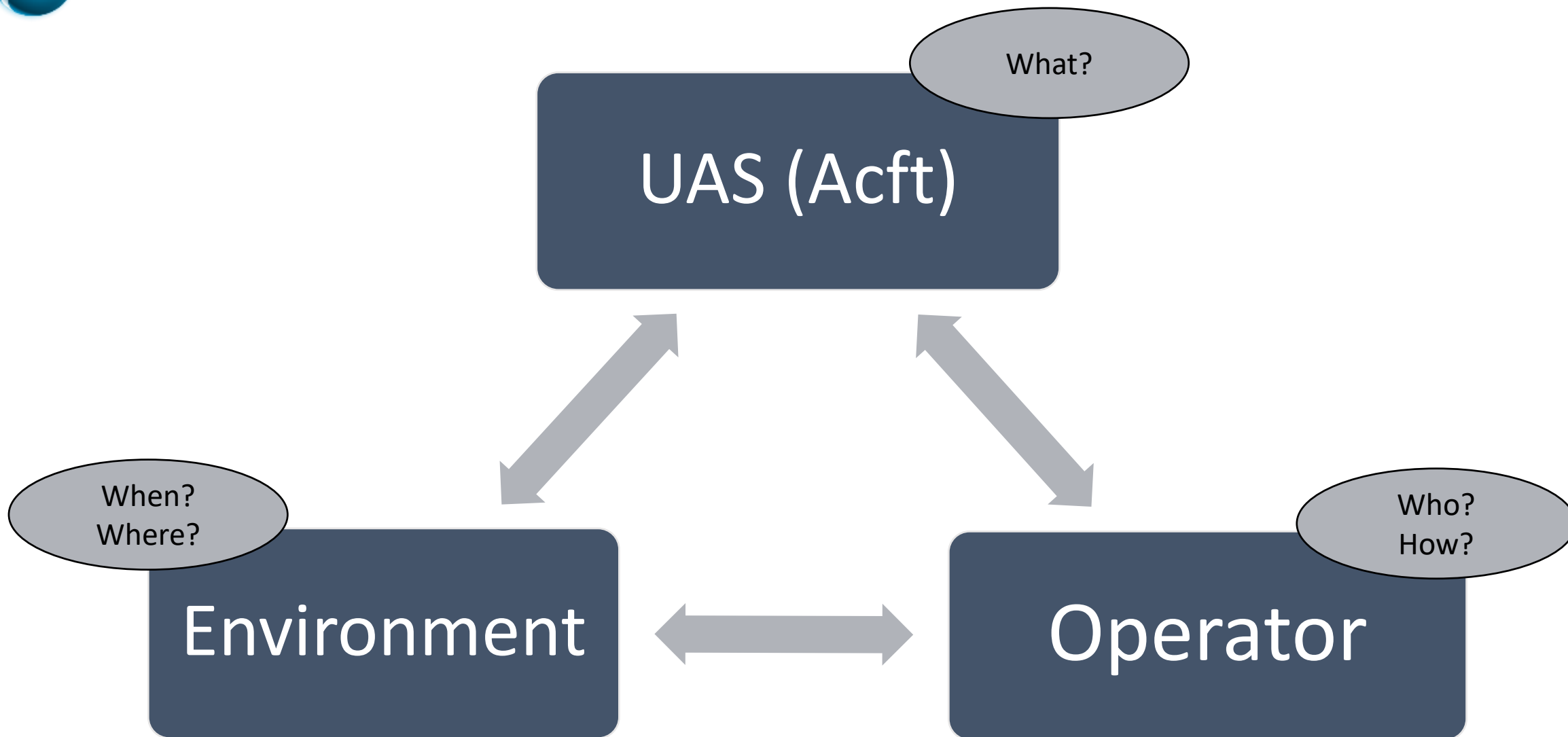


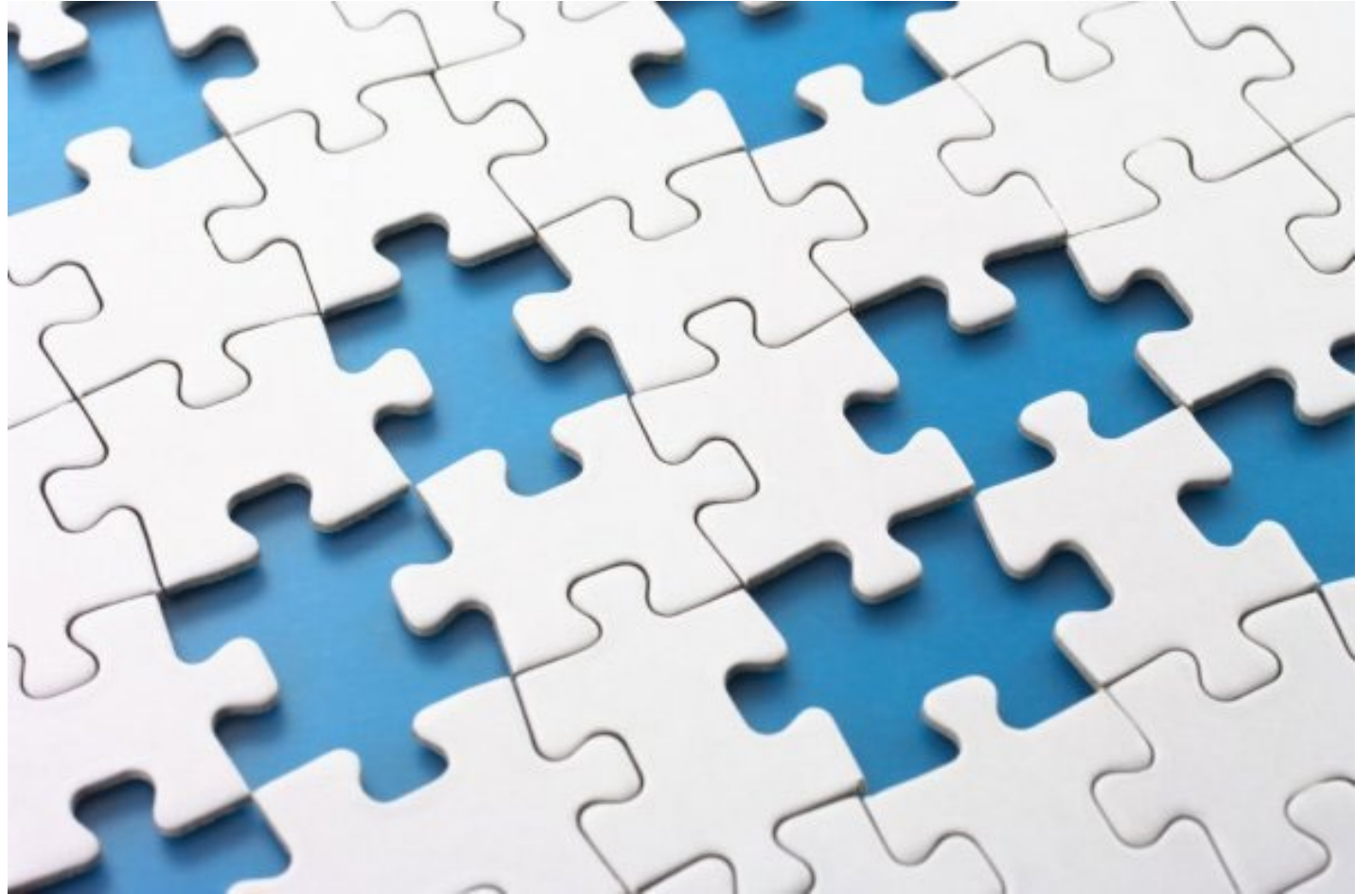
Safety in UA Operations

Second Unmanned Aircraft Systems – Remote Piloted Aircraft Systems
Implementation/Regulation Workshop (UAS/RPAS/W) for the
NAM/CAR/SAM Regions

29 September 2021



HOLISTIC
APPROACH







What?

When?
Where?



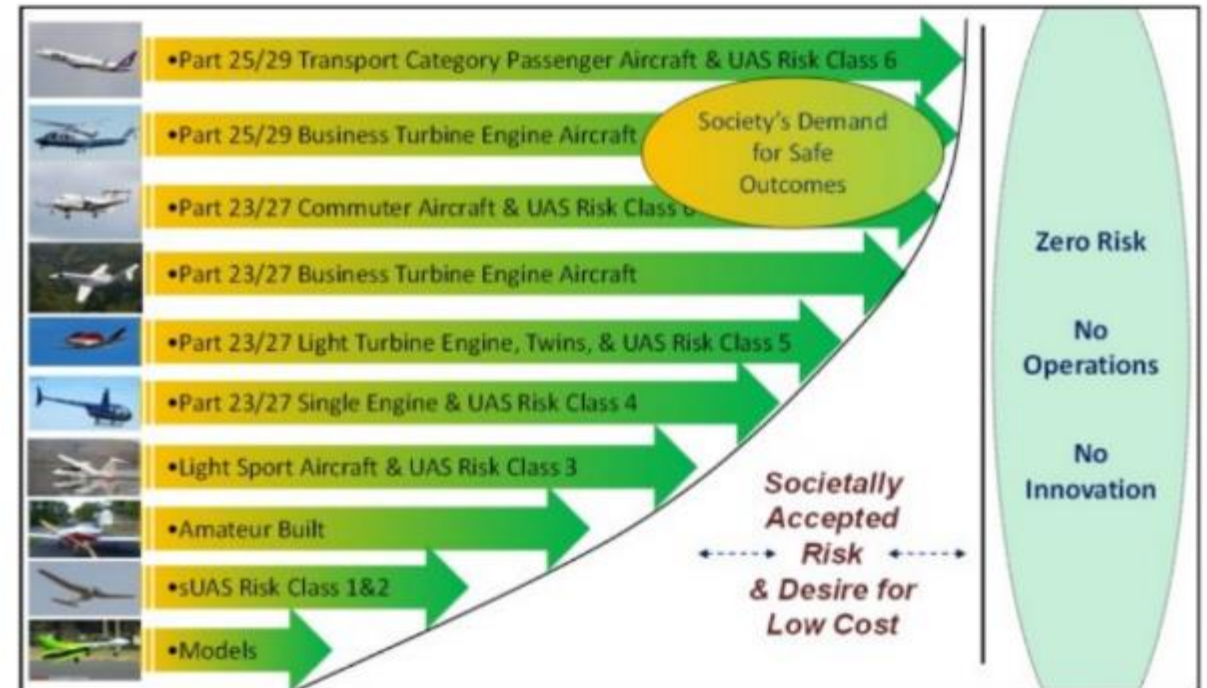


Who?
How?

Proportionality in the rules



FAA Safety Continuum





Classification of RPA (ANAC)

- Class 1: MTOW above 150 kg;
- Class 2: MTOW below or equal to 150 kg and above 25 kg;
- Class 3: MTOW between 250g and 25 kg.

Due to its small hazard potential, there is almost no requirement for operating drones lighter than 250g.

IMPORTANT: Classification is only applicable for non-recreational users!



Rule - Summary

	Class 1 RPAS	Class 2 RPAS	Class 3 RPAS	Model aircraft
Aircraft registration	Traditional	Traditional	VLOS 400 feet: Inscription Other: Traditional	Inscription
Design approval or authorization	Yes	Yes (simplified)	Only for BVLOS or above 400 feet (simplified)	No
Minimum age for operation	18 y.o.	18 y.o.	18 y.o.	No
Operational risk assessment	Yes (IS E94-003)	Yes (IS E94-003)	Yes (IS E94-003)	No
Medical certificate	Yes (RBAC 67)	Yes (RBAC 67)	No	No
License and rating	Yes	Yes	Only for ops above 400 feet	Only for ops above 400 feet
Operation area	Distant from third parties (see more in “Where can you fly?”)			

... in other words

	OPEN	SPECIFIC	CERTIFICATED
Applicability	Class 3 RPAS operating VLOS up to 400 feet + model aircraft	Class 2 RPAS and other Class 3 RPAS operations	Class 1 RPAS
Aircraft registration	Inscription (SISANT online tool)	Traditional	Traditional
Design evaluation	None	Design authorization (RBAC-E No. 94)	Type certification (RBAC No. 21)
Remote pilot license and rating	No	Required only for operating C2 RPAS or +400 ft	Required
Medical certificate	No	Required only for operating Class 2 RPAS	Required
Public aerial service authorization	No	No	Required



“Open” Category Operations



Users: 69,000

Drones registered:

86,000 (36,000 for commercial use)



Flight requests received in 2020:

175,000

BVLOS operations

DESIGN

OPS/ATM

BVLOS operations are safe when conducted in an area authorized by ATC (DECEA).

The presence of other unauthorized aircraft in the area is unlikely.

Operations will only be carried out in segregated airspace.

NOTAM, LOA or other authorization means defined by DECEA.

In the event of other aircraft entering that airspace, there are appropriated mitigations in place.

Means to monitor air traffic in the area.

VHF comms monitoring or other means defined/accepted by DECEA.

RPA conspicuity

External lighting
(12.5 seconds reaction time)
E94-002A – 5.4.9

It is improbable that a RPA whose design was authorized for BVLOS will leave the authorized flight area.

Navigation system with appropriate performance and reliability.

(Performance: H error: 95% - V error: 99,7%
Reliability: Dual sources with cross comparison)
E94-002A – 5.4.7

The RPS presents information necessary for the RP to conduct operations in a safe manner.

(Front camera, map with authorized volume and current position, etc.)
E94-002A – 5.4.6

There are appropriate mitigations in case of any equipment or system failure.

Safety analysis
E94.405(a)(3)

Procedures (AFM)
E94.405(a)(1)

Emergency recovery
E94.407(c)

Specific procedures agreed with ATC.

Authorized designs (BVLOS)



Arator 5B / 5C

Manufacturer: XMobots (Brazil)
Operations: E/VLOS (2 km) up to
2.000 ft AGL or BVLOS (5 km)
below 400 ft AGL
A5B: Authorized 08JUN2018
A5C: Authorized 07APR2021



eBee Classic/Plus/X

Holder: Santiago&Cintra (BR)
Manufacturer: Sensely (CH)
Authorized operations: BVLOS
(5 km) below 400 ft AGL
EBEEC/EBEEP: 15APR2019
EBEEX: 19JUL2021



Echar 20D

Manufacturer: XMobots (Brazil)
Authorized operations : BVLOS
(30 km) up to 6,000 ft AMSL
Authorized 10MAR2021



RPAS-112

Manufacturer: Energias (Brazil)
Authorized operations: BVLOS
(7,2 km) below 400 feet AGL
Authorized 10JUN2021

Authorized designs (BVLOS)



Arator 5B / 5C

Manufacturer: XMobots (Brazil)
Operations: E/VLOS (2 km) up to
2.000 ft AGL or BVLOS (5 km)
below 400 ft AGL
A5B: Authorized 08JUN2018
A5C: Authorized 07APR2021



FOUR NEW MODELS IN 2021

Holder: SA
Manufacturer: Sensely (USA)
Authorized operations: BVLOS
(5 km) below 400 ft AGL
EBEEC/EBEEP: 15APR2019
EBEEX: 19JUL2021



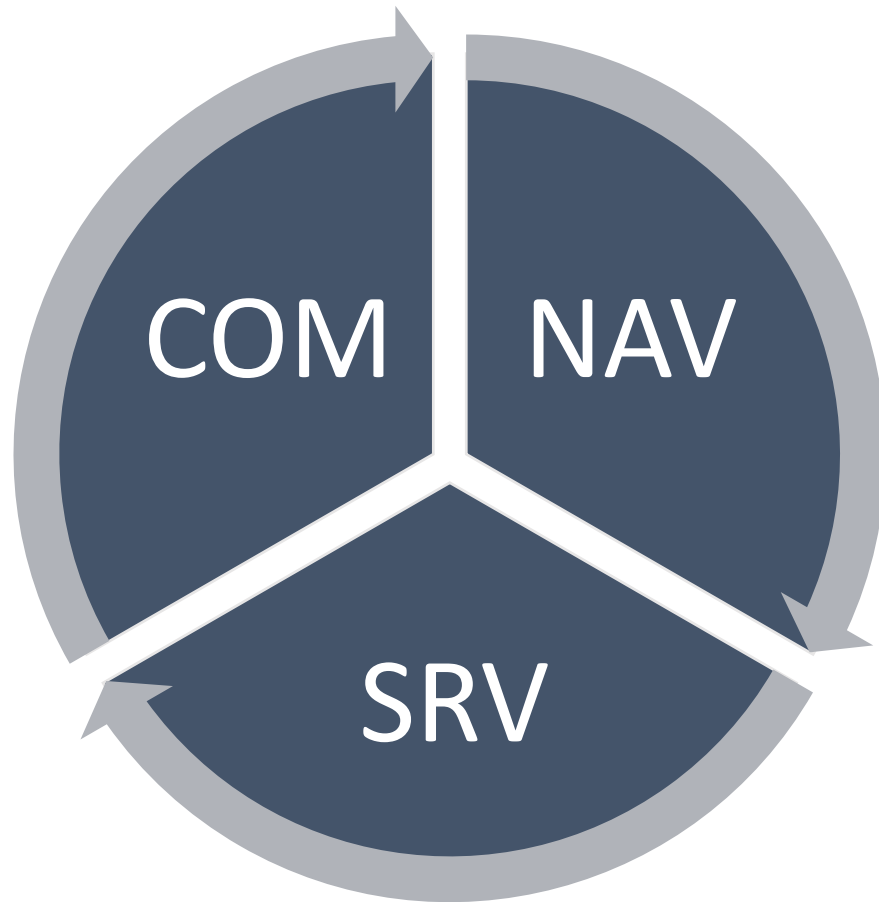
Holder: SA
Authorized operations: BVLOS
(30 km) below 400 ft AGL
Authorized 10MAR2021



RPAS-112

Manufacturer: Energias (Brazil)
Authorized operations: BVLOS
(5 km) below 400 feet AGL
Authorized 10JUN2021

RPAS integration in ATM



Nominal operations

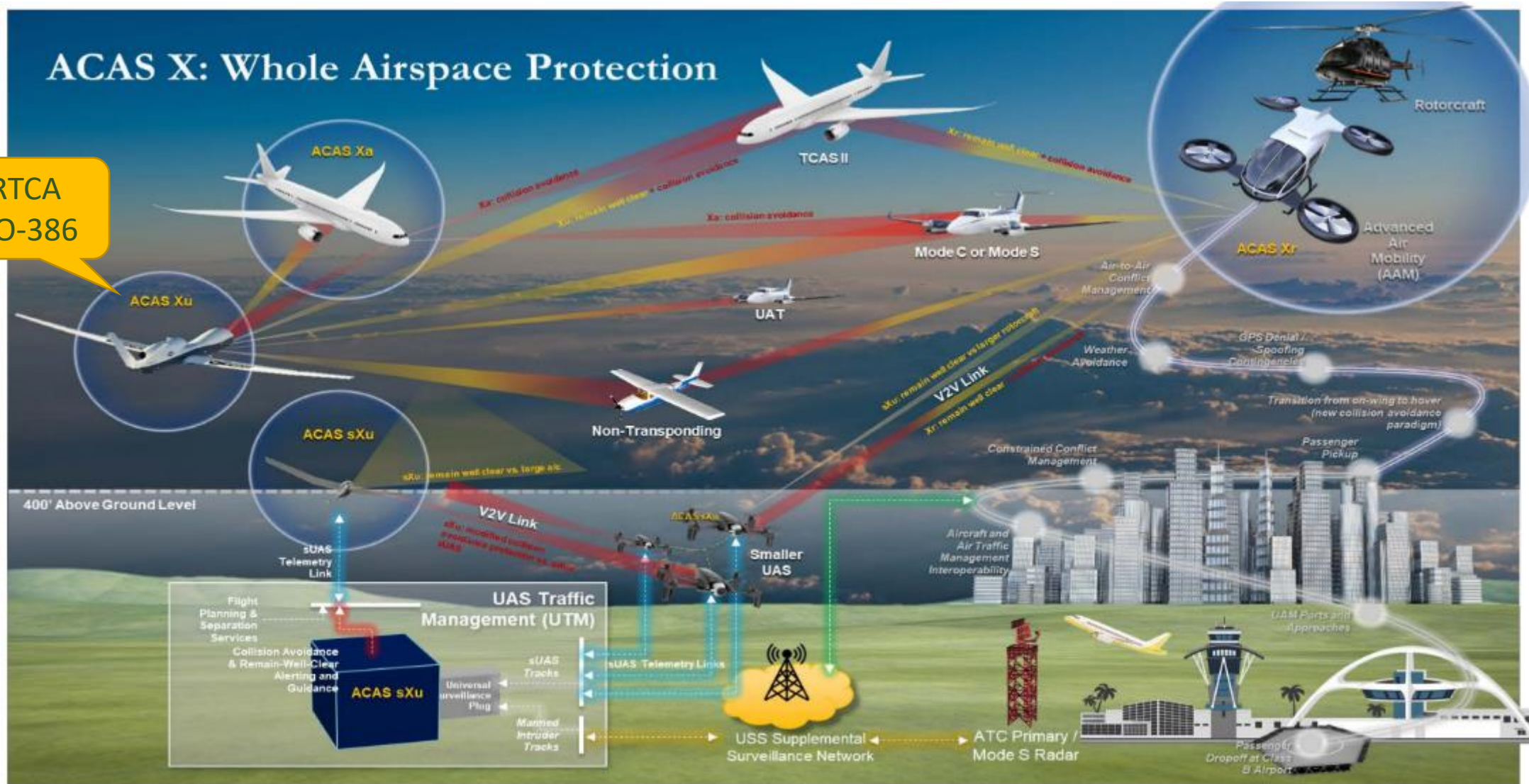
Off-nominal operations

RPAS
Contingency

Airspace
Contingency

RPAS integration in ATM

RTCA
DO-386

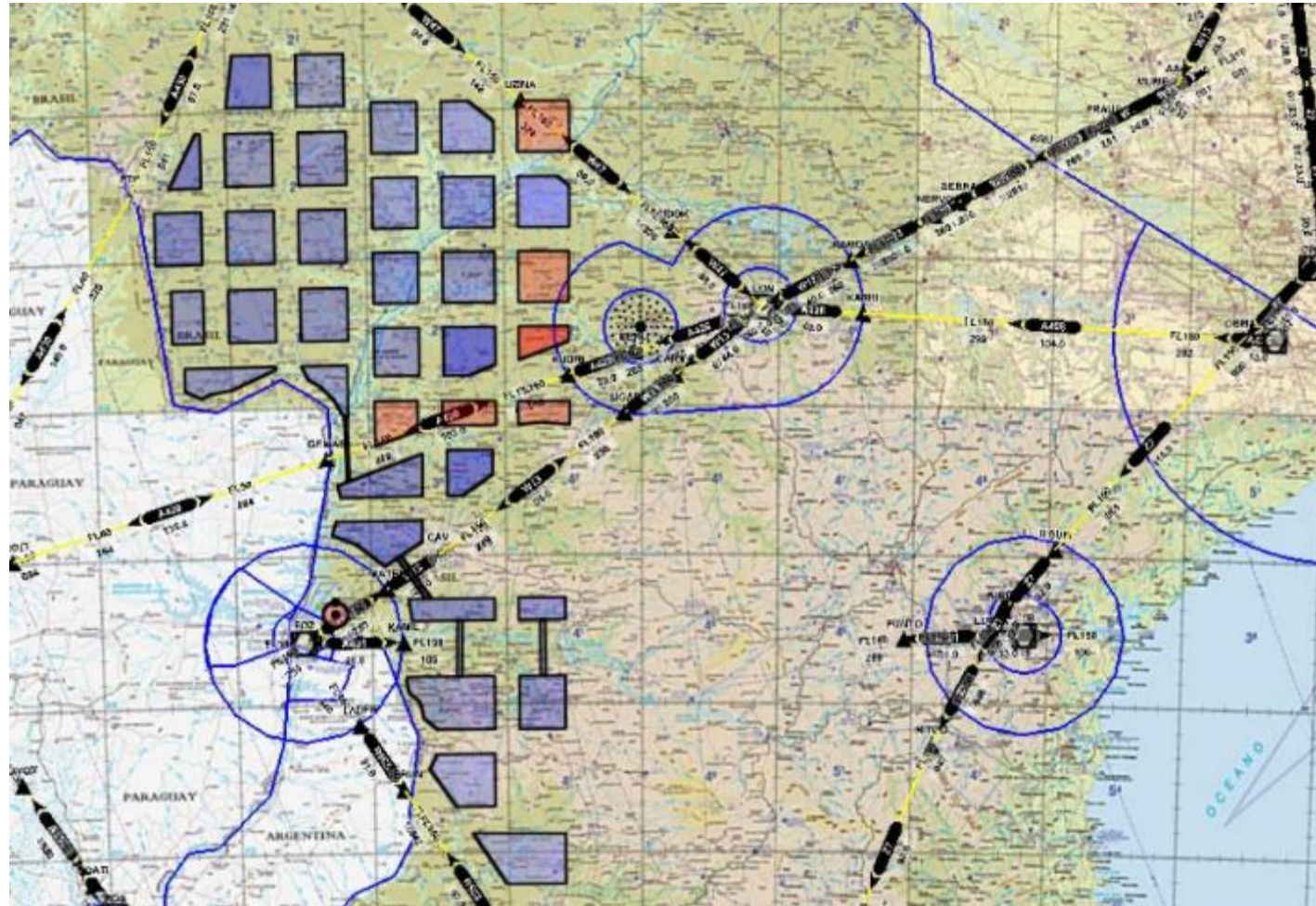




Accomodation (Example #1)



Accomodation (Example #1)



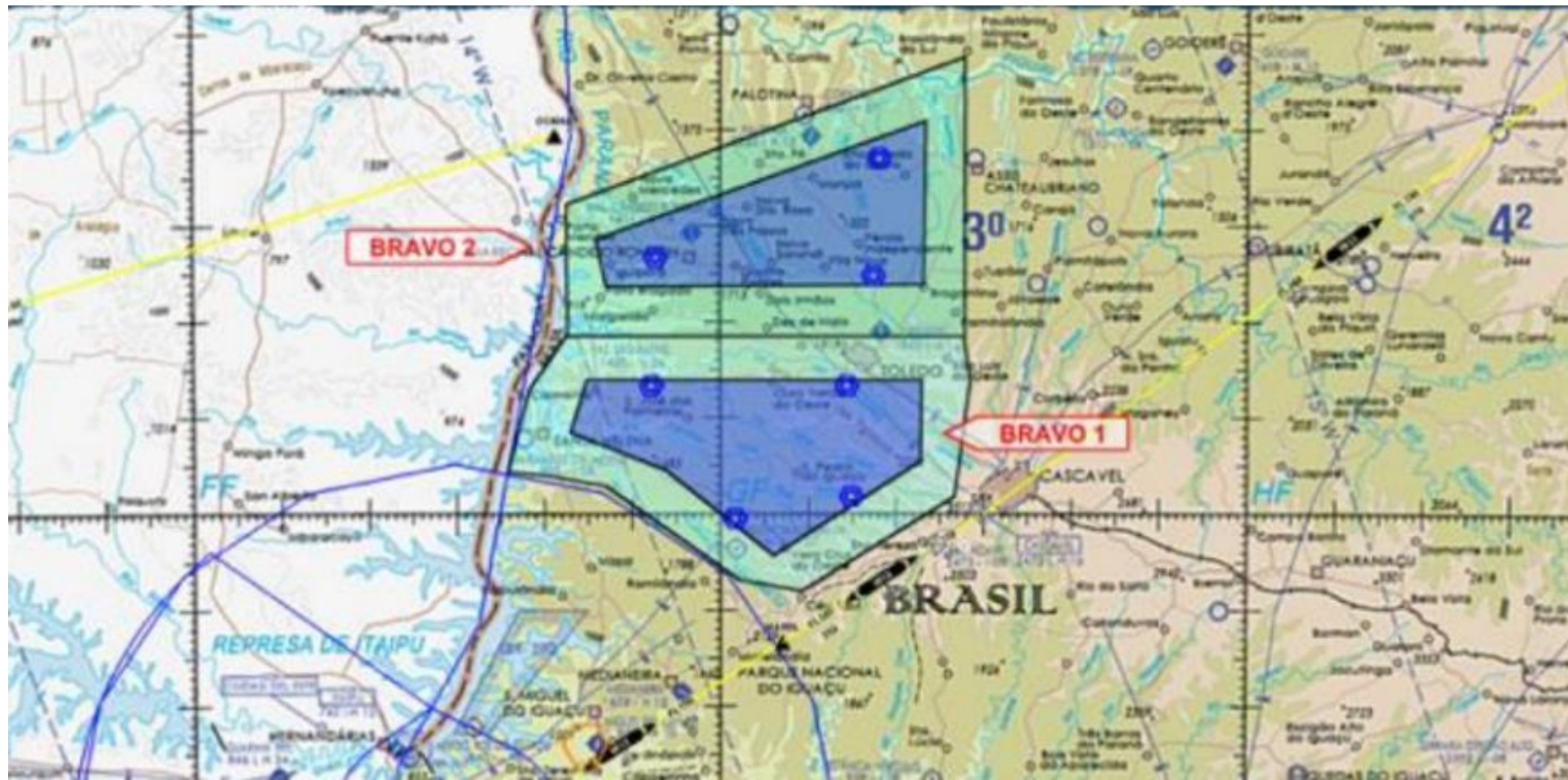
Accommodation (Example #1)



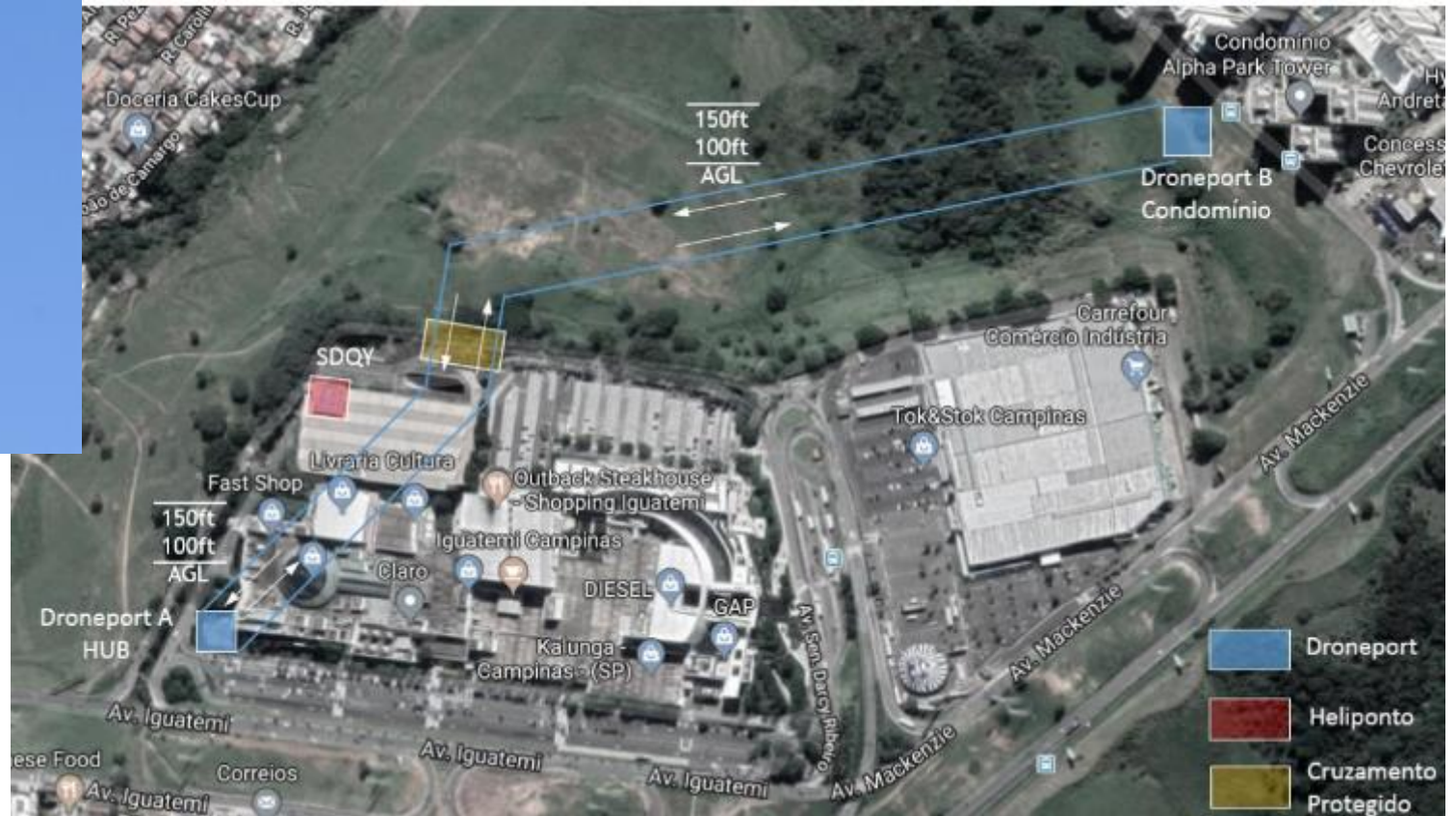
Accomodation (Example #1)



Accomodation (Example #1)



Accommodation (Example #2)



Accommodation (Example #2)

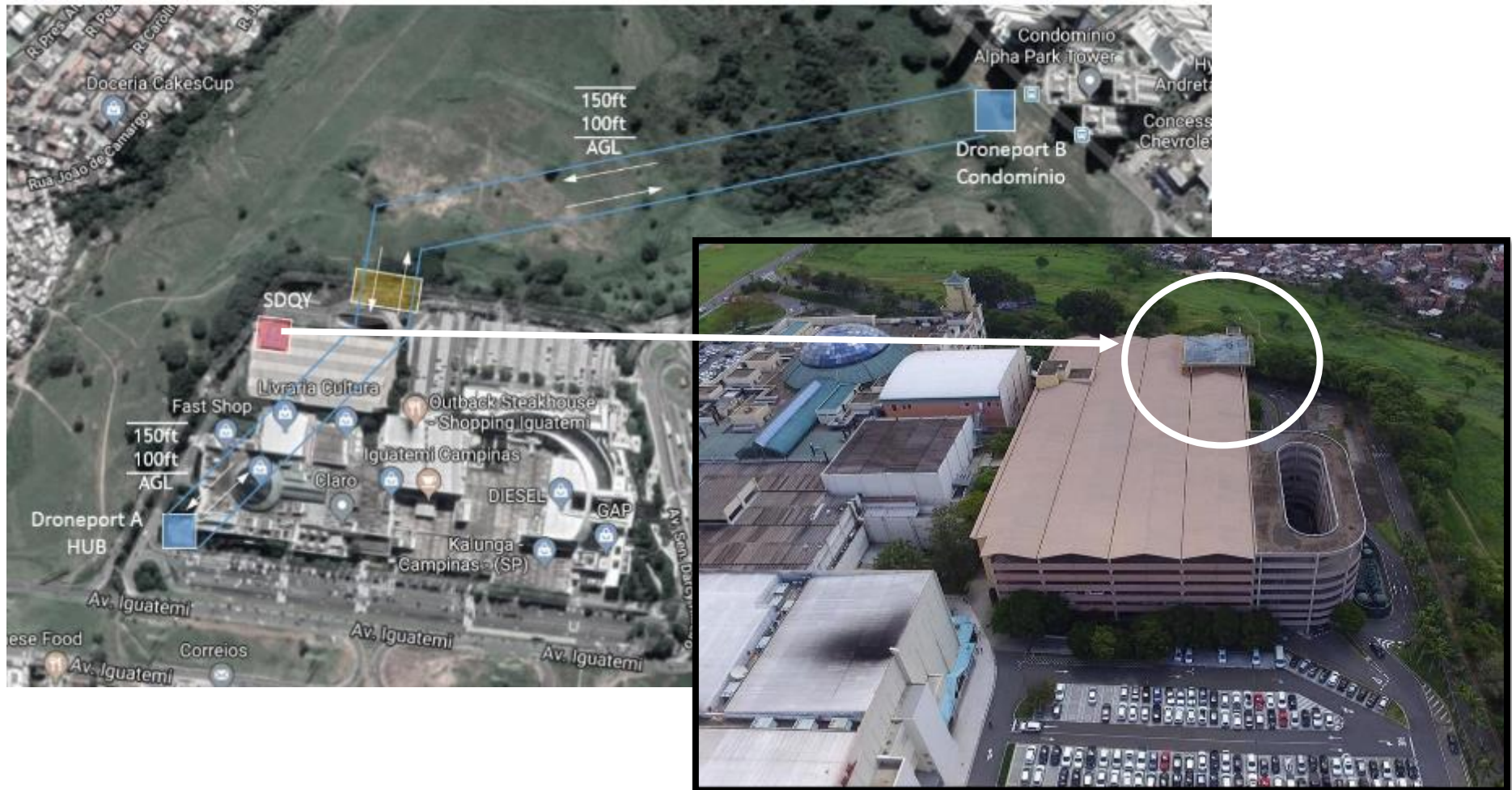
ANAC evaluation included:

- Design maturity (about 200 flights / 35 flight hours in VLOS)
- Flight Termination System (parachutes functioning)
 - Procedures (Operating Manual)
- Navigation system (performance and reliability)
 - Ground avoidance features
- Two flight test sessions with ANAC witnessing



**ANAC EXPERIMENTAL
CERTIFICATE ISSUED**

Accommodation (Example #2)

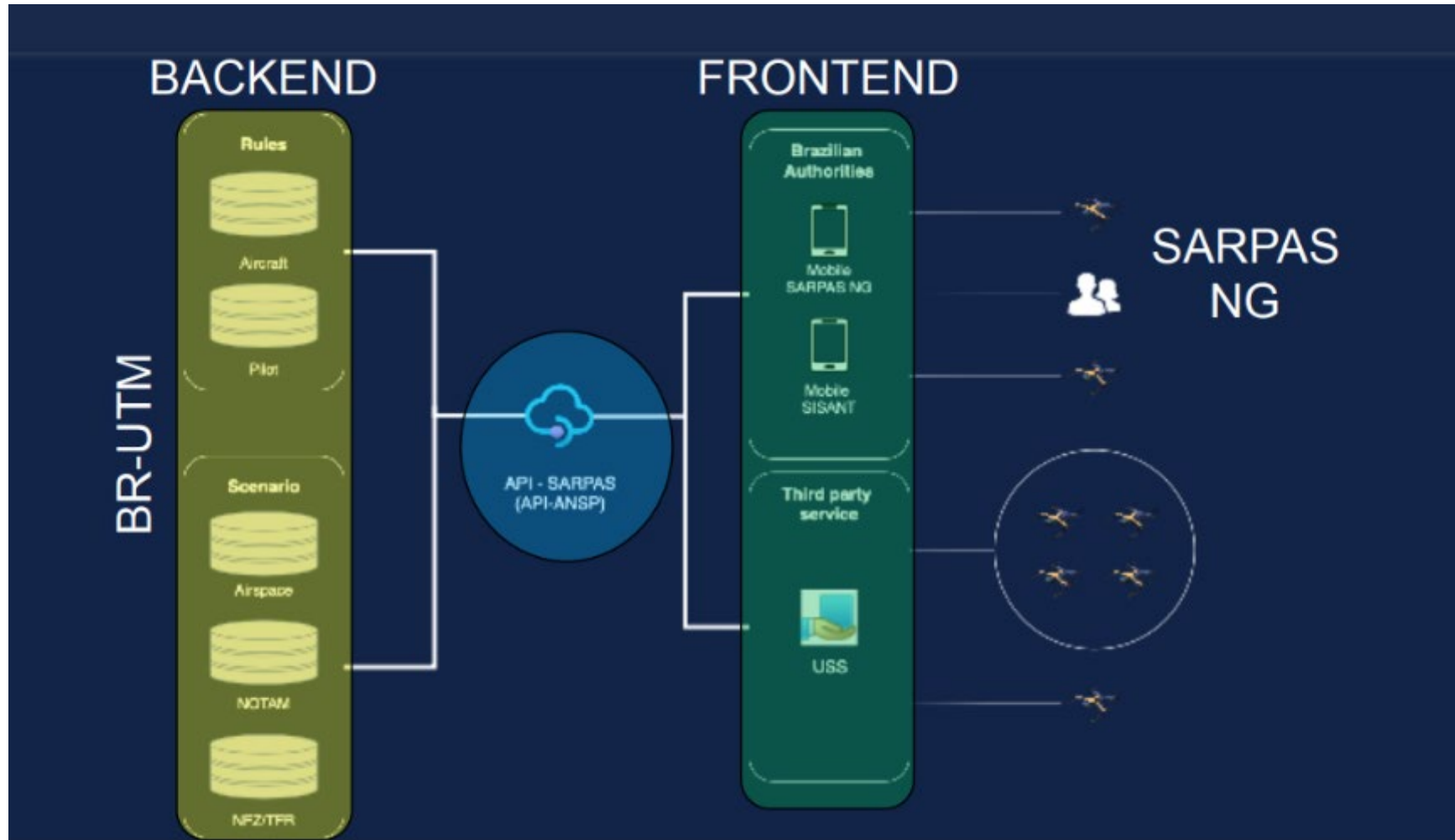


Accommodation (Example #2)

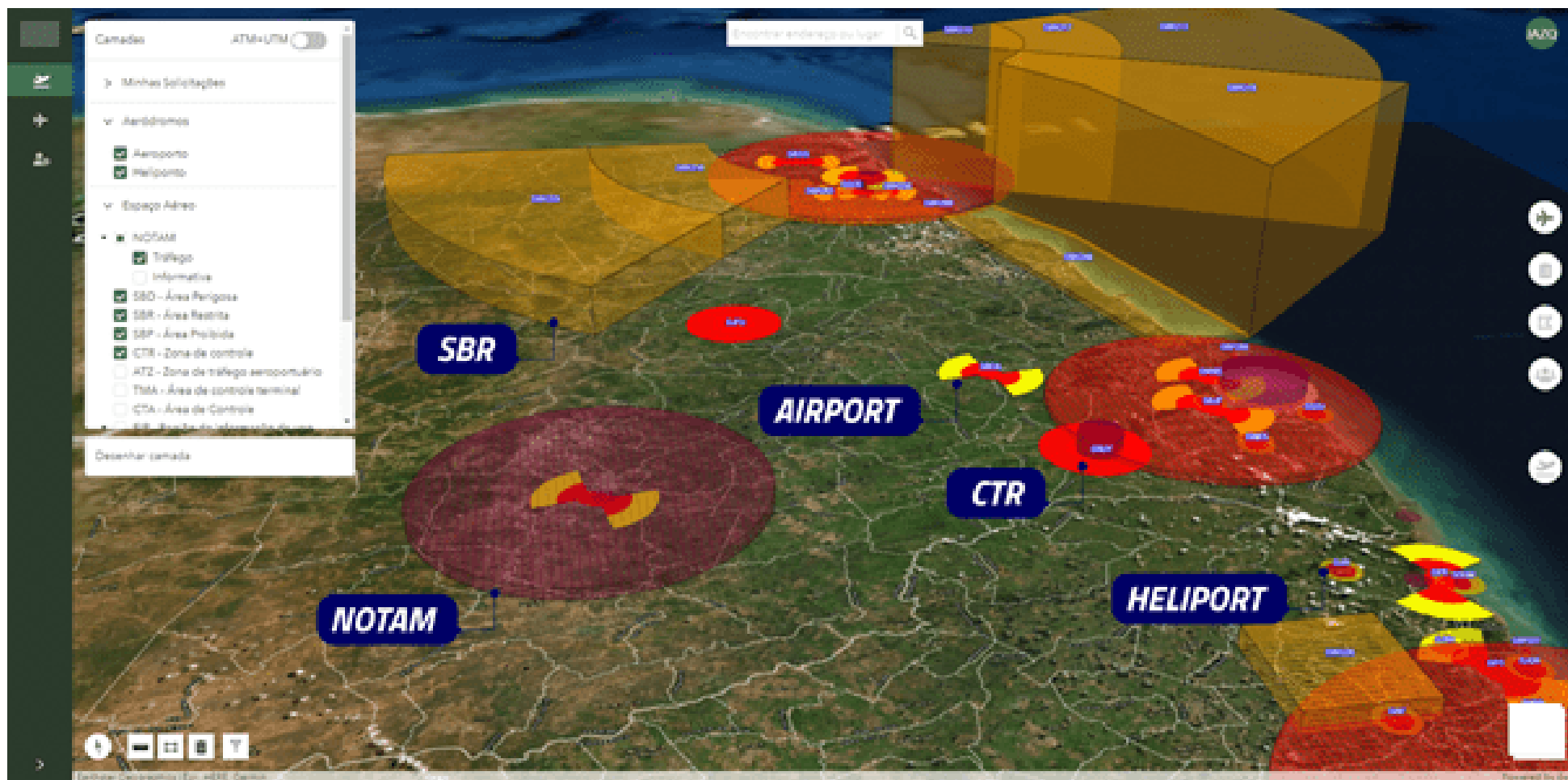
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A) SDQY - CAMPINAS/SHOPPING CENTER IGUATEMI
CAMPINAS,SP
B) 18/05/21 20:14 - C) 05/08/21 21:00
E) UA (FLT RPA) ACONTECERA WI COORD
225337.30S/0470159.01W, 225343.62S/0470123.28W,
225324.86S/0470103.33W, 225305.96S/0470132.97W
F) GND
G) 2700FT AMSL
DT EXPED: 18/05/21 20:14
STATUS: EXPIRED
ORIGEM: AIM3_NOF / 4739 / 2021



Next steps (BR-UTM)



Next steps (BR-UTM)





Regulatory Improvement/Update

	Main theme
Front 1	Regulatory reorganization with greater focus in the intrinsic operational risk and revision of the rules for operations in limited environments.
Front 2	Development of technical criteria for new operational environments and scenarios.
Front 3	Electronic remote identification and other technical and operational criteria to support UTM environments.



ANAC

<https://www.gov.br/anac/en/topics/drones>
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