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Cluster 5 National Contact Point.

GREEN HYDROGEN FUELED UAVs AND HOVERING LAND ASSETS FOR WILDFIRES and RECONNAISSANCE

Hydrogen to the rescue for forest fires

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The GREENET project has received funding from the EU Horizon Europe programme under Grant Agreement No 101069604

This project aims to develop effective and sustainable forest fire fighting in coordination with land side and air side UAV and hovercraft/track vehicles driven by green hydrogen energy

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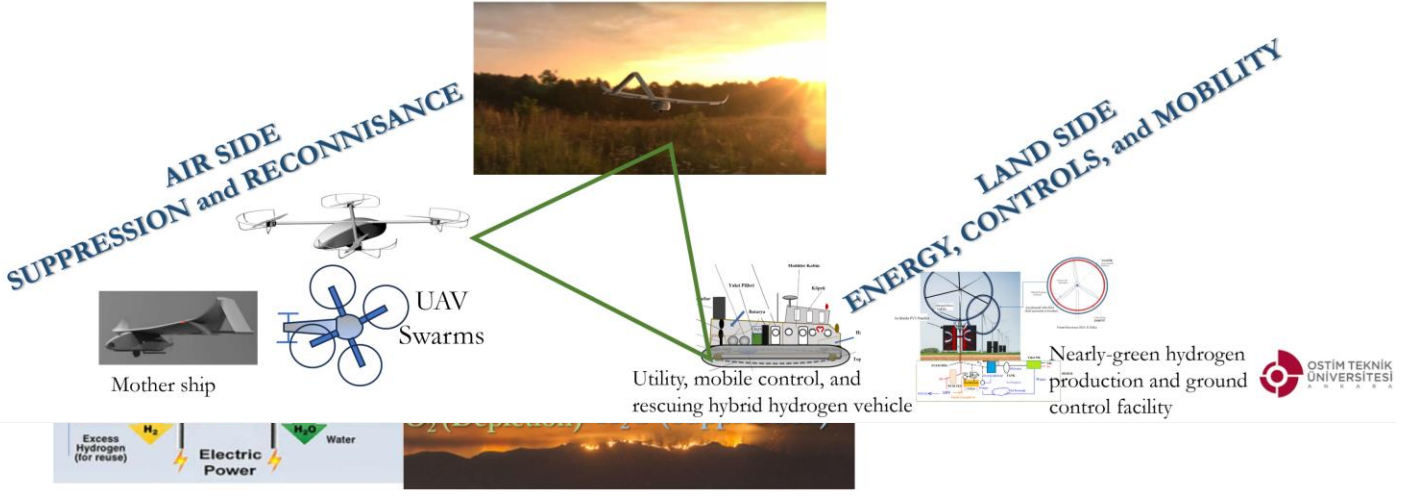
This presentation focuses on a compound UAV system for forest firefighting and rescue missions. The main advantage is that during operational flight the water discharge from the on-board hydrogen fuel cell is added to the on-board water tank. Green hydrogen is produced on the ground base using solar, wind, and geothermal energy (If available). The Mother UAV design incorporates full dedication of AI-based computers for night-time operations and to perform risky flight profiles successfully. Mother UAV, UAV swarms, mini helicopters, hybrid ground control vehicles complement the missions. All operate with green hydrogen produced on the land side.

Coordinated Effort of Multiple Assets



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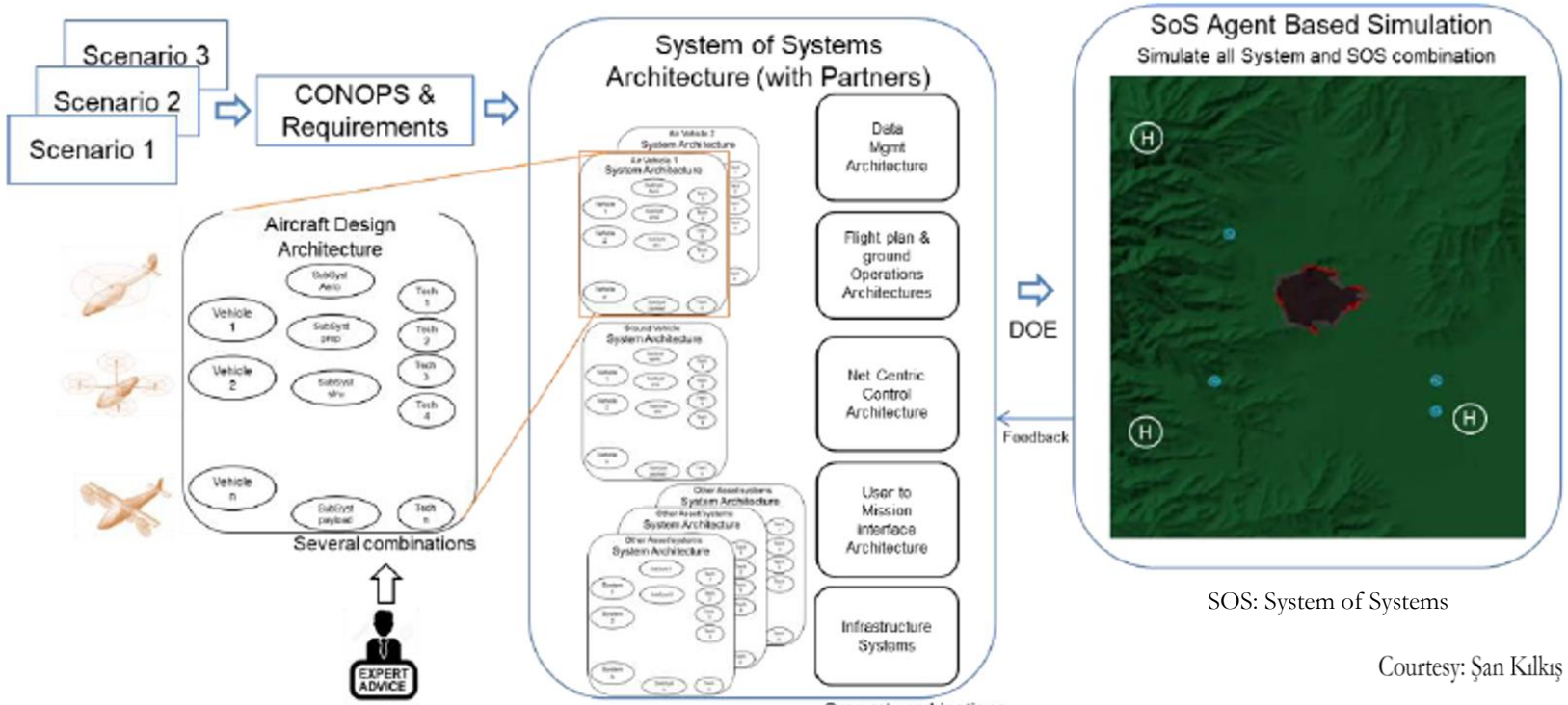
SPECIFIC CONTRIBUTION TO THE TOPIC/AREA

Four Major Prongs of Innovation

- **Green hydrogen generation both on the land side and mobile land side assets**
- **Hydrogen fueled UAV**
- **Hydrogen may also be used for fire circumvention**
- **Complete coordination with the landside and the air side assets by the system of systems approach**



SOS: System of Systems

Courtesy: Şan Kılkış

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MAIN ATTRIBUTES and COOPERATION GOALS

Main Attributes

- Hydrogen combustion is cleaner than fuel cells but noisier.
- Distributed electric propulsion (DEP) is quieter at take off and landing but at the cruising flight it does not help, when rescue missions and sonic detection needs most.
- Propeller shrouds may help.
- How much composites? (Fire susceptibility)
- Hydrogen on board has multiple functions:
  - Propulsion
  - Fire suppression (with additives still under research)
  - Cooling of suppressant water
  - Acoustic surveillance for rescue. Propeller at the back, sensors in the front. Sophisticated electronics
  - Water supply (Extended range, or less fueling time)
  - Thermal energy for ancillaries

Cooperation Goals and Fields

- Mechanical, Aerodynamics, Electrical, Metallurgical, Computer, Chemical Engineering, Programming, IAQ Specialists
- System of Systems Specialists, Fire Engineers,
- Renewable Energy and Green hydrogen specialists
- Thermal Energy Storage Systems
- Safety engineers, Finite element and CFD specialists,
- Design Engineers
- Flight testing and wind tunnel testing (VKI)
- Hydrogen storage and safety
- Pilot testing
- Certification