



AL Drones

From **Aviation.**
To **Drones.**

www.aldrones.com.br

contato@aldrones.com.br



ICAO

UTM Crop Spraying Module

Data Requirements for Air Deconfliction in Crop
Spraying Operation

DRONE ENABLE 2022



AL Drones

www.aldrones.com.br

André Arruda, co-Founder
Lucas Florêncio, co-Founder

How to create an UTM for:



- Place with no internet connectivity
- Manned and unmanned aircraft are sharing the same flight level
- Manned aircraft with no transponder nor radio
- Market sensitive to any increase in cost



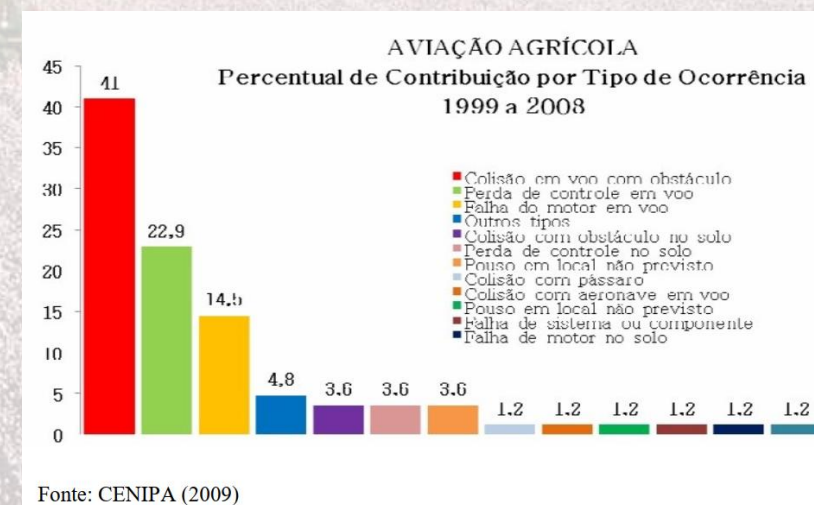
BRAZIL

- Second largest fleet of manned agricultural aircraft in the world, USA is the first
 - 2.432 Aircraft

- 55,5% of the fleet is local manufactured by EMB



- 41% of the agricultural aircraft accidents are caused by collision with obstacle in flight



Government Agencies

- Each Flight is requested in SARPAS system – first steps of an UTM, already operational
- SARPAS system is able to identify potential conflicts with Airport Approach Zones



The screenshot displays the ASA SARPAS NG software interface. The main map shows a geographical area with a red-shaded approach zone for the Major José Ignácio airport. A blue polygon is overlaid on the map, representing a flight path or obstacle clearance area. The sidebar on the right contains the following configuration options:

- ASA MAKER** (v3.21.0 SARPAS NG)
- Definir Local** (button)
- Local** / **Período** / **Visualização** (tabs)
- Formato**: Polígono
- Análise preliminar** (expandable section)
- Altura(m)**: 10 (input field) / 32.8084 (output field)
- Centro**: Lat: -22.0911788, Lng: -48.1302881
- Raio**: 1429.7666 m / 0.77 NM
- Comprimento total**: 6141.6(m) / 3.32(NM)
- 1°**: 22, 4, 55.16, S (input/output fields)
- 2°**: 22, 4, 55.16, S (input/output fields)
- 3°**: 22, 5, 36.71, S (input/output fields)
- 4°**: 22, 5, 40.04, S (input/output fields)

At the bottom of the interface, the coordinates 22 0 12.31 S 48 10 22.27 W and a zoom level of 14 are displayed. The footer includes the DECEA logo and the text "DECEA - ATD | © OpenStreetMap contributors".

Government Agencies

- NOTAMs segregate the airspace



AISWEB

NOTAM

Aviso aos Aeronavegantes

FIR BRASILIA (SBBS)

F1144/22 **N** 06/06/2022 13:09

Q) SBBS/QWULW/IV/M /W /000/030/2156S04804W002
UA (FLT RPA) ACONTECERA COORD 215419.46S0480429.29W
215611.56S0480224.49W 215637.87S0480250.89W
215444.86S0480455.39W (IBATE, SP) RTO
ORIGEM: SDIA 0E7D8B7F

↓ GND ↑ 400FT AGL

📅 14/06/22 10:00 a 11/09/22 22:00 UTC

Motivation of UTM Crop Spraying Module

Main Problems of the current system:

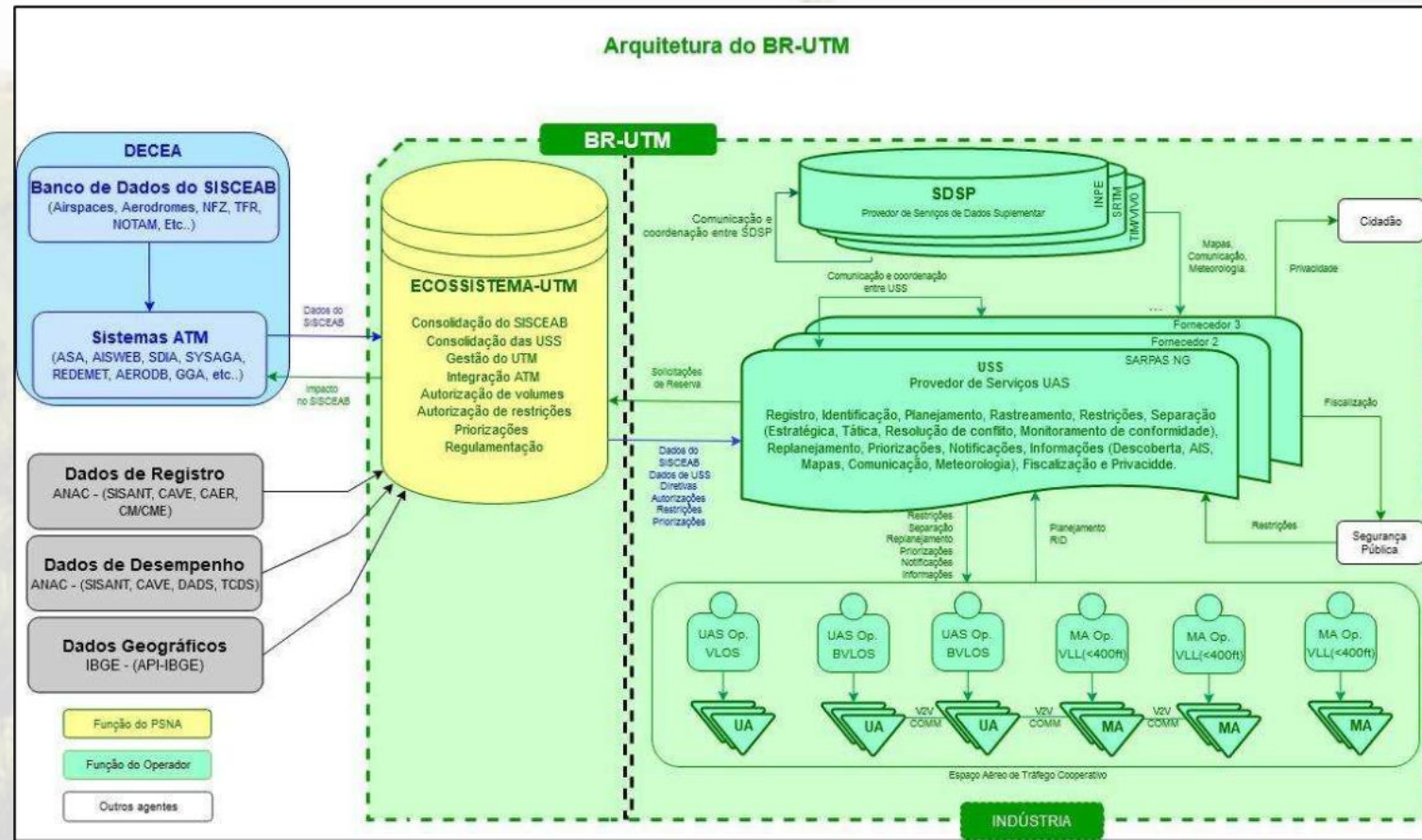
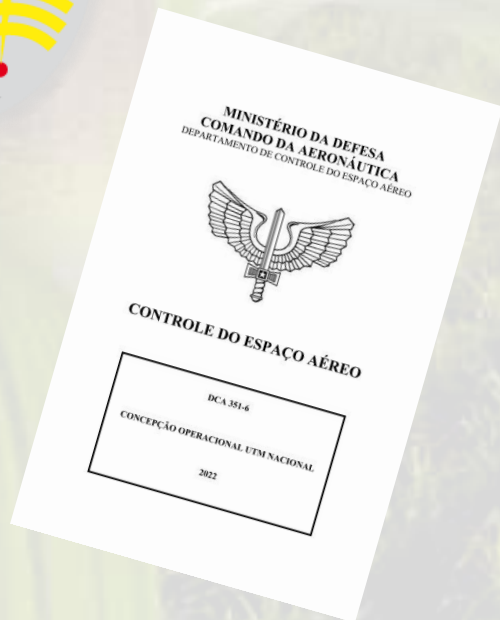
- Missing many information, apart from conflicts with Airport Approach Zones, to be evaluated by the pilot
- Agricultural Aircraft Pilots do not check NOTAMs



Motivation of UTM Crop Spraying Module

Next step:

- DECEA published in Sep/2022 - DCA 351-6 – Concept of Operations of a national UTM
- Inspired by FAA Unmanned Aircraft Systems (UAS) Traffic Management (UTM)

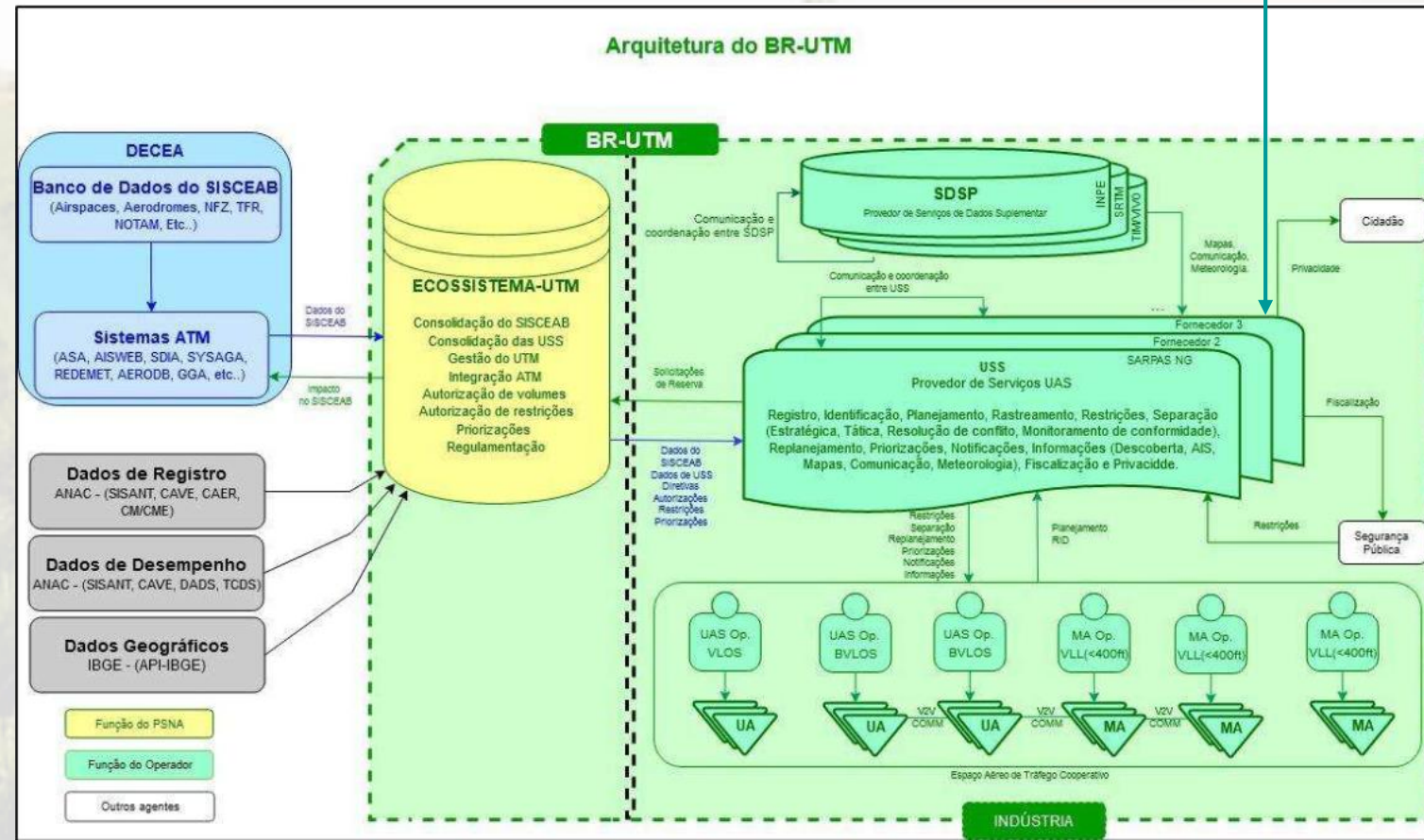


Motivation of UTM Crop Spraying Module

Considering the Main Problems of the current system what requirements need to be added for an adequate Crop Spraying USS

Spraying USS

UTM Crop Spraying Module



UTM Crop Spraying Module

- Missing many information, apart from conflicts with Airport Approach Zones, to be evaluated by the pilot

Database	Chemical	Wind speed	Nozzle type
	Crop	Wind direction	Dosage
	Temperature	Clearance from environmental preservation area	

- Collaboration
- Confirmation of Database (temperature, wind, etc)
 - Existence of obstacles (powerline, tree, house, etc)



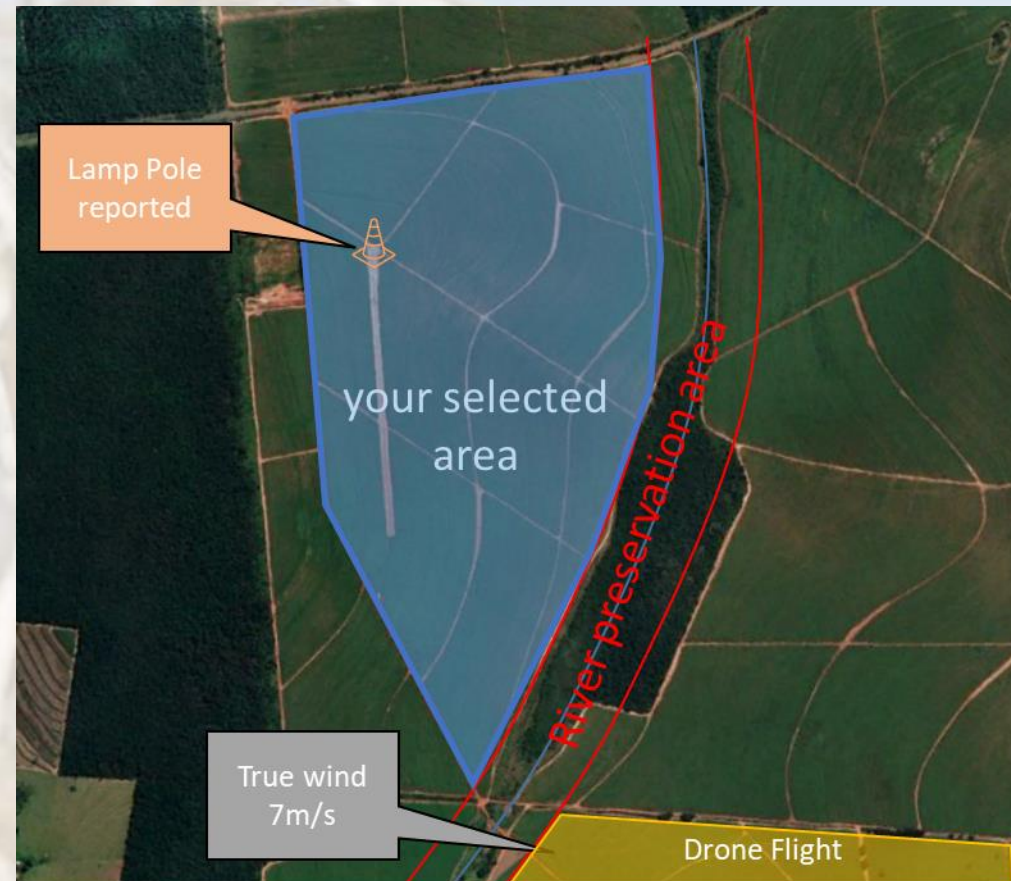
MAPA Ministério da
Agricultura, Pecuária
e Abastecimento

UTM Crop Spraying Module

- Missing many information, apart from conflicts with Airport Approach Zones, to be evaluated by the pilot



Current SARPAS



Future UTM-CSM

UTM Crop Spraying Module

- Agricultural Aircraft Pilots do not check NOTAMs - Air Deconfliction

↳ Inspired by an NGO for the protection of bees

App allows beekeepers to add bee hive locations and it contacts agricultural aviation companies to alert

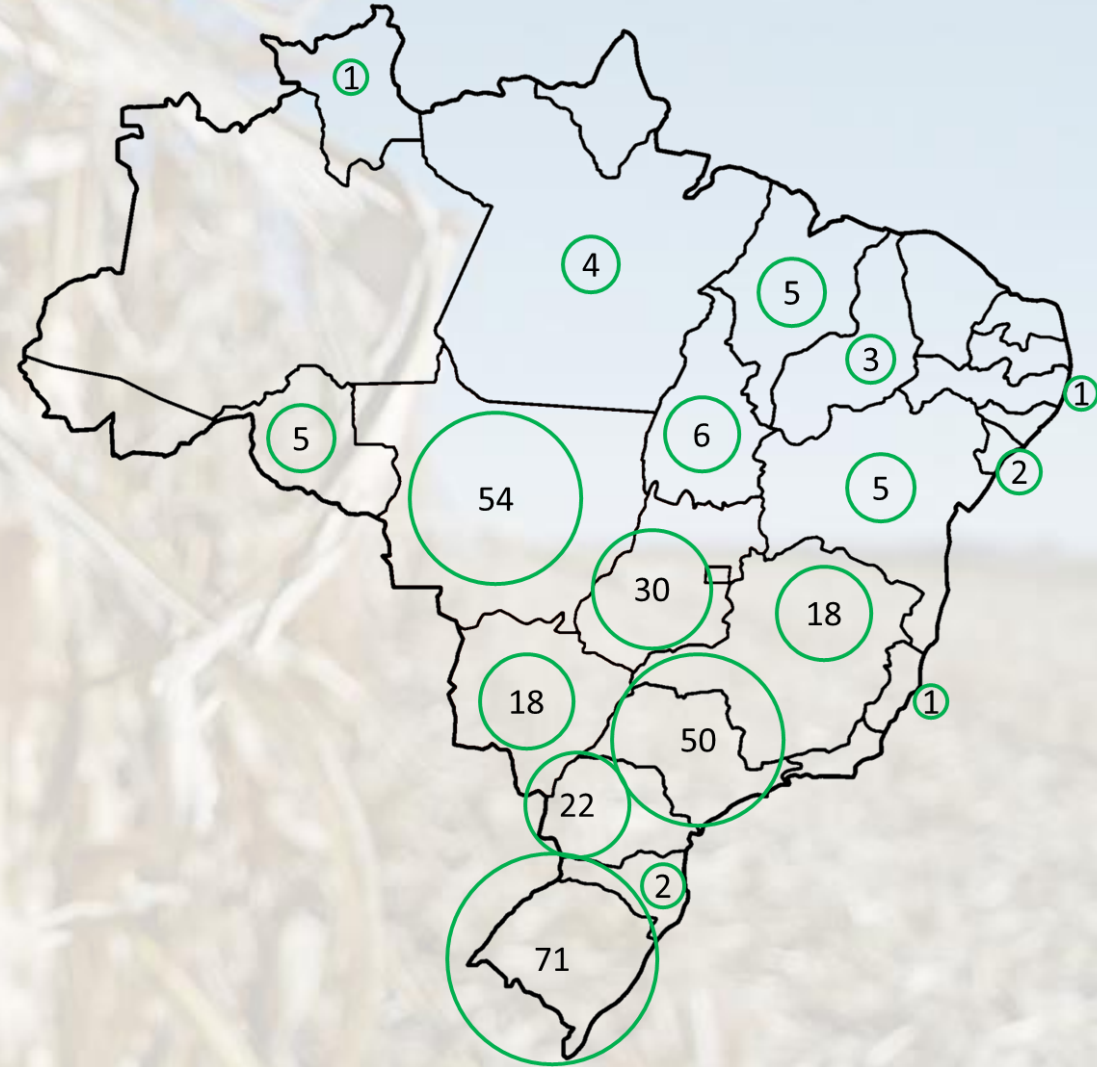
Bee conservation campaign



UTM Crop Spraying Module

- Agricultural Aircraft Pilots do not check NOTAMs - Air Deconfliction

As agricultural aviation companies have a radius of action, it is possible to actively contact them to enable a strategic deconfliction



UTM Crop Spraying Module

During experiments carried out in GO-Brazil, we manually contacted agricultural aviation companies in the region to coordinate drone flights

Many Agricultural Aviation Companies decided to purchase a drone after the experiment



UTM Crop Spraying Module

- It creates an additional Data Requirement for UTM-CSM: location, area of actuation and contact of all agricultural aviation companies in the country
- Develop an automatic report to be sent to the “affected” agricultural aviation companies after a flight request in UTM-CSM
- Create a layer of visualization for the UTM-CSM allowing the identification of the agricultural aviation companies of the region



Challenges

- Some drone operators fear for their security by having their location, date and time sent to others → Increase in the number of flight requests and with educational campaigns
- This method does not include a prioritization technique for manned aircraft → In the near future the agricultural aviation companies needs to collaborate in UTM-CSM
- The proposed strategic deconfliction is not enough to mitigate all the risks involved. It is still recommended to have an DAA technology to add a last layer of safety against air collision → In Brazil, anti collision lighting systems are required for BVLOS applications. We are evaluating to adapt this lighting technology for manned aircraft pilots awareness

Thank you!



AL Drones

From **Aviation.**
To **Drones.**

www.aldrones.com.br

contato@aldrones.com.br