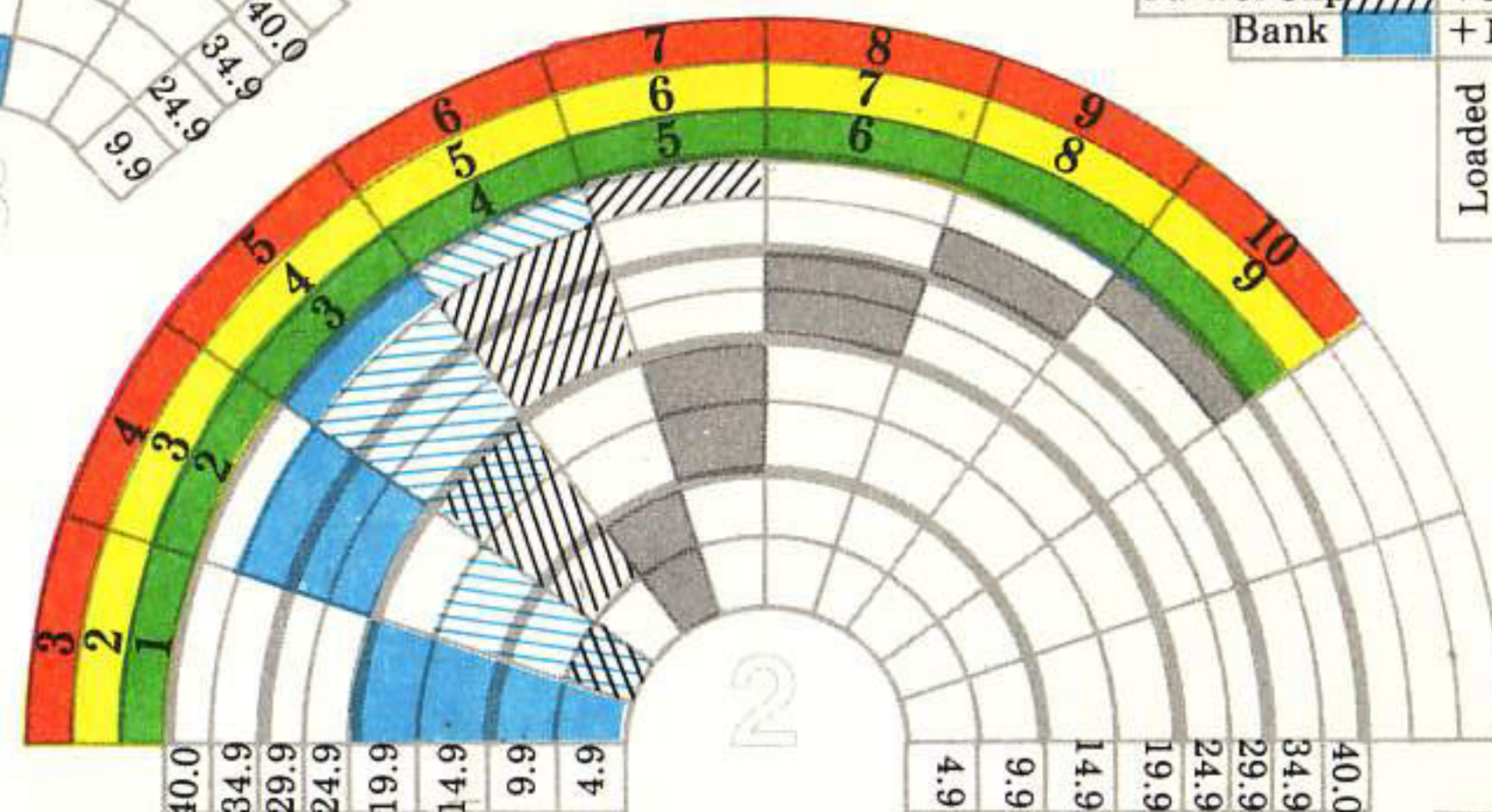
Loaded



Speed Increments

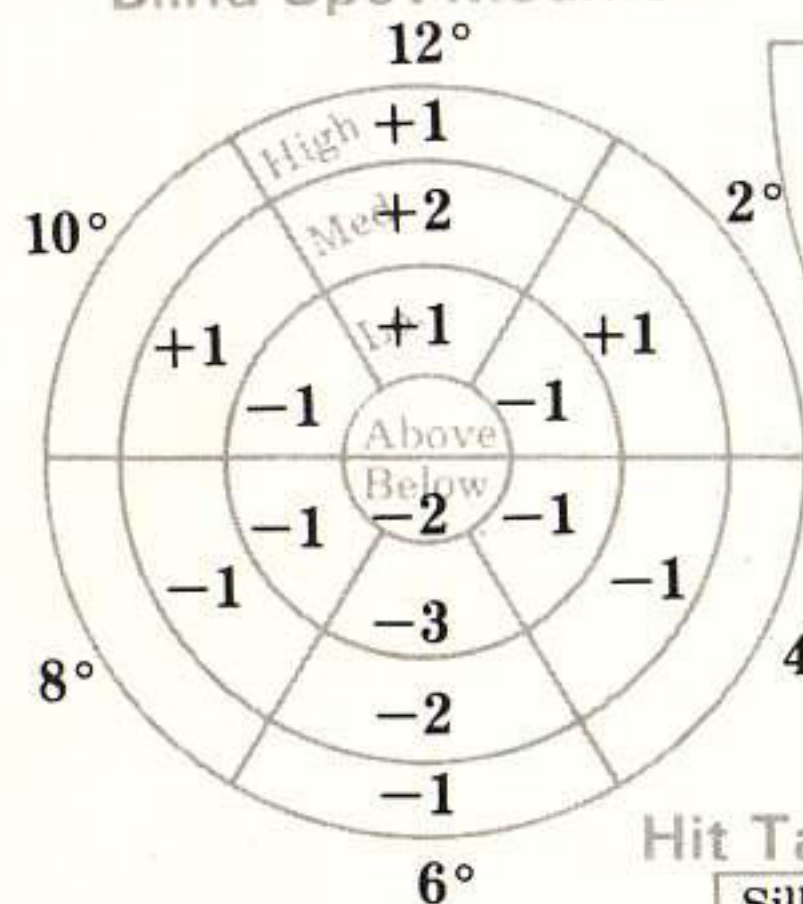


Altitude Change



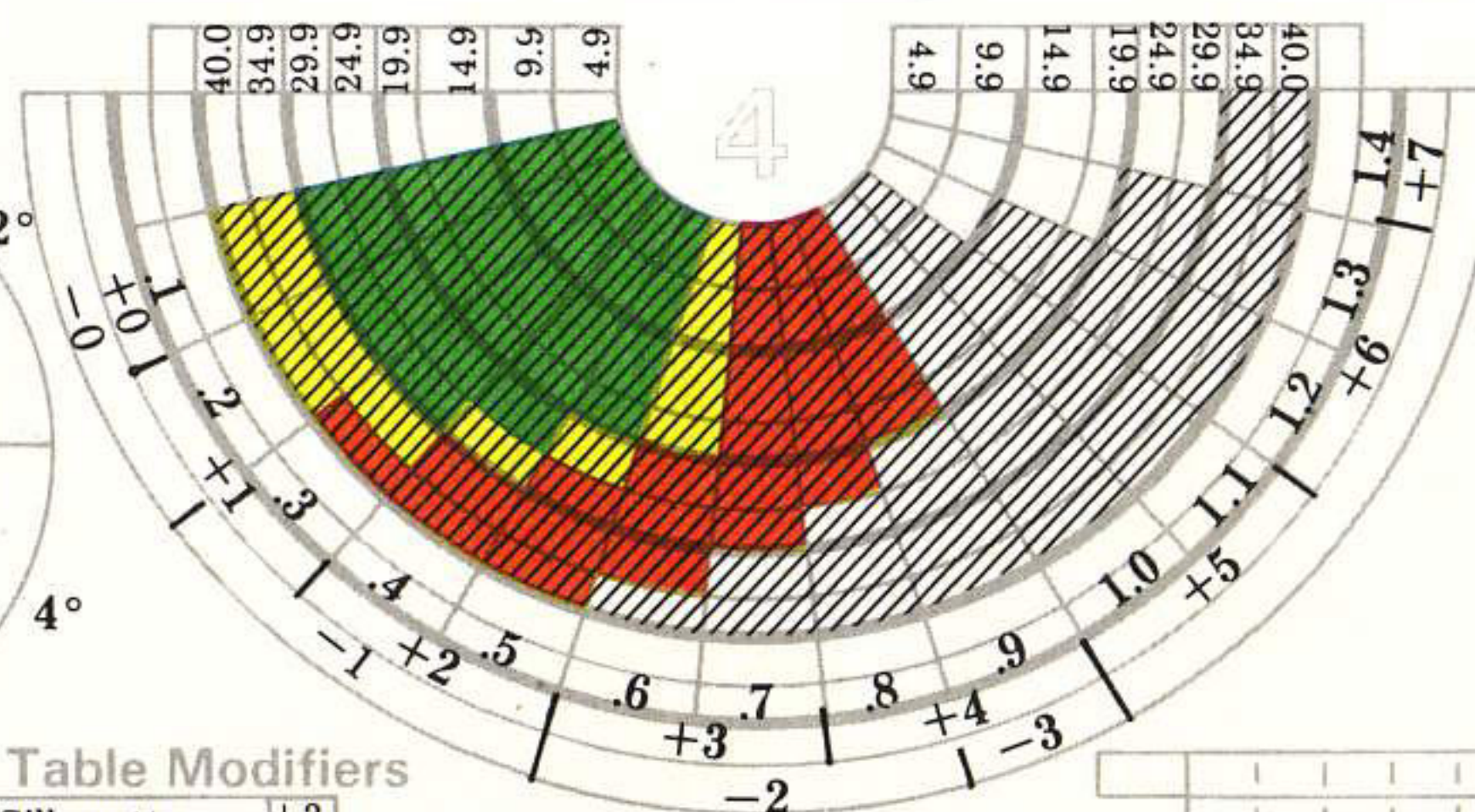
Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+3
Fire	+2



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-0.4
Dive Sp. Climb	-0.2
Max Climb	-0.2

Loaded

Target Characteristics

W	6	Cn	-	Mg	6
F	10	L	4		
C	3	C	-		
E	3	E	-	E	-
G	4M	4M		4M	4M
	(5)	(5)		(5)	(5)
FF					FF

Variants

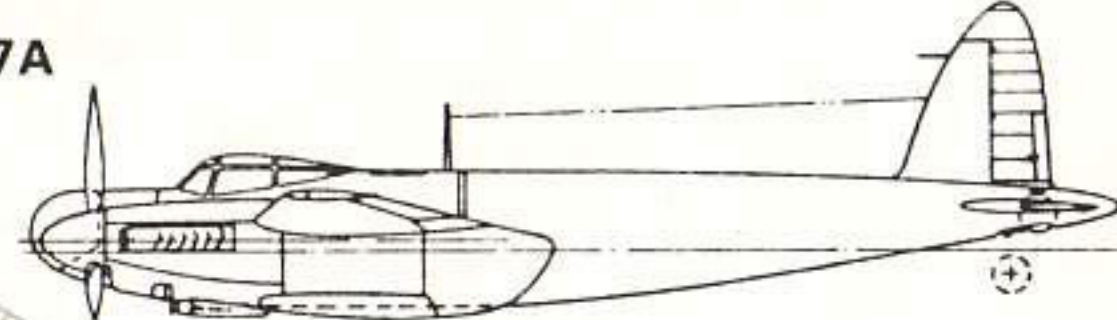
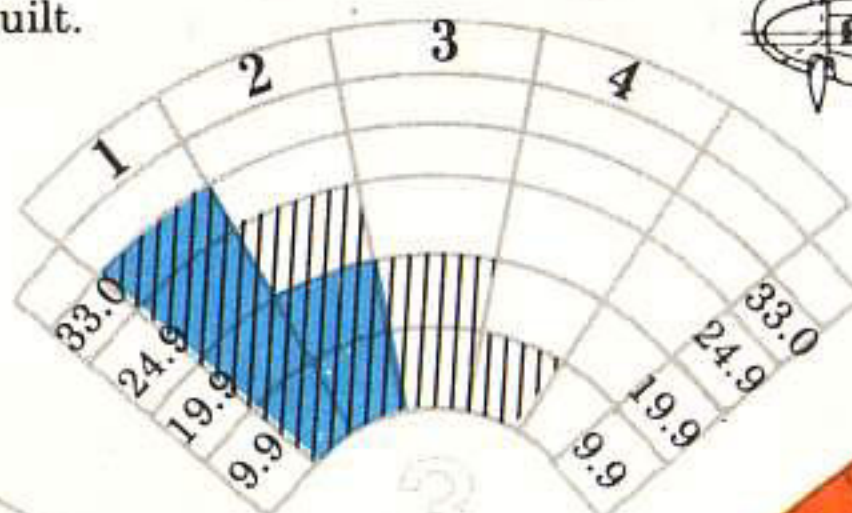
Mosquito F.B. VI

DeHavilland Mosquito F.B. VI Series-2 Fighter Bomber
 PV: 23. Engine Type: I. Producer: Great Britain
 Most widely used of all Mosquito variants, nearly 2600 built.
 First used operationally in Spring '43.
 Loaded: Can carry up to 4 bombs, or 8 A/G rockets.

Stall Speed	0-2
Maneuver Sp.	3
Level Speed	4
Dive Speed	5
Loaded (Opt.)	-1

AIR FORCE DATA CARD 7A

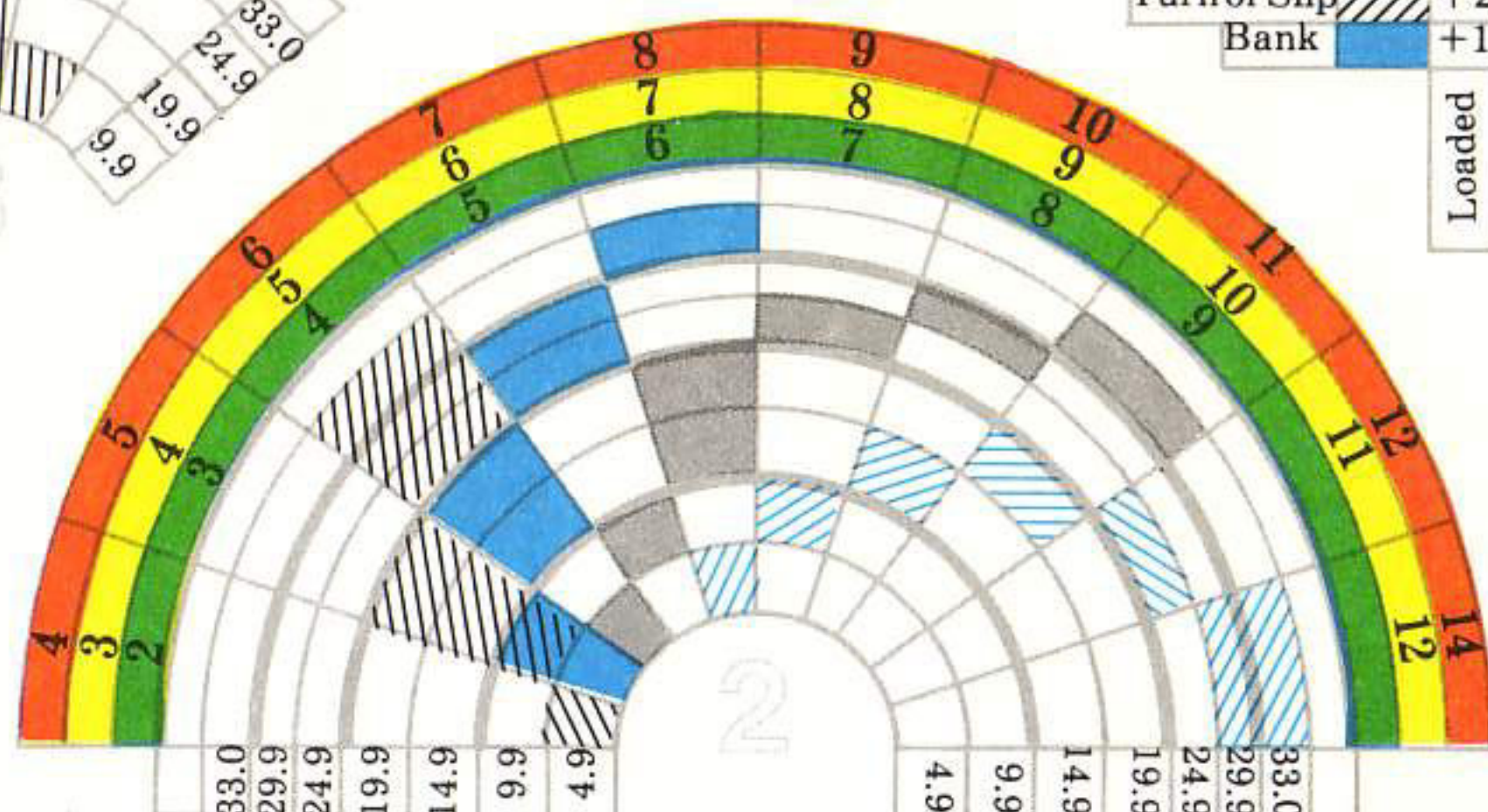
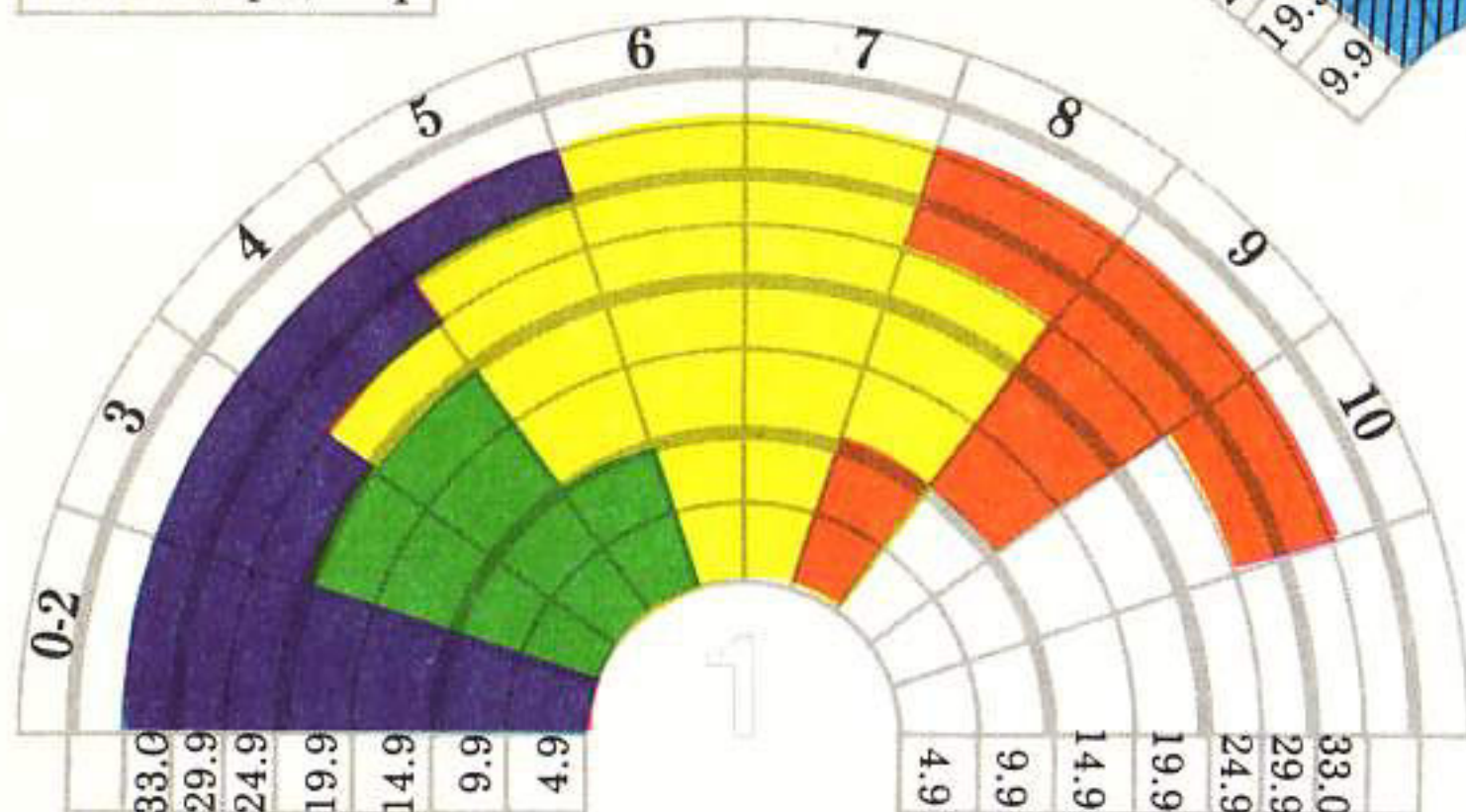
Speed Change



Power Factors	+
Brake Factors	+

Half Loop	P
Half Roll	P
Turn or Slip	+2
Bank	+1

Loaded

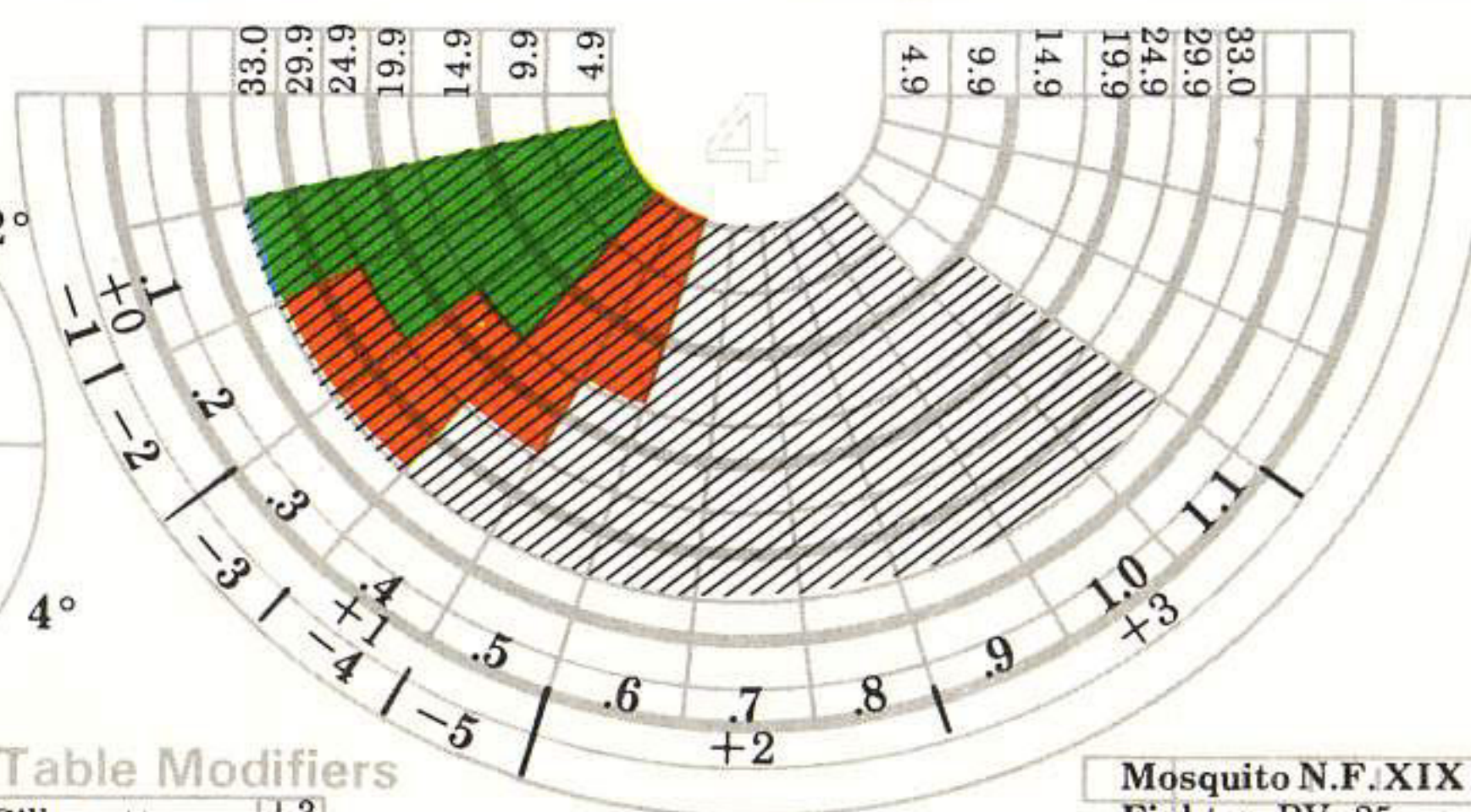
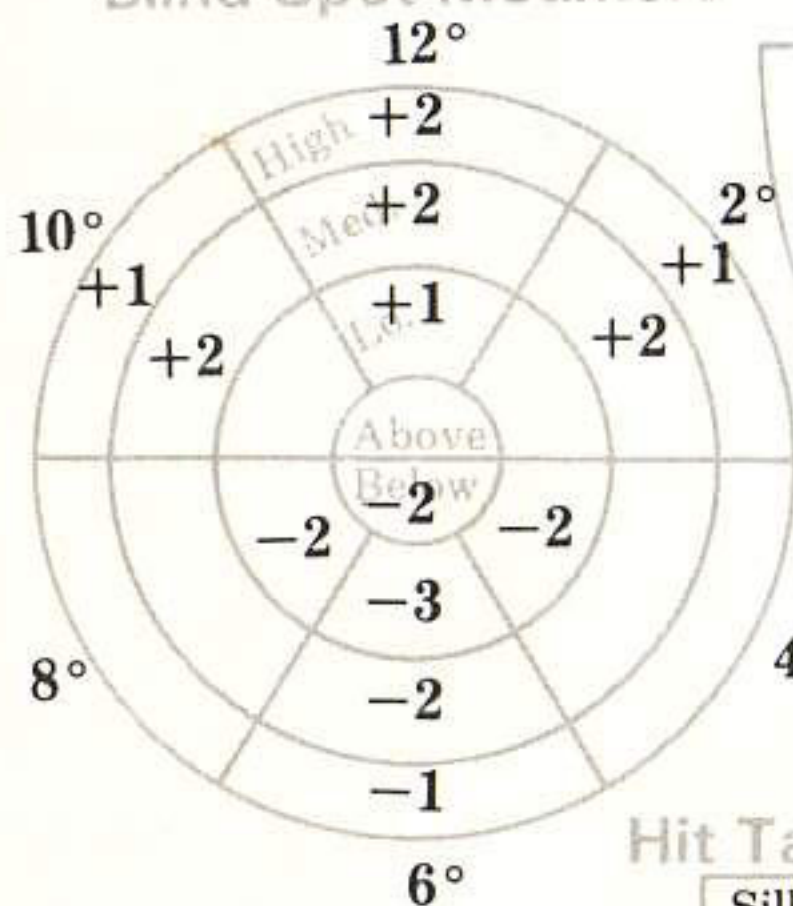


Speed Increments

Altitude Change

Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+3
Fire	+2

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-4
Dive Sp. Climb	-1
Max Climb	-1

Loaded

Target Characteristics

W	6	Cn	6	Mg	6
F	7	L	3		
C	3	C	-		
E	3	E	-	E	3
G	4C	2M	4C	4C	2M
	(6)	(5)	(6)	(6)	(5)
	FF			FF	

Variants

Mosquito N.F.XIX Night
 Fighter. PV: 25
 This variant had similar
 performance and carried

radar, but could not carry
 bombs, rockets, or the
 machine gun armament.

B-24J

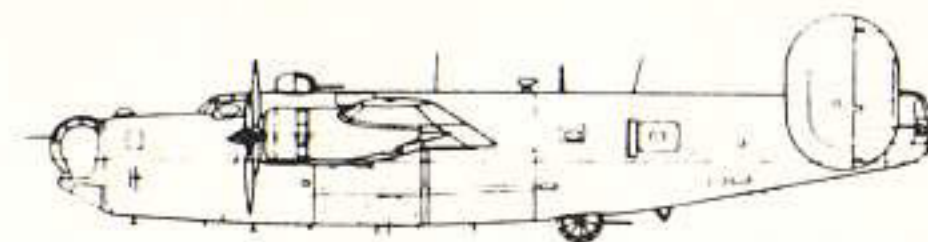
Consolidated B-24J "Liberator VI/VIII" Heavy Day Bomber

PV: 33. Engine Type: R. Producer: USA.

Entered operations in Fall '43. The major model of the B-24, 6678 J-series built.

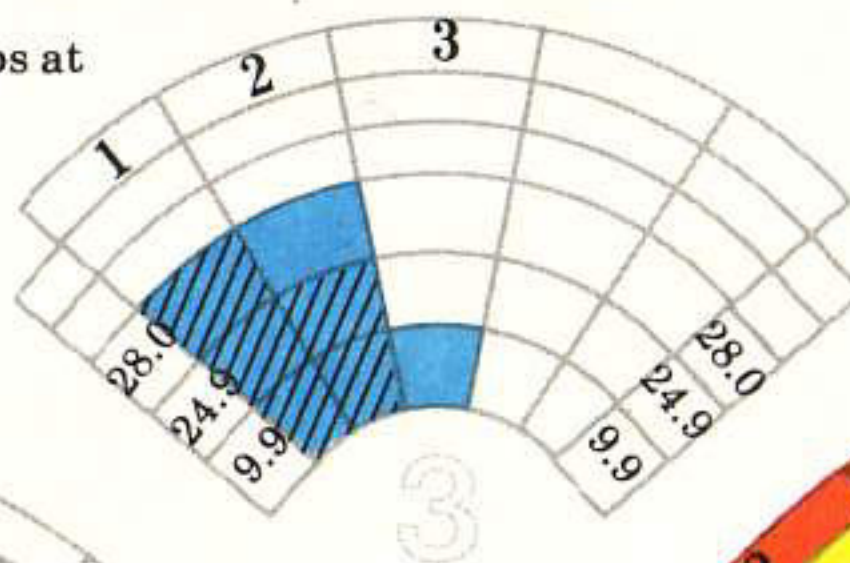
Loaded: Can carry up to 12,800 pounds of bombs (9 bombs at low level). Has sights for use as a level bomber.

AIR FORCE DATA CARD 7B



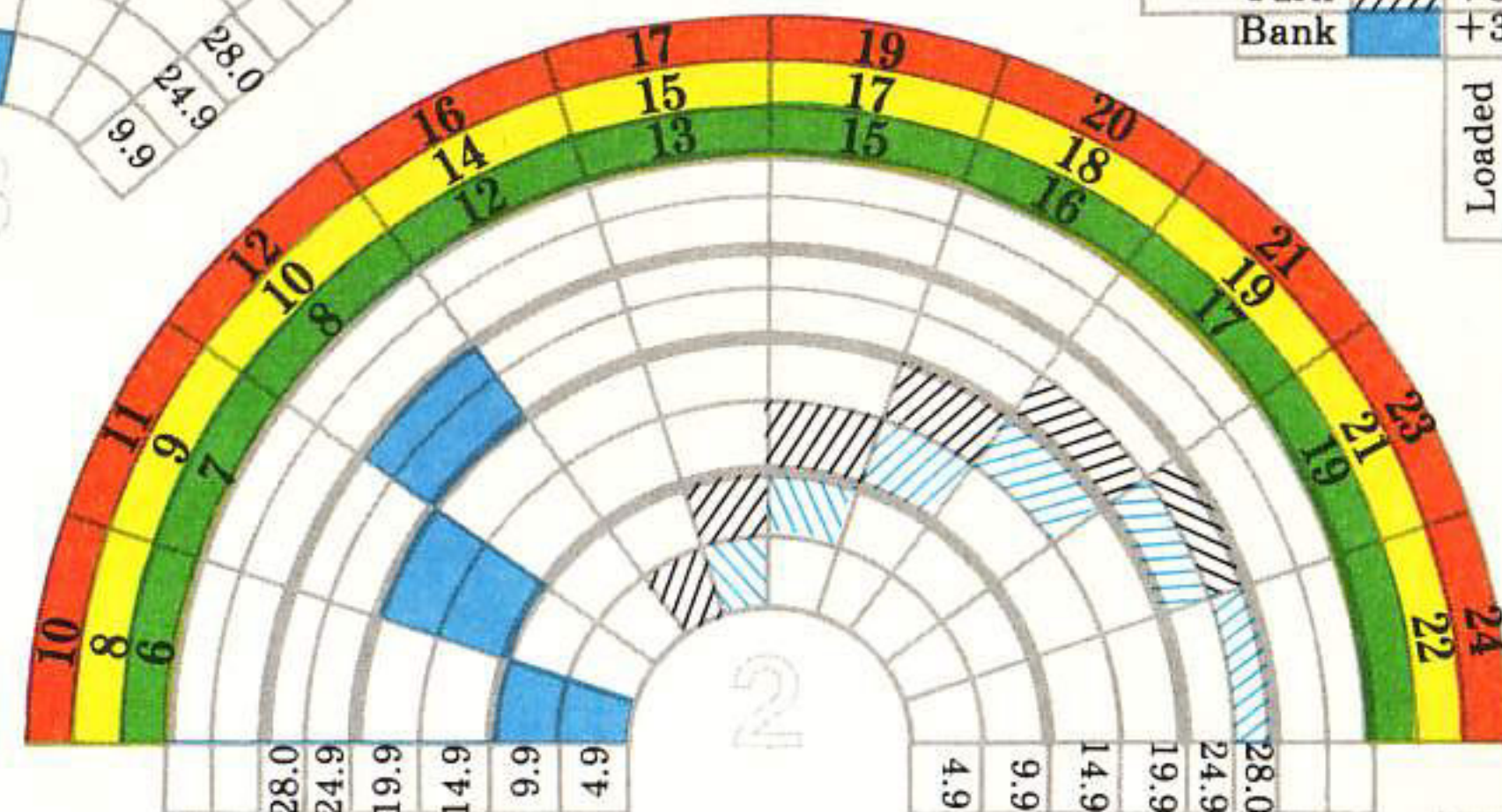
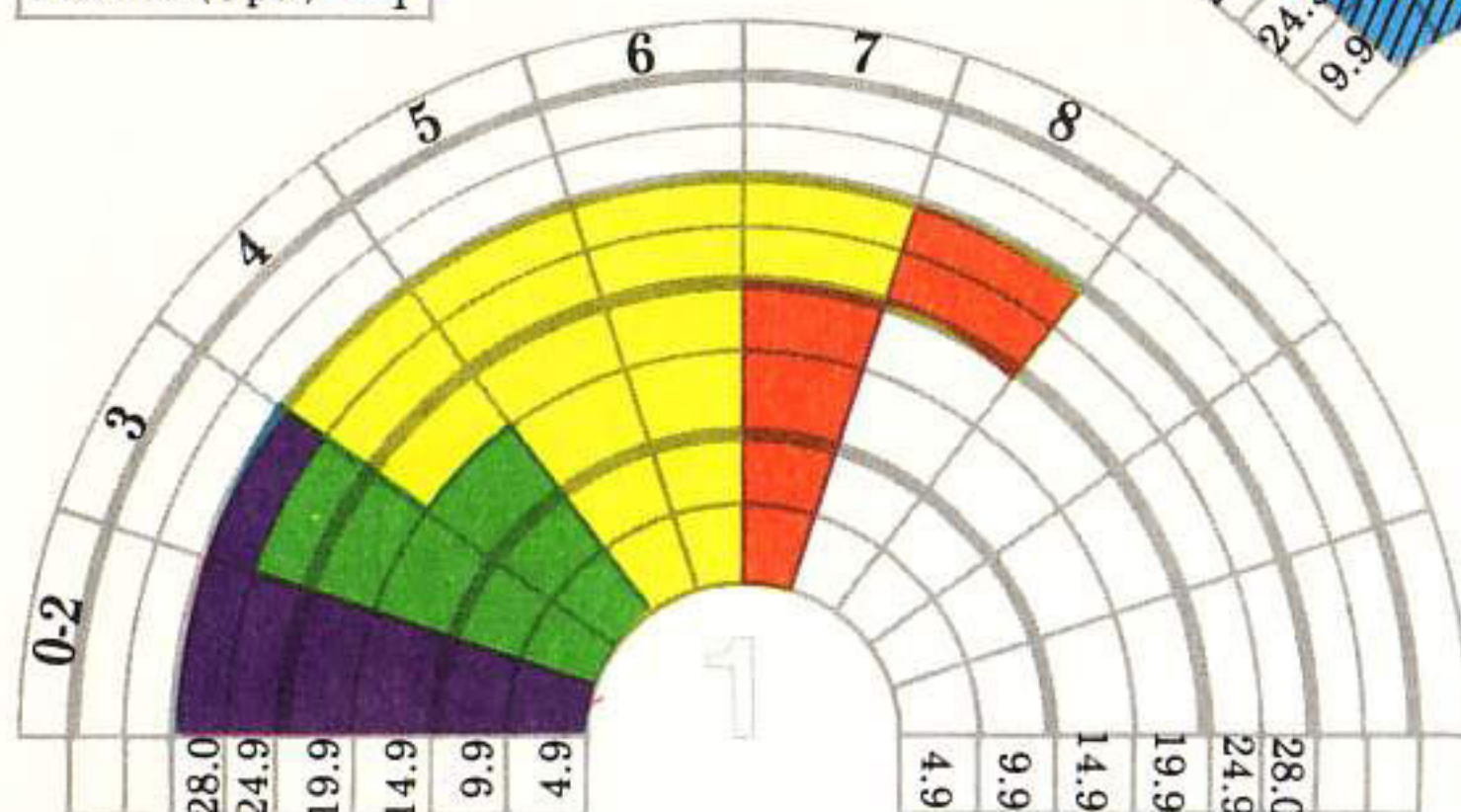
Stall Speed	Dark Purple
Maneuver Sp.	Green
Level Speed	Yellow
Dive Speed	Red
Loaded (Opt.)	-1

Speed Change



Power Factors	Diagonal Lines
Brake Factors	Blue

Slip	Light Blue	+7
Turn	Diagonal Lines	+8
Bank	Blue	+3
Loaded		

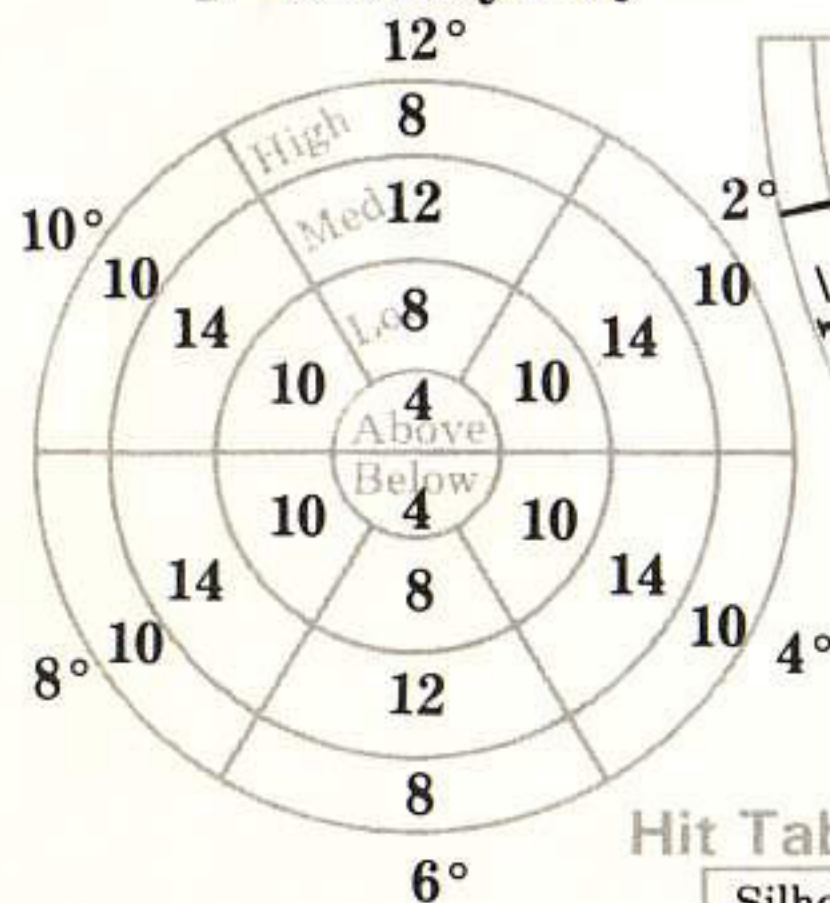


Speed Increments

Altitude Change

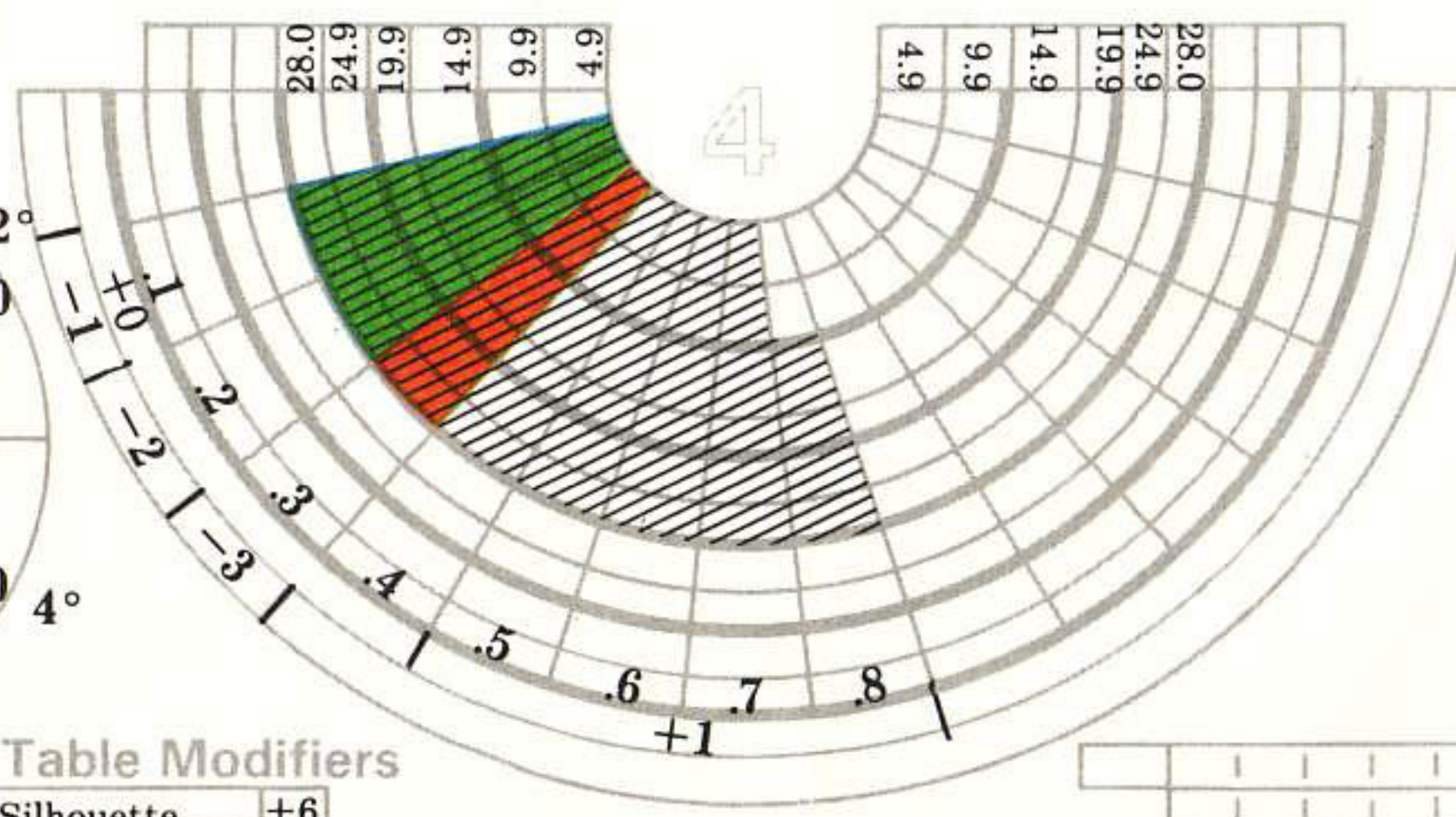
Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+6
Fire	0



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-2
Dive Sp. Climb	-1
Max Climb	-1
Loaded	

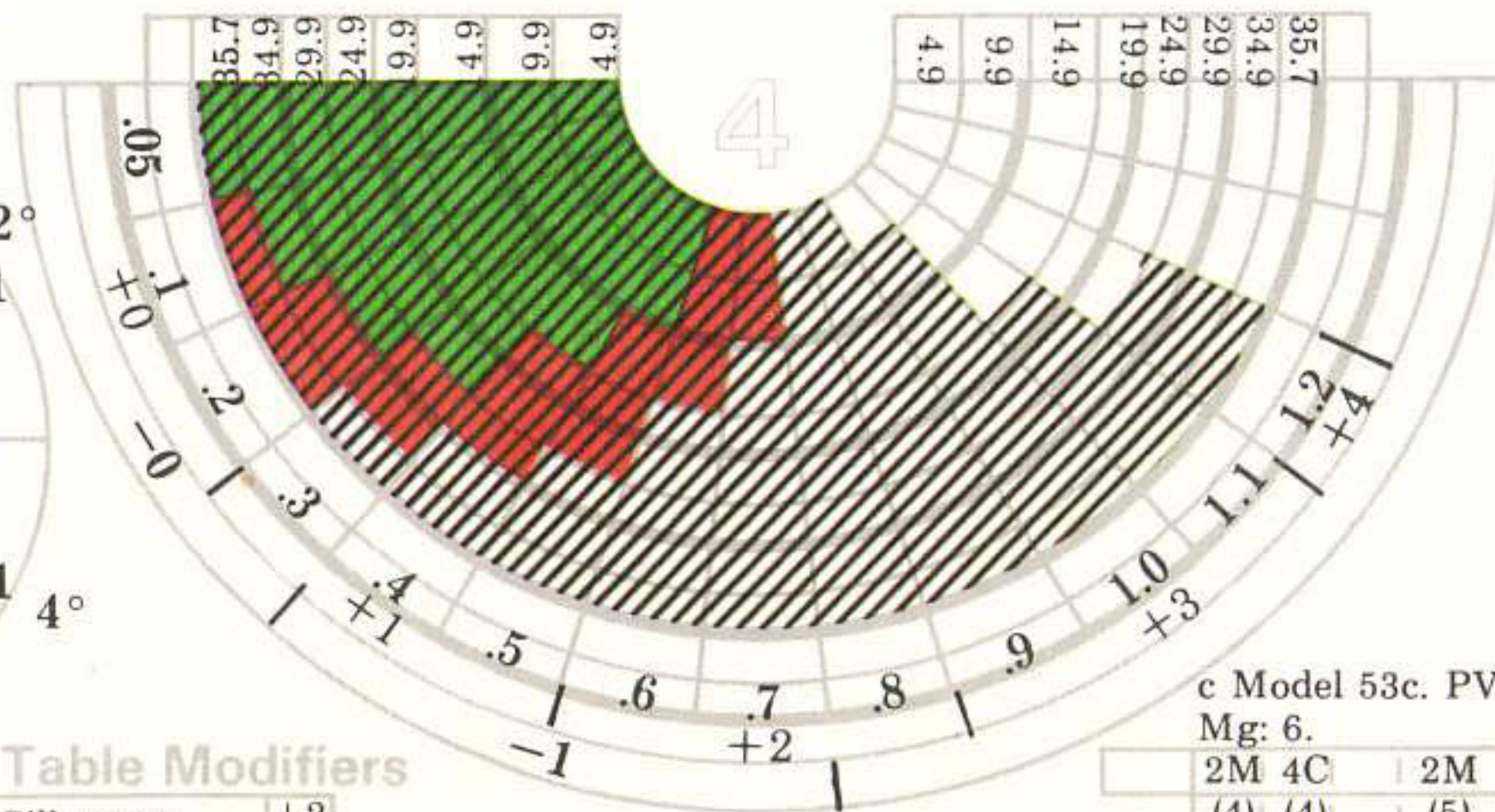
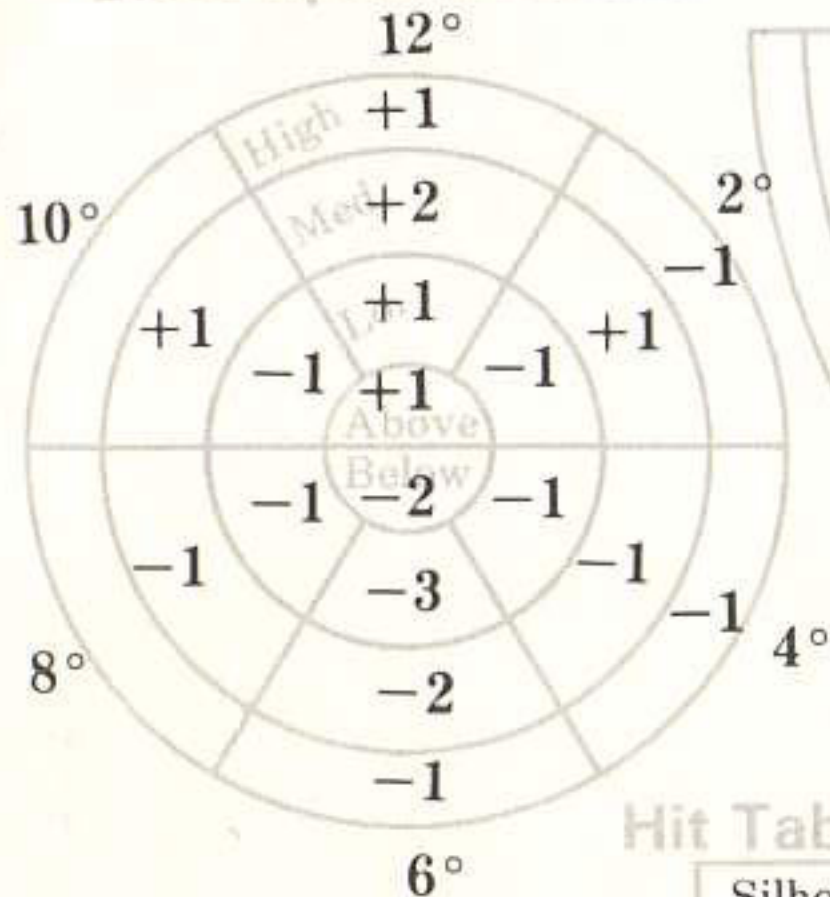
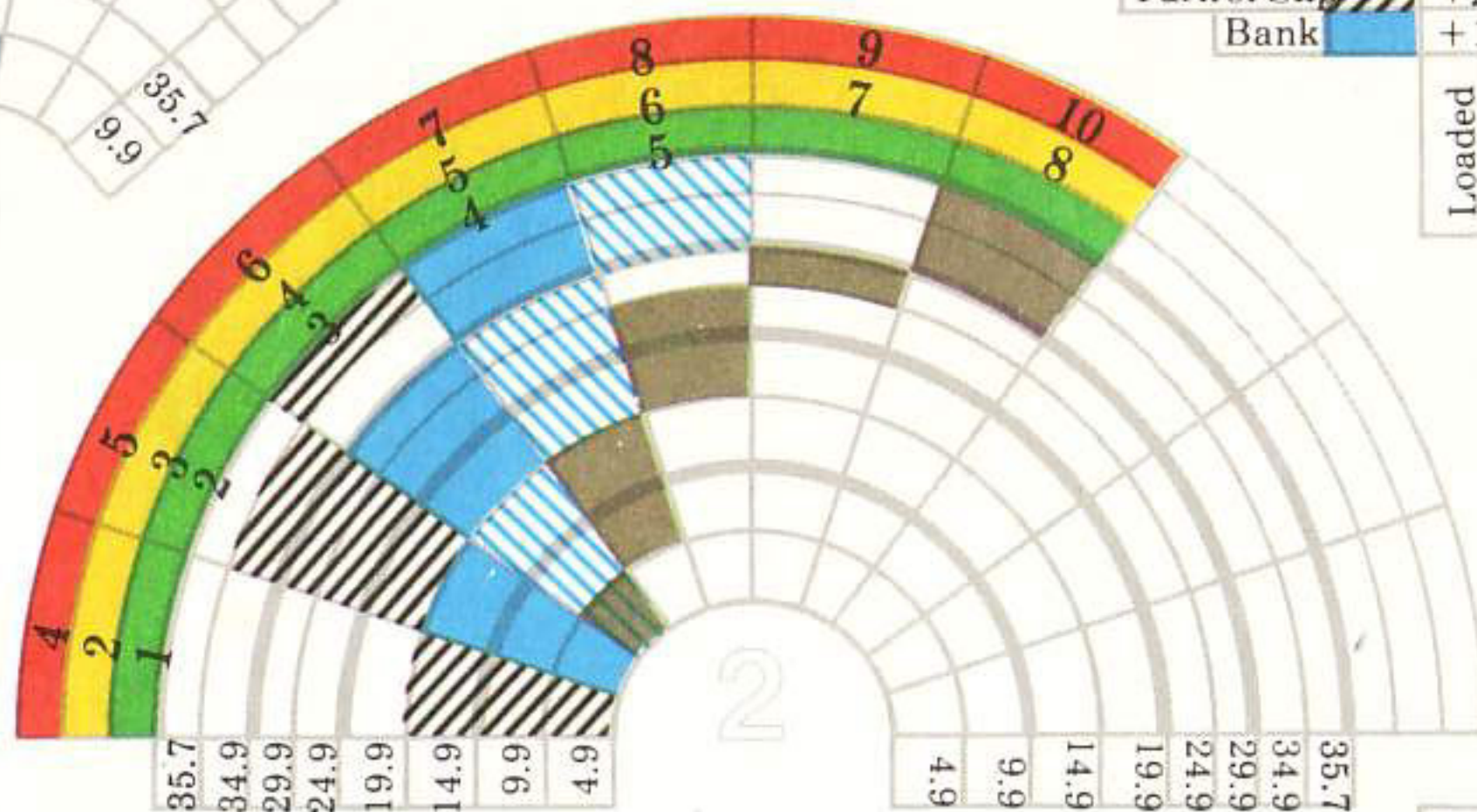
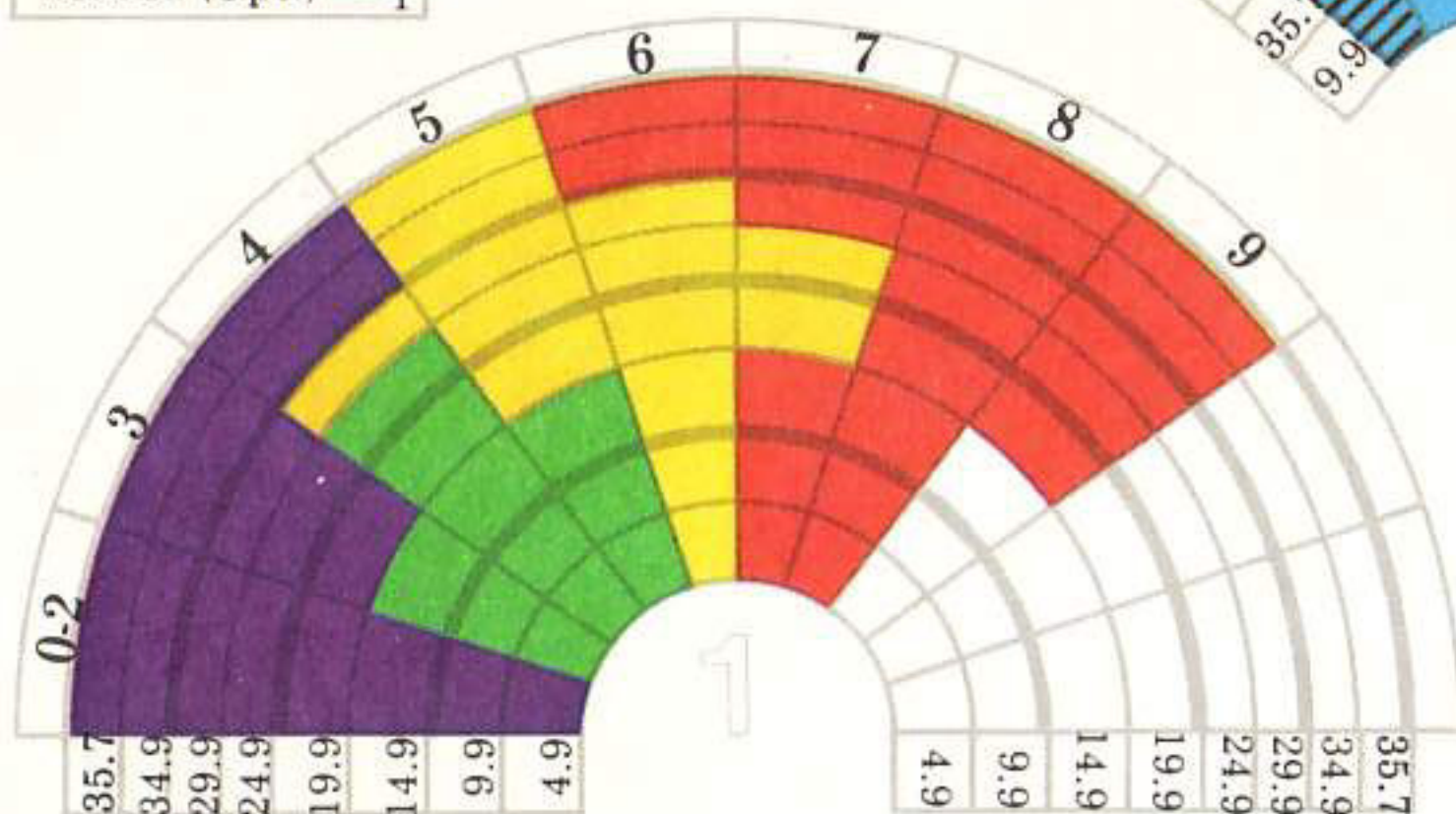
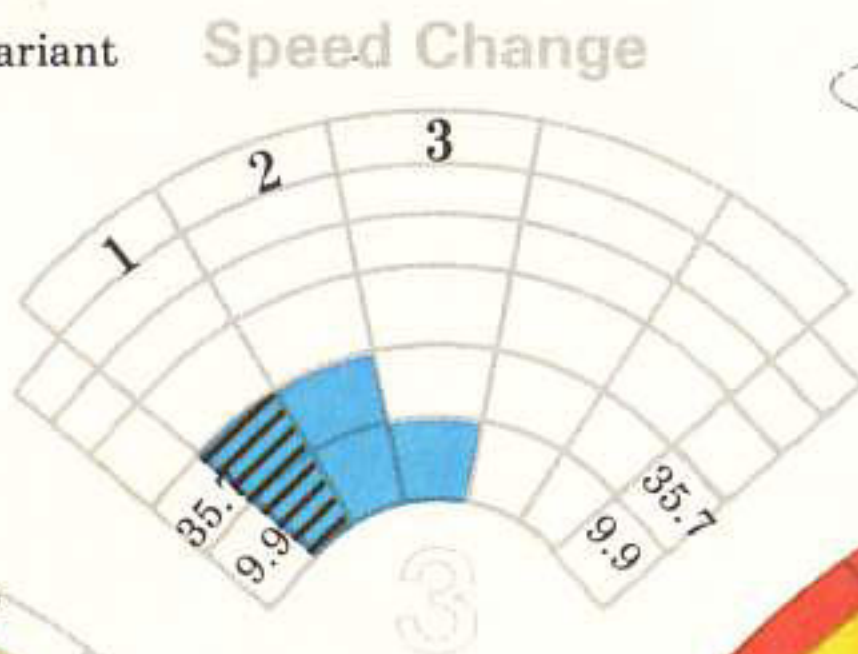
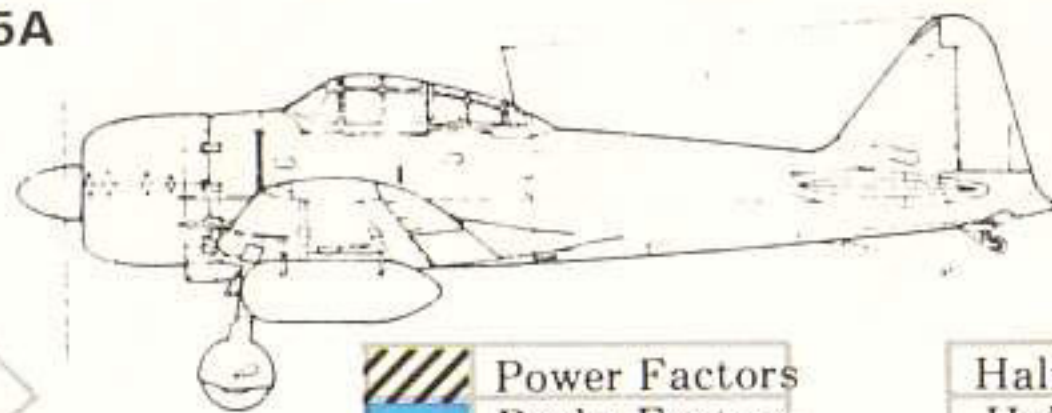
Target Characteristics

W	10	Cr	-	Mg	-
F	9	L	3		
C	2	C	2		
E	2	E	2	E	2
G					
		(6)			
		F			

Variants

Mitsubishi A6M5b Model 52b ("Zeke") Carrier Day Fighter
 PV: 17 Engine Type: R Producer: Imperial Japan
 A6M5 series introduced Fall '43; the most-produced variant
 of the Zero.




DAUNTLESS DATA CARD 15A



Silhouette	+2
Fire	+2

Half Loop		P
Half Roll		P
Turn or Slip		+2
Bank		+1

Loaded

Dive Acceler.	+1	Load
Climb Deceler.	-1	
Max Dive		
Dive Sp. Climb		
Max Climb		

Target Characteristics

W	5		Cn	5	Mg	8
F	4		L	3		
C	3		C	—		
E	3	E	—	E	—	
G	4C	1M	1M	4C		
	(4)	(5)	(5)	(4)		
	FF	FF	FF	FF		

A6M5 Model 52. PV: 16. Cn:
3. Mg: 10.

c Model 53c. PV: 18. Cn: 4. Mg: 6.						A6M5 Model 52. PV: 16. Cn: 3. Mg: 10.			
2M	4C	2M	4C	2M	G	3C	1M	1M	3C
(4)	(4)	(5)	(4)	(4)		(4)	(5)	(5)	(4)
FF		FF		FF		FF	FF	FF	FF

Nick

Kawasaki Ki.45-KA1a "Toryu" Day/Night Fighter/Fighter-Bomber

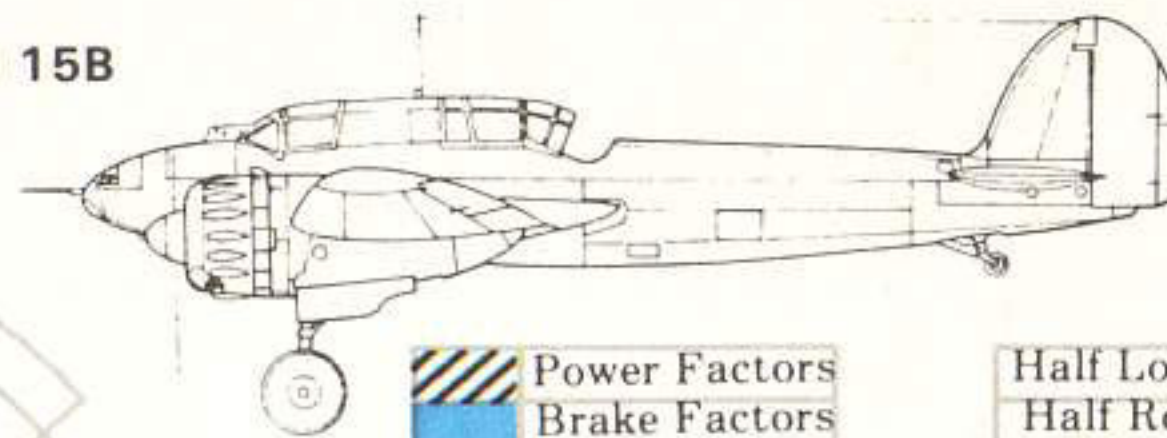
PV: 18 Engine Type: R Producer: Imperial Japan
Production began in September '41. About 1700 built. Carried no radar.

Loaded: Can carry two bombs.

Stall Speed	32.8
Maneuver Sp.	29.9
Level Speed	24.9
Dive Speed	19.9
Loaded (Opt.)	-1

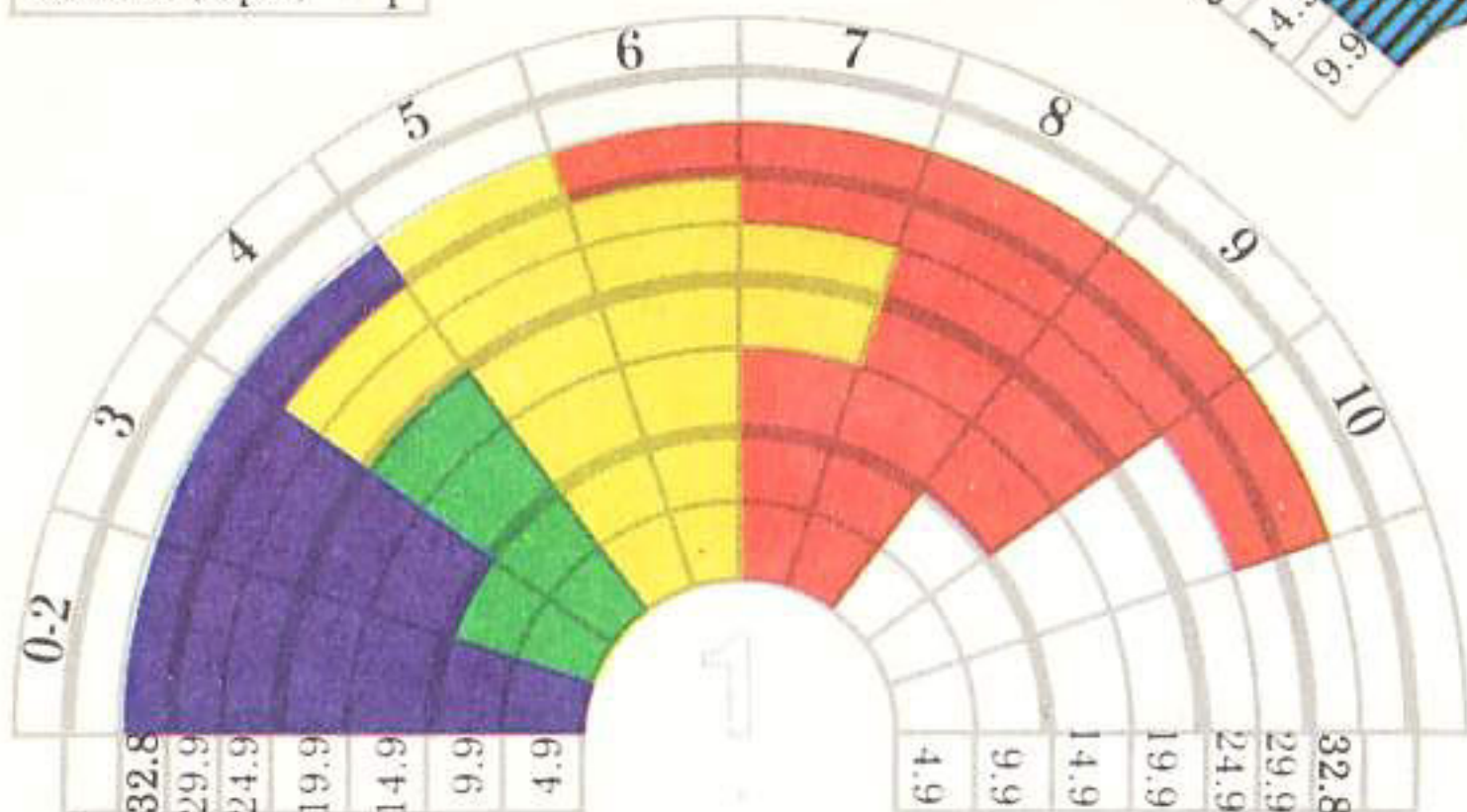
DAUNTLESS DATA CARD 15B

Speed Change



Power Factors	32.8
Brake Factors	14.9

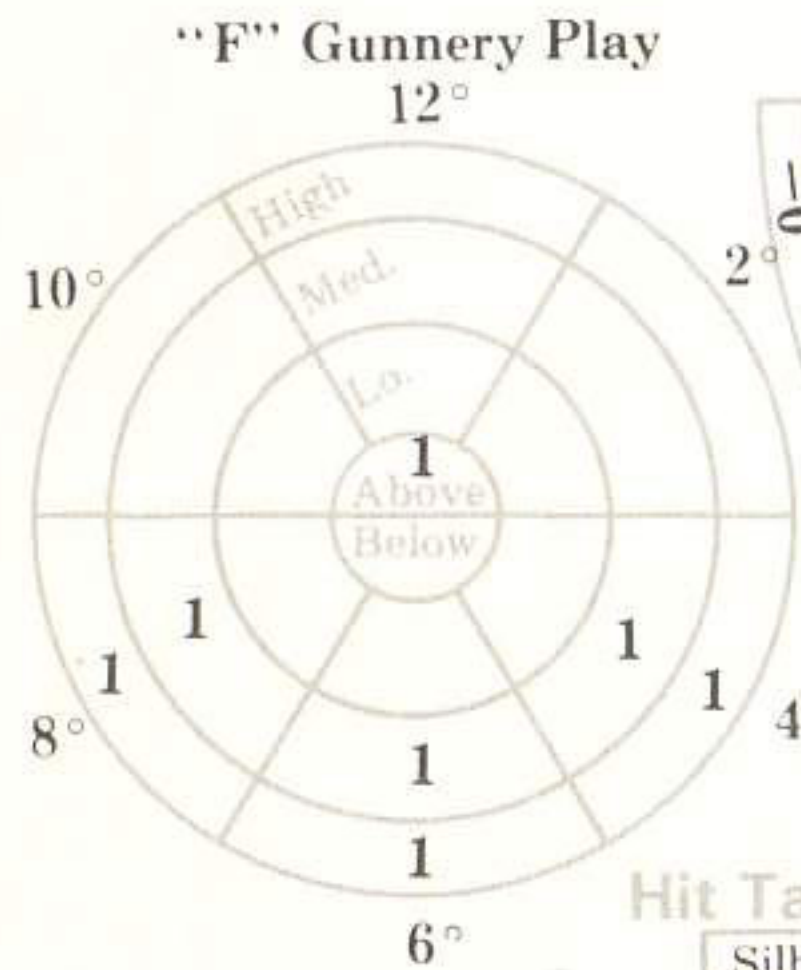
Half Loop	P
Half Roll	P
Turn or Slip	+2
Bank	+1
Loaded	1



Speed Increments

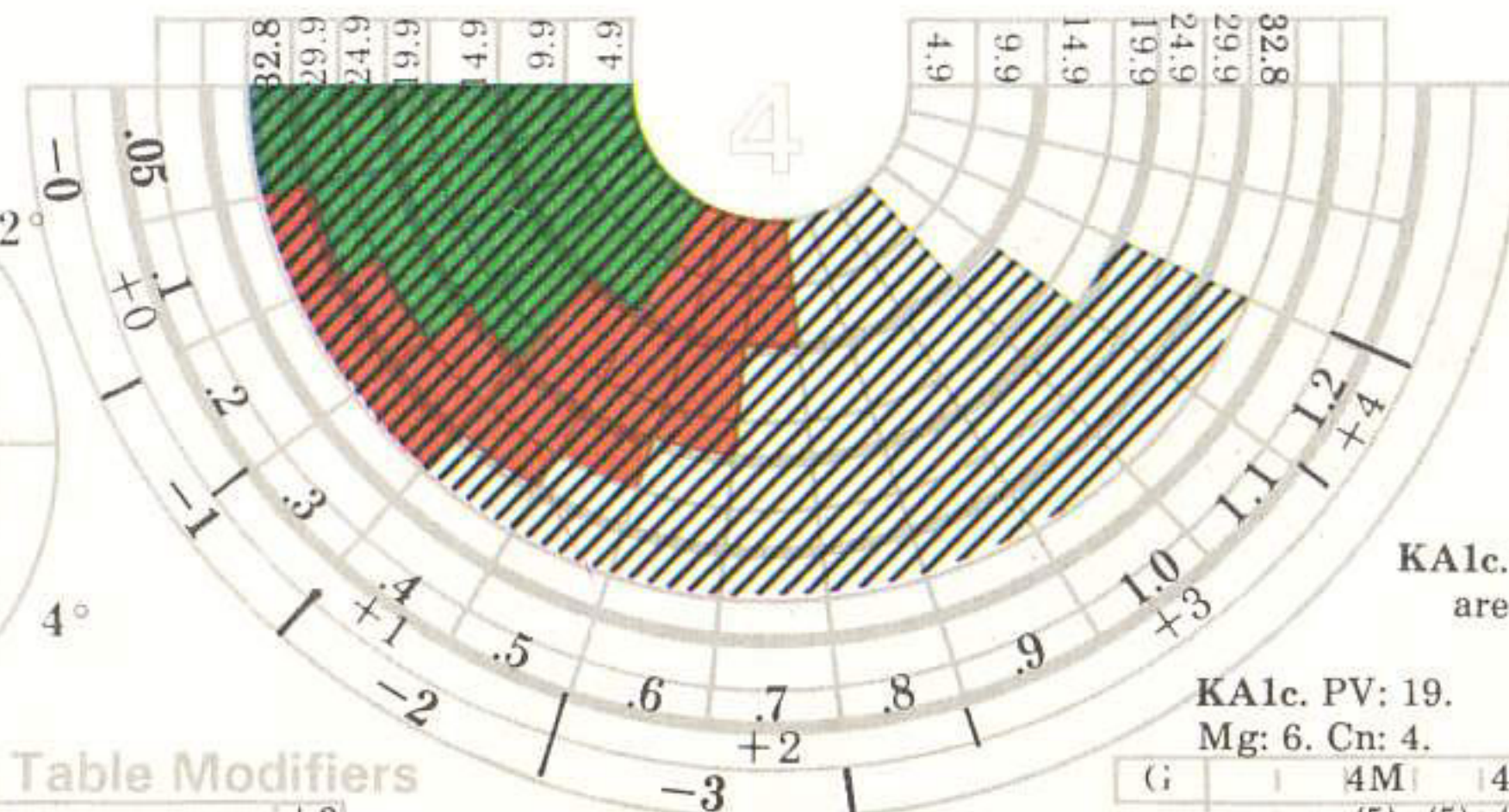
Altitude Change

Maneuverability Requirements



Hit Table Modifiers

Silhouette	+3
Fire	+2



KA1c. G: 4M's
are FH (3).

KA1c. PV: 19.
Mg: 6. Cn: 4.

G	4M	4M[5C]
	(5) (5) (5) (6)	
	FF F FF FF	

Variants

KA1b. PV: 19

G	4C 2M	2M(5C)
	(5) (3) (5) (3) (4)	
	FF FH F FH FF	

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-2
Dive Sp. Climb	-1
Max Climb	-1
Loaded	1

Target Characteristics

W	6	Cn	4	Mg	5
F	6	L	3		
C	3	C	-		
E	3	E	-	E	3
G		2M	3C	2M	
		(5) (5) (4) (5)			
		FF F FF FF			

Val

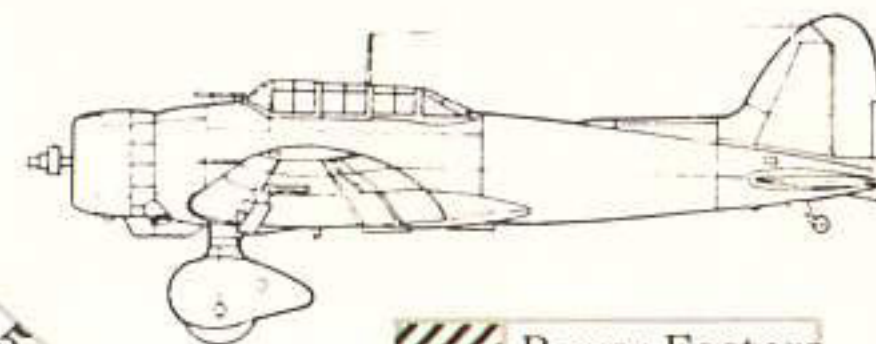
Aichi D3A-1 Model 11 "Type 99" Carrier Dive Bomber. DAUNTLESS DATA CARD 8A

PV: 16 Engine Type: R Producer: Imperial Japan

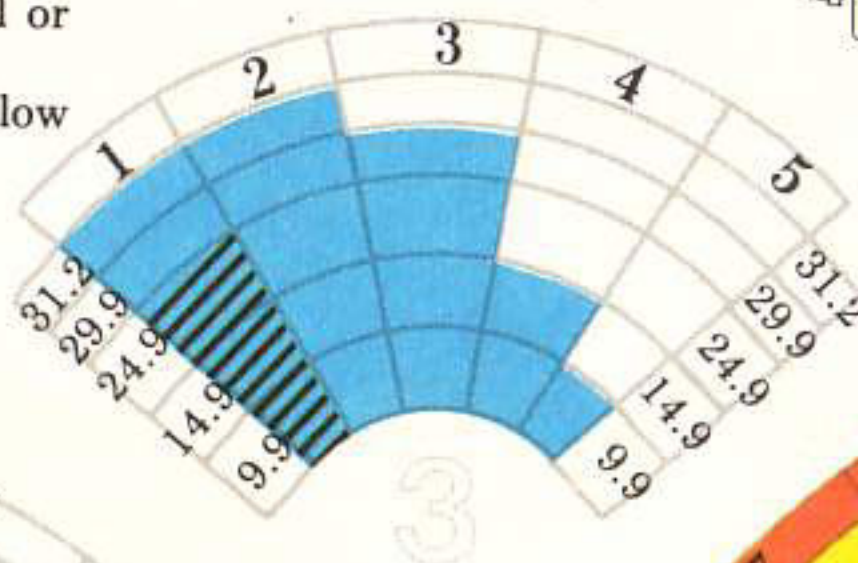
Introduced in 1938. A total of 478 of this model were built. Other versions very similar. Has sights for use as level or dive bomber.

Loaded: Can carry up to 816 pounds of bombs (one bomb low level).

Stall Speed	31.2
Maneuver Sp.	29.9
Level Speed	24.9
Dive Speed	19.9
Loaded (Opt.)	-2

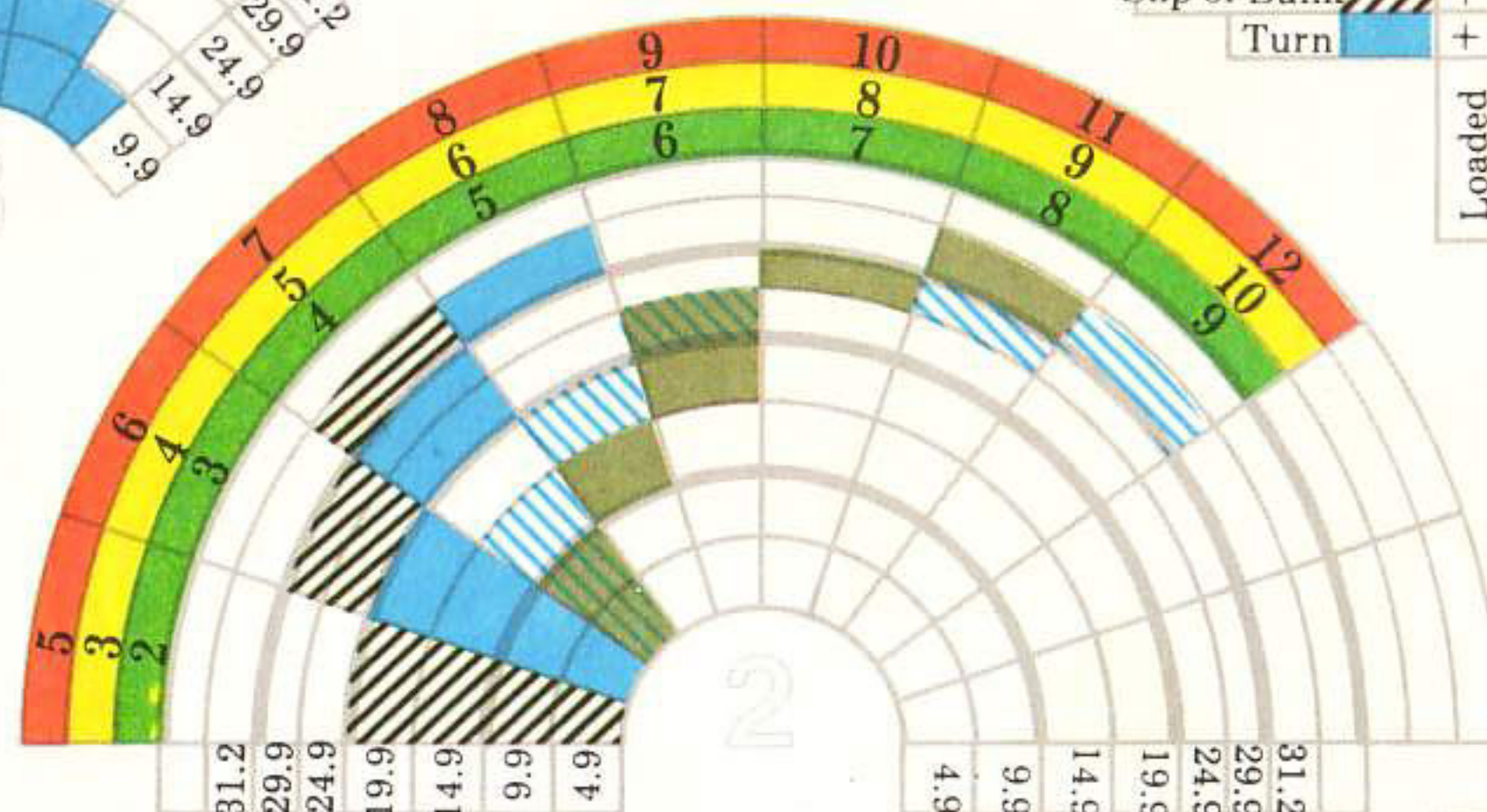
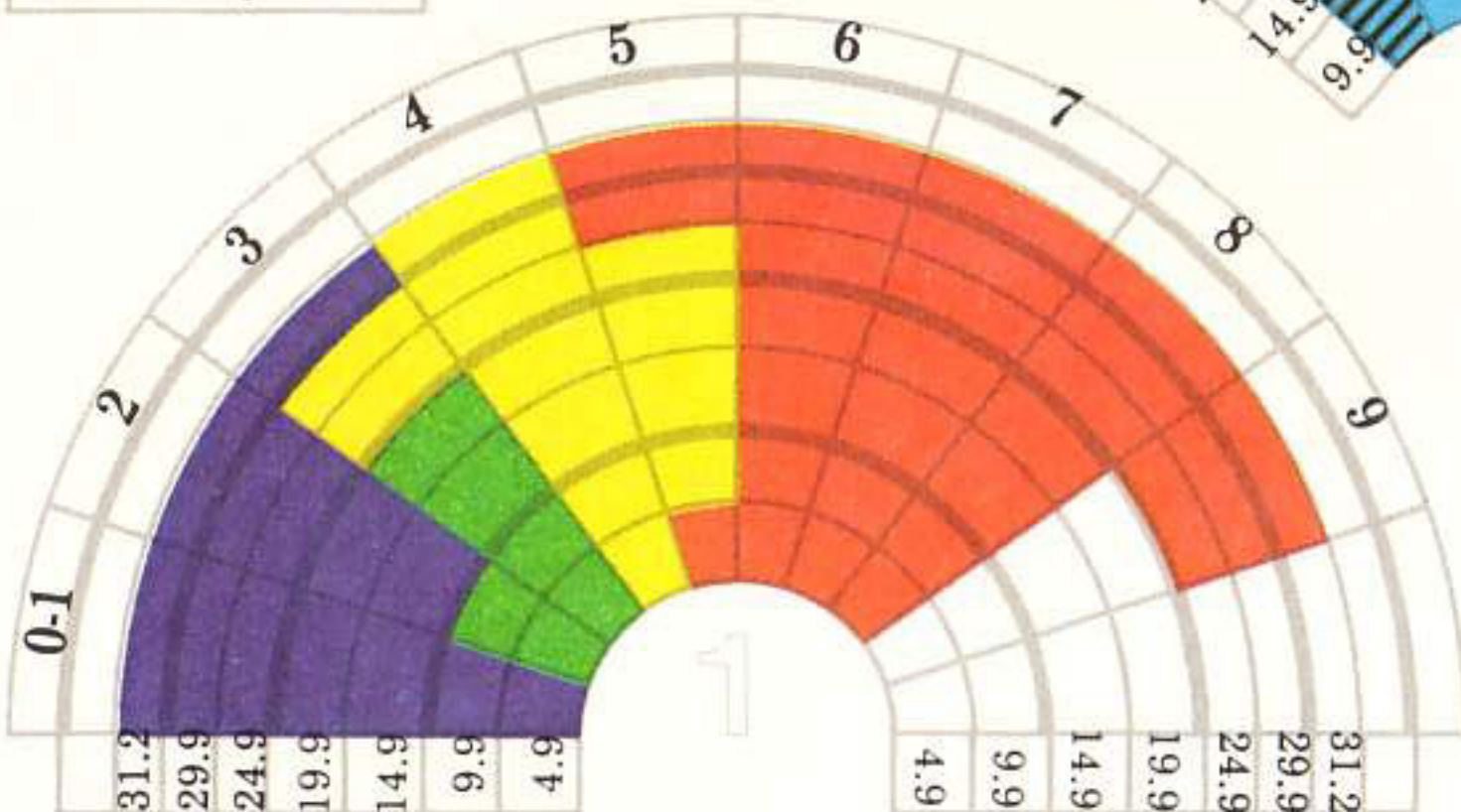


Speed Change



Power Factors	31.2
Brake Factors	29.9

Half Loop	P
Half Roll	+3
Slip or Bank	+1
Turn	+1
Loaded	

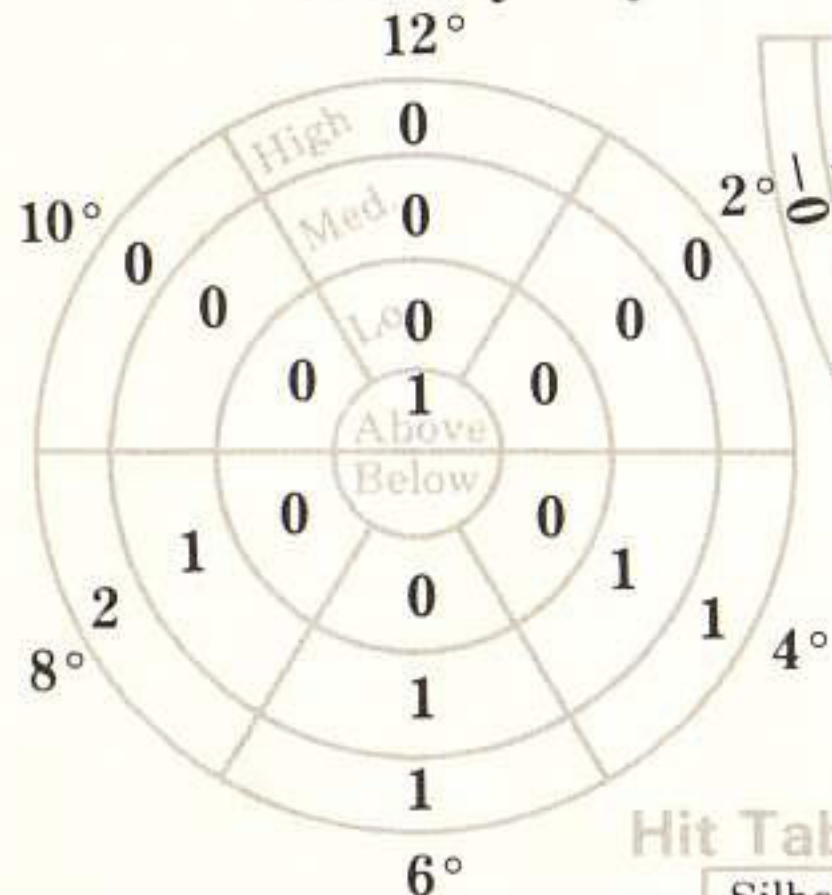


Speed Increments

Altitude Change

Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+3
FF Fire (F=0)	+1

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-2
Dive Sp. Climb	-1
Max Climb	-1
Loaded	

Target Characteristics

W	7	Cn	-	Mg	5
F	5	L	2		
C	3	C	-		
E	3	E	-	E	-
G	1M				1M
	(4)		(5)		(4)
	FF		F		FF

Variants

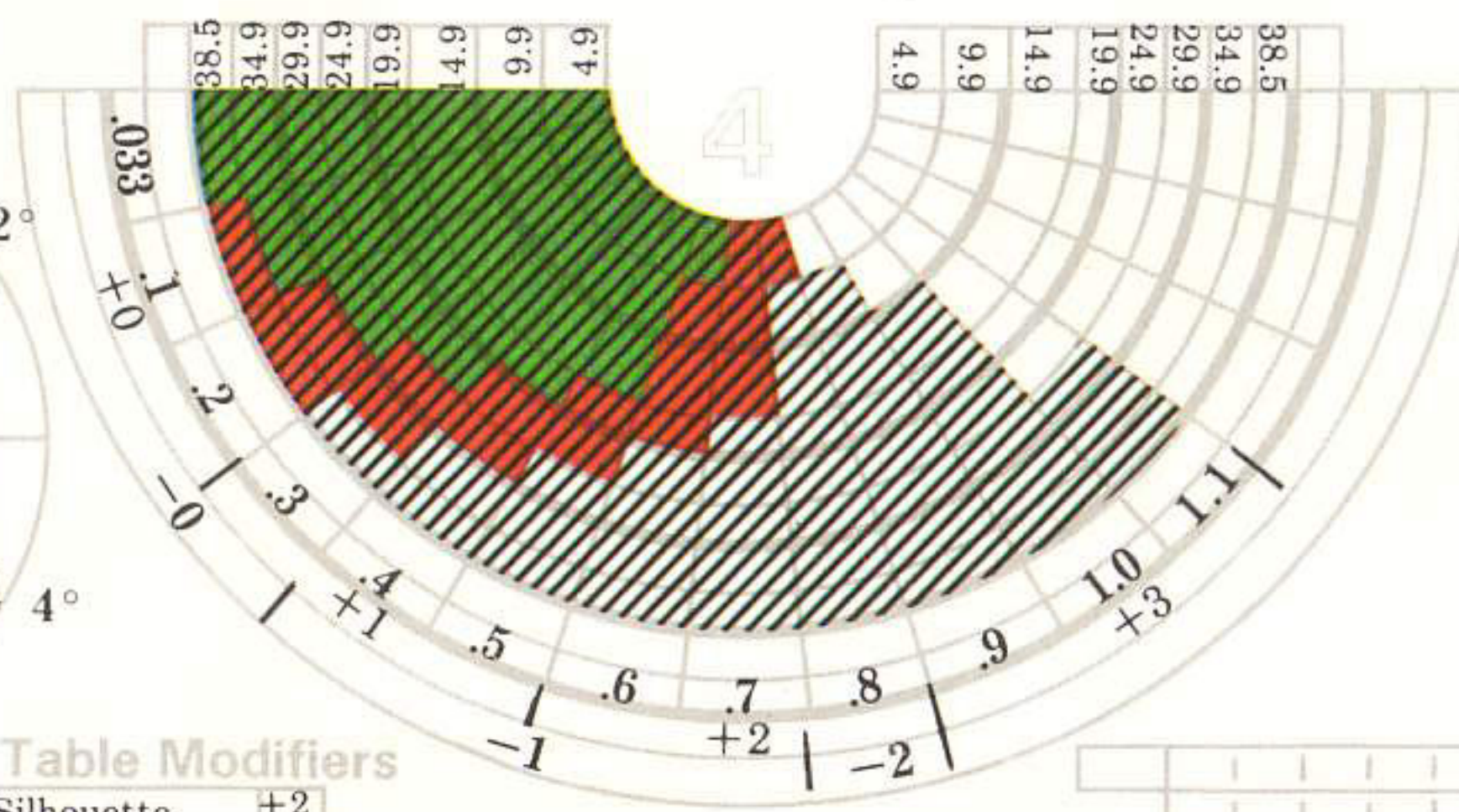
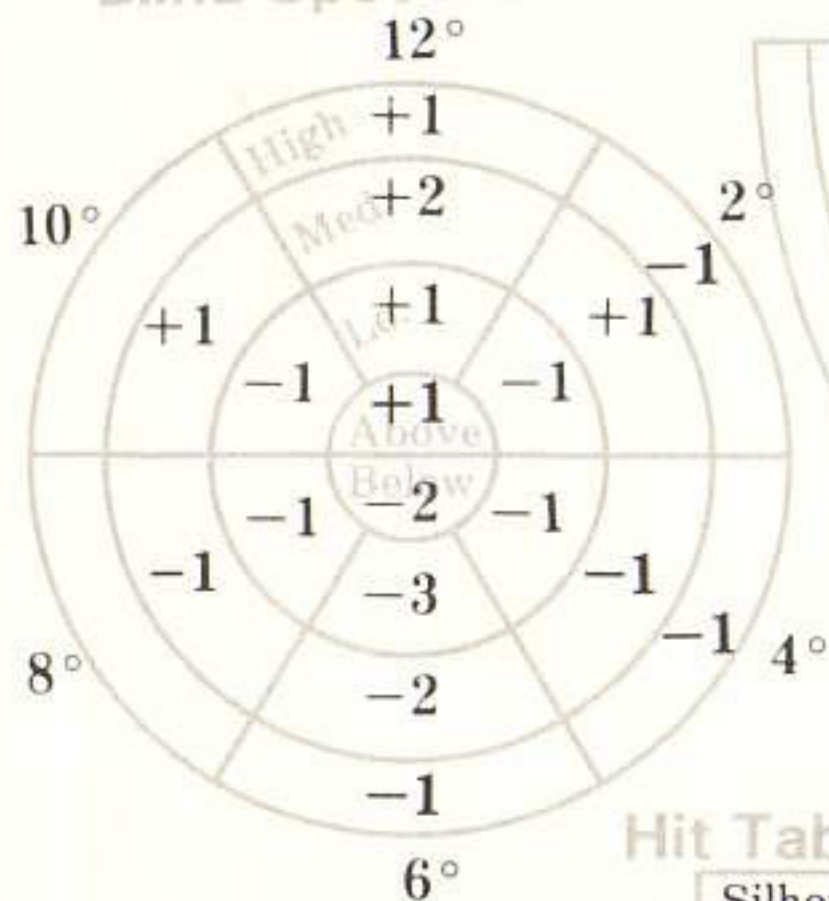
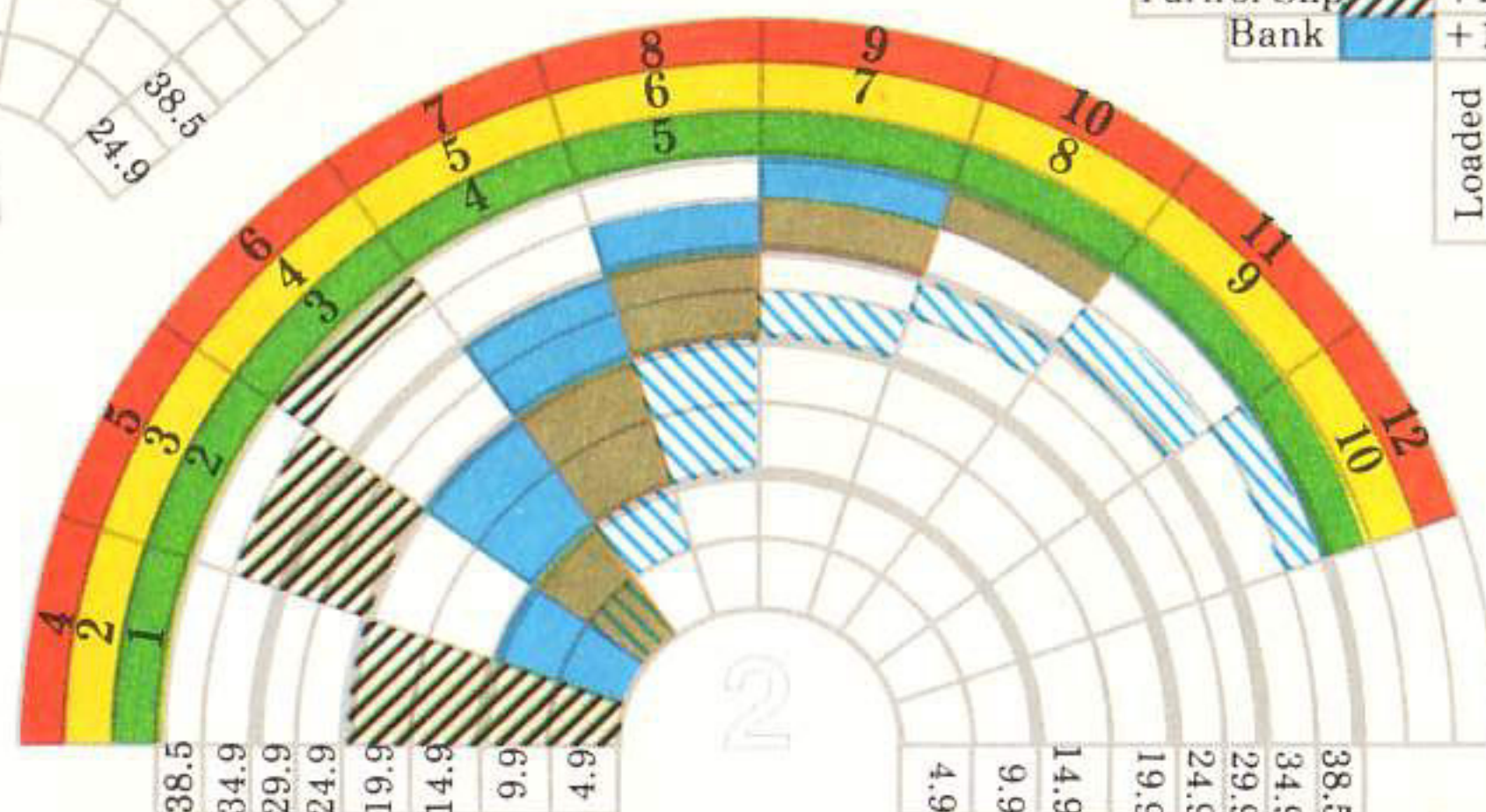
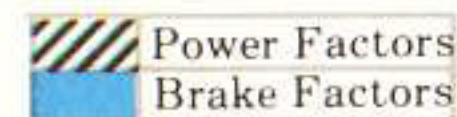
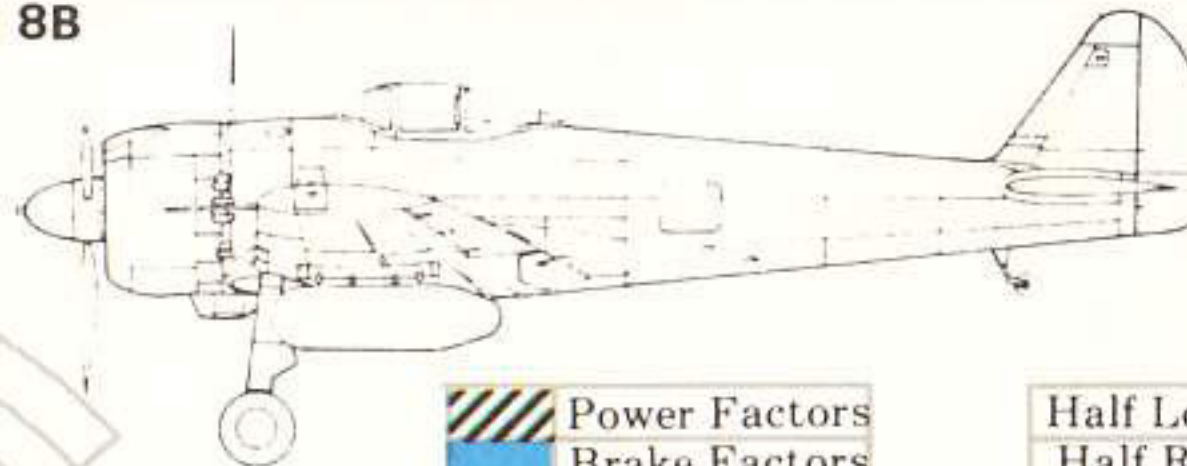
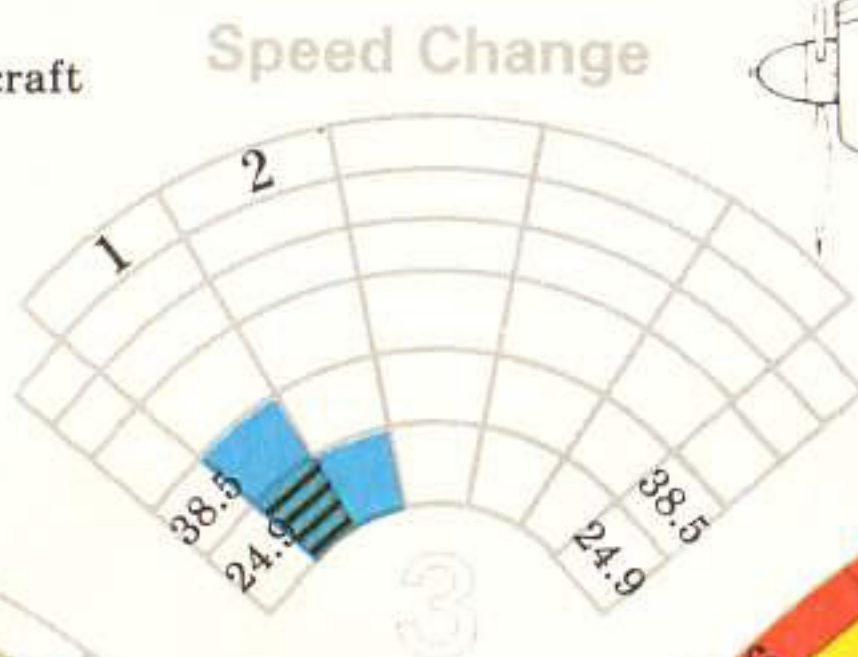
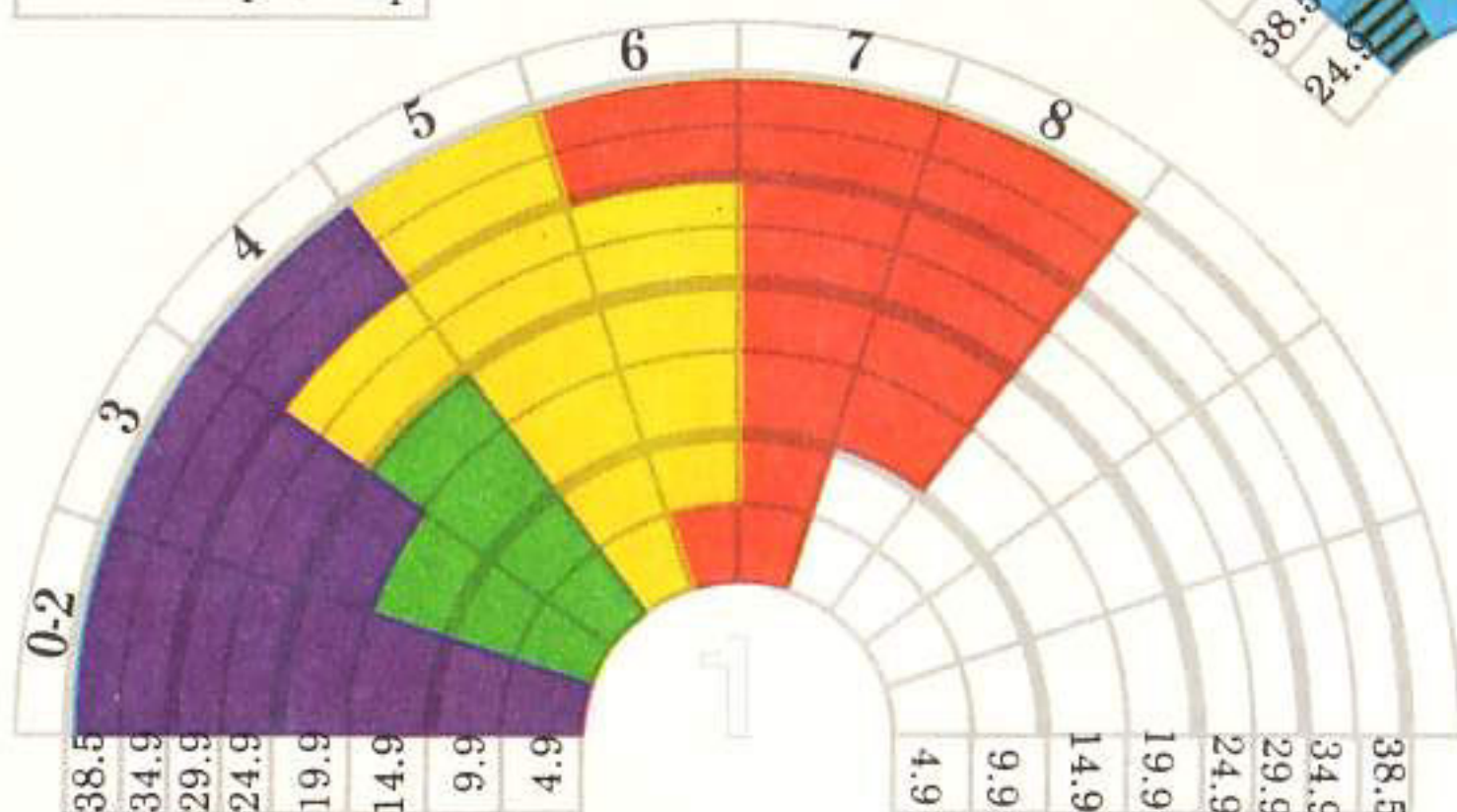
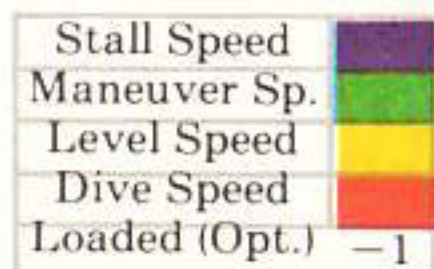
Oscar

Nakajima Ki.43-1c "Hayabusa" Day Fighter

PV: 15 Engine Type: R Producer: Imperial Japan

Operational in early 1942. A total of 716 series 1 aircraft built.

Loaded: Can carry one bomb.



W	4	5	Cn	—	Mg	4
F	4		L	2		
C	2		C	—		
E	3		E	—	E	—
G		2M	2M			
		(5)	(5)			
		FF	FF			

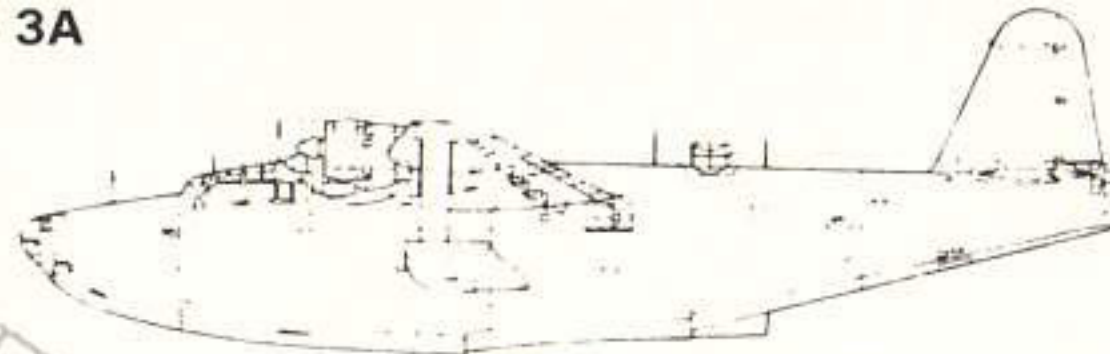
[illegible]

	1	1	1	1	1	1
	1	1	1	1	1	1

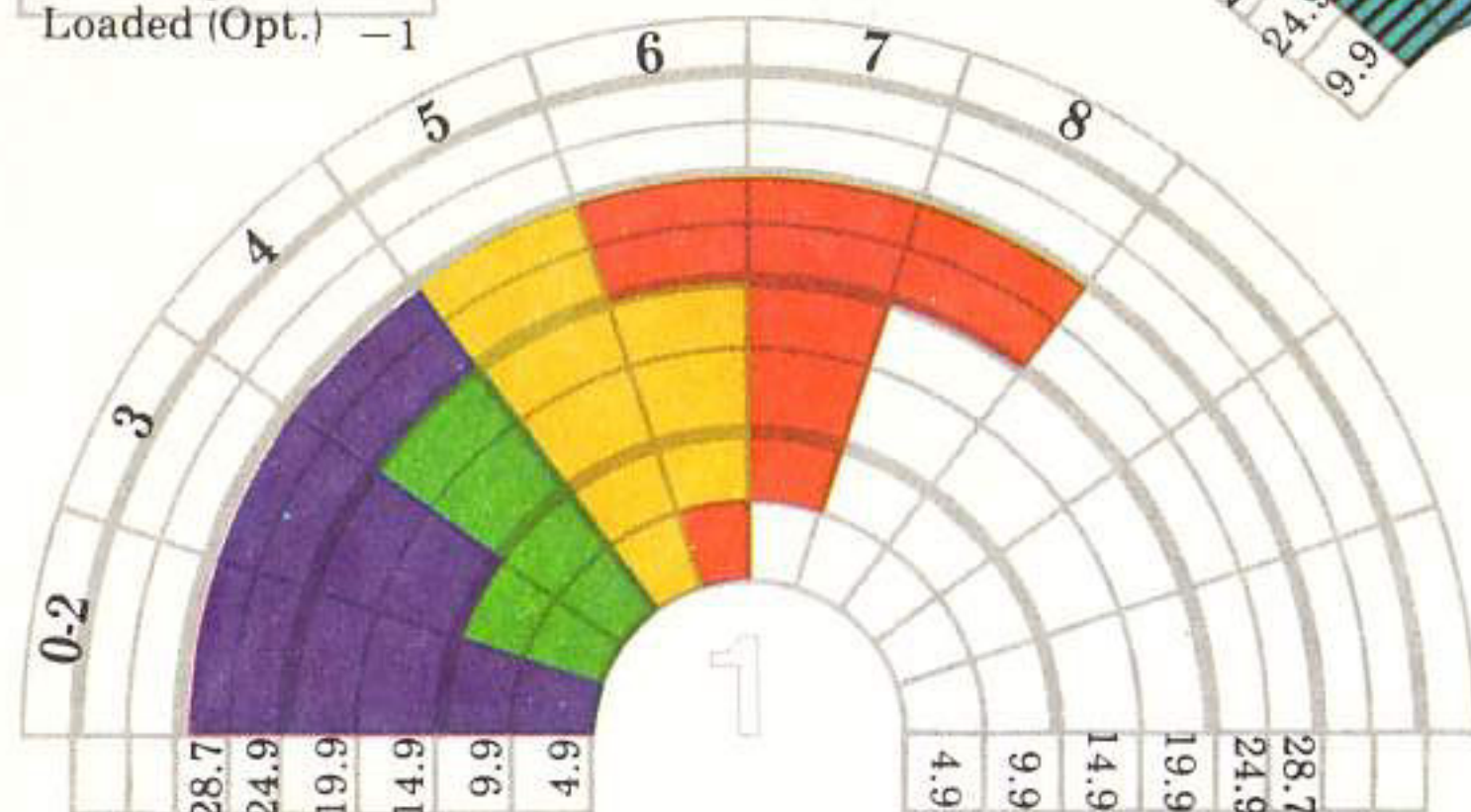
Emily

Kawanishi H8K2 Model 12, "Type 2" Heavy Flying Boat
 PV: 36 Engine Type: R Producer: Imperial Japan
 Operational in late '42. A total of 167 H8K's were built. Has
 sights for use as a level bomber.
 Loaded: Can carry up to 4400 pounds of bombs (4 bombs low
 level) or two torpedoes or 8 depth charges.

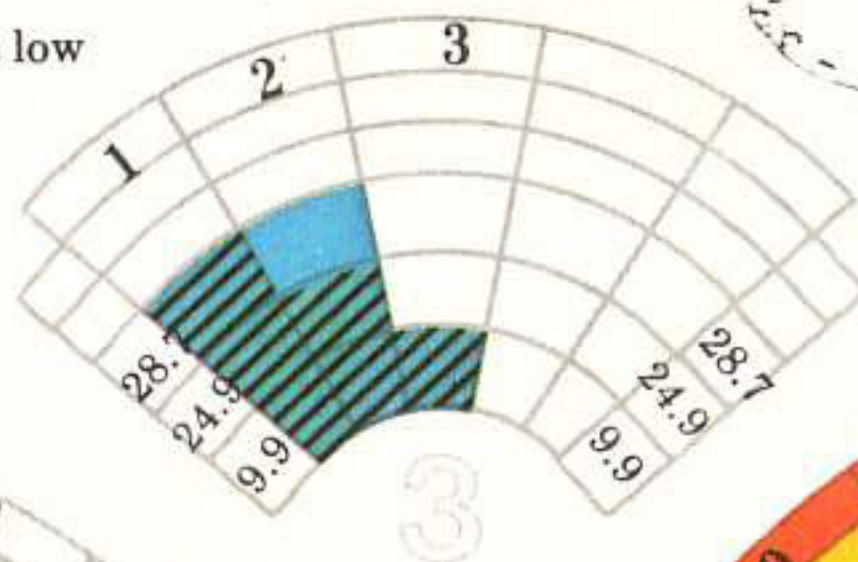
DAUNTLESS DATA CARD 3A



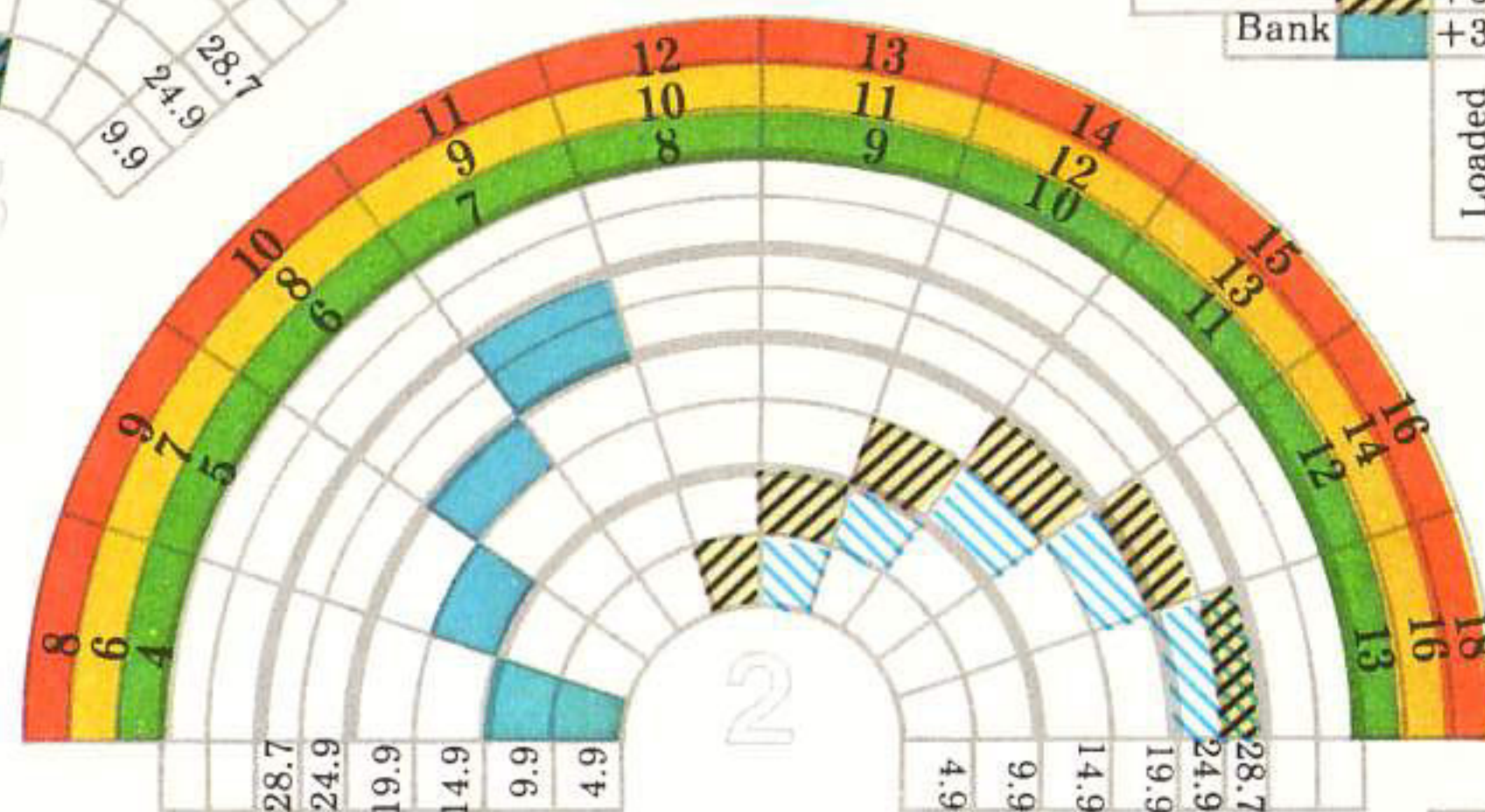
Stall Speed	6.4
Maneuver Sp.	6.6
Level Speed	6.7
Dive Speed	6.8
Loaded (Opt.)	-1



Speed Increments

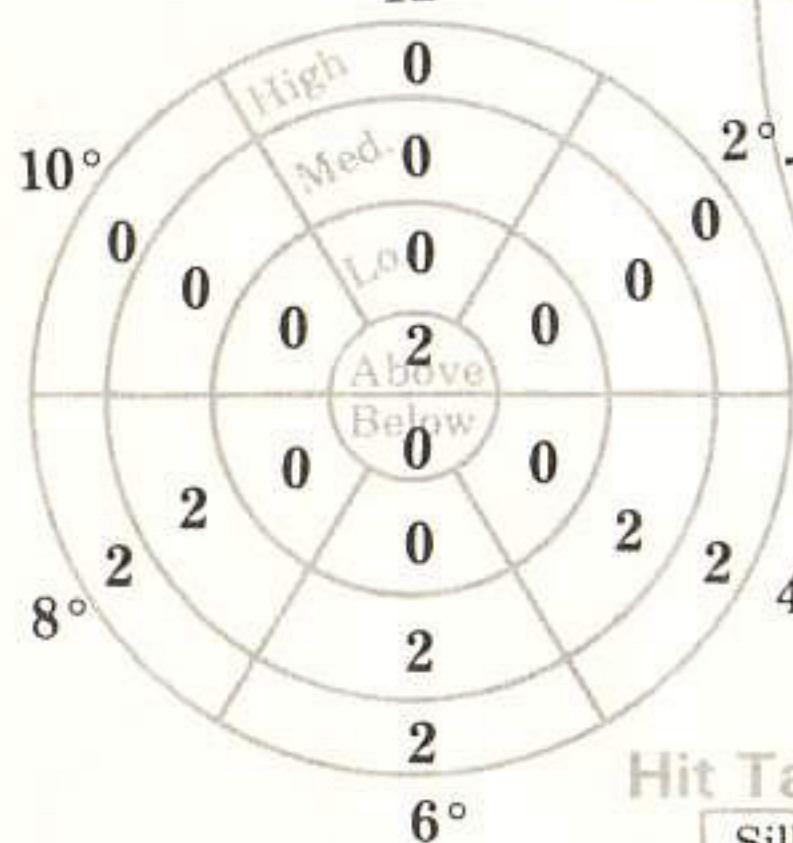


Altitude Change



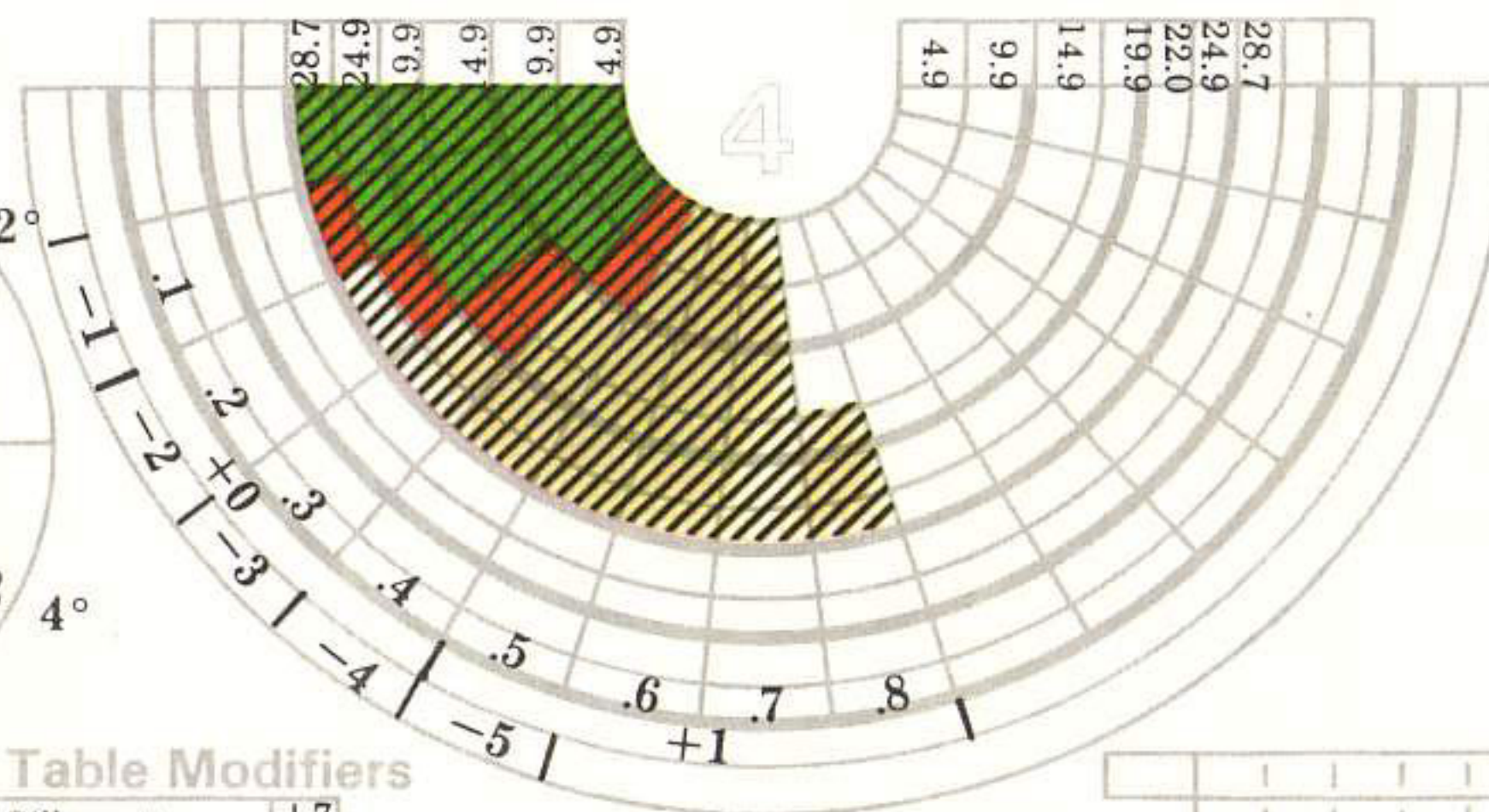
Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+7
Fire	0



Target Characteristics

W	9	Cn	-	Mg	-
F	9	L	3		
C	2	C	2		
E	2	E	2	E	2
G		(5)			
		F			

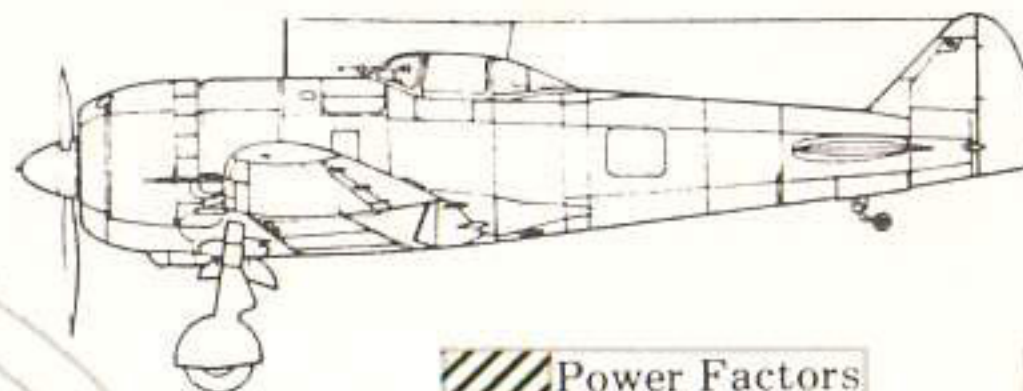
Variants

Tojo

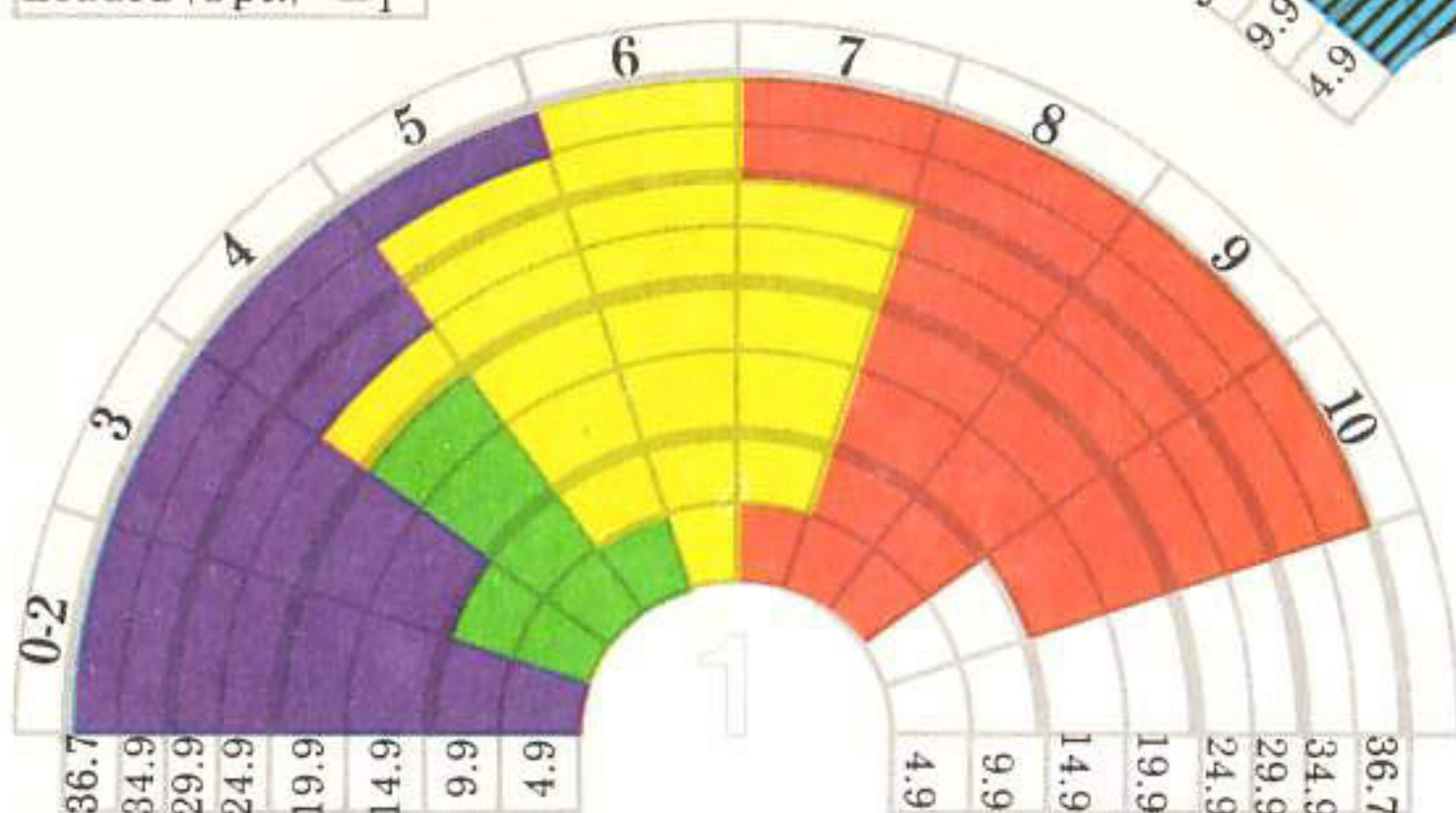
XX Nakajima Ki.44-IIb "Shoki" Day Fighter
 PV: 17 Engine Type: R Producer: Imperial Japan
 Operational early in 1943. A total of 1228 of all types built.
 Loaded: Can carry one bomb.

DAUNTLESS DATA CARD 3B

Speed Change



Stall Speed	1
Maneuver Sp.	2
Level Speed	3
Dive Speed	4
Loaded (Opt.)	-1

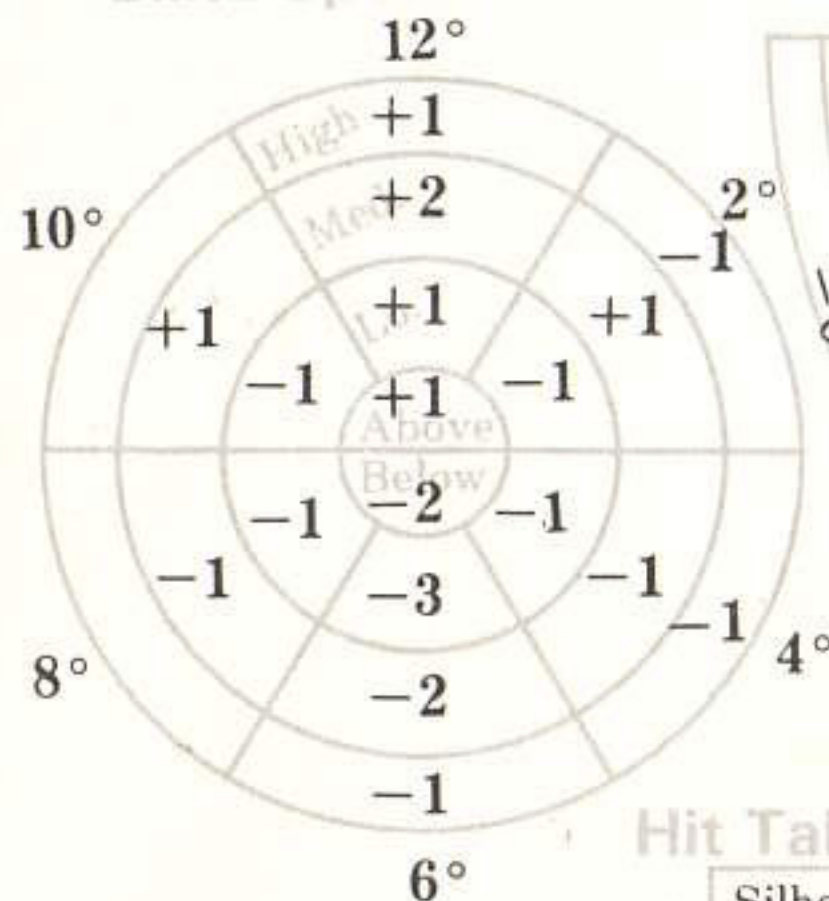


Speed Increments

Altitude Change

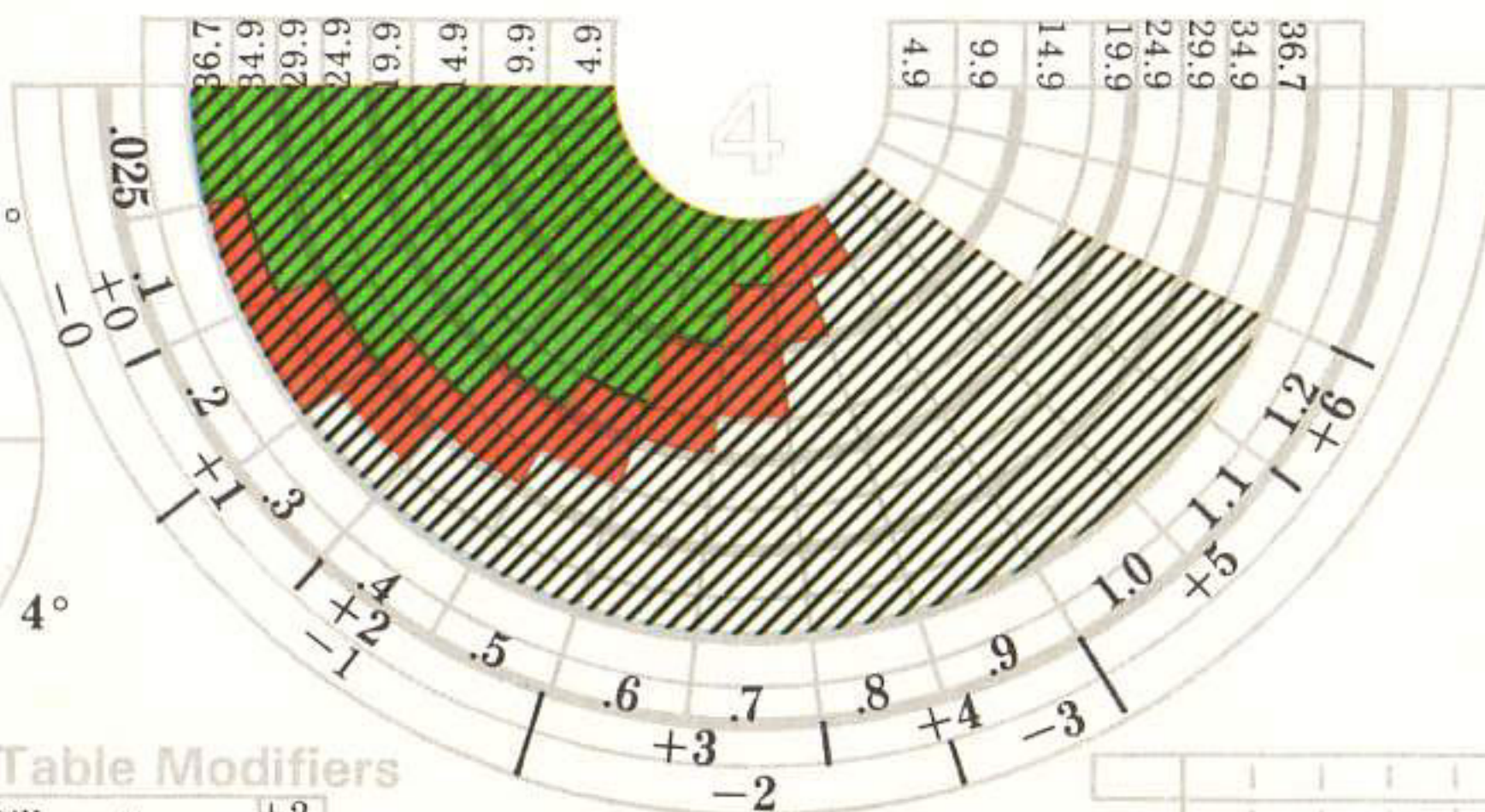
Maneuverability Requirements

Blind Spot Modifiers



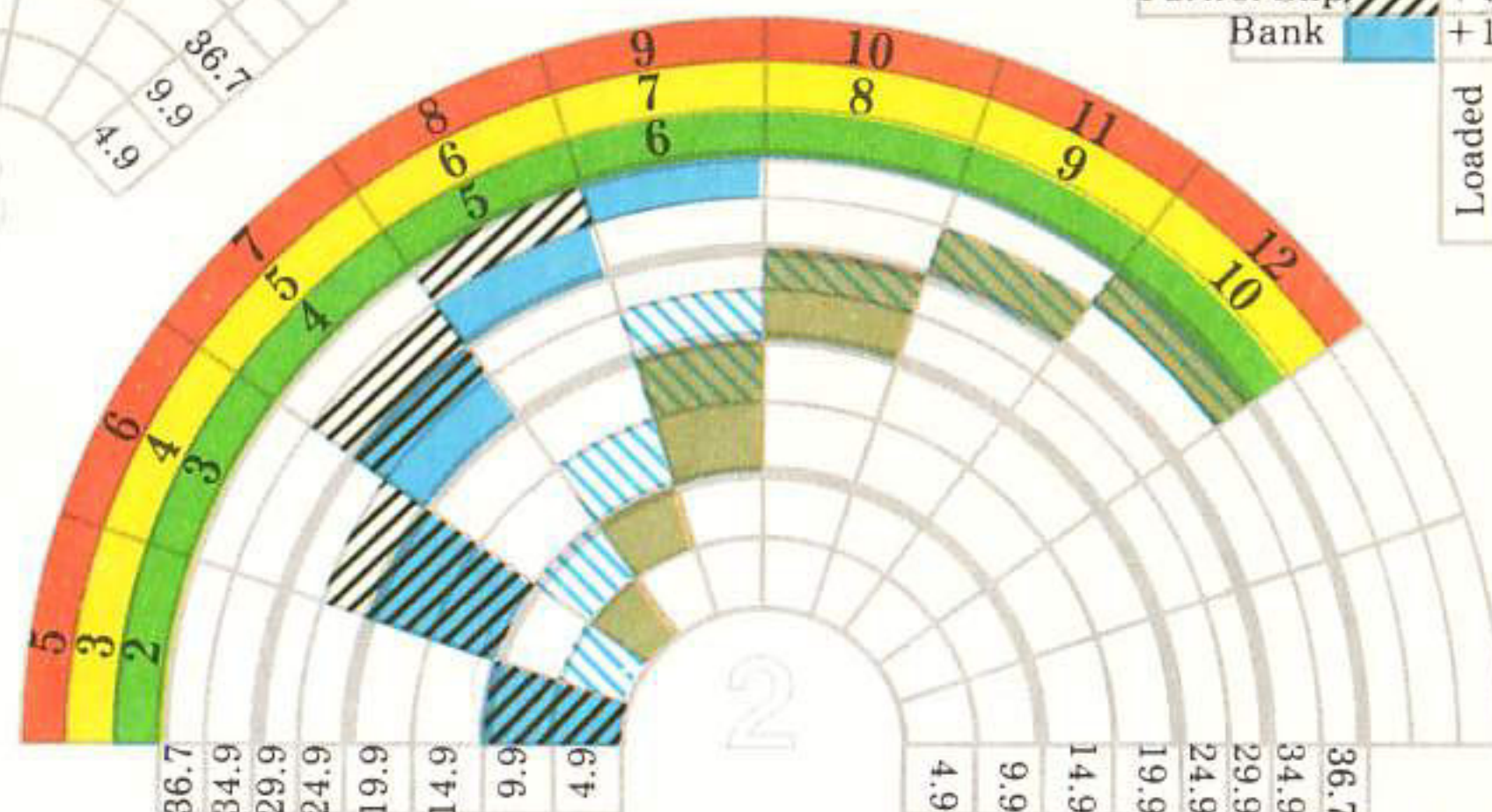
Hit Table Modifiers

Silhouette	+2
Fire	+2



Power Factors	1
Brake Factors	2

Half Loop	P
Half Roll	P
Turn or Slip	+1
Bank	+1
Loaded	



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-0.3
Dive Sp. Climb	-0.2
Max Climb	-0.2
Loaded	

Target Characteristics

W	5	Cn	-	Mg	5
F	5	L	3		
C	3	C	-		
E	3	E	-	E	-
G	2M	2M	2M	2M	2M
	(4)	(5)	(5)	(4)	
FF	FF	FF	FF	FF	

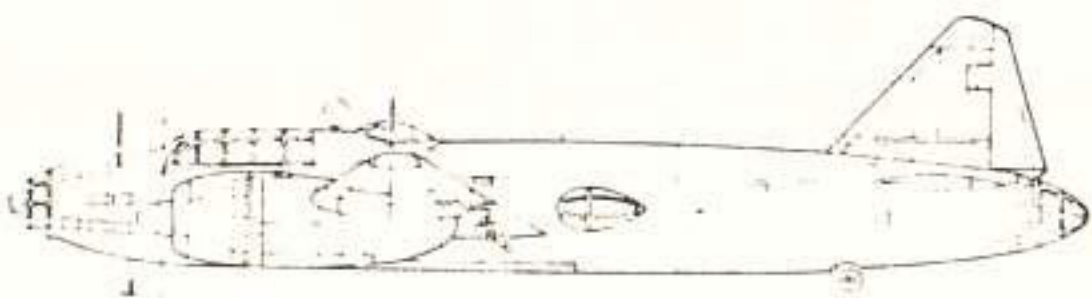
Variants

IIC. PV: 18. Cn: 3.			
4C	4C	4C	4C
(4)	(5)	(5)	(4)
FF	FF	FF	FF

Betty

Mitsubishi G4M2a Model 22a "Type 1" Medium Day Bomber. DAUNTLESS DATA CARD 2B

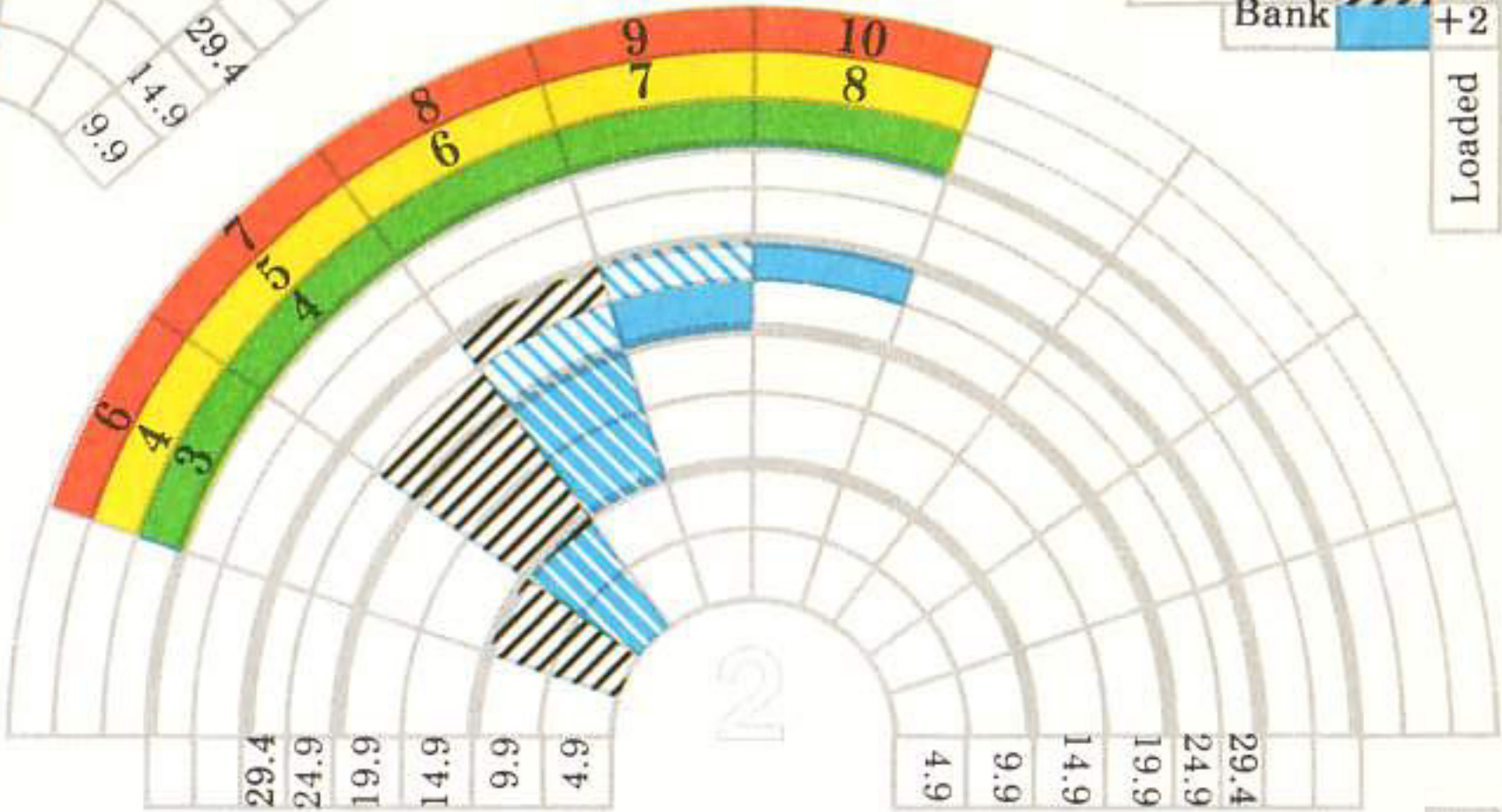
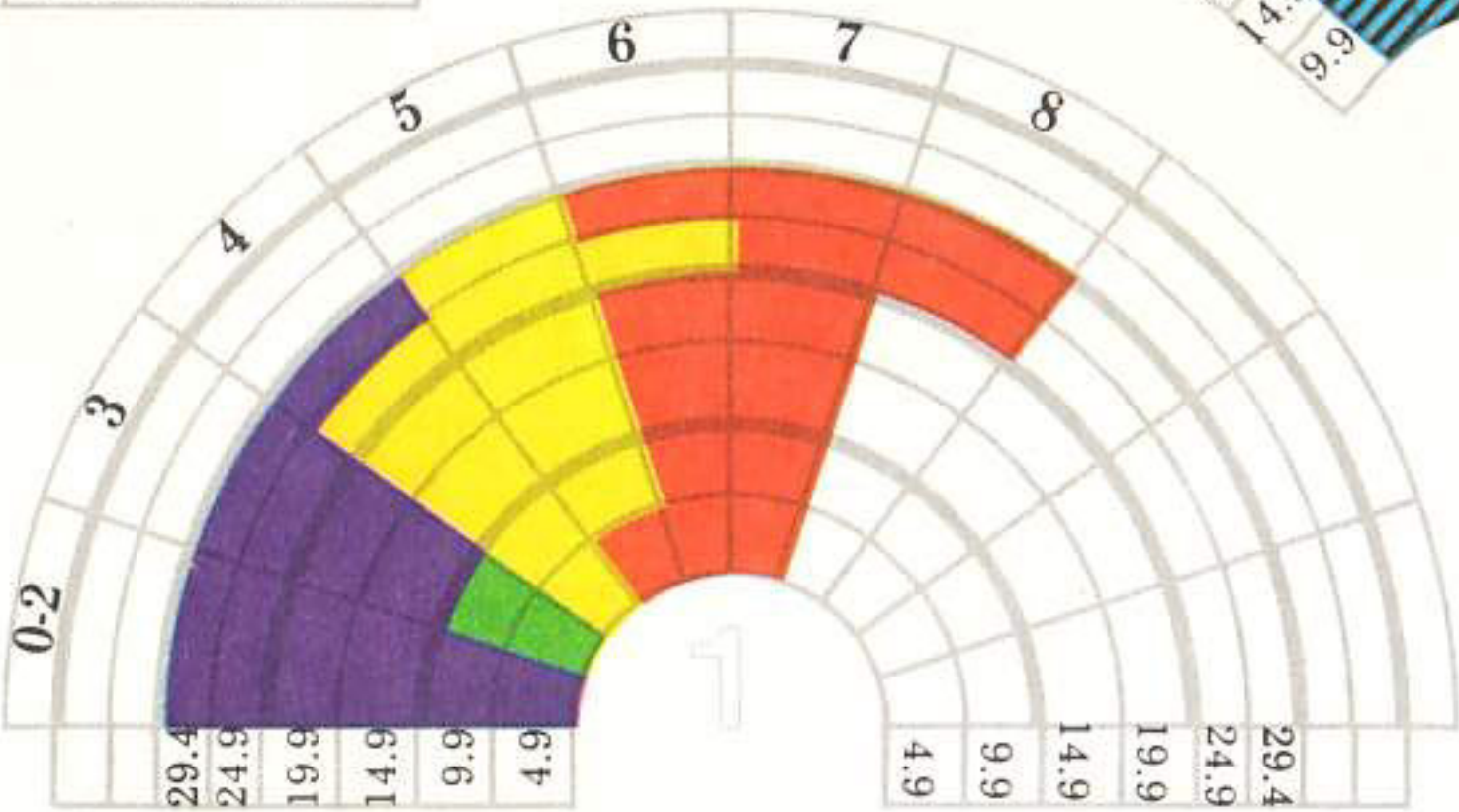
PV: 21 Engine Type: R Producer: Imperial Japan
Operational from early 1942. A total of about 2000 of this model were built. Has sights for use as a level bomber.
Loaded: Can carry up to 1800 pounds of bombs (two bombs low level) or one torpedo.



Stall Speed	<div></div>
Maneuver Sp.	<div></div>
Level Speed	<div></div>
Dive Speed	<div></div>
Loaded (Opt.)	-1

<div></div>	Power Factors
<div></div>	Brake Factors

<div></div>	Slip	+3
<div></div>	Turn	+4
<div></div>	Bank	+2
Loaded		

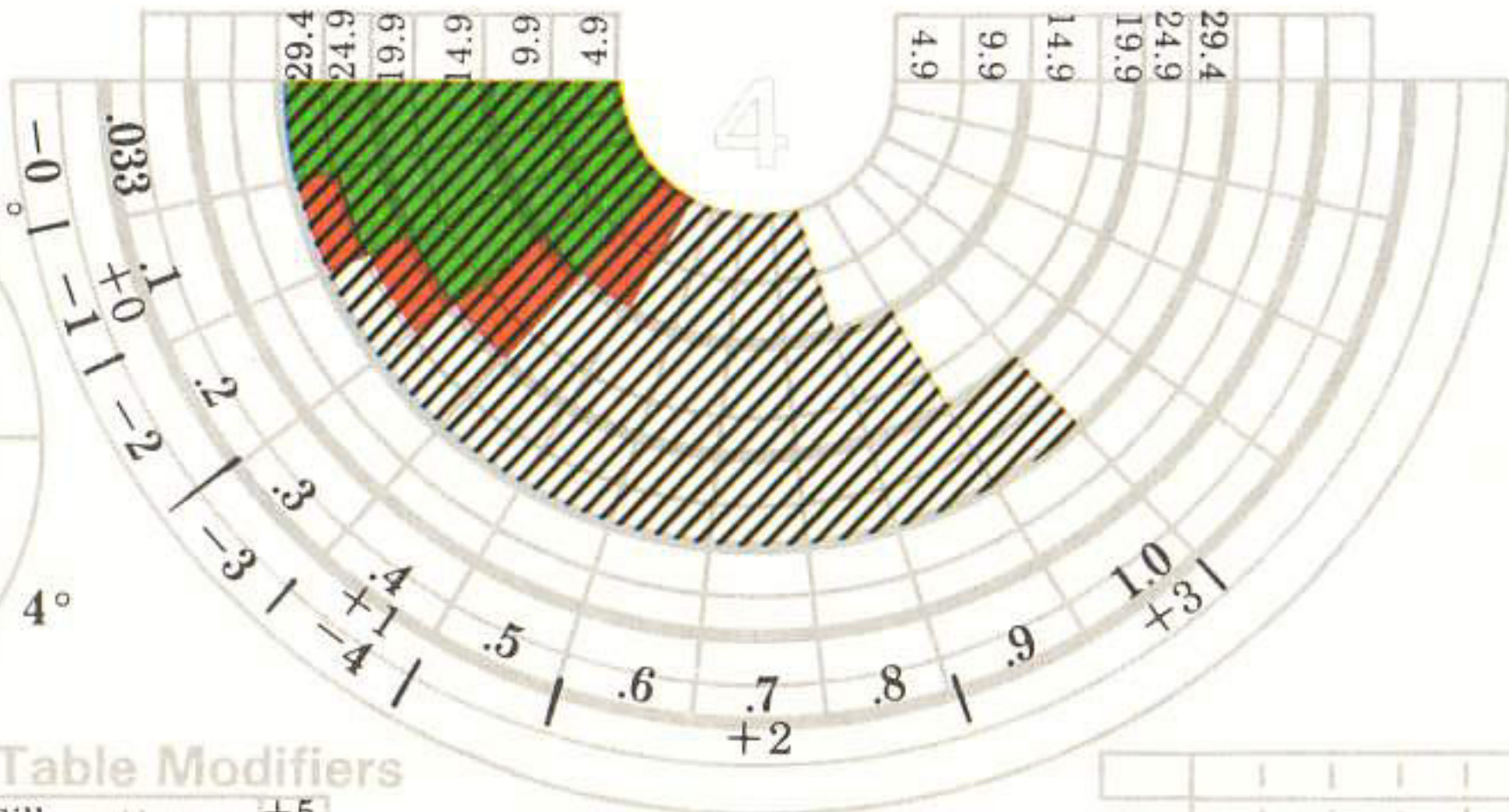
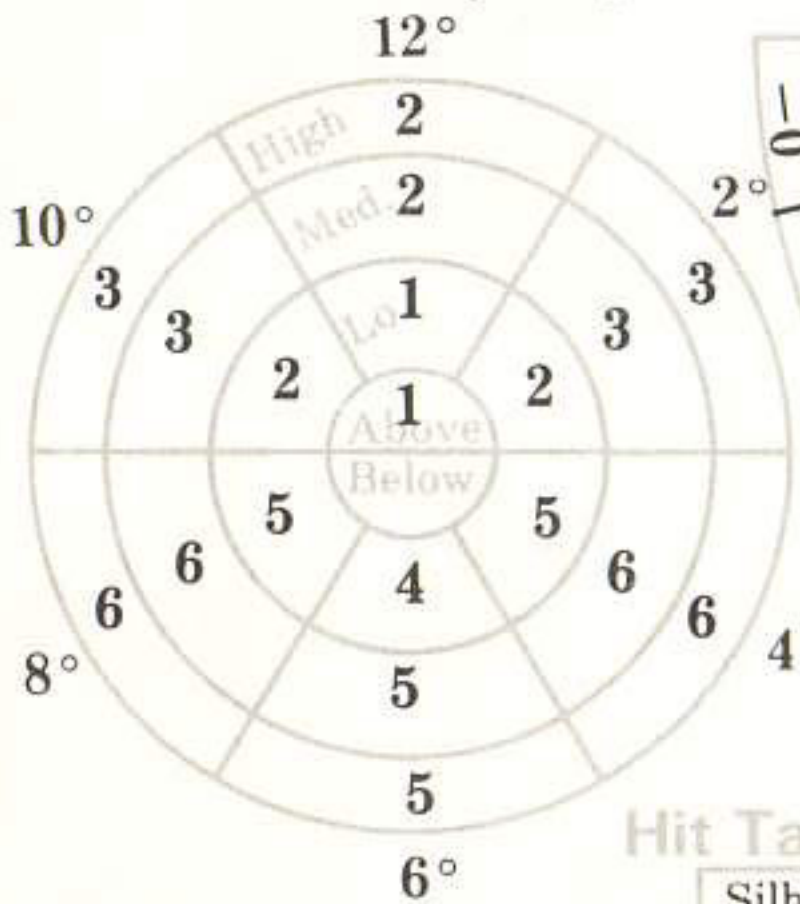


Speed Increments

Altitude Change

Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+5
Fire	0

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-2
Dive Sp. Climb	-1
Max Climb	-1
Loaded	

Target Characteristics

W 8	Cn -	Mg -
F 6	L 2	
C 2	C 1	
E 3	E -	E 3
G	(5)	
	FF	

Variants

TBD

Douglas TBD "Devastator" Carrier Torpedo Bomber

PV: 14 Engine Type: R Producer: USA

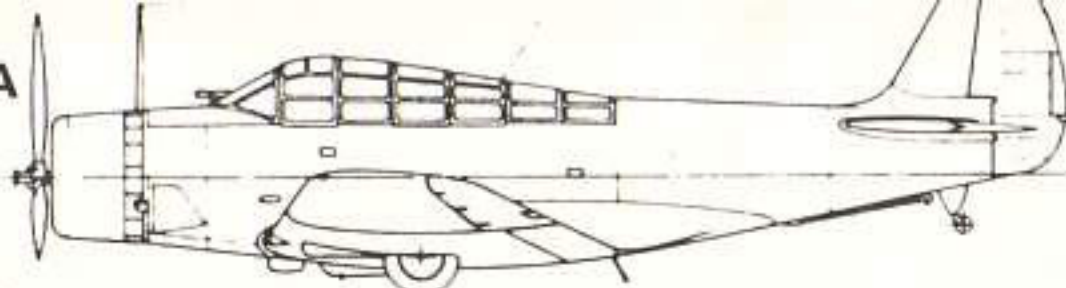
Deliveries began June 1937. 129 built.

Loaded: Can carry up to 1000 pounds of bombs (one bomb low level) or one torpedo or two depth charges. Has sights for level bombing.

Stall Speed	19.7
Maneuver Sp.	14.9
Level Speed	9.9
Dive Speed	6.4
Loaded (Opt.)	-2

DAUNTLESS DATA CARD 2A

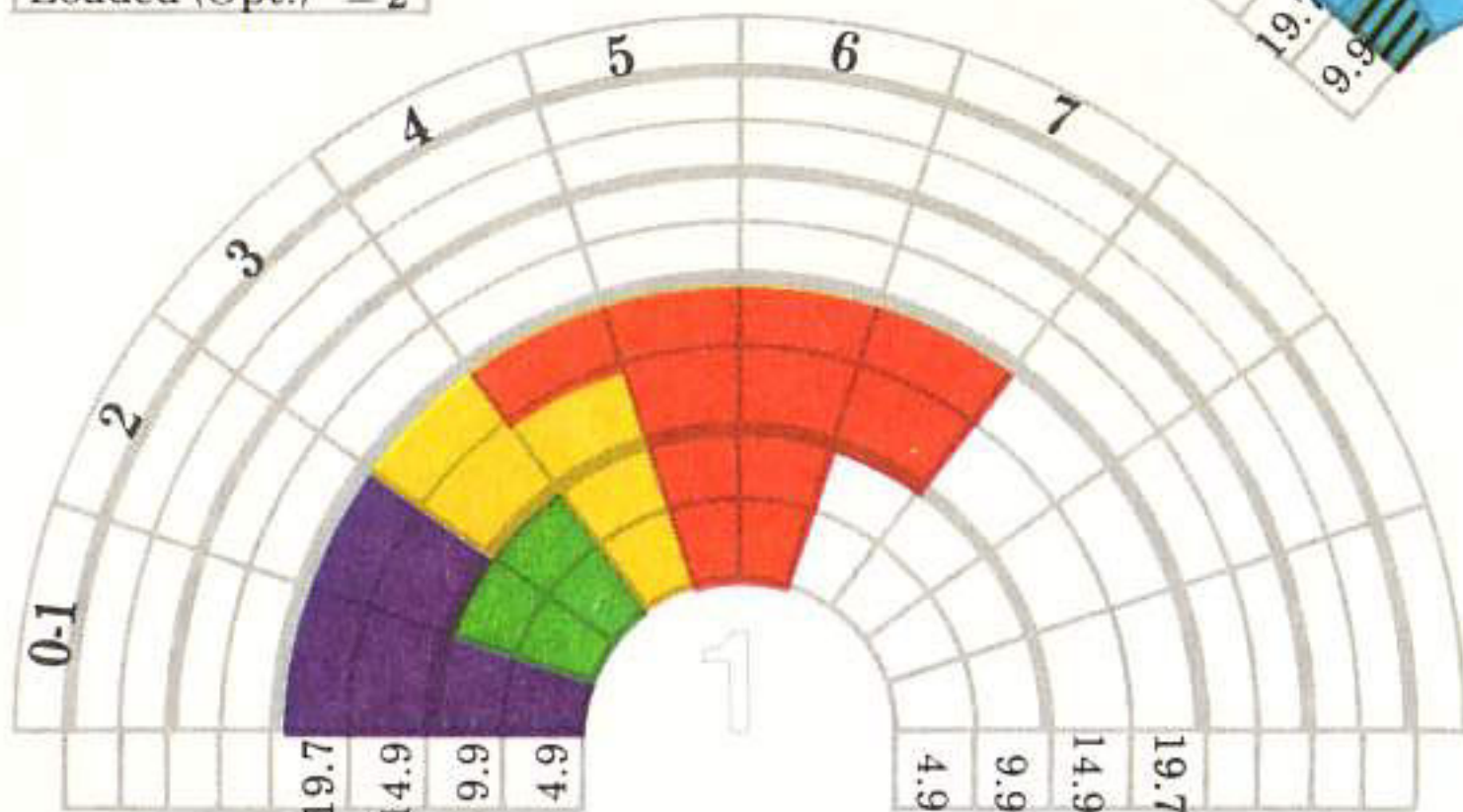
Speed Change



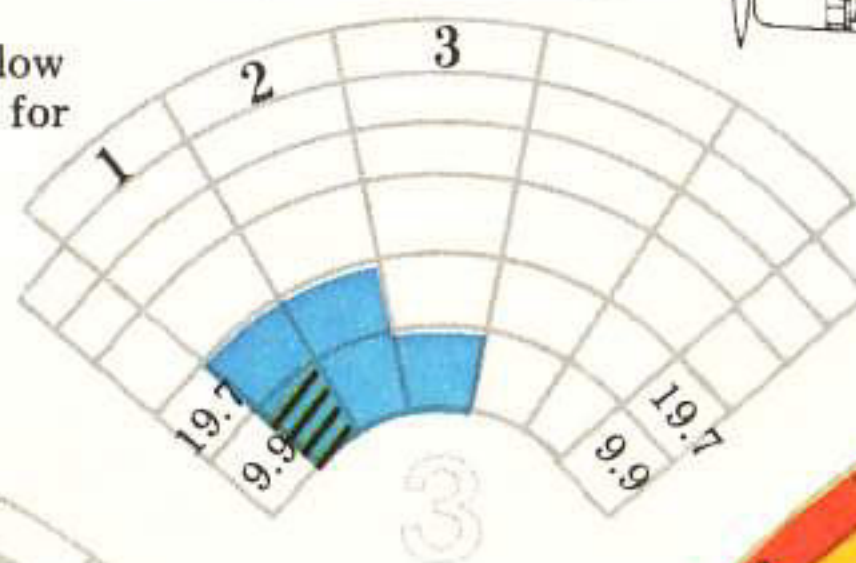
Power Factors	19.7
Brake Factors	9.9

Half Loop	P
Half Roll	P
Turn or Bank	+1
Slip	+1

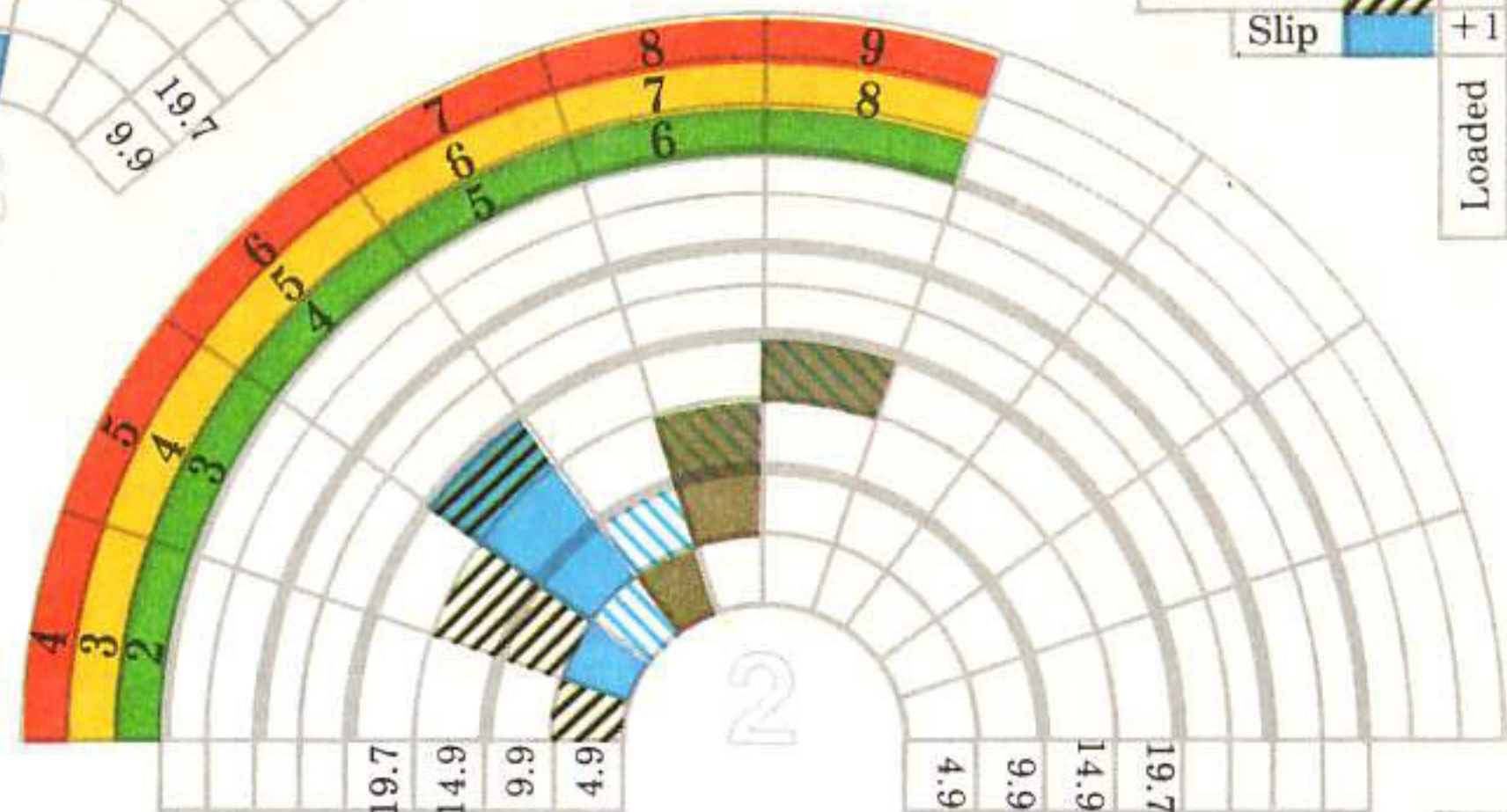
Loaded



Speed Increments



Altitude Change

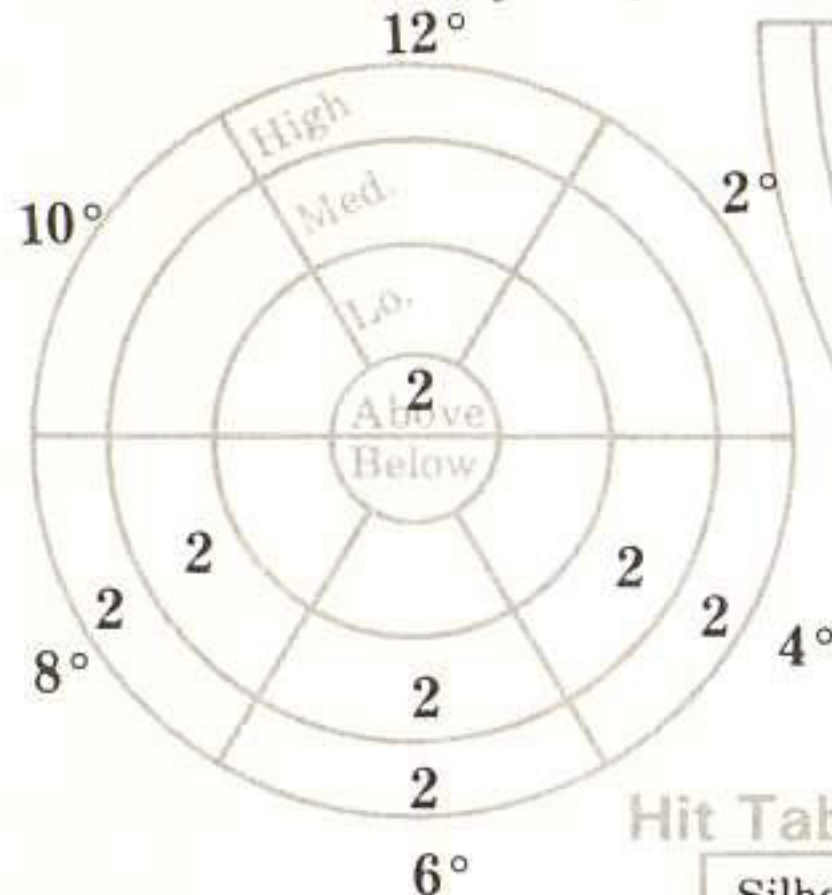


Maneuverability Requirements

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-0.2
Dive Sp. Climb	-0.1
Max Climb	-0.1

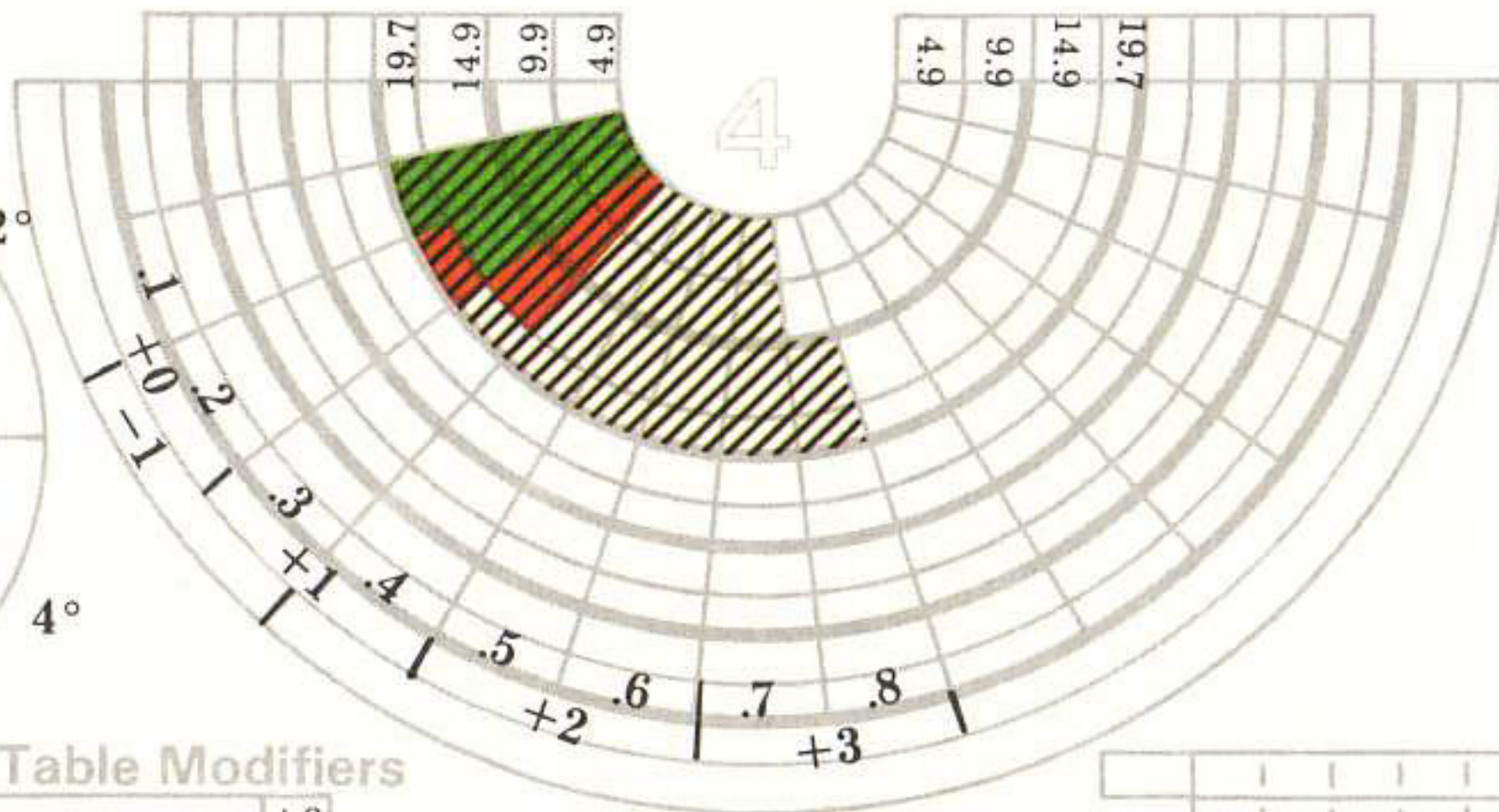
Loaded

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+3
Fire	0



Target Characteristics

W	5	Cn	-	Mg	-
F	4	L	3		
C	3	C	-		
E	3	E	-	E	-
G			2M		
		(5)	(5)		
		F	FF		

Variants

Tony

DAUNTLESS DATA CARD 14A

Kawasaki Ki.61 Model 1b "Hien" Day Fighter

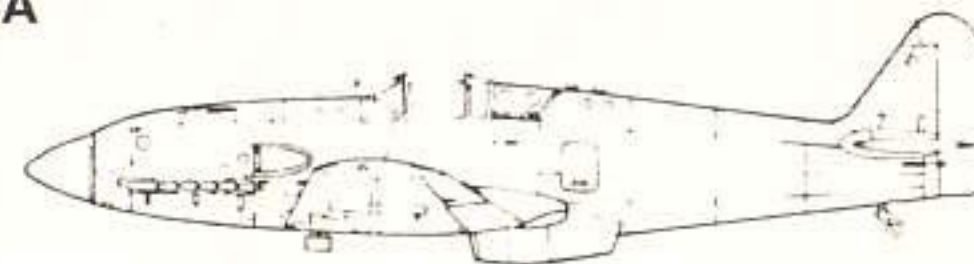
PV: 17 Engine Type: I Producer: Imperial Japan

Operational in April '43. About 2700 built.

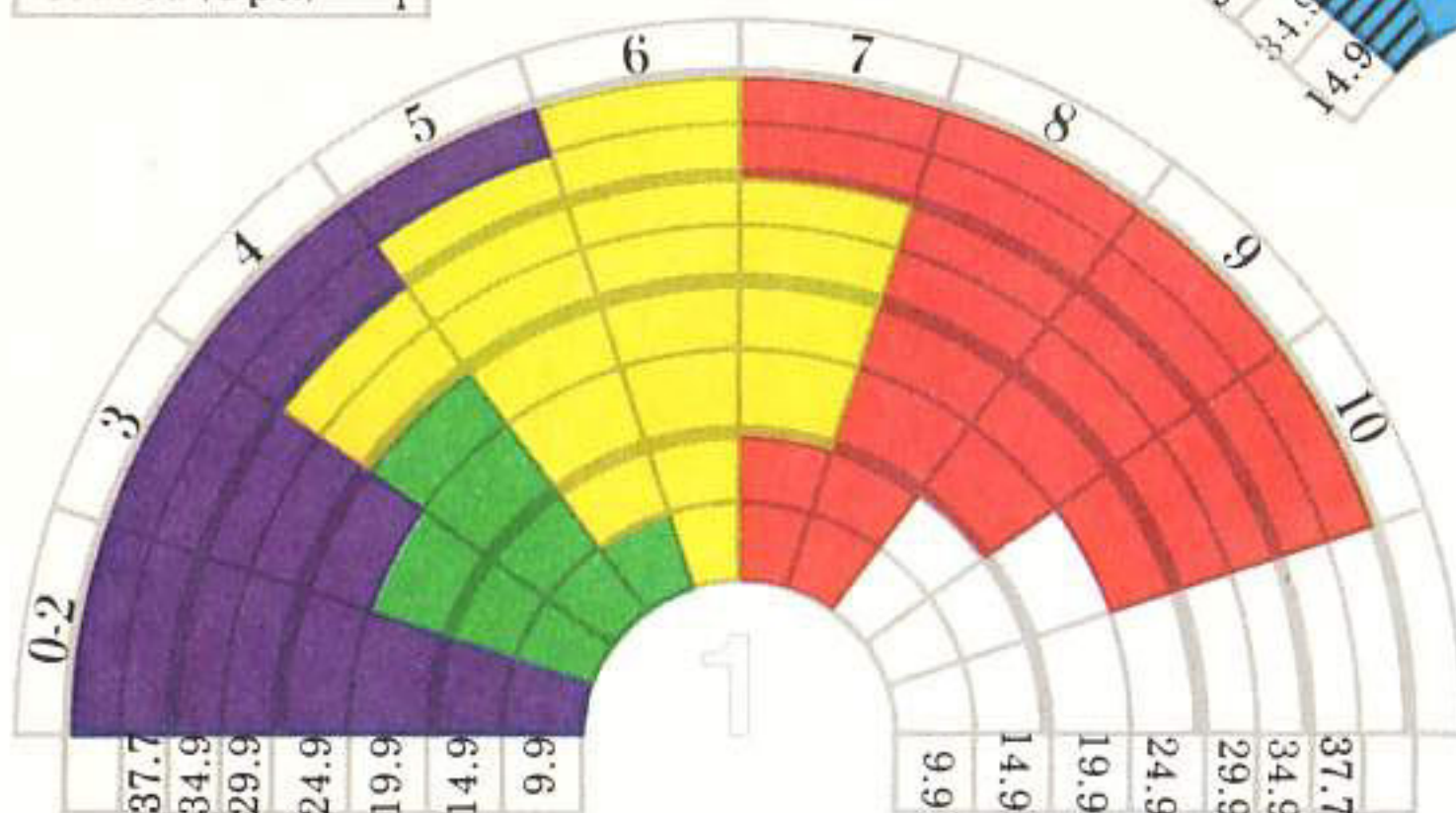
Variants: 1a. PV: 16. Mg: 6. G: 1M outboard. I-Kald. PV: 18,

Mg: 4. Cn: 4. G: 7C (5) outboard. (Outboard replaces 2M (4).)

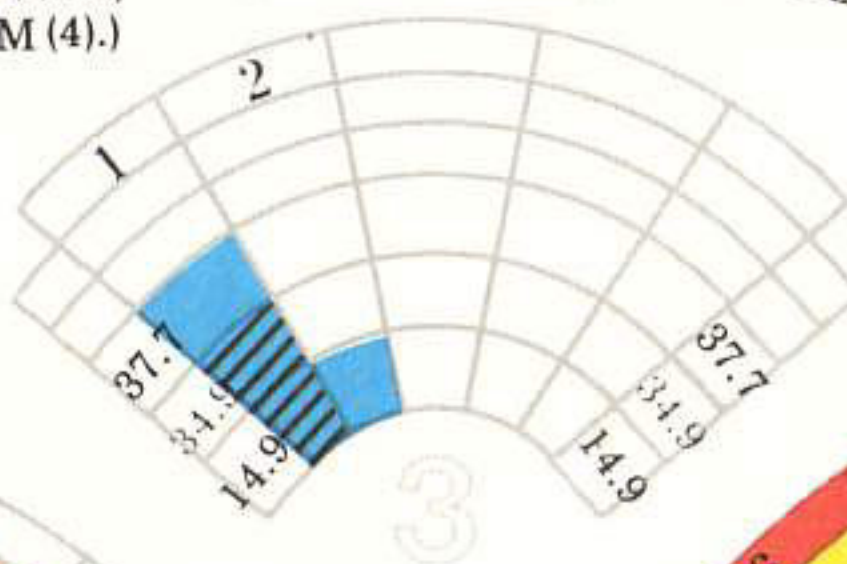
Loaded: Can carry one bomb.



Stall Speed	0.2
Maneuver Sp.	0.3
Level Speed	0.4
Dive Speed	0.5
Loaded (Opt.)	-1

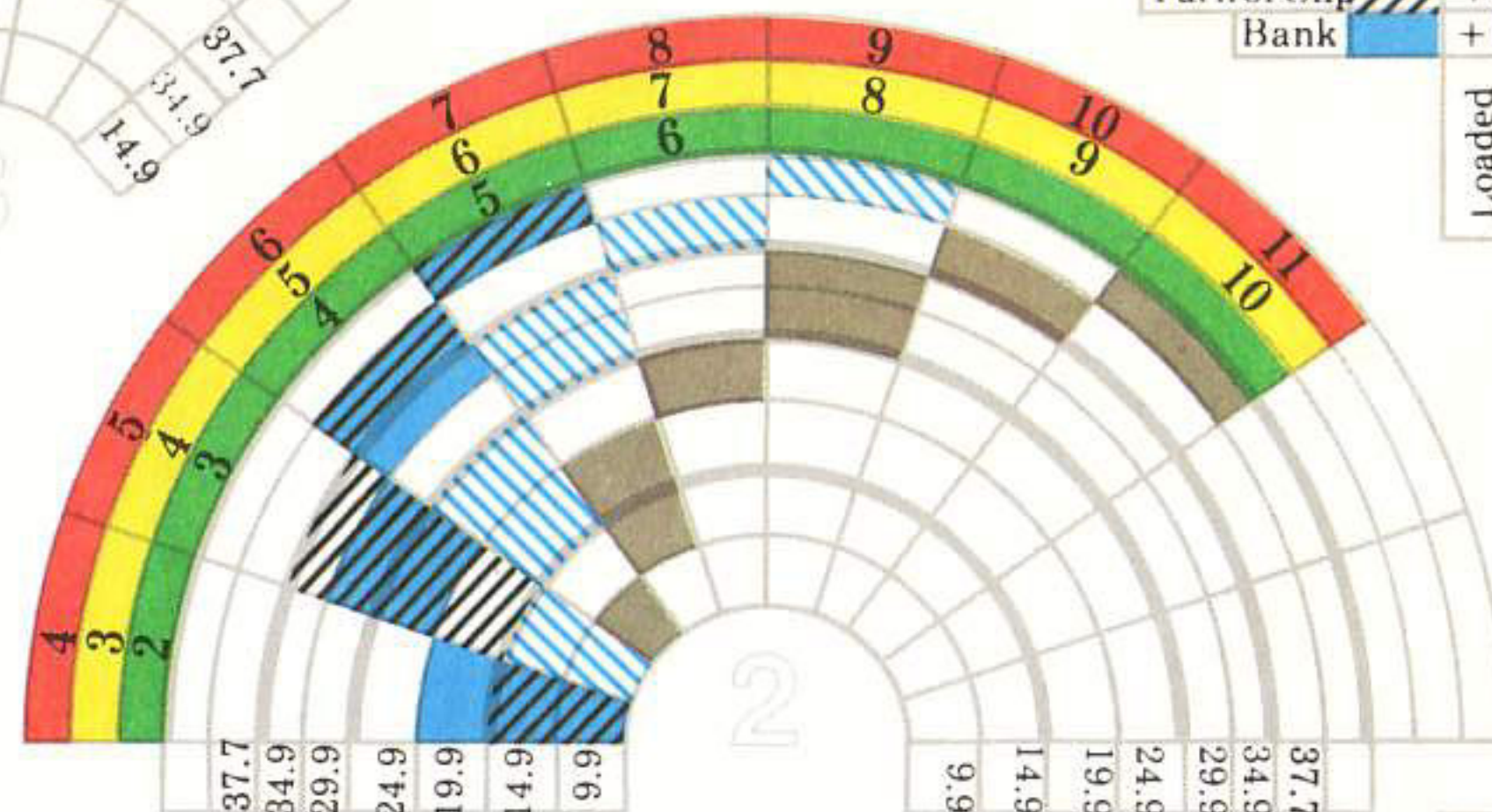


Speed Change



Power Factors	0.5
Brake Factors	0.4

Half Loop	P
Half Roll	P
Turn or Slip	+2
Bank	+1
Loaded	

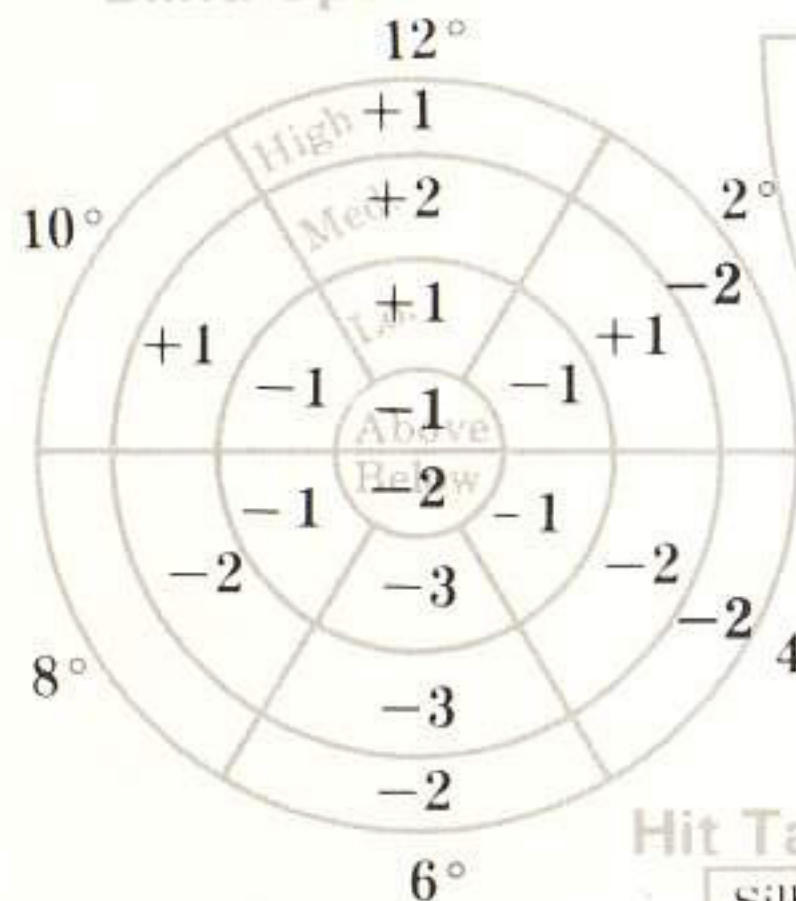


Speed Increments

Altitude Change

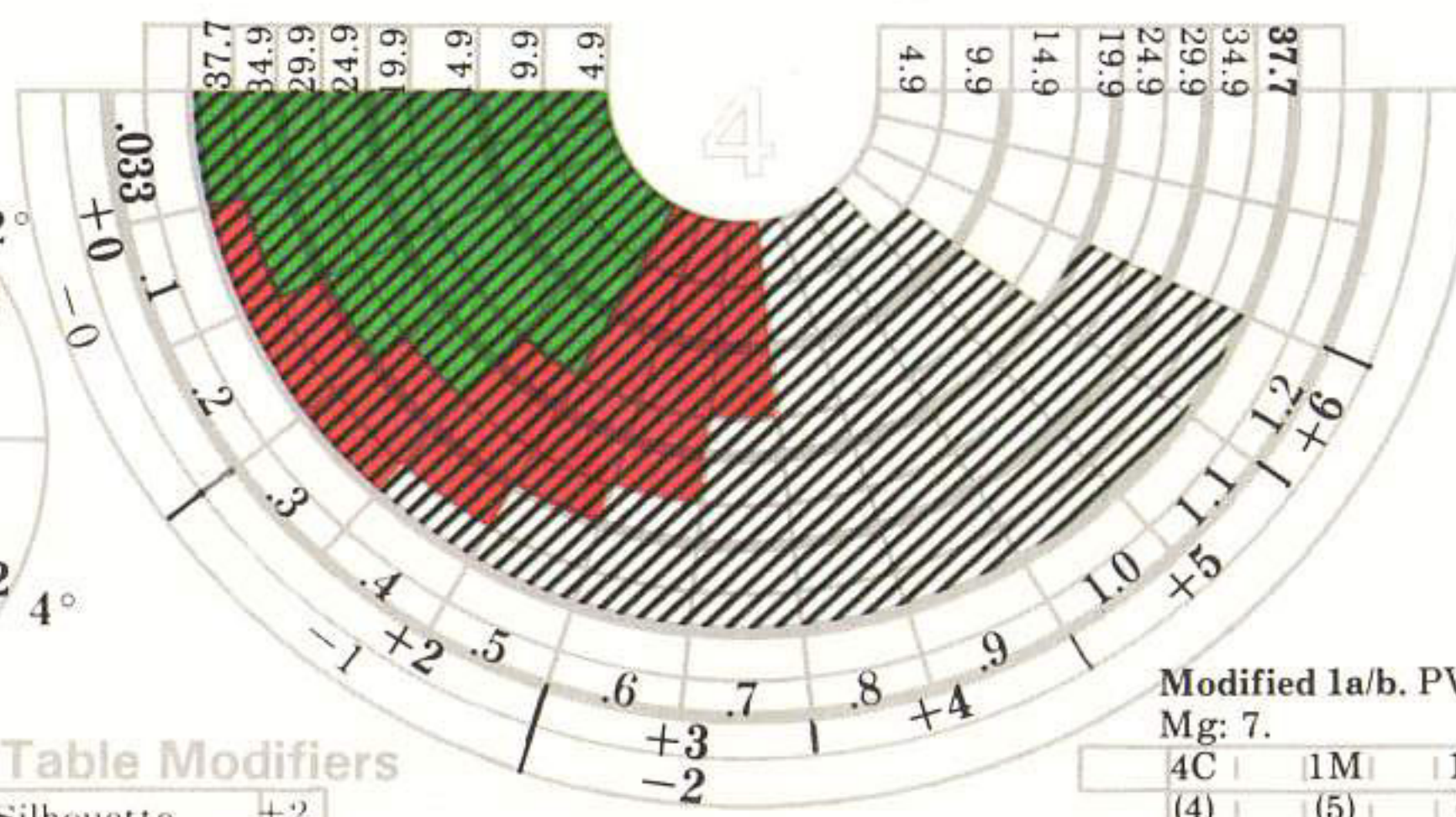
Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+2
Fire	+2



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-0.3
Dive Sp. Climb	-0.2
Max Climb	-0.2

Target Characteristics

W	5	Cn	-	Mg	5
F	6	L	3		
C	3	C	-		
E	3	E	-	E	-
G	2M	2M	2M	2M	
	(4)	(5)	(5)	(4)	
FF	FF	FF	FF	FF	

Modified 1a/b. PV: 17. Cn: 4. Mg: 7.

4C	1M	1M	4C
(4)	(5)	(5)	(4)
FF	FF	FF	FF

I-Kalc. PV: 17. Mg: 4. Cn: 5.

2M	4C	4C	2M
(4)	(5)	(5)	(4)
FF	FF	FF	FF

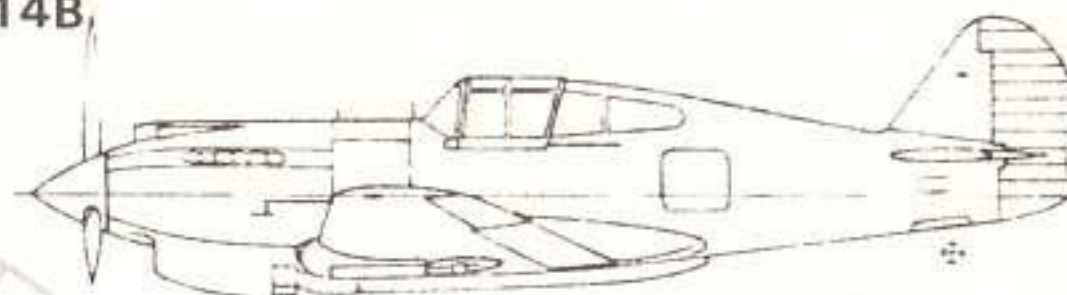
P-40C

Curtiss P-40C "Tomahawk" Day Fighter
 PV: 16 Engine Type: I Producer: USA
 Operational in June '41. A total of 1193 built.
 Cannon listed were actually Heavy Machineguns.
 Loaded: Can carry one bomb.

Stall Speed	6.7
Maneuver Sp.	6.6
Level Speed	6.4
Dive Speed	6.1
Loaded (Opt.)	-1

DAUNTLESS DATA CARD 14B

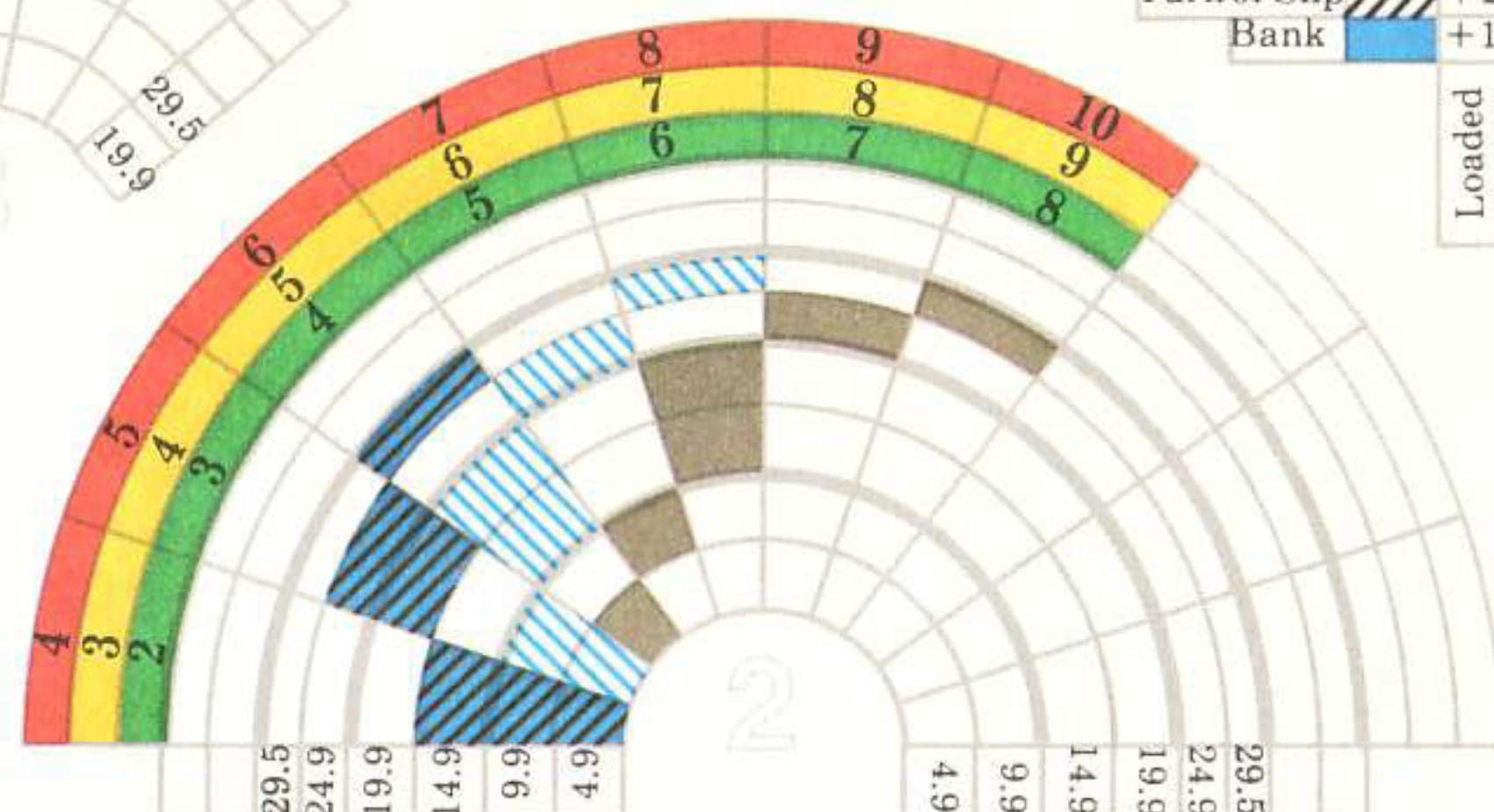
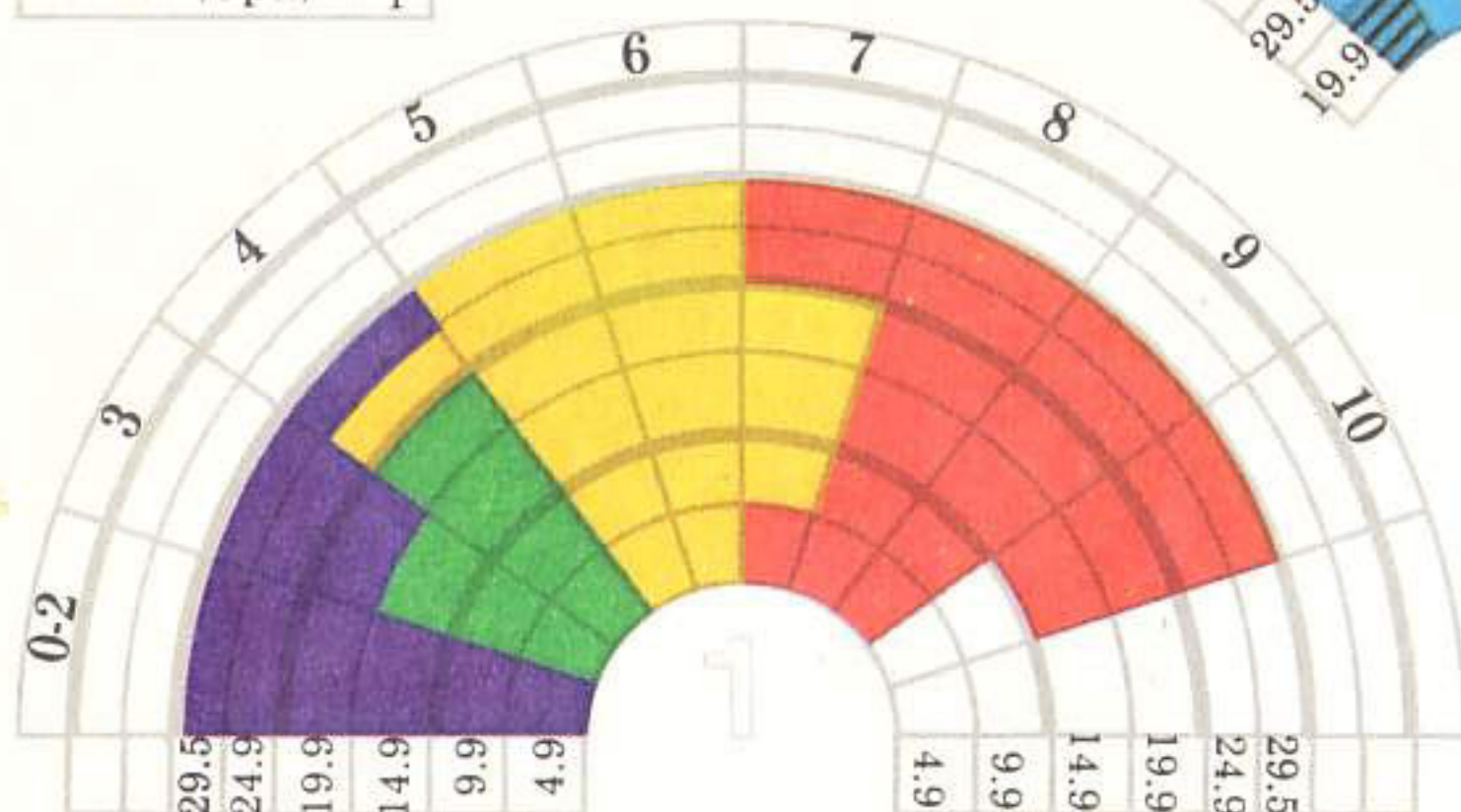
Speed Change



Power Factors	+
Brake Factors	-

Half Loop	P
Half Roll	P
Turn or Slip	+2
Bank	+1

Loaded

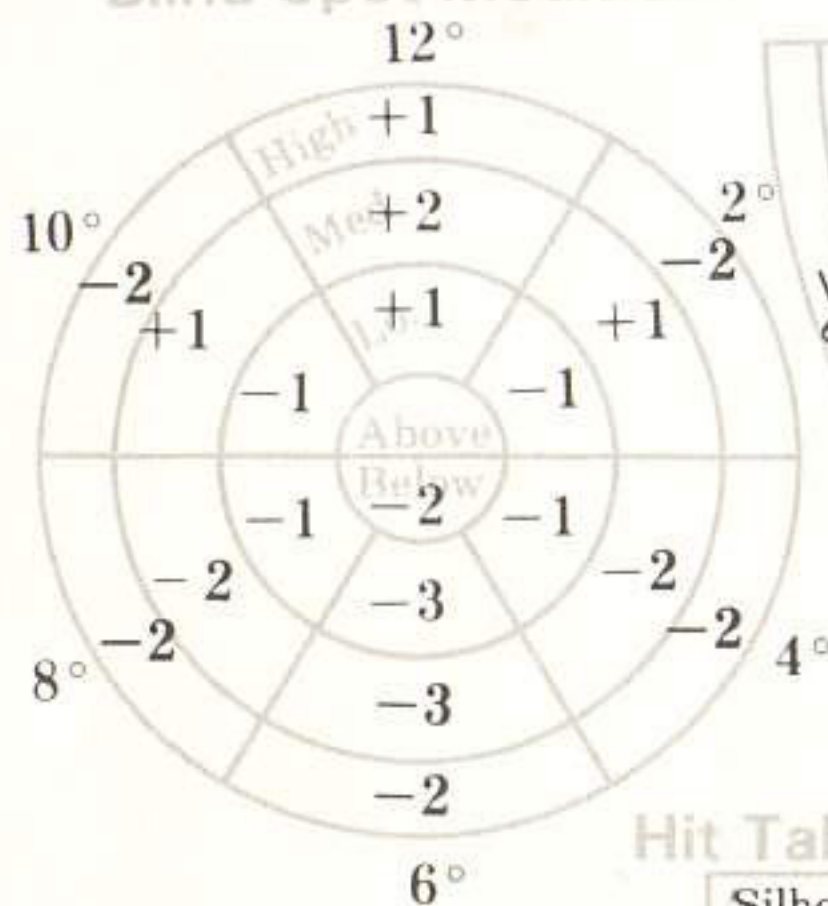


Speed Increments

Altitude Change

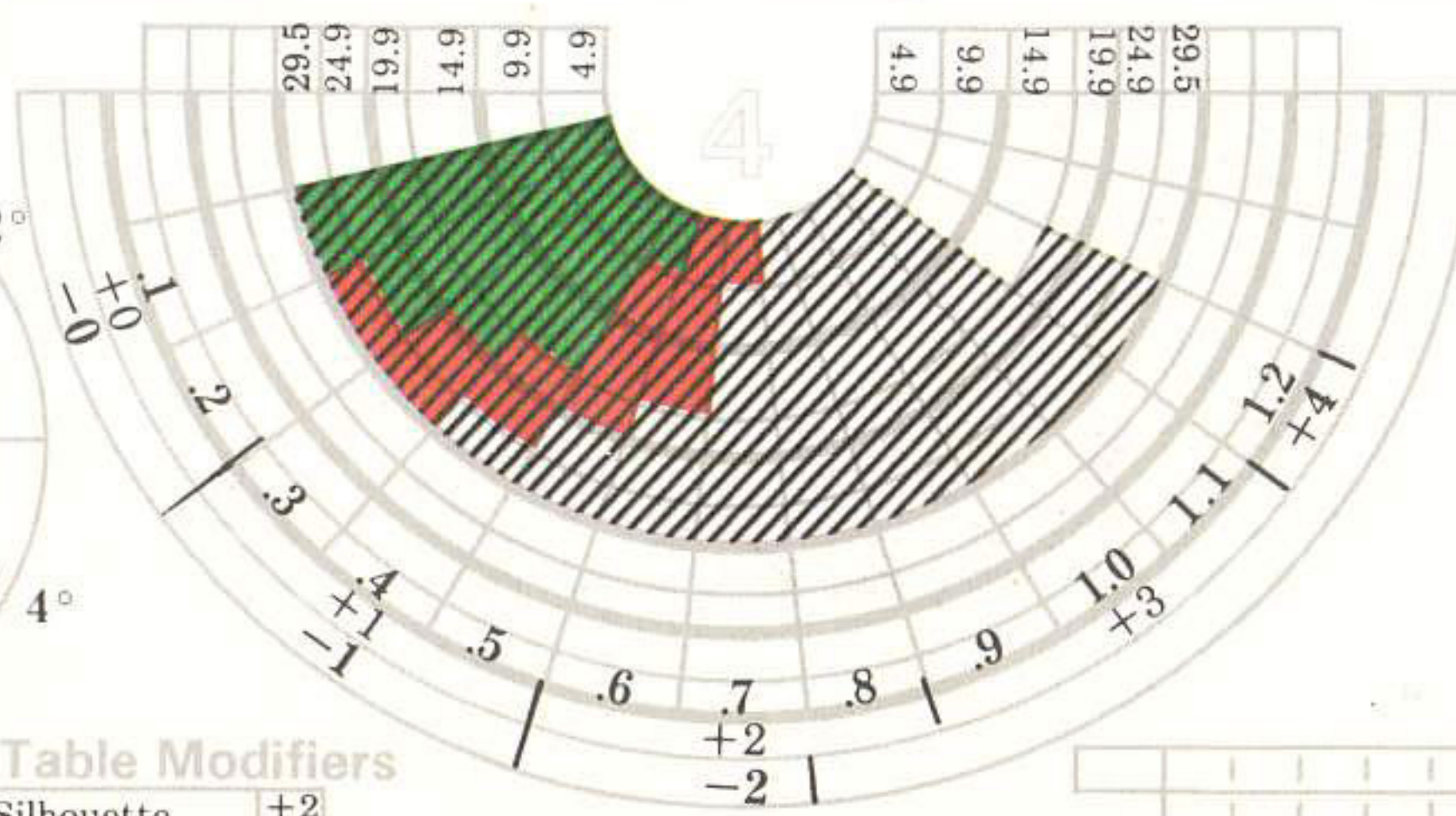
Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+2
Fire	+2



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-.3
Dive Sp. Clim	-.1
Max Climb	-.1

Loaded

Target Characteristics

W	5	Cn	4	Mg	5
F	6	L	3		
C	3	C	-		
E	3	E	-	E	-
G	2M	2C	2C	2M	
	(4)	(6)	(6)	(4)	
FF	FF	FF	FF	FF	

Tom. IIB (RAF). PV: 16.
 Mg: 6.

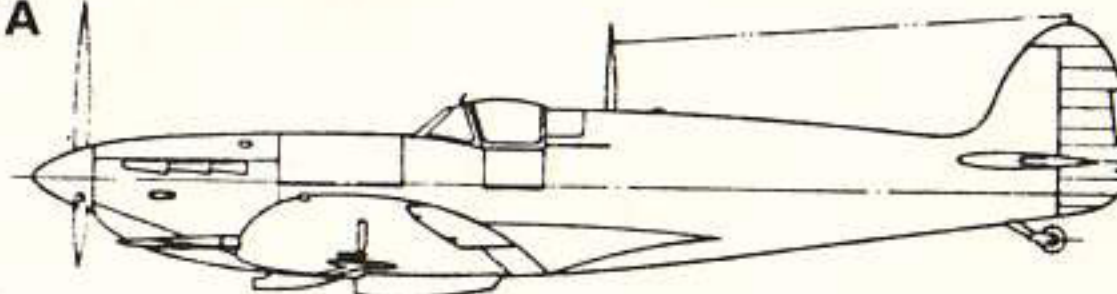
1M	2M			2M	1M
(4)	(4)			(4)	(4)
FF					FF

Variants

Spitfire IX

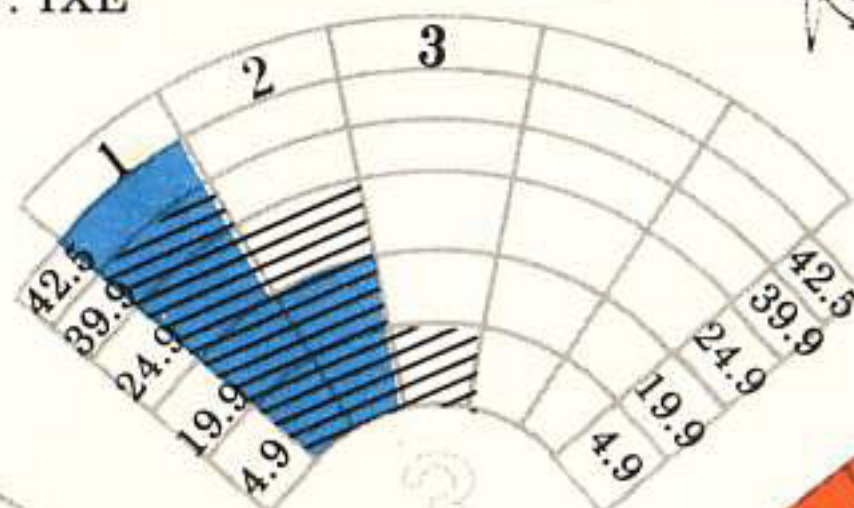
Supermarine Spitfire L.F. IXE Day Fighter
 PV: 19. Engine Type: I. Producer: Great Britain
 Introduced in Summer '42. A total of 4010 of the L.F. IXE
 were built.
 Loaded: Could carry one bomb.

AIR FORCE DATA CARD 11A



Stall Speed	Dark Purple
Maneuver Sp.	Green
Level Speed	Yellow
Dive Speed	Red
Loaded (Opt.)	-1

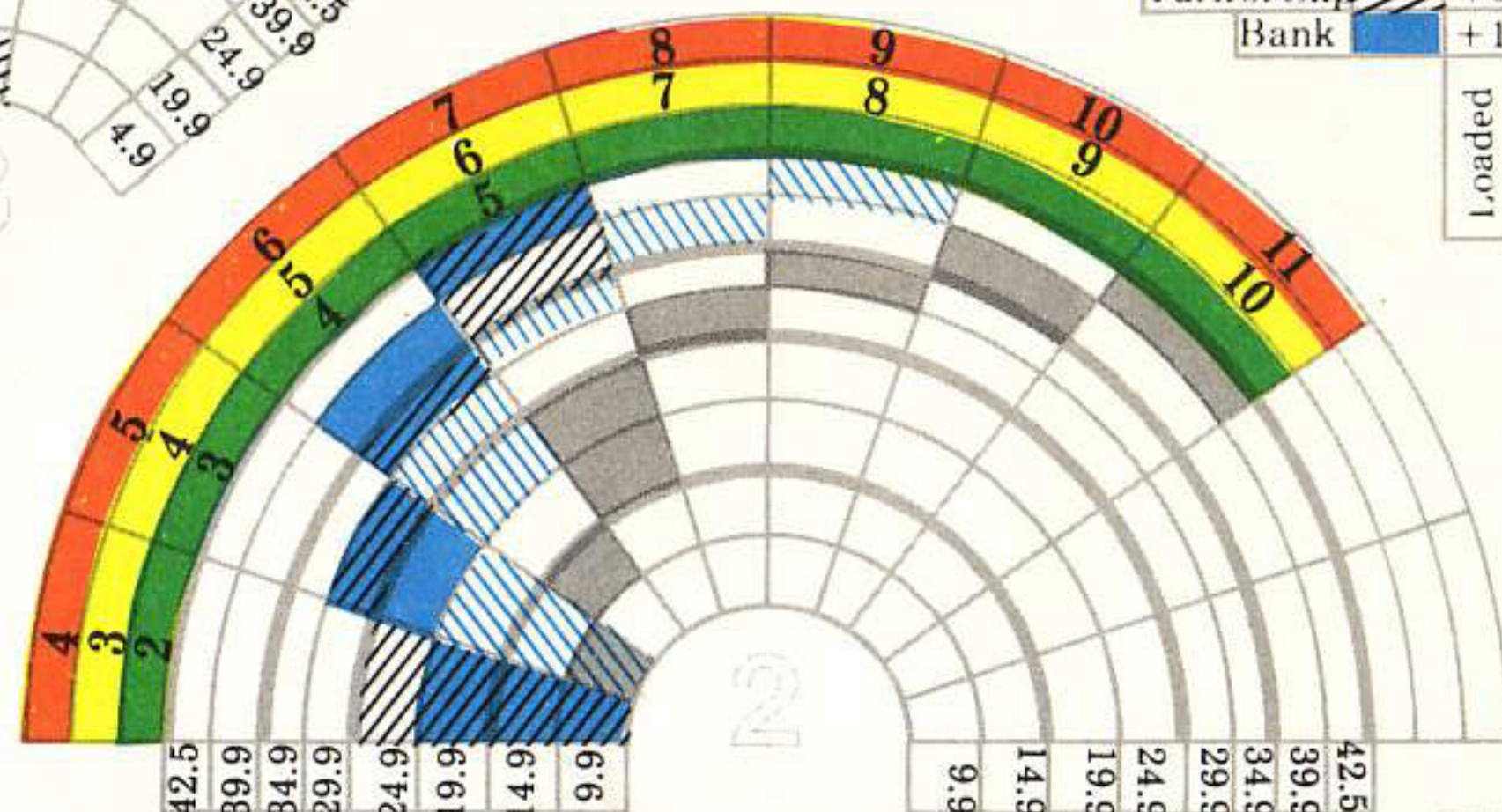
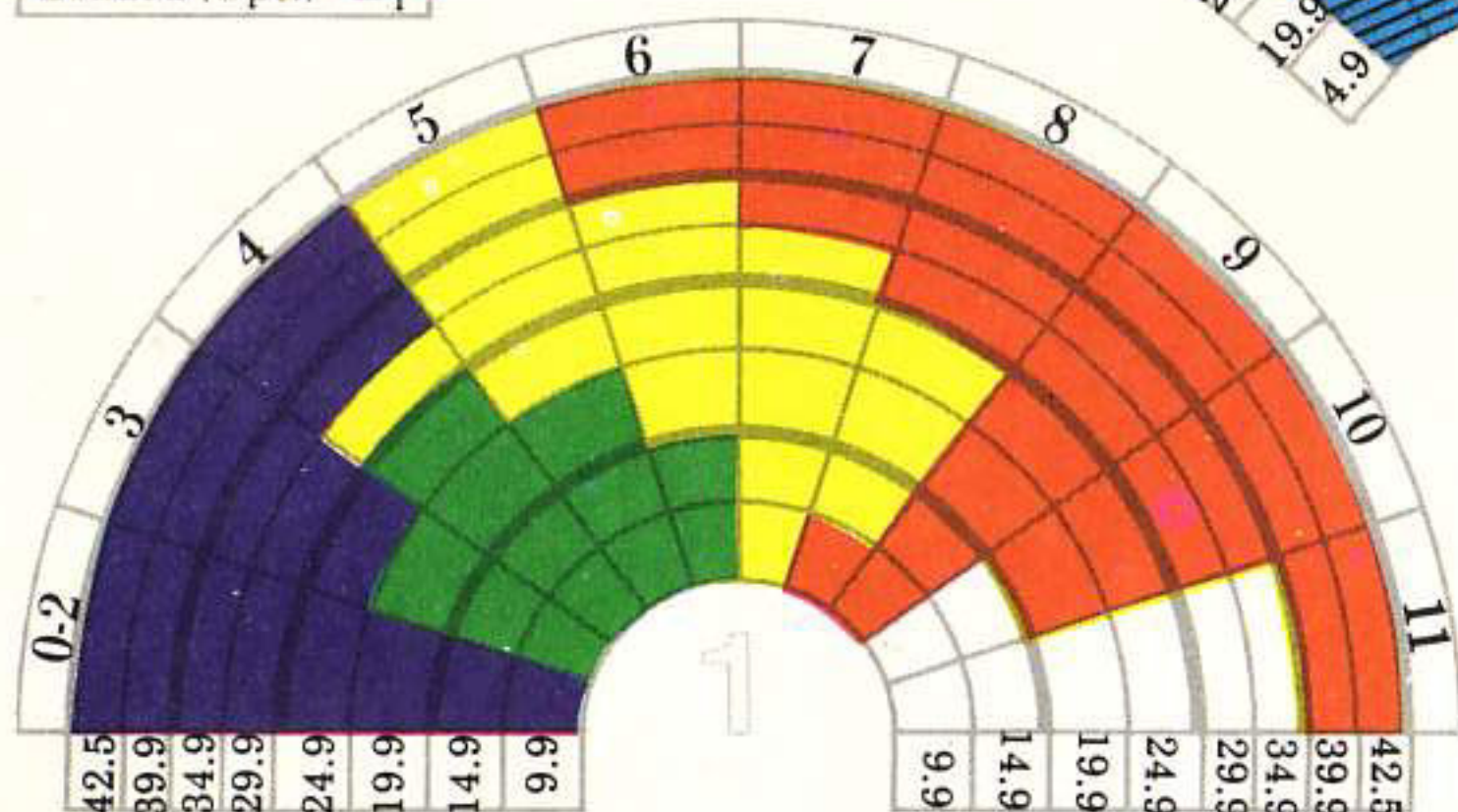
Speed Change



Power Factors	Diagonal Lines
Brake Factors	Blue

Half Loop	Grey	P
Half Roll	Blue	P
Turn or Slip	Diagonal Lines	+2
Bank	Blue	+1

Loaded

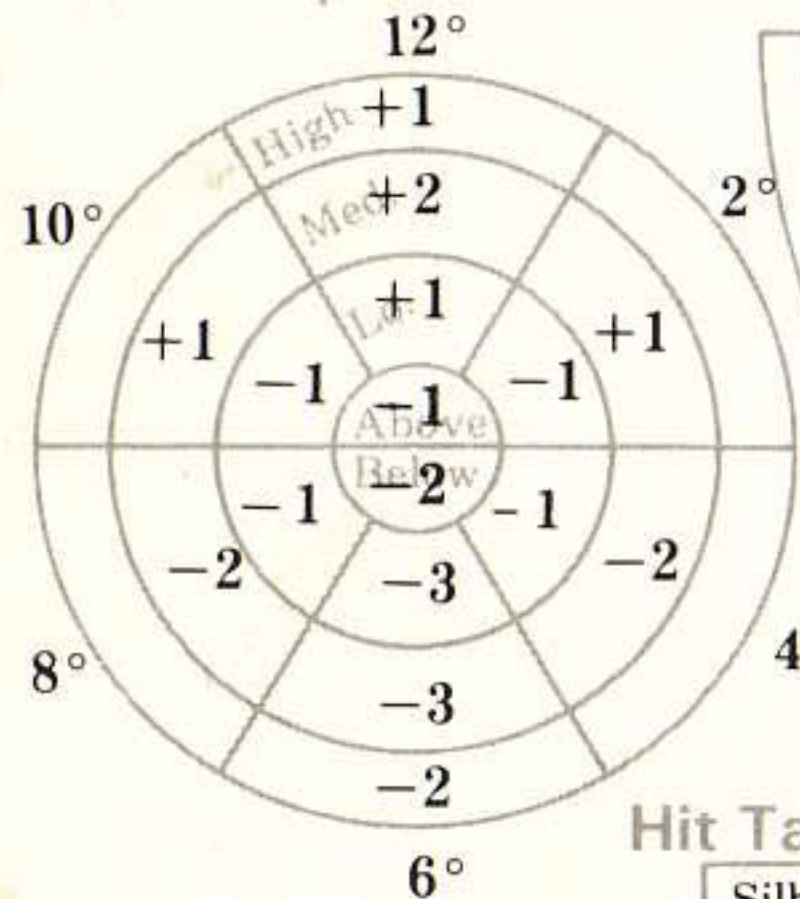


Speed Increments

Altitude Change

Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+2
Fire	+2

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-1
Dive Sp. Climb	-1
Max Climb	-1

Loaded

Target Characteristics

W	5	Cn	5	Mg	5
F	6	L	4		
C	3	C	-		
E	3	E	-	E	-
G	4C	2M		2M	4C
	(5)	(5)		(5)	(5)
FF					FF

Variants

Hurricane I

Hawker Hurricane I Day Fighter

PV: 15. Engine Type: I. Producer: Great Britain.

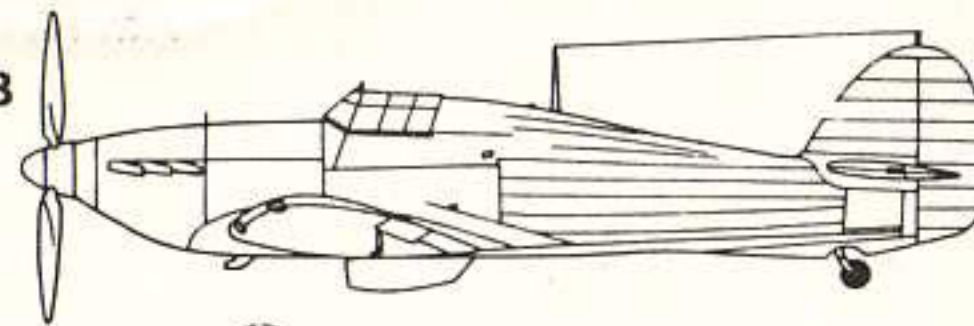
Deliveries started in October '37. A total of 3934 series-I built.

The Sea Hurricane I.A was identical to the Hurricane I in most respects.

Stall Speed	
Maneuver Sp.	
Level Speed	
Dive Speed	

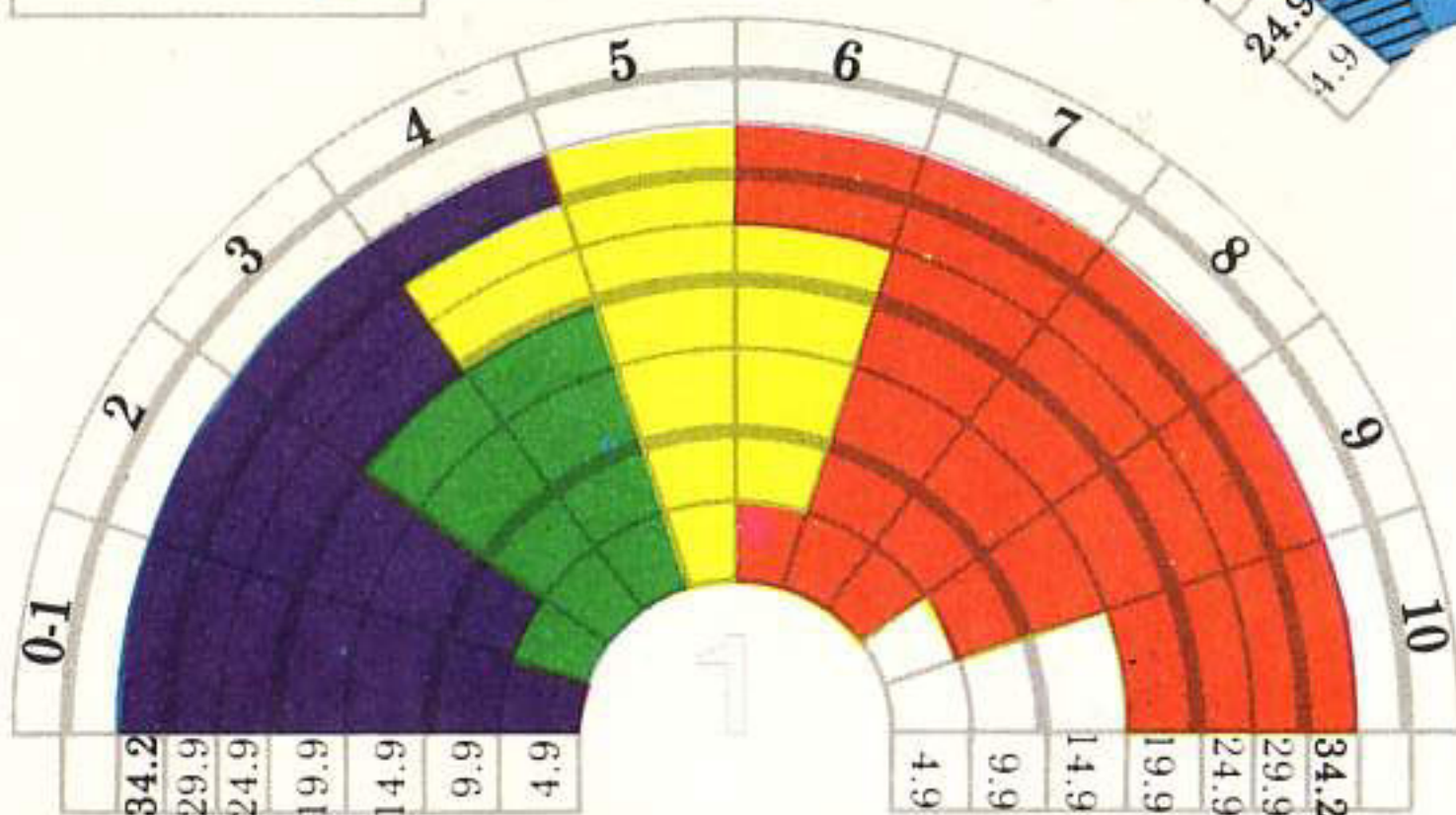
AIR FORCE DATA CARD 11B

Speed Change

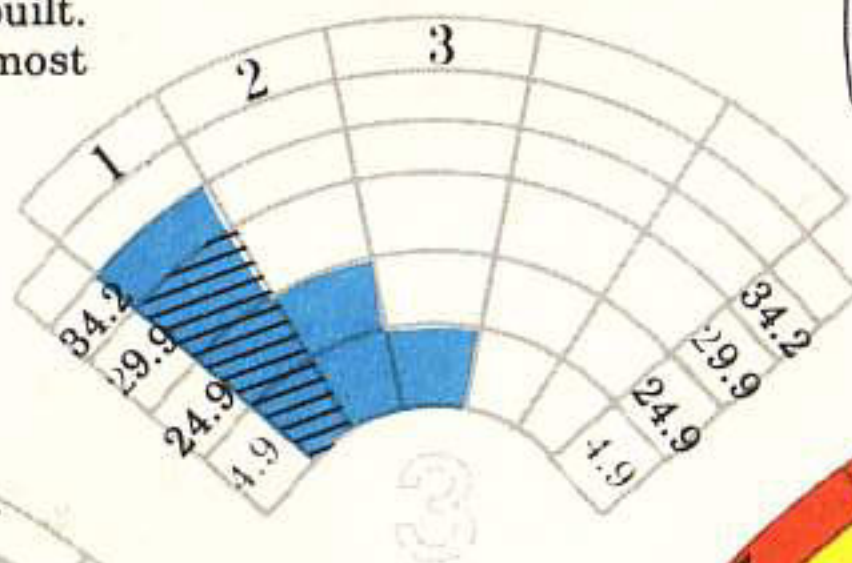


Power Factors	
Brake Factors	

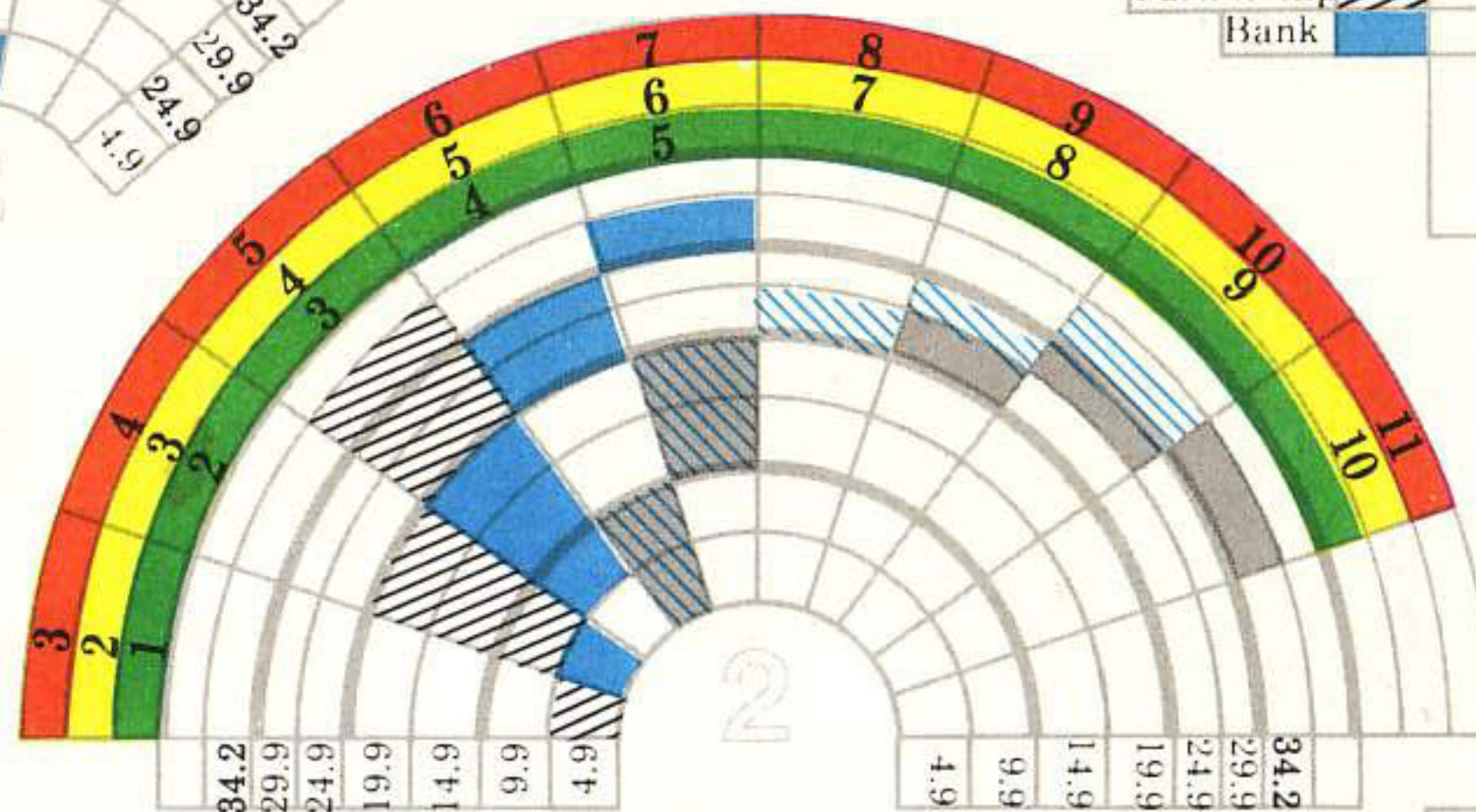
Half Loop	
Half Roll	
Turn or Slip	
Bank	



Speed Increments

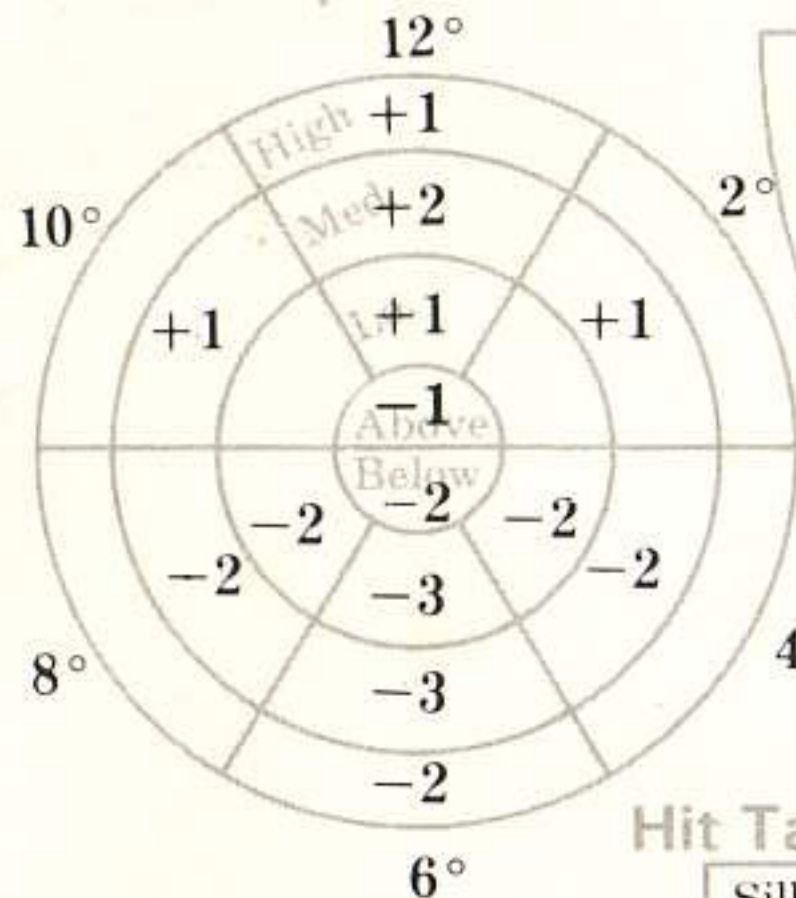


Altitude Change



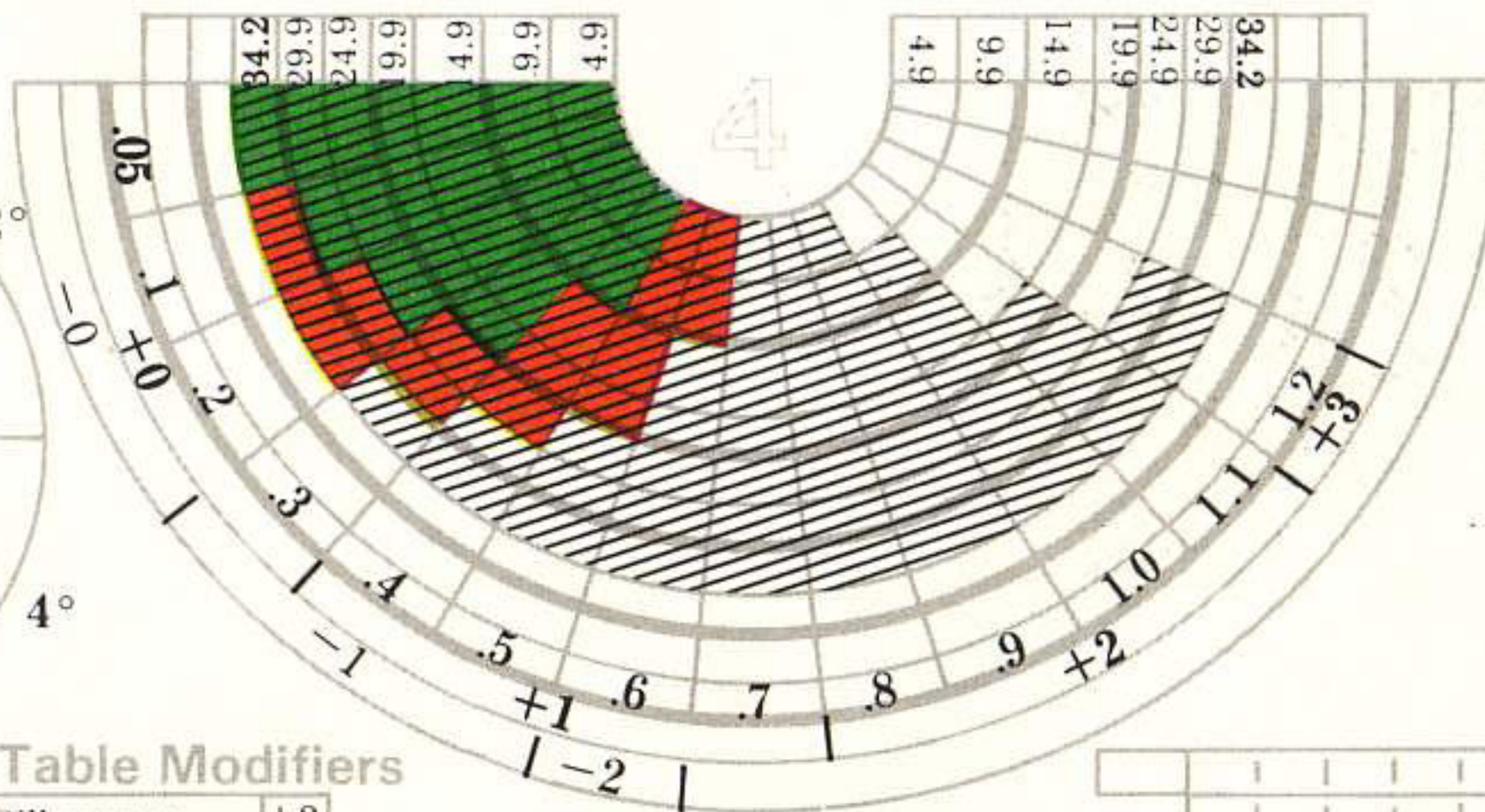
Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+2
Fire	+2



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	
Dive Sp. Climb	
Max Climb	

Target Characteristics

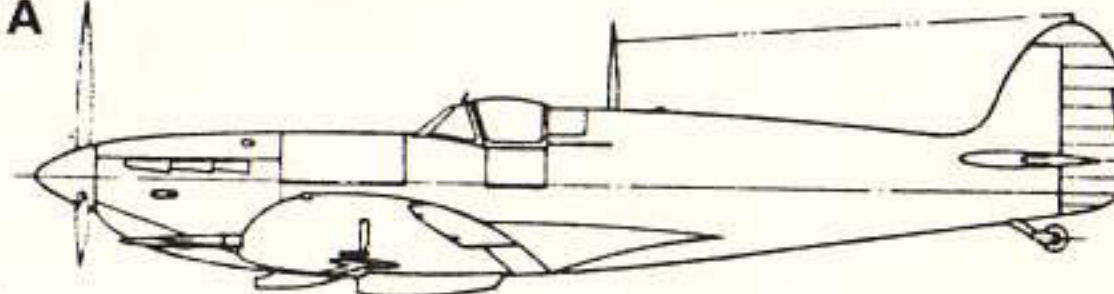
W	6	Cn	-	Mg	4
F	5	L	3		
C	3	C	-		
E	3	E	-	E	-
G	2M	2M		2M	2M
	(4)	(4)		(4)	(4)
	FF				FF

Variants

Spitfire IX

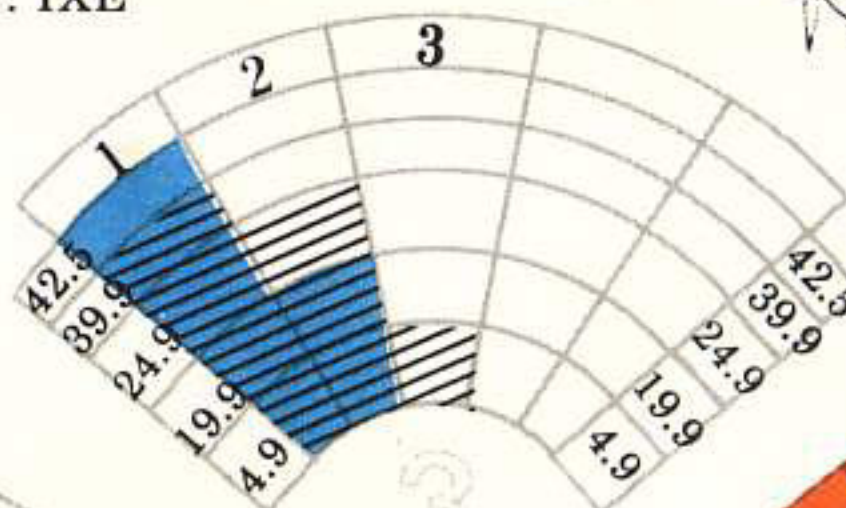
Supermarine Spitfire L.F. IXE Day Fighter
 PV: 19. Engine Type: I. Producer: Great Britain
 Introduced in Summer '42. A total of 4010 of the L.F. IXE
 were built.
 Loaded: Could carry one bomb.

AIR FORCE DATA CARD 11A



Stall Speed	Dark Purple
Maneuver Sp.	Green
Level Speed	Yellow
Dive Speed	Orange
Loaded (Opt.)	-1

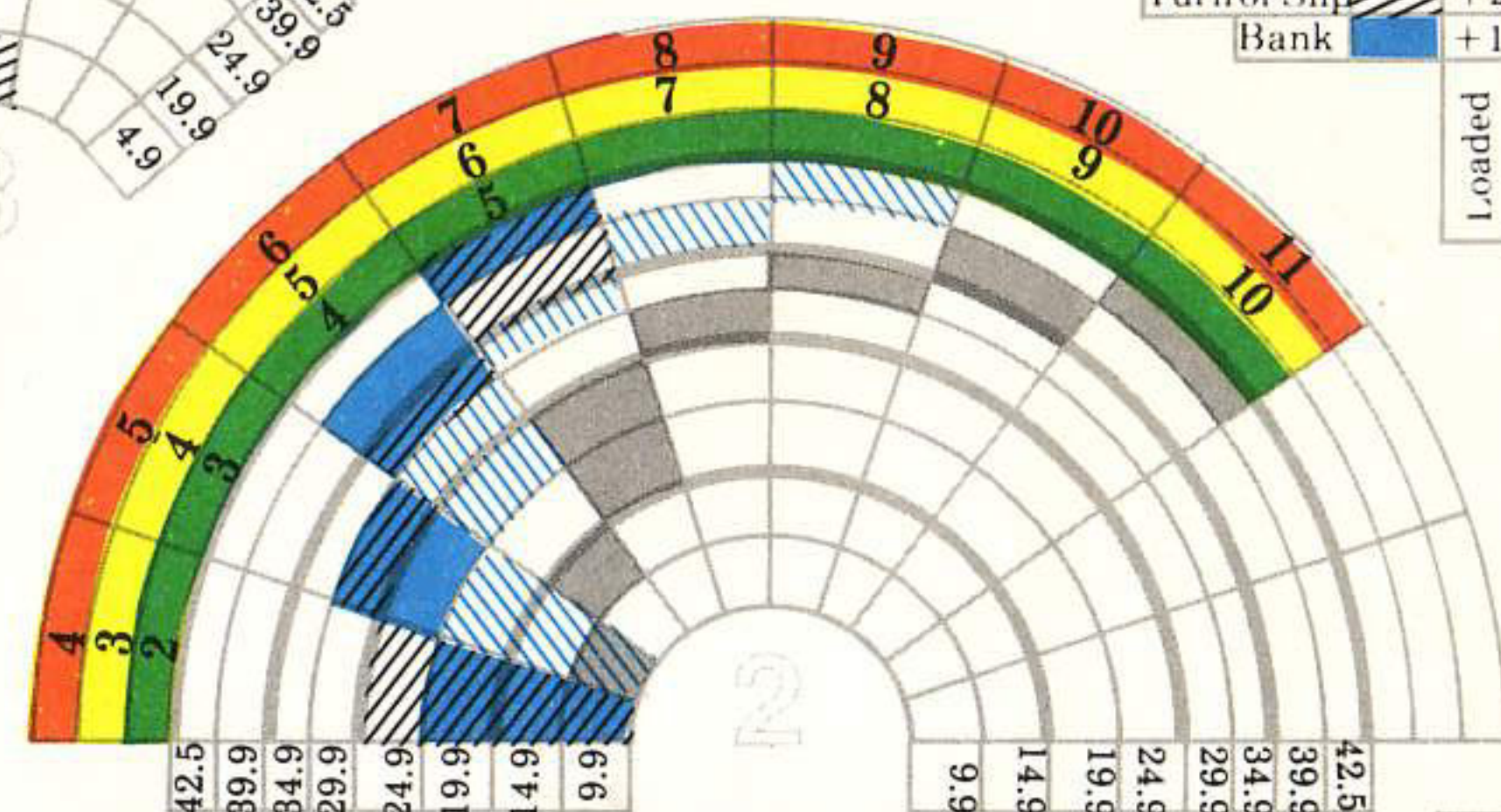
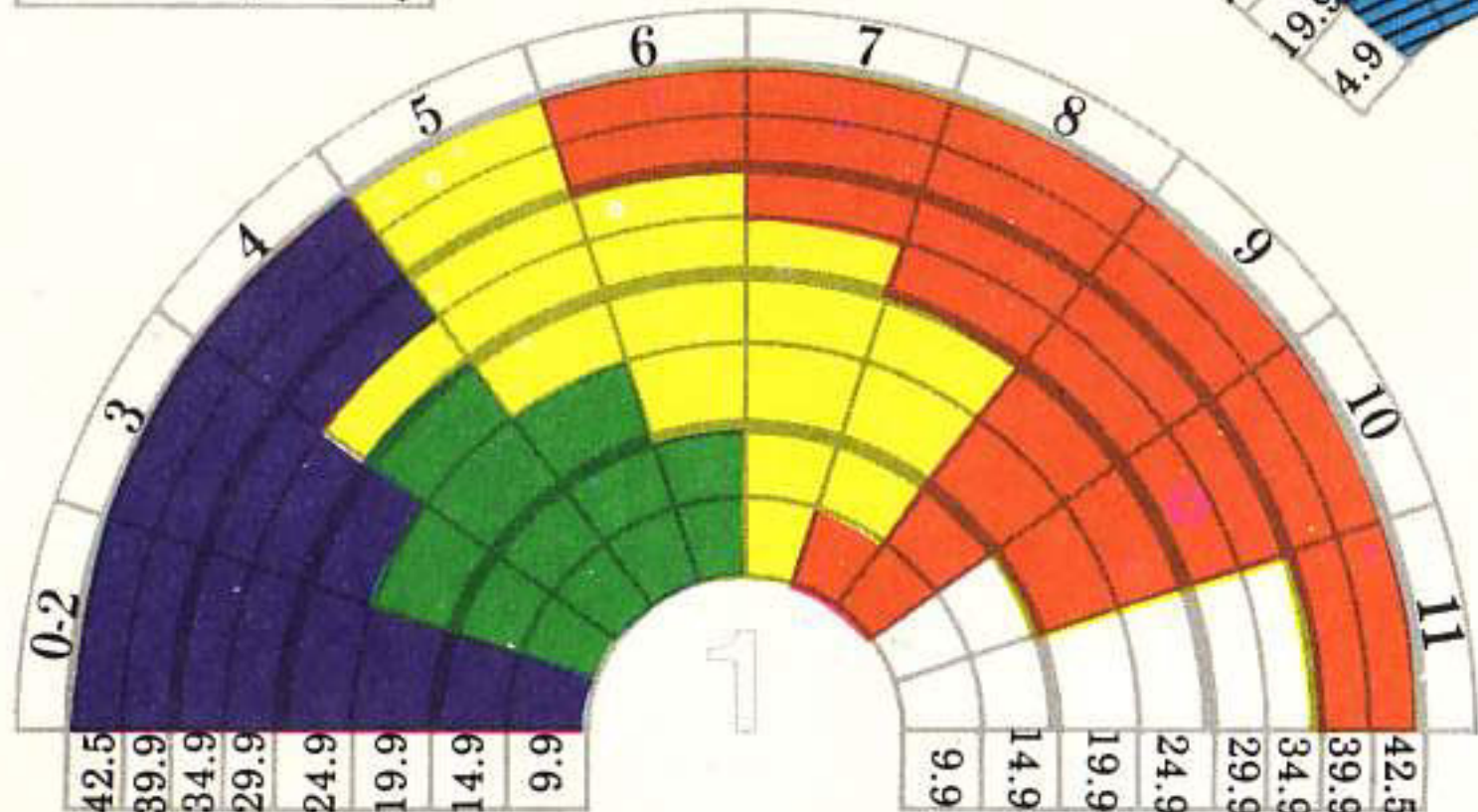
Speed Change



Power Factors	Diagonal Lines
Brake Factors	Blue

Half Loop	Grey	P
Half Roll	Blue	P
Turn or Slip	Blue	+2
Bank	Blue	+1

Loaded

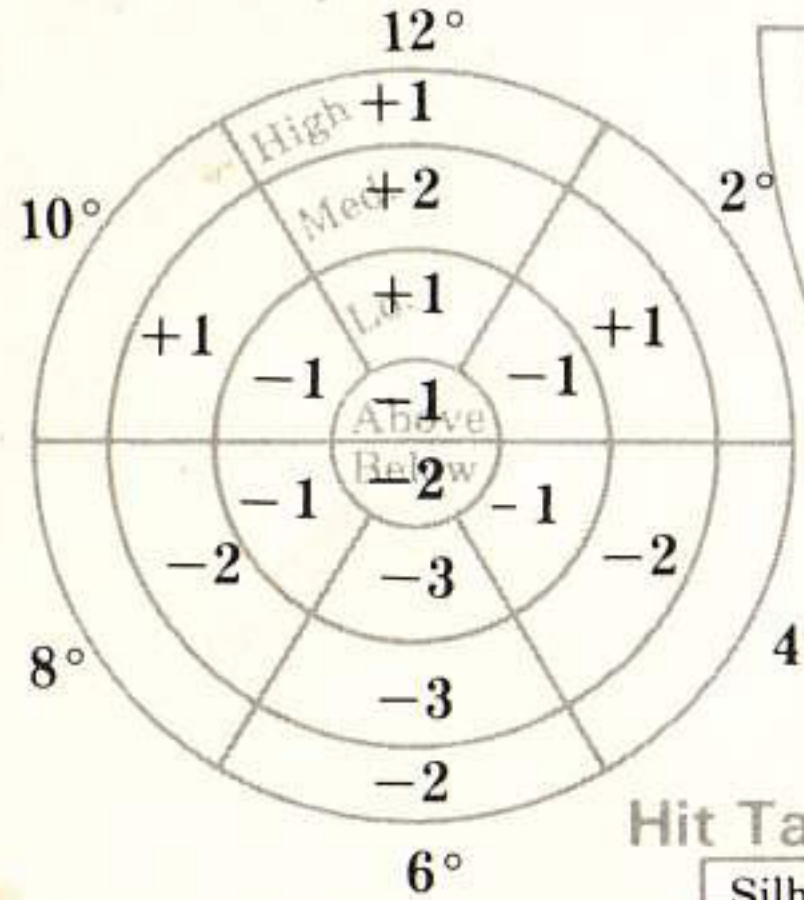


Speed Increments

Altitude Change

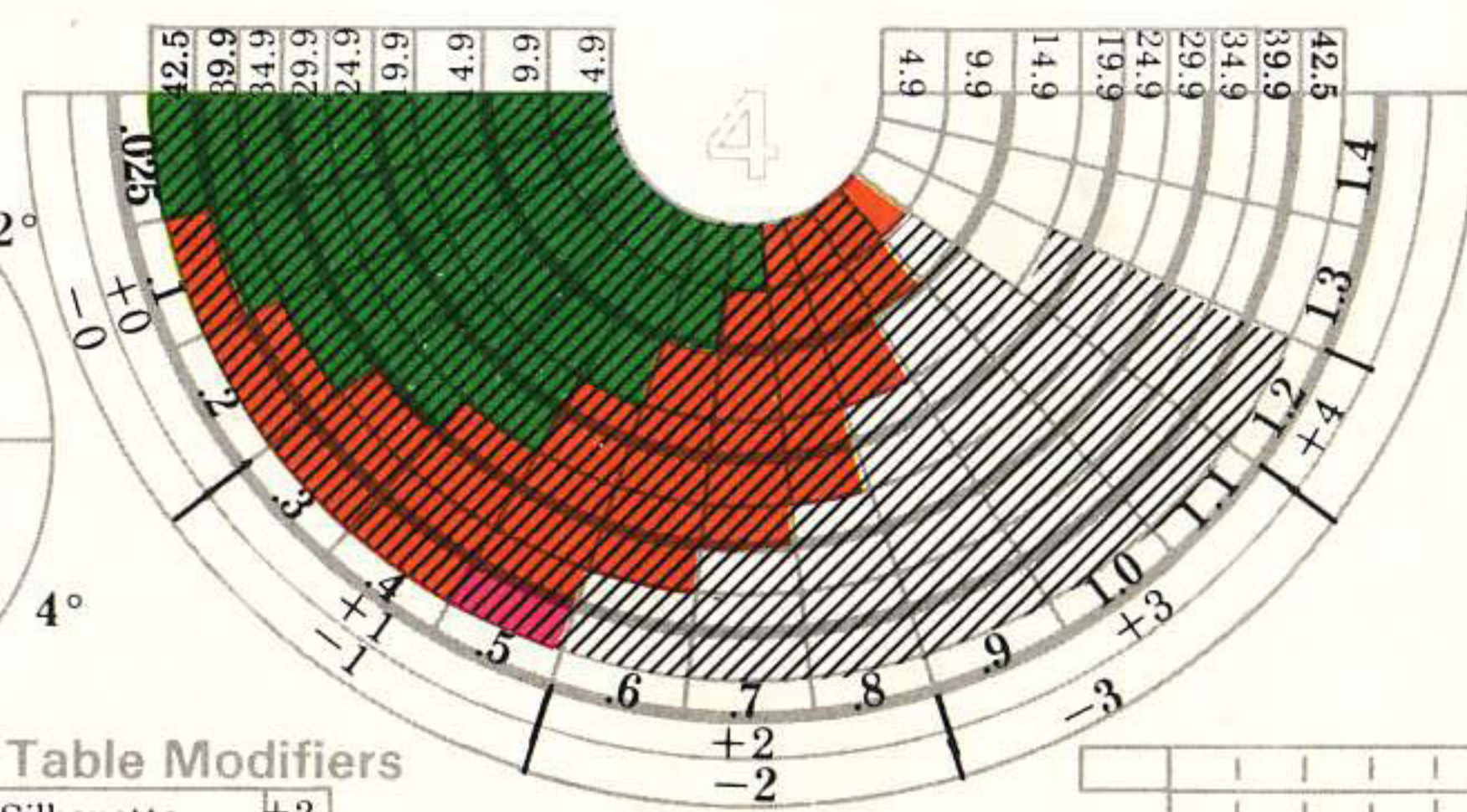
Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+2
Fire	+2



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-1
Dive Sp. Climb	-1
Max Climb	-1

Loaded

Target Characteristics

W	5	Cn	5	Mg	5
F	6	L	4		
C	3	C	-		
E	3	E	-	E	-
G	4C	2M		2M	4C
	(5)	(5)		(5)	(5)
FF					FF

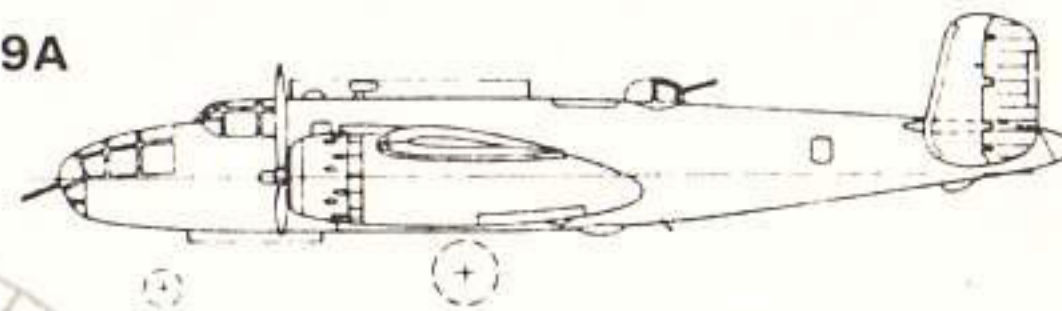
Variants

B-25C

North American B-25C.1 and D "Mitchell" Medium Bomber
 PV: 23 Engine Type: R Producer: USA
 Deliveries started January '42. 2819 C & D versions of this type built. Has sights for use as a level bomber
 Loaded: Can carry up to 5200 pounds of bombs (4 bombs low level) or one torpedo or 12 depth charges. (C-1 carries one bomb; G, three bombs or 8 rockets.)

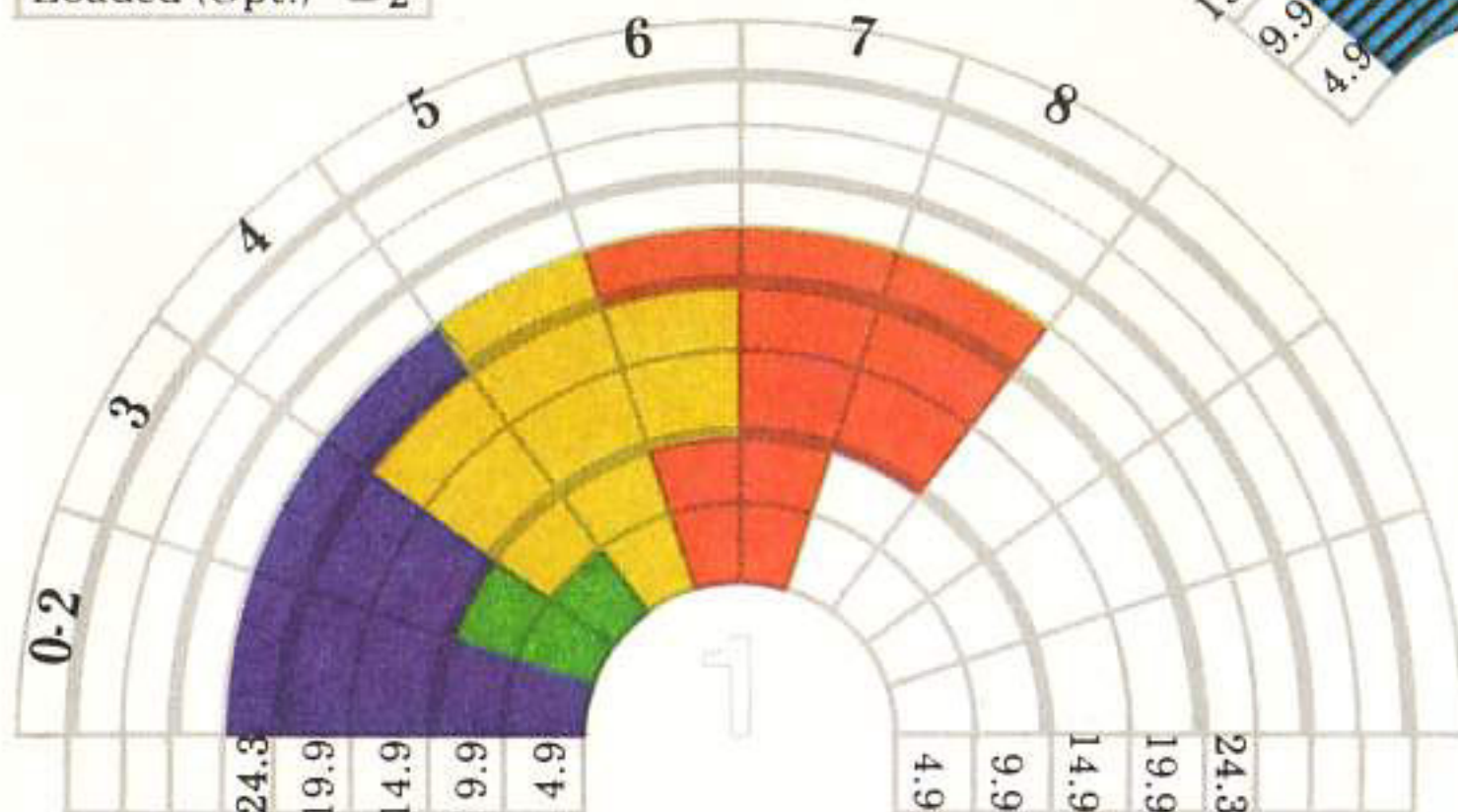
Stall Speed	6.4
Maneuver Sp.	6.6
Level Speed	6.7
Dive Speed	6.9
Loaded (Opt.)	-2

DAUNTLESS DATA CARD 9A

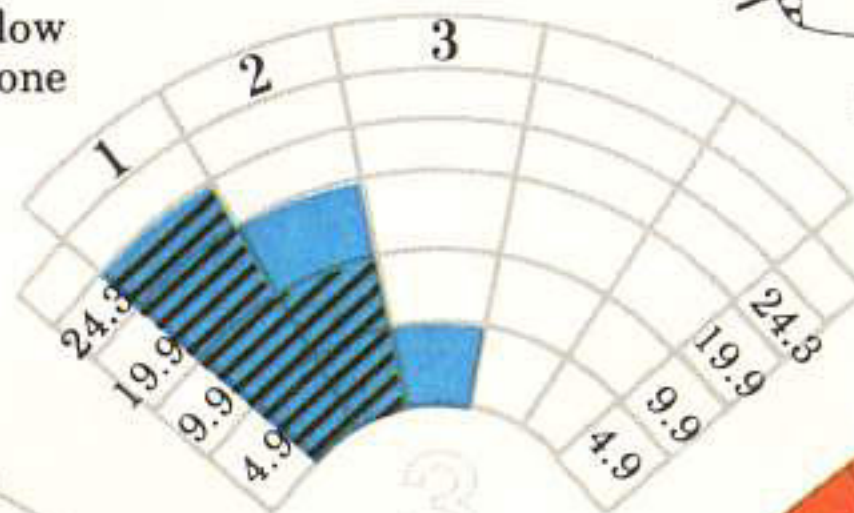


Power Factors	6.4
Brake Factors	6.6

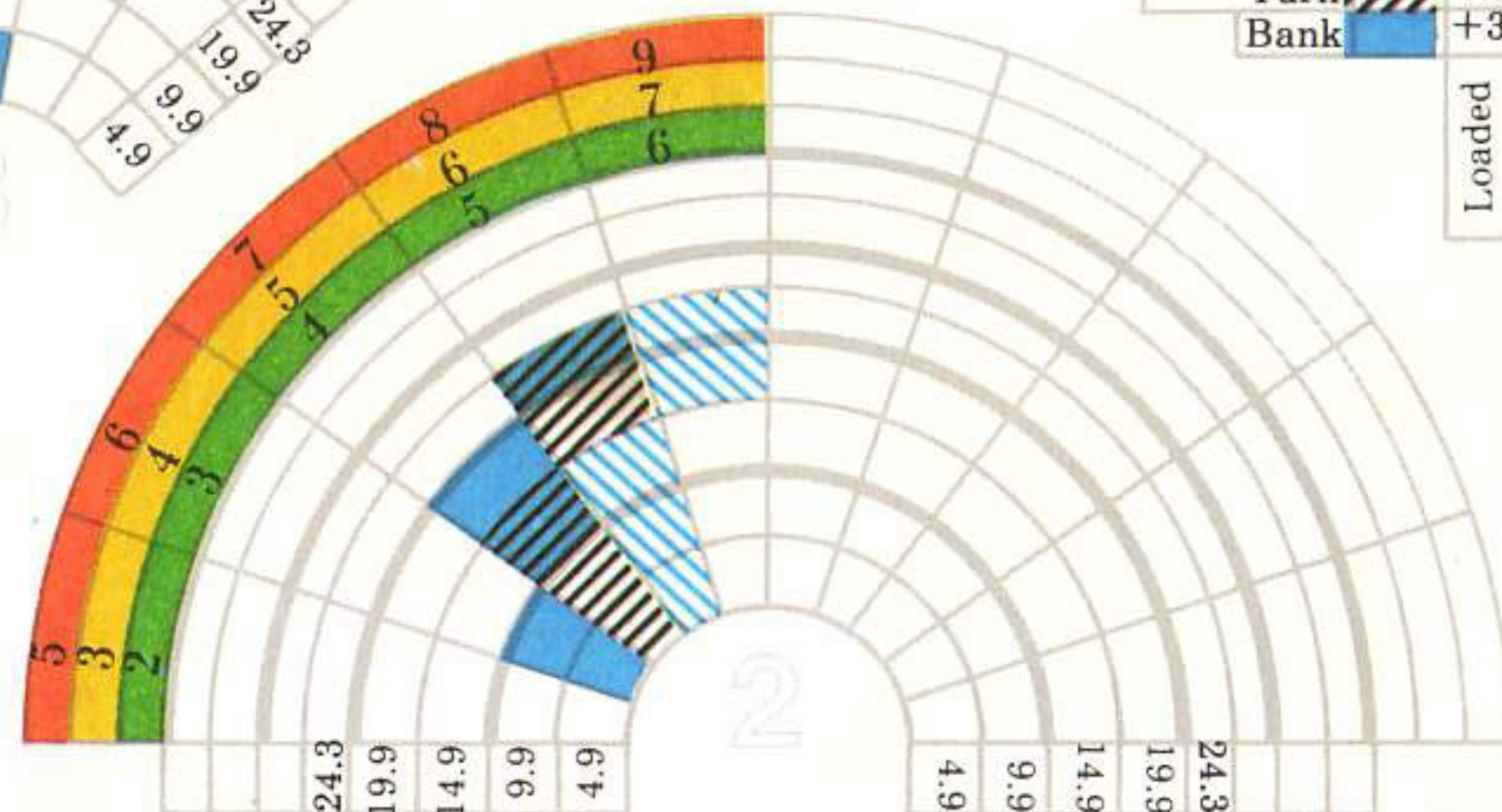
Slip	+3
Turn	+4
Bank	+3
Loaded	



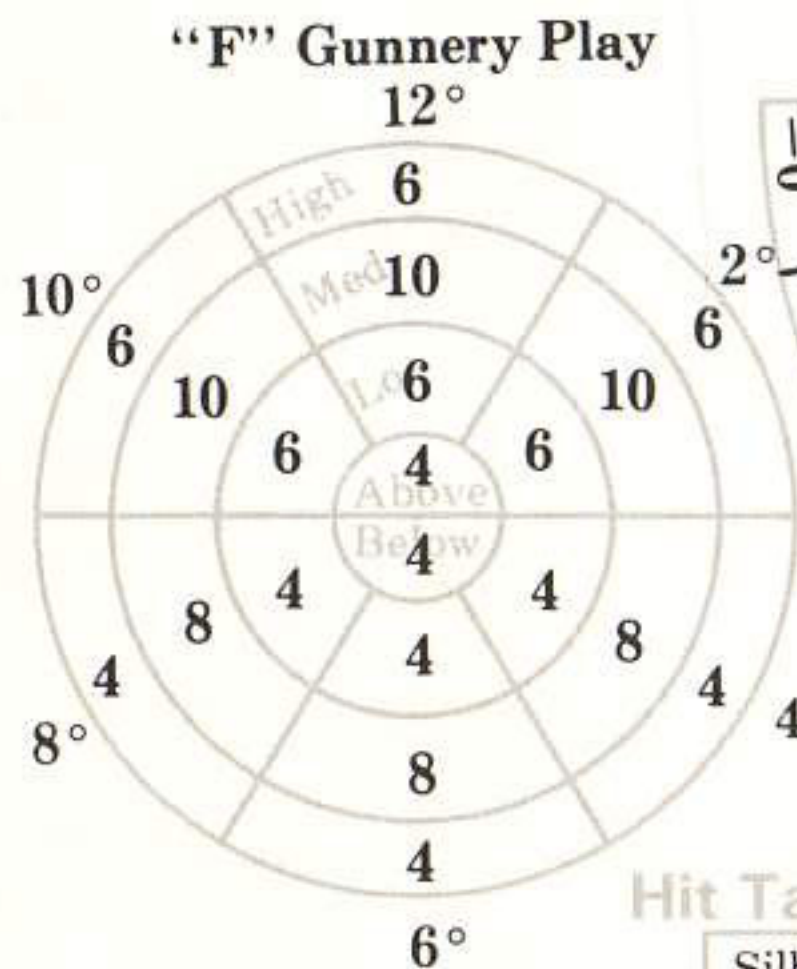
Speed Increments



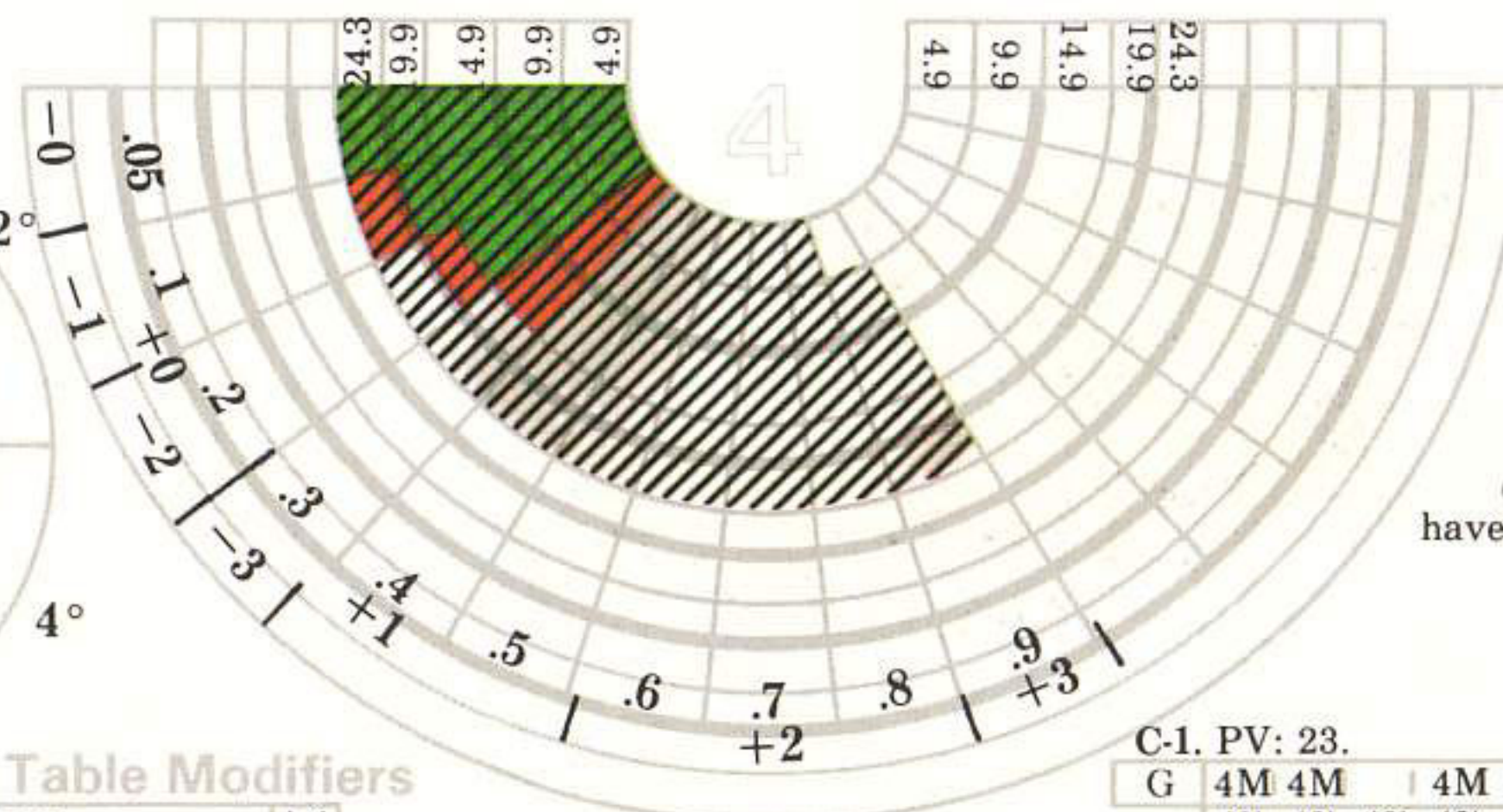
Altitude Change



Maneuverability Requirements



"F" Gunnery Play



Hit Table Modifiers

Silhouette	+4
Fire	0

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-0.3
Dive Sp. Climb	-0.1
Max Climb	-0.1
Loaded	

Target Characteristics

W	7	Cn	6	Mg	8
F	9	L	3		
C	2	C	2		
E	3	E	-	E	3
G			2M		
			(6)	(6)	
			F	FF	

Variants

C-1. PV: 23.	
G	4M 4M 4M 4M
	(6) (6) (6) (6) (6)
	FL FL F FL FL

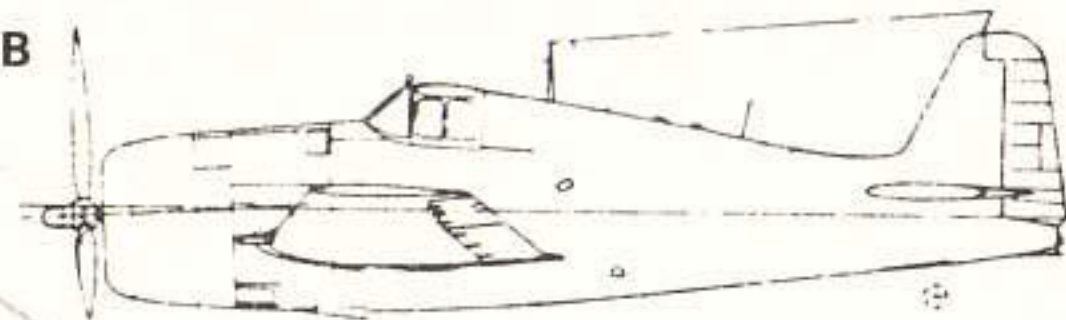
G. PV: 25.	
G	2M [9C] 2M
	(6) (6) (6) (6)
	FL FL F FL

No Low Gunnery Play;
 Med + High "4" in all directions.

F6F

Grumman F6F-3 "Hellcat I" Carrier Day Fighter.
 PV: 21 Engine Type: R Producer: USA
 First combat August '43. A total of 4646 of this model built.
 Loaded: Can carry one bomb.

DAUNTLESS DATA CARD 9B

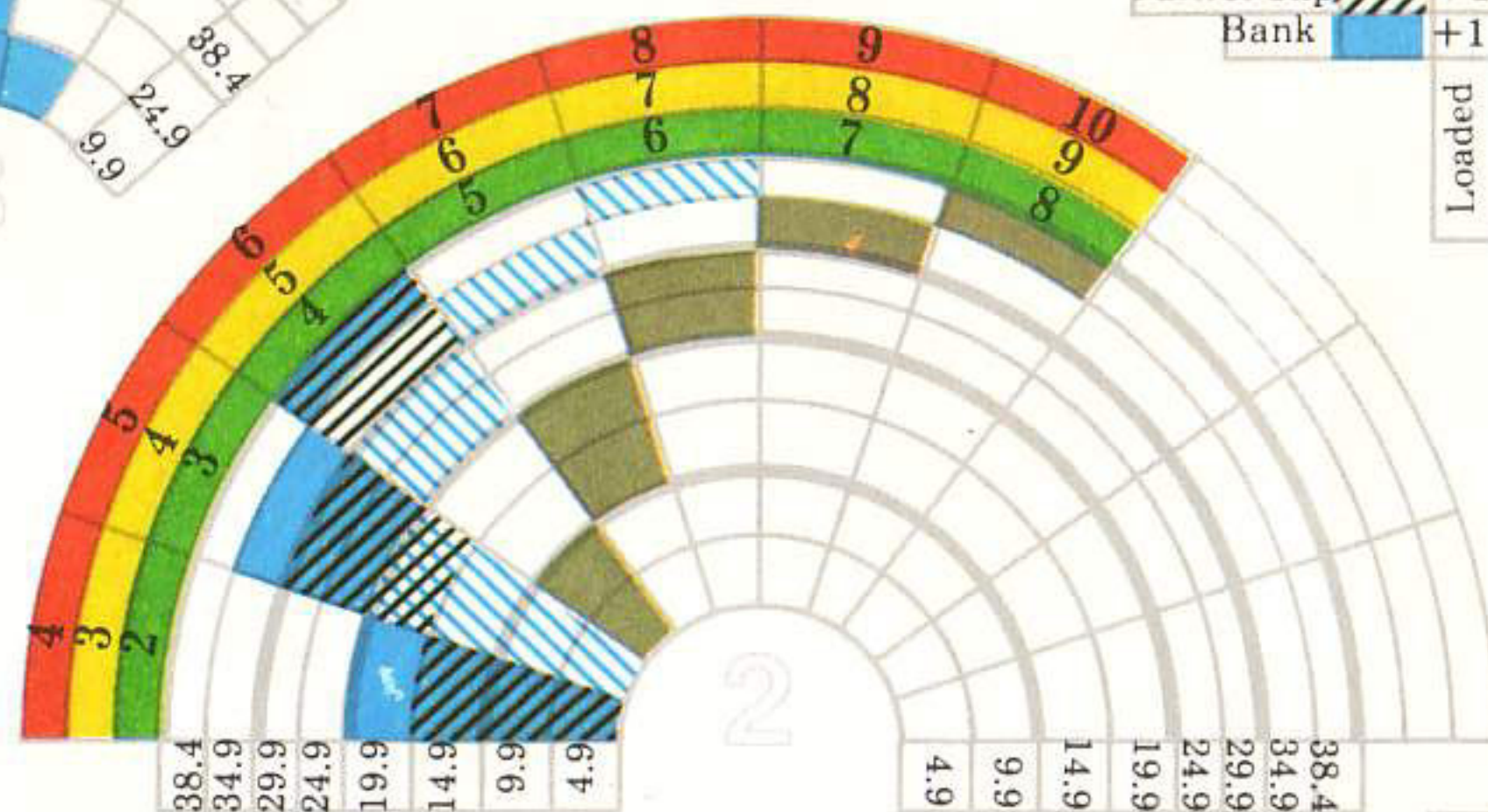
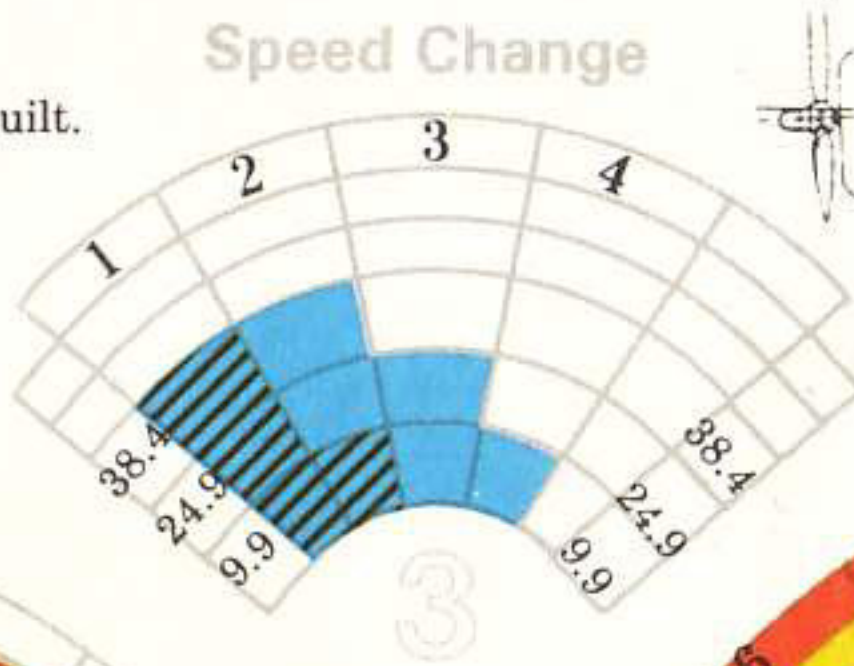
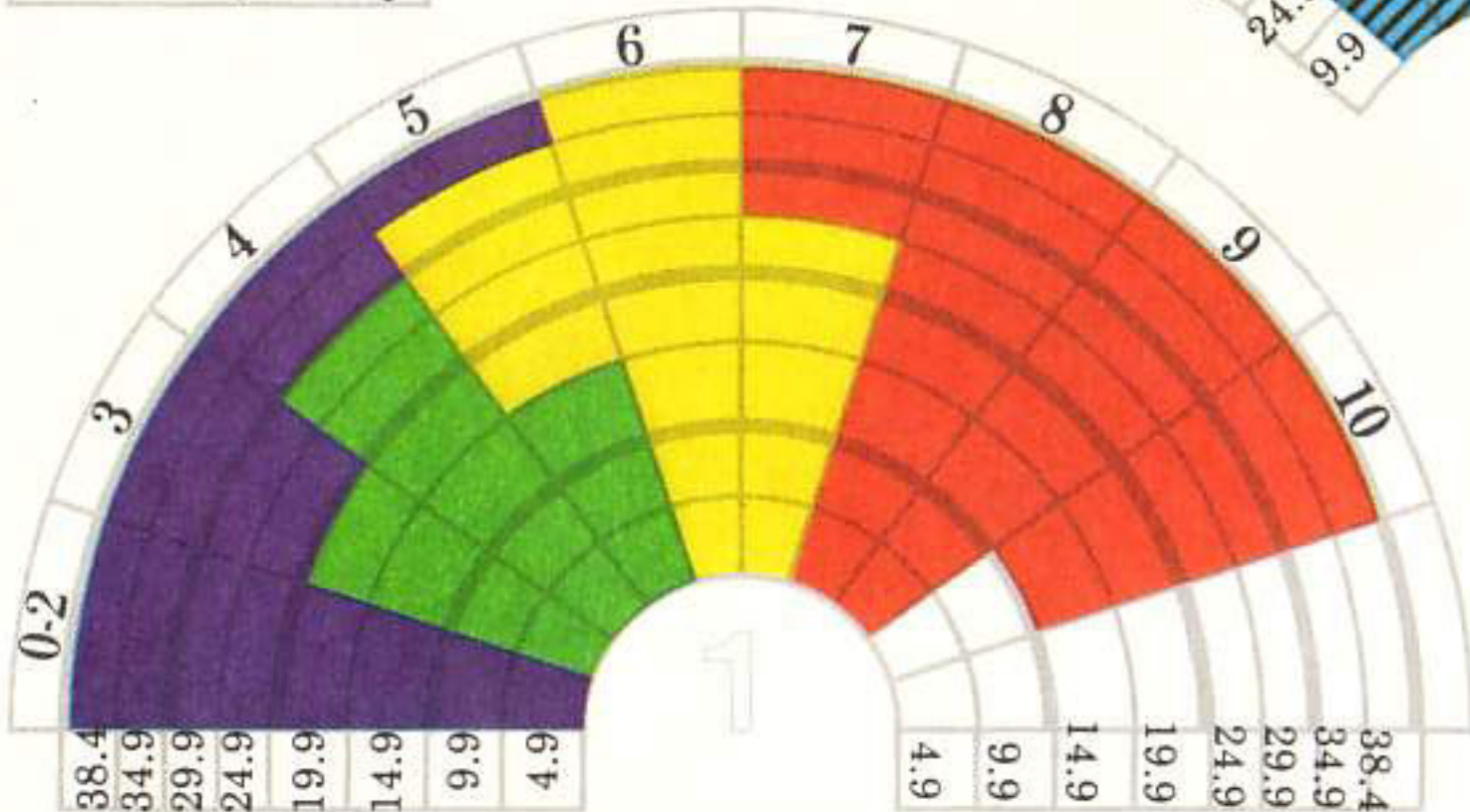


Stall Speed	1
Maneuver Sp.	2
Level Speed	3
Dive Speed	4
Loaded (Opt.)	-1

Power Factors	1
Brake Factors	2

Half Loop	P
Half Roll	P
Turn or Slip	+2
Bank	+1

Loaded

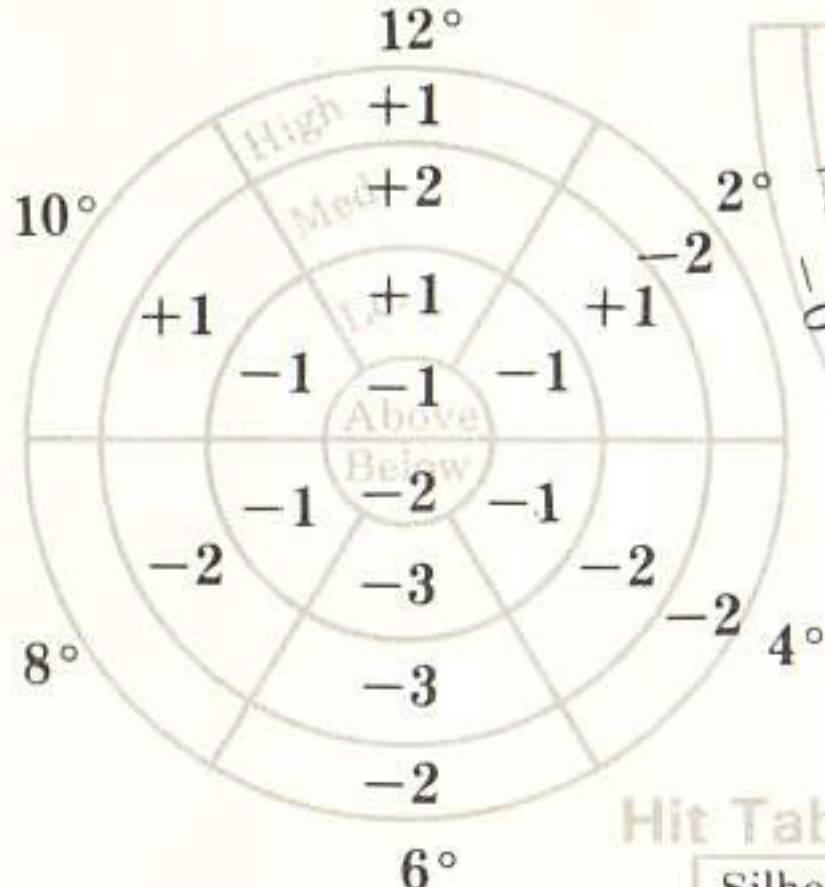


Speed Increments

Altitude Change

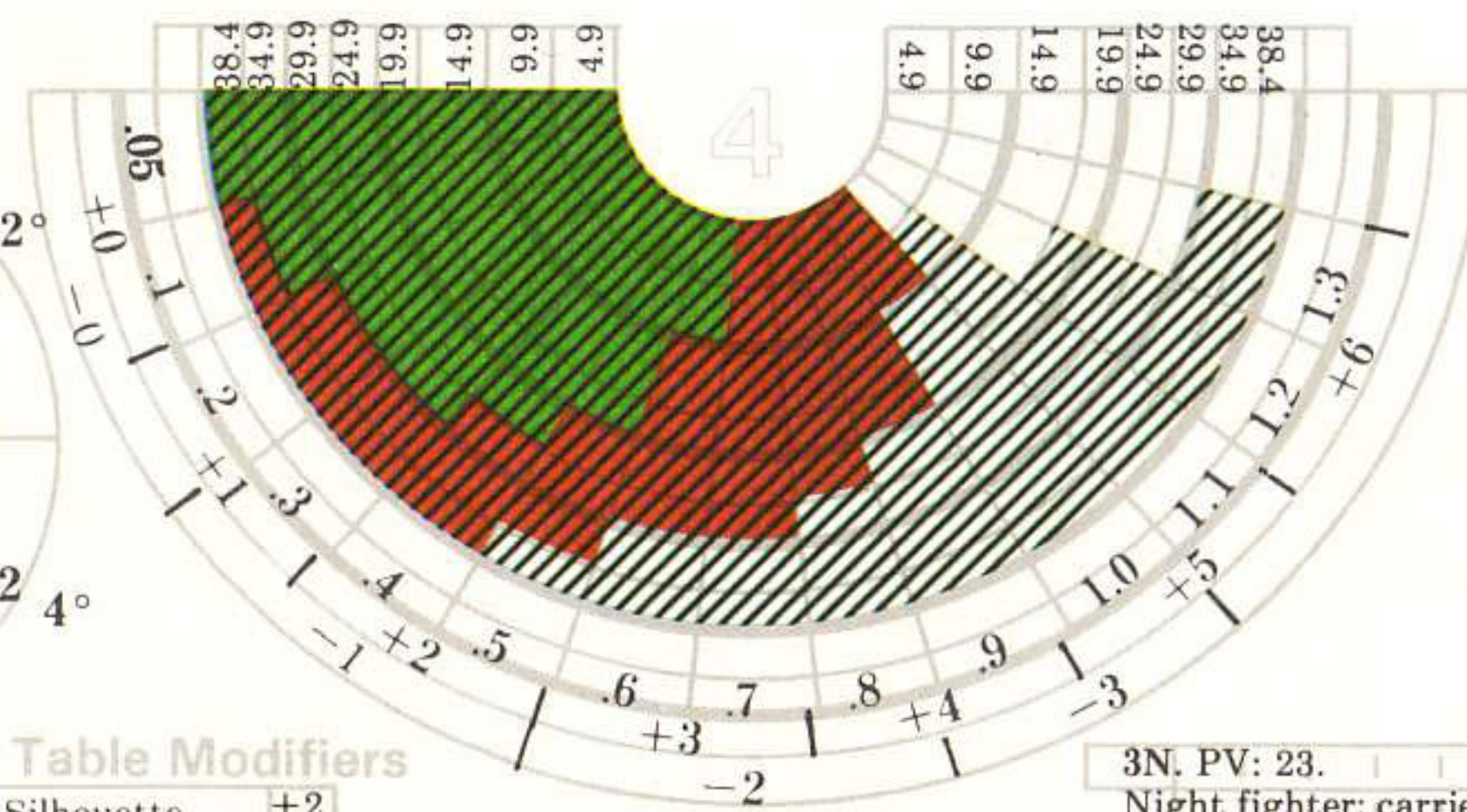
Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+2
Fire	+2



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-0.2
Dive Sp. Climb	-0.1
Max Climb	-0.1

Loaded

Target Characteristics

W	6	Cn	-	Mg	7
F	8	L	3		
C	3	C	-		
E	3	E	-	E	-
G	2M 4M			4M 2M	
	(5) (5)			(5) (5)	
FF				FF	

Variants

3N. PV: 23.
 Night fighter; carried radar.
 Treat as loaded in this config.

F4U-1

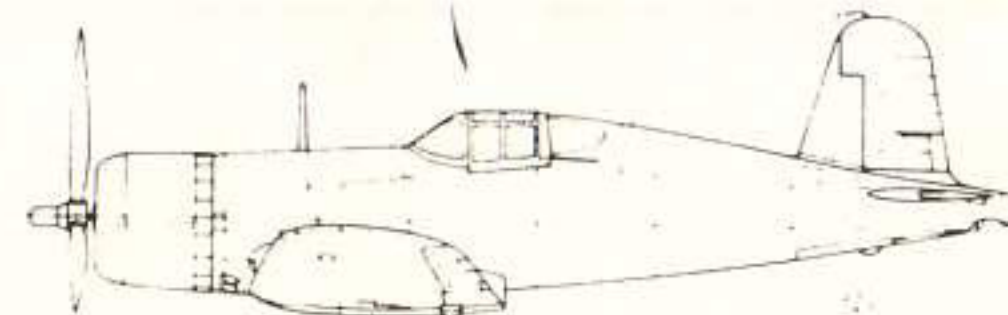
DAUNTLESS DATA CARD 7A

Chance Vought F4U-1A, FG-1A and F3A-1A "Corsair II" Carrier Day Fighter

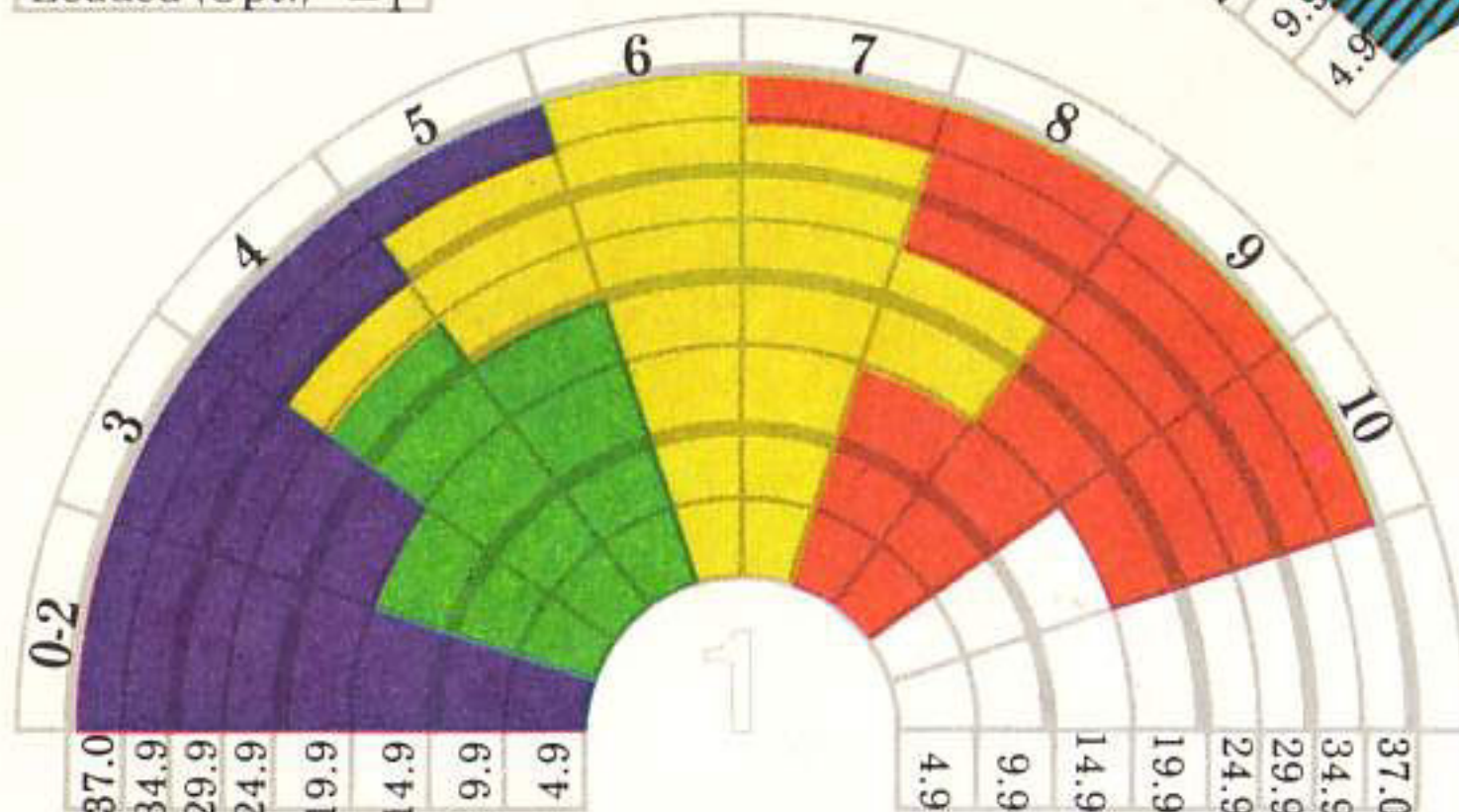
PV: 21 Engine Type: KR Producer: USA

Entered combat in February 1943. A total of 8645 built.

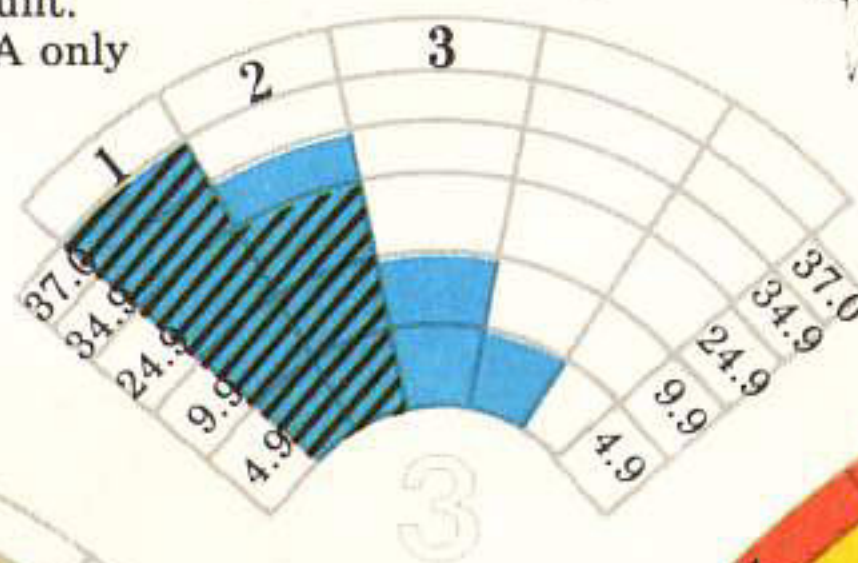
Loaded: Can carry up to 2 bombs or 8 A/G rockets (1A only one bomb).



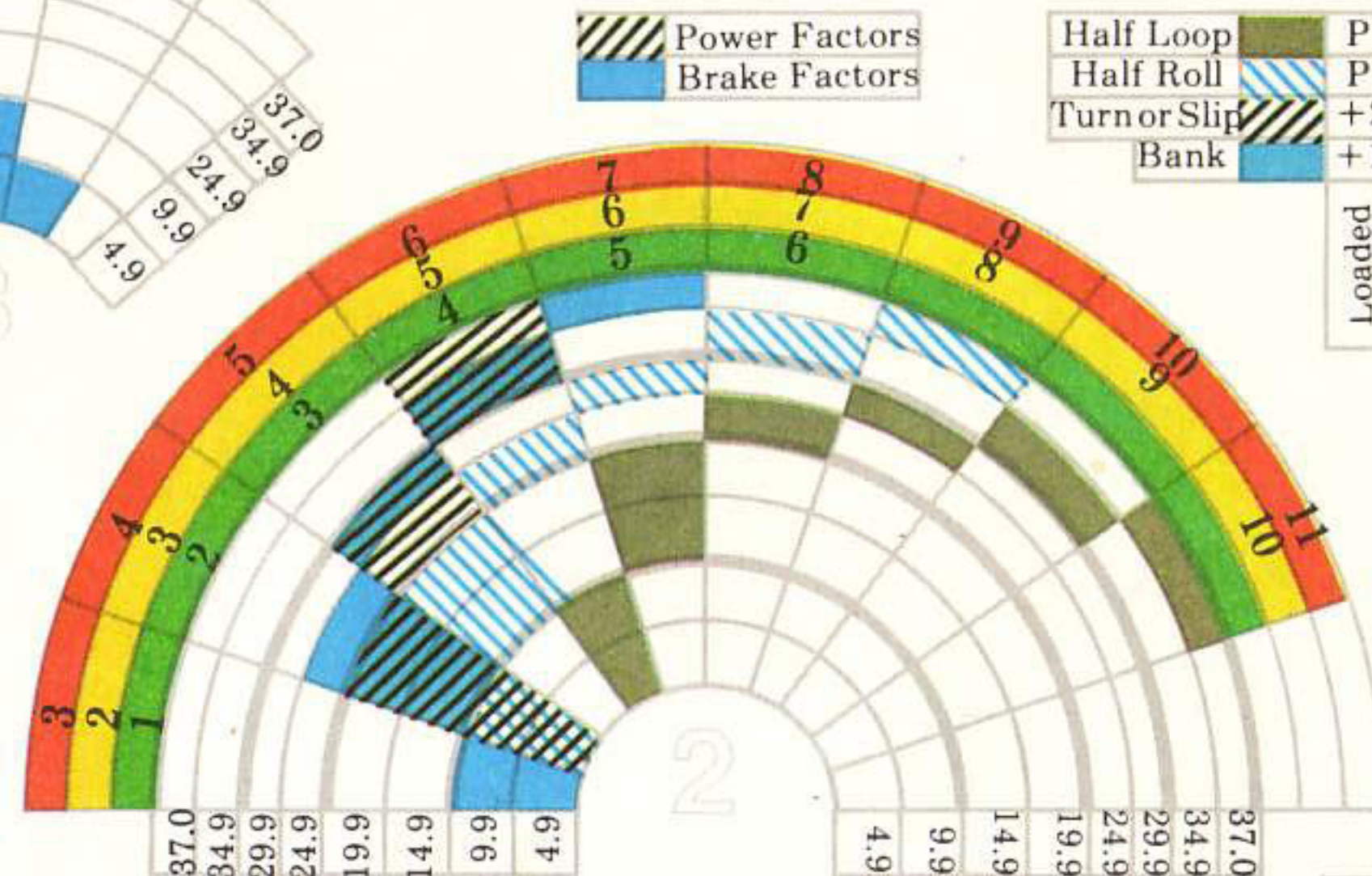
Stall Speed	0.2
Maneuver Sp.	3
Level Speed	4
Dive Speed	5
Loaded (Opt.)	-1



Speed Increments

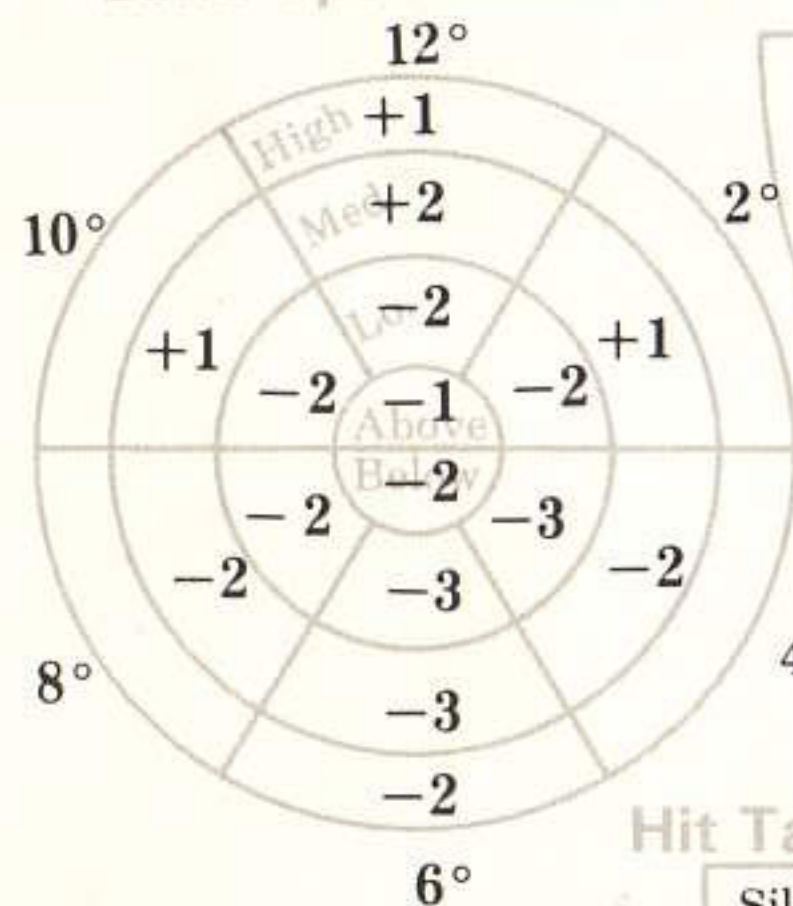


Altitude Change



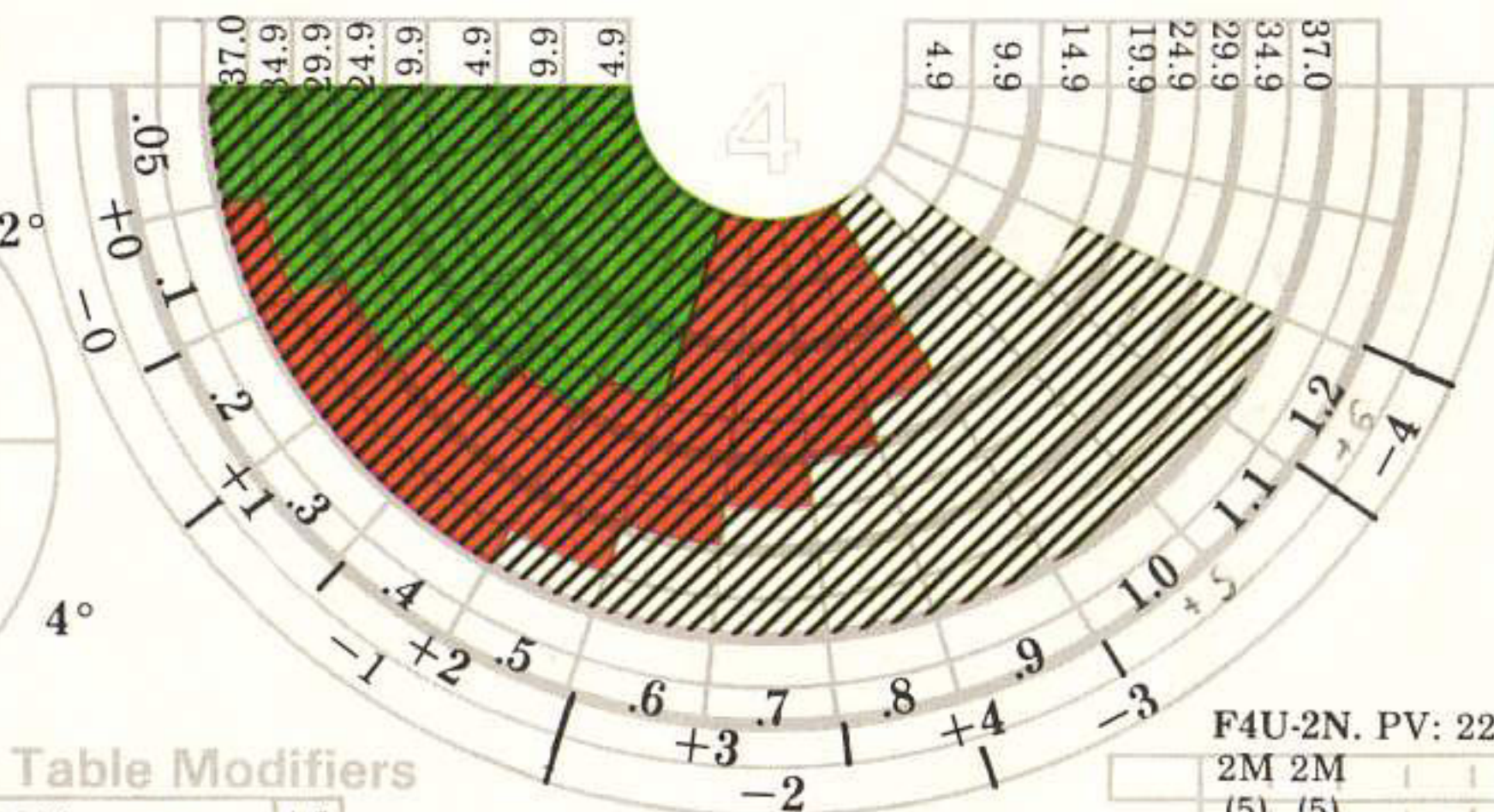
Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+2
Fire	+2



F4U-2N. PV: 22.

2M	2M	2M	2M
(5)	(5)	(5)	(5)
FF			FF

Night Fighter, early armament configuration. Later had 1A armament.

Variants

F4U-1C. PV: 22. Cn: 5.

G	4C	4C	4C	4C
	(5)	(5)	(5)	(5)
	FF			FF

(200 built).

Dive Acceler.	+1	Loaded
Climb Deceler.	-1	
Max Dive	-0.3	
Dive Sp. Clim	-0.1	
Max Climb	-0.1	

Target Characteristics

W	6	Cn	-	Mg	6
F	8	L	3		
C	3	C	-		
E	3	E	-	E	
G	2M 4M			4M 2M	
	(5) (5)			(5) (5)	
	FF			FF	

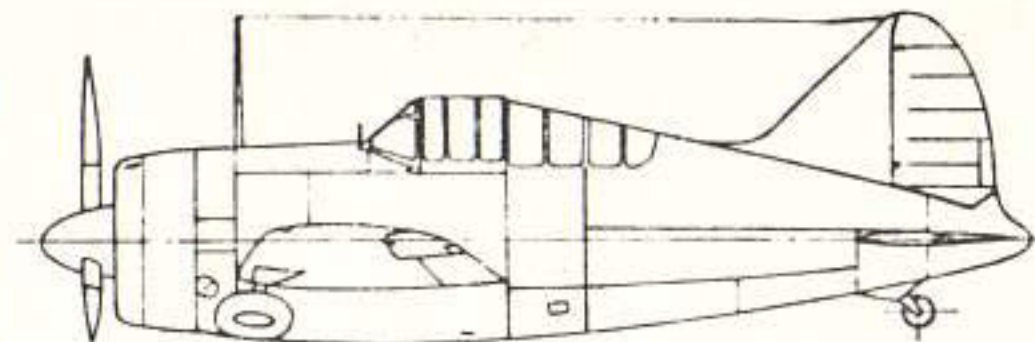
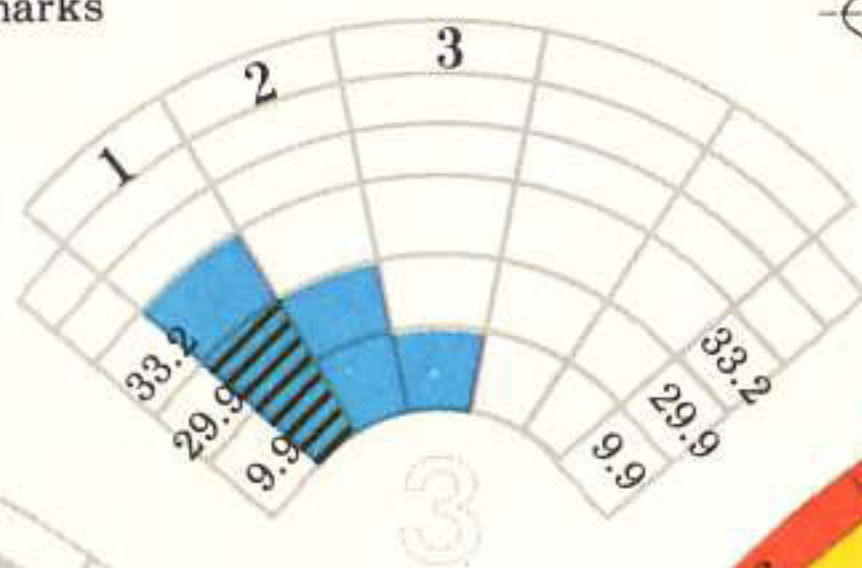
F2A

Brewster F2A-3 "Buffalo" Carrier Day Fighter
 PV: 15 Engine Type: R Producer: USA
 Operational in September 1941. A total of 507 of all marks built.
 Loaded: Can carry one bomb.

Stall Speed	33.2
Maneuver Sp.	29.9
Level Speed	24.9
Dive Speed	19.9
Loaded (Opt.)	-1

DAUNTLESS DATA CARD 7B

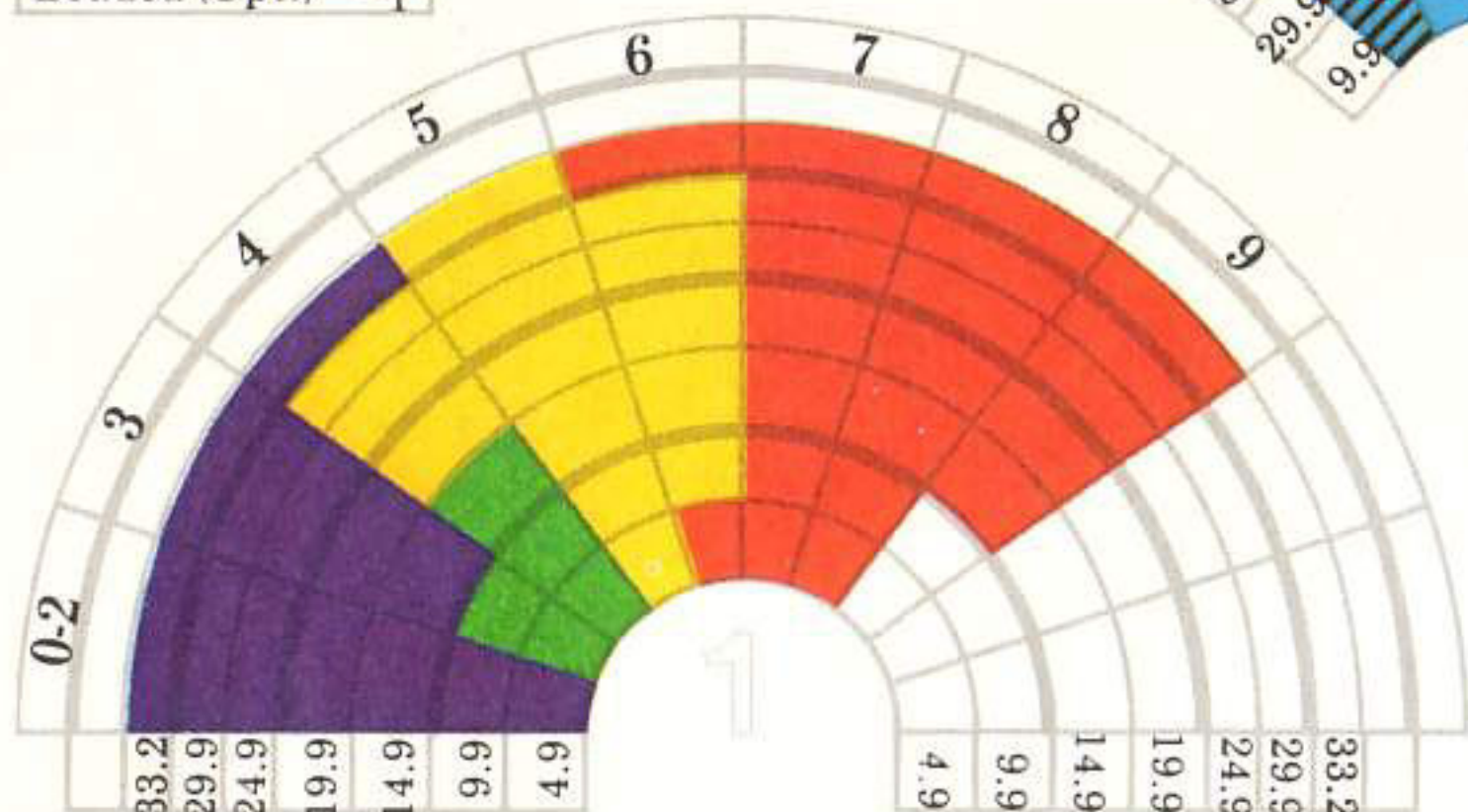
Speed Change



Power Factors
 Brake Factors

Half Loop	P
Half Roll	P
Turn or Slip	+2
Bank	+1

Loaded

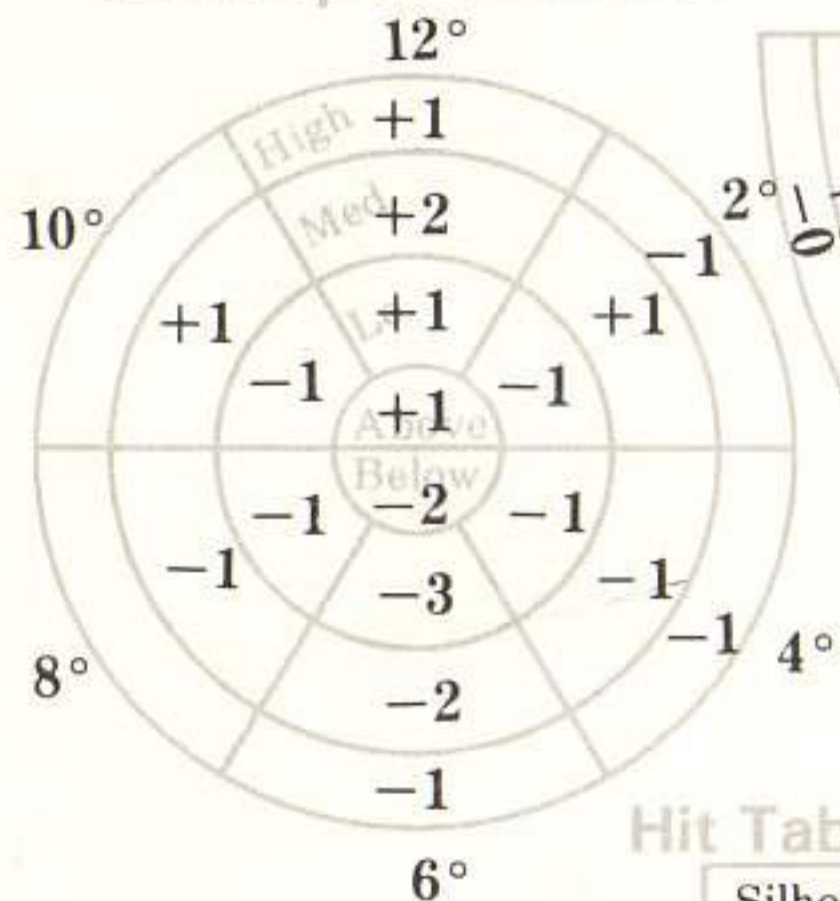


Speed Increments

Altitude Change

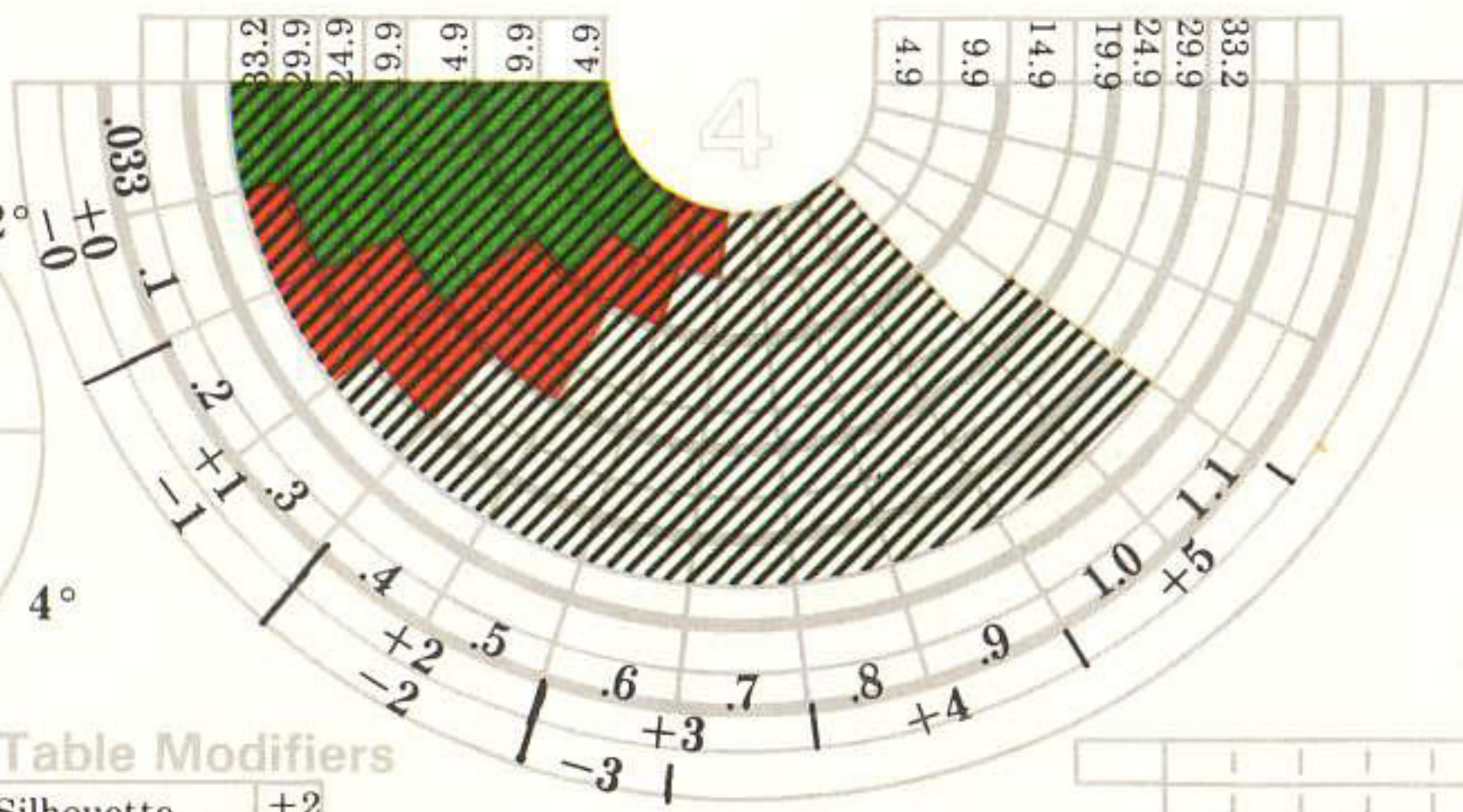
Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+2
Fire	+1



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-2
Dive Sp. Climb	-1
Max Climb	-1

Loaded

Target Characteristics

W	5	Cn	-	Mg	4
F	5	L	3		
C	3	C	-		
E	3	E	-	E	-
G	2M	2M	2M	2M	2M
	(5)	(6)	(6)	(5)	
	FF	FF	FF	FF	

Variants

P-47B

Republic P-47B and P-47C "Thunderbolt" Day Fighter

PV: 22. Engine Type: R. Producer: USA

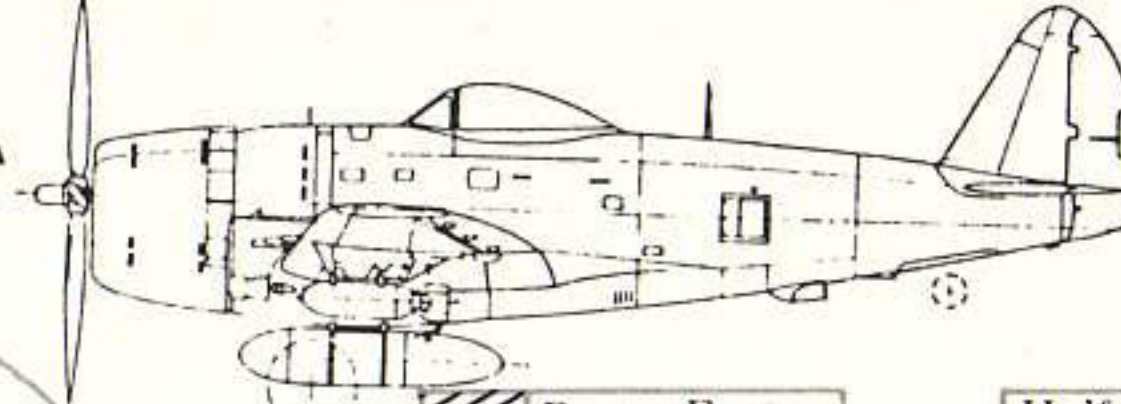
First used operationally in April '43. 773 B & C series built.

Early versions of P-47D very similar.

Loaded: Could carry two bombs.

AIR FORCE DATA CARD 12A

Speed Change

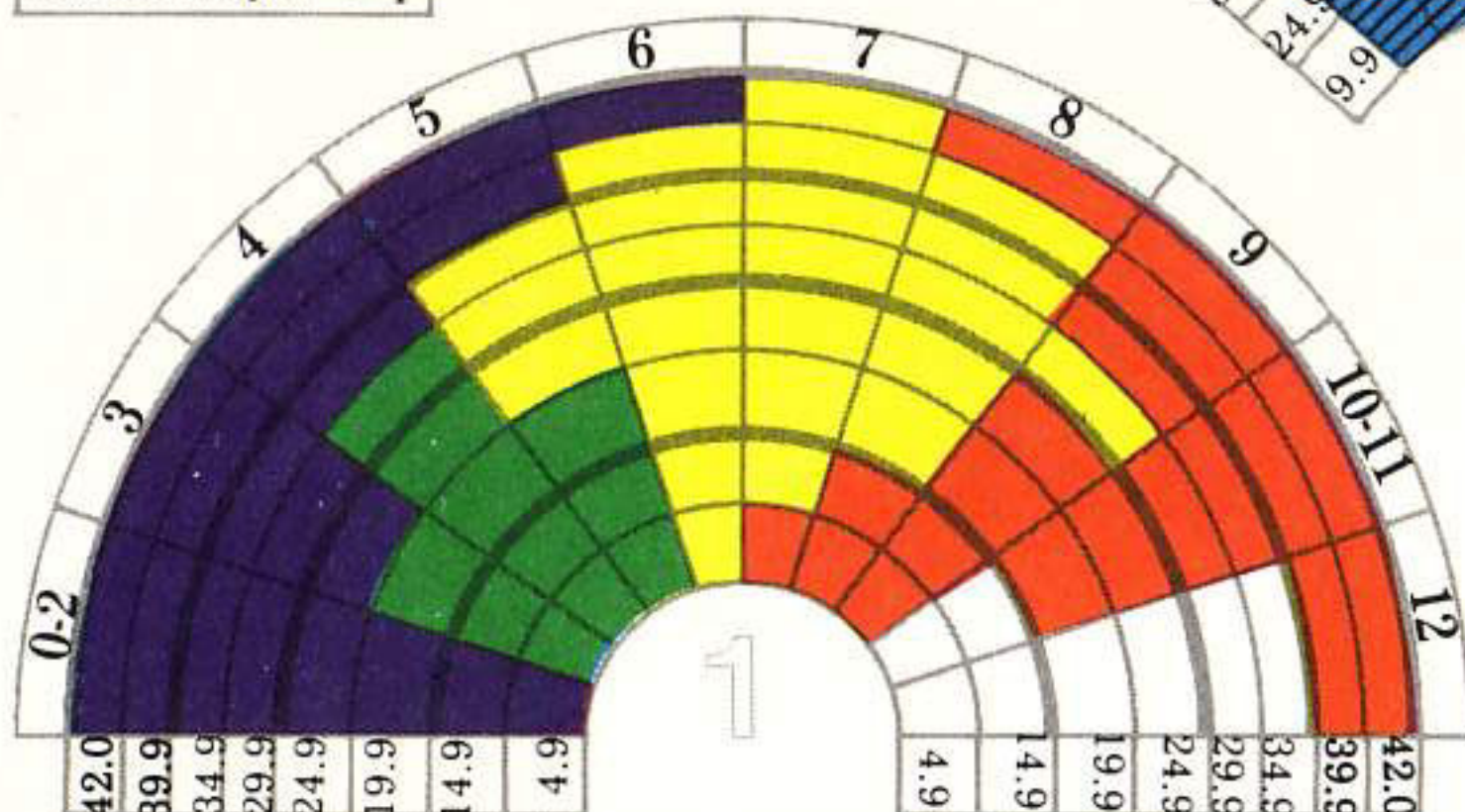


Power Factors
Brake Factors

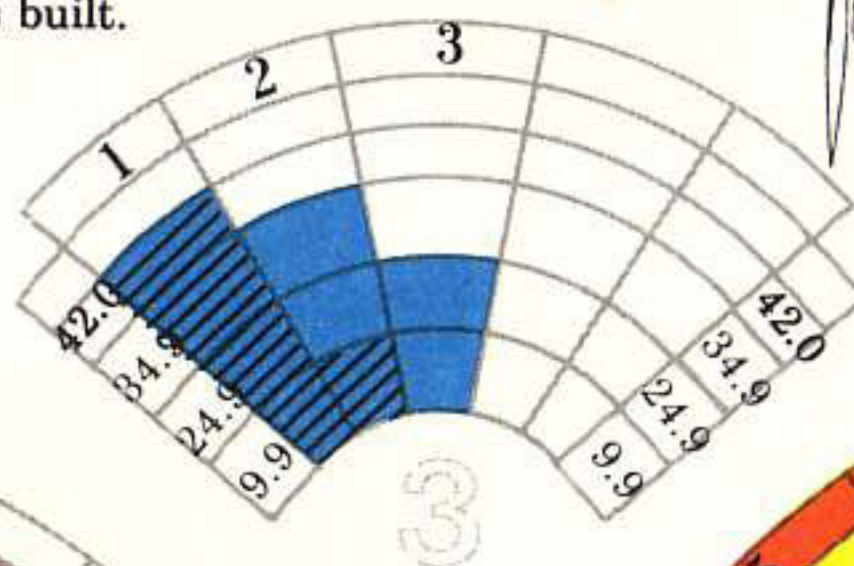
Half Loop P
Half Roll P
Turn or Slip +1
Bank +1

Loaded

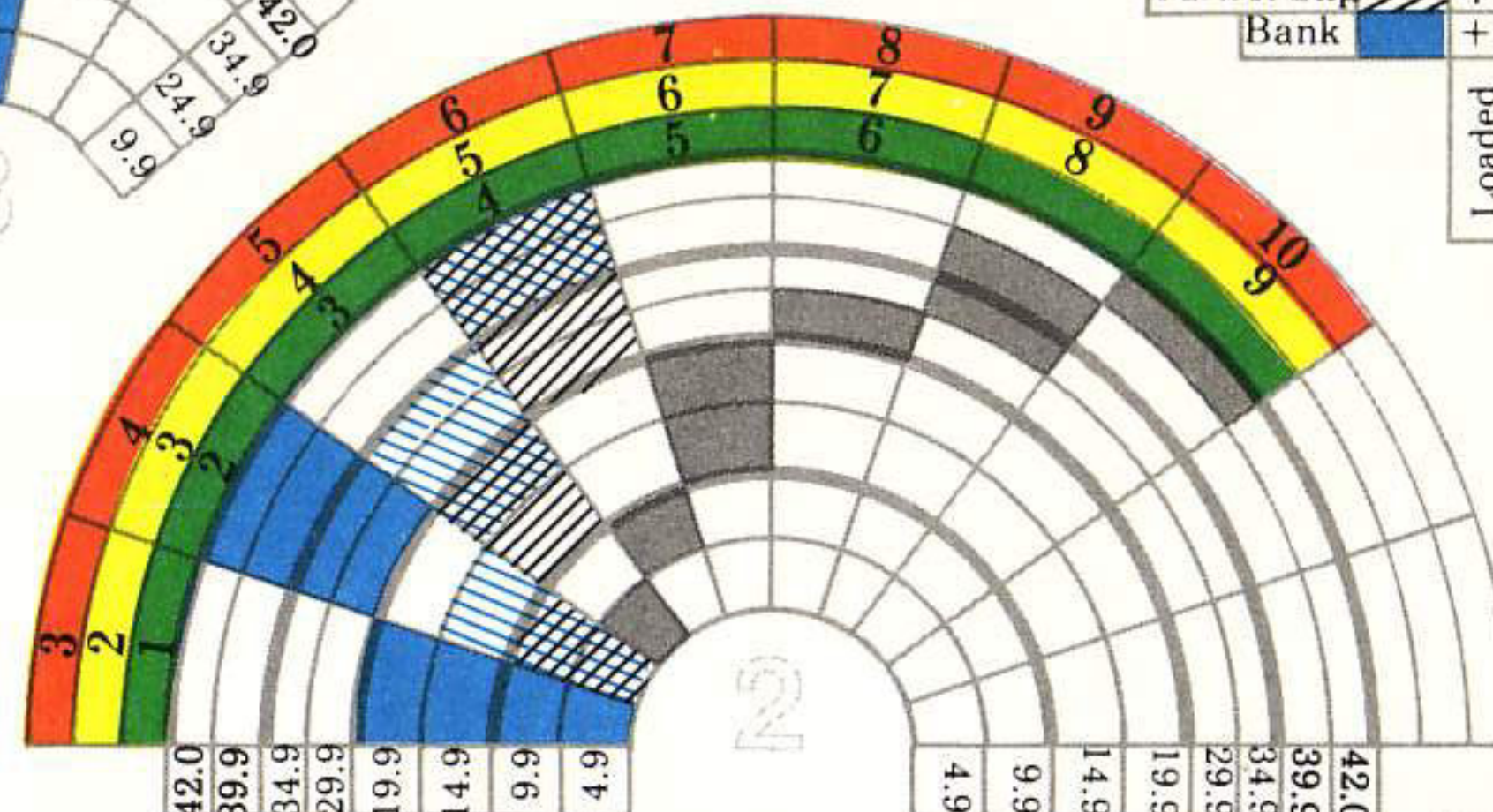
Stall Speed
Maneuver Sp.
Level Speed
Dive Speed
Loaded (Opt.) -1



Speed Increments

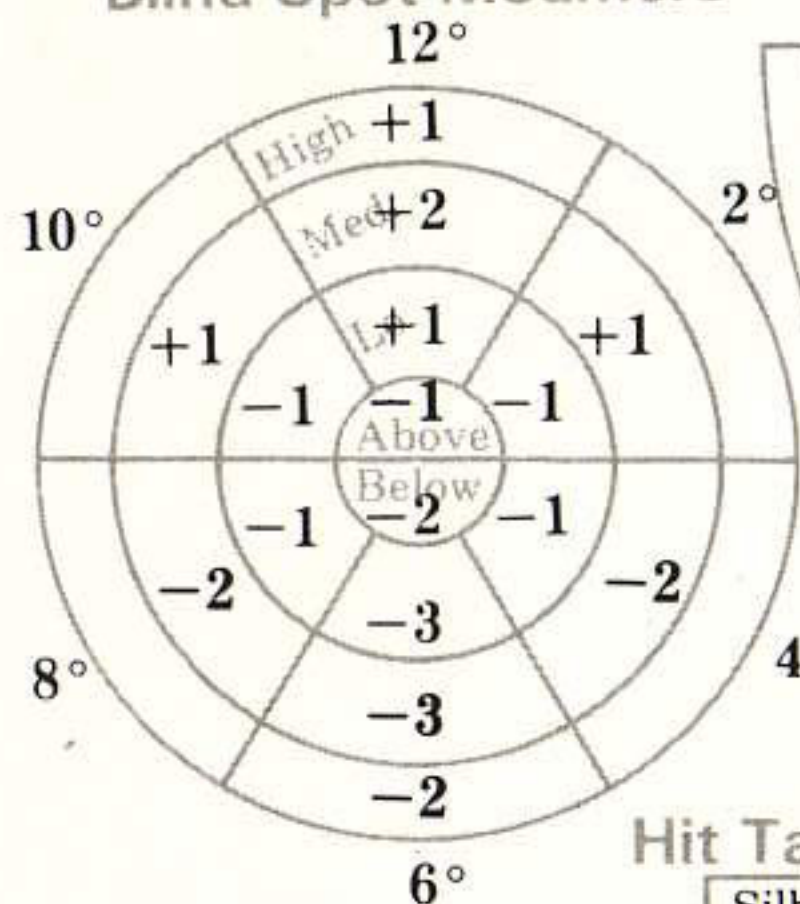


Altitude Change



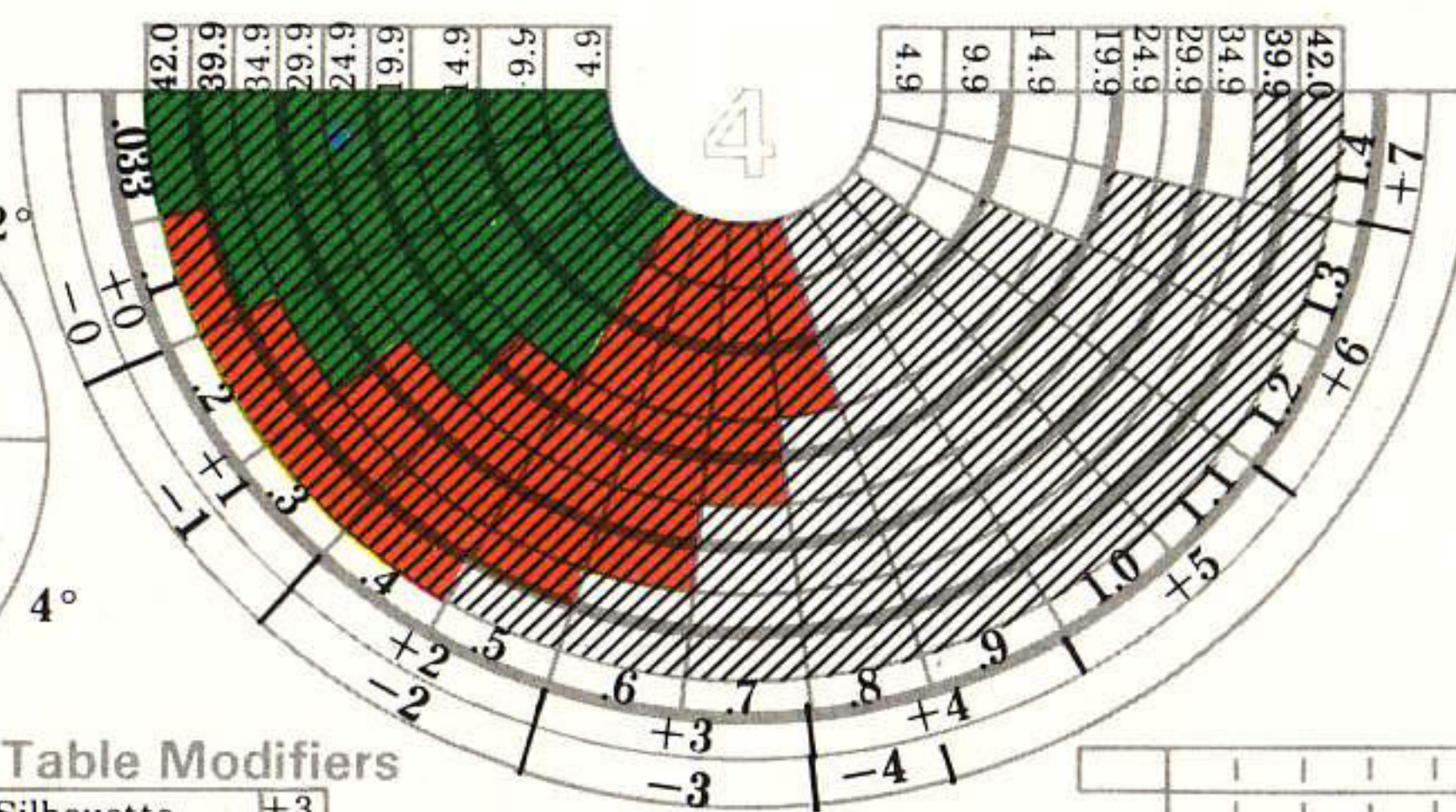
Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette +3
Fire +2



Dive Acceler. +1
Climb Deceler. -1
Max Dive -0.3
Dive Sp. Climb -0.1
Max Climb -0.1

Loaded

Target Characteristics

W	6	Cn	-	Mg	5
F	9	L	4		
C	3	C	-		
E	3	E	-	E	-
G	4M	4M		4M	4M
	(5)	(5)		(5)	(5)
FF					FF

Variants

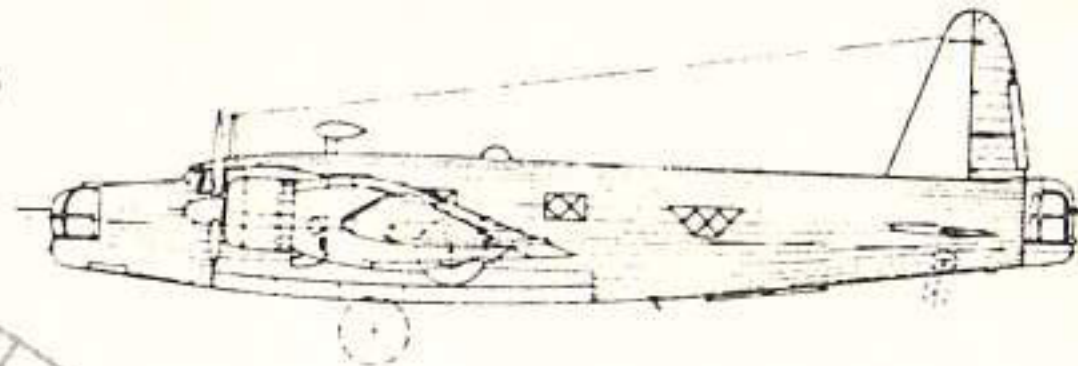
Wellington

Vickers Wellington III Medium Night Bomber
 PV: 23. Engine Type: R. Producer: Great Britain
 Operational in Fall '40. A total of 1519 series—III built.
 Loaded: Could carry up to 6000 pounds of bombs (4 bombs at low level). Has sights for use as a level bomber.

Stall Speed	Dark Purple
Maneuver Sp.	Green
Level Speed	Yellow
Dive Speed	Red
Loaded (Opt.)	-1

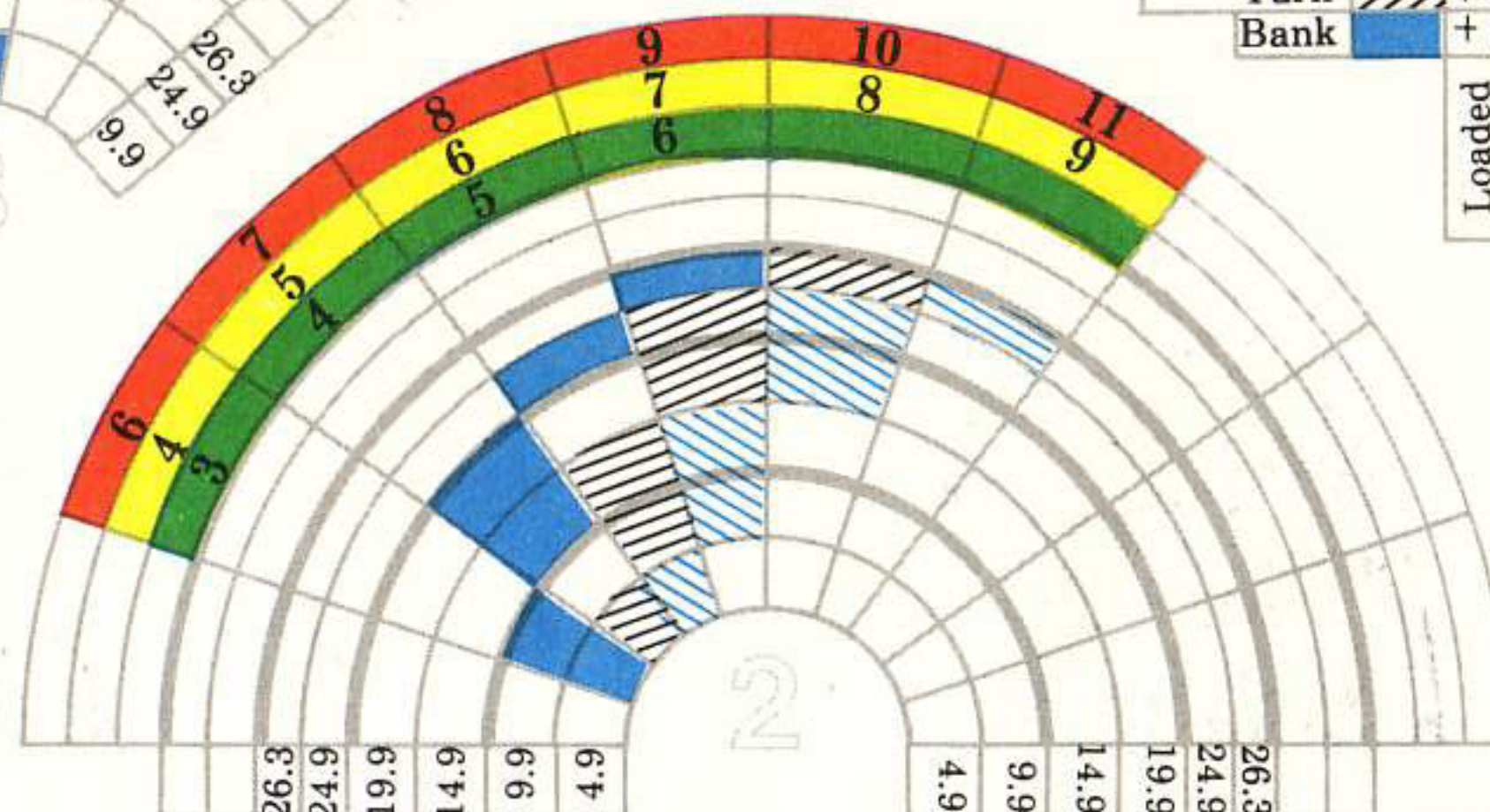
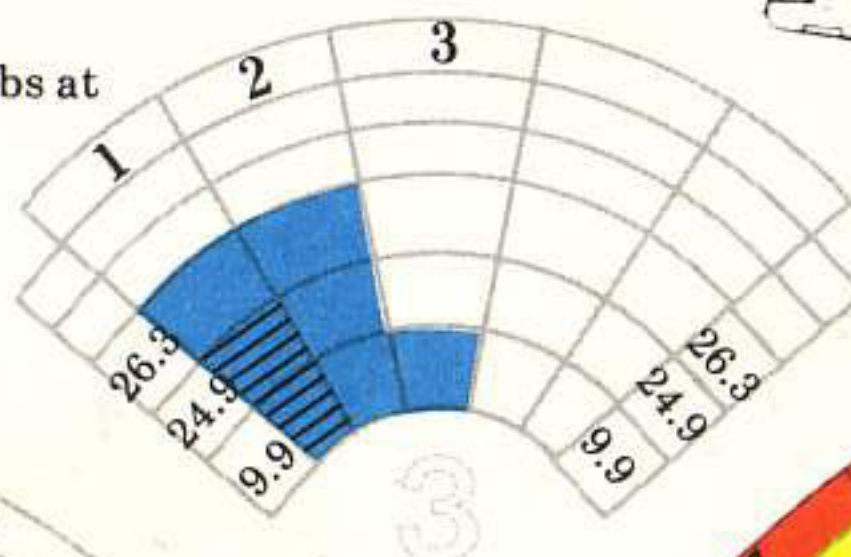
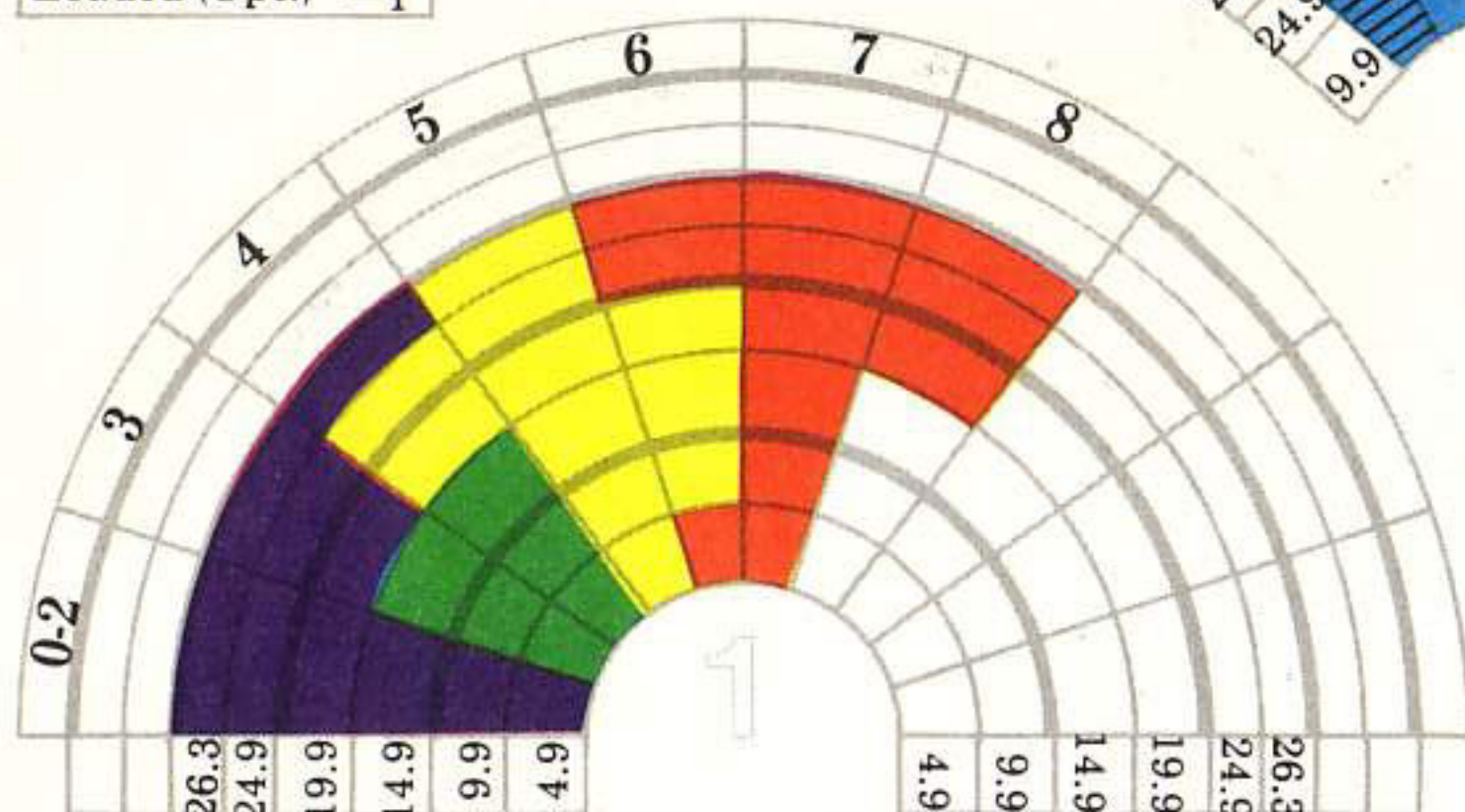
AIR FORCE DATA CARD 12B

Speed Change



Power Factors	Diagonal Lines
Brake Factors	Blue

Slip	Blue	+3
Turn	Diagonal Lines	+4
Bank	Blue	+2
Loaded		

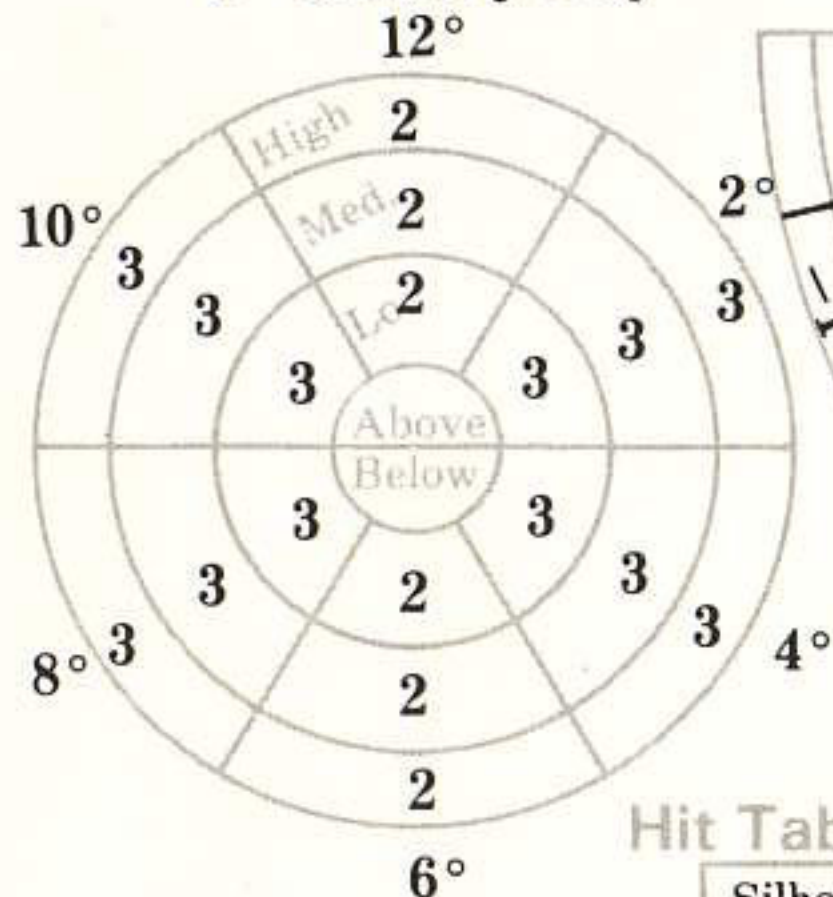


Speed Increments

Altitude Change

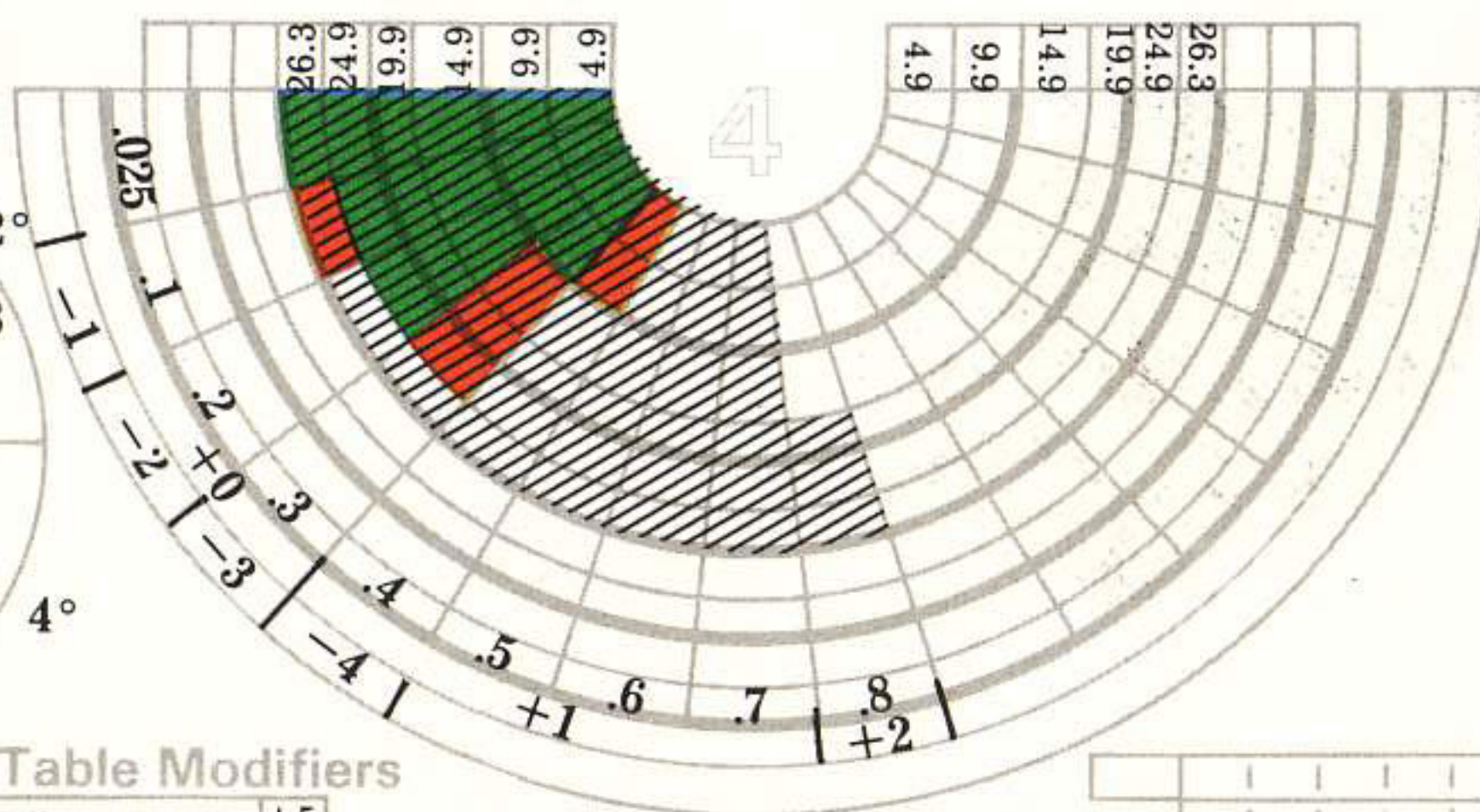
Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+5
Fire	0



Target Characteristics

W	9	Cn	-	Mg	-
F	8	L	3		
C	2	C	2		
E	3	E	-	E	3
G					
		(5)			
		F			

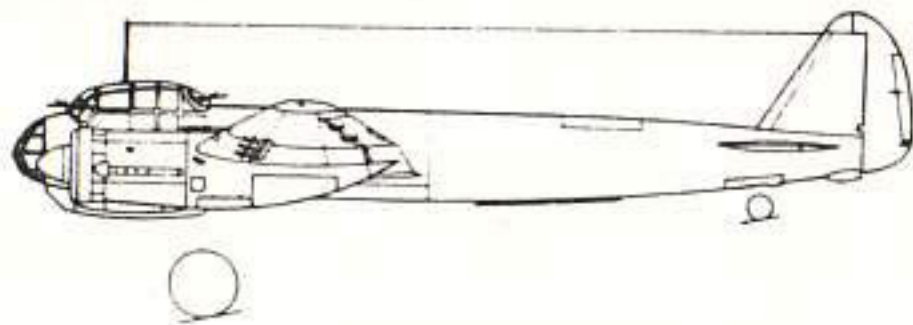
Variants

Ju-88A

Junkers Ju.88A-1 Medium Day/Night Bomber
 PV: 22.Engine Type: I. Producer: Third Reich
 Operational in September '39. Over 9000 Ju-88 bombers built.
 Loaded: Could carry up to 5284 pounds of bombs (4 bombs at low level). Has sights for use as a level bomber or dive bomber.

Stall Speed	
Maneuver Sp.	
Level Speed	
Dive Speed	
Loaded (Opt.)	-1

AIR FORCE DATA CARD 2A

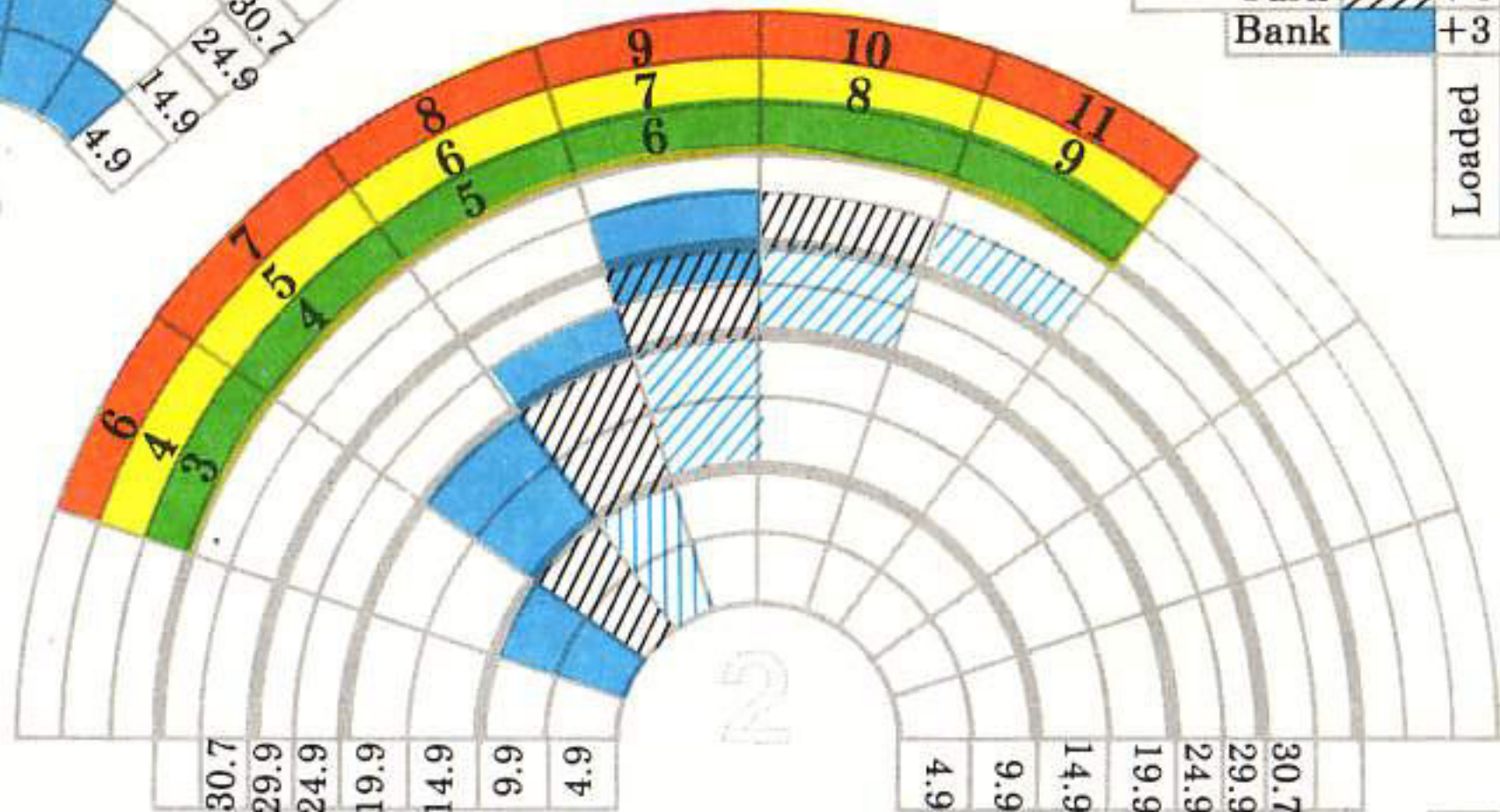
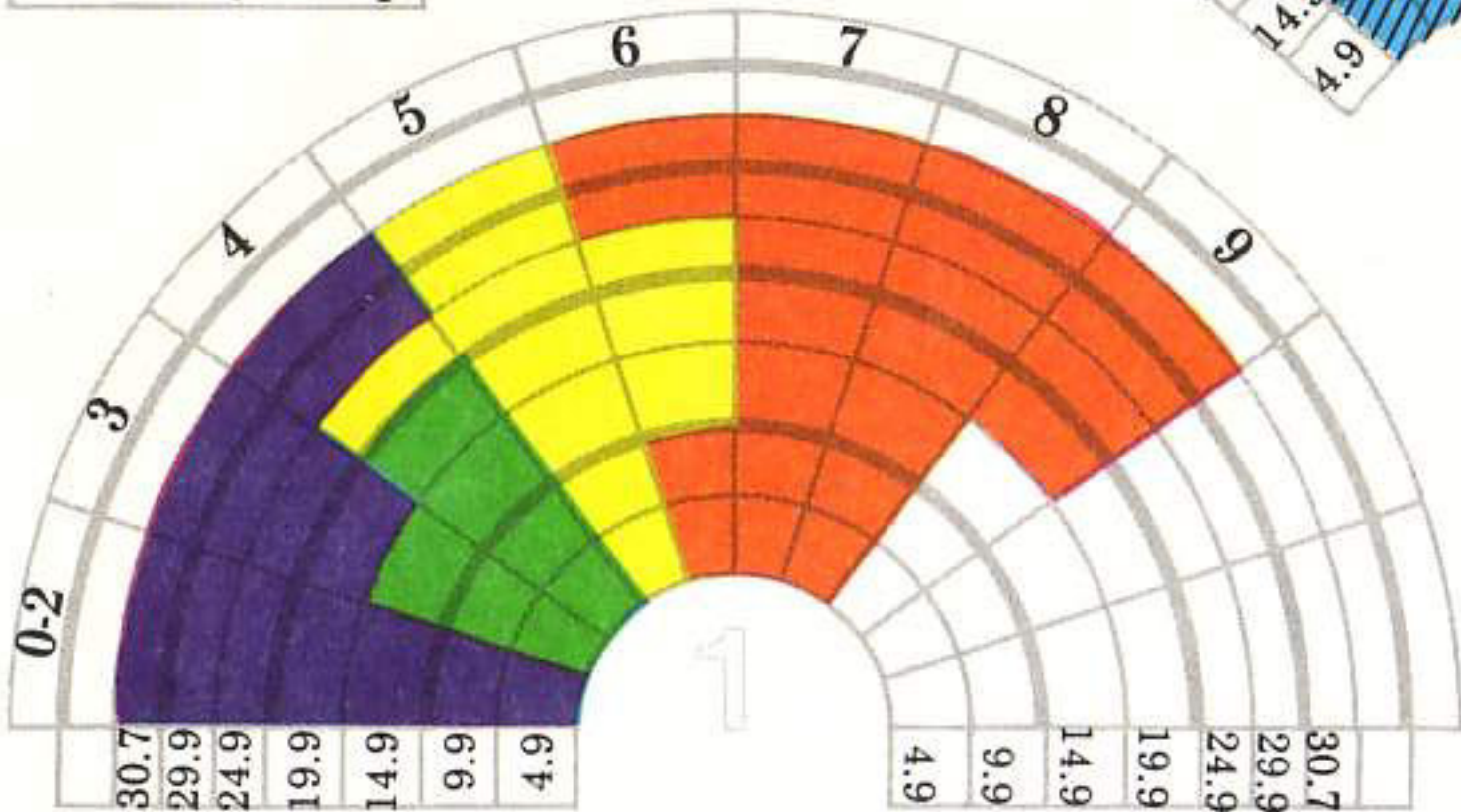


Speed Change



Power Factors	
Brake Factors	

Slip	+3
Turn	+4
Bank	+3
Loaded	

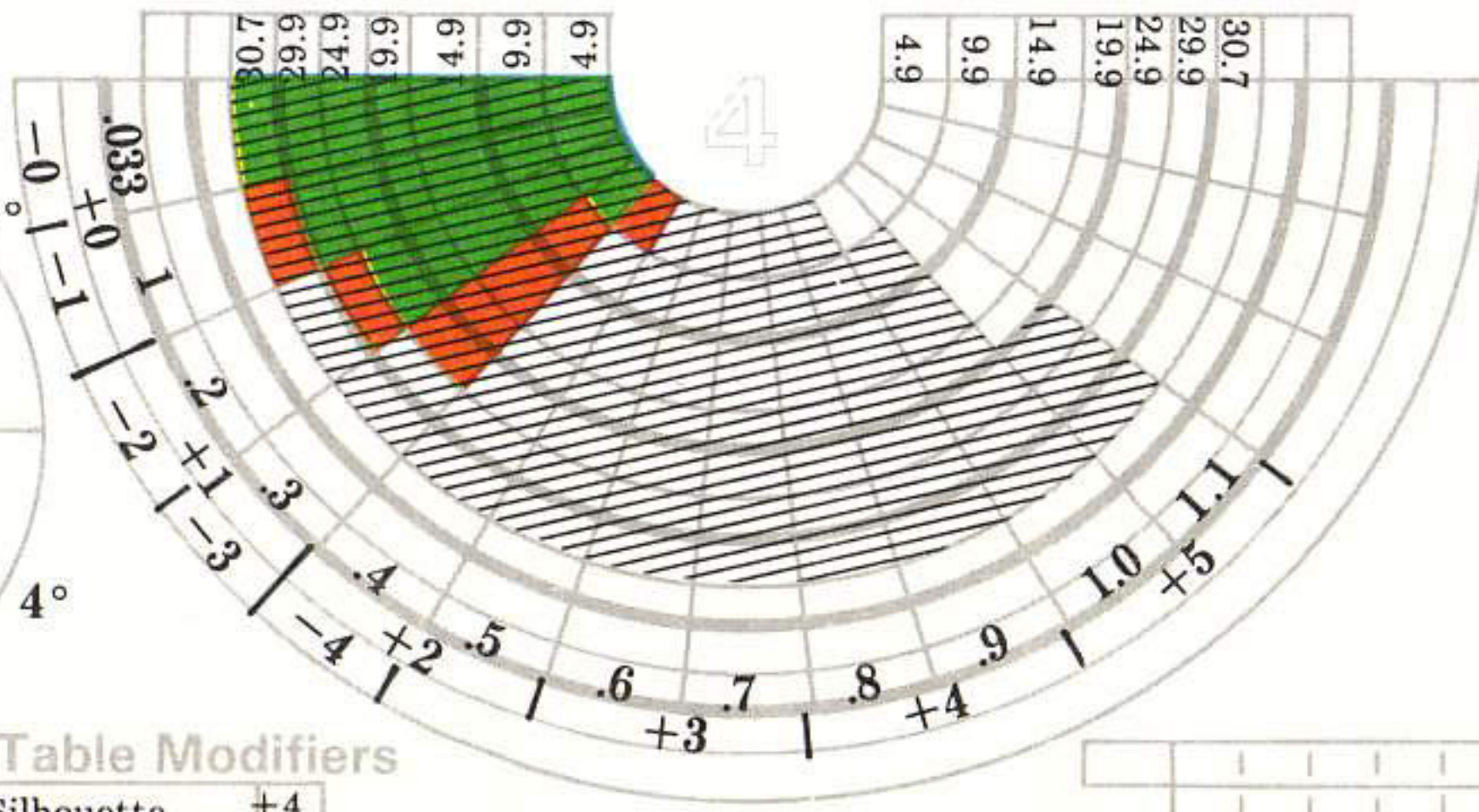
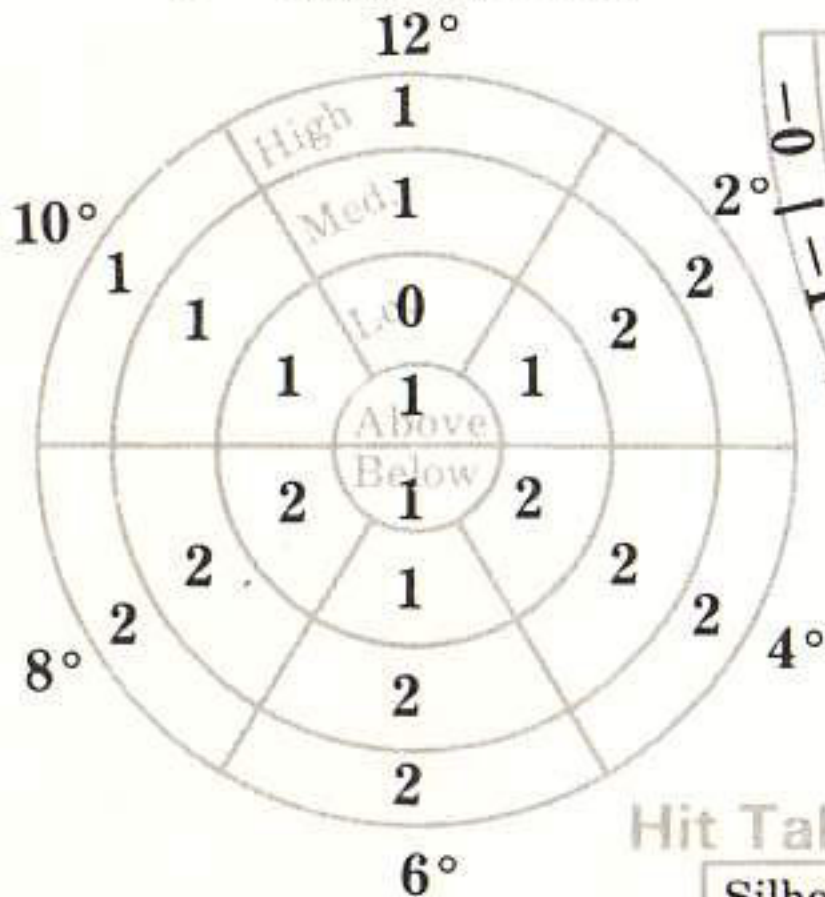


Speed Increments

Altitude Change

Maneuverability Requirements

"F" Gunnery Play



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-3
Dive Sp. Climb	-1
Max Climb	-1
Loaded	

Target Characteristics

W	8	Cn	-	Mg	-
F	8	L	3		
C	2	C	2		
E	3	E	-	E	3
G					
		(5)			
		F			

Variants

Lancaster

Avro Lancaster B.I Heavy Night Bomber.

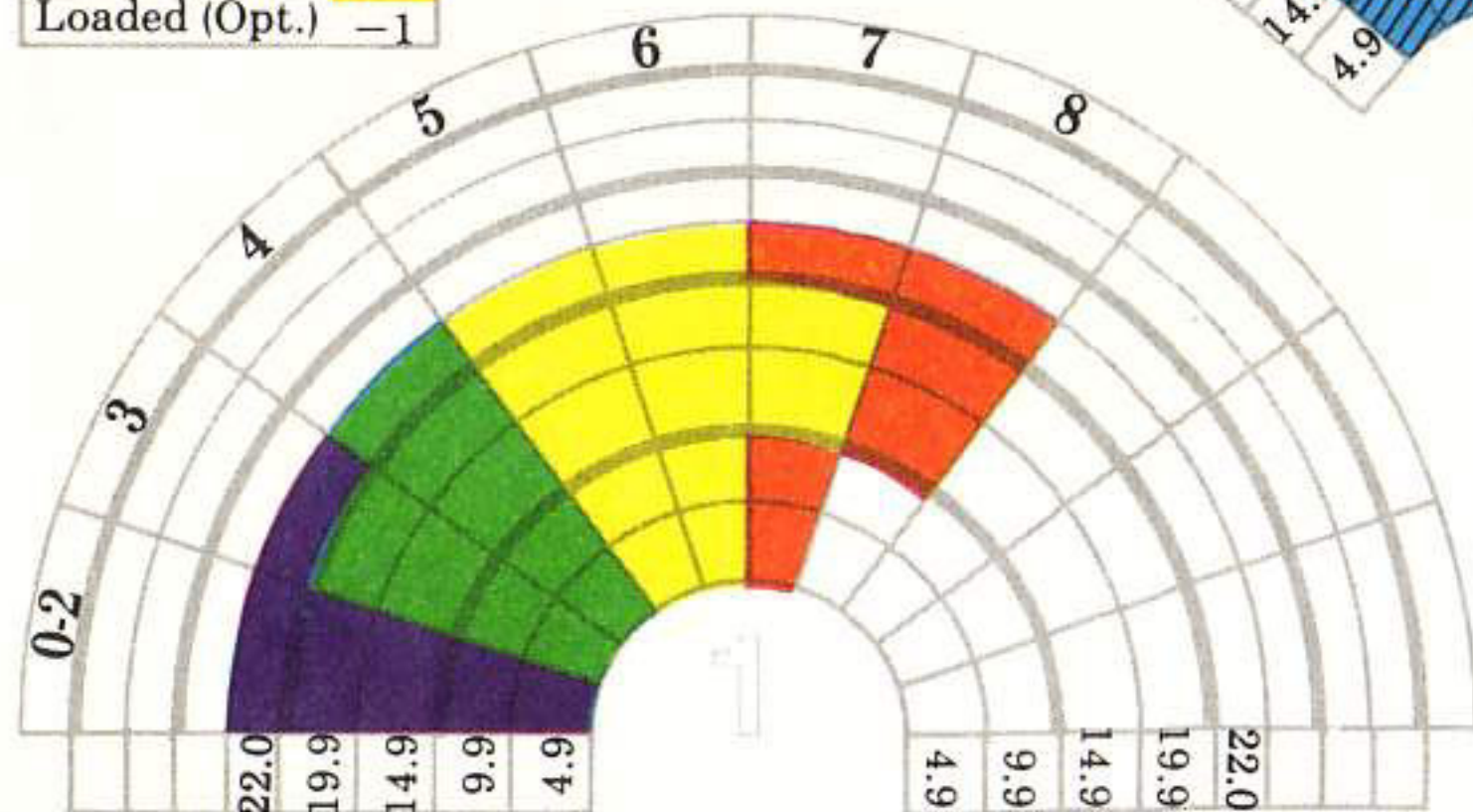
PV: 32. Engine Type: I. Producer: Great Britain.

Operational in Spring '42. A total of 3425 I-series built.

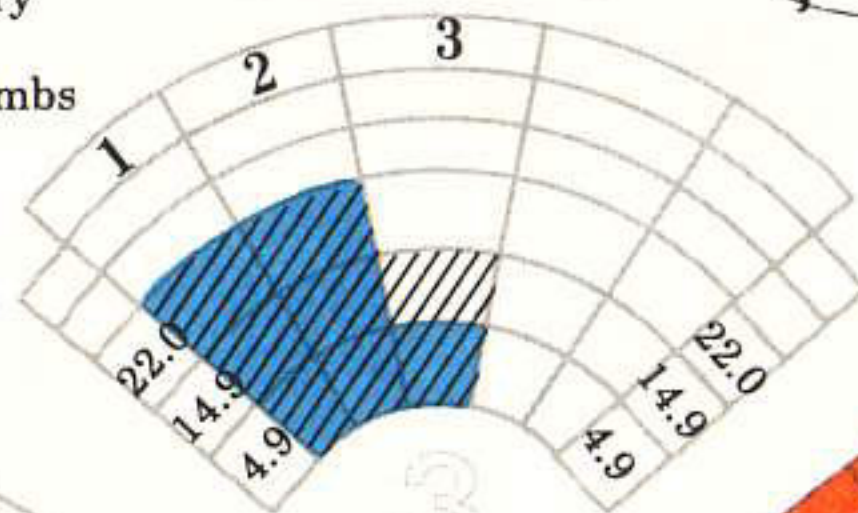
The Lancaster B.X (Canadian version) and B.III were very similar (3469 of these types built).

Loaded: Could carry up to 18,000 pounds of bombs (12 bombs at low level). Has sights for use as a level bomber.

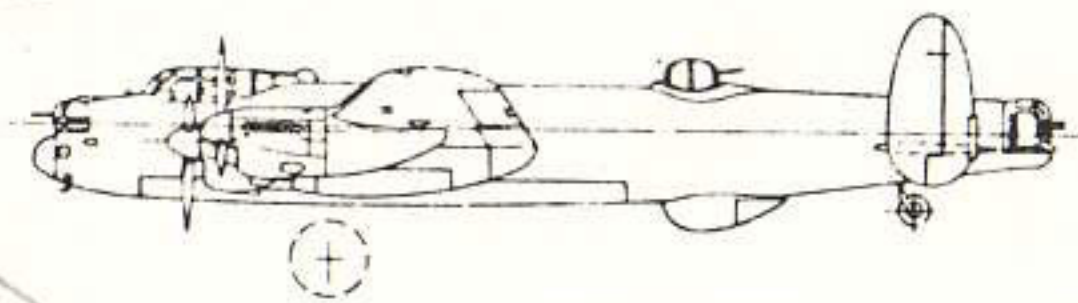
Stall Speed	0.2
Maneuver Sp.	0.3
Level Speed	0.4
Dive Speed	0.5
Loaded (Opt.)	-1



Speed Increments

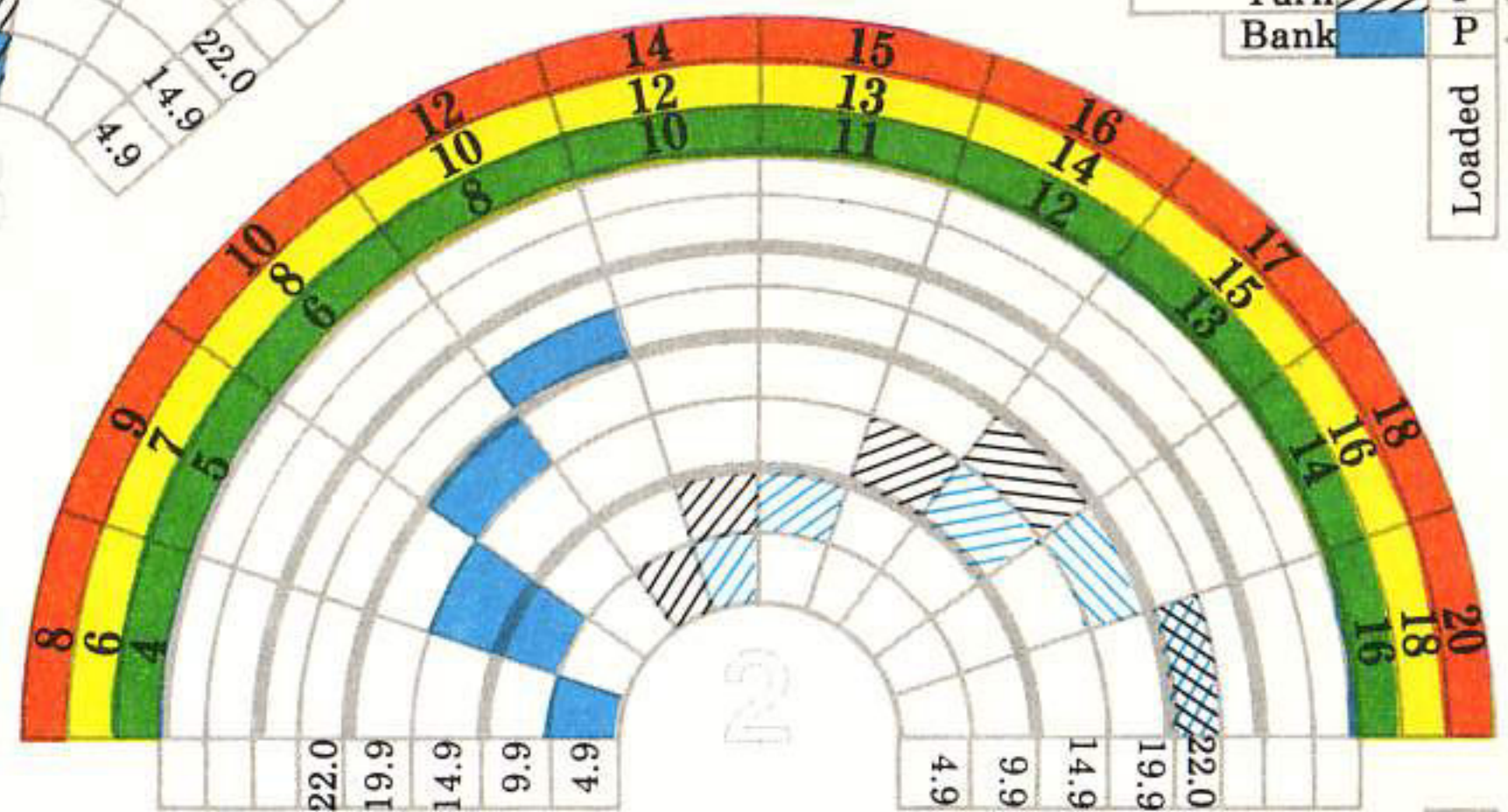


Altitude Change

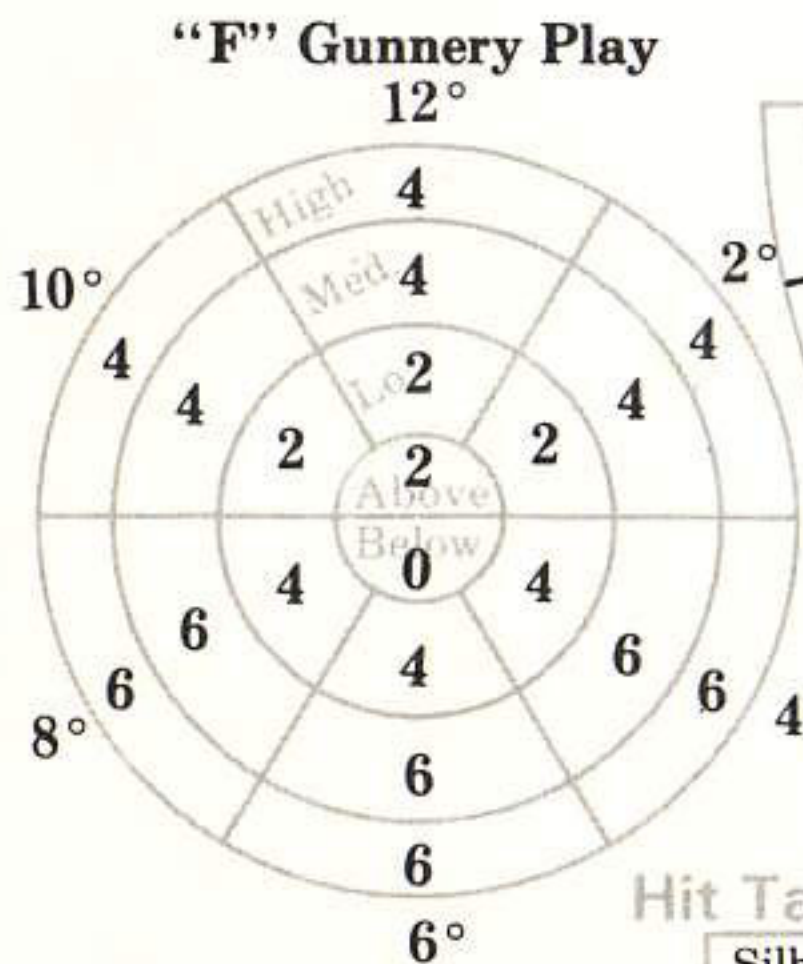


Power Factors	1
Brake Factors	2

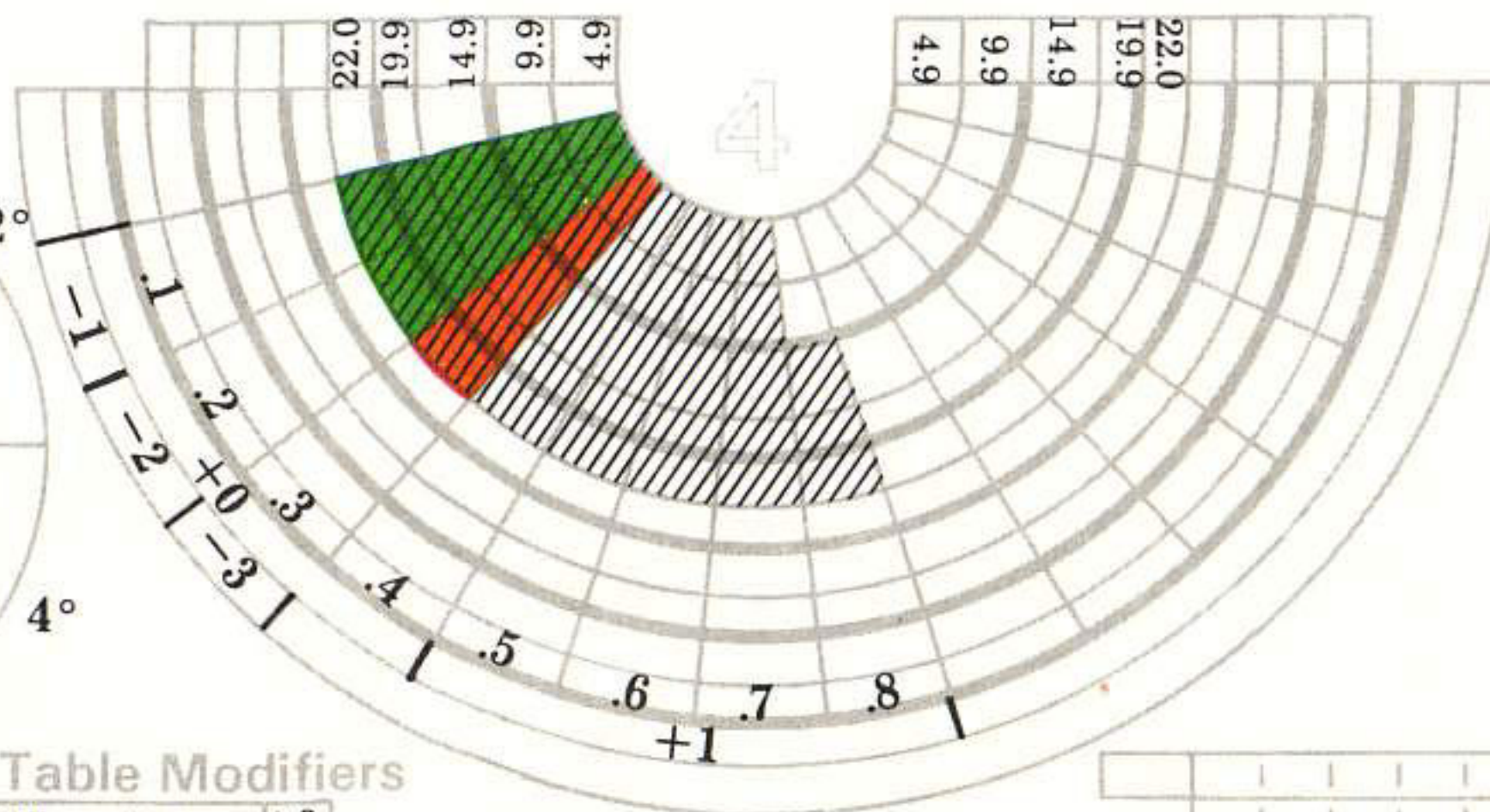
Slip	P
Turn	P
Bank	P
Loaded	P



Maneuverability Requirements



"F" Gunnery Play



Hit Table Modifiers

Silhouette	+6
Fire	0

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-1
Dive Sp. Climb	-1
Max Climb	-1

Target Characteristics

W	9	Cn	-	Mg	-
F	8	L	3		
C	2	C	2		
E	2	E	2	E	2
G					
		(5)			
		F			

Variants

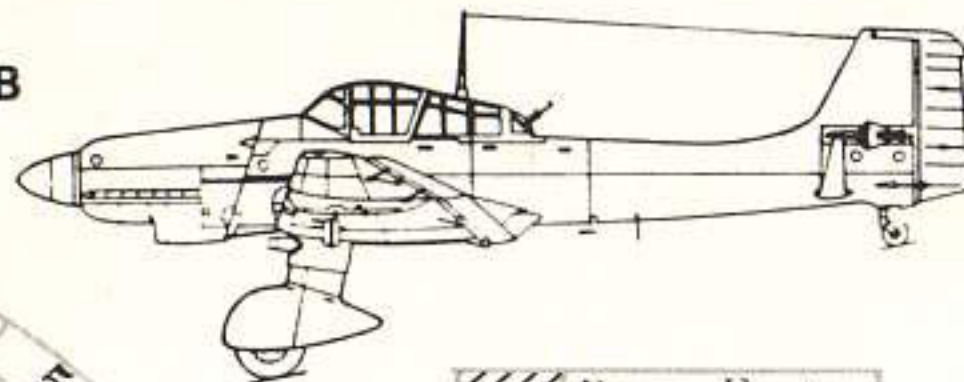
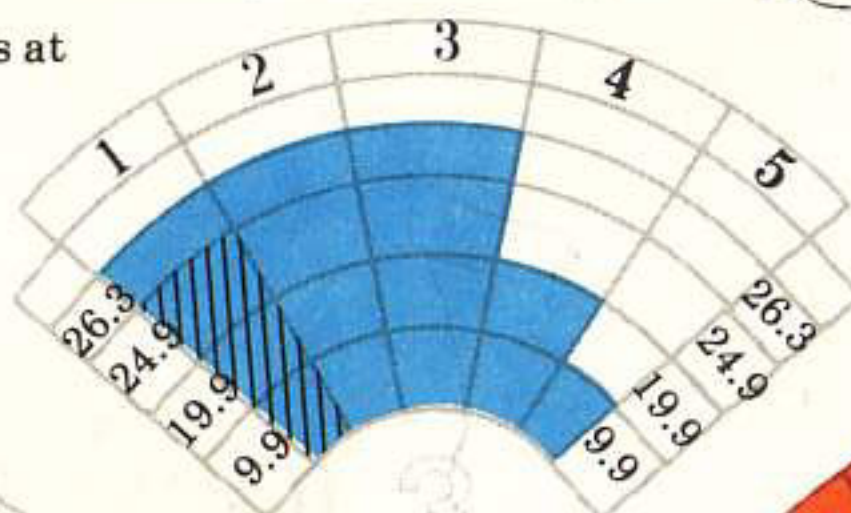
Ju-87B

Junkers JU.87B-2 "Stuka" Dive Bomber.
 PV: 14. Engine Type: I. Producer: Third Reich
 Operational Winter '39. Over 600 B-series built.
 Loaded: Could carry up to 2205 pounds of bombs (2 bombs at
 low level). Has sights for use as a dive bomber.

Stall Speed	Dark Purple
Maneuver Sp.	Green
Level Speed	Yellow
Dive Speed	Orange
Loaded (Opt.)	-2

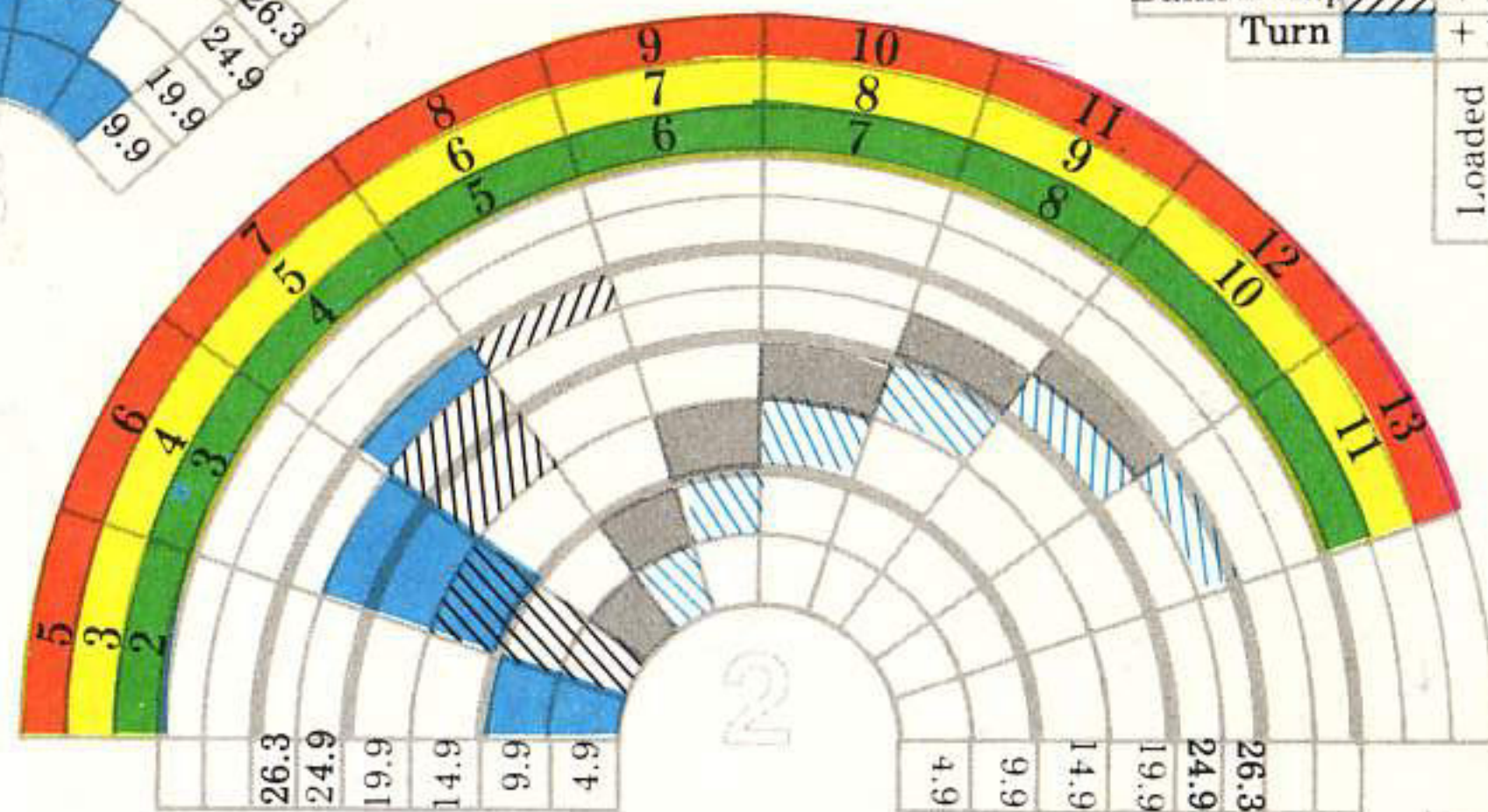
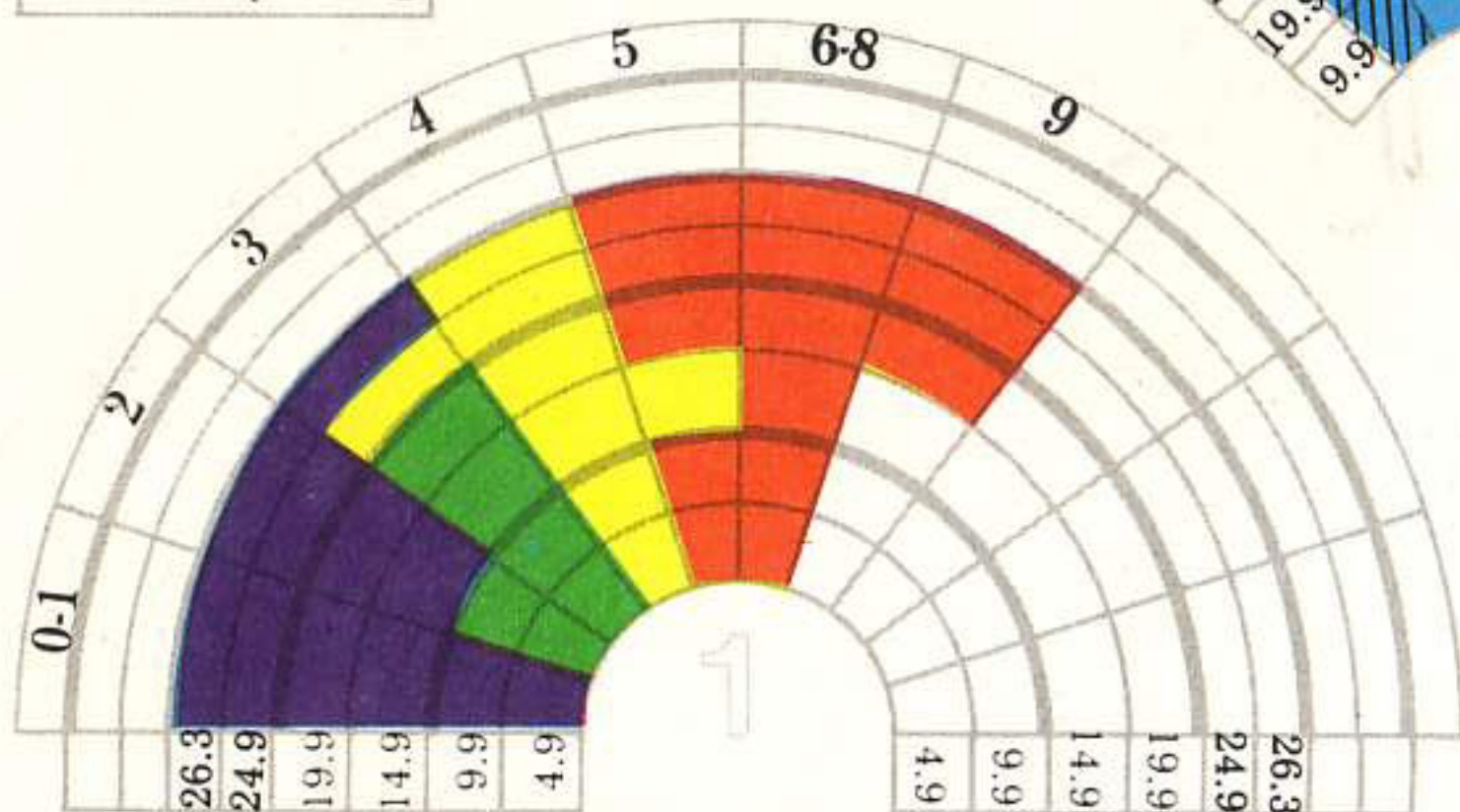
AIR FORCE DATA CARD 15B

Speed Change



Power Factors	Diagonal Lines
Brake Factors	Blue

Half Loop	P
Half Roll	P
Bank or Slip	+1
Turn	+1
Loaded	

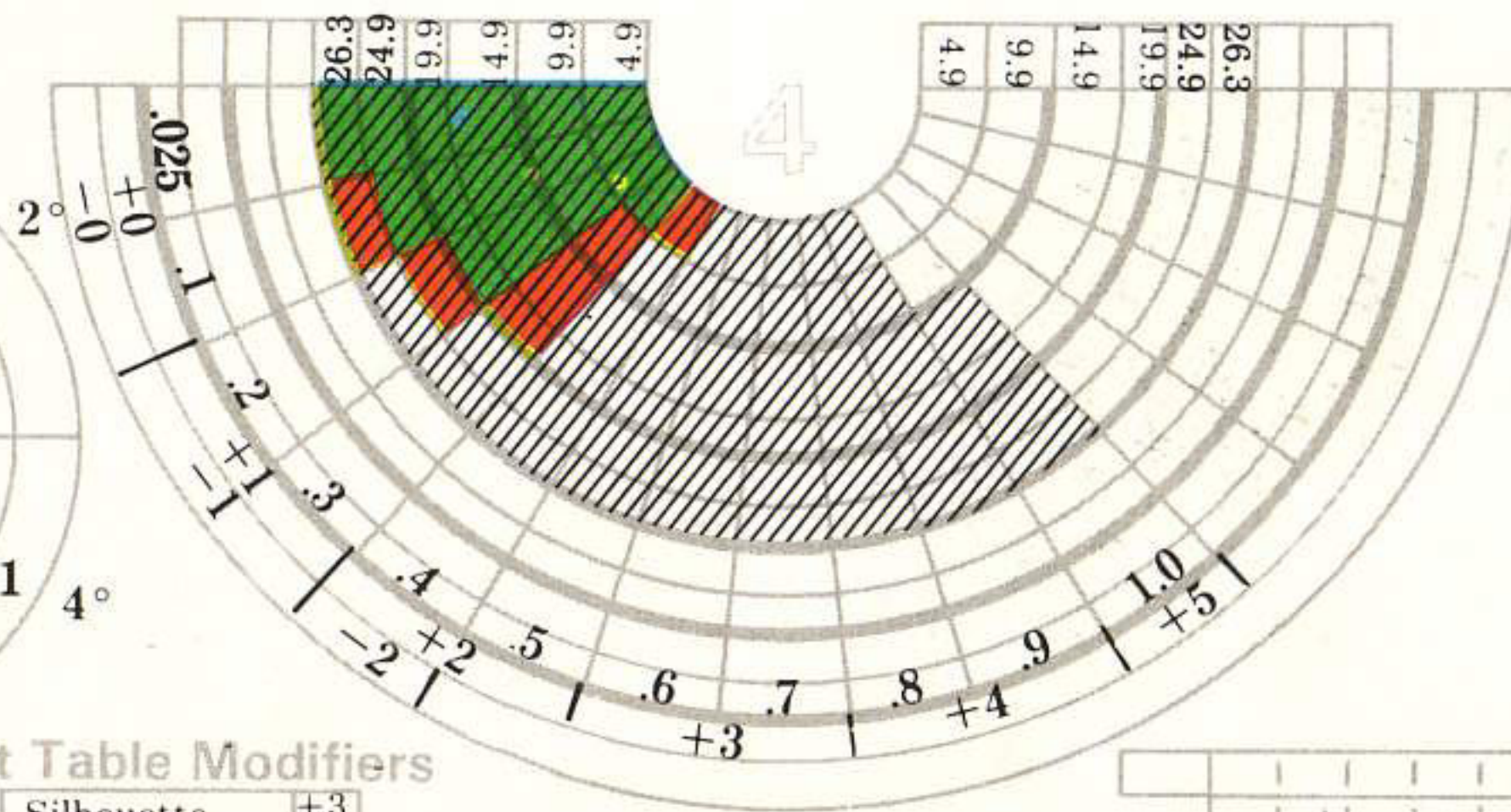
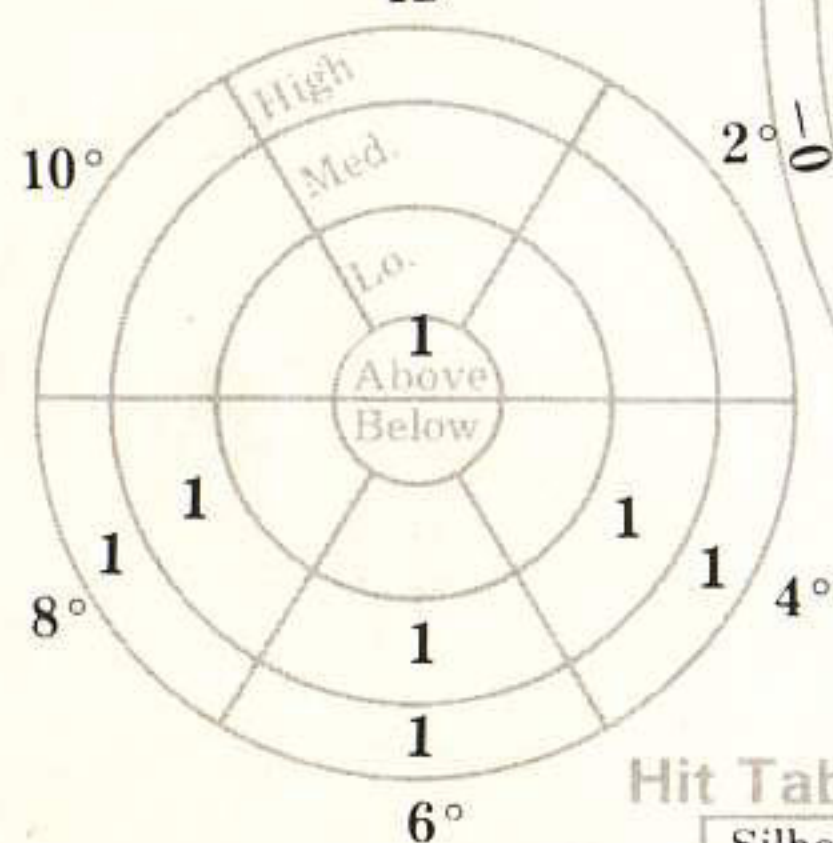


Speed Increments

Altitude Change

Maneuverability Requirements

"F" Gunnery Play



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-2
Dive Sp. Climb	-1
Max Climb	-1
Loaded	

Target Characteristics

W	6	Cn	-	Mg	10
F	6	L	3		
C	3	C	-		
E	3	E	-	E	-
G	1M				1M
	(4)		(5)		(4)
FF		F		FF	

Hit Table Modifiers

Silhouette	+3
FF Fire (F=0)	+1

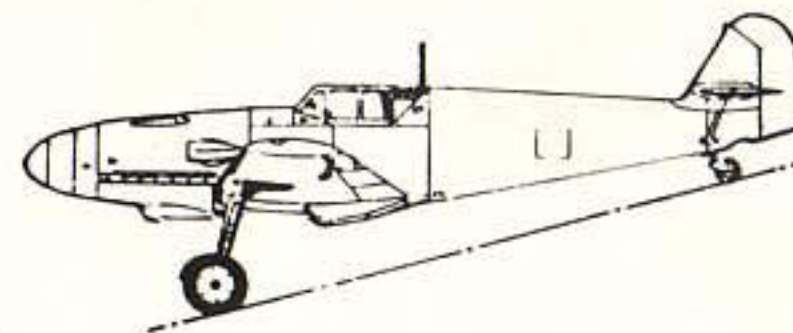
Variants

Me-109G

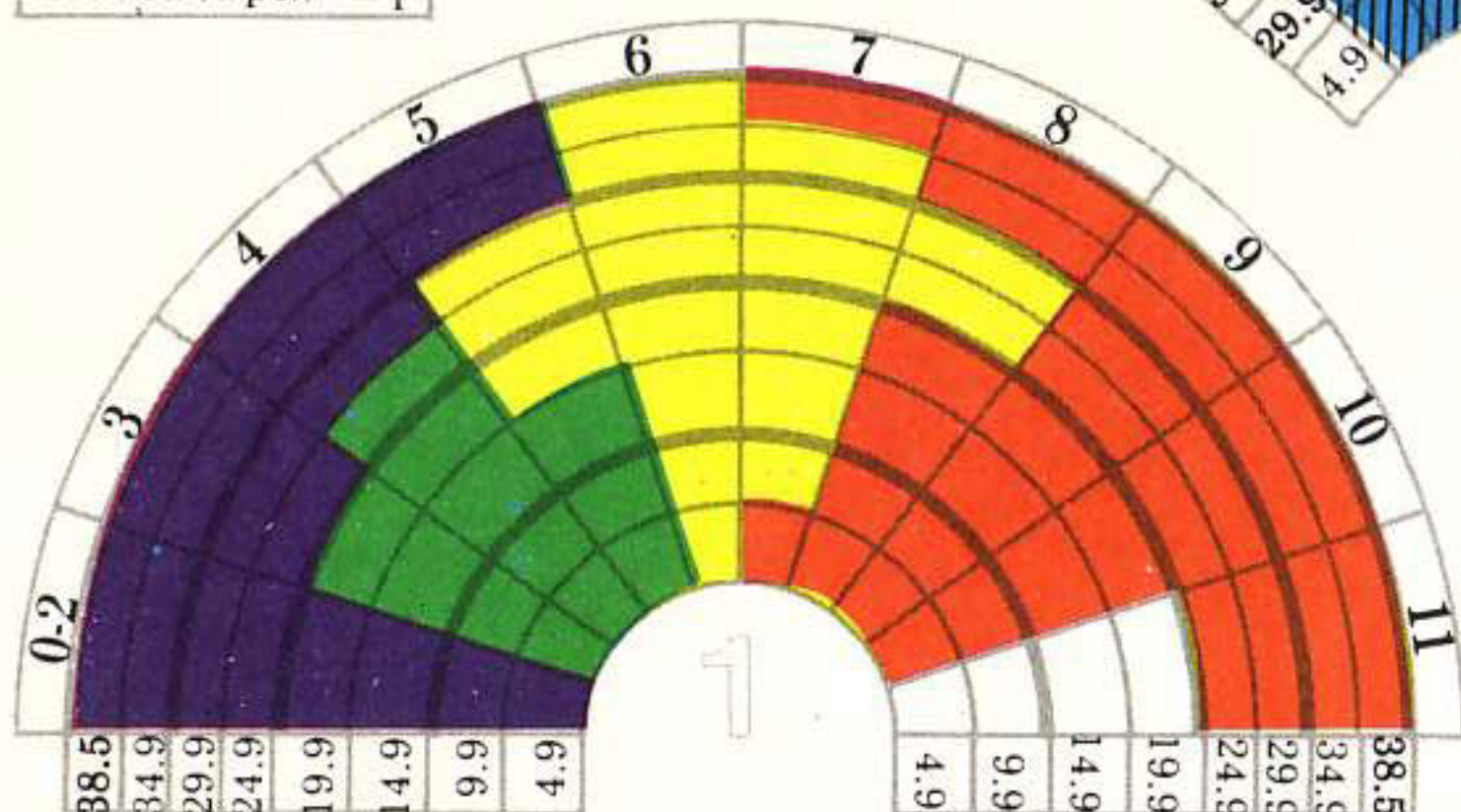
Messerschmitt Bf.109G-5 "Gustav" Day Fighter
 PV: 17. Engine Type: I. Producer: Third Reich
 Operational by Spring '43. Over 23,000 G-series built.
 Loaded: could carry one bomb.

AIR FORCE DATA 15A

Speed Change



Stall Speed	Dark Purple
Maneuver Sp.	Green
Level Speed	Yellow
Dive Speed	Red
Loaded (Opt.)	-1

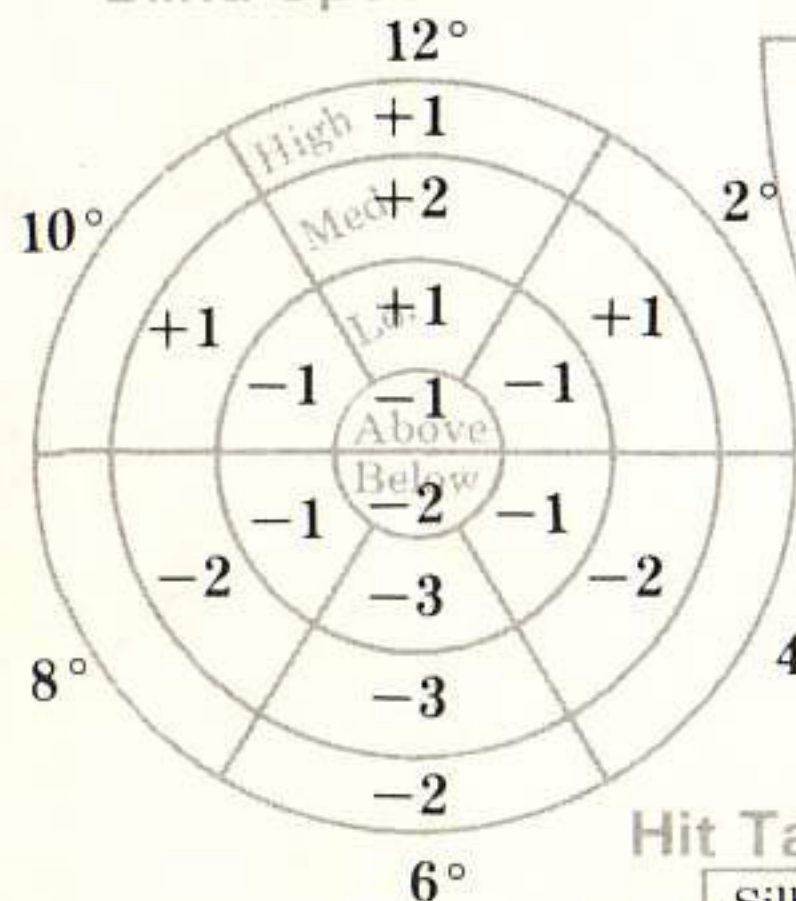


Speed Increments

Altitude Change

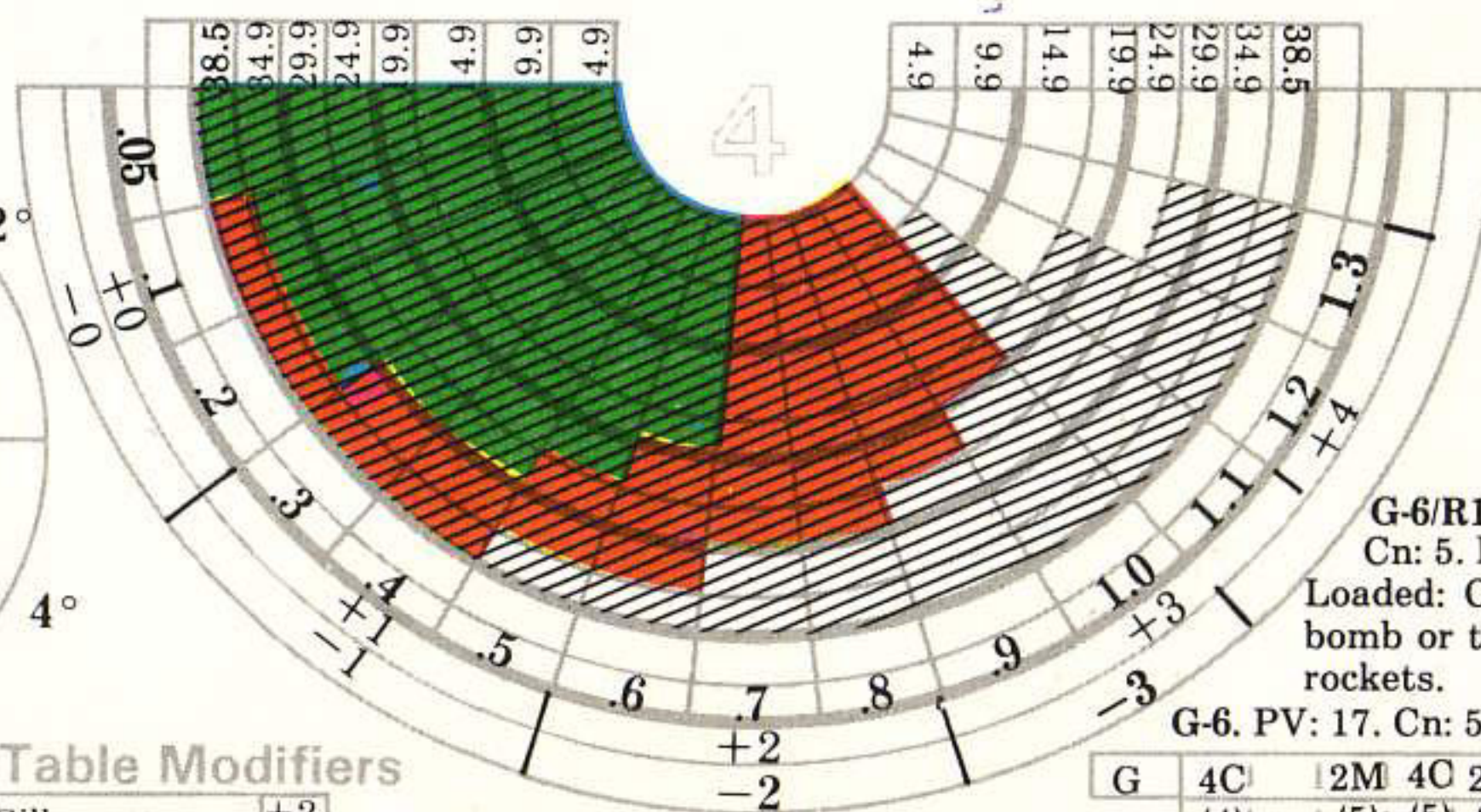
Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

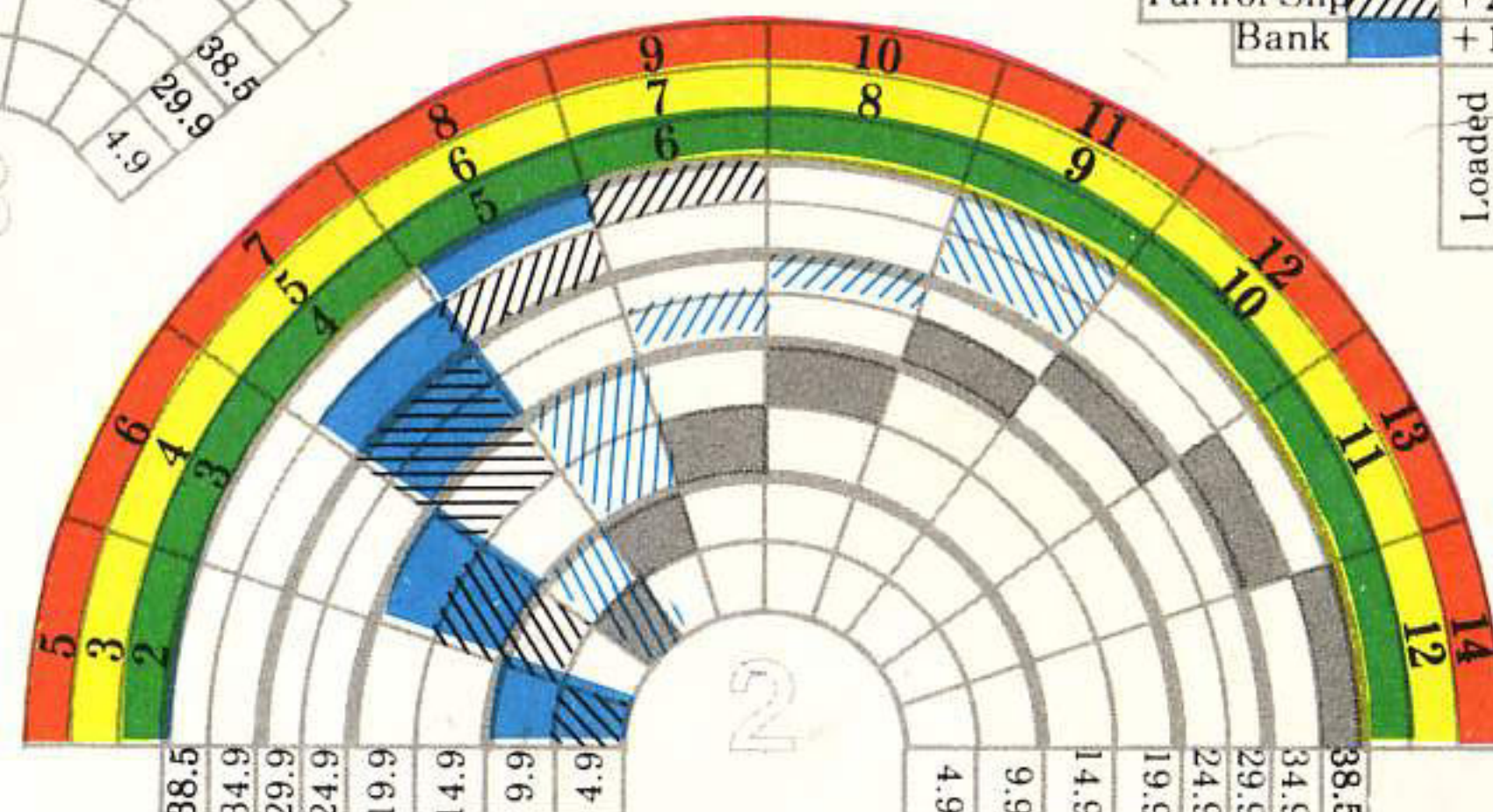
Silhouette	+2
Fire	+2



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 Baltimore, MD 21214

Power Factors	Diagonal Lines
Brake Factors	Blue

Half Loop	P
Half Roll	P
Turn or Slip	+2
Bank	+1
Loaded	1



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-.2
Dive Sp. Climb	-.1
Max Climb	-.1
Loaded	1

Target Characteristics

W	5	Cn	6	Mg	5
F	6	L	4		
C	3	C	-		
E	3	E	-	E	-
G		2M	4C	2M	
		(5)	(5)	(5)	
		FF			

G-6/R1 & G-6/R2

Cn: 5. PV: 18. 8C

Loaded: Could carry one bomb or two A/G or A/A rockets.

G-6. PV: 17. Cn: 5.

G	4C	2M	4C	2M	4C
	(4)	(5)	(5)	(5)	(4)
	FF		FF		FF

Treat as loaded in this configuration.

Variants

G-6/U4. PV: 18 Cn: 4

G	8C	2M	8C	2M	8C
	(5)	(5)	(6)	(5)	(5)
	FF		FF		FF

Treat as loaded in this configuration.

Ju-87B

Junkers JU.87B-2 "Stuka" Dive Bomber.

PV: 14. Engine Type: I. Producer: Third Reich

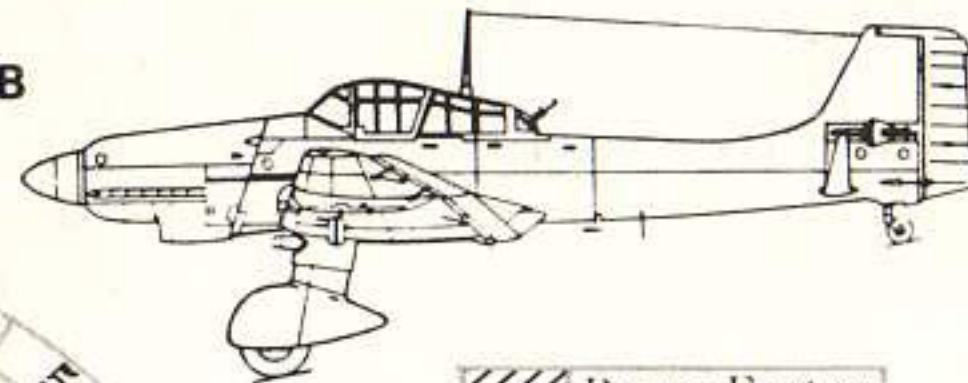
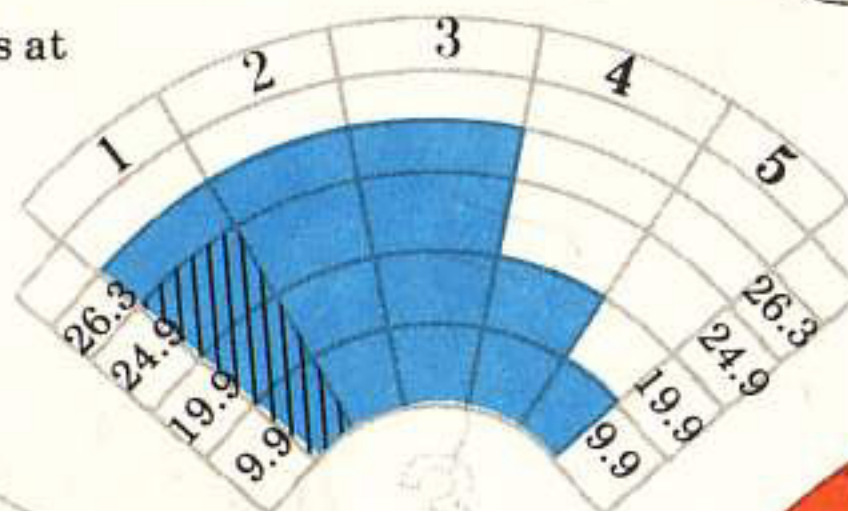
Operational Winter '39. Over 600 B-series built.

Loaded: Could carry up to 2205 pounds of bombs (2 bombs at low level). Has sights for use as a dive bomber.

Stall Speed	Dark Purple
Maneuver Sp.	Green
Level Speed	Yellow
Dive Speed	Orange
Loaded (Opt.)	-2

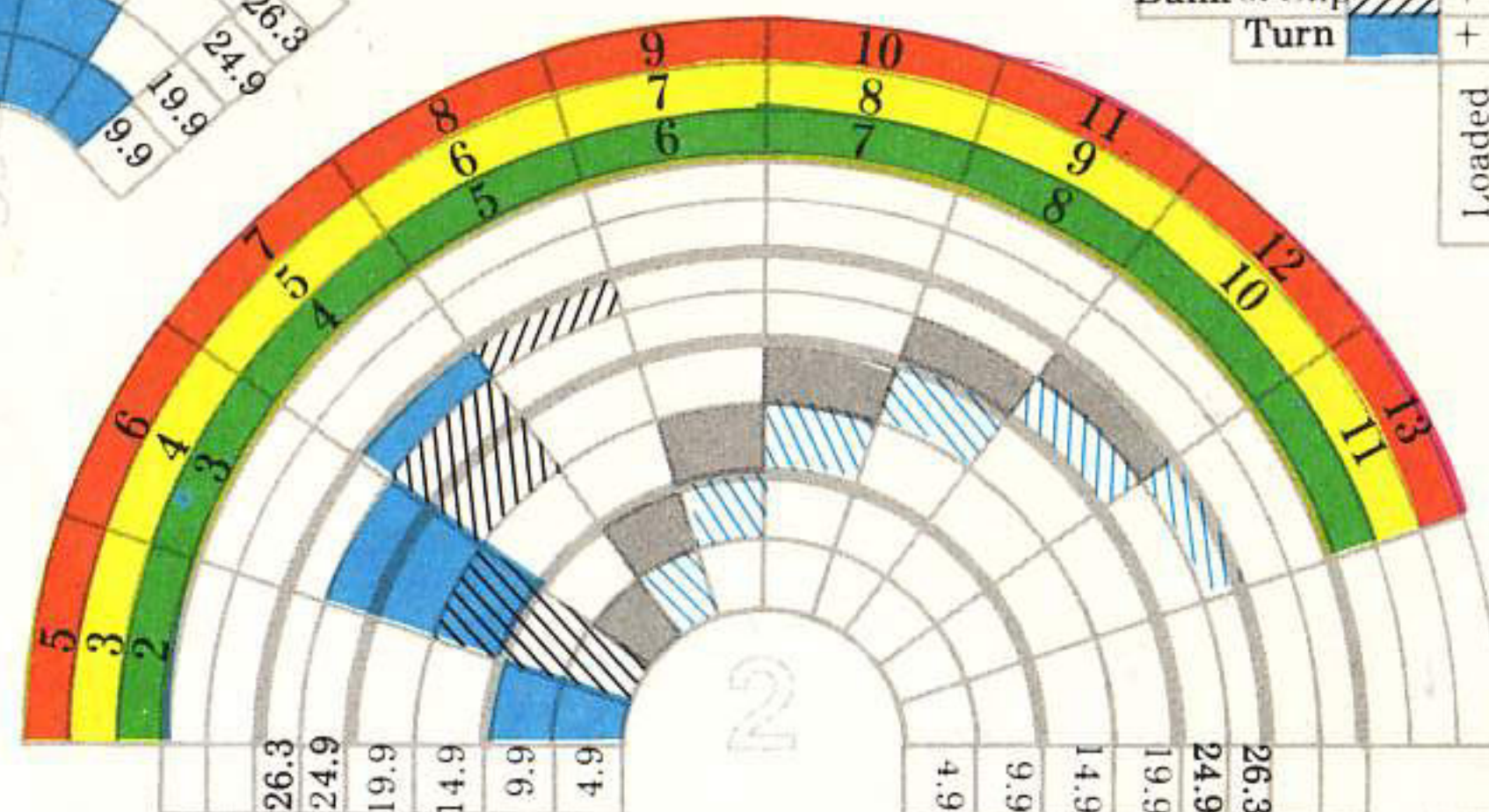
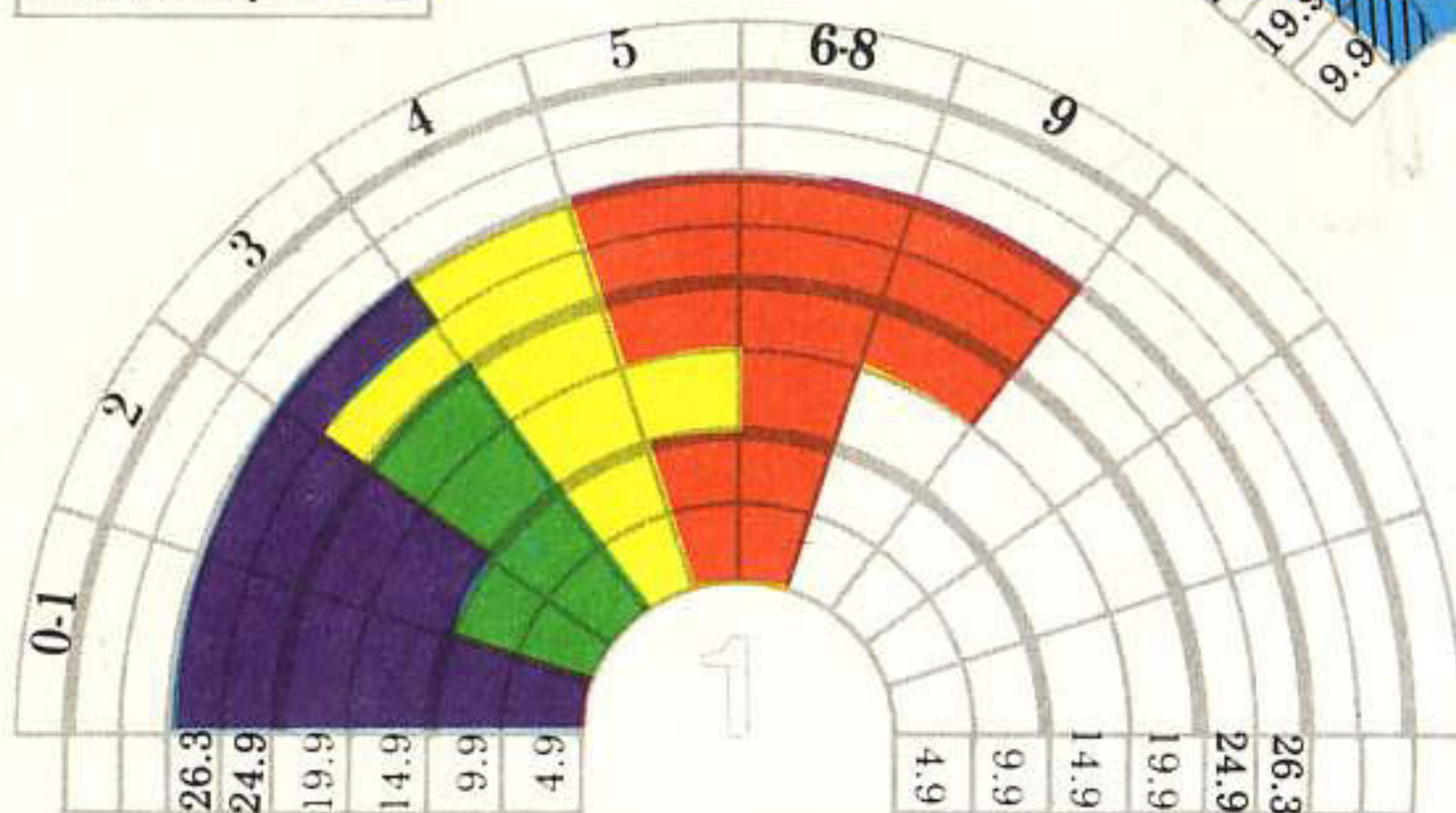
AIR FORCE DATA CARD 15B

Speed Change



Power Factors	Diagonal Lines
Brake Factors	Blue

Half Loop	Grey	P
Half Roll	Blue	P
Bank or Slip	Diagonal Lines	+1
Turn	Blue	+1
Loaded		

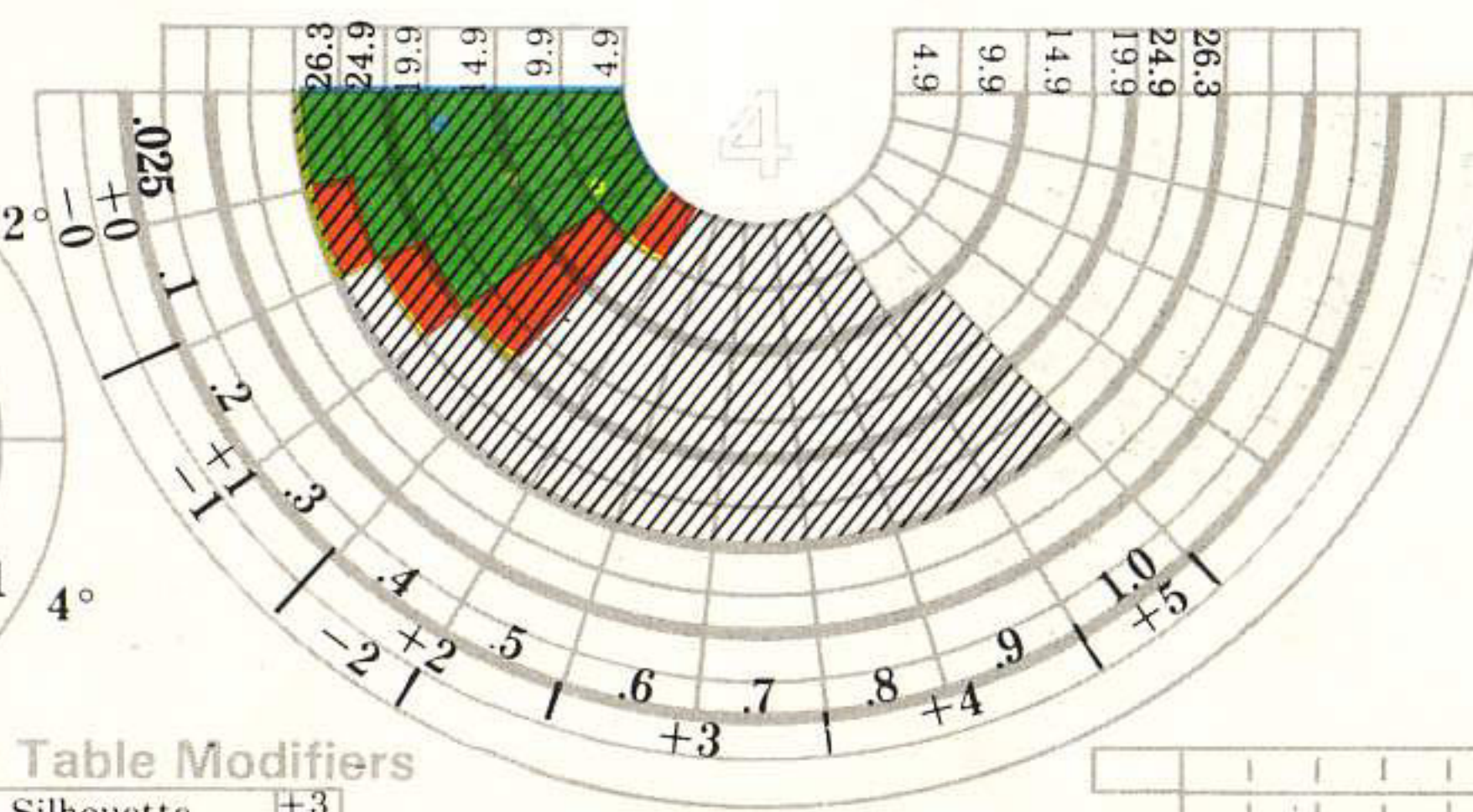
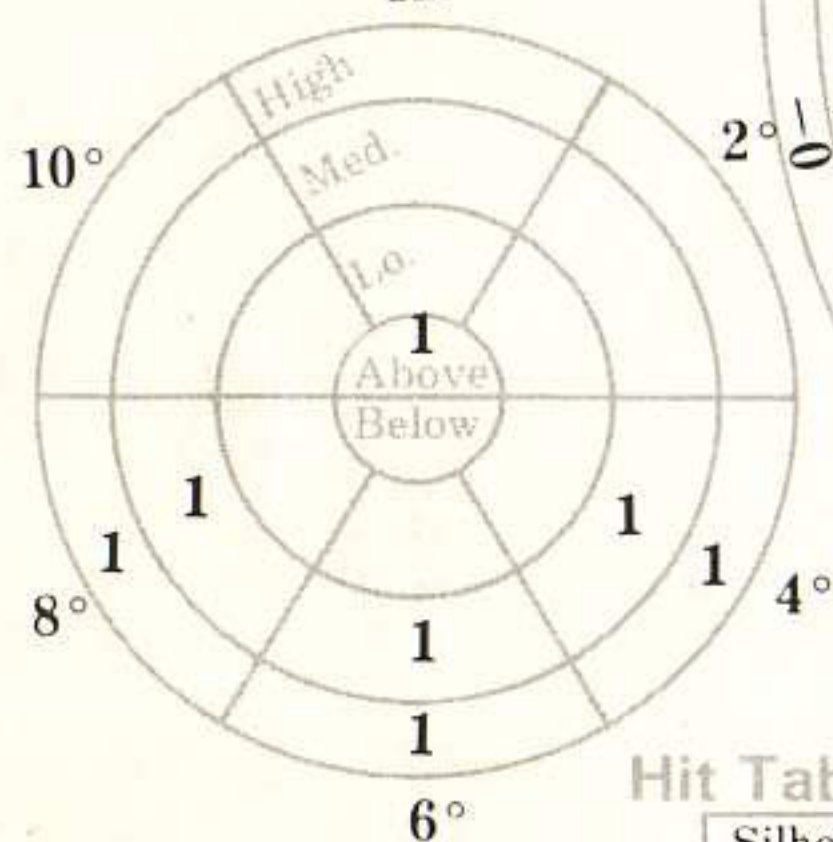


Speed Increments

Altitude Change

Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+3
FF Fire (F=0)	+1

Dive Acceler.	+1	Loaded
Climb Deceler.	-1	
Max Dive	Diagonal Lines	-2
Dive Sp. Climb	Orange	-1
Max Climb	Green	-1

Target Characteristics

W	6	Cn	-	Mg	10
F	6	L	3		
C	3	C	-		
E	3	E	-	E	-
G	1M				1M
	(4)		(5)		(4)
FF		F		FF	

Variants

HE-111H

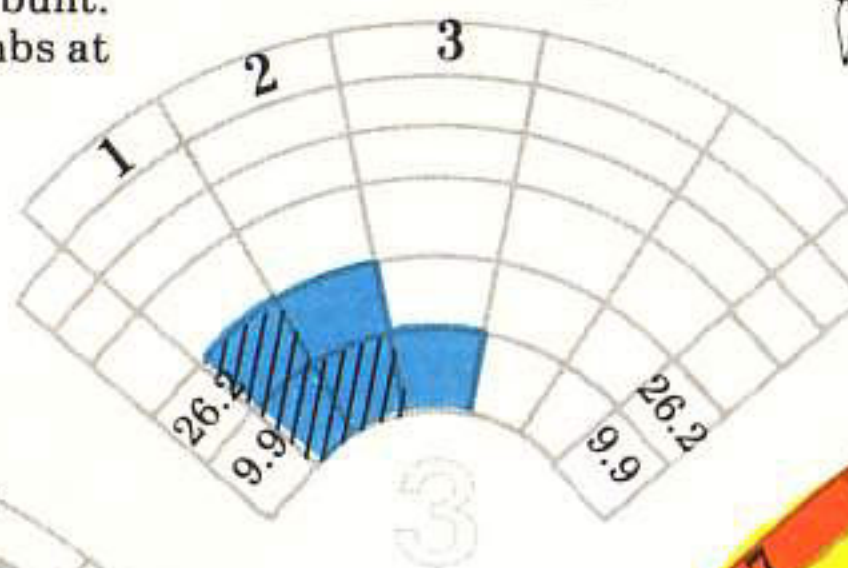
AIR FORCE DATA CARD 3A

Heinkel He.111H-3 Medium Day/Night Bomber
 PV: 21. Engine Type I. Producer: Third Reich
 Operational in Winter '39. Over 5600 (of various marks) built.
 Loaded: Could carry up to 4410 pounds of bombs (4 bombs at low level. Has sights for use as a level bomber.



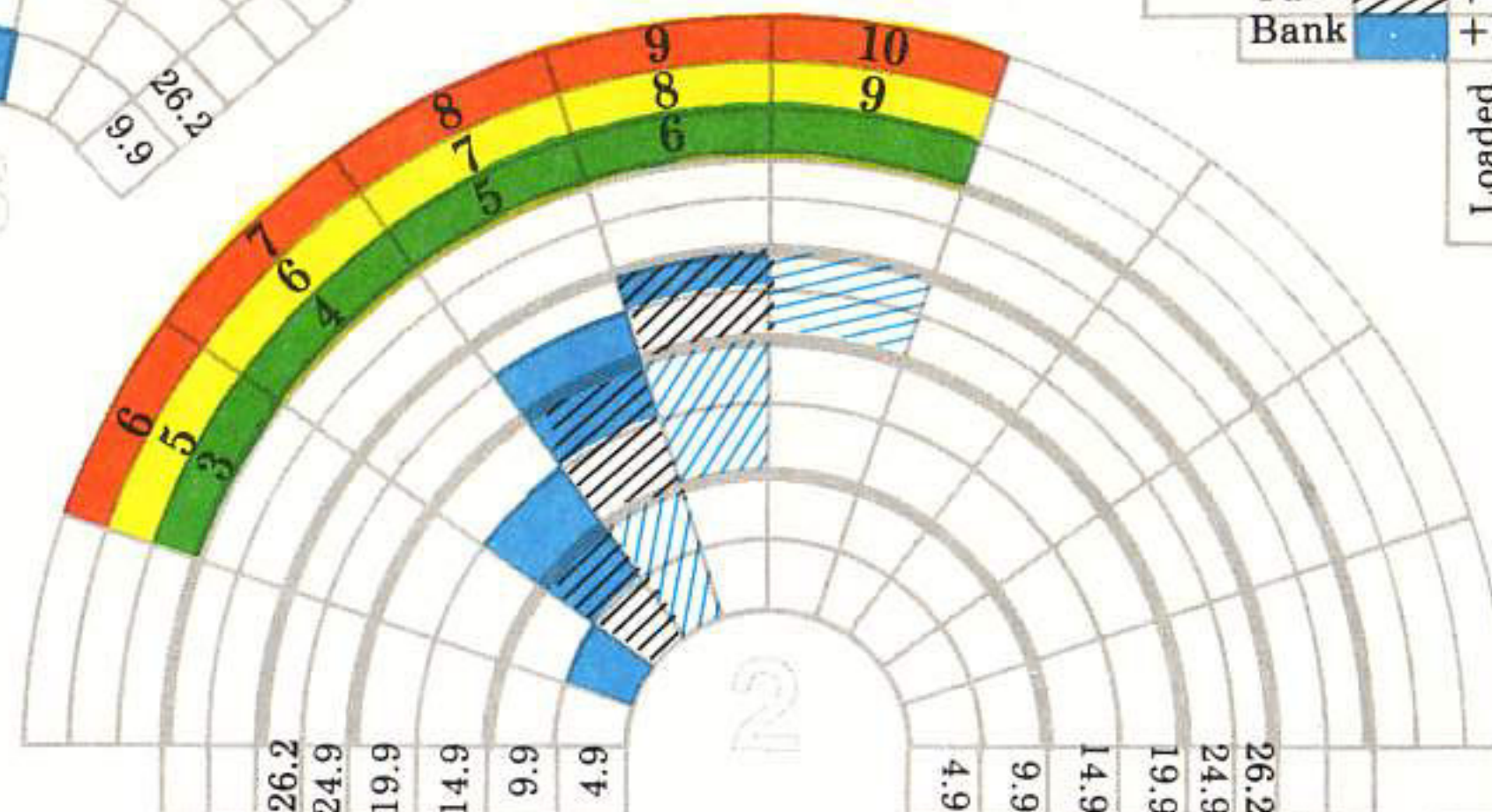
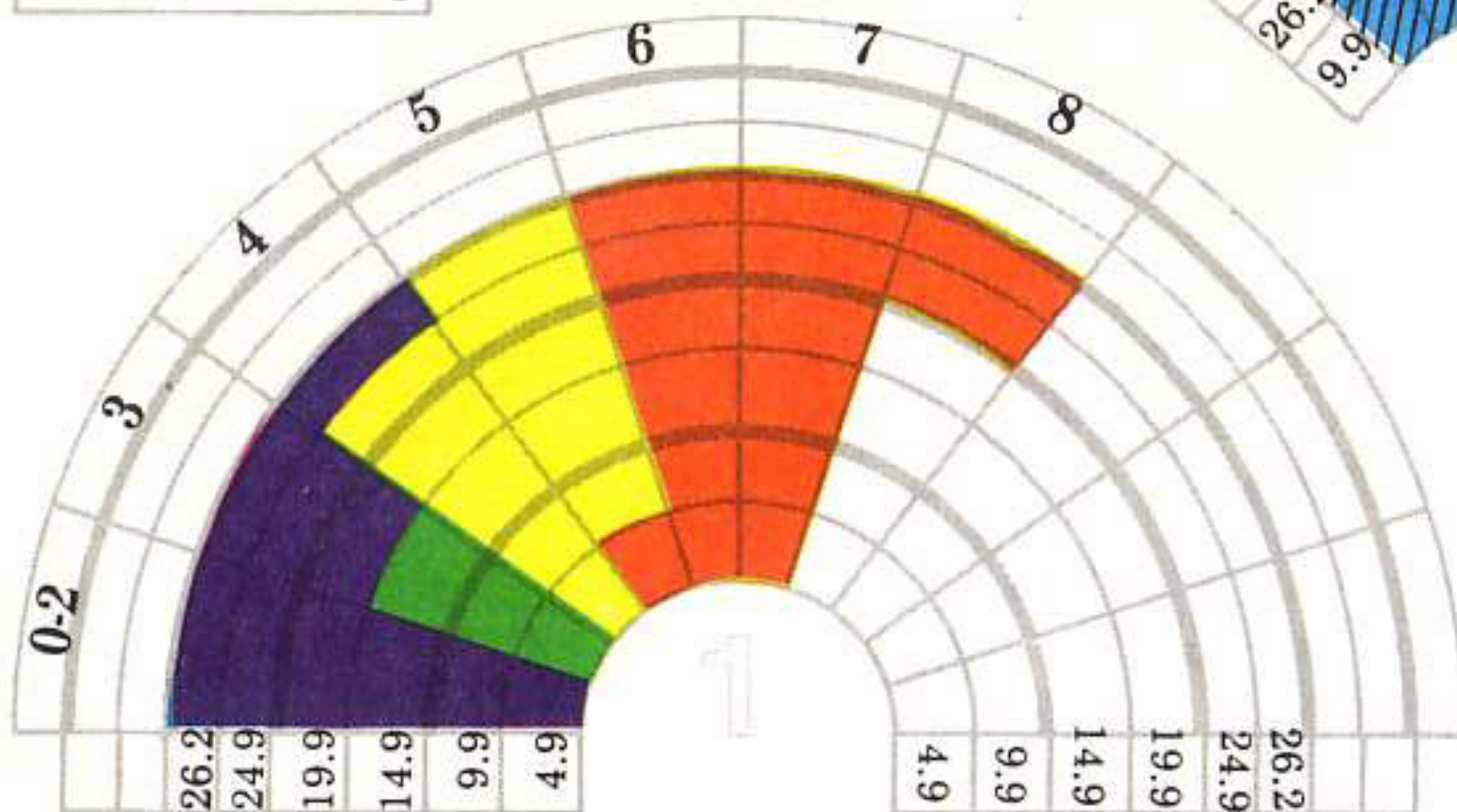
Stall Speed	0-2
Maneuver Sp.	3
Level Speed	4
Dive Speed	5
Loaded (Opt.)	-1

Speed Change



Power Factors	+
Brake Factors	-

Slip	+3
Turn	+4
Bank	+3
Loaded	

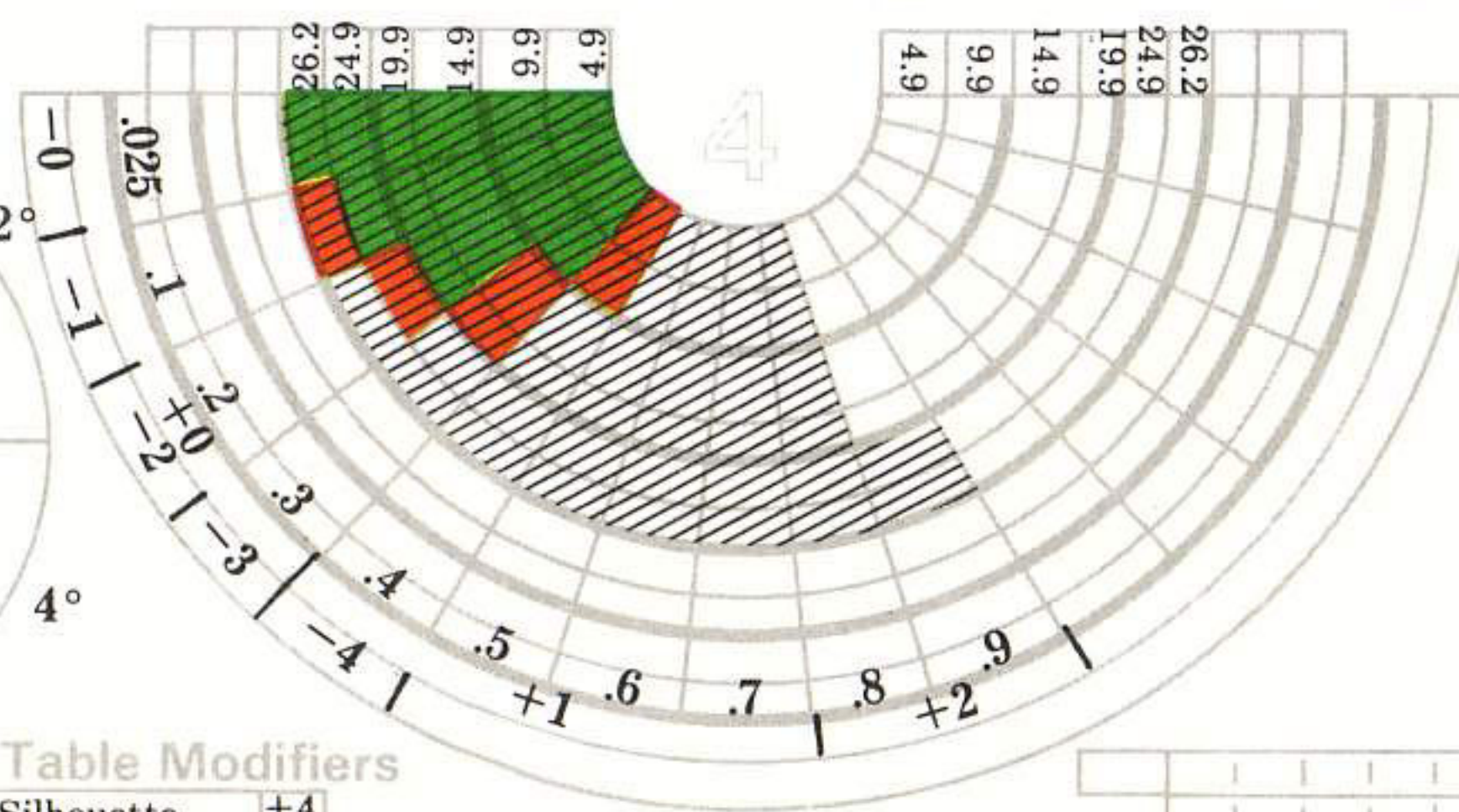
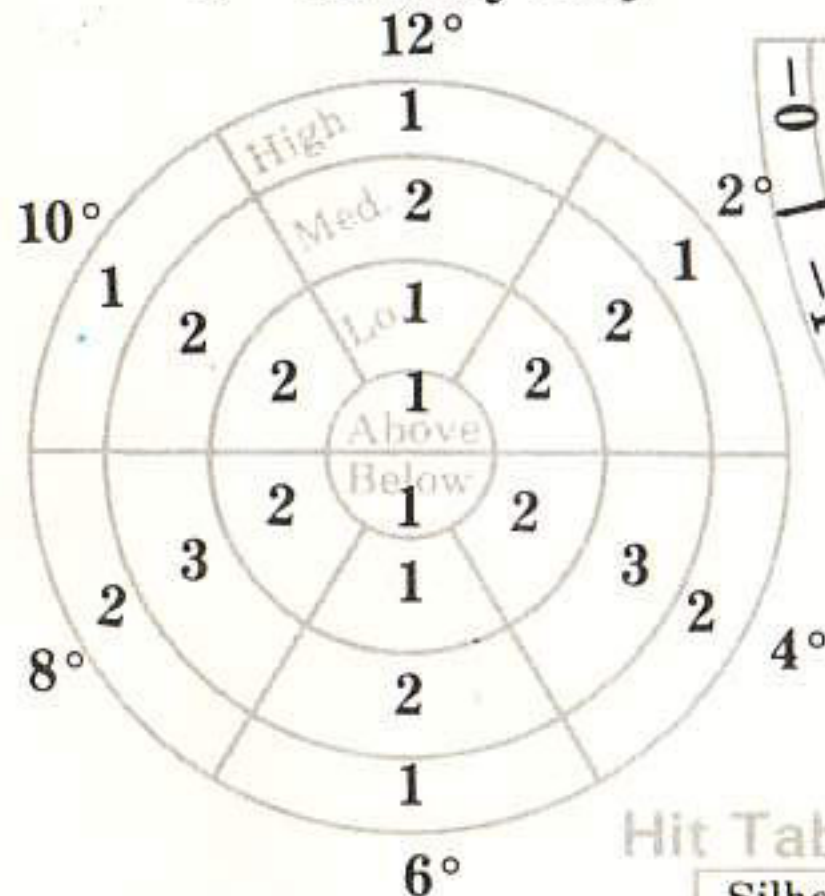


Speed Increments

Altitude Change

Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+4
Fire	0

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-2
Dive Sp. Climb	-1
Max Climb	-1
Loaded	

Target Characteristics

W	9	Cn	-	Mg	-
F	7	L	3		
C	2	C	2		
E	3	E	-	E	3
G	3C				
	(3)		(5)		
	FF		F		

Variants

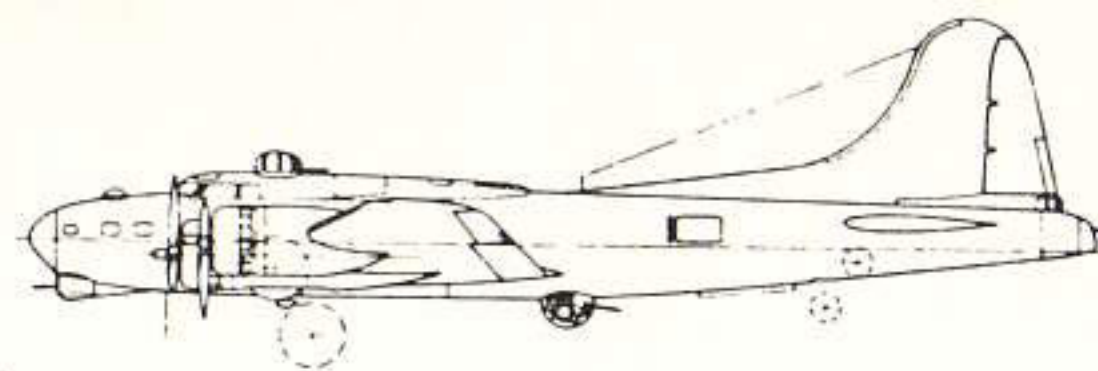
B-17G

Boeing B-17G "Flying Fortress" Heavy Day Bomber.
 PV: 32. Engine Type: R. Producer: USA
 Production started in July '43. A total of 8680 G-series built.
 Loaded: Can carry up to 17,600 pounds of bombs (up to 12 bombs at low level). Has sights for use as a level bomber.

Stall Speed	35.6
Maneuver Sp.	29.9
Level Speed	24.9
Dive Speed	19.9
Loaded (Opt.)	14.9

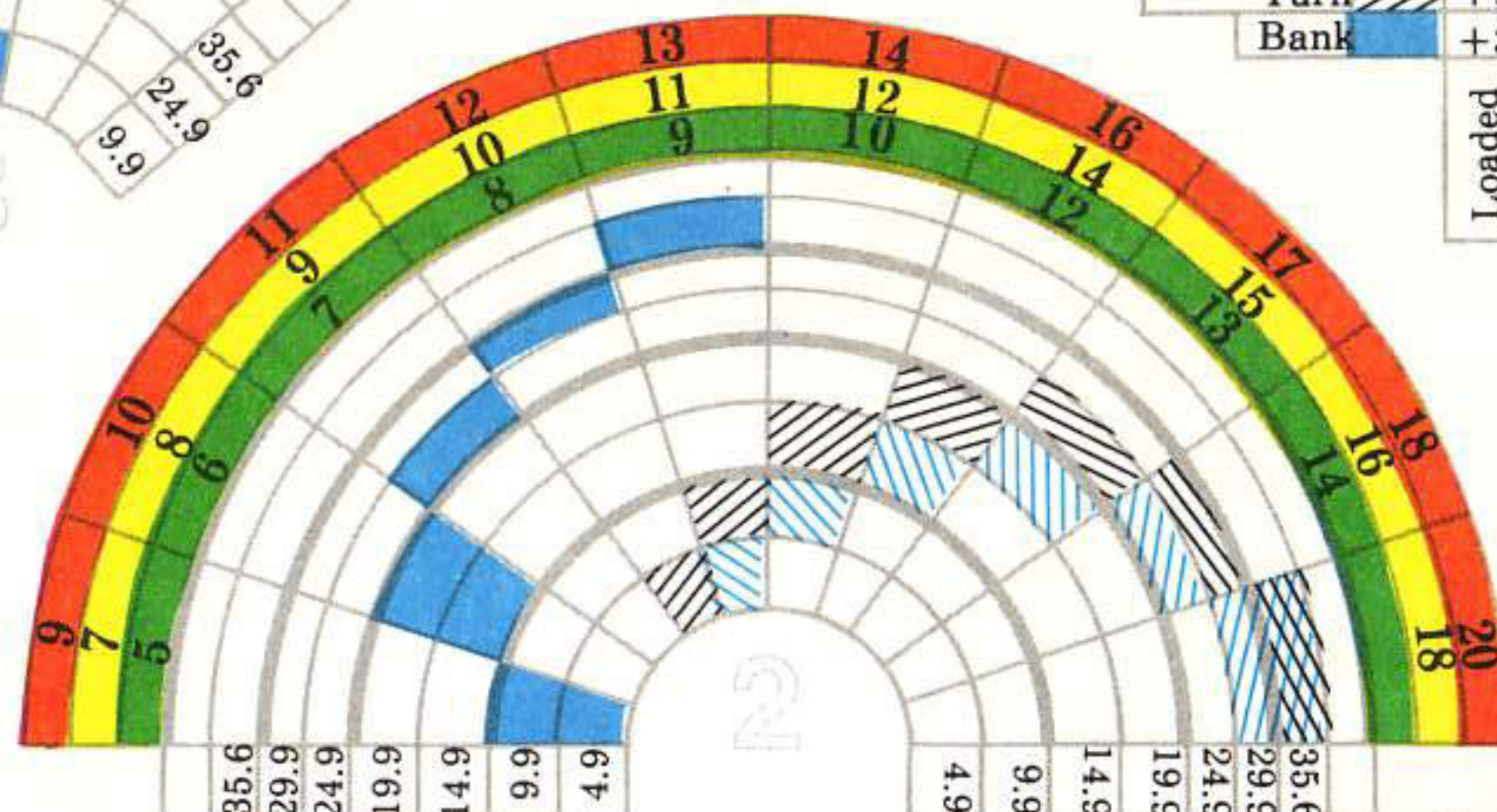
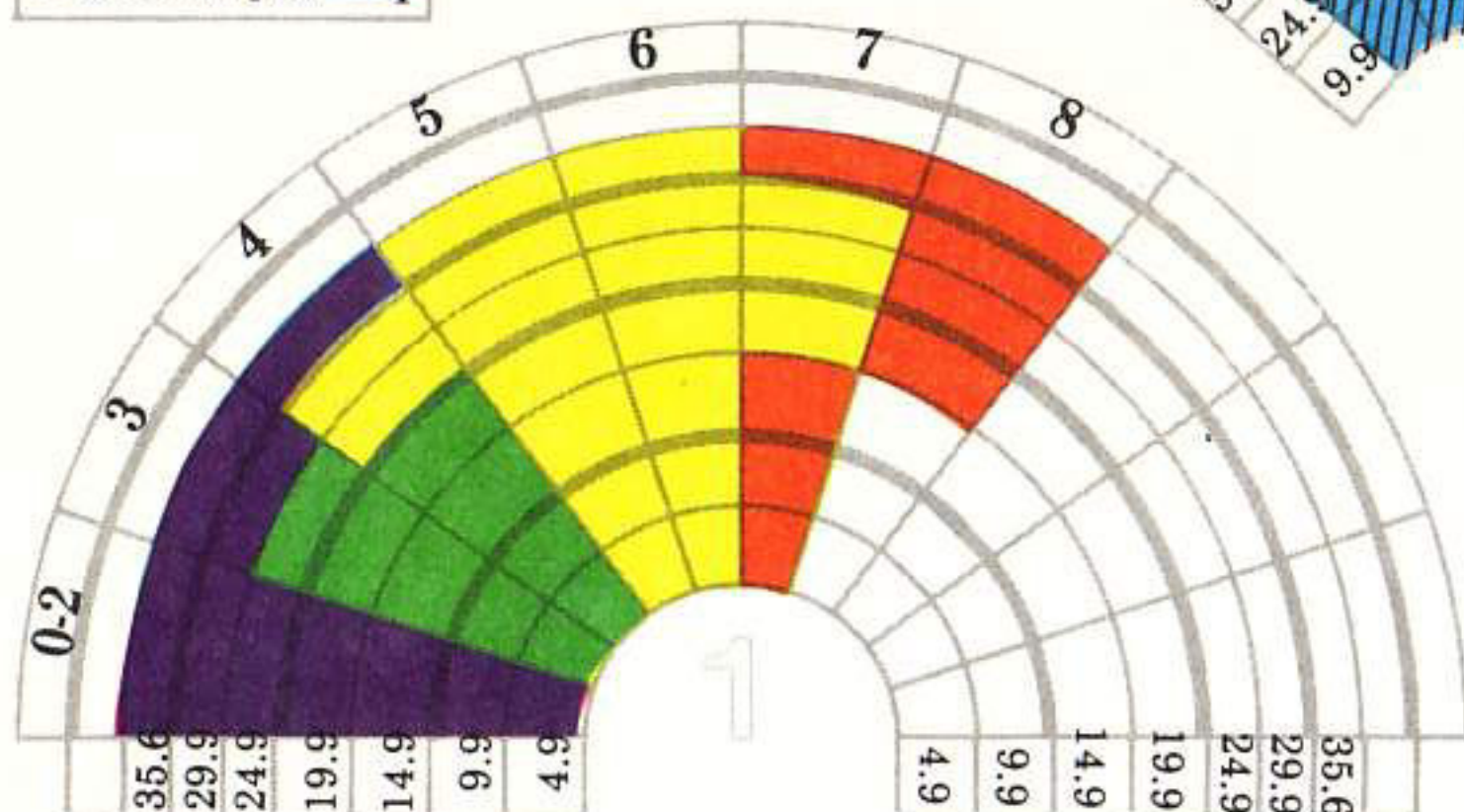
AIR FORCE DATA CARD 3B

Speed Change



Power Factors	
Brake Factors	

Slip	+8
Turn	+9
Bank	+3

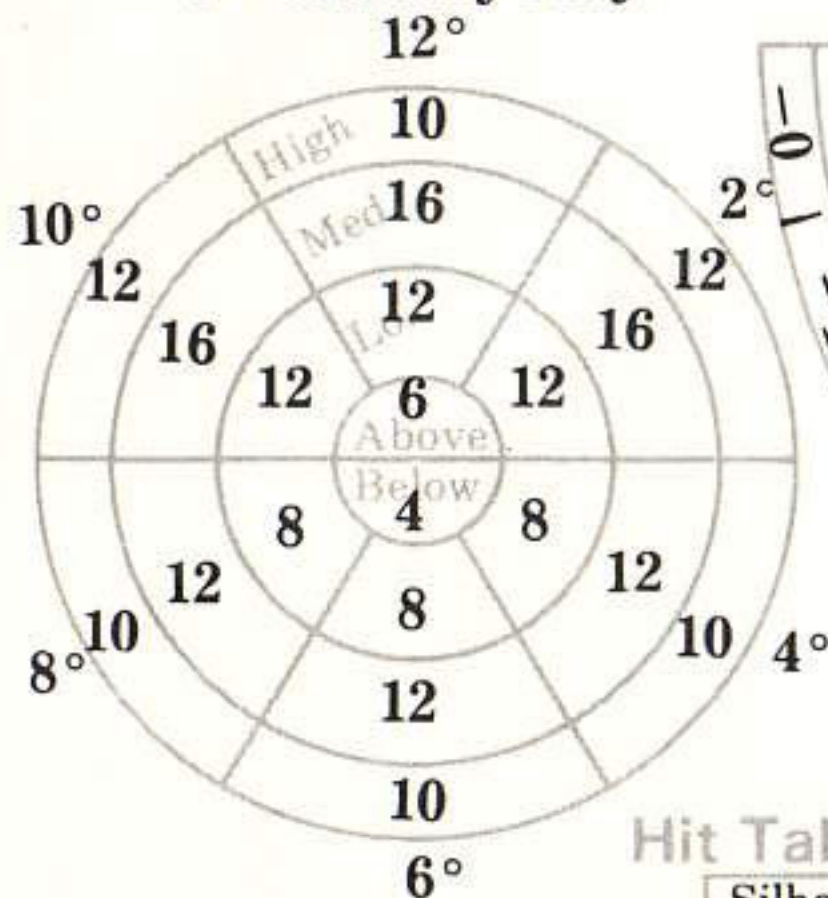


Speed Increments

Altitude Change

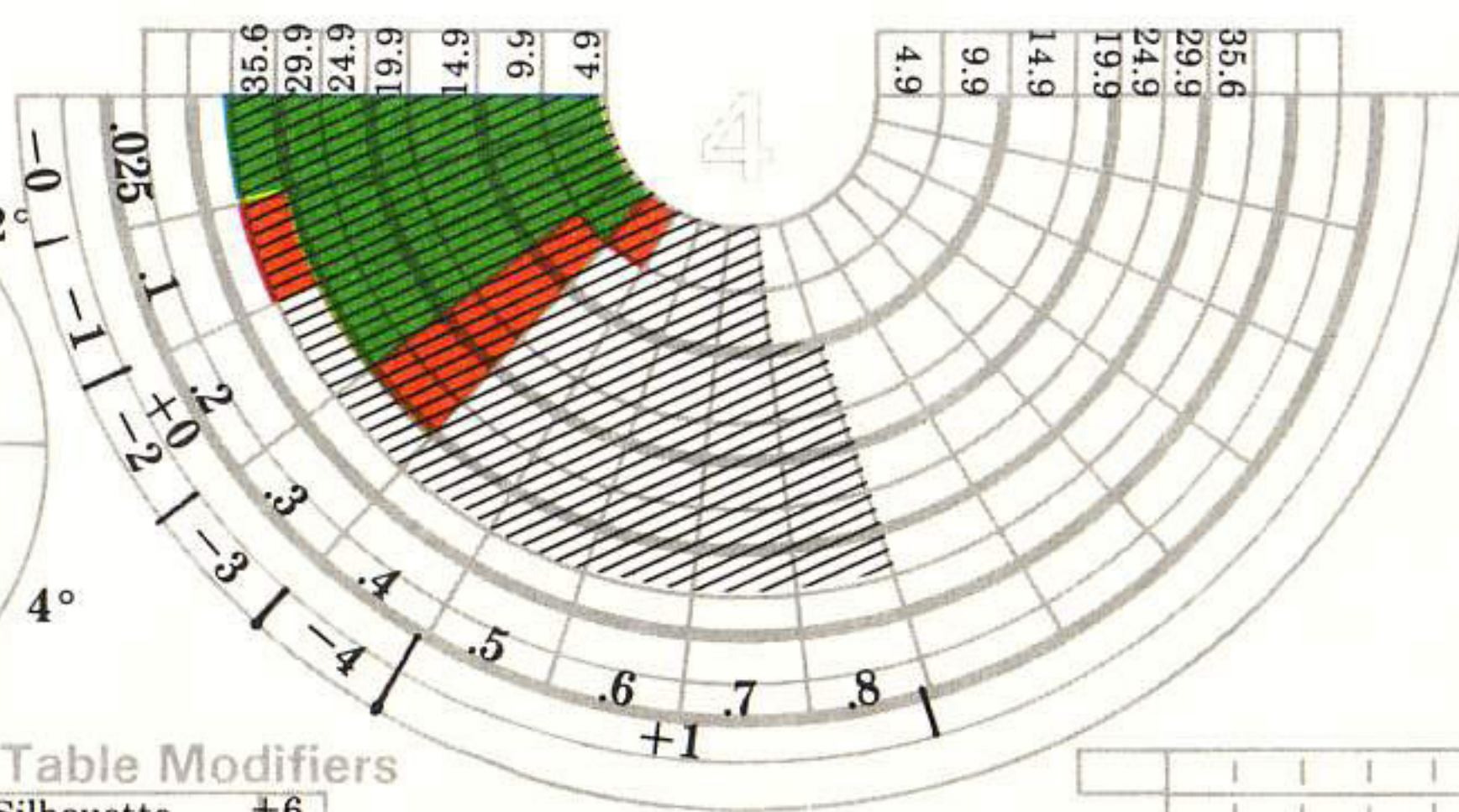
Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+6
Fire	0



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-2
Dive Sp. Clim	-1
Max Climb	-1

Target Characteristics

W	11	Cn	-	Mg	-
F	10	L	4		
C	2	C	2		
E	2	E	2	E	2
G					

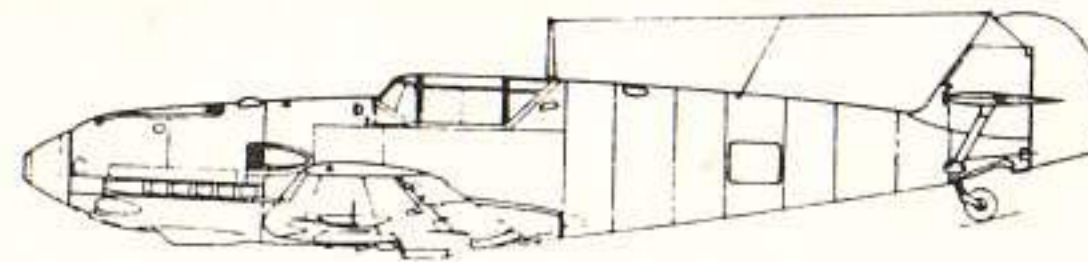
Variants

Me-109E

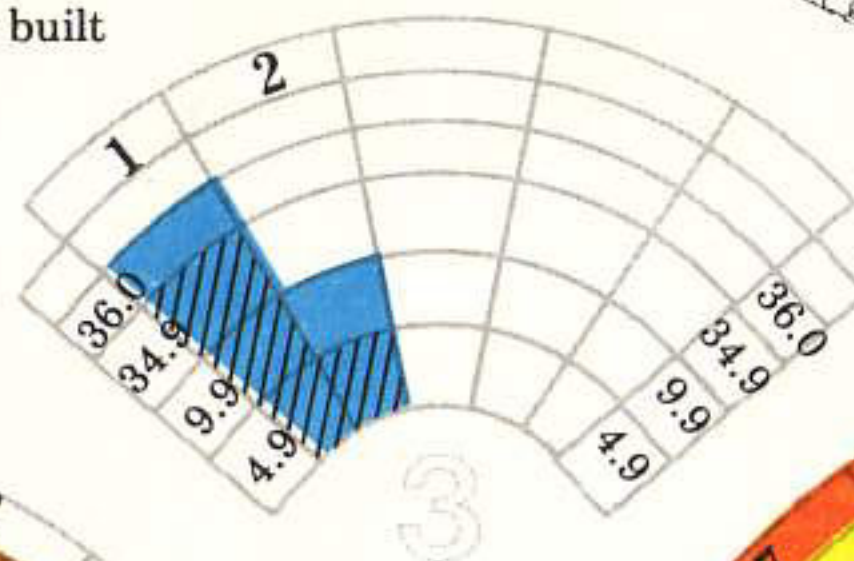
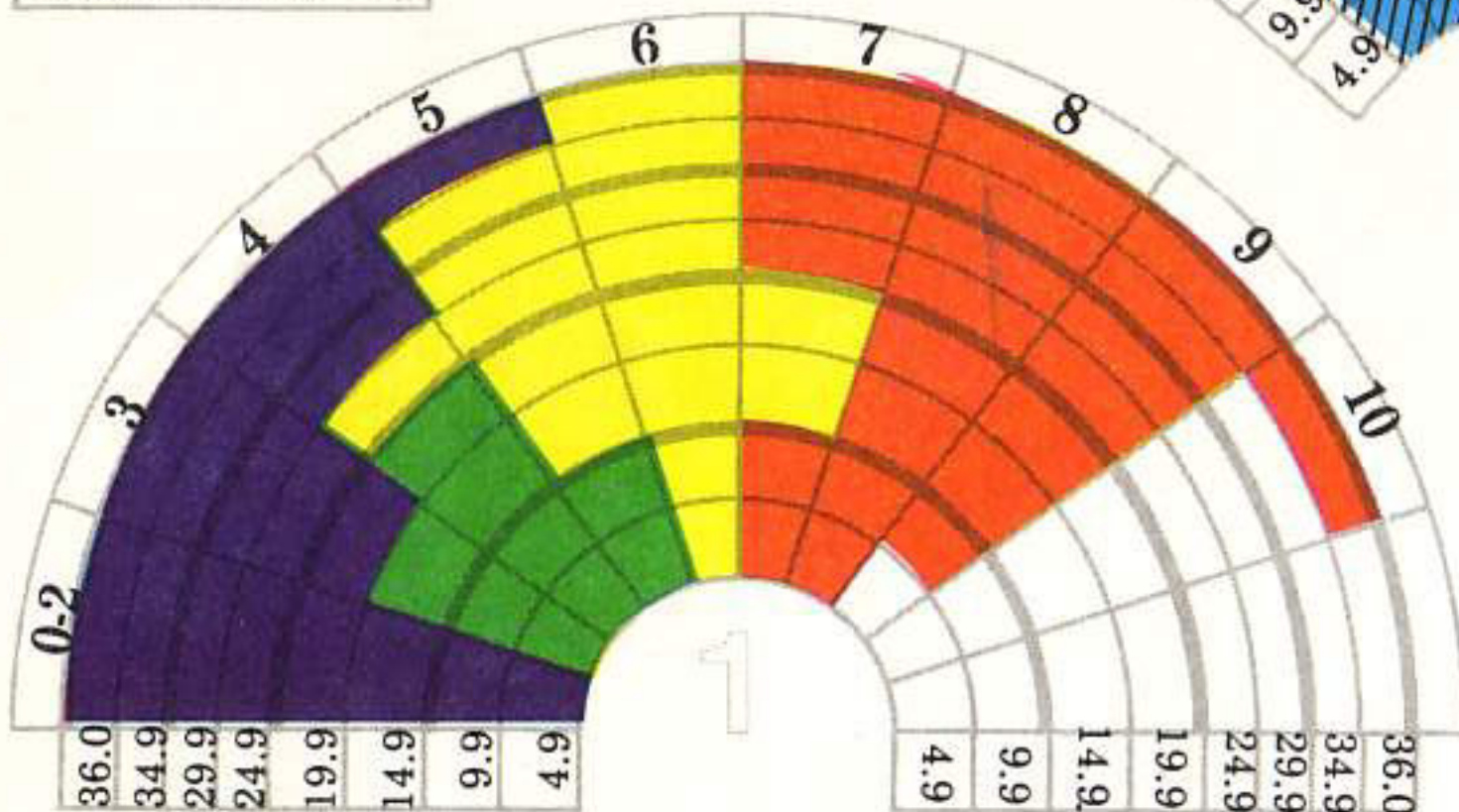
Messerschmitt Bf. 109E-3 "Emile" Day Fighter
 PV: 16. Engine Type: I. Producer: Third Reich
 Entered combat in December '39. About 1900 E-3 series built
 Loaded: could carry one bomb.

AIR FORCE DATA CARD 5A

Speed Change

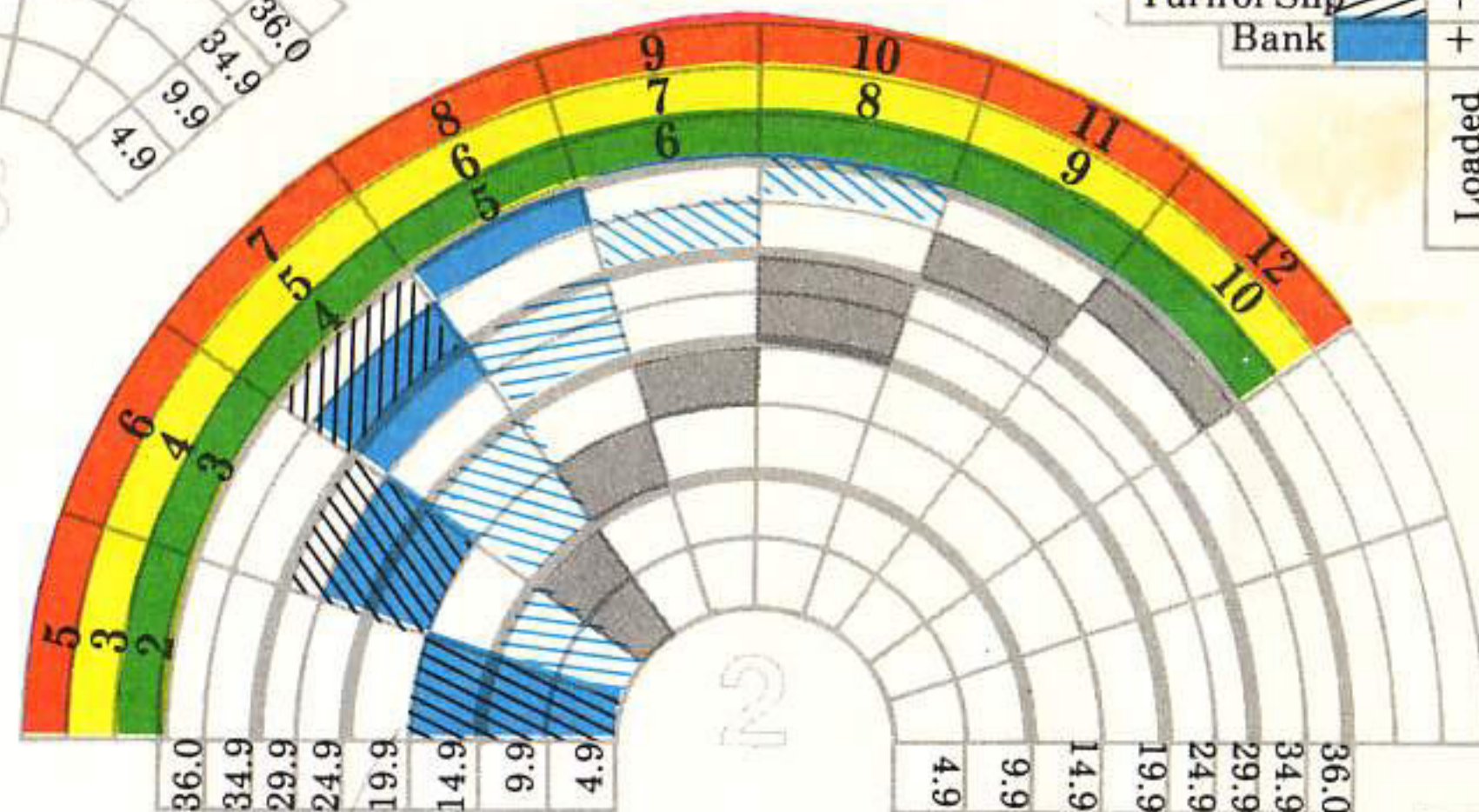


Stall Speed	Dark Purple
Maneuver Sp.	Green
Level Speed	Yellow
Dive Speed	Orange
Loaded (Opt.)	-1



Power Factors	Diagonal Lines
Brake Factors	Blue

Half Loop	P
Half Roll	P
Turn or Slip	+1
Bank	+1
Loaded	

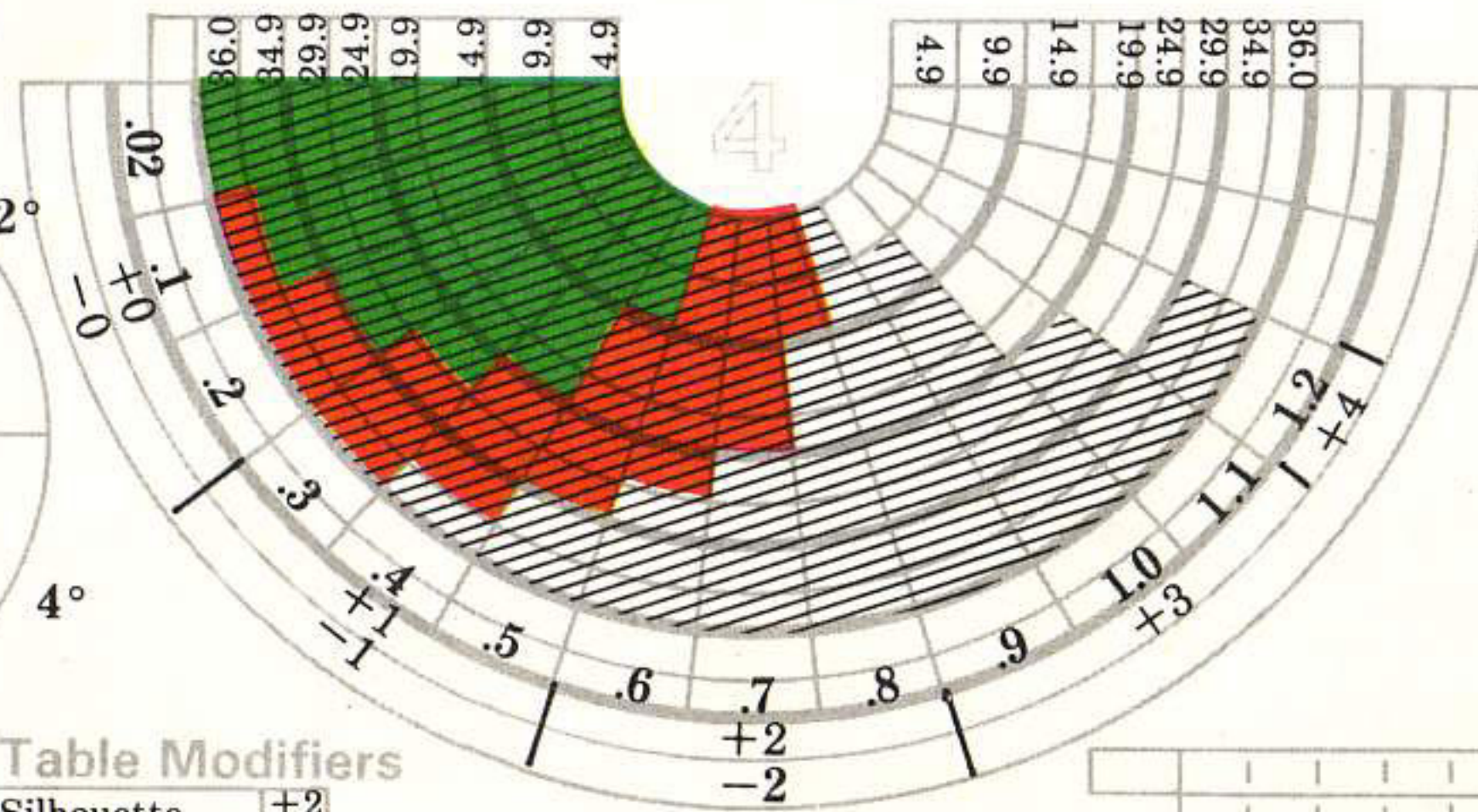
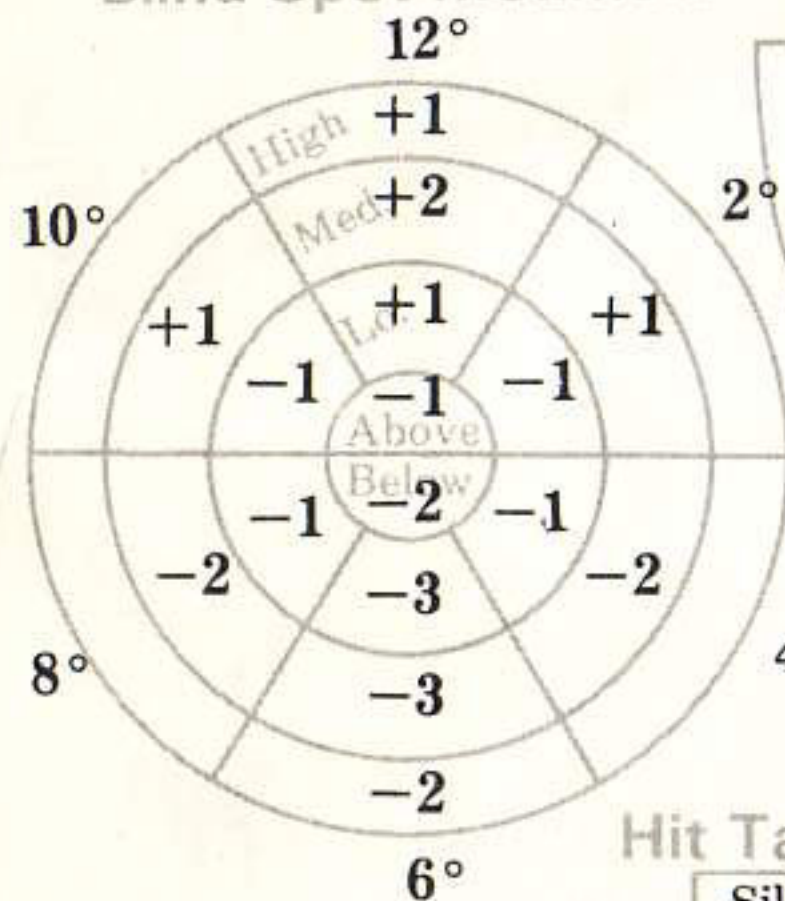


Speed Increments

Altitude Change

Maneuverability Requirements

Blind Spot Modifiers



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-1
Dive Sp. Climb	-1
Max Climb	-1
Loaded	

Target Characteristics

W	5	Cn	3	Mg	12
F	4	L	3		
C	3	C	-		
E	3	E	-	E	-
G	3C 1M	3C 1M	3C		
	(3)	(5)	(4)	(5)	(3)
			FF		

Hit Table Modifiers

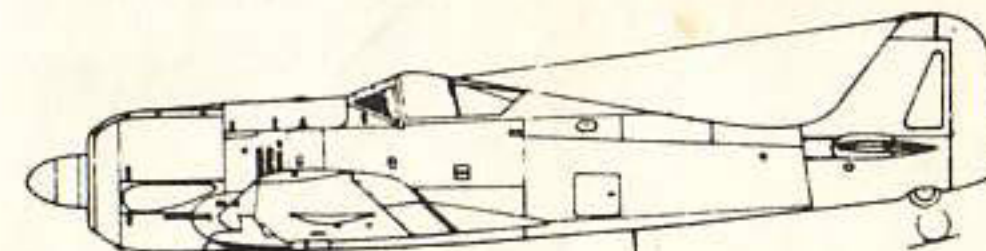
Silhouette	+2
Fire	+2

Variants

FW-190A

AIR FORCE DATA CARD 5B

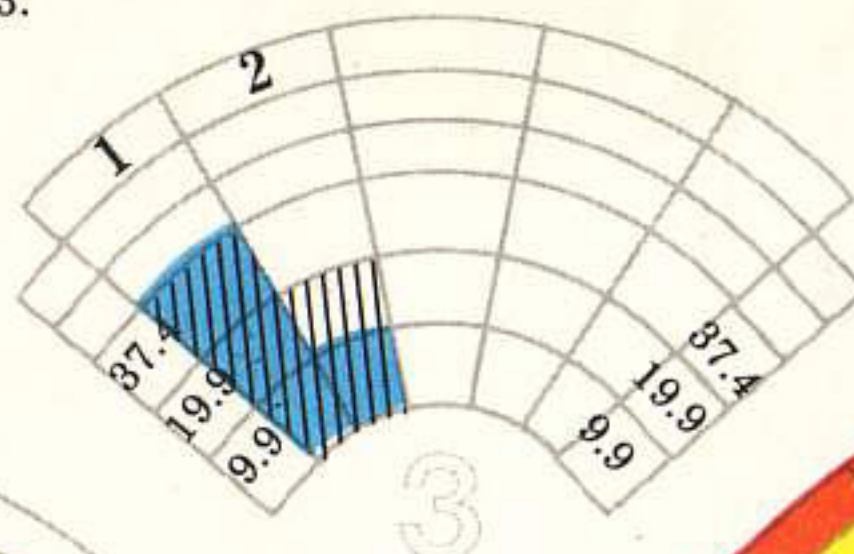
Focke-Wulf FW. 190A-8 "Wuerger" Day Fighter
 PV: 22. Engine Type: R. Producer: Third Reich
 A-series introduced in Fall '41. A-8 introduced in late '43.
 13,367 A-series built.
 Loaded: Can carry one bomb.



Stall Speed	0.2
Maneuver Sp.	3
Level Speed	4
Dive Speed	5
Loaded (Opt.)	-1

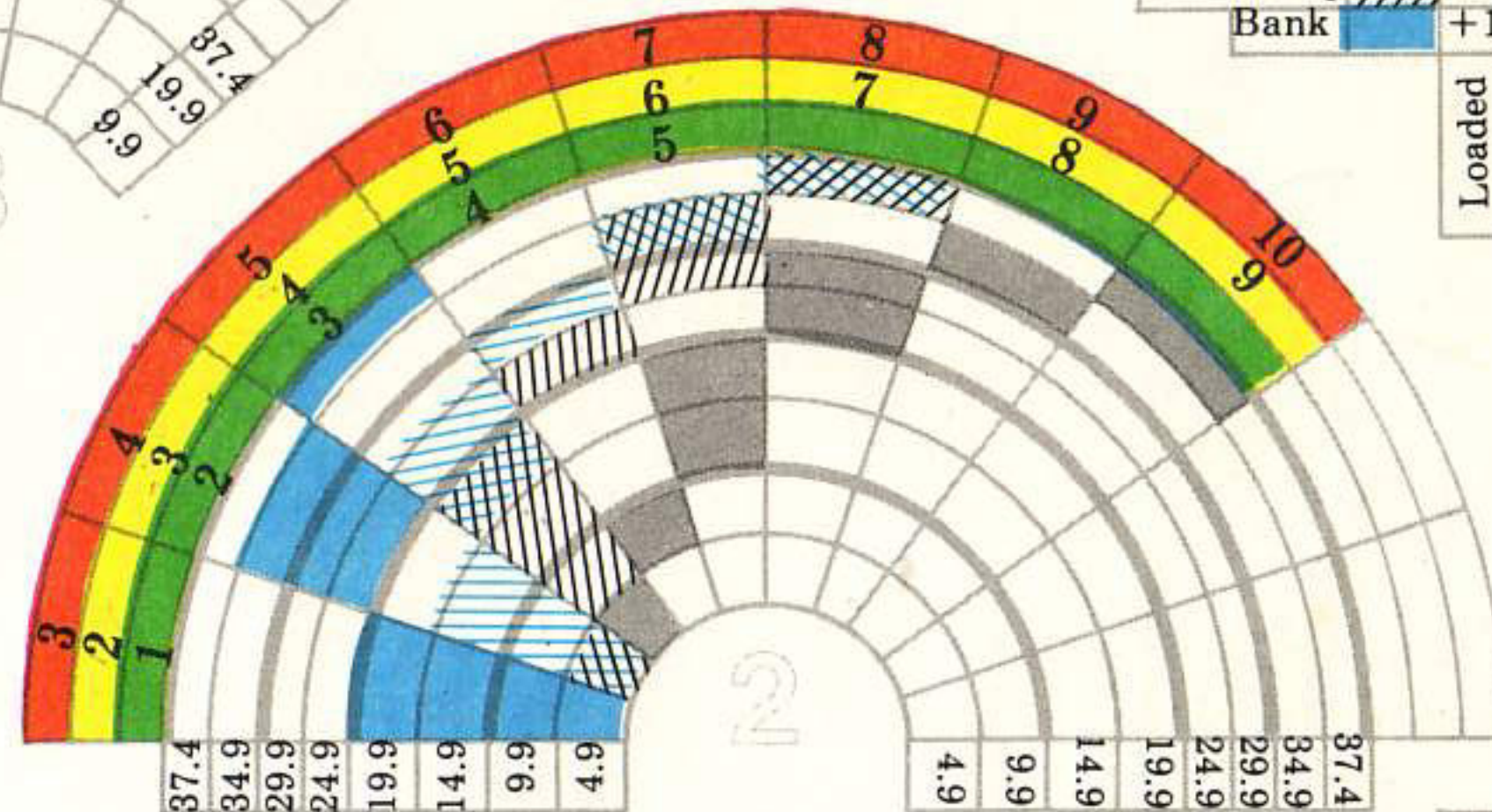
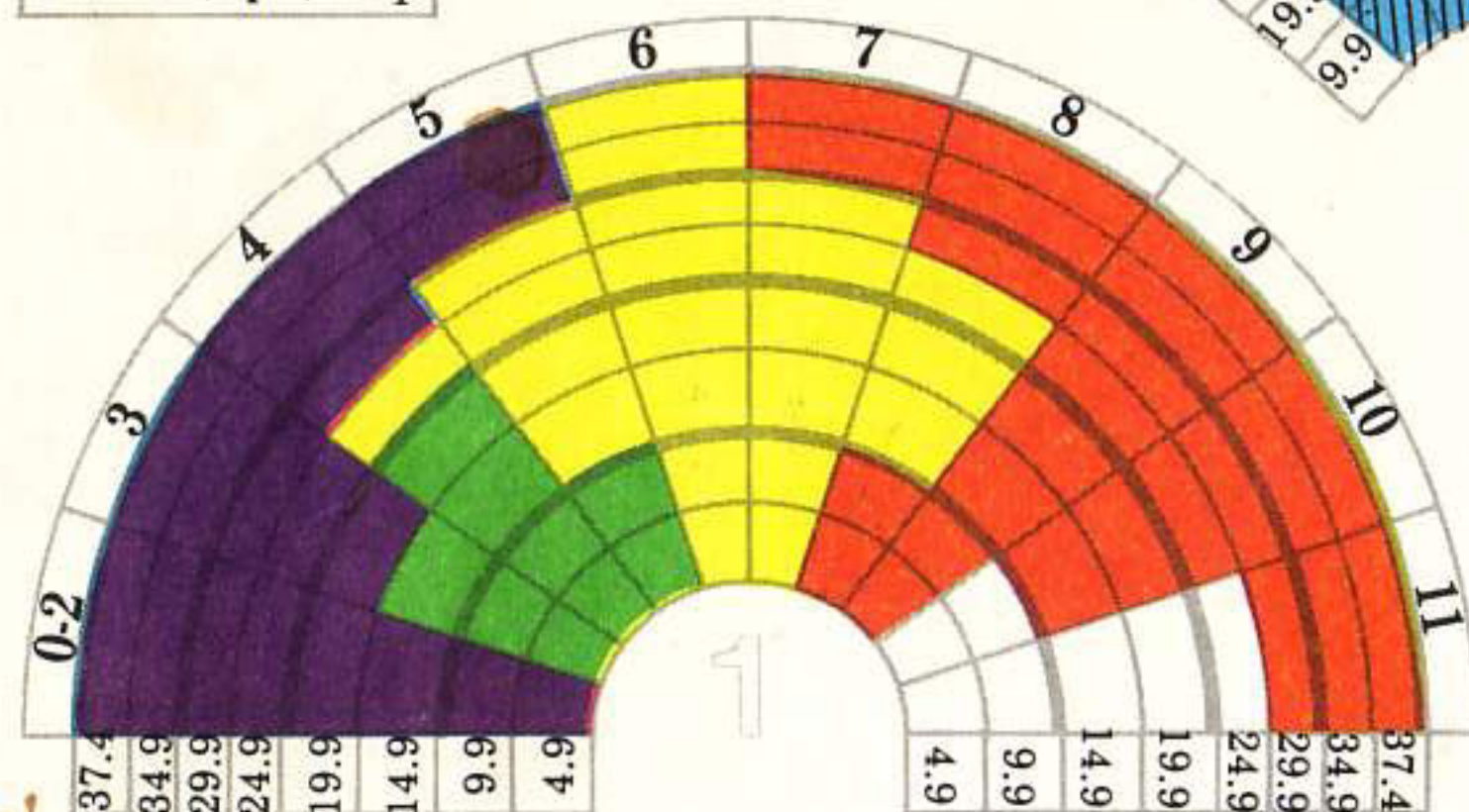
discrete - optimal in forward curve points

Speed Change



Power Factors	Power Factors
Brake Factors	Brake Factors

Half Loop	P
Half Roll	P
Turn or Slip	+2
Bank	+1
Loaded	

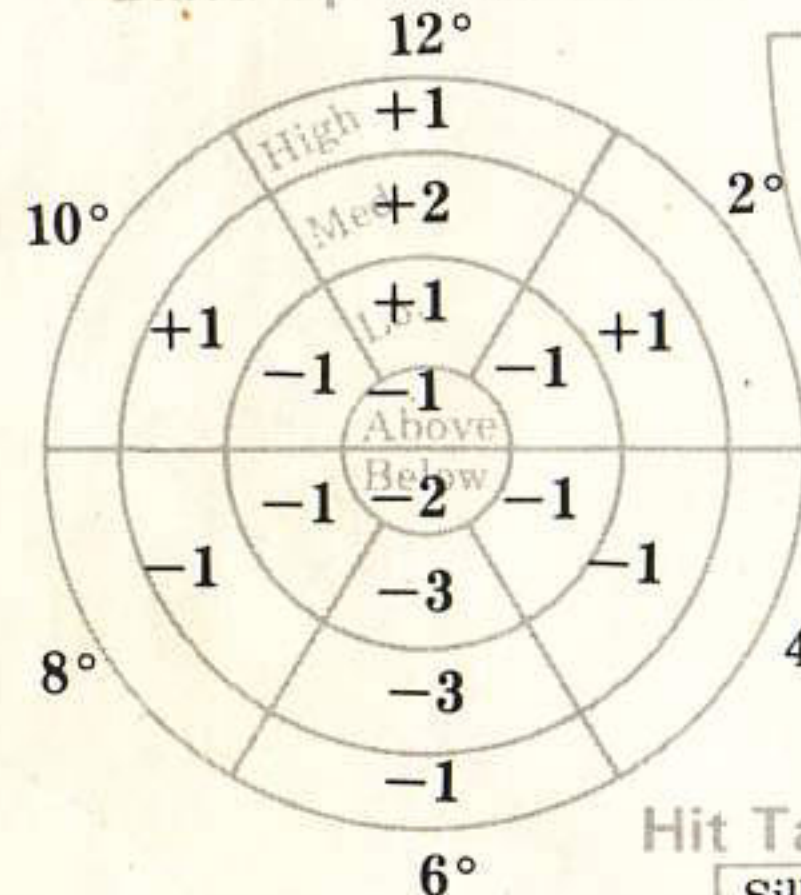


Speed Increments

Altitude Change

Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+2
Fire	+2

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-.4
Dive Sp. Climb	-.1
Max Climb	-.1
Loaded	

Target Characteristics

W	5	Cn	5	Mg	5
F	7	L	4		
C	3	C	-		
E	3	E	-	E	-
G	4C	4C	2M	2M	4C
	(4)	(4)	(5)	(5)	(4)
	FF			FF	

Variants

A-8/R1. PV: 22

G	8C	4C	2M	2M	4C	8C
	(4)	(4)	(5)	(5)	(4)	(4)
	FF				FF	

Treat as loaded in this configuration

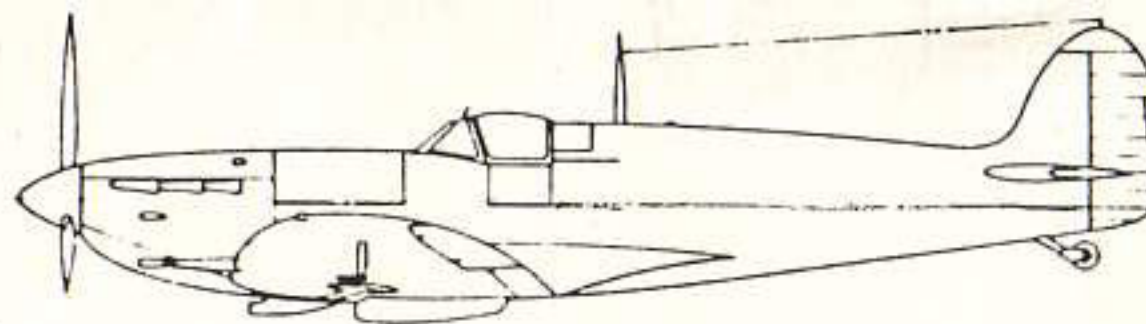
A-8/U11. PV: 22
 Loaded; Can carry up to 5 bombs.

Spitfire V

Supermarine Spitfire V.B Day Fighter

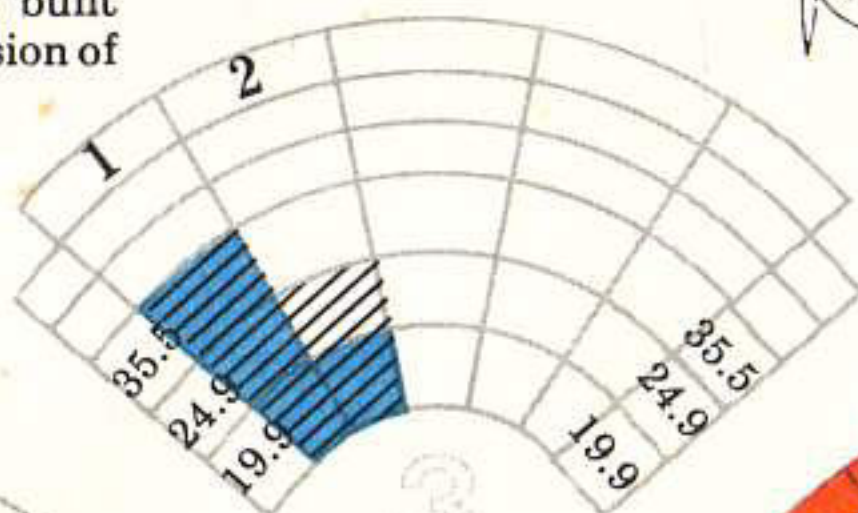
PV: 18. Engine Type: I. Producer: Great Britain
Operational in Spring '41. A total of 3923 V.B-series built
(6479 V-series total). The Seafire I.B. was the carrier version of
the Spitfire V.B.

AIR FORCE DATA CARD 9B



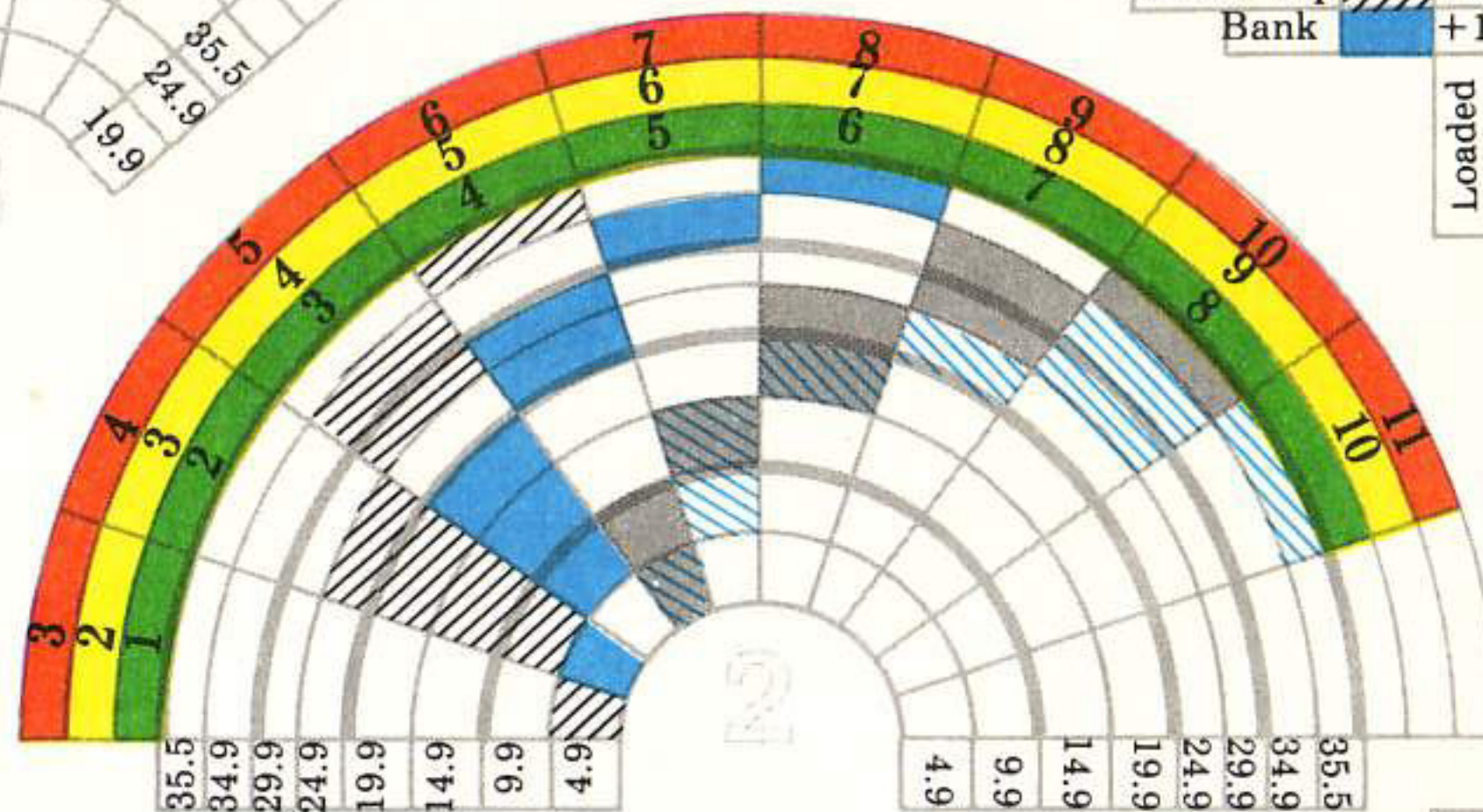
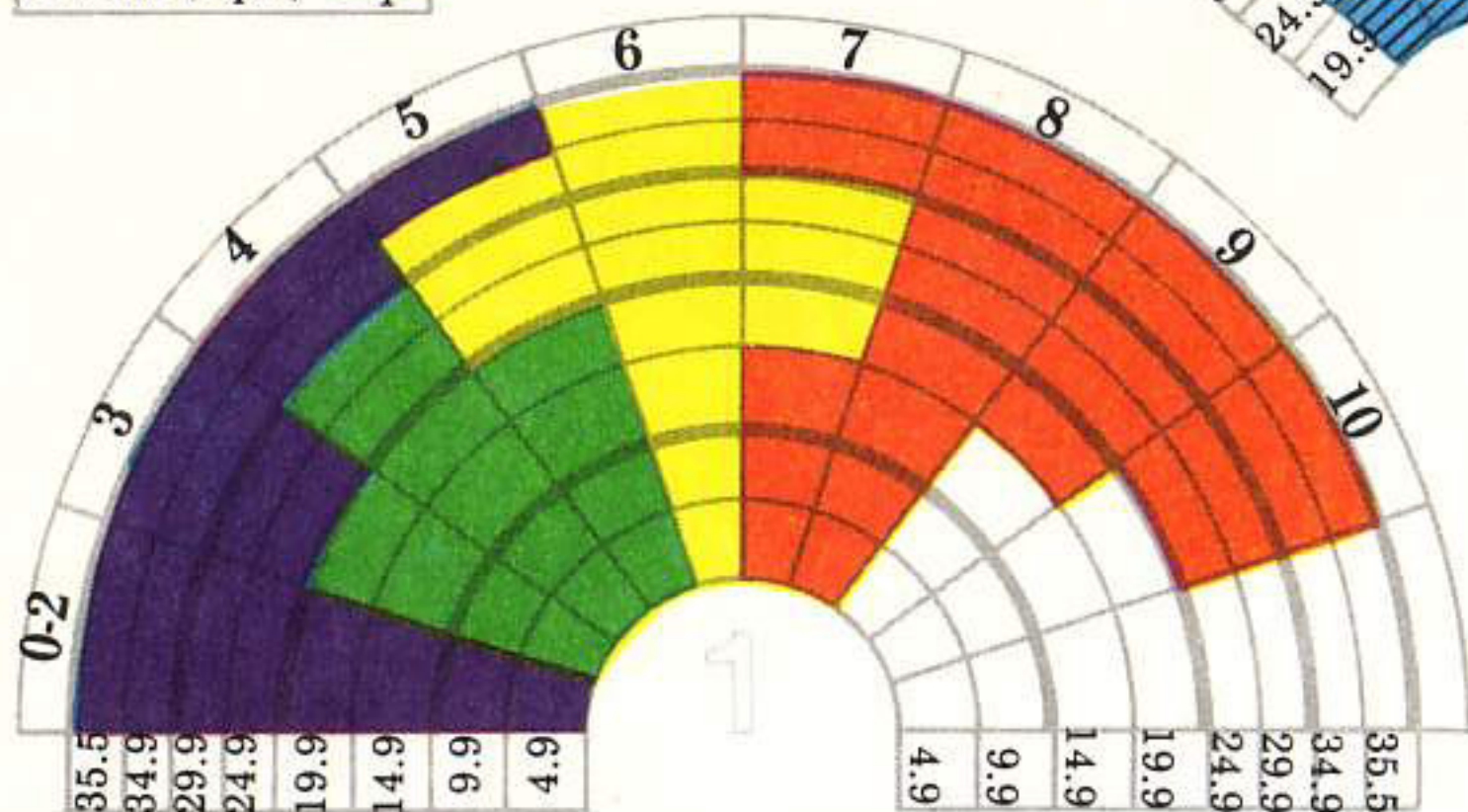
Stall Speed	Dark Purple
Maneuver Sp.	Green
Level Speed	Yellow
Dive Speed	Orange
Loaded (Opt.)	-1

Speed Change



Power Factors	Diagonal Lines
Brake Factors	Blue

Half Loop	Grey	P
Half Roll	Blue	P
Turn or Slip	Diagonal Lines	+2
Bank	Blue	+1
Loaded		

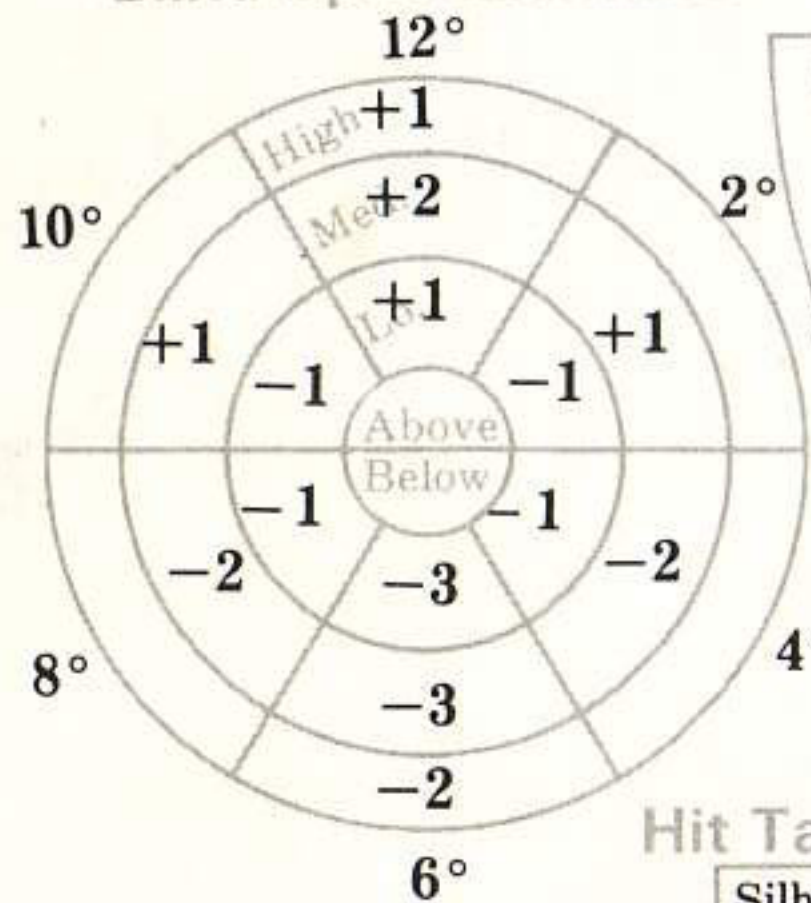


Speed Increments

Altitude Change

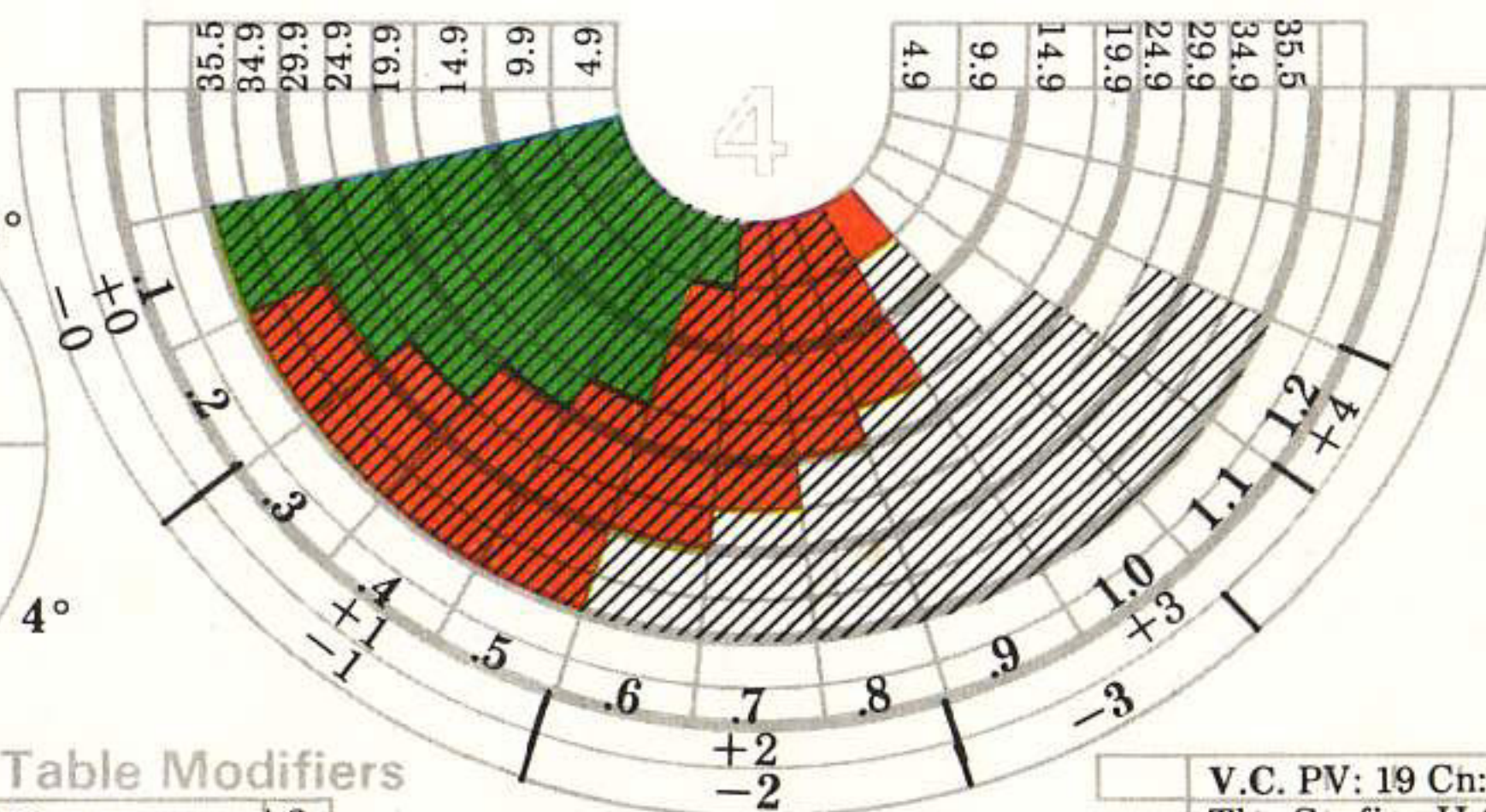
Maneuverability Requirements

Blind Spot Modifiers



Hit Table Modifiers

Silhouette	+2
Fire	+2



Dive Acceler.	+1	Loaded
Climb Deceler.	-1	
Max Dive	Diagonal Lines	-.2
Dive Sp. Climb	Orange	-.1
Max Climb	Green	-.1

Target Characteristics

W	5	Cn	3	Mg	4
F	5	L	3		
C	3	C	-		
E	3	E	-	E	-
G	2M 4C			4C 2M	
	(4) (5)			(5) (4)	
FF				FF	

Variants

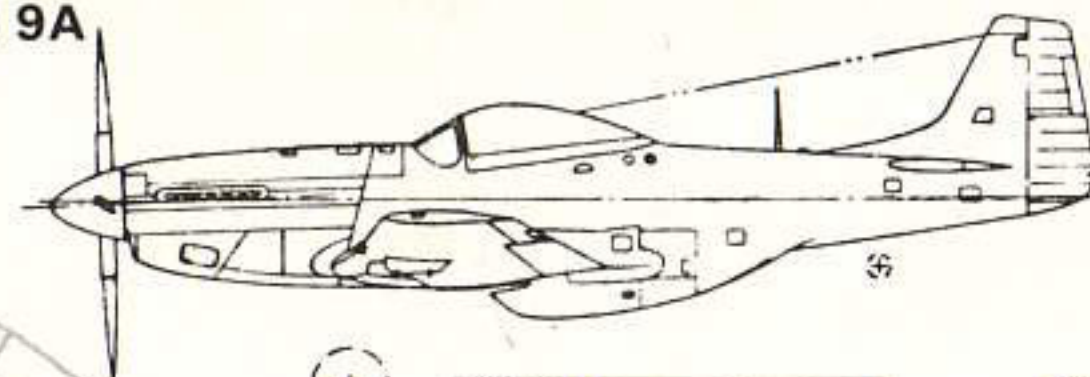
V.C. PV: 19 Cn: 5
The Seafire II.C was the
carrier version of the Spit-
fire V.C.

G	4C 4C			4C 4C
	(5) (5)			(5) (5)
FF				FF

P-51D

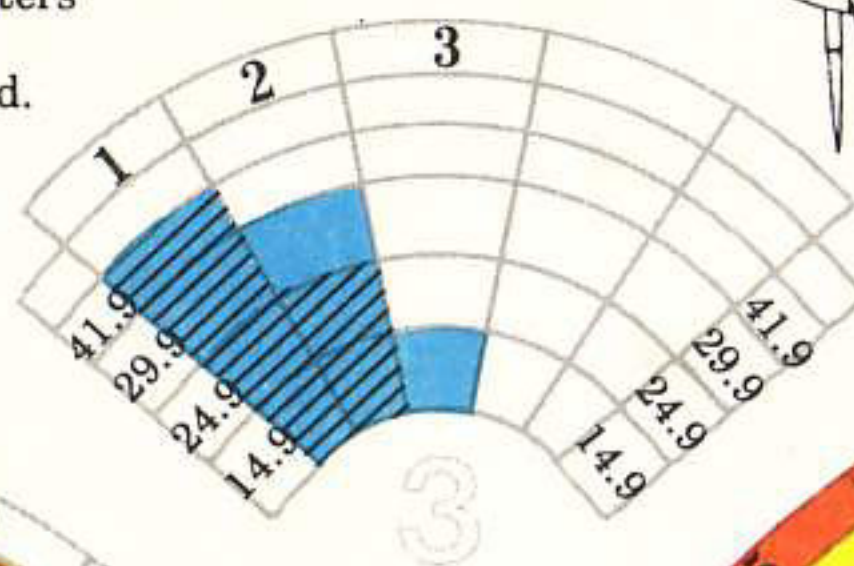
North American P-51D and P-51K "Mustang IV" Day Fighter
 PV: 21. Engine Type: I. Producer: USA
 Entered operations in Spring '44. 9157 D & K series fighters built.
 Loaded: Can carry up to 2 bombs, or 6 A/G rockets loaded.

AIR FORCE DATA CARD 9A



Stall Speed	6.1
Maneuver Sp.	6.6
Level Speed	6.9
Dive Speed	6.1
Loaded (Opt.)	-1

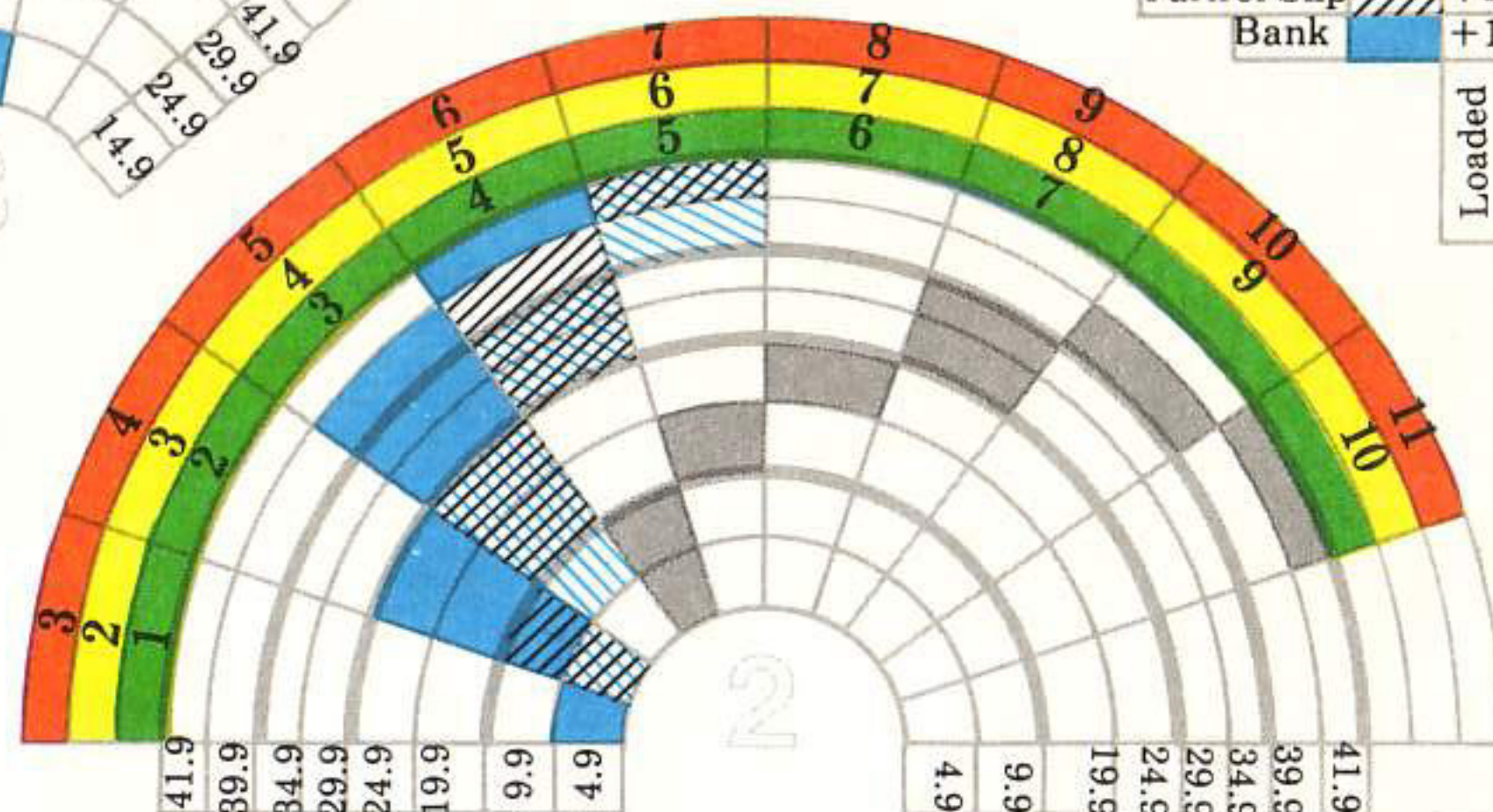
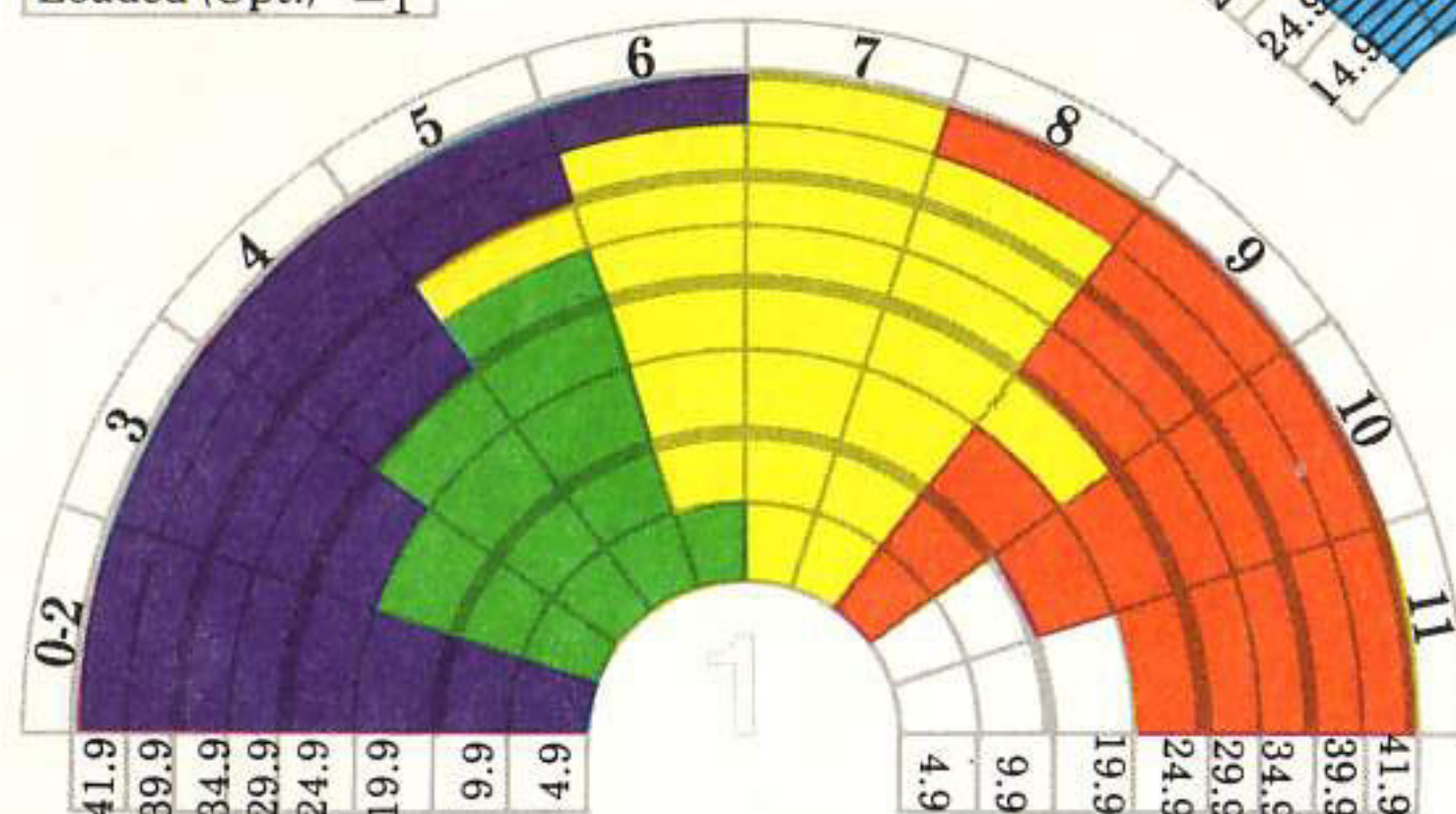
Speed Change



Power Factors	+
Brake Factors	-

Half Loop	P
Half Roll	P
Turn or Slip	+2
Bank	+1

Loaded

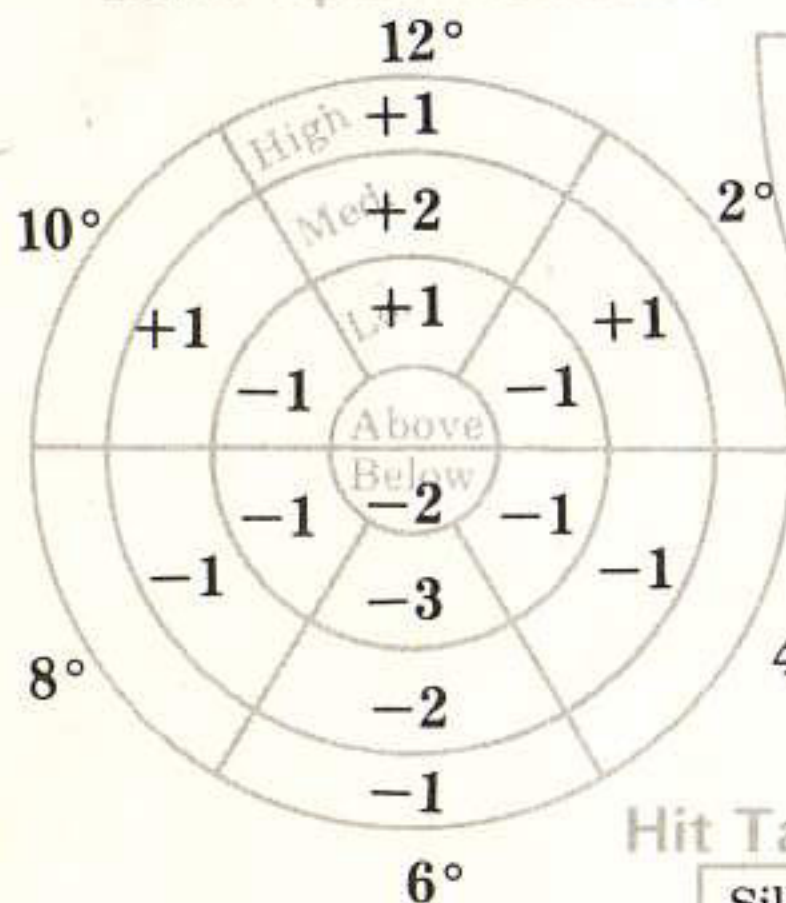


Speed Increments

Altitude Change

Maneuverability Requirements

Blind Spot Modifiers



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-0.5
Dive Sp. Climb	-0.2
Max Climb	-0.2

Loaded

Target Characteristics

W	5	Cn	-	Mg	7
F	7	L	4		
C	3	C	-		
E	3	E	-	E	-
G	2M 4M			4M 2M	
	(5) (5)			(5) (5)	
FF				FF	

Hit Table Modifiers

Silhouette	+2
Fire	+2

Variants

SBD

Douglas SBD-5 "Dauntless" ("Banshee") Carrier Dive Bomber.

PV:16 Engine Type: R Producer: USA

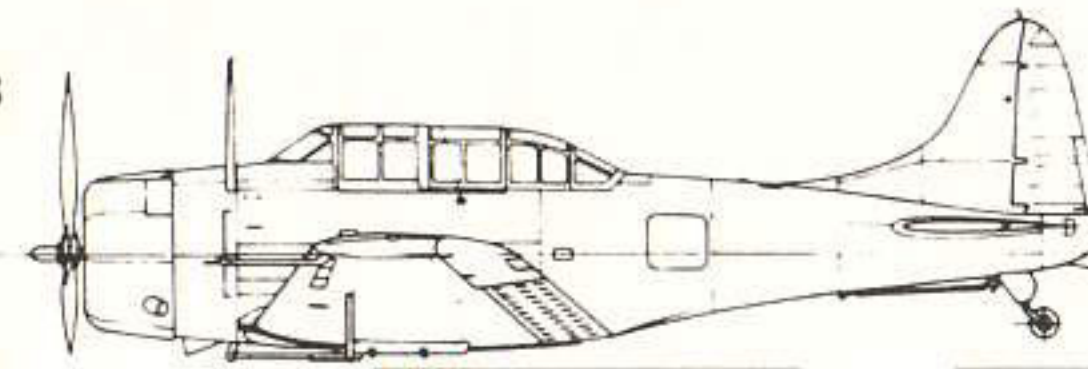
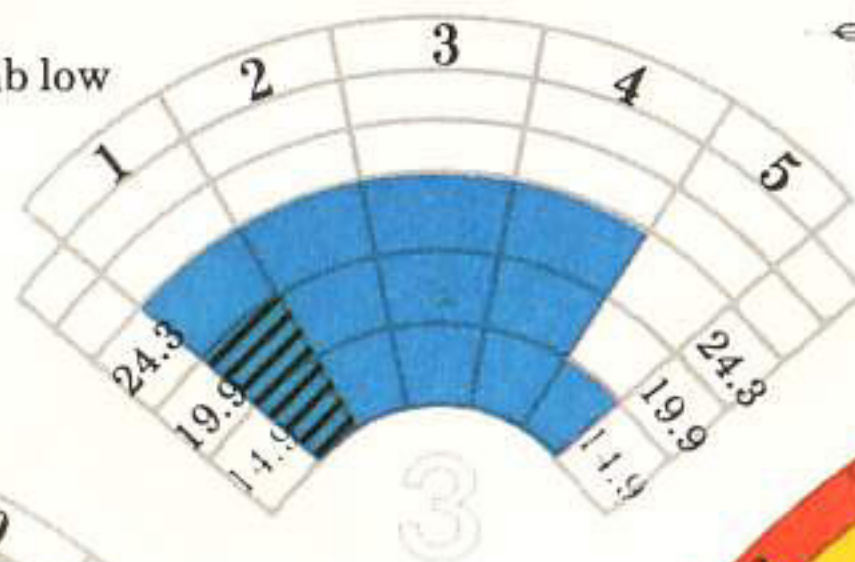
Operational throughout the war. The SBD-5 differed little from other versions. A total of 5936 were built. Has sights for use as a dive bomber or level bomber.

Loaded: Can carry up to 1200 pounds of bombs (one bomb low level) or 2 depth charges.

Stall Speed	1
Maneuver Sp.	2
Level Speed	3
Dive Speed	4
Loaded (Opt.)	-1

DAUNTLESS DATA CARD 6B

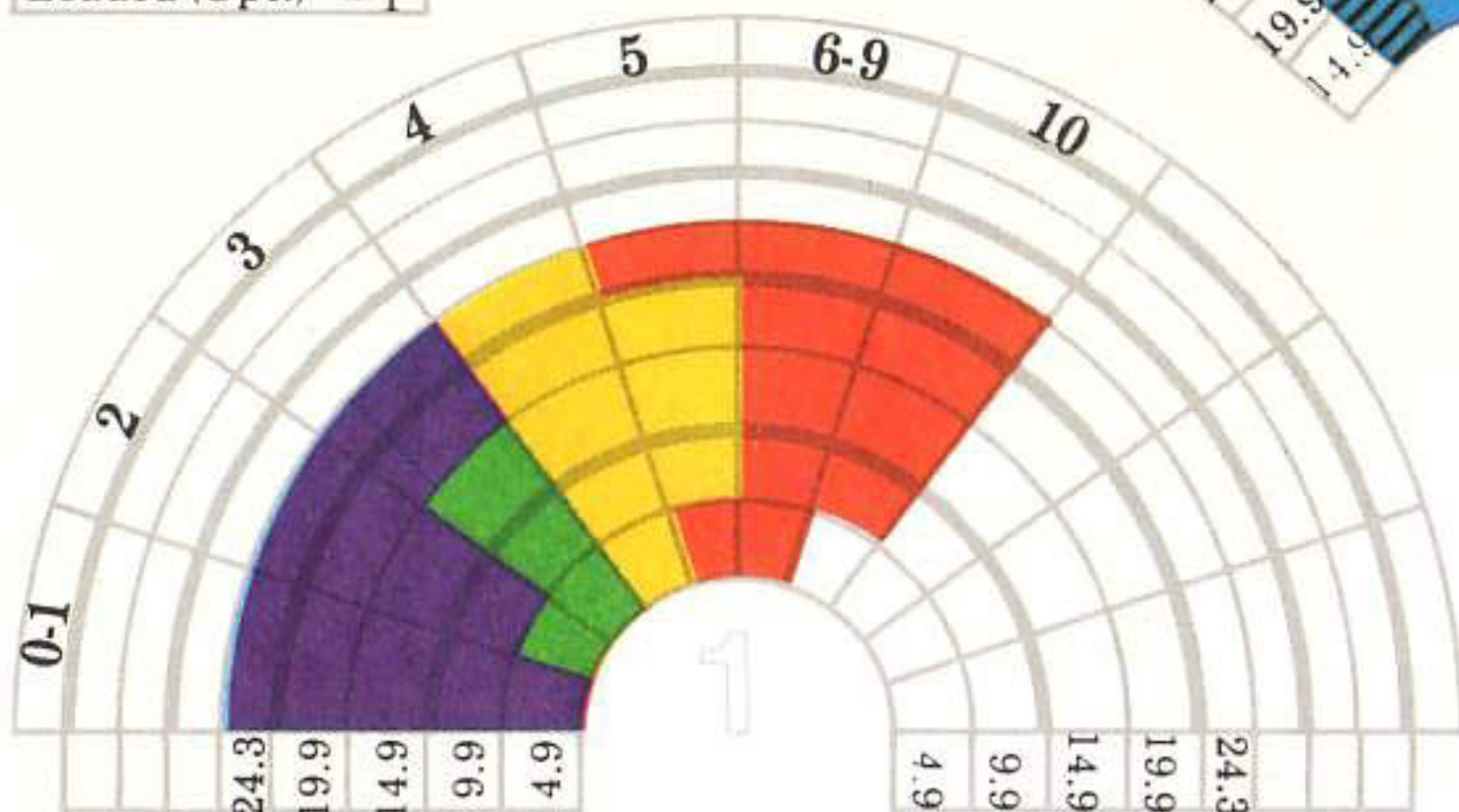
Speed Change



Power Factors	1
Brake Factors	2

Half Loop	P
Half Roll	+2
Turn or Bank	+1
Slip	+1

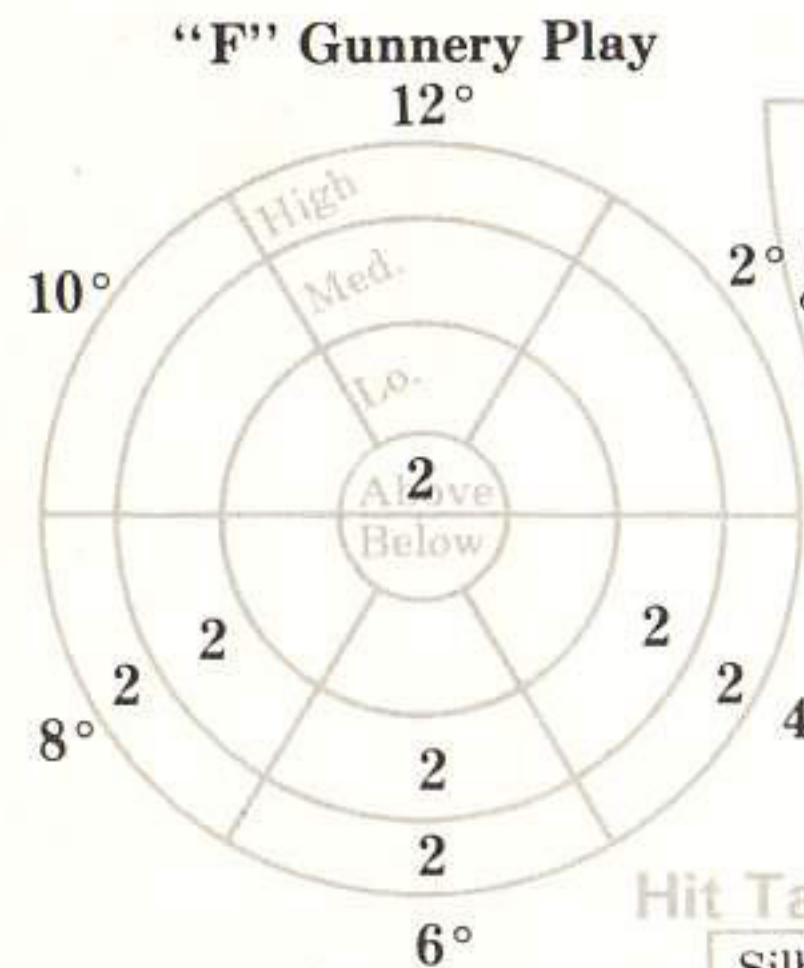
Loaded



Speed Increments

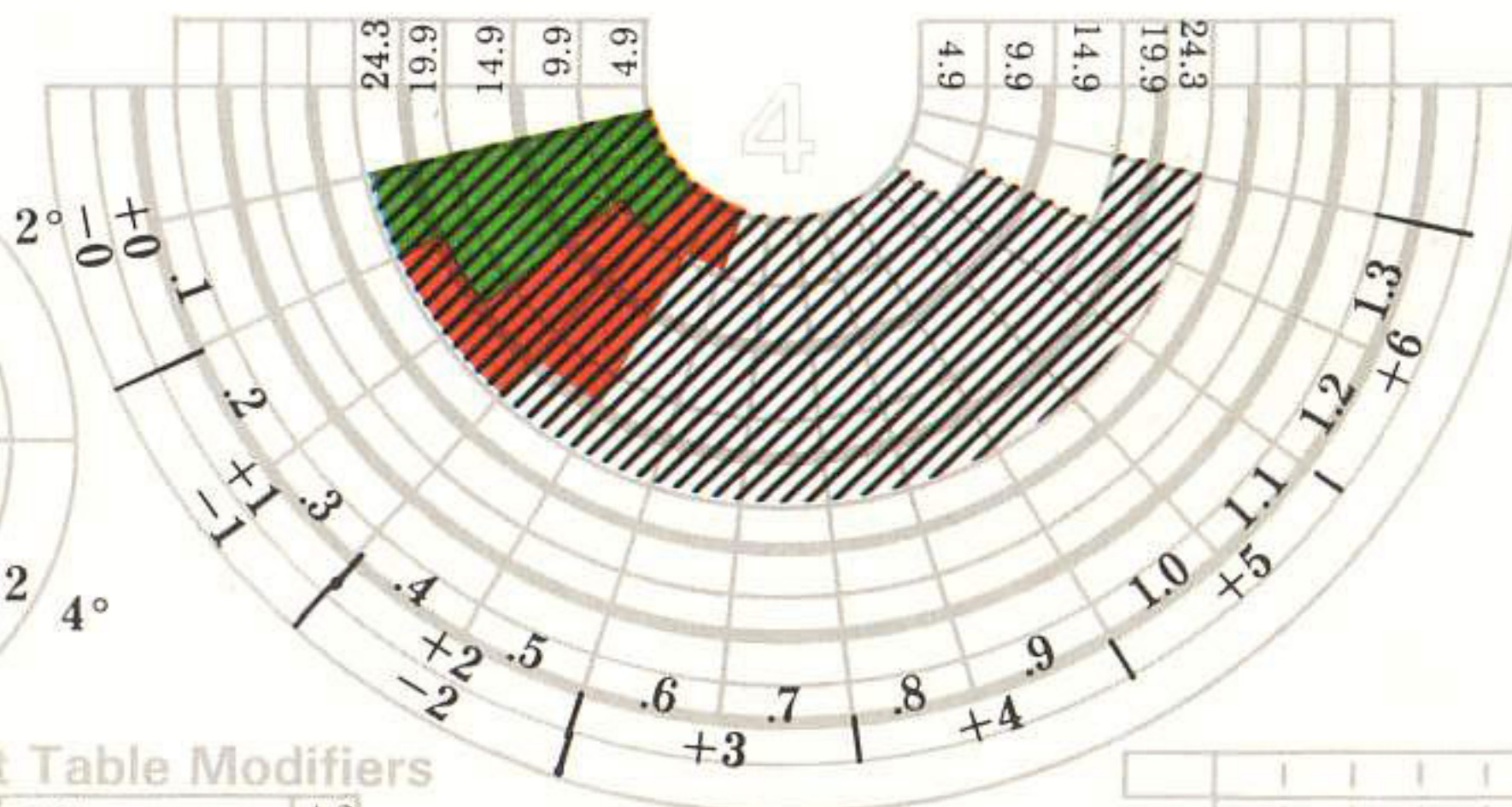
Altitude Change

Maneuverability Requirements



"F" Gunner Play

12°



Hit Table Modifiers

Silhouette	+2
FF Fire (F=O)	+1

Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	1
Dive Sp. Climb	-1
Max Climb	-1

Loaded

Target Characteristics

W	6	Cn	-	Mg	4
F	7	L	3		
C	3	C	-		
E	3	E	-	E	-
G	2M				2M
	(6)		(5)		(6)
	FF		F		FF

Variants

SBD-3. PV: 16.

				2M
		(5)		(6)
		F		FF

P-61A

Northrop P-61A and B "Black Widow" Night Fighter.

PV: 31 Engine Type: R Producer: USA

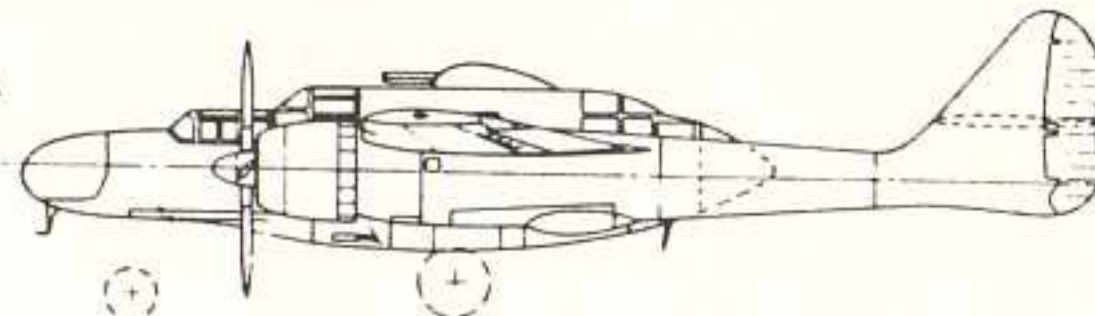
Operational in April '44. A total of 200 A and 450B models built. Equipped with radar.

Loaded: Can carry up to 2 bombs (A) or 4 bombs (B).

Stall Speed	Dark Blue
Maneuver Sp.	Green
Level Speed	Yellow
Dive Speed	Red
Loaded (Opt.)	-2

DAUNTLESS DATA CARD 6A

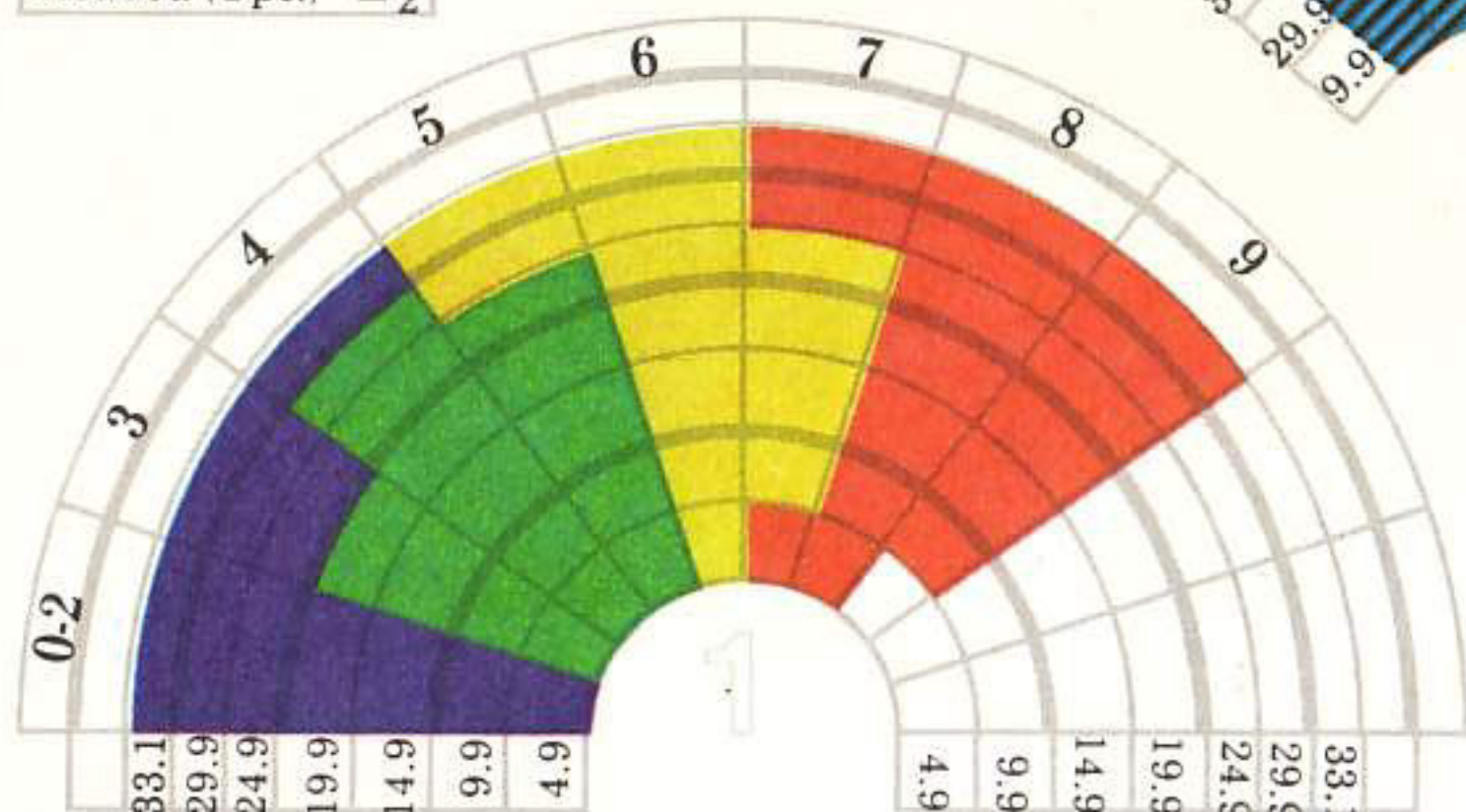
Speed Change



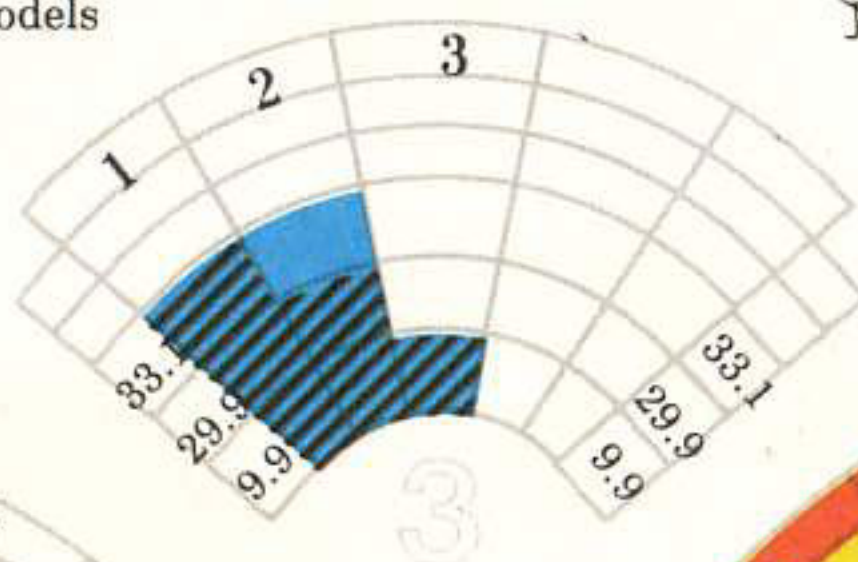
Power Factors	Diagonal Stripes
Brake Factors	Blue

Half Loop	Dark Green	P
Half Roll	Blue Stripes	P
Turn or Slip	Diagonal Stripes	+3
Bank	Blue	+2

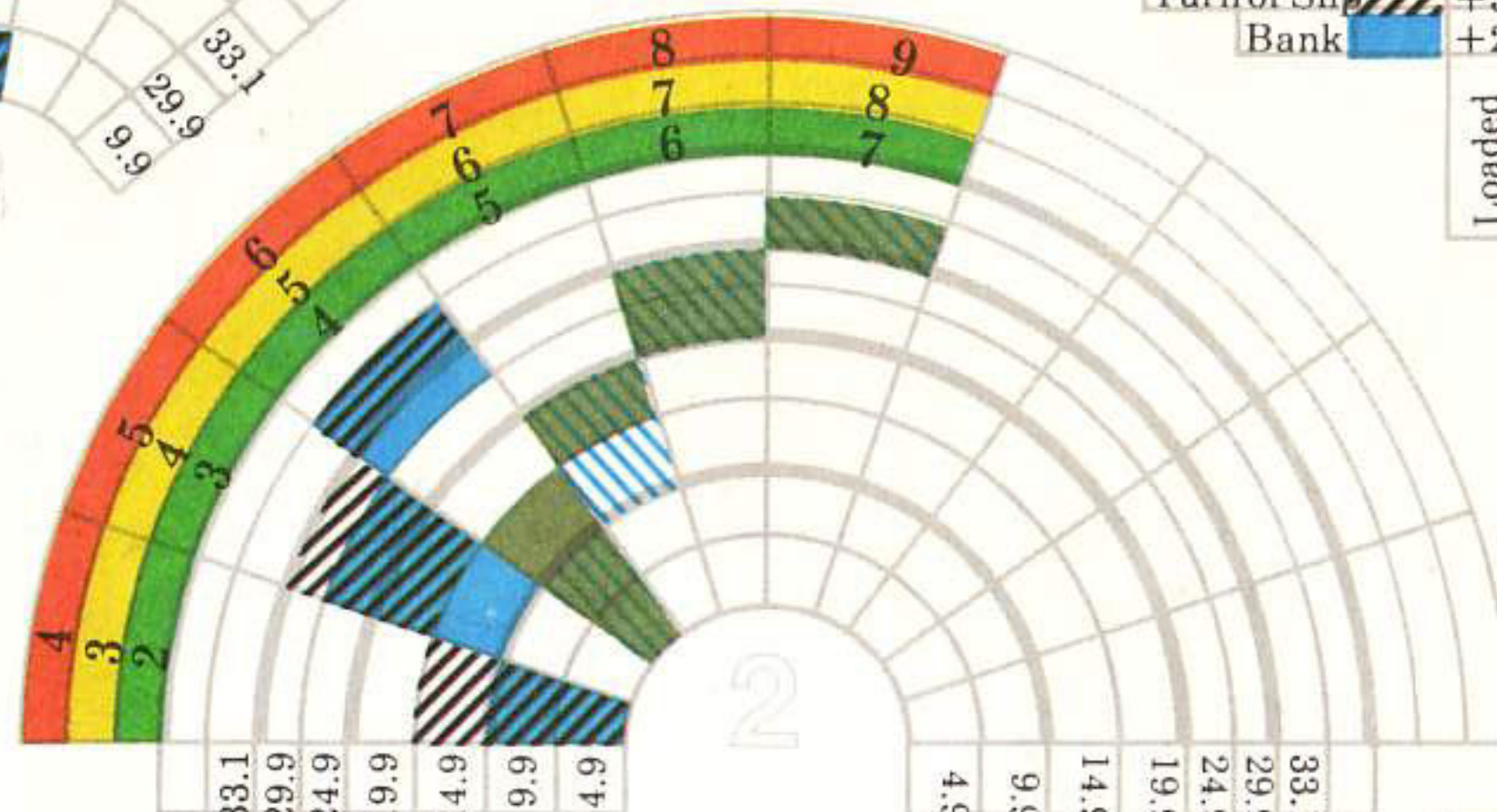
Loaded



Speed Increments

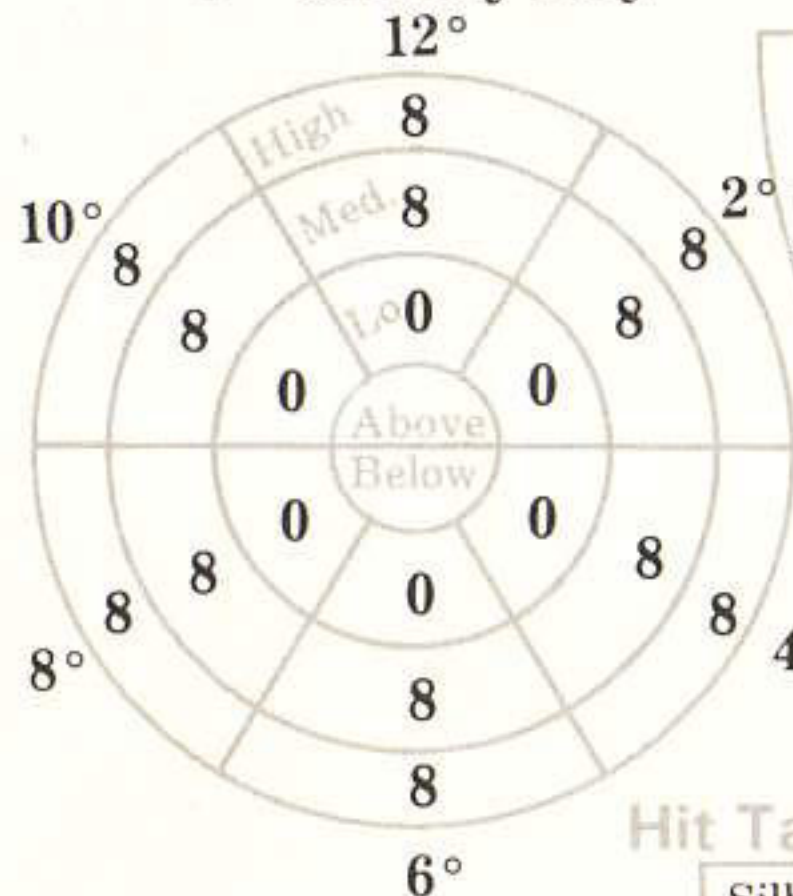


Altitude Change



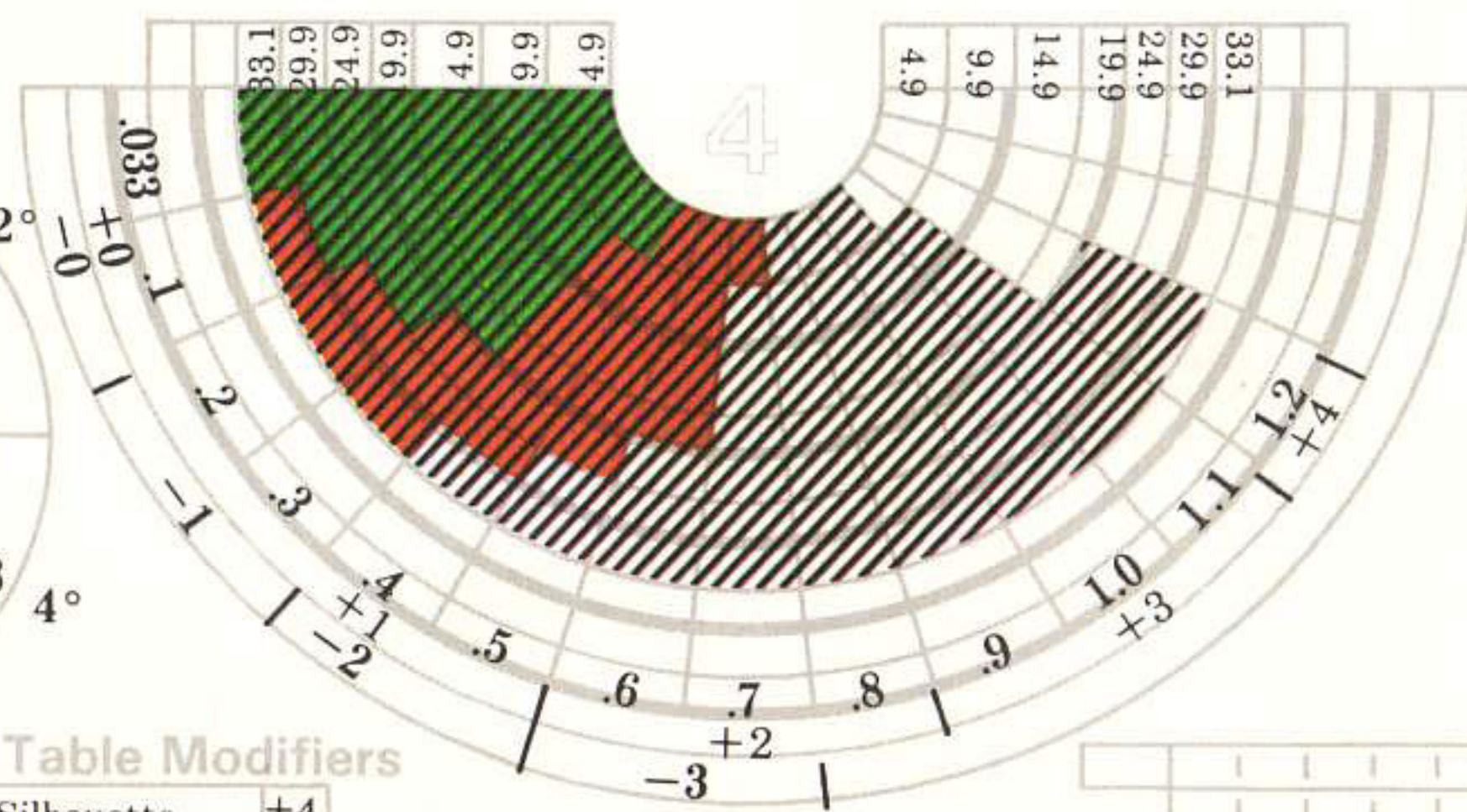
Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+4
FF Fire (F=0)	+2



Dive Acceler.	+1	Loaded
Climb Deceler.	-1	
Max Dive	Diagonal Stripes	-4
Dive Sp. Climb	Red	-2
Max Climb	Green	-2

Target Characteristics

W	8	Cn	5	Mg	-
F	9	L	3		
C	3	C	-		
E	3	E	-	E	3
G	4C	4C		4C	4C
	(6)	(6)		(6)	(6)
FF					FF

Variants

Turreted. PV: 33.

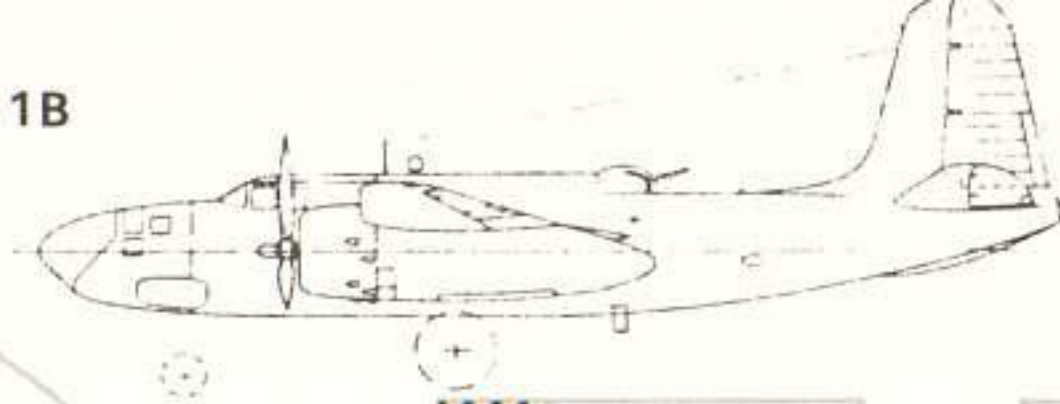
4C	4C		4C	4C
(6)	(6)	(6)	(6)	(6)
FF		F		FF

Only 287 aircraft carried the turret.

A-20G

Douglas A-20G "Havoc" ("Boston") Light Day Bomber.
 PV: 22 Engine Type: R Producer: USA
 Operational in 1943. A total of 2860 G-series built.
 Loaded: Can carry up to 4000 pounds of bombs (3 bombs low level).

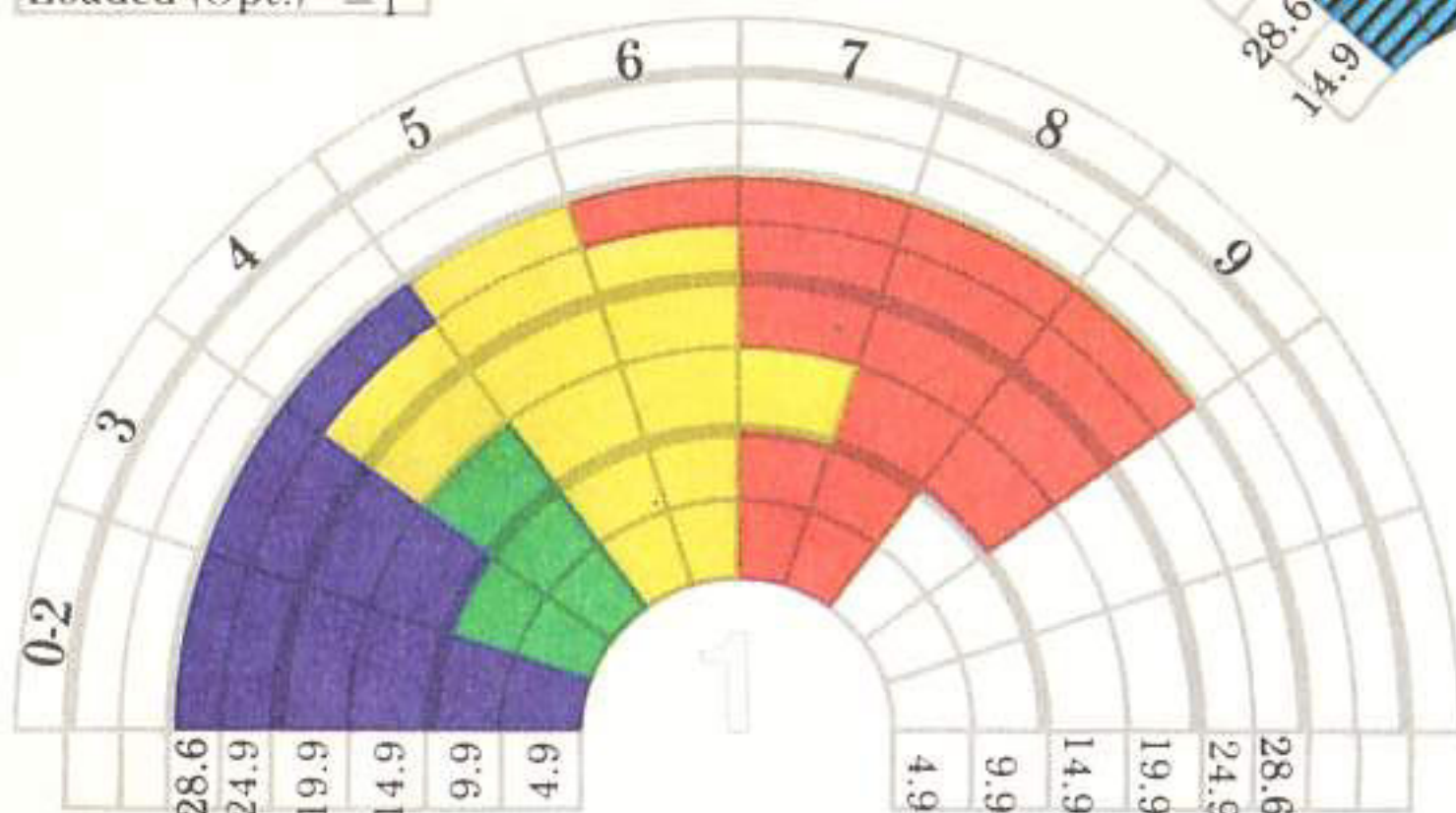
DAUNTLESS DATA CARD 11B



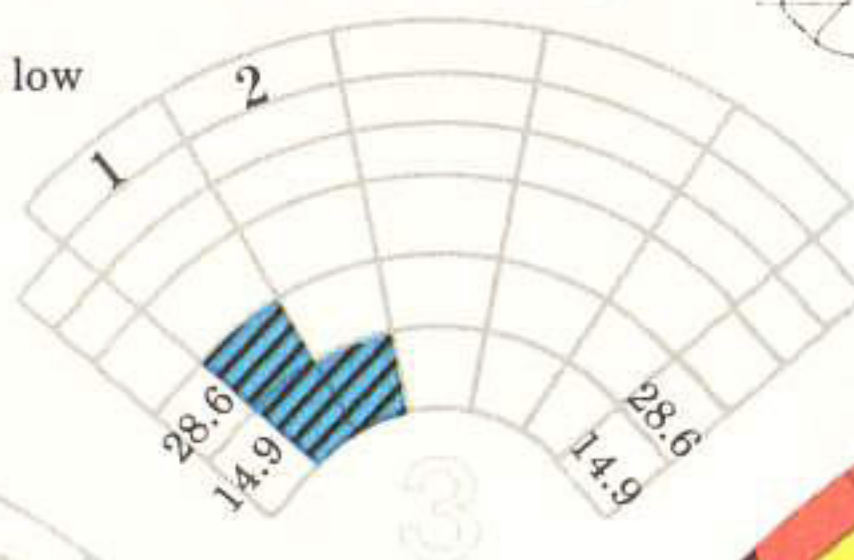
Power Factors
 Brake Factors

Half Loop P
 Half Roll P
 Turn or Slip +2
 Bank +3
 Loaded

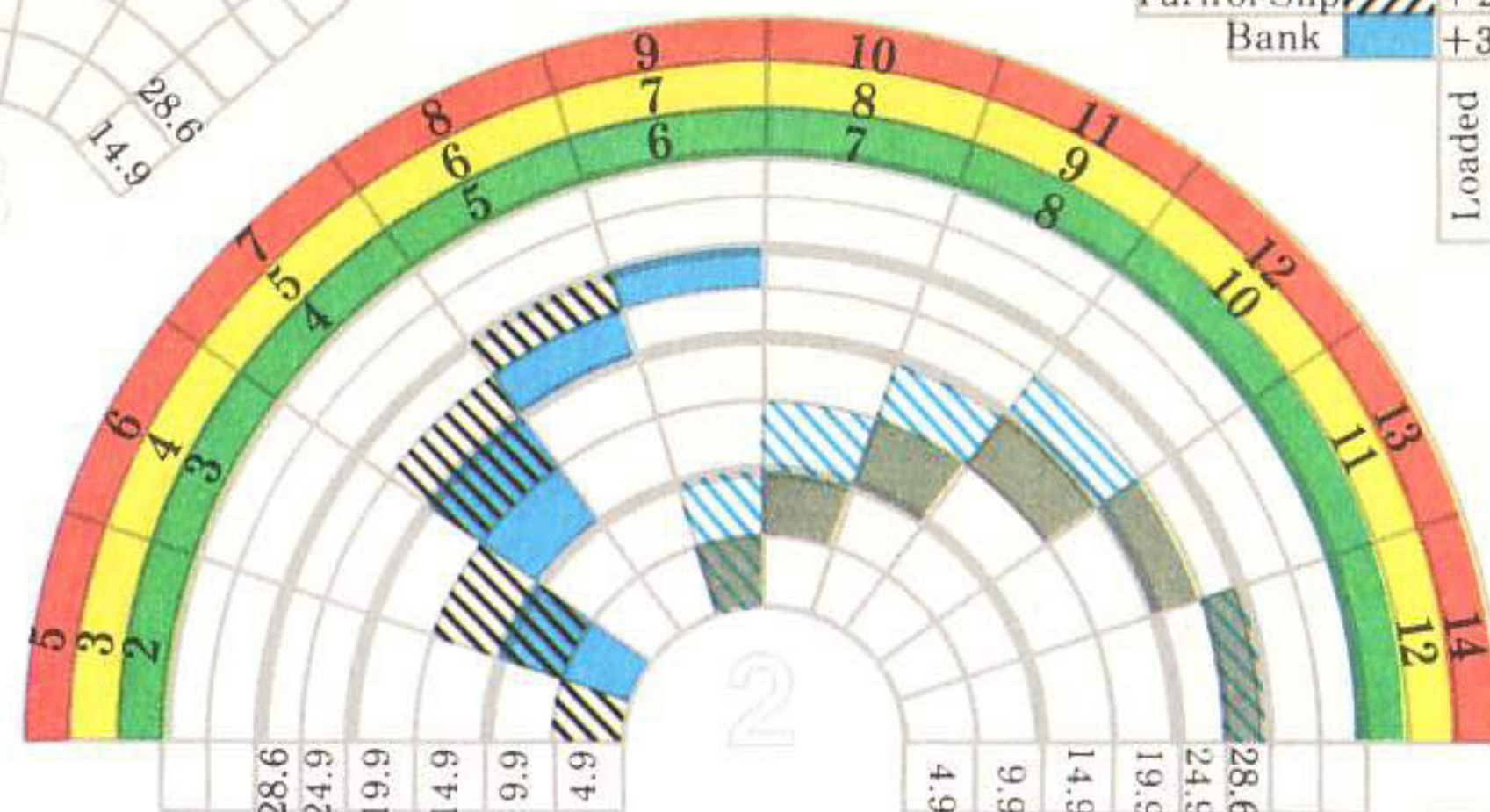
Stall Speed
 Maneuver Sp.
 Level Speed
 Dive Speed
 Loaded (Opt.) -1



Speed Increments

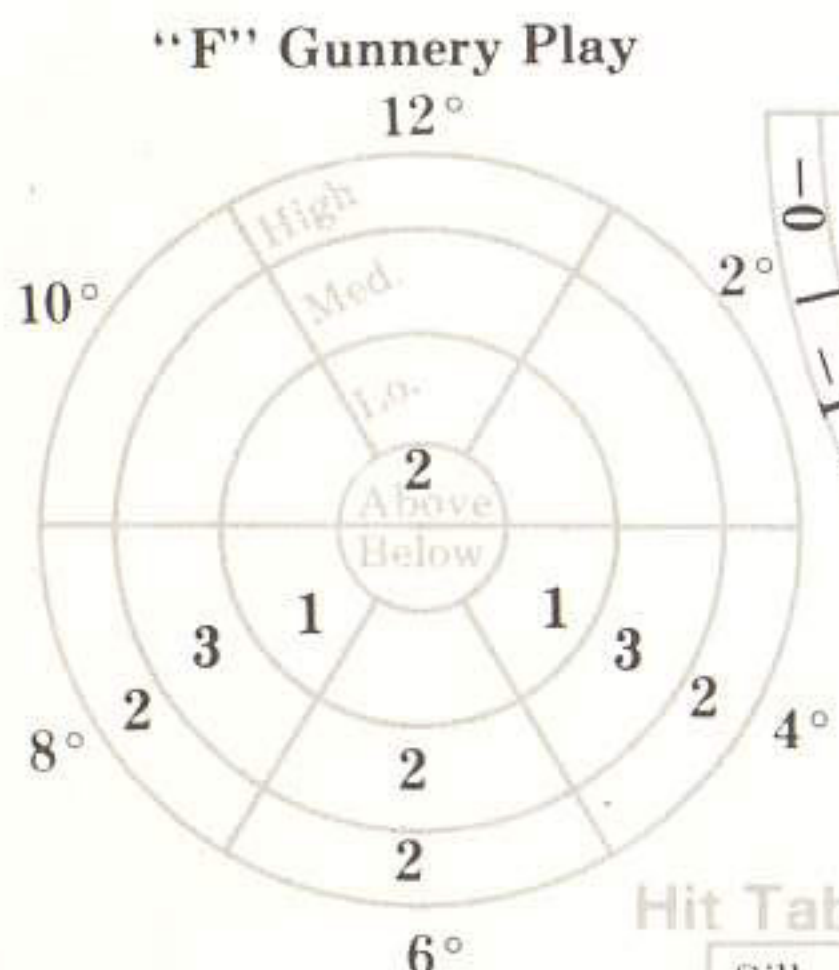


Altitude Change



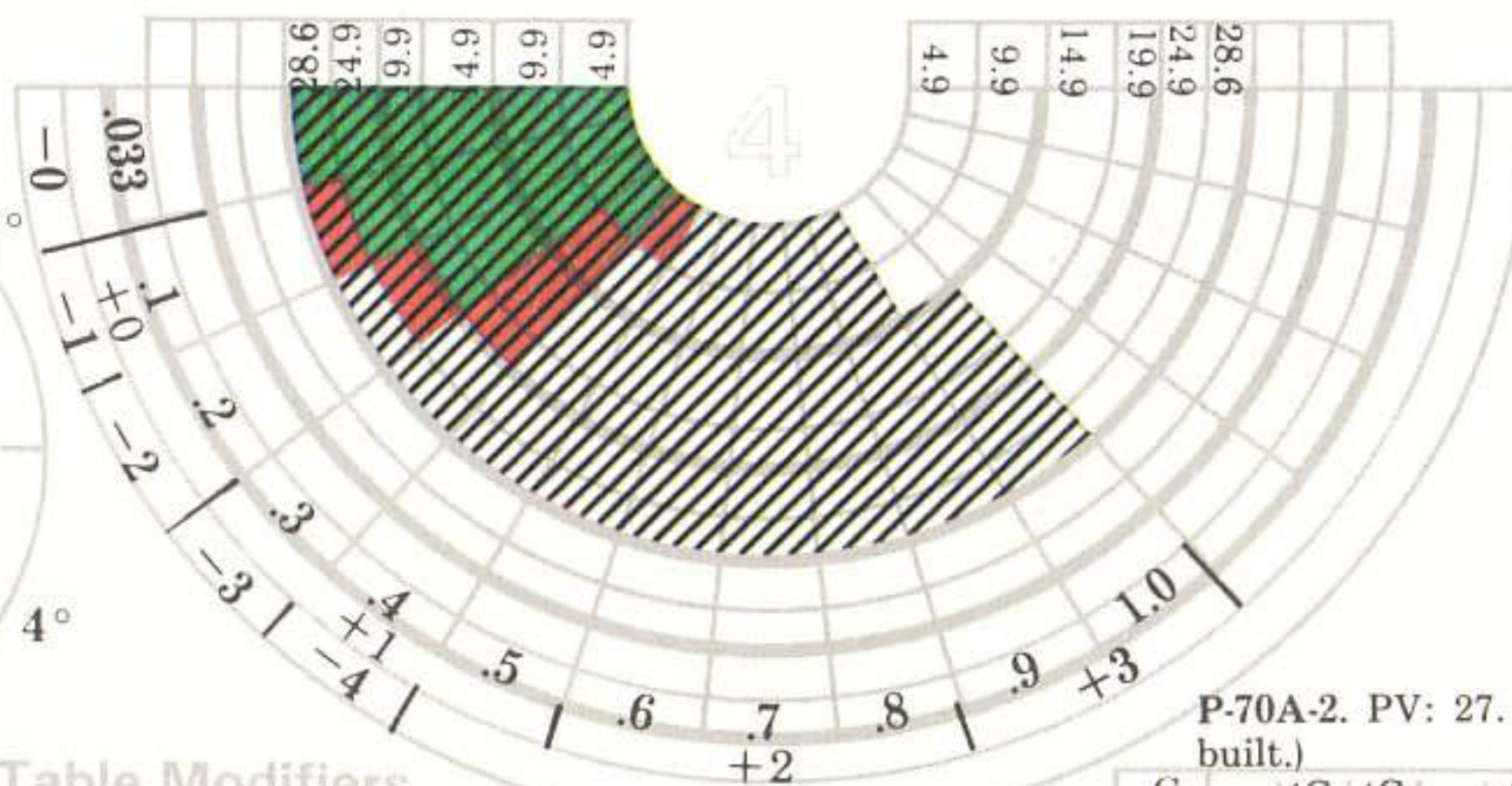
Maneuverability Requirements

Dive Acceler. +1
 Climb Deceler. -1
 Max Dive .2
 Dive Sp. Climb .1
 Max Climb .1
 Loaded



Hit Table Modifiers

Silhouette +4
 Fire 0



Target Characteristics

W	6	Cn	-	Mg	7
F	6	L	3		
C	3	C	-		
E	3	E	-	E	3
G	2M 4M			4M 2M	
	(6) (6)		(6)	(6) (6)	
	FL		F	FL	

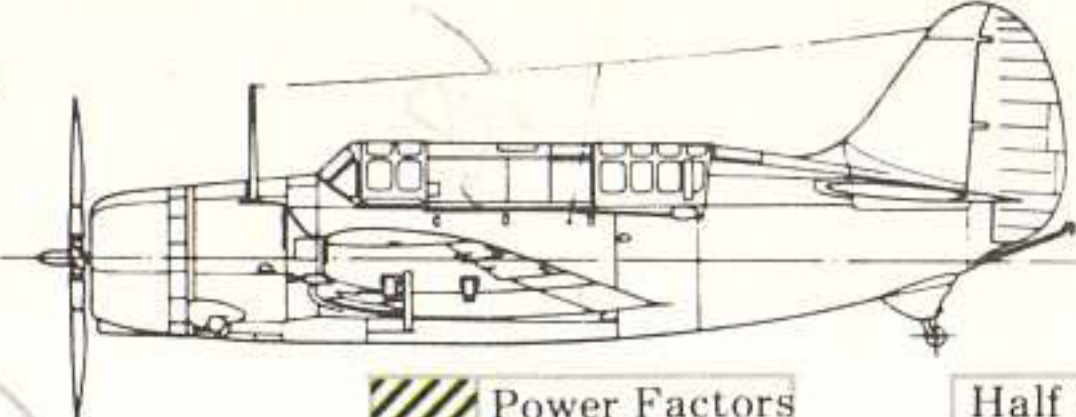
A-20G alt. PV: 24. Mg: 6.
 Cn: 5.
 G 2M 4C 4C 4C 4C 2M
 (6) (6) (6) (6) (6) (6)
 FL F FL
 (Alternate nose armament.)

P-70A-2. PV: 27. Cn: 5. (65 built.)
 G 4C 4C 4C 4C
 (6) (6) (6) (6)
 FF FF
 Night Fighter. Carried Radar. Loaded: 1 bomb.

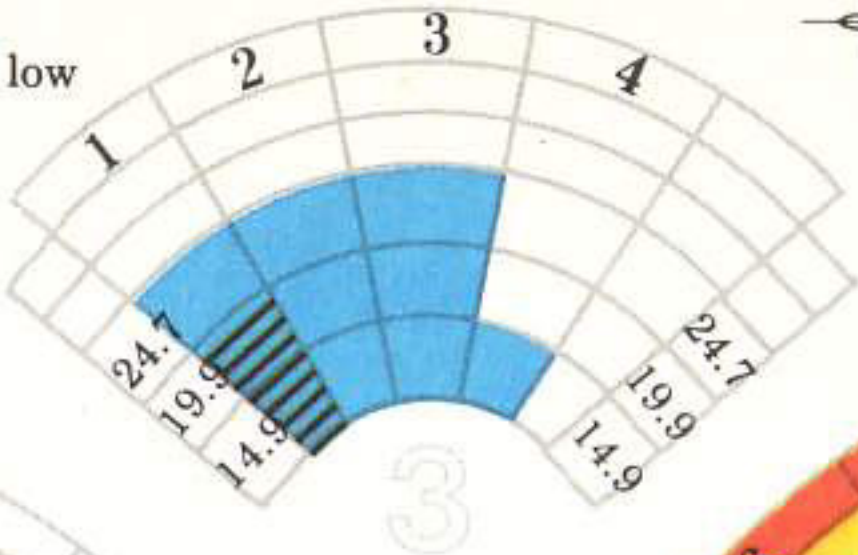
SB2C, SBW-1C and SBF-1C

Curtiss SB2C-1C "Helldiver" Carrier Dive Bomber
PV: 18 Engine Type: R Producer: USA
Operational in early 1944. A total of 868 of this version were built. Has sights for use as a dive bomber.
Loaded: Can carry up to 1200 pounds of bombs (one bomb low level) or 4 depth charges.

DAUNTLESS DATA CARD 11A

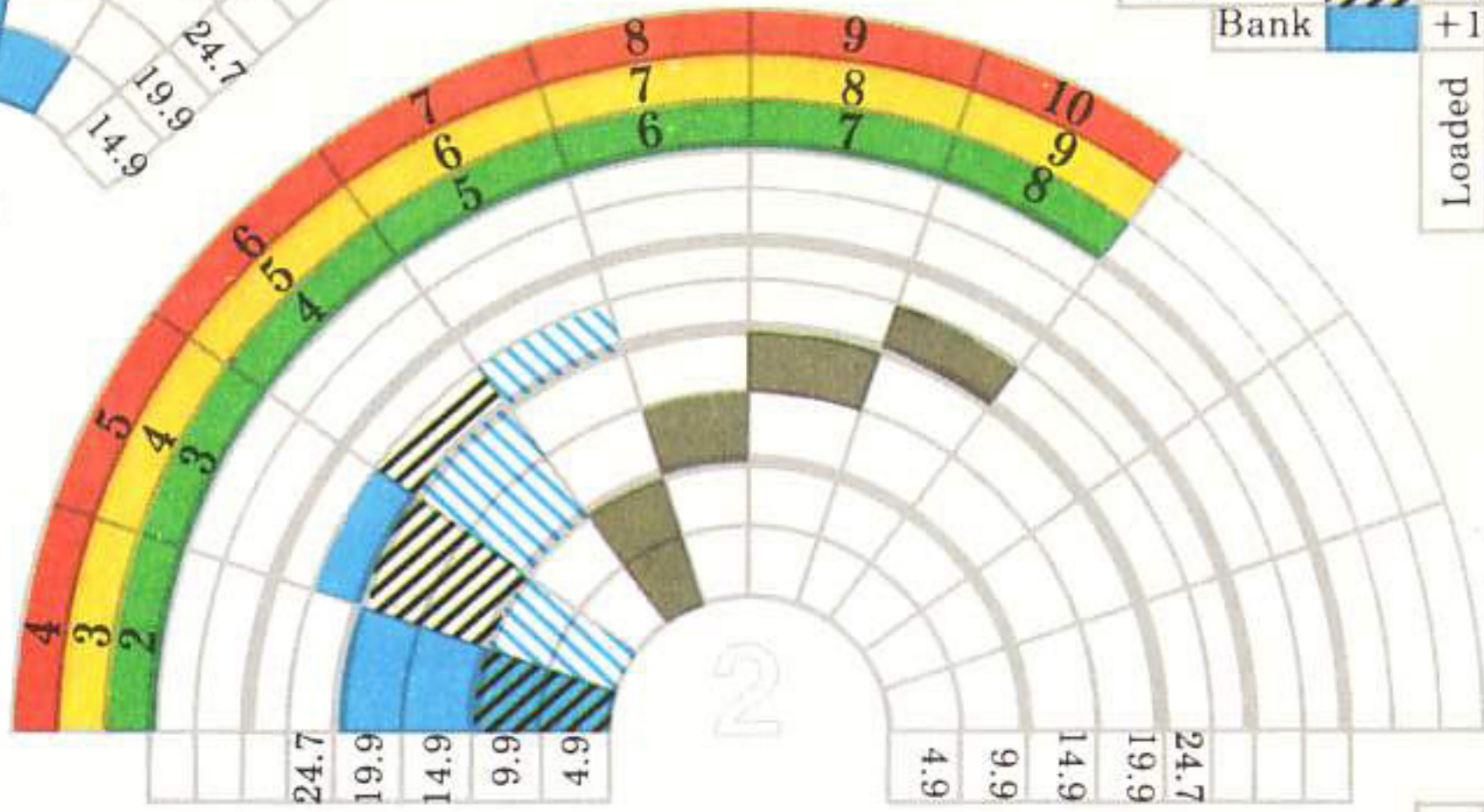
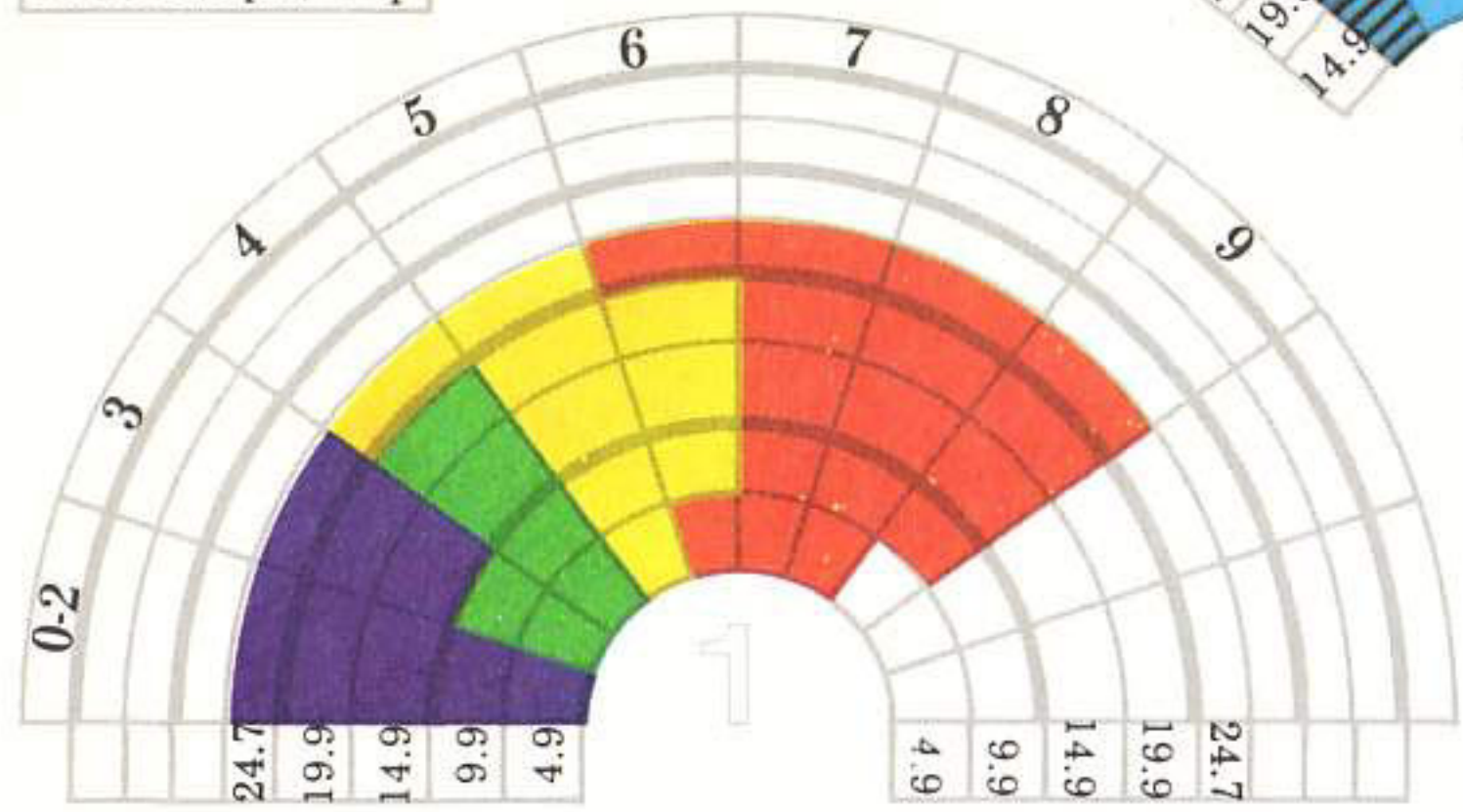


Speed Change



Power Factors
Brake Factors

Half Loop P
Slip or Roll +1
Turn +1
Bank +1
Loaded

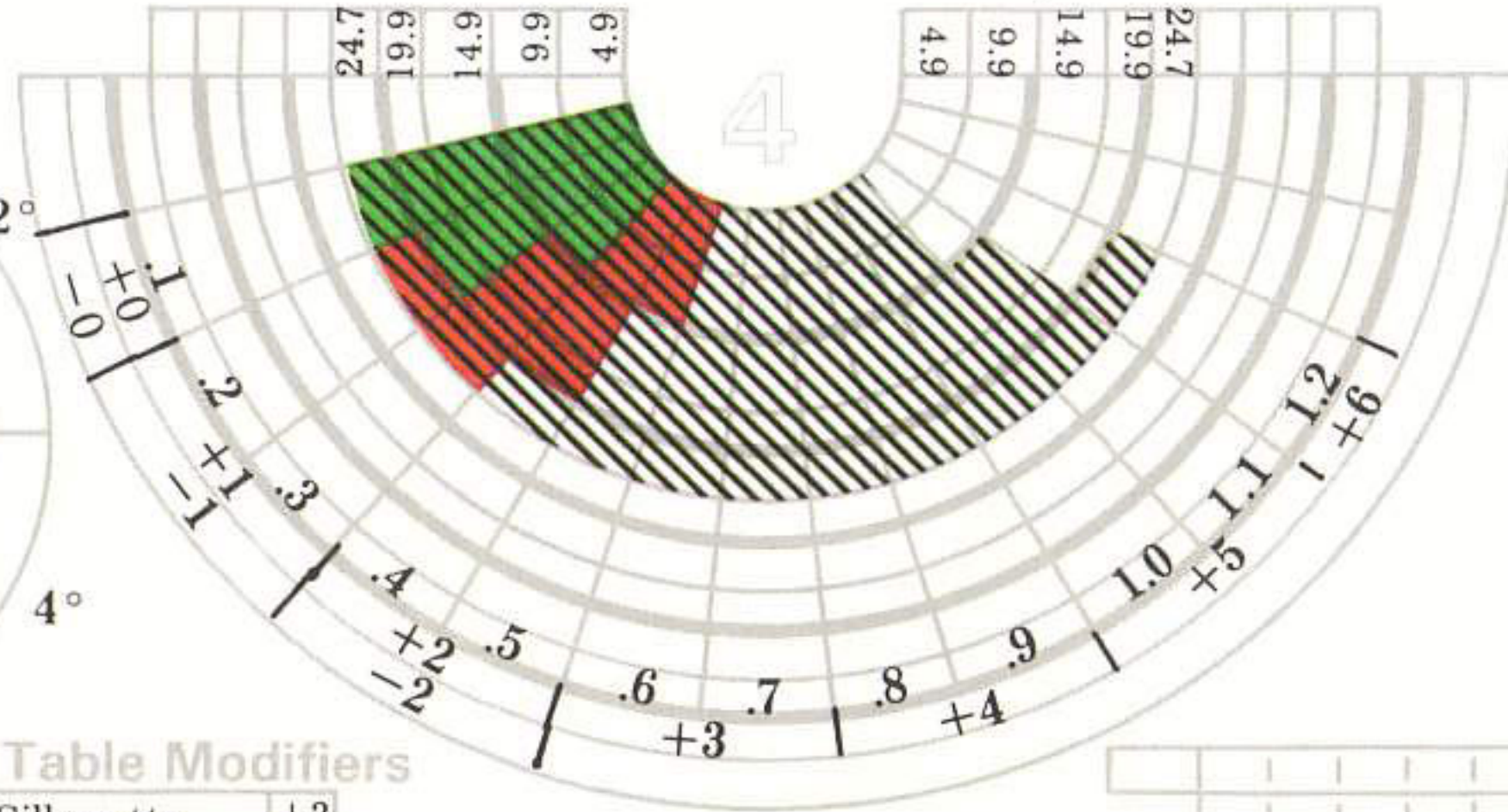
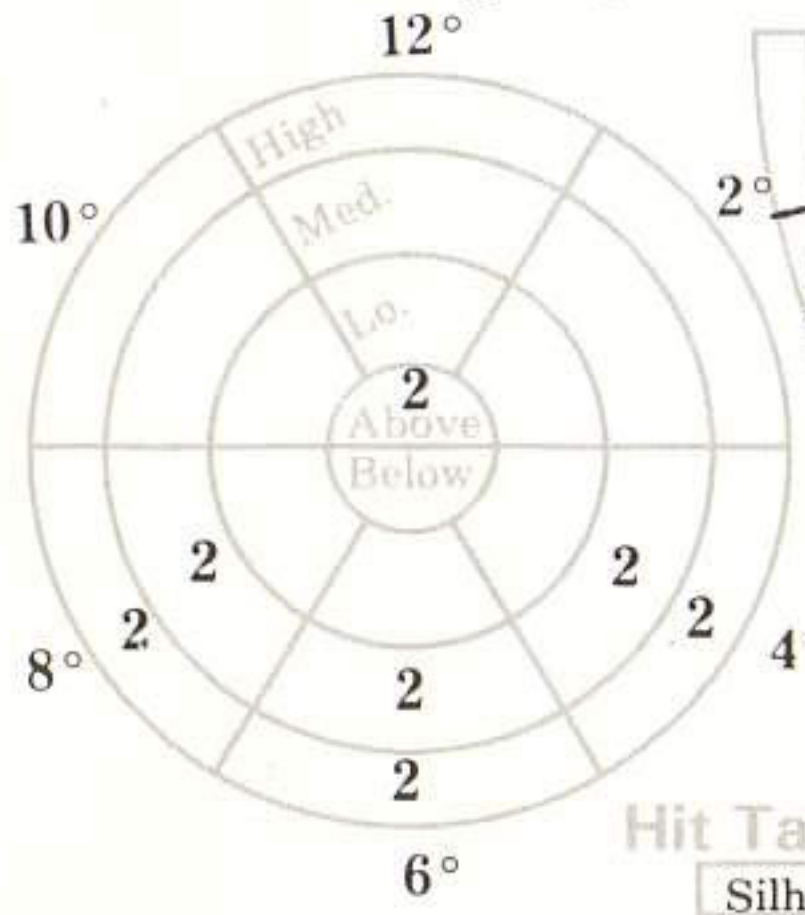


Speed Increments

Altitude Change

Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette +3
FF Fire (F=0) +1

Dive Acceler. +1
Climb Deceler. -1
Max Dive 0
Dive Sp. Climb -.1
Max Climb -.1
Loaded

Target Characteristics

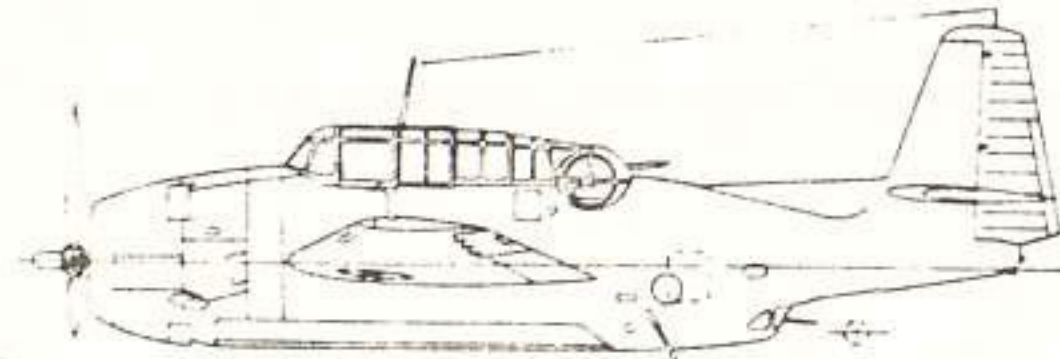
W	6	Cn	4	Mg	-
F	7	L	3		
C	3	C	-		
E	3	E	-	E	-
G	4C			4C	
	(5)	(5)	(5)		
	FF	F	FF		

Variants

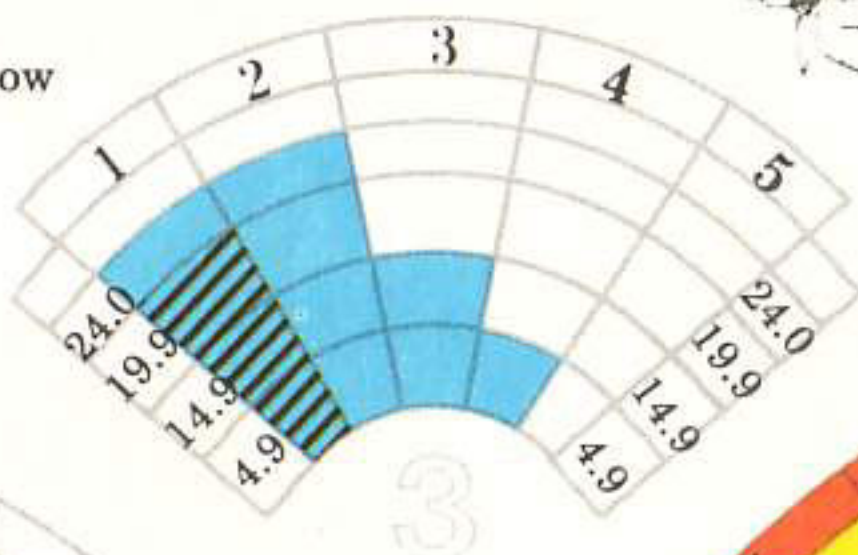
TBF and TBM

Grumman TBF-1C "Avenger" Carrier Torpedo Bomber
 PV: 17 Engine Type: R Producer: USA
 The TBF-1 entered combat in June '42; 1C in Summer '43.
 A total of 2075 of -1 models built; 3096 1Cs. Has sights for level bombing.
 Loaded: Can carry up to 2000 pounds of bombs (two bombs low level) one torpedo, 4 depth charges, or 8 A/G rockets.

DAUNTLESS DATA CARD 4B



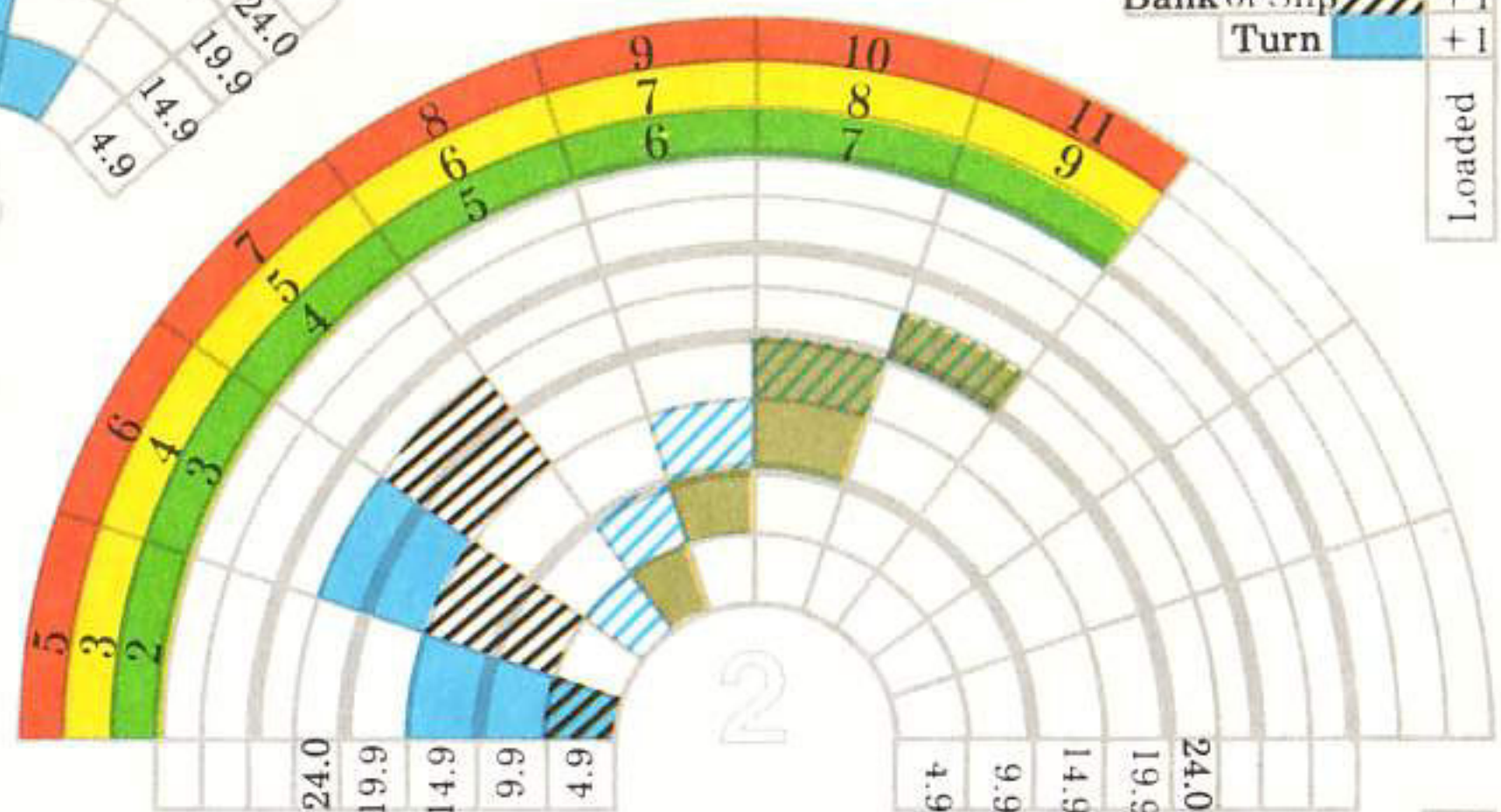
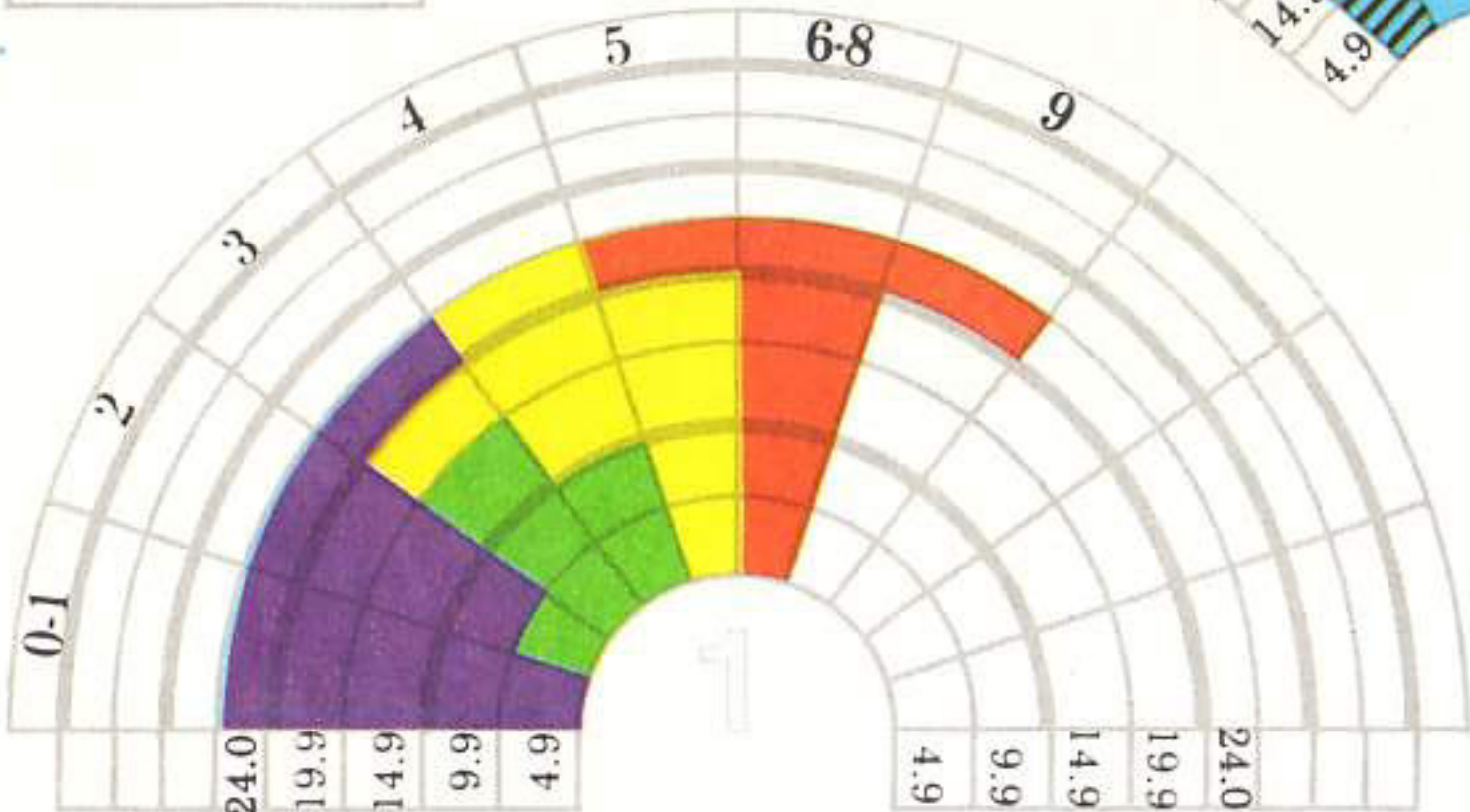
Speed Change



Power Factors
 Brake Factors

Half Loop P
 Half Roll P
 Bank or Slip +1
 Turn +1
 Loaded

Stall Speed
 Maneuver Sp.
 Level Speed
 Dive Speed
 Loaded (Opt.) -2



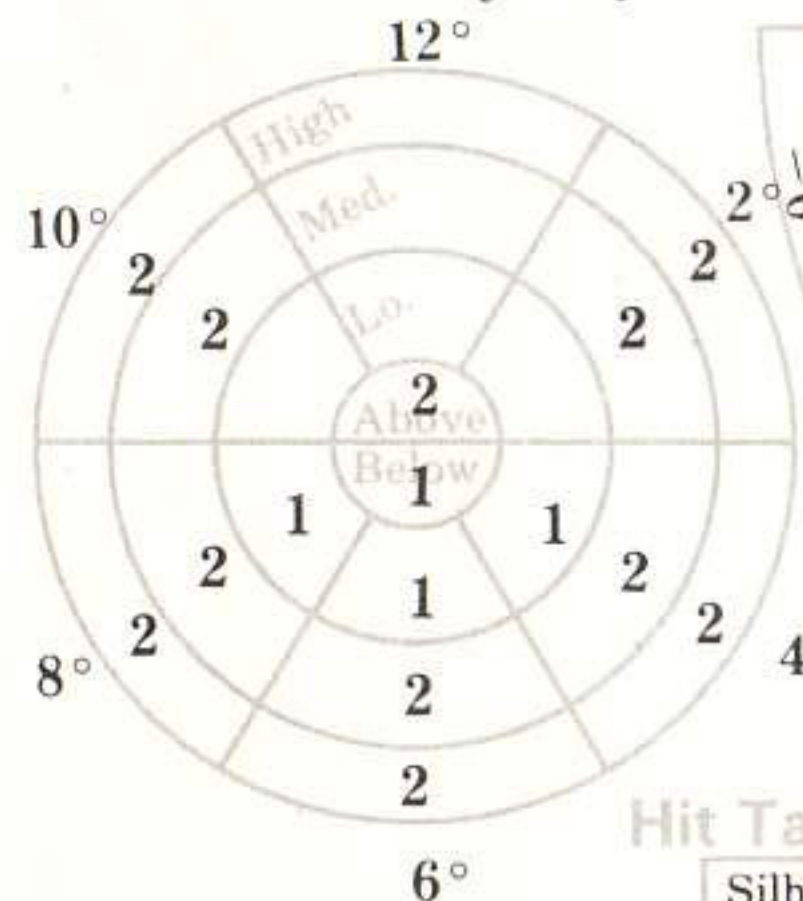
Speed Increments

Altitude Change

Maneuverability Requirements

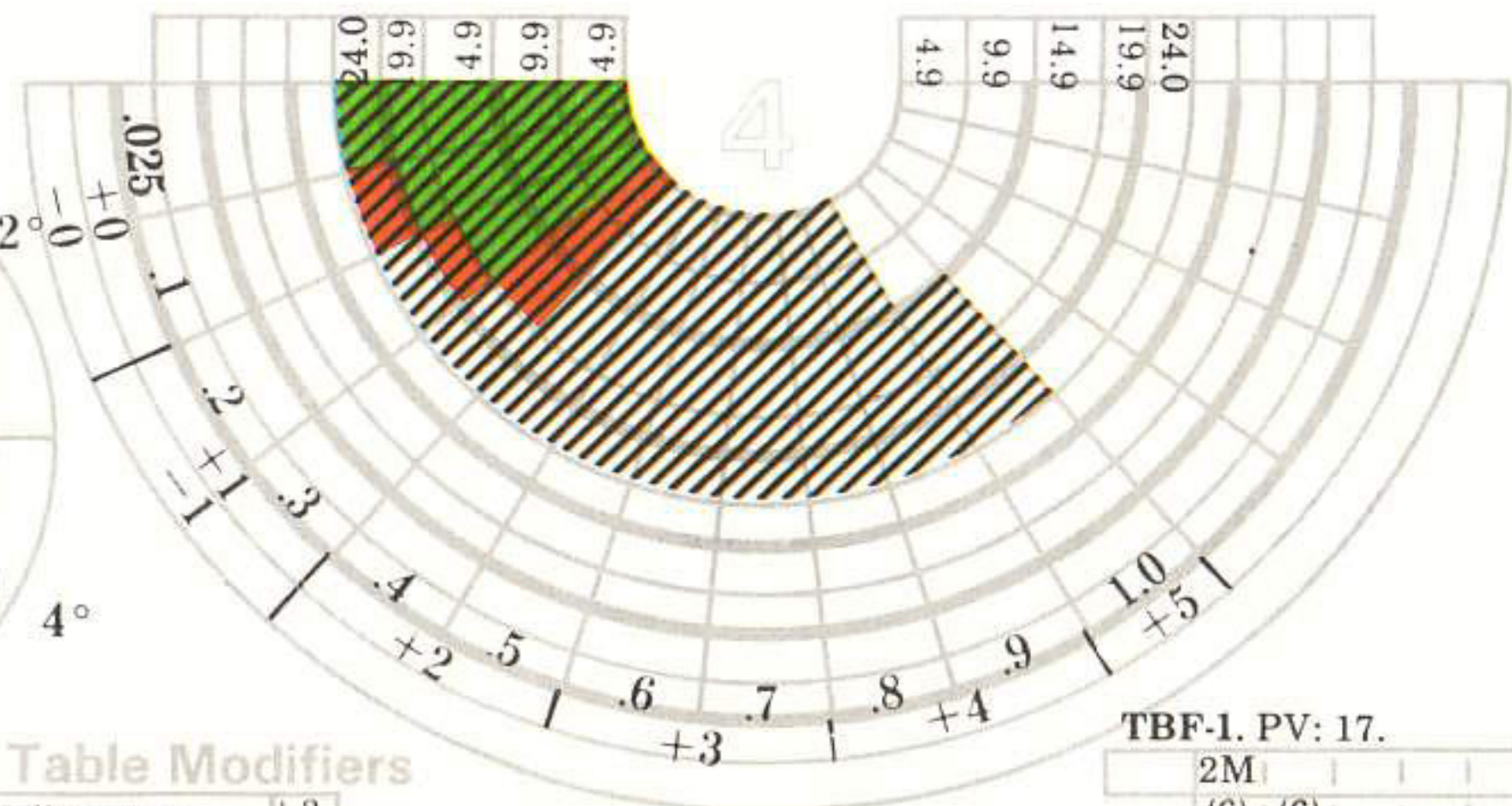
Dive Acceler. +1
 Climb Deceler. -1
 Max Dive -2
 Dive Sp. Climb -1
 Max Climb -1
 Loaded

"F" Gunnery Play



Hit Table Modifiers

Silhouette +3
 FF Fire (F=0) +1



Target Characteristics

W	6	Cn	-	Mg	5
F	8	L	3		
C	3	C	-		
E	3	E	-	E	
G	2M				2M
	(5)		(6)		(5)
	FF		FF		FF

Variants

TBF-1. PV: 17.

2M					
(6)	(6)				
FF	F				

The TBF-1P and 1CP were photo-recon versions

B-26B

DAUNTLESS DATA CARD 4A

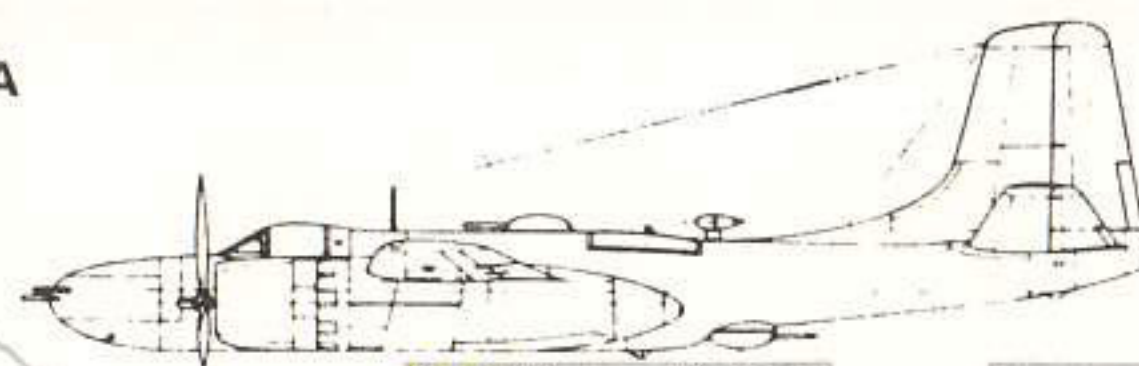
Martin B-26B (short wing) "Marauder Ia" Medium Day Bomber

PV: 24 Engine Type: R Producer: USA

Appeared in May '42. A total of 641 built with short wing.

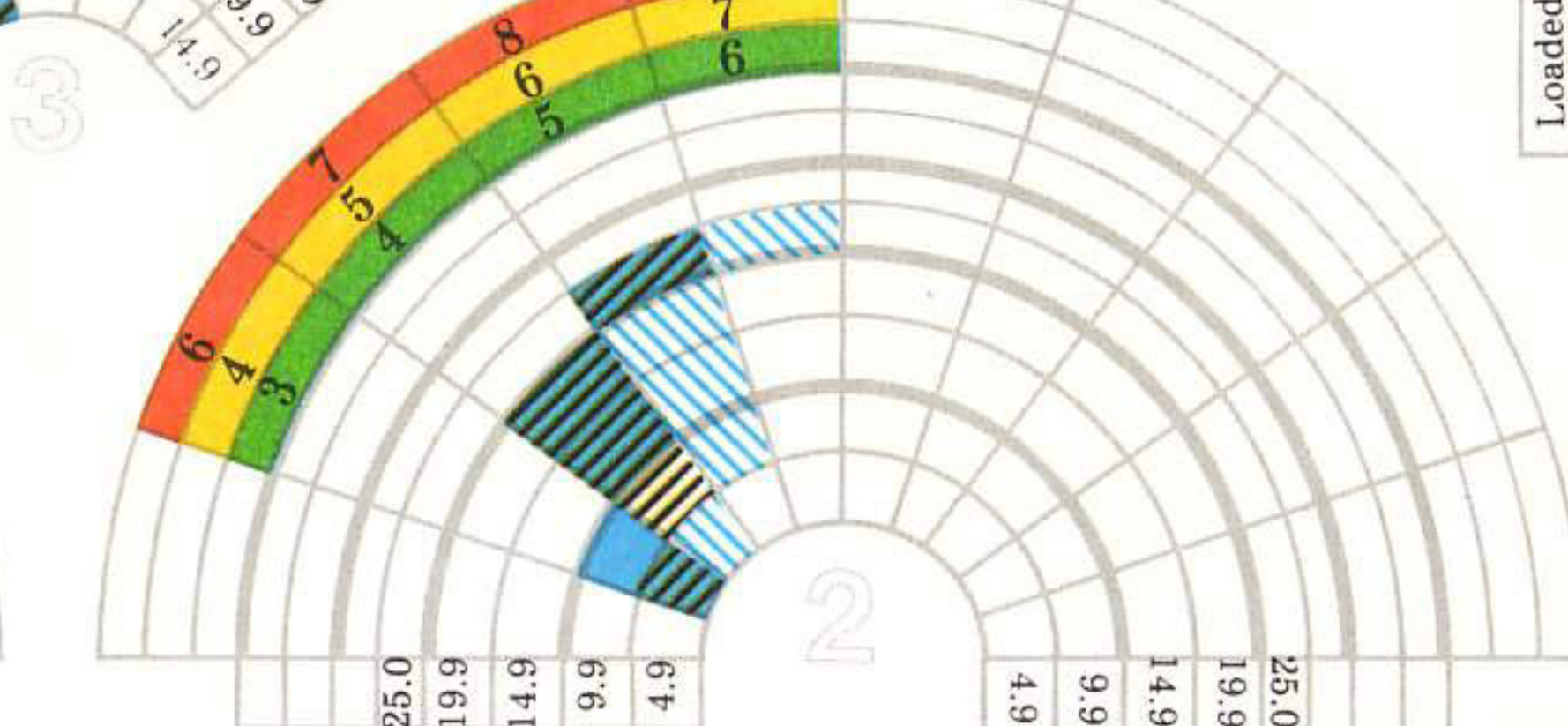
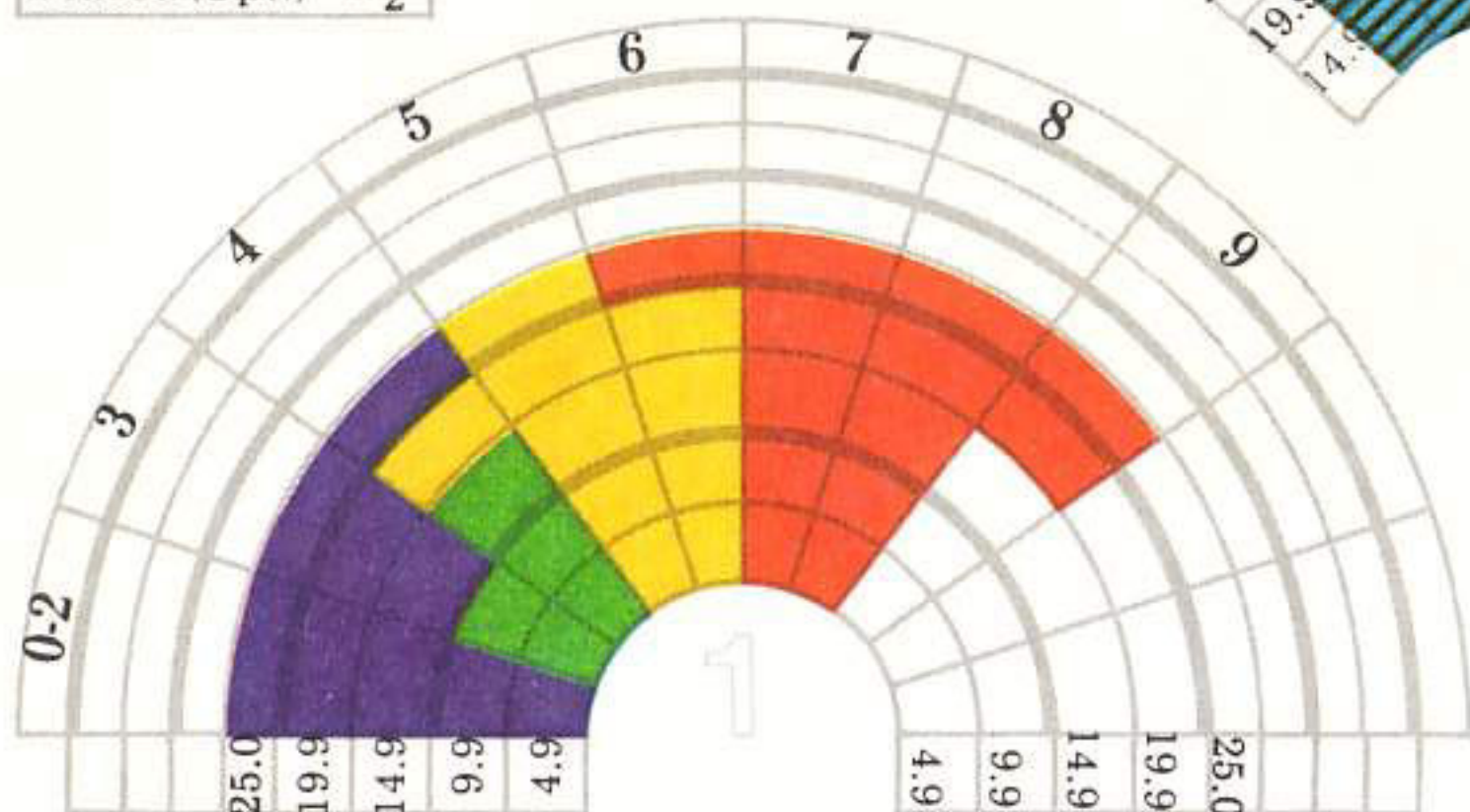
Loaded: Can carry up to 4800 pounds of bombs (4 bombs low level) or one torpedo. Has sights for level bombing.

Stall Speed	25.0
Maneuver Sp.	19.9
Level Speed	14.9
Dive Speed	9.9
Loaded (Opt.)	-2



Power Factors	25.0
Brake Factors	19.9

Slip	+2
Turn	+3
Bank	+3
Loaded	

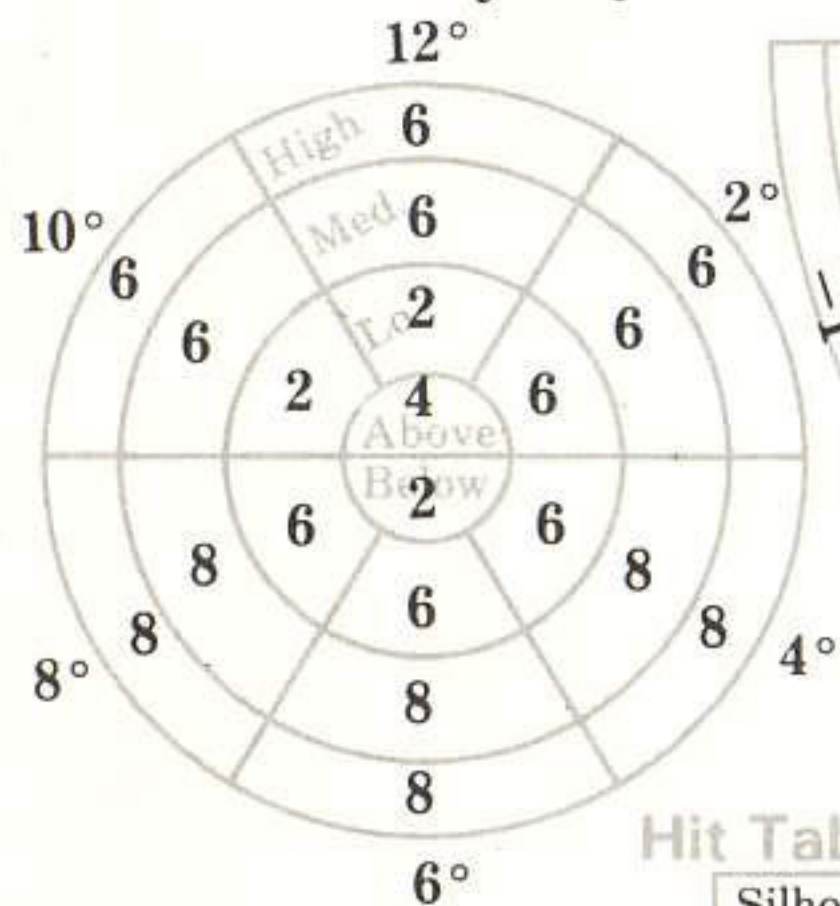


Speed Increments

Altitude Change

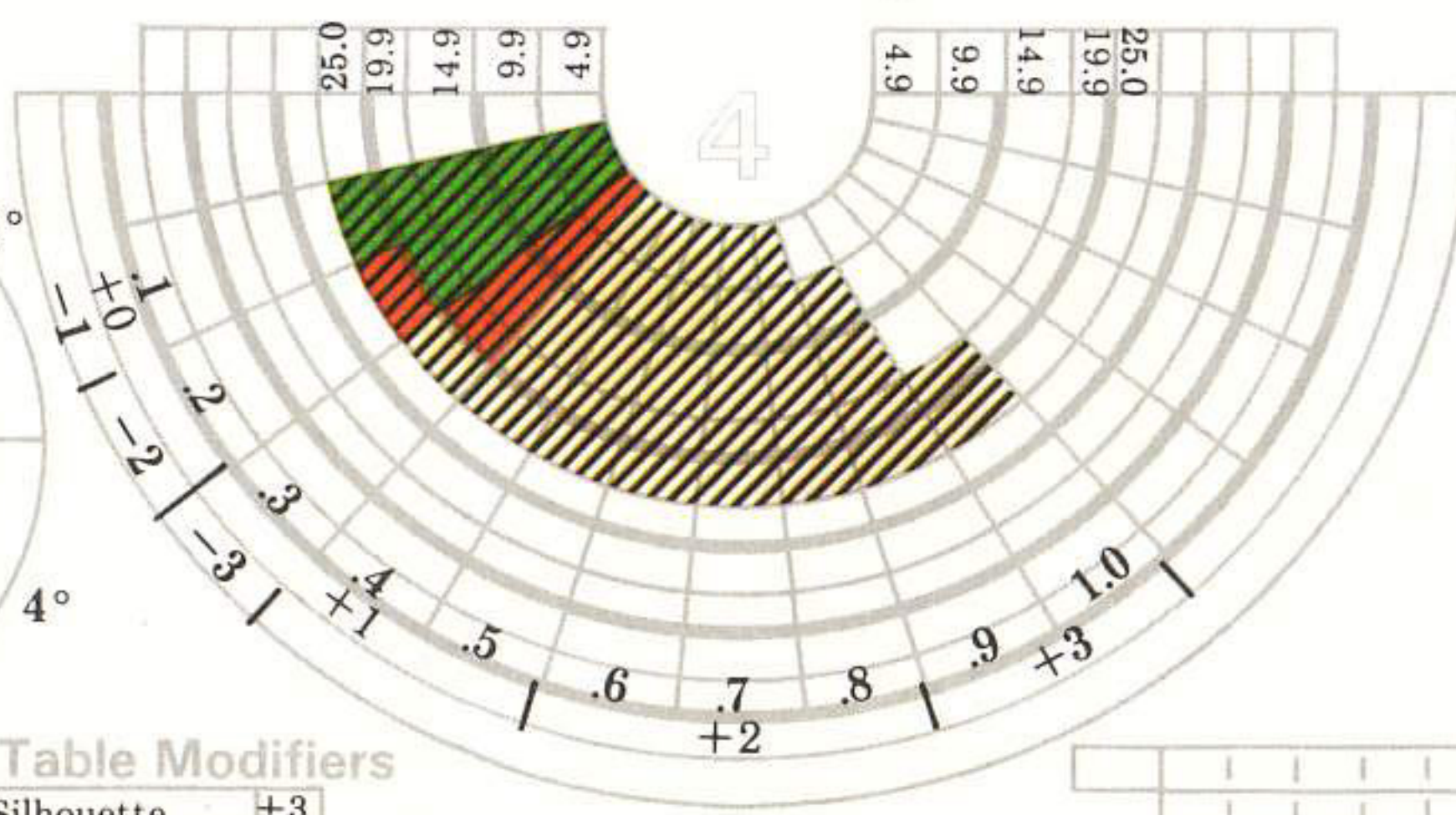
Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+3
Fire	0



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-0.3
Dive Sp. Climb	-0.1
Max Climb	-0.1
Loaded	

Target Characteristics

W	8	Cn	-	Mg	3
F	8	L	3		
C	2	C	2		
E	3	E	-	E	3
G	2M	2M		2M	2M
(6)	(6)	(6)	(6)	(6)	(6)
FL		F		FL	

Variants

B-29

Boeing B 29A-BN "Superfortress" Very Heavy Day Bomber.

PV: 54 Engine Type: R Producer: USA

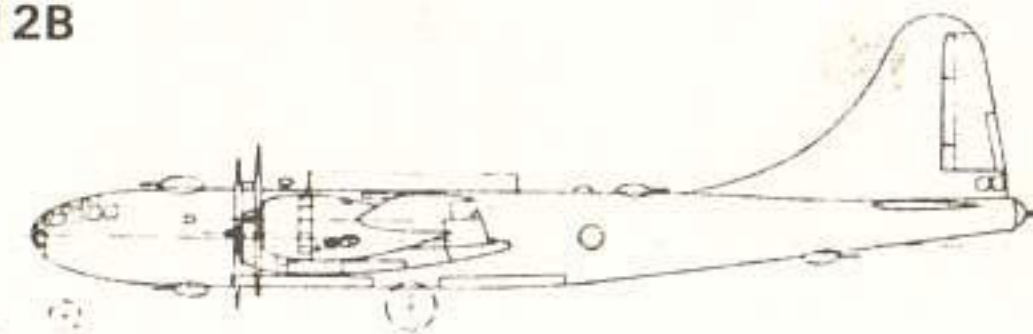
Entered operations in Spring '44. A total of 3970 built.

Has sights for use as a level bomber.

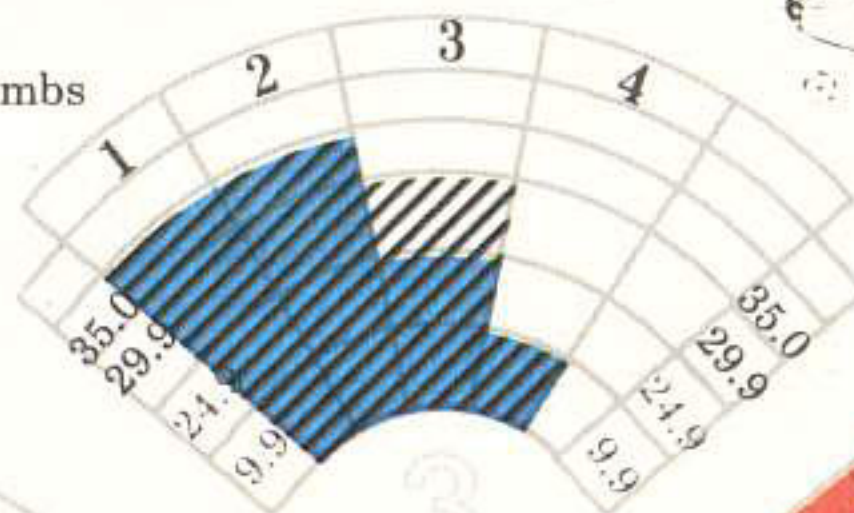
Loaded: Can carry up to 20,000 pounds of bombs (14 bombs low level).

Stall Speed	4.9
Maneuver Sp.	9.9
Level Speed	14.9
Dive Speed	19.9
Loaded (Opt.)	-1

DAUNTLESS DATA CARD 12B

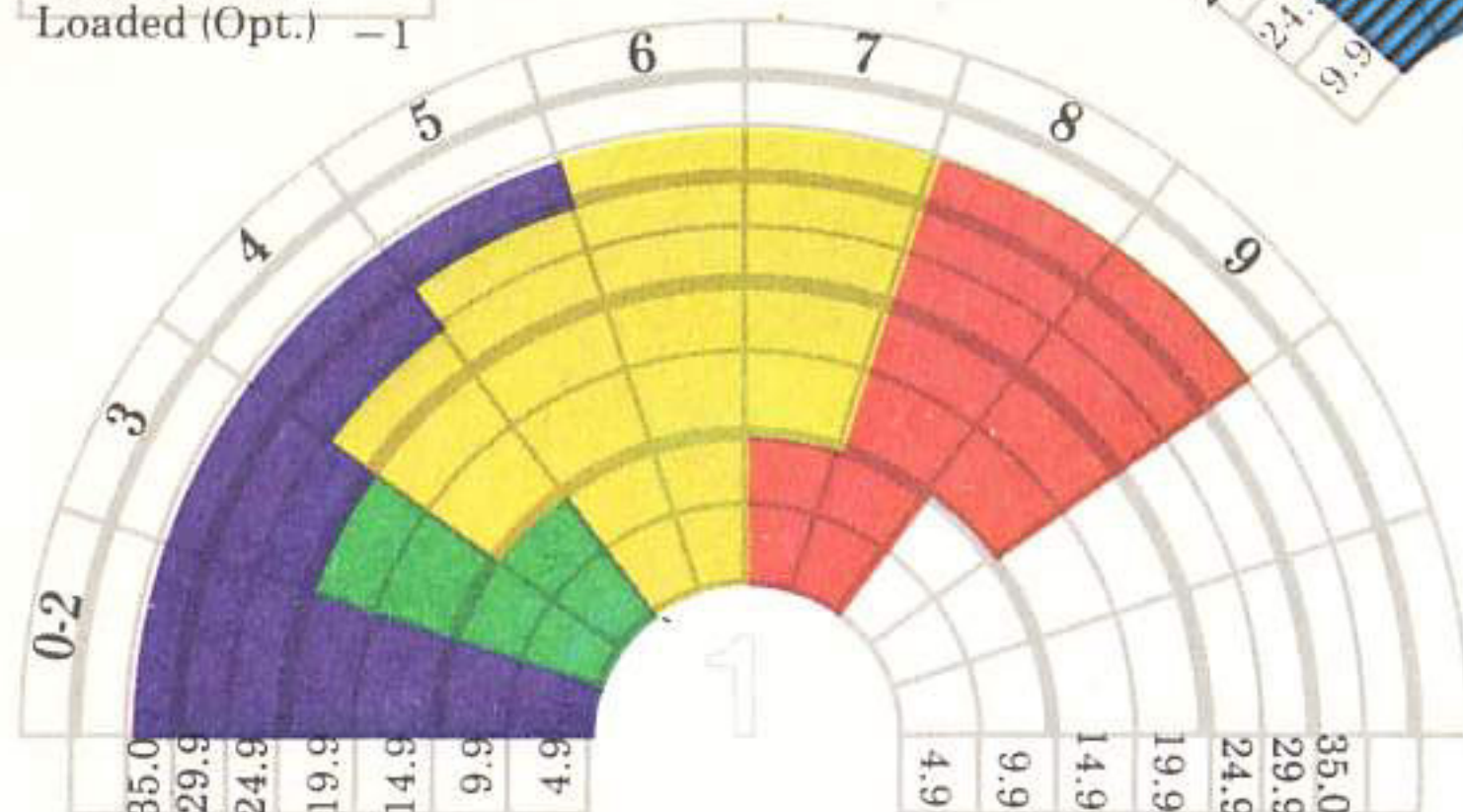


Speed Change

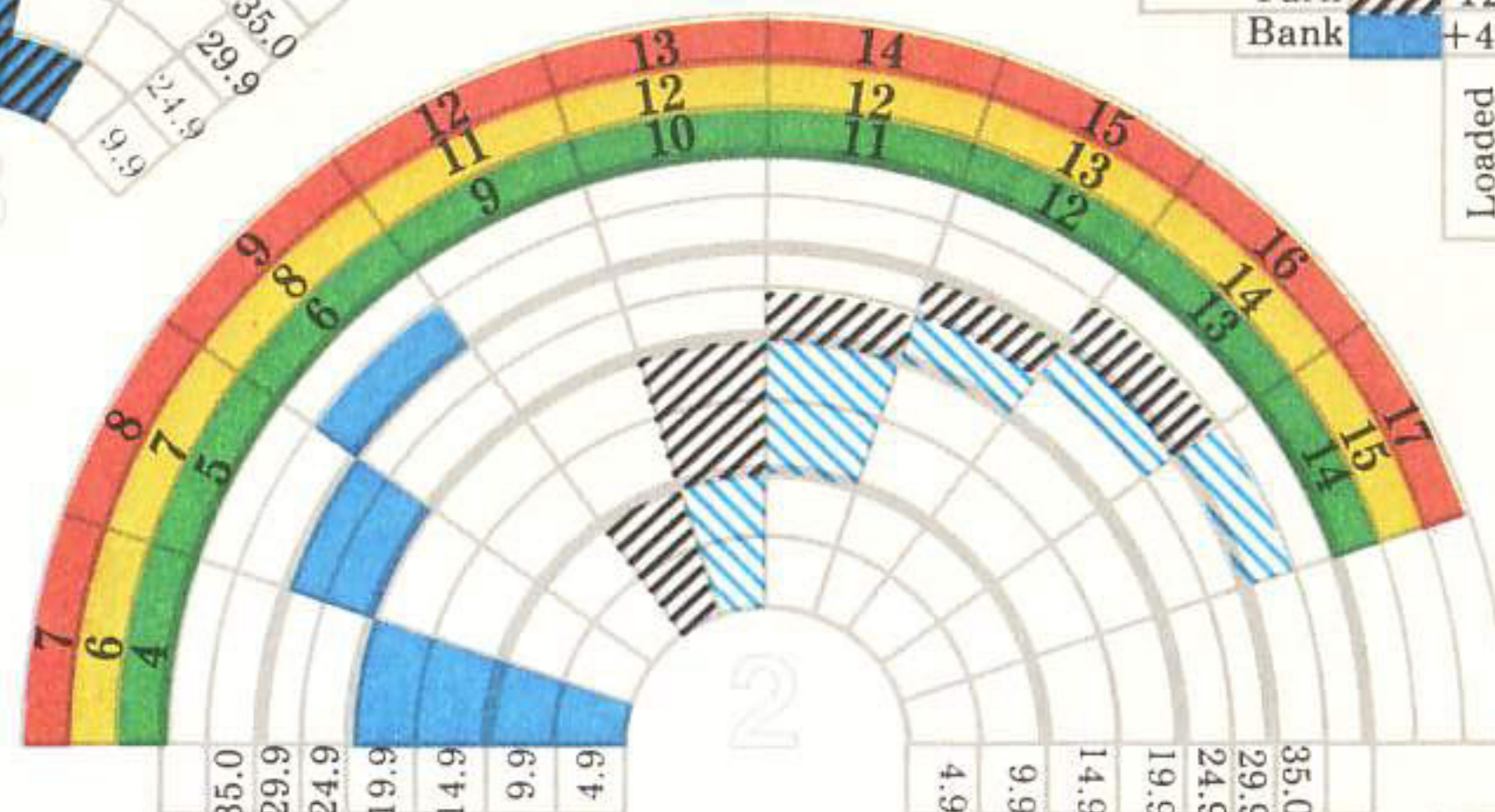


Power Factors	11
Brake Factors	12

Slip	+11
Turn	+12
Bank	+4
Loaded	

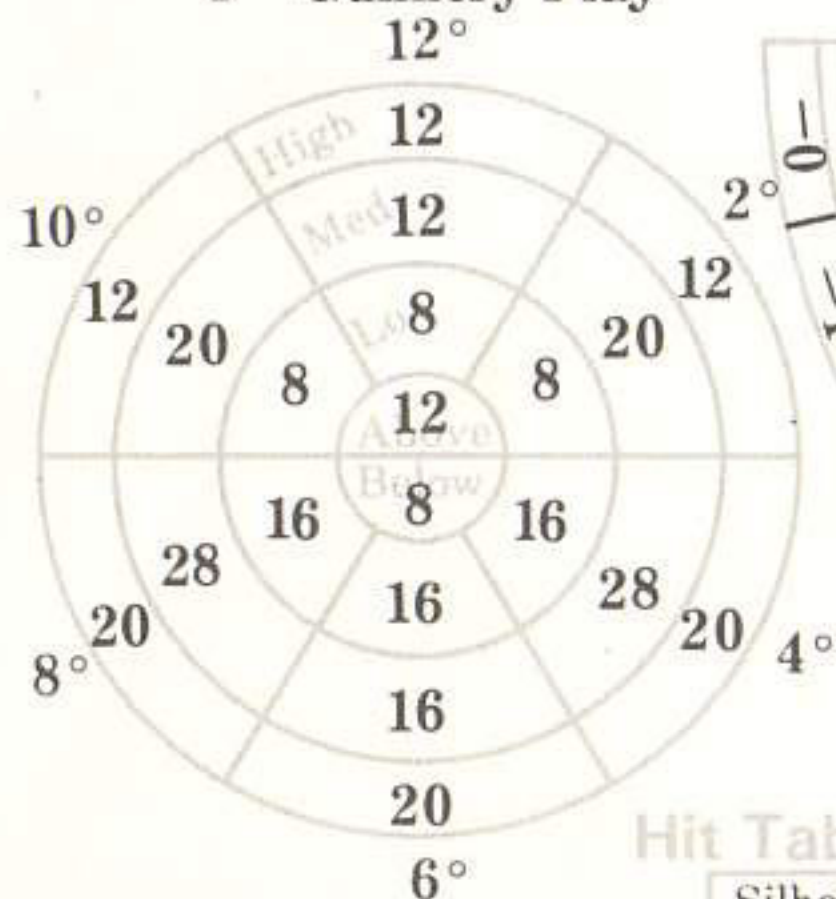


Altitude Change



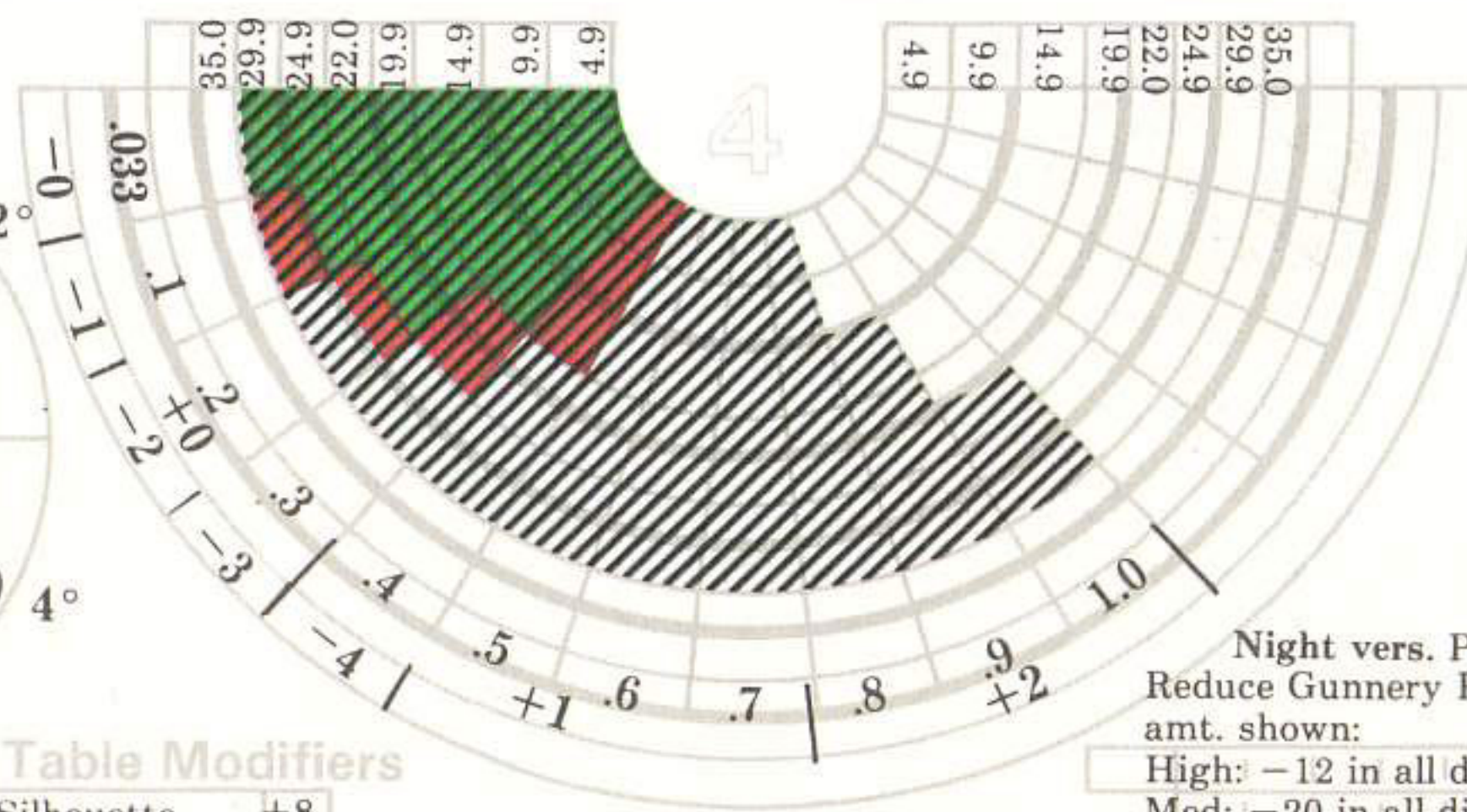
Maneuverability Requirements

"F" Gunnery Play



Hit Table Modifiers

Silhouette	+8
Fire	+1



Dive Acceler.	+1
Climb Deceler.	-1
Max Dive	-0.2
Dive Sp. Climb	-0.1
Max Climb	-0.1
Loaded	

Target Characteristics

W	10	Cn	-	Mg	-
F	10	L	3		
C	2	C	2		
E	2	E	2	E	2
G		(6)			
		F			

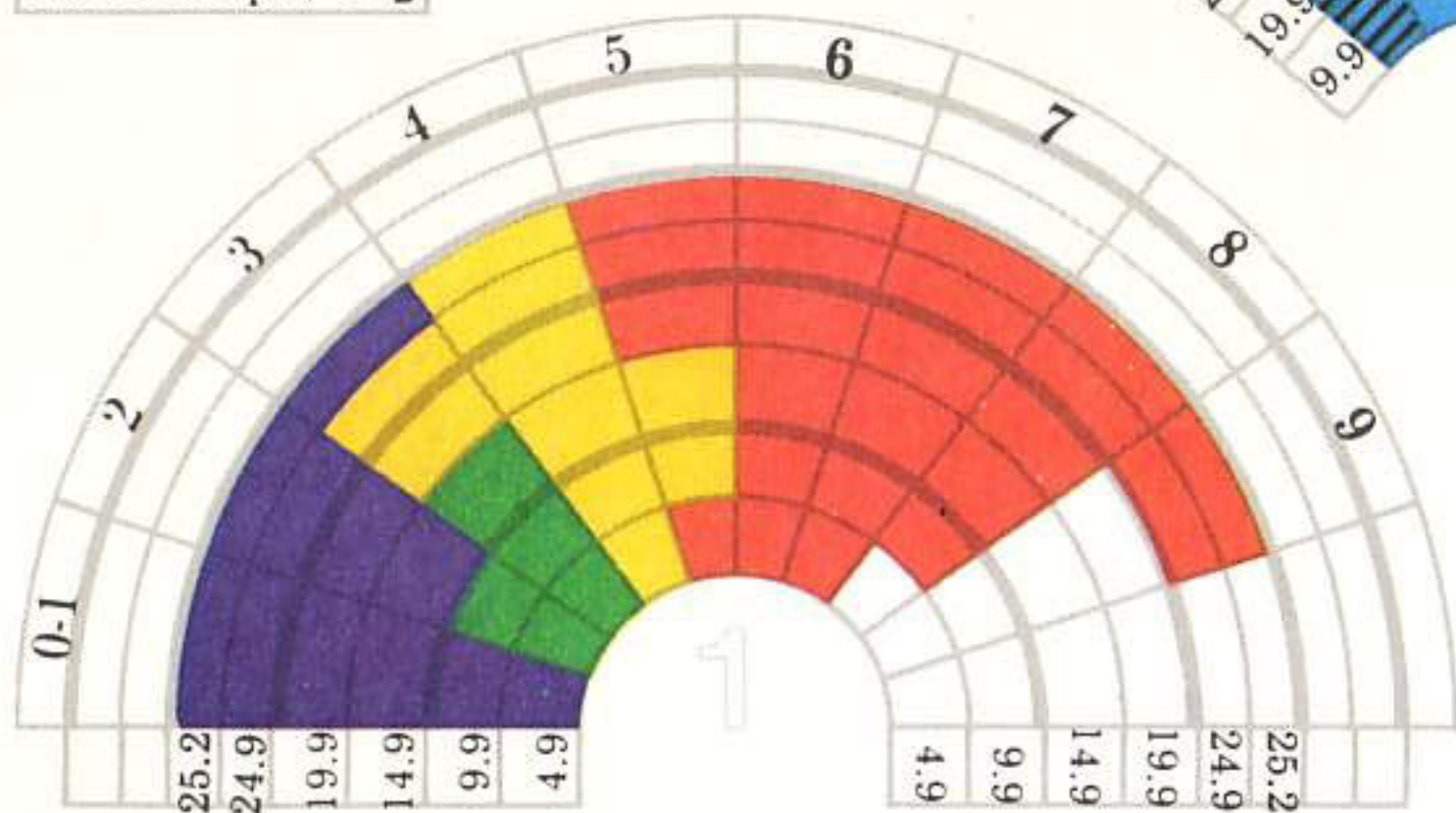
Night vers. PV: 51.

Reduce Gunnery Play by amt. shown:

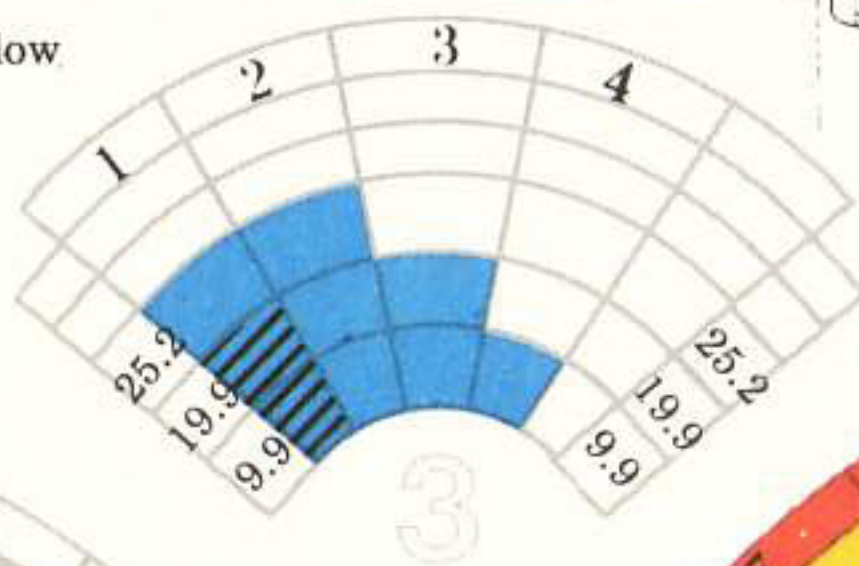
High: -12 in all directions.
Med: -20 in all directions.
Low: -8 in all directions.
(Stripped-down for night raids.)

Nakajima B5N2 Model 23 "Type 97" Carrier Torpedo Bomber
 PV: 17 Engine Type: R Producer: Imperial Japan
 Entered service in November '41. A total of 1200 B5N's produced. Has sights for level bombing.
 Loaded: Can carry up to 1650 pounds of bombs (one bomb low level) or one torpedo, or 6 depth charges.

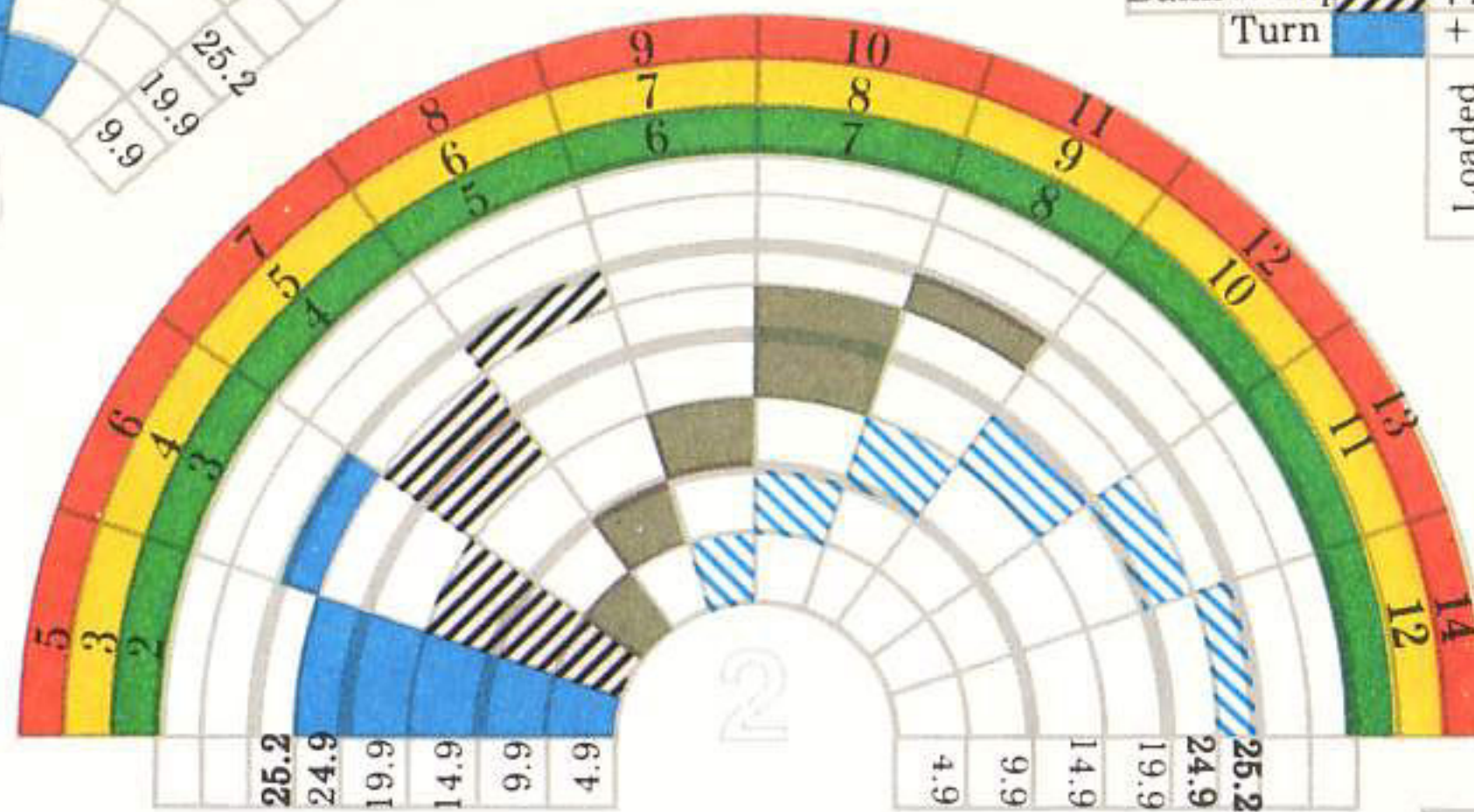
Stall Speed	
Maneuver Sp.	
Level Speed	
Dive Speed	
Loaded (Opt.)	- 2



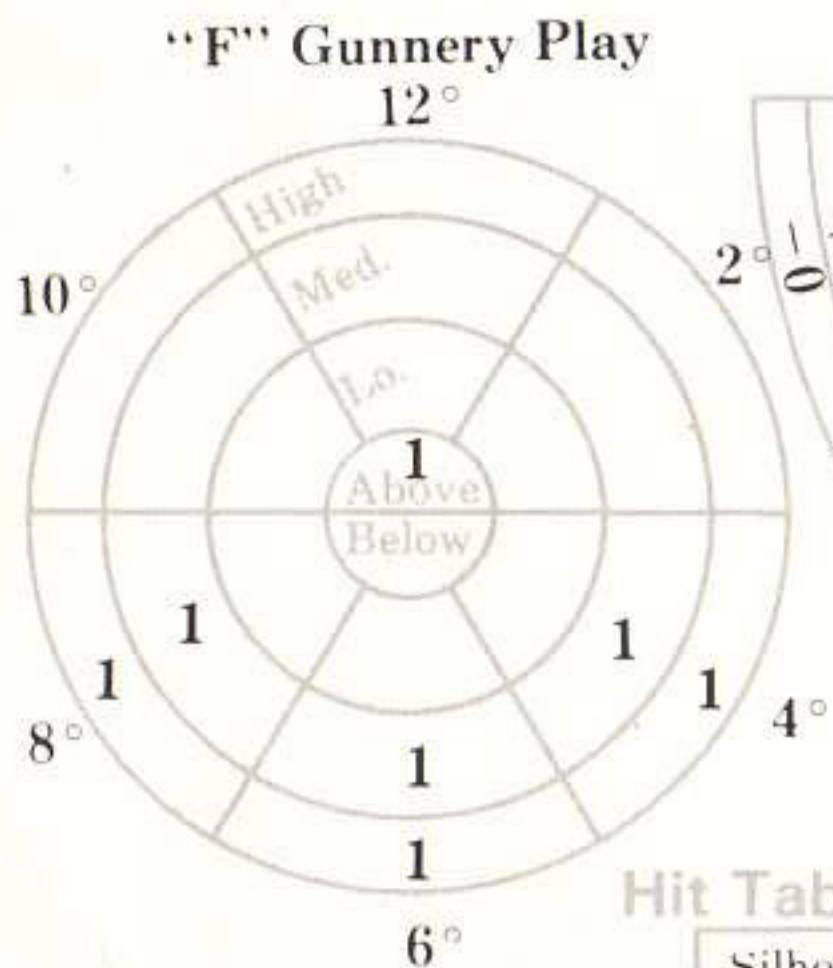
Speed Increments



Altitude Change

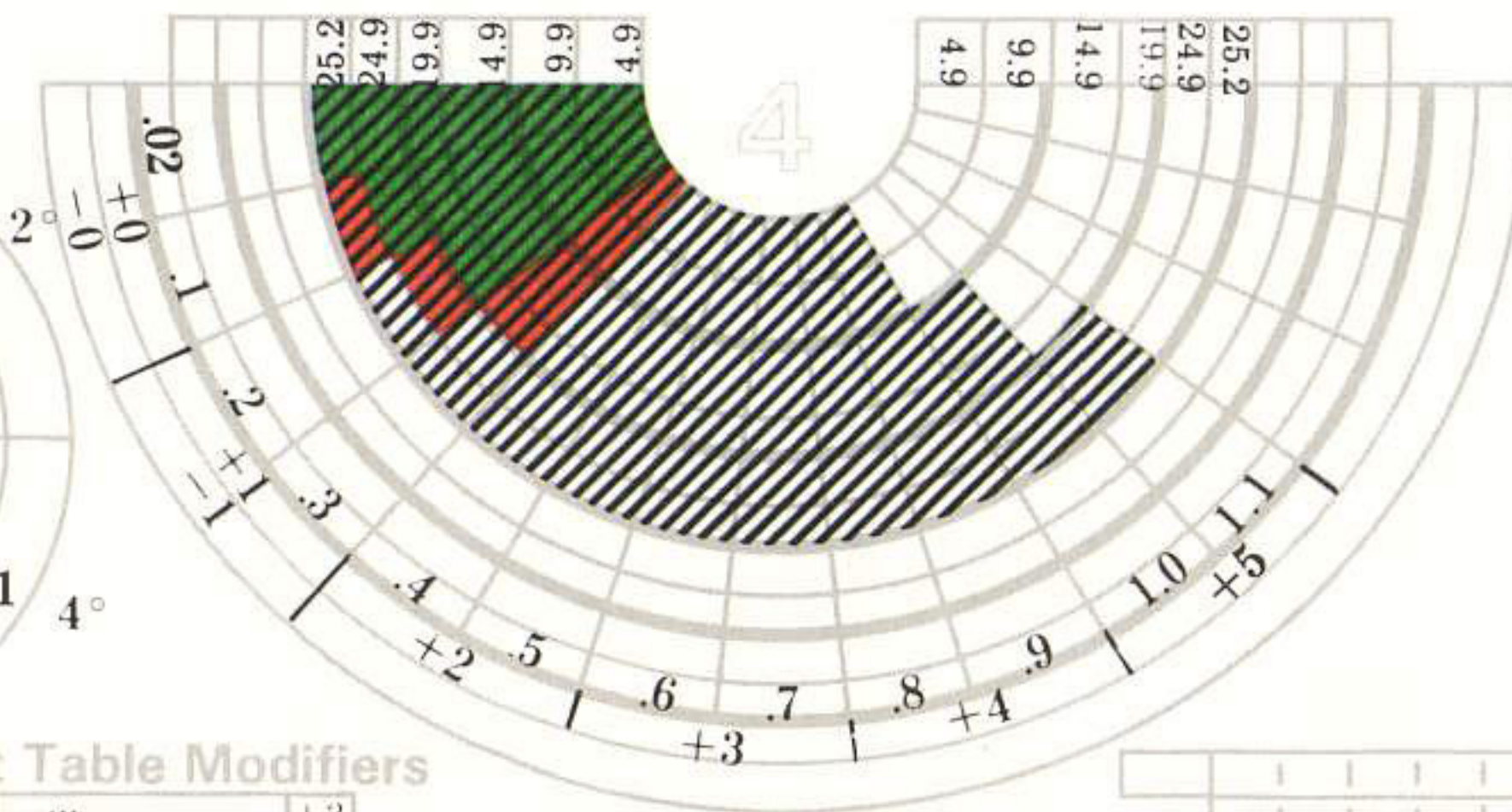


Maneuverability Requirements






Hit Table Modifiers

Silhouette	+3
FF Fire (F=0)	+1



Half Loop		P
Half Roll		P
Bank or Slip		+2
Turn		+1

Loaded

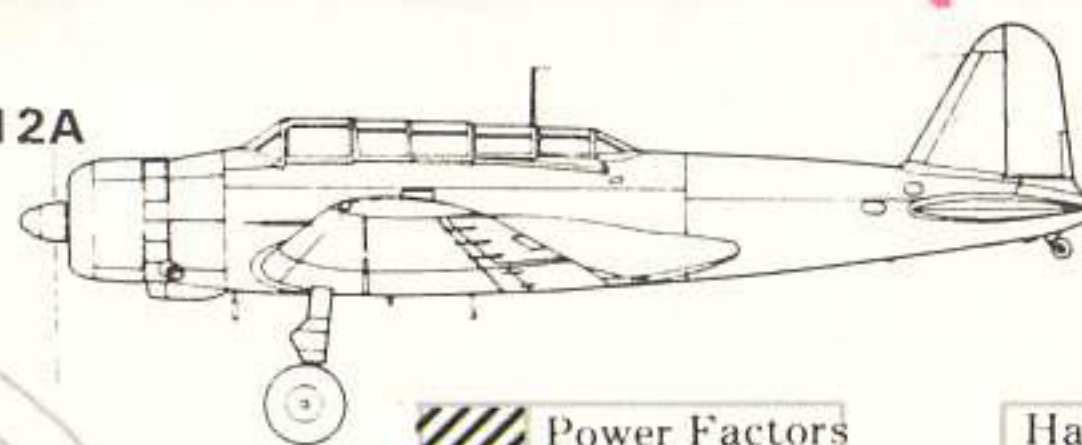
Dive Acceler.	+1	Load	
Climb Deceler.	-1		
Max Dive			-3
Dive Sp. Climb			-1
Max Climb			-1

Target Characteristics

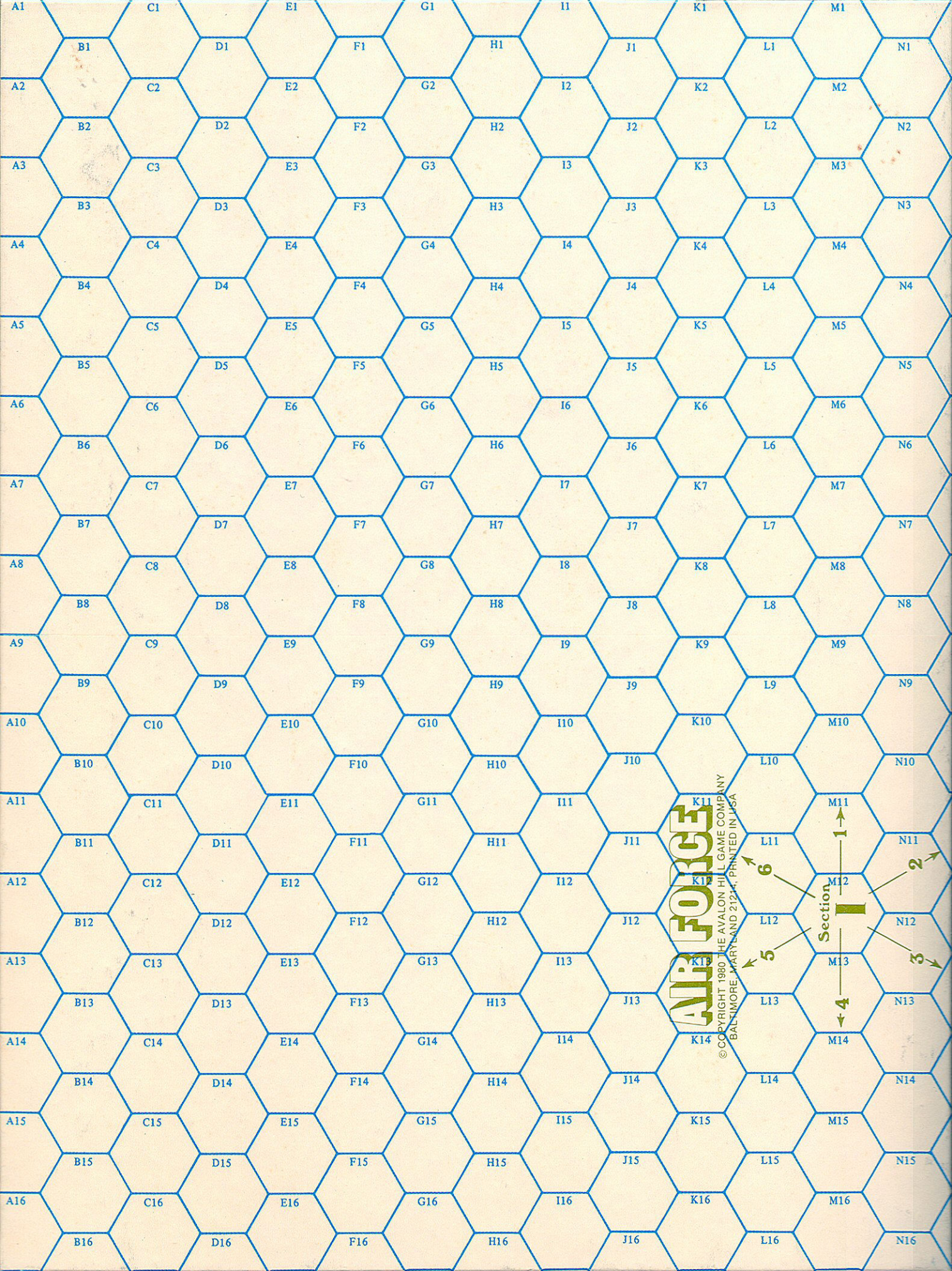
W	5		Cn	—	Ag	6
F	5		L	2		
C	3		C	—		
E	3	E	—	E	—	E
G	1M					1M
	(4)		(5)			(4)
	FF		F			FF

Variants

	1	2	3	4	5	6
	1	2	3	4	5	6



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AIR FORCE

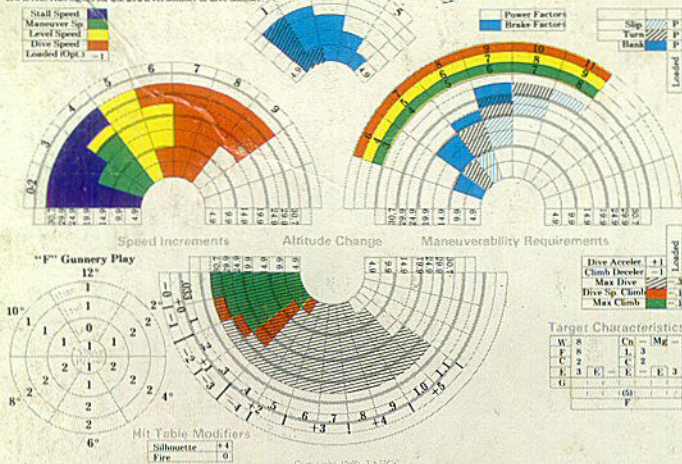
© COPYRIGHT 1980 THE AVALON HILL GAME COMPANY
BALTIMORE, MARYLAND 21214, PRINTED IN USA

Section I



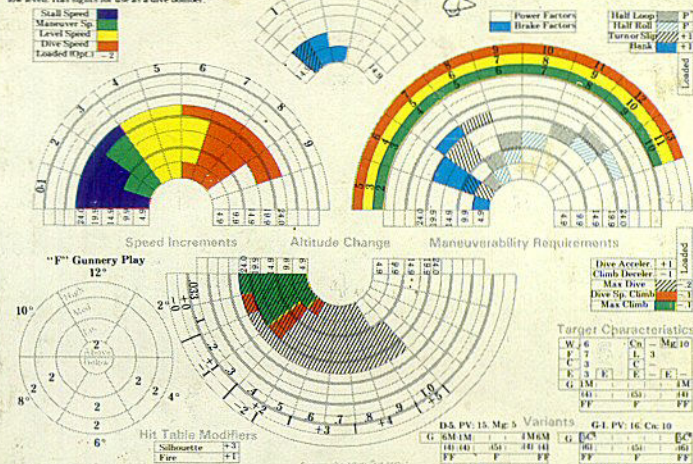
Ju-88A

Junkers Ju-88A-1 Medium Day/Night Bomber
PV: 22 Engine Type: 1. Producer: Third Reich
Operational in September '39. Over 3000 Ju-88 bombers built.
Loaded: Could carry up to 1284 pounds of bombs (11 bombs at low level). Has sights for use as a level bomber or dive bomber.



Ju-87D

Junkers Ju-87D-5 "Stuka" Close Support Bomber.
PV: 13 Engine Type: 1. Producer: Third Reich.
Operational in Spring '41. About 2500 Ju-87D built.
Loaded: Could carry up to 3960 pounds of bombs (13 bombs at low level). Has sights for use as a dive bomber.



AIR FORCE allows you to re-create representative historical air battles from any period between the Battle of Britain of June 1940 through the massive air offensives over Germany: anything from a small-scale fighter clash over the Channel Coast to a night bombing raid over London or Berlin; a close-support tactical dive-bombing strike against front-line enemy troops or a daylight mission against industrial targets in the Ruhr, complete with Anti-Aircraft Artillery defenses. Each of the major aircraft types in the Royal Air Force, Luftwaffe and Army Air Force is represented, and can be used in any combination.

Each individual aircraft in play has its own playing piece in play on the game board, and a Data Card like those above which specifies its own particular handling characteristics—its maximum speed as well as its best maneuver speed (varying with altitude), its



maneuverability, climbing and diving abilities, and its ability to increase or decrease speed. Also shown are the damage-taking capacity and the firepower and range of each gun on the aircraft.

Movement is accomplished by a simple plotting-pad procedure, which typically consists of a few letters and numbers for each aircraft showing its movement and altitude. All aircraft plots of both players are revealed at the same time—except for "disadvantaged" aircraft (those being "tailed" by enemy aircraft). Such aircraft are moved first, so that the "tailing" aircraft may change its plot to follow.

AIR FORCE is a tense game of skill in maneuvering, and understanding the strengths and weaknesses of your aircraft compared to your opponents, playable in its basic version in an hour. Players may add any of the optional rules they like, and increase the number of aircraft in play, as they seek further challenges from the game; and virtually endless scenarios can be easily created.

Aircraft Represented:

Junkers Ju-87D-5 "Stuka" Dive Bomber
Junkers Ju-88C-6c Night Fighter
Junkers Ju-88A-1 Medium Bomber
Avro Lancaster B.1 Heavy Bomber
Heinkel He. 111H-3 Medium Bomber
Boeing B-17G "Flying Fortress II" Heavy Bomber
Messerschmitt Me.262A-1a "Schwalbe" Jet Fighter
Boeing B-17F "Flying Fortress" Heavy Bomber
Focke-Wulf FW.190A-8 "Wuerger" Fighter
Messerschmitt Bf.109E-3 "Emile" Fighter
Republic P-47D "Thunderbolt II" Fighter
Messerschmitt Bf.109F-3 Fighter
DeHavilland Mosquito F.B. VI Series-2 Fighter Bomber
Consolidated B-24J "Liberator VI" Heavy Bomber
DeHavilland Mosquito B.IV Series-2 Light Bomber

North American P-51D "Mustang IV" Fighter
Supermarine Spitfire V.B. Fighter
North American P-51B "Mustang III" Fighter
Hawker Hurricane II.C Fighter Bomber
Supermarine Spitfire L.F.IX.E Fighter
Hawker Hurricane I Day Fighter
Republic P-47B Day Fighter
Hawker Tempest V Series-2 Fighter
Messerschmitt Bf.110C-1 Fighter Bomber
Supermarine Spitfire I.A Fighter
Messerschmitt Bf.110G-4 Night Fighter
Junkers Ju-87B-2 "Stuka" Dive Bomber
Consolidated B-24D "Liberator" Heavy Bomber
Vickers Wellington III Medium Bomber
Messerschmitt Bf.109G-5 "Gustav" Fighter
... plus many variant models of the above!

This game includes:

- Four-Color Data Cards for 30 different aircraft types
- Six "Geomorphic" Game Board Sections for "endless" map effect
- 255 Playing Pieces representing aircraft and targets

- Pad of "Log" Sheets for plotting all maneuvers
- 32-page Rules Folder with Scenarios and Notes on Play
- Complexity Rating: 7 on a scale of 1 (easy) to 10 (hard)



Watch for Expansion Games **DAUNTLESS** and **STURMOVIK!** including further WWII Aircraft and special rules.

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