AIIPL
Advanced Innovative Instruments for Professional Learning

AKADEMIKA

Elevate Your Skills:

Discover Drone Technology with our Training Laboratory

ABOUT THE LABORATORY

The Drone Technology Laboratory for Skill Development and Universities is a specialized facility designed by AKADEMIKA to provide hands-on training and practical experience in the field of drone technology. It serves as a dedicated space where individuals can develop the necessary skills and competencies to effectively operate, maintain, and utilize drones across various industries

KEY FEATURES OF THE DRONE TECHNOLOGY LABORATORY:

- **State-of-the-art Equipment:** The laboratory is equipped with cutting-edge drones, flight simulators, data acquisition tools, and software applications to provide a realistic learning environment. Students have access to a wide range of drone models, ensuring exposure to different configurations and capabilities

- **Training Modules:** The laboratory offers a comprehensive curriculum that covers the fundamental concepts of drones, flight operations, data analysis, and industry-specific applications.

- **Practical Hands-on Experience:** The laboratory emphasizes practical learning through hands-on exercises and simulations. Participants have the opportunity to practice drone flight operations, capture aerial media, process data, and troubleshoot technical issues.

- **Safety Protocols and Best Practices:** Safety is a paramount concern in drone operations. The laboratory promotes the implementation of safety protocols, including pre-flight checks, airspace regulations, emergency procedures, and risk management strategies. Participants learn the importance of responsible drone use and the ethical considerations associated with drone technology.

- **Opportunities:** Upon successful completion of the Training program, Students will enhance their employability Skills and open doors to various career opportunities in sectors such as agriculture, construction, film production, surveying, and more.

- The Drone Technology Laboratory aims to bridge the gap between theoretical knowledge and practical application, equipping individuals with the expertise needed to thrive in the rapidly growing field of drone technology.

CURRICULUM

- Videos & Online Tutorials For DGCA drone rules and regulations/ UTM / DIGISKY/ Remote Pilot Licensing / Component & Data, Identify & select different types of drones, drone applications, and important safety precautions.
- Characterization of Different Parts of Drone using various Test Equipments and Software

BLDC MOTORS/ ESC/PROPELLERS : Identify, select and test hardware assembly of the propulsion system, driver for BLDC motors(ESC) and compatible Propeller, Calculation of Motor and Propeller Efficiency.

FLIGHT CONTROL BOARD : Test, configure and troubleshoot Flight Controller Board (FCB), Electronic Speed Controller (ESC) and its associated peripherals

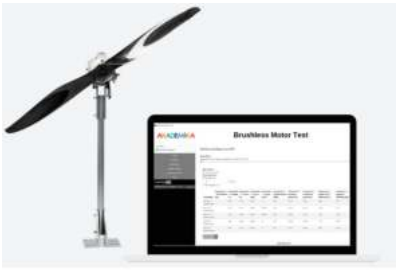
BATTERIES USED IN DRONES : Identification of different type of batteries, battery specifications and their charging techniques used in drone

SENSORS : Inspect, test and execute various IMU , GPS navigation and telemetry module, different RF blocks and antennas used in RF transmitter and receiver

- Assembly of various drone parts, Calibration and programming, troubleshooting of a Un Assembled Drone
- Introduction to Flight Simulator , Control Checks, Pre Flight Check and Simulator Exercises to have an Hands – on experience before actual flight
- Introduction to autonomous flight systems, Programming and configuring autonomous missions, Sensors and navigation for autonomous drones
- Advanced flight techniques (obstacle avoidance, precision flying)
- Drone Data Acquisition and Analysis
- Drone Proto-Typing: Design Frames, Propellers etc and Manufacture using a 3 D Printer

WORKBENCH FOR CHARACTERIZATION OF DRONES COMPONENTS

BLDC MOTORS & PROPELLERS



This System has the facility to characterize and evaluate the performance of your motors and propellers by measuring thrust, torque, RPM, current, voltage, temperature, propeller efficiency and motor efficiency.

SPECIFICATIONS:

- Measuring the Thrust Range (+/- 150N) with resolution of 0.05N and Torque Range (+/- 8 Nm with a resolution of 0.005Nm of the Motors
- Measuring the Electrical Current (0- 150 A) with a resolution of 0.001 A and Voltage (0-180 V) with a resolution of 0.001V - of the Motor, thereby Measure the efficiency of the Motor
- Measure the temperature (-30 C to 100 C) at desired location
- Measure the Motors Rotation Speed upto 30,000 RPM
- A Data Acquisition System with i5 processor, 8GB RAM, USB Interface is supplied along with Software to control the Propulsion System and record data. Software is capable to control the system manually and view live data as it is recorded.
- Facility to control the entire system from a Python API is provided
- Facility to upload the CSV files from the flight controller to perform flight replay tests
- Facility to Plot Real time Graphs, Manual Motor Control, Manual Servo Control .
- Facility for Automated Tests like Ramps, Steps, Measure (Kv), measure no of poles etc

FLIGHT CONTROLLER BOARD AND ELECTRONIC SPEED CONTROLLER

SPECIFICATIONS:

- Advance 32- bit micro-controller multiple PWM / servo output.
- Bus interface (UART, I2C, SPI) and provide redundant power input.
- 32 bit micro-controller with built-in IMU, multiple PWM/Servo output
- Bus interface (UART, I2C, SPI).
- Pre-Installed firmware for Quadcopter (X and +) configuration, Gyroscope, Accelerometer/magnetometer, Barometer. UART (Serial Ports), I2C, SPI, ADC Inputs.
- Battery 3000mAH, 980KV Brushless Motor with soldered connector, Propellers, 30A BLDC Electronic Speed Controller, USB Port. Multicolor LED lights. Provide multi-tone buzzer Interface. Accessories: Mains Cord, Patch Cord, USB Cable and all other accessories for the full feature Application of the kit are supplied

Set is provided with work table as per below specifications:

- Working bench of dimension (LxWxH): 4 x 2.5 x 3 (ft.)
- Base structure made with 38X38X1.5 mm CRC Epoxy coated pipes and top made of 19mm thick plywood with edge bidding.
- MS drawers 03 numbers with handle & lock on drawer.
- Two Pole MCB (16A) is provided for safety of work table.
- Workbench is provided with Anti-static mat, castor wheel and multiple sockets/ Switches for external use

DRONE BATTERY MANAGEMENT TRAINING SYSTEM

SPECIFICATIONS:

Operating Mains Supply : Single Phase, 230V , 50Hz AC Mains.
Battery Type : Li-Po / Li-Ion 6S
Battery capacity : 16,000mAh
Battery Voltage : 24V with Inbuilt configurable Battery Balancer and Charger.
Machine Type : BLDC Motor
Rating : 750KV
Voltage Rating : 24 V Current: 3 A approx. (at No Load.)
Speed : 18000 rpm +/- 10%
Propeller : Diameter: 16 " , Pitch: 5.5"
ESC : Constant Current (A) : 80, BEC : Yes (5V/5A)
Servo Driver : To control the speed of the Motor
Power Analyzer : It measures 8 parameters so serves as a key to electric power safety & performance. Measuring Voltage (V), Current (A), Power (W), Capacity (Ah), and Energy (Wh), Minimum Voltage (Vm), Peak Current (Ap), and Peak Power (Wp).

Motor and Propeller System mounted on a Stand act as a Load to the Battery Management Training System. Experiments to understand battery management and importance of monitoring of cell voltage, current,Temperature & Cell balancing can studied with this Set-up.

Set up is provided with work table as per below specifications:

- Working bench of dimension (LxWxH): 4 x 2.5 x 3 (ft.) approx..
- Base structure made with 38X38X1.5 mm CRC Epoxy coated pipes and top made of 19mm thick plywood with edge bidding.
- MS drawers 03 numbers with handle & lock on drawer.
- Two Pole MCB (16A Good quality ISI mark) to be provided for safety of work table.
- Workbench is provided with Anti-static mat, castor wheel and multiple sockets/ Switches for external use.

WORKBENCH FOR ASSEMBLY, PROGRAMMING AND CONFIGURATION OF DRONES: UNASSEMBLED DRONE KIT

SPECIFICATIONS:

- Advance 32 bit micro-controller with multiple PWM / servo output.
- Bus interface (UART, I2C, and SPI).
- Lidar Sensor for distance measurement.
- Light FPV camera with Stable characteristics,
- Battery Charger features built-in JST-XH balance plug ports and charging status indicators
- 2.4GHz remote module System, Frequencies-Hopping and Low Power Consumption with Throttle curves, Pitch curves, Endpoint adjustments and Servo reversing

1 set of Un-Assembled Quad copter kit includes:

- GPS Module (1 no.) : Concurrent GNSS: up to 10 Hz.
- Propellers (4nos.) :Length: 8″,Pitch: 4.5″
- Frame (1 no.) :Motor Mounting Hole Dia.: 3 mm, Arm Size: 220 x 40 mm.
- BLDC Motors (4 nos.) : Voltage: 7.2v~11.1v / 2s~3s Lipo/Li-Ion, Shaft Length: 10mm or more,Max Watts: 260W,Minimum 900 KV or more,Screw Size: M3
- ESC (Electronic Speed controllers) (4 nos.) : Brushless ESC,30A or more upto 2-4S Brushless ESC,BEC output: 5V 2A.
- FCB (Flight Controller Board) (1 no.): Upto 14 PWM / servo output,Bus interface (UART, I2C, SPI);,Provide redundant power input,Multicolor LED lights.,Provide a multi-tone buzzer Interface/Motor Winding Tone.
- Camera (1 no.):
  Image Sensor: CCD,Power: DC 5-36V.,Operating Current: 5V@60mA; Horizontal Resolution : 600TVL.
  Camera Receiver (1 no.) : Channel: upto 150CH,Power Supply: 5V,Connector: SMA Female
  Camera Transmitter (1 no.): Channels: upto 40CH,Frequency: 5.6GHz-5.9GHz,Antenna: RP-SMA Male
  Guard (4 nos.) : Length : 8”
- RF Transmitter and receiver (1 pair) : 6 channels, 2.40 - 2.48 GHz ,Power ;12V, Battery 8 AA;
- Telemetry: 915 MHz , Mavlink Protocol, Receiver Sensitivity: -121dBm , Transmit Power upto 20dBm
- Mission Planning Software for Configuration and Calibration of the Drones provided with a minimum Configuration of Intel Core i5 processor, 8GB RAM, 512 GB SSD, 15.6″ Display.
- Facility to interface the GCS over a Smartphone
- Accessories: Lipo Battery and Charger, USB Cable,

Set up is provided with work table as per below specifications:

- Working bench of dimension (LxWxH): 4 x 2.5 x 3 (ft.) approx.
- Base structure made with 38X38X1.5 mm CRC Epoxy coated pipes and top made of 19mm thick plywood with edge bidding.
- MS drawers 03 numbers with handle & lock on drawer.
- Two Pole MCB (16A Good quality ISI mark) to be provided for safety of work table.
- Workbench is provided with Anti-static mat, castor wheel and multiple sockets/ Switches for external use

WORKBENCH FOR PROGRAMMABLE NANO DRONE

SPECIFICATION

- Programmable: C++ based API structure making it extremely easy to program
- HD Camera: HD videos and photos – Capability to do ROS based image processing
- Drone weight: 65 grams
- Inbuilt Camera
- Connectivity technology: WiFi
- Material: Nylon
  - QAV250mm carbon fiber frame
  - 5” propellers
- Battery: Lithium Polymer, 150 LiPo quick charge ,
  Charging time: 30 – 40 minutes approx.
  for a full charge, 2 Lithium Polymer batteries (included).

Modular Hardware

- 12 GPIO pins to add external hardware
- 2 DAC channels
- Accessible to UART, I2C, SPI, ADC
- 4 extra reversible motor drivers
- 3V and 5V output power for hardware

- Payload: 15 gram
- Range: 50 - 70 m
- Flight Time: 7+ Min
- Speed: up to 7 m/sec
- Two high-speed motors for more thrust, extra maneuverability and sharper turns
- Microcontroller: STM32F303, 256kb
- Camera: Photo, Video@720p
- Motor Driver: 4 MOSFET (unidirectional) & 4 H-Bridge drives (Bidirectional)
- Propulsion: Brushed coreless DC motors
- Gyro accelerometer to prevent nosedives and reduce choppiness.
- Accessories: All accessories are provided with the kit for its full feature functioning

Set up is provided with work table as per below specifications:

- Working bench of dimension (LxWxH): 4 x 2.5 x 3 (ft.) approx..
- Base structure made with 38X38X1.5 mm CRC Epoxy coated pipes and top made of 19mm thick plywood with edge bidding.
- MS drawers 03 numbers with handle & lock on drawer.
- Two Pole MCB (16A Good quality ISI mark) to be provided for safety of work table.
- Workbench is provided with Anti-static mat, castor wheel and multiple sockets/ Switches for external use

APPLICATION BASED MICRO & SMALL DRONES

Drone Category as per DGCA	Micro & Small
Type	Quadcopter / Hexacopter
All up weight	< 2 Kg / 5Kg /10Kg/20Kg/25Kg
Endurance	14 min to 40 min
Speed	7m/s and above
Flight Altitude	5 m to 500m AGL as per application
Communication Range	1Km to 2 Km as per application
Obstacle Avoidance	Omni-directional obstacle detection & avoidance
Wind Resistance	10m/s

- **Flight modes**
  - Fully Automated from take-off to landing
  - Automated waypoint navigation (pre-defined as well as dynamically adjustable way points during flight)
- **Computing Hardware**
  - Compact handheld controller with joysticks and screen for complete GCS operation including map display and real time video display
- **GCS Software Characteristics**
  - Geographic Map display along with UAV location, UAV trajectory, waypoints & flight plan
  - Real-time video from the UAV with on-screen display of important parameter
- **Failsafe features**
  - Return to Home on communication failure
  - Return to Home on low battery
  - Return to Home on High Winds
  - Dual GNSS receivers onboard for redundancy.
- **Payloads**
  - Spraying System (upto 10 Litres)
  - 10X Optical Zoom Daytime Camera
  - Thermal Infrared Camera
- **Applications**
  - Surveillance
  - Photography
  - Agriculture
  - Mapping & Survey


10X Optical Zoom Daytime Camera


Thermal Infrared Camera

DRONE SIMULATOR TRAINING SYSTEM

The Drone Simulator Training System includes a Flight Simulator Software with Hardware Radio Controller to allow the students to train and make it more realistic and help beginners learn how to fly with ease, greatly improving their skills.

This 6 CH USB Radio Controller makes it super simple to hook up a lifelike radio controller to the RC Simulator.

CONTROLLER SPECIFICATION

No. of Channels : 6/10
Antenna Length (mm) : 26
Certificate : CE
Code Type : Digital
Default Operating Mode : Mode 2 (Left-Hand Throttle)
Cable Length : 1 Mtr.

Works with Windows 10,8,7, Vista and XP, 32 and 64 bit

Note: Computer is not in our Scope of Supply

DRONE'S SPARE PARTS KIT

TECHNICAL SPECIFICATIONS:

The spare parts provided are suitable and compatible for the drones supplied in this package. The Drone Spare kit has the following minimum spare parts of a Drone Kit:

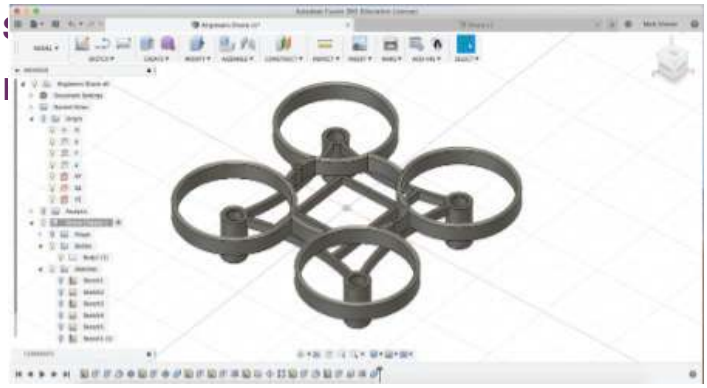
- Li-Po Batteries – 2 Nos
- BLDC motors – 6 Nos
- Propeller set – 4 Set
- FCB – 1 No
- ESC – 6 Nos
- Frame 1 Set
- GPS module – 1 No
- Power Module – 1 No
- Carry case for portability of Spare parts

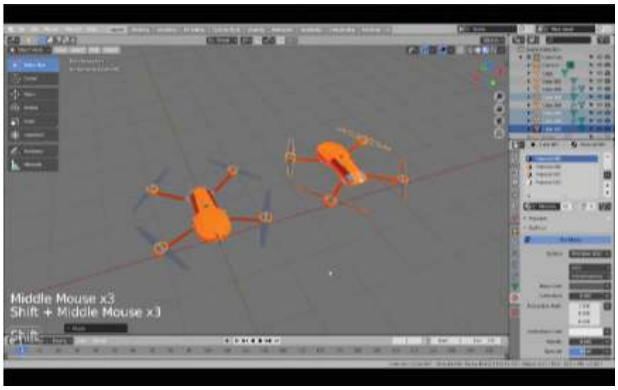
DRONE PROTOTYPING STATION

This Training Station enables the students to design and prototype the Frames and Propellers used in Drones

SPECIFICATION

Modeling Software :





Flexible 3D modeling and design: Use Solid, Surface, Mesh Modeling.
Interactive assemblies: Detailed visualizations of complex products with exploded views and animations.
Design Workspace: Creates Mechanical designs for prismatic geometry to create solid bodies

Render Workspace: Photo-realistic rendering and documentation: Annotate dimension and document models with real-life rendering technology.
Integrated CAD and CAM

3D Printer :

Built Volume	:	L:250mm X W: 250mm X H: 300mm
Nozzle Temperature	:	290 C , Printing Speed: 80mm/sec
Connectivity	:	USB Drive, WiFi, LAN, Bed calibration
Sensor	:	Yes
Material Compatibility	:	PLA + , ABS +, PETG PC, Carbon Fiber
Print Head	:	Direct Drive Extruder with Swapable Nozzles Screen
User Interface	:	Full Colour TFT with Touch
Layer Thickness	:	0.12 -0.6 mm,
Power requirements	:	1000W

KEY BENEFITS OF A WELL DESIGNED DRONE LABORATORY

- Hands on Training
- Safety and Risk Management
- Industry Relevant Skills

JOB OPPORTUNITIES AS

Drone Pilot / Operator

Drone Technician/ Maintenance

Drone Software Developer

Drone Data Analyst

Drone Entrepreneur

OUR PRODUCTS

- FIBER OPTIC NETWORK
- COMPUTER NETWORKS
- ANALOG & DIGITAL COMMUNICATION
- IoT and WIRELESS COMMUNICATION
- RF/MICROWAVE/ ANTENNA
- TEST & MEASURING INSTRUMENTS

FIBER OPTIC NETWORK

COMPUTER NETWORKS

ANALOG & DIGITAL COMMUNICATION

IoT and WIRELESS COMMUNICATION

RF/MICROWAVE/ ANTENNA

TEST & MEASURING INSTRUMENTS

AKADEMIKA

Unit No 128/129, Hema Industrial Estate
Sarvodaya Nagar, Jogeshwari (E)
Mumbai – 400060

+91 9004904462

www.akademika.in

info@akademika.in

• DISTRIBUTOR •

AIIPL

R.K Pillai
President and CEO
?%NJ Rcaf Ntr Jrb,
Ampnmp_rc Mddjac
?iqf_p @sqjlcqq N_pi X/ Ujle* Mddjac Lm, /.66* /.67 $
/.7. Njmr lm, .1* Qcarmp+03 T_qfj* L_tj Ksk `_j 2..5.1
K_f_p_qfrp_jlbj_
K8)7/ 7645146.54
C8 pinjjj_j>_jjnjrcaf,amk
U8 uuu,_jjnjrcaf,amk
Jjlicbjl

AIIPL

asteria aerospace

35+ minutes of flight time

Single person operable

Survey-grade Multi-band PPK GNSS

24 MP high resolution imaging camera

A200™

India's 1st survey grade micro drone with DGCA type certification

The A200 is India's first sub 2 kg drone certified by the DGCA, enabling its easy registration and UIN generation on Digital Sky. Being lightweight, portable, and equipped with high-performance sensors, it is ideal for surveying and mapping applications across industries.

India's 1st Micro Category Drone
DGCA
Type Certified

sales@asteria.co.in
+91 7353036888
asteria.co.in

Compact for single person operations

- Compact, lightweight drone under the micro category (<2 kg).
- Single rugged IP67 certified (dust and waterproof) hard case makes it highly portable and secure.

Survey-grade accuracy in X, Y and Z

- L1/L2 multi-band GNSS receiver with full PPK capability captures precise geotags of each image.
- Suitable for all survey-grade mapping operations with accuracy of <10 cm in X & Y and <20 cm in Z axis orthophotos.

High resolution imaging for all mapping applications

- 24 MP imaging camera with an APS-C sensor captures sharp and hi-res images.
- Camera is mounted nadir-facing on a custom designed mount, reducing vibration's effect on images.

Intuitive and easy to use

- Effortless piloting with Asteria's proprietary Mission Control Software (MCS).
- Ensures advanced flight planning for mapping an area or corridor with just a few clicks.

Technical Specifications*

Endurance	**Up to 35+ mins**
Speed	**Up to 36 km/hr**
Altitude	**Up to 120 m AGL**
Service Ceiling	**Up to 2000 m AMSL**
Range	**Up to 2 km LOS**
All Up Weight	**<2 kg**
Temperature	**-20° to + 50°C**
Wind Resistance	**Up to 30 km/hr**

System Features

Optional PPK GPS for survey grade applications <100 Wh batteries for easy transport & tool-less assembly & disassembly.

Point and click user interface, extremely portable with single IP67 rugged hard case for entire system.

Automated operation from take-off to landing.

Digital, encrypted, MIMO communication link.

Fail-safe for low battery, communication loss, high wind.

Single pilot operation.

*The above-mentioned technical specifications are based on tests done by manufacturer under ideal drone flying conditions.

sales@asteria.co.in +91 7353036888 asteria.co.in

asteria aerospace

- **Dual redundant** GPS
- **40 minutes** of flight time
- **360° obstacle** avoidance
- **Swappable** payloads
- **3000m service** ceiling

A200-XT™

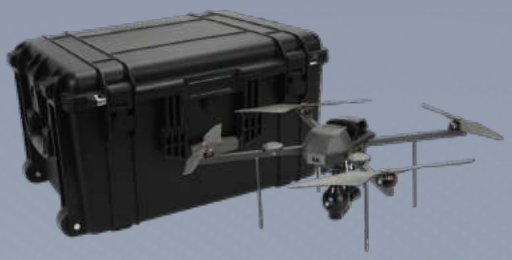
Multi-purpose small category drone with DGCA type certification for surveillance & inspection applications.

Versatile drone for multiple applications

With quick-connect swappable payloads, the A200-XT can be easily configured for a day or night surveillance mission or an inspection or mapping flight.

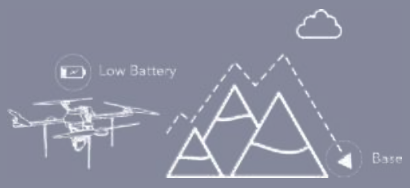
Small Category Drone
DGCA
Type Certified

sales@asteria.co.in
+91 7353036888
asteria.co.in



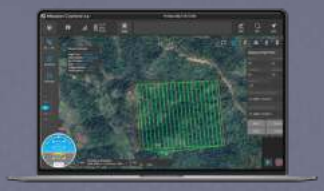
Compact, portable with rapid response

- The A200-XT weighs <3 kg, packed in an ergonomic backpack for easy portability.
- With tool-less assembly and setup, it can go from box to flight in under 5 minutes.



Safety-first features ensuring 360° peace of mind

- Safe operations with omni-directional obstacle detection and avoidance system.
- Dual redundant GPS sensors with geofencing, quick return to launch, and failsafe modes.



Intuitive and easy to use

- Asteria's proprietary Mission Control Software (MCS) makes piloting the A200-XT effortless.
- Simple mission planning & full payload control with video, snapshot, and record/playback.

Thermal Infrared Camera

10X Optical Zoom Daytime Camera

- 1080p high-resolution daytime video camera with 10x optical zoom. 320 x 240 resolution night-time infrared thermal camera with 4x digital zoom.
- Payloads with 360° pan, three-axis gimbal stabilization, and target tracking features.

Technical Specifications*

Endurance	**40 mins**
Speed	**10 m/s**
Flight Altitude	**Up to 500m AGL**
Service Ceiling	**Up to 3000m AMSL**
Communication Range	**2 km**
All Up Weight	**<3 kg**
Operating Temperature	**-20° to + 55°C**
Wind Resistance	**Up to 35 km/hr**

System Features

Tool-less assembly & disassembly.

Point and click user interface.

Fail-safe for low battery, communication loss, high wind.

Digital, AES-128 bit encrypted communication link.

Automated operation from take-off to landing.

Operable by single person.

sales@asteria.co.in

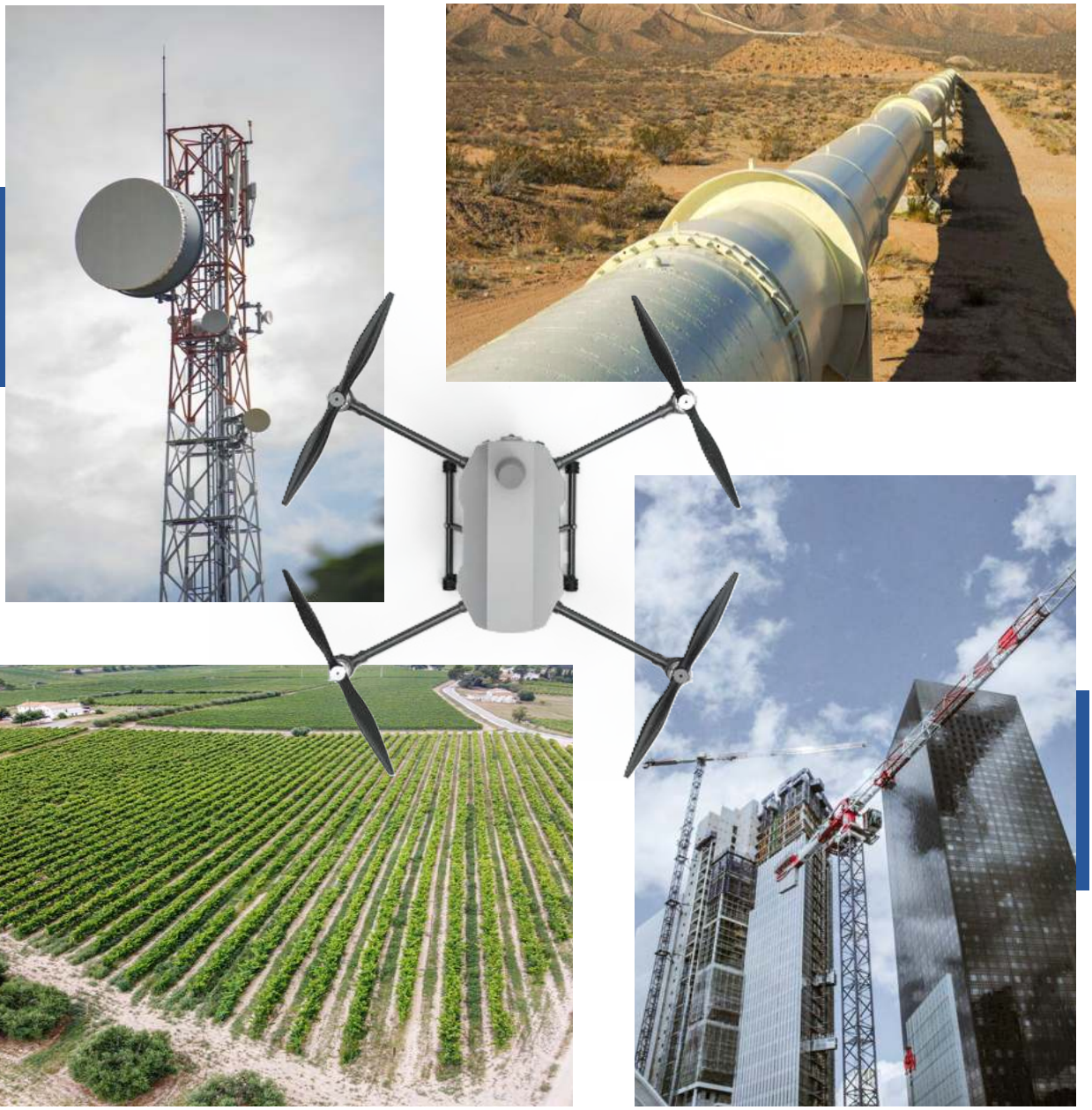
+91 7353036888

asteria.co.in

AIIPL
Advanced Innovative Instruments for Professional Learning

SkyDeck

Drone to Insights made easy through SkyDeck



www.asteria.co.in/skydeck

asteria aerospace

What is SkyDeck?

SkyDeck is a cloud-based drone operations platform that facilitates the delivery of Drone-as-a-Service solutions to enterprises across several industries, including agriculture, mining, oil & gas, telecom, construction, and energy & utilities. It is an end-to-end cloud-based collaborative platform that helps you digitize and manage your physical assets and sites using the power of aerial data captured through drones. SkyDeck provides a unified dashboard and services for drone fleet management, scheduling and executing drone flights, data processing, and visualization and AI-based analysis of aerial data captured using drones. SkyDeck ensures operational transparency, improves collaboration between stakeholders, and provides secure and centralized management for scaling drone programs across multiple applications.

Drive Business Value with Aerial Intelligence

Improve Operational Efficiency

Digitize all sites and assets rapidly using drones to improve transparency and efficiency across business processes. Accurate information enables accurate and faster decisions.

Enhance Collaboration

Simplify collaboration and decision-making between different stakeholders by providing a unified cloud-based platform to access, interact, and collaborate on digital asset data.

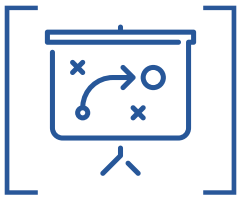
Prevent Threats

Inspect assets using digital aerial data and AI-based analytics for preventive maintenance to improve asset life and mitigate threats.

360° View

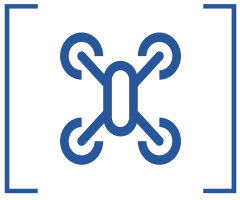
Provides a central view of all sites, projects, and drone fleets, across time. From flight schedules to resource utilization information and everything in between for effective management of drone programs.

How Does SkyDeck Work?



Plan

Schedule and manage drone missions across projects and sites seamlessly.



Fly

Capture high-quality aerial data through automated drone flights.

Visualize

View sites with hi-res geospatial imagery captured from drones.

Analyze

Draw business insights from aerial data and collaborate with all stakeholders.

SkyDeck Applications

Future-ready Agriculture

Map fields in minutes for health assessment, crop growth and data-backed recommendations with SkyDeck.

Ground-breaking Solutions for Construction

Survey prospective locations, monitor progress and enhance operations with comprehensive and accurate oversight of job sites.

Upgraded Telecom Operations

Get a transparent view of your telecom assets, network planning, optimization, and maintenance operations with high-resolution digital twins of every site on SkyDeck.

Drone-powered Mining Operations

Enhance mining operations through easily accessible terrain data. Manage stockpiles, mining assets to improve overall efficiency.

Efficient Pipeline Monitoring

Reach inaccessible areas with a faster and safer means of inspection. Reduce potential risks to communities and infrastructure.