



船舶暨海洋產業研發中心 50週年紀念專刊

馭浪金禧

築夢未來海洋

50

THE 50TH
ANNIVERSARY
SPECIAL ISSUE



財團
法人 船舶暨海洋產業研發中心
Ship and Ocean Industries R&D Center



馭浪金禧

築夢未來海洋

50

THE 50TH
ANNIVERSARY
SPECIAL ISSUE



CH.1 時光長河 五十載技術演進

The River of Time: Five Decades of Technological Evolution

- 18 船舶暨海洋產業研發中心簡介
各司其職 發揮綜效
SOIC Organizational Overview
Each Division in Its Role, Generating Collective Synergy
- 20 榮耀獎項 Awards and Honors
- 24 邁向國際創新會展舞臺
船舶中心以研發實力深獲肯定
Advancing onto the International Innovation Exhibition Stage
SOIC's R&D Capabilities Earn Widespread Recognition
- 28 大事紀 Milestones and Chronicle of Key Events

序言 Preface

- 06 馭浪五十年 開展海洋新局
Fifty Years of Riding the Waves: Pioneering a New Era for the Ocean
- 08 以工程實力為本 讓技術航向現場
Rooted in Engineering Excellence, Launching Technology into the Field
- 10 祝賀詞 Congratulations

CH.2 國防基石 國艦國造新里程

Foundation of National Defense: A New Milestone in Indigenous Defense Warships

- 40 從設計監造到技術文件
推助國艦國造為國防基石
From Design and Supervision to Technical Documentation:
Advancing Taiwan's Indigenous Defense Warships as a Pillar of National Defense
- 42 專業監造 助力海巡新艦成軍
引領各型艦艇技術升級
Guardians of the Blueprint: How Professional Supervision
Empowers Taiwan's New Coast Guard Fleet
- 44 海事教育實習船 培育航向大海的人才
統籌御風輪 打造海上校園
Cultivating Talent for the High Seas: The "Wind Rider" Project
- 46 守護國家能源命脈
油品化學輪再進化
Safeguarding the Nation's Energy Lifeline: The Evolution of Taiwan's Tanker Fleet
- 48 整合先進系統 提升海事效能
智慧航安監控船開啟巡檢新篇章
High-Tech Horizons: Taiwan's New Era of Smart Maritime Patrol
- 50 從船型調整到製造銜接
精進拖船合作 累積實船設計能量
From Lines Optimization to Production Integration:
Tug Collaboration Builds Real-World Vessel Design Expertise
- 52 海事裝備走向實際海域驗證
串聯研發能量 推動國產技術上船
Maritime Equipment Moves Toward Real-World Sea Validation
- 56 建置整合載台管理系統 邁向數位
康定級艦升級 強化戰備能力
Building An Integrated Platform Management System to Advance Digitalization:
Upgrading the Kang Ding-Class Frigates to Strengthen Combat Readiness

CH.3 能源轉型
海洋綠能新航線

Energy Transition: A New Course for Marine Green Energy

- 60 自主研發 接軌國際的風電新里程
德塔浮台領軍浮式風電
Indigenous Innovation Marks a New Milestone in Offshore Wind Delta Float Leads Taiwan's Floating Offshore Wind Power
- 62 示範應用到商轉布局
臺灣電動船加速駛向淨零
Taiwan's Electric Vessels: Navigating the Path to Net Zero
- 64 整合臺灣創新環保與能源科技
擘畫未來綠色船舶新樣貌
Shaping the Future of Green Shipping: Taiwan's Blue Economy Breakthrough
- 66 以安裝模擬技術引領國內業者
開啟臺灣海事工程新篇章
Leading Domestic Industry with Installation Simulation Technology: Opening a New Chapter for Taiwan's Marine Engineering Sector

CH.4 數位驅動
智慧船舶領航者

Driven by Digitalization: Pioneer in Smart Vessels

- 70 打造實船化操作模擬環境
推動人船合一訓練成效
Advancing Maritime Excellence: Taiwan's Indigenous Shiphandling Simulation
- 72 建構海域測試驗證平台
智馭號引領自駕技術邁進
Building a Real-Sea Testing and Validation Platform: THETIS Smart Vessel Advances Autonomous Navigation

- 74 結合場域測試與實證應用
帶動智慧船舶技術持續升級
Combining Field Testing with Real-World Validation: Advancing Smart Vessel Technologies
- 76 導入智慧化製造量能 打造韌性供應鏈
船舶 AI 試製場域
Building Smart Manufacturing Capabilities to Create A Resilient Supply Chain: AI Prototyping Facility for The Shipbuilding Industry
- 78 成立新創公司梭易科海洋
智駕船技術落地與新創研發擴散
Founding the Startup SMS: Commercializing Autonomous Vessel Technology

CH.5 厚植實力
研發基地與人才

Strengthening Capabilities: R&D Facilities and Talent Development

- 82 推動建置國家船模實驗室
厚植臺灣船舶產業設計量能
Elevating Taiwan's Maritime Capabilities: The National Ship Model Basin
- 84 50 年專業領航
船舶中心與臺灣海洋產業攜手並進
SOIC at 50: Navigating Taiwan's Maritime Industry Forward

CH.6 未來展望
航續前行

Future Outlook: Continuing the Voyage Ahead

- 88 前進新興海洋產業
船舶中心布局下一個 50 年
Advancing into Emerging Ocean Industries: SOIC Charts the Course for The Next 50 Years
- 94 船舶人才 Talents

駁浪五十年 開展海洋新局

邱逢琛 董事長

臺灣四面環海，海洋既是天然的地理條件，也是國家發展的重要根基。從航運、漁業、造船、海巡，到國防自主、離岸風電、智慧船舶與低碳航運，海洋產業串起交通、經濟、安全、能源與永續發展，也讓臺灣藉由不同時代的產業轉型，持續累積向海而行的力量。

船舶中心自 1976 年成立以來，走過近半世紀歲月。早期，中心以建立國內船舶自主設計能量為使命，協助臺灣造船及遊艇產業發展；隨著國家需求與產業環境轉變，中心的角色逐步擴展至設計、監造、技術文件、試驗驗證、系統整合與專案管理，並投入國艦國造、海巡艦艇、公務船舶、海事教育、能源船舶與新興海洋科技等領域。這段歷程，正是臺灣船舶產業由基礎建立走向多元發展的重要縮影。

50 年來，船舶中心參與許多攸關國家安全與民生需求的任務。配合國艦國造政策，中心以長年累積的船舶設計與監造技術，支援新型艦艇建造與技術文件工程，協助國防自主從政策願景走向具體成果。面對海巡與公務船舶建造，中心則在設計需求、法規規範、建造品質與任務功能之間，提供專業判斷與協調能力，讓肩負海域執法、救援、巡檢與管制任務的船舶順利成軍，成為守護臺灣海疆的重要力量。

船舶中心的價值，也展現在回應時代變化的能力。當全球航運面臨減碳壓力，中心投入節能船型、替代燃料、低碳船舶與相關技術服務，協助產業掌握國際海事規範的新趨勢；當

智慧化浪潮進入海事領域，中心也推動自駕船舶、智慧航安、海上測試驗證與數位工具應用，讓研發成果逐步走向實際海域、產業現場與商業應用。這些成果代表中心持續從傳統船舶工程支援者，轉向更具整合能力的海洋科技推動者。

回顧這 50 年，我們看見的不只是個別船艦或專案的完成，更是一代又一代船舶工程人才的累積。從圖面設計、結構計算、性能分析、現場監造，到海上公試、技術文件與後續維運，每一項工作都需要細緻、嚴謹與長期經驗。船舶中心能在不同階段承擔國家與產業交付的任務，正因為中心同仁始終以專業為根本，以解決問題為責任，在一次次任務中建立值得信賴的技術能量。

50 週年是一個值得紀念的時刻，也是重新出發的起點。我要感謝歷任董事長、執行長與所有同仁的投入，也感謝主管機關、產業夥伴、造船業界與學研單位長期支持。船舶中心的成長，來自眾人共同努力；臺灣海洋產業的下一段航程，也需要各界持續同行。

展望未來，全球海洋產業正朝低碳化、智慧化、數位化與強大韌性發展，船舶中心將持續以國家需求為方向，以產業升級為目標，以專業技術為根基，推動臺灣船舶與海洋產業航向更廣闊的舞臺，為下一個 50 年開啟新的航道。

FIFTY YEARS OF RIDING THE WAVES: PIONEERING A NEW ERA FOR THE OCEAN

Chairman Forng-Chen Chiu

Taiwan, surrounded by the sea, has long relied on its maritime environment as a foundation for national development. Shipping, fisheries, shipbuilding, coast guard operations, defense self-reliance, offshore wind power, smart vessels, and low-carbon shipping all connect transportation, the economy, security, energy, and sustainability. Across successive waves of industrial transformation, Taiwan has steadily built momentum toward the ocean.

Founded in 1976, the Ship and Ocean Industries R&D Center (SOIC) has been central to this journey. Initially focused on developing Taiwan's independent ship design capabilities to support domestic shipbuilding and yacht industries, SOIC gradually expanded its role. It now encompasses design, construction supervision, technical documentation, testing, system integration, and project management. Its scope has extended to Indigenous Defense Warships, coast guard vessels, public service ships, maritime education, energy vessels, and emerging ocean technologies. This evolution mirrors Taiwan's shipbuilding industry itself—growing from basic capability building into a diversified sector.

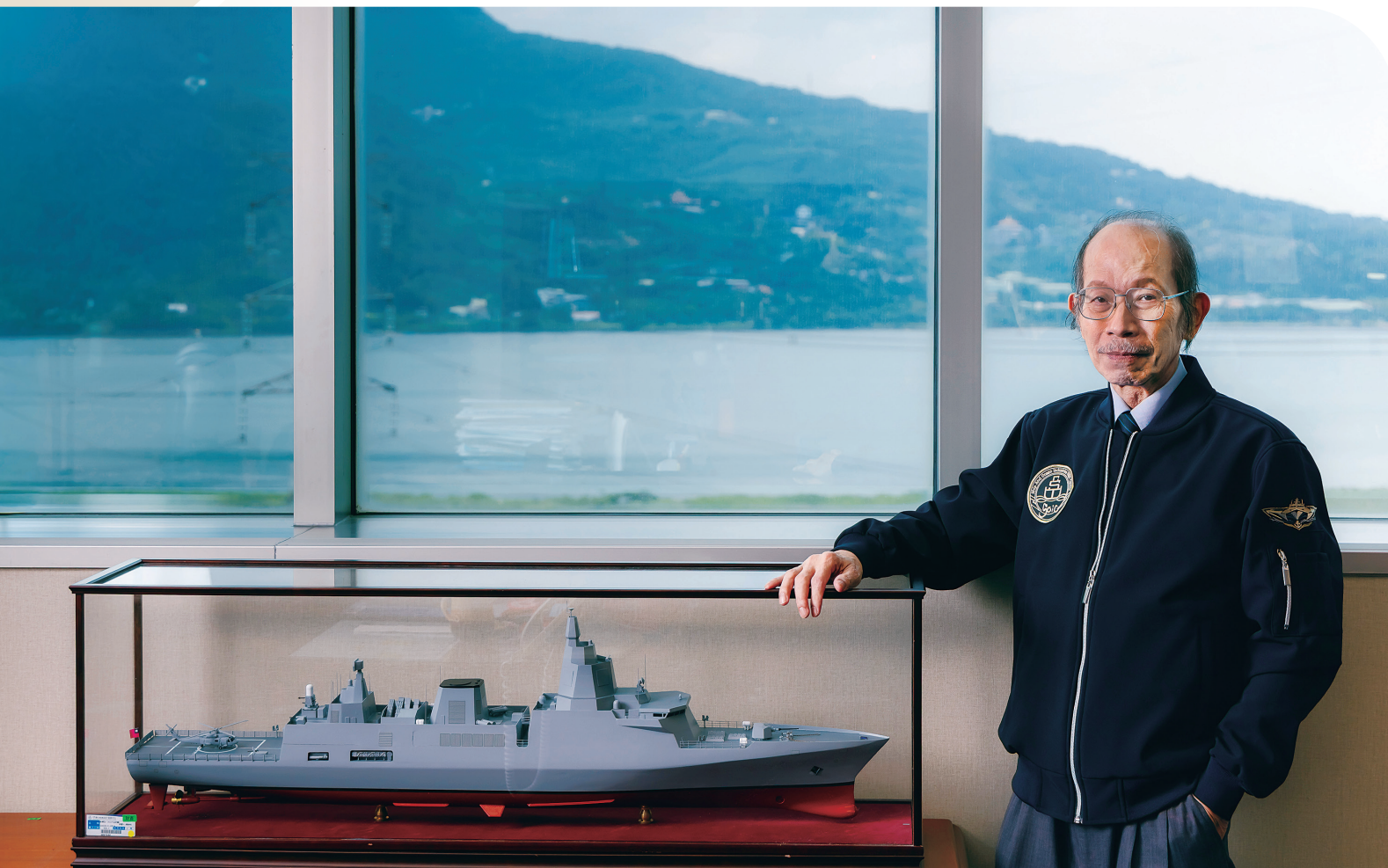
Over the past five decades, SOIC has played a vital role in missions critical to national security and public welfare. Supporting the Indigenous Defense Warships policy, it has applied expertise in ship design and construction supervision to develop naval vessels and technical documentation, turning defense self-reliance into tangible achievements. In coast guard and public service vessel programs, SOIC has balanced design requirements, regulatory compliance, construction quality, and mission functionality. These vessels now safeguard Taiwan's maritime territory through law enforcement, rescue, inspection, and control operations.

SOIC has also adapted to global challenges. As international shipping faces pressure to reduce carbon emissions, it has invested in energy-efficient hulls, alternative fuels, low-carbon vessels, and related technical services. With digitalization reshaping the maritime sector, SOIC has advanced autonomous vessels, intelligent safety systems, offshore testing, and digital tools. These innovations have moved steadily from laboratories into real waters and industrial operations, transforming SOIC from a traditional engineering support organization into a driver of ocean technology innovation.

Looking back, SOIC's achievements are not just individual ships or projects but the accumulated expertise of generations of professionals. From design drawings and performance analysis to construction supervision, sea trials, documentation, and maintenance, every task has demanded rigor and long-term experience. Its success rests on the professionalism of its people, who have consistently embraced problem-solving and built trusted technical capabilities through mission after mission.

The 50th anniversary is both a celebration and a new beginning. Gratitude is owed to past leaders, colleagues, government authorities, industry partners, and academic institutions whose collective efforts have fueled SOIC's growth. The next chapter of Taiwan's maritime industry will likewise require continued collaboration across all sectors.

Looking ahead, the global ocean industry is advancing toward low-carbon, intelligent, digitalized, and resilient development. Guided by national needs, industrial upgrading, and professional expertise, SOIC will continue driving Taiwan's shipbuilding and maritime industries onto a broader global stage, charting a new course for the next 50 years.



以工程實力為本 讓技術航向現場

周顯光 執行長

船舶工程是一門高度整合的專業，從一艘船的需求提出、概念設計、法規檢核、結構配置、性能分析，到建造監造、海上公試與後續維運，每一個環節都牽涉精密判斷，也需要跨領域團隊共同合作。船舶中心走過 50 年，最重要的累積，正是在一次次實務任務中，把技術、經驗與現場問題串聯起來，形成臺灣船舶產業可以持續運用的工程能量。

回顧中心發展，早期我們以協助國內建立船舶設計能力為主要任務，隨著臺灣造船產業與國家政策需求持續演進，服務內容逐步擴大。今日的船舶中心，已能從建案規劃、設計審查、採購招標、建造監造，到性能驗證、技術文件、維保評估與改裝建議，提供完整的技術支援。這樣的轉變，讓中心不只參與船舶建造的某個階段，更能陪伴一項任務從需求確認走到成果落地。

在國艦國造工作中，中心投入設計監造與技術文件工程，協助新型艦艇建立更完整的操作、維修與訓練依據。這些工作往往隱身在船艦背後，卻關係著裝備效能、人員安全與任務執行品質。從設計圖說到船上系統，從建造現場到操作手冊，每一項細節都需要嚴謹檢視。中心同仁以長年累積的船舶專業，協助國內建立更成熟的艦艇工程能力，也為國防自主奠定扎實基礎。

在海巡、公務與教育船舶等任務中，中心也持續扮演技術整合與專案協調角色。不同船

舶有不同任務，有的重視高速與救援能力，有的強調巡檢、監測與指揮功能，也有船舶必須同時滿足教學空間、生活品質與客船安全規範。這些任務很少只有單一答案，工程團隊必須在法規、預算、船東需求、船廠能力與實際操作條件之間反覆校正，找出最可行的方案，這正是船舶中心長期累積的實務價值。

近年，產業環境變化快速，船舶中心也積極推動轉型。面對國際減碳要求，我們投入節能船型、綠能船舶、替代燃料與低碳技術服務，協助產業及早回應海事規範與市場要求。面對智慧化發展，我們投入自駕船舶、智慧航行輔助、海上測試載台與數位資料應用，讓技術從實驗與概念階段，進一步接受實海域條件檢驗。

50 週年專刊所記錄的每一個案例，背後都有同仁投入的專業、耐心與責任感。工程工作常常不在聚光燈下，卻必須在關鍵時刻做出正確判斷，當圖面與現場出現落差，需要有人找出調整方法；當工期、人力與材料受到限制，需要有人協調工序；當新技術進入海域測試，需要有人評估風險並修正細節。船舶中心的力量，正來自這些日復一日的累積。

我要感謝所有同仁在不同任務中的努力，也感謝主管機關、合作單位、船廠、產業夥伴與學研界長期信任。每一項成果都不是單一團隊可以獨力完成，而是許多人在共同目標下持續合作的結果。

展望下一個 50 年，船舶中心將持續強化自主設計、試驗驗證、智慧船舶、低碳技術、數位工具與全壽期服務能力，與臺灣海洋產業共同航向新的旅程。

ROOTED IN ENGINEERING EXCELLENCE, LAUNCHING TECHNOLOGY INTO THE FIELD

CEO Shean-Kwang Chou

Ship engineering is a deeply integrated discipline, spanning mission definition, conceptual design, regulatory review, structural arrangement, performance analysis, construction supervision, sea trials, and lifecycle support. Each stage demands precise judgment and collaboration across multiple fields. Over the past 50 years, SOIC's greatest asset has been the experience gained through practical projects—linking technology, expertise, and operational challenges to strengthen Taiwan's shipbuilding industry.

SOIC's early mission focused on building domestic ship design capabilities. As Taiwan's shipbuilding industry and national policy needs expanded, so did SOIC's services. Today, the organization provides comprehensive technical support, including project planning, design review, procurement, construction supervision, performance verification, documentation, maintenance evaluation, and retrofit recommendations. This evolution allows SOIC to accompany projects from initial requirements through successful implementation.

In Indigenous Defense Warships programs, SOIC has contributed to design supervision and technical documentation, helping new naval classes establish solid foundations for operation, maintenance, and training. Though much of this work remains behind the scenes, it directly impacts equipment performance, crew safety, and mission success. From design drawings to onboard systems, every detail requires rigorous scrutiny. Decades of expertise have enabled Taiwan to develop mature naval engineering capabilities and greater defense self-reliance.

SOIC has also played a key role in coast guard, public service, and educational vessel projects. Each vessel type presents unique challenges: some emphasize speed and rescue, others patrol and monitoring, while educational ships must balance classroom space, living quality, and passenger safety regulations. These projects rarely have simple solutions. Engineering teams must balance regulations, budgets, owner requirements, shipyard capabilities, and operating conditions. SOIC's long-standing experience provides enduring value in navigating these complexities.

In recent years, SOIC has embraced transformation. Responding to global decarbonization, it has invested in energy-efficient hulls, green vessels, alternative fuels, and low-carbon services, helping the industry adapt to evolving regulations and market demands. In parallel, SOIC has advanced smart technologies, including autonomous vessels, intelligent navigation, maritime testbeds, and digital data applications, moving innovations from concept to real-world validation.

Every case in this 50th anniversary publication reflects the professionalism and responsibility of SOIC's colleagues. Engineering often operates out of the spotlight, yet requires sound judgment at critical moments—whether adjusting discrepancies between drawings and site conditions, coordinating constrained resources, or refining new technologies during sea trials. SOIC's strength lies in these daily efforts and accumulations. We extend gratitude to colleagues, supervising authorities, partner organizations, shipyards, industry partners, and academic communities for their trust and collaboration. Achievements are never the result of a single team, but of sustained cooperation toward shared goals. Looking ahead, SOIC will continue strengthening independent design, testing, smart vessels, low-carbon technologies, digital tools, and lifecycle services, charting a new course with Taiwan's ocean industries.



祝賀 C o n g r a t u l a t i o n s

財團法人船舶暨海洋產業研發中心成立五十周年誌慶

卓越研發 帶動技術革新
金禧揚帆 再創海洋輝煌

經濟部產業發展署署長邱求慧 敬賀

財團法人船舶暨海洋產業研發中心成立五十周年誌慶

五十研發築基石
技術提升創新機

經濟部產業技術司司長 郭郭 敬題

祝財團法人船舶暨海洋產業研發中心成立 50 週年誌慶

攜手共進
創新圖強
引領發展

台灣區造船工業同業公會理事長 蔡育新 敬賀

財團法人船舶暨海洋產業研發中心五十周年誌慶

船舶五十 卓越長行
乘風破浪 永續創新

中國造船暨輪機工程師學會理事長 江茂雄 敬賀
國立臺灣大學工學院院長

財團法人船舶暨海洋產業研發中心五十周年誌慶

深耕海洋，引領創新
乘風破浪，再創高峰

陳家義 敬賀
經濟部能源署 陳家義 敬賀

財團法人船舶暨海洋產業研發中心成立五十周年誌慶

五十風華映海天
匠心淬鍊見真章
共築海事水槽業
乘風破浪啟新航

海洋委員會國家海洋研究院院長 陳濟廷 敬賀

半世紀的專業堅持

成就了臺灣造船與海洋產業研發的頂梁柱
深耕海洋、榮耀五十、智慧領航、再創新局
祝 船舶中心 SOIC 50 周年生日快樂！

楊友 敬賀
TTRI 台灣海洋科技研究中心

財團法人船舶暨海洋產業研發中心五十週年誌慶

產業基石 再創新猶

海軍左營後勤支援指揮部 指揮官 吳慶興 敬賀

財團法人船舶暨海洋產業研發中心五十周年誌慶

船載夢想五十秋
舶聚英才同舟
中承使命興產業
心築願景耀全球

海軍保修指揮部 指揮官 葉瑞麟 少將 敬賀

船舶中心五十年誌慶
半古紀傳承新創
五十年持續領航
臺灣造船工業同業公會
理事長 陳朝南 敬賀

船舶中心成立五十周年誌慶
聯英聚智輕舟渡
設算謀圖巨艦航
台灣國際造船股份有限公司
董事長 陳政宏 敬賀



潛艦國造專案辦公室
Indigenous Defense Submarine Program Office,
Republic of China

船舶中心將邁入50歲，是海軍建新一代艦艇
兵力，捍衛海疆的忠實夥伴。
期盼北年時期我們，能夠不忘初心，讓我們
美麗的海域更加安全。

邵維揚 謹賀
2026.3.21

財團法人船舶暨海洋產業研發中心
成立五十週年誌慶

海峽專業、船承設計
發展能量、船造輝煌
中流勇進、心同共濟

海發中心
少將主任
盧建仲 謹賀

財團法人船舶暨海洋產業研發中心成立50週年誌慶

承先啟後
再創新猷

南港造船工業股份有限公司 董事長 黃子真

功在造船
海洋領航
再創輝煌
中信造船董事長 韓榮輝
2026.3.23

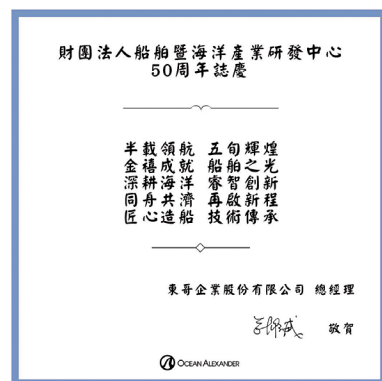
財團法人船舶暨海洋產業研發中心成立五十周年誌慶

從深耕，到深藍，五十年前，我們劃下第一道航線
五十年後，我們定義海洋的無限可能。
從鋼鐵結構到智慧感知，船舶中心不只是造船者，
更是海洋夢想的實踐家。

罡昊企業有限公司 總經理 胡彥儒 敬賀

祝賀

C o n g r a t u l a t i o n s



財團法人船舶暨海洋產業研發中心成立五十週年誌慶

半世紀砥柱滄海，五十載筆繪艤體
感念船舶中心引領革新，與嘉信遊艇伴肩共進
共築世界遊艇王國之金字招牌
欣逢金禧，祝願領航全球，再啟百年新航道！

嘉信遊艇股份有限公司 總經理 蔡俊豪 敬賀

財團法人船舶暨海洋產業研發中心成立五十周年誌慶

半世紀乘風破浪
五十年再創輝煌

財團法人驗船中心 執行長 鄭志文



感佩中心五秩以來乘風破浪，築起臺灣海事研發的堅實航道；
願續領產業前瞻，以創新啟航未來新局邁向國際。

祝船舶中心五十周年誌慶。

勞氏台灣船級社
Chief Representative 呂芳儀 敬賀

呂芳儀

財團法人船舶暨海洋產業研發中心成立五十周年誌慶

五秩領航 再創華章

先進複材科技股份有限公司 董事長 總經理 敬賀

財團法人船舶暨海洋產業研發中心五十周年誌慶

船艇領航任重道遠
研發育英半百功成
五湖四海凌雲破浪
十全鴻略再造輝煌

大瑞遊艇股份有限公司
董事長 總經理 敬賀

財團法人船舶暨海洋產業研發中心五十週年誌慶

技術扎根五十年
智造領航開新局

宏昇螺旋槳股份有限公司
董事長 敬賀

船舶中心50週年慶

船舶設計 海洋開發
風力發電 艦艇監造
培育人材 保疆衛民
豐功偉業 貢獻價值

般若科技 林允進敬賀

財團法人船舶暨海洋產業研發中心成立50周年誌慶

金戈鐵馬五十春秋
智馭汪洋世界一流

日昇船舶科技有限公司 總經理 敬賀

財團法人船舶暨海洋產業研發中心50周年誌慶

深耕海洋五十
共創船舶新局

陽明海運股份有限公司
工務部 許清堂 協理 敬賀

財團法人船舶暨海洋產業研發中心五十周年誌慶

立國以海研行五十載
興業以船航向新遠程

台灣世議工程顧問股份有限公司
鄭運鵬董事長 敬賀

財團法人船舶暨海洋產業研發中心成立五十周年誌慶

船舶研創五十載
領航海洋向未來

東方風能科技股份有限公司
執行長 陳柏霖 敬賀



財團法人船舶暨海洋產業研發中心
成立五十週年誌慶
光輝耀五十
風彩續百年
中興工程顧問股份有限公司 董事長 陳仲賢 敬賀

祝賀 C o n g r a t u l a t i o n s

財團法人船舶暨海洋產業研發中心五十周年誌慶

根深葉茂五十載
創新領航向未來

富蘭登科技股份有限公司董事長

莊意福 敬賀

船舶中心五十周年誌慶：

由聯合設計到船舶中心

傳承創新台灣造船使命

電力推進驅動海洋脈動

控制整合引領智慧航行

晉航企業

祝維卿 敬賀

財團法人船舶暨海洋產業研發中心五十周年誌慶

領航船舶 創新海洋
產業推手 精彩五十

臺灣大學工程科學及海洋工程學系系主任

趙作威 敬賀

財團法人船舶暨海洋產業研發中心五十周年誌慶

深耕五十 引領群倫
研發創新 航向未來

海軍軍官學校 船舶機械學系
徐慶瑜教授 敬題



財團法人船舶暨海洋產業研發中心五十周年誌慶

船領先機 海納百川成大業
船傳使命 洋揚萬里展神功

光翔國際有限公司

總經理 莊金生 敬賀

HANLA IMS CO., LTD.

共同代表理事

池錫俊
金永求 敬賀

財團法人船舶暨海洋產業研發中心五十周年誌慶

船載五十載精研 智匯海疆開盛景
船興半世紀實績 功標洋際啟新程

敬賀船舶暨海洋產業研發中心成立五十週年
船研五十
領航未來
國防大學理工學院動力系主任林俊成 敬賀

財團法人船舶暨海洋產業研發中心五十周年誌慶

橫搖起伏半世紀

再續船緣五十載

高雄科大造船及海洋工程系主任 張偉超 敬賀

船舶暨海洋產業研發中心 50 週年誌慶

設計領航
智造海洋

臺灣海洋大學系統工程暨造船學系 系主任 高瑞祥 敬賀

財團法人船舶暨海洋產業研發中心成立五十周年誌慶

既領天命
奮起創研

林成原

國立臺灣海洋大學輪機工程學系
特聘教授兼系主任

Lifetime Fellow of the International

Association of Advanced Materials (FIAAM)

World's top 2% Scientists for both career-long
and every single year in 2021-2025

國立臺灣海洋大學
榮譽講座教授 彭芳吉 敬賀

金禧傳承五十載
才培俊傑創輝煌

財團法人船舶暨海洋產業研發中心五十週年誌慶

財團法人船舶暨海洋產業研發中心五十周年誌慶

砥礪船舶工程 開拓海洋科技

五十載輝煌 卓然有成 遠見未來

國立中山大學海下科技研究所

所長 邱永盛 敬賀

財團法人船舶暨海洋產業研發中心成立五十週年誌慶

船體創新工藝精，

船航智慧引群英。

五旬壯志謀長遠，

十拓藍圖向海明。

財團法人船舶暨海洋研發中心五十週年誌慶

匠心築夢
通達五洋
50週年誌慶

利凌企業股份有限公司

策略長 許家雄 敬賀

菱光科技股份有限公司 總經理 魏錦明 敬賀

CH.1 時光長河

五十載技術演進

The River of Time:
Five Decades of Technological Evolution

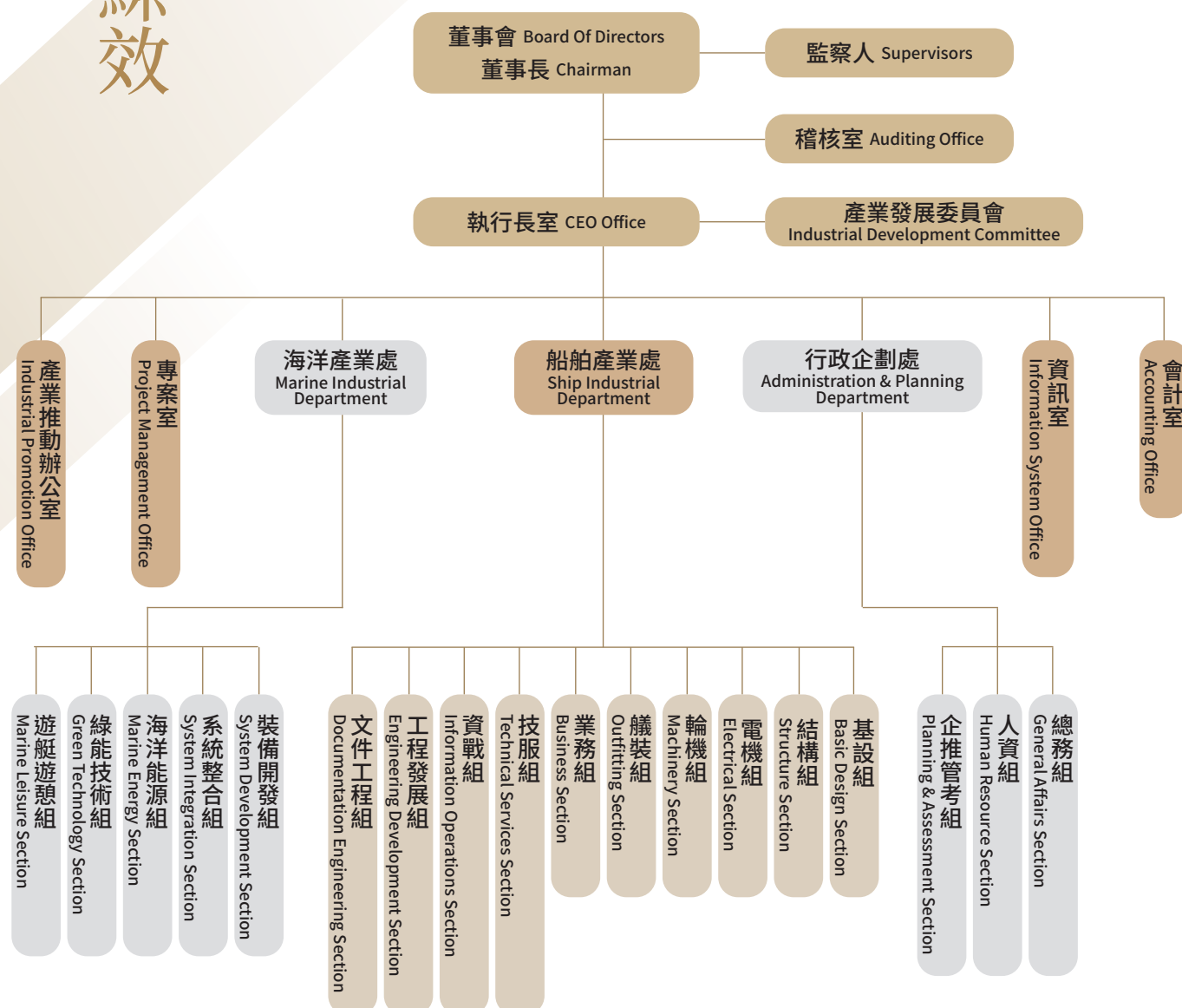


各司其職 發揮綜效
船舶暨海洋產業研發中心簡介

組織架構及核心業務

Organizational Structure and Core Operations

船舶中心以研發與服務為核心，業務範疇涵蓋船舶與海洋兩大領域。「船舶產業處」主理船舶與海運產業技術之研發；「海洋產業處」則掌理離岸風電、智慧船舶、綠能及裝備系統之技術研發。為強化產業競爭力，「產業推動辦公室」提供產業升級、推廣及技術服務，而「行政企劃處」則在後勤支援、規章建置、各項政府委辦計畫及一般業務之成案追蹤、管考及行政支援與人力培訓上提供堅實後盾。「專案室」為任務編組，掌理跨處合作或重大專案業務。透過會計室、資訊室與稽核室的嚴謹管理，中心確保各項政府委辦案與技術服務案能精準執行，帶動整體產業轉型。



SOIC ORGANIZATIONAL OVERVIEW

EACH DIVISION IN ITS ROLE, GENERATING COLLECTIVE SYNERGY

The Ship and Ocean Industries R&D Center (SOIC) operates with research, development, and services as its core pillars, encompassing both the shipbuilding and ocean sectors. The Ship Industrial Department is responsible for the R&D of technologies pertaining to the shipbuilding and maritime shipping industries, while the Marine Industrial Department oversees technical development in offshore wind energy, intelligent vessels, green energy, and equipment systems. To strengthen industrial competitiveness, the Industrial Promotion Office provides services relating to industrial upgrading, market promotion, and technical support. Meanwhile, the Administration & Planning Department furnishes robust back-office support across logistics, regulatory frameworks, tracking, evaluation, and administrative support for government-commissioned programs and general business tracking, alongside talent training. Through the rigorous management of the Accounting Office, Information System Office, Project Management Office, and Auditing Office, the Center ensures the precise execution of government-commissioned projects and technical services, driving the overall transformation of the industry.

榮耀獎項 Awards and Honors

2021年10月辦理「窺見技術與夢想的交會：科專計畫自駕船發展現況」技術論壇，邀集各界學者以其專長領域，發表關於自駕船相關技術之研究，本論壇活動榮獲2021TIE解密科技寶藏「最佳活動獎」榮譽。

In October, 2021, SOIC organized the technical forum "Where Technology Meets Vision: Current State of Autonomous Vessel Development under the Science and Technology Program", convening scholars from diverse fields to present research on autonomous vessel technologies. The forum was honored with the Best Activity Award at the 2021 Taiwan Innotech Expo (TIE), Tech Treasures.



2022年10月辦理「智慧船全攻略—臺灣自駕船舶技術開發與場域應用」科技專案技術成果論壇，推動我國自駕船技術及產業發展帶來貢獻，榮獲2022TIE解密科技寶藏「最佳活動獎」第一名。

In October 2022, SOIC held the "Smart Ship Complete Guide - Taiwan Self-Driving Ship Technology Development and Field Application" technology project technology achievement forum, which won the first place in the "Best Event Award" of 2022 TIE, Tech Treasures.

2022年10月於台北世貿一館展出「風浪影響下船舶自主航行技術」榮獲2022TIE解密科技寶藏「最佳展示獎」。

In October 2022, the exhibit "Autonomous Navigation Technology for Vessels under the Influence of Wind and Waves" at Taipei World Trade Center Hall 1 was honored with the Best Exhibition Award at the 2022 TIE, Tech Treasures.



2023年10月舉辦「智駕新未來·產業合作論壇」，推廣產業技術司之科技專案研發成果，並進行「無人水文探勘船沙盒場域驗證計畫MOU簽署儀式」，促進產業交流與技術合作，榮獲2023TIE解密科技寶藏「最佳活動獎」第一名。

In October 2023, SOIC hosted "The Industry Collaboration for Future Auto, Industry Collaboration Forum", promoting R&D outcomes of MOEA's Department of Industrial Technology science and technology programs, and featuring science and technology programs and featuring the signing of a Memorandum of Understanding for the "Unmanned Hydrographic Survey Vessel Sandbox Field Validation Program". The event received First Place in the Best Activity Award at the 2023 TIE, Tech Treasures.

2023年船舶中心於打造臺灣首艘可於外海惡劣天候下航行之自動駕駛共通性測試船「智馭號」，滿足ISO Small Craft Category A之設計條件，具備跨洋航行條件之安全性，可提供國內發展自駕系統外海航行載台所需之驗證功能。

In 2023, SOIC completed construction of THETIS Smart Vessel, Taiwan's first autonomous common test vessel capable of operating in harsh offshore conditions, designed to ISO Small Craft Category A specifications with transoceanic navigation safety standards, providing a dedicated offshore validation platform for domestic autonomous systems development.



2023年10月於台北世貿一館展出「智慧化航行輔助辨識系統」榮獲2023TIE解密科技寶藏「最佳展示獎」。

In October 2023, the exhibit "Intelligent Navigation Assistance and Identification System" at Taipei World Trade Center Hall 1 received the Best Exhibition Award at the 2023 TIE, Tech Treasures.

2024年10月於台北世貿一館展出「船舶智慧化航行決策系統」榮獲2024TIE解密科技寶藏「最佳展示獎」。

In October 2024, the exhibit "Intelligent Maritime Navigation Decision System" at Taipei World Trade Center Hall 1 was honored with the Best Exhibition Award at the 2024 TIE, Tech Treasures.



2024年11月船舶中心獲得2024 DIGI+ Talent 跨域數位人才加速躍升計畫優良研習單位，頒發獎座肯定研習單位表現。

In November 2024, SOIC was awarded "Outstanding Training Institution" in the 2024 DIGI+ Talent Program for Exceptional Performance.

2025年10月於台北世貿一館展出「智慧航行輔助系統」榮獲2025TIE解密科技寶藏「最佳展示獎」。

In October 2025, the exhibit "Artificial Intelligence Identification Navigation Assistance System" at Taipei World Trade Center Hall 1 received the Best Exhibition Award at the 2025 TIE, Tech Treasures.



2025年4月船舶中心自主研发之「智慧航行輔助系統」榮獲2025年美國愛迪生獎（Edison Awards）銀獎肯定。

In April 2025, SOIC's independently developed Artificial Intelligence Identification Navigation Assistance System was honored with a Silver Award at the 2025 Edison Awards in the United States, widely regarded as the "Oscars of Innovation".

2025年9月船舶中心自主研发之「智慧航行輔助系統」榮獲114年度法人科專成果表揚「產業技術創新獎」。

In September 2025, the Artificial Intelligence Identification Navigation Assistance System was further recognized with the Industrial Technology Innovation Award at the Annual Recognition of R&D Outcomes for Government-Commissioned Institutional Science and Technology Programs.

年度船舶／遊艇獎

中國造船暨輪機工程師學會歷年來致力於國內船舶之設計建造技術，及海洋藝術與文化推廣，經濟部產業發展署特委託中國造船暨輪機工程師學會，設置年度船舶獎及特色船舶獎，年度遊艇獎及特色遊艇獎，選拔每年度在國內船艇廠完工的新造船舶遊艇中最佳設計建造及具特色者，以彰顯該船艇建造相關團隊的傑出貢獻，是造船與海事工程領域的指標性榮譽。



2019 旗福一號 CHI FU NO.1

- 船東：高雄市輪船股份有限公司
- 船廠：靖海造船股份有限公司
- 設計機構：船舶暨海洋產業研發中心

Shipowner: Kaohsiung City Shipping Co., Ltd.
Shipyard: Ting Hai Shipbuilding Co., Ltd.
Design Institute: Ship And Ocean Industries R&D Center (SOIC)



2023 玉山軍艦 YU SHAN

- 船東：中華民國海軍
- 船廠：台灣國際造船股份有限公司
- 設計機構：海軍造船發展中心／船舶暨海洋產業研發中心／台灣國際造船股份有限公司

Shipowner: Republic of China Navy (ROCN)
Shipyard: CSBC Corporation, Taiwan
Design Institute: Naval Shipbuilding Development Center(NSDC) / Ship And Ocean Industries R&D Center (SOIC) / CSBC Corporation



2024 億祥168號 YI SIANG NO.168

- 船東：曾俊棠
- 船廠：健元造船股份有限公司
- 設計機構：船舶暨海洋產業研發中心／健元造船公司

Shipowner: Tseng Chun-tang
Shipyard: Chien Yuan Shipbuilding Co., Ltd.
Design Institute: Ship And Ocean Industries R&D Center (SOIC) / Chien Yuan Shipbuilding Co., Ltd.

ANNUAL VESSEL AND YACHT AWARDS

Dedicated to advancing domestic vessel design, construction technologies, and maritime culture, the Taiwan Society of Naval Architects and Marine Engineers(SNAME) is commissioned by the Industrial Development Administration of the Ministry of Economic Affairs, of the MOEA to organize the annual Vessel and Yacht Awards. These accolades—comprising Vessel of the Year, Special Featured Vessel, Yacht of the Year, and Special Featured Yacht—celebrate the most exceptionally designed and crafted newly built craft completed by domestic yards each year. By highlighting the outstanding contributions of the engineering and development teams, these awards serve as the definitive benchmark of excellence in naval architecture and marine engineering.



2024 智駁號 THETIS Smart Vessel

- 船東：船舶暨海洋產業研發中心
- 船廠：嘉信遊艇股份有限公司
- 設計機構：船舶暨海洋產業研發中心

Shipowner: Ship And Ocean Industries R&D Center (SOIC)
Shipyard: Kha Shing Enterprises Co., Ltd.
Design Institute: Ship And Ocean Industries R&D Center (SOIC)



2025 航港1號 Maritime One

- 船東：交通部航港局
- 船廠：中信造船股份有限公司
- 設計機構：船舶暨海洋產業研發中心

Shipowner: Maritime and Port Bureau, MOTC
Shipyard: Jong Shyn Shipbuilding Co., Ltd.
Design Institute: Ship And Ocean Industries R&D Center (SOIC)

邁向國際創新會展舞臺 船舶中心以研發實力深獲肯定

累積半世紀以來的研發能量，船舶中心已成為臺灣能夠邁向世界的重要推手；並透過國際展會及獎項等交流平台，充分展現深厚的創新研發成果與實力，更彰顯其作為推動臺灣船舶及海洋產業創新發展與轉型升級的重要力量。

自 1976 年成立以來，船舶中心作為臺灣船舶與海洋產業的重要研發機構，不僅透過持續的人才培育和創新研發，提供船舶設計、工程規劃、研究發展、技術與知識整合等多項服務，更藉此帶動產業升級、促進經濟成長、鏈結全球市場，並將臺灣的船舶和海洋產業實力，推展至國際舞臺上。

為能讓國際業界看見船舶中心的研發能量，以及臺灣在船舶和海洋領域建立的競爭力，近年船舶中心積極參與多項國際性專業展會，展現優質的研發成果，同時也在經濟部的帶領下，參加國際獎項的評選。這些曝光不只要爭取更多連結、創造商機，也更加印證臺灣的船舶技術已能與世界頂尖水準匹敵，成為技術創新應用的最佳合作夥伴。

前進國際展會 爭取曝光與商機

國際展會的一大特色，在於能聚集來自

各個國家地區的技術或產品提供者、以及潛在的使用或採購者，讓雙方能共同尋求商務合作的機會。

舉辦近 30 年的新加坡亞洲國際海事防務展（IMDEX Asia），即為國際海事防務的重要交流據點，也讓船舶中心於 2025 年首次申請參展，並以近年來的研發成果為主題；包括編製船艦操作手冊的文件工程，以及對船艦直升機操作限制（Ship-Helicopter Operating Limits, SHOL）包絡線的研究實證，還有能夠提供人員訓練操作船艦的操船模擬器（Maritime Operations Research Integrated Simulator, MORIS）等。

在這 3 項主力技術之外，船舶中心也於展會現場布置簡易的資訊吊牌，讓參觀者能快速了解船舶中心歷年來的船舶設計實績，並吸引各類廠商前來互動，例如文件手冊編輯或軍用無人機的業者等。同時這些參展工

新加坡亞洲國際海事防務展 IMDEX Asia (Singapore International Maritime Defence Exhibition)



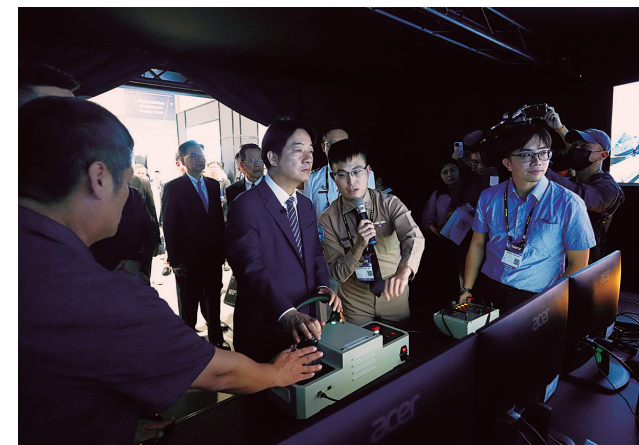
展期為2025年5月6日至8日，此為亞太地區最頂尖的海事防務展覽與會議，自1997年起每兩年於新加坡樟宜展覽中心舉行一次。該展會匯集全球頂尖國防工業、軍事高層，展示先進艦艇與海空防衛技術，是推動國際安全交流的關鍵平台。

Held from May 6 to 8, 2025, this is the Asia-Pacific region's foremost naval defense exhibition and conference, held biennially at Singapore Expo since 1997. It convenes leading global defense industries and senior military officials to showcase advanced naval vessels and maritime defense technologies, serving as a key platform for international security cooperation.

作，像是展攤布置、或是擬定交流策略和跟進聯絡等，也都能為船舶中心同仁累積國際展覽實務經驗，對未來推廣技術帶來幫助。

在研發技術的應用方面，配合國艦國造政策，目前操船模擬器也已提供為我國海軍沱江級巡邏艦量產艦的人員訓練使用。因此在 2025 年臺北國際航太暨國防工業展（Taipei Aerospace & Defense Technology Exhibition, TADTE）中，船舶中心也偕同海軍於現場展出這套操船模擬設備，並以高度擬真的操作和視覺效果，不僅能讓各界實際體驗並深獲讚賞，更顯示可有效協助駕駛人員熟悉各項船艦性能，也能做為一般航海人員訓練之用。

臺北國際航太暨 國防工業展 Taipei Aerospace & Defense Technology Exhibition (TADTE)



展期為2025年9月18至20日，國防工業展海軍以塔江操船模擬機為展覽主軸廣受注目，展現模擬訓練的重要性，亦獲總統府及多位重要人士指定體驗。

Held from September 18 to 20, 2025, the Navy's Tuo Chiang-class ship-handling simulator served as the exhibition centerpiece, garnering designated visits from the Presidential Office and numerous senior officials, underscoring the importance of simulation-based training.

ADVANCING ONTO THE INTERNATIONAL INNOVATION EXHIBITION STAGE SOIC'S R&D CAPABILITIES EARN WIDESPREAD RECOGNITION

Having accumulated half a century of research and development expertise, the Ship and Ocean Industries R&D Center (SOIC) has become a pivotal force driving Taiwan's emergence onto the world stage. Through participation in international exhibitions and award competitions, SOIC has consistently demonstrated the depth of its innovative R&D achievements, affirming its indispensable role in leading Taiwan's shipbuilding and ocean industries toward continuous advancement and upgrading. Since its founding in 1976, SOIC has served as a cornerstone of Taiwan's shipbuilding and maritime industry development. Through sustained investment in talent cultivation and innovative research, the Center provides services encompassing vessel design, engineering planning, research and development, and technical and knowledge integration, catalyzing industrial upgrading, stimulating economic growth, and forging connections with global markets. To ensure the international community recognizes SOIC's R&D capabilities and Taiwan's competitiveness in the shipbuilding and maritime domain, the Center has actively participated in major international trade exhibitions and, under the guidance of the Ministry of Economic Affairs, entered international award competitions. These engagements serve not only to cultivate broader connections and generate business opportunities, but also to affirm that Taiwan's shipbuilding technology has reached the highest global standards, positioning it as an ideal partner for innovative technological applications.

Advancing to International Exhibitions, Securing Visibility and Commercial Opportunities

A defining characteristic of international trade exhibitions is their capacity to bring together technology and product providers alongside potential end-users and procurement entities, enabling both parties to explore mutually beneficial commercial cooperation. IMDEX Asia (Singapore), now approaching its 30th year, stands as a premier international platform for naval defense and maritime affairs. In 2025, SOIC participated for the first time, presenting three flagship R&D achievements: technical documentation engineering for vessel operational manuals; empirical research on Ship-Helicopter Operating Limits (SHOL) envelopes; and the Maritime Operations Research Integrated Simulator (MORIS), a ship-handling simulator for crew training. Informational panels were also displayed to introduce the Center's historical vessel design portfolio, attracting inquiries from firms specializing in technical documentation and military unmanned aerial vehicles. These activities additionally served to build practical international exhibition competencies among SOIC staff.

In alignment with the national Indigenous Defense Shipbuilding policy, MORIS has been deployed for personnel training aboard the Republic of China Navy's mass-produced Tuo Chiang-class patrol vessels. At the 2025 Taipei Aerospace & Defense Technology Exhibition (TADTE), SOIC jointly presented this system alongside the Navy, where its highly realistic operational and visual performance earned widespread admiration, demonstrating its effectiveness for both naval crew familiarization and general maritime training purposes.

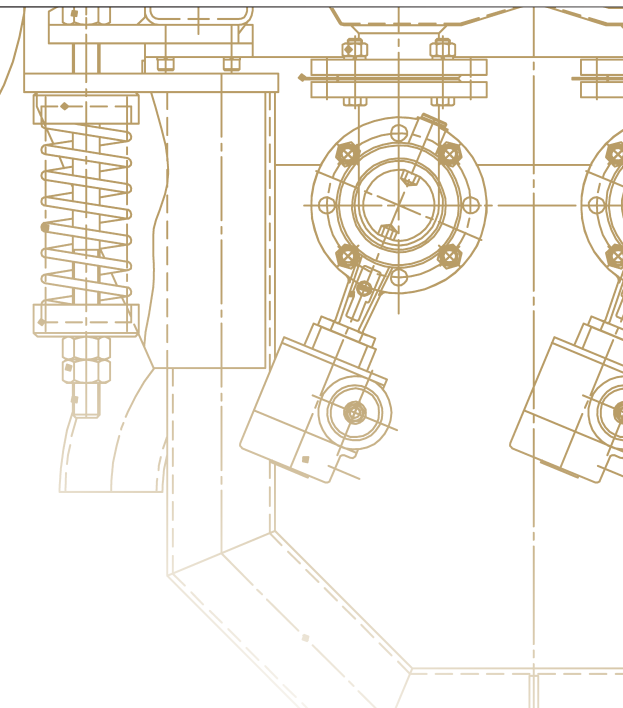
創新智慧船舶技術 深受國際肯定

智慧船舶是當前國際上重要的船舶發展趨勢，也是船舶中心數年來不斷投入的關鍵領域，並已推出多項自動駕駛相關的研發成果。其中在智慧航行輔助系統中，是在一般船舶採用的雷達與自動識別系統（Automatic Identification System, AIS）外，再加入即時 AI 影像的視覺辨識技術，並將所有偵測數據整合呈現於同一介面，讓船舶駕駛人員更完整且正確掌握周遭環境的資訊，例如其他海上船舶或物件，也能藉此提升船舶航行時的安全性。

智慧航行輔助系統推出之後，廣受船舶業界的關注，並接連於 2025 中東消費性電子與通訊展覽（GITEX Global）和臺北國際電腦展（Computex）亮相。該系統成功透

過智慧船舶技術衍生落地至新創公司「梭易科」，並促成其攜手瑞典商北爾電子展開合作；此外，梭易科亦於臺北國際電腦展（Computex）、InnoVEX 國際新創展中，榮獲 Enspyre 安石國際新創特別獎。展會現場利用實況演示的方式，經由攝影機辨識港區動態影像中的各式船舶，甚至還結合臺灣業者的感測及運算等設備，讓參觀者感受到臺灣船舶產業鏈的創新與整合力量。另外，智慧航行輔助系統也曾參與臺灣創新技術博覽會（Taiwan Innotech Expo, TIE）、亞灣新創大南方（Meet Greater South）等展會，為國人展現船舶中心的研發實力。

除了國內外的展會，由船舶中心研發的智慧航行輔助系統，也在經濟部號召下於 2025 年參加素有「創新界奧斯卡獎」美譽



的美國愛迪生獎（Edison Awards），並在激烈評選中榮獲銀獎肯定；顯見船舶中心的研發與整合能力不只已具備國際水準，更能帶動國內智慧科技的發展，也為我國船舶和海洋產業持續注入創新活水。

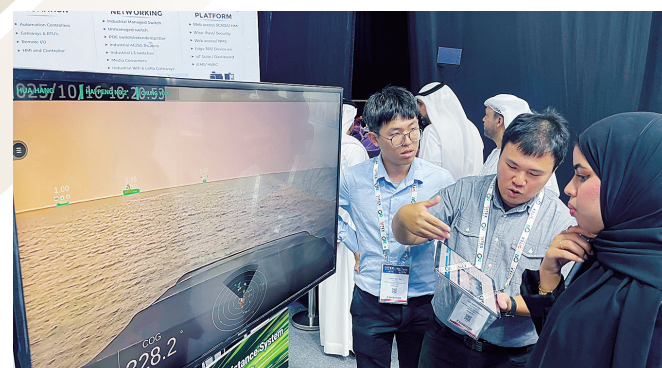
Innovative Intelligent Vessel Technologies, Earning International Recognition

Smart shipping is a significant trend in contemporary global maritime development and a domain in which SOIC has made sustained investment, yielding multiple autonomous navigation-related R&D outcomes. The Artificial Intelligence Identification Navigation Assistance System augments standard radar and AIS (Automatic Identification System) capabilities with real-time AI-powered visual recognition, consolidating all detection data within a unified interface. This enables vessel operators to maintain more comprehensive situational awareness of surrounding vessels and objects, thereby significantly enhancing navigational safety.

The system attracted considerable industry attention and was showcased at both GITEX Global 2025 and Computex Taipei. It has been successfully commercialized through the startup SOIC Marine Solutions Co., Ltd., which established a collaborative partnership with Swedish firm Beijer Electronics Corp., and received the Enspyre Special Innovation Award at both Computex and InnoVEX. Live demonstrations at these events, employing cameras to identify vessel types from real-time port footage, integrated with Taiwanese sensing and computing equipment, vividly conveyed the innovative and integrative strength of Taiwan's maritime industry supply chain. The system was also exhibited at the Taiwan Innotech Expo (TIE) and Meet Greater South, showcasing SOIC's capabilities to domestic audiences.

At the initiative of the Ministry of Economic Affairs, the system further entered the 2025 Edison Awards, widely regarded as the "Oscars of Innovation", earning a Silver Award in a highly competitive process. This recognition affirms that SOIC's R&D and integration capabilities have attained genuine international standards, driving the advancement of domestic intelligent technologies and continuously infusing Taiwan's shipbuilding and ocean industries with innovative momentum.

中東消費性電子與通訊展覽 GITEX Global (Gulf Information Technology Exhibition)



展期為2025年10月13日至17日，是中東、北非及南亞地區規模最大的科技盛會。此展與CES、IFA並列為全球三大IT展，聚焦AI落地應用、網路安全、通訊及消費電子，展示臺灣AI與智慧科技創新解決方案。

Held from October 13 to 17, 2025, this is the largest technology exposition in the Middle East, North Africa, and South Asia. Co-listed alongside CES and IFA as one of the world's three foremost IT exhibitions, it focuses on AI applications, cybersecurity, communications, and consumer electronics, providing a platform to showcase Taiwan's AI and smart technology solutions.

臺北國際電腦展 Computex Taipei



展期為2025年5月20日至23日，COMPUTEX是全球指標性的AI與科技展會之一，聚集半導體、AI、運算與智慧應用產業，透過展會展示船舶智慧航行輔助系統。

Held from May 20 to 23, 2025, Computex is one of the world's foremost AI and technology exhibitions, bringing together the semiconductor, AI, computing, and smart applications industries, before whom the Artificial Intelligence Identification Navigation Assistance System was presented.

亞灣新創大南方 Meet Greater South



展期為2025年8月22日至23日，南臺灣最重要的新創與產業盛會，主要聚焦AI試產線、高值化技術與新創應用，船舶中心展出科專成果「智慧航行輔助系統」，提供結合可見光彩色影像與熱成像技術，可助於系統在夜間與濃霧環境中讓影像具備可辨識目標的能力。

As Southern Taiwan's premier startup and industrial event focusing on AI pilot lines and high-value tech, the exhibition runs from August 22–23, 2025. Here, SOIC highlights its TDP achievement, the "Artificial Artificial Intelligence Identification Navigation Assistance System", which combines visible-light color and thermal imaging to enhance target recognition under nighttime and heavy-fog conditions.

臺灣創新技術博覽會 Taiwan Innotech Expo (TIE)



展期為2025年10月16日至18日，展示AI航海團隊的概念，利用人工智慧結合影像辨識、雷達、自動識別系統（AIS）及擴增實境（AR）技術，並透過論壇探討在國際海事組織（IMO）淨零轉型浪潮下，臺灣如何結合智慧與綠色技術發展航運。

Held from October 16 to 18, 2025, the exhibition showcased the AI maritime crew concept, integrating AI with image recognition, radar, AIS, and augmented reality (AR). Forums explored how Taiwan can leverage smart and green technologies amid the IMO's net-zero transition.

大事紀 Milestones and Chronicle of Key Events

1976-1985 奠基期 從零到一 開啟自主設計新紀元

1970 年代，臺灣造船業正處於起步階段，當時國內造船設計高度仰賴國外技術，不僅成本高昂，更難以累積本土研發能量。在時任行政院長蔣經國先生的支持下，由旅美學人組成的造船工程學社建言，於 1976 年正式成立「財團法人聯合船舶設計發展中心」（USDDC）。由厲汝尚博士建立籌備處，落腳臺北八德路，開啟了臺灣造船工業自主設計的長征。

成立初期，中心首要任務是證明臺灣具備「全程自力設計」的能力。1976 年底，中心成功完成第一艘國產 6,100 載重噸木材船設計案，並獲得 16 艘訂單，這不僅是技術的突破，更是臺灣造船業正式擺脫國外依賴、走向自立的轉捩點。隨後，中心技術能量快速釋放，1982 年配合中船設計美國艾索（ESSO）石油公司 87,700 噸油輪，導入當時最先進的機艙無人化全自動控制與節能技術；1983 年更設計出我國首艘巴拿馬極限型（66,000 噸）散裝貨輪，分屬國內七大航運公司建造，奠定了中心在大型商船設計的領先地位。這 10 年，是從無到有的開創，為臺灣海洋產業種下了自主研發的種子。

1976-1985: FOUNDATION PERIOD FROM ZERO TO ONE: INAUGURATING A NEW ERA OF INDEPENDENT DESIGN

During the 1970s, Taiwan's shipbuilding industry was still in its nascent stage, with domestic vessel design heavily dependent on foreign expertise, a reliance that not only imposed substantial costs but also impeded the accumulation of indigenous R&D capabilities. With the support of Premier Chiang Ching-kuo, and acting upon recommendations put forward by the Society of Naval Architects based in the United States, the government formally established the United Ship Design and Development Center (USDDC) in 1976. Under the foundational leadership of Dr. Li Ru-shang, who established the preparatory office on Bade Road in Taipei, Taiwan's long march toward independent shipbuilding design had begun. In its earliest years, the Center's foremost objective was to demonstrate Taiwan's capacity for end-to-end independent vessel design. By late 1976, the Center had successfully completed the design of the nation's first domestically designed 6,100 deadweight tonnage (DWT) timber carrier, securing orders for 16 vessels. This achievement represented not merely a technical breakthrough, but a defining turning point at which Taiwan's shipbuilding industry formally shed its dependence on foreign design and embarked upon a path of self-reliance. The Center's technical capabilities expanded rapidly thereafter: in 1982, it collaborated with China Shipbuilding Corporation on the design of an ESSO 87,700-ton tanker, incorporating the most advanced unmanned engine room automation and energy-saving technologies available at the time; and in 1983, it produced the design for Taiwan's first Panamax-maximum-size (66,000-ton) bulk carrier, vessels of which were subsequently constructed for seven major domestic shipping companies, firmly establishing the Center's leading position in large commercial vessel design. This inaugural decade represented a period of creation from nothing, sowing the seeds of independent R&D that would sustain Taiwan's maritime industry for generations to come.

1986-1999 成長期 軍民並進 構築國家海防後盾

進入第二個 10 年，中心不僅在商船領域穩定發揮，更開始承擔國家安全與海洋執法的重任。隨著國家政策對「國艦國造」雛形的重視，中心開始涉足複雜度極高的軍用與執法艦艇設計。1990 年，海軍委託設計的 9,300 載重噸油彈補給艦「武夷艦」成功交付，這艘具備海上整補與垂直整補功能的指標性軍艦，證明了中心在複雜系統整合上的卓越能力。

除了大型軍艦，中心也開始為海防需求提供標準化解決方案。1995 年，中心首次設計 100 噸級警巡艇，這類船型不僅航速快、機動性強，更成為日後海巡執法的主力機種。1997 年更與海發中心共同規劃設計 500 噸級「錦江艦」原型艦，成為我國第一代自製巡邏艦的典範。在此期間，中心亦不忘提升民間產業競爭力，1999 年引進美國 TPI 公司「複合材料樹脂注入式成型法 (SCRIMP™)」專利技術並移轉至國內遊艇廠，成功協助臺灣遊艇業從中小型船轉向巨型豪華遊艇製造，贏得「遊艇王國」美譽。這 10 年，中心從單純的「船殼設計」進化為「系統規劃」者，跨越了軍民技術的高牆。

1986-1999: GROWTH PERIOD DUAL ADVANCEMENT IN CIVIL AND MILITARY SECTORS, BUILDING THE NATION'S MARITIME DEFENSE CAPABILITY

Entering its second decade, the Center not only continued to perform steadily in the commercial shipping domain but also began to shoulder significant responsibilities in national security and maritime law enforcement. As national policy placed increasing emphasis on the concept of indigenously built naval vessels, the Center ventured into the highly complex field of military and law enforcement vessel design. In 1990, the Center successfully delivered the 9,300 DWT replenishment oiler ROCS Wu Yi, commissioned by the Republic of China Navy, a landmark naval vessel equipped with both underway replenishment and vertical replenishment capabilities, which demonstrated the Center's exceptional proficiency in complex systems integration. Beyond large naval vessels, the Center also began providing standardized design solutions for coastal defense requirements. In 1995, it completed its first design for a 100-ton patrol boat, a vessel class characterized by high speed and strong maneuverability that would go on to become the mainstay of Coast Guard enforcement operations. In 1997, the Center co-designed the 500-ton Chin Chiang-class prototype patrol vessel in collaboration with the Naval Shipbuilding Development Center(NSDC), establishing the benchmark for Taiwan's first generation of indigenously built patrol ships. During this period, the Center also remained committed to enhancing the competitiveness of civilian industries: in 1999, it introduced and transferred the SCRIMP™ (Seemann Composites Resin Infusion Molding Process) patented technology from the American firm TPI Composites to domestic yacht manufacturers, successfully enabling Taiwan's yacht industry to transition from small and medium-sized vessels to the production of large luxury yachts, earning the nation its celebrated reputation as the "Kingdom of Yachts". Over this decade, the Center evolved from a pure naval architecture entity into a comprehensive systems planning institution, bridging the technical divide between military and civilian domains.

2000-2005 擴張期

技術躍升 開拓國際布局

跨入 21 世紀，中心在國際航運市場的影響力達到新高點，於 2002 年遷至淡水現址，擴展營運格局。隨著全球貨櫃化運輸需求暴增，中心精進流體力學與結構分析，挑戰超巴拿馬型 (Post-Panamax) 巨艦。2000 年，中心與中船合作為香港東方海外設計 5,500 TEU 貨櫃船，這不僅是國內首次設計超巴拿馬型船隻，更一舉奪下 RINA「2004 年傑出船舶獎」。隨後，2008 年進一步設計 8,236 TEU 大型貨櫃輪，首次採用高難度的 HT40 高張力鋼板，大幅減輕船重並提升載能。

此階段亦是中心組織精進與榮譽豐收的時期。2001 年設計的 500 噸級巡邏艦「台北艦」展現了軍民兩用技術的高成熟度。面對全球競爭，中心於 2004 年實施組織再造，調整架構以強化研發動能。這段期間，中心不再僅是臺灣的設計中心，而是具備國際視野的船舶研發機構，透過參與各項國際造船技術研討會與獎項評選，讓臺灣的造船實力在世界舞臺上閃耀。無論是承接丹麥船東的高規格訂單，或是精進執法艦艇的性能，中心都展現了身為國家級設計中心的穩定與擴張力。

2000-2005: EXPANSION PERIOD

TECHNOLOGICAL ADVANCEMENT AND INTERNATIONAL STRATEGIC DEVELOPMENT

Entering the 21st century, the Center's influence in the international shipping market reached new heights. In 2002, it relocated to its current premises in Tamsui, expanding its operational capacity. As global demand for containerized shipping surged dramatically, the Center refined its expertise in hydrodynamics and structural analysis to meet the challenge of designing Post-Panamax mega-vessels. In 2000, in collaboration with China Shipbuilding Corporation, the Center designed a 5,500 TEU container ship for Hong Kong-based Orient Overseas Container Line, not only marking the first domestically designed Post-Panamax vessel, but also earning the prestigious RINA Significant Ships of 2004. This was followed in 2008 by the design of an 8,236 TEU large container vessel, which for the first time employed the technically demanding HT40 high-tensile steel plating, substantially reducing vessel weight while enhancing cargo capacity. This period also witnessed significant organizational refinement and a wealth of accolades. The 500-ton patrol vessel ROCS Taipei, designed in 2001, demonstrated a high level of maturity in dual-use military and civilian technology. In response to intensifying global competition, the Center undertook a comprehensive organizational restructuring in 2004 to strengthen its research and development momentum. During this era, the Center transcended its role as a domestic design institution, emerging as a shipbuilding R&D organization of genuine international standing. Through active participation in international shipbuilding conferences and award competitions, Taiwan's shipbuilding prowess was brought to prominence on the world stage. Whether fulfilling high-specification commissions from Danish shipowners or advancing the performance capabilities of law enforcement vessels, the Center consistently demonstrated the stability and expansive capacity befitting a national-level design institution.

2006-2015 轉型期

更名SOIC 布局藍色能源與綠色船舶

船舶中心歷史上最關鍵的轉型期。2012 年中心由原本的「財團法人聯合船舶設計發展中心」（USDDC）正式更名為「財團法人船舶暨海洋產業研發中心」（SOIC）。這個更名不只是文字的變更，更宣告了中心從單一的造船設計，轉向「海洋產業」的全面開發，正式納入離岸風電、海洋能利用與綠能驅動等新興技術領域。

轉型後的第一個 10 年，中心展現了強大的政策執行力。2012 年主辦「離岸風電海事工程發展聯盟」成立大會，正式跨入再生能源領域。同時，在國防自主政策下，中心交出了傲人的成績單：2014 年，具備雷達匿蹤功能的「沱江級」飛彈巡邏艦下水，其穿浪型雙船體的特殊設計，象徵我國軍艦研發進入數位化與智能防禦的新紀元；隔年，目前我國最大的軍用艦艇「磐石艦」與海巡署「宜蘭艦」、「高雄艦」等 3,000 噸級巡防艦相繼交付，展現了中心承接國家指標案的高穩定性。在民用領域，中心協助日月潭推動船舶電動化，2011 年完成「日月潭二號」等綠能巡邏艇，開啟了國內電動船舶的新篇章。這 10 年，船舶中心成功轉身，成為兼具國防安全、產業輔導與綠能研發的海洋科技中樞。

2006-2015: TRANSFORMATION PERIOD

RENAMED SOIC, CHARTING A COURSE IN BLUE ENERGY AND GREEN SHIPPING

This decade represented the most pivotal transformation in the Center's history. In 2012, the organization was formally renamed from the Ship Design and Development Center to the Ship and Ocean Industries R&D Center (SOIC). This renaming was far more than a nominal change, it signaled a fundamental strategic shift from singular focus on shipbuilding design to the comprehensive development of the broader ocean industries, formally incorporating emerging technological fields including offshore wind energy, marine energy utilization, and green propulsion systems. In the first decade following this transformation, the Center demonstrated formidable policy execution capability. In 2012, it hosted the inaugural assembly of the Offshore Wind Power Marine Engineering Development Alliance(Marine-Team), marking its formal entry into the renewable energy sector. Concurrently, under the national defense autonomy policy, the Center delivered an impressive portfolio of achievements: in 2014, the Tuo Chiang-class missile patrol vessel, featuring radar stealth capabilities and a distinctive wave-piercing catamaran hull, was launched, symbolizing Taiwan's naval R&D entering a new era of digitalization and intelligent defense systems. The following year, the nation's largest military vessel to date, the replenishment ship ROCS Pan Shi, along with the 3,000-ton-class frigates ROCS Yilan and ROCS Kaohsiung, were successively delivered, underscoring the Center's consistent reliability in executing nationally significant projects. In the civilian domain, the Center assisted in advancing vessel electrification at Sun Moon Lake, completing the green-energy patrol boats including Sun Moon Lake No. 2 in 2011, opening a new chapter in domestic electric vessel development. Over this transformative decade, SOIC successfully repositioned itself as a comprehensive ocean technology hub, integrating national defense, industrial support, and green energy R&D within a single institutional mandate.



2016年

商船監造與工程服務 Commercial Vessel Supervision and Engineering Services

- **9月**：受中鋼運通委託監造之209,000噸級散裝貨輪「中鋼遠見輪」，於日本JMU ARIAKE船廠舉行命名暨交船典禮。此案展現了中心承接超大型商船國際監造的高規格品質管控實力。 **September**: The 209,000 DWT bulk carrier "China Steel Vision", commissioned by China Steel Express and supervised by the Center, was officially named and delivered at the JMU ARIAKE Shipyard in Japan. This project demonstrated the Center's high-standard quality control capabilities in undertaking international supervision projects for ultra-large commercial vessels.

2017年

組織經營、治理與人事 Organizational Management, Governance, and Personnel

- **8月1日**：邱逢琛博士正式接任第十四屆董事長；執行長職務由陳錦福副執行長代理。 **August 1**: Dr. Forng-Chen Chiu officially assumed office as the 14th Chairman, while Deputy CEO Ching-Fu Chen served as Acting CEO.

研發成果、綠能轉型與工程服務 R&D Achievements, Green Energy Transition, and Engineering Services

- **1月**：協助高雄市政府改裝完成亞洲地區首艘複合動力渡輪「快樂號」，該計畫建立了250kW級距載客渡輪與岸際儲能充電設備，並正式啟用，開啟了國內渡輪邁向綠能化與電力驅動的新頁。 **January**: Assisted the Kaohsiung City Government in completing the retrofit of "Happy Ferry", Asia's first hybrid-powered ferry. The project established a 250 kW-class passenger ferry and shore-side energy storage charging facilities, which were officially put into operation, marking a new chapter in the domestic ferry industry's transition toward green energy and electric propulsion.
- **5月**：外交部為吉里巴斯共和國打造之200噸級登陸艇於三陽造船廠完工交船，該艇由船舶中心負責審圖及監造。 **May**: A 200-ton landing craft built by the Ministry of Foreign Affairs for the Republic of Kiribati was completed and delivered at San Yang Shipbuilding Co., Ltd. The Center was responsible for drawing review and construction supervision of the vessel.

2018年

組織經營、治理與人事 Organizational Management, Governance, and Personnel

- **5月**：陳錦福代理執行長退休，由邱逢琛博士接任第十四屆董事長並兼任執行長。 **May**: Acting CEO Ching-Fu Chen retired, and Forng-Chen Chiu succeeded as the 14th Chairman while concurrently serving as CEO.

國防艦艇、工程服務與艦艇交付 National Defense Vessels, Engineering Services, and Vessel Delivery

- **4月**：完成國防部海軍「康定級巡防艦」首艦「迪化艦」之整合載台管理系統精進案任務，本案由SOIC整合國內外技術，成功展現國防自主能量的建立。 **April**: Completed the Integrated Platform Management System (IPMS) upgrade for the ROC Navy's first Kang Ding-class frigate, "Di Hua". Led by SOIC, the project integrated domestic and international technologies and demonstrated Taiwan's growing defense self-reliance.
- **12月**：完成國防部海軍「快速布雷艇」、「新一代飛彈巡防艦」及「高效能艦艇後續艦」之設計任務。 **December**: Completed the design projects for the Ministry of National Defense Navy's "Fast Mine-Laying Boat", "Next-Generation Missile Frigate", and "High-Performance Ships".

研發成果、綠能與特種船開發 R&D Achievements, Green Energy, and Specialized Vessel Development

- **2月5日**：船舶中心與靖海造船、強德電能聯手打造之亞洲第一艘全新電力渡輪「旗福一號」正式營運。該船是亞洲首艘以全電力推進的公共運輸渡輪，標誌著綠能交通技術的重大突破。 **February 5**: "CHI FU NO.1", Asia's first all-electric ferry jointly developed by SOIC, TING HAI SHIPBUILDING CO., LTD., and LIFETECH ENERGY INC., officially commenced operations. As Asia's first fully electric public transportation ferry, the vessel marked a major breakthrough in green transportation technology.
- **2月28日**：由船舶中心設計、大舟造船廠製造之屏東救難船「慈航輪」完工交船。該船是國內首艘具備6米潮差補償上下船能力之救護船，大幅提升海上救難的適應性。 **February 28**: The rescue vessel "TZU HANG" for Pingtung County, designed by SOIC and built by TA CHOU SHIP BUILDING CO., LTD., was completed and delivered. The vessel was the first rescue ship in Taiwan equipped with a 6-meter tidal compensation boarding system, significantly enhancing adaptability in maritime rescue operations.

2019年

國際監造與海洋研究服務 International Supervision and Marine Research Services

- **2月**：中油公司委託船舶中心監造，於越南新造之1,999總噸油駁船（共2艘）順利完工交船。 **February**: Two newly built 1,999 GT oil barges commissioned by CPC Corporation, Taiwan and supervised by SOIC were successfully completed and delivered in Vietnam.
- **3月**：中油公司委託船舶中心監造，於印尼新造之499總噸油駁船（共3艘）順利完工交船。 **March**: Three newly built 499 GT oil barges commissioned by CPC Corporation, Taiwan and supervised by SOIC were successfully completed and delivered in Indonesia.
- **5月16日**：國家實驗研究院海洋中心委託船舶中心監造，於越南胡志明市TRIYARDS造船廠建造之海洋調查研究船「勵進號」，在高雄港正式啟用。 **May 16**: The oceanographic research vessel "R/V Legend", commissioned by the Taiwan Ocean Research Institute of the National Applied Research Laboratories and supervised by SOIC during construction at TRIYARDS Shipyard in Ho Chi Minh City, Vietnam, was officially inaugurated at the Port of Kaohsiung.

2019年

組織經營、治理與辦公室啟用 Organizational Management, Governance, and Office Inauguration

- **4月1日**：周顯光博士接任執行長。 **April 1**: Dr. Shean-Kwang Chou assumed office as CEO.
- **12月11日**：船舶中心「產業推動辦公室暨自駕船模擬操控室」於高雄軟體園區舉行啟用典禮。此舉旨在推動船舶產業升級，並為臺灣自駕船技術提供核心的模擬訓練與研發基地。 **December 11**: SOIC held the inauguration ceremony for the "Industry Promotion Office and Autonomous Ship Simulation Control Room" at the Kaohsiung Software Park. The facility was established to promote the upgrading of the shipbuilding industry and to serve as a core simulation training and R&D base for Taiwan's autonomous vessel technologies.

研發成果、工程服務與艦艇交付 R&D Achievements, Engineering Services, and Vessel Delivery

- **1月29日**：船舶中心與旗津在地船廠合作之高雄第二艘電力渡輪「旗福二號」正式下水啟用。該渡輪整合臺灣在地機電廠商、造船廠與電池製造商，是一艘全船MIT（臺灣製造）的國產電動渡輪。 **January 29**: "CHI FU No. 2", Kaohsiung's second electric ferry developed through collaboration between SOIC and local shipyards in Cijin, officially entered service. The ferry integrated Taiwan-based electromechanical manufacturers, shipbuilders, and battery suppliers, making it a domestically produced electric ferry built entirely in Taiwan (MIT, Made in Taiwan).
- **4月**：海軍「康定級巡防艦」整合載台管理系統精進案第2艘「承德艦」順利完工交付。 **April**: Successfully completed and delivered the IPMS upgrade for the second Kang Ding-class frigate, "Cheng De".
- **4月16日**：船舶中心與大舟企業、長岡機電聯合發表經濟部科專成果，共同開發出國內首艘搭載自製動力系統之複合動力遊艇「Aquasense 33 Hybrid」。 **April 16**: SOIC, together with TA CHOU SHIP BUILDING CO., LTD. and NAGAOKA MACHINERY CO., LTD., jointly presented the results of a Ministry of Economic Affairs technology project and successfully developed AQUASENSE 33 HYBRID, Taiwan's first hybrid yacht equipped with a domestically developed propulsion system.
- **12月**：完成國防部海軍「新型救難艦」及「微型飛彈突擊艇」之合約設計任務。 **December**: Completed the contract design projects for the Ministry of National Defense Navy's "new rescue and salvage vessel" and "Micro-class Missile Assault Boat".
- **12月26日**：海巡署艦隊分署35噸級巡防艇於高鼎船廠舉行首艘交船典禮。該艇船速高達45節，全案規劃建造52艘，船舶中心負責本案之專案管理。 **December 26**: The Coast Guard Administration Fleet Branch held the delivery ceremony for the first 35-ton patrol boat at JADE SHIPBUILDING CO., LTD. The vessel is capable of speeds up to 45 knots. The project plans called for the construction of 52 vessels in total, with SOIC responsible for project management.

2020年

資安認證 Information Security Certification

- **10月**：船舶中心通過資訊安全外部稽核之第三方驗證程序，獲得國際資訊安全ISO 27001與國家資訊安全CNS 27001認證肯定。 **October**: SOIC passed the third-party verification process for external information security audits and was awarded both the international information security certification ISO 27001 and the national information security certification CNS 27001.

國防艦艇、監造與指標工程 National Defense Vessels, Supervision, and Landmark Projects

- **1月**：船舶中心監造之中鋼運通公司「208,000載重噸級散裝貨輪—中鋼創造輪」，於JMU津造船廠舉行命名及交船典禮。 **January**: The 208,000 DWT bulk carrier China Steel Creation, commissioned by China Steel Express and supervised by SOIC, held its naming and delivery ceremony at the JMU TSU Shipyard in Japan.
- **6月9日**：「新型兩棲船塢運輸艦」於台船高雄廠舉行安放龍骨典禮。本案由船舶中心負責設計與監造，為政府推動「國艦國造」之指標型建案。 **June 9**: The keel-laying ceremony for the "Amphibious Transport Dock" was held at CSBC Corporation's Kaohsiung Shipyard. SOIC was responsible for the design and supervision of the project, which served as a landmark project under the government's "Indigenous Defense Warships" policy.
- **12月11日**：參與監造之海巡署「600噸級巡防艦」首艦「安平艦」正式交付。該艦以海軍「高效能艦艇後續艦」為原型進行裝備調整，成功展現「平戰轉換」之國防研發實力。 **December 11**: The first 600-ton patrol vessel of the Coast Guard Administration, "Anping", for which SOIC participated in supervision, was officially delivered. Based on the Navy's "Follow-on High-performance Ships" platform with modified equipment configurations, the vessel successfully demonstrated Taiwan's defense R&D capability in the operational transition of the Taiwan Coast Guard from peacetime to wartime.
- **12月15日**：參與海軍「高效能艦艇後續艦」及「快速布雷艇」設計，並與海發中心共同執行監造任務。首艦下水典禮由時任蔡英文總統命名為「塔江艦」；同日，快速布雷艇首艇亦順利完成交付。 **December 15**: SOIC participated in the design of the Navy's "Follow-on High-performance Ships" and "Fast Mine-Laying Boat", and jointly carried out supervision tasks with the Naval Shipbuilding Development Center. At the launch ceremony, the first vessel was named "Ta Chiang" by then-President Ing-wen Tsai. On the same day, the first Fast Mine-Laying Boat was also successfully delivered.

2021年

組織經營、治理與綠能布局 Organizational Management, Governance, and Green Energy Development

- **5月20日**：船舶中心與丹佛斯集團攜手打造之「綠色能源應用發展中心」於臺北城市科技大學舉行揭牌啟用儀式。透過推動綠能科技實踐永續發展，並協助臺灣船舶產業接軌國際、強化核心競爭力。 **May 20**: SOIC and the Danfoss Group jointly established the "Green Energy Application Development Center", which held its inauguration ceremony at Taipei City University of Science and Technology. Through the promotion of green energy technologies, the center aims to advance sustainable development, assist Taiwan's shipbuilding industry in aligning with international standards, and strengthen its core competitiveness.

2021年

國防艦艇、監造與工程服務 National Defense Vessels, Supervision, and Engineering Services

- **4月**：海軍「康定級巡防艦」整合載台管理系統精進案第3艘「武昌艦」順利完工交付。 **April**: Successfully completed and delivered the IPMS upgrade for the third Kang Ding-class frigate, "Wu Chang".
- **4月13日**：「新型兩棲船塢運輸艦」下水典禮於台船高雄廠舉行。由時任蔡英文總統正式命名為「玉山艦」。本案由台船公司負責建造，船舶中心負責設計與監造，是「國艦國造」政策中指標型的建案與重要里程碑。 **April 13**: The launching ceremony for the "Amphibious Transport Dock" was held at CSBC Corporation's Kaohsiung Shipyard. The vessel was officially named "Yu Shan" by then-President Ing-wen Tsai. Built by CSBC Corporation with SOIC responsible for design and supervision, the project represented a landmark achievement and major milestone under the "Indigenous Defense Warships" policy.
- **10月**：海軍「康定級巡防艦」整合載台管理系統精進案第4艘「康定艦」順利完工交付。 **October**: Successfully completed and delivered the IPMS upgrade for the fourth Kang Ding-class frigate, "Kang Ding".

2022年

國防艦艇、監造與工程服務 National Defense Vessels, Supervision, and Engineering Services

- **3月**：海軍「康定級巡防艦」整合載台管理系統精進案第5艘「西寧艦」順利完工交付。 **March**: Successfully completed and delivered the IPMS upgrade for the fifth Kang Ding-class frigate, "Xi Ning".
- **4月8日**：海巡署600噸級巡防艦之第4艘「旗津艦」舉行交船典禮。本案由中信造船負責建造，船舶中心參與監造。 **April 8**: The delivery ceremony for the fourth 600-ton patrol vessel of the Coast Guard Administration, "Qijin", was held. The vessel was built by Jong Shyn Shipbuilding Co., Ltd., with SOIC participating in supervision.
- **4月22日**：海巡署4000噸級巡防艦第2艘「新竹艦」於台船公司舉行交船，船舶中心擔任本案之專案管理。 **April 22**: The second 4,000-ton patrol vessel of the Coast Guard Administration, "Hsinchu", was delivered at CSBC Corporation. SOIC served as the project manager for the project.
- **6月21日**：「船模試驗國家隊成立大會」於高雄舉行。由時任總統蔡英文親臨現場指導，表達對國家船模實驗室之期許。該實驗室建置已由船舶中心負責全案推動與執行。 **June 21**: The "Inauguration Ceremony of the National Ship Model Testing Team" was held in Kaohsiung. Then-President Tsai Ing-wen attended in person to express expectations for the National Ship Model Laboratory. SOIC was responsible for the overall planning and execution of the laboratory project.
- **10月6日**：參與監造海巡署600噸級巡防艦第5艘「八里艦」交船暨第6艘「吉安艦」下水命名聯合典禮（於中信造船舉行）。 **October 6**: Participated in the joint ceremony for the delivery of the fifth 600-ton patrol vessel "Bali" and the launching and naming of the sixth vessel "Ji'an" for the Coast Guard Administration, held at Jong Shyn Shipbuilding Co., Ltd.
- **11月**：海軍「康定級巡防艦」整合載台管理系統精進案第6艘「昆明艦」順利完工交付，全案完成。 **November**: Successfully completed and delivered the IPMS upgrade for the sixth Kang Ding-class frigate, "Kun Ming", marking the conclusion of the entire project.
- **11月16日**：舉行海巡署1000噸級巡防艦首艘「彰化艦」交船暨第2艘「台中艦」命名下水聯合典禮。本案由台船公司負責建造，船舶中心負責監造。 **November 16**: The joint ceremony for the delivery of the first 1,000-ton patrol vessel "Changhua" and the naming and launching of the second vessel "Taichung" for the Coast Guard Administration was held. The vessels were built by CSBC Corporation, with SOIC responsible for supervision.

研發成果、資通技術與榮譽肯定 R&D Achievements, ICT Technologies, and Recognition

- **6月8日**：國際海洋日，船舶中心協助湛藍海洋聯盟打造第三代「湛門機」（掃海機器人）並舉辦發表會活動。邀請陽明海運、森威能源、能元科技等重要貴賓共同分享對海洋環境保護的重視與實踐。 **June 8**: On World Oceans Day, SOIC assisted the Azure Alliance in developing the third-generation "Marine Vacuum" and held a launch event. Distinguished guests from companies such as Yang Ming Marine Transport Corporation, Shinfox Energy, and E-One Moli Energy Corp. were invited to share their commitment to and practices in marine environmental protection.
- **7月**：成功帶動跨域業者投入自駕船產業鏈，執行無人載具創新實驗計畫。完成高雄「愛之船」自動駕駛載客服務場域驗證，具備自主循跡航行、避碰、靠泊及自動售票等功能。 **July**: Successfully encouraged cross-industry enterprises to participate in the autonomous vessel industry chain through the implementation of an unmanned vehicle innovation experiment project. Completed field verification of autonomous passenger service operations for Kaohsiung's "Love Boat", featuring autonomous route tracking, collision avoidance, automated berthing, and automatic ticketing functions.
- **10月**：於台北世貿一館展出「風浪影響下船舶自主航行技術」，榮獲2022 TIE解密科技寶藏「最佳展示獎」。 **October**: Exhibited the "Autonomous Navigation Technology of Ships under the Influence of Wind and Waves" at Taipei World Trade Center Hall 1, winning the "Best Exhibition Award" at the 2022 Taiwan Innotech Expo (TIE), Tech Treasures.
- **10月**：辦理「智慧船全攻略—臺灣自駕船舶技術開發與場域應用」科技專案技術成果論壇，榮獲2022 TIE解密科技寶藏「最佳活動獎」第一名。 **October**: Organized the technology project results forum titled "Intelligent Ships Raiders: The Development of Autonomous Ships Technology and Field Application in Taiwan", which received First Prize for "Best Event Award" at the 2022 Taiwan Innotech Expo (TIE), Tech Treasures.

2023年

組織經營、治理與榮譽肯定 Organizational Management, Governance, and Recognition

- **4月26日**：船舶中心催生第一家船舶技術新創公司——「梭易科海洋應用方案股份有限公司」，引領智駕船技術邁向產業化落地。 **April 26**: SOIC facilitated the establishment of Taiwan's first ship technology startup, "SOIC Marine Solutions Co., Ltd"., leading the commercialization and industrial implementation of autonomous vessel technologies.
- **10月**：於台北世貿一館展出「智慧化航行輔助辨識系統」，榮獲2023 TIE解密科技寶藏「最佳展示獎」。 **October**: Exhibited the "Artificial Intelligent Identification Navigation Assistance System" at Taipei World Trade Center Hall 1 and received the "Best Exhibition Award" at the 2023 Taiwan Innotech Expo (TIE), Tech Treasures.
- **10月24日**：舉辦「智駕新未來·產業合作論壇」，並榮獲2023 TIE解密科技寶藏「最佳活動獎」第一名。 **On October 24th**: Organized the "Intelligent Driving New Future: Industry Cooperation Forum", which won First Prize for the "Best Event Award" at the 2023 Taiwan Innotech Expo (TIE), Tech Treasures.
- **11月**：船舶中心落實環境永續，獲新北市政府頒發112年度「民間綠色採購企業」肯定。 **November**: In recognition of its commitment to environmental sustainability, SOIC received the 2023 "Green Private Procurement Enterprise" award from the New Taipei City Government.

研發成果、工程服務與船艦交付 R&D Achievements, Engineering Services, and Vessel Delivery

- **2月16日**：海軍「高效能艦艇後續艦」第三艘「旭江艦」於龍德造船舉行下水典禮，由船舶中心負責設計與監造。 **February 16**: The launching ceremony for "Xu Jiang", the third "Follow-on High-performance Ships" of the Navy, was held at Lungteh Shipbuilding Co., Ltd. SOIC was responsible for the vessel's design and supervision.
- **5月**：國內首艘具自主循跡功能的港口垃圾清潔船「湛門機」正式於新北瑞芳鼻頭漁港服役。 **May**: Taiwan's first port waste collection vessel equipped with autonomous route-tracking capability, the Ocean Fighter, officially entered service at Bitou Fishing Harbor in Ruifang, New Taipei City.
- **5月15日**：船舶中心參與海巡署「第6艘CG607吉安艦交船、第7艘CG609命名下水，暨新型35噸級巡防艇第25艘PP-3512艇」聯合典禮。 **May 15**: SOIC participated in the joint ceremony for the delivery of the sixth Coast Guard Administration vessel CG607 Ji'an, the naming and launching of the seventh vessel CG609, and the 25th newly developed 35-ton patrol vessel PP-3512.
- **10月17日**：交通部航港局智慧航安監控船「航港1號」下水典禮，由中信造船建造，船舶中心負責設計與監造。 **October 17**: The launching ceremony for the Maritime and Port Bureau's intelligent maritime safety monitoring vessel "Maritime One" was held. The vessel was built by Jong Shyn Shipbuilding Co., Ltd., with SOIC responsible for design and supervision.
- **10月27日**：船舶中心成功打造臺灣首艘可於外海惡劣天候航行之自動駕駛共通性測試船「智駁號」，滿足ISO Small Craft Category A之設計條件，具備跨洋航行條件之安全性，可提供國內發展自駕系統外海航行載台所需之驗證功能。 **October 27**: SOIC successfully developed Taiwan's first autonomous navigation common test vessel capable of operating in harsh offshore sea conditions, the "THETIS Smart Vessel". Designed to meet ISO Small Craft Category A standards, the vessel possesses the safety requirements for transoceanic navigation and provides a validation platform for the offshore operation of domestically developed autonomous navigation systems.
- **11月23日**：船舶中心成功協助廠商致茂電子完成具備 CHAdeMO V2X 功能之四輪車端與充電柱端模擬機開發，該產品已成功銷售至日本松下電器總公司，以及韓國現代汽車日本分公司。 **November 23**: SOIC successfully assisted Chroma ATE Inc. in developing vehicle-side and charging-station-side simulators equipped with CHAdeMO V2X functions. The products were successfully sold to Panasonic Corporation headquarters in Japan and the Japanese branch of Hyundai Motor Company.

2024年

國防艦艇與公務船交船 / 下水典禮 National Defense Vessels and Government Vessel Delivery / Launch Ceremonies

- **2月6日**：海軍「高效能艦艇後續艦」之第三艘「旭江艦」交船典禮（龍德造船建造，中心負責設計與監造）。 **February 6**: Delivery ceremony for "Xu Jiang", the third "Follow-on High-performance Ships" of the Navy. The vessel was built by Lungteh Shipbuilding Co., Ltd., with SOIC responsible for design and supervision.
- **3月1日**：沱江級艦第4艘艦「武江」軍艦交船典禮，由海軍司令唐華主持。 **March 1**: Delivery ceremony for "Wu Chiang", the fourth vessel of the Tuo Chiang-class corvette program, presided over by Navy Commander Tang Hua.
- **3月9日**：海巡署嘉義級巡防艦第三艘「雲林艦」交船，暨第四艘4,000噸級巡防艦命名下水聯合典禮，總統蔡英文出席主持；此案由台船公司負責建造、船舶中心負責專案管理及監造。 **March 9**: Joint ceremony for the delivery of "Yunlin", the third Chiayi-class patrol vessel of the Coast Guard Administration, and the naming and launching of the fourth 4,000-ton patrol vessel, presided over by then-President Tsai Ing-wen. The vessels were built by CSBC Corporation, Taiwan, with SOIC responsible for project management and supervision.
- **3月26日**：海軍「高效能艦艇安江及萬江軍艦交船典禮」，總統蔡英文出席主持；此案由龍德造船負責建造、船舶中心負責設計與監造。 **March 26**: Delivery ceremony for the Navy's High-Performance Ships "An Chiang" and "Wan Chiang", presided over by then-President Ing-wen Tsai. The vessels were built by Lungteh Shipbuilding Co., Ltd., with SOIC responsible for design and supervision.
- **4月30日**：交通部航港局智慧航安監控船「航港1號」交船典禮；此案由中信造船公司負責建造，船舶中心負責設計與監造。 **April 30**: Delivery ceremony for the Maritime and Port Bureau's intelligent maritime safety monitoring vessel "Maritime One" The vessel was built by Jong Shyn Shipbuilding Co., Ltd., with SOIC responsible for design and supervision.



2024年

- **6月2日**：海巡署「安平級巡防艦第8艘永康艦交船、第9艘命名下水，暨新型35噸級巡防艇第31艘PP-3520艇交船」聯合典禮，由蕭美琴副總統主持；此案由中信造船負責建造、船舶中心負責專案管理及監造。**June 2:** Joint ceremony for the delivery of "Yongkang", the eighth Anping-class patrol vessel of the Coast Guard Administration, the naming and launching of the ninth vessel, and the delivery of the 31st newly developed 35-ton patrol vessel PP3520, presided over by Vice President Bi-khim Hsiao. The vessels were built by Jong Shyn Shipbuilding Co., Ltd., with SOIC responsible for project management and supervision.
- **10月23日**：海軍新型救難艦「大武軍艦」交船典禮；本案由台灣國際造船股份有限公司負責建造，船舶中心負責設計與監造。**October 23:** Delivery ceremony for the Navy's new rescue and salvage vessel "Dawu". The vessel was built by CSBC Corporation, Taiwan, with SOIC responsible for design and supervision.
- **11月6日**：行政院副院長鄭麗君出席海巡署「1000噸級巡防艦第3艘連江艦交船，暨第4艘CG1006命名下水聯合典禮」；案由台灣國際造船股份有限公司負責建造、船舶中心負責監造。**November 6:** Vice Premier Li-chiun Cheng attended the joint ceremony for the delivery of "Lienchiang", the third 1,000-ton patrol vessel of the Coast Guard Administration, and the naming and launching of the fourth vessel CG1006. The vessels were built by CSBC Corporation, Taiwan, with SOIC responsible for supervision.

商船與民用技術監造 Commercial Vessels and Civilian Technical Supervision

- **3月28日**：台灣中油5,000載重噸級油品化學品輪「平運輪」命名暨交船典禮；此案由新加坡洪新劉海運控股公司負責建造，船舶中心負責規劃與監造。**March 28:** Naming and delivery ceremony for CPC Corporation, Taiwan's 5,000 DWT oil and chemical tanker "Ping Yun". The vessel was built by ASL Marine, with SOIC responsible for planning and supervision.
- **11月11日**：台灣中油50,000載重噸級「安運輪」油品化學品輪命名儀式；案由台灣國際造船股份有限公司負責建造，船舶中心負責規劃與監造。**November 11:** Naming ceremony for CPC Corporation, Taiwan's 50,000 DWT oil and chemical tanker "An Yun". The vessel was built by CSBC Corporation, Taiwan, with SOIC responsible for planning and supervision.

研發成果、獎譽與認證 R&D Achievements, Awards, and Certifications

- **10月**：「船舶智慧化航行決策系統」於台北世貿展出，榮獲2024 TIE解密科技寶藏「最佳展示獎」。 **October:** The "Intelligent Maritime Navigation Decision System" was exhibited at the Taipei World Trade Center and received the "Best Exhibition Award" at the 2024 Taiwan Innotech Expo (TIE), Tech Treasures.
- **12月4日**：研發具表演功能之水下智慧遙控載具「濤寶」，於數位產業署人才培育計畫中榮獲DIGI+全球數位新星大賞專題競賽冠軍（與大葉大學合作）。 **December 4:** The underwater smart remote-controlled vehicle "Tao Bao", which has performance functions, won the championship in the DIGI+ Global Digital Talent Awards Special Competition in the Digital Industry Agency's Talent Cultivation Program (in cooperation with Da-Yeh University).
- **12月5日**：自主研發之15 MW半潛式浮式風電平台「德塔浮台（Delta Float）」，獲得財團法人驗船中心與德國驗證機構TÜV SÜD的聯合認證，彰顯臺灣在浮式風電領域的技術實力。**December 5:** The independently developed 15 MW semi-submersible floating offshore wind platform "Delta Float" received joint certification from CR Classification Society and TÜV SÜD, demonstrating Taiwan's technological capabilities in floating offshore wind power.

國家研發設施與人才培育 National R&D Facilities and Talent Development

- **5月3日**：辦理「軍艦國造技術工作坊」。 **May 3:** Organized the "Indigenous Defense Warships Technology Workshop".
- **5月16日**：國家海洋研究院「國家船模實驗室動土典禮」，總統蔡英文出席主持，此案由SOIC負責全程代辦與專案管理。**May 16:** Groundbreaking ceremony for the National Ocean Research Institute's "National Ship Model Basin", officiated by then-President Ing-wen Tsai. SOIC served as the lead project manager and agent for the entire duration of the project.
- **7月19日**：辦理「軍艦國造技術工作坊－高科大場」，探討巡防艦國造挑戰及關鍵技術。**July 19:** Organized the "Indigenous Defense Warships Technology Workshop – NKUST Session", focusing on the challenges and key technologies of domestically built frigates.
- **9月13日**：辦理「國防水下關鍵技術研討會－海大場」，提升水下聲學監控與減噪設計技術。**September 13:** Organized the "National Defense Underwater Critical Technology Seminar – NTOU Session", aimed at enhancing underwater acoustic monitoring and noise reduction design technologies.
- **10月25日**：辦理「軍艦國造技術工作坊暨國防水下關鍵技術研討會－台大場」。 **October 25:** Organized the "Indigenous Defense Warships Technology Workshop and National Defense Underwater Critical Technology Seminar – NTU Session".
- **年度活動**：與遊艇公會共同辦理「遊艇設計競賽」，並促成得獎學生進入船廠實習。**Annual Events:** Co-organized the "Yacht Design Competition" with the Taiwan Yacht Industry Association and facilitated internship opportunities for award-winning students at shipyards.

組織經營、治理與擴張 Organizational Management, Governance, and Expansion

- **2月12日**：與漢翔公司共同簽署合作協議，開啟「海空結盟」新局。**February 12:** Signed a cooperation agreement with Aerospace Industrial Development Corporation (AIDC), ushering in a new era of "sea-air alliance" collaboration.
- **7月1日**：於高雄辦公室舉行揭牌儀式，現場同步展示全新升級之「SOIC MORIS操船模擬實驗室」，展現中心深耕南部船舶及海洋產業之決心。**July 1:** Held the unveiling ceremony for the Kaohsiung Office, where the newly upgraded "SOIC MORIS Ship Handling Simulation Laboratory" was simultaneously showcased, demonstrating SOIC's commitment to the development of the shipbuilding and marine industries in southern Taiwan.

2025年

2025年

- 船舶中心員工人數突破296人。SOIC's workforce exceeded 296 employees.

研發成果與國際獎譽 R&D Achievements and International Recognition

- **4月7日**：自主研發之「智慧航行輔助系統」榮獲2025年美國愛迪生獎（Edison Awards）銀獎肯定，提升臺灣海洋科技國際能見度。**April 7:** The independently developed "Artificial Intelligence Identification Navigation Assistance System" received the Silver Award at the 2025 Edison Awards in the United States, enhancing the international visibility of Taiwan's marine technologies.
- **10月31日**：自主研發「智慧船舶航行安全驗證平台」，由財團法人驗船中心進行獨立公正檢驗。**October 31:** The independently developed "Smart Ship Navigation Safety Verification Platform" underwent independent inspection conducted by CR Classification Society.
- **12月2日**：燃料電池技術里程碑。中心成功協助國內廠商於實驗載台「智駁號」完成燃料電池系統整合安裝，並順利完成實場域測試（累計航程達24公里），標誌著中心邁入船舶氫能系統整合之重要里程碑。**December 2:** A milestone in fuel cell technology was achieved. SOIC successfully assisted domestic manufacturers in integrating and installing a fuel cell system on the experimental test platform vessel "THETIS Smart Vessel", and successfully completed field testing with a cumulative voyage distance of 24 kilometers, marking an important milestone in SOIC's advancement into hydrogen energy system integration for vessels.

國防艦艇、公務船交船與下水典禮 National Defense Vessels, Government Vessel Delivery, and Launch Ceremonies

- **1月10日**：行政院長卓榮泰出席海巡署「長濱艦交船、CG612命名下水、PP-10096及PP-3525交船」聯合典禮（中心負責專案管理與監造）。 **January 10:** Premier Jung-tai Cho attended the joint ceremony for the Coast Guard Administration's delivery of "Changbin", the naming and launching of CG612, and the delivery of PP-10096 and PP-3525. SOIC was responsible for project management and supervision.
- **2月26日**：教育部「御風」實習船交船暨首航典禮，由中心負責專案管理及監造。**February 26:** The Ministry of Education's training vessel "WIND RIDER" held its delivery and maiden voyage ceremony, with SOIC responsible for project management and supervision.
- **9月8日**：海巡署1000噸級巡防艦第四艘「花蓮艦」交艦及第五艘「澎湖艦」命名下水聯合典禮，由副總統蕭美琴主持，海洋委員會主委管碧玲及產官學各界代表共同出席，見證「國艦國造」的重要成果。（中心負責監造）。 **September 8:** The joint ceremony for the delivery of "Hualien", the fourth 1,000-ton patrol vessel of the Coast Guard Administration, and the naming and launching of the fifth vessel "Penghu" was presided over by Vice President Bi-khim Hsiao. Minister of the Ocean Affairs Council Bi-ling Kuan, along with representatives from government, industry, and academia, attended the ceremony to witness this important achievement under the "Indigenous Defense Warships" policy. SOIC was responsible for supervision.

- **10月2日**：財政部關務署5噸級快艇第2艘及第3艘交船，本案由中心負責設計與監造。**October 2:** The second and third 5-ton fast patrol boats for the Customs Administration of the Ministry of Finance were delivered. SOIC was responsible for design and supervision of the project.
- **10月2日**：參與海巡署聯合典禮，包含600噸級巡防艦第10艘「蘇澳艦」交船暨第11艘「CG613」命名下水（海洋委員會管碧玲主委主持）。 **October 2:** Participated in the Coast Guard Administration's joint ceremony, including the delivery of "Su Ao", the tenth 600-ton patrol vessel, and the naming and launching of the eleventh vessel CG613, presided over by Ocean Affairs Council Minister Bi-ling Kuan.

產研合作、展覽與人才培育 Industry-Academia Collaboration, Exhibitions, and Talent Development

- **3月2日**：圓滿完成「國家船模實驗室專業人才培訓」（自113年6月起辦理），提升我國海洋產業本土化與關鍵核心技术能量。**March 2:** Successfully completed the "National Ship Model Laboratory Professional Talent Training Program" (conducted since June 2024), enhancing Taiwan's marine industry localization and strengthening key core technologies.
- **7月18日**：辦理「國防水下關鍵技術研討會－海大場」，涵蓋電力推進系統、水下聲學與機器人領域。**July 18:** Organized the "National Defense Underwater Critical Technology Seminar – NTOU Session", covering electric propulsion systems, underwater acoustics, and robotics.
- **8月1日**：辦理「軍艦國造技術工作坊－台大場」，針對軍事巡防小艇與大型救難船設計進行深度探討。**August 1:** Organized the "Indigenous Defense Warships Technology Workshop – NTU Session", featuring in-depth discussions on the design of military patrol craft and large rescue vessels.
- **9月18日至20日**：以自主研發之「高效能艦艇後續艦（塔江艦）操船模擬機」協助海軍參展「2025年臺北國際航太暨國防工業展」，賴清德總統及顧立雄部長親自指定操作體驗。**September 18-20:** Assisted the Navy in participating in the "2025 Taipei Aerospace & Defense Technology Exhibition" by showcasing the independently developed "Follow-on High-performance Ships"(Ta Chiang) Ship Handling Simulator". President Ching-te Lai and Minister of National Defense Wellington Koo personally tried out the simulator for hands-on operation and experience.

CH.2 國防基石

國艦國造新里程

Foundation of National Defense:
A New Milestone in Indigenous Defense Warships



從設計監造到技術文件

推動國艦國造為國防基石

配合我國推動國艦國造政策，船舶中心投注近半世紀以來的船舶發展經驗，協助各型艦艇的設計與監造工作，並加以建立技術文件工程能量，依各艘新造船艦功能編製相關操作手冊，使國艦國造得以實現更高效益、促進國防自主。

「國艦國造」是我國建立國防自主的重要政策，透過自有船艦自行建造的方式，不僅能符合使用特性與需求、有效增進戰力，還能帶動國內造船相關產業發展、提升國防工業能量。自 1976 年成立至今的船舶中心，經由執行各項民間與軍方的委託案，已累積相當豐富的船舶設計、監造技術服務等經驗與能力，自是實現國艦國造的強大後盾。

在 2016 年公布的國艦國造 12 項造艦計畫中，以安海計畫打造新型救難艦（大武級救難艦）即為主要項目之一；新型救難艦的換裝，可顯著強化國軍在海上救難的能力，並交由船舶中心擔綱設計與監造的任務。

投入設計監造 推動救難艦換裝

為有效汰換舊型救難艦艇，並因應現代

化海上救難任務需求，海軍新型救難艦於整體性能上大幅提升：最高航速可達 18 節，巡航船速 12 節時續航力達 10,000 浬；採用 5 部發電機、雙馬達之全電力推進系統，配置雙俥、雙舵及可變螺距螺槳推進器，並整合艏側推進器與伸縮式全向推進器。

艦上裝備符合國際海事組織 (IMO) DP1 級標準之動態定位系統 (Dynamic Positioning, DP)，即便在海象 4 級、海流速度 1.5 節的條件下，仍可有效維持船位穩定。

在救難與支援功能方面，新型救難艦配備高性能拖帶與消防系統；可於船速 6 節、海象 4 級條件下，執行 10 萬噸級船舶之拖帶作業；另配置 4 座射程達 120 公尺之消防水瞄及水幕灑水系統，可有效支援海上滅火與艦體防護任務。

在水下救援與打撈作業方面，新型救難艦配置可下潛至 100 公尺之潛水鐘系統，能於海象 4 級條件下支援 3 名潛水人員執行任務，並設有可容納 5 人以上之減壓艙。此外，艦上亦配備最大作業深度達 500 公尺、航速 3 節之水下遙控載具 (Remotely Operated Vehicle, ROV)，可執行大範圍海床搜索、水下探測及目標定位等任務，進一步強化水下作業能力。

經過全新設計的新型救難艦，具備更大的拖帶能力與更多元的救難設備，可確實支援海軍艦艇到民間船舶的救援任務。同時船舶中心還負責此次新型救難艦的監造工作，以確保船艦的建造能符合設計要求及品質；後續也順利推動首艘原型艦大武軍艦於 2023 年 3 月正式下水，開啟未來更多新型救



船舶中心 2022 年制訂《國艦國造技術文件發展指南》，做為每艘艦艇專屬技術文件的編製標準。In 2022, SOIC established the "Indigenous Defense Warships Technical Documentation Development Guidelines" to standardize the preparation of vessel-specific technical documentation for individual naval platforms.

難艦的建造。

編製技術文件 發揮新造艦艇性能

透過自造船艦的方式，可讓我國海軍艦艇具有客製化的規格設計，以能因應不同的作戰任務需求；然而要能確實發揮各類新型艦艇的功能與性能，就不可缺少完整且詳細的操作指引。因此多年前船舶中心即集結資深人才，投入船艦技術文件工程的研究，並彙集先進國家的經驗與資料，於 2022 年制訂《國艦國造技術文件發展指南》，做為每艘艦艇專屬技術文件的編製標準。

此後在船舶中心提供的國艦國造監造技術服務中，也將技術文件工程列為服務項目之一。其中編製的技術文件，即為大武軍艦的救難裝備手冊與輪機裝備手冊；後續配合高效能艦艇後續艦（沱江級巡邏艦）和新一代輕型巡防艦的造艦期程，也都陸續針對各艘艦艇推動船艦裝備系統手冊、輪機裝備操作技術手冊、戰系技術手冊、戰系裝備系統操作手冊、戰系裝備故障處理程序手冊等技術文件彙編。

在各艘艦艇的技術文件中，都會精準詳列該艦上所有裝備的規格性能與操作流程，甚至根據各個部門位置的操艦官兵分冊，以達到正確的操作，以及訓練和執行任務等；這不僅能有效維護相關人員與裝備的安全，並減少損壞、提高壽期，也是船舶中心順應國艦國造發展創造的新能力與新價值。📖

FROM DESIGN AND SUPERVISION TO TECHNICAL DOCUMENTATION: ADVANCING TAIWAN'S INDIGENOUS DEFENSE WARSHIPS AS A PILLAR OF NATIONAL DEFENSE

Taiwan's Indigenous Defense Warships policy is a vital pillar of defense autonomy, ensuring that purpose-built vessels meet operational requirements while strengthening the domestic defense industrial base. Since 1976, the Ship and Ocean Industries R&D Center (SOIC) has served as a key technical backbone for this initiative, leveraging decades of expertise in vessel design, construction supervision, and technical documentation engineering.

A primary example of this policy is the An-Hai Project, under which SOIC was tasked with the design and construction supervision of the Navy's new rescue and salvage vessel, Dawu. Launched as a prototype in March 2023, the vessel modernizes Taiwan's fleet through substantial performance upgrades:

- **Propulsion & Range:** *Dawu* is equipped with an all-electric propulsion system, achieving a maximum speed of 18 knots and a cruising range of 10,000 nautical miles at 12 knots.
- **Station Keeping:** The vessel is equipped with an IMO DP Class 1 (DP1)-compliant dynamic positioning system, providing position-keeping capability under Sea State 4 conditions and currents of up to 1.5 knots.
- **Surface Rescue:** The vessel is fitted with high-performance firefighting systems and a towing winch capable of towing vessels of up to 100,000 tons.
- **Subsea Salvage:** The vessel is equipped with a diving bell system rated for 100 m, an onboard decompression chamber, and a remotely operated vehicle (ROV) capable of operating at depths of up to 500 m for seabed search operations.

Beyond vessel construction, fully realizing customized naval capabilities requires comprehensive operational guidance. To address this need, SOIC established *Indigenous Defense Warships Technical Documentation Development Guidelines* in 2022 as the standard for preparing vessel-specific technical documentation. Technical documentation engineering has since been incorporated into SOIC's technical supervision services for Indigenous Defense Warships programs. For the rescue and salvage vessel *Dawu*, SOIC compiled dedicated rescue equipment and machinery equipment manuals. In line with Taiwan's naval shipbuilding schedule, SOIC has also progressively developed vessel-specific equipment, machinery, combat system, and troubleshooting manuals for "Follow-on High-performance Ships" (Tuo Chiang-class) and next-generation light frigates. By detailing equipment specifications, performance characteristics, and operating procedures, and by organizing manuals according to shipboard departments and crew duties, these documents support proper operation, crew training, and mission execution. They also enhance personnel and equipment safety, reduce equipment damage, and extend vessel service life, representing a new capability and added value developed by SOIC in support of Taiwan's Indigenous Defense Warships policy.



在 2016 年公布的國艦國造 12 項造艦計畫中，以安海計畫打造新型救難艦（大武級救難艦）為主要項目之一。The An-Hai Project was one of the major initiatives under the 12 Indigenous Defense Warships projects announced in 2016, with its primary objective being the construction of a new rescue and salvage vessel, the vessel *Dawu*.

在臺灣長達一千多公里的海岸線上，海巡署艦艇日夜巡弋。然而，每艘船艦從藍圖轉化為實體，背後都有著一連串的技术折衝、行政協調與危機處理。船舶中心在多項海巡造艦案中，扮演關鍵的監造與技術顧問角色，憑藉始終如一的專業堅持，完成一項項艱難任務。

在海巡署 1,000 噸級巡防艦 6 艘建造案中，機關提供初版規範書及參考圖資予得標船廠進行細部設計及建造，但允許於不增加期程與成本前提下，依細部設計成果調整規範書內容，如：取消非必要滑油淨油機、提升高壓水槍射程至 120m 以增強執勤能量等。船舶中心作為監造單位，除了維持工程品質與管控進度外，亦須協助機關於契約架構及政府採購規定下，妥適處理細部設計變動衍生之技術及契約變更相關議題。

首艦因設計整合及疫情、戰爭等不可抗力因素影響，工期較長，惟隨船廠產能提升、監造積極管控並提出工序優化建議，第 2-4 艦完工日已由符合契約期限逐步提早至規定日期前約 4 個月，餘艦進度更大幅超前，顯示工藝趨於穩定成熟，履約效率明顯提升，並能交付出令機關滿意的成果。

克服專案轉續挑戰
解決火山浮石危機

100 噸級巡防救難艇案在執行歷程中面臨諸多實務挑戰與環境變數。該案因原承造船廠財務危機倒閉而中斷，全案由台船基隆廠接續承建，並在船舶中心嚴謹的監造與督導下，協助船廠迅速銜接工程進度並精準掌握技術細節。

在技術執行層面，100 噸級艦艇面對高馬力主機配置帶來重量變動對船速表現之潛在挑戰，引導其維持原船型並優化設計，與落實嚴謹的重量控制，最終成功驗證 28 節以上合約船速目標。此外，監造團隊亦同步協助應對各項外部環境變數與複雜技術議題。針對日本火山浮石漂移抵我國海域後對海巡艦艇動力系統之威脅，載重線勘畫豁免之法規適法性釐清等議題，監造團隊均透過



船舶中心在多项海巡造舰案中，扮演關鍵的監造與技術顧問角色，憑藉始終如一的專業堅持，完成一項項艱難任務。SOIC plays a pivotal role as a supervisor and technical consultant in numerous Coast Guard shipbuilding projects, overcoming a series of complex challenges through steadfast professional dedication.



100噸級艦艇的主要挑戰是重量控制，船廠在細部設計積極減重，如減輕孔、精準調控板厚等；船舶中心則嚴謹審查，以符合重控與強度的平衡。For the 100-ton class vessels, the primary challenge lies in weight control. While the shipyard pursued aggressive weight reduction in detailed design—such as lightening holes—SOIC rigorously reviewed to ensure the balance between weight control and structural strength.

嚴謹的技術查證與實務研判，提供專業應對策略，確保海巡勤務能量在各類考驗下仍能穩定執勤。

接手監造解約空窗 因應產業人力競爭

在 50 艘沿岸多功能艇案中，船舶中心於前任監造單位解約後半途接手，面臨前期資料未完全掌握之困難，需即時盤點現況、補建監造機制，同時兼顧工期壓力與品質要求。另因前監造約中止至新約生效日間存有空白，部分程序尚待完備，致當時案件現況與前期規範存有落差，監造團隊遂在既有架構下，協助機關逐步調整與現況相符。

另在大型艦艇建造中，外部環境的競爭也成為挑戰。當時適逢離岸風電產業興起高薪誘因導致造船界人力短缺。為了解決船廠人力重疊導致的延宕，船舶中心與船廠磨合，規劃出工程優先順序與人力跨案調配，確保在人力缺口下仍能維持交付品質。

優化旗艦醫療功能 預留平戰轉換潛力

4,000 噸級巡防艦則是海巡署最強大的旗艦，不僅具備遠洋航行能力，更擁有完善的醫療艙間與手術室，能提供救護功能。更重要的是，艦艇設計具備「平戰轉換」潛力。平時執行海上巡護任務，一旦進入戰時，加入海軍指揮體系，協助防衛海疆，保衛臺灣主權。

從近岸巡防艇到千噸級巡防艦，船舶中心扮演技術把關，以及串聯設計、建造、監造與任務需求的重要角色。面對契約變更、廠商危機、人力短缺與環境風險，以專業判斷與協調能力穩定造艦進度，為臺灣海疆防衛與海上救援能量奠定堅實基礎。

GUARDIANS OF THE BLUEPRINT: HOW PROFESSIONAL SUPERVISION EMPOWERS TAIWAN'S NEW COAST GUARD FLEET

Across Taiwan's vast coastline, Coast Guard Administration (CGA) vessels serve as tireless sentinels. Yet, the journey from a naval architect's blueprint to a commissioned ship is fraught with technical friction and administrative hurdles. Central to this transformation is the Ship and Ocean Industries R&D Center (SOIC), acting as a vital technical consultant and supervisor to ensure the fleet's modernization stays on course.

Efficiency in the 1,000-Ton Class

In the procurement of six 1,000-ton patrol vessels, the shipyard adjusted specifications via detailed design, such as boosting high-pressure water cannon range to 120 meters to enhance operations. As the supervisor, SOIC ensured quality and assisted the CGA with technical and contract modifications under government procurement laws. Despite initial pandemic and geopolitical delays, the shipyard's expanding capacity, paired with SOIC's workflow proposals, accelerated progress. Consequently, delivery of the 2nd through 4th ships was gradually advanced to four months ahead of schedule, proving that shipyard craftsmanship synergized with SOIC's strategic supervision drastically boosts contract performance.

Crisis Management and Technical Precision

The 100-ton patrol boat project faced severe challenges when the original builder's bankruptcy required transfers to CSBC's Keelung shipyard. Under SOIC's strict supervision, the project transitioned smoothly while managing key technical details. To address potential speed risks from heavier equipment such as high-power engines, SOIC guided the shipyard to optimize the design while maintaining the original Lines and implementing rigorous weight controls, ultimately verifying the contract speed of over 28 knots. Furthermore, the team provided professional strategies to handle environmental variables—such as navigating Japanese volcanic pumice threats—and resolved complex load-line regulations, ensuring the fleet's operational capabilities remained stable under all conditions.

Overcoming Transition and Labor Gaps

SOIC's adaptability was further proven during the 50 Coastal Multi-Purpose boats project. Taking over mid-contract after a previous supervisor's termination, SOIC rapidly inventoried incomplete data to rebuild quality mechanisms. For larger vessels, they navigated a national shipbuilding labor shortage caused by the burgeoning offshore wind industry. By coordinating manpower across different projects, SOIC ensured that delivery quality remained uncompromised.

Strategic Versatility: The 4,000-Ton Flagships

The fleet's crown jewels are the 4,000-ton vessels. These flagships feature advanced medical suites for maritime rescue and a crucial peacetime-to-wartime transition potential. In peacetime, they protect sovereignty; in wartime, they seamlessly integrate into Naval command. From nimble coastal craft to massive frigates, SOIC serves as the ultimate technical gatekeeper. By stabilizing progress amidst crises and labor shortages, SOIC has laid a sophisticated foundation for Taiwan's maritime defense and rescue capabilities.

御風輪為海事教育實習船，隸屬教育部並委託高雄科技大學管理營運，由台船承造，船舶中心則擔任專案管理與技術服務角色。面對校方教學需求、造船實務與嚴苛國際客船法規，中心發揮專業轉譯功能並提供科學評估，確保這座全長 110 米、承載 250 名師生的移動校園兼具教育便利與航行安全，成為技職教育接軌國際的重要推手。

御風輪的誕生，源於舊船育英二號的更換需求。育英二號服役已久，載運量僅 80 人，且因船齡漸長，維修費用節節上升，後期甚至只維持港內教學。為了提升學生的海上生活體驗與操作能力，教育部撥款支持高科大執行此案，將載運人數大幅提升至 250 人，並納入與商船規格一致的駕駛室、機艙及輪機控制室，甚至安裝觸媒轉化器、壓艙水處理系統等先進設備。

轉譯教學需求為技術語言 以理服人

在御風輪專案，船舶中心主要提供專案管理與建造技術服務，最大挑戰之一，在於將學校老師的教學與管理需求，轉化為招標文件與符合法規的技術文字。

例如，由於御風輪屬客船等級，防火與安全規範遠較一般貨船嚴格，搭載乘客較多

也使人員疏散分析設計更為困難，分散的梯道亦會造成後續管理上的困擾。面對此議題，專案管理團隊主動協助船廠，透過詳細的人員疏散模擬分析計算，最終完成前、中、後三組梯間的配置，同時兼顧逃生安全與人員管理的便利性。

此外，為了建立與校方及審查委員的信任，船舶中心團隊採取積極主動的溝通策略。在投標階段，團隊詳盡整理委員的所有意見，即便在得標後仍一一拜訪討論，使專案後續進行順利。

居中協調 運用數位科技推動進度

當專案進入建造階段，船舶中心更稱職扮演船廠（台船）與船東（教育部、高科大）之間的溝通協調角色。例如，在艙內設計選色方面，船廠習慣提供小樣本給船東審查，但船東往往無法想像完工後的樣貌，導致雙方多次文件往返仍無法決斷。針對此情況，專案管理團隊隨即介入，建議船廠製作局部空間的 3D 模擬圖，並邀請船東到現場直接調色。透過面對面溝通，原本的僵持不下轉化為順利的討論，有效推動工程進度。

此外，疫情期間的各種不確定性也為工程帶來壓力。由於人力短缺、工班受疫情影響，原定施工排程面臨延誤風險，船舶中心憑藉同時在台船執行的多個專案經驗，主動協助船廠全盤考量，靈活調整各案場間的程序。例如，當某工班因故休息時，便協調後續工作先行準備，或與其他專案互相挪移資源。最終，即便交船日期稍有展延，但在合理的調整下，仍順利完成這項艱鉅任務。



御風輪全方位滿足師生在海上實習期間的學習與休閒需求。The WIND RIDER is designed to be all-encompassing, meeting the diverse learning and leisure needs of faculty and students during their time at sea.

優化實習空間與設備 建造海事培訓搖籃

御風輪於 2025 年正式交船，其設計處處考量教學實務與學生生活品質。相較於舊有的育英二號，御風輪特別規劃兩座實習駕駛室，並刻意拓寬走道與操作空間，確保學生在觀摩學習時能擁有充裕的視野與動線。除了教學設施方面，艙內不僅建置完善的視聽教室與機艙教學系統，更導入航海、輪機及高壓電等三套全功能模擬機系統，強化學生的實務應變能力。值得一提的是，教學模擬機在船舶靠岸時仍可運作，讓尚未具備出海條件的高職學生也能在港內進行扎實的技能訓練。

除了專業教學空間，船艙亦規劃體育室、自修室、會議室，甚至是電影院與舒適的用餐區，全方位滿足師生在海上實習期間的學習與休閒需求。御風輪交船後已執行十餘趟次，包含前往東京、鹿兒島等長程航程，成為臺灣航海教育最重要的搖籃。



御風輪特別規劃兩座實習駕駛室，並刻意拓寬走道與操作空間，確保學生在觀摩學習時能擁有充裕的視野與動線。Notably, the WIND RIDER features two dedicated training bridges with intentionally widened aisles and operating areas, ensuring students have ample visibility and space to move during observation and hands-on learning.

CULTIVATING TALENT FOR THE HIGH SEAS: THE "WIND RIDER" PROJECT

The WIND RIDER is a state-of-the-art maritime training vessel commissioned by the Ministry of Education and operated by the National Kaohsiung University of Science and Technology (NKUST). Built by CSBC Corporation, with project management and technical services provided by the Ship and Ocean Industries R&D Center (SOIC), this 110-meter "campus at sea" represents a major leap forward for Taiwan's vocational education, aligning it with stringent international standards.

From Legacy to Innovation

The project was born from the need to replace the aging Yu-Ying No.2. While the predecessor was limited by an 80-person capacity and rising maintenance costs, the WIND RIDER accommodates 250 persons. It features professional-grade facilities, including bridge and engine control rooms that mirror commercial shipping standards, alongside advanced environmental technology like catalytic converters and ballast water treatment systems.

Bridging Education and Engineering

One of SOIC's primary challenges was translating academic requirements into compliant technical specifications. Because the WIND RIDER is classified as a passenger vessel, it must adhere to rigorous fire and safety regulations. SOIC utilized detailed evacuation simulations to design a three-stairwell configuration, ensuring both emergency safety and efficient daily movement. Furthermore, SOIC acted as a vital mediator between the shipbuilders and the university. To resolve stalemates over interior design, the team introduced 3D digital mock-ups, allowing stakeholders to visualize and adjust spaces in real-time. This tech-driven approach, combined with proactive labor management during the COVID-19 pandemic, ensured the project's successful completion despite global supply chain disruptions.

A Modern Cradle for Maritime Excellence

Delivered in 2025, the WIND RIDER is meticulously designed for hands-on learning. Key features include:

- **Dual Training Bridges:** Expanded aisles provide students with unobstructed views during navigation drills.
- **Integrated Simulators:** Navigation, Engineering, and High-Voltage simulators allow for rigorous training even while the ship is docked.
- **Quality of Life:** The vessel includes a gym, cinema, and modern dining areas to support long-haul voyages.

Since its delivery, the WIND RIDER has already completed numerous voyages to international ports like Tokyo and Kagoshima. By balancing educational functionality with navigational safety, it has established itself as the premier training ground for the next generation of maritime professionals.



御風輪為海事教育實習船，隸屬教育部並委託高雄科技大學管理營運，由台船承造，船舶中心則擔任專案管理與技術服務角色。The WIND RIDER is a maritime training vessel under the Ministry of Education, managed and operated by National Kaohsiung University of Science and Technology. It was built by CSBC Corporation, Taiwan, with SOIC providing project management and technical services.

守護國家能源命脈 油品化學輪再進化

平運輸與安運輸的建造，象徵臺灣能源韌性的提升。5,000 噸級的平運輸極大化有限空間，靈活執行離島補給任務；50,000 噸級的安運輸則接軌國際，提前達成第三期能效指標，並預留雙燃料轉型空間。這兩大建案充分展現船舶中心從規劃、監造到預見未來需求的整合實力。

維持臺灣能源供應的穩定，絕非僅靠陸路的油罐車或地下管線。事實上，支撐國家能源網韌性的關鍵命脈，是中油自有船隊 24 小時不間斷的環島運輸。為強化這條海上供應鏈，中油近年推動「平運輸」與「安運輸」新造計畫，並委由船舶中心執行全程監造。

空間極大化 平運輸的離島補給挑戰

5,000 噸級的油品化學輪「平運輸」，全長約 100 公尺，主要任務是支援臺灣本島各港口補給及離島油品運送。過去中油雖有 6,500 噸級船舶，但進入離島港口時易受潮差與吃水限制，載運效益未達最佳化。因此，平運輸特意將級距下調至 5,000 噸，以提升調度靈活性。



5,000噸級的油品化學輪「平運輸」，主要任務是支援臺灣本島各港口補給及離島油品運送。The 5,000-ton oil and chemical tanker "Pingyun" is primarily tasked with supporting refueling operations across Taiwan's mainland ports and transporting petroleum products to its outlying islands.

然而，船體縮小並不代表功能可以簡化。如何在有限的空間內，完整保留駕駛臺、貨油控制室、住艙及作業區，成為設計首要課題。該船由新加坡 ASL 船廠負責建造，船舶中心則扮演中堅角色，精準協調整合船東需求、設計圖說與施工條件。為達成空間利用極大化，平運輸採用全寬駕駛臺並集中配置操作臺，搭配大面積開窗設計，不僅顯著提升空間通透感與駕駛視野，更讓船員無需頻繁移動即可掌控全局，大幅優化操作效率。

跨境監造 疫情下的工期奇蹟

平運輸自 2021 年 11 月簽約，至 2024 年 3 月正式交船，實際建造期僅約 28 個月，遠低於預留給船廠的 36 個月。在新冠疫情肆虐、全球供應鏈混亂的情況下，此成果尤為難得。

疫情期間，新加坡工作簽證門檻大幅提高，船舶中心監造人員排除萬難進駐第一線。面對設備交期拉長、工序停滯等考驗，兩位外派同仁自 2022 年 9 月起駐守新加坡長達一年半，負責監造工作，涵蓋結構焊道、水密狀況、機械設備測試等，確保船體具備 20 年以上的使用壽命。

在海上公試期間，船東及團隊更展現了卓越的應變能力。當時平運輸進行續航力測試，主機警報大作，經查為燃油系統壓力設定不當導致爆管。團隊隨即協助船東回頭查核圖資並重新配置管路，不僅解決當下的危機，更優化機艙空間配置，讓未來維修作業更為順手。



50,000噸級的「安運輸」在設計階段便瞄準2025年第三期船舶能效設計指標（EEDI Phase 3），目標是較基準線降低3成以上的碳排放。The 50,000-ton "Anyun" was designed with a focus on the 2025 EEDI Phase 3 (Energy Efficiency Design Index) standards, aiming to reduce carbon emissions by more than 30% compared to the established baseline.

遠瞻未來 安運輸的節能與雙燃料布局

相對於平運輸的精悍，50,000 噸級的「安運輸」則展現接軌國際的野心。作為國際航線船舶，安運輸在設計階段便瞄準 2025 年第三期船舶能效設計指標（EEDI Phase 3），目標是較基準線降低 3 成以上的碳排放。

台船從船型優化著手，透過降低水下阻力減少主機馬力需求。此外，更在螺旋槳前方安裝節能裝置，藉由整流與增推減阻技術提升推進效率。據評估，此項設計可節能約 2% 至 4%，每年減少約 329 噸二氧化碳排放。結合高效防汙塗料與螺槳優化，安運輸成功提前達成環保法規要求。

更具前瞻性的是，安運輸已經為未來的能源轉型預留空間。儘管目前採用傳統燃料，但其主機選型已納入雙燃料可能性，後續可靈活改裝為甲醇或其他替代燃料系統。

從平運輸到安運輸的成功實績，充分展現船舶中心在跨國建造協調與前瞻節能合規的深厚實力。值得一提的，船舶中心近年積極由單純的繪圖設計，轉型為能夠提供涵蓋建案規劃、採購招標、建造監造，乃至後續維保與改裝評估的全壽期服務，建立更專業、更完整的全方位技術支援體系。📍

SAFEGUARDING THE NATION'S ENERGY LIFELINE: THE EVOLUTION OF TAIWAN'S TANKER FLEET

A nation's energy security is often measured by the resilience of its supply chain. In Taiwan, this lifeline is sustained by CPC Corporation's self-operated fleet, which provides round-the-clock maritime transportation. The recent completion of Tanker Pingyun and Tanker Anyun represents a pivotal advancement in this mission. These projects showcase the integrated expertise of the Ship and Ocean Industries R&D Center (SOIC), spanning project planning, construction supervision, and future-ready design.

Maximizing Efficiency in Compact Spaces

The 5,000-ton Pingyun was designed to address the unique challenges of offshore island supply. While CPC previously used 6,500-ton vessels, those ships were often hampered by tidal and draft limitations at smaller ports. By deliberately downsizing to 100 meters long, the Pingyun gained the operational flexibility required for these sensitive routes.

Downsizing, however, required significant engineering ingenuity. To ensure no loss of functionality, SOIC coordinated a design that maximizes space within a more compact hull. The vessel features a full-width bridge with integrated consoles and expansive windows, enhancing navigational visibility and allowing crew members to manage operations with minimal physical movement.

Overcoming Global Challenges

The construction of the Pingyun at Singapore's ASL Shipyard became a "scheduling miracle" during the COVID-19 pandemic. Despite severe supply chain disruptions and tightened visa regulations, SOIC personnel remained on the front lines for 18 months. Their dedication ensured the vessel was delivered in just 28 months—well ahead of the original 36-month timeline. The team even assisted the owner in reviewing the drawings and reconfiguring the fuel system piping after a pressure-related rupture during sea trials, not only fixing the issue but also optimizing the engine room for future maintenance.

Anticipating the Green Energy Transition

While the Pingyun focuses on versatility, the 50,000-ton Anyun aligns Taiwan with global environmental standards. Built for international routes, it achieved EEDI Phase 3 targets ahead of schedule, reducing carbon emissions by over 30% relative to the baseline. This was achieved through hull optimization, high-performance coatings, and advanced energy-saving devices that cut annual CO₂ emissions by approximately 329 tons.

Furthermore, the Anyun is built for the future; its engine is designed for potential dual-fuel conversion, allowing for a seamless transition to methanol or other alternative fuels. Through these projects, SOIC has proven its transformation into a comprehensive lifecycle service provider, ensuring Taiwan's maritime fleet remains efficient, sustainable, and secure.

整合先進系統 提升海事效能 智慧航安監控船開啟巡檢新篇章

隨著國際海事公約對港口國管制（Port State Control, PSC）法規日益嚴格，以及因應離岸風電發展對助航設施與風場巡檢任務需求與日俱增，交通部航港局於近年推動「智慧航安監控船」建造計畫。這艘由船舶中心設計、中信造船廠承造的巡檢船「航港 1 號」，導入多項創新的智慧航行系統，為臺灣海域航行安全與環境監測開啟新篇章。

早期航港局主要仰賴 1987 年交船的「運星艦」執行任務，該艦原隸屬海關總稅務司署，主要功能為燈塔運補與查緝。然而，隨著燈塔自動化與無人化發展，傳統大型運補需求降低；舊有船艦因法規過時、設備老舊，每年維修費用高達數百萬甚至上千萬元，且為符合「海上人命安全國際公約（SOLAS）」執行港口國管制（PSC）檢查，並執行助航設施與風場巡檢任務，航港局決定建造一艘更具靈活性、安全性且智慧化的新一代巡檢船。

建置 AR 擴充實境系統 整合 360 度全景監控

於 2024 年交船的「航港 1 號」，最大亮點在於智慧系統整合。船上配置擴充實境（AR）系統，該系統能將雷達回波、自動識別系統（AIS）資訊與電子海圖統整於單

一可視畫面，並且標註周邊船名與距離。在彰化、臺中等離岸風場航道密集的複雜環境中，此項功能可大幅減輕船長需頻繁切換螢幕與目視確認的負擔，提升航行安全。

此外，船上安裝「360 度全景攝影監控系統」，能即時擷取周邊影像，這在執行違規調查時尤為關鍵，能彌補傳統雷達或 GPS 定位可能存在的數據誤差，提供具法律效力的即時影像存證。這套系統也能將畫面回傳至岸端的應變中心或海事中心，縮短應變時間。據統計，海難救助的資訊獲取時間，能從過往的 90 分鐘大幅縮減至約 4 分鐘。

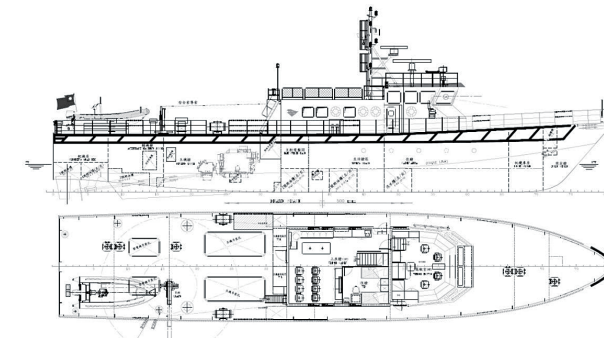
導入精密油汙偵測科技 預留無人機作業平台

在環境守護方面，「航港 1 號」率先在設計中配置「油汙偵測系統」。此系統利用現有的 X-band 雷達回波分析，透過科學計算辨識出海上油汙區塊，無需另外採樣海水即可掌握汙染擴散情況，為溢油事故的應變提供決策依據。

展望未來技術，設計團隊於 2019 年規劃階段即預留「無人機甲板平台」。考量海上作業的高風險性，平台周邊配置安全網、充電設施與訊號傳輸頻道，未來可配合政策採購具備自動導航與全向避障功能的無人機，執行更大範圍的監測任務。

權衡安全與性能 達成最佳平衡

在建造過程中，團隊面臨的挑戰之一是通訊頻寬。由於海上通訊高度仰賴衛星，設計團隊配置左右兩顆 Intellian ku- 頻段衛星



展望未來技術，設計團隊於 2019 年規劃階段即預留「無人機甲板平台」。With a forward-looking approach to technology, the design team incorporated a dedicated "UAV deck platform" as early as the planning phase in 2019.

天線，並透過調整影像解析度與採用半即時上傳機制，解決衛星網路在天氣不佳時頻寬不穩的問題。會議室內配置的 65 吋觸控螢幕，則能整合船端資訊，將巡檢船化身為移動指揮所。

此外，設計過程也展現工程上的協調與權衡。在追求高速與任務實際需求，如耐火性與穩定性之間，團隊最終說服船東採用全鋼構設計以確保防火安全。雖然這將船速從最初規劃的 24 節調整為更符合巡邏任務性質的 21 節，但卻在安全性與功能性之間達成了最佳平衡。

這艘智慧航安監控船的竣工，不僅提升航港局巡檢與管制的效率，更將透過累積珍貴的海上影像大數據，為未來 AI 模型訓練與自動化導航奠定實務基礎，開啟更智慧、更先進的海事治理新時代。📍



智慧航安監控船的竣工，不僅提升航港局巡檢與管制的效率，更將透過累積珍貴的海上影像大數據，為未來 AI 模型訓練與自動化導航奠定實務基礎。The completion of this "Smart Maritime Safety Monitoring Vessel" does more than just enhance the efficiency of the Maritime and Port Bureau's inspections and controls; by accumulating invaluable maritime big data and imagery, it establishes a practical foundation for future AI model training and autonomous navigation.

HIGH-TECH HORIZONS: TAIWAN'S NEW ERA OF SMART MARITIME PATROL

As international Port State Control (PSC) regulations tighten and offshore wind farm expansion increases the need for sophisticated oversight, Taiwan's Maritime and Port Bureau, MOTC (MPB) has launched a flagship solution: the MARITIME ONE. Designed by SOIC and constructed by the Jong Shyn Shipbuilding Co., Ltd., this "Smart Maritime Safety Monitoring Vessel" represents a quantum leap in navigational safety and environmental stewardship. For decades, the MPB relied on the YUN HSING, a 1987-era supply ship originally built for lighthouse resupply. However, as lighthouse automation reduced the need for large-scale transport and maintenance costs soared into the tens of millions, the transition to a more agile, intelligent fleet became a necessity. The MARITIME ONE was born from this need for compliance with the International Convention for the Safety of Life at Sea (SOLAS) and modern flexibility.

Intelligence at Sea: AR and 360-Degree Monitoring

The vessel's core strength lies in its integrated intelligence. Its Augmented Reality (AR) system merges radar echoes, AIS (Automatic Identification System) data, and electronic charts into a single visual interface. In the congested waters near Changhua and Taichung's wind farms, this allows captains to identify nearby vessels and distances without the fatigue of switching between multiple screens. Complementing this is a 360-degree panoramic surveillance system. By capturing real-time imagery, the ship provides legally admissible evidence for maritime violations, compensating for the minor data gaps inherent in GPS or radar. Crucially, this data streams back to shore-based centers, reducing the information-gathering time during rescue operations from 90 minutes to a mere 4 minutes.

Environmental Defense and Future-Proofing

The MARITIME ONE is also a pioneer in environmental protection. It features an X-band radar-based oil spill detection system that identifies slicks through scientific algorithms, eliminating the need for physical sampling. Furthermore, anticipating the rise of robotics, the ship includes a dedicated UAV deck platform equipped with safety nets and charging stations. This ensures the vessel is ready to deploy autonomous drones for wide-area monitoring as soon as policy allows.

Engineering a Balanced Vessel

Constructing such a sophisticated ship required strategic trade-offs. To solve satellite bandwidth instability during foul weather, engineers installed dual Ku-band antennas and optimized data transmission protocols. In a pivotal design choice, the team prioritized safety over raw speed, opting for an all-steel structure for superior fire resistance. While this capped the speed at 21 knots rather than the planned 24, it secured the stability required for a mobile command center. The MARITIME ONE does more than just patrol; it serves as a floating data hub. By accumulating maritime Big Data, it lays the groundwork for future AI-driven navigation, ushering in a smarter, safer era of maritime governance.



「航港1號」最大亮點在於智慧系統整合。The standout feature of the Maritime One is its integrated intelligent systems.

從船型調整到製造銜接 精進拖船合作 累積實船設計能量

從金港五號到臺灣港務港勤公司（TIPM）兩型拖船，再到中油大林拖船，船舶中心持續與船廠合作，逐步從船型調整、性能分析，走向結構模型建置與生產資訊銜接。這一系列拖船案，呈現船舶中心設計能量的延伸，也讓圖面與模型更貼近船廠建造需求。

拖船看似船型不大，設計卻與作業環境高度相關，港區水深、拖力需求、航速條件與操作空間，都會影響船型選擇。過去船廠建造拖船，常以既有船型放大或縮小處理；然而，一旦港區條件改變，原本有效的線型未必仍然適用。

船舶中心與中信造船的拖船合作，正是在這樣的需求下展開，金港五號是其中重要起點。這艘由中信造船承造的拖船，必須符合金門料羅灣港的水域條件，也必須兼顧船速、拖力與操作需求。船舶中心參與設計協作與技術整合，協助將港區限制轉化為可執行的船型方案。

金門料羅灣港水域較淺，若沿用船廠原本較瘦、船尾較高的拖船線型，吃水便難以符合需求。船舶中心團隊因此重新調整水下線型，讓船底更寬、更平，使整體更接近方體，藉此增加排水面積並降低吃水。

這樣的調整，也同步擴大了水下可用空間，不過，船體愈接近方體，阻力也可能提高，因此還須確認船速與拖力能否維持在合約要求之內。金港五號的技術調整，正是在

增加空間、壓低吃水與控制阻力之間反覆校正，才逐步形成可行的船型方案。

拖船外形確定後，接著便是設備、系統及結構規劃，船體結構須依照船級協會法規進行計算，確認各部件都符合強度需求，此非船廠強項。這類工作牽涉分析、計算與圖面整理，圖面除了表達技術內容，也要符合後續施工與審查需求。在雙方密切合作下，金港五號順利完成海上公試。

合作持續推進 設計走向製造現場

以金港五號的成功經驗為基礎，船舶中心與中信造船的合作延伸到 TIPM 兩型拖船與中油大林拖船。隨著合作逐步累積，船舶中心參與的工作，也從前期設計協作，進一步走向結構模型與生產資訊的銜接。

TIPM 拖船案包括 6,400 匹與 3,200 匹兩種船型，較大型的 6400 匹拖船，主要由船廠自行設計，船舶中心協助建立結構模型，提供後續放樣與製造所需資料；較小型的 3,200 匹拖船，則從線型、艤裝、輪機到結構，船舶中心皆參與設計。

結構設計完成後，船廠仍須進行放樣，也就是把設計構件轉換為鋼板切割與現場組裝所需的生產資訊。在 TIPM 與中油大林拖船等合作案中，船舶中心建立的 3D 模型，已能直接提供船廠作為放樣基礎，讓設計成果更接近建造現場使用的結構資料。

三維設計磨合 提升圖面銜接效率

隨著合作案增加，雙方也開始面對設計工具與作業習慣的磨合。早期船廠仍多以



2D 作業為主，船舶中心則已採用 3D 船舶設計軟體進行結構設計，雙方在格式、圖面輸出與繪圖習慣上，需花時間調整。後續合作中，雙方逐步採用同一套 3D 船舶設計軟體 CADMATIC，模型便有機會直接交由船廠使用，減少重新建模與格式轉換的時間，也讓設計資料與製造流程之間的銜接更順暢。

不過，模型能否真正進入現場，關鍵仍在細節。以料件編號為例，船廠原有一套工作人員熟悉的編碼方式，設計端則因修改頻繁，難以完全比照既有邏輯，後來雙方改以自動編碼搭配料號圖，讓現場能依位置對照作業，也讓圖面資料更貼近製造端需求。

實船經驗回饋 累積後續設計能力

TIPM 兩型拖船也讓團隊更注意拖船上層結構振動問題。大型拖船在試車時曾出現駕駛室振動情況；小型拖船則在設計階段先進行振動分析，並提出結構調整建議，後續試車並未出現相同問題。

船體振動牽涉主機、推進系統、結構自然頻率與共振條件，原因往往需要逐案判斷。此次經驗也促使團隊進一步研究國外拖船上層結構設計，作為未來改善拖船設計的重要參考。

從金港五號的線型調整、阻力驗證與海上公試，到 TIPM 兩型拖船的結構模型、放樣資料與振動分析，再到中油大林拖船案的持續推進，船舶中心在不同船案中持續累積拖船設計、結構分析與製造銜接經驗。這些實船合作，也讓設計成果更能回應建造現場需求，並持續累積船舶中心的船舶工程服務能量。📍

FROM LINES OPTIMIZATION TO PRODUCTION INTEGRATION: TUG COLLABORATION BUILDS REAL-WORLD VESSEL DESIGN EXPERTISE

The collaboration between the Ship and Ocean Industries R&D Center (SOIC) and Jong Shyn Shipbuilding CO., LTD.(JSSC) has evolved from Lines optimization to structural modeling and production data integration. Projects ranging from JINGANG NO. 5 to Tugs for TIPM Marine Corporation (TIPM) and CPC Corporation's Dalin Refinery highlight SOIC's expanding design capabilities and closer alignment with shipyard construction needs.

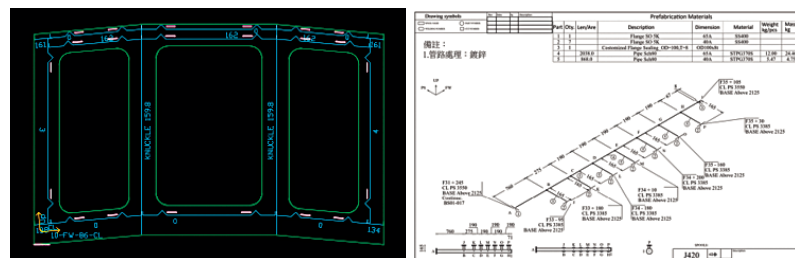
Tug design depends heavily on operating conditions such as harbor depth, bollard pull, speed, and maneuvering space. Traditionally, shipyards scaled existing designs, but changing port conditions often rendered them unsuitable. The partnership began with JINGANG NO. 5, built for Liaoluo Port in Kinmen. SOIC helped adapt the design to shallow waters by reshaping the hull into a wider, flatter form, increasing displacement while reducing draft. This box-like hull required careful resistance verification to ensure speed and towing power met requirements. After balancing draft, space, and resistance, the design was finalized. Structural analysis and classification compliance followed, leading to successful sea trials.

Building on this success, SOIC and JSSC extended collaboration to TIPM's 6,400HP Tug and 3,200HP tugs and CPC's Dalin Refinery Tug project. For TIPM 6,400HP tug, SOIC supported structural modeling and production data. For the smaller vessel, SOIC handled full design, including Lines, machinery, and outfitting. Importantly, SOIC's 3D models could serve directly as lofting data, reducing discrepancies between design and construction.

Initially, differences in workflows posed challenges: JSSC relied on 2D drawings, while SOIC used 3D software. Over time, both adopted CADMATIC, enabling direct transfer of digital models and improving efficiency. Integration also required harmonizing part numbering systems. An automatic coding system with part-number drawings eventually streamlined identification and compatibility with manufacturing.

The two types of TIPM tugs drew the team's attention to superstructure vibration issues. During sea trials, 6400HP Tug experienced wheelhouse vibration. For the 3200HP Tug, vibration analysis was conducted during the design stage to propose structural adjustment recommendations, and subsequent sea trials showed no such issues. Hull vibration involves the main engine, propulsion system, structural natural frequencies, and resonance conditions, and the causes often need to be evaluated on a case-by-case basis. This experience also prompted the team to further study overseas tugboat superstructure designs as an important reference for future design improvements.

From hull lines optimization, resistance verification, for JINGANG NO. 5, to structural modeling, lofting integration, and vibration analysis for the two types of TIPM tugs, and further to the continuous advancement of the CPC Dalin tug project, SOIC has steadily built expertise in tug design, and production integration. These collaborations ensure designs better respond to shipyard onsite needs while continuously enhancing SOIC's engineering service capabilities.



與中信造船的合作案中，交付成果也已逐步轉向3D化，提升轉換效率，也讓製造流程與圖面資料之間的銜接更順暢。By adopting 3D-based deliverables in projects with JSSC, SOIC have optimized conversion workflows and achieved better synchronization between manufacture and design data.

串聯研發能量 推動國產技術上船

海事裝備走向實際海域驗證

經濟部產業發展署持續推動主題式研發計畫，以提升國內海事裝備水準。在相關計畫中，船舶中心扮演關鍵輔導角色，協助富蘭登、智勤及新力能源等業者申請補助，並提供技術支援與實驗載台，將陸上技術轉化為嚴苛海況下可運用的成熟產品。

經濟部產業發展署近年積極推動主題式研發計畫，旨在透過政府資源與技術輔導，帶動國內海事裝備產業鏈的升級。其中，船舶中心扮演關鍵的橋樑角色，引領富蘭登、智勤與新力能源等民間優秀業者，將原本強大的陸上技術實力，成功移植並轉化為能適應惡劣海象的海事裝備。

透過技術指標的訂定、實驗載台的提供以及繁瑣的實海域測試支援，船舶中心與業者攜手克服船體晃動、強腐蝕與複雜電磁干擾等環境限制，不僅強化國產裝備在國防領域的自主能量，更為未來的民生巡檢、海上執法與綠能航運開拓全新的應用可能。

無人機落艦挑戰大 海域測試修正演算法

富蘭登合作案聚焦於艦載無人機落艦平台的研發。在現代海事作業中，無人機具備廣域偵蒐與即時監控的優勢，但要在波濤洶湧的船艦甲板上精準降落，必須克服船體隨海浪產生的多軸向晃動。這項技術的量化指標極具挑戰性，為了確保系統具備實戰價值，船舶中心提供自行研發的「智駁號」無人船作為實驗與實證載台，這類載台能實現小型船隻在受風浪影響時的劇烈動態，讓開發團隊能針對各種海況進行演算法的調整。

為了模擬真實的極端環境，船舶中心特



富蘭登合作案聚焦於艦載無人機落艦平台的研發（AI示意圖）。AI-conceptual diagram of the collaborative project with FairTech, focusing on the research and development of a shipborne UAV landing platform.



智勤打造海空韌性通訊網（AI示意圖）。AI-conceptual diagram of the resilient maritime-aerial communication network developed by ZyFLEX.

別整理並提供颱風前後船舶橫搖角度達 10 度以上之船舶運動數據。富蘭登在陸地研發時，習慣使用光學雷達進行測距與特徵識別，但來到海上後發現，雷達波在波光粼粼的水面上產生的反射特性與陸域地面完全不同，水面的鏡面反射或浪花產生的碎波，經常導致測距數據出現異常大幅波動，甚至讓系統誤判甲板位置。

為了克服這些環境變因，船舶中心協助富蘭登在實際海域進行多次試驗，從靜態的泊靠到動態航行測試，工程人員逐步修正視覺識別演算法，並強化補償平台的回饋反應速度。

透過這次合作，富蘭登得以掌握海上動態補償的關鍵參數，更學會如何處理海面環境的光影變化。這套運動補償平台未來若能成熟應用，將能大幅縮短無人機回收時間，甚至能在不影響母船航行的狀態下完成全自動

MARITIME EQUIPMENT MOVES TOWARD REAL-WORLD SEA VALIDATION

The Industrial Development Administration (IDA), Ministry of Economic Affairs, has long promoted thematic R&D programs to elevate Taiwan's maritime equipment technologies. Central to this effort, the Ship and Ocean Industries R&D Center (SOIC) provides counseling, technical support, and experimental testbeds. By assisting companies such as FairTech Corporation, ZyFLEX Technologies Inc. (ZyFLEX), and Eco-Energy Technology Co., Ltd. (EET), SOIC helps companies adapt technologies originally developed for land-based use into reliable systems that can operate safely in demanding marine environments.

SOIC serves as a bridge between government resources and private-sector innovation, helping companies bring promising technologies from the lab or land-based applications into real maritime environments. Through technical benchmarking, real-sea verification trials, and support in addressing challenges such as vessel motion, corrosion, and electromagnetic interference, SOIC helps reduce the risks of marine deployment. These efforts strengthen Taiwan's domestic capabilities in defense-related equipment while creating opportunities in offshore inspection, maritime law enforcement, and green transportation.

UAV Shipboard Landing Challenges Sea Trials to Refine Algorithms

FairTech Corporation's collaboration with SOIC focuses on developing a shipborne landing platform for unmanned aerial vehicles (UAVs). UAVs are vital for wide-area surveillance and real-time monitoring, but precise landings on pitching and rolling vessel decks remain a major challenge. SOIC's "THETIS Smart Vessel" unmanned platform simulates dynamic vessel motion under wind and wave conditions, enabling algorithm refinement across varied sea states.

To replicate extreme environments, SOIC provided marine data captured before and after typhoons, setting benchmarks at roll angles exceeding 10 degrees. FairTech's land-based LiDAR systems struggled with radar reflections over water, where specular reflections and wave-induced scattering caused misjudgments of deck position. Offshore trials—from static mooring to dynamic navigation—allowed engineers to progressively refine visual recognition algorithms and motion compensation systems.

Through this collaboration, FairTech acquired critical parameters for maritime motion compensation and learned to manage complex lighting and reflection changes. Once matured, the system will reduce UAV recovery time and enable autonomous landings without disrupting mothership navigation. Applications include offshore wind farm inspections and maritime search-and-rescue operations.

Overcoming Signal Blockage at Sea Resilient Maritime Communications for Real-Time Decisions

ZyFLEX Technologies Inc. focuses on resilient maritime communications for demanding field operations communications. For law enforcement officers conducting boarding inspections or anti-smuggling operations, stable communication is more than a convenience—it is essential for operational safety and timely decision-making. At sea, however, communication is often affected by limited signal coverage and by metal vessel structures that can block or weaken wireless signals. Under the IDA program, ZyFLEX aims to develop portable wireless communication

化降落作業，對於離岸風場巡檢或海上搜救效率將有顯著助益。

突破海上訊號遮蔽 打造即時決策所需的韌性通訊

智勤合作案著重於海上韌性通訊的建立與優化。對於執行登檢和緝私任務的執法人員來說，穩定不中斷的通訊不只是作業需求，更是保障第一線人員安全的關鍵。然而，目前海上通訊往往面臨多重限制，例如，在廣大海域上不一定有穩定訊號覆蓋，或是船體金屬結構也容易造成訊號遮蔽，使影像與通訊品質受到影響。智勤過去具備供應軍規通訊設備的實力，在產發署的計畫中，目標是開發出一套具備高資安防護能力，且能穩定傳輸高畫質影像的可攜式無線電系統。

這套系統採用寬頻跳頻與展頻技術，研發邏輯在於提升通訊內容對截聽與惡意干擾的抵抗能力。海上環境的電磁條件複雜，大型船艦上也常布設多種天線與通訊設備，因此系統不只要「能傳」，更要在干擾與遮

蔽環境下穩定運作。船舶中心提供船舶場域測試環境，並協助業者如何針對海上高溫、高濕及鹽分侵蝕進行物理結構的強化設計。

智勤成功將原本龐大的通訊機小型化至符合人體工學的背負式規格，並在進行實際測試時，由人員穿戴後進入漁船機艙深處，皆可成功回傳現場畫面。由於船體多為金屬結構，容易屏蔽無線電訊號，研發團隊透過多節點中繼與強化的傳輸協議，確保執法人員在訊號條件不佳的艙間，仍能將即時的高畫質影像穩定傳回母船指揮部。

這項突破讓後方的決策者不再僅能依靠語音回報，而是能精確掌握第一線的動態畫面，此外，這套通訊設備也被測試應用於無人機的遠距影像回傳，在布袋至馬公的長距離飛行測試中，展現超過 50 公里的穩定傳輸能力，顯示其在海事執法、巡檢與更廣泛場域應用上的發展潛力。

燃料電池導入船舶 陸上平台降低實船改裝風險

新力能源的合作計畫，則顯示臺灣綠能

技術正逐步延伸至海事應用場域。作為國內領先的氫燃料電池研發業者，在淨零碳排議題升溫後，新力能源開始尋找更具發展潛力的應用場域，並將目標轉向技術門檻更高的船舶燃料電池動力系統。然而，陸上燃料電池與船舶動力系統之間存在巨大鴻溝，船舶對於瞬間電力負荷的變化要求極高，且必須面臨封閉艙間內的散熱限制與氣體安全性等嚴苛考驗。

為了加速研發進程並降低實船改裝的風險，船舶中心特別打造一套陸上實驗平台，將「智馭號」與「快樂輪」等船的電力負載特性完全復刻在實驗室環境內，讓新力能源的燃料電池系統能在陸地模擬實際航行的功率輸出、負載變動與馬達轉速變化。在早期的整合實驗中，團隊發現傳統的水冷散熱系統無法直接套用在小型船隻上，因為既有的管路與排熱空間已達飽和。

面對空間局限，新力能源與船舶中心最終採取氣冷設計搭配局部管路優化的方案，讓燃料電池在密閉艙間內維持在最佳工作溫度。這項技術實證不僅解決了散熱難題，更驗證了燃料電池作為船用輔助動力或主動力的可行性。新力能源未來並規劃引入高壓碳纖維儲氫瓶，大幅增加氫氣儲存量以提升航行續航力。

除了動力系統本身的開發，燃料電池的船舶應用還牽涉到法規與驗證標準。臺灣目前的造船規範對於氫氣能源的使用尚處於摸索階段。船舶中心透過產發署計畫，積極與國內船舶檢驗及認證單位合作，並參考 DNV、ABS 等國際主要驗船機構的規範，嘗試建立一套適合臺灣市場的檢驗流程。這對船東而言非常重要，因為若無明確的規範與船牌核發依據，即便技術再先進，綠能船也無法投入商業載客營運。

政策支持 國產裝備切入海事市場

產發署推動的這 3 項裝備系統研發計畫，不僅是個別技術層面的突破，更是臺灣海事產業鏈垂直整合的範例。其成果顯示，當臺灣優秀的電子、通訊與能源業者跨足海事領域，結合適當的政策支持與專業輔導，就能在國際海事裝備市場中創造出極具競爭力的解決方案。

從國防安全到民生應用，這 3 家業者的研發實績，已成為臺灣邁向智慧海事轉型的重要里程碑，未來隨著更多實海域測試數據的累積，國產海事裝備將具備更優異的性能，在全球藍色經濟競爭舞台占有一席之地。🇹🇼

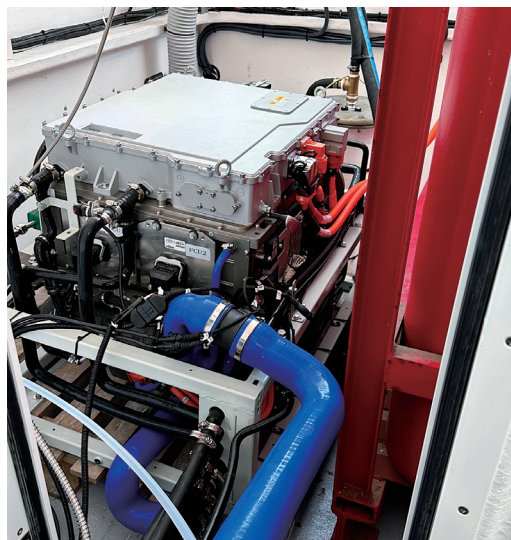
systems with strong cybersecurity protection and stable high-definition video transmission. The system uses broadband frequency hopping and spread-spectrum technologies to make communications more resistant to interception and disruption. In this process, SOIC supported real-sea testing and advised on marine-grade design considerations, including heat, humidity, salt corrosion, electromagnetic interference, and vessel vibration. ZyFLEX further miniaturized its system into a backpack-sized device that officers can carry during onboard operations. Field tests showed that personnel could enter deep engine-room spaces while maintaining stable video transmission. To overcome signal blockage caused by metal structures, the team adopted a multi-node relay architecture and enhanced communication protocols, allowing real-time video to remain reliable even under poor signal conditions. This capability allows decision-makers to rely not only on voice reports, but also on live visual information from the field. The team also demonstrated long-range UAV video transmission over more than 50 kilometers, from Budai to Magong, showing the potential of resilient wireless communications for both maritime operations and broader field applications.

Fuel Cell Integration into Maritime Systems Land-Based Platforms Reduce Retrofit Risks

Eco-Energy Technology Co., Ltd. (EET) is expanding Taiwan's green energy technologies into maritime applications. As a leading hydrogen fuel cell developer, EET targets the demanding ship propulsion market amid global net-zero goals. However, gaps exist between land-based fuel cells and marine systems, which require dynamic load response and strict safety in confined engine rooms. SOIC established a land-based experimental platform replicating vessel power loads, enabling EET's systems to simulate navigation conditions. Early tests revealed conventional water-cooling systems were unsuitable for small vessels due to space limitations. EET and SOIC adopted air-cooling with localized piping optimization, ensuring optimal temperatures in confined spaces. This validated fuel cells as feasible auxiliary or primary propulsion systems. Plans include introducing high-pressure carbon fiber hydrogen storage tanks to extend operational range. Beyond propulsion, fuel cell adoption faces regulatory challenges. Taiwan's hydrogen shipbuilding regulations are still developing. Through the IDA program, SOIC collaborates with domestic inspection bodies and references international classification societies such as DNV and ABS to establish localized frameworks. Clear certification standards are critical for shipowners before green vessels can enter commercial operations.

Policy Support Driving Domestic Maritime Market Entry

The three R&D programs promoted by the IDA represent technological breakthroughs and vertical integration across Taiwan's maritime industry chain. They demonstrate how Taiwan's strengths in electronics, communications, and energy can produce competitive solutions for the global maritime equipment market when supported by policy frameworks and professional guidance. From defense applications to civilian use, the achievements of FairTech, ZyFLEX, and EET mark milestones in Taiwan's smart maritime transformation. As more real-sea test data accumulate, domestically developed equipment will continue to improve and secure a stronger position in the global blue economy.



安裝於智馭號艙間燃料電池系統。The hydrogen fuel cell system installed within the engine compartment of the THETIS smart vessel.



氫燃料電池系統於智馭號實船測試。Real-sea operational testing of the hydrogen fuel cell system onboard the THETIS Smart Vessel.

建置整合載台管理系統邁向數位 康定級艦升級強化戰備能力

康定級艦服役逾 20 年，原有載台管理系統面臨零組件停產、維修籌補不易與後續支援成本攀升等壓力。海軍因此推動「康定級艦整合載台管理系統（IPMS）精進建置」專案，由船舶中心負責系統規劃與建置，希望在新造艦銜接完成前，先穩定既有艦艇的妥善率與任務能力。

康定級艦整合載台管理系統精進建置案，起因來自原艦長年運作後浮現的維修壓力。原系統由法方建造交付，使用多年後，部分零組件已停產，海軍在料件籌補、維修等待與後勤支援上遇到困難；因之，海軍思考如何將關鍵能量留在臺灣，逐步解決消失性商源問題。

有效解決消失性商源問題 穩定妥善率

此次精進建置的核心，在於以新的整合載台管理系統（IPMS），取代原有載台控制與監測架構，整合推進、電力、油水櫃、輔機、損害管制、消防、水密門、監

視系統及自我診斷等功能。早期，艦上多仰賴大量配線、儀表與開關，如今改採數位化方式，以通訊線路串接各項資訊，讓監視、維護、資料回溯與空間運用都更有效率。

新系統另一項關鍵，在於採用較通用的工業模組，而非高度客製化零件。這樣的設計，使得後續籌補來源更多、選擇更廣，零附件取得也更容易，價格壓力相對較低。對海軍來說，這代表日後維修不必再長時間受制於單一廠商，妥善率維持與後勤彈性都能同步提升。系統整合後，各項設備的狀態、警報與操作資訊也能集中管理，對值更人員而言，判讀設備情況與掌握異常變化都更直接，有助於提升日常操作效率與艦上管理的一致性。

6 艘同級艦逐艦調整 8 年提升精進逐步校正修整

此精進專案涵蓋 6 艘康定級艦，雖屬同一船型，但各艦的實際現場設備條件卻不盡相同。各艦服役二十多年來各自經歷不同的維修與設備更換，加上冷氣機、攝影機位置與觀看角度等細部設計，皆須隨各艦需求而調整。

此外，正因為是以全新的整合載台管理系統（IPMS），取代原有載台控制與監測架構，整合許多控制命令、訊號傳遞與操作邏輯，所以，必須靠團隊與艦上人員以及海軍船廠維修技師反覆核對，才能確保系統建置正確無誤。長達 8 年的專案期間，除了考驗技術，也考驗著協調與整合能力。



本案不只完成 6 艘艦的系統更新，還延伸建置陸上訓練機台與維修測試場域。In addition to upgrading the systems on all six frigates, the project also established shore-based training simulators and maintenance testing facilities.

保留本地控制機制 同步建置岸上教育訓練

系統升級後，康定級艦不只獲得更佳的數位整合能力，也提升了備援性、資料紀錄與操作彈性。各操控台之間可依權限切換監視與操作，事件、警報與歷史趨勢也能完整保留，便於後續追蹤與判讀。即使如此，系統仍保留本地控制能力，一旦通訊或數位介面失效，人員仍可回到現地手動操作，確保艦艇在各種狀況下維持基本控制。這樣的設計也兼顧數位化便利與作戰安全需求，讓系統升級後仍保有必要的操作底線。

本案不只完成 6 艘艦的系統更新，還延伸建置陸上訓練機台與維修測試場域，讓教官、學員與維修人員都能在岸上進行教育訓練、故障測試與模組更換。

對海軍而言，這項專案的完成，代表康定級艦在新造艦陸續到位前，仍可望持續維持一定戰力，也代表艦艇管理、維修與教育訓練的自主能量，正一步一步累積。從老艦延壽、系統更新到後續維保能量的建立，這項專案已超出單次設備升級的範圍，也為臺灣既有艦艇的持續運作累積更穩定的技術能量。📍

BUILDING AN INTEGRATED PLATFORM MANAGEMENT SYSTEM TO ADVANCE DIGITALIZATION: UPGRADING THE KANG DING-CLASS FRIGATES TO STRENGTHEN COMBAT READINESS

After more than two decades of service, the Kang Ding-class frigates faced mounting challenges with their original French-built platform management systems. Key components were discontinued, spare parts became difficult to source, and lifecycle support costs rose sharply. To sustain operational readiness until new-generation vessels arrive, the Navy launched the Integrated Platform Management System (IPMS) Enhancement Project, with the Ship and Ocean Industries R&D Center (SOIC) leading planning and implementation.

Resolving Diminishing Manufacturing Sources and Sustaining Readiness

The project replaced the outdated control and monitoring architecture with a modern IPMS. This unified digital platform integrates propulsion, power, fuel and water tanks, auxiliary machinery, damage control, firefighting, watertight doors, surveillance, and self-diagnostics. Previously reliant on extensive wiring and physical gauges, the new system digitizes operations, enabling efficient monitoring, maintenance, and data retrieval. By adopting standardized industrial modules instead of proprietary parts, the Navy reduced costs, improved spare parts availability, and lessened dependence on a single foreign supplier. Centralized management of alarms and equipment status now makes operations more intuitive and efficient for personnel.

Tailored Upgrades Across Six Frigates

All six frigates underwent upgrades, but each required vessel-specific adjustments due to decades of varied maintenance histories. Differences in wiring, equipment, and layouts meant that lessons from one ship could not be directly applied to others. Incomplete documentation further complicated integration, requiring repeated verification with shipboard crews. Construction schedules also had to align with operational missions, forcing teams to complete removal, rewiring, installation, and testing within tight three-to-six-month windows, often alongside other maintenance projects. Spanning eight years, the project tested not only the technical expertise of all parties involved but also their capabilities in coordination and integration.

Balancing Digitalization with Safety

The upgraded IPMS enhances redundancy, data recording, and operational flexibility. Control stations can transfer authority based on permissions, while alarms and historical records support troubleshooting. Importantly, manual local controls remain available, ensuring ships retain basic functionality if digital systems fail. This balance preserves combat safety while embracing digital modernization.

Extending Capabilities Ashore

Beyond shipboard upgrades, the project built shore-based simulators and maintenance facilities, enabling training, fault testing, and module replacement exercises. These additions strengthen long-term support and skill development. Ultimately, the project extends the service life of the Kang Ding-class frigates, sustains combat capability, and builds indigenous expertise in system integration, maintenance, and training—laying a stronger foundation for Taiwan's naval readiness.



© Wikipedia

海軍推動「康定級艦整合載台管理系統（IPMS）精進建置」專案，希望將關鍵能量留在臺灣，逐步建立自主整合與維護能力。The Navy launched the Kang Ding-class Frigate Integrated Platform Management System (IPMS) Enhancement Project with the aim of retaining critical capabilities in Taiwan and gradually building independent system integration and maintenance expertise.

CH.3 能源轉型 海洋綠能新航線

Energy Transition:
A New Course for Marine Green Energy



自主研發 接軌國際的風電新里程 德塔浮台領軍浮式風電

海洋資源潛力無窮，離岸風電即是開創先進綠色能源的一大來源；船舶中心也為此從傳統的船舶產業跨入海洋產業，並因應未來浮式風電的建置需求，研發國內自主的「德塔浮台」技術，為臺灣的離岸風電發展提供關鍵支柱。

在能源議題的持續發酵下，離岸風電已成為臺灣推動能源轉型、實現淨零排放的要角。並自 2019 年設置首座離岸風電示範風場以來，時至 2025 年累計裝置容量已達 4.4GW，並規劃總裝置容量至 2030 年將達 13.1GW、2050 年達 40 ~ 55GW，為國內能源供應更多自產且低碳的再生能源。

因應臺灣離岸風電的發展，自 2011 年更名轉型的船舶中心也跨足海洋能源領域，其中即著重在離岸風電相關技術的研發，使國內業者在新興產業崛起帶動下，能獲得技術支持、提升專業能量，促進臺灣離岸風電產業的建構與成長。包括自 2013 年起，在臺灣尚未有第一支離岸風機時，即率先部署展開更前瞻之浮動式風機平台的

研究，並在離岸風場逐步建置商轉之下，正式於 2021 年啟動商用等級浮動式風機平台的技術開發。

為臺灣量身打造 建立自主浮台技術

以臺灣現有的離岸風場，多位於水深 50 公尺內的區域，並採用固定式風機發電，安裝過程中水下基礎需藉由在海床上打樁設於海床上，水下基礎的結構重量與海事工程的船機規格隨著水深增加，需求也會大幅提升。隨著未來離岸風電規模擴增、淺海風場逐漸飽和後，勢必得走向離岸較遠的深海區域，相對也就需要改採浮動式風機，並透過繫纜與錨錠系統使承載風力機的浮動式平台能與海床相連。

由船舶中心研發的「德塔浮台」（DeltaFloat）技術，是特別針對臺灣環境條件、基礎設施與船機能量而設計。首先是可搭載當前國際上規格最大的 15MW 海上風機，並根據臺灣預計開發區域之實際海域條件與現有技術評估綜合考量下，在國際主流浮台概念中選用「半潛式」（Semi-submersible）設計，以利於未來導入臺灣離岸風場使用。

以臺灣海域經常遭受極端風速（如颱風）及長浪等天候侵襲下，德塔浮台強調設計上更能對抗天然災害威脅，並據此強化浮台的結構強度和穩定性、耐用性等。例如在強風或強浪影響下，德塔浮台即可經由主動控制之壓艙技術調整重心，使浮動式風機能維持在一定的傾斜角度內，進而提高風機的發電效率。



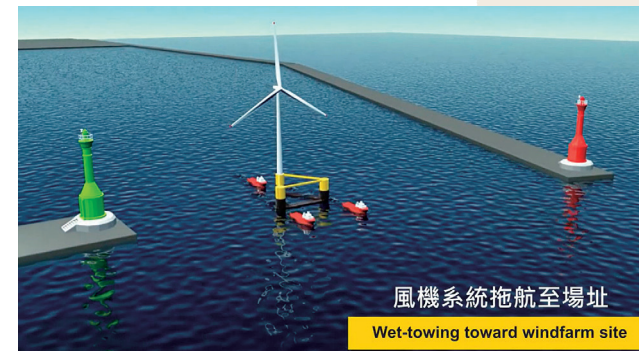
由船舶中心研發的「德塔浮台」（DeltaFloat）技術，是特別針對臺灣離岸風電而設計。SOIC's Delta Float technology is specifically designed for Taiwan's environmental conditions

整合在地供應鏈 創新技術獲國際認證

在與國內離岸風電供應鏈的整合上，德塔浮台的設計過程中也考慮到生產製造與海事工程階段。包括在浮台特性和船舶結構具高度相似下，未來即可交由本地造船業者負責製造，並將其製造工藝或條件納入浮台設計中；比如依船塢空間、或是業者具備的工法和可取得的材料，規劃浮台的尺寸構件與結構用料等，也易於在地生產與組裝。

對應未來浮式風機的海事工程，必須先於岸邊組裝風機和浮台後，再拖帶至海上架設，卻可能因重量而造成吃水過深問題。因此德塔浮台在設計上，也考量國內港口水深大多不足的限制，可在作業船舶將風機浮台拖往海外施工時，因應航道水深限制條件，將吃水深度降至最低僅 3.8 公尺，大幅降低浮式風機組裝與運輸的難度及成本。

做為打破國外設計壟斷、為國內產業提早布局的自主技術，德塔浮台概念設計於 2023 年獲得美國驗船協會 (ABS) 的原則性認可 (Approval in Principle, AiP)，後續亦於 2024 年獲得財團法人驗船中心與德國驗證機構 TÜV SÜD 的聯合驗證，以及 2025 年取得國內驗船中心「基本設計」（Basic Design）驗證，過程中持續開發動態電纜安裝與平台海上拖帶等關鍵技術，顯示德塔浮台不只符合國際水準，未來也將有效延續至實場安裝驗證等階段，為臺灣離岸風電產業提供重要發展基礎。📍



德塔浮台在設計上調整吃水深度最小僅達 3.8 公尺，大幅降低浮式風機組裝與運輸的難度及成本。The DeltaFloat design allows draft to be reduced to as little as 3.8 meters, significantly lowering the complexity and cost of floating wind turbine assembly and transportation.

INDIGENOUS INNOVATION MARKS A NEW MILESTONE IN OFFSHORE WIND DELTA FLOAT LEADS TAIWAN'S FLOATING OFFSHORE WIND POWER

The ocean offers vast renewable energy potential, and offshore wind has become a cornerstone of Taiwan's green transition. To meet future demand, the Ship and Ocean Industries R&D Center (SOIC) has developed the indigenous Delta Float technology, a critical step in advancing floating offshore wind power. Since Taiwan's first demonstration wind farm in 2019, installed capacity is expected to reach 4.4 GW by 2025, 13.1 GW by 2030, and 40-55 GW by 2050. Offshore wind is central to Taiwan's net-zero goals, supplying increasing shares of domestic low-carbon energy. SOIC, rebranded in 2011, expanded from shipbuilding into marine energy, supporting local companies and strengthening Taiwan's offshore wind supply chain. Research on floating platforms began in 2013, with formal development launched in 2021 as commercial offshore wind farms grew.

Tailor-Made Floating Platform Technology

Current offshore wind farms use fixed-bottom turbines in shallow waters under 50 meters. As shallow sites saturate, future projects must move into deeper waters, requiring floating platforms. Delta Float, designed for Taiwan's conditions, supports turbines up to 15 MW. SOIC adopted a semi-submersible design, aligning with international concepts but optimized for Taiwan's environment. Taiwan's waters face typhoons and long-period waves. Delta Float addresses these hazards with enhanced strength, stability, and motion-control technology that adjusts its center of gravity, keeping turbine tilt within safe ranges and improving efficiency.

Integrating Local Supply Chains

Delta Float's design incorporates shipbuilding expertise, enabling local fabrication and assembly. Platform dimensions, materials, and construction methods are tailored to Taiwan's docks and resources, ensuring practical domestic production. Installation requires onshore assembly before towing offshore, but excessive draft can pose challenges. Delta Float reduces draft to just 3.8 meters during towing, easing transport and lowering costs.

International Certification and Future Readiness

As an indigenous innovation breaking foreign design monopolies, Delta Float strengthens Taiwan's early foothold in floating offshore wind. In 2024, it earned joint Approval in Principle (AiP) certification from Taiwan's CR Classification Society and Germany's TÜV SÜD. In 2025, it achieved Basic Design AiP certification and unveiled technologies for dynamic cable installation and towing. These milestones confirm Delta Float's compliance with international standards and readiness for real-world deployment. By combining technical resilience, supply chain integration, and global certification, Delta Float provides a vital foundation for Taiwan's offshore wind industry, marking a significant step toward sustainable energy independence.

臺灣電動船加速駛向淨零 示範應用到商轉布局

在淨零碳排成為全球顯學之前，船舶中心便已洞察先機。從早期在日月潭推動的小型電動巡邏艇，到如今旗津與鼓山間穿梭的「旗福系列」電動渡輪，甚至是整合氫燃料電池與太陽能的 250kW 級直流微電網技術，船舶中心正逐步建構臺灣電動船舶的技術版圖。

臺灣電動船的歷史可追溯至 2011 年的日月潭計畫。當時政府提供補助，鼓勵業者將化石燃料船改裝為電動船，目標是保護日月潭的好山好水環境不受汙染。船舶中心在此契機下打造首艘電動巡邏艇，目前已服役超過 10 年。這段時期的實作，為後續的大型計畫奠定基礎，包括後來的「花博一號」電動接駁船，以及後續在日月潭運行的多艘電動客船。

從日月潭起步 渡輪逐步電動化

船舶中心目前最具代表性的大型實績之一，在於高雄輪船公司的渡輪系統整合。過去旗津與鼓山間的柴油渡輪在靠岸或慢速行駛時，常因引擎燃燒效率不佳而排放黑煙並產生濃烈柴油味。為改善環境品質，技術團隊將「快樂輪」等渡輪改裝為電動馬達驅動，並配置定轉速運行的發電機作為備援。

此種複合形式的動力系統讓發電機維持在最佳效率點，兼具省油及減少二氧化碳排放優點，又能確保船隻不會因電力問題失去動力。後續新造的旗福一號、二號渡輪更進一步強化此架構，透過整合鋰電池系統，實現無噪音且平穩的航行體驗。

直流架構提升效能 快充技術跨足電動車應用

這些電動船技術的核心，實質上是一套先進的直流微電網系統。船舶中心將船隻定位為「孤島電網」，為了在有限的空間內提升效率，技術團隊採用 750V 以上的高壓直流電壓級距，不僅效率優於交流電，更能精確控制電動馬達。

此外，船舶中心在研發船用快充系統時，更意外跨足電動車領域，與致茂電子合作研發出銷售至日本 Panasonic、現代汽車與 YAMAHA 等大廠的快充測試機台，甚至參與日本 CHAdeMO 協會電動車充電協定的制定，展現出強大的跨領域技術實力。

整合氫能與太陽能 挑戰長航程零碳船

邁向淨零碳排的更高目標，船舶中心進一步開發整合太陽能、鋰電池與氫燃料電池的 250kW 級系統。這套技術能有效解決純電航行的里程限制。以目前的實驗船為例，船頂配置 95kWp 的太陽能板作為主要能源來源，在慢速航行時可直接驅動馬達；當需要提升速度或增加續航時，擔任增程角色之 240kW 氫燃料電池發電系統補足所需電能。



技術團隊採用 750V 以上的高壓直流電壓級距，不僅效率優於交流電，更能精確控制電動馬達。The engineering team adopted high-voltage DC architecture exceeding 750V, which not only delivers higher efficiency than AC systems but also enables more precise control of electric motors.



船頂配置 95kWp 的太陽能板作為主要能源來源，在慢速航行時可直接驅動馬達。With a 95kWp solar array on the roof as the primary power source, the vessel can drive its motors directly during low-speed navigation.

由於氫氣系統在相同能量密度下較鋰電池更輕，能避免因電池過重導致排水量增加，進而耗費更多推力的惡性循環，使船隻具備長航程潛力，且產物僅有水與微量氫氣，達成真正的完全淨零排放。

產業化仍有門檻 持續推動技術商轉

然而，推廣電動船技術仍面臨諸多挑戰。由於臺灣船舶產業規模較小，降低廠商投入開發海事專用電動船舶相關零組件意願，導致技術團隊必須具備極強的系統整合能力，將陸用設備調校以適應海上的苛刻環境。加上船廠態度通常較為保守，傾向選用具備全球維修網路的國外品牌，使國產技術的商品化充滿挑戰。

儘管如此，船舶中心仍持續透過自有智慧船舶測試平台「智駁號」等專案累積技術，致力將這套結合直流微電網與多元綠能的技術推向國際，為臺灣船舶產業開創淨零轉型的新局。📍

TAIWAN'S ELECTRIC VESSELS: NAVIGATING THE PATH TO NET ZERO

Long before net-zero emissions became a global mandate, the Ship and Ocean Industries R&D Center (SOIC) had already identified the maritime industry's green trajectory. From early small-scale electric patrol boats on Sun Moon Lake to the "CHI FU Series" ferries currently operating between Cijin and Gushan, SOIC is methodically constructing Taiwan's technological foundation for electric propulsion.

From Inland Lakes to Coastal Waters

Taiwan's electric vessel journey began in 2011 with the Sun Moon Lake project. To preserve the lake's pristine environment, the government incentivized operators to convert fossil-fuel vessels to electric power. SOIC's inaugural electric patrol boat, built during this era, has remained in service for over a decade. This success paved the way for larger projects, such as the "Flora Expo No.1" shuttle and various passenger vessels now operating in inland waters.

A major milestone involves the electrification of the Kaohsiung City Shipping Co. fleet. Traditionally, diesel ferries produced heavy smoke and odors during low-speed docking. To mitigate this, SOIC implemented a hybrid propulsion configuration. By utilizing electric motors for primary drive and constant-speed generators as backups, vessels like the "Happy Ferry" operate at optimal efficiency, reducing emissions while ensuring power redundancy. Newer models, like CHI FU No.1, integrate lithium batteries for a silent, smooth sailing experience.

Innovative DC Microgrids and Global Reach

At the heart of these vessels is an advanced DC microgrid system. Treating ships as "isolated island power grids", SOIC utilizes high-voltage DC levels exceeding 750V. This architecture offers superior efficiency and more precise motor control compared to conventional AC systems. Interestingly, this maritime research sparked a breakthrough in the electric vehicle (EV) sector. In collaboration with Chroma ATE Inc., SOIC developed fast-charging testing equipment now utilized by global giants like Panasonic and Hyundai. Their expertise even influenced Japan's CHAdeMO charging protocols, showcasing impressive cross-disciplinary impact.

The Future: Hydrogen and Solar Integration

To solve the range limitations of pure battery power, SOIC has developed a 250kW-class system integrating solar panels, lithium batteries, and hydrogen fuel cells. On experimental vessels, a 95kWp rooftop solar array powers the motors during low-speed transit. For higher speeds or longer voyages, a 240kW hydrogen fuel cell acts as a range extender. Because hydrogen systems are lighter than batteries at equivalent energy densities, they prevent weight-induced efficiency loss, resulting in truly zero-emission, long-range travel. While challenges like conservative procurement and a small domestic component market persist, SOIC continues to refine these technologies via its "THETIS Smart Vessel" testing platform. By integrating diversified green energy and DC microgrids, Taiwan is effectively steering its maritime industry toward a sustainable, international future.



從小型電動巡邏艇到「旗福系列」電動渡輪，船舶中心正逐步建構電動船舶的技術版圖。From small electric patrol boats to the "CHI FU series" ferries, SOIC is steadily building Taiwan's technological ecosystem for electric vessels.

擘畫未來綠色船舶新樣貌 整合臺灣創新環保與能源科技

具低碳排性質的環保船舶，是國際航運產業的發展趨勢與未來商機；藉由保利馬的重新設計升級與修復改造，船舶中心結合國內多家業者的創新技術與能量，共同打造新世代的綠色船舶，也為臺灣產業開啟藍色經濟新契機。

交通運具的低碳化、零碳化，是實現環保與淨零排放的重要一環。尤以傳統船舶多是以重油或柴油等化石燃料為動力來源，並在運轉航行的同時，不斷為環境帶來碳排和污染的負擔；這也使得可在船舶上使用的綠色科技，在近年來更加受到國際上的關切與重視，甚至成為新興業者亟欲跨足的領域。

現已改名為「保利馬壹號」（Porrima P111）的保利馬，即是一艘具有實驗性質的零排放環保船，並在 2023 年 10 月因船體受損來臺，委由船舶中心進行升級設計，運用多項先進綠能與環保科技，和國內相關業者共同完成修復改造工程，進而於 2025 年 5 月重新下水，展現創新綠色科技帶來的永續航運價值。



「保利馬壹號」（Porrima P111）運用多項先進綠能與環保科技共同完成修復改造工程，展現創新綠色科技帶來的永續航運價值。"Porrima P111" has undergone a comprehensive restoration and upgrade integrating a wide range of advanced green energy and environmental technologies, demonstrating the sustainable value that innovative green technologies can bring to the future of maritime transportation.

以環保為始 與臺灣創新科技相呼應

以雙體船造型打造的保利馬，最早是由瑞士探險家 Raphaël Domjan 發起，先後曾獲得 PlanetSolar 基金會與 Race for Water 基金會的支持，首先於德國建造為全球最大的太陽能船，在 2010 年 3 月首次下水，並歷經 584 天的航行，於 2012 年 5 月成為全球第一艘只使用太陽能就完成環球航程的船舶。

後來經過發動機改裝，以及增設 SkySails 高空風帆系統和氫能設備的保利馬，又陸續航行至全球各地，除了藉此展示綠能科技在船舶上的應用，也執行保護海洋的相關科研計畫。到了 2021 年 3 月，在《藍色經濟》（The Blue Economy）一書作者 Gunter Pauli 教授的帶領下，保利馬改由 Porrima 基金會接手，不僅延續原來的環保願景與價值觀，也希望透過保利馬宣導創新、永續的藍色經濟理念。

在 2022 年 1 月時，保利馬和 Gunter Pauli 就曾來到高雄港，與宏碁集團創辦人施振榮等人交流。然而在保利馬離臺駛向馬爾地夫途中，卻遭遇暴風雨且觸礁受損；因此後來施振榮即與 Gunter Pauli 在臺創立保利馬公司，將保利馬購置回臺整修，並在船舶中心的推助下，成為現代最具環保與創新的綠色船舶。

整合多元技術 打造藍色經濟產業鏈

保利馬來臺進行修復工程的主要考量，是要結合臺灣的船舶產業與能源科技實力。因此船舶中心在規劃設計時，除了仍以環保



2022年1月保利馬離臺駛向馬爾地夫途中遭遇暴風雨且觸礁受損。In January 2022, Porrima encountered severe storms and ran aground while departing Taiwan for the Maldives, resulting in significant damage.

訴求及船舶適用為主軸，並拆除所有損壞及老舊設備線路，重新裝設包括可回收、總發電量達 95kWp 的太陽能板；可經海水淡化製氫的氫能系統則提高燃料電池容量至 240kW，能儲存氫氣用於發電的氫氣瓶容量達 1,322Nm³，約當發電量為 1,888kWh。全新的鋰電池儲能系統容量雖略減至 750kWh，但相對重量也大幅減輕，並配合推進系統的提升，可較原船擁有更輕的總噸數與更快的航行速度。

為了能夠因應保利馬的複合能源組成，船舶中心還導入智慧化的能源控制系統，可透過監控船舶設備的操作、各項能源的電力等狀況，即時調控電能的來源與輸出，達到省能、提升續航力的效果。另外，在破損船體的修復改造上，船舶中心也引進可回收再利用的碳纖維與樹脂，並對船型進行優化，以能兼顧設備結構與航行效能。

這次在保利馬船上全新搭載的設備或技術，幾乎都是來自臺灣在地的廠商；例如循旭科技的太陽能板、錫力科技的氫能系統、行競科技的鋰電池，也有電動馬達、台麗朗的碳纖維、嘉信遊艇的造船工藝等。這顯示出經由保利馬的升級設計與修復工程，讓多家過去只在陸域發展、或是缺乏海域應用的國內業者，能在船舶中心的整合帶領下，不僅讓保利馬成為零碳排船舶產業的起點，點燃未來量產的契機，同時還獲取跨域發展的經驗實績，也正是形成「藍色經濟」的最佳表現。🌊

SHAPING THE FUTURE OF GREEN SHIPPING: TAIWAN'S BLUE ECONOMY BREAKTHROUGH

As the global maritime industry shifts toward decarbonization, environmentally friendly vessels have moved from niche experiments to major commercial opportunities. At the forefront of this transition is the Porrima P111, an experimental zero-emission craft that recently underwent a transformative redesign in Taiwan. Orchestrated by the Ship and Ocean Industries R&D Center (SOIC), this project has successfully integrated Taiwan's cutting-edge energy technologies, setting a new benchmark for the "blue economy".

A Global Icon Reborn

The Porrima, a catamaran originally built in Germany, made history in 2012 as the first vessel to circumnavigate the globe powered exclusively by solar energy. Under the vision of Professor Gunter Pauli, author of The Blue Economy, the vessel evolved to include hydrogen systems and SkySails kite propulsion. However, severe storm damage in 2022 brought the vessel to Taiwan. Recognizing a unique opportunity, Acer Group founder Stan Shih and Professor Pauli established a domestic company to acquire and refurbish the ship, leveraging Taiwan's industrial prowess for its second act.

Engineering Excellence through Integration

SOIC's restoration strategy prioritized maritime applicability and environmental sustainability. By stripping away aging systems, they implemented a high-tech hybrid energy architecture:

- **Solar & Hydrogen:** The team installed 95kWp of recyclable solar panels and a 240kW hydrogen fuel cell system. This system desalinates seawater to produce hydrogen, stored in tanks with a capacity equivalent to 1,888kWh.
- **Storage & Propulsion:** A new lithium battery system, though slightly smaller at 750kWh, significantly reduced the vessel's weight. This lighter tonnage, paired with propulsion upgrades, resulted in faster cruising speeds.
- **Intelligent Management:** To balance these diverse energy sources, SOIC introduced a smart management system that monitors and adjusts power output in real-time, maximizing efficiency.

Building a Domestic Maritime Supply Chain

The Porrima project served as a powerful catalyst for Taiwan's technology sector. Almost all core components were sourced domestically: solar panels from PV Tech, hydrogen systems from YC Synergy, lithium batteries from XING Mobility, carbon fiber from TAIRYFIL, and shipbuilding craftsmanship by Kha Shing Enterprise Co., Ltd.

This collaboration allowed companies previously focused on land-based applications to gain vital maritime experience. By successfully adapting these technologies for the harsh marine environment, SOIC has not only restored a historic vessel but also established a foundation for the mass production of zero-carbon ships. The Porrima P111 now stands as a floating laboratory, proving that Taiwan is ready to lead the world toward a sustainable, zero-emission maritime future.

開啟臺灣海事工程新篇章 以安裝模擬技術引領國內業者

離岸風電海事工程的風險及挑戰相當高，需要更嚴謹的施工規劃與評估來提升安全、避免損失；為此船舶中心順應臺灣離岸風電發展需求，開發離岸風電海事工程安裝模擬技術，有效協助國內業者跨足海事工程領域、爭取商機。

離岸風電是臺灣得以創造自主能源的重要組成，其來源即是周邊海域蘊藏的優質風場，並將天然風能轉換為低碳電力，也是臺灣積極推動的能源轉型方向。然而對於從未有過離岸風電的臺灣，即使透過明確政策的規劃引領，若想要在離岸風電產業形成的同時，帶動國內相關業者的成長和參與，仍具有相當大的挑戰性。

以離岸風電的海事工程來說，不僅施工場景位於環境天候瞬息萬變的大海中，加上風機設備及船舶機具等皆所費不貲，作業中稍有不慎便會導致巨額損失。因此，國際間已制訂嚴格的標準與規範以降低風險。針對國內業者尚缺乏相關技術能量的現況，船舶中心自 2014 年起投入研發離岸風電海事工

程安裝模擬技術，旨在彌補技術缺口並提升施工安全。

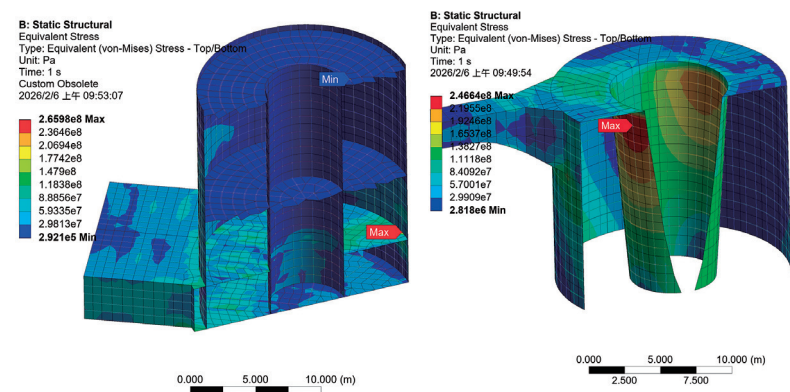
先模擬後動工 降低海上作業風險

相較於陸域上的風電工程，離岸風電所需的海事工程更顯複雜多變；以臺灣先期投入的固定式離岸風機為例，包含水下基礎安裝、風機安裝、海纜鋪設等主要工程，當中所使用的船舶設備與機具工法也不同。因此在每次出海作業前，都必須擬定完整的施工計畫與評估報告，詳盡載明該次工程的氣象預報資料，以及採用的船舶設備與施工方案，以及緊急應變計畫等內容；這除了是要符合國際海事工程的操作規範，也是業者取得工程認證與保險的憑藉。

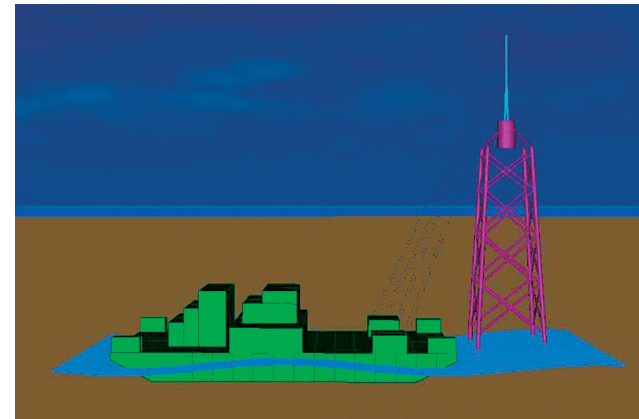
為協助國內業者建立離岸風電海事工程的能力與資格，在船舶中心研發的安裝模擬技術中，主要即涵蓋海事工程中的運輸、安裝、維運等階段，並對重要的工項流程投入研究分析，建構計算模擬的方法，讓海事工程業者能明確了解工程中可能發生的各種狀況，做為評估安全與風險時的依據。

目前船舶中心已成功建立的安裝模擬技術中，包括有海事運輸與拖帶評估，可針對大型結構物計算海上拖運時的穩定性、拖纜張力、路徑規劃等以確保運輸安全；打樁計算與基礎評估則是因應固定式水下基礎，進行打樁可行性評估與結構受力分析，確保樁體能順利植入海床並支撐風機荷重。

起重船吊裝動態評估要模擬的是重型結構物的海上吊裝作業，評估鋼索張力與船體擺動的臨界值，進而預判安全且可工作的



船舶中心順應臺灣離岸風電發展需求，開發離岸風電海事工程安裝模擬技術，有效協助國內業者跨足海事工程領域、爭取商機。SOIC aligns with the development needs of Taiwan's offshore wind power, developing installation simulation technologies that effectively help domestic operators step into the marine engineering field and capture business opportunities.



船舶中心發展「海事保證鑑定」，協助產業界確認其離岸風場施工時各關鍵步驟如裝載、海上運輸、吊裝、安裝過程均能符合安全需求。SOIC has developed Marine Warranty Survey (MWS) services to help industry verify that every critical step of offshore wind farm construction—including loading, marine transportation, lifting, and installation—meets safety requirements.

「氣候窗」（Weather Window）；海纜安裝模擬分析則負責模擬海纜在安裝過程中的動態反應，計算張力、扭矩與最小彎曲半徑以避免損壞。

開發自主技術 促進業者躋身供應鏈

因應未來擴展至深水區的浮動式離岸風電，船舶中心也持續建立相關的安裝模擬技術。如已於岸邊先行組裝的風機與浮式平台，同樣需巨型結構物的運輸與拖帶評估；或針對浮式平台的錨錠系統安裝，也要模擬分析錨錠的繫纜預張力以及土壤抓力。

這些經過計算模擬與分析評估的結果，反映出海事工程業者在施工時面對的風險程度或安全係數，並且除了納入施工計畫書外，更重要的是可提供給第三方認證單位審查，以及後續金融保險單位的承保評核。因此如穩晉港灣、台塑重工、俊鼎機械等國內業者，都是在船舶中心的技術輔導協助下，順利承攬海事工程的委託，躋身離岸風電的供應鏈。

對離岸風電海事工程的深度理解，也讓船舶中心藉此發展出「海事工程技術顧問服務」。也就是可擔任第二方技術諮詢單位（Owner's Engineer）的角色，代表業主對海事工程業者提交的施工船機設備規格與施工計畫等核心內容進行複核。如此一來，不僅能緊密對應臺灣海峽特殊的颱風、地震等海域環境加以評估，更能大幅提升國內在海事工程領域的自主技術能力。🇹🇼

LEADING DOMESTIC INDUSTRY WITH INSTALLATION SIMULATION TECHNOLOGY: OPENING A NEW CHAPTER FOR TAIWAN'S MARINE ENGINEERING SECTOR

Offshore wind marine engineering involves high risks and requires rigorous planning to ensure safety and prevent losses. To support Taiwan's offshore wind development, the Ship and Ocean Industries R&D Center (SOIC) has created installation simulation technology, enabling domestic companies to enter the marine engineering sector and seize new opportunities.

Offshore wind power is central to Taiwan's energy independence strategy, converting abundant wind resources into low-carbon electricity. Yet, with no prior offshore wind experience, Taiwan faces challenges in fostering domestic industry participation despite clear government policies. Marine engineering is particularly demanding, as operations occur in unpredictable sea conditions with costly equipment. Even minor errors can cause major financial losses, making compliance with international standards essential. Recognizing the lack of local expertise, SOIC began developing installation simulation technology in 2014 to bridge this gap and enhance construction safety.

Simulate Before Construction to Reduce Risks

Compared with land-based projects, offshore wind engineering is more complex. Tasks such as subsea foundation installation, turbine generator setup, and submarine cable laying require specialized vessels and methods. Each operation must be preceded by detailed construction plans specifying the weather forecasts, vessels and equipment, and emergency responses. These documents are also vital for certification and insurance.

SOIC's simulation technology supports transportation, installation, and operations and maintenance phases. By analyzing critical procedures, it enables marine engineering operators to gain a clear understanding of various potential scenarios, serving as a reliable foundation for safety and risk assessments. Key technologies include:

- **Marine transportation assessment:** Ensures safe towing of large structures through stability and route planning.
- **Pile-driving and foundation analysis:** Evaluates drivability assessments and structural stress analysis.
- **Dynamic lifting assessment:** Simulates heavy-lift operations, wire tension, and vessel motion limits.
- **Submarine cable installation simulation:** Models cable behavior to prevent bending or tension damage.
- **Corrosion protection evaluation:** Designs systems to safeguard metal structures against seawater exposure.

Building Indigenous Capabilities

As offshore wind expands into deeper waters with floating technology, SOIC continues to advance simulations for towing massive structures and installing mooring systems. These assessments not only guide construction but also support certification and insurance reviews. With SOIC's expertise, domestic firms such as Wen Shin Harbor Engineering, Formosa Heavy Industries, and CTCI Machinery have secured contracts and joined the offshore wind supply chain.

Deep expertise in marine engineering has enabled SOIC to launch its "Marine Engineering Technical Consultancy Services". Acting as the Owner's Engineer (a second-party consultant), SOIC represents developers in reviewing core deliverables from contractors, including vessel specifications and construction plans. This localized approach ensures rigorous risk assessments tailored to the Taiwan Strait's unique typhoon and earthquake conditions, while significantly enhancing Taiwan's technical autonomy in offshore wind.

CH.4 數位驅動 智慧船舶領航者

Driven by Digitalization: Pioneer in Smart Vessels



推動人船合一訓練成效 打造實船化操作模擬環境

累積近二十年的研發能量，船舶中心推出首套國內自主研發的操船模擬系統 SOIC MORIS，可透過擬真的操控環境與視覺效果提升訓練成效，並兼具系統的靈活性與在地支援，讓更多航運相關的使用者更有效率地推動必要的操船訓練。

成立半世紀的船舶中心，是促進臺灣航運發展的重要力量。透過接合專業人才，提供船舶設計、工程規劃等服務，或是運用研究與整合服務，都使得船舶與海洋相關業者能獲得先進應用技術的支持。

而船舶中心自主研發的艦船操控與模擬研究系統（Maritime Operations Research Integrated Simulator, MORIS），正是為國內船艦操控科技研究與輔助船長、航海人員訓練的一大創新利器。

高擬真環境 提升操船訓練效果

船舶的種類型式相當多元，例如大型商貨船、工作拖船、漁船、遊艇、軍用船，以及因應各種用途的特種船等，每艘船舶的設

計製造上，都會隨著船東需求而有所差異。而操船模擬系統的作用，是讓駕駛新船的船員，在登船前能於模擬機中操作演練，熟悉船舶性能和港口環境，或供既有船員依規複訓、延續證書效期，也是各家航運業者行之有年的操船訓練。

然而以往國內所使用的操船模擬設備大多來自國外廠商，並以商船的操控訓練為主，不僅價格相當昂貴，一旦設備出現問題就需透過原廠安排維修，經常要耗費數週之久，也影響船員的訓練時程。

由船舶中心與國內產學界專業單位合作開發的專業操船模擬系統 SOIC MORIS，強調的是高擬真度的船舶動態計算與操船環境，當中結合了操船控制系統軟硬體，包含船舶操縱運動計算模組、船舶數模資料庫、虛擬環境和航儀資訊系統等。

在操作介面上，可模擬船艦駕駛室的各項航儀與控制設備，包括雷達和電子海圖，並能顯示風速、流速等環境資訊，以及船舶航行的舵角、引擎轉速等參數；就連推進器的型式，也可依實船類型模組化更換。

透過操船人員的訓練操作，更進一步顯現 SOIC MORIS 的技術核心，也就是能真實模擬船舶的運動狀態，特別是模擬不同種類噸位的船舶，在天候風浪變化或操作方式下，船舶的運動反應也會大不相同。

MORIS 也應用在水面無人船自動駕駛的自主決策與操控演算法訓練與驗證，讓無人船在虛擬環境場域先行測試性能，完成後再導入實船測試應用，提升發展效率與安全性並大幅降低研發成本。



SOIC MORIS在系統的快速運算後，可連同實際的港口場景，動態呈現在虛擬實境的畫面上，甚至還可帶入引擎聲，讓操船人員能據以判斷和操作。After rapid computation, SOIC MORIS can dynamically present the actual port scene on the virtual reality screen, and can even incorporate engine sounds, allowing ship operators to make judgments and take actions accordingly.

系統全新升級 彈性擴充多元功能

船舶中心自 2007 年即著手研發操船模擬系統，並隨著科技進步與應用，使得 SOIC MORIS 也能不斷精進；並在 2025 年的全新升級中，還包括持續改善各項操控功能的軟硬體，以及優化船舶的資料庫等。另在視覺效果的增強也相當顯著，讓操船的感受更加真實。

在技術自主的優勢下，船舶中心還為 SOIC MORIS 提供完整支援及維保服務，可讓國內航運相關業者不再受限於國外廠商。且 SOIC MORIS 還可依不同業者的需求，導入更多船舶與港口的模型，或是客製化訓練任務教材；例如離岸風電的工作船或拖船所要執行的海上結構物或船艦拖拉、頂靠、登塔登艦等任務，面對不同天候條件也需有不同的應對操船方式，都可透過操船模擬系統來協助訓練。SOIC MORIS 更具備多艘艦艇聯合操演的功能；也就是讓多名使用者同時上線，各自操作位於同一海域的艦艇並進行互動演練。

目前 SOIC MORIS 也已為我國海軍採用，配合新造的沱江級巡邏艦納入接艦訓練中，讓所屬接艦官兵可從岸上就投入訓練，加速適應艦艇複雜的操作流程與各種情境應對。未來船舶中心可因應不同船型、任務需求，為各型艦艇量身打造最適合的專用模擬機，並以船艦操控全壽期的概念，從船艦的使用需求、設計、人員培訓到使用回饋的流程，建立以船艦壽期為主軸、模擬訓練為輔助、實操演練為驗證的訓練循環體系，不僅提升訓練效能與彈性，也為未來艦隊智慧化、模組化訓練奠定基礎。📍

ADVANCING MARITIME EXCELLENCE: TAIWAN'S INDIGENOUS SHIP- HANDLING SIMULATION

For over half a century, the Ship and Ocean Industries R&D Center (SOIC) has been the cornerstone of Taiwan's maritime development. Leveraging nearly two decades of research, SOIC has recently introduced SOIC MORIS (Maritime Operations Research Integrated Simulator), the nation's first domestically developed ship-handling simulation system. This breakthrough provides highly realistic training environments, reducing Taiwan's reliance on expensive, difficult-to-maintain foreign systems.

A High-Fidelity Bridge to Real-World Mastery

The maritime industry acts as a "locomotive" for the economy, integrating metal processing, machinery, and advanced ICT. SOIC MORIS harnesses these multi-disciplinary strengths to create a high-fidelity operational interface. The system recreates an actual ship's bridge, featuring authentic navigational instruments like radar, electronic chart systems, and real-time environmental data displays.

The core strength of MORIS lies in its sophisticated motion calculation modules. Different vessel types—from massive cargo ships and Tuo Chiang-class corvettes to agile tugboats—respond uniquely to wind, currents, and steering inputs. MORIS calculates these dynamics in real time, presenting them within immersive virtual port environments complete with natural environmental sounds and engine noise. This realism allows crews to familiarize themselves with vessel performance and specific port geography before ever stepping on board, ensuring smoother certification renewals and recurrent training.

Versatility and Future-Ready Applications

Beyond traditional crew training, MORIS is a vital tool for cutting-edge maritime research. It serves as a validation platform for autonomous decision-making algorithms used in Unmanned Surface Vehicles (USVs). By testing performance in a virtual space before real-world sea trials, developers significantly enhance safety while slashing R&D costs.

The comprehensive 2025 system upgrade further optimized the vessel database and introduced high-resolution LED displays to simulate challenging conditions, such as heavy rain and nighttime navigation. Because the technology is indigenous, SOIC provides localized maintenance and flexible customization. Operators can request specific port models or specialized training modules—such as offshore wind farm support operations involving complex towing and platform docking maneuvers.

Blueprint for the Future

The Taiwanese Navy has already adopted MORIS to accelerate the operational readiness of personnel assigned to new patrol corvettes. Looking forward, SOIC aims to establish a "full life-cycle" training ecosystem. This cycle integrates vessel design, simulation-based training, and real-world validation. By building this modular and intelligent foundation, SOIC is not only enhancing the skills of today's navigators but also securing Taiwan's position as a global leader in the future of smart maritime operations.



艦船操控與模擬研究系統的開發，是船舶中心為船艦操控科技研究與協助操船人員訓練的一大創新。The development of the Maritime Operations Research Integrated Simulator (MORIS) is a major innovation by Ship and Ocean Industries R&D Center for research on ship handling technology and for assisting in the training of ship operators.

智馭號引領自駕技術邁進 建構實海域測試驗證平台

船舶智慧化與無人化發展蓬勃，為解決自駕技術業者於海域測試驗證的困擾，船舶中心運用多年累積的智慧船舶關鍵技術，打造通用型自駕測試船「智馭號」，讓各種類型的自駕技術都能獲得有效測試，向市場應用大幅推進。

無人化的自駕船舶，是許多國家都在積極發展的方向，所著眼的是各式各樣在海域上的應用，以達到更高的效率與安全、降低人力負擔或成本等效益。然而要能真正實現無人操作的自駕船，則必須整合多種智慧化的技術與設備，讓船舶變得更聰明，能夠解讀分析資料、判斷並下達決策，進而控制相關的儀器設備、完成任務。

這類智慧化的技術及設備，在陸域上的發展相對成熟，但要能應用在海域，還必須經過嚴苛的驗證程序；尤其是要裝設在船舶上運行測試，才能掌握實際的表現成效，並取得海事認證。為此船舶中心特地打造全臺首艘通用型自動駕駛外海測試船「智馭號」（THETIS Smart Vessel），提供國內各項自駕船舶技術的研發測試平台，促使更多智

慧技術能用於自駕船上。

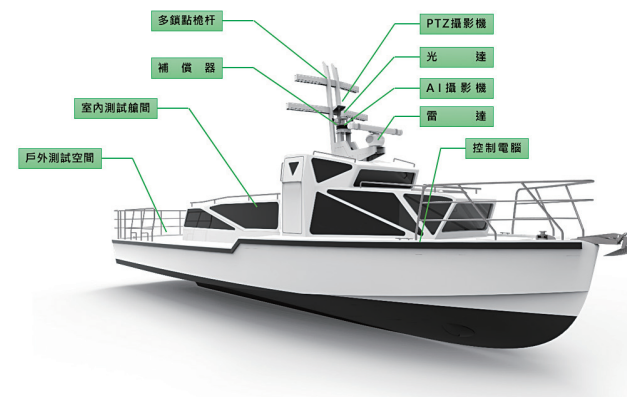
自駕技術為核心 打造共通性測試載台

為能讓自駕技術在海域實測，過去做法大多是租用漁船、遊艇等船舶。然而這些船舶原先各有其用途，要能找到可配合的船舶業者已不容易，甚至需要支付高昂租金；並且這類船舶的功能構造也非專為技術測試而設計，皆需要加以改裝和復原，卻也推升了測試成本。這種缺乏實驗測試載台的困境，正是智馭號要協助解決的問題。

這也使得 2023 年下水的智馭號，在規劃設計上以打造共通性的測試載台為取向。當中包括採用 ISO Small Craft Category A 標準，可抵抗六級浪（達輕度颱風標準）並於惡劣天候下航行；同時還搭載船舶中心自行研發的自動航行輔助與決策系統與複合動力系統等技術，可提供循跡自航、自主導航、遠端遙控、自主避碰、最佳航路指示，以及 AI 船舶辨識技術、AI 船舶自動追蹤、船舶風險示警、AR 可視化資訊、遠端監控系統等多種功能，滿足大部分自駕技術在外海測試所需。

在船體外型上，智馭號則導入晶體多切面與三角面的設計概念，除了營造低調潛行的質感，在最高瞭望處也設有多鎖孔桅杆並預留空間，不只能減少遮蔽、提升視野，也使架設或擴充感知環境的相關航儀設備，如攝影機、雷達、光達等。

而在智馭號後側，還分別設有戶外測試空間和室內測試艙間，可供無人載具、綠能



智馭號配置PTZ 攝影機、光達、AI 攝影機以及高精度雷達在內的多種設備。THETIS Smart Vessel is equipped with a variety of advanced systems, including PTZ cameras, LiDAR, AI cameras, and high-precision radar.

設備、貨物運輸等測試使用。

擴展平台服務 整合產學研技術能量

在智馭號建構的自駕技術測試驗證平台上，可結合感知、決策、系統等功能，有效為自駕技術業者建構客製化的自駕船系統功能測試程序，目前已包括航儀設備系統測試、動力系統測試、複雜氣候測試、控制核心系統測試、遠端監控系統等。相對於已進行的海域實測項目，也涵蓋自駕系統元件與模組、低軌衛星通訊系統、離島冷凍貨物運送、氫燃料電池、直流發電機、海氣象觀測、海底地形量測等多項技術應用。

透過智馭號提供的技術測試服務，不僅能讓業者在較低的成本負擔下，有效驗證自家的自駕技術，並優化產品性能或服務品質，提升各項裝備系統應用於船舶的可行性，進而建構完整的商業模式；甚至藉此獲得船舶中心的輔導、精進相關知識與技術，或是與船舶中心共同建立產學研間的合作，推動技術整合、發展創新應用，可說是一舉多得。

例如在智馭號具備可測試自動駕駛技術、遠距操控、數據回傳等多種功能下，就可在提供業者進行技術測試驗證的同時，也能讓學校師生參與相關研究，或是培養學生自駕船的操控技能與遠端控制船舶的技術、學習電動船舶的保養維護與能源管理等，讓智馭號能成為多元跨域的自駕技術發展平台，為未來智駕化、無人化的船舶開創先機。📍

BUILDING A REAL-SEA TESTING AND VALIDATION PLATFORM: THETIS SMART VESSEL ADVANCES AUTONOMOUS NAVIGATION

As smart and unmanned shipping technology grows, developers face challenges in finding reliable sea-testing environments. To address this, Taiwan's Ship and Ocean Industries R&D Center (SOIC) created the THETIS Smart Vessel, a multipurpose autonomous test ship designed to validate self-driving technologies and accelerate their commercial use.

Driving Autonomous Maritime Innovation

Unmanned autonomous vessels are a global focus, promising efficiency, safety, and reduced manpower. Achieving this requires integrating intelligent systems capable of interpreting data, making real-time decisions, and controlling onboard operations. While such technologies are mature on land, marine deployment demands rigorous validation and certification. THETIS provides Taiwan's first dedicated offshore autonomous vessel test platform, enabling real-world trials and supporting domestic innovation.

A Purpose-Built Shared Platform

Previously, offshore testing relied on rented fishing boats or yachts, which were costly, required modifications, and lacked technical suitability. Launched in 2023, THETIS was designed specifically as a shared testing vessel. Built to ISO Small Craft Category A standards, it withstands Sea State Level 6 waves and harsh weather. Equipped with SOIC-developed systems—including autonomous navigation, collision avoidance, AI vessel recognition, hybrid propulsion, and remote monitoring—it meets diverse testing needs. Its design features a crystalline, stealth-like exterior and a multi-mount mast for flexible installation of sensors such as radar, LiDAR, and cameras. The aft section offers outdoor and indoor testing spaces, supporting trials for unmanned vehicles, green energy, cargo transport, and more.

Expanding Services and Collaboration

THETIS enables customized testing of sensing, decision-making, and integrated systems. Current services include:

- Navigational system testing
- Propulsion system testing
- Weather condition testing
- Core control validation
- Remote monitoring validation

Sea trials have already covered autonomous modules, satellite communication, refrigerated cargo transport, hydrogen fuel cells, DC generators, meteorological observation, and seabed surveying. By lowering costs and offering technical guidance, THETIS helps developers optimize performance, integrate systems, and build viable business models. It also fosters collaboration across industry, academia, and research, creating a mutually beneficial ecosystem.

A Multidisciplinary Platform

Beyond industry, THETIS supports education and research. Universities use it for training in autonomous navigation, remote ship control, electric vessel maintenance, and energy management. With its versatile capabilities, THETIS serves as a multidisciplinary platform, opening new opportunities for smart and unmanned maritime systems.



船舶中心特地打造全臺首艘通用型自動駕駛外海測試船「智馭號」，提供國內各項自駕船舶技術的研發測試平台。SOIC specially developed Taiwan's first versatile offshore autonomous vessel test platform, the THETIS Smart Vessel, to support the research, development, and testing of a wide range of domestic autonomous vessel technologies.

結合場域測試與實證應用 帶動智慧船舶技術持續升級

船舶中心持續投入智慧船舶技術研發，除了透過感知、決策、控制等主要領域不斷精進，同時也藉由實場域的測試與驗證，有效打造技術應用的實績；這不只能做為自行研發智慧船舶技術的示範，更提供國內智慧船舶產業發展的最佳助力。

智慧船舶的主要優勢，在於能提升航行安全、降低營運成本，甚至更深入達到自駕化、無人化，延伸出更多元的應用價值。因此在智慧科技的創新帶動下，能夠「智駕」的船舶會愈來愈受到重視，也是船舶中心近年持續投入的重點技術領域，並藉以促進國內智慧船舶產業的發展和應用。

要讓船舶實現自駕或智駕，必須使其具備過去由人負責的駕駛能力。這種能力反映在科技層面上，在於感知、決策與控制等三大核心：讓船舶能夠感應外部情境並獲取資訊，再經分析判斷後擬定最佳決策，進而控制船舶設備航行。船舶中心針對這三大核心技术不斷開發精進，並透過場域的測試與實證運行，為未來更多的智慧船舶應用鋪路。



船舶中心針對核心技术不斷開發精進，並透過場域的測試與實證運行，為未來更多的智慧船舶應用鋪路。SOIC continuously refines its core technologies while using field testing and real-world validation to pave the way for broader smart vessel applications in the future.

場域實證 推動觀光船自駕營運

在無人化智慧船舶的場域驗證上，船舶中心自 2020 年開始推動沙盒實驗計畫。包括在高雄愛河河道自主航行實驗計畫中，將原已退役的觀光船，重新改裝為智駕船並用於測試；當中引進了船舶中心研發的循跡自航、智慧避碰、自動靠泊等技術，並搭配光達和攝影機等感知設備，讓自駕船能夠依照規劃路線航行，且當遇到其他船舶或障礙物時，能進行辨識與自主避碰。

接續則是在 2021 年的高雄亞灣自駕船觀光服務實驗計畫中，船舶中心更進一步結合船舶營運、動力系統、感知設備等 6 家業者，共同改裝 4 艘運行中的愛河觀光遊船。技術上以實際營運為導向，加入多船管理、電子票證系統等技術，並建置遠端的岸控臺、沿用原有的太陽能系統，進行船舶自駕與觀光服務的實地測試驗證。

透過多項自駕技術的概念與服務驗證後，這 4 艘觀光船正式取得營運許可、投入實證運行階段，以全新型態提供愛河觀光載客服務；並可從岸邊出航開始，直至航行結束回到碼頭，全程皆能以自動駕駛方式完成，不需人力介入。這也能讓原先在觀光船上配置的人力得以減少，並可專注在旅客的導覽服務等其他工作上。

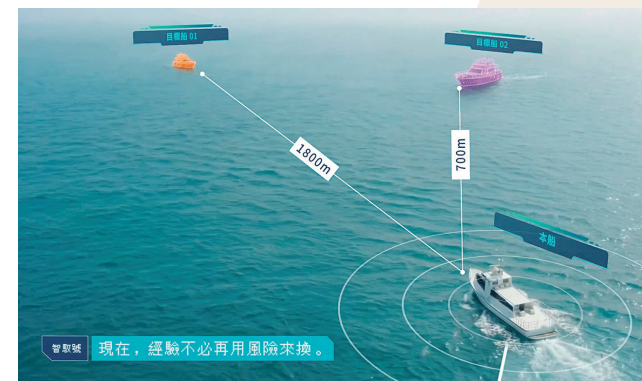
精進技術 實測模擬雙管齊下

經由愛河觀光遊船的技術驗證與實證運行，充分證明船舶中心所開發之自駕技術具備可行性與可靠性，可有效支撐智慧船舶自主航行之實際應用。但船舶行駛在不同的水

域環境，遭遇到的海象或其他船舶與障礙物等影響航行的因素差異甚巨。船舶中心因應自駕場域的不同，除精進研發技術，同時也與遊艇業者合作，或運用船舶中心自行建造的自駕測試船「智馭號」，持續於港口和海外海航行測試，提升自駕技術的可用性與安全性。

以感知技術為例，一般船舶在海上具備自動識別系統（Automatic Identification System, AIS）、雷達等設備來獲取其他船舶或物件的資訊，做為判斷與控制船舶航行的依據；卻也受限於裝設並開啟 AIS 設備的船舶才能發送訊號，或是雷達可能受到環境干擾等問題。因此船舶中心結合以攝影機為感知媒介的視覺辨識技術，打造「智慧航行輔助系統」；不僅能透過可見光與熱影像二種方式，還利用人工智慧技術協助影像識別，並整合 AIS 和雷達資訊於可視化界面顯示，讓船舶駕駛能快速掌握周遭環境狀況。

在船舶自主避碰的技術上，船舶中心也開發「智慧船舶航行安全驗證平台」。該驗證平台運用自行研發的操船模擬系統，並內建國際船級社 DNV 所公告之海上多船會遇情境，以及多樣化的船型與海洋環境之客製化選項，與實際智慧船舶系統連接後可達到硬件在環（Hardware in the Loop, HIL）的虛實整合測試模式，為智慧船舶技術開發帶來低成本、高效率、即測即得等便利性。這項技術已獲得財團法人驗船中心（CR）的認證，並可提供國內業者驗證其自駕技術，爭取智慧船舶的未來商機。



船舶中心開發「智慧船舶航行安全驗證平台」，並運用同樣是自行研發的操船模擬系統，模擬船舶在海外時遭遇的多船情境。SOIC has developed the Smart Ship Navigation Safety Verification Platform and utilized its self-developed ship maneuvering simulation system to simulate complex multi-vessel encounter scenarios in offshore environments.

COMBINING FIELD TESTING WITH REAL-WORLD VALIDATION: ADVANCING SMART VESSEL TECHNOLOGIES

The Ship and Ocean Industries R&D Center (SOIC) continues to drive the development of smart vessel technologies, focusing on sensing, decision-making, and control. By combining R&D with real-world field testing, SOIC demonstrates the reliability of its innovations and supports the growth of Taiwan's smart vessel industry.

Smart vessels enhance navigational safety, reduce operating costs, and pave the way toward autonomous operations. Intelligent navigation, or "smart piloting", has become a major focus for SOIC, enabling vessels to replicate human capabilities: perceiving the environment, analyzing data, and controlling systems. Continuous refinement of these functions, validated through field trials, is expanding practical applications.

Field Validation: Autonomous Tourist Vessels

SOIC launched regulatory sandbox experiments in 2020, beginning with the Kaohsiung Love River autonomous navigation program. A retired sightseeing boat was retrofitted with SOIC-developed systems including autonomous track-following, collision avoidance, and automatic docking, supported by LiDAR and cameras. The vessel successfully navigated pre-planned routes while avoiding obstacles. In 2021, SOIC advanced this work through the Kaohsiung Asia New Bay Area Autonomous Vessel Tourism Service Demonstration Project. Partnering with six industry players, four sightseeing boats were retrofitted with technologies such as fleet management, electronic ticketing, and remote shore-based control. These vessels retained solar power systems and underwent Proof of Concept and Proof of Service testing. After receiving permits, they entered demonstration operations, offering autonomous sightseeing services. Human crew requirements were reduced, allowing staff to focus on passenger interaction and guidance.

Real-World Testing and Simulation

The Love River project proved the feasibility of SOIC's autonomous navigation technologies. Yet, diverse waters present different challenges, from sea states to traffic patterns. To address these, SOIC continues R&D while conducting harbor and offshore trials with yacht operators and its own THETIS Smart Vessel. In sensing technology, conventional AIS and radar have limitations. SOIC integrated camera-based visual recognition into its Smart Navigation Assistance System, combining visible-light and thermal imaging with AI, AIS, and radar data. This provides operators with a clear, accurate view of surroundings. For collision avoidance, SOIC developed the Smart Ship Navigation Safety Verification Platform. Built on its ship maneuvering simulation system, the platform incorporates DNV multi-vessel scenarios and customizable environments. When connected to smart vessel systems, it enables Hardware-in-the-Loop testing, offering developers a cost-effective validation tool. Certified by CR Classification Society, the platform supports domestic developers in advancing autonomous navigation and seizing future opportunities.

船舶AI試製場域 導入智慧化製造量能 打造韌性供應鏈

面對 AI 智慧化的趨勢與船舶產業的升級需求，船舶中心領先設置 AI 試製場域，提供數位化掃描、3D 列印、機械手臂加工等服務功能，讓船舶業者能快速試製產品、建立數位資料，使企業的營運與作業也能朝向智慧化發展。

人工智慧（Artificial Intelligence, AI）等智慧科技的大幅躍進，可為各種產業帶來新的變革與成長動力，也能造就市場競爭的優勢。尤其對於發展歷史悠久、營運模式變化不大的船舶產業，不論是在設計或製造等階段，許多作業都還維持傳統模式，卻也是智慧科技能夠協助促進效率或精進品質，並創造更多創新價值的地方。

因應近年政府大力推動 AI 發展，為能促使更多船舶業者提升經營效益，船舶中心也積極打造智慧化的工具與流程。包括產業輔導團、與大專校院合作，結合智慧製造相關設備與 AI 等技術，規劃建置 AI 試製場域；首先則針對遊艇類的小型船舶，提供小型部

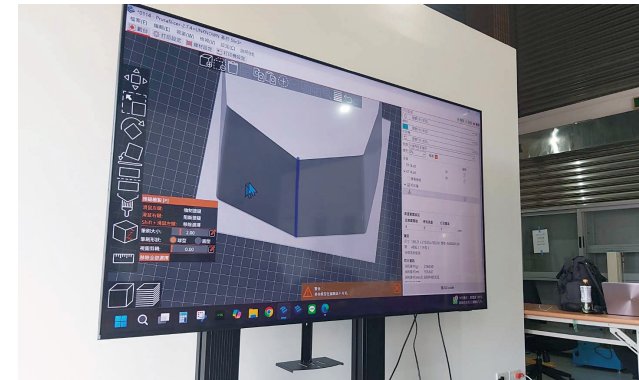
件的产品試製服務，讓船舶業者可以從試用到真正應用，強化自身的數位化與智慧化能力。

軟硬體整合 打造智慧試製場域

遊艇這類船舶是高度客製化的產品，除了會根據船東的需求與喜好來設計，建造過程中也經常修改調整；特別是小型的金屬部件，例如繫纜柱、艙蓋、舷窗等，既要能符合船體造型風格，也要確實具備應有功能。但以往這類部件多是由木工師傅手工打模，經過不斷微調確認後，再交由五金廠負責製作出模具或產品，不僅得耗費許多時間，通常也很難保留完整的產品數據並用於後續的分析應用。

一條智慧化的試製產線，則可有效解決許多設計製程中的問題。以船舶中心建置的 AI 試製場域為例，其中一項功能是掃描，也就是能夠從模具或產品中建立完整的數位資料；這些資料能在往後需要開發新產品時，做為重要的基礎與參考依據，甚至也利於整合 AI 技術輔助設計產品，加速新產品的開發流程。

再來則是透過 AI 試製場域中設置的 3D 列印機和機械手臂等製造設備，可直接依照產品設計圖樣快速印製，配合 AI 協助收集資訊、調整優化列印條件，避免溫度過高而產生變形，並在印製後能經由機械手臂進行更精確的研磨加工。這樣的產品試製作業不只能節省大量時間，還能讓船舶業者迅速提出正確的產品打樣供客戶確認，以及交由五金廠製作模具和產品。



透過AI試製場域中設置的3D列印機和機械手臂等製造設備，可直接依照產品設計圖樣快速印製。Through the 3D printers, robotic arms, and other manufacturing equipment installed in the AI prototyping facility, products can be rapidly fabricated directly from design drawings.

以 AI 驅動 引領船舶產業升級

經由船舶中心建置的 AI 試製場域，等於整合了 AI 技術與先進製造設備等軟硬體，形成產品試製的數位化解決方案；這不但能提升船舶業者的作業效率，更可協助克服木工人力日益減少，以及建立產品數位資料庫等問題。同時透過 AI 試製場域的示範運作，也能讓船舶業者有機會先行試用，降低自行建置試製產線的投資風險；並可視實際需求且待時機成熟後，再考慮複製相同模式的產線投入應用。

在船舶業者的營運流程中，AI 的導入不僅能讓產品試製的流程更加順暢，還可延伸出更多方面的應用效益，也吸引不少船舶業者的興趣。例如在產品的設計面，AI 就可整理相關法規與設計資料，並能協助檢視設計內容；或是在船舶生產專案管理和日常行政作業上，AI 也能有效記錄和彙整各式資料，以避免遺失或混淆、或是導致錯誤與重工，也可以藉此建立更完備的知識庫，提供未來設計參考、新人訓練、生產現場查詢等使用。

在船舶產業對 AI 應用的需求與日俱增下，船舶中心也集結政府資源，並以輔導顧問的角色出發，協助船舶業者實現數位轉型；包括從人才培育層面著手，規劃多種 AI 課程讓在職員工學習使用 AI。例如對生成式 AI 系統下指令，協助快速提案；或在 AI 試製場域也增設教育訓練空間，可供教學體驗使用，成為帶動船舶產業升級的智慧場域。📍

BUILDING SMART MANUFACTURING CAPABILITIES TO CREATE A RESILIENT SUPPLY CHAIN: AI PROTOTYPING FACILITY FOR THE SHIPBUILDING INDUSTRY

The Ship and Ocean Industries R&D Center (SOIC) has established an AI prototyping facility to support the shipbuilding industry's digital transformation. Offering services such as digital scanning, 3D printing, and robotic machining, the facility enables rapid prototyping and data creation, helping shipbuilders transition toward smarter, more efficient workflows.

Driving Innovation in Shipbuilding

Artificial Intelligence (AI) is reshaping industries by boosting efficiency and competitiveness. Shipbuilding, with its long history and reliance on traditional methods, stands to benefit significantly. Many design and manufacturing processes remain manual, leaving room for smart technologies to enhance quality and create new value. Responding to government initiatives promoting AI, SOIC has collaborated with universities and industry experts to integrate intelligent tools and establish this prototyping facility. Initially focused on small yacht components, the facility allows companies to experiment with digital workflows before full-scale adoption.

Smart Prototyping for Customized Components

Yachts and similar vessels require highly customized parts, such as bollards, hatch covers, and portholes. Traditionally, these were hand-modeled and refined repeatedly, a time-consuming process that often lacked complete product data. SOIC's facility addresses these challenges with digital scanning, generating precise digital records that can be reused for future designs and integrated with AI-assisted tools. The facility also employs 3D printers and robotic arms to produce parts directly from design drawings. AI optimizes printing conditions to prevent defects, while robotic arms handle polishing and machining. This streamlined workflow saves time, delivers accurate prototypes for customer review, and provides manufacturers with reliable samples for mold production.

AI-Driven Transformation

By combining AI with advanced manufacturing hardware, SOIC's prototyping facility improves efficiency, reduces reliance on shrinking pools of skilled labor, and builds digital product databases. It also serves as a demonstration platform, allowing shipbuilders to test systems before investing in their own production lines. Beyond prototyping, AI supports broader applications in shipbuilding. It can organize regulations and design data, assist in reviewing designs, and consolidate project management information to prevent errors and rework. These capabilities contribute to building comprehensive knowledge bases for future reference, training, and production.

Talent Development and Industry Upgrading

SOIC is also promoting workforce transformation by offering AI training courses and hands-on learning within the facility. Employees gain practical experience using generative AI for tasks such as proposal drafting. By combining education with advanced prototyping tools, SOIC has created a smart platform that drives digital transformation and strengthens the resilience of the shipbuilding supply chain.



船舶中心積極打造智慧化的工具與流程，包括與大專校院合作，結合智慧製造相關設備與AI等技術，規劃建置AI試製場域。SOIC has actively developed intelligent tools and workflows, including collaboration with universities and colleges to integrate smart manufacturing equipment and AI technologies in planning and establishing the AI prototyping facility.

智駕船技術落地與新創研發擴散

成立新創公司梭易科海洋

因應國內智駕船舶產業發展，船舶中心除了持續研發技術並建造海上測試載台「智駁號」，更透過衍生新創公司梭易科海洋，統籌經營測試驗證服務與商用產品開發，以能推動更多自駕技術和應用走向市場，爭取未來的產業商機。

智慧船舶的發展日益興盛，從政府到民間都不斷推出各種技術與應用，也帶來無數創新機會。船舶中心約自 2018 年起開始投入自駕船舶的研發，也陸續開發出循跡自航、自動避碰決策、自動靠泊等關鍵技術，並推動自駕船舶的實證運行，例如高雄愛河的觀光遊船，或是協助設計開發自駕清潔船舶等；甚至因應國內缺乏自駕技術的實測船舶，更在 2023 年設計建造首艘海上測試載台「智駁號」。

「智駁號」的出現，為國內各項智駕船舶的相關技術和應用，提供了測試驗證的重要管道，成為向商業化推進的一大利器。因此為能充分運用這項特別的資源，船舶中心在經濟部產業技術司的支持下，於 2023 年 4 月衍生新創「梭易科海洋應用方案股份有

限公司」（梭易科海洋），以能進一步推廣自駕船舶技術、促進智慧船舶產業發展。

提供測試服務 讓技術應用走向海域

在梭易科海洋的主要營運任務中，首要是自駕技術和應用的海上載台測試服務；尤其過去民間業者想要在外海實場域驗證時，往往難以找到能配合的船舶業者且所費不貲。因此透過自船舶中心租賃智駁號的方式，梭易科海洋即可在這座整合多項自駕技術的載台上提供服務，讓業者的創新技術或應用概念得以投入測試驗證，比如低軌道衛星通訊、海氣象水文資料量測、綠能船舶等領域，同時也降低業者的先期投資門檻。

當民間業者提出的技術或應用，能夠在海上進行實測、取得資料後，可做為效益評估或後續改良的依據，促成更加完備的商業解決方案。甚至以智駁號為測試載台，還能讓業者藉此發掘問題或觸發更多需求，除了用以開發多元的技術和應用，也能由梭易科海洋轉介至船舶中心，委託研發相關技術或協助跨域整合，或是提供未來自駕船舶的營運服務，提高商業化的成功機會。

自成立後，已有多家業者與機構洽談各式測試服務，或規劃智駁號為研發技術時的核心設備。例如資策會曾透過「智駁號」進行多次船舶影像資料收集，包含攝影機影像、測試船航行資訊、波浪觀測資料等，並經中華電信 OneWeb 低軌道衛星通訊系統測試傳輸狀況；中央氣象署也運用具智駕系統之智駁號裝設海氣象觀測儀器，於彌陀浮標附近進行 14 次海氣象資料收集，作為未



梭易科海洋以「智駁號」為測試載台，還能讓業者藉此發掘問題或觸發更多需求。By using THETIS Smart Vessel as a testbed, SMS also enables operators to discover issues or trigger new demands.

來發展無人自駕船氣象資料收集之可行性先期驗證。

整合 i-Pilot 產品 開拓船舶市場新商機

除了海上載台測試服務之外，梭易科海洋也整合船舶中心研發的自駕技術，推出「i-Pilot 智慧船舶安全輔助航行系統」，經由感知、避碰、控制等系統的整合，加上合作廠商的自動導航模組，提供船舶航行時的輔助導航功能，如航線自動規劃、危險與碰撞警報等，亦可在船員授權下直接連線控制船上自動導航系統，並已於 2025 年 11 月完成原型機開發與 POC 測試，開始進入市場銷售導入期。

在 i-Pilot 上市初期，鎖定漁船、遊艇、動力小船等市場；並為使產品更能符合使用需求、順利開發市場，梭易科海洋也積極推動各方面的產業合作與活動。例如與海事設備人機介面全球市占第一的瑞典商北爾電子合作，開發 i-Pilot 的人機介面；或是針對 i-Pilot 的前裝市場，也與國內遊艇業者合作，持續驗證測試並優化產品，加強各項功能及服務，或是研發小型船舶用航行記錄器等相關產品；另在國際漁船市場的拓展上，目前也已前往馬來西亞參展，並與當地公司洽談合作。

i-Pilot 的輔助航行功能，在許多業者的技術應用中都能發揮效果，也成為梭易科海洋提供海上測試服務中的重點。像是國內最大測繪業者詮華國土測繪公司，透過智駁號進行高雄港內的水文量測，以及臺中港 5A5B 碼頭海床地物調查等測試；其中採用 i-Pilot 的自駕循跡自航等功能，可更有效地控制自駕船舶的航行軌跡和偏移量，進而提高量測的品質與效率，也讓業者的創新應用得以驗證並提升。📍

FOUNDING THE STARTUP SMS: COMMERCIALIZING AUTONOMOUS VESSEL TECHNOLOGY

To capture growing opportunities in Taiwan's autonomous vessel industry, the Ship and Ocean Industries R&D Center (SOIC) has spun off a startup, SOIC Marine Solutions Co., Ltd. (SMS). Supported by the Ministry of Economic Affairs' Department of Industrial Technology, SMS was established in April 2023. While SOIC drives core technological R&D and built Taiwan's first offshore test vehicle—the THETIS Smart Vessel—in 2023, SMS propels commercial product development and propagates the offshore test vehicle service and new interdisciplinary applications of smart ship technology.

SOIC's smart vessel research began around 2018, yielding breakthroughs in autonomous path tracking, collision avoidance, and automatic docking. These innovations were demonstrated on Kaohsiung's Love River sightseeing boats and autonomous cleaning vessels. Today, the THETIS Smart Vessel serves as a critical real-world testing platform, bridging the gap between laboratory technology and commercial maritime applications.

Offshore Testing Services in Real Maritime Environments

High costs and recruiting challenges always blocked private enterprises from conducting maritime test. SMS helps customers to evaluate and provide accessible offshore testing services by the THETIS Smart Vessel. SMS offers companies an integrated platform to test innovations in low-earth-orbit (LEO) satellite communications, green energy, and oceanographic data collection, significantly lowering upfront investment barriers.

Through SOIC's connected clients and by SMS's business development, SMS has serviced many companies and organizations for specialized R&D, cross-disciplinary integration, or autonomous operations, boosting commercial success. For example, SMS provides offshore maritime test service for the Institute for Information Industry (III), to test transmission performance of Chunghwa Telecom's OneWeb LEO satellite network at sea, by transmitting live camera video imagination, marine meteorological data and ship's navigation data via THETIS out of Kaohsiung port to III's laboratory in Taipei last year.

Additionally, SMS collaborated with Coastal Ocean Monitoring Center of National Cheng Kung University (COMC, NCKU) to provide service for marine meteorological data collection by smart vehicle for Central Weather Administration, as a prophase proof of concept test for future autonomous marine meteorological data collection. The THETIS is deployed marine meteorological instruments aboard and successfully completed 14 data-collection voyages around the Mituo buoy station near Kaohsiung port.

The results compared with the data of Mituo buoy station is equivalent, but with less interval.

Unlocking Maritime Opportunities via the i-Pilot Product Line

Beyond testing service, SMS has converted the SOIC's autonomous navigation technologies into the "i-Pilot maritime advanced driving assistance system" prototype and had finished the POC in November 2025. By integrating sensing, collision avoidance and control modules, i-Pilot offers automatic route planning and hazard alerts, and could be inline control the ship's auto-pilot system under authorized by captain/on duty crew. The i-Pilot starts in product introduction stage, focus on the fishing vessels, yachts, and small motorized boats market. For marketing development, SMS propagates industrial collaboration and joint relative activities, to visit the Taiwan yacht manufacturers like Horizon and Monte Fino yacht, and partnered with Sweden's Beijer Electronics Corp., the market leader of maritime HMI display, and visited Malaysia for seeking the early adopters and collaboration opportunity.

The i-Pilot could solve the pain points of some marine activity and operation in real world. For example, the offshore hydrographic survey, required precise tracking control against the wave, wind and current at sea with low speed and long operation time, is extremely relied on experienced captain. Long operation time always fatigues captain conducting the efficiency decreasing and precise control failure. The i-Pilot could help captain to maintain the precise tracking control and improve the survey data quality to meet with the working standard requirement, and unlock the limitation by experienced captain for offshore hydrographic survey company to run for more cases with better cost and efficiency.



船舶中心在經濟部產業技術司的支持下，於2023年4月衍生新創「梭易科海洋應用方案股份有限公司」。With the support of the Department of Industrial Technology, Ministry of Economic Affairs, SOIC officially spun off SOIC Marine Solutions Co., Ltd. (SMS) in April 2023.

CH.5 厚植實力 研發基地與人才

Strengthening Capabilities:
R&D Facilities and Talent Development



厚植臺灣船舶產業設計量能 推動建置國家船模實驗室

為因應產業升級、國艦國造等需求，船舶中心承接海洋委員會「國家船模實驗室」建置案，並整合實驗室建造、設備儀器引進、專業人才培育、維運管理規劃等重要工程，全面性地協助提升國內自主的船舶設計能量、促進船舶產業發展。

身為海島型國家，船舶產業對臺灣的重要性自是不言而喻，然而船舶的造價通常不菲，使得新設計的船舶在正式投入生產前，除了必須具備縝密的規劃與考量，更不可或缺的是透過船模實驗來先行驗證船舶的性能，以能先行驗證船舶的性能，也凸顯出建置船模實驗室的必要性。

船舶在水域航行移動時，船身的設計或部件都會與流體之間產生不同的流場或現象，並影響船舶的運動表現；這也使得新式船舶皆應由船模實驗取得測試數據並進行分析，確認船舶線型與需求性能相符。

這種力求精確的船模實驗，必須在精密的船模實驗室中進行，為配合國內船舶產業及國防發展等需求，船舶中心也在海洋委員會國家海洋研究院的委託下建置「國家船模實驗室」（National Ship Model Basin），

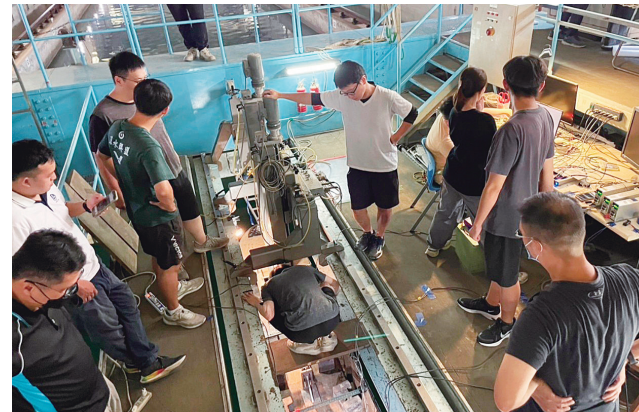
為我國打造首座國際級的船模實驗室。

整合精密設施 提供高階船模實驗服務

自 2022 年起推動的「國家船模實驗室多功能水槽建置計畫」，除了需新建土木與建築工程以及採購相關軟硬體設備外，其實驗室的重點就在於打造兩座水深 5.5 公尺的大型水槽；分別為長約 80 公尺、寬約 40 公尺的方形耐海與操縱性能水槽，並結合造波系統、拖車系統等，以及直徑約 60 公尺搭配迴旋臂系統的圓形迴旋臂試驗水槽。

透過這兩座試驗水槽及設備，可拖動縮尺的木造船模在水面或水下航行，並模擬不同的波浪海象等，以能進行各項核心實驗。例如利用「平面運動」（Horizontal Planar Motion Mechanism, HPMM）來量測船舶在水面上 6 個自由度的水動力係數；或是在「耐海性能實驗」中，可模擬船舶在波浪中的運動狀態；以及針對水面與水下載具利用迴旋臂系統進行「迴旋實驗」，以獲取多種航行姿態的水動力分析等。

這些經由實驗獲得的流體力學數據，就可用以建立船舶的運動方程式與航跡模擬器，進而優化船體的控制面（如方向舵尺寸的決定）、微調自動駕駛（Autopilot）系統的控制演算法，使新設計的船舶能具備良好的航向穩定性與迴旋能力等性能。因此船舶中心也運用船舶領域的專業能力，針對施工期間的工程結構與品質，以及裝備儀器的進場和調整校正，乃至於各項介面之間的整合等，都加以嚴格控管，確保未來船模實



透過計畫培養能掌握流體試驗數據分析、模型精密加工與複雜系統操作的專業技術團隊。Through this project, SOIC is cultivating a professional technical team capable of mastering fluid dynamics data analysis, precision model machining, and the operation of complex testing systems.

驗的精確度。

規劃營運管理 促進船舶產業未來發展

國家船模實驗室的建置，不僅能有效提供產業與學研界的實驗所需，帶動國內船舶設計與創新技術的發展，更能夠因應國艦國造、海事工程等政策或需求，讓關鍵的船模實驗能夠就近在國內實施，不需再支付高昂費用送往國外實驗，也能避免具有機敏性的船艦資料外流。另外，未來國家船模實驗室也有機會透過更具價格優勢的服務，爭取越南、泰國等東南亞市場，藉此深耕臺灣船舶產業能量。

為能讓國家船模實驗室落成後順利營運，船舶中心在建置計畫中也安排專業人才的培育和維運管理的規劃，協助未來接管國家船模實驗室的行政法人國家海洋科技營運中心，能夠具有專業服務和維運管理的能力。其中在人才培育方面，委託國內外多家機構或技術顧問，提供船模製造、基礎理論、實驗流程等多面向的訓練課程；包括首批前往英國受訓的 10 名種子師資，也已投入實務推動與技術執行工作。

在維運管理層面上，船舶中心也針對國家船模實驗室的未來營運進行評估與規劃。像是從實驗儀器的操作使用與維護保養，到設備、能源、人員的所需經費等，提出整體的財務分析，並建立 ISO 營運管理品質系統，使國家船模實驗室能在更完備的規劃落實下，成為未來推動我國船舶與海洋產業發展的動力。📍

ELEVATING TAIWAN'S MARITIME CAPABILITIES: THE NATIONAL SHIP MODEL BASIN

As an island nation, Taiwan relies heavily on its shipbuilding industry. However, building vessels is costly, requiring meticulous planning and extensive ship model testing to verify performance before production. When a hull interacts with fluid dynamics, complex hydrodynamic phenomena affect its operational efficiency. To safely validate these factors without relying on expensive overseas facilities—which risk exposing sensitive naval data—Taiwan is constructing its first international-class testing facility: the National Ship Model Basin.

Commissioned by the National Academy of Marine Research (NAMR) under the Ocean Affairs Council (OAC), the Ship and Ocean Industries R&D Center (SOIC) is leading this pivotal project. Initiated in 2022, the multi-functional basin project integrates advanced civil engineering with cutting-edge hardware and software. At its core are two 5.5-meter-deep testing basins: a rectangular Seakeeping & Maneuvering Basin (80m x 40m) equipped with wave generators and towing carriage systems and a circular Rotating-Arm Basin (60 m diameter).

Using scaled wooden models, researchers can simulate diverse sea conditions both on and below the water surface. Key experiments include using a Horizontal Planar Motion Mechanism (HPMM) to measure hydrodynamic coefficients across six degrees of freedom, executing seakeeping tests in waves and utilizing the rotating arm to capture hydrodynamic derivatives during rotational maneuvers. The resulting data helps establish motion equations and trajectory simulators, optimizing hull control surfaces and autopilot algorithms to improve course stability. SOIC enforces strict quality control across construction, equipment installation, and interface integration to ensure ultimate precision.

Beyond enhancing local ship design and supporting the Indigenous Defense Warships policy, the facility will stimulate innovative maritime technology. Financially, it positions Taiwan to attract clients from Southeast Asian markets, like Vietnam and Thailand, through competitive pricing.

To guarantee seamless operations upon completion, SOIC is actively managing talent cultivation and maintenance planning for NAMR. The project has engaged global technical consultants to deliver training in model manufacturing and experimental theory. Notably, the first cohort of ten seed instructors completed their training in the United Kingdom and returned to Taiwan. Furthermore, SOIC has conducted rigorous financial analyses regarding energy, personnel, and upkeep costs, while establishing an ISO-based quality management system. This robust framework ensures the National Ship Model Basin will serve as a premier driving force for Taiwan's long-term maritime growth.



船舶中心在海洋委員會國家海洋研究院的委託下建置「國家船模實驗室」，為我國打造首座國際級的船模實驗室。Commissioned by the National Academy of Marine Research (NAMR) under the Ocean Affairs Council (OAC), SOIC is establishing the "National Ship Model Basin", creating Taiwan's first international-class ship model testing laboratory.

50年專業領航 船舶中心與臺灣海洋產業攜手並進

船舶中心的價值，不僅僅在於技術圖紙的繪製，更在於其長年累積的技術判斷、法規解讀與豐富的產業實務經驗。對於長期參與中心運作與產業合作的多位董事而言，船舶中心最核心的貢獻，是成功在政府、船東、造船廠與供應鏈之間，構築了一個值得信任且具備高度專業的對話平台。

走過半世紀，船舶中心從早期「聯合船舶設計發展中心」出發，陪伴臺灣造船產業建立自主設計能力。隨著產業需求與國家政策持續轉變，船舶中心的任務也逐步延伸至海洋工程、離岸風電、智慧船舶、國艦國造與海洋綠能等領域。透過產官學界領袖的觀察，我們能更清晰地看見船舶中心如何發揮「專業領航」的精神，引領臺灣海洋產業在變動的時代中站穩腳跟。

連結船廠與船東需求 搭建產業合作平台

中信造船總經理韓育霖形容，船舶中心與船廠、船東之間，是一種長期合作的夥伴關係。有時船舶中心代表船東協助監造，有時船廠也會委託船舶中心協助設計、規劃與評估，這樣的角色轉換，使船舶中心能在不

同立場之間協助溝通。「3 個單位都是想把事情做好，」韓育霖說，船舶中心熟悉船東需求、法規條件與船廠執行限制，能在專案推進前先協助釐清問題，降低後續衝突發生的可能。

船舶中心已成為產業日常運作的一部分，遇到設計、人力、評估或專業判斷問題，業界很自然就會想到船舶中心。韓育霖以「像 Google 搜尋」形容這種存在感，需要知道什麼、需要判斷什麼，第一時間就會想到船舶中心。他也指出，造船是一個需要長時間累積的產業，臺灣未來可朝特種船舶、海洋工程船、海巡船、軍用用途船舶與無人船系統整合等方向發展，船舶中心則可持續扮演高階人才儲備與產業技術支援的角色。

台灣國際造船總經理蔡坤宗也觀察到，船舶中心的角色已從早期協助船舶、艦艇合約設計，拓展至更完整的海洋產業體系。他指出，船舶中心近年在政府委託下，協助串聯造船廠、海洋相關企業與技術團隊，讓國艦國造、無人船、智慧船廠與海洋能源等議題，能逐步形成臺灣自己的合作體系。「它擔任政府跟產業界合作聯繫的橋梁，」蔡坤宗說，船舶中心會主動洽詢船廠與相關業者，協助大家理解政策方向、研發資源與可申請的技術主題。

蔡坤宗特別肯定船舶中心的主動性。面對海巡署、國防部海軍等艦案需求，船舶中心會提早邀集船廠討論，讓未來可能參與備標與建造的業者，及早掌握設計與執行上的可行作法。這樣的協調，有助於後續建造案加速推動，也能縮小規劃與執行之間的落

差。他期許，船舶中心未來能在經濟部之外，進一步連結交通部、國防部等相關部會，從造船、航運、海洋、國防與人才培育的整體需求出發，形成更完整的國家產業政策支援能力。

交通部航港局局長葉協隆則從治理與公益角度觀察船舶中心。他認為，船舶中心的核心精神可歸納為「專業領航，貢獻國家」。在他參與董事會的過程中，船舶中心投資保利馬公司，推動氫能船舶與船舶淨零減排，展現其呼應全球減碳趨勢、投入前瞻技術的決心。

葉協隆也肯定船舶中心重視公司治理與績效管理。除了配合政府政策執行國艦國造等任務，船舶中心也積極爭取政策專案以外的合作機會，維持財務自主，並將同仁薪酬獎金與績效連結，鼓勵團隊以專業爭取成果。面對全球航運永續與智慧轉型浪潮，以及持續變動的國際情勢，他期許船舶中心以深厚的船舶專業與人才資源，協助臺灣在造船產業、航運發展、能源轉型與國防實力上創造更大貢獻。

驅動能源轉型新航向 建構本土綠能供應鏈

經濟部能源署電力發展及管理組組長夏峪泉，則從能源轉型與離岸風電角度，看見船舶中心新的時代任務。其中，船舶中心自主研发的 15 MW 半潛式浮式風電平台「德塔浮台」，於 2024 年底取得驗船中心與德國 TÜV SÜD 聯合認證，對臺灣浮式風電發展具有指標意義。夏峪泉認為，船舶中心長年扮演政府技術幕僚與產業研發支援的雙重角色，是連接政策與產業實務的重要橋梁。

他並對於能見證船舶中心在國艦國造、離岸風電與先進船舶等國家核心政策展現研發實力與執行力，深感榮幸。展望未來，他期許中心在既有成果上，擴大浮式風機實海域驗證，建構本土海事工程供應鏈，並成為推動智慧船舶與海洋綠能發展的重要平台。

從船廠、航港主管機關到能源政策部門，董事們的觀察各有角度，也共同描繪出船舶中心的定位。下一個 50 年，臺灣海洋產業需要更完整的研發能量，也需要能把政策方向、工程技術與現場經驗串聯起來的專業機構。船舶中心的厚實專業，將持續引領臺灣海洋產業航向下一個階段。

SOIC AT 50: NAVIGATING TAIWAN'S MARITIME INDUSTRY FORWARD

The value of the Ship and Ocean Industries R&D Center (SOIC) lies not merely in drafting technical blueprints, but in the accumulated technical judgment, regulatory expertise, and rich practical industry experience built over decades. For board members who have long participated in the center's operations and industry collaborations, SOIC's most fundamental contribution has been successfully establishing a trusted, highly professional dialogue platform connecting government, shipowners, shipyards, and supply chains.

Bridging Shipyards and Shipowner Needs

JONG SHYN SHIPBUILDING CO., LTD. President Yu-lin Han describes the relationship between SOIC, shipyards, and shipowners as a long-term partnership. SOIC sometimes represents shipowners in construction supervision, while shipyards may commission SOIC for design, planning, and evaluation — a flexible role that facilitates communication across different stakeholders. Han notes that SOIC's familiarity with shipowner requirements, regulatory conditions, and shipyard constraints helps clarify issues before projects proceed, reducing potential conflicts down the line. "All three parties want to get the job done right", he said. SOIC has become so integral to daily industry operations that it functions like a "Google search" — the first place professionals turn when they need answers or judgment calls. CSBC Corporation President Kun-chung Tsai observes that SOIC's role has expanded from contract design for vessels and naval ships to encompassing a broader maritime industry ecosystem. Acting as a bridge between government and industry, SOIC proactively engages shipyards and related businesses, helping stakeholders understand policy directions, R&D resources, and applicable technical programs. He particularly commends SOIC's initiative in convening early discussions among shipyards regarding Coast Guard and Navy vessel requirements, enabling potential bidders and builders to grasp design feasibility well in advance.

Steering Energy Transition

Maritime and Port Bureau, MOTC Director-General Hsieh-lung Yeh views SOIC through a governance and public interest lens, summarizing its core spirit as "professional leadership, national contribution". He highlights SOIC's investment in hydrogen-powered vessels and net-zero shipping, reflecting its commitment to forward-looking technology aligned with global decarbonization trends. From the energy sector perspective, Ministry of Economic Affairs Electricity Development and Management Division Chief Yu-chuan Hsia sees a new era mission for SOIC. SOIC's independently developed 15 MW semi-submersible floating wind platform — the "Delta Float" — received joint certification from CR Classification Society and Germany's TÜV SÜD in late 2024, marking a milestone for Taiwan's floating offshore wind development. He looks forward to SOIC expanding real-sea validation of floating wind turbines and building a domestic marine engineering supply chain. Across shipyards, port authorities, and energy policy departments, board members' diverse perspectives collectively illuminate SOIC's positioning. For the next 50 years, Taiwan's maritime industry will need comprehensive R&D capabilities and a professional institution capable of connecting policy direction, engineering expertise, and field experience — a role SOIC is well-positioned to fulfill.

船舶中心的價值，不僅僅在於技術圖紙的繪製，更在於其長年累積的技術判斷、法規解讀與豐富的產業實務經驗。SOIC's value lies not only in technical drafting, but in its long-accumulated technical judgment, regulatory interpretation, and rich practical industry experience.



CH.6 未來展望 航續前行

Future Outlook: Continuing the Voyage Ahead



前進新興海洋產業 船舶中心布局下一個50年

船舶中心走過半世紀，協助臺灣累積船舶自主設計、開發分析與監造能量。隨著產業環境改變，中心的角色也逐步從造船技術支援，延伸至國艦國造、離岸風電、智慧低碳船舶與新興海洋產業，以系統整合、技術研發與產業協作為核心，推動臺灣海洋產業邁向下一階段。

船舶中心成立於 1976 年，原名「財團法人聯合船舶設計發展中心」（USDDC），設立宗旨為建立國內船舶自主設計能量，支援臺灣造船及遊艇產業發展。之後，隨著離岸風電帶動海洋產業發展，主管機關經濟部

促請船舶中心擴大業務範圍，使其角色從船舶設計與技術支援，延伸至海洋產業研發與整合服務，2012 年，正式更名為「財團法人船舶暨海洋產業研發中心（SOIC）」，任務定位進入新階段。

船舶中心轉型歷程與核心主軸

1976年 聯合船舶設計發展中心

建立自主設計能量、支援造船及遊艇產業。

2012年 更名為「船舶暨海洋產業研發中心」

擴大至海洋產業研發與整合服務（能量從技術支援延伸至產業化）。

現在 及下一個50年

- 國艦國造
國防自主、穩健經營（年營收突破8億元）。
- 離岸風電
從固定式轉向「浮式平台」，掌握深水海洋工程核心技術。
- 智慧低碳綠能船舶
淨零航運（雙燃料、氨/氫能）、智慧無人載具（水面/水下）。



船舶中心協助臺灣累積船舶自主設計、開發分析與監造能量。SOIC has helped Taiwan build up capabilities in independent ship design, engineering analysis, and shipbuilding supervision.

船舶中心董事長邱逢琛指出：「臺灣過去的海洋產業多集中在航運、造船、漁業、觀光遊憩等傳統範圍，未來則要把眼光放到先進船舶發展。」此次轉型使船舶中心的任務更加清晰，不再只提供船舶設計服務，而是以既有的船型開發、結構分析、系統整合與監造經驗為基礎，回應國防自主、能源轉型與淨零航運等多元需求。也因此，船舶中心下一階段將持續聚焦三大主軸：國艦國造、離岸風電、智慧低碳綠能船舶，並以研發與產業協作帶動臺灣海洋產業升級。

船舶中心轉型後的重點，在於讓研發成果真正進入產業應用，邱逢琛強調：「技術必須要真正落地到產業，要產業化、商業化。」這也使中心在技術研發之外，更重視應用、產業需求與實務驗證，讓研發成果能被船東、船廠與海洋產業使用。

值得注意的是，船舶中心近 6、7 年營運表現穩健，年營收已從新臺幣 5 億多元增長至超過 8 億元，「身為政府資助的法人，中心在技術研發與獲利平衡之間有著明確的自我定位。」邱逢琛說。

掌握造船需求變化 引導國產技術布局

除了技術研發，船舶中心也希望在國內造船需求管理扮演更主動的角色。臺灣公務船整體需求在時程上常

ADVANCING INTO EMERGING OCEAN INDUSTRIES: SOIC CHARTS THE COURSE FOR THE NEXT 50 YEARS

The Ship and Ocean Industries R&D Center (SOIC), having passed its 50-year milestone, has long supported Taiwan in independent ship design, engineering analysis, and shipbuilding supervision. Over time, its role has expanded beyond shipbuilding into Indigenous Defense Warships, offshore wind power, smart low-carbon vessels, and emerging ocean industries. With system integration, technological R&D, and industrial collaboration at its core, SOIC is steering Taiwan's maritime sector toward its next stage of development.

Founded in 1976 as the United Ship Design and Development Center (USDDC), SOIC was tasked with developing Taiwan's ship design capabilities and supporting domestic shipbuilding and yacht industries. As offshore wind power accelerated marine industry growth, the Ministry of Economic Affairs urged SOIC to broaden its scope. In 2012, it was rebranded as Ship and Ocean Industries R&D Center (SOIC), marking a new era of strategic positioning.

SOIC Chairman Forng-Chen Chiu explained that Taiwan's marine industries traditionally focused on shipping, shipbuilding, fisheries, and tourism, but future priorities lie in advanced vessel development. SOIC now leverages expertise in hull form development, structural analysis, system integration, and construction supervision to meet needs in defense self-reliance, energy transition, and net-zero shipping. Its next phase centers on three pillars: Indigenous Defense Warships, offshore wind power, and smart low-carbon vessels, while promoting industrial upgrading through R&D and collaboration.

Chiu emphasized that research must be industrialized and commercialized. SOIC ensures innovations are validated and applied by shipowners, shipyards, and the broader marine industry. Driven by Taiwan's Indigenous Defense Warships policy, SOIC has seen steady growth, with annual revenue rising from NT\$500 million to NT\$800 million. As a government-funded institution, it balances technical R&D with profitability.

Managing Shipbuilding Demand

SOIC also plays a proactive role in managing Taiwan's domestic shipbuilding demand. Public vessel procurement often fluctuates, straining shipyard capacity during peak demand and leaving gaps during slower periods. CEO Shean-Kwang Chou explained that early discussions with SOIC on vessel specifications, budgets, schedules, and capacity can strengthen tender planning and production arrangements. Through demand databases and long-term trend analysis, SOIC helps allocate resources, forecast vessel demand, and guide localization strategies. These efforts influence shipyard capacity, workforce planning, and the sustainability of Taiwan's shipbuilding industry.

Offshore Wind Power: Moving to Deep Waters

Offshore wind power has become a key SOIC priority. Taiwan initially relied on fixed-bottom turbines, but as suitable sites diminish, development is shifting to deeper waters, making floating offshore wind technology essential. Floating systems depend heavily on floating structure design, mooring systems, motion analysis, and offshore platform technologies—areas where SOIC excels. Chiu noted, "As water depths increase, floating platforms become essential. This involves highly complex marine and vessel dynamic technologies, which represent our core strengths".

在智慧化與國防需求升高的趨勢下，船舶中心近年持續投入自駕船與無人載具技術。Amid rising demand for smart technologies and national defense applications, SOIC has consistently invested in autonomous vessels and unmanned systems in recent years.



有過於集中或分散的情形，當多個機關於相近期間編列預算並推動造船計畫時，可能對船廠產能造成負荷，影響標案推動節奏；然而在需求相對較低的期間，船廠則需面對產能調配與市場競爭等經營挑戰。因此，船舶中心執行長周顯光認為：「當海巡、海軍、地方政府或其他公務單位有造船需求時，若能先與船舶中心討論船型規模、預算、期程與國內船廠量能，後續標案推動與船廠產能安排都會更有依據。」

周顯光進一步說明：「透過需求資料庫、去識別化資訊與長期趨勢判斷，中心可以協助政府更有效配置資源，提前判斷哪些船型或設備需求可能增加，進一步引導國產化與技術研發。」他強調這項工作的進展除了會影響單一標案進度，也關係到國內船廠產能、人力配置與造船產業長期永續發展。

離岸風電走向深水 浮式平台接軌海洋工程

離岸風電是船舶中心轉型後的重要發展主軸。早期臺灣離岸風電多以固定式風機為

主，工程需求集中在水下基礎、港灣工程與海事施工，隨著適合固定式開發的場域逐漸受限，風場開發勢必往更深水域推進，浮式離岸風電也成為下一階段重點。

相較於固定式風機，浮式風電更仰賴浮體設計、繫纜系統、運動分析與海上平台技術，這些能力正是船舶中心長期累積的專業。邱逢琛指出：「當水域變深，就必須使用浮式平台，這涉及複雜的海洋船舶動態技術，是我們的核心競爭力。」因此，船舶中心近年將浮式平台作為離岸風電技術發展的重要切入點，希望將船舶設計與海洋工程經驗，轉化為推動臺灣深水風場開發的力量。

除了平台設計，船舶中心也在離岸風電政策推動扮演技術幕僚角色。離岸風電涉及開發規劃、工程審查、施工標準、海事安全與供應鏈建構，行政部門需要海洋工程與船舶技術支援。船舶中心派出人員進駐能源署辦公室，擔任政策規劃的技術幕僚，同時也協助標檢局建立國內離岸風電的相關標準，使離岸風電逐步從外商技術導入，走向更符合臺灣海域條件與產業需求的發展模式。

在產業端，船舶中心則協助國內工程顧問、造船與海事工程業者熟悉離岸風電需求。過去臺灣工程公司多以土木、港灣或陸域工程經驗為主，對海上作業、動態分析與國際認證較不熟悉，船舶中心透過技術指導與聯盟方式，協助業界取得國際認證，進而進入風電產業鏈。周顯光表示，「這項工作讓船舶中心成為連結政府、國外開發商與國內產業的重要橋梁，也讓技術在地化逐步轉化為國內業者可承接、可執行的工程能力。」

除浮式平台設計與政策技術支援，船舶中心亦將海事工程模擬視為提升產業能力的重要工具。離岸風電施工涵蓋拖船、風機、繫纜與海上操作，若直接在實海域訓練，成本與風險都相當高，因此中心發展拖船與海事作業模擬系統，讓業者能在模擬環境中熟悉相關操作，協助提升人才訓練效率，也增加海事工程安全性。

減碳壓力升高 低碳船舶成為研發主軸

面對全球淨零趨勢，航運業正進入燃料轉換的新階段。雖然航運碳排放約占全球 3%，但單艘大型船舶排放量高，加上國際海事組織（IMO）逐步強化減碳要求，船東規劃新船與更新既有船隊時，造價、載重與航行效率已不是唯一考量，未來碳費、燃料供應與法規變化也必須納入評估。

低碳船舶也因此成為次世代船舶的重要主軸，邱逢琛指出，「對中心而言，相關研發不能停留在技術展示，必須回到產業應用，協助船東、船廠與設備業者將國際減碳趨勢轉化為新船設計、設備導入與船隊更新時可執行的方案。」

燃料選擇是目前設計新船的最大變數，包括液化天然氣、甲醇、氨及氫皆被視為實現淨零排放的選項。周顯光進一步說明：「由於一艘船往往要使用二、三十年，因此船東現在要造船，通常會選擇雙燃料引擎，保留未來轉向其他燃料的彈性，避免賭錯技術方向。」在這個過程中，船舶中心的任務，是持續掌握燃料技術、國際法規與設備發展，協助臺灣航商在減碳壓力下保有調整空間。

無人載具加速發展 智慧船舶走向系統整合

在智慧化與國防需求升高的趨勢下，船舶中心近年

SOIC also advises on offshore wind policy, supporting planning, engineering review, construction standards, maritime safety, and supply chain creation. Personnel are stationed within the Energy Administration and the Bureau of Standards, Metrology and Inspection to help establish domestic offshore wind standards, reducing reliance on imported technologies.

On the industrial side, SOIC guides domestic engineering firms, shipbuilders, and marine companies in meeting offshore wind requirements. Many firms previously specialized in land-based projects and lacked offshore expertise. Through technical guidance and alliances, SOIC helps them obtain international certifications and enter the supply chain. Chou remarked, "SOIC has become an important bridge connecting the government, international developers, and domestic industries".

SOIC also develops marine engineering simulation systems for tugboats and offshore operations, allowing operators to train in safe, simulated environments, improving efficiency and safety.

Low-Carbon Vessels: Responding to Decarbonization

With global net-zero goals, shipping faces fuel transitions. Shipping contributes about 3% of global carbon emissions, and large vessels are major emitters. The International Maritime Organization (IMO) continues tightening regulations, making carbon fees, fuel availability, and compliance critical factors in ship design.

Low-carbon vessels are now central to next-generation development. Chiu stressed that R&D must move beyond demonstration to industrial application, helping shipowners and shipyards adopt practical solutions. Fuel choice is the greatest variable: liquefied natural gas (LNG), methanol, ammonia, and hydrogen are all potential pathways. Chou explained that shipowners prefer dual-fuel engines to preserve flexibility and reduce risk. SOIC monitors fuel technologies, regulations, and equipment trends to help Taiwan's shipping industry maintain strategic flexibility under decarbonization pressure.

Smart Vessels and Unmanned Systems

SOIC has invested in autonomous vessels and unmanned systems, driven by commercial and national defense needs. Chou observed, "Part of the traditional fleet's capabilities is gradually shifting toward unmanned platforms". Commercial motivations include crew shortages, efficiency, and safety improvements. Computer-assisted control optimizes navigation, fuel use, and safety, while reducing crew requirements. However, adoption is limited by regulations, liability, and accountability concerns. Military unmanned systems have advanced more rapidly. Chiu stated, "Unmanned surface and underwater vehicles will become a major focus. Underwater vehicles require higher autonomous decision-making, presenting a higher technological threshold suitable for Taiwan". These systems integrate sensing, control, communication, and positioning for reconnaissance, mine countermeasures, and inspection.

SOIC focuses on technical support and system integration, turning expertise in ship design and marine engineering into industrial modules for commercialization. This avoids direct competition with industry. Smart vessel development now emphasizes system integration, aligning with Taiwan's strengths in ICT and electronics. Vessels are becoming platforms for advanced systems, merging shipbuilding with electronics. Chou noted, "Traditionally, shipbuilding and electronics were separate, but smart technologies are changing this division".

SOIC builds experience through testbeds, demonstration projects, and collaboration with shipyards, transforming them into replicable design modules and integration solutions. This helps Taiwanese companies enter broader maritime markets and establish positions in smart shipping technologies.

持續投入自駕船與無人載具技術。「傳統大艦隊的部分能量，正在往無人載具的方向移動。」周顯光點出當前船舶發展方向。此變化一方面來自商用船舶對人力、效率與安全的重新思考，另一方面也受到近年地緣衝突影響，使軍用無人船、水面載具與水下載具的需求快速升高。

早期商用無人船的研發動機，主要來自船員招募不易、航行效率提升與安全管理需求，若能夠透過電腦輔助控制船舶，則航行路徑、燃油效率與安全管理都有機會進一步提升，且船上人員需求減少，船體空間配置也能重新設計。不過，商用無人船普及仍受國際法規、保險責任與事故歸屬限制，因此發展有限。

相較之下，軍用與特定任務型無人載具近年發展更快，對此，邱逢琛指出：「水面與水下無人載具會是下一階段很重要的方向，尤其水下載具不像水面船可以依靠一般電波通訊，必須具備更高层次的自主判斷能力，技術門檻更高，適合臺灣發展。」這類載具整合辨識、控制、通訊與定位等技術，應用於探測、掃雷、巡檢及其他海事任務。

在這個發展方向下，船舶中心的角色聚焦於技術支援與系統整合，將長期累積的船舶設計、海事工程與控制技術能量，轉化為產業可使用的關鍵模組，協助業者導入技術並將產品推向市場。「如此的分工，也能避免法人與產業直接競爭。」邱逢琛說。

整體而言，智慧船舶的發展關鍵，已從船體設計延伸到船上系統整合，正好與臺灣資通訊、電子零組件及機電整合優勢相互呼應，船舶將成為高科技系統的載台。周顯光提到，「傳統船舶產業與電子業原本距離較遠，但智慧化趨勢正在改變這項分工。」當感測、通訊、控制與資料系統逐步進入船舶，臺灣既有的電子與資通訊能力，就有機會轉化為海事應用的新能量。

周顯光進一步強調，「未來，船舶中心將透過國內實驗場域、示範計畫與船廠合

作，持續累積智慧船舶與無人載具的實證經驗，並將這些經驗轉化為可複製的設計模組、驗證流程與系統整合方案，協助國內業者切入更廣泛的海事市場，讓臺灣在智慧船舶發展中找到更清楚的位置。」

跨足新興海洋產業 累積跨域研發能量

隨著船舶中心從船舶設計走向海洋工程與新興海洋產業，人才需求也逐漸改變，周顯光指出，「未來新興海洋產業離不開系統整合，也需要更多元的人才。」船舶中心過去所需人才多來自造船、海洋工程、機械、輪機等領域，如今面對離岸風電、無人載具、智慧船舶、低碳燃料與海上平台等新任務，中心需要的人才也擴及電機、電子、資通訊、資安、光學、聲學、材料、防腐、AI等領域。

為爭取優秀人才，船舶中心提早接觸潛在人才，透過中心專業人員至大學授課，以及提供暑期實習、工讀機會與獎學金，讓學生在畢業前先看見船舶與海洋產業的技術挑戰與發展空間，而由於離岸風電、國艦國造與智慧化等政策方向明確，也使船舶中心近年人員規模逐步成長。

邱逢琛強調：「中心不追求快速擴張，而是重視穩健發展，避免業務與人力大起大落。」對一個以長期技術累積為核心的研發法人而言，明確的發展方向、友善工作環境與可持續累積的專業發展，皆是人才願意留下的重要條件。

展望下一階段，船舶中心對海洋產業的想像，已超越傳統航運、造船、漁業與觀光遊憩。面對海洋開發與海洋利用需求升高，臺灣未來將迎來更多新興應用，包括離岸風電、海洋能源、海上太陽能、潮流發電、洋流發電、波浪發電，以及安全防衛、水面與水下無人載具等。船舶中心也正將半世紀累積的設計與工程經驗，轉化為支持臺灣海洋產業邁向下一階段的關鍵能量。📍

船舶中心未來展望策略藍圖

政策對接 Policy

- 國艦國造
- 離岸風電政策支援
- 技術幕僚角色
(能源署／標準制定)

系統整合平台 Platform

- 系統整合能力
- 海事模擬系統
- 驗證與測試平台

需求與產能管理 Pipeline

- 造船需求資料庫
- 長期趨勢預測
- 產能調節

技術產品化 Productization

- 船型設計
- 浮式平台
- 低碳船舶
- 無人載具模組

產業協作 Partnership

- 船廠×工程顧問×國際開發商
- 技術聯盟
- 國產化推動

人才與跨域研發 Synergy

- 電機／資通訊／AI／材料
- 產學合作
- 人才培育機制

Expanding into Emerging Ocean Industries

As SOIC evolves, talent needs are diversifying. Chou explained, "Future emerging ocean industries will depend on system integration and require diverse talent". Previously, SOIC recruited from shipbuilding and marine engineering. Today, offshore wind, unmanned systems, smart vessels, low-carbon fuels, and offshore platforms require expertise in ICT, cybersecurity, optics, acoustics, materials science, corrosion protection, and AI. SOIC engages early with universities, offering teaching assignments, internships, part-time opportunities, and scholarships. These initiatives expose students to industry challenges and opportunities. Clear policy directions in offshore wind, naval shipbuilding, and smart technologies have

supported steady growth. Chiu emphasized that SOIC values stable, sustainable growth over rapid expansion, focusing on strategic direction, supportive environments, and professional development. Looking ahead, SOIC's vision extends beyond traditional shipping and fisheries. Taiwan is expected to see growth in offshore wind, ocean energy, offshore solar, tidal and current generation, wave energy, maritime security, and unmanned vehicles. SOIC is transforming decades of expertise into a driving force for Taiwan's marine industries as they advance into the future.

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