Indian Industry Trends in Defence Shipbuilding

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- Indigenous Naval Construction – Trends & Prospects
- ‘Make in India’ in Defence
- Industry Capabilities – A L&T Case Study
- Areas of Collaboration with Global Leaders
- Way Ahead

Indigenous Naval Construction - Trends & Prospects

India's Defence Production – Present Status

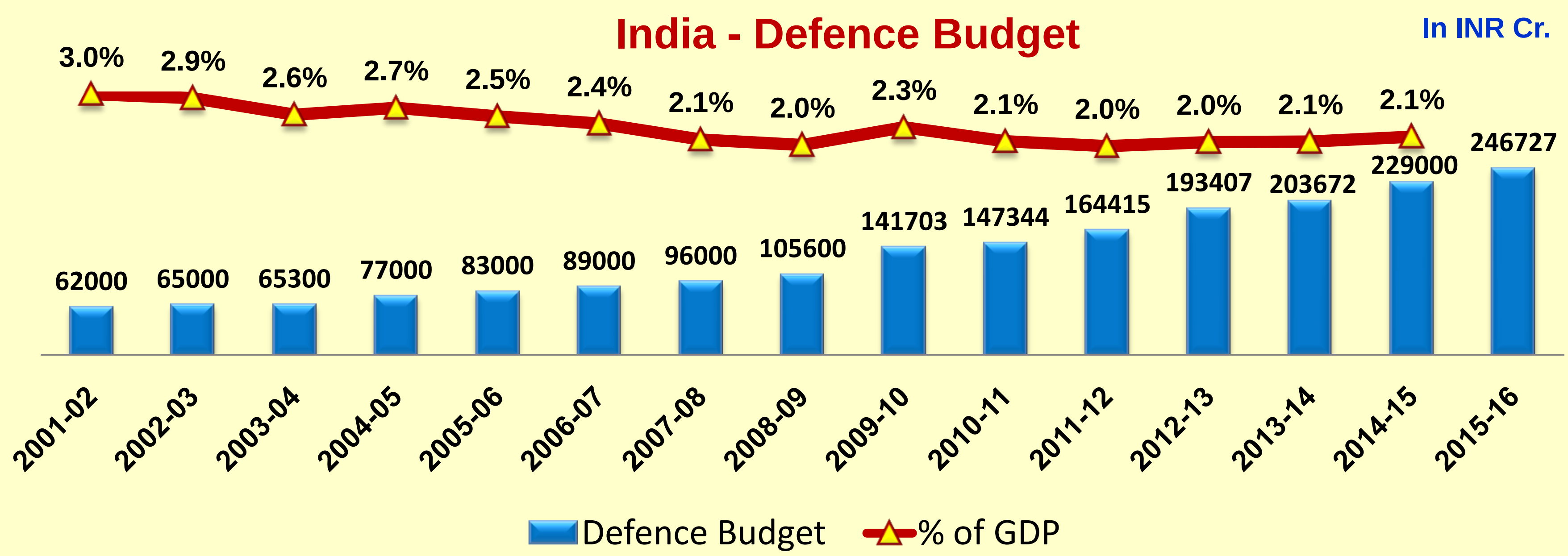
- **India is the largest importer of arms in the world**

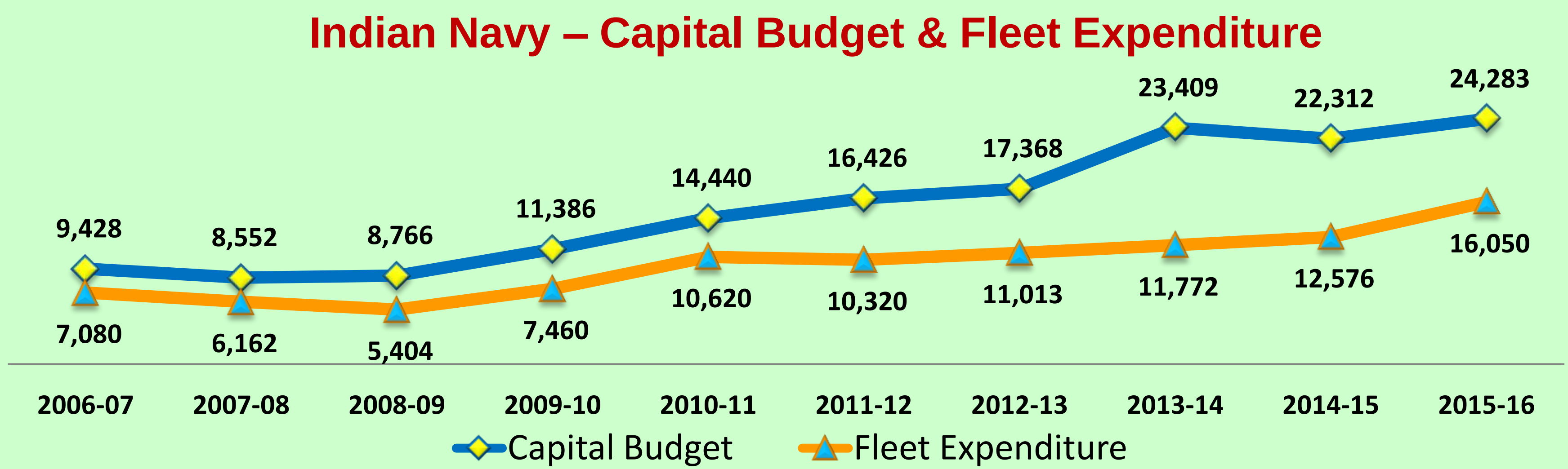
Importers	Share of International Arms Imports (%)	Main Suppliers (Share of Importer's Total Imports)		
	2009-13	**1st**	**2nd**	**3rd**
India	14	Russia (75%)	USA (7%)	Israel (6%)
China	5	Russia (64%)	France (15%)	Ukraine (11%)
Pakistan	5	China (54%)	USA (27%)	Sweden (6%)
UAE	4	USA (60%)	Russia (12%)	France (8%)
Saudi Arabia	4	UK (44%)	USA (29%)	France (6%)

Source: SIPRI

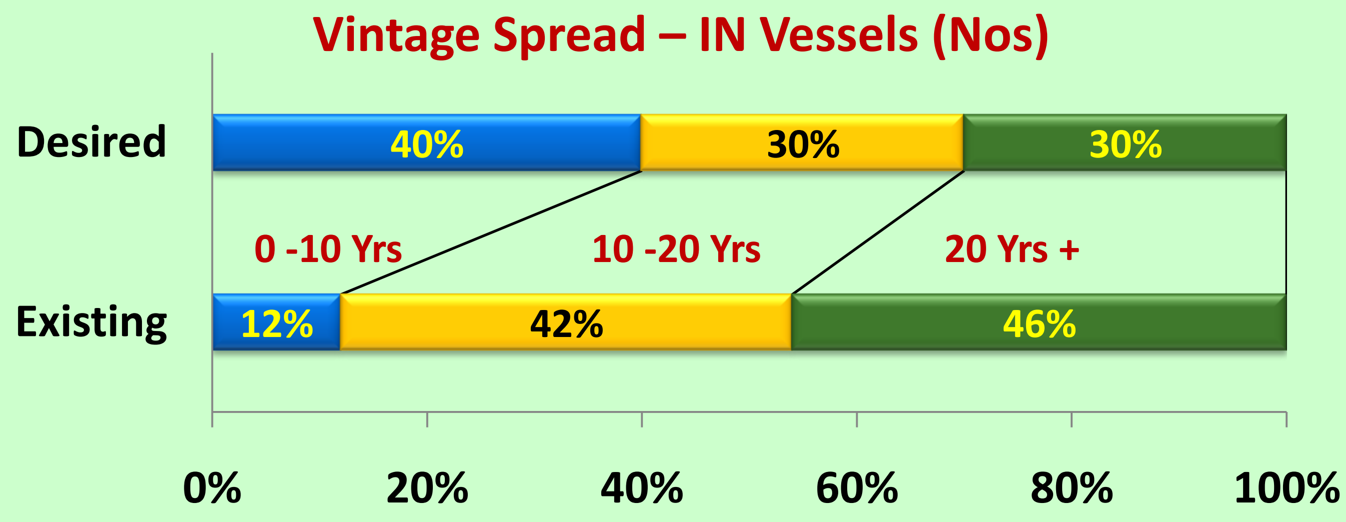
- **India's import v/s indigenous ratio at 70:30**
- **Government aims to limit imports to 30% in next 5 years**

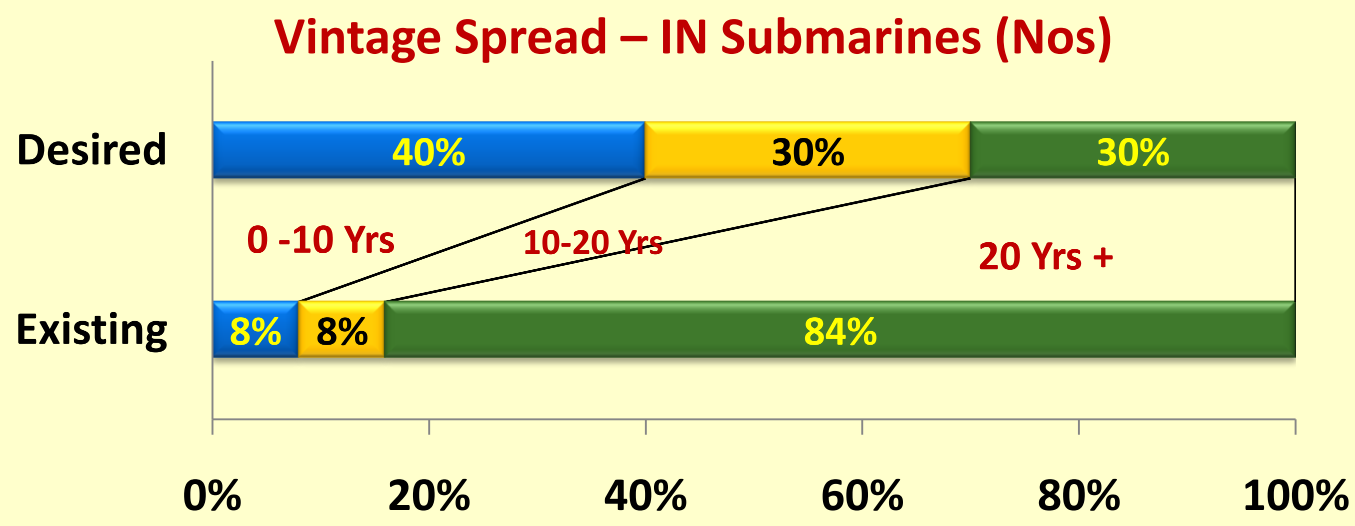
Defence & Naval Budget



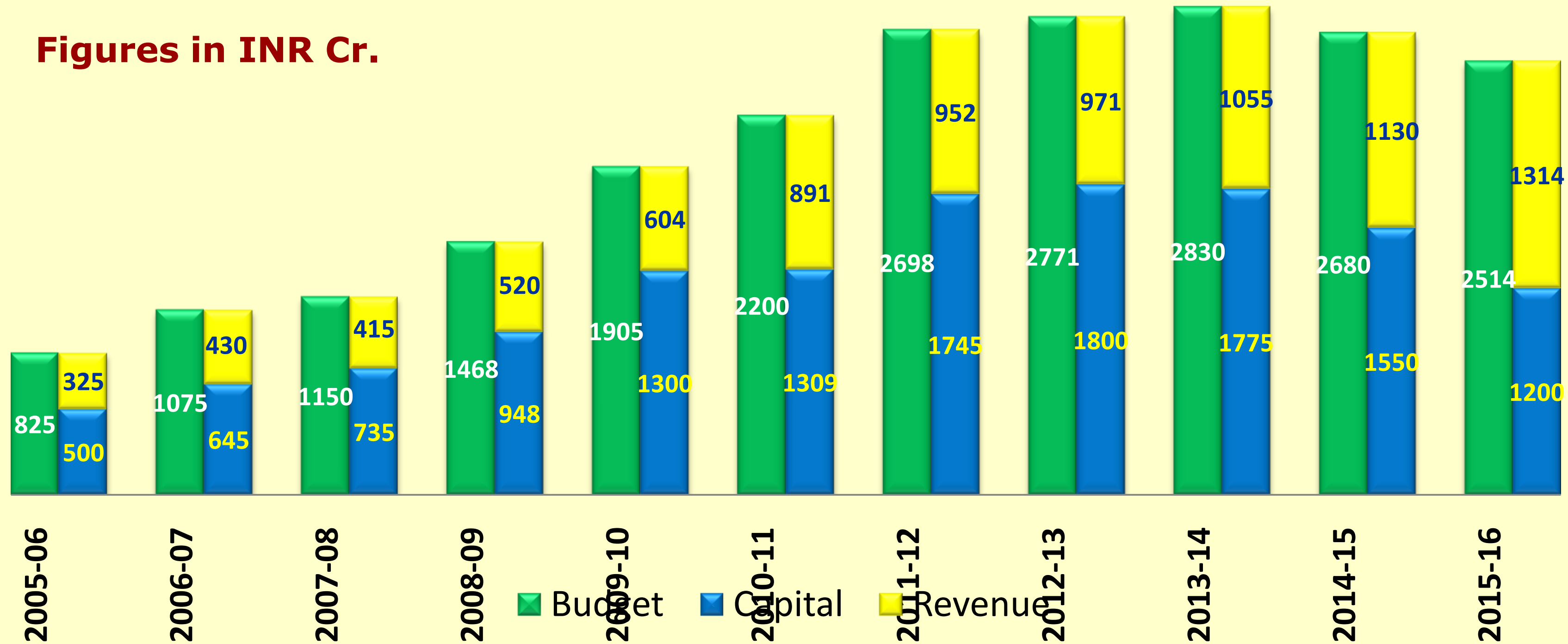


Indian Navy : Ageing Fleet



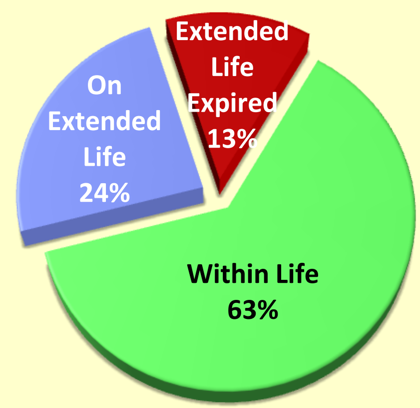


Coast Guard : Budget & Vintage Spread



Vintage Spread Of Coast Guard Vessels				
Class of Ship	**No. of Vessels**	**Within Life**	**On Extended Life**	**Extended Life Expired**
AOPV/OPV	15	8	6	1
FPV/IPV	37+	17	10	10
IB	40+	32	6	1

ICG Fleet Profile



Ordering Trend *(Reference Year 2000)*

Destroyers (P15A) – MDL
Nominated, Under Execution
11,400 Cr.

Destroyers (P15B) – MDL
Nominated, Under Execution
35,000 Cr.

Aircraft Carrier (P71) – CSL
Nominated, Under Execution
3,300 Cr.

Submarines (P75) – MDL
Nominated, Under Execution
23,550 Cr.

Frigates (P17) – MDL
Nominated, Delivered
3,000 Cr.

Frigates (P17A) – MDL, GRSE
Nominated
45,000 Cr.

Landing Craft Utility – GRSE
Nominated, Under Execution
2,200 Cr.

ASW Corvettes (P28) – GRSE
Nominated, Under Execution
7,000 Cr.

NOPV – GSL
Nominated, Under Execution
1,800 Cr.

LST (l) – GRSE
Nominated, Delivered
1,200 Cr.

Others – Various PSU Yards
Delivered & Under Execution
5,420 Cr.

Total Orders
INR 1,49,400 Cr.

Orders on PSUs
INR 1,38,850 Cr.
(~ 93%)

Ordering Trend *(Reference Year 2000)*

NOPV – Pipavav
Contracted, Under Execution
2,975 Cr.

CGOPV – L&T
Contracted, Under Execution
1,400 Cr.

Fast Patrol Vessels – Pipavav
Under Contract Finalization
920 Cr.

Interceptor Boats– L&T
Contracted, Under Execution
1,430 Cr.

Cadet Training Ships – ABG
Contracted, Under Execution
1,450 Cr.

Floating Dock – L&T
Contracted, Under Execution
450 Cr.

Others
Contracted, Under Execution
1,925 Cr.

Total Orders
INR 1,49,400 Cr.

Orders on Pvt Yards
INR 10,550 Cr.
(~ 7%)

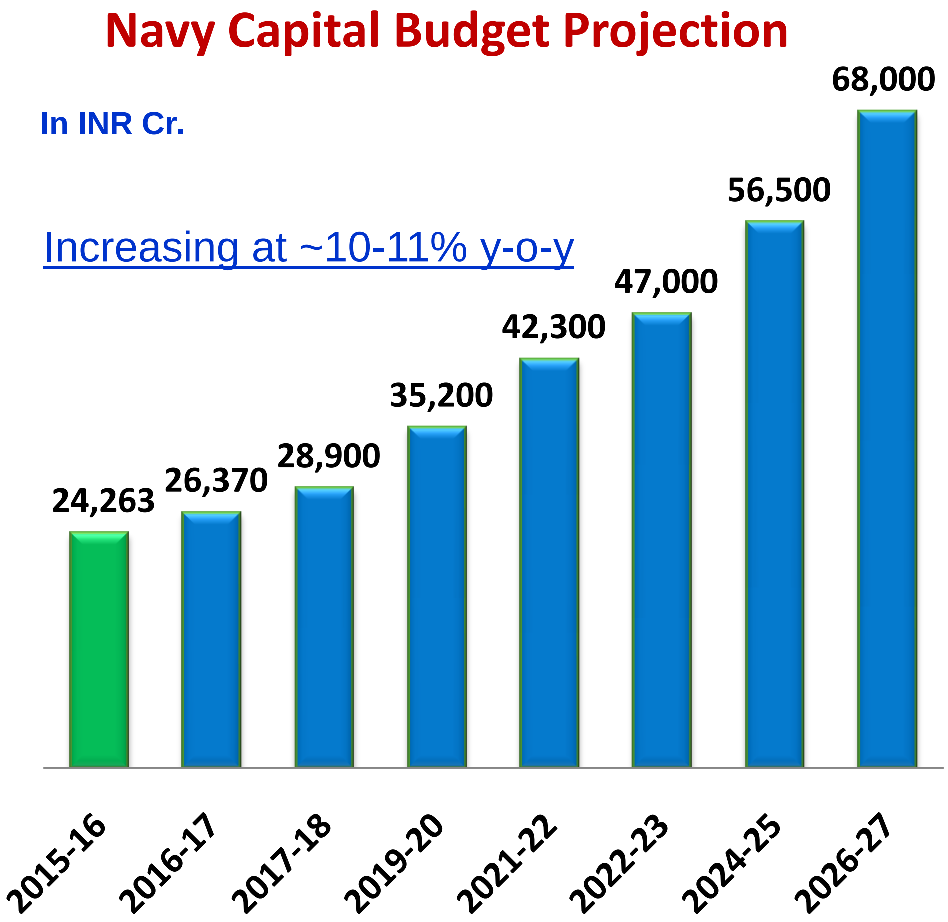
Naval Business Potential Up to 2023

Projected Requirements till 2023		
Platform	**Projected Force Level**	**To be acquired***
Aircraft Carrier	3	**1**
Landing Platform Dock	6	**6**
Destroyers/Frigate	37-42	**6-8 Frigates** **3-5 Destroyers**
Submarines	24	**12**
Corvettes	32-36	**18-22**
Local Naval Defence	20	**11**
Mine Counter Measure Vessels	24	**18**
Landing Craft Units	16	**16**
Fast Interceptor Crafts / Fast Attack Crafts	1100 FICs	**> 1000 FICs**

Naval Fleet	Approx. Total Order Value
Major New Programmes	~ Rs 3,20,000 Crs
Average Yearly Order Placement over next 10 yrs	**~ Rs 32,000 Crs**

**Source: Q-Tech Synergy Pvt Ltd.*

Naval Business Potential Up to 2027*



*Ref : Eye On Defence March 2015 by EY

Major Programmes	
Capital Projects Planned	**Resource Projections (Cr.)**
Carriers	45,000
Destroyers/Frigates	95,000
Submarines	2,23,000
Corvettes	23,000
LND/MCMV/FSS	55,000
LPD/LCU	16,000
Total	**4,57,000**

‘Make in India’ in Defence

‘Make in India’ Initiative

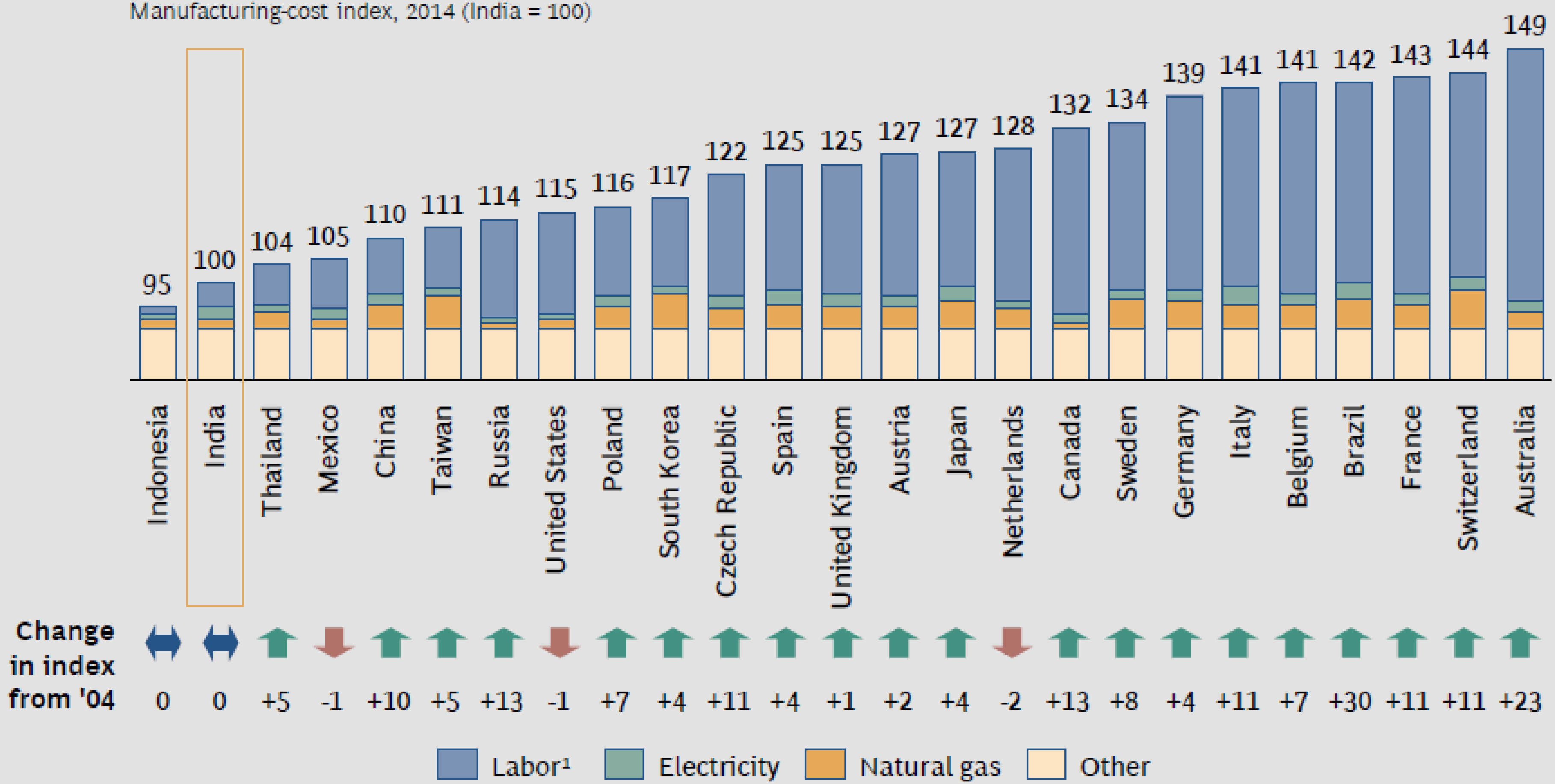
- Launched by Hon’ble Prime Minister of India on 25th Sep, 2014
- Aims to encourage FOEMs to manufacture products in India
- Focuses on 25 important sectors of economy including defence - a focus area
- Norms and procedures relaxed for enhancing ‘ease of doing business’
- Received extremely positive response from across the world

‘Make in India’ Initiative – Salient Expectations

Make In India

- Generating Large Scale Employment
- Acquisition of Cutting Edge Technologies, Infrastructure, Skills
- Sharpening India’s Competitive Edge, Globally
- Reducing Imports & Enhancing Exports, Promote Defence Exports
- Imprinting India on Global Map as a Quality & Competitive Manufacturing Hub for Defence
- Improving Overall Quality of Life
- Enhance Indigenous Content for all Procurement Categories

Advantage India in Manufacturing



Sources: US Economic Census; BLS; BEA; ILO; Euromonitor; EIU; BCG analysis.
Note: No difference assumed in "other" costs (for example, raw-material inputs, machine and tool depreciation); cost structure calculated as a weighted average across all industries.
[1]Productivity-adjusted.

"Our Main Weapon Is the 65% Population Below 35 Years of Age" - PM

Procurement Preference : DPP 2013 Promotes 'MII'

- DPP to be amended for faster realization of 'Make in India' for Defence
- Thrust on indigenisation, incentivise higher indigenous content for all categories

Most Preferred

Buy (Indian)

Buy & Make (Indian)

Make (Indian)

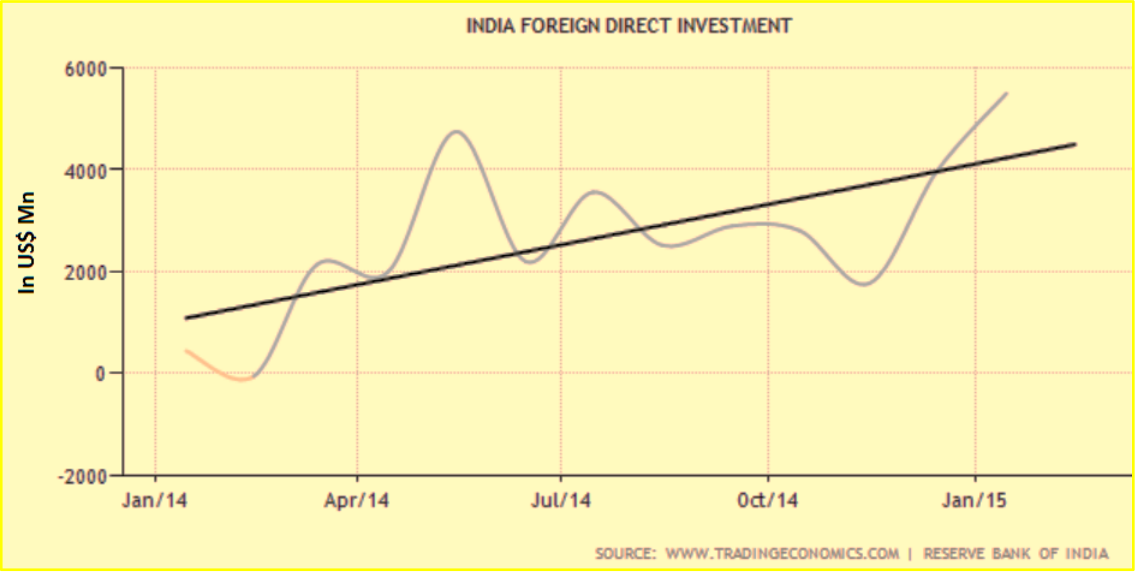
Buy & Make

Buy (Global)

Least Preferred

Policy Changes to Attract FDI

- FDI norms eased across many sectors including defence – 26% to 49%
- Govt. reaching out to investors across the globe to invest in India
- Clear focus on infrastructure growth, essential to attract FDI
  - Many new infrastructure projects announced by this government
  - PPP model being followed to further boost basic infrastructure
- Govt's policy initiatives have received positive response from foreign investors



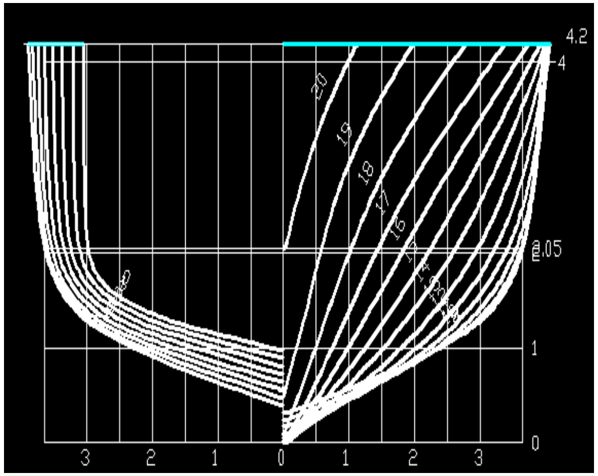
Make in India in Defence Sector

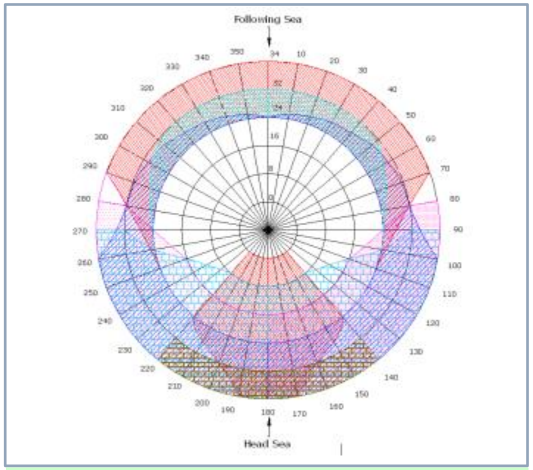
- **2000-14: Indian defence budget grew at 10% CAGR**
- **2008-14: CAPEX was 38 % of the annual spending**
- **FY16: CAPEX is at 37 % of defence budget of $15 Bn**
- **2009-13: India was world's largest defence importer accounting for 14%**
- **Till 2001: Defence production was restricted to state owned enterprise. Post 2001, sector partially opened up for private sector participation**
- **Indian defence manufacturing sector is now at an inflection point**
- **Projects worth $28 Bn cleared in last 8 months by DAC, under new govt.**
- **Estimated defence sector opportunity over next 10 years : $245 Bn***
- **Conditions are conducive to aggressively launch 'Make in India' initiative**

*Ref : Citi Research

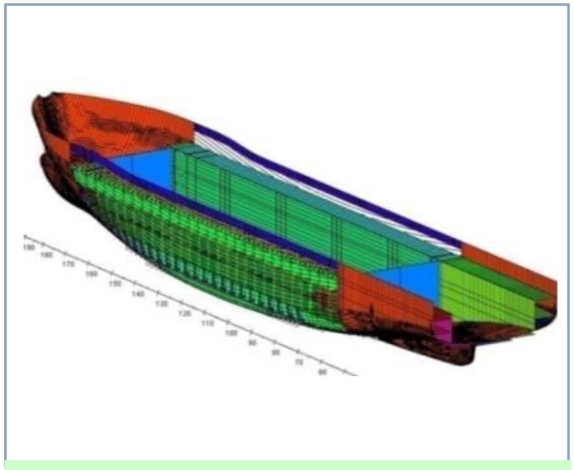
Industry Capabilities – A L&T Case Study

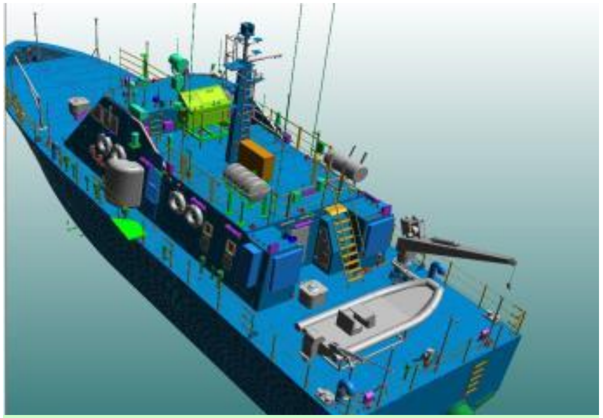
Basic / Detailed Design Capability

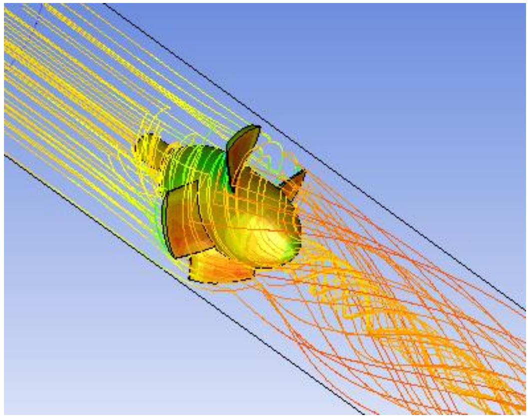

Ship Hull Design

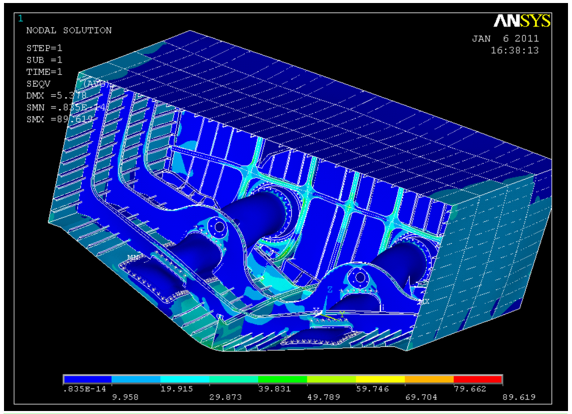


Stability & Seakeeping


Structural Design


3D Modelling


CFD Studies



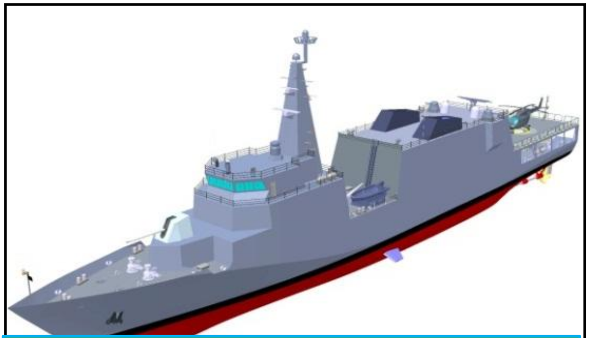
Structural Analysis

L&T has Developed In-house Design & Engineering Capability

In-house Developed Designs

Interceptor Boats - ICG

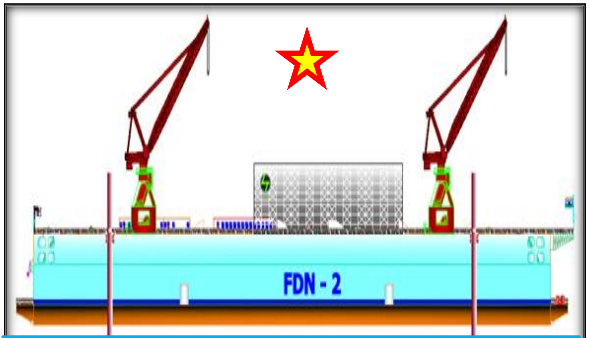
Offshore Patrol Vessels - ICG



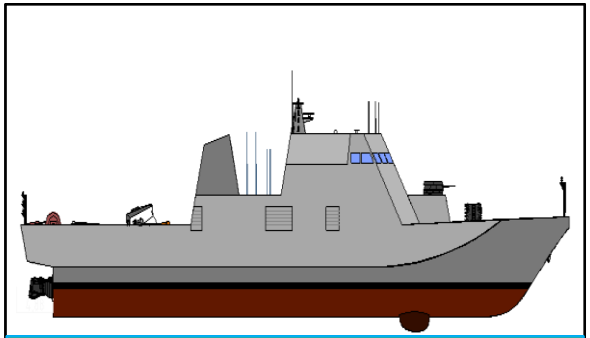
Offshore Patrol Vessels - IN

Training Ship – IN & ICG

Fast Patrol Vessel – ICG

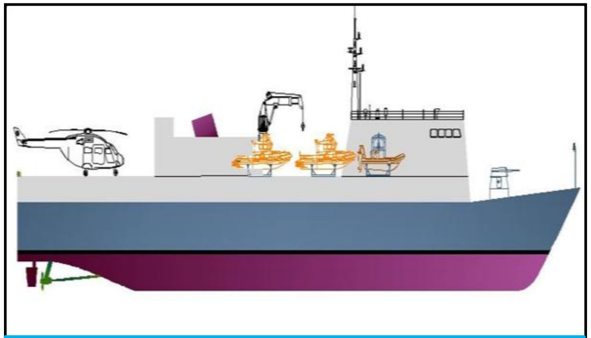


Floating Dock – IN



ASW Corvette – IN

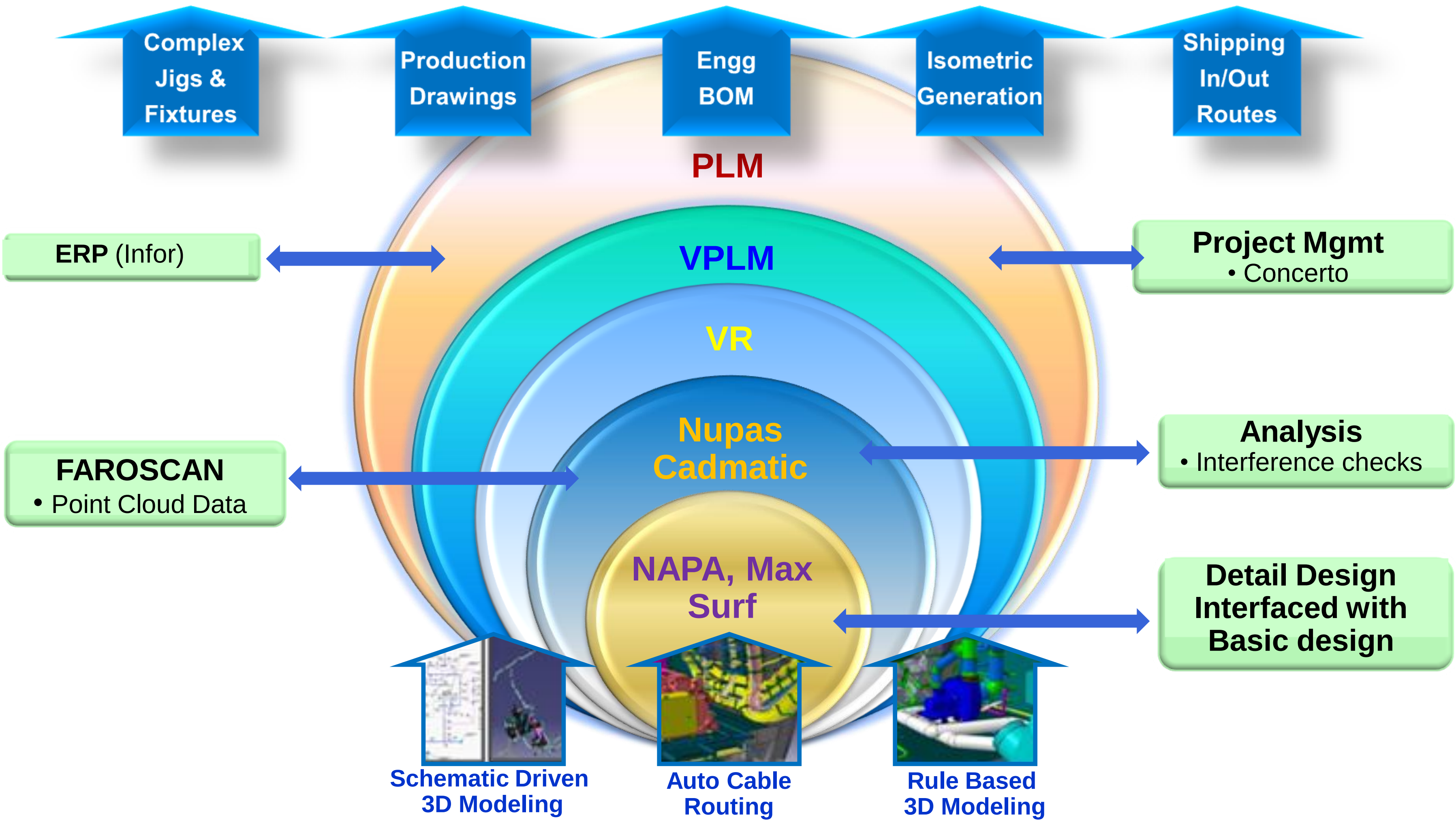
Interceptor Boats - Vietnam



Survey Training Vessel – IN

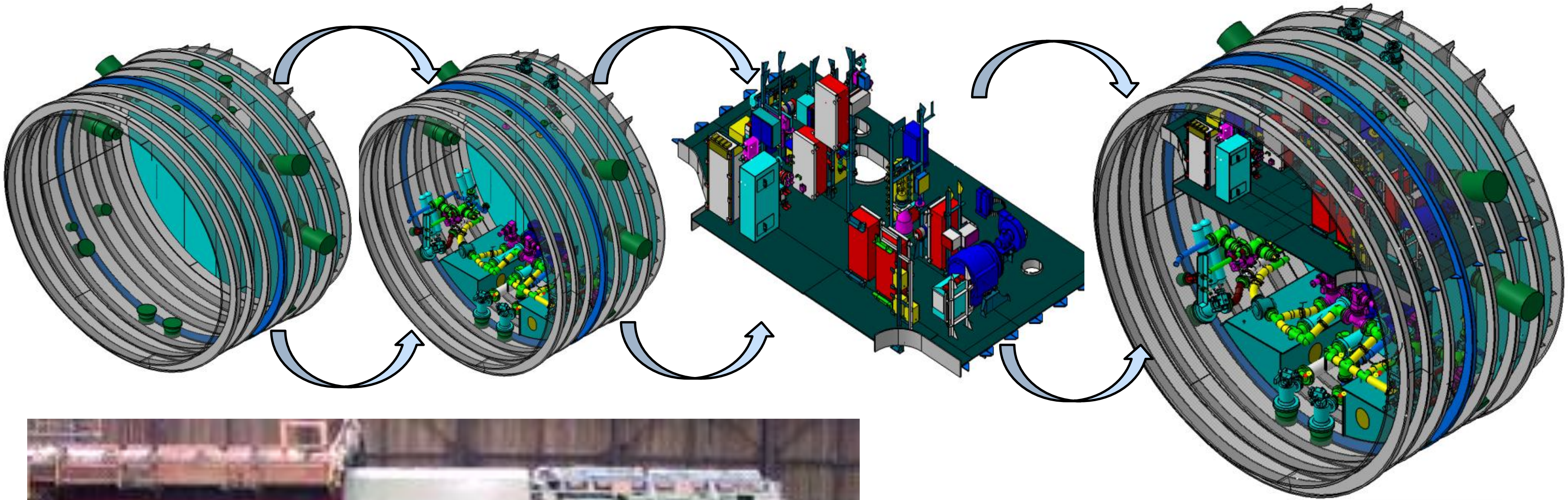
★ *Orders Received – Execution Started*

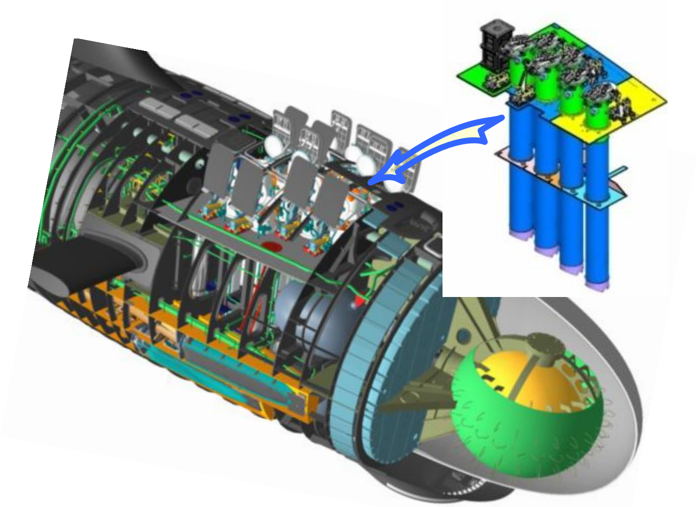
Digital Shipbuilding



Tightly Integrated Digital Solution Deployed by L&T

Modular Design & Construction – Available





Modular Construction Incorporated at Design Stage

Virtual Reality

Conceptualize in 3D Digital Environment → See What you mean... → Commence Production

Modern Shipyard Infrastructure

Hull Construction

Proven Capability in Hull Construction

- Development of Technology for hull construction including Submarine PH without TOT through extensive mock-up trials :
  - Reliable welding techniques including metallurgy of the weldment
  - High productive processes viz SAW, GMAW, GTMAW, Pulse MIG
  - Distortion control at all stages of construction
  - Development of special Jigs and fixtures to enhance production
  - Varieties of High Strength Low Alloy steels and Aluminium
- The technology developed is reliable and repeatable .
- Developed processes and specifications for different type of steels

3D Enabled Outfitting

Proven Capability in 3D Enabled Outfitting

- Equipment installation
- Piping, cabling, trunking
- Special Fixtures and Customised machine tools

Productivity Enhanced Through

- Digital Mockup for resolving interferences
- Shipping in/out routes & outfit sequencing
- Operability/maintainability checks during design to prevent rework
- High Degree of Automation, Robotics ensuring error free repeatability, reducing cycle time
- Virtual Reality models to train workmen & verifying shipping routes
- RFID enabled Material Management and Full-kit Techniques.
- Laser based modern measurements & alignment tools

Outfitting, System Integration & Trials

L&T has gained valuable expertise in outfitting & systems integration thru design & development of naval systems & integration on-board naval platforms

- Equipment, cable, piping & trunking outfitting and integration on-board
- Systems integration
- Cold checks including check wire and connectivity/continuity checks
- Flushing through / blowing through for engg. systems

Experience on STW, HATS & SATS from

- Systems integration onboard other platforms undertaken
- Weapons, Sensors & Engg. Systems designed, manufactured & delivered

Use of Modern Metrology Solutions

Laser CMM

Laser Cross Liner

Laser Distance Meter

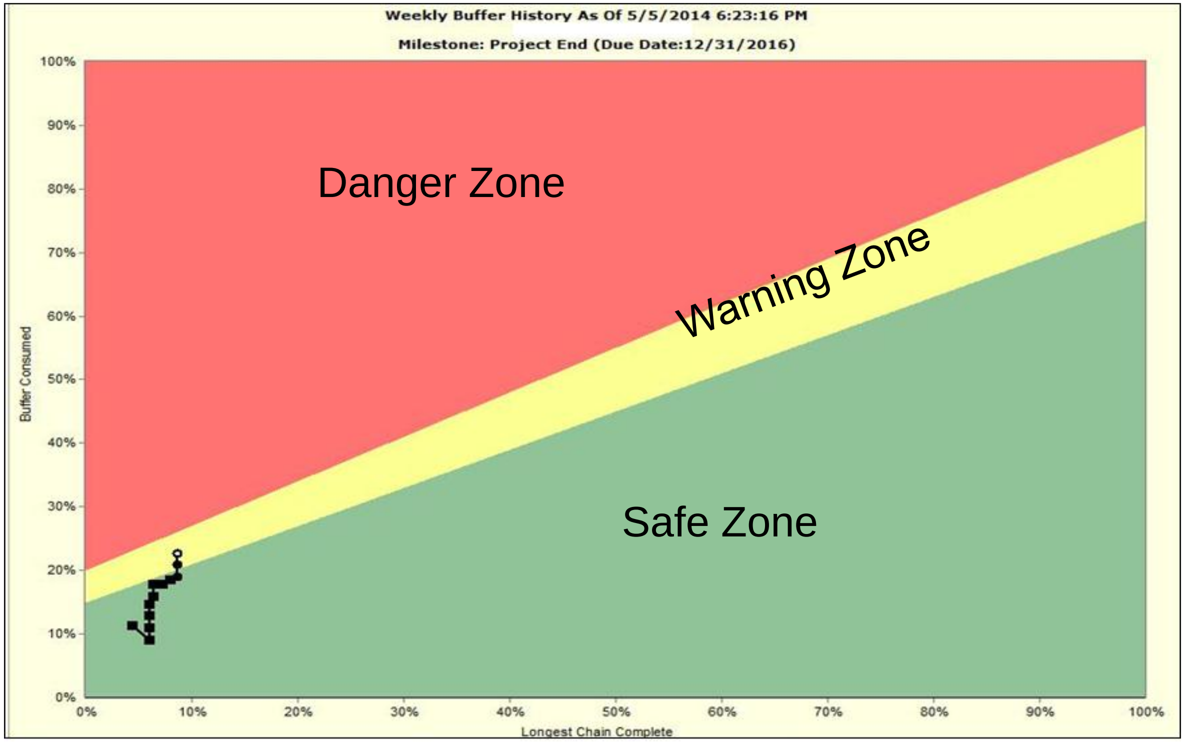
Laser Scanner

Quality, Speed, Repeatability, Recordability

L&T Deploys State of the Art Inspection Tools

Project Management – Modern Techniques

- Rich experience in managing large size, complex, multi-site projects
- Evolution of PM Tools: PERT → Gantt → CPM → CCPM
- Concerto CCPM for real time project monitoring and identifying constraining chains
- Project mgmt thru TOC-CCPM provides early warning with sufficient buffer to mitigate problems
- Global Procurement Chain for efficient sourcing of inputs

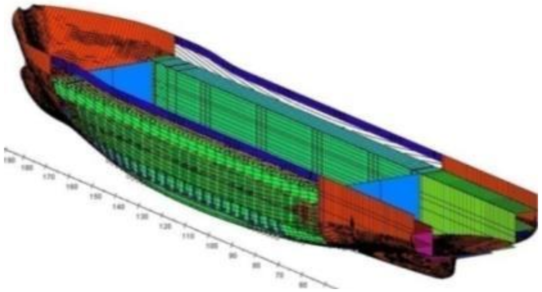


Areas of Collaboration with Global Leaders

Areas of Cooperation

Design Engineering

- For complex defence systems
- For Naval requirements
- For Analytical studies



Manufacturing / Construction

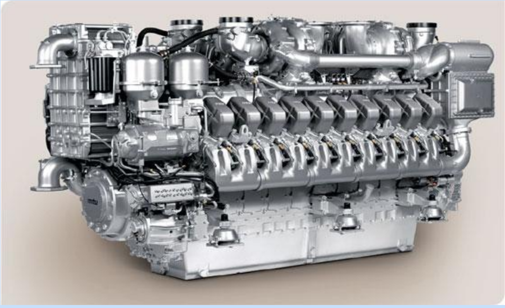
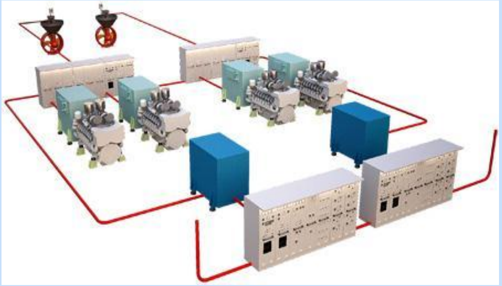
Technologies

- Modular construction techniques
- Modern production processes
- Enhanced automation & robotics
- Special jigs and tools

Areas of Cooperation

Co-production of Marine Equipment

- Main Engines
- Reduction Gears
- Propulsion Shafting
- Control Systems
- HVAC System
- Elevators & Cranes
- Marine Duty Pumps
- Air Compressors
- Fire Fighting Systems
- Deck Machinery
- Valves

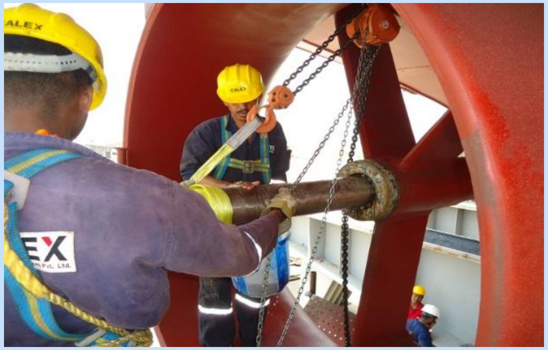





Areas of Cooperation

Life Cycle Support

- Routine refits & repairs
- Spare support with indigenous content
- Mid-life upgrades
- Retrofit and modernization
- Conversions
- Life enhancement programmes



Areas of Cooperation - Export Opportunities

World Naval Market Summary Table, 2013-2032								
Global Naval Market Forecast (2013-2032)	In Progress (Building)		Planned (Near-Term Targets)		Projected (Rock-Kicking)		*Totals*	
Vessel Type	*# Hulls*	*US$B*	*# Hulls*	*US$B*	*# Hulls*	*US$B*	***# Hulls***	***US$B***
Aircraft Carrier	9	49.8	2	4.0	2	3.0	***13***	***56.8***
Amphibious	129	29.5	204	33.9	33	3.4	***366***	***66.8***
Auxiliary	57	8.1	112	40.1	16	3.1	***185***	***51.3***
Corvette	51	7.1	43	13.1	23	5.8	***117***	***26.0***
Cruiser	2	2.6	6	3.6			***8***	***6.2***
Destroyer	55	55.3	90	113.8	3	2.9	***148***	***172.0***
FAC	147	5.5	45	3.5	34	2.8	***226***	***11.8***
Frigate	193	68.8	75	42.4	44	17.0	***312***	***128.2***
MCMV	28	4.5	71	6.4	28	2.6	***127***	***13.5***
OPV	121	12.5	139	16.7	31	3.1	***291***	***32.3***
Patrol Craft	1121	9.7	482	7.5	157	1.6	***1760***	***18.8***
Submarine	154	142.3	142	100.7	27	11.5	***323***	***254.5***
Totals	***2067***	***395.7***	***1411***	***385.7***	***398***	***56.8***	***3876***	***838.2***

Source: AMI International

Areas of Cooperation

Joint efforts for Exports

- Large market for export of defence vessels-

  OPVs, Corvettes, FACs, Patrol Crafts, Aux Vessels

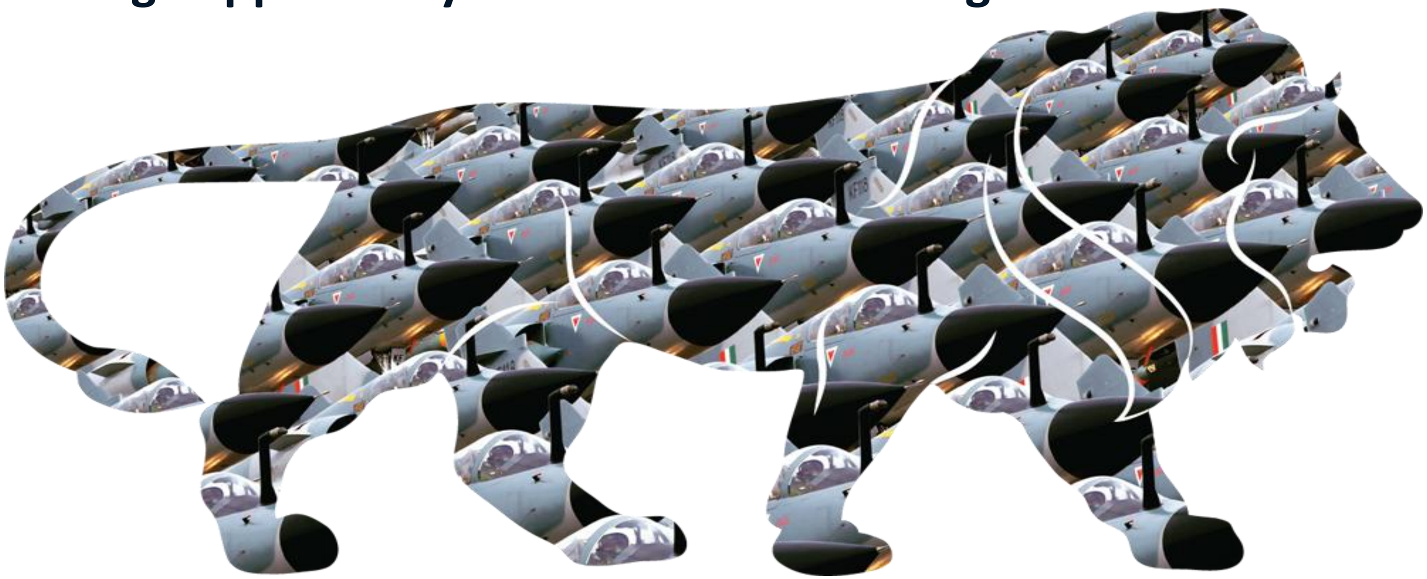
  - Near Term : 821 Hulls @ US$ 80.9 Bn
  - Long term : 261 Hulls @ US$ 16.4 Bn
  - Total : 1082 Hulls @ US$ 97.3 Bn

- Indian shipyard, though cost effective, lack the track record & design
- Global shipyard can fill above gaps by associating with Indian shipyards
- Equipment & systems for export ships could be bought by Indian shipyard from established Russian OEMs, for re-export

Way Ahead

Way Ahead

- Indian defence industry at inflection point
- Huge business opportunity of US$245 Bn over next 10 year
- Govt’s strong resolve & support for indigenous defence production
- New policy to provide incentives for higher indigenous content
- Joint working to ensure a win-win model – Indian co. & FOEMs
- Huge opportunity for collaboration with global leaders



Thank You

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