PEMA | PROTECTED EXTERNAL MARITIME AREA

CITADEL APPROVED

Crew protection and continuity for merchant vessels

Shipowner proposal | For transits and port calls exposed to drone and missile threats



EARLIER WARNING

Combine surveillance sources and crew alerts.

EQUIPPED REFUGE

Move people to prepared protected spaces.

ESSENTIAL CONTINUITY

Retain surveillance, power and communications.

DESIGN BASIS	2 × 20 ft modules	16 crew + 2 to 4 operators*	24 h emergency endurance*

PORTS / PEMA · PIMA

* Design targets; layout and load profile to be verified.

CITADEL APPROVED

THE THREAT TODAY

Crews are under threat on three fronts.

BLACK SEA

570+

ships attacked since January 2026; at least 40 seafarers killed.

FT, citing Ambrey and the IMO

RED SEA

6+

killed in missile strikes on the cargo ship Tihamah and its rescue, 11 Aug 2026.

Al Jazeera, citing Yemeni officials

SOMALI BASIN

8

ships hijacked, Jan to Sep 2026; 105 crew affected, 90 held hostage.

ICC IMB; Maritime Executive

up to 2% of ship value: Black Sea war-risk cover for a port call, from about 1% two weeks earlier. Insurers price what crews face.

Reuters via Baird Maritime, 5 Aug 2026

CITADEL APPROVED

THE STANDARD

A shelter has a job description. PEMA fits it.

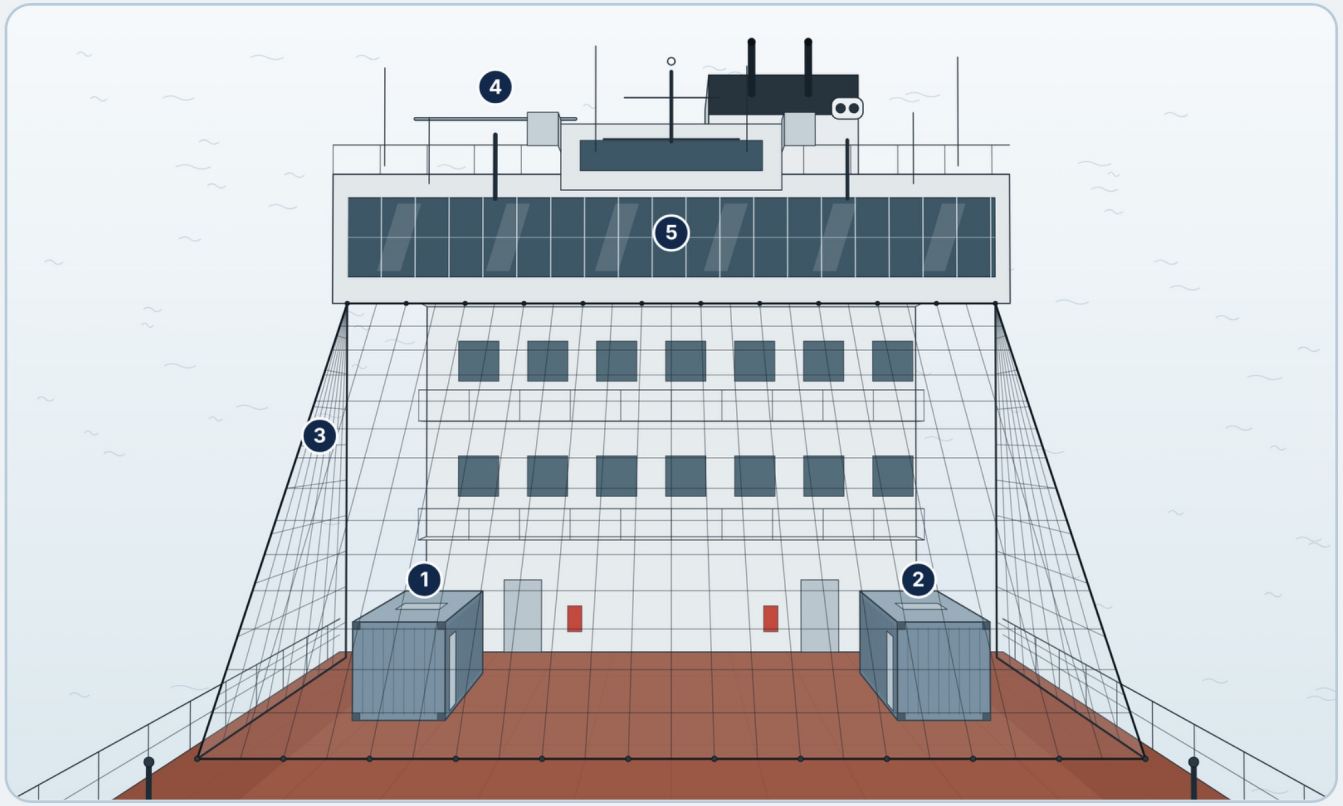
Rows 1 to 3 follow the citadel guidance in BMP5. Row 4 is our own design target.

Resists forced entry	Armour plate on all six sides, armoured door, roof hatch and air intake. Protection level to your specification.
Two-way communication	Intercom and comms panels in both modules, with a link to the bridge.
Food, water, sanitation	Stores in lockers, water tank and washbasin, bio-toilet with sealed cartridge.
Staying power	Emergency battery and filtered overpressure air. Our target: 24 hours on essential loads.

CITADEL APPROVED

THE SOLUTION

Two armoured modules, one protected area.



1. **PEMA-1**
   Control module, 2 to 4 operators
2. **PEMA-2**
   Crew shelter, 16 people
3. **Protective net**
   From the bridge to the deck
4. **Mast sensors**
   Radar, EO/IR, RF, acoustic
5. **Bridge**
   Unchanged, faces the bow

Schematic, not to scale. Positions are set per vessel.

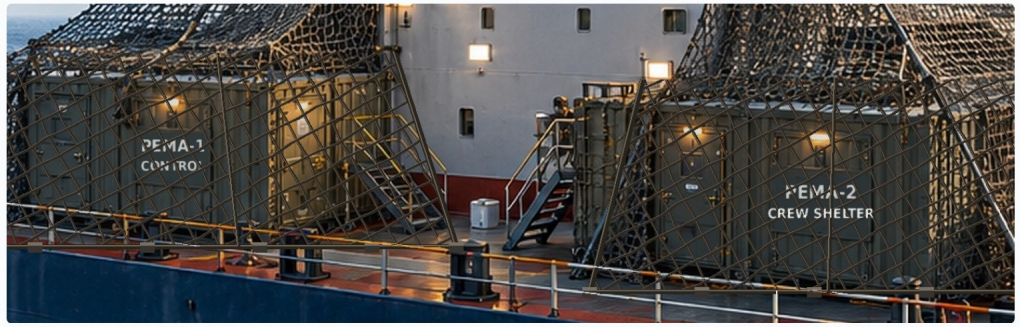
CITADEL APPROVED

ARRANGEMENT

Outside on deck. Or within the vessel.

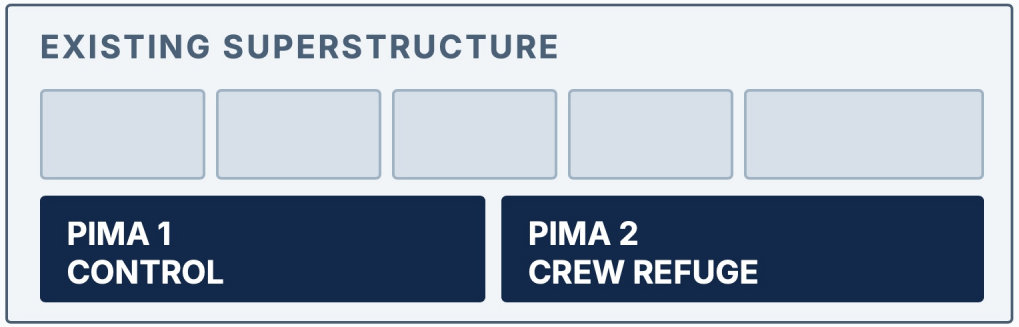
We choose the arrangement after reviewing the ship, crew routes and available structural capacity.

A / PEMA · PROTECTED EXTERNAL MARITIME AREA



- Two armoured 20 ft modules on the main deck
- Protective net from the bridge to the deck, over both
- No hull cutting; modules can move to the next vessel

B / PIMA · PROTECTED INTERNAL MARITIME AREA



- Selected spaces inside the superstructure, reinforced
- Same functions: control room and crew refuge
- Air, power, comms and sanitation fitted inside

PIMA inside the ship takes more engineering on board than PEMA, and our designs for it are ready too.

CITADEL APPROVED

HOW IT WORKS

From warning to shelter in four steps.

01
DETECT
Radar, EO/IR, RF scanner and acoustic sensors watch the approaches, day and night.

02
ASSESS
Two to four operators in PEMA-1 confirm the threat and brief the Master.

03
SHELTER
On the Master's order the crew moves to PEMA-2: seats and bunks for sixteen.

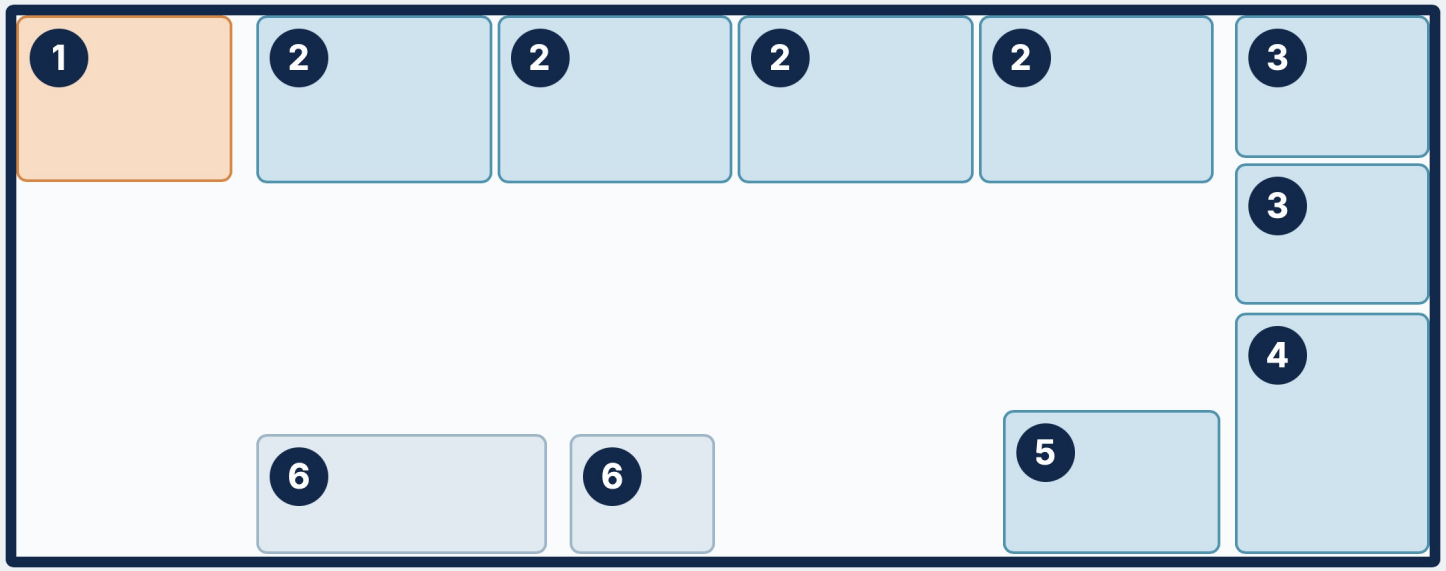
04
CONTINUE
Backup power and communications keep critical vessel functions running.

Sensors and countermeasures from leading European manufacturers: certified and proven in real conditions. Configured per vessel and route.

CITADEL APPROVED

PEMA-1 | CONTROL MODULE (20 FT)

See everything from inside the armour.



1. Emergency battery for life support
2. Operator stations, 2 main and 2 auxiliary
3. Racks: servers, recording, network
4. UPS and IT battery
5. Filtered air, overpressure fan
6. Lockers, first aid, extinguisher

4 operator stations

8-display monitor wall

2 server racks

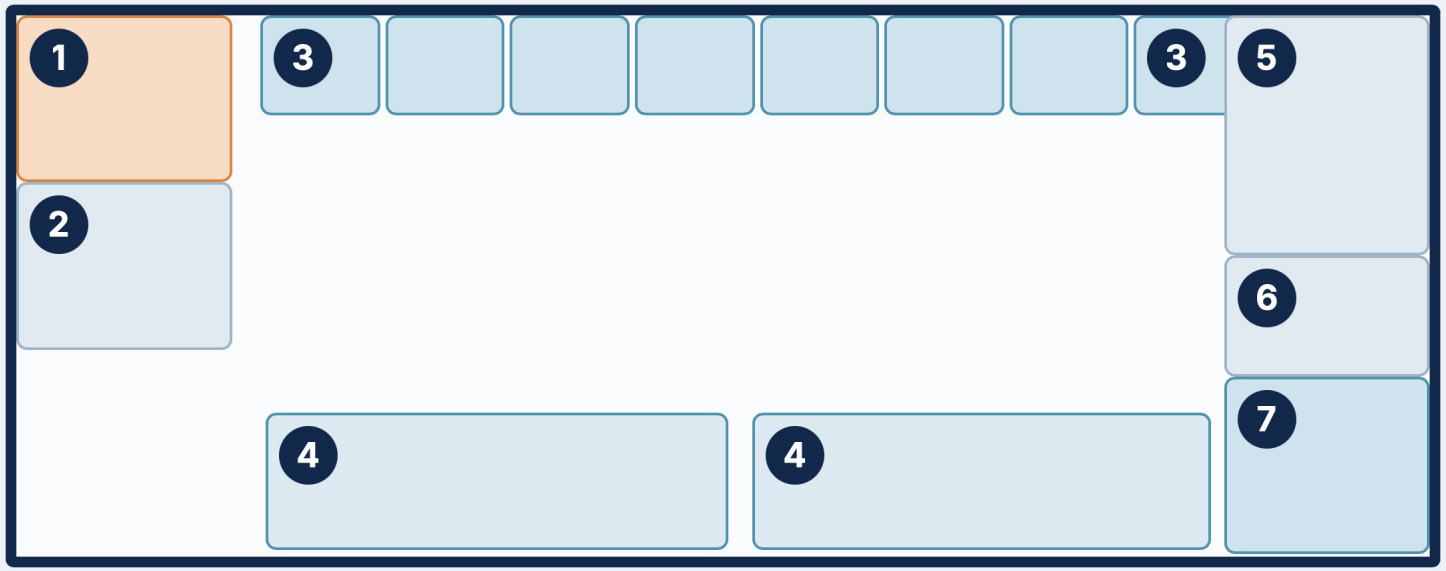


Concept visualisation

CITADEL APPROVED

PEMA-2 | CREW SHELTER MODULE (20 FT)

Shelter for sixteen, built to wait.



1. Emergency battery cabinet
2. Medical cabinet and comms
3. Suspended folding seats, 16 in all
4. Hanging folding bunks, 4 in all
5. Bio-toilet, sealed cartridge
6. Washbasin and water tank
7. Filter and overpressure fan

16 suspended seats

4 hanging bunks

3+ days of stores



Concept visualisation

CITADEL APPROVED

LIFE SUPPORT

Air, power and cables are part of the design.

AIR · FILTERED, AT SLIGHT OVERPRESSURE

Armoured intake hood → Armoured damper → Filter bank → Overpressure fan → **Protected space** → Pressure-relief valve

POWER · EMERGENCY BATTERY, TARGET 24 H ON ESSENTIAL LOADS

Ship main and emergency supply → Switchboard → Charger and battery management → **Emergency battery** → Light, fan, comms, toilet exhaust

CABLES · SEALED ENTRIES, ARMOUR STAYS INTACT

Sealed entries in wall frame and roof plate → Trays to stations and racks → Link between the two modules → Intercom to the bridge

Targets and routes are indicative and are confirmed in design with the factory.

CITADEL APPROVED

INSTALLATION

Bolt-on, not built-in.

1
Survey the vessel

2
Prepare the deck position

3
Lift and lash to ISO castings

4
Connect air, power and data

5
Drill the crew

No hull cutting

Modules stand on the main deck. Any local deck reinforcement comes from the vessel survey.

Standard handling

ISO corner castings, so a crane lifts and lashes them like any 20 ft container.

Moves with the trade

After a survey, the same modules can be fitted to the next vessel.

WHAT IT CHANGES FOR THE OWNER

A real shelter, without a shipyard job.

A place for the whole crew

Sixteen seats, four bunks, clean air, power, water and a toilet. Ready when the alarm sounds.

Eyes on the situation

Two to four operators watch the sensors and the approaches from behind armour.

The ship stays in service

Fitted on deck with no hull cutting, so there is no yard job inside the hull.

One design, whole fleet

Identical modules, shared spares and drills. Move them when your routes change.

CITADEL APPROVED

APPLICATION AND OPTIONS

Configured for your vessel and your route.

APPLICATION

Commercial vessels transiting, or calling at ports, in high-risk regions.

For example: Black Sea, Sea of Azov, Persian Gulf, Red Sea.

Goal: protect the crew and keep critical functions running under drone or missile attack.

PROTECTIVE DESIGN

- Steel or composite net from the bridge down to the deck
- Two modular 20 ft containers
- Ballistic and blast protection to your specification
- Escape routes and life-saving appliances stay accessible

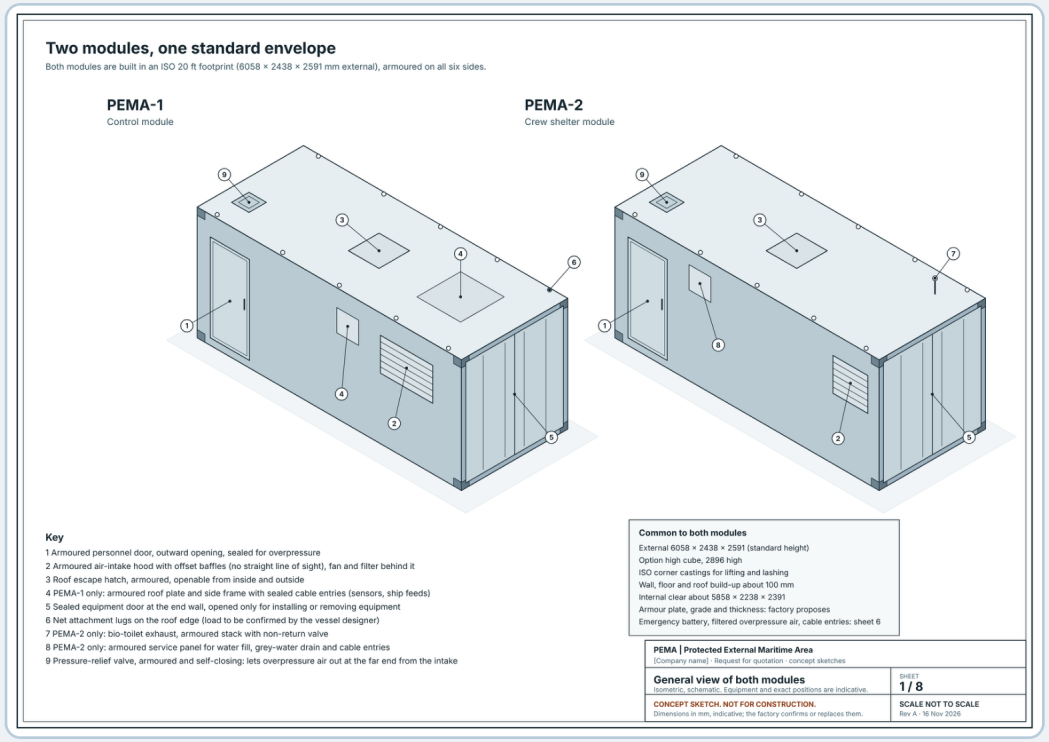
OPTIONS

- Additional sensors
- EW integration (jamming, spoofing)
- Protection against surface drones
- Custom layout and capacity
- Integration with existing vessel systems

DETECTION AND COUNTERMEASURES Drone detection and, where required, suppression equipment from leading European manufacturers. All certified and proven in real conditions.

WHERE WE ARE

A built prototype, on certified steel.



Sheet 1 of 8: general view of both modules.

Prototype built

Built to our drawings. Every vessel set starts from it.

Certified ballistic steel

All ballistic steel used on the prototype has passed testing. Certificates are available.

Full drawing set

Both modules, interiors, air, power and cables, shell, and the arrangement on a vessel.

CITADEL APPROVED

THE PATH TO YOUR FIRST VESSEL

Built. Certified. Ready for your first ship.

Done

Prototype built

Built to our drawings: the basis for every vessel set.

Done

Certified steel

All ballistic steel on the prototype tested, with certificates.

Ready

Production

Four partner sites ready to build PEMA and PIMA.

Next

Your first ship

We survey it and build your set from the prototype.

PRODUCTION PARTNERS · WE BUILD CLOSE TO YOUR FLEET, AT SHORT NOTICE

4
partner production sites

- **Europe**
- **Persian Gulf**
- **Central and South America**
- **Asia**

CITADEL APPROVED

NEXT STEP

Start with your first ship.

Give us your first ship. We come on board, survey it, and build your PEMA or PIMA set from our certified prototype, around your threat assessment and under NDA.

What we need from you

The vessel general arrangement and deck data, your threat assessment, and a deck position for two modules or the spaces available inside.

Talk to us

LAVR UK

CONTACT PERSON

Dmytro Petrenko, Project Director

+49 176 21181180 · D.Petrenko@lavr-uk.com

www.lavr-uk.com

Special terms for CITADEL members.