AI SPRINT
AI IN SECURE PRIVACY-PRESERVING COMPUTING CONTINUUM

Introduction to the Use Case

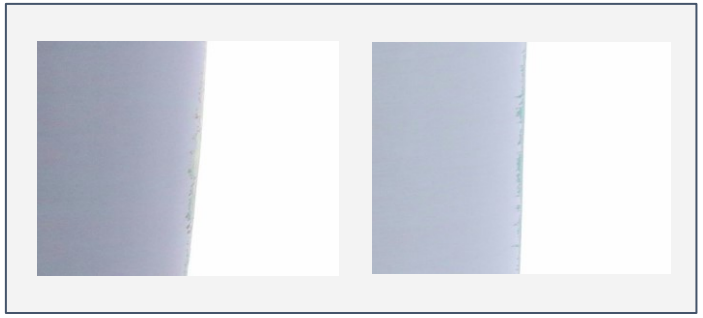
Michał Kłosiński,
7bulls.com, TTAnalysis

AI-SPRINT project has received funding from the European Union Horizoon 2020 research and innovation programme under Grant Agreement **No. 101016577.**

Agenda

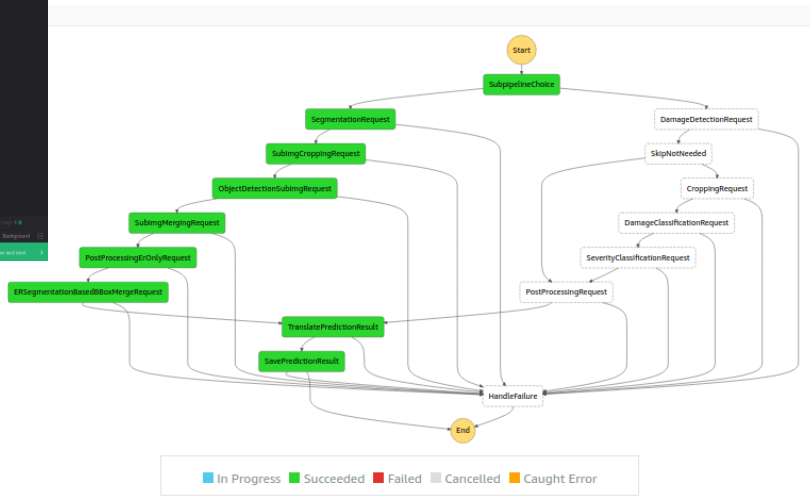
- Wind turbine inspection
- Use case background
- Cloud data processing pipelines
- How AI-SPRINT allows to change data processing approach
- Software stack
- Validation approach

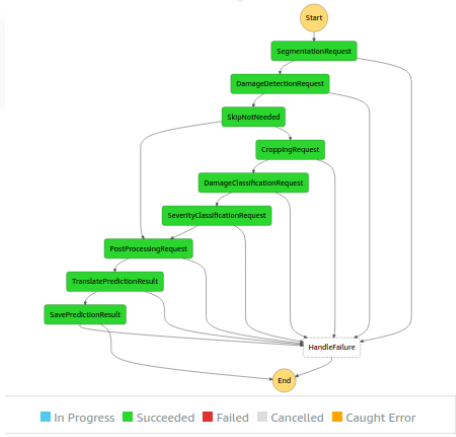
What we are working with ?

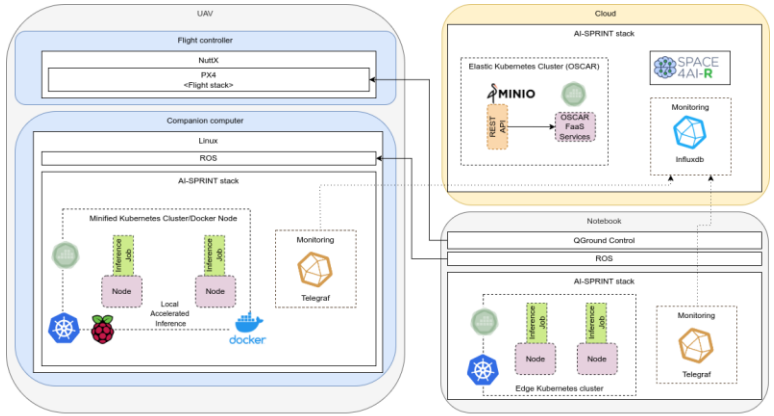


Use Case Background

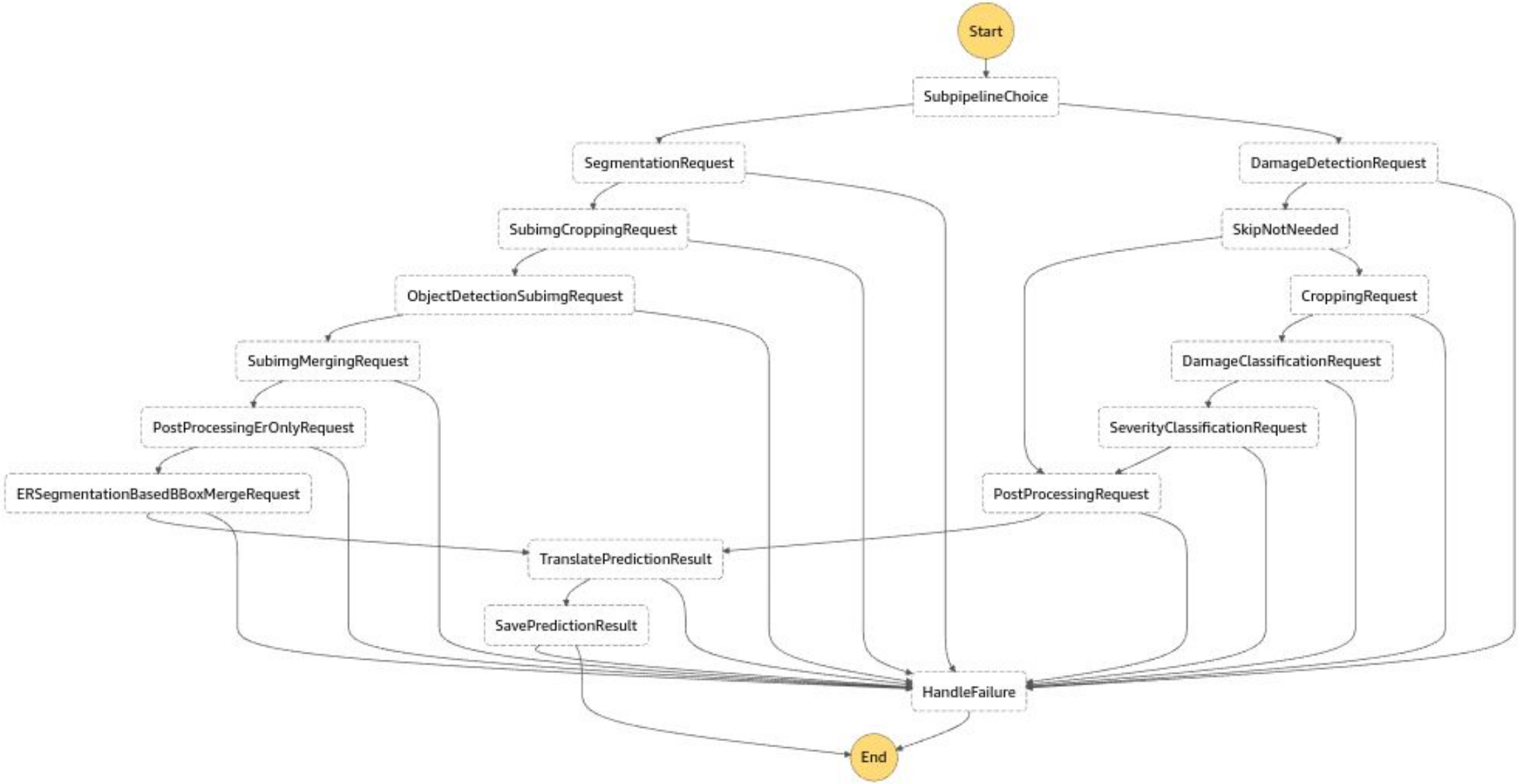
- AirFusion: Cloud Asset Management platform
- Generic AI model integration
- Custom solution using dedicated model
- Flexible multi-step image analysis pipeline
- TTA: Next-gen data processing pipeline
- AI-SPRINT: Seamless data processing on UAV, edge and cloud.





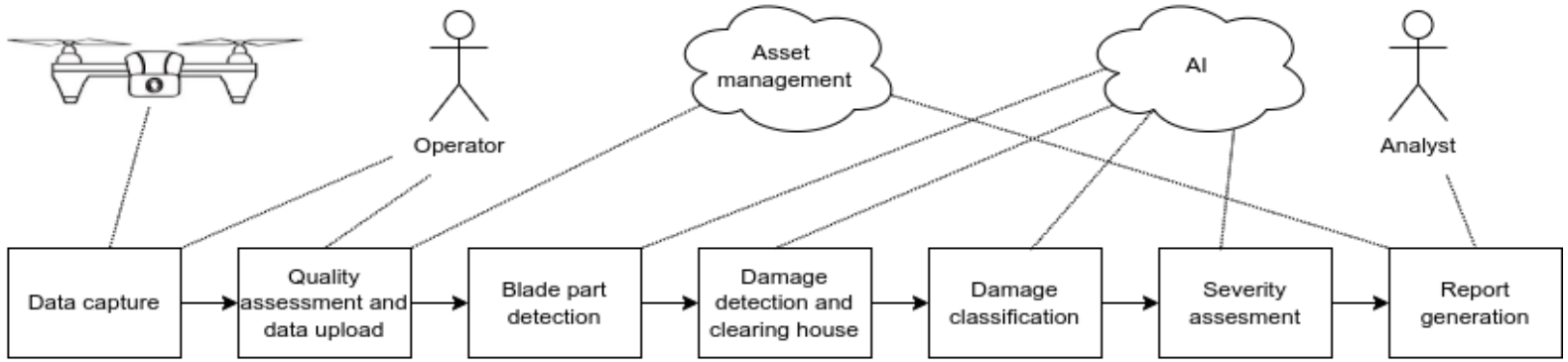


Cloud pipelines we used to work with



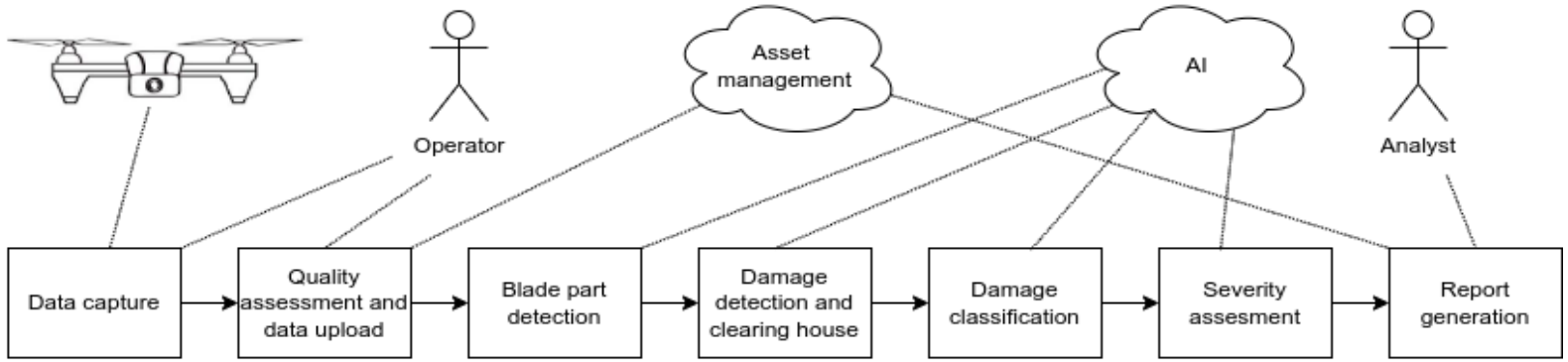
Process transformation

Before

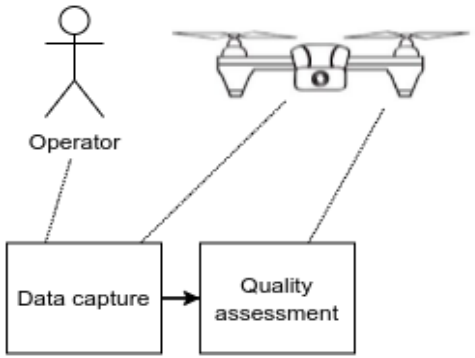


Process transformation

Before

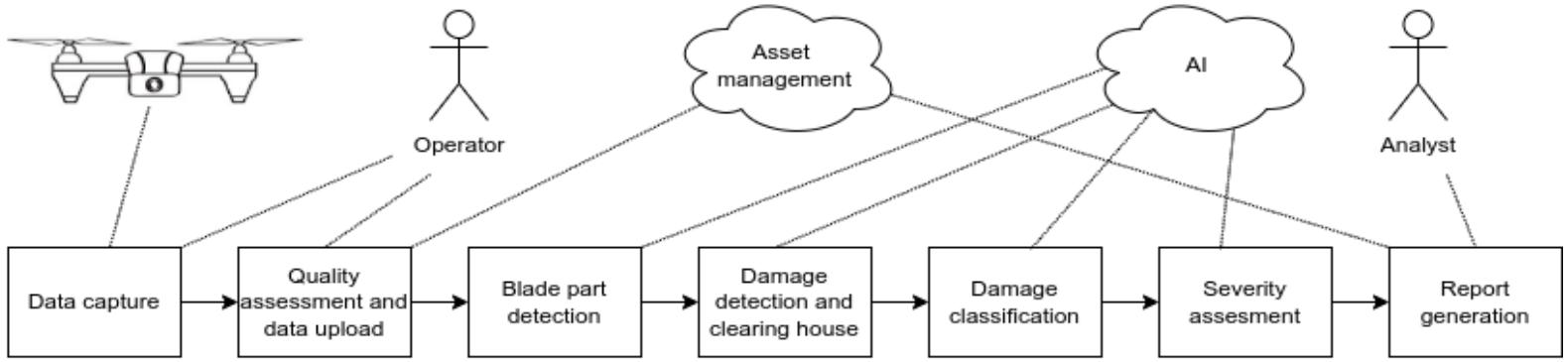


After

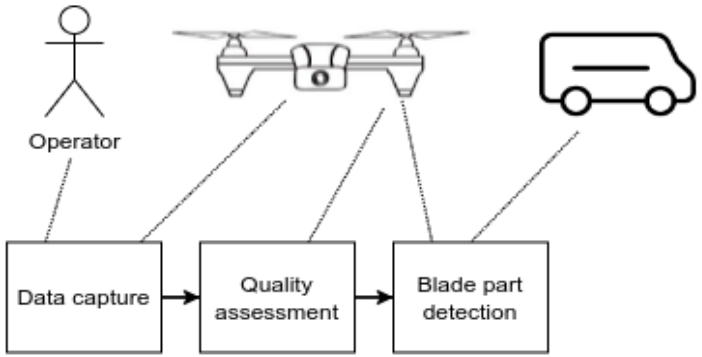


Process transformation

Before

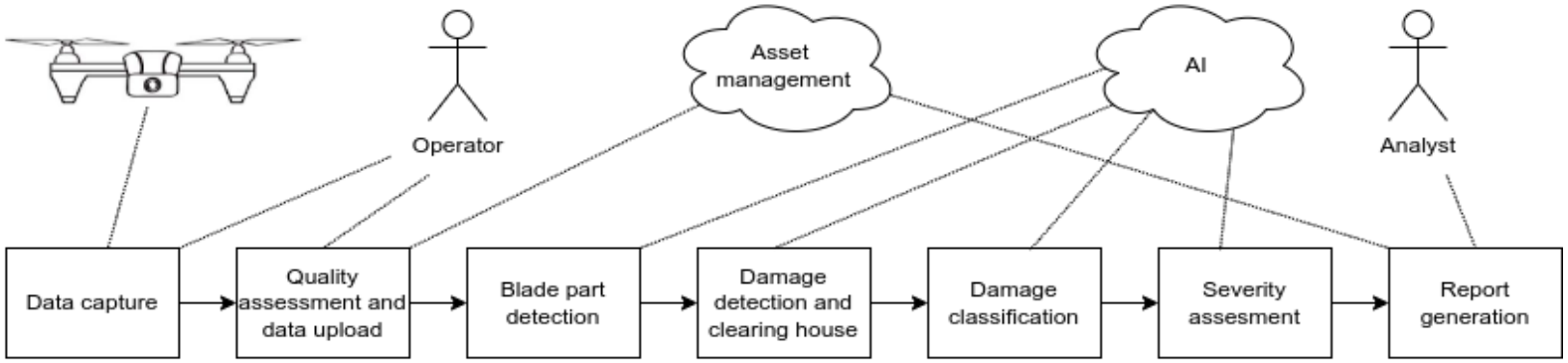


After

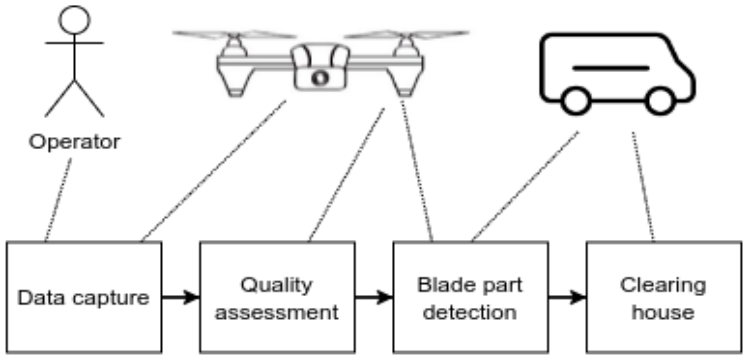


Process transformation

Before

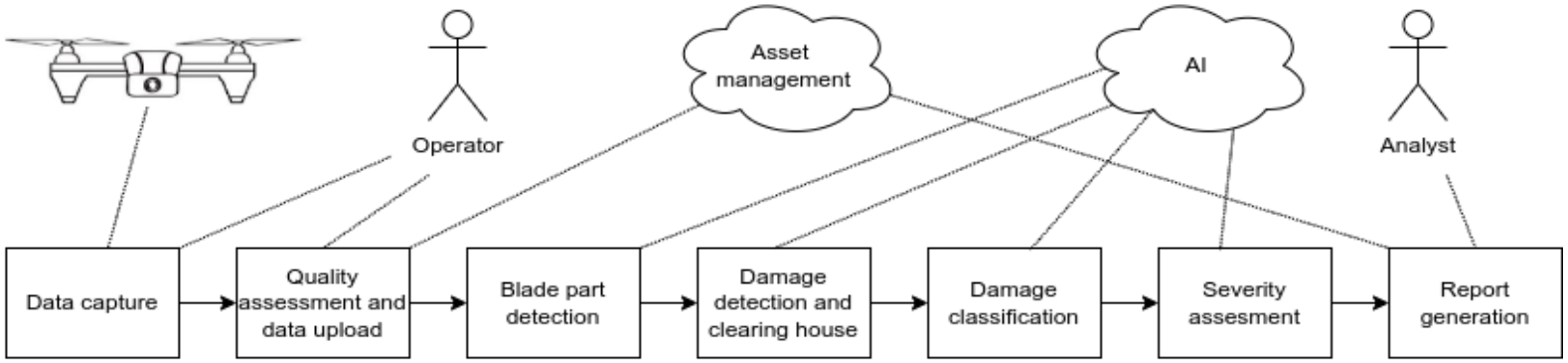


After

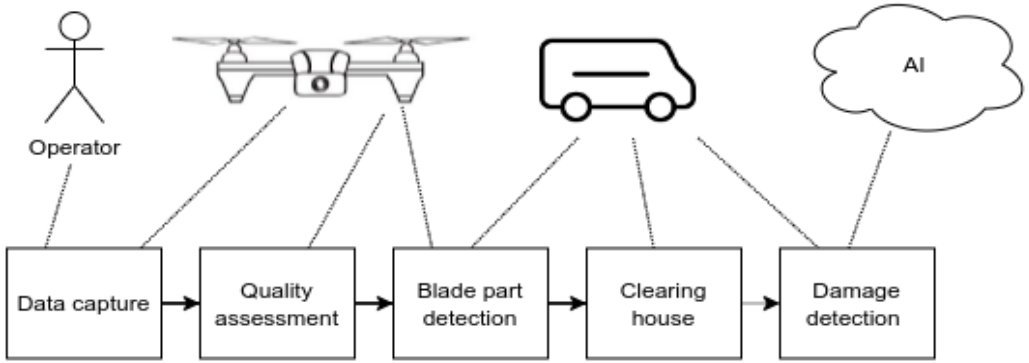


Process transformation

Before

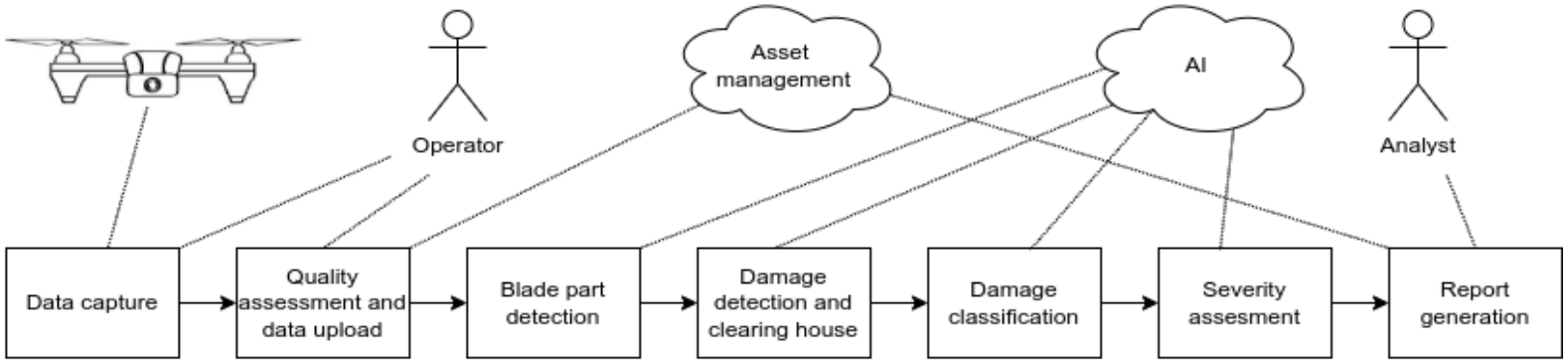


After

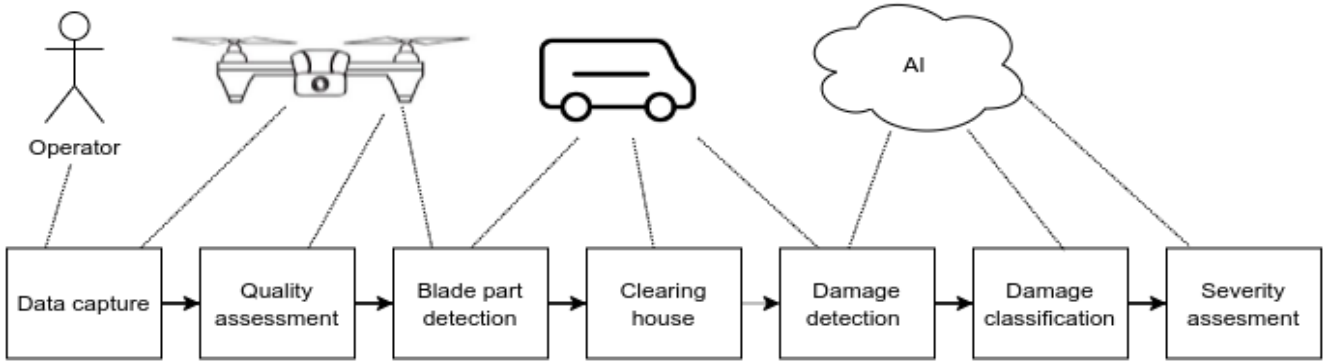


Process transformation

Before

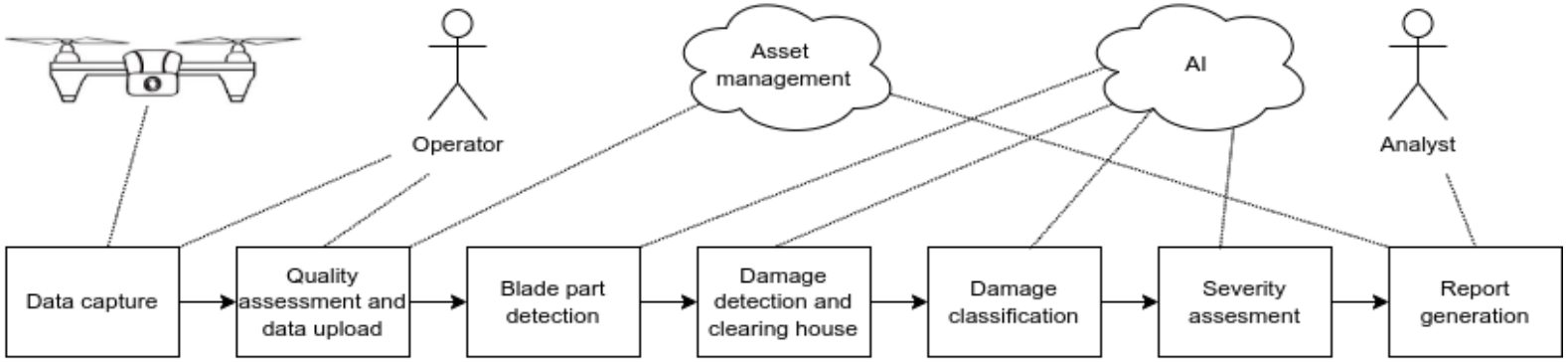


After

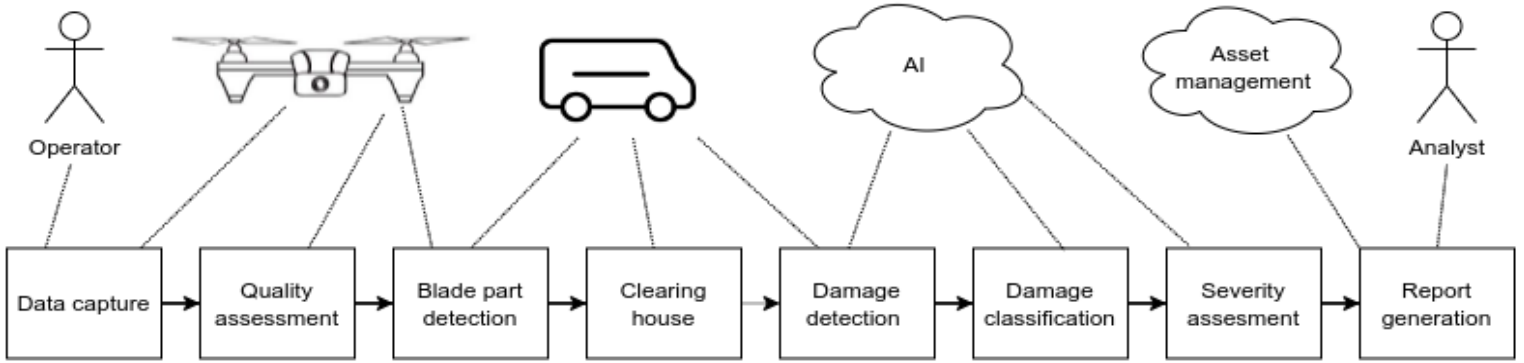


Process transformation

Before

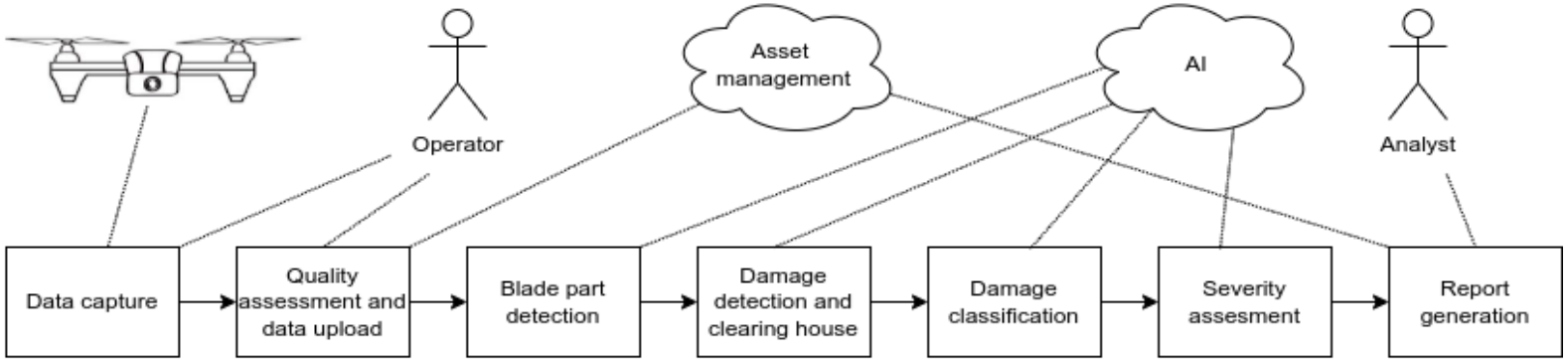


After

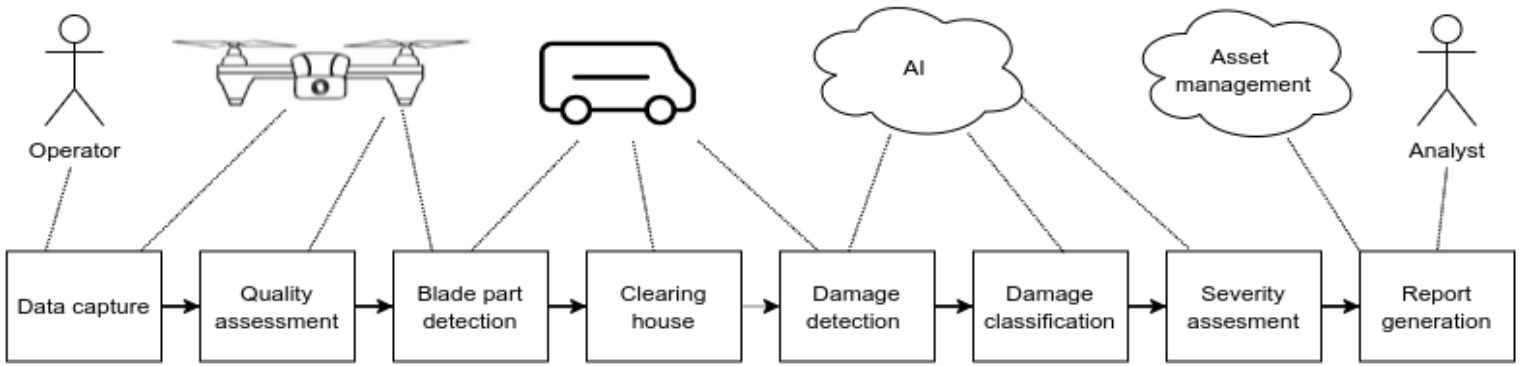


Process transformation

Before



After



Key differences

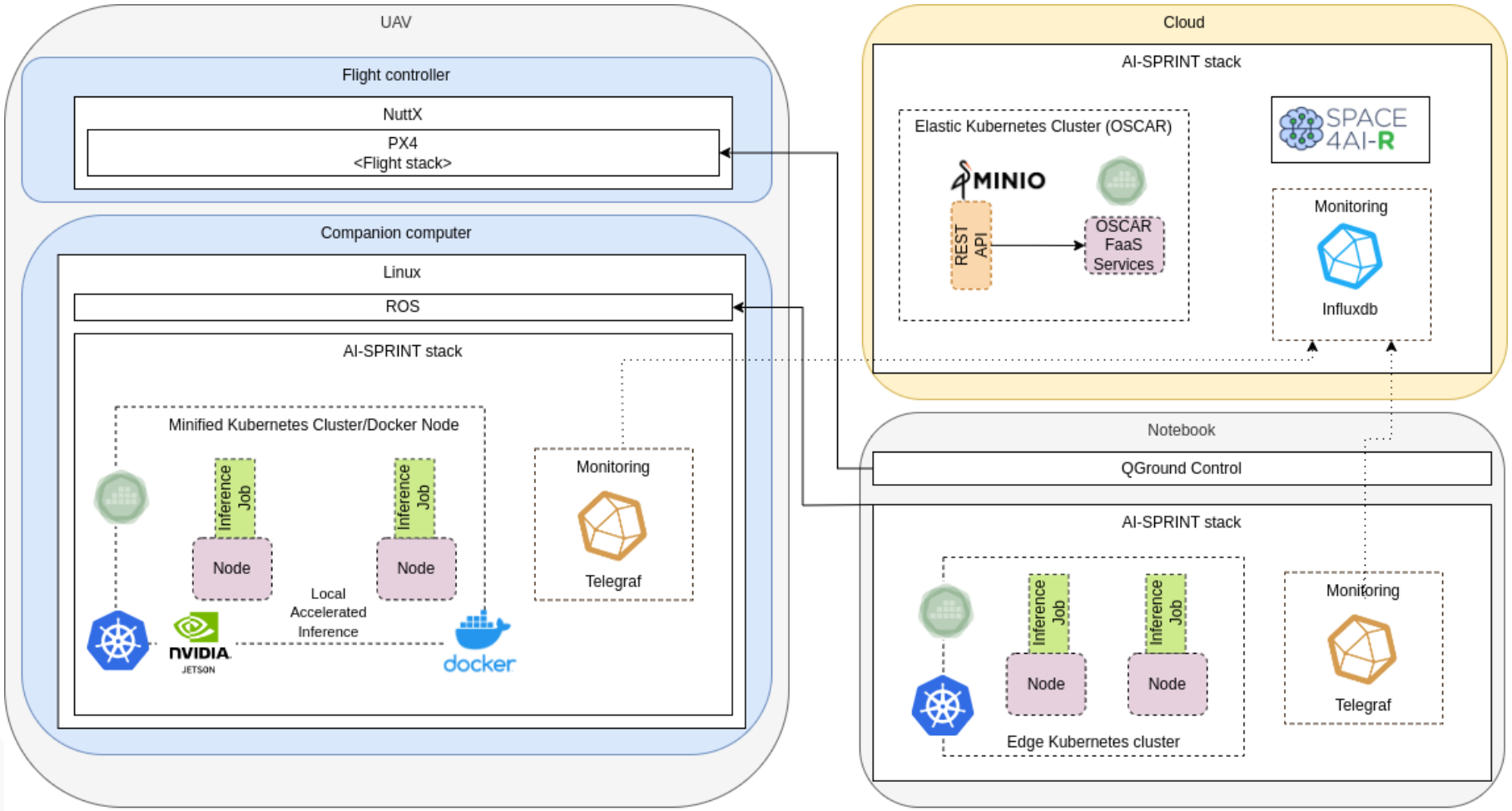
Before:

- Manual quality assessment
- Manual data upload
- All processing done in the cloud
- Batch process

After

- Immediate quality feedback
- No dedicated data upload step: automated process involving initial data analysis
- Asset management application involved only after data is processed
- On-line process

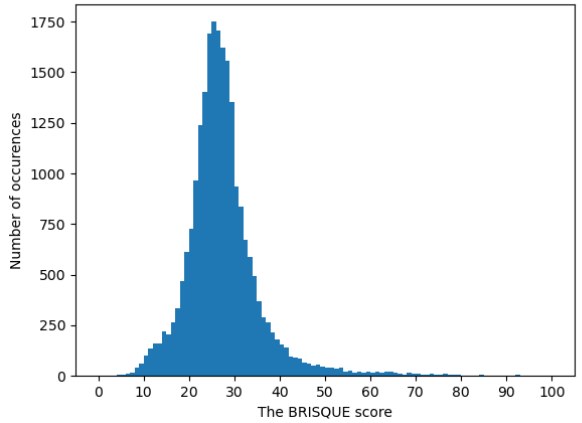
Software stack

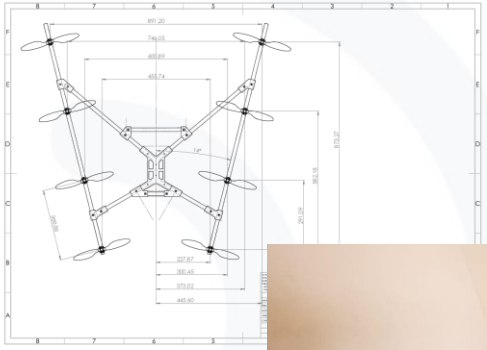


- Software stack on-board UAV:
  - Autopilot: PX4
  - ROS 2.0 (robotic operating system) running on companion computer
- UAV operator software:
  - QGroundControl
- UAV emulation:
  - SITL
  - Gazebo
- Key AI-SPRINT tools:
  - IM
  - Monitoring
  - OSCAR
  - OSCAR-P
  - SPACE4AI

Use Case Validation

- Introduction of AI-SPRINT components into TTA pipelines
- Performance tests of modules running on UAV
- In-lab end-to-end tests of the inference pipeline
- Field validation: Flight with custom built UAV





https://docs.google.com/presentation/d/10VRnQKj8pCusoNK4JwxmwWj4KDRSH4-/edit#slide=id.g25873d3030d_1_162

AI SPRINT
AI IN SECURE PRIVACY-PRESERVING COMPUTING CONTINUUM

Testimonial from the Use Case

Edward Mier-Jędrzejowicz,
TTAnalysis

AI-SPRINT project has received funding from the European Union Horizoon 2020 research and innovation programme under Grant Agreement **No. 101016577.**

- Introduction
- Customer requirements
- Initial Use Case
- AI Sprint enhanced functionality

Functionality enhacements

- On-board processing - NVIDIA
- Immediate Image verification
- Automated drone flight correlation for repeat image scanning
- Edge computing - GPU
- Reduced data download – improved cloud performance

Platform architecture for Multiple Applications

- Wind Turbine blade imaging
- New architecture allows flexibility
- Cross applications – power lines, PV, building structures, civil works, telecom towers
- AI Enhancements for image library development
- Problem identification to Automated Repair service procedures

The AI-SPRINT project has received funding from the European Union Horizon 2020 research and innovation programme under **Grant Agreement No. 101016577**