VTOL AVIATION INDIA PRIVATE LIMITED
(Under Industry - Academia Collaboration With)
INDIAN INSTITUTE OF TECHNOLOGY-KANPUR
VTOL AVIATION INDIA PRIVATE LIMITED

ABOUT GROUP COMPANY:

Firstly we would like to share a brief insight to our Group Company 'E F C Group Of Companies' and 'VTOL AVIATION INDIA PVT. LTD.' is a company formed under the 'Make In India' initiative under this Group. EFC Group Of Companies have made a remarkable presence in the field of shipping and logistics for over 3 decades now and performing tremendously in this field with turnover of around Rs 300 Crores and expected to grow at a steady pace. We have several diversified sectors being explored by our group companies and as a group company we are deeply committed to make a breakthrough in the Indian Aviation Sector through our new venture, i.e., 'VTOL AVIATION INDIA PVT. LTD.'.

INTRODUCTION:

We would like to take the privilege to introduce our Company 'VTOL AVIATION INDIA PVT. LTD.'. It's a company formed to promote advanced technology products under the 'Make In India' initiative. We are deeply committed to make a breakthrough in the 'Indian Aviation Sector' through our new ventures. The technologies conceptualized by 'VTOL AVIATION INDIA' are being developed under 'Industry-Academia Collaboration' with India's premier Institute 'Indian Institute Of Technology-Kanpur', which is well recognized all over the world for its remarkable legacy and huge contribution to all the prominent developing sectors in India.

HOW IT ALL BEGAN:

'VTOL Aviation India Pvt. Ltd.' company has been founded by 'Mr Kalyan Chowdhury' who has been a pioneer in the Shipping and Logistics Industry. He started this venture with the ideology driven around the vision to make a breakthrough in the conventional aviation sector and give India its first 100 % 'Make In India' technology. These new technologies developed would be multifaceted technologies, encompassing all the advancements in the engineering and technology fields pertaining to aviation sector. The aim is to incorporate advanced feature to ensure highest benchmark in aviation safety in all of our products and technologies. The new products will have contra landing electric vertical take-off and landing features, apart from being more than a conventional aircraft, these aircraft can also be viewed as yachts as well due to its advanced design and capabilities. This aim is the foundation of all of our upcoming products under 'VTOL Aviation India'.

Indian Aviation sector has long sought to perfect advanced flight for airplanes, none explored so far. We at 'VTOL AVIATION INDIA' under the Industry Academia Collaboration with 'IIT Kanpur' have undertaken to develop technologies, which have never been tried in India. 'VTOL Aviation India' with its drive and commitment towards advanced scientific research will be able to leverage modern advances in technology, engines, materials, avionics, and design systems to launch advanced UAV's, and Air Taxi's. All these would be made available successfully in India, abroad and widely accessible to all across the globe. Our aim at 'VTOL AVIATION INDIA' is to reshape the future of flight with the ultimate breakthrough in aviation sector. Our company under 'Make in India' & 'Self Reliance' mission will render advanced products in sectors such as Defence, Civil Aviation, Paramedics, Emergency Services, Surveillance, Aviation Training, Tourism and Business Chartering as well.
A MESSAGE : FROM FOUNDER - MR KALYAN CHOWDHURY

"An Investment In Knowledge Pays The Best Interest‘ once quoted by ‘Benjamin Franklin‘ resounds in my mind always was the first words shared by ‘Mr Kalyan Chowdhury‘ while sharing the message quoted below.

‘VTOL AVIATION INDIA’ was formed primarily to encourage scientific research in India especially in the Indian aviation sector. The objective behind the ‘Industry - Academia Collaboration’ with IIT - Kanpur was to leverage advanced breakthrough innovations and developments in the field of VTOL technologies in India and at the same time motivate students to pursue scientific research. Such efforts would surely make a major difference to our Nation’s Self Reliance vision. Instead of getting technology and advanced products related to aviation from Foreign Countries, we wish to develop indigenous technology under Make in India initiative.

OUR VISION:

We are aiming to capitalize the potential under ‘Make In India‘ and come up with a unique advanced products with zero carbon emission. We aim to bring an absolutely new technology in India, develop and enhance this technology under Make In India Initiative also promote Self-Reliance Motto. Our vision revolves around transforming flight for Defence, Civil Aviation, Paramedics, Emergency Services, Surveillance, Aviation Training, Tourism and Business Chartering sectors. This is ultimately bringing a family of vertical take-off airplanes to Indian Aerospace with highest safety oriented features. Our main goal is to define a transition aircraft concept with better performance in safety, noise, speed, range and payload than existing concepts, while cutting complexity to one third and reducing the emissions to absolutely negligible fractions. The New technology is the advanced Hybrid powered UAV, contra landing e-VTOL concept, it’s a very new innovative and brilliant aircraft concept, which is not yet explored in India. This is an advanced version of the conventional VTOL concept, so need of airports and huge land space, is directly eliminated which is already scarce in India. The most unique feature with our project is that it’s taking care of the safety concern at large.

OUR MISSION:

VTOL AVIATION INDIA’s mission is to bring our youth of this Nation to make ground breaking breakthrough in the aviation sector. This mission is what drives the company’s commitment to safety innovation. Our aircraft’s safety features gives everyone the peace of mind to explore the world safely without a fraction of fear regarding safety at large. With its extended Technology, Innovations, Ideas and Concepts, ‘VTOL AVIATION INDIA’ would be based on a platform of multiple genre problem solving to meet the evolving needs of Defence, Civil Aviation, Paramedics, Emergency Services, Surveillance and Rescue.

We Give Wings to Your Dream, Fly High with ‘VTOL Aviation India’
2016
- Ideation Phase: Finalization of VTOL Concept Based Sketch
- Scientific Research on VTOL Aviation Technology

2017
- Signing of MOU with Indian Institute of Technology-Kanpur
- Successful Testing & Launch of Solar UAV - ‘AYAAN’ at IITK

2018
- Participation in Army Exhibition at New Delhi
- Participation in ‘Govt Of India’ run ‘Defence Programs’ (Defence Corridor)
- Displays Of ‘VTOL UAV’ - ‘AAVEG’ Prototypes at Air-Shows Worldwide

2019
- Production of VTOL UAV’S - ‘AAVEG’
- Testing of VTOL Air Taxi - ‘ABHIYAAN’ and Prototype Launch

2020
- Production of VTOL Air Taxi - ‘ABHIYAAN’
- Launch of VTOL Air Taxi - ‘ABHIYAAN’

2021
- Availability of VTOL Air Taxi - ‘ABHIYAAN’
- Display at Air Shows - Worldwide
INDUSTRY - ACADEMIA COLLABORATION UNDER MOU WITH IIT - KANPUR:

‘VTOL AVIATION INDIA’ intended to identify potential areas of technical collaboration that would leverage development of such an advanced technology which is not yet developed in India and desires to make remarkable contribution to the Indian aviation sector with the support from ‘INDIAN INSTITUTE OF TECHNOLOGY – KANPUR’. ‘VTOL AVIATION INDIA’ was primarily founded to make major and significant contributions to the Indian aviation sector, and not for commercial objective, so in this premise collaborating with India’s Premier institute was the most obvious match for a collaborating partner.

IIT-Kanpur is India’s premier engineering institute having vast experience in academics and research. ‘VTOL AVIATION INDIA’ also intends to engage in skill involvement programs and simulation studies at IITK. Our aim is increasing industry exposure to improve employability of students, increasing student engagement in current technologies through internship programs & live projects. We further intend to conduct professional development courses for increasing awareness of technologies, their industrial implementation and commercial applications. MOU & Contractual agreement for Industry Academia Collaboration has been signed between IIT Kanpur & VTOL Aviation India Pvt. Ltd. An overall tentative initial budget had been outlined at approximately Rs. 11 crore for Scientific Research & Developments and the regular disbursements are in place with phase-wise R & D Progress.

The advanced engineered aircraft technologies being developed by VTOL AVIATION INDIA with IIT Kanpur under Industry Academia Collaboration have tremendous potential to become the pioneering technology in the field of civil aviation and defence as well. The prominent feature is its capability to land on any space, open ground, rooftop, helipad, snow, runway or no runway, and the best feature is that it can land on water and take off as well just like a seaplane.

ABOUT : INDIAN INSTITUTE OF TECHNOLOGY - KANPUR

“Indian Institute of Technology - Kanpur” is globally acclaimed for education and research in science, engineering, management and humanities. IITK is an Indian institute established by Govt. of India in 1959 as one of the first Indian Institute of Technology. The institute was created with the assistance of a consortium of nine US research universities as part of the Kanpur Indo-American Programme (KIAP). Aerospace department at IIT Kanpur is one of few institutions in India providing education in the field of Aeronautical engineering having state-of-the-art facilities such as wind-tunnel and flight lab equipped with airfield and test aircrafts. The Aerospace Engineering Department in IITK is more than 40 years old.
The department has the following laboratories with a clear focus on teaching and research:

- High Speed and Low Speed Aerodynamics Lab
- Propulsion Lab
- Combustion Lab
- Flame Dynamics Lab
- Structures Lab
- Flight Lab
- Aeromodelling Lab
- Computational Fluid Dynamics Lab
- Structural Analysis Lab
- Unsteady Aerodynamics Lab
- Design Lab
- Autonomous Helicopter Lab
- Micro Air Vehicle Lab

The faculties of the department were instrumental in establishing the National Tunnel Facility (NWTF), which now forms a separate section. The major contributions of the faculty are in the design and development of high speed and low speed wind tunnels, flow measurements using hotwire and laser Doppler anemometry, PIV, reacting flow, CFD, industrial and wind energy aerodynamics, CFD including subsonic, transonic, supersonic and hypersonic flow computations, supersonic/hypersonic similitude, unsteady aerodynamic modeling and parametric estimation techniques; satellite dynamics; (analysis and development of software in the areas of thermal problems in rocket propulsion) and flow through turbo-machines, structural dynamics, random vibration analysis, design and optimization of fiber reinforced composite structures for static, dynamic and random loading; adaptive finite element analysis; smart structures; multi scale modeling; damage in composite structures; behavior of adhesive joints; helicopter dynamics, aero-elasticity; wind turbines; modeling of advanced materials; micro/mini air vehicles, autonomous helicopter.

The flight laboratory runs courses in flight testing wherein students participate to collect, analyze and evaluate performance and handling qualities of the airplanes. Flight laboratory is actively involved in the research towards parameter estimation from flight data. Accordingly, the aircraft instrumentation is being upgraded. The expertise developed here are being shared with various aero agencies to contribute towards research and development in the field of flight testing.
Recently, Unmanned Aerial Vehicles or UAV’s are increasingly being used in both military and civilian applications. They can provide safety and comfort in jobs that earlier required the presence of a human pilot. UAV’s have proven to be exceedingly useful. However, accompanying this increasing use is also a natural drive to make the systems more flexible and robust in terms of their capabilities including endurance and large power reserves. We are targeting the same through our variable payload hybrid aircrafts with advanced sub-systems and robust technologies.

‘Vertical Take-Off and Landing (VTOL)’ aircrafts are becoming increasingly important in both civil and military aviation sectors as these systems have great potential for operating as both piloted and pilotless modes. The ability to carry enough payload including troops and minimal readiness time have made VTOL aircrafts an ideal choice for operations related to rapid deployment of ground troops, precise location hovering for delivery of supplies, and rapid medical evacuation of troops from difficult terrains. Compared with fixed-wing UAV’s, VTOL UAV’s have several advantages, such as hovering capability and no space restriction for take-off and landing. These are particularly useful for civilian applications in search and surveillance and static image capturing.

VTOL AVIATION’s Hybrid VTOL UAV is a VTOL aircraft that can carry variable payload as per its usage in a specific sector and can operate like an air taxi if required. It will have a VTOL UAS that has long endurance, high speed, and operational ceiling, with various capabilities of carrying out surveillance, strike, supply emergency cargoes and medical-aid also at the same time being easily maintainable and mass producible. Primarily run with electric propulsion, it will have hybrid power options as well. The variable landing capabilities targeted are such as (Ground Surface, Rooftop, Water, Snow or Ice, Helipad or Runway). It would be an ‘Autonomous Aircraft’ with RPAS options as well. It has both Electrical & Hybrid Power options. It will have ‘Live Video Streaming’ with the ground control station as per the aircraft chosen for respective mission. Some of the targeted products have been conceptualized to have options of ‘Weapon Release System’ as well.

The cruise speed targeted for higher payload aircrafts would be around 300 – 350 Kms/Hr. these would have ‘Advanced Aerodynamics & Long Endurance’ features. Like any popular technology that is first championed by military and later adapted by civilian world, the VTOL aircraft systems, both manned and unmanned, offers many potential benefits such as below-mentioned:

- First advantage offered is the limited need of operational infrastructure,
- Second advantage is the much higher ground speed/airspeed (about three times) offered by such systems when compared with rotary wing aircrafts (helicopters and quad-copters),
- Third advantage is the higher energy efficiency (translated to increased range) offered by such aircrafts when compared with rotary wing systems,
- A fourth advantage is the comfort (smoothness) offered by such systems to passengers while in flight, in comparison to rotary wing, especially during adverse weather conditions.

VTOL UAV’s have the added benefit of offering high, durable and flexible performance. Our aircrafts can be applied in both military and civil spheres; such systems are primarily slated for Intelligence, Surveillance, Target Acquisition, and Reconnaissance (ISTAR), and possibly extended to Suppression of Enemy Defence (SED).
'VTOL Aviation India' has targeted to produce the below categories of aircrafts as per their Milestones.

**ROADMAP:**

Category 1: Hybrid ‘VTOL UAV’s’ (Multiple Payloads)
- Usage range could be surveillance, strike, border patrolling, and dropping light weight cargo, medical aid, emergency stores drop during war times etc.

Category 2: Hybrid Air Taxi
- Govt & Defence Services,
- Civil Aviation.

Payload Categories
- 10-20 Kgs
- 30-50 Kgs
- 100-200 Kgs
- Customised Payloads

Category 3: Technologies for UAV usage specific
- Enemy UAV/Drone Detection Technology,
- Signal Jamming of Enemy Drones or UAV,
- Live Streaming of UAV Feeds to GCS,
- Geo Mapping Technology for Aerial Survey, Forest Survey etc,
- Stealth Technology for UAV’s for protection during War Times/counter strike.

Payload Categories
- 2 Seater
- 4 Seater
- 6 Seater
- 8 Seater

Some of the Primary Features of the proposed products are listed below:
- Negligible Carbon Emission Foot Print
- Fully Autonomous Envelope Protection System
- Intelligent Power Management Systems
- In Flight Destination Updation Capability
- Advanced Aerodynamics & Long Endurance
- More Power Reserves
- Light-Weight, Carbon Fiber Fuselage
- Dynamic Mission and Navigation System
- Night Landing Capabilities
- No Runway requirement for VTOL UAV & AIR TAXI
- Additional Features of RPAS
- Encrypted communication link system available
- Solar, Battery & Electrical Power Combinations Available
- Electrical Propulsion
- Easy Maintenance & All Weather Aircrafts
- Anti-Collision System Available
- Live Video Streaming of UAV Feeds to GCS,
- 4D Flight Management Systems (Auto Generated Route)
- Redundant System Monitors
- Low IR & Radar Signature
- Advanced safety features of emergency landing and parachute option available
TARGET SECTORS FOR PROBLEM SOLVING:

DEFENCE SECTOR-

All the ‘VTOL AVIATION INDIA’ products are very dynamic products and have multiple usages. Primarily VTOL UAV’s are designed for defence sector. The various organizations under Ministry of Defence, such as Army, Navy, Air force, and other defence forces can be greatly benefitted through our products in respective performance of their responsibilities in the context of the defence of the country by each organization.

VTOL Capabilities: Water, Ground, Rooftop, Snow/Ice, Helipad and Runway. The operational leverages are there due to provision of Autonomous, Unmanned (UAV), Remotely Piloted & Manned Technology. The VTOL products cater to all these operation modes. Additional capabilities involve, defence weapon release systems. Military weapon systems can be configured as per directives from the respective defence organization specific to their operations. We can also undertake express parcel deliveries, by public bodies, government officials or the armed forces.

PARAMEDICS & EMERGENCY SERVICES

India with its large population struggles a lot during the times of emergency, medical attention and cases of critical medical attention. As general public at large is so widely spread from rural to urban location, the cities and metro cities, there are many location which don’t have direct access to medical facilities and struggle to reach to nearest hospital for immediate attention, here we will bridge the gap with our aircrafts equipped for paramedic usage till the patient is flown to the nearest hospital.

As these aircrafts are high speed aircraft, time duration of travel is largely reduced and patient can be treated within due time. Also in emergency services such as any epidemic, or war times, natural calamity such as floods, immediate medical and emergency aids can be transported and delivered to such locations. Vital organs and other medical transportation can be targeted to avoid unwanted delay.

AIR TAXI

VTOL AIR TAXI-ABHIYAAN is a new age VTOL aircraft specifically designed to render its services as the most economical and fastest mode of transportation. The advantages are shorter trips, comfortable, pollution free journey. No congestion compared to other mode of road transportation, cost effective travel mode, greater access to remote location as well where today’s transportation modes cannot reach giving greater access to all to travel anywhere without restrictions of accessibility due to different terrains.

TOURISM

This advanced engineered air-taxi’s, have the capabilities to land on any space, open ground, rooftop, helipad, snow/ice, runway or no runway, and the best feature is that it can land on water and take off as well just like a seaplane. This aircraft would have numerous genre’s to explore, it’s not only designed to cater to just defence sector, paramedic usage, commercial transport but also it has great utility to be used otherwise as a yacht or seaplane which can connect remote islands as well, as the design is so unique. This aircraft can also be used for promoting tourism, adventure sports and lots more. These aircrafts comes with easy maintenance and are greatly affordable with enhanced comfort than the regular mode of transportation.
Business/Private Chartering-

Business Jets brings the best of commercial aviation into the realm of private air travel, offering customers a wide range of products that can be uniquely customized for the private, business or governmental sectors. The robust characteristics of these aircrafts also provide an excellent value proposition when outfitted for the private market; offering larger, more personalized space, unmatched reliability and worldwide support.

Latest in business class comfort, travel comfortably with adequate space and payload for overnight bags. No long queues at the airports or the hassle to maintain own private jet or fleet, we are there to render such customized door to door service. Shorter travel distance, time saving journeys, more time for business meets.

Aviation Training-

The Aviation sector In India has long awaited advanced new aircrafts for imparting training to students and professionals as well. In the present times there is a dearth of such aircrafts, the aircrafts used for training a quiet old and conventional technology aircrafts. Here we wish to render our newly developed technically advanced aircrafts and prototypes for training purposes.
**CORE AREAS FOR SCIENTIFIC RESEARCH PROGRAMS:**

**VTOL TECHNOLOGIES FOR UNMANNED AIR VEHICLE SURVEILLANCE SYSTEM IN HIGH ALTITUDE:**

The very purpose of reconnaissance is to gain intelligence about the enemies, or potential enemies preparedness, movements, possible intentions, vulnerable points and vital targets. Success is assured for the better prepared and better informed side. The advantages of aerial reconnaissance for intelligence gathering are three folds: (i) timeliness of the information secured, (ii) the depth of penetration possible, and (iii) the relative difficulty the enemy has in preventing it. In this problem area, VTOL UAV’s can attain these objective through its advanced technology and sub-systems.

**DEVELOPMENT OF COUNTER MEASURE UAV TECHNOLOGIES:**

As ‘VTOL AVIATION INDIA’ is developing VTOL UAV’s and Air Taxi technology, it’s also engaged in scientific research in the field of advanced autopilot systems, which will have additional technological features to detect, identify, track and collect data of the enemy UAV advances or possible aerial attempts and send these live digital feeds to the GCS.

**DEVELOPMENT OF ADVANCED TECHNOLOGIES FOR AERIAL MAPPING & GIS DATA STREAMING:**

The technologies developed at ‘VTOL AVIATION INDIA’ will also cater to the requirements of aerial mapping for land survey, forest survey purposes etc. The data collected through the UAV recording system will transmit these data into GIS form for Geo Referencing purposes as well.

**HYBRID UAV’S/AIRCRAFTS FOR DELIVERING STORES/EMERGENCY MEDICAL AID AT HIGH ALTITUDE AREAS:**

VTOL AVIATION INDIA is engaged in developing HYBRID VTOL UAV’S, the special features of these aircrafts are greater service ceiling, higher endurance, and hybrid power plant. Another great advantage of these aircrafts is the performance at high altitude area, as these aircrafts will have hybrid power plant, the performance of the aircraft is not deterred by the erratic weather in HAA’s.
CORE TEAMS:

The overall technical and scientific research team consisting of approx. 20 lead senior engineers, experienced Researchers, honorary PHD’s team members is led by Prof A. K. Ghosh who is presently heading the Aerospace Engineering Dept & Flight Lab of IITK. Prof Ghosh apart from being the Head of Aerospace Engineering Dept, he also is designated panel member on India’s reputed Boards & Committees.

For VTOL Aviation India’s Project, he is our Chief Mentor for Scientific Research VTOL Aircrafts project. On the basis of the existing MOU, we are in the process of tying up with the department such as computer science and electrical communication, apart from our below team members.

- Prof Deepu Philip (System Engineering)
- Prof Nishchal (Elec Dept)
- Dr Shravanthi (Earth Science)
- Dr Sadarla (Aerospace Dept)
- Capt Amulya
- Mr Nikhil Apadhayay
- Prof Giri & Prof Puja Agarwal (Guidance & Control)

We are also seeking guidance from the below renowned experts from the respective feilds:

- Prof T. K. Ghosal from Jadavpur University,
- Dr B Chakaraborty, Ex Director (ADRD),
- Dr Arvind Bharli, Retd from OSD Tech (DRDO),
- Mr Amitava Debnath
News & Events - 2018

Participation in Army Exhibition - 8th Jan 2018

We Give Wings to Your Dream, Fly High with 'VTOL Aviation India'
OUR NETWORKS

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