ADA
Aeronautical Development Agency

Self Reliance in Combat Aircraft Development

Self-Reliance in Combat Aircraft Development

LCA TEJAS

LCA NAVY

LCA MK2

Advanced Medium Combat Aircraft (AMCA)

Twin Engine Deck Based Fighter (TEDBF)

ADA

Contents

Programmes

ADA

ADA as a nodal organisation for combat aircraft development has synergised and developed strategic capabilities in various disciplines with identified partners for realising number of advanced technologies and final products for the Users. This has been achieved in association with HAL as principal partner and with DRDO Laboratories, CEMILAC, DGAQA, CSIR Labs, PSUs, Private Sector Agencies, IAF, IN and Academic Institutions as major partners who have actively participated and contributed towards success of this national venture.

"Tejas" the premier programme undertaken by ADA with significant contributions by participant organizations is a triumphant venture culminating in the induction for operations by IAF. This has led to the successful formation of 'Flying Daggers', No. 45 Squadron of IAF and 'Flying Bullets' No. 18 Squadron of IAF.

Three other variants of the LCA Programme, viz., Air Force Trainer, Navy Trainer and Navy Fighter are under flight test. Mk2 versions of Air Force is 4.5+ generation aircraft with higher thrust engine and improved mission and point performance is in advanced stage of design. Twin Engine Deck Based Fighter (TEDBF) design activities has been initiated to meet the Indian Navy's long term carrier based multirole fighter requirements. This is envisaged to replace the current MiG-29K.

Advanced Medium Combat Aircraft (AMCA) a Fifth Generation, Medium Weight, Multirole, Twin Engine Stealth Fighter Aircraft is under development. The configuration incorporates several advanced technologies like external geometric profiling, serpentine air intake, internal weapon bay, radar absorbing materials and coatings to enhance its stealth capabilities.

Tejas is a Light Combat Aircraft (LCA) configured with a single engine, compound delta wing, relaxed static stability and advanced digital fly-by-wire control system, which makes it an agile war machine. Tejas is the smallest and lightest multirole all-weather supersonic fighter of its class.

- Multi-role aircraft with 7 hard points capable of carrying mixed air-to-air and air-to-ground stores for air combat operations
- The fly-by-wire flight control system enables excellent handling qualities, making it a Pilot's delight. The advanced glass cockpit enhances situational awareness and aids in decision support for all missions.
- It is equipped with Computerized Utility Management System and Health & Usage Monitoring System which eases maintenance.

The Air Force Trainer is a 2-Seater aircraft capable of all operational roles as well as training.

The Naval Fighter and Trainer variants are capable of operating from STOBAR aircraft carrier with minimal footprint. As part of qualification for carrier suitability, launch capability from a ski jump and arrested landing replicated in the Shore Based Test Facility (SBTF) at INS Hansa, Goa, has been successfully demonstrated. LCA Navy had also demonstrated arrested landing and ski-jump take-off on-board INS Vikramaditya & INS Vikrant.

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LCA AF FIGHTER

Performance

• Max speed	1.6 Mach
• Service Ceiling	50,000 ft
• 'g' Limits	+8/-3.5

Dimensions

• Span	8.20 m
• Length	13.20 m
• Height	4.40 m

Weight

• Take-off Clean	10330 kg
• Empty	7040 kg
• External Stores	3910 kg

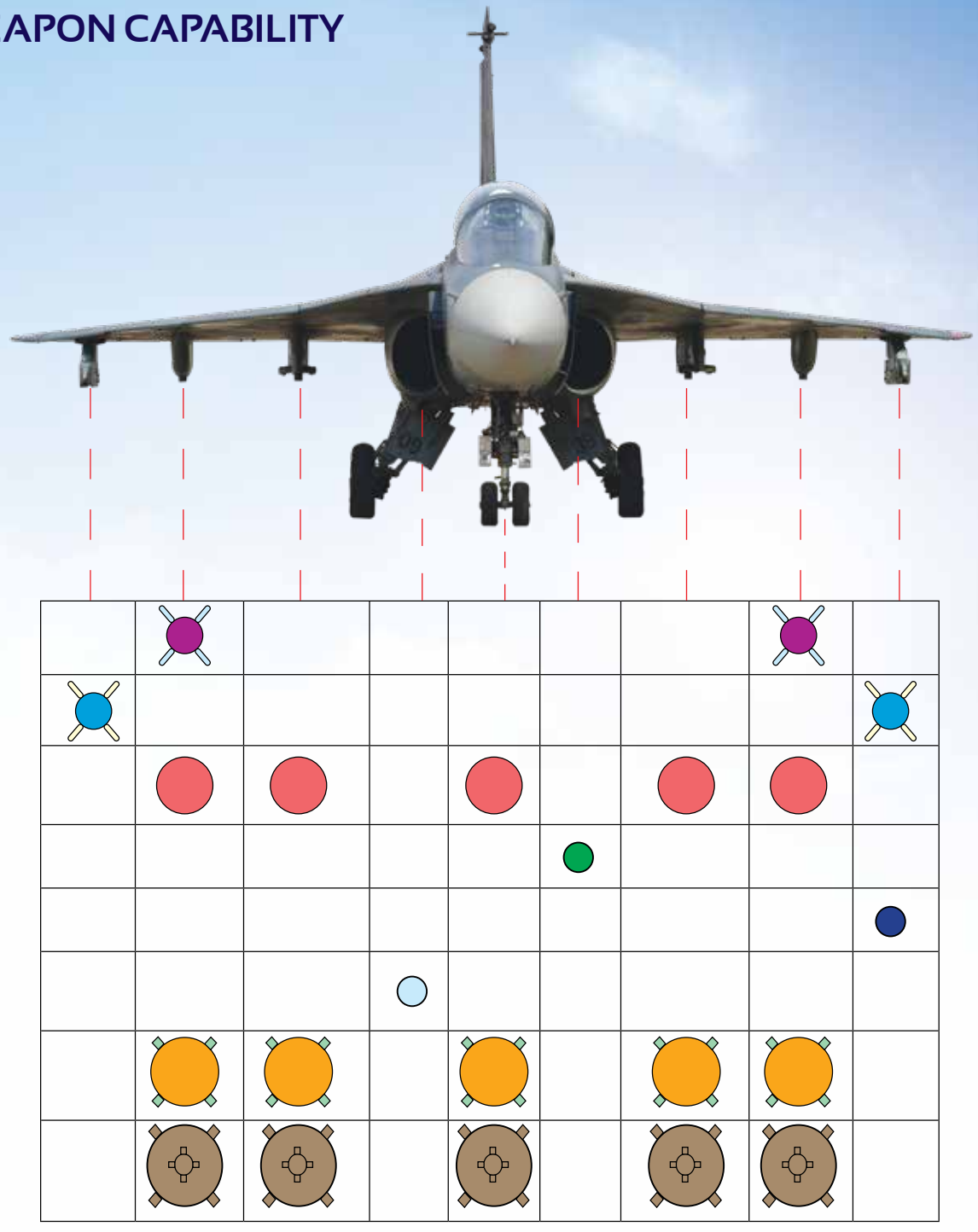
Power Plant

GE - F404 - IN20

Special Features

- ¤ Compound Delta Planform
- ¤ Relaxed Static Stability
- ¤ Composite Structure
- ¤ Fly-by-wire Flight Control
- ¤ Computer based monitor and control of Electro Mechanical Systems
- ¤ Glass Cockpit
- ¤ Multi-Mode AESA Radar
- ¤ Air-to-Air Refueling
- ¤ Beyond Visual Range Combat Capability

WEAPON CAPABILITY



External Stores

- Beyond Visual Range (BVR) Missile
- Close Combat Missile (CCM)
- Electronic Warfare Pod (EW Pod)
- Bombs
- Laser Guided Bomb (LGB)
- Gun
- DROP Tanks
- Laser Designator Pod (LDP)

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LCA AF FIGHTER CAPABILITIES

- Sensors - INS GPS based Navigation/ Weapon Aiming Suite, Multi-Mode Radar, Litening LPD, HMDS,VOR/ILS, TACAN, IFF, RWR & CMDS
- EW suite consists of AESA based jammer (ASPJ)
- AESA radar with simultaneous air-to-air and air-to-ground capability
- Operable in extreme Hot/Cold Weather Conditions
- Hot Refueling Capabilities
- GSh-23 Gun

3DT carriage for better endurance

- Advanced Auto-Pilot along with Critical Altitude Recovery, Disorientation Recovery
- Day/Night Operations

Air-to-Air refueling with IL-78 tanker

Formation flying of Tejas aircrafts

Close combat missile - R73 E firing

High-altitude operations at Leh

LCA AF TRAINER CAPABILITIES

- Operational Type Trainer and 2-Seater
- Similar capabilities as the Fighter

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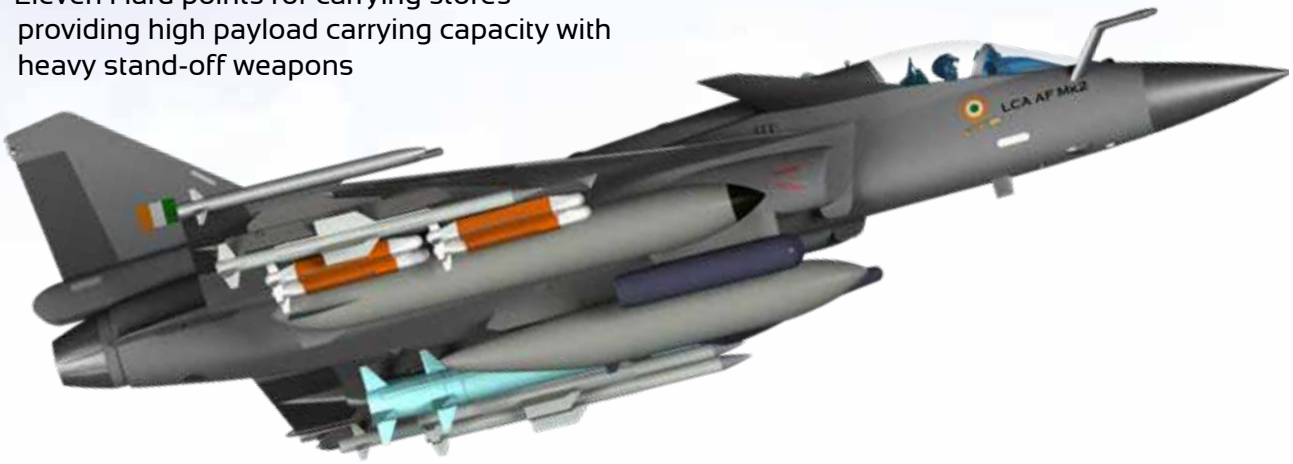
LCA AF MK 2 FIGHTER AIRCRAFT

Getting Ready to touch the sky with glory

It is a state of the art multirole supersonic fighter with delta wing and close coupled canard with following features:

- **Long range and endurance:**
  - Ensured by: Higher Thrust Engine, Increased Fuel Carrying Capability & Improved Aerodynamic Design
  - Enhanced by: Inflight refueling capabilities & Onboard Oxygen Generation Systems (OBOGS)
- **Multirole Capabilities:**
  - Air-to-Air : BVRs & CCMs to intercept and neutralize enemy aircraft
  - Air to Surface : Long range Precisions guided Heavy stand off weapons to target strategic locations
  - Reconnaissance : Identification of threats and border patrolling
- Eleven Hard points for carrying stores providing high payload carrying capacity with heavy stand-off weapons
- **Advanced Sensors:**
  - Active Electronically Scanned Array (AESA) Radar
  - Infra Red Search & Track (IRST)
- Unified Electronic Warfare Suite (UEWS) with Radar Warning Receiver (RWR), Jammers and Missile Approach Warning System (MAWS)
- Network Centric Warfare Capabilities
- Multi Sensor Data Fusion
- Quick turn around and role change
- Modern Cockpit with smart Large Area Display (LAD), Smart Head Up Display (SHUD) and Side Control Stick
- Fly-by-Wire Flight Control system with Upgraded Digital Flight Control Computer, Multi Function Air Data Probe and Indigenous Actuators



Dimensions

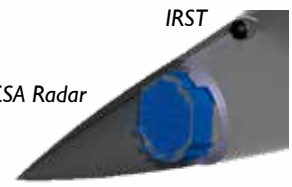
- Length : 14.65 m
- Span : 8.50 m
- Height : 4.87 m

Weight

- Max. All Up Weight : 17500 Kg
- Payload : 6500 Kg

Performance

- Service Ceiling : 50000 ft
- 'g' Limits : +9/-3.2
- Max Speed : 1.8 Mach



IRST and AESA Radar

Upgraded DFCC

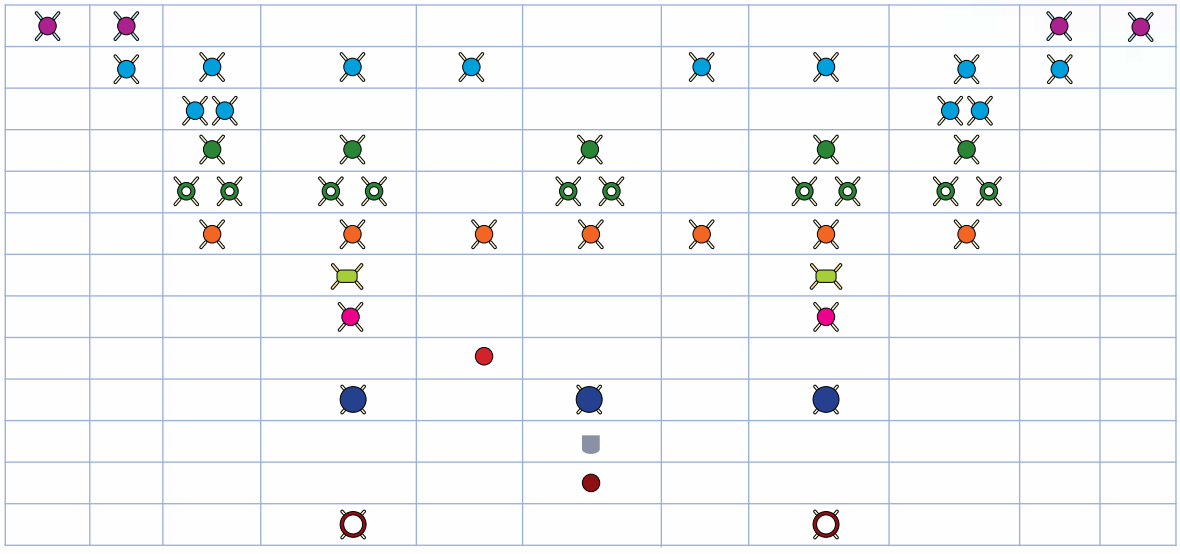
On-Board Oxygen Generation System (OBOGS)

Smart Cockpit

FUTURE OF AIR POWER
LCA AF Mk2

Networked Fighter

- Advanced secure SDR enabled tactical Data Link
- Real time transfer of data and imagery
- Secure weapons guidance using MDL
- Teaming possible in future

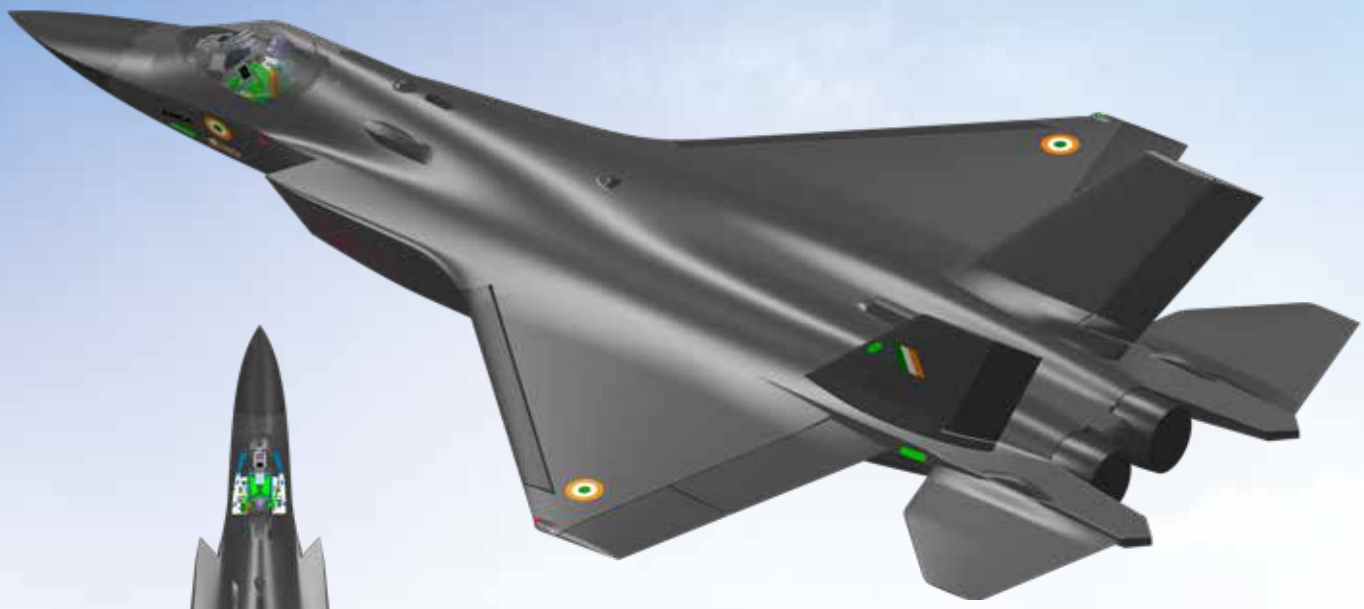


- Close Combat Missiles
- Beyond Visual Range Missiles
- Beyond Visual Range Missiles (twin)
- Smart Bombs
- Precision Guided Munition
- Dumb Bombs
- Cruise Missile
- Air to Surface Missile
- Laser Designated Pod
- Drop Tanks
- Flushed Gun Pod
- Low Band Jammer
- Anti Ship Missiles

ADVANCED MEDIUM COMBAT AIRCRAFT (AMCA)

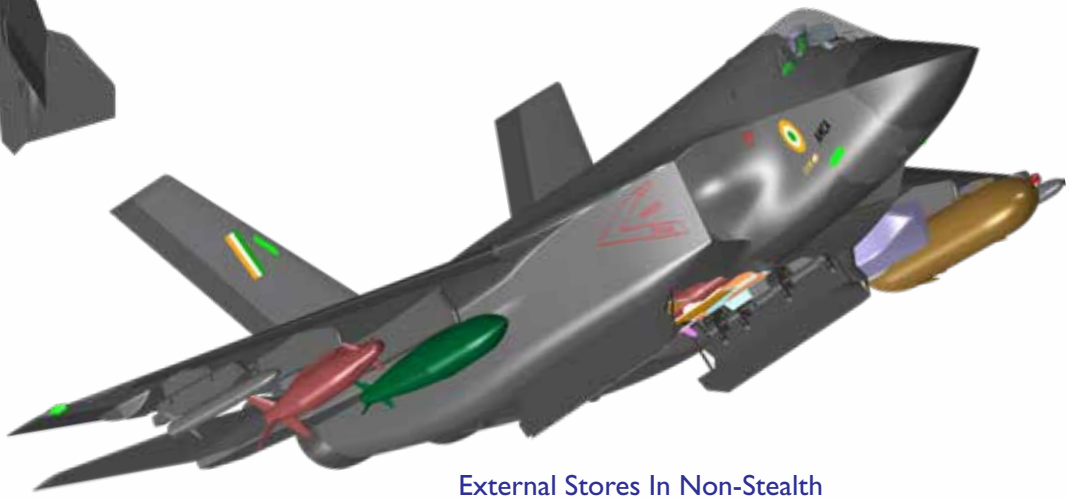
Being Designed to touch the sky with glory

AMCA is 5th generation stealth, medium weight(25T) category, multi-role and twin engine fighter aircraft with a swing role capability. The aircraft has trapezoidal wings, all moving Horizontal tails and twin canted Vertical tails with Composite and Radar Absorbing Structures.



BALANCED DESIGN

Trade-off between aerodynamics, stealth and structure for achieving the balanced design. Enhanced lethality and survivability by means of stealth and electronic warfare capabilities.



External Stores In Non-Stealth Configuration

The advanced technologies that confer stealth capabilities are DSI with Serpentine Duct, Internal Weapon Bay (IWB), Radar Absorbing Material (RAM) and Conformal Antennae. The stealth mission enables the Suppression of Enemy Air Defence (SEAD), Destruction of Enemy Air Defence (DEAD) and precision strike.

FEATURES

- Stealth Airframe
- Glass Cockpit PVI
- IVHM
- Electronic Pilot (EP)
- Integrated Sensor & EW Suite
- Pilot Decision Aids
- Network Centric Warfare

- Internal Carriage of weapons/stores
- Diverter-less Supersonic Intake (DSI) with Serpentine Duct
- 360° Enhanced Situation Awareness
- Conformal Antennae/Apertures
- Extended detection range sensors (AESA Radar and IRST)
- Retractable Air-to-Air Refueling Probe

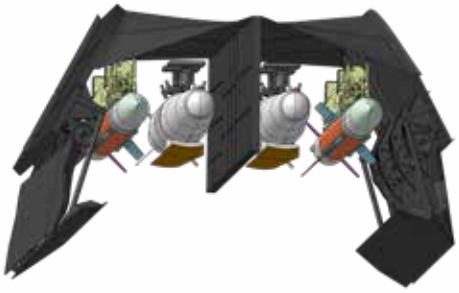
COCKPIT

AMCA cockpit is a equipped with state-of-art technology for pilot vehicle interface.

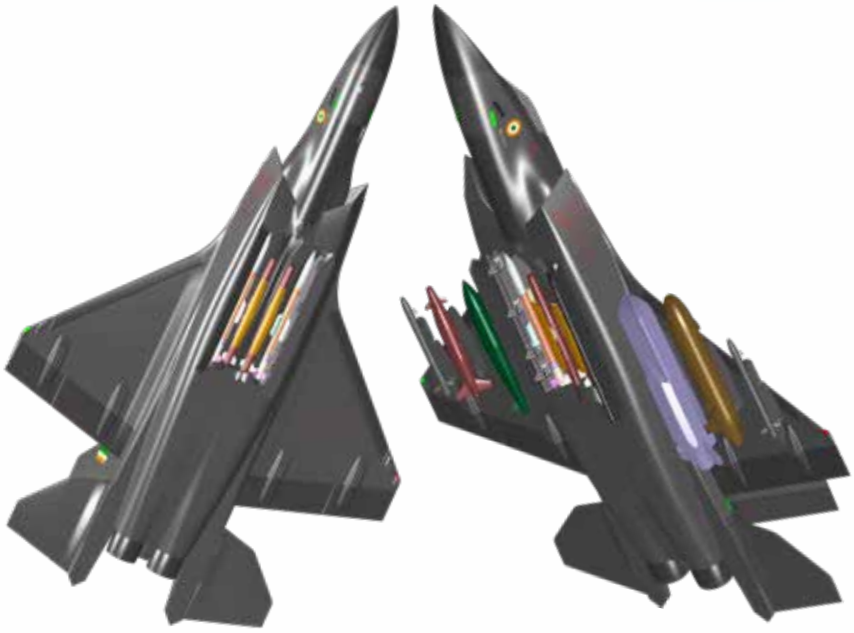
SMART COCKPIT

COCKPIT FEATURES

- Head-Up Display (HUD)
- ITO Coated Single Bubble Canopy
- Helmet Mounted Display System (HMDS)
- Large Area Display (LAD)
- 3D Audio warnings and pilot voice commands



INTERNAL WEAPON BAY



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LCA NAVY Mk1

Indigenously designed and developed Naval Fighter Aricraft with STOBAR (Short Take-off But Arrested Recovery) capability for carrier borne operations in Air defence and Anti-ship Strike role. Compound delta wing, relaxed static stability and advanced digital fly-by-wire control system makes it an agile war machine.

Special Features

- Airframe capable to withstand severe arrested landing loads
- High strength telescopic landing gear for high sink rate landing
- Arrester Hook System for landing within 90 meters deck run
- LEVCON, a control surface for approach speed reduction during landing on carrier
- Special Control law for Ski-Jump Take-off & Arrested Landing

Take-off from INS Vikramaditya

Achievements

Ski-jump Take-off with CLDT

Night Ski-Jump Take-off

High Sink Rate Landings

72° Nose Wheel Steering

- Successfully demonstrated ABCD (Atmanirabhar Bharat Capability Demonstration) onboard Indigeneous Aircraft Carrier INS Vikrant on 6th Feb 2023.
- Successfully demonstrated Carrier Compatibility by Ski-Jump Take-off and Arrested Landing from INS Vikramaditya.
- Demonstrated Ski-Jump Take-off and Arrested Landing during Day and Night at SBTF.
- Ski-Jump Take-off in adverse headwind conditions vis-à-vis Carrier environment demonstrated successfully.
- Handsfree Take-off control law mode proven successfully.
- Demonstrated numerous High Sink Rate Arrested Landing at SBTF.
- Ski-jump Take-off and Arrested landing with Center Line Drop Tank (CLDT) demonstrated successfully
- Ski-jump Take-off and Arrested landing with Derby missile demonstrated successfully
- Hot refueling demonstrated and being carried out as routine activity between two sorties on ground
- Fuel jettisoning demonstrated successfully. LCA-Navy is the first Indian Aircraft with this capability.
- Data link Functionality demonstrated with Sea Harrier.

Shore Based Test Facility (SBTF), a unique state of the art facility, replicating IN aircraft carrier, developed by ADA at INS Hansa, Goa.

Features

- 14° Parabolic Ski-Jump Ramp
- Restraining Gear System
- Arresting Gear System
- Optical Landing System

Test facility enhanced for precision flight testing with

- Photogrammetry System
- Telemetry & Monitoring Station

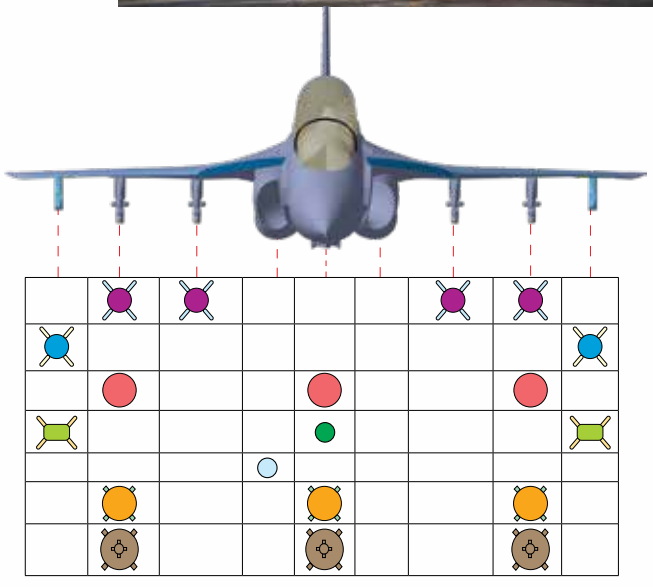

Ski-Jump


Arrested landing on INS Vikrant

- On-board equipments designed and tested for severe arrested landing shock
- 19° HUD & Nose Droop provides enhanced Field of View (FOV) for carrier landing
- 72° Nose Wheel Steering for tight maneuvering on limited deck space
- In-flight Fuel Jettisoning capability for quick recovery during emergency
- Hot refueling capability to increase turnaround service


Ski-jump Take-off with Derby Missile


Arrested Landing at SBTF



Mission capability

- Air superiority with CCM, BVR, Gun and SPJ
- MMR with Air-to-Air and Air-to-Ground capability
- Data link functionality with Ground and Air stations
- RWR and CMDS functionality

External Stores

BVR · Gun · Bombs
CCM · Drop Tank · LGB
SPJ · LDP

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TWIN ENGINE DECK BASED FIGHTER (TEDBF)

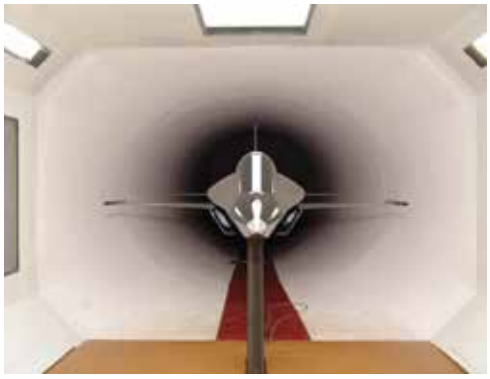
Description

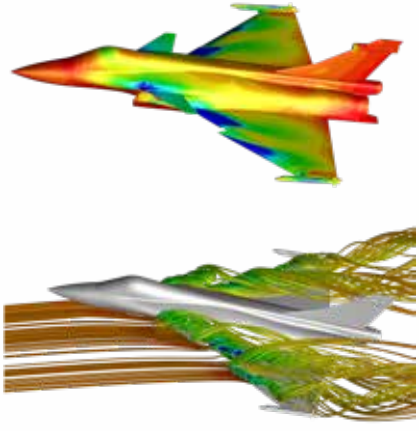
TEDBF is a Twin engine, single seat, carrier borne fighter Aircraft designed for operations onboard IN carriers. IN has envisaged TEDBF as a replacement for MiG-29K. It will operate with concept of Ski-jump Take-off But Arrested Recovery (STOBAR). TEDBF is being designed with superior mission capability with primary roles of Air Defence and Maritime Strike.

The aircraft has network centric capability along with multi sensor data fusion integrated with advanced sensors like AESA Radar, IRST, UEWS, and MAWS. TEDBF will operate from INS Vikrant and INS Vikramaditya aircraft carriers.

Specs:

Length	:	17 m
Span (folded)	:	8.3 m
Span (spread)	:	11.6 m
Height	:	5.65 m
Max. All Up Weight	:	26 tonnes
Max. Payload	:	13 tonnes
Service Ceiling	:	55,000 ft
'g' Limits	:	+8g/-3g
Max Speed	:	1.8 Mach
Store Stations	:	12 nos.





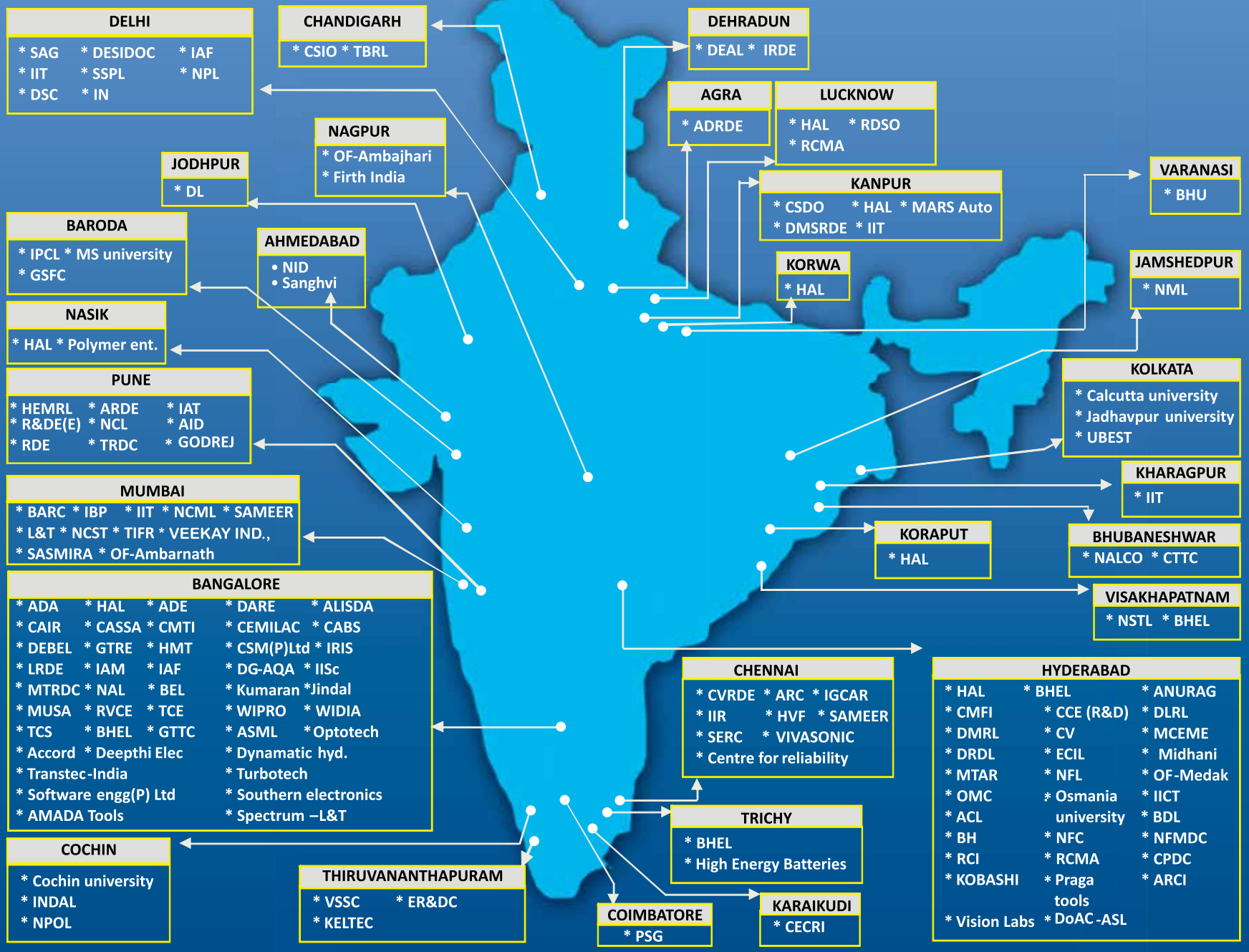
Roles:

- Combat Air Patrol
- Deck Launch Interception
- Air-to-Air Combat
- Anti-ship Strike
- Maritime Strike
- Land Attack Strike
- Escort Jamming
- Buddy Refueling


NAVY


IndianOil Aviation

WORK CENTRES OF LCA PROGRAMME



"TRAPPED TO
PROPEL DREAMS"

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