PROSPECTUS

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

The operation manual of the **INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM** contains the procedures, instructions and guidance for use by operational personnel in the execution of their duties.

The manual is a prospectus and a compendium containing comprehensive instructions for operations and training, containing the ground training, instructions, modalities risk, procedures and operational guide for pilots of **Remotely Piloted Aircraft Systems (RPAS).**

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

TABLE OF CONTENT

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

0.2 APPROVAL PAGE

TITLE OF MANUAL:	OPERATIONS MANUAL
MANUAL REFERENCE CODE:	I-RPAS/OPS/001
MANUAL ISSUE NO.& DATE:	13th APRIL, 2020
MANUAL REV:	Version 0.1

Prepared by: Name :

Designation : UAV Coordinator

Signature : Date:

Checked and Recommended for Approval by:

Name :

Designation :

Signature : Date :

ORGANISATION APPROVAL

Approved by

Name :

Designation :

Signature: Date:

AUTHORITY'S APPROVAL

Approved by NCAA:

Name:

Designation :

Signature: Date:

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

0.3 STATEMENT OF COMPLIANCE

Institute for Remotely Piloted Aircraft System (I-RPAS) Operations Manual is in compliance with the proposed Nig. CARs Part 21 and the procedures shall guide in all applicable regulations, requirements and with the terms and conditions of ROC. This Manual contains Quality procedures that must be complied with by all the personnel of I-RPAS Operations Manual in the performance of their duties. Adherence to these procedures is in support of continued airworthiness and enhancement of safety standards. The Accountable Manager/CEO shall be responsible for the financing of all training.

Sign:

Name:

Designation: **Accountable Manager**

Date:

4.0 Amendment Procedure

Where in the light of operating experience, errors are found in the manual or deficiencies in the manner in which operations are conducted, recommendations for amendment action shall be submitted to the Chief Pilot.

All changes to the manual and the 'Schedule 1 – RPAS Operating Types' must be notified to, and accepted by, NCAA. Changes to correct typographical errors or changes to subordinate documents, including Appendices to this manual, may be accepted and approved by the Chief Pilot.

5.0 Revision Log

The operations manual must have a section for the revision of the operations manual whenever it is revised.

6.0 Abbreviations, Acronyms and Definitions

The following lists must be included in this section of the operations manual but are not exhaustive;

AC	-	Advisory Circular
AGL	-	Above Ground Level
AIP	-	Aeronautical Information Publication
ALA	-	Authorized Landing Area
AMS	-	Above Mean Sea Level
ANO	-	Air Navigation Order
AOO	-	Area of Operations
ATC	-	Air Traffic Control
ATM	-	Air Traffic Management
ATS	-	Air Traffic Services
BLOS	-	Beyond Line of Sight
BVLOS	-	Beyond Visual Line of Sight
CAP	-	Civil Aviation Procedures
CW	-	Clockwise
CCW	-	Counter Clockwise
E-VLOS	-	Extended – Visual Line of Sight
FPV	-	First Person View
GAD	-	General Aviation Directorate
GCS	-	Ground Control System
GPS	-	Global Positioning System
GHY	-	Get You Home
HLS	-	Helicopter Landing Site
IAW	-	In accordance with
ICAO	-	International Civil Aviation Organization

IMU	-	Inertia Measurement Unit
IOC	-	Intelligent Orientation Control
JSA	-	Job Safety Assessment
LED	-	Light Emitting Diode
LiPo	-	Lithium Polymer Battery
METAR	-	Meteorological Terminal Aviation Report
MGRS	-	Military Grid Reference System
MOR	-	Mandatory Occurrence Reporting
NAMA	-	Nigerian Airspace Management Agency
NM	-	Nautical Miles
NCAA	-	Nigerian Civil Aviation Authority
Nig. CARs	-	Nigerian Civil Aviation Regulations
NOTAM	-	Notice to Airmen
PfCo	-	Permission for Commercial Operation
PIC	-	Pilot in Charge
RC	-	Remote Control
ROS	-	ROS Systems Oil & Gas Ltd
RP	-	Remote Pilot
RPA	-	Remotely Piloted Aircraft

DEFINITIONS:

Accountable Manager: A single, identified person having responsible for the effective and efficient performance of the state's SSP or of the service provider's SMS.

Aerodrome: Means an aerodrome that is promulgated in the current Civil Aviation Act.

Controlled Aerodrome means an aerodrome at which are traffic control service is being provided to aerodrome traffic.

Remotely Piloted Aircraft means an unmanned aircraft that is piloted from a remote section and:

1) includes a radio control model aircraft, but
2) does not include a control line model aircraft or a free flight model aircraft;

Risk Mitigation: The process of incorporating defence or preventive controls to lower the security and/or likelihood of a hazards projected consequence.

Safety Management Systems, A systematic approach to managing safety, including the necessary organisational structures, accountabilities, policies and procedures.

Safety Performance. A state's or service provider's safety achievement as defined by its safety performance targets and safety performance indicators.

Safety Risk. The predicted probability and severity of the consequences or outcomes of a hazard.

Remote Pilot: A Person charged by the operator with duties essential to the operation of a remotely piloted aircraft and who manipulates the flight controls, as appropriate, during flight time.

System Failure: An occurrence when the system has failed to perform as intended. This could be a result of either Remote Pilot error or equipment/software malfunction.

Visual Line of Sight (VLOS). Remote Piloted direct unaided line of sight contact using the naked eye.

WHO WE ARE

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM LIMITED prides itself as a well-established industry leader in drone and counter drone systems, with its headquarters in FCT Abuja Nigeria and an international office in Lagos, Nigeria. We are at the forefront of the security industry and are proud to provide quality Emerging Technology and Security Services & Solutions tailored to meet our clients' needs across various industries.

We are an innovative and competent firm in the business of providing Consultancy Services & Solutions for Aviation Industries (Public & Private), Communities and Nations. We are an indigenous brand with affiliations to various international organizations.

Our vision is to be the number one provider of Corporate Aviation Security Services in Nigeria and West Africa.

Our brand and business strength as at today is due to our experienced team of individuals who have knowledge and expertise in fields of national security, investigation and international policing for more than 35 years and our international affiliations/partners. Also, this is further enhanced by the innovative ideas of the management, who strive to keep the company at par with the latest global development in intelligence and security management.

We'll show you where you are most vulnerable, and then help you neutralize or counteract a wide variety of corporate and private client corporate security issues.

ADVISORY BOARD

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

The Advisory Board is not yet another "think tank" but a group of experts that share in our vision for establishing a lead in using the benefits of Drone Technology to make Africa region and the world Safer.

AIG C.K. Aderanti, mni (Rtd)
Daniel Security Systems Limited
President/CEO
Nigeria.
Assistant Inspector General of Police (AIG) Cornelius Kayode Aderanti, Mni. – served with the Nigeria Police Force for 35 years meritoriously in the following capacities:-

- First African to the appointed in the UN training center;
- Deputy Defense Adviser (Police) Permanent Mission of Nigeria to the UN Headquarters, New york;
- Senior Police Liaison Adviser, in the office of Operations, African Division (DPKO), UN Headquarters, New york;
- Head, INTERPOL National Central Bureau, Abuja
- CP/Director, Directorate of peacekeeping operations and training, Headquarters, Abuja
- Commissioner of Police Lagos State Command
- Assistant Inspector General of Police Zone 2 Lagos – In-Charge of South West Commands
- Assistant Inspector General of Police Zone 1, Kano – In-Charge of North West commands
- Assistant Inspector General of Police Zone 3 Yola – In-Charge of Northeast Commands.

AIG C.K. Aderanti, mni (Rtd.) *is an astute administrator and a result-driven stickler for perfection*

Engr. Oluwole Benedict Adeyileka is the Rector of the Kwara state-owned International Aviation College, Ilorin.

Before his appointment, Engr. Adeyileka was the acting Director General/CEO at Nigerian Civil Aviation Authority (NCAA). Engineer Adeyileka was prior his appointment as acting Director General of NCAA, the Director of Air worthiness Standard (DAWS).

He also served as the Technical Director at Aero Contractors of Nigeria Limited and was an Associate Vice President – Technical/ NACC Post Holder Maintenance.
He had also served as the Deputy General Manager – Engineering, Aero Contractors and Technical Director, Highland Airways Limited.

ADVISORY BOARD

Capt. Edward Boyo is the founder and Managing Director of Landover Company Limited, a leading aviation services company in Africa providing multidisciplinary services to Aviation Industry in West Africa.
He is the Publisher of Aviation & Allied Business Africa Journal, Africa's leading publication on aviation development published since 1993.
Capt. Boyo is also the founder and Chief Executive Officer of Overland Airways, a scheduled commercial and charter airline based in Lagos, Nigeria.

He has served in various Government committees towards improvement of the aviation industry, including the Federal Government Committee on the Aviation Intervention Fund set up to support Nigerian airlines.
He is a current and active Pilot, holding an Airline Transport Pilot License and a Flight Engineering License from the United States Federal Aviation Administration (FAA) and a Pilot Instructor's Certificate from Oxford Air Training School in the United Kingdom. He also holds a degree in Business Administration from the University of Lagos, Nigeria and has more than 30 years hands-on experience in aviation.
Capt. Boyo is proudly African committed to improving the quality of life in Africa through the delivery of world-class aviation products and services, as well as social responsibility activities. He believes that a good air transport system in the continent will help Africa rise above its social and economic challenges for the well-being of her people.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

ADVISORY BOARD

Capt. Roland Iyayi M.Sc
President/CEO
TopBrass Aviation Limited

Capt. Roland Iyayi is the President/CEO of TopBrass Aviation Limited, which offers VVIP and executive air charter and scheduled services, with operations based in Lagos, Nigeria. Prior to this time, Roland worked out of Aero leasing and Consultancy limited, an aviation consulting firm based in Nigeria charged with Research and Development and Strategic Planning, following which he held the position of MD of the same company until his appointment to the position of Technical Advisor to the Honorable Minister of Aviation in Nigeria.

Roland later assumed the office of the MD/CE of the Nigerian Airspace Management Agency (NAMA), after being a member of the Presidential Task Force on Aviation in Nigeria. Following this, he was appointed to the position of Acting Managing Director/Chief Operating Officer and charged with Corporate Development and Strategic Planning with Aero contractors Company of Nigeria Limited.

Roland, who is a qualified pilot and Air Safety Investigator with over 25 years industry experience, earned an MSc degree in Air safety Management from the City University of London and is a member of the Aircraft Owners and Pilots Association (AOPA) and National Business Aircraft Association (NBAA).

PHILIP INGRAM, MBE, B.Sc, MA, GCLI

Writer, Broadcaster- intelligence, security, cyber, CBRNE (that is Chemical, Biological, Radiological, Nuclear and Explosives), geopolitics, terror and more.

Philip is a widely published journalist with core competence in the security and intelligence arenas who has built a long and senior career in British Military Intelligence, with years of experience in all aspects of intelligence and security as well as strategic planning.

He presents and conducts interviews on screen, with the output being delivered to large organizations such as INTERPOL. Philip has worked as a commentator for BBC TV News and Radio, BBC Mundo, TRT World, CNN, ABC, CBC, Japanese NTV, RT.com and many others as well as presenting INTERPOL World TV. He retained other business interests in the armoured vehicle and specialist molecular detection, and specialist Cyber Intelligence where he chairs a company. He is frequently quoted in the mainstream press.

His broad experience sets him up as a perfect chair for conferences and roundtables and He has been a speaker at dinner events stirring up a little debate amongst the diners where appropriate and at a number of high-level roundtable and spotlight events. He is a PTSD survivor.

Specialties: Journalism (print, online and video), business mentoring, marketing, risk management, change management, SEO, writing, presenting, podcasting and interviewing; with a splash of cyber security and cyber intelligence.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

YUSUF AZEEZ ALABA

Managing Director,
TAMTAM PROJECT LIMITED.

Mr. Yusuf has gathered vast experience in all aspects of business formation, operation, finance and management from the aviation, maritime, building and road construction, and the electrical field and combined all his experience to make this company truly successful. He is a consummate entrepreneur having well over 20 years in the business environment. He is an effective communicator and motivator with the ability to bring the best out of his staffs and anyone he works with to achieve set goals. A relentless optimist, he will never have no for an answer.

Skills

Very strong command of business and management principles in relation to development, resource allocation, production methods, and leading others. Deep technical background in business analytics with experience using project management and user interface software. Initiator and problem-solver using creativity, resourcefulness, and assets to break down and overcome organizational obstacles. Lifelong learner committed to staying on top of the best current and emerging business practices, especially in an international context. Attentive listener who is not afraid to incorporate the opinions of valued team members/staff into policy and planning.

Work Experience

TAMTAM PROJECT LIMITED
Founder and CEO
2008 – present

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

- Direct all organizational operations, policies, and objectives to maximize productivity and returns.
- Analyze complex scenarios and use creative problem-solving to turn challenges into profitable opportunities.
- Interview, appoint, train, and assign responsibilities to department managers.
- Monitor cost-effectiveness of operations and personnel using quantitative data, offering feedback and making cuts where necessary
- Coordinate and approve budgets.

VICMAN VENTURES LIMITED
GENERAL MANAGER
2005 – 2008

- Uncovered new clients and business opportunities.
- Developed marketing content and sales scripts with strategic messaging.
- Led trainings in staff development and empowerment.
- Led trainings in sales best practices, research and analytics, customer service, branding, and international considerations.
- Increased annual turnover by N20 million.

UNIKAT VENTURES LIMITED
PROJECTS MANAGER
1999 – 2005

- Successfully executed the upgrading of SATCOM at the major airports in Nigeria
- Introduced time saving techniques that were implemented during projects.
- Coordinated with, operations, engineering, and research departments to develop cost effective methods of executing projects
- Maintained regular communication with the end-users (customers) to ensure that their needs were always incorporated and taken care of in the projects..
- Anticipated and created plans to mitigate unnecessary project delays and hiccups.

PROFESSOR BONIFACE KAYODE ALESE

Information and Cyber Security Expert

PhD degree in Computer Science

Prof B. K. Alese is a Professor of Information and Cyber Security with over two decades of teaching, research and community service experience. He holds a PhD degree in Computer Science with specialization in Information Security from The Federal University of Technology Akure in 2004. He started his academic career in 1998 at the Federal University of Technology, Akure and rose to become a full Professor in 2014.

He has successfully supervised 18 PhD as a Major Supervisor and 27 as a Co-Supervisor apart from many others at Masters level. He has held different positions in the University such as Head of Department, Associate Director and Dean of Students' Affairs. He has mentored and led students of the University to win laurels in IT related competitions at both local and International levels. He is visiting Professor to the University of Mines and Technology, Tarkwa, Ghana. He is the President of Technology Against Crime, Cybercrime Expert Group, Africa Sub Region.

He is member of various Professional bodies both locally and internationally such as , Nigeria Computer Society, Institute of Electrical and Electronics Engineering (Computer Society) New York, Association for Computing Machinery; New York, Computer Professional of Nigeria (CPN), Cyber Security Experts Association of Nigeria, Information Systems Security Association, Virginia, United States, Information Systems Audit and Control Association, United States of America, Cyber Peace Foundation, Cyber Peace Corps and Technology Against Crime, Africa Sub-Region. He was member of National University Commission BMAS drafting Committee for Cyber Security and Information Technology as courses of study in Nigeria.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

ADVISORY BOARD

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

Jerry Akubo, CEH, MCITP, CFIN
National Technical Consultant - INTERPOL NCB
Abuja
CEO/Founder, TAC Initiative Africa
Abuja - Nigeria

Jerry Innocent Akubo, National Technical Consultant, INTERPOL National Central Bureau, Abuja and also the CEO/Founder TAC NGO Africa. Actively engaged in Law Enforcement Technology Advisory domain for over two (2) decades now – in the following areas:-

Project deployment officer – OASIS Africa Project deployed by INTERPOL to all the Saharan African Border
National Technical Consultant – In-Charge of Expanding INTERPOL I-24/7 databases to relevant Law Enforcement Agencies within Nigeria
Established a Digital Resource Center for the Research & Planning Department of the NPF
Established an Intelligence Support System (ISS) for the Criminal Intelligence within the Police Force
Focal point – INTERPOL Cybercrime Expert Group
Focal Point – INTERPOL Drone Expert Forum
Focal Point - Computer Forensic Institute
Country Representative/Authorized Training Partner - Institute for Drone Technology, Australia.

Jerry Innocent Akubo is an International Security Consultant who is often found sharing his insights at global INTERPOL events on demystifying remote sensing apparatus, security assessment of Emerging technology platforms and initiatives geared towards encouraging the use of technology Against Crime.

Mr. Kelvin Lungu. AG ABU (MEng, BEng, MEIZ)
Lecturer - University of Zambia
Co-Ordinator - Zambia Flying Labs

Mr. Lungu is a Civil Engineer by profession and is also a drone enthusiast. He is one of the leading pioneers in Zambia in drones for social good and a visionary in creating a better Africa for tomorrow through innovation, robotics and drone technology advancement. He was one of the 10 finalists for the African Drone Forum 2020 with ideas that promote integration of drone technology/innovation with machine learning to solve problems related to mitigation of cholera and malaria outbreaks. Agabu is the project coordinator for Zambia Flying Labs which is a drone flying hub part of a network created by an international organization called WeRobotics, and the CEO of JCKEG Solutions which is a technology and innovation think tank also into drone solutions. His strengths lie in integrated drone technology/innovation solutions and drone mapping/operations.

In his profession as an Engineer his proficiencies include project management, work supervision, GIS practical applications, remote sensing, proposal writing, feasibility studies, and social and environmental assessments. Agabu possesses extensive computer skills and expertise in map digitization, database management, spatial analysis, modelling and analyses using QGIS and ArcGIS. He is also competent in using software such as AutoCAD, Civil 3D, WaterGEMS, PMWIN, MS Applications (Word, Power point and Excel).

His competency in project supervision was most notable in his supervision for the road survey and feasibility study for over 10 districts part of the Pave Zambia 2000 project, in the Southern Province of Zambia. He was responsible for all field geotechnical investigations, environmental assessment, geo-data collection and validation of the surveyed data using differential GPS units. He was also responsible for ensuring correct spatial analysis and digitization of surveyed data sets.

AREA OF EXPERTISE:

The areas of interest for my expertise include:

1. Drone Business
2. Industrial Drone Operations and/or
3. Drone Education

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

Sanjana Rathi,
Research Analyst,
Cyber Peace Foundation,
Ranchi Jharkhand,
India.

Sanjana Rathi is a Research Analyst working for Cyber Peace Foundation in the domain of Cyber Diplomacy - 'TheCyberDiplomat' initiative and Technology Policy. She is also a scholar studying Security & Diplomacy at Tel Aviv University.

Previously, she has worked with international law enforcement, defense think-tank, academia, and the private sector in Singapore, Israel, UK, and India. Her domain of expertise is in technology, innovation, cybersecurity, and business development. She is a Computer Science Engineer and also holds an MSc. Degree in Digital Innovation from the London School of Economics. Besides that, she has a Diploma in Cyber Law and Forensics from the National Law School of India University.

TECHNICAL SCIENTIFIC COMMITTEE OF THE INSTITUTE

Ackson Kondwani Mwenda
Aerospace Engineer | Founder African Drone Voice.
Zambian based in Cote D'ivoire.

Ackson is an Aerospace engineer who is active in the drone industry with precision agriculture at WeflyAgri and is also pushing for cross border drone delivery through his innitiative African Drone Voice. He was educated in Kharkiv, Ukraine at National Aerospace University and also worked as a trainee Aircraft maintenance engineer at Zambia Flying Doctor service on Cessna 208B caravan Aircraft.

He also served as the National point of contact for Zambia at SGAC Space Generation Advisory Council in support of the United Nations on space applications. He branched off from aviation to the drone industry and has been active in it since 2017 in aerial mapping and data processing. He is passionate about seeing unmanned traffic management systems being fully active for cross border Drone trade to become a reality in Africa.

Orville McCalla,
CEO/President AeroStream Consulting Inc.;
Canada
As CEO and President of AeroStream Consulting Inc., Orville McCalla has more than 15 years' experience in the aviation industry, delivering solutions from the ground up to sustainable operations. Orville is a personable, highly motivated and results-oriented individual with strong commitment to safety and excellence. Orville has held positions such as Director, Business Development & Client Relations, Associate Business Development Manager, Aeronautical Analyst, and Technical Records Administrator. He has progressive thought leadership and is known for his ability to think outside the box, to find solutions to complex challenges, and sustainable business relationships.
Orville is keen on fostering healthy, sustainable business relationships, and has successfully developed and implemented business campaigns penetrating new markets, successfully re-established business relationships, and fostered strategic partnerships that are directly linked to client's Key Performance Indicators (KPIs).
Orville has worked with airlines in North America including Canada, as well as airlines in Africa, assisting with maintaining compliance with civil aviation regulations and other regulatory authorities. He holds a private pilot's licence, a diploma in Aviation Operations and has obtained his Quality Systems Auditor certificate from the Canadian Council for Aviation and Aerospace."

TECHNICAL SCIENTIFIC COMMITTEE OF THE INSTITUTE

Adewale Adegoke is experienced in applying geospatial technologies and data to catalyse transformative economic opportunities for both the private and public sectors. He has been instrumental in driving the application of geospatial data and drone technology to optimise agricultural production in order to facilitate access to market, credit and inputs for small holder farmers in 8 Nigerian states. Deriving tangible benefits for financial investments in geospatial infrastructure, demand generation for drone services, forging strategic business partnerships, commercialising geospatial services have been key components of his 14-year career in the geospatial industry covering the Caribbean, The United Kingdom, West Africa and The Middle East. Under his leadership, staff collaboration and partnerships as the CEO of Orbital Solutions Global Services Limited the company is currently mapping farms and profiling farmers in eight(8) Nigerian States and implementing drone services in one(1) state in Southern Nigeria with strategy to scale up to more states by 2019.

Kalu Sampson
Chief Pilot
Institute for Remotely Piloted Aircraft Systems, Abuja-Nigeria

Felix Ojogbane
UAV Training Manager
Institute for Remotely Piloted Aircraft Systems, Abuja-Nigeria

Kind Gideon
UAV Operations Manager
Institute for Remotely Piloted Aircraft Systems, Abuja-Nigeria

Abdullazeez Ocheja
Payload Operator
Institute for Remotely Piloted Aircraft Systems, Abuja-Nigeria

Peter Nkwoka
Maintenance/Tech. Manager
Institute for Remotely Piloted Aircraft Systems, Abuja-Nigeria

Ibrahim Ali
UAV Observer/Support Crew
Institute for Remotely Piloted Aircraft Systems, Abuja-Nigeria

Sylvernus Akubo
Drone Software Integrator
Institute for Remotely Piloted Aircraft Systems, Abuja-Nigeria

Bright Lawrence
Drones Solution Specialist
Institute for Remotely Piloted Aircraft Systems, Abuja-Nigeria

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

Remote Pilot licensing, Training & Certification

This refers to requisite training acquired & the permits granted by the authorizing agency in collaboration with **I-RPAS** for operating Remotely Piloted Aircraft in Nigeria.

The authorized agency is the **Nigerian Civil Aviation Authority (NCAA)** and the training platform is the **Institute for Remotely Piloted Aircraft System (I-RPAS).**

The training includes a robust Learning Management System (LMS) - Theory training, in-person training and flying test.

The certified pilot certification issued by I-RPAS is then forwarded to the NCAA for validation on the drone pilot license national database, this enables the graduates of the institute to exercise specific set of privileges in Nigeria's airspace.

Hence this different training modules as follows:

A — Remote Pilot Training

We can provide up to sub 25kg for **multirotor**, as well a fixed wing accreditation. However, our basic course is for multirotor sub 7 kg. If you are interested in sub 25kg or fixed wing we would be happy to discuss with you.

Employment

- The market for drone technology has been estimated by **PriceWaterhouseCoopers** to grow to US$127 billion by 2020.

- Successful completion of this course may provide career opportunities for graduates as a UAV operator within a range of roles in various sectors, for example, in agriculture, surveying, infrastructure, emergency services or aerial imagery. In addition, the skills gained through the course will assist graduates as an addition to their skill base when applying for jobs in a variety of areas. For example, as a surveyor or in construction.

- Industries where drone technology is being particularly quickly adopted include:

B— RPAS Forensics

The use of Drones is growing rapidly and expanding to criminal enterprises and terrorist organizations. Police Corrections Facilities and deployed militaries are dealing with drones on a regular basis. Read the news today and you are likely to find an article discussing the malicious use of a Drone.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

Remote Pilot licensing, Training & Certification

Strategies and techniques to properly collect and examine these devices are not widely known, leaving investigators with the following challenges:

- How do you collect Drones?
- How do you extract data from these devices?
- How do you report the information?
- How do you track the vehicles path associating to an individual?

Many collectors stop after retrieving videos. Drones do much more than record video, they can transport illegal payload like drugs and weapons, but also deliver munitions or act as the projectile!

This course will cover all of these questions and more and will give you the skills to Collect, Preserve, Examine, and Report (CPER) the hidden intelligence within a Drone. In addition, you will leave with the skills necessary to collect and upload data residing from these mobile platforms.

C— RPAS Operations for First Responders

it will provide a basic understanding of the key regulatory, safety and operational factors surrounding drone operations for first responders. The course will include two days of live flight training during which students will learn to operate UAS and execute search-and-rescue operations.

I-RPAS Drone Operational Management for Disaster Response is a five-day strategic course running Feb. 12-16. This training is designed to assimilate various lessons learned using UAS during recent disasters and emergency response operations. The course will provide emergency management personnel with a comprehensive overview of how drones are spurring innovation in disaster management. A combination of live flight demonstrations and scenario-based, problem-solving exercises will provide students with a thorough understanding of how to coordinate manned and unmanned aircraft in response to a major incident.

D— RPAS Induct for (students)

Organisations: This course is used as a base level training for anyone intending to use a drone within our clients organisation, whether that be a client employee or a contractor coming onto a client's site. Induction courses are tailored to the client's operating environment and include four online modules from the Civil Aviation Safety Authority Accredited Remote Pilot Licence course.

Individuals: Being able to fly your drone is just the beginning. If you want to operate a drone under 2kgs commercially you are going to need insurance. This course covers key aspects of how to safely plan and carry out a drone mission.

E— RPAS Induct for (Executives)

Integrating drones with your operations provides amazing benefits in productivity and enhanced offerings. BUT you've got to do it right. Safety, compliance with legal obligations, and aviation requirements all need to be managed. This course provides knowledge about how to address the questions and challenges to maximise the opportunity, demonstrate duty of care and importantly execute the correct use of Drone technology safely into your organisation.

You do not need to be a pilot to do this course. This course is designed for people who will manage a workplace that includes drones, rather than necessarily for the pilots who operate the drones.

F— RPAS Training for (Industries)

Organisations: This course is used as a base level training for anyone intending to use a drone within our clients organisation, whether that be a client employee or a contractor coming onto a client's site. Induction courses are tailored to the client's operating environment and include four online modules from the Civil Aviation Safety Authority Accredited Remote Pilot Licence course

Individuals: Being able to fly your drone is just the beginning. If you want to operate a drone under 2kgs commercially you are going to need insurance. This course covers key aspects of how to safely plan and carry out a drone mission.

9. Drone Engineering Training Categories:

Quadcopter, Octacopter, Hexacopter, Fixed Wing, Payload -

an aerial robot combining a simple propeller mechanism with powerful electronics for limitless real-world applications. It is an embedded system comprising of microcontrollers, sensors, flight gear and other integrated components.

This Course helps participants to develop a general drone engineering concept from scratch while understanding the various engineering concepts in making a working Unmanned Aerial Vehicle. Developing a Quadcopter provides the right kind of hands-on application that an Engineering student needs!

Course Highlights

Build and Test your own Quadcopter

Introduction to design and development of Multi Rotor Vehicles

Understanding the Electronics circuitry involved in Quadrotor

Learn about Stability and Control of Drones

Learn about the working of sensors like Accelerometer and Gyroscopes

Hands-on experience on DC motors, ESCs (Electronic Speed Controllers) and Quadcopter Embedded control board

Course Structure

Lecture Session - 4 hrs

Design Session - 1 hr

Fabrication Session - 6 hrs

Calibration Session - 1 hr

Testing Session all drones designed by the participants are flown by an expert flyer of Team Roboversity- 3 hrs

Certificate Distribution - 1 hr

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

Topics Covered

Multirotor Vehicles - Introduction

Understanding rotary-wing aircraft and their dynamics

Design of the Structure

Stability & Control of Drones

Algorithm of the control systems

Kit Content

Embedded Development Board

Brushless DC motors

Propellers (Pushers and Pullers)

Electronic Speed Controllers

Power Distribution Board

Accelerometer sensors

Gyroscopic sensors

Quadrotor frame

Screws and Nuts

Transmitter *

Receiver *

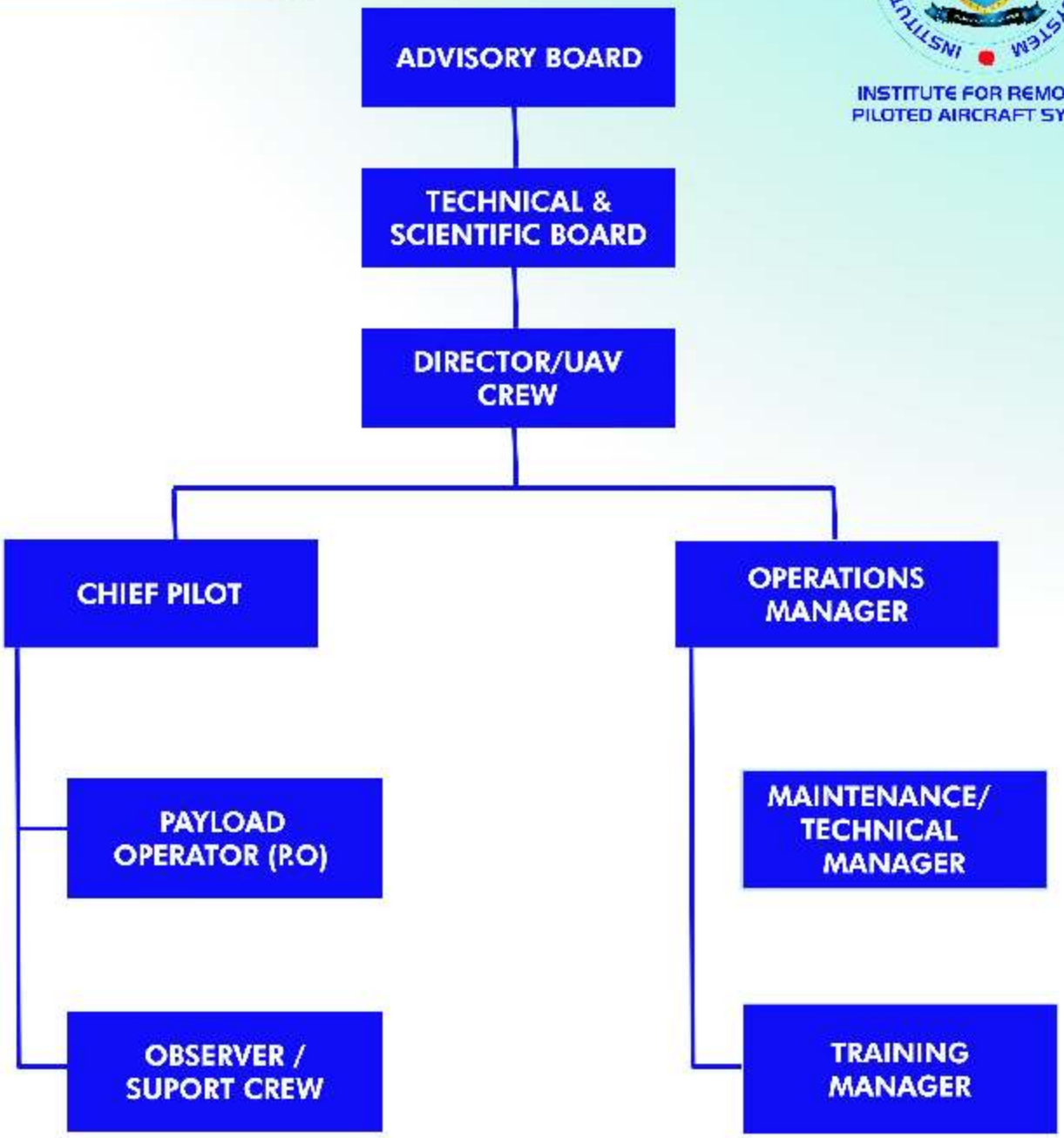
Working tools *

All the above components would be provided during the program to participants in groups of 10 but would be taken back at the end. This is being done to reduce the cost of the program and make it affordable for students who do not want to buy the take-away kit.

Take-away kit consists of all the above items excluding the items marked with *.

ORGANIZATIONAL STRUCTURE

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM



Accountabilities & Responsibilities

Accountabilities of CEO/Director

The Director UAV has the overall responsibility. The Director UAV (with approval of the CEO) will provide the necessary resources so that all operations and maintenance can be conducted to meet company obligations, goals and objectives whilst maintaining rule compliance, safe operations and a safe workplace.

- Ensuring that I-RPAS air operations are conducted in compliance with the NCAA rules and regulations.
- Maintaining a record of licenses, route qualifications held by each UAV Pilot and crew member.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

garuda robotics Singapore

THE INSTITUTE FOR DRONE TECHNOLOGY New Zealand

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

Partners

SKYE BROWSE

TECHNOLOGY AGAINST CRIME (TAC)

TERRA DRONE

Zambia FlyingLabs

INTERNATIONAL AVIATION COLLEGE ILORIN

Nigeria FlyingLabs South West Hub

VTO LABS- USA

CANARD

THE INSTITUTE FOR DRONE TECHNOLOGY

garuda robotics Singapore

New Zealand

- Monitoring operational standards & maintaining training records.
- For the running of I-RPAS's UAV business performance, rule compliance and safety management.

Responsibilities of Chief Pilot

The Chief Pilot for I-RPAS is responsible for:

- Allocating of work rosters.
- Maintaining a system to record UAV workloads in compliance with the I-RPAS Operations Manual.
- Ensuring compliance with UAV payload as specified for each UAV type used by the operator.
- Monitoring and supervising the training and checking of UAV pilots' documentation.
- Conducting proficiency tests.
- Maintaining a complete and up-to-date reference library of operational documents.
- Allocating appropriate aircraft

Responsibilities of Maintenance Controller

The technical/maintenance manager is responsible for maintaining operational capability of the UAV used by I-RPAS, in accordance with the manufacturer specifications. Responsibilities include:

1) Coordinating UAV maintenance routines.
2) Ensuring logs and records are maintained and up-to-date.
3) All maintenance manuals are current and in date and in accordance with the manufacturer.
4) Carrying out aircraft firmware updates.

Responsibilities of Remote Pilot in Command

The Remote Pilot is in command of the aircraft and has full responsibility for safe operation of the UAV whilst on operations. The RP must:

1) Take responsibility for the go/no go decision for each operation.
2) Ensure that all pre-flight procedures have been carried out.
3) Ensure that appropriate permissions have been obtained and NCAA regulations are adhered to.
4) Ensure that risk assessments have been completed and approved.
5) Define safe working areas and cordon if necessary.
6) Liaise with the crew, the client and the public before the flight and to provide comprehensive briefs ensuring that they understand the need to be compliant with requests or orders from the RP.
7) Wear protective personal equipment & high visibility equipment as necessary.

8) Adhere to site safety procedures as necessary.
9) Operate the UAV in a safe, responsible and professional manner.
10) Fill in all logs and documentation.

On completion, correctly shutdown the UAV and equipment and check the site to ensure all equipment is collected and the site is left as found.

Responsibilities of Camera Operators, Spotters and Others

To assist the RP with post-flight checks including

1) To carry out reasonable duties as requested by the RP.
2) To assist the RP in ensuring the aircraft payload is correctly set up and secure.
3) To assist the RP with pre-flight checks.
4) To operate the payload for the duration of the flight where required.

Spotter / Support Crew

1) To carry out reasonable duties as requested by the RP.
2) To remain under the control of, and in communication with, the RP at all times during flight, observing the airspace and public to facilitate the flight operation.
3) To inform the RP of any airspace intrusion or any issues with public entering the flight area.
4) To assist the RP with briefing and controlling crew members and the public.
5) To assist the RP with the preparation, checks and repacking of the UAV.

GENERAL OPERATING STANDARDS

FITNESS FOR DUTY

As a policy, I-RPAS shall ensure at all times that its personnel are fit for duty. I-RPAS shall ensure that personnel:

a) Do not exercise the privileges of their license at any time when they are aware of any decrease in their medical fitness which might render them unable to safely exercise the privileges of the license; and

b) Notify management or NCAA officials that they are becoming aware of any decrease in medical fitness or are under the influence of any psychoactive substance or medicines which might render them unable to safely exercise the privileges of the license.

c) Operator and Observers shall only deploy the UAS when rested and emotionally prepared for the tasks at hand.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

d) Physical illness, exhaustion, emotional problems, etc., seriously impair judgment, memory and alertness. The safest rule is not to act as an operator or observer when suffering from any of the above. Members are expected to "stand down" when these problems could reasonably be expected to affect their ability to perform flight duties.

e) A self-assessment of physical condition shall be made by all members during pre- flight activities.

f) Performance can be seriously hampered by prescription and over-the-counter drugs. The UAS Coordinator must be advised anytime such drugs are being taken. If it is determined that the medication being taken could hamper an operator or observer, that member shall be prohibited from the deployment or exercise.

g) No member shall act as an operator or observer within eight hours after consumption of any alcoholic beverage, while under the influence of alcohol, or while having an alcohol concentration of 0.04.

ALCOHOL CONSUMPTION

Remote Pilots or any other person involved in the operations of RPAS under the authority of this ROC shall not perform their duties whilst under the influence of alcohol. Alcohol must not be consumed less than 8 hours prior to RPAS operations or during any period of an operation. As a 'safety sensitive aviation activity,' operational person(s) working under the authority of this UOC may be randomly tested for alcohol and other drugs and are required to conform with any drug and alcohol testing requirements as directed by NCAA.

DRUGS AND MEDICATION USE

Remote Pilots or any other person involved in the operations of RPAS shall not perform their duties whilst having consumed, used, or absorbed any drug, pharmaceutical or medicinal preparation or other substance in any quantity that will impair their ability to perform their duties under the authority of this ROC.

All persons working under the authority of this ROC must not perform any task if their performance can be adversely affected by medication (prescription or non- prescription). It is their responsibility to advise the Chief Controller about any medication that they are taking that may negatively impact on their performance.

No person working under the authority of this ROC is permitted to perform any tasks whilst under the influence of illegal drugs.

Fatigue management

On completion of a Pilots basic UAV training, I-RPAS have noticed that many UAV Pilots become complacent with the basic rules and regulations leading to incidents stemming from very basic errors. To minimise complacency in UAV operations and maintain high standards of airmanship, I-RPAS UAV pilots will maintain periodic continuation training throughout their contracted period. Within this training I-RPAS UAV pilots complete revision on the basis of good airmanship, how to design maintain and implement checklists and how to conduct thorough risk assessments.

The acronym PAVED is use in the field, which is easily remembered forms the basis of our standard operational procedures.
Personal

I-RPAS UAV Pilots and staff should use the IMSAFE checklist, sleep, fatigue, travel to the work site, weather, currency and competency. You maybe current but are you competent? When was the last time you flew a UAV in high winds in Atti for example? The drone can manage, but can you?

Aircraft

Is your drone airworthy? Were you the last person to use it? Have you checked the tech log? Is the firmware up to date and have you tested it? Do you have sufficient batteries with you and charging facilities? How about a backup aircraft?

Environment

What's the weather like? Are you comfortable and experienced enough to fly in the forecast weather conditions? Have you considered all your options and left yourself an "out"? Are you comfortable with the type of flight paths available to you? Did you check NOTAMS? Are you at comfortable flying in this location? What about sources of RF interference?

External Pressure

Are you stressed or anxious? Is this a flight that will cause you to be stressed or anxious? Is there pressure to get the job done today? Is the client with you, do you have a Plan B? Are you being honest with yourself and others about your pilot abilities and limitations? Remember the potential for loss of equipment and I-RPAS reputation.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

Delay

Is your flight likely to be delayed due to client changes? How will this delay effect your flight? Has the contracted flight been delayed on site which can leads to fatigue, boredom and often battery management problems.

Transportation of Dangerous Goods

Lithium Battery Transport Rules and UAV Aircraft

Due to most I-RPAS Unmanned Aerial Vehicles being powered by Lithium Batteries, all I-RPAS UAV Pilots should be aware of the stringent transportation regulations applicable to the lithium batteries

These transportation regulations address the packaging, testing and size limitations (in Watt-hours and kilograms) of lithium ion batteries and UAVs (packed with lithium batteries). The rules also specify the number and size (in Watt-hours) of lithium batteries that may be carried on aircraft by passengers. Worldwide Aviation Authorities have proposed rules for small commercial UAV's. However, lithium batteries, are already stringently regulated as hazardous materials (also known as "dangerous goods"). Transport authorities around the world issue regulations that shippers of UAVs must comply with and that passengers must adhere to when carrying lithium ion batteries onboard an aircraft. Failure to comply with these regulations can result in significant civil penalties

If a I-RPAS employee or contractor is traveling with a UAV and spare lithium batteries, they must be aware that most International hazardous materials regulations strictly prohibit spare lithium batteries from being placed in checked baggage. In addition, lithium batteries carried on the aircraft by passengers generally may not exceed 100 Watt-hours. However, slightly larger lithium ion batteries exceeding 100 Wh, but not exceeding 160 Wh, may be carried onboard the aircraft with the approval of the airline. No more than two of these slightly larger lithium ion batteries may be carried on the aircraft
When a UAV is going to be transported by either sea, air or land it is always advisable to check with the appropriate authority

REMOTE PILOT ADMINISTRATION

Remote Pilot qualifications

All Remote Pilots working under the authority of the ROC must hold a valid UAV Controllers Certificate or a Remote Pilot Certificate issued by NCAA or other regulatory /training agency for the type and rating of UAV being operated on behalf of the company.

Required Qualifications

All UAV pilots must be appropriately qualified & certified for the aircraft they are operating and they should only operate in accordance with their license (Remotely Piloted Aircraft Operator Certificate (ROC). Pilots must have completed training on the use of the UAV, to ensure they are familiar with all settings and failsafe options.

Support crew when used, must be familiar with the appropriate sections within this Operations Manual, particularly the emergency procedures and the aircraft Quick Reference Handbook (QRH)(Appendix F1- F5). In addition, they must have been briefed by the Pilot in Charge before the first flight of the operation. Clients may be used to ensure the Pilot in Charge is not disturbed but must be briefed to follow the Pilot in Charge instructions during flight.

An NCAA approved UAV course is a minimum requirement that teaches you everything you need to know to become a proficient UAV pilot. These include: Ground School: The theory section of UAV training provides an understanding of the equipment that can be utiilised as well as safe UAV operation standards and knowledge of Nigerian air law. At the end of the Ground School, a theory exam is completed and needs to be passed prior to proceeding to the next stage of training.

Operations Manual: The most important document for licensed UAV pilots is the Operations Manual. This comprehensive document outlines how the UAV(s) will be utilised within a commercial capacity thereby complying with NCAA criteria. This document must and will be updated regularly in line with I-RPAS business requirements.

Drone Flight Test: The practical section of the training allows the individual to demonstrate the required skills to safely operate a UAV. These includes control of the UAV, completion of a real-world assignment scenario as well as carrying out all necessary checks and notifications just as you would on a commercial I-RPAS contract.

Every I-RPAS UAV pilot will be required to remain current at all times on the various types of UAV's that will be available for various tasks. Therefore, pilots will be expected to maintain flying skills currency through hands on flying with various UAV's that they may have access to or appropriately configured simulators.

The best way to track Pilot currency is through Ground Control Station (GCS) apps which record flight logs. An example of this is the DJI Go app that records and displays all flight history.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

To maintain currency, a pilot must have flown a SUA for more than 2 hours within the last 3 months with at least 15 minutes of that time within the Atti mode

Remote Pilot Operators (RPO) to maintain log books

The following logs and records should be kept to ensure compliance with NCAA permission to fly in terms of logging pilot and aircraft hours.

Pre-flight organisation:

1. The Initial feasibility and pre-deployment form (Appendix A) must be completed before an operation is approved. If the client is not the landowner then permission from the landowner must be obtained.

2. The Site survey and risk assessment (Appendix B) must be completed by the RPO. This includes site information and survey, operational details, risk assessment and permissions.

Pre-flight checks:

The pre-flight checklist (see azppropiate aircraft Quick Reference Handbook) should be followed before commencing each flight. Laminated checklists are available for use in operations.

During flight:

Guidance in the event of emergency is available in the emergency procedures section and in the QRH for use in operations.

Post-flight:

1. Follow the post-flight checklist (see azppropiate aircraft Quick Reference Handbook) to ensure that the aircraft is made safe, data checked and equipment correctly cleared away.

2. Complete pilot logbook giving details of flight times, purpose, UAS and incidents. Online logging is acceptable as long as it records the above details

3. The following records may also need to be completed or transferred on return to base or on site depending on the nature of the operation.

a. Battery log (can be online log)
b. Aircraft maintenance log, including any incidents or changes made to the UAS

c. Incident book (if in doubt, record it!)

Remote Pilots competency

NCAA guidelines and requirements
Certification procedure
An application for grant of a permit for aerial aviation services (PAAS) must be made in writing to the director general of the NCAA. The application should be signed by a person duly authorised by the applicant and submitted on or before a date no less than six months before the expected date of use of the PAAS.

FLIGHT CONDUCT

All flights must be authorised by the Chief Pilot

The Chief Pilot in conjunction with the UAV Coordinator must approve all projects and flights prior to the project being accepted, the UAV Coordinator will place a note on the task with proposed completion dates. (if possible allow 5-7 working days for planning and approval)

That the following paperwork is completed
Site survey
Risk assessment
Permissions granted
Pre – notification of UAV Flight

Allocating appropriate aircraft. On any operation, the aircraft chosen for the task must be of appropriate capacity. That is, it must be capable of carrying the load with sufficient power for the flight, appropriate backup batteries and have performance capabilities compatible with the operation in question. Certain categories of operation will require certain types of equipment. In the allocation task, the chief pilot should consider any special equipment required, or any maintenance that will fall due during the task. (For example, is the project scheduled during aircraft maintenance is due , a servicing arrangement needs to be put in place or an alternative aircraft used)

Persons permitted to operate RPA

Nigeria Drone Laws
Drone use is banned in Nigeria unless you have obtained a permit; RPAS Operators Certificate (ROC). Operators with a permit must ensure that they follow the following drone laws when flying in Nigeria,

To qualify for a permit / certificate, applicants are expected to undergo five phases.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

These are: Pre-Application, Formal Application, Document Evaluation, Demonstration & Inspection and Certification phases.
The RPAS Operators Certificate (ROC) should be carried on site during each authorized/approved operation.

Handover/takeover procedures

A hand over /take over procedure is required, when there are two controllers, to positively identify an action and ensure it is understood by the participants

Remote Pilot briefing including emergency procedures

Any support crew and, if appropriate, persons who are to be under the control of the Pilot in Charge (PiC) must be briefed on site. This should include final allocation of roles, a synopsis of the flight and emergency procedures. If persons under control of the PiC are to be overflown they must be made aware of what to do in the event of a loss of control of the aircraft.

(Emergency procedures appropriate to each UAS used by The Operator are contained within the Quick Reference Handbook for that aircraft)

Fire

The PiC must place the fire extinguisher/blanket in a safe, visible location near the take-off area. The only potential source of fire is the lithium-polymer flight battery and this is only likely in the event of impact damage. If the UAV is damaged in a crash, if possible the flight battery must be disconnected and removed and placed in an open area away from flammable objects. The battery should be monitored for swelling and the crew warned to stay clear. In the event of a fire, the extinguisher/blanket should be used to minimize spread of flame. If possible the battery should be allowed to burn itself out. Care should be taken as further cells may ignite and lithium-polymer batteries can burn very fiercely.

Incidents

In the event of an incident the PiC should follow the procedures below.
In the event of injury, the casualty is the priority. If necessary, emergency services should be contacted.

In the event of an incident causing injury or fatality:

a) Make the UAV safe by removing flight battery if possible
b) Administer first aid as necessary
c) Contact emergency services if necessary
d) Any injured person remains the priority until they are stabilized and if necessary paramedics have taken control
e) Take witness statements if appropriate
f) Photograph the scene to show position of the UAV

g) Ensure any footage is retained to show as evidence
h) Log the details of the accident and report as necessary

In the event of an incident where there is no injury:

a) Make the UAS safe by removing the flight battery
b) Monitor the flight battery for swelling
c) Take witness statements if appropriate
d) Photograph the scene to show the position of the UAV
e) Ensure any footage is retained to show as evidence
f) Log the details of the accident and report as necessary

After any accident or incident the PiC should ensure that all appropriate logs are completed and that, if appropriate, the incident is reported. No further flights should be carried out until the cause of the incident is established and any risk of re-occurrence is mitigated.

Use of checklists

All UAV's will be inspected by the PiC using the pre-flight and post-flight checklists before and after every flight. Routine maintenance will be carried out by the Technical Manager.
Maintenance regimes will be different for individual aircraft and are detailed in the Maintenance File in Section M of the QRH. Each QRH must have a maintenance regime that includes details for maintenance of the following, as a minimum:

- Airframe
- Lift surfaces and control surfaces
- Propulsion systems
- Payload
- Electronics
- Other systems appropriate to individual aircraft

Regular maintenance will be logged and parts replaced/repaired as appropriate
An example checklist is below

	Battery checks	Checked
	Check battery for damage or deformities	
	Check battery connections are clean	
	Check Phantom internal power connectors are clean	
	Check battery casing	
	Check inside battery compartment for damage and debris Check battery health using appropriate app	

	Airframe checks	Checked
	Confirm all screws are adequately tightened	
	Check airframe for cracks or damage	
	Check under motor mounts for hairline cracks (close observation)	
	Check landing gear is secure	
	Visually and gently tug chec k exposed wiring	
	Clean airframe if appropriate	

	Motor andpropeller checks	Checked
	Check motor screws are tight	
	Check for bearing movement (clicking when moving motor bell)	
	Remove propellers and run motors. Check there is no excessive vibrati on	
	Check motor bell for deformities	
	Check propellers for chips, stress lines and tip wear	

	IMU check	Checked
	Use the DJI Go App to check IMU calibration	
	Place the aircraft on a flat, stable surface and run advanced IMU calibration	

	Controland Video transmission system checks	Checked
	Check 4 antennae in landing gear are secure and free from bending or damage Check transmitter antennae for damage	
	Check all sticks and switches are secure and functional	
	Clean transmitter if necessary	

	Camera and gimbal checks	Checked
	Check rubber mounts and retainers	
	Check gimbal wiring	
	Check ribbon cables for damage	
	Check for resistance to movement when unpowered	
	Confirm gimbal self - stabilises fully when powered	
	Ensure camera lens is clean and free from dust	

	Vision positioning system checks	Checked
	Check and clean downward facing camera	
	Check and clean sonar sensors	
	Ensure connections to aircraft are secure	

Operating RPAS

The company is to provide detailed information

Source of RPAS Operating Instructions

Guidance has been given by the NCAA who have provided templates for the completion of Operational Manuals

RPAS Operational Library

I-RPAS have used the following URL for RPAS Operational Library
https://www.ncaapublications.com/s-13-Manuals.aspx T

Precedence of Manuals

If differences exist between the manufacturer's instructions and company operational or maintenance procedures, the manufacturer's procedures will be followed unless the company procedure provide a higher safety standard.

If any person conducting operations under the authority of this ROC identifies a difference between company and manufacturer's procedures, the difference must be reported to the Chief Pilot / Maintenance Controller (as appropriate).

RPAS Serviceability Prior to Operation

Pre-flight and post flight checks are mandated for all operations. The Remote Pilot must record the completion of these checks on the Flight Log. All defects found in the RPAS must be recorded on the Defect/ Maintenance Log.

The Remote Pilot must ensure that all defects or outstanding maintenance actions detailed in the Defect/Maintenance Log have been addressed prior to operation of the RPAS.

Method of Recording Hours in Service and Defects

The company is to provide detailed information (no detail information was provided)

Maintenance Control of RPAS

All RPAS operated under the authority of this ROC will be operated under the maintenance control of I-RPAS. Each RPA operated under this ROC will be identified as in Schedule 1.

INTERNAL TRAINING

The training requirements for those persons working under the authority of the ROC include consideration of their general training needs with regards to this Operations Manual, RPAS equipment, and specific operational activities that the person will be involved in, such as:

- night time operations
- operations within controlled airspace
- operations above 400ft AGL
- BVLOS operations.

Persons Permitted to Conduct Training

Persons Permitted to Conduct Training

I-RPAS training manager and appropriate staff will actively train its staff in safety requirements and procedures required for UAV operations and will retain a record of all internal and external training conducted.

NOTE:

All pilots must be appropriately trained, qualified and certified for the aircraft they are operating and operate only in accordance with I-RPAS ROC. Pilots must have completed training on the use of current UAV equipment, to ensure they are familiar with all settings and failsafe options.

Support crew, when used, must be trained and be familiar with the appropriate sections of the Operations Manual, particularly the emergency procedures and the aircraft QRH and must have been briefed by the PiC before the first flight of the operation.

Equipment to be loaded onto the UAV should be carefully attached in line with the manufacturer's guidelines and the training received into the different configurations of the UAV

I-RPAS are going through the process of getting an ATO (Approved Training Organization) License from the NCAA which will then enable I-RPAS train non-qualified UAV pilots.

Record Keeping

The following logs and records should be kept to ensure compliance with NCAA permission to fly in terms of logging pilot and aircraft hours.

Pre-flight organisation:

1. The Initial feasibility and pre-deployment form (Appendix A) must be completed before an operation is approved. If the client is not the landowner then permission from the landowner must be obtained.

2. The Site survey and risk assessment (Appendix B) must be completed by the PiC. This includes site information and survey, operational details, risk assessment and permissions.

Pre-flight checks:

The pre-flight checklist (see appropiate aircraft Quick Reference Handbook Appedix) should be followed before commencing each flight. Laminated checklists are available for use in operations.

During flight:

Guidance in the event of emergency is available in the emergency procedures section and in the QRH for use in operations.

Post-flight:

1. Follow the post-flight checklist (see appropiate aircraft Quick Reference Handbook Appedix) to ensure that the aircraft is made safe, data checked and equipment correctly cleared away.

2. Complete pilot logbook giving details of flight times, purpose, UAS and incidents. Online logging is acceptable as long as it records the above details

3. The following records may also need to be completed or transferred on return to base or on site depending on the nature of the operation.

a. Battery log (can be online log)
b. Aircraft maintenance log, including any incidents or changes made to the UAS
c. Incident book (if in doubt, record it!)
b. In some cases, flight records can be synced from the UAV that has completed the flight with an online UAV data

Remote Pilot Induction Training Requirements

I-RPAS Induction is a one day assessment that is specifically aimed at evaluating your core skills in operating a UAV safely and legally.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

I-RPAS training department team will covers the basic yet essential knowledge of your drone system.

Topics covered include:

- Aircraft overview
- Aircraft setup
- Aircraft controls
- Emergency procedures
- Deployment procedures
- Simple aircraft manoeuvres
- Flight modes – explaining GPS and ATTI (Attitude)

This introduction to drone operation is suitable for both fixed wing and multi-rotor drone systems and is for UAVs weighing up to 20kgs.

Remote Pilot Type Conversion Training Requirements

Remote Pilots who have not completed training on a particular type of RPAS must complete RPAS type training prior to their involvement in any commercial operation conducted under the authority of this ROC

Remote Pilot Training for Specialized Operations

Training requirements for specialized operational activities (e.g. night time operations, BVLOS, etc.,) will be developed by the Chief Pilot as required. Details of the training syllabus, delivery methods, course outline and training materials will be detailed in the 'RPAS Operational Library'.

OPERATIONS

Limitations and Conditions

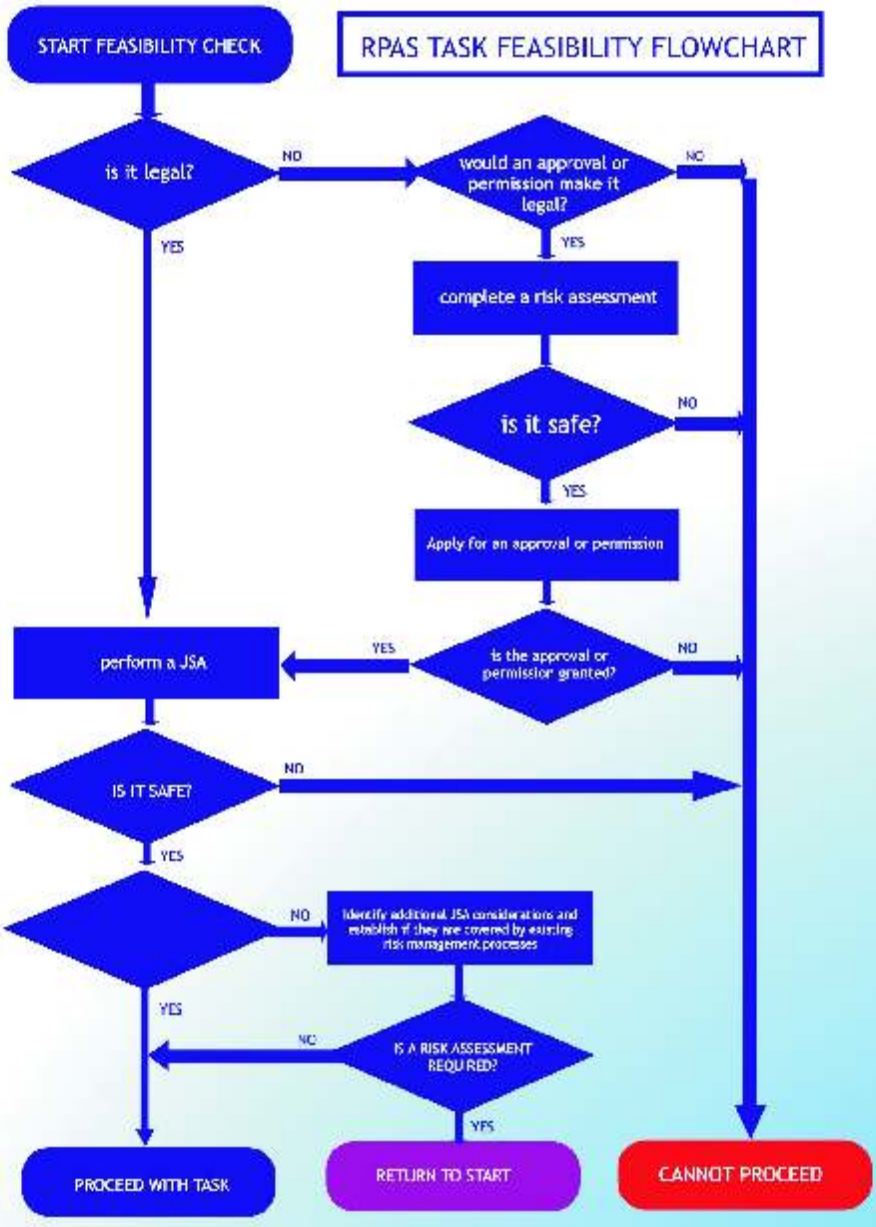
All operations must be carried out within the limitations and conditions as detailed in the operations manual, the RPAS Operational Library, or any other permission, exemption or approval issued by NCAA.

Feasibility Check and Job Safety Assessment (JSA)

Before a task can be carried out a feasibility check must be performed to ensure it is within the scope of the ROC.

The flow chart below represents the process to be followed to determine if a task may proceed. A number of boxes indicates there are steps to consider. The corresponding steps are listed below.

A red box indicates the task cannot proceed.



INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

Legality of operations

The first step of the feasibility process is to determine whether the operation can be conducted legally. Consideration should be given to all applicable Federal, State, Local or aviation related legislation.

I-RPAS Operators must ensure that they follow the following drone laws when flying in Nigeria. Further information on the Legality of operations must be gained when operating in any other host countries

- Do not fly your drone over people or large crowds
- Respect others privacy when flying your drone
- Do not fly your drone over airports or in areas where aircraft are operating
- You must fly during daylight hours and only fly in good weather conditions
- Do not fly your drone in sensitive areas including government or military facilities. Use of drones or camera drones in these areas are prohibited

	Commercial Use
Pilot Requirements	• Must have Remote Pilot Airman Certificate • Must be at least 16 years of age • Must pass TSA (what does TSA stand for?) vetting process
Aircraft Requirements	• Must be less than 55 lbs • Must be registered if it weighs more than 0.55 lbs • Must undergo pre-flight check for safe operating conditions
Location Requirements	Class G airspace
Operating Rules	• Must keep aircraft in line of sight at all times • Must remain under 400 feet
	• Must fly only during daytime
	• Must fly at or below 100 mph • Must always yield right of way to manned aircraft
	• Must not fly over humans • Must not fly from a moving vehicle

Approvals, Permissions or Exemptions

Pre-flight organisation:

The Initial feasibility and pre-deployment form (Appendix A) must be completed before an operation is approved. If the client is not the landowner then permission from the landowner must be obtained.

The Site survey and risk assessment (Appendix B) must be completed by the PiC. This includes site information and survey, operational details, risk assessment and permissions.

Before commencing any operation, the PiC must be satisfied that all relevant permissions have been obtained. The landowner's permission should be obtained. It is best practice to inform neighbouring landowners which may be done via the client. It is also best practice to inform owners of any land that may be overflown during the operation.

The following information should be made available

- up-to-date PFCO for The Operator
- insurance details
- a Quick Reference Handbook (QRH) for each type of UAS

Perform a Job Safety Assessment (JSA)

A JSA is a formal process to identify the dangers of specific job tasks in order to reduce the risk of injury to workers. It involves breaking down the steps of performing a job, identifying hazards at each step, and creating controls to keep workers safe while performing that task. Before a task can be carried out a feasibility check must be performed to ensure it is within the scope of the ROC.

Validation of the JSA

Legality of operations - Establish if the process of the operation can be conducted legally. Consideration should be given to all applicable Federal, State, Local or aviation related legislation

A JSA should be accomplish each day and submitted to the Chief Pilot or Person in Charge (PiC), By performing JSAs for each job or process and updating your staff and client employees on a regular basis, providing them with easy access to their findings is essential to generating greater awareness of safety risks.

Risk Assessment

A risk assessment is required for any risk that has not been adequately mitigated by existing risk control measures and procedures. If an assumption made in the initial JSA is no longer valid, or the Remote Pilot identifies a new risk, these matters must be considered and detailed in the JSA.

If the Remote Pilot is unable to mitigate the risk using an existing company procedure, a Risk Assessment must be completed in accordance with Appendix 8 of this manual.

A full JSA must be completed using the procedure in appendix B. This should be as specific to the site as possible. Whilst there is always a degree of acceptable risk, this should be minimized to ensure the operation is as safe as possible. Some risks (e.g. weather) cannot be accurately established until the day of

operation and it is the responsibility of the PiC to ensure that the flight(s) can be carried out safely. If the PiC does not feel it is possible to carry out the operation safely, they must postpone the operation until it can be carried out.

If the operation is carried out in a public place or involves complex flight manoeuvres or people beyond the control of the PiC then an appropriate observer must be used who is familiar with the Operations Manual and Job Safety Assessment systems employed by The Operator. The role of the observer will be directed by the PiC and will depend on the circumstances of the operation.

The Site survey and risk assessment (Appendix B) must be completed by the PiC. This includes site information and survey, operational details, risk assessment and permissions

Threat and Error Management

Despite having sophisticated UAV, and even having "auto pilot", GPS, "Auto Return To Home", and even automated takeoff and landings...as the PIC (Pilot in Command) you have responsibility is to the public, the UAV, the crew and my co-workers, equipment you fly and use.
Threat and Error Management are errors that are defined as actions or inactions that:

- Lead to a deviation from crew or organisational intentions or expectations
- Reduce safety margins; and
- Increase the probability of adverse operational events on the ground and during flight.

You can then breaks it down to three main areas operation:

- Internal Threats
- Internal really means the relation of our personal flying part and the results and actions of the UAV in the air, or ground
- External Threats/Environmental
- External Threats are much more common, such as power lines, buildings, antennas and obstacles that for most will be a cause for concern
- The environmental are areas such as wind, turbulence, rain and low visibility that affect us, at the time of flying.
- The Human errors
- Probably the biggest single factor of the safety. An example is client pressure to keep flying "just few more minutes to get the right shot" while the battery level of our drone goes down to our reserves (35%), or the request to fly closer then the allowed 30 meters of separation. Pressure from clients, is a major part of the human errors that might occur

Try and deal in a safe and simply manner with the risk highlighted above.

- Look for potential threats and environment factors that may affect your work.
- Find ways to minimise the risks you have identified
- Implement the risk mitigation for a safe outcome.

Normal and Non-normal Operations

Normal Operations

This ROC manual applies to all personnel involved in the safe operation of UAS. It is intended that The Operator will use UAS commercially, in accordance with the operating procedures detailed in this ROC and the safety procedures of any client the service is provided to. Commercial UAS services will be tailored to the client's needs whilst at all times making sure The Operator operates within the limitations of the Permission given and the rules of the air detailed in the relevant NCAA documentation and adequate insurance is in place to cover the activities carried out

Non-normal Operations

Any work outside of Normal Operations needs to be inserted as an amendment, such for flying during the hours of darkness or Low Light Operations

Specialised Operations

Specialised operations (SPO) means any operation where the UAV is used foR specialised activities where appropriate UAV licences must be obtained - such as:

- Security Services
- Training Services.
- Consultancy Services.
- Procurement and delivery.
- Staff proofing.

Operations within 3NM of aerodromes

During the completion of the site survey and risk assessment it should be established if the operation falls into an Air Traffic Zone (ATZ) or is in proximity to an aerodrome or military installation. If necessary, the relevant ATC, authorities and the Police should be contacted to prevent issues during the operation

Operations near towered aerodromes

If you determine your location is legal for drone operations but is within the vicinity of an airport, then you should contact Air Traffic Control / Tower who should be able to speak to you about drone operations.
The airport manager or employee will likely be interested in the following information:

- Where you will be operating (address or latitude/longitude)
- The altitudes at which you will be flying (below 400 feet above ground level)
- What type of flying activity you will be doing
- The number of aircraft and a basic description of the aircraft
- When you will be flying and for how long
- Your name and a method of contacting you such as a cell phone number or radio frequency

Airport management may not say the drone operation is approved, but all that is required is notification for drone operations to take place. If the airport says the operation may be unsafe or that they disapprove it, you should fly in another location where you do not need the airport's approval or where the airport operator states would be acceptable.

Operations in the approach or departure paths of an aerodrome

Operations over the movement area of an aerodrome

Permission from the airport but it is best to stay clear of all airports

Operations at night, in cloud or in conditions other than Day VMC

An amendment the ROC stating that you wish to include Night flying in the Ops Manual. Headings such as the following must be taken into consideration.

- Low Light Operations
- An Overview
- Adequate Ground Lighting
- Ground Safety
- UAV Lighting
- Flight Paths
  - Ascend vertically up to Point A.
  - Move to Point B on a straight course.
  - Return to Point A on a straight course.
  - Descend and land or if required move to Point C on a straight course.
  - Return to Point A on a straight course.
  - Descend and land

Operations above 400ft AGL

An Operational Safety Case (OSC) will need to be submitted to the NCAA on each area that you will fly above 400ft

Operations beyond visual line of sight (BVLOS)

An Operational Safety Case (OSC) will need to be submitted to the NCAA on each area that BVLOS will be flown

Operations over a populated areas

If the operation is carried out in a public place or involves complex flight manoeuvres or people beyond the control of the PiC then an appropriate observer must be used who is familiar with the Operations Manual and risk assessment systems employed by The Operator. The role of the observer will be directed by the PiC and will depend on the circumstances of the operation.

If operating under a standard PFCO; people, vessels, vehicles or other structures within 50m must be under the control of the PiC. How this control is established will depend on the operation.

Operations near other airspace users

Maintain the correct separation and that the aircraft frequencies do not interfere with each other

Operations in restricted or prohibited airspace

Permission must be obtained from the correct Authority

Operations near people

Within 50 meters of any person, vessel, vehicle or structure that is not under the control of the person in charge of the aircraft, except during take-off and landing this distance may be reduced to 30m

Over or within 150m of a group of people or an organised assembly of more than 1,000 persons

Accident/Incident Reporting

Following the Operations Manual procedures correctly is the best method of ensuring a safe operation. Whilst incidents cannot always be prevented, the risk of accident and injury can be minimized through thorough preparation and risk assessment. Flight crew must also be fully familiar with the emergency failsafe mechanisms of each UAS.

In the event of an incident the PiC should follow the procedures below.

In the event of injury, the casualty is the priority. If necessary, emergency services should be contacted.

In the event of an incident causing injury or fatality:

1. Make the UAS safe by removing flight battery if possible
2. Administer first aid as necessary
3. Contact emergency services if necessary
4. Any injured person remains the priority until they are stabilized and if necessary paramedics have taken control
5. Take witness statements if appropriate
6. Photograph the scene to show position of the UAS
7. Ensure any footage is retained to show as evidence
8. Log the details of the accident and report as necessary

In the event of an incident where there is no injury:

a) Make the UAS safe by removing the flight battery
b) Monitor the flight battery for swelling
c) Take witness statements if appropriate
d) Photograph the scene to show the position of the UAS
e) Ensure any footage is retained to show as evidence
f) Log the details of the accident and report as necessary

After any accident or incident the PiC should ensure that all appropriate logs are completed and that, if appropriate, the incident is reported. No further flights should be carried out until the cause of the incident is established and any risk of re-occurrence is mitigated.

Incidents

Any significant incidents that occur during an operation must be recorded in the event log as well as the pilot logbook. If necessary, incidents must be reported to the NCAA using the guidance indicated in there Mandatory Occurrence Reporting. It is important that all incidents that occur during flight are logged and if necessary reported to the NCAA.

Incidents that are likely to need reporting include "any incident which endangers or which, if not corrected, would endanger an aircraft, its occupants or any other person"

Any occurrence relating to the UAS operation that resulted in injury or the potential of injury to crew members, client or members of the public should be reported. Any occurrence resulting in a collision or near miss with another aircraft should be reported.

Following the Operations Manual procedures correctly is the best method of ensuring a safe operation. Whilst incidents cannot always be prevented, the risk

of accident and injury can be minimized through thorough preparation and risk assessment. Flight crew must also be fully familiar with the emergency failsafe mechanisms of each UAS.

The PiC has full responsibility for carrying out operations safely. If at any time the PiC is in doubt, the operation should be halted until the risk is acceptable, regardless of pressure from the client or time constraints.

Safety of the public, client and crew is paramount and must not be compromised in any way.

Post-flight:

Follow the post-flight checklist (see aircraft QRH) to ensure that the aircraft is made safe, data checked, and equipment correctly cleared away.

Complete pilot logbook giving details of flight times, purpose, UAS and incidents. Online logging is acceptable as long as it records the above details

The following records may also need to be completed or transferred on return to base or on site depending on the nature of the operation.

a. Battery log (can be online log)
b. Aircraft maintenance log, including any incidents or changes made to the UAS

Dropping or Discharging Items

No pilot in command of a UAV may allow any object to be dropped from that UAV in flight that creates a hazard to persons or property. However, this does not prohibit the dropping of any object if reasonable precautions are taken to avoid injury or damage to persons or property.

Hazardous operation.

No person may:

- Operate a small unmanned aircraft system in a careless or reckless manner so as to endanger the life or property of another; or
- Allow an object to be dropped from a small unmanned aircraft in a manner that creates an undue hazard to persons or property.

Dangerous goods

All I-RPAS UAV staff should be aware of the stringent transportation regulations applicable to transportation

These transportation regulations address the packaging, testing and size of UAVs (packed with lithium batteries). The rules also specify the number and size batteries that may be carried on aircraft by passengers.

Worldwide Aviation Authorities have proposed rules for small commercial UAV's. Stringently regulated rules of hazardous materials (also known as "dangerous goods"). Transport authorities around the world issue regulations that shippers of UAVs must comply with and that passengers must adhere to when carrying hazardous material onboard an aircraft. Failure to comply with these regulations can result in significant civil penalties

If a I-RPAS employee or contractor is traveling with a UAV, they must be aware that most International hazardous materials regulations strictly prohibit spare hazardous material batteries from being placed in checked baggage.

When a UAV is going to be transported by either sea, air or land it is always advisable to check with the appropriate authority

Use of Radio

If appropriate, communications should be maintained with local Air Traffic Control (ATC). It is best practice to notify the ATC before the operation and after all flights are complete.

Communications with crew members will normally take place face to face. If the distance between crew members is too great to facilitate this, an appropriate and legal two-way radio system must be used.

RPAS Training School

Institute for Remotely Piloted Aircraft System Training Institution

I-RPAS is in the certification process to become a NCAA Approved Training Organisation (RPAS) that can supply UAV both commercial/recreation pilots licenses up 25KG - refer to Institute for Remotely Piloted Aircraft System Training Manual.

Maintenance Control Procedures

Maintenance Programming

Scope of Maintenance

UAS will be inspected by the PiC using the pre-flight and post-flight checklists before and after every flight. Routine maintenance will be carried out by the Technical Manager.

Maintenance regimes will be different for individual aircraft and are detailed in the Maintenance File in Section M of the QRH. Each QRH must have a maintenance regime that includes details for maintenance of the following, as a minimum:

- Airframe
- Lift surfaces and control surfaces
- Propulsion systems
- Payload
- Electronics
- Other systems appropriate to individual aircraft

Regular maintenance will be logged and parts replaced/repaired as appropriate

Maintenance to be in Accordance with Schedules

The PiC has full responsibility for supervising UAS operations.
The PiC should ensure that the Operation Checklists (Section B3 and QRH) are used at appropriate stages of operations to ensure that all steps are followed.

Variation of Maintenance Schedules

If operational experience identifies that the existing maintenance schedule is deficient, the Maintenance Controller will vary the maintenance scheduling to ensure the ongoing reliability of the RPAS. The Maintenance Controller must not allow the maintenance schedule to be less onerous than the manufacturer's specifications. All variations of the maintenance schedule will be recorded in the relevant RPAS section of the RPAS Operational Library. The Maintenance

Controller will review each schedule periodically to ensure the most current instructions are in use

'On Condition' Maintenance

Drone Maintenance Checklist

maintaining your drone properly can help you maintain your drone and avoid unnecessary failures as drone maintenance is key to your flight safety.
Visual Inspection
Inspect the outer shell and other components for damage..

- Check condition of propellers before and after every flight. Make sure there are no bent blades or cracks.
- Inspect the gimbal for damage and camera lens for dust or dirt.

Battery

- Read the Intelligent Flight Battery Safety Guidelines.
- Use a fully charged battery. If a battery is idle for a long time, its performance might be affected.
- Do not allow the battery to come into contact with liquids. This will lead to permanent damage.
- Don't remove or install the battery from the aircraft when it's turned on.
- Check the status of the battery in the software being used to fly the UAV
- Don't charge the battery right after a flight because the battery's temperature may be too high.
- After charging is complete, disconnect the battery from the charger.
- Examine the charger regularly for damage to the cord , plug, enclosure or other parts. Never use a damaged charger.
- Fully charge and discharge the battery once every three months to maintain battery health.
- Pre-heat your battery if temperature temperature is lower than 10°C(50°F). Inspire 2 Intelligent Flight Battery features auto heating.
- If you fly in high temperatures above 40°C(104°F), keep an eye on battery temperature. If the battery's temperature get higher than 65°C(149°F), land your drone immediately.

Transportation

- Store the battery in a specified transportation box/bag before the transit to avoid damage from external forces. Do not store a battery with metal components.

Remove batteries from the aircraft when stored for an extended period. Discharge the battery to 30% before transit. If the battery needs to be carried onto the plane, discharge it to 5% of its total power.You can set your batteries to self-discharge in DJI GO app.

- Attach the gimbal clamp when storing your drone. This will effectively help to avoid any damage to your gimbal.
- If you transport your drone a long way, it's a good idea to re-calibrate your compass before flying again.
- Remove your propellers when you transport your drone Storage

Store the aircraft in a dry, cool and non-magnetic place to avoid any damage.

- When the aircraft and the battery will be stored for more than 3 months, store in around 25°C(77°F) and avoid direct sunlight.
- Discharge the battery to 40% to 65% prior to storage. Storing a battery with full power or low power for a long time may lead to permanent damage.

Follow these tips will help you properly maintain your drone. If you find this helpful, please share this article with other drone pilots

The company is to provide detailed information

Minimum Requirements for Maintenance Schedules

BEFORE & AFTER EVERY FLIGHT

Check condition of props (run finger along leading and trailing edges, flex both blades to check for hairline cracks);
Check motor shafts have no free play (missing E clip? Loose bell housing screw? Bad bearings?);
Check motors move freely when spun by hand;
Check condition of battery spade connectors and data pins (level, free movement, clean);
Check camera mounts are secure (and any other attachments);
When powered up and idling confirm no unusual noise or vibration from motors.

EVERY WEEK or EVERY 10 FLIGHTS, WHICHEVER SOONER

Visual inspection of shell and other components for cracking/damage (landing skids, camera mounting plates, etc.);
Check tightness of motor retaining screws and shell retaining screws
Clean battery contact pads with alcohol and swab or proprietary electrical contact cleaner and cycle spring pins several times to check for spring weakness and full unimpeded travel;
Check batteries for number of cycles and discharge per suppliers recommendations if required.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

EVERY MONTH or EVERY 40 FLIGHTS, WHICHEVER SOONER

Remove upper shell and check state of all wiring - plugs fully seated, condition of all solder joints, condition of visible circuit boards and wiring runs, internals generally clean and no debris/loose items.

Maintenance Procedures

Maintenance Instructions

See Quick Reference Handbook (QRH) for each aircraft

Repair or Replacement of Components

Firmware/Software Updates

Firmware and associated flight software will be updated in line with manufacturer recommendations. Updates will be checked monthly. Firmware updates will be overseen by the Technical Manager. After updates, the aircraft will be flown at a test location to ensure that any updates have not affected the operational performance of the aircraft. The Technical Manager will ensure that all pilots are aware of changes caused by firmware updates. All firmware updates will be logged in the AML

Maintenance Authorisation

Maintenance Personnel to be Authorised

The UAV operator would be able to approve an individual or company who meets minimum competency standards to perform maintenance on the UAS used by the operator, including, for example, satisfactorily completing the maintenance training course provided by the UAV manufacturer.

- UAV licence holder
- An approved maintenance organisation
- the manufacturer of the UAS or associated product
- A competent individual authorised by the UAV operator

Remote Pilot Maintenance Authorisation

Maintenance on the UAV requires the highest standards of maintenance. UAV's in categories 0-7kg or 0-20kg would all have similar maintenance requirements as carried out on the checklists

The UAV operator would be able to approve an individual or company who meets minimum competency standards to perform maintenance on the UAS used by the operator.:

If a major defect is found that is out of his expertise during the checklist in the QRH or as stated in 6.1.5, then would be the operator's responsibility to authorise the correct maintenance supplier

Defects

It is the responsibility of the PiC to ensure that the UAS is in a fit state to fly. All defects should be recorded in the appropriate log. Depending oin the severity of the defects the UAV should be marked that it is not serviceable and unfit to fly and stored in an appropriate place

Recording of Defects and Maintenance

Recording and Logs of the previous operation should be checked in advance to ensure that no repairs or servicing need to be carried out. The checklist in the aircraft QRH should be used to ensure the equipment has been fully checked prior to commencing the operation.

It is the responsibility of the PiC to ensure that the UAS is in a fit state to fly. This will include checking that batteries are correctly charged for the UAS, laptop and photographic equipment and that the correct equipment is brought to the site

Any defect should be reported to the PiC who should ensure that all appropriate logs are completed and that, if appropriate, the defect is reported. No further flights should be carried out until the cause of the defect is established and any risk of re-occurrence is mitigated.

Flight Log

The flight log should be examined for any unusual occurrence and if found to be of should be investigated

Flight Tests

See section F7 of appropriate QRH

SCHEDULE 1 - RPAS Operating Types

I-RPAS - Appendix

Appendix A Pre-Site Briefing Operation Information Documents
Appendix B- Site Survey, Risk Assessment and Final Check Sheet
Appendix C Flight Logs
Appendix D: Spare
Appendix E Spare etc.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

COURSE OUTLINE:

A TURNKEY RPAS LEARNING MANAGEMENT SYSTEM

DEVELOPED BY:- partners

Zambia FlyingLabs

TECHNOLOGY AGAINST CRIME (TAC)

TECHNOLOGY AGAINST CRIME IN AFRICA

Nigeria FlyingLabs South West Hub

SKYE BROWSE

SKYE BROWSE

IAC

INTERNATIONAL AVIATION COLLEGE ILORIN

TERRA DRONE

VTO LABS- USA

CANARD

COURSE OUTLINE:

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

Zambia FlyingLabs

TECHNOLOGY AGAINST CRIME (TAC)

TECHNOLOGY AGAINST CRIME IN AFRICA

Nigeria FlyingLabs South West Hub

SKYE BROWSE

INTERNATIONAL AVIATION COLLEGE ILORIN

TERRA DRONE

VTO LABS- USA

CANARD

MODULE I: GENERAL INTRODUCTION AND OVERVIEW OF THE COURSE

Introduction to key staff of the Institute
Introduction to the facilities
Introduction and brief background and aims of each student
Overview of the course, what will be happening each day
Overview of expectations in terms of course completion, attendance and examinations
Introduction to course materials
A chance for you to ask any questions.

Module 2: AIRSPACE, CHARTS AND OTHER AERONAUTICAL PUBLICATIONS (THEORY TRAINING)

Topic 1. Airspace
(a) Classification of airspace
(b) Airspace depiction on aeronautical charts
(c) Airspace in relation to the circumstances in which an aeronautical radio qualification is required

Topic 2. Obtaining information or approval Permissions for RPA operations in restricted areas (a) Aeronautical Information Publications
i. Aeronautical Information Publication Supplements (AIP SUP)
ii. Aeronautical Information Circulars (AIC)
iii. Enroute Supplement Nigeria (ERSA)

Topic 3. NOTAMs
(a) Obtaining NOTAMs for operational areas
(b) Decoding NOTAMs
(c) When is a NOTAM required?
(d) Submitting a NOTAM for publication

Topic 4. Form of the Earth, Aeronautical charts and maps
(a) Features on an aeronautical chart (other than airspace)
(b) Cardinal and Ordinal points of the compass
(c) Latitude and longitude
(d) Distance on the earth and on charts
(e) Depiction of height and elevation on charts
(f) Magnetic variation
(g) Relationship between magnetic heading, relative heading and magnetic
(h) Electronic maps and charts

Module 3: BASIC AVIATION KNOWLEDGE FOR RPA.

Topic 1. Direction of flight and wind
(a) Expressing direction of flight
(b) Difference between aircraft heading and track

(c) Wind velocity
(d) The relationship between true and magnetic heading

Topic 2. Time

(a) UTC
(b) Converting local and standard time to and from UTC
(c) Time as a 4, 6 and 8 figure group

Topic 3. Units of measurement for aeronautics

(a) Differences between height, altitude and elevation
(b) Units of measurement for:
(c) Converting between different units of measurement

Topic 4. Energy

(a) Aircraft energy, including

Topic 5. Aerodynamics, weight and balance

(a) Terminology
(b) 'Bernoulli's principal', 'Coanda effect' and 'Newton's third law'
(c) Basic weight and balance principles

Topic 6. Lift and drag

(a) Changes to lift and drag resulting from:
(b) Types of drag, including:

Topic 7. Propellers and rotors

(a) Terminology:
(b) Propeller / rotor principles

Topic 8. Principles of Operation – Flight Control

(a) Longitudinal, lateral and vertical axes;
(b) Pitch, roll and yaw;
(c) Skid and slip;
(d) Effect of changes in power on vertical and horizontal speed;
(e) Relationship between control inputs and aircraft movements;
(f) Angle of climb and rate of climb;
(g) Trim controls

Topic 9: Principles of operation – remote pilot station (RPS)

(a) Features of a remote pilot station:

Module 4: ELECTRICAL AND ELECTRONIC SYSTEMS FOR RPA (THEORY TRAINING)

Topic 1 : Electrical Terms

(a) volts;
(b) amps;
(c) watts;

(d) ohms;
(e) hertz.

Topic 2. Function of electrical components

(a) electrical components of an RPA:
(b) equipment redundancy;

Topic 3: Electric motors

(a) Current draw through the motor in relation to rotor or propeller diameter or pitch; (b) Current draw through the motor in relation to rotor or propeller loads
(c) Determination of appropriate 'Kv'?

Topic 4 : Batteries

(a) types of batteries:
(b) battery specifications and abbreviations (types, voltage; amperage etc);
(c) characteristics of batteries used as an energy source for RPA:
(d) batteries classified as dangerous goods for air transportation.

Topic 5: Charging/discharging batteries

(a) charging procedures for batteries;
(b) discharging procedures for batteries;
(c) cell balancing in multi-cell batteries;
(d) state of the charge of a battery with reference to capacity and voltage;

Topic 6 : Battery limitations

(a) 'continuous C-rating' and 'maximum burst C-rating';
(b) trade-off between battery size and flight endurance of an electrically-powered RPA; (c) battery serviceability;
(d) battery checkers.

Topic 7

(a) radio waves
(b) characteristics of radio waves, wave propagation, transmission including:
(c) the radio frequency band ranges (MF, HF, VHF, UHF);
(d) effective range of transmissions;
(e) factors affecting the propagation of radio waves, including:
(f) radio antenna types, characteristic's, optimisation and shielding:
(g) digital and analogue signals;
(h) command and control link range testing;
(i) radio frequencies for RPA operations.

Topic 8 : Global Navigation Satellite System (GNSS)

(a) components of a GPS
(b) how GPS works, including accuracy of different systems
(c) factors that affect the performance of GPS, including the following:
(d) number of satellites available;
(e) path interference;
(f) electromagnetic interference (EMI);

(g) type of software;
(h) signal availability
(i) indications of faulty GPS equipment

MODULE 5: METEOROLOGY FOR RPA (THEORY TRAINING)

Topic 1. Weather phenomena

(a)Causes and effects of the following weather phenomena in relation to RPA operations:
(b)The meaning of symbols used on weather maps

Topic 2. Weather observations

(a)Indications of the presence of:

Topic 3 . Aeronautical forecasts

(a)Obtaining aeronautical forecasts for the area of operations
(b)Decoding an aeronautical forecast
Weather Abbreviations
Cloud Type abbreviations
Cloud Amount abbreviations
Weather Descriptors used in TAF, TTF, and ARFOR
Weather Descriptors used in TAFs
Weather Intensity Descriptors

Module 6: Human performance for RPA (theory training)

Topic 1. General

(a)Airmanship
(b)Differences between the sensory information available to a person operating an RPA compared to the pilot of manned aircraft
Situational awareness during RPA operations
Information processing and decision making in relation to the following factors The methods of enhancing decision-making skills

Topic 2. Basic health

(a) Medical and psychological factors that may affect pilot performance in relation to operating RPA:
i. an upper respiratory tract infection including colds, hay fever, congestion of air passages and sinuses;
ii. a headache, including a migraine;
iii. an injury ;
iv. ageing
v. dehydration
vi. Fatigue and Nigerian Regulatory Environment
Nigerian Regulatory Environment: Fatigue Management
vii. alcohol use and smoking
viii. drug use, including prescription and over the counter medications
ix. emotions, including anger, anxiety, depression and fear
x. spatial disorientation and illusions

(b) The main medical issues or conditions that may affect a person's ability to operate an RPA safely
Communicating effectively in an aviation environment

Module 7: RPA knowledge of operations and procedures (theory training)

Topic 1 General operations
(a) General considerations relating to:
(b)Responsibilities of the remote pilot:
(c) Considerations:

Topic 2 Risk assessment and management
(a) The strategic risk assessment process relevant to RPAS operations, including:

Topic 3 Airworthiness—general
(a) determine RPAS serviceability for a specific operation
(b) use of the RPA technical log;
(c) responsibilities of the holder of a remote pilot licence in relation to the continuing airworthiness of the RPA including:

Topic 4 Role equipment or sensors
(a) safety and performance implications of various payloads (including cameras and other sensors)

Topic 5 Accident and incident reporting
(b) requirements for accident and incident reporting mentioned in the Transport Safety Investigation Regulations 2003 and the Transport and Safety Investigation (Voluntary and Confidential Reporting Scheme) Regulation 2012.

Topic 6 Abnormal operations
(a) considerations in the event of the following:

Topic 7 Fail-safe procedures and emergency actions
(a) failsafe systems and emergency actions, including:

Topic 8 Operation of RPA near aerodrome
(a) considerations in relation to operating an RPA near an aerodrome:
(b) the prohibitions in Part 101 of NCAA relating to operating RPA at or near particular aerodromes and HLS;
(c) the process to obtain a permission, approval or exemption (however described) under NCAA in relation to operating an RPA at or in the approach and departure paths of a particular aerodrome;
(c) determining the runway or runways in use at an aerodrome; (d) traffic patterns at aerodromes;
(e) limitations on the operation of an RPA near an aerodrome if the aerodrome has more than 1 runway;

Topic 9 Operations of RPA above 400 FT AGL
(a) considerations relating to operations of an RPA above 400 FT AGL:

Module 8: Operation rules and rules of the air for RPA (theory training)

Topic 1. Aviation legislation and information

(a) Documents that contain aviation legislation, aeronautical information and general operating rules that apply to the operation of RPA;

(b) obtaining the documents and ensuring that the information is up-to-date. Topic 2 Remote pilot licence

(a) conditions that apply to a remote pilot licence under Part 101 of NCAA;

(b) other conditions that may apply to a remote pilot licence;

(c) conditions that apply to a certified RPA operator under Part 101 of NCAA.

Module 9 Part I: RPA that is a multirotor (theory training)

1. RPA components

(a) typical components of the RPA;

2. Weight and balance - launch and landing and recovery

(a) effects of changes to the following the performance of the RPA;

3. Aerodynamics – multirotor lift and drag

(a) aerodynamic properties of a rotor blade;

(b) Definitions of the following terms:

4. Aerodynamics - hovering

(a) definitions of the terms:

5. Aerodynamics – forward flight

(a) translational lift

(b) drag in forward flight

6. Principles of operation – flight controls

(a) Primary flight controls and how they effect the movement of a multirotor about its longitudinal, lateral and normal vertical axes, including:

(b) secondary flight controls – trim controls; (c) stabilisation;

(d) GPS hold

7. Aerodynamics – abnormal operations

(a) direction of rotation of a rotor and the implication of incorrect installation;

(b) effects on the operation of the RPA if a motor of the RPA fails to produce thrust 8. Launch

(a) advantages of launching the RPA into the wind;

(b) aerodynamic effects of wind shear and ground effect on the operation of the RPA 9. Climbing

(a) effect on climb rate and angle from changes in the following:

10. Turning

(a) banked turns;

(b) rotations or flat turns;

(c) limitations on steep turns;

II. Descents

(a) avoiding vortex ring state when operating the RPA (b) recovery actions to escape vortex ring state;

12. Landing and recovery

(a) advantages of landing and recovery into the wind; (b) considerations when landing and recovering.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

COURSES

- Remote Pilot's License
- Drone Safety for Managers
- Drone Induct

VERSATILITY AND ENDURANCE

Combining Vertical Takeoff and Landing with flying efficiency and endurance.

DRONE OPERATIONS CENTER

1. *Control room setting, where drone pilot operates alongside all other operators (call center, ground vehicle and personnel dispatch).*
2. *Common scenarios:*
   - *National-level Security Command Center*
   - *Logistics Hub Command Center*
   - *Tactical Operations Center*
3. *Suggested setup:*
   - *Size for TV wall + 2 pilot consoles: 4m x 6m room*
   - *High speed fixed broadband connectivity: min 100Mbps fiber (Singtel eVolve broadband recommended).*

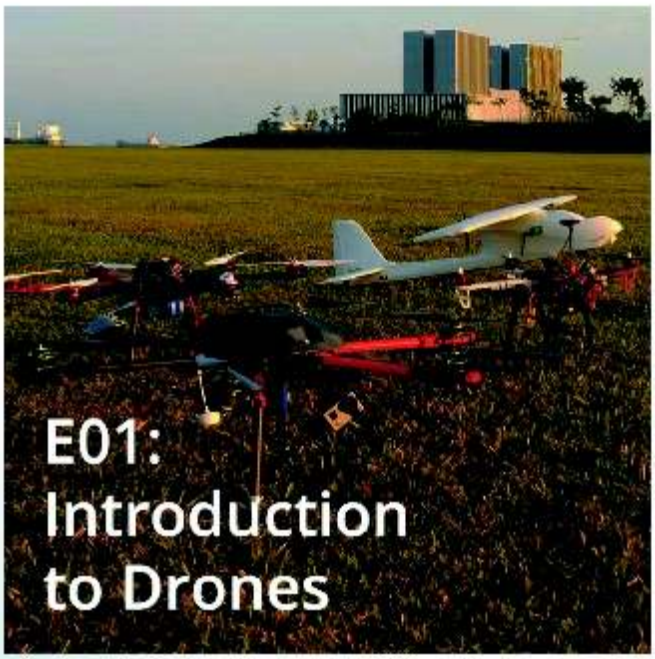
MOBILE DRONE OPERATIONS CENTER

1. *Vehicular setting, where drone pilot is part of the operations team deployed to site.*
2. *Common scenarios:*
   - *On-site Security Command Post*
   - *Ad-hoc Last-mile Dispatch Center*
   - *On-site Tactical Operations Center*
3. *Suggested setup:*
   - *Size for operations: 10 feet truck or van, or outdoors under canopy*
   - *4G LTE connectivity (Singtel 4G IoT network recommended).*

Drone Safety For Managers

This course is designed for people who will manage a workplace that includes drones, rather than necessarily for the pilots who operate the drones.

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM



INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

Construction

Safer way of taking close-up images for inspection of industrial structures.

Refinery Plants

Facilities management of large areas covered more quickly and cost-effectively.

Inspired by Excellence & Innovation

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

TRAINING CENTRE

INSTITUTE FOR REMOTELY PILOTED AIRCRAFT SYSTEM

OFFICE:

PLOT 239 P.O.W MAFEMI CRESCENT, BEHIND CHIDA EVENT CENTRE, BESIDE DAILY TRUST LTD, UTAKO DISTRICT, ABUJA -NIGERIA.

E-MAIL: info@irpas.org.ng

website: www.irpas.org.ng

TEL: +234 (0) 703 929 6332, +234 802 424 0099
+234 (0) 706 224 7581

...experience and innovation in security technological training.