



Makna

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FleetCare AI

Maintenance intelligence & workflow automation for coal shipping — tug & barge operations. Built to support ISM & class compliance workflows — readiness by design.

Photograph and move on — the crew's phone is the capture tool

AI assists, people decide — drafts, scores & recommends; humans approve; everything is logged

Designed for 27 vessels — tugs & barges, offline-tolerant, phased 1-4

Pilot-first — 6-8 weeks, 100% creditable, explicit GO/NO-GO

Prepared by Makna

AI Solutions for Indonesian Industry

11 AUGUST 2026

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01 Executive Summary

Vessel maintenance runs on paper, clipboards and experience. **FleetCare AI** is the first **integrated maintenance system** for your 27 vessels — a complete web-based FMS with AI embedded. **No ERP required**. Crew photographs, AI does the admin, failures are flagged early, spares match jobs, everything is logged for class and ISM.

up to 40%

unplanned downtime reduction — industry benchmark ^[1]
benchmark, not tug/barge-specific; validated in pilot

up to 38%

reduction in corrective maintenance work — industry benchmark ^[1]
corrective work, not total budget

2–4 wks

early-warning lead time — pilot target ^[2]
a KPI we measure and validate, not a promise

27

vessels — tugs & barges

THE MAINTENANCE INTELLIGENCE LAYER

Paper, spreadsheets and clipboards record what happened. **FleetCare helps determine what should happen next.**

The problem

Unplanned downtime, manual data capture, spreadsheets and clipboards — and no operational visibility until something fails.

Why different

Photo-first, offline-tolerant, AI-assisted with human approval, phased delivery — built to replace paper, spreadsheets and clipboards.

How to start

A low-risk 6–8 week production pilot on 2–3 vessels — **100% creditable** against the full-fleet program. Break-even at ~3% improvement.

SOURCES — EXECUTIVE SUMMARY

- 1. **Downtime / corrective-maintenance ranges (up to 40% / 38%):** industry benchmark synthesis — McKinsey & Company (2020), “Prediction at scale” ^B; PRIME Marine (2026), Orion Ship Management case ^B. Cross-industry / ocean-going — **not tug & barge specific; transferability to be validated in the pilot**. Full sources in Appendix E.
- 2. **2–4 weeks early-warning lead time:** vendor-published examples (iFactory 2026; OXMaint 2025) ^B — set as the **pilot target KPI**; prediction accuracy improves as vessel data accumulates.

02 The Maintenance Problem

In a tug & barge fleet, the cost of maintenance isn't just the repair — it's the **unplanned downtime**, the **manual admin**, and the **missed early warnings**.

Fixed schedules miss real wear

Running-hour intervals can't see variable loads, fuel quality, or weather routing. Equipment degrades between inspections — and no one knows until it fails.

Manual, disconnected capture

Job libraries typed by hand. Readings and oil reports logged on paper or in spreadsheets. Stock lives on clipboards. Nothing is trended; nothing alerts early.

One failure is expensive

A single major tug overhaul typically costs **IDR 1-3 billion** including repairs, off-hire and replacement charter (Makna estimate) ^[1].

Paper and spreadsheets record what happened — **they don't tell you what should happen next.**

- No trend, no alerts, no audit trail until an inspector asks — then it's a scramble
- The alternative (a marine ERP) means **USD 100k-500k+** implementation and 12-24 month rollouts (market estimate) ^[2]

THE REAL COST

Every week of delayed visibility compounds: a small degradation becomes a major repair, a missed reading becomes a surprise failure, a clipboard stock count becomes a job stopped for lack of a spare.

SOURCES

1. Main-engine overhaul cost (IDR 1-3B): **Makna estimate** built from published marine-diesel overhaul benchmarks (Neptunus Power 2025; Con-tractor 2026) plus off-hire & replacement-charter economics **C**.
2. Incumbent marine ERP USD 100k-500k+ / 12-24 months — what you'd otherwise buy: **Makna market estimates** — DNV ShipManager · MariApps smartPAL · SERTICA don't publish pricing **C**. Full sources in Appendix E.

03 FleetCare — Your Integrated Maintenance System

CORE POSITIONING

Paper records what happened → FleetCare decides what should happen next

Crew & Office

Superintendents, chief engineers and crews use phones and dashboards — photograph and move on.

FleetCare

A complete **web-based maintenance management system** — vessels, equipment, jobs, readings, inventory, approvals and audit in one place — with **AI embedded** and human approval at every material step.

What you run today

Spreadsheets, paper, clipboards, lab reports, OEM manuals — **becomes the input**. FleetCare is the system that replaces them, and integrates with class surveys and any future systems.

A complete FMS

Deterministic core — scheduling, inventory, workflow, audit, compliance rules — works even if AI is unavailable. AI enhances it.

Photo-first & offline

Capture on board with poor connectivity; sync when back in range.

AI-assisted, human-approved

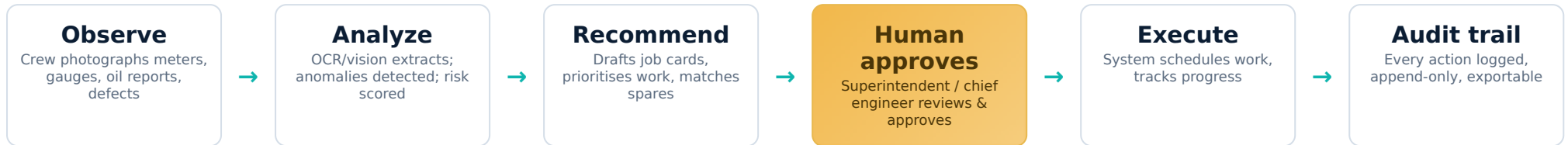
Drafts, scores and recommends — every material action requires approval and is logged.

Phased & measurable

P1 → P4 with proof at every gate; economics validated in the pilot.

04 How FleetCare Works

AI observes, analyzes and recommends. **Humans approve.** Systems execute. Everything is logged.



Offline-tolerant

Capture on board with poor or satellite-only connectivity; syncs automatically when back in range.

Photos as first-class data

The photo is the record — hour meters, oil reports, shelf counts, defects — with evidence attached.

Reliable by design

Scheduling, intervals, due dates and the audit trail run on deterministic software — they work even if AI is unavailable.

What FleetCare does NOT do

- Does not change class or statutory requirements, or take over ISM responsibilities
- Does not override engineering judgment — AI recommends; engineers decide
- Does not authorise critical maintenance or major expenditure
- Does not auto-purchase — reorder is a suggestion until approved
- Does not tamper with audit logs (append-only)
- Does not share data beyond configured AI providers (no training on customer data)

Trust by design

- Alerts and drafts may be generated automatically — **actions never are**
- Every material action is human-approved and audit-logged
- Designed to support ISM/class compliance workflows — readiness by design
- Designed to support Indonesian data protection requirements (UU PDP)

MONITOR → IMPROVE — THE LOOP THAT MAKES IT BETTER

Every phase measures KPIs on your data (capture acceptance, OCR accuracy, anomaly detection, recommendation acceptance, plan compliance, downtime, break-even). Models refine as data accumulates — **the system gets measurably better at your fleet.**

05 Overall Scope & Solution Architecture

One platform, four modules — **the map before the details**. Phased delivery, value proven at every gate.

P1 • Maintenance Plan

Structured, compliant maintenance plan from OEM manuals — job cards, smart scheduling, gap checks. **Phase 1**

P2 • Maintenance Monitoring

Photo OCR for running hours & oil reports; anomaly detection and risk-scored prioritisation. **Phase 1**

P3 • Inventory

Photo stock-taking, smart reorder forecasting, job-to-spares matching — shortages flagged weeks ahead. **Phase 2**

P4 • Overhaul

Overhaul & dry-dock planning and tracking — scope, spares, critical path, handover records. **Phase 2**

D • Human control

Maintenance approval · critical-intervention approval · purchasing approval · compliance decisions. **Nothing material ships without approval.**

C • ML / analytics

Anomaly detection · trend analysis · failure-risk scoring · demand forecasting. **Improves with accumulated data.**

B • AI / LLM (assistance)

Document interpretation · OEM extraction · job-card drafting · defect classification · Q&A · recommendations. **Drafts — humans approve.**

A • Deterministic software

Intervals · due dates · scheduling · inventory rules · workflow · audit trail · compliance rules · RBAC. **Works even if AI is down.**

BUILD → EMBED → MONITOR → IMPROVE

Start with the deterministic core, embed AI assistance module by module, monitor KPIs on your data, and improve continuously — **the loop that makes the system measurably better at your fleet.**

06 P1 · Maintenance Plan

Turn OEM manuals and Excel job lists into a structured, compliant, workable maintenance plan — fast.

Problem

- Job libraries typed by hand from OEM manuals
- Schedules miss voyages and real operating hours
- Compliance gaps invisible until an audit

Capability

- AI drafts the job library from OEM PDFs / Excel
- Smart scheduling around voyages & running hours
- Designed to support ISM/class compliance workflows — gap checks

Data required

- OEM manuals & job lists
- Vessel register & equipment hierarchy
- Voyage schedule

BEFORE → AFTER

FleetCare AI
GenAI Fleet Maintenance Platform

DashboardVesselsJobs & ScheduleMonitoringAI Agent Log

27 vessels1 Superintendent

Maintenance Plan — Job Cards

AI-generated job library · scheduling by running hours & calendar

All vesselsAll status

423 job cards shown

Generate job cards from OEM manual

JOB-CARD GENERATOR · SOURCE: YANMAR 6EY17W SERVICE MANUAL (PDF, 214 PP) · CONFIDENCE 96%

draft

Change fuel injection pump — 4000 h · spares: injection pump kit · safety: relieve pressure

Approve

draft

Turbocharger cleaning — 2000 h · spares: cleaning kit · safety: cool engine

Approve

draft

Camshaft & tappet inspection — 8000 h · spares: gasket set · safety: lock-out

Approve

VESSEL	EQUIPMENT	JOB CARD	INTERVAL	LAST DONE	STATUS	SPARES	SOURCE
TB Bakauheni	Aux Genset 1	Replace air filter	800 h	8,946 h	Overdue - 9,746 h	Air filter element	AI-imported
TB Merak	Main Engine 2	Valve clearance check	2000 h	9,399 h	Overdue - 11,399 h	Gasket set	OEM
TB Tanjung Priok	Main Engine 2	Crankcase inspection	4000 h	2,691 h	Overdue - 6,691 h	—	OEM
TB Tanjung Priok	Aux Genset 2	Replace air filter	800 h	4,284 h	Overdue - 5,084 h	Air filter element	AI-imported
TB Balikpapan	Main Engine 1	Injector pressure test	1000 h	8,151 h	Overdue - 9,151 h	Injector kit	OEM
TB Balikpapan	Main Engine 2	Crankcase inspection	4000 h	4,657 h	Overdue - 8,657 h	—	OEM
TB Banjarmasin	Main Engine 1	Inspect & clean fuel filters	250 h	8,635 h	Overdue - 8,885 h	Fuel filter element	AI-imported
TB Banjarmasin	Main Engine 1	Injector pressure test	1000 h	7,809 h	Overdue - 8,809 h	Injector kit	OEM
TB Banjarmasin	Aux Genset 1	Injector service	2000 h	9,584 h	Overdue - 11,584 h	Injector kit	AI-imported
TB Banjarmasin	Steering Gear	Rudder bearing check	2000 h	6,766 h	Overdue - 8,766 h	—	OEM
TB Samarinda	Aux Genset 1	Change lube oil & filters	400 h	7,252 h	Overdue - 7,652 h	Lube oil 45L filter kit	OEM

AI-assisted job-card generation — agent drafts job cards from OEM manuals; superintendent reviews & approves.

FleetCare AI
GenAI Fleet Maintenance Platform

DashboardVesselsJobs & ScheduleMonitoringAI Agent Log

27 vessels1 Superintendent

Maintenance Plan — Job Cards

AI-generated job library · scheduling by running hours & calendar

All vesselsOverdue

14 job cards shown

Generate job cards from OEM manual

VESSEL	EQUIPMENT	JOB CARD	INTERVAL	LAST DONE	STATUS	SPARES	SOURCE
TB Bakauheni	Aux Genset 1	Replace air filter	800 h	8,946 h	Overdue - 9,746 h	Air filter element	AI-imported
TB Merak	Main Engine 2	Valve clearance check	2000 h	9,399 h	Overdue - 11,399 h	Gasket set	OEM
TB Tanjung Priok	Main Engine 2	Crankcase inspection	4000 h	2,691 h	Overdue - 6,691 h	—	OEM
TB Tanjung Priok	Aux Genset 2	Replace air filter	800 h	4,284 h	Overdue - 5,084 h	Air filter element	AI-imported
TB Balikpapan	Main Engine 1	Injector pressure test	1000 h	8,151 h	Overdue - 9,151 h	Injector kit	OEM
TB Balikpapan	Main Engine 2	Crankcase inspection	4000 h	4,657 h	Overdue - 8,657 h	—	OEM
TB Banjarmasin	Main Engine 1	Inspect & clean fuel filters	250 h	8,635 h	Overdue - 8,885 h	Fuel filter element	AI-imported
TB Banjarmasin	Main Engine 1	Injector pressure test	1000 h	7,809 h	Overdue - 8,809 h	Injector kit	OEM
TB Banjarmasin	Aux Genset 1	Injector service	2000 h	9,584 h	Overdue - 11,584 h	Injector kit	AI-imported
TB Banjarmasin	Steering Gear	Rudder bearing check	2000 h	6,766 h	Overdue - 8,766 h	—	OEM
TB Samarinda	Aux Genset 1	Change lube oil & filters	400 h	7,252 h	Overdue - 7,652 h	Lube oil 45L filter kit	OEM
TB Makassar	Main Engine 2	Change lube oil & filters	500 h	11,741 h	Overdue - 12,241 h	Lube oil 320L filter kit	AI-imported
TB Makassar	Aux Genset 2	Change lube oil & filters	400 h	8,514 h	Overdue - 8,914 h	Lube oil 45L filter kit	AI-imported
TB Makassar	Air Compressor	Valve & unloader service	1000 h	9,164 h	Overdue - 10,164 h	Valve kit	AI-imported

FleetCare AI · prototype build 7 Aug 2026 · Nalar.ai — demo data, no real vessel information

Smart scheduling — weekly work lists per vessel with overdue/due-soon flags and voyage-aware replanning.

KPI & VALUE

KPIs: job-library build time · coverage % · gap count. Value: fewer missed jobs, compliance-ready records, a plan the crew can actually follow.

07 P2 · Maintenance Monitoring

Photo OCR for running hours & oil reports; **anomaly detection and risk-scored prioritisation** — early warnings that improve with your data.

Capability

- Photo OCR — running hours, oil reports, gauges
- Trend analysis & anomaly detection (starts day one on statistics)
- Failure-risk scoring per vessel / engine
- Recommended inspections & actions — human-approved

Data required

- Running-hour telemetry (weekly readings or sensors)
- Oil-analysis history (trendable time series)
- ≥ 12 months maintenance history (preferred)
- Defect photos, operating context, spares history

KPI & value

- **2-4 wks early warning = pilot target**, not a promise
- Anomaly detection rate · recommendation acceptance
- **Value:** earlier intervention, fewer surprises

PROTOTYPE — MONITORING

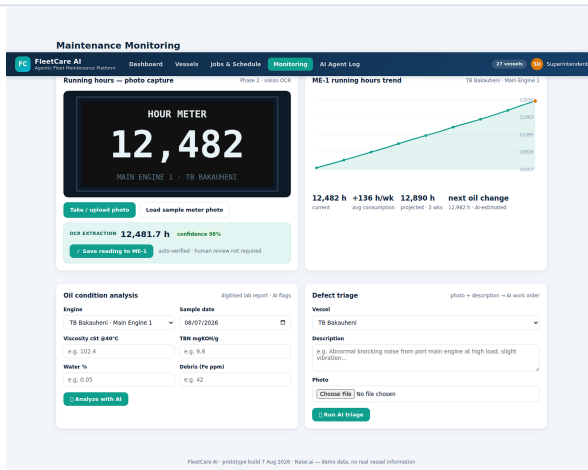
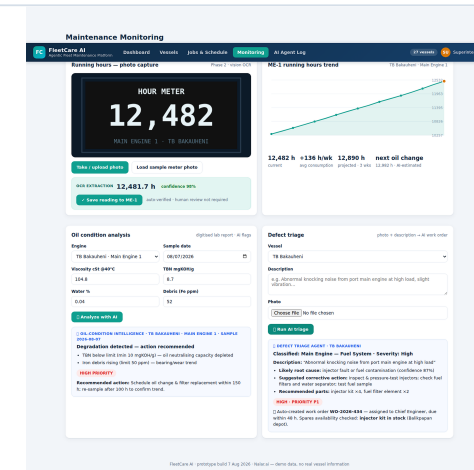


Photo OCR — a photo of the hour meter becomes a reading, automatically.



Anomaly & risk flows — degradation detected, risk scored, actions recommended.

Model-readiness honesty: anomaly detection and risk scoring run from day one on rules and statistics (no history required). Supervised failure prediction is added after ≥ 12 months of labelled history — anomaly-first, prediction-second.

08 P3 / P4 · Future Expansion

One platform, four phases — **expand when value is proven** at each gate.

P3 · Inventory

- Photo stock-taking — AI reads labels & counts with photo evidence
- Smart reorder forecasting from consumption vs min/max & lead time
- Job-to-spare matching — shortages flagged weeks before a job is due

P4 · Overhaul Plan & Monitoring

- AI-drafted scope from class surveys, history & OEM intervals
- Progress extracted from daily reports/photos — per work package
- Budget vs actual reconciled; overruns flagged early

PHASED = LOW ENTRY, PROOF AT EVERY GATE

Each phase has its own problem → capability → data → action → KPI → value chain. Contract what delivers value now; expand when the pilot and phase results justify it.

Why phase it

Lower entry risk, earlier visibility, working demos at each stage — and the economics of every phase validated on your own data before scaling.

Dependency note

P3 depends on the P1 job library; P4 comes after the core platform is proven. The commercial model covers each path — see Slide 14.

09 Solution Architecture

FleetCare is a complete **web-based maintenance management system** — a deterministic backbone that works with or without AI, with embedded AI/ML — and a continuous **build → embed AI → monitor → improve** loop.

D • Human control

Maintenance approval · critical-intervention approval · purchasing approval · compliance decisions. **Nothing material ships without approval.**

C • ML / analytics

Anomaly detection · trend analysis · failure-risk scoring · demand forecasting. **Improves with accumulated data**; accuracy gains are explicit.

B • AI / LLM (assistance)

Document interpretation · OEM extraction · job-card drafting · defect classification · natural-language Q&A · summarisation · recommendations. **Drafts — humans approve.** Model-agnostic: capabilities, not vendor names.

A • Deterministic software

Intervals · due dates · scheduling · inventory rules · calculations · workflow · audit trail (append-only) · compliance rules · RBAC. **Works even if AI is down.**

On “agents”: the word is reserved for genuine multi-step orchestration that adds value — e.g. defect triage → work-order draft → spares availability check. Single-step capabilities (OCR extraction, classification, Q&A) are AI-assisted features, not agents. Full technical detail in Appendix A-B.

10 Solution Architect & Choice of LLM

How the system is engineered — and why the model choices keep it **affordable**.

A · ENGINEERING DECISIONS — WHAT WE CHOSE, AND WHY

Decision	What we chose	Why
System architecture	Four layers: deterministic core · AI/LLM · ML/analytics · human control	Reliable where it must be; intelligent where it adds value; humans in command at every material step
Deterministic core	Intervals, due dates, scheduling, inventory rules, workflow, audit trail, compliance rules — in code	The FMS backbone works with or without AI; records, approvals and audits never depend on a model being available
Database	PostgreSQL + pgvector on one box	Relational integrity for maintenance records + vector search over OEM manuals (RAG) without extra infrastructure
Storage	S3-compatible object storage	Photos as first-class evidence — meter shots, oil reports, defects — served via signed URLs
Frontend	Responsive PWA, mobile-first	Crew phones are the capture tool; offline capture + auto-sync for vessels with poor connectivity
AI integration	Hosted LLM APIs behind an async job queue with per-task routing	No GPU capex; background OCR/AI jobs keep the app responsive on vessel-grade devices
Human-in-the-loop	AI drafts → human approves → append-only audit log	Trust, and class/ISM record-keeping: who did what, when, why
Security	TLS, encryption at rest, RBAC, tenant isolation, append-only audit	Designed to support ISM/class compliance workflows and Indonesian data protection requirements (UU PDP)

B · CHOICE OF LLM — MOST COST-EFFECTIVE MODEL PER TASK

Task	Model / approach	Role
Text & agents — scheduling, triage, forecasting, RAG	DeepSeek V4 Flash (\$0.14 in / \$0.28 out per 1M tokens)	DEFAULT — most cost-effective frontier-class text model
Clean captures — meters, gauge digits, labels	Classical OCR (Tesseract/PaddleOCR — free, on-box)	DEFAULT — ≈ IDR 0/photo
Messy docs — oil reports, defect photos	Gemini Flash-Lite class (\$0.30/\$2.50)	DEFAULT — best price/quality at the vision tier
Hard docs / low confidence	Gemini 2.5 → 3.6 Flash (\$1.50/\$7.50)	ESCALATE — only when confidence < 90%
Air-gap / offline sites (Phase 2+, optional)	Local vision model — under review (model-agnostic)	OPTIONAL ADD-ON — quoted separately; classical OCR covers clean offline captures today

Rationale: ~2/3 of photos never touch an API (classical OCR first); text runs on the most cost-effective frontier-class model; premium vision is reserved for genuinely hard documents. Verified list prices Aug 2026; volume assumptions auditable in Appendix B. Offline clean captures run on on-box OCR today; a local vision model for air-gap sites is under review — no functional gap.

THE PRICE IS DESIGNED IN, NOT DISCOUNTED

Routing keeps **AI opex ≈ IDR 25-60k/month @27 vessels** (≈ 25M text tokens · ~400 OCR photos · ~200 vision photos/mo — auditable) — even a 5× spike stays under IDR 300k/mo. Architecture + model choice structurally define cost: **no GPU hardware** (hosted APIs), a **lean single-box stack**, and **template-based delivery** (standardized tug & barge equipment — job libraries built once, parameterized across the fleet). Result: full 4-phase program at **IDR 750M** (committed; excl. VAT/PPN 11%), platform opex ≈ **IDR 1.0-2.6M/mo** — sustainable at every tier, no hidden margin pressure. All list prices verified Aug 2026 — **reconfirm at contract**.

11 Business Impact & ROI

Conservative, transparent economics — **we measure your baseline in the pilot, we don't assume it.**

BREAK-EVEN — THE CFO QUESTION

The platform pays for itself if addressable cost falls just ~3%: **Full Program (P1-P4) break-even ≈ 2.7%** (subscription 324M/yr ÷ addressable pool 12B/yr) · **year-one incl. implementation ≈ 8.9%** (750M + 324M ÷ 12B/yr). Break-even needs only two numbers — the pilot-measured baseline and the fixed subscription. **No improvement assumption required.**

WE MEASURE, WE DON'T ASSUME

Your baseline is **measured in weeks 1-2 of the pilot on your own fleet**: maintenance spend, unplanned downtime, admin hours, inventory write-offs, overhaul costs, stock-outs. The ROI is then re-run with real numbers, and GO/NO-GO is tied to measured improvement ≥ break-even. Assumption becomes customer-verified fact (D→A).

THE FORMULAS (NO BLACK BOX)

Annual benefit = addressable pool × improvement % · **Net benefit** = annual benefit – subscription · **ROI %** = net benefit ÷ implementation · **Payback** = implementation ÷ (net benefit ÷ 12) · **Break-even %** = subscription ÷ addressable pool.

FULL PROGRAM (P1-P4) · OPTION B · IMPL 750M · SUB 324M/YR · ADDRESSABLE POOL IDR 12B/YR (MAINTENANCE + DOWNTIME + ADMIN/OVERTIME + INVENTORY + OVERHAUL)

Illustrative scenarios — pending pilot-measured baseline

Scenario	Annual benefit	Net benefit / yr	Payback	ROI %
Conservative (10%)	IDR 1.2B	+876M	~10 mo	117%
Base (20%)	IDR 2.4B	+2,076M	~4 mo	277%
Upside (30%)	IDR 3.6B	+3,276M	~3 mo	437%

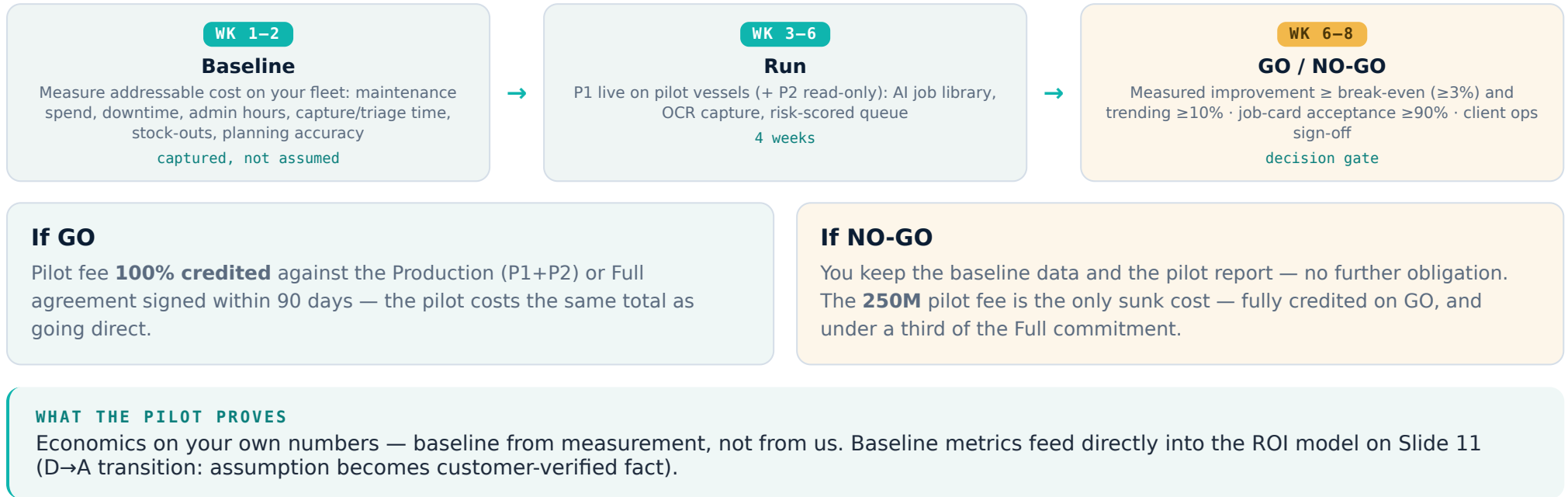
One program, one comparison: your current baseline vs FleetCare Full.

SOURCES

1. Benchmark ranges: McKinsey 2020 · ATS 2025 · PRIME Marine 2026 — 20–38% corrective-maintenance reduction, 25–40% downtime reduction; cross-industry/ocean-going, transferability validated in pilot. Baseline = **illustrative Makna scenario**, replaced by pilot measurement (D→A).

12 Pilot — Prove Economics, Not Just Software

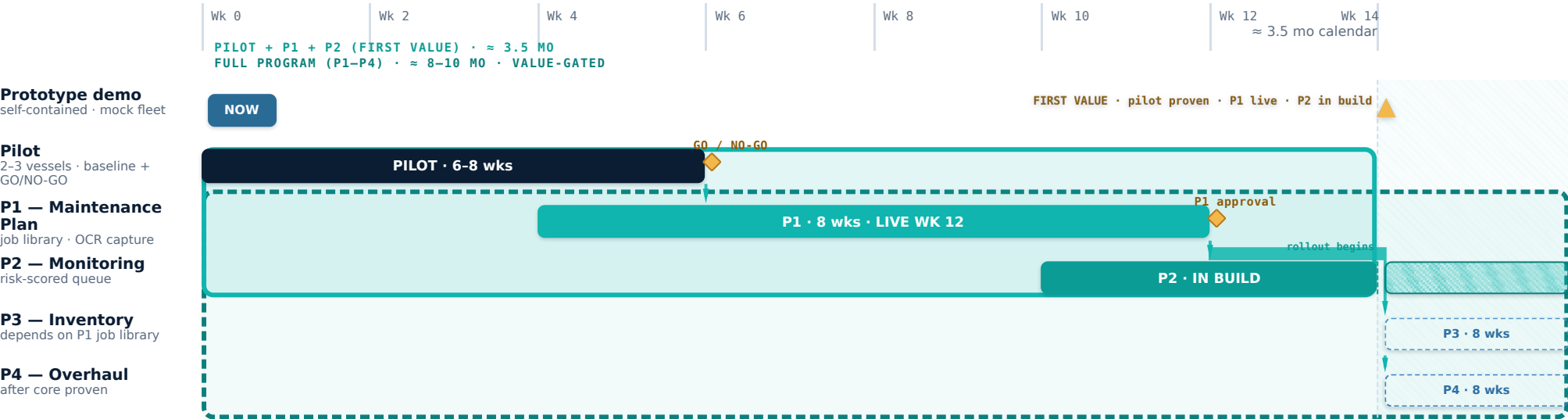
A **6-8 week production pilot** on 2-3 vessels — **fully creditable**, with an explicit GO/NO-GO. The lowest-risk way to de-risk a 750M+ program.



Two tracks: lightweight 4-6 week proof-of-value (capability demo) or the recommended 6-8 week production pilot (measured baseline + GO/NO-GO; trend basis ≈ 5 weeks of measurement). Both **IDR 250M flat**, 50/50 payment.

13 Implementation Roadmap

Prototype-first, phased, **working demos at every gate** — see it working on your data before committing.



◆ gate → dependency | rollout begins (27 vessels) ▨ beyond axis · value-gated ▲ FIRST VALUE

Schedule assumption: 3.5-month first value assumes client data (OEM manuals, registers) at kickoff and ≤1-wk review gates — data availability is the critical-path risk. Full P1-P4 ≈ 8-10 months; P3/P4 are value-gated expansion, not committed dates. Conditions: client pre-commit for the wk-4 P1 start, else first value ≈ wk 14-16 (still ≈ 3.5-4 mo).

□ **Timeline depends on the availability of discussion and data submission.**

Honesty: the 6-wk pilot is an adoption/feasibility gate, not full break-even — economics are proven with P1+P2 live data.

Human approval points

Every phase gate includes explicit human approval: job cards reviewed, plans approved, work orders signed, expenditure authorised.

Prototype-first

A working, self-contained prototype is available now — a live demo can be arranged for your team before any commitment.

14 Commercial Proposal

Three clear choices. Start small, **credit everything**, scale when value is proven. All prices IDR, excl. VAT/PPN (11%) · valid 90 days · FX illustration ≈ IDR 18,000/USD (11 Aug 2026).

Option	Scope	Implementation (one-time)	Subscription	Notes
1 · Pilot	2–3 vessels · 6–8 wks production pilot	IDR 250M flat	Included during pilot	100% creditable vs Production or Full (90 days) · 50/50 payment
2 · Production RECOMMENDED	P1 + P2 — Plan & Monitor · 27 vessels	IDR 375M	IDR 350k–1.0M per vessel/mo (options C–A) ≈ 9.45–27M/mo fleet (×27 vessels)	Year-one ≈ IDR 618M (Option B) · payback ~3–8 mo
3 · Full	P1–P4 · 27 vessels	IDR 750M committed, after discount excl. VAT/PPN (11%) · vs IDR 850M staged	IDR 450k–1.4M per vessel/mo (options C–A) ≈ 12.15–37.8M/mo fleet (×27 vessels)	Year-one ≈ IDR 1.1B (Option B) · payback ~4–7 mo

THE COMMITMENT ANCHOR

Full scope, committed now: IDR 750M — save IDR 100M vs the 850M staged price. Buy all four phases now and save; buy phase-by-phase (Production 375M + P3/P4 expansion 475M) and pay 850M. One number per scope, no arithmetic. All prices exclude VAT/PPN (11%).

Subscription = per-vessel/month rate (Option A/B/C) × 27 vessels — see Pricing Schedule (next page). Training premium add-on: 32M/phase · 55M P1+P2 · 87M P1–P3 · 100M full. Intermediate scopes (single phases, Enterprise P1–P3) quoted on request — see Pricing Schedules.

Pilot credit

The full **IDR 250M pilot fee is credited 100%** against Production or Full signed within 90 days — the pilot costs the same total as going direct.

Ownership & billing detail → appendix

Option A fully-managed · B BYO AI keys (recommended) · C client-hosted; fixed vs hybrid billing; AI item/job-card charges; annual prepay 12-for-10; full schedules — in Appendix D.

COST-FLOOR SANITY (OUR SIDE)

Platform running costs ≈ IDR 1.0–2.6M/mo (AI + hosting, full-fleet default) vs the lowest subscription tier (IDR 9.45M/mo) — ≈ 3.6× headroom even at the lowest tier.

◆ Pricing Schedules

D0 · COMMITMENT PRICING (ONE-TIME IMPLEMENTATION)

Package	Scope	Price you pay
Pilot	2-3 vessels · 6-8 wks production pilot	IDR 250M flat
Production RECOMMENDED	P1 + P2 — Plan & Monitor · 27 vessels	IDR 375M
Full — committed	P1-P4 · 27 vessels · commit now	IDR 750M — save 100M vs staged
Full — staged	P1+P2 now (375M) + P3/P4 expansion (475M)	IDR 850M

Full scope, committed now: IDR 750M — save IDR 100M vs the 850M staged price. Intermediate scopes quoted on request. Training premium: 32M/phase · 55M P1+P2 · 87M P1-P3 · 100M full. All prices IDR, excl. VAT/PPN (11%) · valid 90 days · FX ≈ IDR 18,000/USD (11 Aug 2026).

D1 · SUBSCRIPTION BY OPTION & TIER (PER VESSEL / MONTH)

Tier	Option A — Fully Managed	Option B — BYO AI Keys RECOMMENDED	Option C — Client-Hosted
Basic (P1)	IDR 700k	IDR 500k	IDR 250k
Standard (P1+P2)	IDR 1.0M	IDR 750k	IDR 350k
Enterprise / Full (P1-P4)	IDR 1.4M	IDR 1.0M	IDR 450k

D2 · BILLING, TERMS & OWNERSHIP

- **Annual prepay (12-for-10):** Std B 202.5M/yr · Full B 270M/yr · Std A 270M · Full A 378M
- **Fixed plans:** up to 8,000 AI-processed items/mo fleet-wide included; overage IDR 750/item
- **Hybrid:** base IDR 450k/vessel/mo + IDR 750/AI item + IDR 2,500/AI job card
- **Payment:** implementation 30/40/30 per phase (40% at UAT incl. AI acceptance); pilot 50/50; subscription monthly in advance or annual prepay
- **Included:** 99.5% uptime SLA (A/B) · daily backups · AI model updates · support (ID+EN, next-business-day) · up to 100 users (+IDR 25k/user/mo) · extra vessels at 85% of per-vessel rate · data export
- **Ownership options:** A fully-managed · B BYO AI keys (recommended — cost transparency, model flexibility) · C client-hosted (strongest residency)
- **Excludes:** VAT/PPN (11%) · valid 90 days · FX ≈ IDR 18,000/USD (11 Aug 2026)

15 Our AI Agents — the Team That Builds It, and the Team That Runs It

Two teams, one loop: the **delivery team** builds the system; the **predictive analysis team** makes it smarter on your live data — **humans in command**.

Team composition and agent roles may evolve following scoping discussions — the delivery model is designed to adapt to your fleet's priorities.

A • DELIVERY TEAM — BUILDS THE PLATFORM

Developer agent

Builds the platform phase by phase — full-stack code, API, database, OCR/AI routing; ships working modules with automated tests.

UI/UX agent

Designs the photo-first, crew-first experience — capture flows, dashboards, offline mobile layouts; prototypes before build.

QA agent

Gates every release against acceptance criteria (incl. AI accuracy targets); verifies offline sync, audit integrity, approval gates.

Data analyst agent

Turns OEM manuals, Excel job lists & registers into the job library, pilot baseline and KPI dashboards; runs the ROI model on your numbers.

Technical expert agent

Holds the domain bar — ISM/class/OEM correctness of AI outputs, model behaviour and fallbacks, escalations.

Every delivery-team output is reviewed and approved by human engineers before delivery.

B • PREDICTIVE ANALYSIS TEAM — RUNS ON YOUR LIVE DATA ONCE THE SYSTEM IS LIVE

Anomaly detection agent

Watches readings & oil data; flags drift and impossible entries — day one on statistical baselines.

Degradation analyst agent

Trends oil condition & running hours; quantifies wear per engine; degradation curves and useful-life bands.

Failure risk scorer agent

Combines anomaly + degradation + operating context into per-vessel risk scores; queues prioritised by risk.

Predictive forecaster agent

Failure, spares & budget forecasts; supervised models as labelled history accumulates (≥ 12 months).

Recommendation engine agent

Drafts actions — inspect/sample/replace, work orders, reorders, job-to-spares — **every recommendation requires human approval**.

Detect → analyse → score → forecast → recommend — every output human-approved: **alerts may be automatic, actions never are**.

HOW THEY RELATE — ONE CONTINUOUS LOOP

Build → deploy → predict → improve: the delivery team builds the system; the predictive team makes it smarter on your data. The same loop runs inside the product and in how we build it — humans in command at every step.

16 Next Steps

A low-risk conversation and a pilot that **pays for itself**.

- 1 Review & alignment discussion**
We walk through the proposal, demo the prototype, and align on priorities, success metrics and pilot vessels.
 - 2 Confirm pilot vessels & data sources**
We agree the pilot vessel set, data sources (OEM manuals, job lists), and the first working demo target.
 - 3 Agreement & kickoff**
Commercial terms confirmed in IDR, phase plan locked, discovery begins.
 - 4 Pilot begins**
Working demo within weeks — not months. Baseline captured week 1-2; GO/NO-GO at week 10-12.
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Makna — AI Solutions for Indonesian Industry

A working, self-contained prototype is available — a live demo can be arranged for your team. This document is confidential and intended solely for the recipient of this proposal. It contains proprietary information and may not be distributed without the written consent of Makna. All figures subject to final agreement. **Risk note:** pilot first, 90-day warranty per phase, data export included.

A Appendix — Technical Detail

A · INFRASTRUCTURE ECONOMICS

Tier	Spec	Monthly (IDR, ≈)	Providers	When to use
Lean	4 vCPU · 16 GB — Postgres+pgvector on-box	250–500k	Hetzner CX42 (SG) · IDCloudHost · DO	Pilot / dev only (≤10 vessels)
Standard	8 vCPU · 16 GB + object storage	300–800k	Hetzner CX42 (SG) · IDCloudHost · DO	Pilot minimum spec / small fleet
Production / HA RECOMMENDED	8–16 vCPU · 32 GB + managed DB + CDN/WAF	1.0–2.5M	AWS Jakarta · IDCloudHost EPYC · Hetzner + managed PG · Hetzner AX41 (cost-optimised)	Default for the full 27-vessel fleet (validated spec)

Validated baseline (10 Aug 2026, revised): 16 GB RAM floor (pilot/dev) · 32 GB production/HA (15 Gi live stack). Indonesian-region default; cost-optimised Hetzner dedicated (AX41 €42.30–49/mo ≈ IDR 740–860k/mo) only if residency waived.

B · MODEL ROUTING & SELECTION (INTERNAL DETAIL — MODEL-AGNOSTIC BY DESIGN)

The value proposition sells capabilities, not vendor names; this routing is an implementation detail that swaps freely. Verified list prices Aug 2026.

Task	Model / approach	Role
Text / agents (scheduling, triage, forecasting, RAG)	DeepSeek V4 Flash	DEFAULT
Clean captures — meters, gauge digits, stock labels	Classical OCR (free, on-box)	DEFAULT
Messy docs — oil reports, defect photos	Gemini Flash-Lite class	DEFAULT
Hard docs / low confidence	Gemini 2.5 → 3.6 Flash	ESCALATE

AI opex ≈ IDR 25–60k/month @27 vessels (text ≈ 15–30k · classical OCR ≈ 0–5k · vision-LLM ≈ 10–25k; ~25M text tokens, ~400 OCR + ~200 vision photos/mo) — even a 5× spike stays under IDR 300k/mo. **Optional add-on (Phase 2+):** air-gap/offline sites can run an on-prem vision box — **local vision model, under review (model-agnostic)** — quoted separately; classical OCR covers clean offline captures today.

C · SECURITY & DATA CHECKLIST

Encryption — TLS in transit, encryption at rest

RBAC + access control (crew / chief engineer / superintendent / admin, least privilege, SSO-ready)

Audit logs — append-only, immutable, exportable per vessel

Tenant isolation — row-level security, per-client separation

Backup / DR — daily backups, point-in-time recovery

Retention — configurable policies for photos & documents

Data export — full export on request (client owns their data)

AI-provider handling — only necessary content sent; **no customer data used for training (contractual)**

Human approval — AI outputs require approval before becoming official records

All controls standard. Designed to support Indonesian data protection requirements (UU PDP); Indonesian-region hosting option (AWS Jakarta ap-southeast-3).

E Appendix — Sources & Citations

Claim classes: A customer-verified fact (created by the pilot) · B external benchmark · C Makna estimate · D illustrative assumption · E unsupported. Current deck: A=0 · B=3 · C=5 · D=1 · E=0.

SOURCES — EXECUTIVE SUMMARY & ROI

- Downtime reduction (25-40% / up to 40%):** McKinsey & Company (2020), “Prediction at scale” — mckinsey.com (30-50%) B ; PRIME Marine (2026), Orion Ship Management case — primemarine.com (40%) B . *Caveat: cross-industry / ocean-going, not tug & barge specific — validated in pilot.*
- Maintenance-cost / corrective-work reduction (20-38%):** McKinsey (2020) — 18-25%; ATS (2025) — up to 40% vs reactive — advancedtech.com; PRIME Marine (2026) — 38% corrective reduction B .
“Corrective-reduction” ≠ total maintenance spend.
- Advance warning (2-4 wks):** iFactory (2026); OXMaint (2025) — vendor-published examples B — set as **pilot target KPI**, not a promise.
- Annual baseline IDR 8-12B: Makna illustrative scenario** D — replaced by pilot-measured baseline.
- Major tug overhaul IDR 1-3B: Makna estimate** from marine-diesel overhaul benchmarks (Neptunus Power 2025; Con-tractor 2026) + off-hire/charter economics C .
- Incumbent ERP USD 100k-500k+ / 12-24 months: Makna market estimates** — vendors (DNV, MariApps, SERTICA) do not publish pricing C . Vendor documentation: DNV ShipManager · smartPAL · SERTICA.
- AI opex 25-60k/mo & hosting tiers:** Makna engineering model on verified Aug 2026 list prices C — volume assumptions stated in Appendix B.
- ROI scenarios & break-even:** Makna model on pilot-measured baseline D → A via pilot.

F · “WHAT FLEETCARE DOES NOT DO” — EXTENDED

- FleetCare **is** the maintenance management system — it replaces spreadsheets, paper and clipboard processes; it does not replace class-required statutory processes or your people's engineering judgment
- Does not change, waive, or interpret class or statutory requirements
- Does not assume ISM responsibilities — supports the workflows; the operator retains formal compliance responsibility
- Does not replace engineering judgment — AI recommends; engineers decide
- No automatic authorisation of critical maintenance, major expenditure, or safety-critical approvals
- No automatic purchasing — reorder suggestions require approval
- No deletion or modification of audit records (append-only)
- No data sharing beyond configured AI providers — contractual no-training-on-customer-data
- Alerts and drafts may be generated automatically; **actions never are**

CFO TEST — ALL 10 QUESTIONS ANSWERED

Why spend · why not the FMS · what if AI is wrong · how much saved · how fast · what happens to data · lock-in · model changes · what am I paying for · why trust Makna — each is answered in Slides 2-16 and this appendix. Details on request.

17 Your Next Move

Start with a low-risk pilot — **100% creditable**, with a clear GO/NO-GO.
The lowest-risk way to validate a 750M+ program on your own numbers.

FLEETCARE AI

Photograph and move on — AI assists, people decide.

Makna — agentic AI solutions that give meaning to Indonesian industry.

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