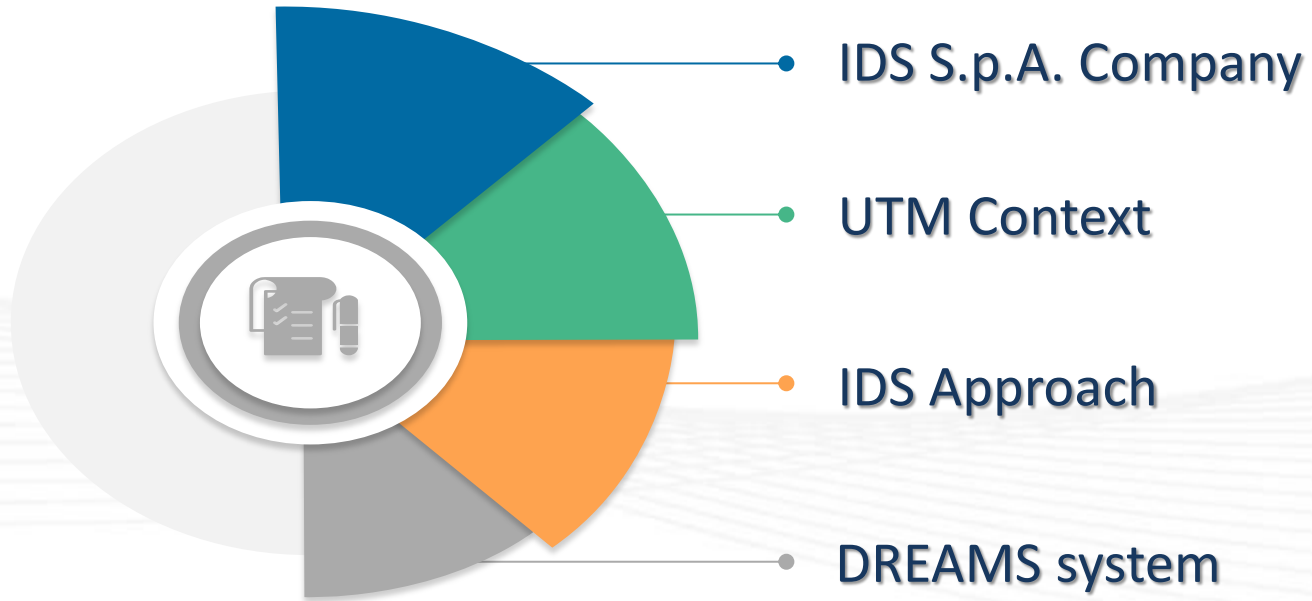


DREAMS – DRone Enhanced Airspace Management System

The IDS UAS Traffic Management approach

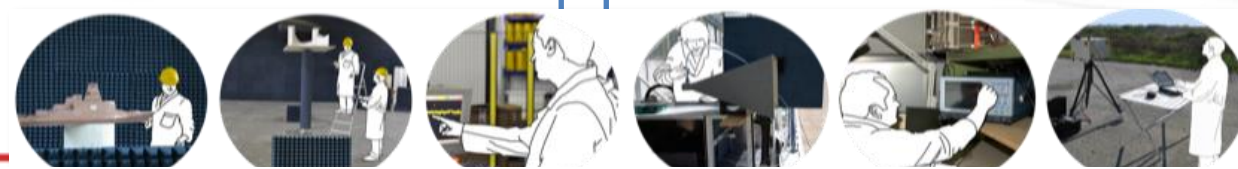




- Founded in 1980, is a system engineering and manufacturing company providing high technology solutions in selected defense and civil sectors
- Totally independent
- IDS HQ: Pisa (Italy)
- 5 Subsidiary worldwide

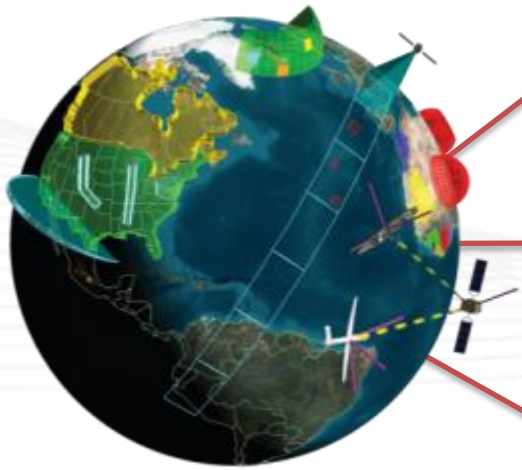






- IDS corporation totals more than 580 professionals, 75% with technical degrees
- IDS's Quality Management System certification - UNI EN ISO 9001:2015



Research & Development Laboratories, Technological support to divisions

IDS and its international companies support clients on every continent in different areas



and:
Indian MoD, French MoD, Turkish MoD, Korean ADD, Chinese MoD, Egyptian MoD

MoD, DoD,
Navies, Armies,
& Air Forces










Global
Industrial
Firms

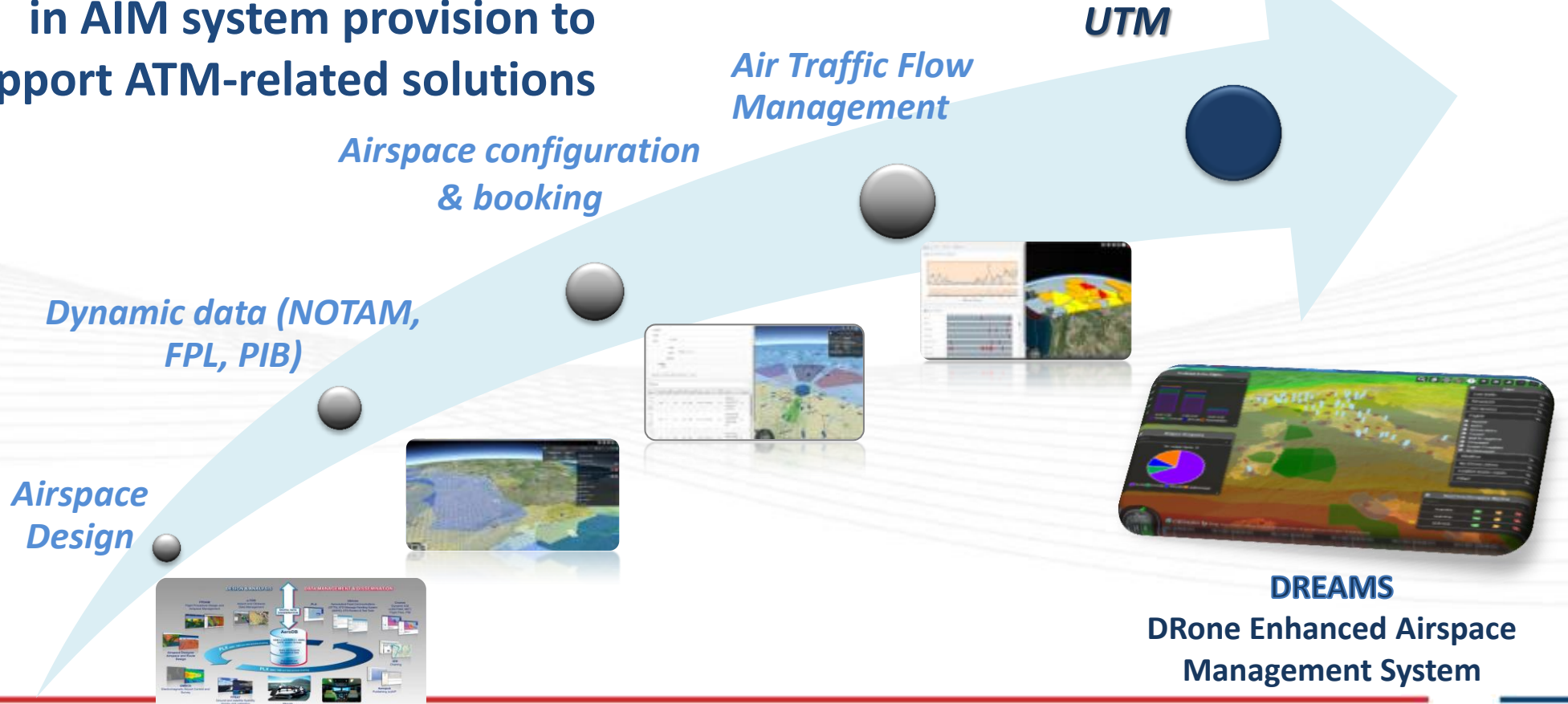






... 85+
ANSPs/CAA

More than 30 year experience
in AIM system provision to
support ATM-related solutions



SESAR 1 - Industrial Research and VLD DEMO

- Operational, Technical and Transversal project (e.g. **i4D Trajectories, Trajectory Management**, PBN procedures, Verification & Validation, **Service Modelling, SWIM**).
- EUROCONTROL subcontractor for Digital NOTAM and Digital Briefing.
- **INSuRE Project**: RPAS Integration into non-segregated ATM

SWIM DEMO and Master class

- IDS **SWIM-service provides** a web GUI to request Flight Plans and Weather data to WFS and WCS services (2015)
- Global Demo - IDS Service allows distributing **Digital NOTAM** messages to interested clients (2016)
- xNOTAM system (**D-NOTAM** airspace closure following volcanic ash event) (2012)

SESAR 2020

- **RPAS Project**: Surface operations by RPAS; IFR RPAS Integration
- **ASM/DCB Project**: Management of Dynamic Airspace configurations; Integrated Local DCB Processes
- **AIM/AIM Project**: Static Aeronautical Data Service; Aeronautical Digital Map Service; AIM Information Services

SESAR UTM

- SESAR2020 RPAS EXPLORATORY RESEARCH - RPAS-02 - Drone information management: **DREAMS Project (Drone European AIM Study)**
- SESAR RPAS EXPLORATORY RESEARCH - RPAS-01 CONOPS – **CORUS** Project Leded by EUROCONTROL IDS (as UAS manufacturer) in the Advisory board

CONTEXT MATTERS

- Thousands of drones already in operation
- Significant increase forecasted for the next few years
- Great market potential in multiple sectors

BENEFITS



- reduction of human exposure to risky work operations
- new services and business opportunities
- efficiency
- employment opportunities

ISSUES

- Safety, security, privacy, data protection, environment

SOLUTION



- Infrastructure to enable and safely manage UAS operations in low-altitude airspaces

- Reconcile safety constraints, coming from ATM domain and requirements and challenges of drone industry
- Allow safe and efficient integration of *large scale drone traffic* into low altitude airspace
- Overcome existing constraints and limitations on airspace access
- Reach the full exploitation of potential of UAS operations making them cost effective and operationally feasible
- Key enabler for the implementation of BVLOS operations and autonomous operations and services

Drone
Regulations
& standards

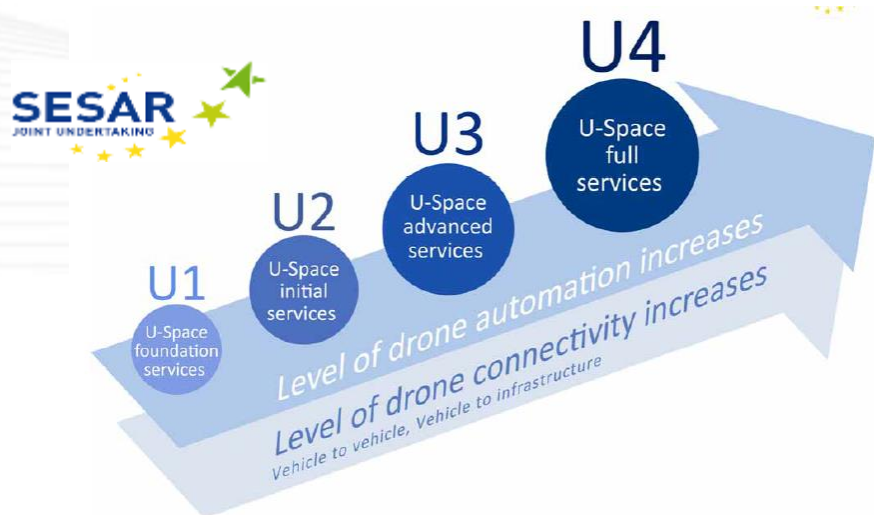


sUAS capabilities & technological
maturity

UTM services and
enabling infrastructure



- Development of DREAMS system: a fully web-based solution to contribute to the stepwise implementation of UTM services in line with U-space concept
- Basic capabilities for short term implementations (drones registration, no-fly zone service, ...)
- Enhanced capabilities to collaborate with stakeholders to define and validate new operational concepts and requirements



UTM Challenges

Rising **number** of aerial vehicles (sUAS)

Low altitude **CNS, tracking and surveillance**

UTM stakeholders: **role, responsibilities, procedures**

Great variety of drones (MTOW, size, performance) and **mission needs**

Limited capabilities to carry **heavy or power intensive equipment**

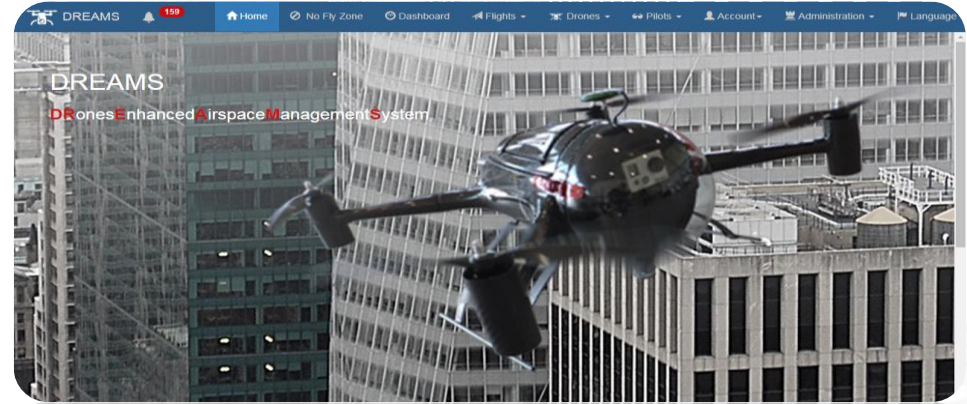
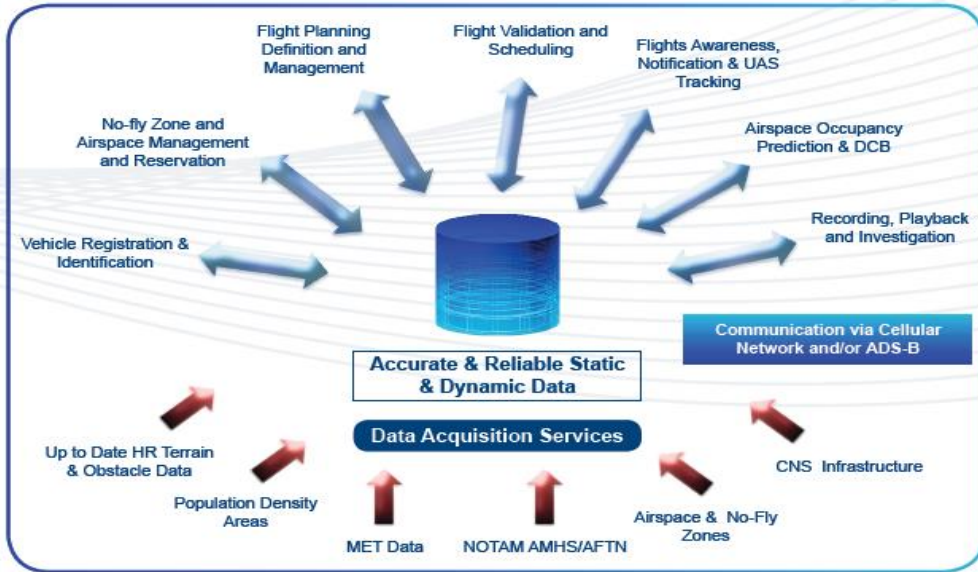
Suitable services for provision of **up to date reliable data**

Standard definition

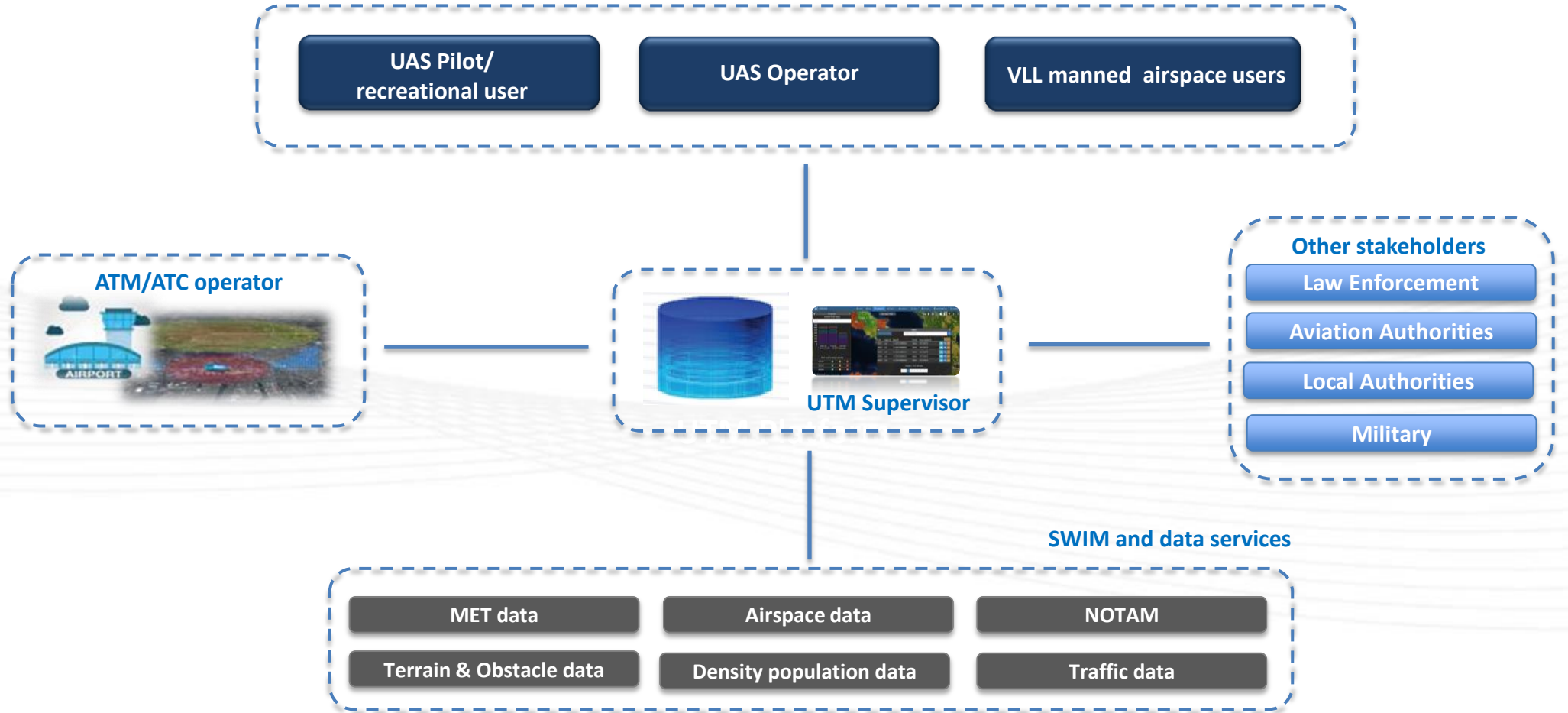
Separation standards and **contingency management**

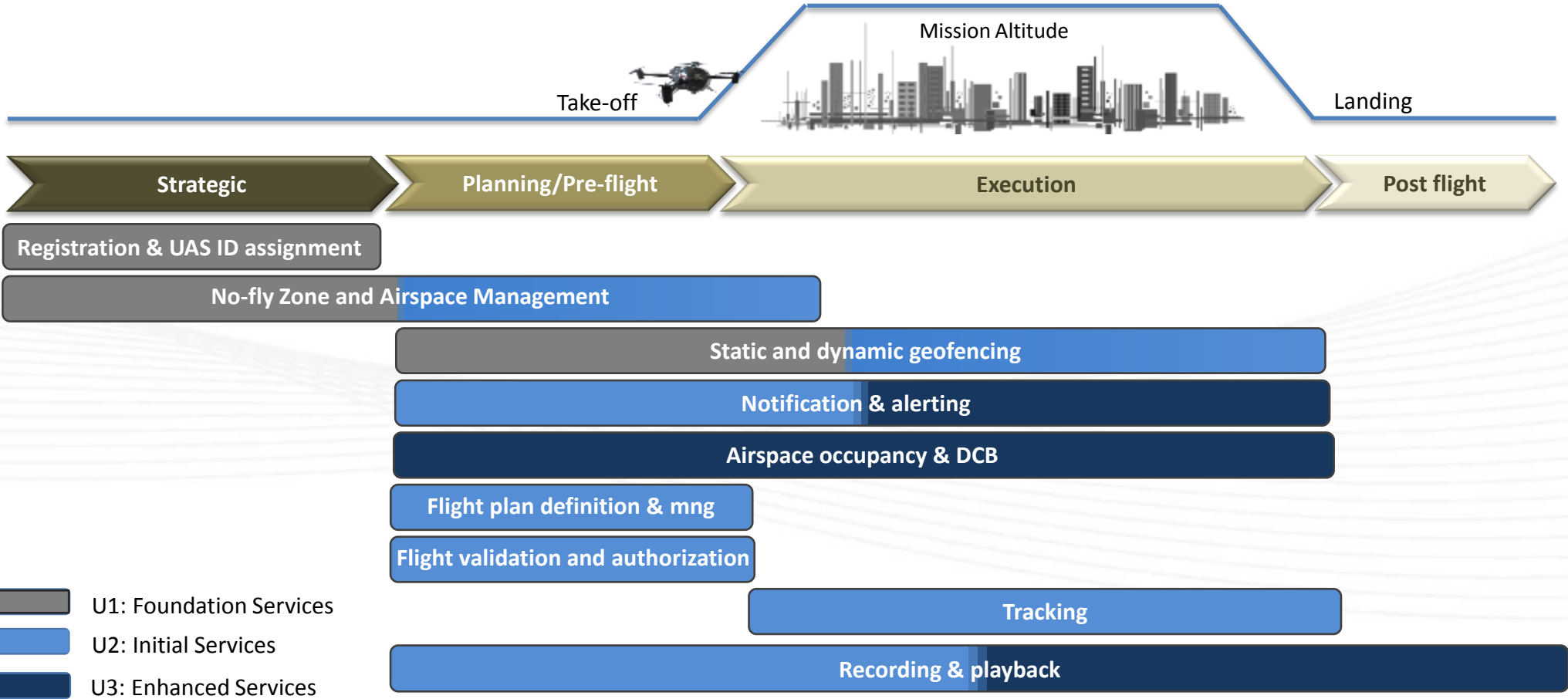
Maturity of **on board capabilities** and **technologies for BVLOS** operations

- UTM capabilities in support of planning, execution and post flight phases of UAS Operations
- Based on **existing technologies and standards** currently applied in the **aviation industry**.



- Enables **CAA, ANSP, private VLL airspace service providers and major UAS operators** to implement UTM services.
- Provides wide set of **functionalities and services for several UTM stakeholders** through tailored services and ad-hoc interfaces.



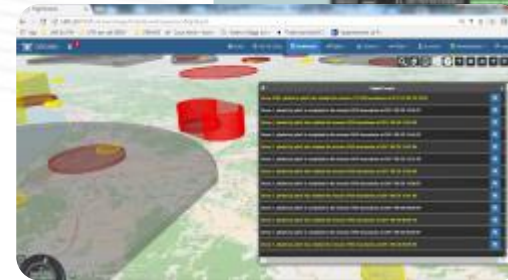




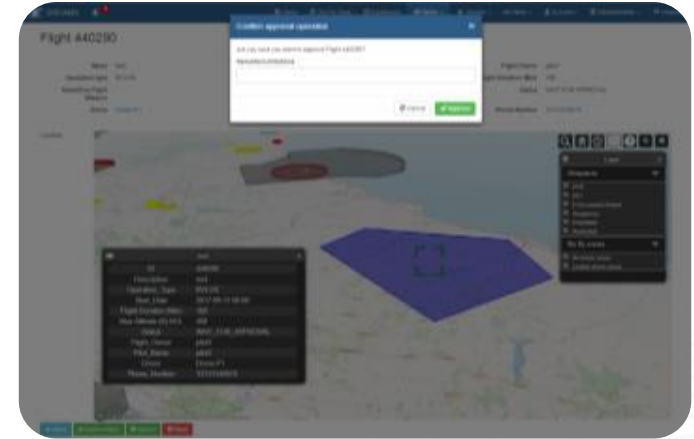
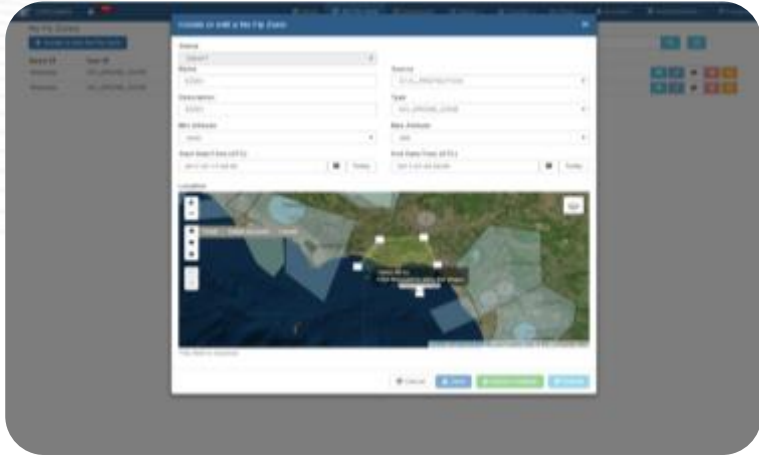
- **2D/3D map**
- **Airspace occupancy:** current, in the future; occupancy at national, regional, district level; mission type
- «Short term» **occupancy warning**
- **Information layers** activation/deactivation: **meteo** layers, **ATS** geography, **no fly zone** (No-drone zones, Limited-drone zones), **flights** per status (planned, active, sys-active, completed,...)



- **Temporal navigation** and details visualization: airspace, no fly zone and flights
- **Flight search** (from map, free text, per status) and details visualization
- Tracking and visualization of cooperative drones and other entities
- **Flight authorization** request notification
- **Notification** in case of new no-fly zone impacting flights
- No fly zone **infringement alerting**

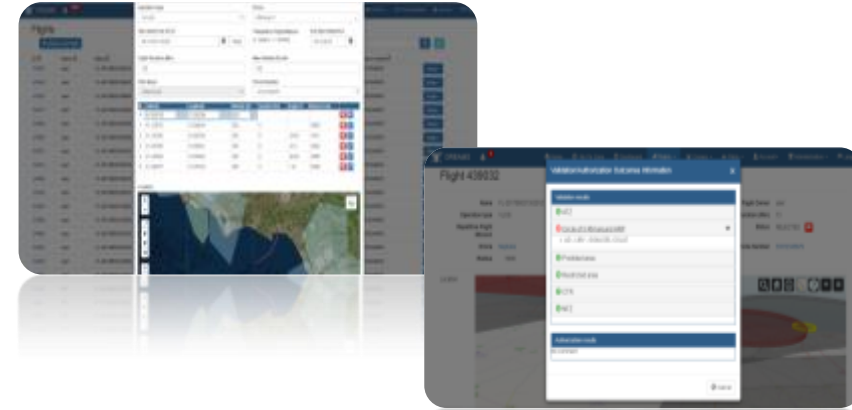


- **Automatic flight plan validation check** (airspace, no-fly zones and national rules)
- Request of impact assessment: **interference check VS other planned flights**
- **Flight Plan Rejection or approval**



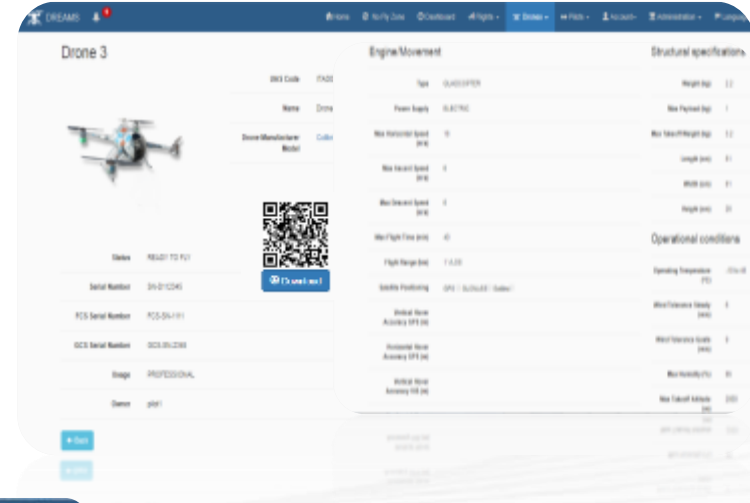
- **No-fly zone definition and management:**
 - Features: permanent, temporary; originator.; no/limited drone zones
 - Status: draft, cancelled, rejected, published
- **Interference check:** overlapping with other airspaces and no-fly zones
- No Fly Zone **Impact Evaluation** on planned flights

- **Flight plan definition** (linear and area flight plans), single, repetitive
- **Flight plan validation** according to airspace constraints and national rules
- **Temporal navigation and visualization** of evolving airspace constraints and planned flights
- **Flights monitoring**
- Visualization of other traffic



- **Flight logbook**
- Operator, pilot and drone registration and management
- **Multi layer map visualization** (weather, airspace, traffic,..)
- **Supervise and manage your flights** (draft, planned, active, expired, rejected, completed, wait for approval,...) on interactive 2D/3D map
- **Timely notification** in case of new no-fly zones impacting your flights

- Drone registration and unique ID assignment
- QR code generation
- Drone manufacturer and models



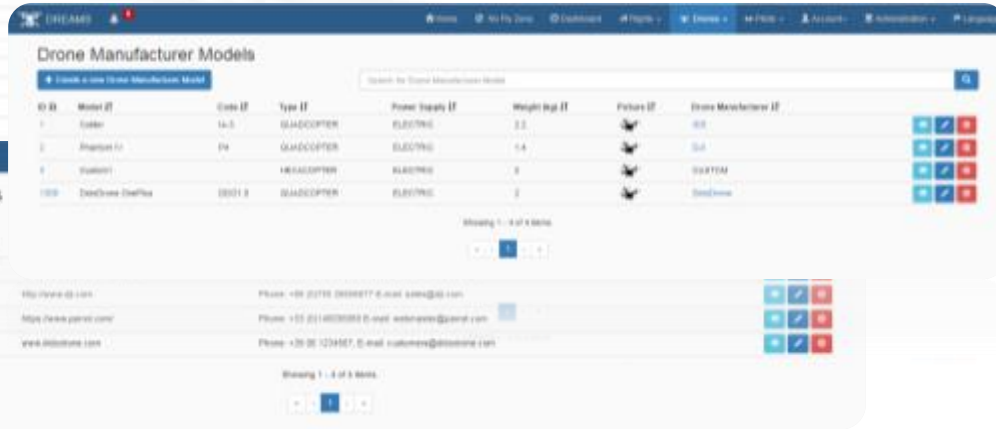
Drone 3

Engine/Movement




Wing Curb	FASE	Type	QUANTITA'	Weight [kg]
None	Drone	Prop. Single	0.83760	Max Payload [kg]
None	Drone	No Horizontal load [kg]	0	Max MaxPayload [kg]
None	Drone	No Vertical load [kg]	0	Max [kg]
None	Drone	No Diagonal load [kg]	0	Max [kg]
None	Drone	No High Thrust [kg]	0	Max [kg]
None	Drone	High Thrust [kg]	1.130	Max [kg]

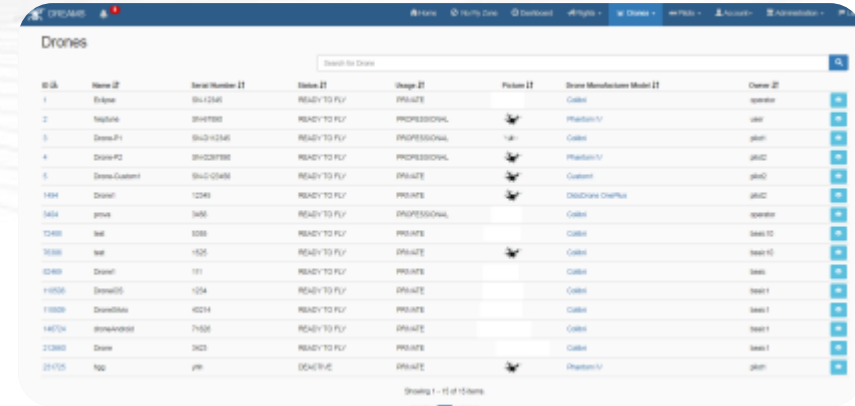
Operational conditions

Serial Number	Value
Serial Number	3010245
FCS Serial Number	FCS04191
OCS Serial Number	OCS00208
Stage	PROFESSIONAL
Owner	gpt















Drone Manufacturer Models

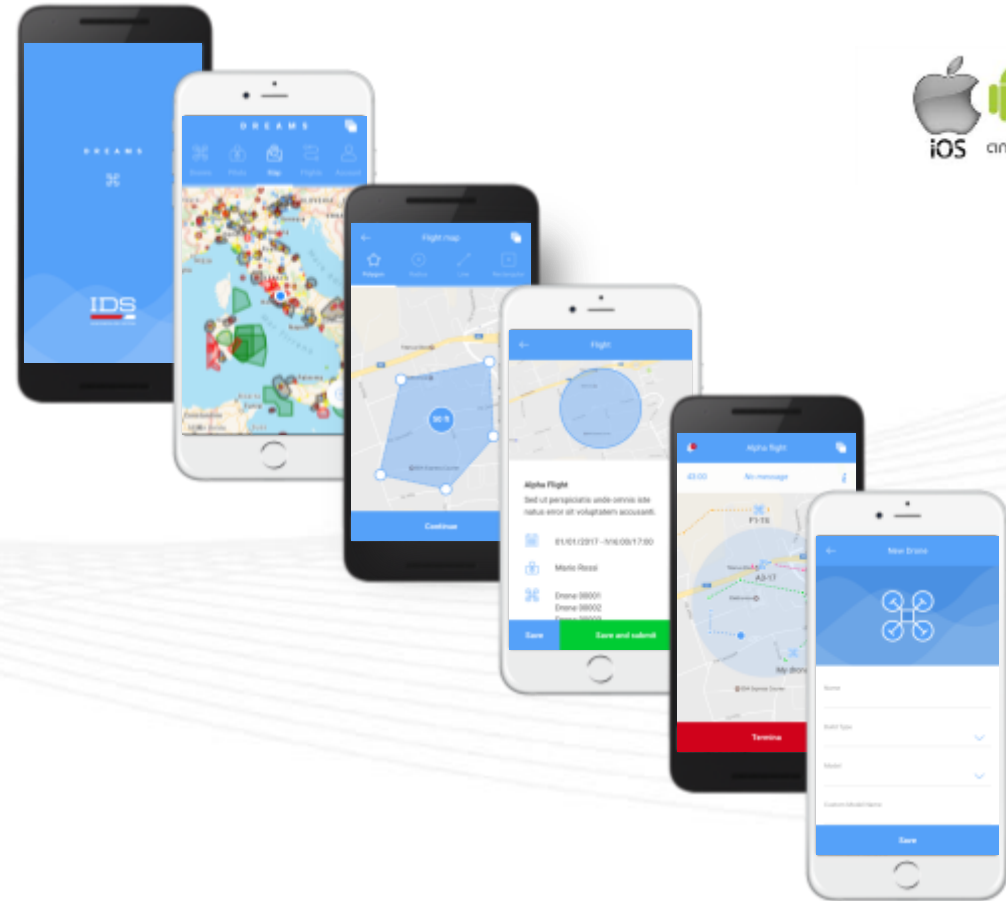
ID	Model ID	Code ID	Type ID	Power Supply ID	Weight [kg] ID	Picture ID	Drone Manufacturer ID
1	Copter	14-5	QUADCOPTER	ELECTRIC	2.2		IDS
2	Angulus IV	IV	QUADCOPTER	ELECTRIC	1.4		GAUTAM
3	Yodanis		HEXACOPTER	ELECTRIC	0		GAUTAM
1000	DeeDrone CheeFox	0001-3	QUADCOPTER	ELECTRIC	2		DeeDrone



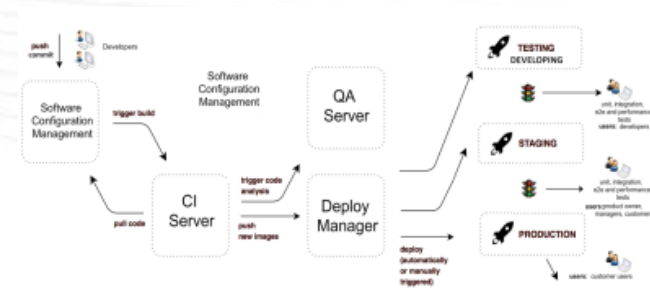
Drones

ID	Name ID	Serial Number ID	Status ID	Stage ID	Picture ID	Drone Manufacturer Model ID	Owner ID
1	Drone	3010245	READY TO FLY	PRIVATE		Copter	operator
2	Yodanis	3010246	READY TO FLY	PROFESSIONAL		Phantom IV	gpt
3	Drone P1	3010246	READY TO FLY	PROFESSIONAL		Copter	gpt
4	Drone P2	3010246	READY TO FLY	PROFESSIONAL		Phantom IV	gpt
5	Drone Custom	3010246	READY TO FLY	PRIVATE		Custom	gpt
1004	Drone1	1245	READY TO FLY	PRIVATE		DeeDrone CheeFox	gpt
1004	gpt	305	READY TO FLY	PROFESSIONAL		Copter	operator
1040	test	038	READY TO FLY	PRIVATE		Copter	test10
1036	test	125	READY TO FLY	PRIVATE		Copter	test10
0240	Drone1	191	READY TO FLY	PRIVATE		Copter	test
1005	Drone05	124	READY TO FLY	PRIVATE		Copter	test1
1000	Drone04	4214	READY TO FLY	PRIVATE		Copter	test1
14074	DroneAndreas	7450	READY TO FLY	PRIVATE		Copter	test1
20382	Drone	302	READY TO FLY	PRIVATE		Copter	test1
20105	test	301	DEACTIVE	PRIVATE		Phantom IV	gpt

- Homescreen
- Layer Visualization
 - Live Traffic
 - Airspaces
 - Flights
 - Weather
 - No Fly Zones
- Mission definition (linear, rectangular, polygonal, circular)
- Flight logbook
- Start & stop
- Flight status notification
- Drone and pilot entity management



- Same technological platform as IDS ATFM system and D-NOTAM; interfaces to **SWIM** network, **AFTN/AMHS** system
- **Microservices architecture**: guarantee scalability and high availability requirements
- **SWIM based**: Aeronautical (**AIXM**), Weather (**WXXM**), Flight (**FIXM**) Information Exchange Model
- Development process: **Agile Scrum**
- Use of standard **open data formats**: (CSV, GRIB, XML, KML, JSON)
- **Web service interfaces**: build on open standards (XML, HTTP, REST, SOAP)
- Self-documenting interfaces (**API**)
- Continuous integration and deployment



- **NOTAM management** impacting VLL airspace
- Automatic **airspace access** and **flight prioritization** according to sUAS operation classification
- Contingency management - **alternative drone flight path** generation and proposal
- Airspace alerting for **manned airspace users**
- Coordination with ATM/ATC and **notification and authorization** mechanisms
- **ATC tracks acquisition** and management
-



*Thank you
for your attention*