

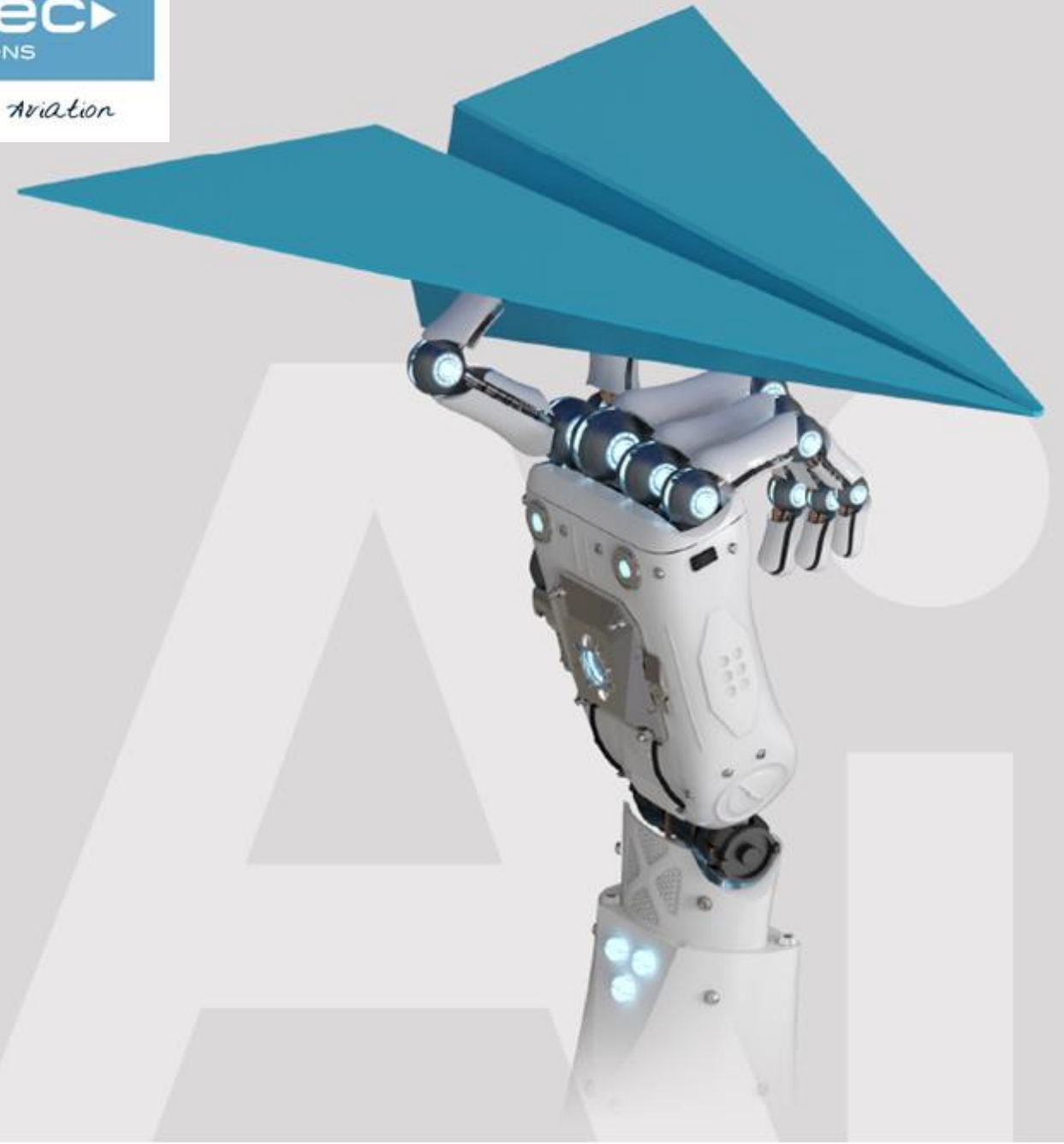


# SAFETERM AI ENHANCED RPAS FLIGHT TERMINATION SYSTEM

Juan Ignacio del Valle  
Project Officer Air Programmes - EDA

Eugenio Sillero  
Project Manager - GMV

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# SAFETERM USE CASE



- Large Remote Piloted Aircraft System (RPAS) operation.
- + C2 Datalink loss → Contingency procedure to airfield or Flight Termination Area (FTA)
- + Degraded condition (e.g. power loss) → all predefined airfields/termination area out of reach

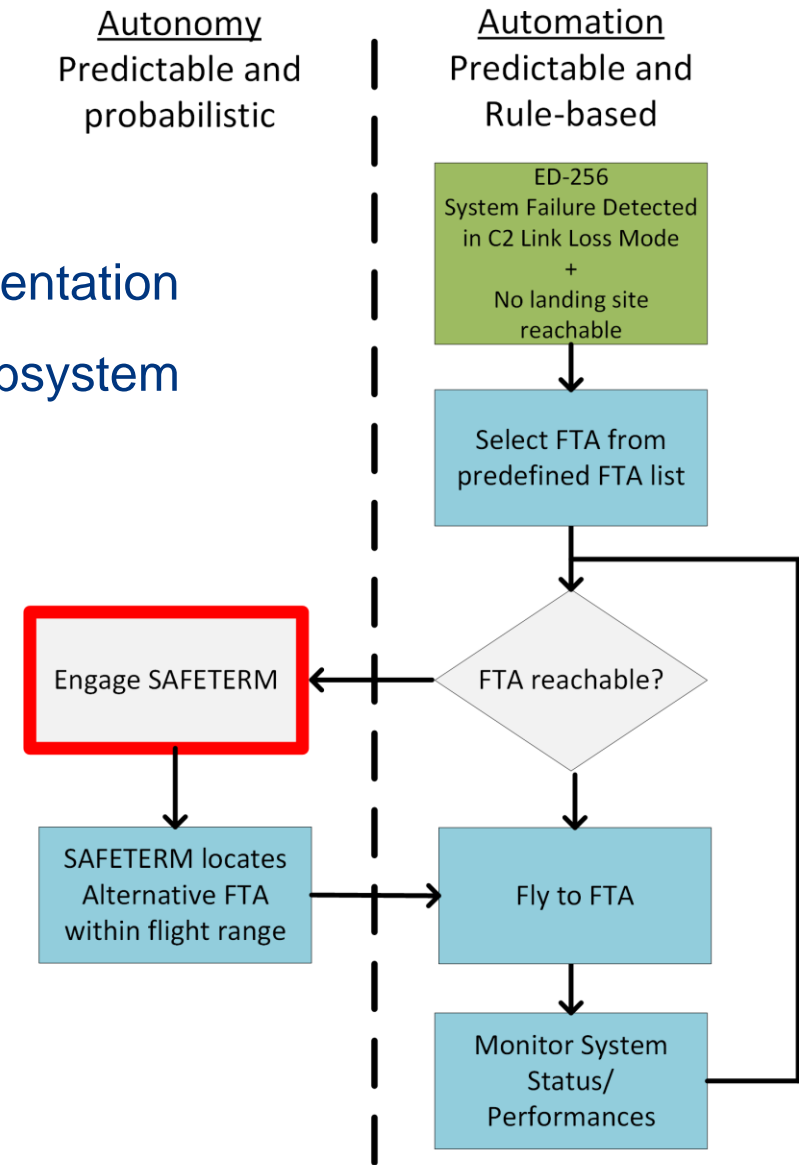
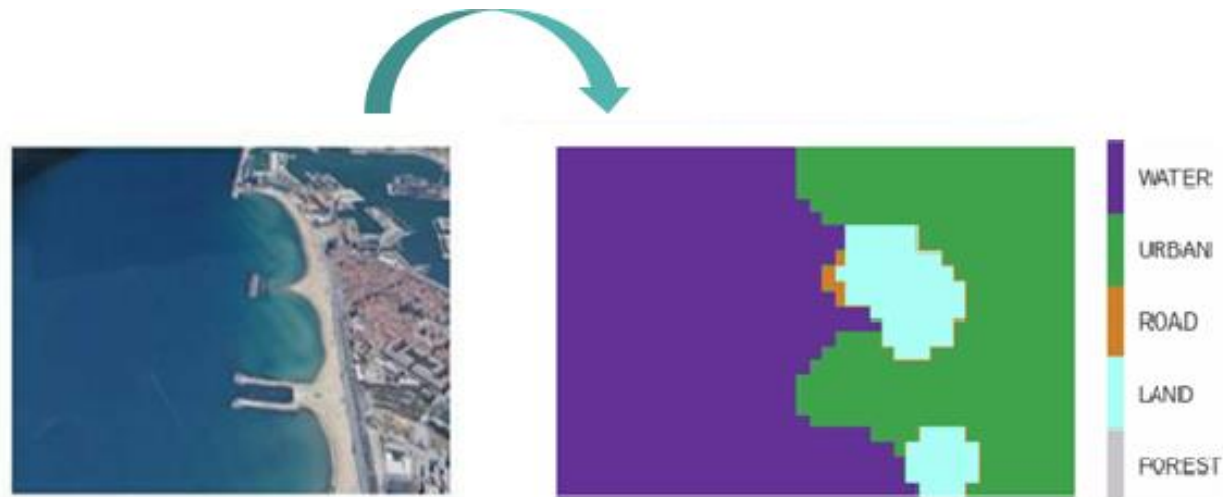


## Objective: Minimise damages caused by flight into terrain

- Flight Termination Procedure enhancement:
  - Image recognition using video feed
  - Classify different areas
  - Select the safest Alternative FTA within flight range
  - Terminate flight into Alternative FTA

# SAFETERM DESIGN CONSIDERATIONS

- Limited scope for the AI/ML item: Image recognition / multiclass segmentation
- AI/ML-based functions triggered by (conventional/rule based) RPA subsystem
- Static predefined classes/priorities (water, land, forest...)
- Rule based selection of Alternative Flight Termination Area

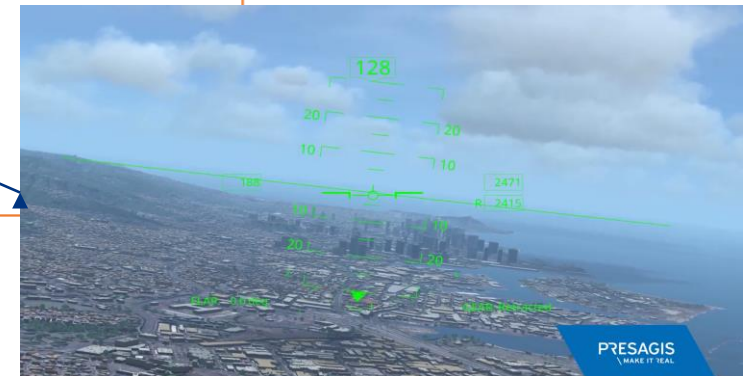
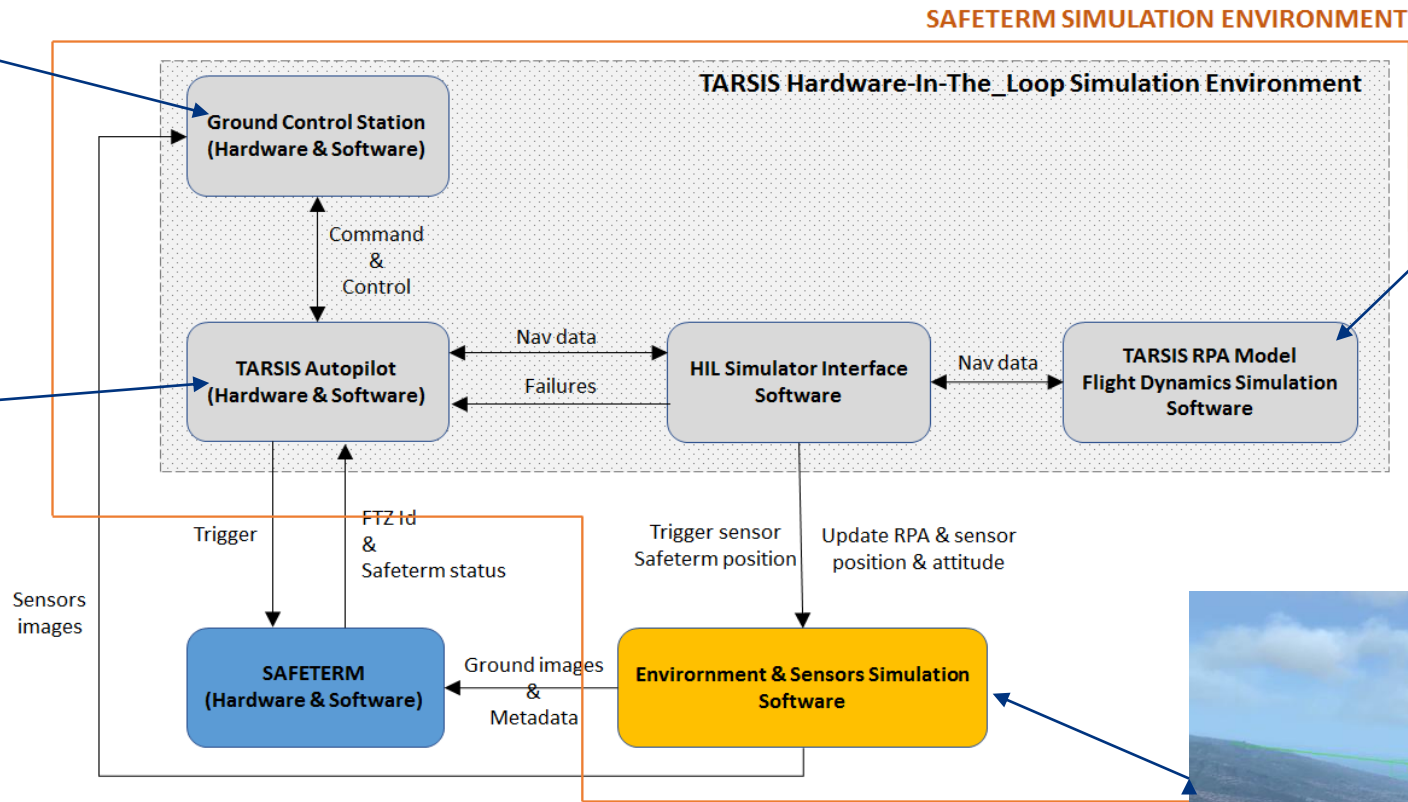




# ALIGNMENT WITH EASA ROADMAP – SAFETERM PROTOTYPE CLASSIFICATION

EASA AI Roadmap AI Level (subsystem)	Function allocated to the (sub) systems (adapted Harvis LOAT terminology)	SAFETERM
<b>Level 1A Human augmentation</b>	Support to information acquisition	X
	Support to information analysis	X
<b>Level 1B Human assistance</b>	Support to decision/action selection	X
<b>Level 2 Human-AI collaboration</b>	Overseen automatic decision/action selection	X
	Overseen automatic action implementation	X
<b>Level 3A More autonomous AI</b>	Overridable automatic decision/action selection	X
	Overridable automatic action implementation	X
<b>Level 3B More autonomous AI</b>	Non-Overridable automatic decision/action selection	Multiclass segmentation Alt. Flight Termination Area prioritization/decision
	Non-Overridable automatic action implementation	Autopilot

# SAFETERM PROOF OF CONCEPT



# DEVELOPMENT CONSIDERATIONS

**Complete development lifecycle has been designed with safety in mind according with the following guidelines:**

- Requirement capture: ODD, safety and performance requirement capture and trace
- Data management: Quality, completeness, representativeness, normalization and maintenance. Special attention is paid to augmentation techniques to cover the gaps in the available data.
- Model selection and training: Metric identification (accuracy, precision, specificity) and fit monitoring (bias and variance). Reproducibility and robustness needs also to be assessed.
- Implementation: Monitoring on the conversion from training to deployment environments.
- Verification: Performance, robustness and execution time as main drivers for quality and validity assessment.
- Integration: Consistence and data integration are verified in order to ensure correct integration with rule-based SW.

# Thank you for your attention !

SAFETERM is a project sponsored by the European Defence Agency and developed by GMV and AERTEC. For more information, visit [www.safeterm.eu](http://www.safeterm.eu)

