DIGITAL SKY

UAVs : BOON FOR INDUSTRY, BANE FOR REGULATORS

The Industry is ready to take off, but needs regulatory clarity

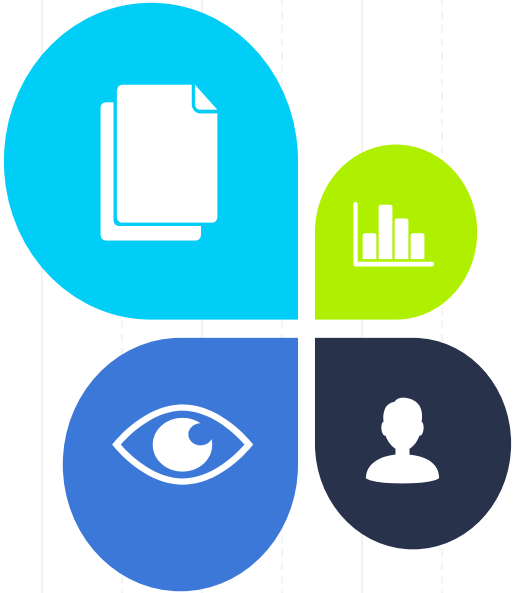
Regulators must encourage industry, but difficult to ensure safety, security & privacy

INTENSIVE PAPERWORK

The current proposed CARs would result in massive paperwork for each drone flown. Pain point for operators & regulators alike

LACK OF ENFORCEABILITY

Even with strict CARs, difficult to actually ensure that all UAVs are licensed and operating as per guidelines. Operators have greater incentive to skip permissions



INSURANCE INDUSTRY NEEDS DATA

Insurance mandated on large drone flight. But no data on UAVs, incident rates, etc. for fair pricing of insurance industry

PROXY PILOTS

No way to ensure that only licensed & trained pilots are operating as per the UAOP

AUTOMATE

The entire chain of permissions

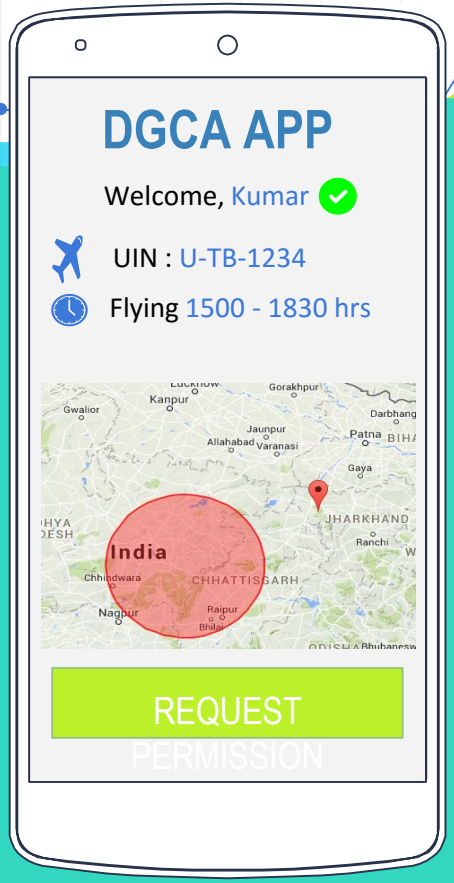
From registration of UAVs

To flying missions

Using Digital Sky APIs

FLIGHT PERMISSIONS ON APP

Making flying drones in India paperless, seamless, safe & secure for end-user as well as regulators



WHY DIGITAL SKY IS FUTURE PROOF

1

India will lead the world in building scalable civil aviation regulations

SALIENT BENEFITS OF DIGITAL SKY

No Paperwork

Workflow is entirely digital, with an appropriate rules engine, the permissions issuance can be completely automated.

No Permission, No Take-off

Minimized risk of unauthorized flights. Security agencies can set permanent as well as temp no-UAV zones.

Aadhaar Authentication of Pilots

Will prompt a reduction in proxy pilots, as legal liability will be on pilot who authenticated the flight

Reduced Turnaround Times

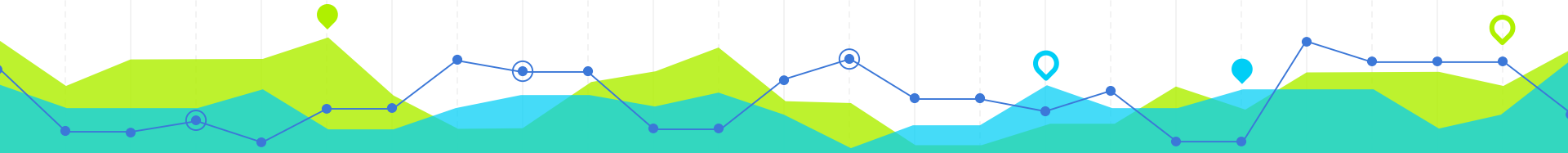
Dramatic reductions as authentication will be done via APIs, no need to manually verify documents.

Granular License Control

Can revoke or suspend the license of individual operators / pilots/ UINs and will result in no permissions

Automated Flight Plan Logging

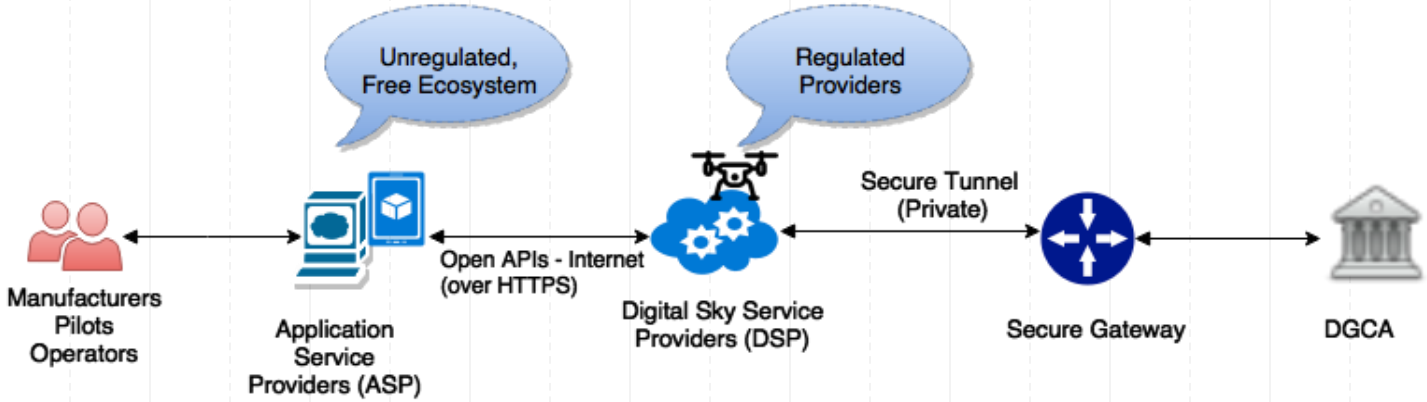
Lastly, all flight plans will be uploaded to check they were compliant with regulations. Any incidents can be reported via app.



Digital Sky Ecosystem

How innovation is fostered

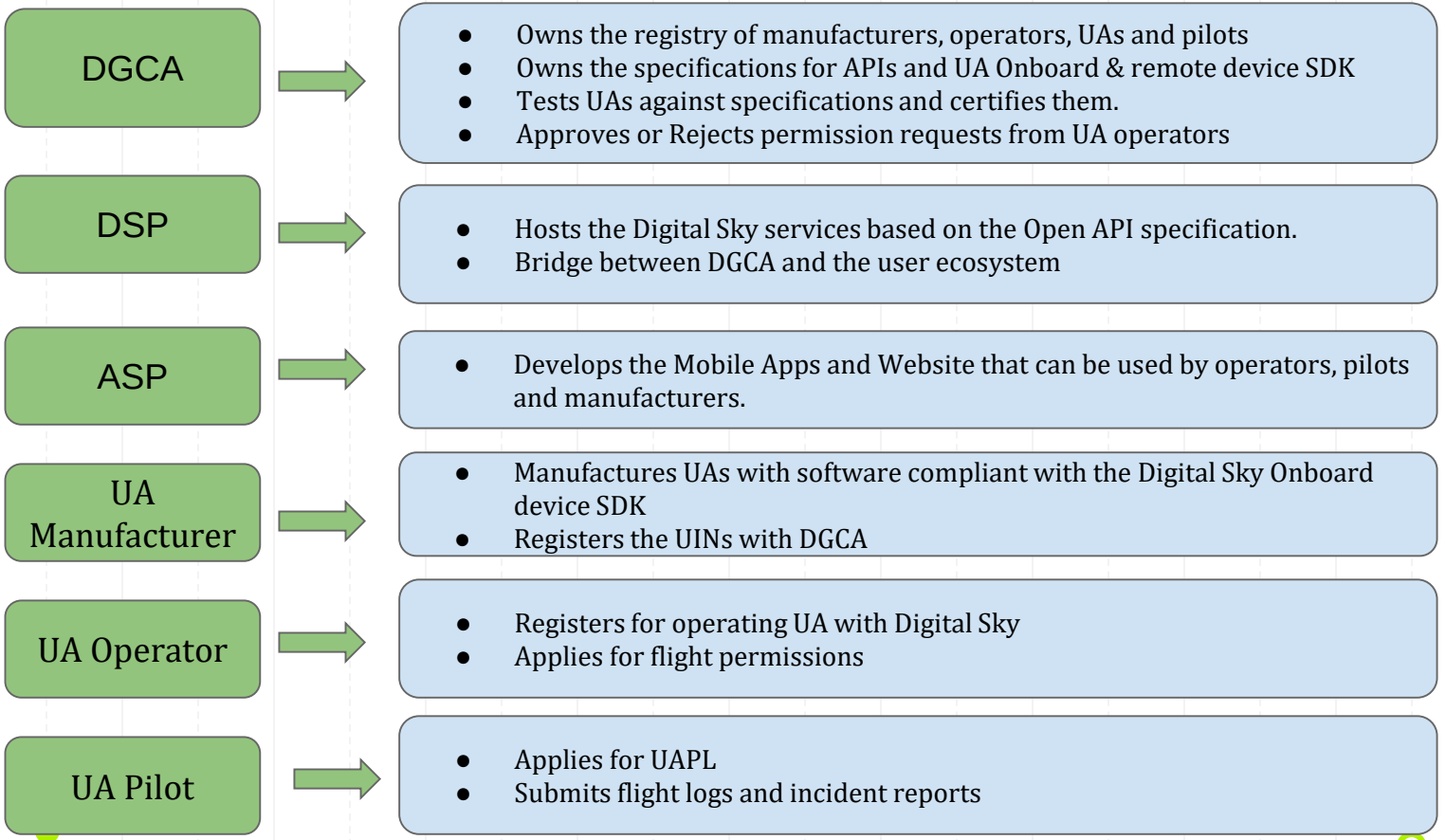
2



- To achieve rapid adoption and innovation in the UA ecosystem, a federated model of service access is recommended
- **Digital Sky Service Providers (DSP)** - the core services of the Digital Sky system - Permission, Registry etc. should be provided through DSPs
- **Application Service Providers (ASP)** - develop web or mobile applications that are leveraged by operators, pilots and other users of the UA ecosystem.

Digital Sky Ecosystem Architecture

Digital Ecosystem View



Process Flows

What we automate

2

OVERALL PROCESS

Pre-Flight

Online Registration of Operators, Pilots & UIN issuance

Take-Off

App-based permit request, UAV verifies Permission Artefact

Post-Flight

Logging of Flight Plans with DGCA, Incident Reporting

Pre-Flight

Online Registration of Operators, Pilots & UIN issuance

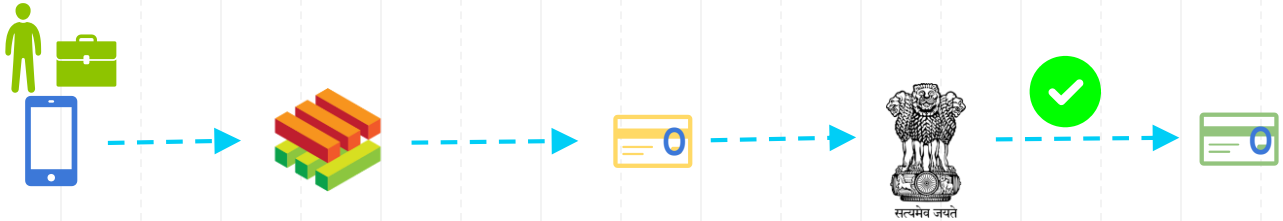
Take-Off

App-based permit req., UAV verifies Permission Artefact

Post-Flight

Logging of Flight Plans with DGCA, Incident Reporting

UNMANNED AERIAL OPERATOR REGISTRATION



Owners / Directors Fill Form on ASP App

e-Sign/GSTN for authentication & signing of self-declaration

Temporary Enrollment number issued

Sent to DGCA for Approval

Permanent UAOR Number issued

Pre-Flight

Online Registration of Operators, Pilots & UIN issuance

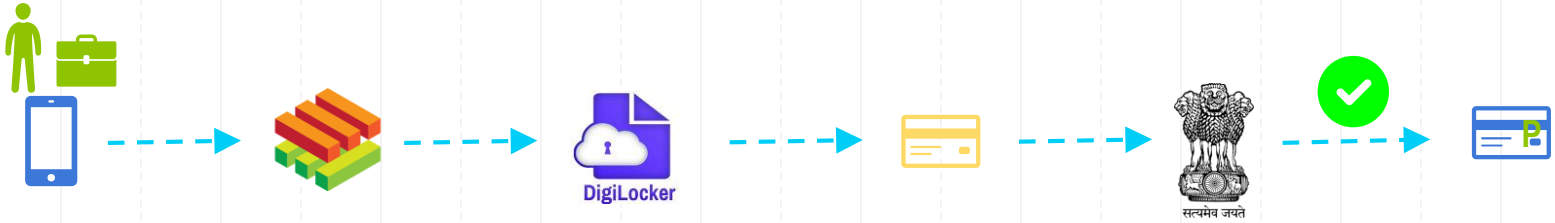
Take-Off

App-based permit req., UAV verifies Permission Artefact

Post-Flight

Logging of Flight Plans with DGCA, Incident Reporting

UNMANNED AERIAL PILOT REGISTRATION



Pilots Fill Form on ASP App

e-Sign/GSTN for authentication & signing of self-declaration

Digital Locker for Digitally signed Training Certificates

Temporary Enrollment number issued

Sent to DGCA for Approval

Permanent UAPL Number issued

Pre-Flight

Online Registration of Operators, Pilots & UIN issuance

Take-Off

App-based permit req., UAV verifies Permission Artefact

Post-Flight

Logging of Flight Plans with DGCA, Incident Reporting

REGISTERED MAKE FLOW

Manufacturers send details of UAV, Operating Manual, Technical Specifications

Testing of drones by DGCA

Stakeholders give other regulatory approval (WPC, etc) through digi locker

Make Registered with DGCA

U-AB-XXXX

UIN Series is issued. Manufacturer Produces compliant UAVs

Pre-Flight

Online Registration of Operators, Pilots & UIN issuance

Take-Off

App-based permit req., UAV verifies Permission Artefact

Post-Flight

Logging of Flight Plans with DGCA, Incident Reporting

REGISTRATION OF UIN

U-AB-XXXX

For Registered Make, Owners can Scan UIN on ASP App

AADHAAR

Permanent UAOR + Aadhaar for Authentication

Send to Digital Sky API for registration

UIN linked to UAOR

For Unregistered Make

Owner sends details of UAV, Operating Manual, Technical Specifications

Testing of drones by DGCA, WPC

U-AB-XXXX

DGCA Issues New UIN

Pre-Flight

Online Registration of Operators, Pilots & UIN issuance

Take-Off

App-based permit req., UAV verifies Permission Artefact

Post-Flight

Logging of Flight Plans with DGCA, Incident Reporting

SALE / TRANSFER / LEASE OF UAVs

U-AB-XXXX

Owner scans UIN on ASP App

Permanent UAOR + Aadhaar for Authentication of Buyer/Seller/Leasor/ Leasee

Send to Digital Sky API for registration

UIN linked to new UAOR

Pre-Flight

Online Registration of Operators, Pilots & UIN issuance

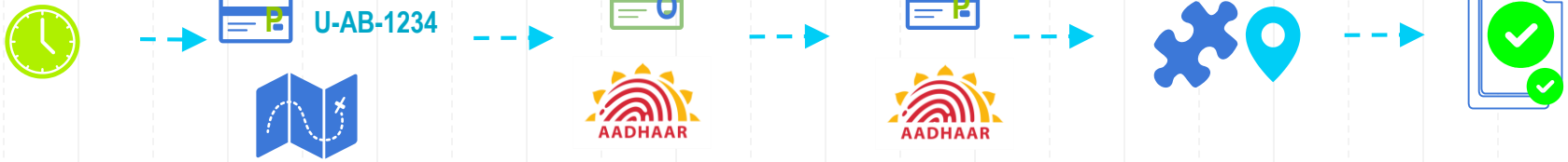
Take-Off

App-based permit req., UAV verifies Permission Artefact

Post-Flight

Logging of Flight Plans with DGCA, Incident Reporting

AUTOMATED PERMISSION ISSUANCE : PART 1



Owners must apply for Permissions

Submit UIN + Flight Plan + Pilot(s) Details

Permanent UAOR + Aadhaar for e-Signing of liability contract

Pilot e-Signs liability contract via Aadhaar

Send to Digital Sky API. Backend rules engine, checks against Geofences set up by security agencies

Receive Digitally Signed certificate, known as Permission Artefact

Completed online from smartphone only

Pre-Flight

Online Registration of Operators, Pilots & UIN issuance

Take-Off

App-based permit req., UAV verifies Permission Artefact

Post-Flight

Logging of Flight Plans with DGCA, Incident Reporting

AUTOMATED PERMISSION ISSUANCE : PART 2

Drones request for Permission Artefact before take-off

Verify if current location & flying height within allowed bounds of Permission Artefact.

Only take-off if all conditions are met.

If in-air, and geofence is crossed, drone must initiate return to home

Can operate offline based on smartphone-drone connection

Pre-Flight

Online Registration of Operators, Pilots & UIN issuance

Take-Off

App-based permit req., UAV verifies Permission Artefact

Post-Flight

Logging of Flight Plans with DGCA, Incident Reporting

FLIGHT LOGGING & INCIDENT SELF-REPORTING

Actual Flight Path is recorded in an open format (like XML)

Verify if flight parameters within allowed bounds of Permission Artefact. Generate Incident Report if not

In case of crashes or property damage, Pilot has option to tag & self-report incident via App

Pilot e-Signs flight path & incident report / no incident certificate via Aadhaar

Pre-Flight

Online Registration of Operators, Pilots & UIN issuance

Take-Off

App-based permit req., UAV verifies Permission Artefact

Post-Flight

Logging of Flight Plans with DGCA, Incident Reporting

SECURITY AGENCY DASHBOARD

FOR AUTHORIZED SECURITY AGENCIES ONLY

GEOFENCING

Agencies can implement temporary restrictions (for e.g. VIP movements) or permanent restrictions (e.g. Military bases).

GROUND ALL UINs OF MANUFACTURER

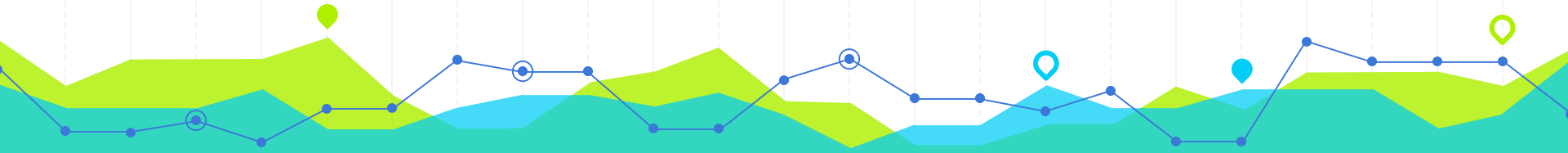
In case of a hardware bug, or security flaw, all drones of a particular make can be grounded.

GROUND ALL UINs OF OWNER/PILOT

Security Agencies can block the issuance of new Permission Artefacts for all UINs linked to a particular owner or pilot.

GRANULAR PERMISSIONS

Agencies can also allow flights of some classes/makes, while restricting others. For e.g. Allow Micro Fixed Wing drones in city parks, but not any others.



Architecture Overview

3

How we automate

Open Platform

Ecosystem Centric

Design for Scale

User Centric

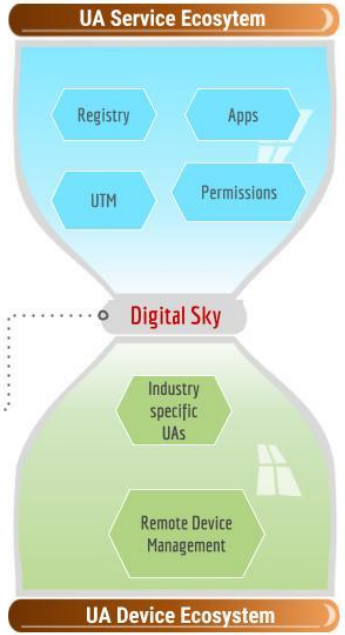
Universal Identity

- Minimal
- Standardized
- Simple design
- Easy to execute
- Easy to write a law

Privacy by design

IT ACT Compliant

- Digital Sky as a utility, an enabler
- Allows innovation on all sides
- Amplifies ecosystem players

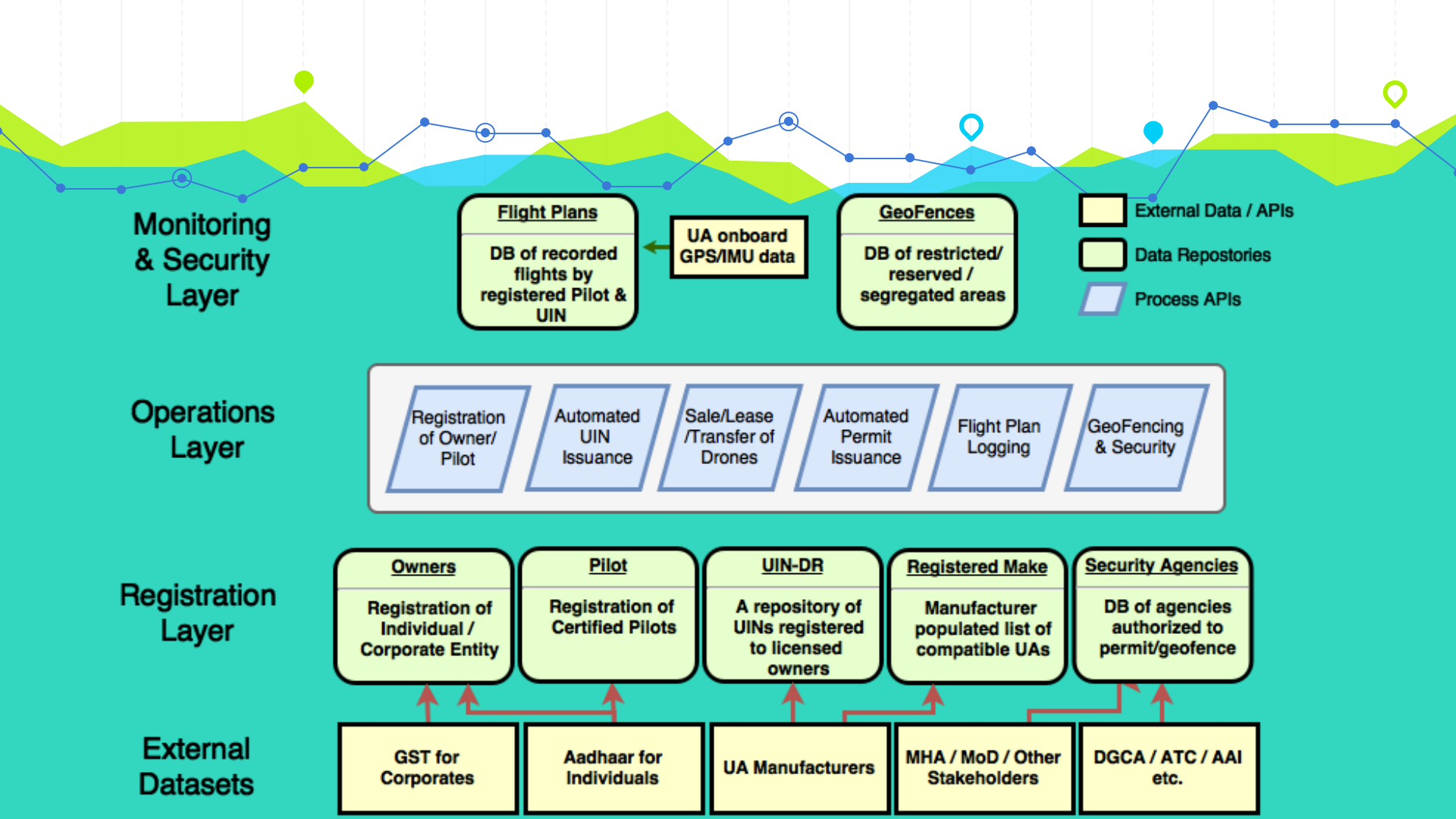


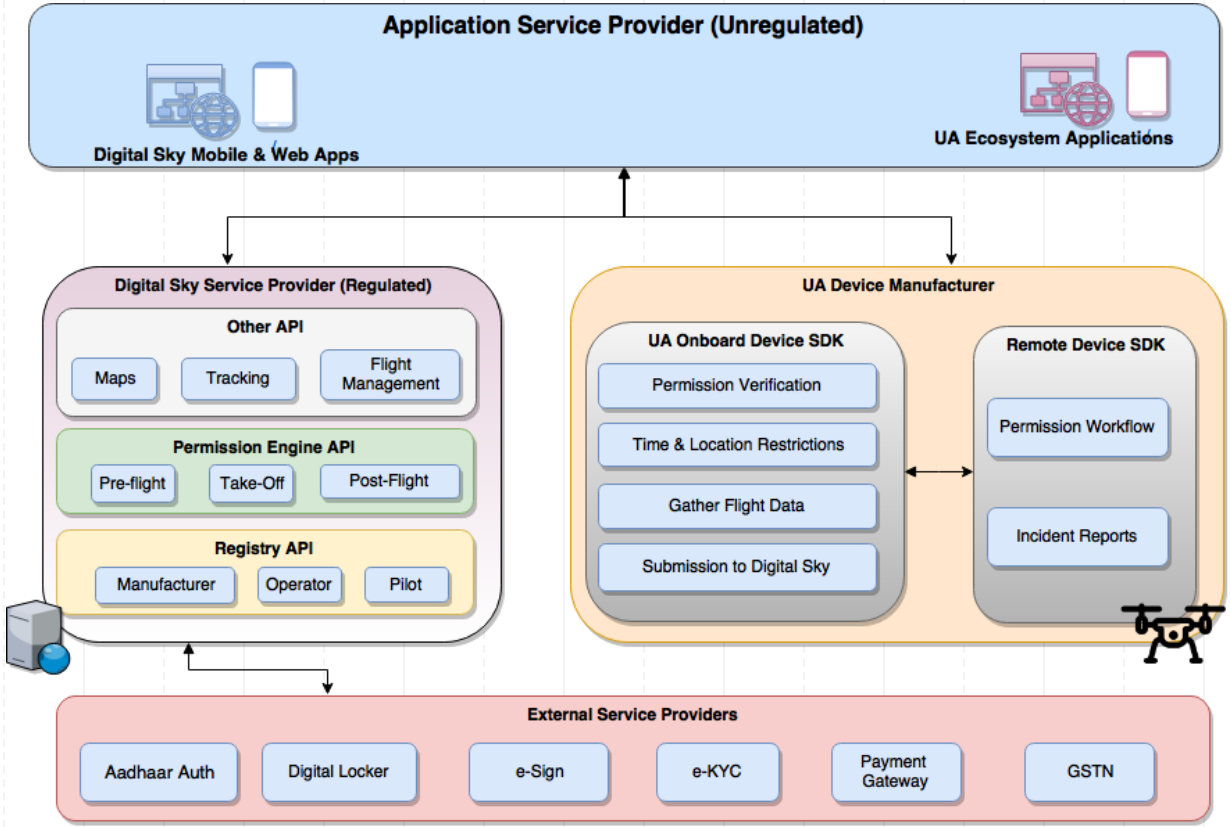
Secure by design

Granular Control

Evolutionary Design

Digital Sky has the “Hourglass” model for ecosystem innovation


Monitoring & Security Layer
Flight Plans
DB of recorded flights by registered Pilot & UIN
UA onboard GPS/IMU data
GeoFences
DB of restricted/ reserved / segregated areas
External Data / APIs
Data Repostories
Process APIs
Operations Layer
Registration of Owner/ Pilot
Automated UIN Issuance
Sale/Lease /Transfer of Drones
Automated Permit Issuance
Flight Plan Logging
GeoFencing & Security
Registration Layer
Owners
Registration of Individual / Corporate Entity
Pilot
Registration of Certified Pilots
UIN-DR
A repository of UINs registered to licensed owners
Registered Make
Manufacturer populated list of compatible UAs
Security Agencies
DB of agencies authorized to permit/geofence
External Datasets
GST for Corporates
Aadhaar for Individuals
UA Manufacturers
MHA / MoD / Other Stakeholders
DGCA / ATC / AAI etc.



Digital Sky Architecture Elements

CRITICAL STAKEHOLDERS

Manufacturers

Must be compliant with the Digital Sky & automated flight plan logging. Also, must implement security measures to ensure no permission, no take-off.

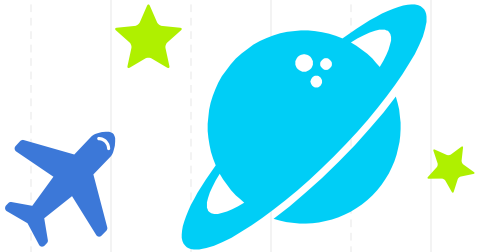
Can be managed with firmware upgrade only

Pilot Training Schools

Must issue certificates digitally that can be verified. Reputation scores of schools, based on logs, can be published as an incentive to prompt good behaviour.

Other Govt. Stakeholders

All departments concerned must allow for DGCA APIs/App to become the single window for clearances. They must adopt digital.



FIRST IN THE WORLD

To automate permissions. Will provide regulatory stability to innovators.

SUNRISE FOR UAV INDUSTRY

THANKS!

Any questions?

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