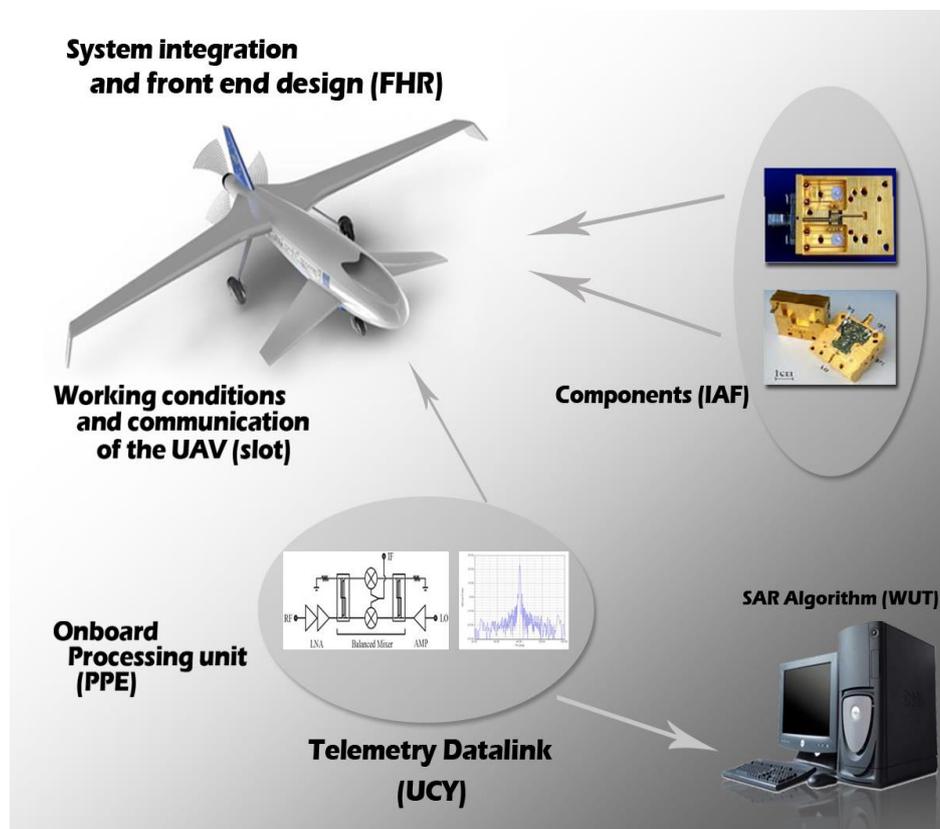


The project has been already closed.  
The content below is taken from the former project website.  
It is not guaranteed that all the information is still actual.

## Collaboration

The SARape project is formed to build up expertise in SAR measurements from UAVs as well as to develop a demonstrator that shows the prospects of a system described here. Each partner of the consortium brings in his key skill. On the other hand, all components and software inserted into the completed system depend on each other, so a near cooperation is intended to successfully handle the project and to build up a base for further cooperation.



## Collaboration Matrix

- IAF-FHR: Develop HF-components and manufacture radar frontend
- FHR-PPE: Interface analog signals and digitizer
- PPE-UCY: Interface digital data-stream and telemetry / modem
- PPE-WUT: Interface digital raw data and algorithm
- SLOT-FHR-PPE-UCY: Interface within a UAV (mechanical/electrical)
- SLOT-FHR-WUT: Flying conditions of a UAV
- SLOT-ALL: Communication platform for information exchange

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## Policy Briefs

Improvement and customization of existing miniaturized millimetre wave radar for UAV SAR application, gathering of airborne data for representative military scenarios and development of a high-resolution millimetre wave SAR algorithm is the purpose of the project. To convince the target audience (stakeholders) of the urgency of the application importance of SAR and problems related to UAV applicability are discussed below.

### SAR images supply important information concerning

- Firm infrastructure (roads, runways, fouling, etc.)
- Movable objects (parked vehicles, command posts, etc.)
- Changes of conditions (lanes, additional / missing vehicles)

### Problems when using SAR on UAVs

- UAVs have limited space / pay load / electrical power
- Movement of UAVs are more shock-like then with 40 tons planes
- Inertial systems have to be very accurate
- Processing has to combine all raw-data and telemetry-data

### Possible Applications

- Camp control
- Counter IED (probably with change detection technology)
- Surveillance
- Search and Rescue
- Border control
- Disaster recovery / monitoring
- Pipeline control
- Environmental monitoring

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## Key technology

The concept of all proposed parts of the SARape UAV system is known for years, now. But neither the combination of these components which built a system so powerful nor the high resolution has been implemented yet on an airborne platform. Especially the 94 GHz radar front-end giving a high bandwidth with extreme high coherence is an important factor for the later high resolution SAR processing and is a new step for UAVs. These systems can now be implemented into an airborne platform, because the digital wave form generation now feasible in single chip designs.

To generate high resolution SAR images pre-processing of the data as well as a fast data link is needed, which is also nowadays small in size and power consumption, so it can be implemented on board. This is also true for the real-time data processing on ground.

The proposed high resolution real-time SAR processing can be implemented only now, because it depends on all former mentioned components which were not available until now. This advanced high-resolution SAR processing will also use techniques for motion compensation. Also the development of the necessary human machine interface (HMI) is necessary and has to be tailored for a ground based real time SAR operator and remote pilot.