Cintranaval–Defcar, S.L.
CINTRANAVAL GROUP

SHIP DESIGN – CAD/CAM SOFTWARE
CINTRANAVAL-DEFCAR, S.L. is one of the top technological Spanish companies in the shipbuilding industry.

Our company is backed with 50 years experience in basic and classification design of the most diverse types of vessels having already carried out almost 600 "CND" brand projects built for shipowners from 30 different countries.

Furthermore CINTRANAVAL-DEFCAR, S.L., has developed the detail design and production engineering of nearly 60 vessels using in-house programmed CAD/CAM software, the DEFCAR system -used by more than 100 companies in 24 different countries-.

A high degree of specialisation as ship designers allied to a program of continuous CAD/CAM software development is the key factor in the company’s success.
ON THE OTHER HAND, CINTRANAVAL-DEFCAR, S.L. IS PART OF CINTRANAVAL GROUP, WHICH COMPANIES - ALL WORKING IN THE MARINE FIELD - ARE THE FOLLOWING:

- **SISTEMAR, S.A.** THE INTERNATIONALLY REPUTED SPECIALISTS IN HYDRODYNAMICS AND SHIP PROPULSION, AND ORIGINATORS OF HIGH-EFFICIENCY PROPELLER CLT (ALREADY INSTALLED IN MORE THAN 275 VESSELS WORLDWIDE).

- **BPM SHIPPING, S.L.** SPECIALIZED ON INSPECTIONS AND SURVEY SERVICES FOR SHIPYARDS AND SHIPOWNERS, STUDIES ON INTERMODAL TRANSPORT AND PREPARATION OF OPERATIONAL MANUALS.

- **SIATEG, S.A.** FOCUSED ON INTERNATIONAL CONSULTANCY SERVICES, LOGISTICS SUPPORT, AS WELL AS SERVICES FOR TECHNOLOGY TRANSFER AND MIX BUILDING BETWEEN SPAIN AND FOREIGN SHIPYARDS
2. HISTORY

- The origin of Cintranaval Group is the ship design company Cintra SA, founded in 1964.

- Cintranaval S.L. was founded in 1978 by a group of managers of Cintra SA, keeping the know-how of the former company.

- In March 2003, Cintranaval SL merged with the software company Defcar Ingenieros, S.L. (founded in 1995), forming Cintranaval-Defcar S.L.

- In 2004 is incorporated to the group the company specialised in hydrodynamics and propulsion, Sistemar, S.A., founded in 1987.

- In 2005, the company Bilbao Plaza Maritima Shipping, specialized consultancy made by a group of reputed naval architects, is incorporated to the group.

- The same year is incorporated Siateg, S.A. to the group, in order to coordinate the international projects.
3. LOCATION

BISCAY:  CINTRANAVAL-DEFCAR, S.L
        BILBAO PLAZA MARITIMA SHIPPING, S.A.

MADRID:  SISTEMAR, S.A
         SIATEG, S.A.
4. BUSINESS ACTIVITIES

1. Consultancy services
   - Need identification and analysis
   - Feasibility studies
   - Yard selection
   - Assistance to tenders (Preparation of tender documents & final evaluation)
   - Assistance to contract negotiations

2. Ship design *(CND-Designs)*
   - Conceptual design
     - Styling / 3D Infographies and virtual videos
     - General arrangements & technical specifications
     - Hydrodynamics & ship propulsion
     - Naval architectural calculations
4. BUSINESS ACTIVITIES

- **Preliminary Design**
  - Scantling calculations
  - Main structural drawings
  - Main arrangement drawings

- **Classification Approval Design**
  - Structure drawings
  - Steel outfitting & foundations
  - Machinery layout & piping diagrams

- **Production Design / Detail Engineering**
  - 3D virtual model of hull structure, equipment & pipelines
  - Production information
4. BUSINESS ACTIVITIES

3. Survey services

- Inspections during the ship construction and guarantee period
- Equipment, installation and vessel’s testing
- Fulfillment of guarantees

4. CAD/CAM software programming: The DEFCAR System

- Ship Design Modules (Hull design & Naval architectural calculations)
- Steel Production Engineering
- Piping Production Engineering
- Onboard loading program

5. Preparation of operational manuals

6. Technology transfer and training

7. Logistics support
5. CND DESIGNS AROUND THE WORLD

MANY WELL-KNOWN INTERNATIONAL SHIPOWNERS ARE TAKING ADVANTAGE OF CND DESIGNS:

1. TUGBOATS & OFFSHORE VESSELS:
   - ADAMS Offshore W.L.L. – Kingdom of Bahrain
   - ADNOC – Abu Dhabi (UAE)
   - BOLUDA Group – Spain
   - Caribbean Drydock Co. (C.D.C.) - Cuba
   - CATARUZZA – Italy
   - Compañía de Remolcadores IBAIZABAL – Spain
   - FAIRPLAY - Germany
   - Fratelli NERI– Italy
   - GESMAR – Italy
   - KEGM (Administración Turca) - Turkey
   - NORTH STAR (CRAIG group) - U.K.
   - OCEAN Group - Italy
   - Petroleos de Venezuela, S.L., (P.D.V.S.A.) - Venezuela
   - Remolcadores de Barcelona, S.A. (REBARSA) – Spain
   - Remolcadores Gijoneses, S.A. (REGISA – Grupo Junqueira) – Spain
   - Remolcadores de Puerto y Altura, S.A. (REPASA) – Spain
   - Remolcadores Nosa Terra, S.A. – Spain
   - Remolques Unidos (RUSA) – Spain
   - Rimorchiaori Riuniti Laziali– Italy
   - Rimorchiaori Riuniti Spezzini – Italy
   - Seabulk International (Seacor Holding) - U.S.A.
   - Sea Eagles Shipping (SES) – Sharjah (UAE)
   - SMIT – The Netherlands
   - SVITZER A/S (A.P. Moller-Maersk group) – The Netherlands
   - TRIPMARE - Italy
   - U.R.S. – Belgium

CINTRANAVAL-DEFCAR USES TO DEAL WITH MANY SHIPYARDS AND SHIPOWNERS FROM: LATIN AMERICA, TURKEY, MIDDLE EAST, EUROPE & MEDITERRANEAN COUNTRIES
MANY WELL-KNOWN INTERNATIONAL ADMINISTRATIONS ARE TAKING ADVANTAGE OF CND DESIGNS:

2. PATROL VESSELS:

- Indonesian Police - INDONESIA
- Kenyan Navy - KENYA
- Ministere de Peches et de la Marine Marchande – MOROCCO
- Moroccan Customs Service - MOROCCO
- State Agency of Tribute Administration – SPAIN
- Guardia Civil - SPAIN

CINTRANAVAL-DEFCAR USES TO DEAL WITH MANY SHIPYARDS AND SHIPOWNERS FROM: LATIN AMERICA, TURKEY, MIDDLE EAST, EUROPE & MEDITERRANEAN COUNTRIES
5. CND DESIGNS AROUND THE WORLD

MANY WELL-KNOWN INTERNATIONAL SHIPOWNERS ARE TAKING ADVANTAGE OF CND DESIGNS:

3. SUPER TUNA PURSE SEINERS:
   - ALBACORA, S.A.
   - ATUNSA
   - Conservas GARAVILLA, S.A.
   - INPESCA, S.A.
   - ECHEBASTAR Fleet, s.l.u.
   - PEBERTU
   - Grupo PETUSA
   - Grupo Marítimo e Industrial (GRUPOMAR) - Mexico
   - Pesca Azteca (Grupo PINSA) - Mexico
   - Pesquería Vasco Montañesa, S.A. (PEVASA)
   - Túñidos Congelados, S.A.

CINTRANAVAL-DEFCAR USES TO DEAL WITH MANY SHIPOYARDS AND SHIPOWNERS FROM: LATIN AMERICA, TURKEY, MIDDLE EAST, EUROPE & MEDITERRANEAN COUNTRIES
5. CND DESIGNS AROUND THE WORLD

TRACK RECORD OF VESSELS BUILT WITH CND DESIGN

- TUG BOATS AND OFFSHORE VESSELS      269 + 8 (*)
- TUNA PURSE SEINERS                   77 + 12 (*)
- OTHER FISHING VESSELS                180
- PATROL AND RESCUE VESSELS            20
- MERCHANT SHIPS                       24
- YACHTS AND PLEASURE BOATS            5

TOTAL 595

(*) Under construction

“CND”, 50 YEARS DESIGNING EXCELLENT SHIPS
5. CND DESIGNS AROUND THE WORLD

- **TUNA PURSE SEINERS**
  
  ✓ **ALL KIND OF PURSE SEINER VESSELS COMPRISING**
    - Lengths from 25 to 110 m.
    - Fish well capacities from 100 to 3,300 cubic m.

- **TOTAL NUMBER OF UNITS**: 77 + 12*
5. CND DESIGNS AROUND THE WORLD

- **FISHING BOATS**
  
  *(OTHER THAN TUNA PURSE SEINERS)*

  ✓ TRAWLERS
  ✓ LONG LINERS
  ✓ SHRIMP FISHING BOATS
  ✓ TUNA ROD FISHING VESSELS
  ✓ MULTIPURPOSE FISHING VESSELS

**TOTAL NUMBER OF UNITS 180**
5. CND DESIGNS AROUND THE WORLD

- **TUGBOATS**

  - **PROPULSION:**
    - CONVENTIONAL
    - VOITH-SCHNEIDER (VSP)
    - AZIMUTH TRACTOR
    - AZIMUTH STERN DRIVE (ASD)

  - **ROLE:**
    - HARBOUR & COASTAL
    - TERMINAL ASSISTANCE
    - OCEAN-GOING
    - ESCORT
    - PUSHER
    - MOORING ASSISTANCE

**TOTAL NUMBER OF UNITS 251+4**
5. CND DESIGNS AROUND THE WORLD

- OFFSHORE VESSELS
  - PLATFORM SUPPLY VESSELS (PSV)
  - FIELD CONTROL VESSELS (FCV)
  - MULTIPURPOSE SUPPLY VESSELS
  - DSV / ROV SUPPLY VESSELS
  - ANCHOR HANDLING TUG SUPPLY (AHTS)
  - OFFSHORE STAND-BY VESSELS

TOTAL NUMBER OF UNITS 18 +4*
5. CND DESIGNS AROUND THE WORLD

- MERCHANT SHIPS
  - CONTAINER SHIPS
  - BULK CARRIERS
  - RO-ROS
  - TANKERS
  - GENERAL CARGO

TOTAL NUMBER OF UNITS 24
5. CND DESIGNS AROUND THE WORLD

- PATROL VESSELS
  - COASTAL PATROL VESSEL
  - OFFSHORE PATROL VESSELS (OPV)
  - RESCUE VESSELS
  - LANDING CRAFTS

TOTAL NUMBER OF UNITS 20
6. Marine Software: The DEF CAR System

**Modules**

- Hull Design & Fairing
- Naval Architectural Calculations
- Plate Development
- On Board Loading Analyzer
- Piping & Outfitting
- Structural Steelwork
The DEFCAR System is used by more than 100 companies in 25 different countries. Among others: in Asia (India, Indonesia, Vietnam & Singapore), America (Mexico, Canada, Cuba & Brazil) or Europe (Poland, UK & Spain)

- **SHIPYARDS**: 33
- **DESIGN OFFICES & UNIVERSITIES**: 50
- **VESSELS WITH DFLOAD (LOADING ANALYZER)**: 20

**TOTAL**: 103
7. ANOTHER COMPANIES OF CINTRANALVA GROUP

- DESIGN OF HIGH PERFORMANCE CLT PROPELLERS
- HYDRODYNAMICS CONSULTANCY
- RESEARCH AND DEVELOPMENT ACTIVITIES

CLT PROPELLERS - SUMMARY OF ADVANTAGES

- HIGHER EFFICIENCY
- HIGHER SHIP SPEED
- LOWER FUEL CONSUMPTION
- BETTER MANOEUVRABILITY CHARACTERISTICS
- LOWER NOISE AND VIBRATION LEVELS
- LOWER OPTIMUM DIAMETER
- BETTER PERFORMANCE OF CP BLADES OUT OF DESIGN RANGE
The CLT propeller has an end plate at the tip of each blade. The end plate is located on the pressure side of the blade with the aim to obtain a higher overpressure downstream.

The radial pitch distribution of a conventional propeller is unloaded at the tip with the aim to reduce the risk of excitation of tip vortices.

On the contrary, in the case of CLT propellers the pitch increases monotonously towards the tip so that the blade tip bears a substantial load.

This is possible thanks to the existence of the tip plate that acts as a barrier avoiding the communication of water between both sides of the blade.
7. ANOTHER COMPANIES OF CINTRANAVAL GROUP

CLT PROPELLER. POTENTIAL APPLICATIONS

- The boss for FP applications and the blade flange for CP applications are the same for CLT propeller / blades than for the alternative conventional propeller/blades
- The inertia of the CLT propeller/blades is almost the same than the one of the alternative propeller/blades
- The installation of CLT propeller/blades does not introduce any modification in the shaft line performance neither for newbuildingins nor retrofittings

- In case of retrofitting the old conventional propeller/blades can be kept as spare
- If necessary the CLT propeller/blades may be changed by the alternative conventional propeller/blades without any problem
NEWBUILDINGS

• The extra-cost for the installation of the CLT propeller/blades is just due to the difference in cost with regard to the alternative conventional propeller/blades

RETROFITTING

• The extra-cost for the installation of the CLT propeller/blades is not only the complete cost of design and manufacturing but also the cost of dismounting the existing conventional propeller/blades plus the cost of transportation and installation of the new CLT propeller/blades

• Estimation of the fuel bill reduction per year achieved by the CLT propeller as a function of the type of ship (sailing hours per year, specific fuel consumption, percentage of saving estimated) and the fuel price

• The return of the investment is produced in the range of 3 to 6 months

• The return of the investment is produced in the range of 2 to 3 years
7. ANOTHER COMPANIES OF CINTRANAVAL GROUP

INSTALLED CLT PROPELLERS AROUND THE WORLD

- ORDERS OF CLT PROPELLERS 275
- APPLICATIONS OF CLT PROPELLERS FOR CP SYSTEMS 55
- SHIPOWNERS WITH MORE THAN ONE ORDER 35
- SHIPOWNERS WITH AT LEAST 3 VESSELS WITH CLT 20
7. ANOTHER COMPANIES OF CINTRANAVA GROUP

- INSPECTION AND SURVEY SERVICES
- PREPARATION OF OPERATIONAL MANUALS:
  - SOPEP, SOLAS, U.S. COAST GUARD, MARPOL, ETC…
- FREIGHT POLICY ADVISING
- ISM CODE ADVISING
- ADVISING ON “QUALITY ASSURANCE CERTIFICATE” (ISO 9000/2000)
- ADVISING ON SHIP’S VALUATION AND PURCHASE-SALE OPERATIONS
- AUDITS ON SAFETY AND QUALITY
RECENT ADVISING SERVICES:

2008  MARINE AFFAIRS DEPARTMENT. MARM (Ministry of Environmental, Rural and Marine Areas). SPANISH GOVERNMENT.
TECHNICAL ADVISING DURING THE BUILDING PERIOD of a ship of cooperation in terms of fishing. State-of-the-art vessel belonging to the Administration.

2007  IEO (SPANISH OCEANOGRAPHIC INSTITUTE). MICINN (Ministry of Science and Innovation). SPANISH GOVERNMENT.
Auditing and Consultancy services as OWNERS’S SURVEYOR DURING THE BUILDING PERIOD of two oceanographic vessels with diesel-electric propulsion. Highly innovative vessels with very advanced propulsion system and scientific equipment on board.
Noiseless vessels to comply with ICES 209.
Leading vessels in environmental protection (to comply with BV’s CLEANSHIP notation)

2006  MARINE WELFARE INSTITUTE. MTIN (Ministry of Labour and Immigration). SPANISH GOVERNMENT.
ADVISING DURING THE GUARANTEE PERIOD of the vessel “Juan de la Cosa”, the most sophisticated multi-role hospital ship built for the MWI. Technical advising for the Marine Welfare Institute’s fleet.

2005  MARINE WELFARE INSTITUTE. MTIN (Ministry of Labour and Immigration). SPANISH GOVERNMENT.
TECHNICAL ADVISING DURING THE BUILDING PERIOD of the vessel “Juan de la Cosa”.

7. ANOTHER COMPANIES OF CINTRANAVAL GROUP
OPERATIONAL MANUALS

✓ SOPEP (Shipboard Oil Pollution Emergency Plan) Manual for contingency plan against pollution for oil leakage and spilling
✓ SOLAS Training Manual (R.35) and Maintenance Manual (R.36)
✓ Garbage treatment Manual (MARPOL, Annexe V)
✓ SOLAS Fire protection Manual (SOLAS amendments of 2000)
✓ Manual for Crude Oil Washing (COW)
✓ Cargo Securing Manual
✓ Ballast Monitoring System Manual
✓ Oil Cargo Transfer Manual
✓ Manual for procedures and means in tankers
✓ Any operational or regulatory Manual required by national administrations, US Coast Guard or IMO
✓ Etc…
SIATEG S.A.

- SERVICE FOR MIX BUILDING BETWEEN SPANISH AND FOREIGN SHIPYARDS
- LOGISTIC SUPPORT FOR EXPORT OPERATIONS
- TRANSFER OF TECHNOLOGY

**REMARKABLE REFERENCE:** TECHNICAL COORDINATION OF MIX BUILDING OF 31 TUNA LONG-LINERS BETWEEN SPAIN AND INDONESIA

- Division in 10 blocks
- Construction between 4 Spanish and 1 Indonesian shipyards
- Preparation of kits (360 20’ containers and 1,281 pallets)
- Upgrading of Indonesian shipyard
- Training to 40 technicians on state-of-the-art marine technology
- Coordination works in Indonesia during 2 years
INTERNATIONAL PROJECTS

- Mix construction of 31 tuna long liners between Spain and Indonesia for BBVA.
- Collaboration with Gondán shipyard for the building of 8 vessels for the Kenian Navy.
- Collaboration with Gondán shipyard for the building of 2 patrol boats for the Indonesian Police.
- Project for the mix construction of fishing vessels between Spain and The Philippines.
- Project for the mix construction of fishing vessels between Spain and Vietnam.
- Project for the mix construction of fishing vessels between Spain and Saudi Arabia.
- Preliminary study on the modernization and enlargement of Pukhet fishing port (Thailand).
- Preliminary study on the development of a fishing complex at Tok Bali (Malaysia).
- Study on the development of a shipyard at Vietnam.
- Preliminary study for a drydock shipyard and its equipment in Paraguay.
- Study on the development of a repair shipyard at Morocco.
- Study for the development of a shiprepair center at the port of Bilbao (Spain).