

Highly Heterogeneous Data and Machine Learning Models in Air Traffic Control Application

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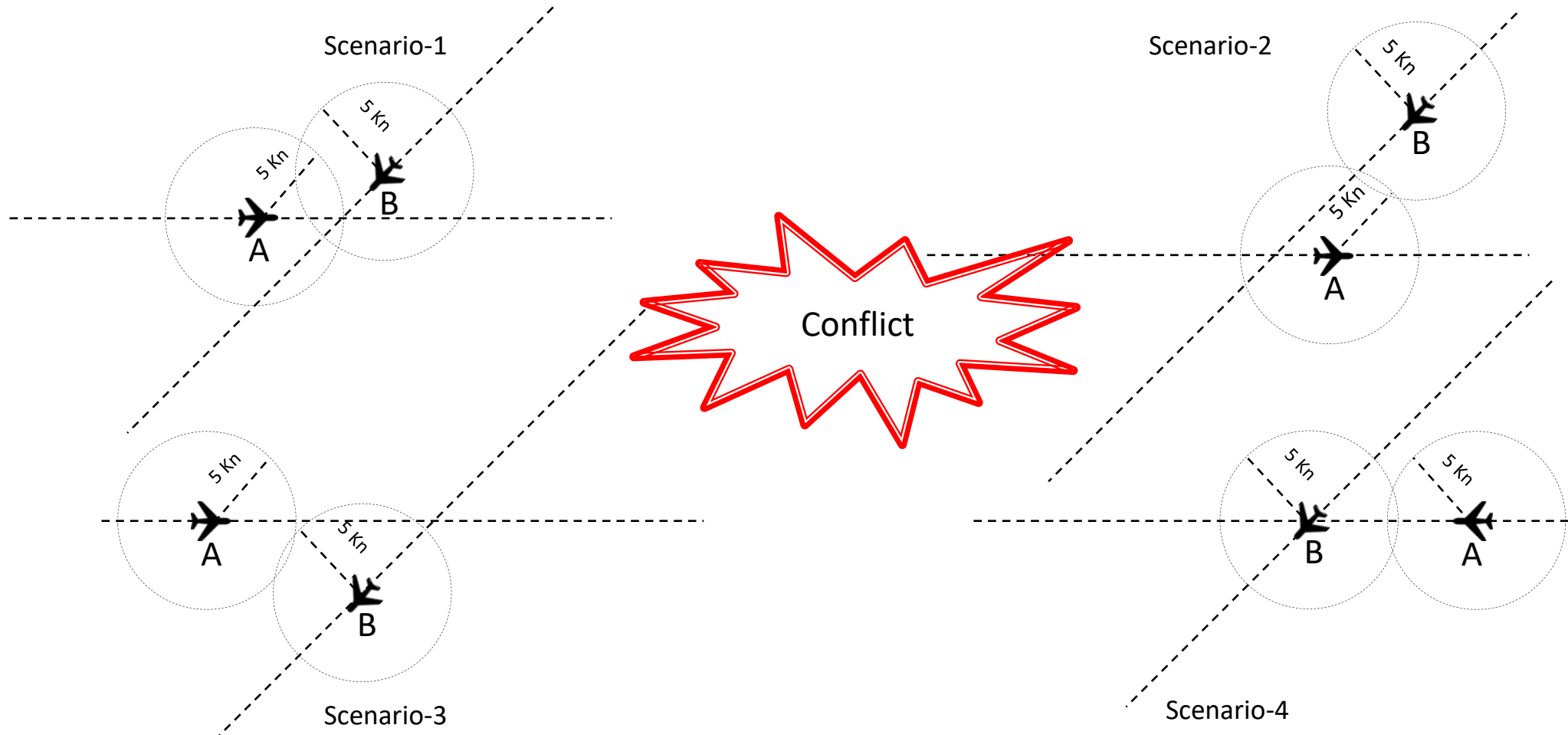
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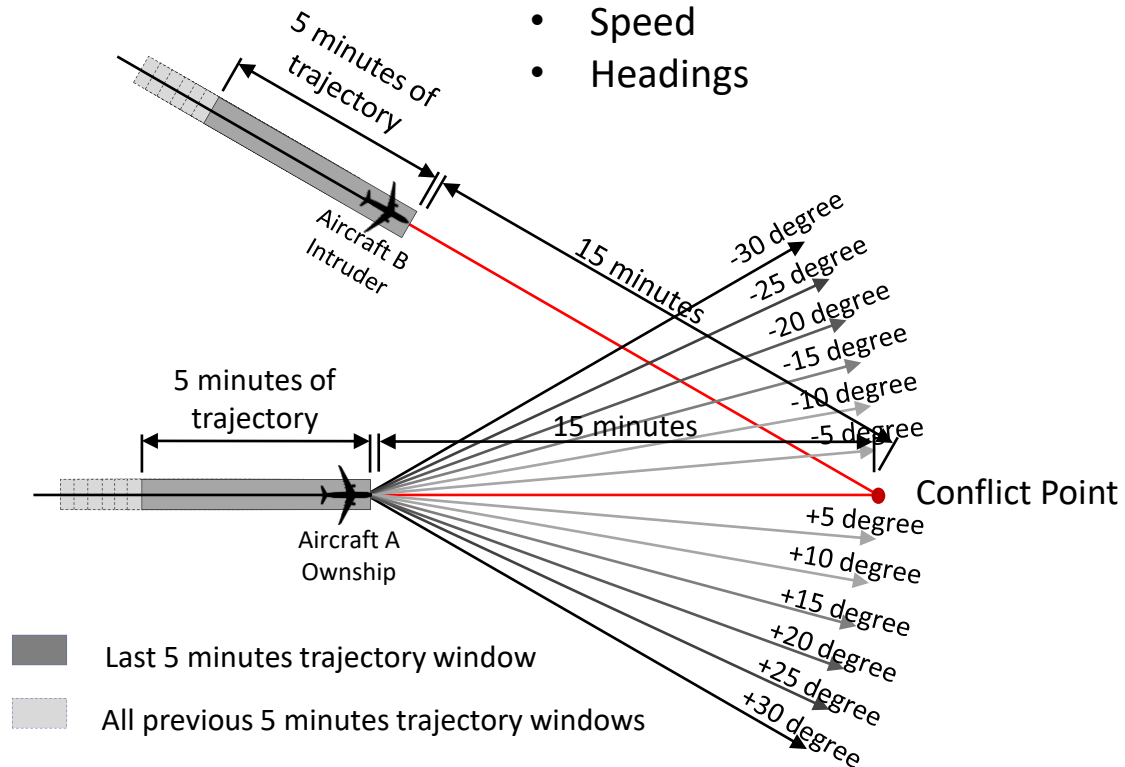
Aircraft conflict scenario



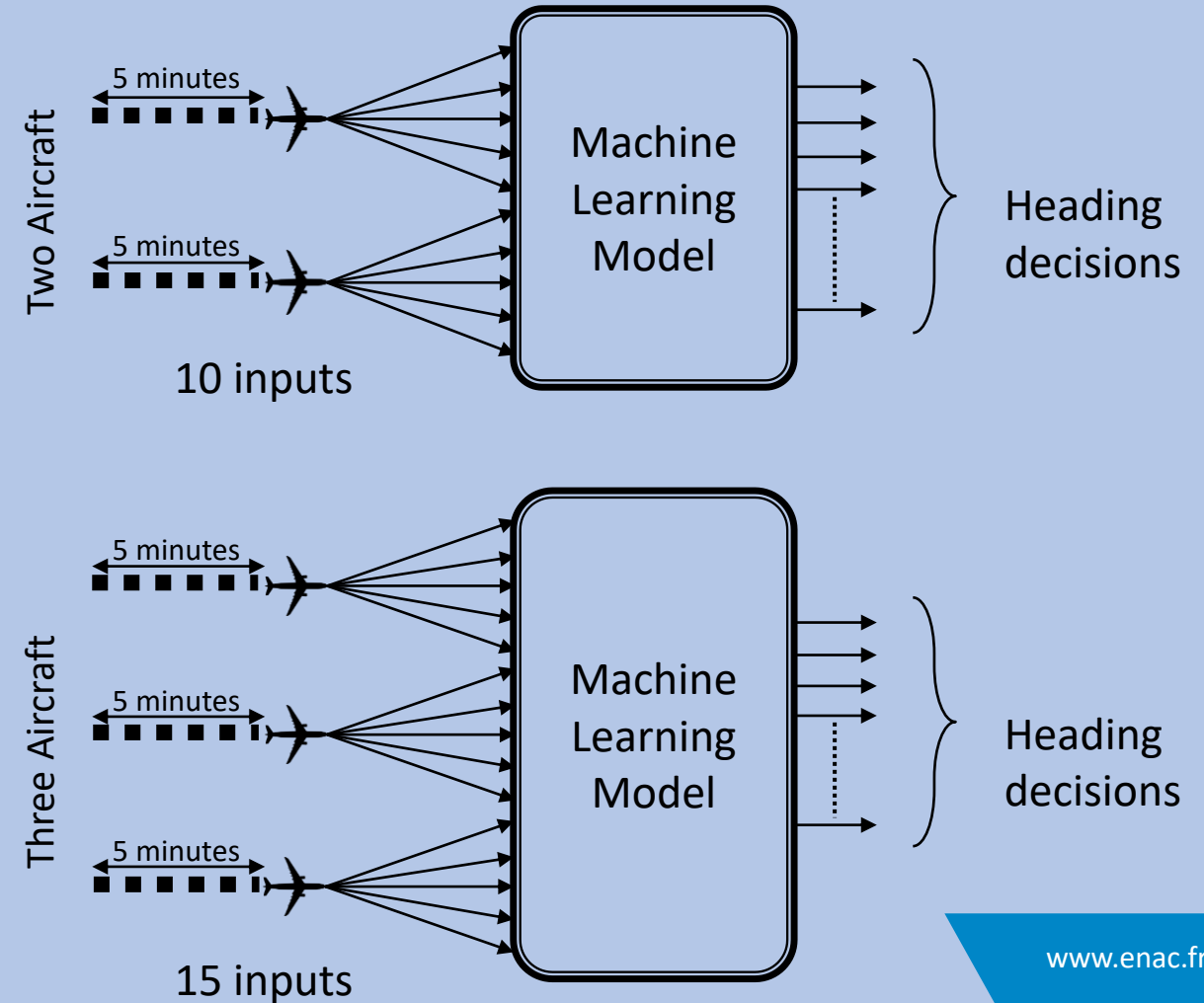
Problem

Basic parameters

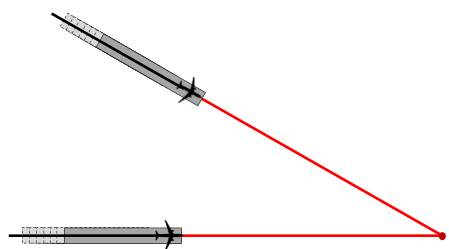
- Latitude
- Longitude
- Altitude
- Speed
- Headings



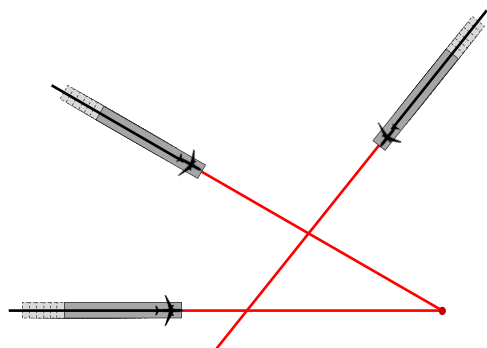
Model based on trajectory



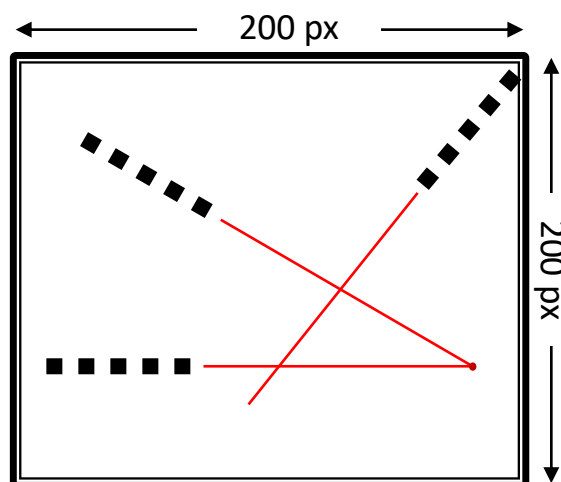
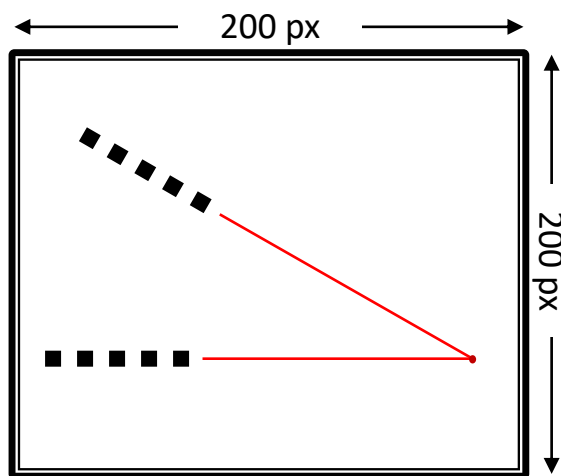
Problem



Two aircraft

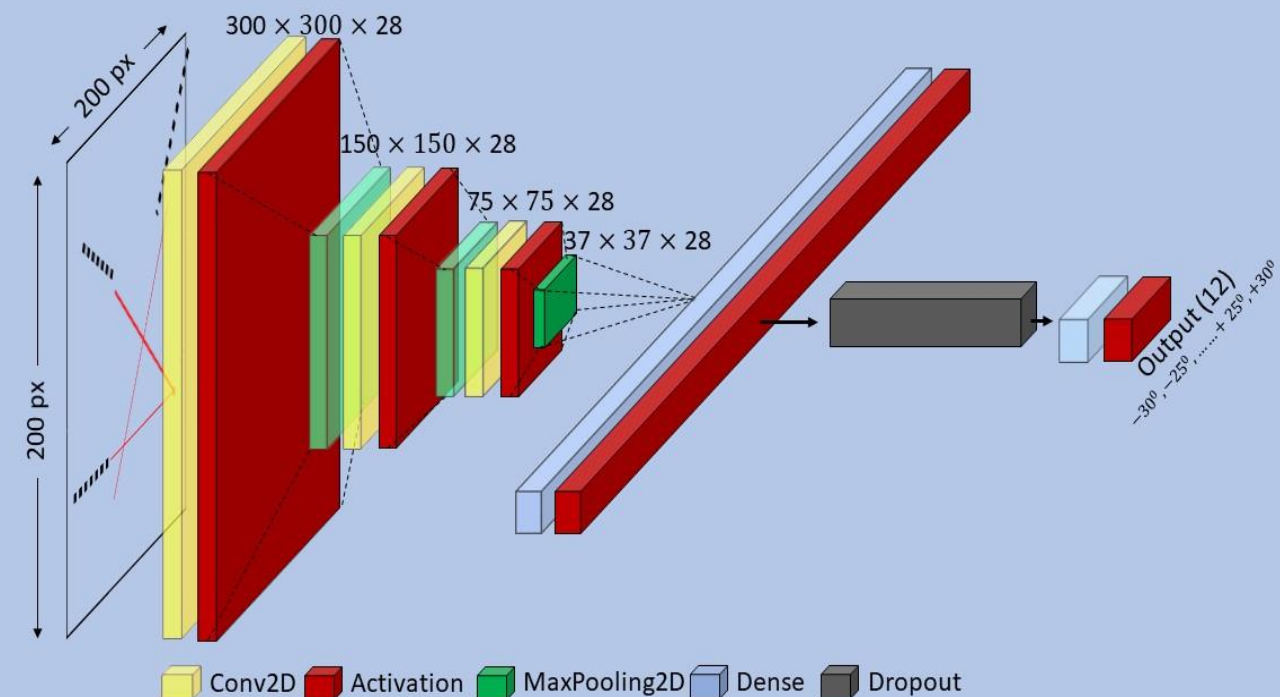


Three aircraft



Model based on image

A variable number of aircraft can be possible as an input

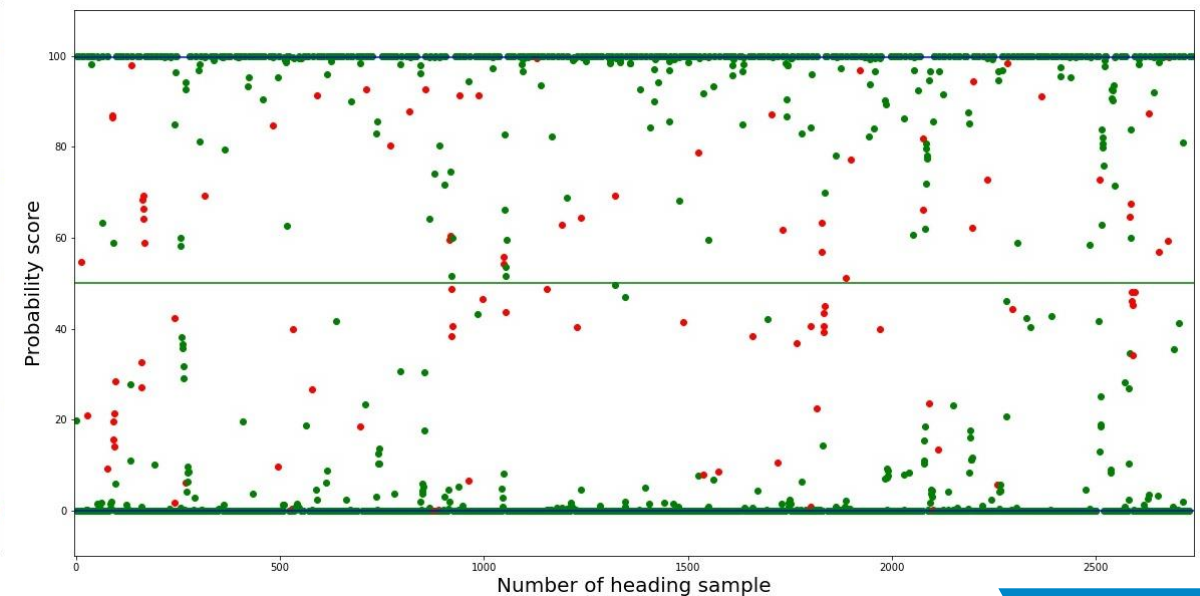
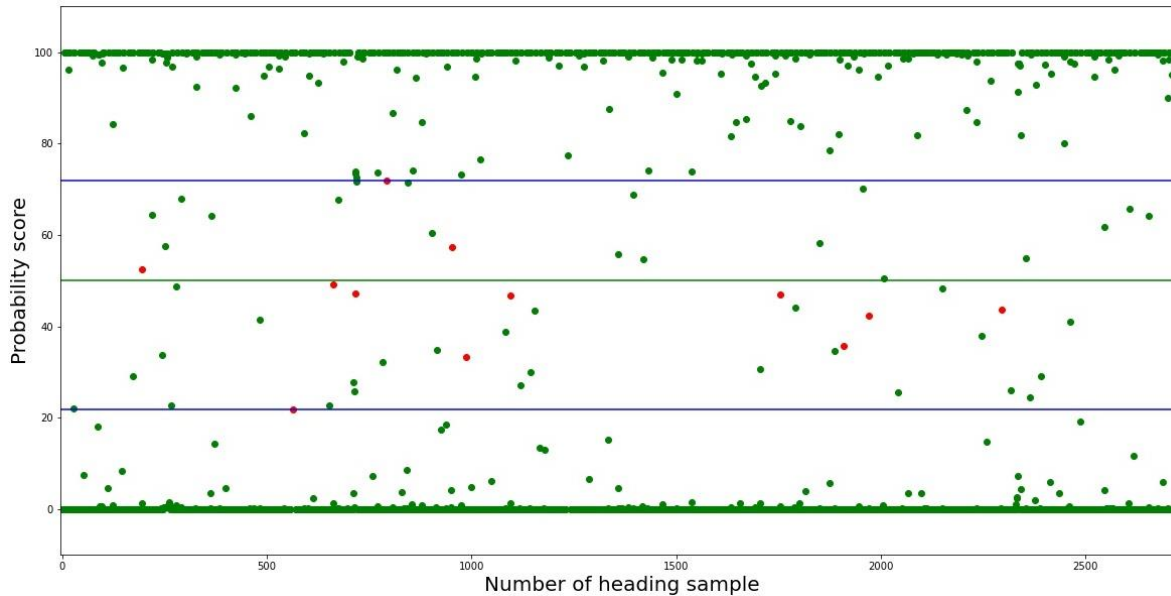


Results

Test

Validation

Model	Acc	Acc	auROC	auPR	S_p	S_n	PPV	FNR	FPR	MCC	F_1
Model _{img}	98.97%	99.16%	0.999	0.999	99.41%	98.66%	98.82%	1.34%	0.59%	0.981	0.987
Model _{trj}	96.38%	98.76%	0.999	0.999	99.20%	97.87%	98.40%	2.13%	0.80%	0.972	0.981





Publications

Conferences

1. Md Siddiqur Rahman, Laurent Lapasset and Josiane Mothe. (2022). **Multi-label Classification of Aircraft Heading Changes using Neural Network to Resolve Conflicts.** In *Proceedings of the 14th International Conference on Agents and Artificial Intelligence - Volume 3*, ISBN 978-989-758-547-0, ISSN 2184-433X, pages 403-411 (Accepted)
2. Md Siddiqur Rahman, Laurent Lapasset and Josiane Mothe. (2021). **Aircraft Conflict Resolution using Convolutional Neural Network on Trajectory Image.** In *Proceedings of the 21st International Conference on Intelligent Systems Design and Applications* (Accepted)
3. Md Siddiqur Rahman. (2020). **Supervised machine learning model to help controllers solving aircraft conflicts.** In *ADBIS, TPDL and EDA 2020 Common Workshops and Doctoral Consortium*, pages 355-361. Springer, 2020. (Accepted)

Poster

1. Laurent Lapasset, Md Siddiqur Rahman, and Josiane Mothe (2020): **Solving aircraft conflicts: data resources.** In *1st International Conference on Cognitive Aircraft Systems (ICCAS 2020)*. p. 76 (2020) (Accepted)