ENSTA BRETAGNE LECTURE • KEYNOTE ADDRESS

Access to the Global Ocean & Applied Physics

Bypassing impossible barriers: from 20-hour disposable vectors to transatlantic self-deployment.

Physics-First Engineering • 40-Minute Masterclass

THE GENESIS • AUTUMN 1967

Porquerolles: Where the Subsurface Imperative Began



> **A seven-year-old boy on this stone jetty meeting Lieutenant de Vaisseau André Fauve—who, three months later, vanished into the abyss with all fifty-two crewmen.**

Commandant Fauve & La Minerve (S647): Lost on 27 January 1968 under 2,300 meters of water off Cape Sicié.

Zero Compromise: Deep-sea mechanics and hydrostatic pressure forgive no design shortcut.

The Unmanned Mandate: Taking human lives out of harm's way through autonomous vectors.

TRACK RECORD

Breaking Rules to Open Frontiers

Deep Space & Telecom

Giotto, Galileo, cellular 0G architectures.

First Modern Passive Radar

Revisiting 1943 radar principles.

Global ATM & VoIP

Transpac voice packetisation network.

Subsurface Systems

Naval innovation and sonar superiority.

CORE ENGINEERING PHILOSOPHY

Bypassing Impossible Barriers

Never attack a theoretical wall head-on. Exploit the side door.

Additive structuring: 3D millimeter-scale internal material control.

Black hole absorption: Dissipate incident RF and acoustic energy.

Fluid flow cloaking: Bend incident wavefields smoothly around hulls.



Engineered Matter

Geometry replaces mass to dictate acoustic and electromagnetic properties.

THE AUSS GENESIS

The 2016 Thales Commando Challenge

Lean Execution

30 engineers in rapid prototyping sprints.

Cost Disruption

€5M allocated instead of €20M.

Compressed Cycle

18 months delivered versus 5 years.

Proven Sea Time

350 operating hours prior to Euronaval.

OPERATIONAL PROTOTYPING

SerennDeep: From Workshop Rig to Heavy Sea Deployments

600 × 400

Full-Scale Vector: Modular carbon-composite pressure hull & sensor bay.



Internal Mechanics: Multi-axis steerable blade rings & hydro-acoustic seals.



High-Sea Qualification: 350+ certified hours in Atlantic conditions.

EURONAVAL 2016 PARADIGM CONFLICT

Doctrinal Gridlock: Autonomous vs Capital Ships

1980–2016 LEGACY DOCTRINE

Capital Ship Hegemony

Multi-billion-euro high-tonnage vessels. The consensus rejected unmanned autonomy as unsuited to high-intensity naval conflicts.

Result: Zero adoption of autonomous strike doctrines.

THE AUTONOMOUS VISION

Persistent Multi-Domain Vectors

Autonomous hybrid platforms across mine countermeasures, ASW, and rapid environment evaluation without crewed escorts.

Outcome: Re-emerged as the dominant modern combat model.

APPLIED PHYSICS BENCHMARK

Redesigning the Global Sonar Standard

20×

Mass, unit cost, and handling footprint reduction

Applying modern composite materials and computing power to proven acoustic principles.

2012: The End of the Traditional Naval World



PHASE 2 • THE MONUMENTAL ILLUSION

12,500 Tons of Heritage Dogma

The flagship *Moskva*: 500 crew, 16 Vulkan cruise missiles. The undisputed symbol of capital surface supremacy.

ATTRITION PARADIGM

The Vector as a 20-Hour Taxi: Primacy of the End State



> **The hull is a disposable delivery truck. The value is strictly in the jamming-resilient C2 and terminal strike effect.**

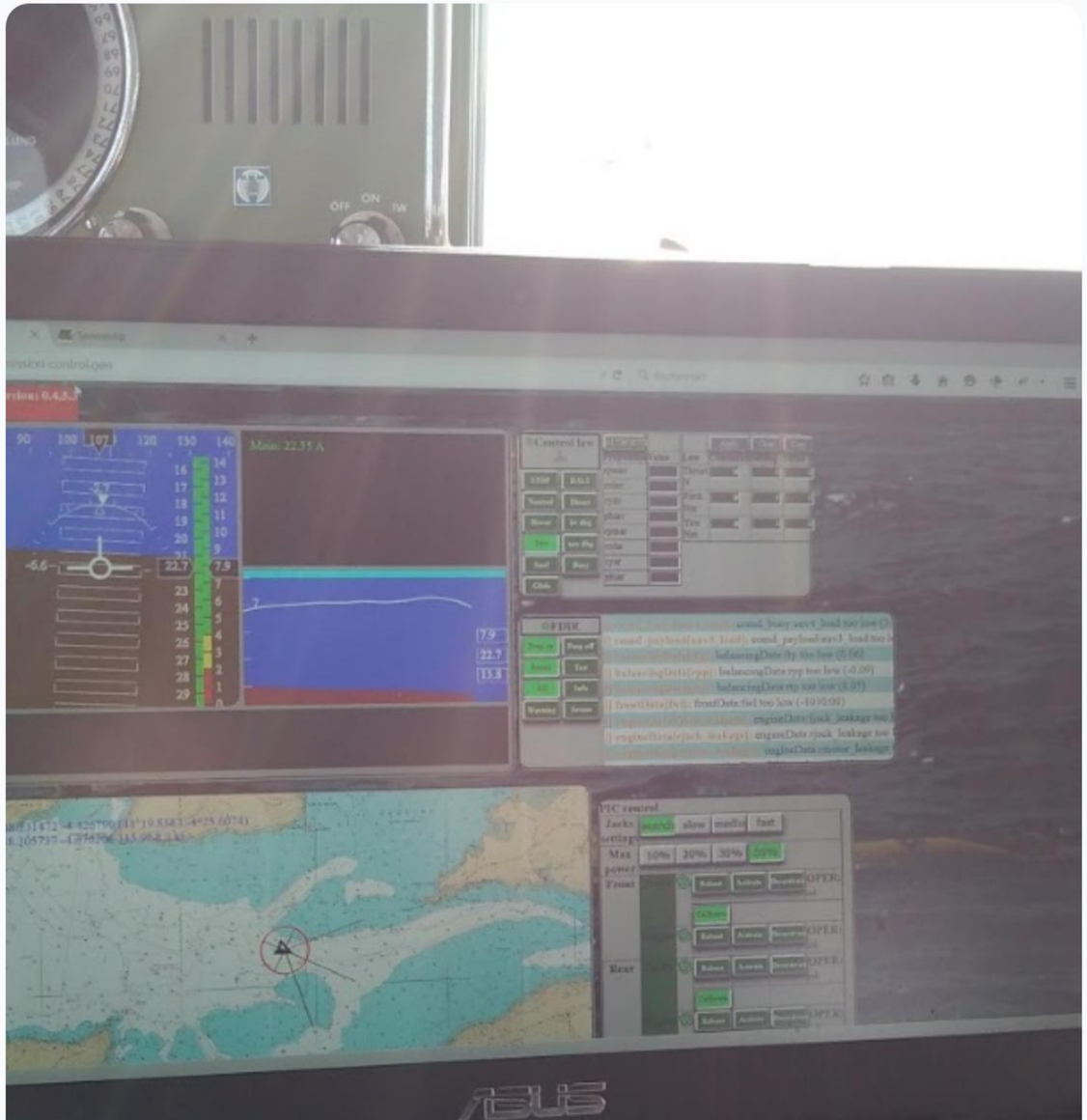
No 10-year fatigue: Designed for a 20-hour operational sortie.

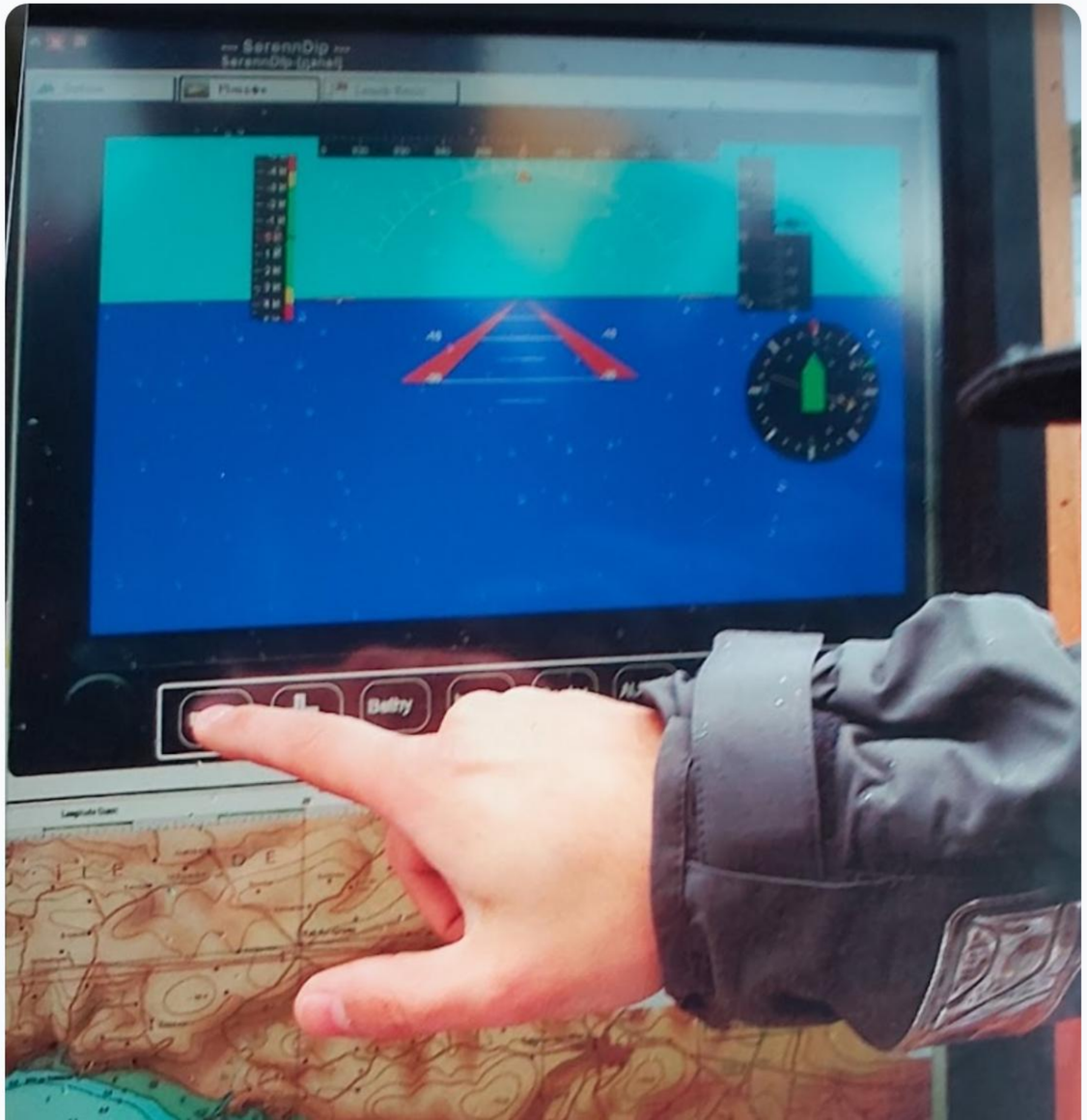
End-State Victory: If lost mid-course but depletes enemy missile silos, the strategic mission is 100% successful.

Mass production: Low-cost composite structures produced at industrial pace.

COMMAND & CONTROL SOFTWARE

Fielded C2: Tactical Overlays & Subsurface Telemetry





ENGINEERING CAUTIONARY STUDY

Titan Implosion: When Sensors Cannot Cheat Physics

ADIABATIC CATASTROPHE

18× Sun

Interior air temperature reached eighteen times solar surface heat during instantaneous 1-millisecond collapse.

The Failure of Structural Monitoring

Acoustic HUMS sensors cannot compensate for composite buckling instability under 400 bars.

The Applied Physics Rule: Sensors record catastrophic failure; correct structural mechanics prevents it.

METAMATERIALS & FLUID CONTROL

Auxetics and Active Hydrodynamic Cloaking

Auxetic Lattices

Negative Poisson ratio structures to dissipate deep pressure.

Depth Allowances

Consumable dive potential renewed via sacrificial core inserts.

Boundary Layer Control

Active fluid management cancelling skin friction drag.

BIONIC FLUID DYNAMICS & ACTIVE CLOAKING

Beyond Torpedo Profiles: Integrated Boundary-Layer Shaping



Hydrodynamic Invisibility in Fluid Streams

Moving away from skin-friction-heavy slender bodies towards bionic geometries and distributed thrust manifolds.

Boundary-Layer Energising: Surface micro-texturing and flow-tripping patterns to suppress turbulent separation.

Distributed Multi-Jet Ejection: Multi-nozzle clustered base arrays for uniform wake filling and drag cancellation.

Deep-Sea Potential: Tested to 3,000m operational depth standards with modular hydrodynamic shells.

ECONOMIC & OPERATIONAL PARADIGM

Redefining Support Vessels: Moving Beyond the Mothership



Integrating primary support vessel functions directly into the autonomous vector.

Rethinking logistics: Transition away from €50k/day dedicated 80m escort vessels.

Transatlantic endurance: Autonomous trans-oceanic self-deployment.

Hybrid versatility: Unmanned hubs handling launch, monitoring, and multi-domain data relay.

ENSTA BRETAGNE • KEYNOTE CONCLUSION

”Do not fall in love with your hulls. Focus on the flows, the matter, and the end state.”

Applied physics does not negotiate. It is our job to master it.

Questions & Discussion

Image Sources



https://www.mauvais-genres.com/47661-thickbox_default/2012-french-movie-poster-47×63-in-2009-roland-emmerich-john-cusack.jpg

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