



PJ.18-06a – ADS-C improving ground TP

Mr. Angel Olbés
Systems and Solutions Expert
Indra Sistemas

DIGITS Webinar 1st Dec 2020



founding members



Problem statement

FDPs compute trajectories used in safety critical processes:

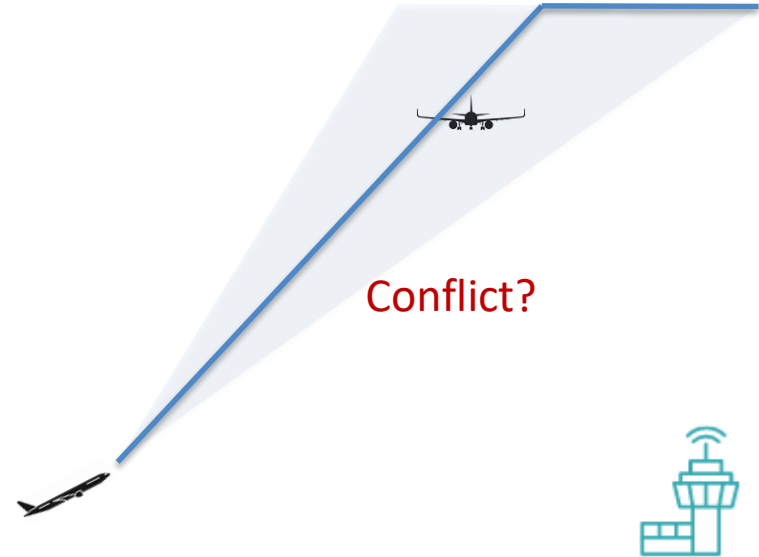
- Separation
- Arrival Queuing

There is some uncertainty in the prediction due to:

- Technical limitations
- Operational limitations

Moving towards TBO:

All stakeholders contributing to a synchronized view of the flight trajectory



18-06a Scope and Objectives

18-06a is a **TECHNICAL** solution.

Objective: to improve ground trajectory prediction using new information from AUs

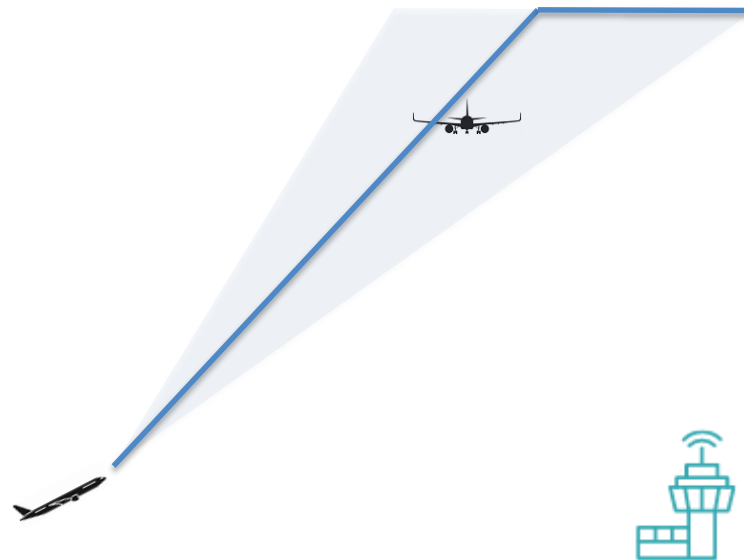
How? Two options:

- To use raw EPP data as a prediction?
- To improve the TP engine?

Both options are not self-exclusive!

18-06a focus:

Improving the TP engine using ADS-C data



18-06a Scope and Objectives

18-06a is a **TECHNICAL** solution.

Objective: to improve ground trajectory prediction using new information from AUs

How? Two options:

- To use raw EPP data as a prediction?
- To improve the TP engine?

Both options are not self-exclusive!

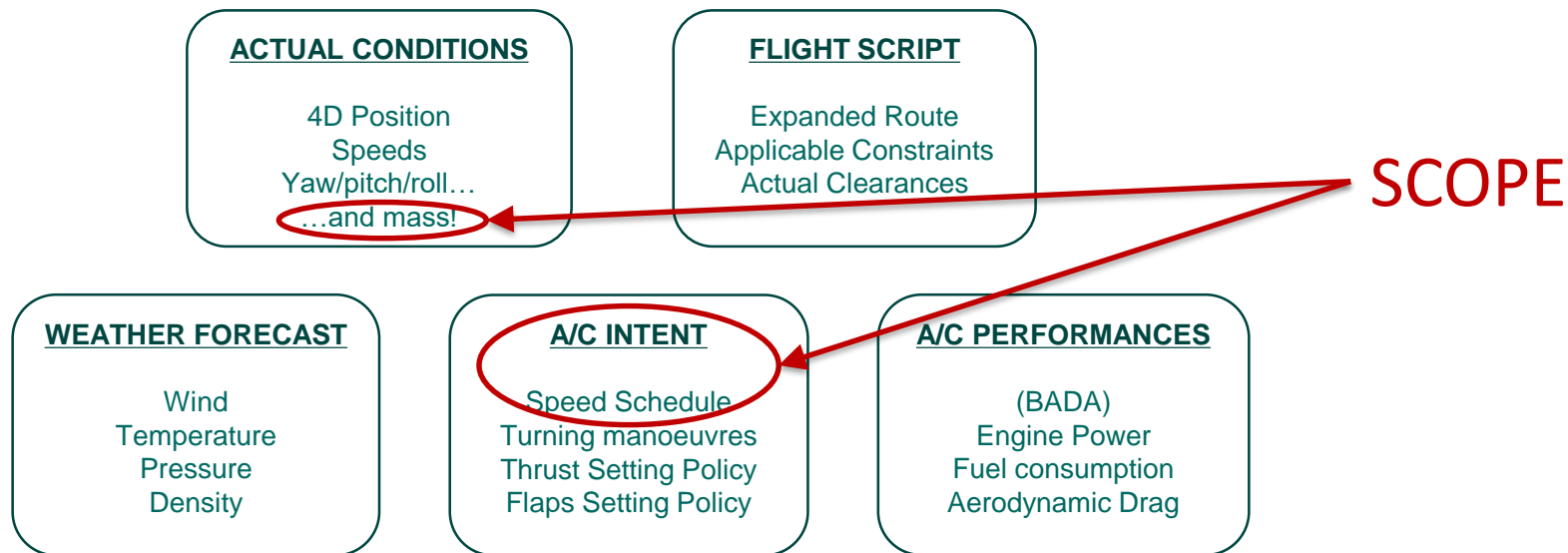
18-06a focus:

Improving the TP engine using ADS-C data



Technical approach: improving inputs

Trajectory prediction = Physics (formulas) + **Input Data/Parameters**



Validation Exercises & Partners

Partners	Technique	ADS-C data source
ENAV (DSNA/BULATSA/COOPANS) LEONARDO	Replay of real flights	Revenue flights using already delivered PJ31 Airbus Aircrafts
ECTRL MUAC INDRA	Replay of real flights	Revenue flights using already delivered PJ31 Airbus Aircrafts
DFS INDRA	Real Time Simulation	PAS@ATM Flight Simulator (Airbus) Full Flight Simulator (Lufthansa)
NATS INDRA	Real Time Simulation	Thales Avionics Simulator

Validation Results & Conclusions



There are improvements in the enhanced TP when the ADS-C mass and speed schedule deviate from the reference values used in BADA (simulation environment).
The results provide enough confidence to continue the validations in Wave 2



The solution could not validate an improvement of the enhanced TP because of the effect created by the use of revenue flights including ATCO inputs.
Additionally, the limited sample size considered makes it difficult to quantify results and fully assess the impact of using the reports.



Identified some additional uncertainty sources.
Proposed ideas to go beyond existing limitations

Regarding TP improvements

- Performance model Calibration
- Improve MET data
- Refine turning manoeuvres
- Use EPP predicted speeds
- Non-Idle descending manoeuvres

Regarding validation approach

- Larger and better flights sample
- Isolate analysis from ATCO clearances
- Share same method and metrics





ADS-C improving ground TP

Thank you very much
for your attention!



founding members

