

NavArch Studio — Hydrostatics Low-Fi Wireframes

Purpose: quick ASCII wireframes + interaction notes for the Hydrostatics area. Use as a reference for UI build tickets in Linear.

0) Global Shell

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NavArch Studio          Project ▾ Hull ▾ Version: v0.1 [Report]
Tabs: Hydrostatics • Resistance • Propulsion • Seakeeping
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- Right Dock (collapsible): **Benchmarks & Compare** drawer.

1) Hydrostatics — Empty State (first time)

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┌────────── Left: Inputs ───────────┐────────── Center: 3D View ───────────┐
├──────────┤├────────── Right: Outputs ───────────┤├──────────┤
| [Hull & Medium] | | [Point Results] | |
| Source: (• Parametric ◦ CSV) | | (No hull |
loaded) | - | |
| Units: (• Metric ◦ Imperial) | | Click "Try Sample Wigley |
Hull" | - | |
| p: (Fresh ▾) | | or upload CSV offsets to |
start. | - | |
| | | |
| | | [Curves/Tables] |
| [Condition] | |
| | | Hydrostatic Table Bonjean |
| Draft: [ ] Trim: [ ] Heel: | |
| | | KN (Cross-curves) GZ |
| Solve equilibrium: [ ] | |
| | | (disabled until computed) |
| | |
| | |
| [Accuracy & Run] | |
| | | [Benchmarks & Compare ▸] |
| Accuracy: ( Fast • Precise ◦ ) | |
```

[Compute]	[Generate Curves]
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- Helper CTA: **Try Sample Wigley Hull (L=100, B=10, T=5)**. - CSV uploader shows inline schema hint.

2) Hydrostatics — After Compute (solved state)

Left: Inputs		Center: 3D View
Right: Outputs		
[Hull & Medium]		[Point Results]
Source: • Parametric (Wigley)		3D hull mesh
Displacement ∇ : 9,850 m ³		
Units: • Metric		– Waterplane slice
LCB / VCB / TCB: 52.3 / 2.8		
ρ: Fresh		• CoB ♦ CoG LCF/LCB ticks
KB: 1.75 BM_T: 6.42 KM_T: 8.17		
A_wp: 1,120 m ² TPC: 14.9		Station & waterline grid ▣
[Condition]		Camera: orbit/pan/zoom
Wetted Surface: 3,420 m ²		
Draft: [5.0] Trim: [0.0]		Status: ✓ Solved
Heel: [0.0]		
Solve equilibrium: [x] W/LCG/KG		[Curves/Tables]
W: 10000 kN LCG: 51.9m KG: 5.2m		Hydro Table ▣ Bonjean KN GZ
		(grid with export CSV)
[Accuracy & Run]		
Accuracy: (Fast ◦ Precise •)		[Benchmarks & Compare ▶]
[Compute] [Generate Curves]		

- Hover in 3D shows station #, local draft, section area. - Snapshot icon in 3D: **Save as Benchmark** with thumbnail.

3) Curves & Tables — Hydrostatic Table

Right Panel: Curves/Tables

Hydrostatic Table | Bonjean | Cross-curves (KN) | GZ

Range: Draft min [3.0] max [7.0] step [0.1] (units sync) [Generate]

Data Grid

Draft	▽	LCB	KB	BM_T	KM_T	A_wp	TPC	Wetted_S	...	
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[Export CSV] [Copy]

4) Bonjean (by station)

Right Panel: Bonjean

Station: [0 ▾] Overlay current condition: [x]

Chart: Area vs Draft

▲

curve(s) per station

[Export CSV]

5) Cross-curves (KN) & GZ

KN Tab

Angle range: [0°]-[60°] step [5°]
0.5

GZ Tab

KG: [5.20 m] ΔKG [+/-

[Generate PDF] [Also export CSV bundle]

8) Validation & Error States

- CSV schema checker shows row/col, first 3 errors inline; link to docs.
- Solver messages zone above Outputs: *Solved* · *Needs input* · *Not converged* · *Geometry warning*.
- Non-blocking toasts for Save/Export; retry CTA on failures.

9) Keyboard Shortcuts & Power-User Flow

- **C** Compute · **G** Generate Curves · **B** Save Benchmark · **R** Report
- **1/2/3** focus Draft/Trim/Heel; **↑/↓** nudge; **Space** Fast/Precise toggle
- Viewport: **H** toggle grids; **Ctrl+S** quick save snapshot

10) Responsive Behavior

- $\geq 1280\text{px}$: 3-pane default
- Tablet: Inputs collapsible; charts stack under 3D
- Mobile: Stepper pages — Inputs → 3D → Results; Benchmarks as slide-up sheet

11) Accessibility Notes

- Sliders mirror numeric inputs; charts provide table equivalents
- WCAG-AA contrast; visible focus rings; ARIA live region for solver status
- Keyboard navigable drawers/modals; escape to close

12) Analytics (Lightweight)

- Log: compute runs, time-to-solve, curve generations, report exports
- Capture: hull source (param/csv), accuracy mode (fast/precise) — anonymized

13) Linear Import CSV — Mapping Notes

- Columns used: **Title**, **Description**, **State**, **Priority**, **Labels**, **Parent**, **Estimate**
- **Parent**: put the epic title to create a hierarchy (child issues link to epic)

- Suggested Priorities: P0 (critical), P1 (high), P2 (normal), P3 (low)
- Estimates in points: 1, 2, 3, 5 (team can recalibrate later)

Workspaces, Personas & Phases — UX Blueprint

1) Personas (primary → secondary)

- **Naval Architect (Senior)** — owns geometry & methods; wants full control, precise numbers, batch runs.
- **Designer (Junior)** — executes tasks with guardrails; prefers presets, guidance, and safe defaults.
- **Planner / Project Manager** — plans scenarios, compares options, assembles reports; read-mostly with lightweight edits.
- **Reviewer / QA** — verifies results, signs off; focuses on deltas, tolerances, and compliance.
- **Operations (future)** — consumes reports, status dashboards; no authoring.

2) Workspace Model (segregate by phase)

Global workspace switcher in header (left of Tabs): - **Design Workspace** — authoring-heavy. Geometry ingest, solvers, curves; advanced controls visible. - **Planning Workspace** — decision-heavy. Scenarios, benchmarks comparison, report assembly, approvals. - (Future) **Operations Workspace** — read-only dashboards, KPIs, alerts.

Behavior - Persona-aware defaults: Senior → Design; Planner/Reviewer → Planning. - Sticky per-user last workspace per project. - Soft theming: subtle header badge ("Design" / "Planning").

3) Navigation & Header IA

Project ▾ | Workspace: Design ▾ | Tabs: Hydrostatics • Resistance • Propulsion • Seakeeping | [Generate Report]
 Persona badge (role) | Status chip (Solved/Needs input) | Help ▾

- Workspace menu includes short descriptions and a link to "What changes between workspaces?".

4) Hydrostatics module: differences by workspace

Design Workspace (authoring)

- Left panel shows **all** inputs: geometry source, density, Draft/Trim/Heel, Solve Equilibrium, Accuracy, Import/Export.
- Center 3D: full overlays (waterplane, section/waterline/buttock grids, CoB/CoG markers), hover diagnostics.
- Right: Point results + **all** curve tabs (Hydro Table, Bonjean, KN, GZ) with generation controls.

- **Advanced zone** (collapsible): finite-diff step size, meshing density, tolerances.
- Save as **Benchmark** after each compute; tag with method/mesh/assumptions.

Planning Workspace (decision)

- Left panel slim: **Scenario selector**, density, **KG override**, and **range pickers** for tables/curves.
- Center 3D simplified: hull + waterplane, key markers only (no deep grids by default).
- Right: **Compare-first** layout — Benchmarks drawer open by default, Curves tabs prioritize **GZ** and **Hydro Table**; quick buttons: *Overlay*, *Show Δ*, *Add to Report*.
- Guardrails: geometry/mesh controls hidden; solver uses locked presets from Design workspace.

5) Permissions & Feature Gating

- **Role → Capability matrix**
- Senior: full authoring; can change tolerances & advanced settings.
- Junior: authoring with guardrails (no tolerance edit; warnings require confirm).
- Planner/Reviewer: read + scenario configuration; cannot modify geometry.
- UI badges on gated controls (lock icon + tooltip: “Design workspace only” / “Requires Senior role”).
- Attempting gated action → lightweight modal: *Request change from Senior* (creates task in backlog via Linear).

6) Presets, Onboarding & Guidance

- **Persona playbooks** (first time per workspace):
- Senior (Design): “Load geometry → Set density → Compute → Save Benchmark → Generate Curves.”
- Planner (Planning): “Pick scenarios → Overlay curves → Add to Report → Submit for review.”
- **Presets menu**: Vessel archetypes (Barge, Wigley, Series) + analysis presets (Fast vs Precise) saved per project.
- **Inline tips**: subtle info icons next to critical fields (LCF, KM) with brief definitions.

7) Review & Handover Flow

- **Freeze** a design snapshot → becomes a **Planning Scenario**.
- Scenario cards show: hull version, assumptions, solver settings hash, timestamp.
- **Review Mode** (read-only): comments panel, markup tools on plots, sign-off status.
- **Report builder** pulls from frozen scenarios only (ensures traceability).

8) Deltas & Compliance

- Delta surface ($\Delta \nabla$, ΔLCB , ΔKM , $GZ@ \varphi$, max GZ, area under GZ) always visible in Planning.
- Tolerance templates (e.g., Class rules) applied to results with pass/fail chips.

9) Analytics & Smart Defaults

- Track per-persona usage of tabs/controls; suggest hiding rarely used advanced controls for Juniors.
- Auto-promote popular Draft/Angle ranges to quick presets.

10) Linear Tickets — Workspace/Persona Layer (ready-to-import)

- **[EPIC] WS-Design: Authoring UX** — Advanced panel, presets, freeze action.
- **[EPIC] WS-Planning: Decision UX** — Scenario selector, compare-first layout, delta surface.
- **[EPIC] Roles & Gating** — Capability matrix, UI locks, “Request change” flow (Linear integration stub).
- **[EPIC] Review & Report** — Review mode, comments, sign-off, report builder hooks.
- **[EPIC] Onboarding & Help** — Persona playbooks, inline tips, glossary popovers.

Acceptance anchors - Workspace switcher in header with persona-aware default. - Hydrostatics module presents different control density per workspace. - Gated controls visually identifiable; request-change path creates a task. - Freeze snapshot promotes to Planning Scenario with immutable metadata.