DRAFT

Hive, Queen, and Country

RPG Combat Rules V0.9.1

November 17, 2012

Who This Book Is For

The detailed combat system presented in this book is suitable for Role Playing Game adventures and stand-alone combats of a few ships. The level of detail is probably too high for large combats or tabletop wargaming. For simpler, "faster" rules that are more suited to large battles or tabletop wargaming see the Simple Combat Rules avaible at
http://www.hivequeenandcountry.com/

Thanks

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1.Introduction

1.1 What's in this Book

This book is a supplementary text for the Stars of Empire Roleplaying Game [*1*], and the *Flying Machines of the Worlds: 1902* source book [*2*]. This book provides the detailed combat rules for aircraft in the Hive, Queen, and Country role playing setting.

These rules are aimed at RPG adventures and stand-alone combats of a few ships. For simpler, "faster" rules that are more suited to large battles or tabletop wargaming see the Simple Combat Rules avaible at

http://www.hivequeenandcountry.com/

This book includes:

- Rules for Detailed Combat (Section 2)
- Rules to construct the Vehicle Design Sheets used in combat from the designs produced by the HQC Vehicle Design Rules [**3**] (Section 3)
- Rules for modeling Mass Combat at a very low level of detail (e.g. modeling an entire war or very large battle) (Section 4)
- Rules for detailed boarding actions (Section 5)

1.2 A Note on the Current Date for Players and Referees

All the Hive, Queen, and Country products are set in an imaginary timeline that diverges from our own in the late 1700s and becomes increasingly different as it moves forward. The original campaigns were set in the years 1891-1893 which were those of the original Hive War, which latterly became known as the First Hive War or Anglo-Hive War. Stars of Empire is explicitly set in the years before 1894. All timelines march forward and that of the HQC Universe is no exception. This book is set in the year 1902, when the Second Hive War is at its peak, and covers many of the flying machines used in that conflict.

The people of Hive, Queen, and Country have been flying since the 1860s, and had mechanical computers since the 1830s. By the 1900s, aircraft have been being designed for 40 years, and computation has advanced the state of the art by another 5-10 years. Thus, the ships of the 1900s are in many ways more advanced than the aircraft of the late 1930s in our timeline (OTL). Unlike OTL, air travel has caught on much more quickly because Aerolyth is so much more effective. Additionally, with space travel being a reality, the people of HQC have discovered some aspects of high-speed aerodynamics. Even though steam engines and internal combustion engines (ICE) are only 10-15 years more advanced than our time line, the aircraft are much more aerodynamic.

1.3 Flying Machines of the Worlds: 1902

This book is a free supplement for *Flying Machines of the Worlds: 1902, a* source book for the Hive, Queen and Country Universe. *Flying Machines* introduces Victorian Science Fiction Roleplayers and War Gamers to the many aerial vessels of that Universe. Whether in the skies of Earth, Mars or Venus these powerful machines provide swift transport or deadly combat capabilities. This volume, heavily illustrated in full color, is modeled on period publications such as Jane's or The Naval Annual; Flying

Figure 1: Flying Machines of the Worlds: 1902

Machines of the Worlds features designs for 111 ships for use in any Steampunk or Victorian Science Fiction setting. In Hive, Queen and Country these are the vessels that patrol the skies of

Earth, have fought with the Hives and are now opening the frontiers of Mars and Venus to colonization.

This 256 page full color book includes:

- Details on the aerospace technology and how it can used in a Stars of Empire adventure
- Descriptions of many of the ships which populate the skies of the HQC Universe
- Real World Vehicle Statistics to allow conversion to any combat rules
- Notes on Currency and Unit conversions
- Referee's information on the HQC universe
- A scratchbuiling/kitbashing chapter including detailed directions on how to build your own Shakespeare Class Aerolyth Flyer

Flying Machines is available from:

- **Createspace**: https://www.createspace.com/4015022
- **Amazon**: http://www.amazon.com/Flying-Machines-Worlds-1902-Universe/dp/1480035815/
- **RPGNow**: http://www.rpgnow.com/product/106515/Flying-Machines-of-the-Worlds-1902

A line of miniatures based on the ships from the book are available from:

- **Objects May Appear…**: http://www.shapeways.com/shops/objects
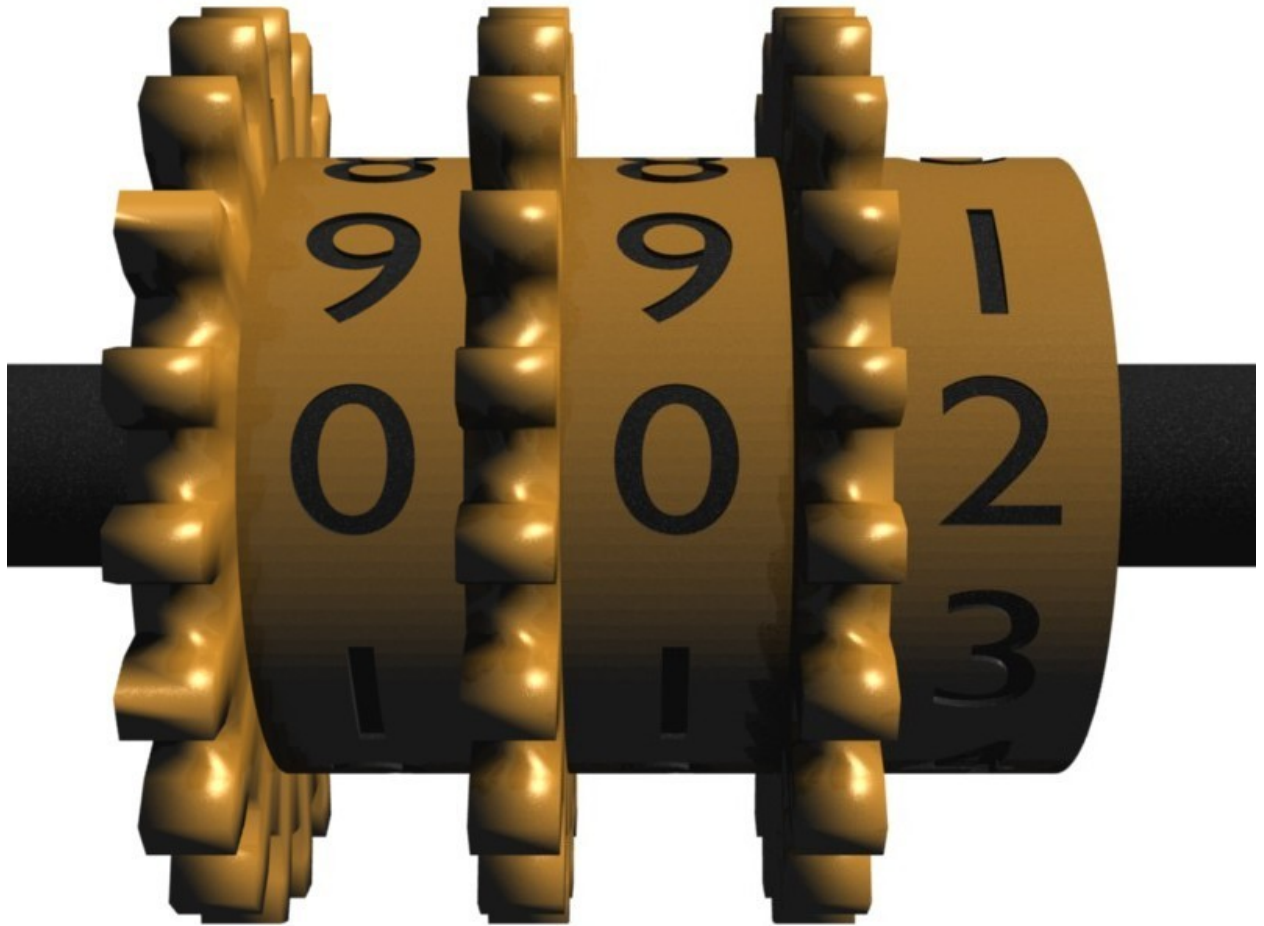
2. The Combat Round

2.1 The Combat Round

Combat is conducted as a series of "rounds" during which each ship on the opposing sides performs a series of actions. Each round represents 1 minute. Each round, every vehicle is allowed to perform a number of actions (see Table 1) up to its action points.

Before combat begins, assign one side to be "odd" and the other "even"

For each round:

      1. Roll a d20 to determine whether a ship from the "odd" or "even" side will act next.

2. The selected side selects a ship that has not yet acted this round. If all ships from that side has already acted, the other side selects a ship
   a. The selected ship performs actions (see Table 1) until all its action points are used up
   b. The ship's position is adjusted based on its current speed
   c. If the selected ship is on fire, calculate the fire's damage (See Damage Effects on page 20)
3. If all ships have acted, the round ends and the next round begins. Otherwise, repeat step 1.

2.2 Opposed Roll Rule Systems

These rules are based on a simple "d20 Opposed Roll" rule system.
In this system, the **acting** player rolls a d20 and the **opposing** player (or referee) rolls a d20. Modifiers may be applied to the **acting** roll. The higher roll (after modification) wins. If the **acting** player wins, the action succeeds. If the **opposing** player wins, the action fails. "Ties" mean the **actor** wins and the action succeeds.

Example: The acting player tries to perform a "Cause Overshoot" action. This roll is modified by adding the actor's **maneuver** rating (+7) and subtracting the opposing player's **maneuver** rating (−1). The **actor** rolls a 5, which is modified to a 11 (5+7−1). The opposing player rolls a 13. 11 is less than 13, so the action **fails**.
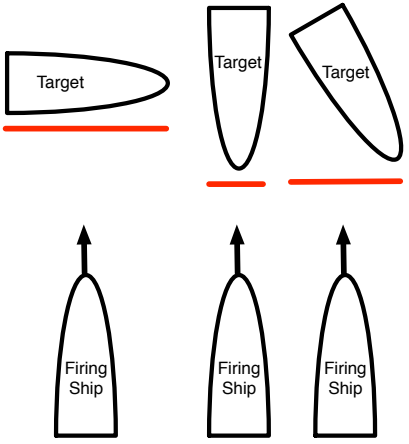
2.3 Combat Actions

All actions must complete an opposed roll unless they are labeled as "automatic".

Table 1: Combat Actions

Action	Action Points	Description	Modifiers to roll
Movement Actions			
Turn	1	Change heading by up to the **Turn Rate** from the VDS.	Automatic
Climb	1	Increase altitude	Automatic
Increase Turn rate by 10°	3	Turn 15° more than the normal turn rate. If the roll is failed the ship remains at its current heading.	−5 + **Maneuver** from VDS
Increase Turn rate by 20°	4	Turn 45° more than the normal turn rate. If roll is failed, ship loses 100m in altitude and remains at its current heading.	−10 + **Maneuver** from VDS
Increase Turn rate by 30°	5	Turn 90° more than the normal turn rate. If roll is failed, ship loses 200m altitude and remains at its current heading.	−15 + **Maneuver** from VDS
Evasive Maneuvers	5	Begin maneuvering erratically. Effective speed is reduced by 50%.	Automatic
Align for Fire	2	Align ship to fire fixed weapons at a target.	+ **Maneuver** from VDS

Action	Action Points	Description	Modifiers to roll
Cause Over-shoot	2	Decelerate quickly or change course to cause a trailing aircraft to overshoot and end up ahead of the acting craft	**+ Maneuver** from VDS **− Opponent's Maneuver**
Maintain Course in Weather	2	Maintain proper course and control in inclement weather.	**+ Maneuver** from VDS −5 Gale force winds (70 km/hr) −10 Storm (90 km/hr) −15 Hurricane (>118km/hr)
Combat Actions			
Brace for Impact	*	Crew braces for impact and secures internal hatches to reduce damage. * = Consumes ½ of the ship's action points each turn that the ship is braced	Automatic
Range Target & Compute Firing Solution	5*	Gets the range to a target and (optionally) computes a firing solution. This action must be performed before any ship is fired at, unless performing a **snap shot**. Record the amount by which this roll succeeds or fails as the 'Range Accuracy.' Once the target is ranged and a firing solution computed, the 'Range Accuracy' will degrade over time. Each round after the initial range is computed; divide the range accuracy by 2, rounding down. * It may take several minutes to compute the firing solution, consult the 'Time Fire' property of the ship's data sheet to determine how long.	−15 target concealed by smoke screen −Weather effects −5 night, but illuminated (**Range Mod** from VDS) (**Target Mod** from VDS, if computing a firing solution.)
Fire!	5	Fire weapons at a given target. A successful roll means the target is hit and must roll for penetration and damage (see Section 2.4, page 18)	+ Range Accuracy (if range target & firing solution computed/ Note: Rockets only use ½ range accuracy, and Range Accuracy degrades over time) − 5 if Snap Shot

Action	Action Points	Description	Modifiers to roll
		Note: The '**Fire**' rolls do **not** use the '1 is 1' rule. **Figure 2: Target Facing (in red) showing Broadside, End-on, and angled**	− Target's **Maneuver** if Target under Evasive Maneuvers − Actor's **Maneuver/2** if Acting Ship under Evasive Maneuvers **Weapon Accuracy:** From Table 7 or the VDS **Target Size Effect:** Based on facing −4 <20m facing −0 20-40m +4 40-80m +10 >80m **Range**: +16 0 < 500 m +8 500-1000m +4 1-2km −0 2-4km −4 4-8km −12 8-16km −24 16-32km −32 >32km **Spotting**: +2 per consecutive turn firing at this target **Speed**: −1 every 500 meters per minute of combined target and acting ship speed **Weather:** −2 Light precipitation −4 Heavy precipitation

Action	Action Points	Description	Modifiers to roll
Scan	5	Search for opposing ships at night. Must have searchlights capable of reaching the distance to the target. At night, a successful Scan roll must be made before a target must be engaged.	− 20 − 10 Target concealed by smoke screen + 10 per searchlight or fire on target ship Range as **Fire** roll –2 unlit night (no moon) –4 Light precipitation –8 Heavy precipitation
Ram	5	Ram a target ship. To accomplish this, the ship must be traveling at sufficient speed to be able to close the distance with the target ship. If successful, the procedure to calculate damage can be found in Section 2.3.4	− 10 + Ramming ship **Maneuver** – Target ship **Maneuver** **Target Size Effect:** Based on facing –6 <10m facing –3 10-20m –0 20-40m +3 40-80m +6 80-160m +12 >160m
Close for Boarding	5	Maneuver the ship to be able to send boarders across to a targets hip.	–5 As per Ram Action
Deploy Boarding Party		Deploy a party to attack a ship	+1 per Grapples Gun +1 per ship or creature Arms (not armaments, physical arms) + **Crew Mod** +5 if using a Corvus –2 if target has Torpedo netting –3 if target has Electrified fence
Prepare to repel boarders	5	Prepare the ship to repel boarders. If this is successful, the ship counts as "prepared" during any boarding actions (See Section 2.3.2). Even if unsuccessful, the ship is at least not surprised. While the ship is prepared, its available action points are halved.	+ **Command** Factor + **Crew Mod**

Action	Action Points	Description	Modifiers to roll
Clear For Action	½ Action Points	* = If successful, doubles the number of action points available to the ship for the next two rounds. If unsuccessful, –5 action points for the next two rounds	+ **Command** Factor + **Crew Mod**
Abandon Ship	*	Orderly evacuation of the ship *= All the action points for that turn	+ **Command** Factor + **Crew Mod**
Carried Vehicle Handling			
Launch Vehicles	5	Launch one carried vehicle from each vehicle deployment area.	Automatic
Recover Vehicle	5	Recover one vehicle into a vehicle landing area. If roll fails, the vehicle is damaged (1d20)	+10 +landing craft's **maneuver**
Quick Recover Vehicles	5	Recover one vehicle into each vehicle deployment area. If roll fails, one vehicle is damaged (1d20). If the roll fails by more than 5, the host craft suffers a ramming attack by one of the landing vehicles	+5 +landing crafts' **maneuver**
Refuel & Refit Vehicle	5	Refuel, rearm, and perform minor repairs on one carried vehicle for each vehicle deployment area. If successful, vehicle may launch the next round.	Automatic
Damage Control			
Damage Control	5+x	Repair vehicle damage. Costs a minimum of 5 action points, though more points can be expended to improve the roll. If the roll is successful, roll die according to the **Repair Rate** factor in the ship's vehicle sheet. If unsuccessful, make the same rolls, but divide the result by 4, rounding up. Note: ships with repair facilities can repair other ships by first **closing for boarding**.	+ **Command** Factor + **Damage Ctrl** + **Crew Mod** +2 per additional action point spent +1 per additional 15 trained passengers (e.g. marines) who can assist + As per Table 41 of the *HQC Vehicle Design Rules*
Automatic Fire Extinguishers	Auto	If Fire Sprinkler systems are present, they will automatically fight a fire, even if no crew assists. If successful, one fire is extinguished. If unsuccessful, the fire spreads at half the normal rate.	− 5

Action	Action Points	Description	Modifiers to roll
Extinguish Fire	5+x	Extinguish one fire per d20 of Repair Rate. Note, fire damage is applied after the ship's actions for that turn, so if the fire is immediately extinguished, no damage is done.	+ **Damage Ctrl** + **Fire Ex** + **Crew Mod** +1 per additional action point spent
Repair System	10+x	Repair a damaged system or Special Damage (See 'Damage Effects' Section 2.4).	−10 +1 per additional action point spent +As per Table 41 of the *HQC Vehicle Design Rules*
Recover & Treat Wounded	5	If successful, one disabled crewmember per sick bed or autodoc is enabled and returned to combat. Re-enabled crew become available in 1d20/5 turns. Note: ships with medical facilities recover and treat the wounded of other ships by first **closing for boarding**.	+Medical facilities or Autodoc carried
Misc.			
Screen	5	Position the active ship to block fire directed at another ship or target. The active ship must be moving at the same speed as the defended ship or target and must be between the defended ship and the attacking ship. See Below. If successful, attacks during the next round aimed at the defended ship or target will strike the active ship instead	−5 + **Maneuver * 2** −10 if active ship is smaller than target + Command Factor
Communicate (Optional)	3	Send a precise message to another ship during combat. Must have a functioning communication device (e.g. signal lamp, heliograph, radio, etc…). Note: Aerolyth craft cannot send or receive radio messages.	− 5 + 10 Fleet has sufficient command facilities + 1 each communication device + **Command** Factor + **Crew Mod** −4 Light precipitation −8 Heavy precipitation

Action	Action Points	Description	Modifiers to roll
Coordinate Fleet (Optional)	3	Give general orders to the fleet. (e.g. retreat, concentrate fire, performed a pre-defined maneuver, form up in a formation) If the roll fails, the effect is up to the GM (e.g. message garbled, message ignored, etc…)	− 2 per ship in the fleet + 10 Fleet has sufficient command facilities + **Command** Factor + **Crew Mod** −4 Light precipitation −8 Heavy precipitation

2.3.1 Shooting

A common series of actions in combat is to fire weapons at a target. This can involve up to four separate rolls:

- **Range Target & Compute Firing Solution (Action)**: Estimate the range to the target and compute a firing solution. This may involve using mechanical aids to compute the optimal placement of the guns. This helps correct for the relative motion between the firing ship and its target, wind effects, and even estimates of how the opposing craft may be maneuvering. This action is optional, but improved accuracy. If the action succeeds, record the difference between the acting and opposing rolls as the **Range Accuracy**, which modified the **Fire** action. Range Accuracy degrades over time. Each round after the initial range is computed; divide the range accuracy by 2, rounding down.
- **Fire (Action)**: An opposed roll to determine if the salvo struck the target.
- **Roll to Penetrate**: If the 'Fire' action is successful, roll to determine if the salvo penetrates the target's armor (see Section 2.4).
- **Assess Damage**: Damage is allocated to the target based on the weapon, penetration, and special damage due to critical hits.

The ranging and firing solution substantially improves the accuracy of fire, especially at long ranges. However, it does consume time, and may not be worthwhile if the target is close enough. For this reason, it is often preferable to forgo the **Range Target & Compute Firing Solution** actions and simply fire. This is known as a "snap shot."

Example: A Zongtang-class (See *Flying Machines of the Worlds: 1902,* Section 13.2) ship (range mod +10; target –6; Crew mod +0, time fire 2), moving at 600m/m fires on an Aerial Sovereign-class (See *Flying Machines,* Section 5.8) ship (109m long), moving at 300m/m. The Aerial Sovereign is 5km away and its broadside is facing the Zongtang.

The Zongtang first performs a 'Range Target & Compute Firing Solution'. It rolls a modified 22(18+10(range mod)–6(target mod)), opposed by 14. The action is successful by 8 (22-14). The **Range Accuracy** is 8.

Two turns later, the Zongtang fires. By this time, the **Range Accuacy** is 2 (8/2/2). It rolls a modified 17 (11+2(range accuracy)+10(Target Size)–4(range)–2(combined speed)) opposed by an 18, therefore the shot misses.

One turn later, the Zongtang has closed to 3km. The Zongtang fire again, using the same targeting solution, which has now degraded to 1(2/2). It rolls a 20 (11+1(range accuracy)+10(Target Size)–0(range)–2(combined speed)), opposed by a 16 – a hit!

2.3.2 Boarding Actions

Boarding actions can begin once one ship has successfully performed **both** a "close for boarding" and "Deploy Boarding Party" actions. Once this has occurred, the attacking ship may begin a boarding action. A Boarding actions take at least 10 regular combat rounds (i.e. 10 minutes). In many cases boarding actions are either small enough that the normal combat rules from SoE can be used, or one side is clearly outmatched allowing the Referee to immediately declare a victor. However, if the number of combatants is large or the outcome less certain, additional rules for a more detailed resolution are provided in Section 5 or the Mass Combat Rules from p161 in the SoE book.

2.3.3 Screening

One ship can protect another ship by interposing itself between that ship and an attacker. This is known as 'screening'. To set a screen, a ship must:
- Travel at the same speed as the ship to be protected
- Travel at a similar altitude as the ship to be protected
- Be located in between the ship to be protected and the attacking ship
- Be roughly the same size or larger than the ship to be protected
- Sucessfully perform a "Screen" action.

2.3.4 Ramming

If a vehicle successfully rams a target ship, it inflicts a given amount of damage based on the relative speed of the two ships and the mass of the ramming ship, rounded up (Table 2). This damage is allocated between the two ships, depending on if the attacking ship has a ramming plate and if it "penetrates" the target ship (Table 3). Damage portioning is rounded up.

Table 2: Ramming Damage

Relative velocity (m/m)	Penetration (mm)	Damage per 10 tons
>900-1800	4	1d20 / 2
1801-2700	10	2d20
2701-3600	18	5d20
>3600	27	10d20

Table 3: Ramming Damage Division

Condition	Rammer	Target
No ram plate	50%	50%
Ram plate **or** penetrate	33%	67%
Ram plate **and** penetrate	20%	80%

If either the rammer or the target has hull strengthening, the damage they received is halved. If the damage inflicted on either ship is more than one quarter of the ship's damage points and that ship is an Aerolyth ship, it must make a roll against its maneuver rating or it has been tilted

beyond the limits of its Aerolyth. Note, Hive creatures do not receive damage if they are ramming, but they do if they are the target.

> **Example**: A Huiji II (229 tons), traveling at 2100m/m, collides with a stationary ship with 0.5 cm of armor. At that speed, the ship does 2d20 of damage per 10 tons, so (23*2)=46d20. Rolls indicate 419 points of damage. The Huiji penetrates the target's armor (10>5), but does not have a ramming plate. Therefore, the damage is allocated 33% to the Rammer (0.33*419)=139 and 67% to the target (0.67*419)=281.

2.3.5 Optional Rule: Fleet Control

In the confusion of combat, orders often don't always come through. Even well organized fleets can fall apart and become uncoordinated mobs. Optionally, the Referee may include the passing of message and directions between ships with the 'Communicate' and 'Coordinate Fleet' rolls.

2.4 Resolving Hits

If the Hit roll is successful, the firing ship should check to see if the round penetrated the vehicle's armor, and then check for damage. Note, it is still possible to cause damage even if the penetration roll is unsuccessful.

2.4.1 Penetration Roll

If the salvo hits, make an opposed "To Penetrate" Roll. This roll is modified by the target vehicle **armor mod** (from target's vehicle sheet), the weapon's **penetration** (from firing ship's vehicle sheet for that weapon), and a range effect (from Table 4)

If the attack is a rocket and the target has a Torpedo net deployed, the first rocket hit is counted as not penetrating.

Table 4: Range Effects

Range	Description	To Penetrate Mod
Short	First third of weapon's range	+0
Medium	Second third of weapon's range	−4 **OR** −Penetration / 4
Long	Last third of weapon's range	−8 **OR** −Penetraion / 2

> **Example**: Two salvos from BL 6-inch/25.5 Mk III guns (penetration +113, damage 1d20) hit a craft with 10cm of steel armor (−100) at medium range (+0).
>
> The first salvo rolls a modified 21 (8+113−100+0), opposed by a 9, so it penetrates.
> The second salvo rolls a modified 17 (4+113−100+0), opposed by an 18, so it does not penetrate.

2.4.2 Damage Roll

Roll for damage based on the VDS entry for that weapon. If the hit did **not** penetrate, divide that amount of damage by 10, rounding down. If the hit did penetrate, the full amount of damage is

applied. Additionally, if the hit did penetrate, every die that rolled a '19' or '20' causes one critical hit. For each critical hit, pull a card from a standard playing deck and consult Table 6. Alternatively, if no cards are available, you can use dice. To do this, first roll 1d20 to determine the house of the roll (using Table 5) and then 2d20 to determine the value using column two of Table 6. If a flamethrower hits, on a '10' or greater it causes a **fire** critical hit **in addition** to any regular critical hit and damage.

Table 5: d20 to House Conversion

Roll	House
1-5	♦
6-10	♣
11-15	♥
16-20	♠

Table 6: Critical Hits

Card	Die	Effect
2-10♦	1-25	Additional Damage. Roll 1d20 for each card value (e.g. a 5♦ would roll 5d20).
2-10♣	1-25	Cascading failure. Roll 1d20 for each card value (e.g. a 5♣ would roll 5d20). For each die larger than 15, roll an additional die. (e.g. a 7♣ is drawn, so 7d20 are rolled, with values of 4,4,5,9,12,17, and 18. Two of those are larger than 15, so 2d20 are rolled. Resulting in a 13 and 16. One of these are greater than 15, so another 1d20 is rolled, getting a 17. This is greater than 15, so another 1d20 is rolled, getting a 5. All of these rolls are totaled (4 + 4 + 5 + 9 + 12 + 17 + 18 + 13 + 16 + 17 + 5=120) for 120 total points of damage.
2-10♥	1-25	Crew Damage. Roll 1d20 for each card value (e.g. a 5♥ would roll 5d20). This is the number of crew who are lost. It is assumed that half of these crew are killed, and half are disabled and can be returned to duty with a 'recover and treat wounded' action. The number of action points a ship can perform per round is degraded as crew is disabled. For example, a ship with 120 crew normally has 7 action points. If 30 crew are disabled, this is reduced to 5 action points ((120-30)/120*7=5.25).
2-6♠	1-18	One fire starts. Each fire does 5d20 damage each round, until extinguished.
7-9♠	19-23	Two fires start. Each fire does 5d20 damage each round, until extinguished.
10♠	24-25	Three fires start. Each fire does 5d20 damage each round, until extinguished.
Jack	26-27	One Minor system disabled
Q♣	28-30	Engine disabled. 1d20 damage points, plus the engine stops producing power. The ship begins decelerating and Aerolyth panels fail and other electrical devices fail, unless there is a battery backup or redundant engine. Requires a 'Repair System' action to repair.
Q♦	28-30	Propulsion disabled. The propulsion system stops propelling. The ship begins decelerating. Requires a 'Repair System' action to repair.
Q♥	28-30	Maneuver disabled. The ship is unable to unable to turn or take evasive maneuvers until a 'Repair System' action succeeds.

Card	Die	Effect
Q♠	28-30	Electrical system disabled. All electrical systems fail (including Aerolyth panels and batteries) until a 'Repair System' action succeeds.
K♣	31-34	Bridge hit. The ship's available action points are halved and 1d20 crew are injured.
K♦	31-34	Control Systems. 1d20 damage point, The ship's available action points are halved and until a 'Repair System' action succeeds.
K♥	31-34	Blast. a fire starts, plus an explosion occurs. The explosion causes 1d20 points of cascading (die >15 cascade).
K♠	31-34	Blast. two fires start, plus an explosion occurs. The explosion causes 1d20 points of cascading (die >15 cascade).
A♣	35-40	Blast. a fire starts, plus an explosion occurs. The explosion causes 1d20 points of cascading (die >15 cascade).
A♦	35-40	Structural failure. Severe damage to the structure of the vehicle. 1d20 damage now, and 1d20 damage each time the ship attempts to maneuver, land, or travel at more than one-quarter speed. Repair requires major overhaul with extensive repair facilities and 1d20 * 2 man-hours to repair.
A♥	35-40	Hidden Failure. Something goes wrong, but it is not immediately apparent. In 1d20/5 rounds, draw and apply two more critical hits.
A♠	35-40	Disaster! The magazine explodes, the Aerolyth misaligns, the boiler bursts, and the cat gets sick. The ship explodes.

Example: Two salvos from BL 6-inch/25.5 Mk III guns (penetration +113, damage 1d20) hit a ship.

The first salvo penetrates. It rolls 1d20 and gets a 2, so it does 2 points of damage to the target. The second salvo does not penetrate. It rolls 1d20 and gets 12, so it does 1 point of damage to the target (12/10=1.2)

2.4.3 Damage Effects

Fire: If a ship is on fire, it receives 5d20 damage each round for each fire that has started, until extinguished. Note, fire damage is applied after the ship's actions for that turn, so if the fire is immediately extinguished, no damage is done. An uncontested fire doubles in size every round. If efforts are made to combat the fire, even if they are not successful, the fire only increases by 50% per round. However, it is not extinguished.

Damaged: If the ship looses more than one quarter of its hit points it suffers a −1 to all command rolls.

Severely Damaged: If the ship loses half or more of its hit points, it loses half of its action points for each turn. Additionally, roll a 1d20 for each weapon system. On a 15 or greater, that weapon system is disabled until a "repair system" action. The ship may begin losing altitude (See Table 7).

Disabled: If the ship loses more than three-quarters of its hit points, roll a 1d20 for each weapon system. On a 5 or greater, that weapon system is disabled until a "repair system" action. Addi-

tionally, its maximum speed is reduced by 50%. The ship will begin losing altitude (See Table 7).

Destroyed: If the ship loses all of its hit points, it is considered destroyed. It immediately suffers failures in all of its major systems, and enters an uncontrollable free fall. The crew can only evacuate in the next round, and hopefully someone brought parachutes. The ship may begin losing altitude (See Table 7).

Table 7: Damage effects on Altitude in meters per minute

Damage Level	Cayley	Zeppelin	Aerolyth
Severe	Cannot Climb	Cannot Climb	100
Disabled	If $V_{max} < V_{stall}$, 500	100	1000
Destroyed	5000	1200	13000
Note: Craft fitted with Emergency Lift systems will not begin losing altitude until they are Destroyed.			

2.5 Air/Ground/Sea Combat

For rules on bombing, see the Bombing Rules V0.9 on http://hivequeenandcountry.com/.

2.6 Post-Battle Damage & Repair

After a ship has left combat, assuming is had not been destroyed, it still may have substantial damage. It is assumed that of the damage points inflicted, half are easily repaired within a few hours of combat, but that the other half are long-term injuries that will take substantial time (and machine tools) to repair. Rules for ship repair:

- The number of man-hours to repair a point of long-term damage can be found in Table 8. Remember, half the damage done to a ship is long term, the rest is quickly repaired.
- It takes 4kg of repair materials per person per hour of repair work
- The effective size of a repair crew is the crew of a maintenance facility (Table 9) plus one tenth of any other crew who may be enlisted to help.
- At the GM's discretion, the ship's crew may also be injured. To compute crew casualties, use this equation:

$$((damage/total))/2$$

Where **damage** is the number of damage points the ship has suffered and total is the **total** number of ship points from the ship's VDS. Assume half of these casualties are fatal and half are non-fatal.

Table 8: Time to repair ships of different size

Ship Size (tons)	Man-hrs. / point
<10	150
<100	100
<1000	50
<5000	100
<10000	125
>=10000	175

Table 9: Maintenance Facilities

Maintenance Facility	Crew

Maintenance Facility	Crew
Mini Shop	1
Field Shop	4
Portable Maintenance facilities [*3*]	12
Forward Maintenance facilities	40
Small airport berth	20
Large airport berth	40
Military Repair berth	200

Example: A 1500 ton craft (705 damage points) receives 212 points of damage in a battle. 106 of that is long-term damage. It will require 10600 man-hours to repair. It has access to a Forward Maintenance facility (crew 40) and an additional 50 crewmembers can assist. The effective repair crew is 45 (40+50/10) so 235.6 hours (10600/45) are needed to fix the craft. Working 12 hour days, the repairs can be completed in just under 20 days, and will require 42400 kg of repair materials. The ship had 250 crew, of whom 37 are now casualties.

Example: A 20 ton craft (10 damage points) receives 6 points of damage in a battle. 3 of that is long-term damage. It will require 300 man-hours to repair. The repairs will be carried out by a Mini-shop (crew 1) and 5 additional crewmembers. The effective repair crew is 1.5 (1+5/10) and the repairs will take 200 hours and require 1200 kg of repair materials.

3. Detailed Vehicle Design Sheet
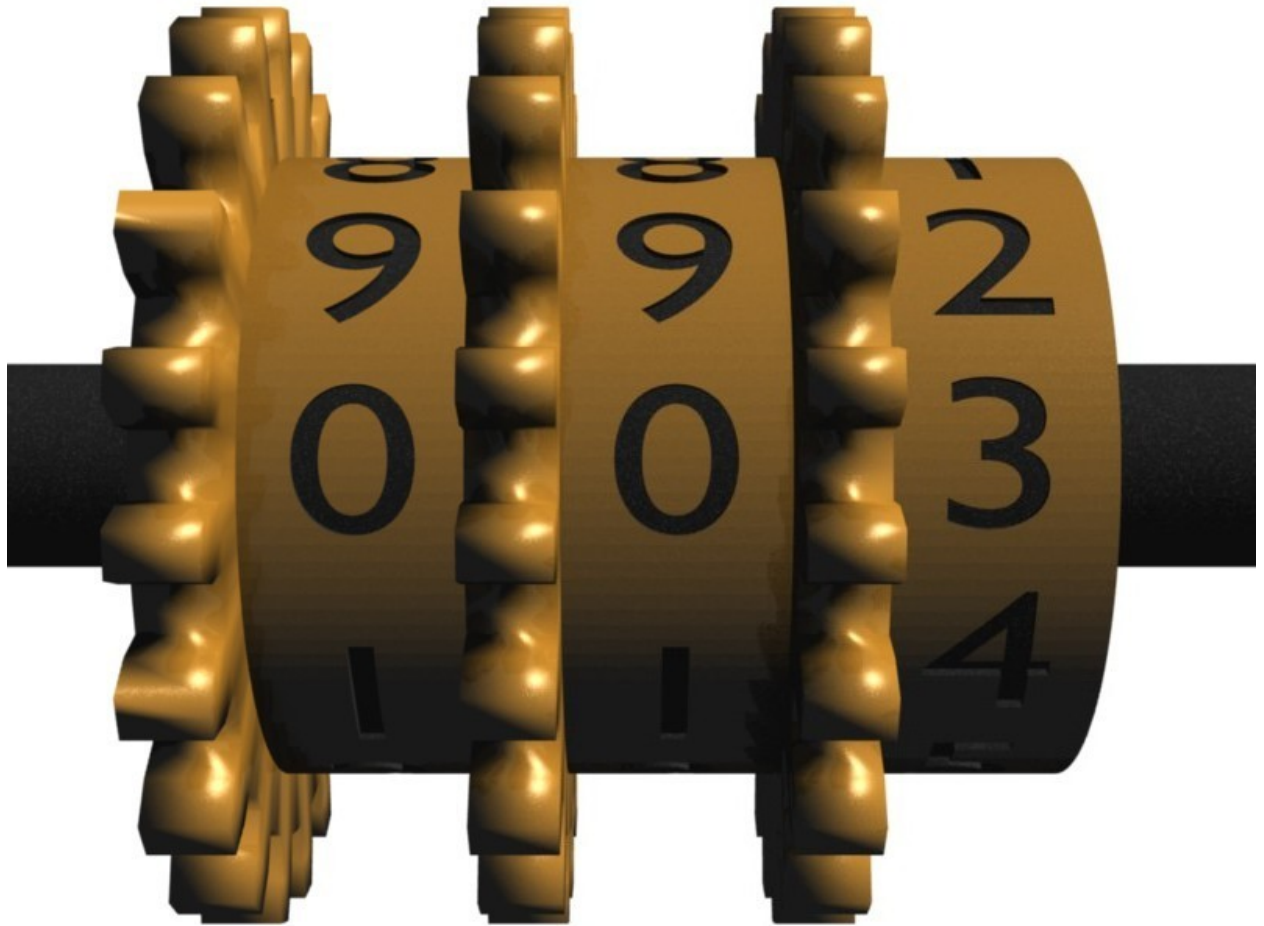
The Detailed Vehicle Design Sheet (VDS) provides a quick reference for important combat qualities of different ships. The VDS is based on a vehicle design created with the HQC Vehicle Design Rules [*3*]. Pre-made VDS are available on http://www.hivequeenandcountry.com/ .

3.1 Die Rolls

Many of the die rolls for combat could involve large numbers of die. If the players have a random number generator program to simulate large numbers of die rolls, an automatic die-rolling machine, or just really enjoy summing long lists of numbers, this may not be an issue. However,

they may prefer to simplify die rolls by dividing the number of die to be rolled by a constant and then multiplying the result by that constant with some rounding.

For example, instead of rolling 48d20, simply roll 5d20*10 or 8d20*6. The exact division is left to the Referee's discretion.

3.2 Representing Combat

Combat between several ships can quickly get complicated. A convenient way to track the complexities of combat is to use models or counters to track the location of different ships and their relation to each other. Common devices to help track and represent combat:

- **Models:** A number of manufacturers make models of ships or planes that can be converted to resemble these ships. Additionally, several models, in multiple scales, of the ships in this book can be found through Objects May Appear (See the ads at the back of this book).
- **Scratchpad:** Scratch paper to track ship damage, speed, and any other details.
- **Scaled Ruler(s):** (Some rulers at different scales are provided in the back of this book or online at http://hivequeenandcountry.com/)

Air-to-Air combat can cover large areas, so it is necessary to use a scaled representation of the combat board. A 10000:1 scale (10 km=1 meter) allows a 10km by 10km battlefield to be represented on a reasonable size card table. However, at such a scale even a large ship would be only a few millimeters in scale. So, it is recommended that players use ships of a smaller scale (1200:1 works well) on the larger scale playing surface.

3.3 Vehicle Design Sheet

Each ship has a **Vehicle Description Sheet** (VDS) that summarizes its relevant characteristics and capabilities. A sample VDS is shown in Table 10. The Sheet's fields – and how to fill them out – are explained in Table 11. For simplicity, all roll modifiers listed are applied to the **acting** (non-opposing) roll.

Table 10: Blank Vehicle Data Sheet

Ship Name:					
Crew		Damage Ctrl		Fire Ex	
Action Points		Repair Rate		Turn Rate	
Hit Points		Speed/Accel.		Command	
Armor Mod		Range Mod		Target Mod	
Maneuver		Crew Mod		Time fire	
Weapon		Accuracy	Range	Penetration	Damage
Other Systems:					

Table 11: Vehicle Design Sheet Key

Sheet Field	Description
Ship Name	The name of the ship or class of ships
Crew	The total standard crew of the ship, as calculated in the "Crew Accomoda-tions" section (3.3.13) on page 61 of the *HQC Vehicle Design Rules* [*3*]. List passengers and carried soldiers in "other systems"
Action Points	A rating of how many actions a ship can undertake. The number of action points is 5 + the total number of officers in the ship / 3, rounded down.
Hit Points	The number of hit points a ship has indicates the amount of damage it can take before it ceases function. The number of hit points is based on the loaded mass of the ship and any strengthening systems (see Section 3.3.1 of the *HQC Vehicle Design Rules*) [*4*] [*6*]. If the ship masses less than 1200 tons (i.e. less than 1,200,000kg) the number of HP is 0.5 * M, rounded up, where M is the ship's loaded mass in tons. If the ship is more than 1200 tons, the HP is $56*M^{1/3}$, rounded up. Notes: • If the ship's hull is made of wood, the HP is decreased by 30%, rounded down. • Hull strengthening increases Hit points by 20% (Level 1) or 30% (Level 2) • Improved Component location increases hit points by 10% • Increased Compartmentalization increases hit points by 20% (Level 1) 30% (Level 2) • Hive creatures Hit Points are multiplied by 3.5
Speed/Accel	Maximum speed and acceleration, as calculated in Section 3.4 of the *HQC Vehicle Design Rules*. This is written in terms of distance traveled (in meters) and speed accelerated (in meters per minute) in a round, which is one minute (60 seconds).
Command	Command modifier, based on C&DH modifiers and command facilities (Section 3.3.10 of the *HQC Vehicle Design Rules*). This may be modified by the use of Generalist Crew (–3) or Overworked.
Armor Mod	Modifier used for penetration rolls when the craft it hit. The modifier is the number of tenths of centimeters of steel armor equivalent, or fraction there of. E.g. 2.4cm of steel would be +24, 1.25cm of steel would be +13. If the armor is different on different sides of the ship, note the different armor facings with abbreviations. For example, the Zongtang class has 1cm of armor on its top, 1.5cm on the bottom, and 1.25cm on the sides, it would be listed as "10t/15b/13s". If the ship had 1cm of armor on its front and 5mm everywhere else, it would be listed as "10f/5" _(see armor table below)_

Armor Type	Modifier or Steel Equiv
Open Frame	Automatic Penetrate
Light or Medium fabric or canvas	+ 5
Heavy canvas	+0
Teak / Elm / Oak	–0.35 per cm

Sheet Field	Description	
	Pine	−0.3 per cm
	Concrete	−1 per cm
	Granite	−1.1 per cm
	Iron	−9 per cm
	Hive Chitin	−39 per cm
	Steel	−10 per cm
	Wootz Steel	−11 per cm
	Aluminum	−3.8 per cm
Range Mod	Modifier for estimating range. +2 per m of best rangefinder, +2 per rangefinder. For example, a ship with three 4m rangefinders would have a Range Mod of +14 (+8+6). Max +20	
Damage Ctrl	+ Shoring (+2) and structural repair kits (+5) + Shops: (mini+3; field +5; portable+5; forward +10) +5 if Automated Damage Controls	
Repair Rate	1d20 per 120 crew or fraction thereof. Note, repair and replenishment systems (see Section 3.3.6 of the *HQC Vehicle Design Rules*) may increase additional repair rate. A ship must have at least 20 crew to perform repairs in battle.	
Fire Ex	Fire extinguishing (+5) and fireproofing systems (−20% − −40). Include modifiers to fire extinguishing and fire spread rate from fireproofing. Vehicles with an aluminum hull frame have a −5 modifier and fire spreads 25% faster due to increased thermal conduction. Vehicles with concrete or stone frames have a +2 modifier and fire spreads 30% slower. Vehicles with a wooden hull frame or wood or canvas armor have a −10 and fire spread rate is 100% faster. Fire spread rate is modified by fireproofing (−20-40%) and firewalls (−50%)	
Target Mod	Modifier for computing a target solution. −10 if no computer, gunnery software, or plotting board + 1 Gunnery SW I + 2 Gunnery SW II + 3 Gunnery SW III + 4 Gunnery SW IV + Plotting Board Factor (See Section 3.3.11 of the *HQC Vehicle Design Rules*: I:+1, II:+2; III:+4, IV:+5, V:+6) + 5 if Babbage Inc. Computer − 0 if ABM computer − 5 in Scheutzian computer	
Turn Rate	Rate, in degrees per minutes, for a constant velocity turn. From Section 3.4.3 of the *HQC Vehicle Design Rules*.	
Maneuver	From Section 3.4.3 of the *HQC Vehicle Design Rules*	
Crew Mod	General crew quality. Modifies several rolls. Computed based on crew or officer training (see Crew Quality, below)	
Time Fire	Time to compute a firing solution, in rounds. If a plotting table is used, the firing solution is not available until the next turn (I.e. Time Fire = 1). If a	

Sheet Field	Description
	computer is used, the time to compute the solution is given Table 34, page 55 of the *HQC Vehicle Design Rules*, (remember a round is 1 minute). If neither a computer nor plotting table is used, the firing solution is not available for two turns.
Weapon	Name of a weapon system. Multiple weapons of the same type can be combined into a battery (See below).
Accuracy	From Table 12. This may refer to a group of weapons, or to a single weapon of that type. If so, it will be marked "(single)" or "(s)"
Range	in meters, from Table 12
Penetration	From Table 12
Damage	From Table 12. This may refer to a group of weapons, or to a single weapon of that type. If so, it will be marked "(single)" or "(s)"
Other Systems	Any other notable system on the ship such as carried marines, repair facilities, etc…

3.3.1 Weapons Tables

Weapons characteristics are summarized in the table below. Note that rockets have different values depending on if they are fired from a launcher or if they are in a fixed external mount. Launchers contain equipment to aim and precisely calibrate the fuel burn rate on rockets, allowing much greater accuracy. Some rockets even have adjustable stabilization fins that can be timed to deploy at different times, enabling a primitive form of guidance.

Table 12: Weapon Effects

Name	Accuracy Mod	Range (m)	Penetration	Damage	Rate of Fire (Turns)
1-inch Nordfelt gun	0	5300	11	1d20	1
11-inch 25ton RML	−1	10100	111	5d20	10
BL 12 inch naval gun	0	16600	212	6d20*2	1
BL 13.5 inch naval gun Mk I	+1	19600	302	4d20*6	1
BL 4-inch/25 gun Mk I	+1	12300	82	1d20/4	1
BL 6-inch/25.5 gun Mk III	0	14100	113	1d20	1
BLR gun, 10-inch	+1	20800	299	6d20*2	1
BLR gun, 12-inch	+1	22100	360	5d20*5	1
BLR gun, 14-inch	+1	23300	424	5d20*10	1
BLR gun, 16-inch	+1	23300	445	7d20*10	1
BLR gun, 3-inch	0	14300	96	1d20/4	1
BLR gun, 5-inch	0	14800	120	1d20	1
BLR gun, 6-inch	0	16200	153	1d20	1
BLR gun, 8-inch	+1	18600	224	5d20	1
Bomb, 100kg			16	10d20	

Name	Accuracy Mod	Range (m)	Penetration	Damage	Rate of Fire (Turns)
Bomb, 10kg			7	1d20	
Bullet Caste, 10kg	0	1100	6	11d20	1
Bullet Caste, 1kg	+1	6900	18	3d20	1
Flamethrower, Large*	+3	200	1	4d20	1
Flamethrower, Small*	+2	100	1	1d20/2	1
Gatling Gun	+2	3500	10	1d20/2	1
Grapple Arrow	–2	100	9	0	2
HA bomb, 10 ton			2854	10d20*200	1
HA bomb, 20 ton			3648	10d20*460	1
HA bomb, 5500kg			2304	10d20*100	1
Hotchkiss Revolving Cannon 37mm/5	+1	5500	13	1d20/4	1
Hotchkiss Revolving Steam Cannon 37mm/5	+1	5500	13	1d20	1
Howell Torpedo Launcher	–0	900	2	7d20	2
Mallet Mortar	–2	3800	36	5d20*7	15
Maxim Gun	+2	4200	9	1	1
QF 6 inch /40 naval gun	+1	15100	129	8d20	1
Rapid Fire Gun, 1-pounder	–1	5700	13	1d20/4	1
Rapid Fire Gun, 3-pounder	0	9900	40	1d20	1
Rapid Fire Gun, 6-pounder	0	10700	47	2d20	1
RBL 20 pounder Armstrong gun	–2	6500	24	1	1
RBL 40 pounder Armstrong gun	–1	7600	37	1d20/4	2
RBL 7 inch Armstrong gun	–1	7700	46	1d20/2	3
RML 16 inch 81 ton gun	0	13900	218	3d20*10	14
RML 17.7 inch	0	13500	217	4d20*10	15
Rocket (External), 12 inch	–4	22300	33	8d20*2	1
Rocket (External), 12 pdr	–2	9600	9	1d20/2	1
Rocket (External), 16 inch	–4	25800	46	4d20*10	1
Rocket (External), 24 pdr	–3	13500	11	1d20/2	1
Rocket (External), 6 inch	–3	16500	16	2d20	1

Name	Accuracy Mod	Range (m)	Penetration	Damage	Rate of Fire (Turns)
Rocket (External), 6 pdr	−2	8600	6	1	1
Rocket (External), 9 pdr	−2	8900	7	1	1
Rocket (External), 9.2 inch	−3	19500	24	7d20	1
Rocket (External), Bolshoi	−2	81600	124	5d20*9	1
Rocket (External), Chetvert	0	16700	44	2d20	1
Rocket (External), Sazhen	−1	24800	89	9d20*2	1
Rocket Launcher, 12 inch	+3	22300	33	8d20*2	3
Rocket Launcher, 12 pdr	+5	9600	9	1d20/2	1
Rocket Launcher, 16 inch	+3	25800	46	4d20*10	4
Rocket Launcher, 24 pdr	+4	13500	11	1d20/2	1
Rocket Launcher, 6 inch	+4	16500	16	2d20	2
Rocket Launcher, 6 pdr	+5	8600	6	1	1
Rocket Launcher, 9 pdr	+5	8900	7	1	1
Rocket Launcher, 9.2 inch	+4	19500	24	7d20	2
Rocket Launcher, Bolshoi	+5	81600	124	5d20*9	4
Rocket Launcher, Chetvert	+7	16700	44	2d20	2
Rocket Launcher, Sazhen	+6	24800	89	9d20*2	3
Sea King Ballista	+2	4200	44	2	5
Sea King Corvus (10m)	+0	10	5	2	5
Sea King Polybolos	+2	2800	17	1	4
Torpedo Launcher, Whitehead 14-inch	+0	1100	1	7d20*2	2
Torpedo Launcher, Whitehead 15-inch	+0	1400	1	7d20*3	2
Venusian Lightning Gun	+4	1400	Auto	10d20*2	
Venusian Railgun, Large	+3	8600	59	1d20/2	1
Venusian Railgun, Small	+2	5500	18	1d20/4	1

Note: the rate of fire may include multiple rounds fired in the same turn for automatic weapons.
Note(*): flamethrowers cause a critical 'fire' hit

3.3.1 Combining Weapons

Multiple weapons of the same type can be combined into a single entry on the vehicle design sheet, and fired as one. The vehicle sheet entry for that weapon is filled out according to Table 13.

Table 13: Combined Weapon Vehicle Sheet Entry

VDS field	Calculation

VDS field	Calculation
Accuracy	From Table 12, +1 for each additional gun in the salvo, up to +5
Range	From Table 12
Penetration	From Table 12
Damage	From Table 12 * the number of guns

Example: A group of four BL 6-inch/25.5 Mk III guns

Weapon	Accuracy	Range	Penetration	Damage
4x BL 6-inch/25.5 Mk III	0	14100	+113	4d20

3.3.2 Combining Ships (Swarms)

Ships that have less than 5 Hit Points can be combined into collections or 'swarms.' This is particularly true of smaller Hive creatures, like Lancers or to represent large numbers of fighters attacking a large Aerolyth ship. These combinations of ships maneuver, fire, and take damage like normal ships, but are not susceptible to fire, critical hits, or being boarded. A VDS for a swarm is filled out as follows:

Ship Name:					
Crew	Sum	**Damage Ctrl**	NA	**Fire Ex**	NA
Action Points	As Single Ship	**Repair Rate**	NA	**Turn Rate**	As Single Ship
Hit Points	Sum	**Speed/Accel.**	As Single Ship	**Command**	As Single Ship
Armor Mod	As Single Ship	**Range Mod**	As Single Ship	**Target Mod**	As Single Ship
Maneuver	As Single Ship	**Crew Mod**	As Single Ship	**Time fire**	As Single Ship
Weapon		**Accuracy**	**Range**	**Penetration**	**Damage**
Combine All Weapons as per Section 3.3.1, above					
Other Systems:					

3.3.3 Crew Quality

The 'Crew Quality' modifiers are mainly a judgment call. They should take into account factors such as those found in Table 14. A truly exceptional crew with good training, officers, and experience, with a strong tradition and a lot of luck, may have a crew modifier as good as +6 or +7. A shockingly poor crew could have a modifier of −7 or −8.

Table 14: Crew quality factors

Factor		Range
Nation	Some nations have particularly strong aeronaval traditions, while	−1 to +1

Factor		Range
	others have no strong tradition to draw upon.	
Crew	Any group of people will have naturally more or less talented individuals. A well-selected crew can perform much better than an average crew.	−2 to +2
Officers		−1 to +2
Experience	Battle hardened veterans are more proficient in combat than green troops.	−1 to 0
Training	Training, education, and frequent drill can improve quality. Lack of these can hamper.	−1 to +2
?	There are always indefinable qualities that can give a crew an edge, or condemn them. Luck, grit, destiny, caffeine…	−1 to +1

4.Mass Combat
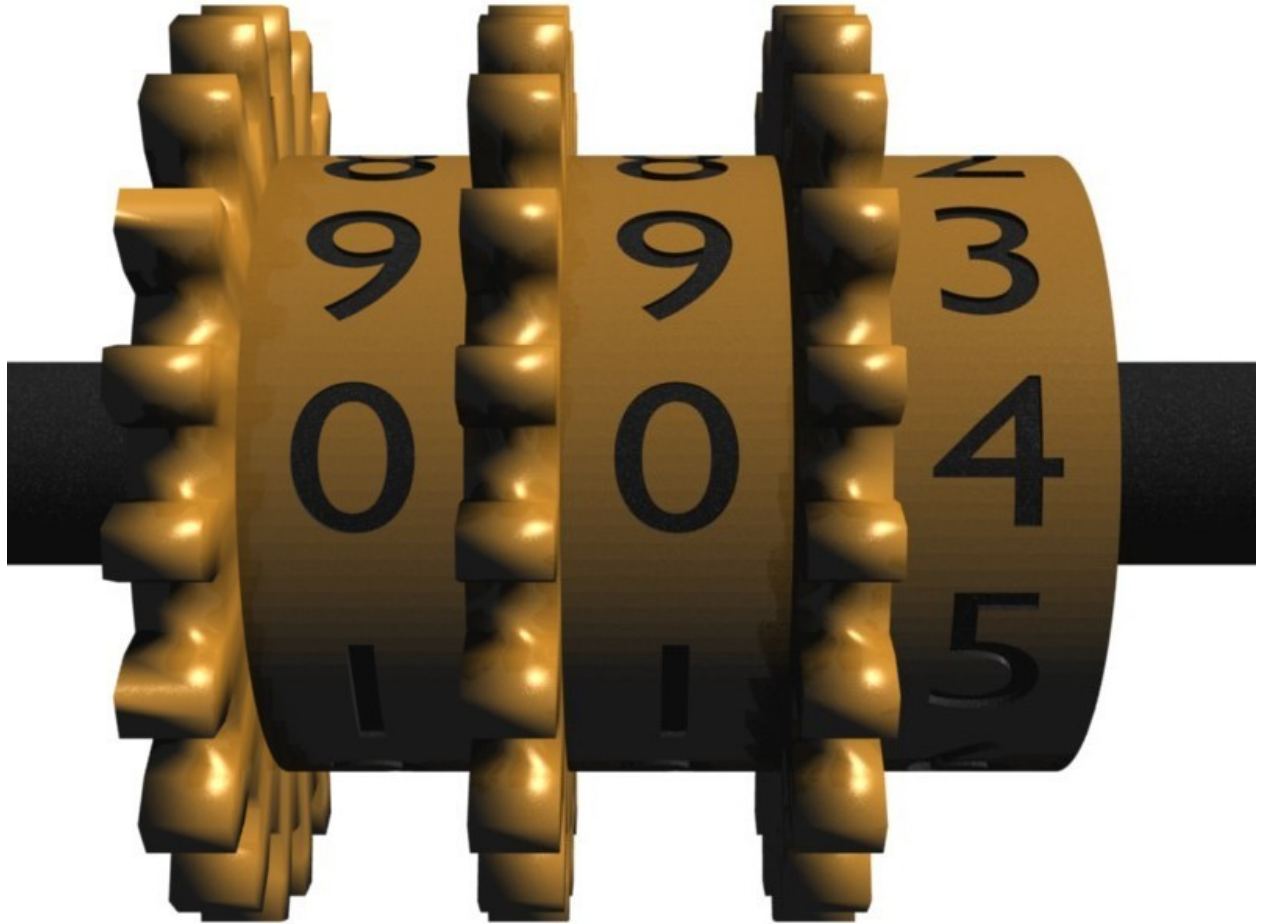
In a large campaign, it may be necessary to represent truly vast battles in which dozens, hundreds, or even thousands of ships and smaller aircraft engage in combat. Even with a quick combat system, resolving such a battle could take far longer than is feasible.

The Mass Combat rules provide a simple, quick mechanism to determine combats between large forces. Like the Boarding Actions rules (Section 2.3.2, page 17), the mass combat system is based on Lanchester's square laws, Dupuy vehicle attrition rates, and Wayne Hughes [*6*] [*7*] [*7*].

4.1.1 Setup

In the Mass combat system, fleets are represented by two characteristics: **Staying Power** and **Attack Power**.

4.1.1.1 Staying Power

Staying power represents the ability of a fleet to receive damage and continue functioning. For each class of ship, its **Staying Power** is calculated by this equation:

$$(\text{Hit Points})*(1+ ((\text{Average Armor})/5)^{0.5})*(1+0.025* (\text{Speed})^{0.5})$$

Where,

- **Hit Points** is as calculated for the Vehicle Design Sheet (See Table 11).
- **Average Armor Mod** is computed by summing the armor mod for each facing of the ship and dividing by six. For example, a ship with an armor mode of (20f/10s/30) (20 front, 10 sides, 30 other) would have an average armor of (20+10+10+30+30+30)/6 or 21.7.
- **Speed** is measured in meters per minute and is the maximum speed for the creature.

To compute the **Staying Power** for a fleet, compute the value for each ship and then multiple by the number of ships and sum.

Example: A pack of hive creatures:

Class	Hit Points	Avg. Armor	Speed (m/min.)	Staying Power (per ship)	Number of ships
Early Flying Lancers	0.3	12	3180	1.12	16500
Tough Meso	10	39	3036	66.40	150
Macro BB	6110	71	3894	58943.17	1

Total Staying Power: 87382

Optional Rule: If the fleet carries ships equipped with command facilities (e.g. flag bridge), multiply the **Staying Power** by this factor:

$1+(\text{E\_all\_command\_facilities}(\text{CommandRating} * \text{ShipsCommanded}) / (\text{ShipsInFleet}) * 0.05)$

Where,

- **CommandRating** is the improvement to command rolls given by that type of flag bridge (e.g. 3 for Commodore's Flag Bridge, +2 for a Vice Admiral's bridge)
- **ShipsCommanded** is the number of ships which can be commanded by that flag bridge (e.g. 30 for a Fleet Flag Bridge, 3 or a Commodore's Flag Bridge)
- **ShipsInFleet** is the number of "large" ships (bigger than 20 tons) in the fleet.

Example: A fleet of 10 ships contains a Commodore's Flag Bridge (+3 to 3 ships) and a Vice Admiral Flag Bridge (+2 to 20 ships). The command factor is: $1+(((3*3)+(2*20))/(10)*0.05) = 1.245$.

4.1.1.2 Attack Power

Attack Power represents the ability of a fleet to inflict damage on another fleet. For each class of ship, its Attack Power is calculated by:

$$\text{MaxDamage}*\text{AccuracyFactor}*(2+ (\text{Range}/1000)^{0.5})/8$$

- **MaxDamage** is the maximum damage that weapon can inflict. For example, a battery of 12 Gatling Guns can do 6d20 damage, so the maximum damage is 120. Generally, ground attack weapons (bombs) are ignored.
- **AccuracyFactor** is found by adding the **Range Mod** and **Target Mod** for a ship and consulting Table 15.

Table 15: Accuracy Factor for Mass Combat

Range Mod+Target Mod	AccuracyFactor	Range Mod+Target Mod	AccuracyFactor
-26 or lower	93.00%	-6	63.20%
-25	91.95%	-5	61.25%
-24	90.90%	-4	59.30%
-23	90.00%	-3	56.85%
-22	89.10%	-2	54.40%
-21	87.75%	-1	52.20%
-20	86.40%	0	50.00%
-19	85.25%	1	48.80%
-18	84.10%	2	47.60%
-17	82.55%	3	46.55%
-16	81.00%	4	45.50%
-15	79.55%	5	44.40%
-14	78.10%	6	43.30%
-13	76.40%	7	42.43%
-12	74.70%	8	41.55%
-11	73.00%	9	40.63%
-10	71.30%	10	39.70%
-9	69.10%	11	38.93%
-8	66.90%	12 or higher	38.15%
-7	65.05%		

- **Range** is the range of the longest ranged weapon on this hip, in meters. For example, a Gatling gun's maximum range is 3500m and a Maxim Gun's is 4200m, so a ship which carries both would have a **Range** of 4200m.

Like Staying Power, to compute the **Attack Power** for a fleet, compute the value for each ship and then multiple by the number of ships and sum.

Example: A Human Fleet					
Class	MaxDamage	AccuracyFactor	Range	Attack Power (Per Ship)	Ships
Omen Light 2	11	39.70%	4200	2.2	48
Priest Class	900	93.00%	22100	701.1	6
Powerful	1280	93.00%	22300	1000.3	3
Sword	7360	93.00%	23300	5841.2	1
Sea Eagle	270	39.70%	16500	81.2	38
Total Attack Power: 16241					
Because of the command facilities on the Sword Class ship, this fleet's staying power would be					

increased by 10%, to 49490.

Table 16: Staying and Attack power for FLying Vehicles

Ship	Attack Power	Staying Power

4.1.2 Mass Combat Round

Each round represents one day of combat. The combat process for each round assumes that each side inflicts damage on the other side equal to its **Attack Power** (adjusted by a random amount). The **Attack Power** is adjusted each turn by scaling it according to the amount of **Staying Power** lost that turn.

The round process:

1. For each side, Record the **Initial Staying Power** and **Initial Attack Power** for each side in the battle, that is, the Staying Power and Attack Power at the beginning of the round.
2. For each side, roll ((1d20+15)/26) and multiply this by the side's **Initial Attack Power**. This is the amount of damage that side inflicts.
3. For each side, subtract the damage inflicted by the **opposite** side from the side's **Initial Staying Power** to find the side's **Current Staying Power**
4. For each side, compute the **Current Attack Power** by multiplying the **Initial Attack Power** for this round by the **Current Staying Power** and dividing by the **Initial Staying Power**. That is:

Current Attack Power = (Initial Attack Power) * (Current Staying Power) / (Initial Staying Power)

5. Decide if combat is continued, or broken off. If it is continued, return to Step 1 where the **Current Attack Power** and **Current Staying Power** for each side become the **Initial Attack Power** and **Initial Staying Power** for the new round.

Example: The Human and Hive fleets introduced in the examples above are roughly evenly matched. Though the Hive has much greater **Staying Power**, the Human fleet has more **Attack Power** due to its heavier weapons, range, and targeting capabilities.
In the first round, the Human and Hive forces are at full strength. The Human forces roll a 15, so their Attack Power is multiplied by 1.27, yielding 6870 damage. This is damage is subtracted from the Hive's Initial Staying Power (87382), so the Hive is reduced to 80512 Staying Power. Also in this round, the Hive inflicts 2344 damage on the Human forces, which reduces the hu-

man's Staying Power to 47146.

Round 1	Humans	Hive
Initial Staying Power	49487	87383
Initial Attack Power	16241	9141
Roll	(7+15)/26=0.85	(3+15)/26=0.69
Damage Inflicted	13742	6328
Current Staying Power	43159	73641
Current Attack Power	14164.2	7703.5

The Fleets' Staying Power and Attack Power from the end of the first round become the Staying Power and Attack Power of the second round:

Round 2	Humans	Hive
Initial Staying Power	43159	73641
Initial Attack Power	14164.2	7703.5
Roll	(5+15)/26=0.77	(18+15)/26=1.27
Damage Inflicted	10896	9778
Current Staying Power	33381	62745
Current Attack Power	10955.2	6563.7

Round 3	Humans	Hive
Initial Staying Power	33381	62745
Initial Attack Power	10955.2	6563.7
Roll	(3+15)/26=0.69	(10+15)/26=0.96
Damage Inflicted	7584	6311
Current Staying Power	27070	55161
Current Attack Power	8884	5770.3

Round 4	Humans	Hive
Initial Staying Power	27070	55161
Initial Attack Power	8884	5770.3
Roll	(7+15)/26=0.85	(20+15)/26=1.35
Damage Inflicted	7517	7768
Current Staying Power	19302	47644
Current Attack Power	6334.6	4984

After four rounds (four days), combat breaks off. The Human fleet has lost to 61% of its original strength. The Hive fleet has lost 45% of its strength.

4.1.3 Post-Combat

After combat, losses can be calculated from the change in Staying Power over the span of combat. It is assumed that half of the losses indicate ships that were destroyed or damaged beyond repair, and half are from ships that are damaged, but repairable. The procedure to determine losses:

1. Determine the **Loss Rate** with this formula:

$$1-((\text{First Round Initial Staying Power})/(\text{Last Round Current Staying Power}))$$

2. For each class of ship:
     a. If there are 10 or fewer ships, roll 1d20 for each ship and consult Table 17 to determine if the ship is damaged or destroyed.

Table 17: Small Ship Number Loss and Damage Rates

Loss Rate	0-10%	10%-<20%	20%-<30%	30%-<40%	40%-<50%	50%-<60%	60%-<70%	70%-<80%	80%-<90%	90%-100%
Damaged	1	2	3-4	4-6	5-8	6-10	7-12	8-14	9-16	10-18
Destroyed		1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	1-9

     b. If there are more than 10 ships, multiply the loss rate by the number of ships and round down to determine the number of ships that are disabled or destroyed. Half of these ships (rounded up) are damaged, the rest are destroyed.

Example: The Human fleet had a loss rate of 61%:

Class	Original	Damaged	Destroyed	Procedure
Omen Light 2	48	15	14	3b
Priest Class	6	2	3	3a
Powerful	3	1	2	3a
Sword	1	0	0	3a
Sea Eagle	38	12	11	3b

The Hive Fleet had a loss rate of 45%:

Class	Original	Damaged	Destroyed	Procedure
Early Flying Lancers	16500	3752	3751	3b
Tough Meso	150	34	34	3b
Macro BB	1	1	0	3a

4.1.4 Note of Caution

This procedure is good for quick analysis of large-scale combats. However, this rapidity entails losing certain details. It is up to the Referee to "sanity check" the results of the Mass combat to determine if they make sense. If the results do not seem to "fit", the GM should adjust the Staying Power or Attack Power to compensate, or simply decide one side wins by fiat.

Things to consider when sanity checking:

- **Altitude**: If one side has a dramatically higher ceiling than the other, they will have a substantial advantage or even be invulnerable to attack.
- **Armor**: If one side is comprised of heavily armored ships and the other has only low-penetration weapons, the armored side will have a substantial advantage.
- **Surprise**: Surprise can lead to a substantial increase in one side's **Attack Power**. A moderate level of surprise (e.g. maybe attacking a fleet with some, but not much time to prepare) could lead to a 10% increase in Attack Power. Heavy surprise (e.g. a night time attack or attack from the clouds) could be a 25% increase. Complete surprise (e.g. attack on a completely unprepared fleet) could be a 50% increase or more.

- **Training**: A well trained or experienced crew combating poorly trained or inexperienced can lead up to a 100% increase in the more experienced side's **Attack Power**. This would be a very extreme case. 20-40% increase would be a more common.
- **Planning**: If one side has detailed knowledge of the other's plans, composition, or movement and is able to make a detailed plan before the start of battle, this could result in up to a 30% improvement in that side's **Attack Power**.
- **Moral**: Even a well-trained force can become demoralized after a recent defeat. This can lead to up to a 20% reduction in **Attack Power**.
- **Terrain & Weather**: Usually terrain is not a factor in aerial combat, but if one side is engaged in low altitude combat in rugged or mountainous terrain, it could make them less vulnerable to attack. This can be modeled by increasing starting **Staying Power** by up to 35%. Similarly, bad weather has a dampening effect on combat, and can reduce both sides' **Attack Power** by up to 30%.

5. Detailed Boarding Actions
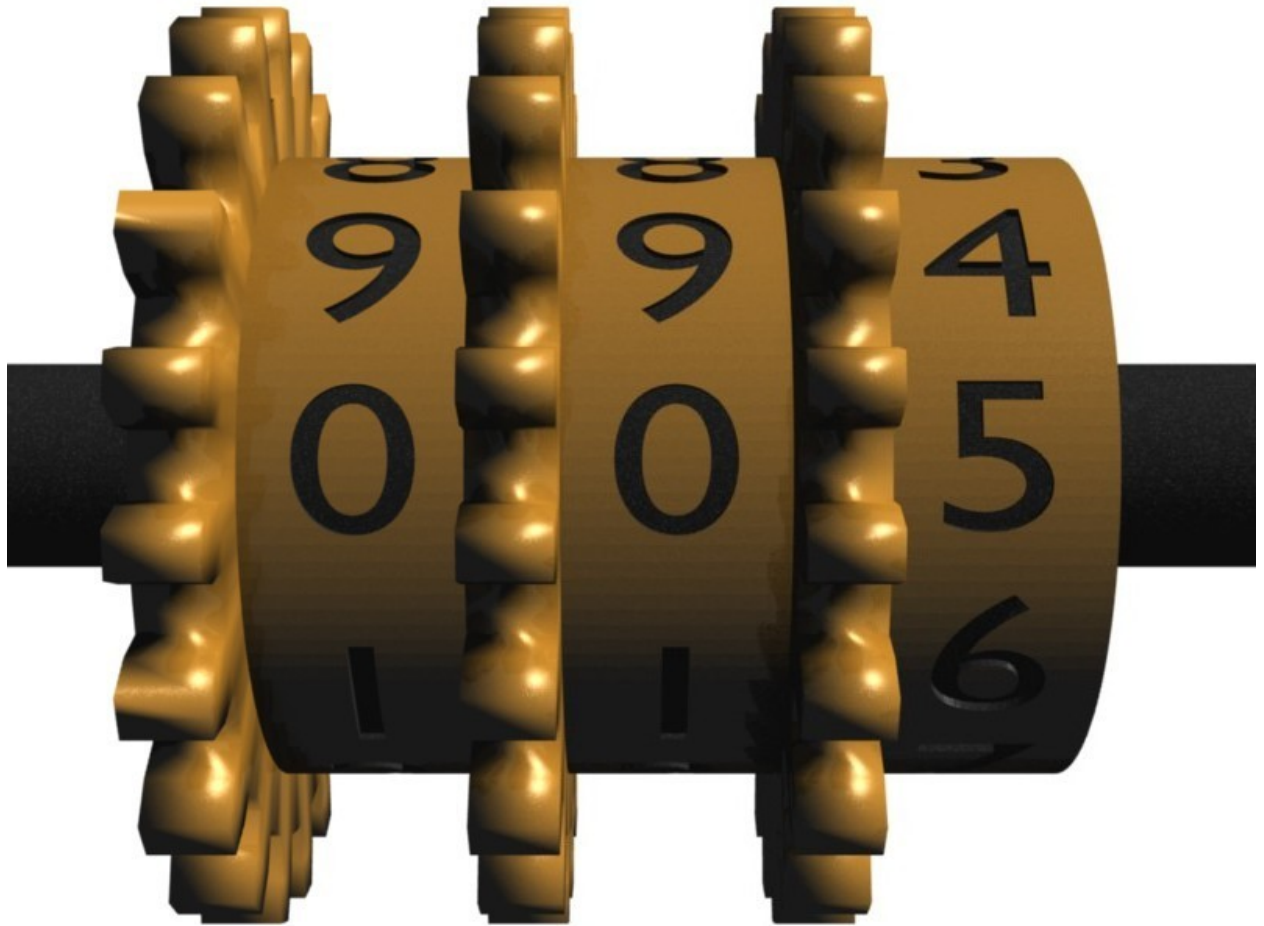
The process for detailed Boarding actions is:

1. **Determine size of fighting parties**: This is decided by the player, and is usually the number of marines or soldiers from the two craft. Optionally, regular crew can be enlisted into the defense as well. Remember, if regular crew (i.e. not soldiers or marines) are used in this combat, the combat effectiveness of the ship is reduced as per the "Overworked Crew" rules (Table 42, page 64 of the *HQC Vehicle Design Rules*).

2. **Compute Base Combat Power of each side**. For each side, compute the combat power of their combatants. This is done by multiplying the number of combatants by their combatant strength calculated from Table 18 and their level of experience from Table 19. For defending forces, this number is multiplied by the conditions of combat from Table 20. That is, (Number) * (Strength) * (Experience) for attackers and (Number) * (Strength) * (Experience) * (Defenses) for defenders. Automated defenses and Hive creatures count as 'Novice'. A ship is considered "surprised" if it was not expecting combat. It is considered "prepared" if it has made a successful "prepare to repel boarders" action. These values should be rounded up.

Design Note: These rules are based on the attrition forecasting equations and methodology found in [**39**] and [**47**]. Casualty rates are increased to reflect the close quarters combat. Variability has been added in to account for chance. The combatant combat value of 1.0 (Table 18) is equivalent to a Theoretical Lethality Index (TLI) of 11.1.

These rules are also just a modified

Table 18: Combatants Strength

Combatant Type	Value
Crew w/ Improvised Weapons	1
Warrior w/ Primitive Weapons	1.5
Warrior or Crew w/ Firearm	3
Modern Soldier w/ Firearm	4
Early Hive Lancer	34.5
Late Hive Lancer	18
Automated Defenses (per 100m^3)	5
Modern Soldier w/ Machine Gun	12

Table 19: Experience

Experience	Value
Expert	1.5
Trained	1.2
Novice	1

Table 20: Defensive Conditions

Condition(s)	Value
All of :prepared to repel boarders; internal defensive positions; automated defenses	2.1
2 of : prepared; internal def.; auto	1.8
1 of : prepared; internal def.; auto	1.3
none of : prepared; internal def.; auto	1
Surprised and internal def or auto def	0.7
Surprised	0.6

Example: A Christchurch-B pirate ship engages a target ship and sends a boarding party. The party is lead by 10 Soldiers and backed up by a scratch party of 30 Crew with improvised weapons. The attacking soldiers are veterans and count as 'Expert', The attacking crewmembers are skilled, but mainly in ship maintenance. They only count as Novice. The pirates are able to board their target by surprise, but the target (450m^3 in size) has automated defenses and 20 marines (count as Modern Solider) of its own. The defenders are trained to fight, but are less experienced than the veteran pirates, so they only count as "Trained". Automated Defenses count as 'Novice.'

Attacking Soldiers: 10 (Number) * 4 (Strength) *1.5 (Experience) = 60

Attacking Crew: 30 (Number) * 1 (Strength) * 1 (Experience) = 30

Total attacker strength = 90

Defending Automated Defenses: (450/100) (Number) * 5 (Strength) * 1 (Experience) * 0.7 (De-

fense) = 16
Defending marines: 15 (Number) * 4 (Strength) * 1.2 (Experience) * 0.7 (Defense) = 51
Total defender strength = 67

3. **Adjust Combat Power for chance**. For each round, adjust the base combat power of each side by a random factor, determined by rolling 4d20, adding 40, and dividing by 82. (i.e. (4d20+40)/82). Multiply this random factor by the Base combat strength calculated in Step 2.

Continued Example: The Attackers roll 4d20 and get 30. Their random factor is (30+40)/82 or 0.85. Their Combat power is 0.85*90 = 76.5. The defenders roll 24, so their factor is 0.78. Their adjusted strength is 0.78*67 = 53.

4. **Compute Casualty rate**. For each side, compute the rate at which casualties are inflicted. The casualty rate is computed by first determining the opposition effect. Divide the Combat power for the current side (computed in Step 3) by that of the opposing side and look up the effect from Table 24, column 2. Next, multiply the value from the table by the values for the side's condition, experience, and armor from Table 21, Table 22, and Table 23. Multiply this number by the constant 0.30.

Table 21: Battle Condition effect on casualties

Condition	Value
Defender: surprised	4.0
Defender: unsurprised	1.0
Defender: prepared	0.8
Attacker: 1st round of attack	3.5
Attacker: 1st round & Facing Electrical Fence, barbed Wire or Torpedo Netting	5.0

Table 22: Experience effect on casualties

Experience	Value
Expert	0.4
Trained	0.5
Novice	1.0

Table 23: Protection effect on casualties

Armor	Value
None	1.0
Primitive Armor	0.95
Metal Helmet	0.95
Modern Armor	0.8

Table 24: Opposition effect on casualties

P_a/P_b	Value
>6	0.4
5-6	0.45
4-5	0.5
3-4	0.6
2-3	0.65
1.5-2	0.75
1.25-1.5	0.85
.85-1.25	1
0.67-0.85	1.1
0.50-0.67	1.2
.35-.5	1.4
.25-.35	1.5
.2-.25	1.7
.1-.2	2
<.1	2.5

Continued Example: The attackers opposition factor is (76.5/53) = 1.44, so the value from Table 24 is 0.85 (1.25-1.5). This is the first round of the attack, and the attack is lead by their experienced Expert troops. The attackers have only metal helmets.
Attacker Casualty rates are: 0.85 (Opposition Effect) * 3.5 (Battle Conditions) * 0.4 (Experience) * 0.95 (Protection) * 0.30 = 0.33
The defenders are lead by their human marines, so they count as "Trained", are taken by surprise, and have no armor. The defender opposition factor is (53/76.5) = 0.69, so the value is 1.1

Defender Casualty rates are: 1.1 (Opposition Effect) * 4.0 (Battle Conditions) * 0.5 (Trained) * 1.0 (Protection) * 0.30 = 0.66

5. **Compute advance rate.** The advance rate determines how much of the ship the attacking force has secured along its longest dimension. If the attacking force is losing (i.e. their combat power is less than the defender's) this implies they are being pushed back. If the total advance into the ship is less than zero, the attack has been pushed back. At the Referee's discretion, the defenders could push it all the way back into the attacking ship, turning the tables. If the total advance is greater than the longest dimension of the ship, the entire ship has been taken, and the defenders overwhelmed. To compute the advance rate for the side that is winning, multiple the appropriate value from Table 25 with the value from Table 26.

Table 25: Base Advance Rate vs., Opposition

P_a/P_b	Advance Rate m/round
1-1.25	10
1.25-1.75	15
1.75-3	29
3-6	49
6+	146

Table 26: Defensive Effect on Advance Rate

Defense	Value
Normal	1
Internal **or** automatic defenses	0.5
Internal **and** automatic defenses	0.25

Continued Example: The attacker's combat power is greater, so they advance. Their opposition factor is (76.5/55) = 1.44 and they are facing automatic defenses so the total advance is 15 (Table 25) * 0.5 (Table 26) = 7.5. The ship is 20m long, so they have advanced about a third into it.

6. **Adjust Forces**. For each side, adjust the size of the combatants due to casualties. The number of casualties are based on the casualty rates from Step 4. Multiply the rate for each side by its forces to determine the number of casualties, and round up. Automated defense losses are not rounded up. Of these casualties, about one third are killed, another third are wounded, but will recover with medical care, and another third will recover after combat.

Continued Example: The attackers casualty rate is 0.33. The defender's rate is 0.66.
Attacking Soldiers: 0.33 (Rate) * 10 (Number) = 4
Attacking Crew: 0.33 (Rate) * 30 (Number) = 10
This leaves 6 solders and 20 crew.
Defending Automated Defenses: 0.66 (Rate) * (450/100) (Number) = 3
Defending marines: 0.66 (Rate) *15 (Number) = 10
This leaves 1.5 Automated Defense units and 5 marines.

7. **Continue combat, break off, or declare winner**. At this point the attacking or defending sides may decide to continue combat, retreat or surrender. Also, if the total advance is greater than the longest dimension of the ship, the ship has been overrun and the defenders bust surrender. If combat is to continue, go to step 2 and begin another round.

Continued Example: Combat continues for the pirate attack. In the second round, the element of surprise has worn off.

2. **Compute Combat Power.** With casualties, the attacker's combat power this round is: 6

(Number of soldiers) * 4 (Strength) *1.5 (Experience) + 20 (Number of crew) * 1 (Strength) * 1 (Experience) = 56. The defenders combat power is 1.5 (Number of automated defenses) * 5 (Strength) * 1 (Experience) * 1.3 (Defense:Automated Defenses) + 5 (Number) * 4 (Strength) * 1.2 (Experience) * 1.3 (Defense) = 40.95

3. **Adjusting for change.** Attacker rolls 37. (37+40)/82*56=52. Defender rolls 34. (34+40)/82*40.95=37

4. **Casualties.** Attacker opposition factor is (52/37)=1.4. Attacker's casualty rate is 0.75 (Opposition Effect) * 1.0 (Battle Conditions) * 0.4 (Experience) * 0.95 (Protection) * 0.30 = 0.09. Defender opposition is (37/52)=0.71. Defender casualty rate is 1.1 (Opposition Effect) * 1.0 (Battle Conditions) * 0.5 (Trained) * 1.0 (Protection) * 0.30 = 0.17.

5. **Advance Rate.** The attackers continue winning. 15 (Table 25) * 0.5 (Table 26) = 7.5m The total advance is now 15m in to the 20m ship.

6. **Adjust forces.** The attacking solders suffer 0.09 (Rate) * 6 (Number) = 1 loss and the attacking crew suffer 0.09 (Rate) * 20 (Number) = 2 casualties. The defenders automated defenses suffer 0.17*1.5=0.26 losses and the marines suffer 0.17*5=1 casualty.

7. **Continue?** With only 4 human defenders left and most of the ship taken, the defenders decide to surrender.

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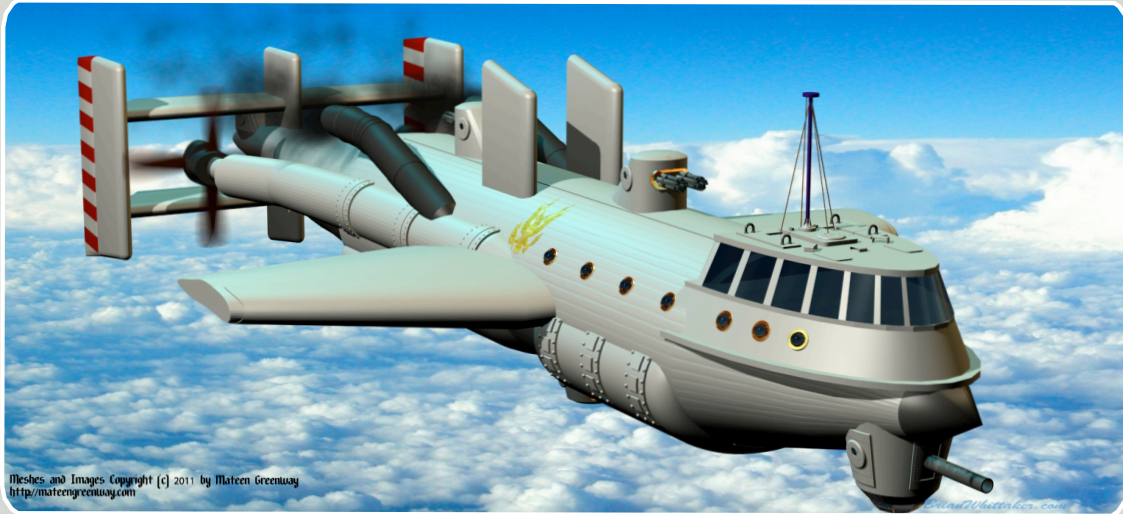
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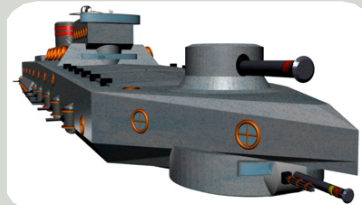
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100m	200m	250m	100m	200m	250m
200m	400m	500m	200m	400m	500m
300m	600m	750m	300m	600m	750m
400m	800m	1000m	400m	800m	1000m
500m	1000m	1250m	500m	1000m	1250m
600m	1200m	1500m	600m	1200m	1500m
700m	1400m	1750m	700m	1400m	1750m
800m	1600m	2000m	800m	1600m	2000m
900m	1800m	2250m	900m	1800m	2250m
1000m	2000m	2500m	1000m	2000m	2500m
1100m	2200m	2750m	1100m	2200m	2750m
1200m	2400m	3000m	1200m	2400m	3000m
1300m	2600m	3250m	1300m	2600m	3250m
1400m	2800m	3500m	1400m	2800m	3500m
1500m	3000m	3750m	1500m	3000m	3750m
1600m	3200m	4000m	1600m	3200m	4000m
1700m	3400m	4250m	1700m	3400m	4250m
1800m	3600m	4500m	1800m	3600m	4500m
1900m	3800m	4750m	1900m	3800m	4750m
2000m	4000m	5000m	2000m	4000m	5000m
1:10000 Ruler	1:20000 Ruler	1:10000 Ruler	1:10000 Ruler	1:20000 Ruler	1:10000 Ruler

2100m	4200m	5250m	2100m	4200m	5250m
2200m	4400m	5500m	2200m	4400m	5500m
2300m	4600m	5750m	2300m	4600m	5750m
2400m	4800m	6000m	2400m	4800m	6000m
2500m	5000m	6250m	2500m	5000m	6250m
2600m	5200m	6500m	2600m	5200m	6500m
2700m	5400m	6750m	2700m	5400m	6750m
2800m	5600m	7000m	2800m	5600m	7000m
2900m	5800m	7250m	2900m	5800m	7250m
3000m	6000m	7500m	3000m	6000m	7500m
3100m	6200m	7750m	3100m	6200m	7750m
3200m	6400m	8000m	3200m	6400m	8000m
3300m	6600m	8250m	3300m	6600m	8250m
3400m	6800m	8500m	3400m	6800m	8500m
3500m	7000m	8750m	3500m	7000m	8750m
3600m	7200m	9000m	3600m	7200m	9000m
3700m	7400m	9250m	3700m	7400m	9250m
3800m	7600m	9500m	3800m	7600m	9500m
3900m	7800m	9750m	3900m	7800m	9750m
4000m	8000m	10km	4000m	8000m	10km
1:10000 Ruler	1:20000 Ruler	1:10000 Ruler	1:10000 Ruler	1:20000 Ruler	1:10000 Ruler

Combat Round

1. Roll a d20 to determine whether a ship from the "odd" or "even" side will act next.
2. The selected side selects a ship that has not yet acted this round. If all ships from that side has already acted, the other side selects a ship
   a. The selected ship performs actions (see Table 87) until all its action points are used up
   b. The ship's position is adjusted based on its current speed
   c. If the selected ship is on fire, calculate the fire's damage (See Damage Effects on page 456)
3. If all ships have acted, the round ends and the next round begins. Otherwise, repeat step 1.

Firing Modifiers

+ **Range Accuracy**	**Range**:
if firing solution computed	+16 0 < 500 m
	+8 500-1000m
Rockets use ½ range accuracy	+4 1-2km
	−0 2-4km
Range Accuracy degrades 50% per round	−4 4-8km
	−12 8-16km
− 5 if **Snap Shot**	−24 16-32km
− Target's **Maneuver** if under Evasive Maneuvers	−32 >32km
	Spotting:
− Actor's **Maneuver/2** if under Evasive Maneuvers	+2 per consecutive turn firing at this target
Target Size Effect:	**Speed**:
Based on facing	−1 every 500 meters per minute of combined target and acting ship speed
−4 <20m facing	
−0 20-40m	
+4 40-80m	
+10 >80m	**Weather:**
Weapon Accuracy:	−2 Light precipitation
From Table 42 or VDS	−4 Heavy precipitation

Penetration

Opposed rolled modified by target's **Armor Mod** the weapon's **penetration**, and range effect.

Critical Hits

- If the hit **did not** penetrate, divide damage by 10
- If the hit **did** penetrate
  - Apply full damage
  - Every '19' or '20' causes one critical hit.
  - If a flamethrower hits a '10' or greater causes a fire critical hit **in addition** to any regular critical hit

Critical Hits

2-10♦	1-25	1d20 damage for each card value
2-10♣	1-25	1d20 damage for each card value. For each die larger than 15, roll an additional die.
2-10♥	1-25	1d20 crew lost for each card value
2-6♠	1-18	One fire starts. 5d20 damage each round
7-9♠	19-23	Two fires start.
10♠	24-25	Three fires start.
Jack	26-27	One Minor system disabled
Q♣	28-30	Engine disabled. 1d20 damage points, plus the engine stops producing power.
Q♦	28-30	Propulsion disabled. The propulsion system stops propelling.
Q♥	28-30	Maneuver disabled.
Q♠	28-30	Electrical system disabled.
K♣	31-34	Bridge hit. Ship's action points are halved.
K♦	31-34	Control Systems. 1d20 damage point, The ship's action points are halved.
K♥	31-34	Blast. A fire starts, plus 1d20 points of cascading (die >15 cascade) damage.
K♠	31-34	Blast. A fire starts, plus 2d20 points of cascading (die >15 cascade) damage.
A♣	35-40	Blast. A fire starts, plus 1d20 points of cascading (die >15 cascade) damage.
A♦	35-40	Structural failure. 1d20 damage now, and 1d20 damage each time the ship maneuvers or travels at more than one-quarter speed.
A♥	35-40	Hidden Failure. In 1d20/5 rounds, draw and apply two more critical hits.
A♠	35-40	Disaster! The magazine explodes, the Aerolyth misaligns, the boiler bursts, and the cat gets sick. The ship explodes.

Damage Level		Effect	Altitude Effect		
			Cayley	**Zeppelin**	**Aerolyth**
Damaged	<75% HP	−1 Command Roll	No Effect		
Severe	<50% HP	Lose 1/2 Action Points; 1d20 per weapon, disabled on >15	Can't Climb	Can't Climb	100
Disabled	<25% HP	Max speed halved; 1d20 per weapon, disabled on >5	If stalled: 500	100	1000
Destroyed	0 HP	Can only evacuate	5000	1200	13000