

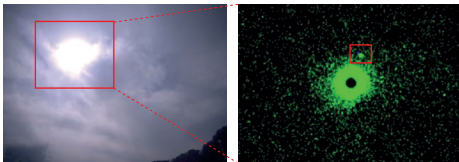
Disruptive bio-inspired vision to tackle new challenges in contested environments

In the last decades, research on new sensors has been mainly focused on optimising their spatial resolution. Sensors with optimised spatial resolution generate, however, large amounts of redundant data requiring more energy and storage space.

More recently, a new, bio-inspired way of capturing images has put the focus on the temporal resolution of relevant information only, i.e. that of the encoding of changes in the field of vision. This sparse information puts temporal resolution back on the scene thanks to its micro-second precision and the close link between time and spatial position of changes.

In order to benefit from all the potential offered by this technology, ISL has launched studies on innovative data processing. The first applications show clear superiority over traditional sensors when used in the fields of detection and tracking of high-velocity objects, navigation in dense or complex environments, or in the field of terminal guidance.

Traditional sensor **Event-based vision**

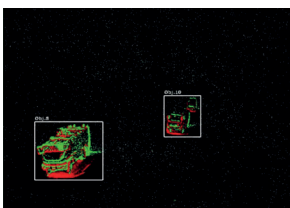


Ability to see in highly contrasted light conditions up to 140 dB dynamic vs. 60 dB with traditional sensors (e.g. the UAV remains visible whereas the traditional sensor is saturated)

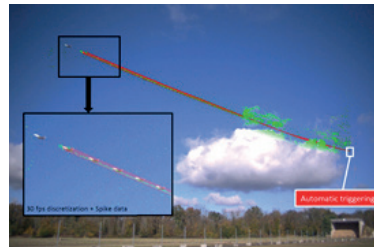
Traditional sensor



Event-based sensor

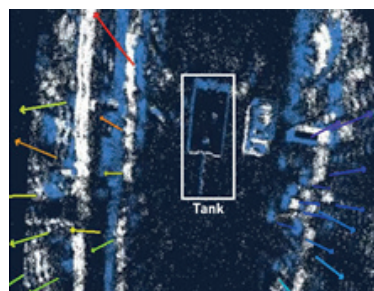


(manufactured thanks to the valuable contribution of Armasuisse and the SET-286)



Drone detection/tracking (~ 200 km/h) with passive and bimodal ISL system

Real-time processing on SWaP (Size, Weight and Power) constrained module



Navigation and guidance using event-based vision

Advantage of the sensors

- High temporal resolution (about a micro-second)
- Very high dynamics
- Low energy consumption and reduced bandwidth usage
- Easy real-time processing
- Non-conventional data encoding time, place and sign of luminosity changes

Applications

- Situational passive analysis in order to counter UAV threats: protective bubble
- Navigation without GPS for high-velocity vectors
- Tracking of multiple high-velocity targets
- Passive and active terminal guidance (SAL)

Tactical advantages

- No blurring due to movement
- Ability to operate in highly contrasted environment (backlight)
- Reaction time
- Passive and bimodal ISL system (usual/event-related)
- On-board real-time processing

