Thrust & Drift — Field Manual

Version 2.15.1 · Mongoose Traveller 2e Space Combat Simulator

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1. Overview

Thrust & Drift is a browser-based Virtual Tabletop (VTT) tool for running Mongoose Traveller 2nd Edition space combat at the gaming table. It is GM-operated and designed for shared-screen play — one person drives, everyone watches.

Two combat modes are available:

Mode	Description
VECTORIAL	Full hex grid with velocity vectors. Ships move according to their accumulated velocity each round. Implements *Traveller Companion 2024* pp. 169–186.
BASIC	Simplified range-band system. No hex map, no vectors. Faster for small engagements.

> ***Note:*** *The mode is selected on the Dashboard before starting a session and cannot be changed mid-battle.*

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2. Dashboard

The Dashboard is the pre-battle lobby. It has two columns: the **Operations Console** on the left and **Ship Profiles** on the right.

2.1 Ship Profiles

The right panel lists all saved ship profiles.

Control	Action
+ NEW PROFILE	Create a new ship from scratch.
✎ Edit	Modify an existing profile.
⧉ Duplicate	Clone a profile as a starting point.
⊗ Delete	Remove a profile (confirmation required).
↓ IMPORT	Load profiles from a `.json` file.
↑ EXPORT	Save all current profiles to a `.json` file.

Control	Action
📖 **CATALOG**	Browse the built-in High Guard 2022 catalog and add ships to your profiles.

2.2 Operations Console

Control	Action
COMBAT MODE	Toggle between Vectorial and Basic before starting.
🔄 **RESUME**	Appears when an autosaved session is found. Click to restore instantly. The right panel shows the full saved roster (round, phase, ships by faction — see §2.2.1 for what each roster row shows).
✕	Clears the autosave from IndexedDB. Appears next to 🔄 RESUME.
▶ **NEW SESSION**	Clears any existing battle state and enters the combat map.
↓ **RESUME FROM FILE**	Load a previously saved `.json` session. A preview screen shows the same roster (§2.2.1) before you confirm.
📖 **FIELD MANUAL**	Opens this manual inside the app.
📋 **CHANGELOG**	Opens the in-app version history (all releases with change categories).

2.2.1 Ship Roster columns

Both the autosave roster and the pre-import session preview show one row per ship, grouped by faction. Each row has:

Column	Shows
Token + Name / Class	Ship silhouette icon (same shape/colour as the map token), instance name (bold) and ship class (muted, below).
Thrust / Armour	Rated Thrust from the profile; current Armour (reflects Ion Cannon reduction, if any).
Telemetry	**Vectorial** mode: hex position and velocity vector (`POSITION q,r` / `VECTOR q,r`). **Basic** mode: ships have no real hex position (they sit on a `{0,0}` placeholder), so this instead shows the nearest-enemy range band.
Status	`💥 DESTROYED` (red) → `⚔ DOGFIGHT` (amber) → `⚔ BOARDING` (red), in that priority order; otherwise `○ NEUTRAL` (grey, neutral-faction ships) or `● COMBAT` (cyan) by default.
Hull	Progress bar (green → yellow → red) and current/max hull points.

2.3 Ship Profile Form

Each profile stores the ship's stats and named crew members.

Field	Description
Name / Tonnage	Display name and hull size (affects target size DM).
Hull / Thrust	Max hull points and base manoeuvre drive rating.
Tech Level (TL)	Ship's technology level (default **12**). Gates Smart guidance on all missile and torpedo weapons — the DM+2 Smart bonus applies only when the *launching* ship's TL ≥ 9 *(CRB p.79)*. Set to 8 or below for pre-stellar opponents or salvaged/primitive vessels. Most standard Traveller-era ships are TL 12–15.

Field	Description
Weapons	Add weapon slots: type, damage dice, range band, and special traits. Turret-mount weapons (Pulse Laser, Beam Laser, Missile Rack, Sandcaster, Particle Beam, Railgun, Fusion Gun, Plasma Gun) may be combined up to 4 per slot (quad turret, HG p.81); the slot header shows SINGLE / DOUBLE / TRIPLE / QUAD as you add weapons. Barbette and bay weapons (Torpedo, Missile Barbette, Ion Cannon, all `*_Barbette`, Ion Cannon Bay, Fusion/Meson/Particle/Railgun Bay) are each a standalone hardpoint — only 1 per slot, cannot combine with anything else *(HG p.29: "a barbette uses a single Hardpoint")*. A live **HARDPOINTS n/n** readout shows how many of the hull's available Hardpoints are used; adding a new weapon to an empty slot is blocked if it would exceed the budget (see below).
Crew	Named crew members, each with individual skill levels (see § 11).

> ***Design note — why TL on the ship, not the weapon:*** *CRB p.79 states that Smart munitions require a fire control system at TL9+ to guide them. All missile and torpedo weapons already carry the* `Smart` *trait in the weapon table — this correctly represents the munition's capability. The TL field on the ship represents whether the vessel's targeting computer can actually exploit that capability. Separating the two avoids silent incorrect DMs when early-TL or pirate vessels appear alongside standard Imperial fleet ships.*

2.3.1 Hardpoint Budget

CRB p.183: a ship has one Hardpoint for every full 100 tons of its hull. Each weapon system (a turret slot, a barbette, a Small/Medium Bay) uses one Hardpoint — a Double/Triple/Quad Turret still counts as just 1, since it's a single mount holding multiple weapons of the same type. Ships **under 100 tons** use **Firmpoints** instead: 1 Firmpoint below 35 tons, 2 from 35–70 tons, 3 from 71–99 tons.

HG p.31: a **Large Bay** is the one exception — it consumes **5 Hardpoints** instead of 1.

The Ship Profile Form shows a live `HARDPOINTS n/n` readout next to the Weapons section header and blocks adding a new weapon to an empty slot if doing so would exceed the hull's budget. This check applies only to **new** slot additions going forward — existing ship profiles (including every ship in the built-in catalog) are never retroactively invalidated, even if one happened to predate this rule and exceed the budget.

2.3.2 Weapon Overrides (GM customization)

Click the ⚙ icon next to a weapon chip to open a per-weapon override editor. Overridable fields are the display name, damage dice, damage bonus, and a free-text GM note — range, salvo size, ammo, and traits are unaffected in this iteration. Any field left blank inherits the base weapon's value.

An override only takes effect when its weapon is the **sole occurrence of that type** in the turret slot. *CRB p.168* — Double and Triple Turrets fire linked (one attack roll, combined damage bonus) only when the mounted weapons are identical; an override makes a weapon mechanically distinct from its unmodified siblings, so applying it to a duplicated weapon would either break that linking or apply silently to the wrong physical weapon. When the weapon isn't a singleton, the editor shows the override as **inactive** rather than applying it — remove the duplicate to reactivate it.

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3. Map Controls

The battle map is a **flat-top hex grid**. All interaction is mouse-driven.

Input	Action
Left-drag	Pan the map.
Scroll wheel	Zoom in / out.
Double-click	Centre the map on that hex.
Left-click token	Select the ship (highlights it). Range band rings appear centred on the selected ship (see below).
Right-click hex	Open context menu — actions depend on the hex content and the current phase.
🔊/🔇 (HUD)	Audio toggle — enables or mutes procedural sound effects (laser fire, impacts, thrust plume, missile launch). No audio files required.

Input	Action
🔍**N% (HUD)**	UI text scale — click to cycle 100% → 115% → 130% → 100%. Scales every on-screen label (HUD, modals, forms) and the map's ship name/hull labels and missile count badges. GM-only preference, resets each session.

> ***Note:*** *Context menu actions are phase-gated **and initiative-gated**. Only options valid for the current phase are shown — and in the Acceleration, Attack, and Actions phases, combat actions are shown only for the ship whose turn it currently is. Right-clicking another ship shows "Not this ship's turn".*

3.1 Legend

Click 📖 **Legend** (fixed button, top-right of the battle screen) to open the visual reference panel. Also accessible via right-click any **empty hex** → **Legend**. The adjacent **?** button opens this Field Manual as an in-app overlay.

Category	Symbols
Tokens	Ship silhouette (6 shapes: delta, needle, freighter, gunship, cruiser, capital — each rotates to face velocity direction); HP arc (green/yellow/red); missile salvo (three staggered yellow silhouettes — rotates to face velocity direction; count + thrust arc shown; hover for launcher/target/thrust tooltip); torpedo (red/amber silhouette — separate salvo type)
Turret beams	Pulse Laser (sky blue), Beam Laser (blue), Particle Beam (purple), Railgun (orange), Fusion Gun (amber-white), Plasma Gun (magenta)
Barbette beams	Pulse Laser Barbette (sky blue, thicker), Beam Laser Barbette (blue, thicker), Particle Barbette (purple, thicker), Fusion Barbette (amber-white, thicker), Plasma Barbette (magenta, thicker), Railgun Barbette (orange, thicker) — all barbettes deal ×3 damage after armour

Category	Symbols
Hit effects	Impact burst (expanding sparks on target), Critical flash (red ring + label), Ion burst (blue ring — Ion weapon hit)
Movement effects	Thrust plume (amber triangle opposite delta-v), Missile launch (ring + sparks), Missile trail (dashed orange line)
Persistent indicators	Sensor lock (dashed cyan line + ring on target), Evasive aura (pulsing blue ring), Dogfight (⚔️ + red ring), Missile exhausted (×), Ion aura (pulsing blue ring, while ionRoundsLeft > 0), **Range band rings** (dashed cyan hexagons — SHORT / MEDIUM / LONG / VERY LONG boundaries — shown when a ship is selected; hidden during thrust targeting), **Current actor ring** (pulsing cyan ring — shown on the token of the ship whose turn it is during Acceleration, Attack, and Actions phases)
Obstacle zones	Asteroid Field (dashed amber border; `AST` light / `AST-D` dense at centre hex); Debris Field (dashed gray-blue border; `DEB`); Gravity Well (solid purple zone, filled purple circle at centre — dashed orange warning ring at radius + 1); Nebula (dashed cyan border; `NEB`). Type label coloured like the zone border; custom label appended if set. *(vectorial mode — obstacles enabled only)*

3.2 Hex Scale

One hex represents **648 km** *(Traveller Companion 2024, p.171)*.

Range band thresholds on the vectorial map:

Band	Threshold	Approx. distance
Short	≤ 2 hex	≤ 1,296 km
Medium	≤ 15 hex	≤ 9,720 km
Long	≤ 38 hex	≤ 24,624 km
Very Long	≤ 77 hex	≤ 49,896 km

Band	Threshold	Approx. distance
Distant	> 77 hex	> 49,896 km

3.3 Basic Mode View

In **Basic** mode there is no hex map. The screen shows **ship bento cards** grouped by faction.

Each card has three zones:

Zone	Content
Header	Ship token icon (same shape/colour as the tactical map token, rotated 90° clockwise — nose right — for the horizontal header layout) · instance name · profile name (cyan, below the instance name) · status badges: `☠ WRECK`, `DOGFIGHT`, `BOARDING`, `EVA N` (evasive thrust), `LOCKED` (sensor locked), `ION NR` (ion disruption active — blue)
Hull	Hull bar (green → yellow → red) · "Hull N/M" · "Ini N"
Status *(conditional)*	Sensor lock → target name (with DM if set); Locked by [attacker]; inbound missiles per launcher (⚡ N× type, ~Xr ETA in basic mode); inbound torpedoes; launched missiles per target (🚀 N× type, ~Xr ETA in basic mode); reloading turrets; critical hits list; missile ammo (🚀 N/max, yellow < 25%, red at 0); torpedo ammo (🎯 N/max, yellow < 25%, red at 0 — separate pool from missiles); sand canisters (🪨 N/max, yellow < 25%, red at 0); ion disruption (`−N PWR · Xr remaining`; `OFFLINE` label when `currentPower` reaches 0)

The Status zone is hidden when none of these conditions are active.

Element	Description
DISTANCES panel	Appears above the ship list. Lists every cross-faction pair with its current range band. Use ⬇ (closer) / ⬆ (further) to adjust a band

Element	Description
	directly — GM override, no thrust spent.

Right-click anywhere in the background (not on a card) to open the global context menu (Roll Initiative, Add ship here).

Ships are placed at **Very Long** range by default when added to a basic mode session.

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4. Phase Flow

Each combat round follows this sequence. The HUD (top-left) shows the current round and phase. Click **NEXT PHASE ⟶** to advance, or press **Enter** *(#41)*.

Phase	What happens
SETUP	Place ships on the map via right-click → *Add ship here*.
INITIATIVE	Roll initiative for all ships. Sets the acting order for the round.
ACCELERATION	Each ship applies thrust to its velocity vector.
MOVEMENT	All ships move simultaneously according to their velocity vectors. *(Vectorial mode only — skipped in Basic mode.)*
ATTACK	Each ship in initiative order may attack or launch missiles.
ACTIONS	Each ship in initiative order; each crew member may perform one action.
END OF ROUND	Round counter increments. Click NEXT PHASE to begin the next round.

4.1 Phase Advance Guards

NEXT PHASE ⟶ enforces preconditions before allowing advancement:

Phase	Guard	Blocked message
All phases	No unresolved missile impacts (`pendingMissileImpacts` empty)	*Resolve all pending missile impacts first. Use the ↩ button in the Battle Log to re-open a dismissed impact.*
Setup	At least 1 ship must be placed	*Place at least one ship first.*
Initiative	Initiative must have been rolled (`initiativeOrder` non-empty)	*Roll initiative before advancing.*
Acceleration / Attack / Actions	All ships in initiative order must have acted (`currentActorIndex ≥ initiativeOrder.length`)	*N actor(s) still to act.*
Movement / End	Always allowed (unless missile impacts pending — see above)	—

When blocked, the button turns dim (`cursor-not-allowed`) and clicking it shows an amber warning below the button. The warning clears automatically once the condition is satisfied.

Enter key *(#41)* triggers the same action as clicking **NEXT PHASE ⟶**, subject to the same guards above. Disabled while any modal is open, so it never fires as an accidental form submit.

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5. Setup Phase

Place ships on the hex grid before the battle begins.

5.1 Adding a Ship

Right-click any empty hex → **Add ship here** (places the ship at that hex directly), or click the ➕ **ADD SHIP** button in the HUD — on its own row below the battle utilities, deliberately apart from the phase-flow buttons to avoid misclicks *(#40)* — (vectorial

mode) to confirm the profile/faction/vector first and pick the hex afterward by clicking the map. A modal opens where you select:

- **Profile** — which saved ship profile to use.
- **Faction** — Players, Allies, Enemies, Neutral. Affects token colour and auto-roll behaviour.
- **Color** — token display colour.
- **Shape** — token silhouette: Delta, Needle, Freighter, Gunship, Cruiser, or Capital. Each shape has a distinct hull outline and bridge/cockpit detail overlay. The choice is per-placement and does not affect game mechanics.
- **Initial vector** *(vectorial mode only)* — see § 5.1.1 below.

5.1.1 Setting the Initial Vector

Pre-sets the ship's starting velocity vector for ships arriving at cruise speed, fleeing, or intercepting at the start of an engagement. Default is (0, 0) — stationary.

How the compass works:

- Six direction buttons (NW / N / NE / SW / S / SE) surround a center preview. **Each click adds exactly one hex-step in that direction to the current vector** — it is cumulative, not a single-choice selector.
- To set a straight vector of length *N* in one direction, click that same button *N* times (e.g. click **NE** three times for a vector of 3 hexes northeast).
- **E** and **W** buttons are also available, either side of the center preview. A flat-top hex has no true East/West neighbour — only the 6 directions above exist as a single hex-step — so **E**/**W** are composite shortcuts: one click applies two hex-steps at once (**E** = NE + SE = (+2, −1), **W** = NW + SW = (−2, +1)), the same net result as clicking both of those buttons in sequence, just in one click.
- The center preview shows the chosen ship shape/colour inside a hex frame, **rotated live to always face the vector's actual current direction** — use it (and the `(q, r)` readout underneath) to confirm the result after every click, especially once you start mixing directions.
- **To reset:** click the center preview itself (the ship icon inside the hex, marked with a small ↺ in the corner) — this immediately sets the vector back to (0, 0), regardless of how many direction clicks came before. Use it whenever the readout shows something other than what you meant, rather than trying to click your way back to zero.

> ⚠ ***Clicking different directions in sequence does not "switch" the heading — it adds up.*** *Each click is a separate hex-step added to whatever is already set, exactly like axial vector addition. Alternating between two directions (e.g. N, then NE, then N again) composes a diagonal result that may not point where you intended, and does* ***not*** *cancel or override the earlier clicks. If you want a clean single-direction vector, click only that one button, repeatedly. If you want a diagonal vector on purpose, that's exactly what mixing directions is for — just watch the rotating preview and the* `(q, r)` *readout to confirm the composite result before confirming placement. This is unrelated to the Thrust budget used in the Acceleration phase (§ 7) — there is no cap here, and no cost is deducted; it is purely a starting-condition convenience. The Δq/Δr fields below the compass always show (and accept) the exact current values if you'd rather type the vector directly than reason about clicks.*

After placing, right-click the ship token → **Assign Crew…** to review or adjust which crew member covers each role and turret (see § 11.3).

5.2 Renaming a Ship Instance

Right-click a ship token → **Rename…** to give an individual ship a battle-specific name (e.g. "Fighter 1", "Cobra — Bounty") without touching the profile. The instance name appears on the map token, in PhaseTracker, in the HUD, in all modals, and in the battle log. The original profile name is shown inside the rename modal for reference.

5.3 Removing a Ship

Right-click a ship token → **Remove from battle**. Available in all phases.

5.3 Enabling Obstacles *(vectorial mode only)*

The HUD shows an **OBSTACLES** toggle during the Setup phase when vectorial combat mode is active. Off by default. Once the battle advances past Setup, the toggle is locked for the rest of the battle.

See § 16 for full obstacle mechanics.

> ***Note:*** *Ships start with zero velocity. Their first Acceleration phase is used to build up speed.*

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6. Initiative Phase

Initiative determines the acting order for the Acceleration, Attack, and Actions phases.

Formula: `2D6 + Pilot skill + current Thrust rating + Tactics effect [+2 Holographic Controls]` *(MgT2e CRB p.165, p.186)*

Initiative is rolled once at the start of combat *(CRB p.165)*. From round 2 onward the initiative order is carried over and the phase advances directly to Acceleration — no re-roll.

> ***RAW gap — new ship joining mid-battle:*** *the CRB has no explicit rule for this case. Thrust & Drift applies a house rule: adding a ship mid-battle flags the next round to open the Initiative phase, so all ships re-roll together and the new ship is included. GM may bypass this by using ↺ (see below) or by simply noting the new ship acts last until the next re-roll.*
>
> ***GM override:*** *a ↺ button appears next to the phase label in the HUD during the Acceleration phase of round 2+. Click it to force an initiative re-roll for the current round — useful to include a new ship, or any time the GM decides a re-roll is appropriate.*

6.1 Rolling Initiative

Right-click any hex → **Roll Initiative**. The modal shows all ships.

Ship type	Behaviour
Player ships (`faction = players`)	Dice inputs start **empty**. Enter the result of your physical 2D6 roll. The total updates live. CONFIRM is disabled until all player ships have entered dice.
NPC ships	Auto-rolled on confirm. Shown as 🎲 *auto* in the modal.
🎲 **button**	Opt-in auto-roll — fills the dice fields for that ship if the player prefers the app to roll.

6.1.1 Tactics(Naval) Check (optional)

If the captain has **Tactics ≥ 1**, an optional secondary dice row appears under the initiative row. The captain may roll 2D6 + Tactics — the Effect (total − 8, can be negative) is added to the initiative total. This check is optional; leaving it blank applies no bonus.

NPC ships with Tactics > 0 auto-roll their Tactics check on confirm.

6.1.2 Holographic Controls Bridge (TL9)

A ship whose profile has **Holographic Controls** enabled (Ship Profile Form → Combat Stats section) always applies **DM+2** to its Initiative roll — the bridge is optimised for the task at hand and automatically reconfigures itself to the situation *(CRB p.186 / High Guard Update 2022 p.31)*. The bonus is baked into the roll automatically; no manual entry is required. The breakdown line under a resolved initiative shows **+ Holo:2** when active.

6.2 Initiative Bonus

If the Captain uses **Improve Initiative** in the Actions phase of round N, the bonus takes effect at the **start of round N+1**: `buildNextRoundState` adds it to the ship's initiative value and re-sorts the acting order before anyone acts. The bonus lasts exactly one round and is removed automatically at the start of round N+2. No manual input required. *(CRB p.166)*

> *The Phase Tracker shows an ↑**ini** amber badge on ships whose bonus is active in the current round.*
>
> ***Click a ship name** in the Phase Tracker to pan the map and center on that token. Useful when tracking multiple ships across a large hex grid.*

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7. Acceleration Phase

Each ship adjusts its velocity vector and optionally declares evasive action.

Initiative order depends on combat mode:

- **Vectorial:** ships act in *reverse* initiative order — lowest first — so higher-initiative ships can react to slower ships' declared vectors *(TC p.174)*.
- **Basic:** ships act in normal initiative order — highest first — same as the Attack and Actions steps *(CRB p.164)*.

7.1 Applying Thrust

Right-click ship → **Apply Thrust**. The map enters **targeting mode**:

1. **Move the cursor** toward the hex you want the thrust to point at. A dashed line stretches from the ship to the clamped thrust endpoint.
2. **Read the overlay**:
3. Dashed line colour: **cyan** when within budget, **orange** when at cap.
4. Circle marks the thrust endpoint (ship position + delta).
5. Ghost token shows next-round position (`ship.pos + ship.vector + delta`).
6. Faint line from the inertial ghost (no thrust) to the new ghost.
7. Badge `cost / max` below the ghost.
8. **Click** to confirm. The thrust delta is applied and targeting mode exits.
9. **ESC** (or right-click) to cancel without applying thrust.

The available thrust (`thrustAvailable`) equals base thrust + any engineer bonus − thrust already used this round − M-Drive critical penalty.

7.2 Note

Full thrust is available for movement. Evasive Action is a **Reaction** declared during the Attack phase — not pre-allocated here *(CRB p.171)*. See §9.9 Reactions below.

7.3 Manoeuvre (Basic Mode)

In Basic mode, **Apply Thrust** is replaced by **Manoeuvre…** in the context menu. Right-click a ship → **Manoeuvre…** during the Acceleration phase.

The modal contributes thrust toward a range band change between the moving ship and a selected enemy. Each ship acts independently on its own initiative turn.

Control	Description
Target	Select which enemy ship this manoeuvre targets. Pool status shown per target.
⬇ Approach / ⬆ Flee	Direction of movement (positive or negative contribution to the pool).

Control	Description
Thrust slider	Thrust this ship commits this action (0 → available thrust). Any amount ≥ 1 is valid.
APPLY MANOEUVRE	Threshold met — band shifts and thrust is spent.
ALLOCATE THRUST	Threshold not yet met — thrust is spent and added to the pool; band stays.
GM SET	Override: sets the band directly without spending any thrust; resets the pool. Use this for initial setup and narrative jumps.

Thrust accumulates across rounds and across both ships *(CRB p.166)*: each contribution is added to a shared pool for the pair. When the pool reaches the threshold the band advances and excess carries to the next step.

> *If both ships approach on the same round (each using the modal on their own turn), their contributions are summed in the pool — the band may advance in a single round or over two combined contributions.*

The cost per band step *(MgT2e CRB p.166 — Ship Movement table)*:

Current band	Thrust required	Example
Adjacent	1	Docked ships
Short	2	Ships in same orbital path
Medium	5	Surface to orbit
Long	10	Near to a planet
Very Long	25	Within jump limit
Distant	50	Distant ships

> *Ships at Very Long (25) or Distant (50) cannot close the band in a single round unless they have very high thrust. Contributions accumulate across multiple rounds. Use **GM SET** for initial placement to avoid stranding small ships at extreme ranges.*

7.4 Aid Gunners (Pilot Action — Manoeuvre Step)

The **Pilot** may attempt to stabilise the ship along the optimal attack vector during the Acceleration phase *(CRB p.166)*. This is a Manoeuvre Step action — it must be resolved **before** the Attack phase so the DM applies to attacks in the same round.

Right-click ship → **Crew Action…** during the Acceleration phase (pilot crew member required).

Check	2D6 + Pilot (8+)
Effect 0	DM+1 to all gunner attack rolls this round
Effect 1–5	DM+2 to all gunner attack rolls this round
Effect 6+	DM+3 to all gunner attack rolls this round
Failure, Effect −1	DM−1 to all gunner attack rolls this round
Failure, Effect −2/−5	DM−2 to all gunner attack rolls this round
Failure, Effect −6 or less	DM−3 to all gunner attack rolls this round

This is a task chain *(CRB p.63)* — **both success and failure** apply a DM. The DM resets to 0 at the start of the next round.

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8. Movement Phase

Vectorial mode only. **Fully automatic — no player input required.**

Click **NEXT PHASE ⟶** to execute movement. The app:

1. **Animates** every token sliding from its current position to its new position (~2 s, easeInOut). Input is blocked during the animation to prevent mis-clicks.

2. Advances every ship's position by its current velocity vector.
3. Detects hostile ships whose trajectories crossed within **Short range (≤ 2 hexes)** — opens the **Passing Encounter** window for each.
4. Detects ships that end in the same hex — opens the **Dogfight** engagement intent modal.

The GM watches the tokens move on the map. If no encounters or dogfights are triggered, the phase advances to **Attack** automatically.

> ***Wrecks drift.*** *A destroyed ship (☠ WRECK) has no pilot and no reactor — it cannot spend thrust — but it retains its last velocity vector. Each Movement phase it continues to drift on that vector indefinitely, following Newtonian inertia. Remove it manually via right-click → Remove from battle when no longer relevant to the scenario.*

8.1 Missile Impact

When a missile salvo reaches its target, the token is consumed and a ⚡ **MISSILE IMPACT** modal opens. Resolution follows CRB p.173 (IMPACT) in two steps.

Vectorial mode: impact is detected during the Movement phase when the salvo reaches the target hex.

Basic mode: the Movement phase is skipped, but missiles still advance. Each round transition, every in-flight salvo spends up to **Thrust 10** guidance budget against the Ship Movement cost table *(CRB p.166)*. Excess carries to the next band. When the salvo reaches **Adjacent** range the modal opens at the start of the following round. Bento cards show **~Xr** (estimated rounds to impact) next to each salvo row.

Point Defence (optional, resolved before Step 1)

If the target has at least one **unfired laser turret** (Pulse Laser or Beam Laser), the GM may roll Point Defence *(CRB p.173)* before the attack roll.

DM	Source
+Gunner skill	Assigned gunner for that turret slot
+1 per laser beyond the first	DM+1 for 2 lasers on one slot; DM+2 for 3 lasers

Roll 2D6 + total DM against **8+**. Effect = total − 8.

- **Missiles:** `max(0, Effect)` missiles destroyed.
- **Torpedo salvoes:** Effect is **halved (rounded down)** before applying — `max(0, ⌊Effect/2⌋)` torpedoes destroyed *(HG p.39)*.

The turret slot is marked fired immediately.

- **Multiple turrets:** if more than one eligible slot is available, a selector appears. Select a slot, roll; repeat with remaining slots.
- **Player targets:** enter dice manually, with a 🎲 opt-in auto-roll button available. NPC targets auto-roll.
- If all missiles are destroyed (count reaches 0), the impact is dismissed immediately — no attack roll.
- The salvo size DM in Step 1 reflects the **remaining count** after PD.

Step 1 — Attack Roll

The attack roll happens at impact, not at launch *(CRB p.173)*.

DM	Source
+1 per missile	Salvo size (e.g. 3 missiles → DM+3)
+2	Smart trait — all missile/torpedo weapons carry this; active only when **launcher TL ≥ 9** *(CRB p.79)*. If the launcher is sub-TL9, the +2 is not applied and the modal shows the reason.
−Pilot skill	Evasive Action *(optional, see below)*

Roll 2D6 + total DM against **8+**. Effect = total − 8.

- **Effect < 0** — MISS: modal closes, no damage applied.
- **Effect ≥ 0** — HIT: proceed to Step 2.

Evasive Action (CRB p.171): if the target has unspent thrust, the GM may click 🛡 **EVASIVE ACTION** before entering the dice. This spends 1 thrust from the target's pool and applies DM −Pilot to this attack roll only. If no thrust is available, the button is disabled.

Step 2 — Damage

Roll **4D6** (Missile) or **6D6** (Torpedo) for a **single** missile/torpedo — not for the whole salvo.

Formula *(CRB p.173)*:

```
net damage = max(0, roll − armour) × min(Effect, count)
```

The modal shows a full breakdown: roll / −armour / per-missile net / ×multiplier / total.

- **APPLY DAMAGE** — deducts net damage from target hull, triggers threshold criticals if applicable, logs the hit.
- **MISS / INTERCEPTED — DISMISS** — closes without applying damage (e.g. all missiles were destroyed by Point Defence before movement).

Multiple salvos impacting in the same round are resolved sequentially; the pending count is shown in the modal header. An impact sound plays when the modal opens.

Recovery

If the impact modal is accidentally dismissed before resolving, it can be re-opened at any time from the **Battle Log**: find the `⚡ MISSILE IMPACT` entry and click the amber ↩ button at the right of the row. The impact is re-queued and the modal re-opens.

While any impact is pending, the HUD shows a pulsing `⚡ N impacts unresolved` badge above the **NEXT PHASE ⟶** button, and phase advance is blocked until all impacts are resolved (see §4.1).

8.2 Ships That Pass in the Night

If two hostile ships cross within **Short range (≤ 2 hexes)** during the same movement step — even if their final positions are far apart — the system detects the closest approach and opens the **Passing Encounter** window.

For each encounter the GM sees:

- Both ship names and faction colours
- Closest approach distance and range band
- **[Ship A] FIRES** — opens the Attack Modal pre-set to Ship A; button shows ✅ **FIRED** after resolving

- **[Ship B] FIRES** — opens the Attack Modal pre-set to Ship B; button shows ✅ **FIRED** after resolving
- **PASS — LET THEM GO** — dismisses the encounter immediately with no attack for either ship

Initiative order applies (TC p.177): attacks resolve at the initiative of the ship that fires first. The GM decides which ship acts first by clicking the corresponding **FIRES** button — the second ship's button remains locked until the first attack is resolved. The second ship fires only if it survives the first ship's attack; if destroyed, the Passing Encounter window closes automatically.

Both ships may fire independently. The encounter window closes automatically once both have either fired or the GM passes. Multiple encounters are resolved sequentially.

> ***Note:*** *Ships that end in the same hex trigger the* ***Dogfight*** *system instead and are handled at the movement → attack phase transition.*

In Basic mode this phase is skipped automatically — range band changes are declared during the **Acceleration phase** via the Manoeuvre modal (§7.3).

---

9. Attack Phase

Each ship in initiative order may make one attack or launch a missile salvo.

9.1 Attack Modal — Step 1: Config

Select the weapon to fire and the target ship. The modal shows a full DM breakdown:

- Gunner skill DM
- Weapon trait DM
- Range band DM
- Target size DM
- Evasion DM *(shown only when active)*
- Sensor Lock DM *(shown only when active)*

The **DM details** button next to the DM Summary opens a popup listing **every** modifier — zero values included — each with where it comes from and its rules reference. Use it to check which modifiers are in play and to spot unexpected negative DMs before rolling.

9.2 Attack Modal — Step 2: Roll

Target number is always **8+** *(MgT2e CRB p. 164)*.

Attacker	Behaviour
Player ships	Dice inputs start empty. Enter your physical 2D6 roll. CONFIRM ROLL disabled until both dice are entered.
NPC ships	Auto-roll button. Click to roll.

Effect = Total − 8. Positive effect = hit. Effect ≥ 6 = critical hit.

9.3 Attack Modal — Step 3: Damage

On a hit, roll damage dice for the weapon. Enter or confirm the damage roll. Damage is applied to the target's hull.

9.4 Attack Modal — Step 4: Critical Hit

Triggered automatically when **Effect ≥ 6 AND damage penetrates armour** *(MgT2e CRB p.168: "it causes damage rather than just bouncing off armour")*, or when damage crosses a 10% hull threshold (Sustained Damage rule, *MgT2e CRB p. 169*).

> *If the weapon's damage is fully absorbed by armour (`damage − armour ≤ 0`), no critical step opens even if the attack Effect is 6 or higher.*

Visual effects (beam ray, impact burst, critical flash) all appear together when the critical step closes, so they are visible on the canvas.

Field	Description
Location	2D6 roll on the location table (Hull, M-Drive, J-Drive, Power Plant, Weapons, Sensors, Bridge, Fuel, Cargo, Crew, Computer).
Severity	Effect − 5, clamped 1–6. Stacks with existing criticals on the same system.

Field	Description
M-Drive	Sev 1 = no penalty. Sev 2–4 = −1 thrust/round. Sev 5–6 = thrust reduced to 0.
Armour	Automated reduction applied immediately. Sev 1: −1 (no roll). Sev 2: roll 1D6, reduction = ⌈result/2⌉ (D3). Sev 3–4: roll 1D6. Sev 5–6: roll 2D6 + GM applies Hull +1 Severity manually. The app prompts for the dice roll where required and updates `profile.armor` in the store.

Manual effects: criticals to Sensors, Fuel Tank, Weapons, Bridge, and Power Plant produce a narrative description that the GM must apply at the table. The modal displays a `⚠ MANUAL — Apply this effect before closing` amber banner to remind the GM that no automated change has occurred in the store.

9.5 Per-Slot Firing Limit

Each weapon slot may fire **once per round** *(CRB p.164)*.

The Attack modal weapon list shows only slots that have not yet fired this round, identified by their slot number (`W1` , `W2` …). Once all offensive slots have fired, the **Attack…** option disappears from the context menu until the next Attack phase or the start of a new round.

The Ship Detail modal labels each slot's mount type. For turret-mount weapons, the label is based on weapon count: **Single Turret** (1), **Double Turret** (2), **Triple Turret** (3), **Quad Turret** (4, HG p.81). A Quad Turret with 4 laser weapons grants **DM+3** on Point Defence — this is computed automatically from weapon count. Same-type weapons in a quad turret fire as a linked group: one attack roll with +3 bonus damage dice. Barbette and bay weapons (Torpedo, Missile Barbette, Ion Cannon, all `*_Barbette` , Ion Cannon Bay, Fusion/Meson/Particle/Railgun Bay) are always shown as **Barbette** or **Bay** — each is a standalone hardpoint, capped at 1 per slot, and never labelled "Turret" *(HG p.29: "a barbette uses a single Hardpoint")*.

9.6 Launching Missiles

Three launcher types are available. All are selected in the Attack modal weapon list. No dice roll is required at launch — the weapon slot is immediately marked as fired.

Missile Rack *(CRB p.162)*

Select `Missile Rack`, choose a target, adjust the salvo count using the `−` / `+` stepper, then click 🚀 **LAUNCH SALVO** →. The button shows 🚨 **NO AMMO** and is disabled when the magazine is empty.

Salvo size is capped at the number of Missile Rack components mounted in the selected turret — each rack is a single mount that launches one missile per round, even inside a mixed-weapon turret. A lone rack sharing a triple turret with, say, a Beam Laser and a Sandcaster can only launch **1** missile per round; a homogeneous triple-rack turret can launch up to **3** *(Traveller Companion p.167 — "a double missile rack turret can still only fire two missiles at once")*. Total magazine: **12 missiles per Rack** component.

Missiles have **Thrust 10** and **10 rounds of guided flight**. Each round in the Movement phase they apply up to Thrust 10 toward the target's predicted position. After fuel is exhausted the salvo drifts on its last vector.

Damage: **4D6 per missile** *(HG p.28)*.

Missile Barbette *(HG p.29–30)*

RAW fires a **fixed 5-missile salvo** *(HG p.30: "A missile barbette fires five missiles at a time")*. The simulator offers a **1–5 salvo stepper** instead — a deliberate house-rule deviation, for referees who want to finish off a damaged target, fire a warning shot, probe point defence, or conserve ammunition without always committing all 5. Total magazine: **25 missiles** (5 full-salvo equivalents). Uses the same guided-flight system as the Missile Rack.

Damage: **4D6 per missile** (same as Rack — barbette ×3 multiplier does **not** apply to missile weapons).

Torpedo *(HG p.30–31)*

Torpedoes are larger, slower-burning guided munitions. Each barbette holds **3 torpedoes**. Select `Torpedo` and fire — salvos may contain 1–3 torpedoes.

Torpedoes use the same guided-flight system as missiles. A torpedo token is rendered in red/amber on the map, separate from missile salvos.

Damage: **6D6 per torpedo** (vs 4D6 per missile) *(HG p.31)*.

Torpedo ammo is tracked separately from missile ammo. A ship with both Torpedo barbettes and Missile Racks/Barbettes shows two independent ammo pools — consuming torpedo ammo does not reduce the missile magazine, and vice versa.

Attack modifiers *(HG p.39)*:

- **DM-2 vs ships < 2,000 tons** — torpedoes are less accurate against small, agile targets. Applied automatically when the target's tonnage is below 2,000.
- **Point Defence is less effective** — the Effect of any successful PD roll is halved (rounded down) before counting torpedoes destroyed: a PD Effect of 3 destroys only 1 torpedo instead of 3. See §8.1 for full PD rules.

> *The launching weapon slot is marked as fired after any launch. Launcher entries disappear from the Attack weapon list once ammo is empty, consistent with the per-slot firing limit.*

9.7 Sensor Lock

Acquired via the Sensors crew action. Grants a +DM to attacks against the locked target. Shown as an **animated cyan ring** on the locked ship.

9.8 Weapon Range Limits

Each weapon has a **maximum range band** beyond which it cannot fire *(MgT2e CRB p. 167: "cannot attack targets beyond listed Range Band")*.

Weapon	Type	Max Range
Railgun	Turret	Short
Railgun Barbette	Barbette	Medium
Beam Laser	Turret	Medium
Beam Laser Barbette	Barbette	Medium
Fusion Gun	Turret	Medium
Fusion Barbette	Barbette	Medium
Plasma Gun	Turret	Medium
Plasma Barbette	Barbette	Medium

Weapon	Type	Max Range
Ion Cannon	Barbette	Medium
Ion Cannon Bay (Small)	Bay	Medium
Ion Cannon Bay (Medium)	Bay	Medium
Ion Cannon Bay (Large)	Bay	Long
Fusion Gun Bay (Small)	Bay	Medium
Fusion Gun Bay (Medium)	Bay	Medium
Fusion Gun Bay (Large)	Bay	Long
Railgun Bay (Small)	Bay	Short
Railgun Bay (Medium)	Bay	Short
Railgun Bay (Large)	Bay	Medium
Pulse Laser	Turret	Long
Pulse Laser Barbette	Barbette	Long
Meson Gun Bay (Small)	Bay	Long
Meson Gun Bay (Medium)	Bay	Long
Meson Gun Bay (Large)	Bay	Long
Particle Beam	Turret	Very Long
Particle Barbette	Barbette	Very Long
Particle Beam Bay (Small)	Bay	Very Long
Particle Beam Bay (Medium)	Bay	Very Long

Weapon	Type	Max Range
Particle Beam Bay (Large)	Bay	Distant
Missile Rack	Launcher	Special (no cap)
Missile Barbette	Launcher	Special (no cap)
Torpedo	Launcher	Special (no cap)
Sandcaster	Defensive	Special (no cap)

When a target is beyond a weapon's max range:

- An **OUT OF RANGE** label appears on the weapon button in the Config step.
- If that weapon is selected, the error is shown above the roll button.
- **ROLL ATTACK is disabled** — the shot cannot proceed until a valid weapon or a closer target is chosen.

"Special" weapons (missiles, sandcasters) have no hard range cap and are never blocked by this rule.

9.9 Reactions

Reactions are declared by the **defender** during the Attack phase, just before the attack roll *(MgT2e CRB p.171)*. The app shows a 🛡 **Reactions** panel in the Attack Config step as soon as a weapon and target are selected.

Each point of unspent Thrust (after movement) can be used once as a reaction. Reactions accumulate across attacks in the same round — a pulsing amber aura on the token shows when a ship has used reactions this round.

Reaction	Availability	Mechanic
Evasive Action	All attacks	Toggle button: spend **1 thrust** to dodge this attack. The attack suffers **DM −Pilot skill** (fixed — not multiplied). *(CRB p.171)*

Reaction	Availability	Mechanic
Disperse Sand	Laser (Pulse/Beam) attacks only; target must have an unfired sandcaster slot	Gunner (turret) check 2D6 + Gunner. On success: +1D+Effect added to armour for this attack only. Slot marked fired immediately.

> ***Point Defence*** *for missile salvos is resolved in the* ***Missile Impact modal*** *(§8.1), not here. The Reactions panel is not shown for missile attacks.*

Chaff Canister *(HG p.38)*: the Gunner action **Deploy Chaff** (Actions phase) creates a chaff cloud around the ship. All Electronics checks and missile attack rolls aimed at that ship suffer **DM−1**; chaff gives no protection against laser, energy or particle weapons. T&D applies it to **Sensor Lock** checks against the ship (a notice shows in the Action modal) and to **missile** attack rolls (a "Chaff cloud" row in the Missile Impact modal). Torpedoes are not affected (HG p.38 names missiles only), and the ship's own checks are not penalised. RAW gives no duration: the cloud lasts **1 round**, like sand. A canister comes from the same sandcaster stock as Disperse Sand and the sandcaster is marked fired, so one sandcaster cannot do both in the same round.

Sandcaster vs boarders *(CRB p.171, HG p.38)*: in the **Contact** modal the defender can fire a sandcaster at the incoming boarding party. Gunner (turret) check 2D6 + Gunner, Average (8+) — RAW gives no difficulty for this use, so it matches Disperse Sand against lasers. On a hit **each boarder** takes Ground-scale damage, rolled per boarder: **Sand 8D** (not multiplied) or **Pebble 1DD = 1D×10** (Destructive ×10, CRB p.78). One canister is spent and the turret is marked fired. With a **boarding party defined** (see below) the damage is rolled for every living boarder and applied through their Protection and characteristics; without one it is shown per anonymous boarder and the GM rules the outcome.

Boarder rosters *(CRB p.77, p.92–93, p.100; HG p.132–133; Companion p.6–7)*: the rules give no boarder stat blocks, so the **GM defines the rosters** — one for the boarding party, one for the defenders — in the **Parties** panel of the Contact and Conflict modals. Each boarder has STR, DEX, END, armour Protection (presets from the CRB armour table, editable), an experience preset (CRB p.92–93: characteristics 7, the table bonuses are shown for you to assign) and an **overflow** characteristic.

- **Damage (CRB p.77):** Protection reduces the damage (AP ignores Protection up to its value; Effect 6+ always inflicts at least 1). It goes to END, then the excess to the overflow STR/DEX and, once that is 0, to the other. STR or DEX 0 = unconscious; STR, DEX and END all 0 = dead. Status is always derived.

- **Canisters:** sand 8D / pebble 1DD are fixed damage — the Gunner check Effect is not added. Protection is subtracted after pebble's ×10. Neither CRB p.171 nor HG p.38 mentions personal armour, so the general CRB p.77 rule applies.
- **Stacking (HG p.132):** roster order is the line (the dead leave it, unconscious boarders stay). In Conflict pick who is firing; *Roll Stack Hit* gives the first in the stack on 2D ≤ 9, another member on 10–12.
- **Missed Shots (HG p.133):** 1–3 hits a random living member of the firing group, 4–5 of the opposing group (the GM rolls the 8+ to hit).
- **Morale (Companion p.6–7):** at 10 % casualties (down + dead) the panel notes that the Referee may call a Morale check (MRL 8+; 30 % → 10+; 60 % → 12+). The app never rolls it.
- The Security modal shows a head count of fit, downed and dead boarders; the battle report groups boarding events under a **Boarding** section.

9.10 Special Weapon Mechanics

AP (Armour Piercing) Trait

Some weapons carry an `AP N` trait that reduces effective armour before damage.

Formula: `effectiveArmour = max(0, profile.armour − apReduction)`

Weapon	AP Value
Railgun	4
Fusion Barbette	3
Plasma Barbette	2
Railgun Barbette	5
Fusion Gun Bay (Small/Medium)	6
Fusion Gun Bay (Large)	8
Railgun Bay (all sizes)	10
Meson Gun Bay (all sizes)	∞ (ignores all armour)

Barbette Damage Multiplier *(HG p.29)*

All barbette weapons apply a **×3 damage multiplier** after armour is subtracted.

Formula: `netDamage = max(0, roll + Effect − effectiveArmour) × 3`

> *The multiplier applies to the net hull damage — a roll fully absorbed by armour deals zero damage regardless of the ×3. Missile and torpedo barbettes are excluded: their damage is per-projectile and uses the Smart trait salvo mechanic.*

Ion Weapons *(HG p.30–33, FAQ HG 2022 p.1)*

Ion weapons do **not** deal hull damage. A successful hit temporarily reduces the target's **Power** — disrupting thrust, computers, and critical systems.

Mounts and damage:

Weapon	Mount	Damage formula	Max Range
Ion Cannon	Barbette	2D × 10	Medium
Ion Cannon Bay (Small)	Bay	6D × 10	Medium
Ion Cannon Bay (Medium)	Bay	8D × 20	Medium
Ion Cannon Bay (Large)	Bay	10D × 100	Long

> ***Naming and scope note:*** *HG contains two separate combat systems. Standard space combat (HG pp.28–86, CRB) covers tactical ship-vs-ship engagements tracked hex by hex — the system T&D implements. Fleet Combat (HG pp.104–124) is an abstracted ruleset for large-scale fleet engagements where ships become simplified stat blocks and weapons are aggregated. Ion weapons appear in both with different names and entirely different mechanics:*

> | | ***Standard space combat (T&D scope)*** | ***Fleet Combat (out of scope)*** |
> |---|---|---|
> | *Barbette name* | ***Ion Cannon*** *(HG p.30)* | *Ion Barbette (HG p.112)* |
> | *Bay names* | ***Ion Cannon Bay*** *S/M/L (HG p.32–33)* | *Small/Medium/Large Ion Bay (HG p.112)* |
> | *Damage system* | *Power reduction (this section)* | *effect-per-weapon × count ÷ Hull Points → Ion Damage table* |
> | *Power stat* | *Yes —* `currentPower`*,* `basePower` | *No* |
> | *Thrust formula* | `floor(baseThrust × currentPower / maxPower)` | *Reduce Thrust by fixed value from table* |
>
> *Fleet Combat mechanics are out of scope for T&D. "Ion Cannon" and "Ion Cannon Bay" are the correct canonical names for standard space combat.*

Mechanics:

Outcome	Effect
Hit (any Effect)	Roll NbD, multiply by damageMultiple → deduct from target Power for 1 round
Hit, Effect ≥ 6	Duration extends to D3 rounds

Ion weapons **ignore armour**. Multiple Ion hits on the same target stack additively (`ionPowerReduction += newDamage`); duration takes the longer of the two.

Power → Thrust mapping (T&D design decision — RAW does not specify the formula):

```
effectiveThrust = floor(baseThrust × currentPower / maxPower)
thrustAvailable = max(0, effectiveThrust + bonusThisRound − thrustUsed − mD
```

Example: Thrust 4, maxPower 100, Ion hit for 70 Power → currentPower 30 → effectiveThrust 1.

Computer bandwidth *(FAQ HG 2022 p.1)*: the same Power reduction amount is also deducted from the target's computer bandwidth. While `currentBandwidth ≤ 0` and `baseBandwidth > 0`, all attack rolls suffer **DM-2** (displayed as COMMS DOWN).

Hardened computers (`/fib` designation): ships with `hardened: true` in their profile are **immune** to Ion weapons — the attack roll is made normally but no Power or bandwidth is deducted.

Duration: reduction persists until `ionRoundsLeft` ticks down to 0 *and* one additional round boundary passes. Power and bandwidth restore to base values at that point.

While active, the target's token shows a **pulsing blue aura**; the bento card shows an **ION NR** badge and a status row (`⚡ ION NR — −X PWR · COMMS DOWN` when depleted).

Bay Weapons — Fusion Gun, Meson Gun, Particle Beam, Railgun *(HG p.31–33)*

Unlike the Ion Cannon Bay, these four bay weapon families deal **ordinary hull damage** — roll the listed dice, add Effect, subtract effective armour (AP where applicable), then multiply by the bay's damage multiple.

Weapon	Size	Damage	Multiple	Traits	Max Range
Fusion Gun Bay	Small	6D	×10	AP 6, Radiation	Medium
Fusion Gun Bay	Medium	7D	×20	AP 6, Radiation	Medium
Fusion Gun Bay	Large	10D	×100	AP 8, Radiation	Long

Weapon	Size	Damage	Multiple	Traits	Max Range
Meson Gun Bay	Small	5D	×10	AP ∞, Radiation	Long
Meson Gun Bay	Medium	6D	×20	AP ∞, Radiation	Long
Meson Gun Bay	Large	6D	×100	AP ∞, Radiation	Long
Particle Beam Bay	Small	6D	×10	Radiation	Very Long
Particle Beam Bay	Medium	8D	×20	Radiation	Very Long
Particle Beam Bay	Large	10D	×100	Radiation	Distant
Railgun Bay	Small	3D	×10	AP 10	Short
Railgun Bay	Medium	5D	×20	AP 10	Short
Railgun Bay	Large	6D	×100	AP 10	Medium

Meson Gun Bay carries `AP ∞` — it **ignores all Armour** (and radiation shielding) outright, per HG p.31: "Meson gun bays ignore all Armour and radiation shielding." Effective armour against a Meson Gun Bay hit is always 0.

Bay weapons vs small targets *(HG p.31)*: "All bay weapons suffer DM-2 when attacking targets of 2,000 tons or less and DM-4 when attacking targets of 100 tons or less." This applies to **every** bay-mount weapon — the four families above and the Ion Cannon Bay alike — and is applied automatically as a **"Bay vs small target"** row in the DM Summary. Thresholds are inclusive (≤2,000t / ≤100t), unlike the Torpedo small-ship DM (§9.6, strict `< 2,000` tons). Missile Bay and Torpedo Bay would be excluded from this penalty per RAW, but neither is implemented in T&D.

Hardpoint cost: Small and Medium bays cost **1 Hardpoint**; Large bays cost **5 Hardpoints** *(HG p.31)* — same rule already applied to the Ion Cannon Bay.

9.11 Point Defence — Active Intercept

In addition to the defensive Point Defence **reaction** (§9.9), a ship with unfired laser turrets may use its Attack phase turn to actively intercept an enemy missile salvo currently in flight — without waiting for the salvo to arrive at its target.

Procedure:

1. Right-click the active ship → **Attack**.
2. In the Attack Config step, select a **Pulse Laser** or **Beam Laser** turret.
3. Under *TARGET*, switch from a ship to an **enemy in-flight salvo** — the dropdown lists all hostile salvos currently in the `missiles` array.
4. Click **INTERCEPT** (replaces the PROCEED button when a missile salvo is targeted).
5. The **Point Defence — Active Intercept** step opens:
6. Roll 2D6 + Gunner skill + laser turret bonus (DM+1 for 2-laser turret, DM+2 for 3-laser turret).
7. Effect (min 0) = number of missiles destroyed from the salvo.
8. If `count − Effect ≤ 0`, the salvo is removed entirely.
9. The firing turret is marked used; the result is logged in the Battle Log.

> *This action costs the attacker's full Attack turn for that turret. The turret cannot be used again in the same round (for attack or PD reaction). There is no restriction on which faction the salvo belongs to — a ship may intercept salvos targeting allies.*

Weapon picker clarity (#42): MgT2e has no dedicated Point Defence hardware — any unfired Pulse Laser / Beam Laser turret doubles as both a normal weapon and a PD system. The weapon picker in the Attack modal marks these with a 🛡 **PD** badge. An already-fired turret is no longer removed from the list — it stays visible, greyed out and disabled, tagged **FIRED**, so it's clear at a glance which weapons are still available this round.

---

10. Actions Phase — Crew

Each **crew member** may perform one action per round *(MgT2e CRB p.171)*. A ship with multiple crew members can use each of them once — the modal stays open after each roll so the GM can chain actions until all crew have acted.

Right-click ship → **Crew Action**. Steps:

1. **Crew member** — only members who have at least one action available in the current phase **and** have not yet acted this round are listed. Already-used members and members with no phase-appropriate actions are hidden.
2. **Action** — the list shows only actions that match the member's skills.
3. **Target** *(Sensor Lock only)* — select the ship to lock. **Target Salvo** *(EW — Counter Missile only)* — select the in-flight salvo to jam.
4. **Roll** — enter 2D6 for player ships; NPC ships have a 🎲 auto-roll button.

After the roll the modal shows the result (SUCCESS / FAILED + Effect). Click **ANOTHER ACTION** to act with a second crew member, or **CLOSE** to exit.

10.1 Skill DM Override

When an action is selected, the relevant skill level is pre-filled as the roll DM. The GM can override this value for specialisations (e.g. Engineer(M-Drive) 3 vs. generic Engineer 2). The 🔄 button resets to the base skill level.

10.2 Available Actions

All checks are **2D6 + skill DM vs. 8+** unless marked Automatic.

Role	Action	Difficulty	Effect on success
Captain	**Improve Initiative**	8+ (Leadership)	+Effect added to this ship's initiative at the start of next round (lasts 1 round) *(CRB p.166)*
Engineer	**Overload M-Drive**	Difficult 10+ (Engineer), cumulative DM−2 per prior attempt this battle	+1 Thrust (fixed) next round *(CRB p.171)*

Role	Action	Difficulty	Effect on success
Engineer	**Repair System**	Average 8+ (Sev 1–2) / Difficult 10+ (Sev 3–4) / Very Difficult 12+ (Sev 5–6) (Engineer)	Removes 1 critical hit from this ship. The GM selects which critical to repair when multiple are present *(CRB p.167)*
Gunner	**Reload Turret**	Automatic	Reloads 1 missile turret; no roll required *(CRB p.167)*
Gunner	**Deploy Chaff**	Automatic	Spends 1 sandcaster canister and 1 unfired sandcaster; chaff cloud around this ship until the next round: **DM−1** to Sensor Lock checks and missile attack rolls against it *(HG p.38)*
Sensors	**Sensor Lock**	8+ (Electronics)	DM+2 flat to all attacks against the selected target *(CRB p.172)*
Sensors	**Electronic Warfare**	8+ (Electronics)	Removes an enemy sensor lock from this ship *(CRB p.167)*
Sensors	**EW — Counter Missile**	10+ (Electronics)	Removes **Effect** missiles (min 1) from one in-flight salvo. Targets **both** salvos still in transit (`missiles` array) and those awaiting impact resolution (`⚡ impact` badge). Cumulative across rounds; a salvo may only be EW'd once per round *(CRB p.173)*

> *A skill level of 0 in a role grants **no actions** for that role. Skills with level ≥ 1 unlock the role's full action list.*
>
> ***Ion Power = 0:** when a ship's `currentPower` reaches 0, sensor actions (Sensor Lock, Electronic Warfare, EW — Counter Missile) are disabled in the*

> *Actions modal with a* `⚡ power offline` *label. All offensive weapons are simultaneously removed from the Attack modal weapon list. (HG p.30)*
>
> ***NPC ships** resolve all non-automatic rolls automatically when the GM clicks 🎲 EXECUTE ACTION.*
>
> ***Overload M-Drive cumulative penalty** (CRB p.171): each attempt after the first (per ship, for the whole battle) suffers an additional DM−2 — 2nd attempt DM−2, 3rd DM−4, and so on. The Actions modal shows an amber warning with the current penalty and attempt count before rolling. The counter increments whether the check succeeds or fails, and there is **no in-app way to clear it** — RAW requires performing offline maintenance (Engineer (m-drive), 1D hours), which falls outside the scope of a combat round.*
>
> ***Overload M-Drive severe failure** (CRB p.171): if the check fails with an **Effect of −6 or less**, the manoeuvre drive suffers an **M-Drive critical hit, Severity 1** — applied automatically. A pre-existing M-Drive critical of higher severity is never downgraded by this.*

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11. Crew System

Ships have a list of **named crew members**, each with individual skill ratings.

11.1 Skills

Abbrev	Skill	Used for
PLT	Pilot	Initiative roll, evasion DM, dogfight/pursuit checks, Aid Gunners action (Manoeuvre Step)
LDR	Leadership	Improve Initiative action (Actions phase)
TAC	Tactics	Initiative DM at start of battle (Initiative phase)
ENG	Engineer	Overload M-Drive action, Repair System action
GNR	Gunner	Attack DM, Reload Turret action, Deploy Chaff action

Abbrev	Skill	Used for
SEN	Sensors	Sensor Lock action, Electronic Warfare action, EW — Counter Missile action

Skill levels range from **0 to 5**.

11.2 Multi-Skill Members

One crew member can hold **multiple skills**. A solo pilot/gunner on a fighter has both Pilot 2 and Gunner 2 on the same crew entry.

11.3 Crew Role Assignments

Before battle, each role slot must be filled by an assigned crew member. Roles are **optional** — an unassigned role contributes **0 skill** (no bonus).

Right-click any ship token → **Assign Crew…** to open the assignment modal.

Using the Assign Crew modal

The modal is divided into two sections:

Roles — one dropdown per non-gunner role:

Slot	Dropdown label
Pilot	`Pilot`
Leadership	`Leadership (LDR)`
Tactics	`Tactics (TAC)`
Engineer	`Engineer`
Sensors	`Sensors`

Gunners — one dropdown per turret slot (T1, T2…), with the weapon names listed next to the slot label.

Each dropdown lists all named crew members. The relevant skill level is shown in brackets — e.g. `Mira Vasquez [pilot 1]` or `Joko Hendrik [no skill]`. Select `— unassigned —` to leave the slot empty.

Buttons:

- **AUTO-ASSIGN** — assigns the crew member with the highest relevant skill to each role and turret slot automatically. A single crew member can cover multiple roles (e.g., solo-pilot light fighter). Use as a starting point, then adjust manually if needed.
- **CLEAR ALL** — resets every slot to unassigned.
- **SAVE ASSIGNMENTS** — commits the selection to the ship and closes the modal.

> *If the ship profile has no named crew, the modal shows "No named crew on this ship. Add crew members in the profile editor."*

Effect of unassigned roles

Role slot	Effect if unassigned
Pilot	Initiative roll, evasion DM, dogfight use skill 0
Leadership	Improve Initiative action not available
Tactics	No Tactics(naval) check at initiative
Engineer	Engineer actions use skill 0
Gunner (T1, T2…)	That turret **cannot fire** this session
Sensors	Sensors actions use skill 0

A crew member can be assigned to multiple slots (e.g., the same person as both Pilot and Gunner T1 on a light fighter).

When a ship is placed on the map the app auto-assigns the best-skilled member per role as a starting point. The GM can adjust at any time before or during combat.

> ***NPC ships** without explicit crew assignments fall back to the highest skill across all crew members (backward-compatible behaviour preserved).*

11.4 Editing Crew

In the ship profile form, use **+ ADD CREW** to add a member and **✕** to remove one. Each row has a name field and compact skill inputs.

Default profiles (Free Trader, Scout, Patrol Cruiser…) and catalog ships (High Guard 2022 catalog) come with pre-generated crew — names and skill levels chosen as a reasonable starting point. **These are fully editable**: open the profile in the Dashboard → **✎ Edit** → **Crew Manifest** to rename members, adjust skill levels, add specialists, or remove crew that doesn't fit the scenario. Changes take effect the next time the ship is placed in battle.

> ***Example:*** *Replace Cass Oduya (Gunner 1) on the Free Trader with your player character's name and actual Gunner skill before the session starts.*
>
> *Legacy profiles using the old flat object format (* `{pilot: 2, gunner: 1}` *) are automatically migrated to the named array format when loaded in the form.*

---

12. Undo / Redo

Every user action that changes game state pushes a snapshot to the undo stack (capped at **20 entries**).

Control	Action
↩️ **Undo**	Restore the previous state. Appears in HUD when stack is non-empty. Shortcut: `Ctrl+Z` / `Cmd+Z`.
↪️ **Redo**	Re-apply an undone action. Appears in HUD when redo stack is non-empty. Shortcut: `Ctrl+Y` / `Cmd+Shift+Z`.

Both buttons are hidden when their respective stacks are empty — they appear only when relevant.

> *The battle log is **not** rolled back on undo. Instead, a* `↩ Undo` *entry is appended to the log so the action history remains readable.*

The Battle Log panel sits at the bottom-left of the screen. Click **▲ BATTLE LOG** to expand it; click ▼ to collapse. When expanded, a drag handle (thin bar at the top of the

panel) lets you resize it by dragging upward. Height ranges from 80 px to 600 px and is remembered for the session.

---

13. Save & Resume

13.1 Autosave

The app autosaves to IndexedDB after every significant action (ships added/removed, damage applied, phase advanced, etc.). No manual trigger needed. Persisted fields include ships, missiles, initiative order, range bands, the basic-mode thrust accumulation pool (`basicBandPool`), and the full battle log.

On next visit, the 🔄 **RESUME AUTOSAVE** button appears on the Dashboard with round, phase, and ship count.

13.2 Manual Save

Click 💾 **SAVE** in the HUD at any time to download the full session as a `.json` file.

13.3 Resume from File

On the Dashboard, click ↓ **RESUME FROM FILE** and select your saved `.json` file. A preview screen shows the full roster (see §2.2.1 for what each row shows) before you confirm loading.

13.4 Profile Export / Import

Ship profiles are separate from battle sessions. Use ↑ **EXPORT** and ↓ **IMPORT** in the profile panel to share or back up profiles independently.

> *Clicking 🏠 in the HUD returns to the Dashboard. A confirmation modal warns that unsaved battle data will be lost — save first if you need to resume.*

---

14. Dogfight

> *MgT2e CRB p.138 — Vehicle Combat / Dogfighting rules adapted for space combat.*

14.1 What is a Dogfight?

A **dogfight** is a close-range sub-system that activates automatically when two or more ships from different factions end the **Movement phase in the same hex** (vectorial mode only).

Standard combat is suspended for the involved ships. Instead, the round subdivides into **6 micro-rounds** of 6 seconds each — one full standard round equals six micro-rounds of dogfight.

14.2 Engagement

When the app detects a potential dogfight at the end of Movement, the **CONFIRM INTENTS** modal opens.

For each ship the GM declares:

Intent	Outcome
Both YES	Dogfight activates immediately
Both NO	Ships treated as Short Range (distance 1) — no dogfight
Mixed	Pursuit check required (see §14.3)

14.3 Pursuit Check

Formula: **2D6 + Pilot + Tonnage DM + free Thrust**

- **Free Thrust** = profile thrust − thrust used this round
- **Tonnage DM**: <50t → 0; 50–99t → −1; 100–199t → −2; +−1 per 100t above 100

If the pursuer's total exceeds the evader's total → dogfight activates. Otherwise → Short Range, no dogfight.

Enter dice manually for each side. The app computes and compares totals live.

14.4 Micro-Round Flow

Open the round from the **HUD dogfight tracker** (⚔️ DOGFIGHT panel, top-left).

Step 1 — Declare escape (optional)

At the start of each micro-round the GM may declare that a ship wants to flee.

- If its thrust exceeds all enemy thrusts → **auto-escape**, no check needed.
- If enemies choose not to pursue → **auto-escape** (toggle "NOT PURSUING").
- Otherwise → pursuit check (same formula as §14.3).

Step 2 — Pilot check

Each remaining ship rolls **2D6 + Pilot + Tonnage DM + Thrust + DEX DM + previous round bonus**.

DM	Source
Pilot skill	`getCrewSkill(crew, 'pilot')`
Tonnage DM	See §14.3 table
Thrust	Profile thrust − thrust used this round
DEX DM	Pilot's DEX characteristic modifier (set in ship profile, −3 to +3)
Extra enemies	−(number of enemy ships − 1) when outnumbered
Round bonus	Previous round winner's margin carries forward as a +DM

Step 3 — Result

Outcome	Effect
Winner	**+2 DM** to all attacks this micro-round; chooses enemy fire arc
Loser	**−2 DM** to all attacks
Tie	Fixed weapons cannot fire; turrets OK; no positional DM

> ***App automation:*** *the dogfight result DM (+2/−2/0) is* ***pre-filled automatically*** *in the Attack modal when the attacker is in a dogfight. On a tied round, barbettes and bay-mounted weapons are removed from the weapon list and a warning banner appears — the app enforces the fixed-weapon restriction.*

Step 4 — Advance

Click **ADVANCE → MICRO-ROUND N+1/6**. After micro-round 6 the dogfight ends automatically and all ships return to normal combat flow.

14.5 Token Visuals

Ships in a dogfight display:

- **Pulsing amber ring** around the token
- ⚔️ **badge** top-right of the token
- Ghost position and velocity arrow are hidden (no movement during dogfight)

14.6 Escape Mid-Dogfight

Escape can be declared at the start of any micro-round (Step 1 above). Conditions:

```
Auto-escape:  ship.thrust > max(enemy thrusts)
              OR enemies choose not to pursue
Check:        2D6 + Pilot + Tonnage DM + free Thrust  (same as §14.3)
              evader total > pursuer total → escaped
```

On successful escape `inDogfight` is cleared; the ship re-enters normal combat from the next standard round.

> ***Technical reference:*** *dogfight-system-design.md*

---

15. Boarding

> *HG 2022 pp.125–135 — full 4-phase boarding system.*

Boarding is a sub-system that activates when an attacker moves adjacent to a target and meets the thrust requirement. Combat shifts from the hex map to the interior of the target ship.

15.1 Triggering a Boarding Action

Right-click the **attacker ship** and select ⚔️ **Board [target name]…**

The option is visible only when:

```
distance(attacker, target) ≤ 1  (Adjacent or Close)
AND target.inDogfight === null  (target not in an active dogfight)
AND attacker.thrust ≥ target.thrust
    OR target M-Drive critical is disabled
AND different factions
```

The **Boarding Setup** modal opens. Select the target and confirm. The boarding moves immediately to Phase 2 — Contact.

15.2 Phase 1 — Approach

> *Handled outside the app. The approach phase is the normal combat movement that brought the two ships together. The GM declares the boarding when conditions are met.*

Voluntary boarding (target cooperates): skip to Contact immediately.

Forced boarding: if the target attempted to flee and failed (or is immobilised), proceed to Contact.

15.3 Phase 2 — Contact

The ⚔️ **CONTACT** modal opens. The GM selects the entry method:

Method	Check	Difficulty	Time	DM
Airlock (cooperative)	None	—	Instant	—
Airlock (forced)	Mechanic (STR)	14+	2D rounds + 1D	—
Maintenance Hatch	Mechanic (STR)	12+	2D rounds	— 🚨

Method	Check	Difficulty	Time	DM
Breaching Tube	None	—	< 2 min	—
Forced Linkage Apparatus	Pilot (DEX)	8+	Immediate	+2
Hull Cut	Mechanic (DEX)	8+/round	Per round	— 🚨

🚨 = decompression risk if compartment not evacuated.

Modifiers:

- 🌀 **Tumbling** — defender rotating the ship: DM −1 to all Contact checks. Click 🌀 **TUMBLING** in the Contact modal to initiate: roll Pilot (DEX) Routine (6+); if successful, select the D3 result (1–3 rounds) — the app tracks the countdown and clears tumbling automatically. *(HG p.127)*
- 🔗 **Forced Linkage** — DM +2 to all Contact checks; defender cannot manoeuvre

Hull Cut tracker: select component (Hatch / Airlock / Hull) and cutting tool, roll each round. Damage reduces component Resilience; breach achieved when damage ≥ breach threshold.

Sandcaster vs boarders and Parties: the defender can fire a sandcaster at the incoming party and the GM can define boarder rosters in the **Parties** panel — see §9.9 (*Sandcaster vs boarders*, *Boarder rosters*).

When entry is secured, click **ADVANCE TO CONFLICT** →.

15.4 Phase 3 — Conflict

The ⚔️ **CONFLICT** modal tracks the boarding fight.

Tactical objectives — check each when captured:

Objective	Effect when captured
Bridge	Remote control of all ship systems disabled for enemy

Objective	Effect when captured
Engineering	Propulsion, reactor, life support under attacker control
Turrets	Weapon systems under attacker control

The ship is considered taken when all three objectives are captured.

Combat tools:

- **ROLL STACKING** — roll 2D ≥ 10 to target a combatant beyond the first in a corridor (HG p.131)
- **ROLL MISSED SHOT** — roll 2D on the missed-shot table for every attack that misses; optional **Armored bulkhead (DM −1)** toggle

Weapon DM in tight spaces: Rifles −2 · Heavy weapons −4 · Grenades → automatic 6D+

When the fight is resolved, click **END CONFLICT — ADVANCE TO SECURITY →**.

15.5 Phase 4 — Security

The ⚔️ **SECURITY — BOARDING OUTCOME** modal resolves the action.

Outcome	Effect
Attacker wins	Boarding party controls the ship; optional faction transfer
Defender repels	Boarders eliminated, captured, or driven off
Ship destroyed	Target destroyed by internal damage during conflict

If **Attacker wins** and faction transfer is enabled, the captured ship's faction changes to match the attacker. Enemy crew is removed from the roster.

Click **CONFIRM OUTCOME** to close the boarding.

15.6 HUD Indicator

While a boarding is active, the HUD shows a ⚔️ **BOARDING** badge below the standard tracker:

```
⚔️ BOARDING   [Attacker] → [Defender]   CONTACT →
```

Click the phase button to reopen the relevant modal at any time.

15.7 Boarding and Normal Combat

- Ships **inBoarding** do not participate in the standard Attack phase
- A ship in an active **dogfight** cannot be targeted for boarding — it must exit the dogfight first
- A ship with **Forced Linkage active** cannot use thrust to manoeuvre
- If the target is destroyed during Conflict, resolve with outcome **Ship destroyed**
- Normal rounds continue in parallel — the GM can advance phases and resolve the boarding on its own timeline, as with dogfights

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> ***Technical reference:*** *boarding-system-design.md*

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16. Obstacles *(optional)*

> ***This system is entirely optional and is not part of the official MgT2e rules.*** *It is a house-rule extension designed to add environmental variety to vectorial combat. It is disabled by default and must be explicitly enabled before the battle begins. All standard combat works normally without it. Obstacles are only available in* ***vectorial combat mode****.*

Environmental obstacles are fixed zones on the hex map that affect movement and combat. They have no initiative and take no actions — they simply modify the behaviour of ships that move through or near them.

16.1 Enabling and Placing

Enable obstacles from the HUD toggle during the **Setup phase** (see § 5.3). Once enabled, right-click any empty hex → **Place obstacle here**.

A two-step modal opens:

1. **Type** — select one of the four obstacle types.
2. **Config** — set radius (in hexes), density (Asteroid Field only), and an optional label.

To edit or remove a placed obstacle, right-click its hex → **Edit obstacle** or **Remove obstacle**.

16.2 Obstacle Types at a Glance

Type	Movement cost	Attack DM vs ships inside	Damage on collision
Asteroid Field (light)	2 pts/hex	−1	1D6 − Armor
Asteroid Field (dense)	2 pts/hex	−2	2D6 − Armor
Debris Field	2 pts/hex	−2	2D6 − Armor
Gravity Well	impassable	—	4D6 − Armor
Nebula	none	−2 (from outside)	none

16.3 Asteroid Field and Debris Field

Movement budget. Each ship moves a number of hexes equal to its velocity vector magnitude (`|v|`). Normal hexes cost 1 point; field hexes cost 2 points. A ship with `|v| = 3` traversing one field hex can move 2 hexes total (2 pts for field + 1 pt for the next hex = 3).

Cover. A ship inside a field receives a DM penalty to all attacks made against it from outside. The penalty does not apply to attacks made *from* inside the field.

Collision. If a ship's movement budget runs out while it is still inside a field, it stops in that field hex and a collision is triggered. A **ObstacleCollisionModal** opens:

- The GM declares whether the Pilot check succeeds (Average 8+ for light, Difficult 10+ for dense/debris).
- On failure, roll the damage dice. Damage is reduced by the ship's Armor normally.

Debris Field origin. When a ship is destroyed (hull → 0), a Debris Field token with radius 0 automatically appears on its last hex. The GM can remove it manually.

16.4 Gravity Well

Represents a minor celestial body — moon, planetoid, or massive orbital station. **Not intended for full-sized planets** (which would be tens of hexes wide and outside the combat area entirely).

Exclusion zone. All hexes within the gravity well radius are impassable. ThrustModal prevents setting a vector that would enter the zone. If a ship's current vector would carry it inside (no thrust available to correct), it is blocked at the nearest border hex and takes **4D6 − Armor damage** (atmospheric entry). If the ship was in an active dogfight, the dogfight ends automatically before damage is applied.

Warning ring. The hex ring at radius + 1 is highlighted in orange — a visual caution border visible on the map at all times.

16.5 Nebula

A large zone of gas and interstellar dust. No movement cost, no collision risk.

Effects:

- Sensor lock cannot be acquired or maintained while either ship is inside the nebula. Any existing lock is cleared when a ship enters.
- DM −2 to all attacks made *from outside* against a ship *inside* the nebula. Ships fighting within the nebula are unaffected.
- DM −2 to all Electronics(sensors) rolls for ships inside the nebula.

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17. Map Tools

17.1 Zoom Levels

Three named zoom levels are available in the toolbar at the bottom-right of the battle map:

Level	Key	Zoom	Best for
C — Close	`1`	2.5×	Token detail in tight engagements
T — Tactical	`2`	1.0×	Default balanced view
S — Strategic	`3`	0.45×	Wide-area overview

Click a button or press the corresponding key to animate a 250 ms ease-in-out transition to that zoom level. The canvas centre is anchored during the animation so you don't lose your place.

The scroll-wheel still provides free-zoom at any point; doing so deselects the active named level. Keyboard shortcuts `1` / `2` / `3` are blocked while any modal is open.

17.2 Battle Report

Click 🖨 **Report** (top-right controls, next to `?` and `📖 Legend`) to open the Battle Report modal.

The report summarises the current battle state in three sections:

Section	Contents
Header	Session title, current round number, combat mode (Vectorial Combat / Basic Combat)
Ship Roster	Vessel name · Faction · Hull (current/max) · Critical hits (system + severity) · Status (Active / WRECK)
Battle Log	All log entries grouped by round, then by category within each round — Attacks, Missile Salvos, Reactions, Point Defence, Critical Hits, Other (only categories with entries are shown); each entry shows Phase and message *(#43)*

Click 🖨 **Print / Save PDF** to open the browser print dialog. Choose a printer or select *Save as PDF* to export the report. The printout uses a white background with monospace text — no additional software required.

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18. Further Reading

Document	Contents
thrust-and-drift-space-combat-simulator-spec.md	Full technical spec — data models, store actions, component structure, roadmap
dogfight-system-design.md	Dogfight sub-system design — micro-round flow, pursuit checks, escape mechanics
boarding-system-design.md	Boarding sub-system design — entry methods, hull-cut, conflict objectives
obstacles-system-design.md	Environmental obstacles design — asteroid field, gravity well, debris, nebula
weapons-expansion-design.md	Weapons expansion design — barbette ×3 multiplier, AP trait, Ion Cannon penalty, Torpedo/Missile Barbette ammo, sandcaster canister tracking

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