SI-SCHWEITZER INGENIEUR GMBH

PRESENTATION FRONTEX WARSAW
May 2018

SCHWEITZER
INGENIEUR
GMBH

AEROSPACE TECHNOLOGY
http://www.si-gmbh.com

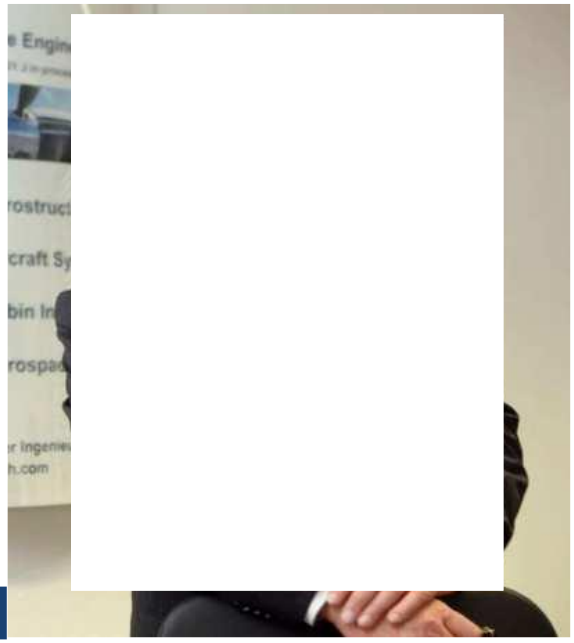
An experienced Team of Specialists

The Team

Engineers with significant experience in Aviation, Aerospace and Project Management

Design Engineers, Quality Managers, Welding Supervision and Prototype Manufacturing

Founder - President



- 35 years of experience in aircraft and UAV development and certification
- Former international project manager of Rheinmetall AG and chief engineer of DASA subsidiary Rhein-Flugzeugbau GmbH
- Founder of SI-Schweitzer Ingenieur GmbH in 1993 with International customers in Aviation

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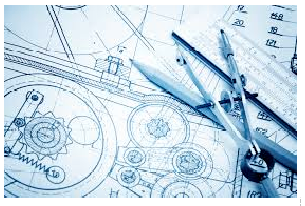
Activities Overview

Activities

Engineering
DOA EASA.21J.311 i.p.



- Specialist in the development and optimization of critical systems, parts and structures by using modern CAE (Computer Aided Engineering) tools
- The successful realization of development projects with distributed tasks is dependent upon close communication between the project partners and the engagement of highly skilled engineers

Special Mission Aircraft

- SI has equipped aircraft with IR/EO (1) cameras, gimbal cameras, LIDAR (2) scanners and SAR (3) systems
- If a project requires monitors, moving-map systems, data storage, data conversion or data-link systems, SI will find the best solution and draft the integration into the aircraft, supporting the customer throughout the process

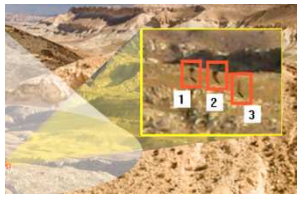
IT Service & UAV Ground Stations

- Systems interface programming
- Generic ground stations
- Direct data links
- Cellular/Sat data links
- Data visualization & predictive maintenance
- Data storage & video streaming
- Robust positioning
- UAS IT - Internet & Intranet

Production
POA DE.21G.0241 i.p.

- TIG Welded and Composites Parts for UAV Systems, general aviation, cabin interior and racing sports
- Engine cradles
- Undercarriages
- Special mission equipment
- Sensor installation components
- Rack systems
- Ground stations
- Mission operator consoles
- UAV catapults
- Suspension parts
- Carbon drive shafts
- Spoilers / Fairings

Multi-Vision Fan^{ViDAR}



- SI is an authorized reseller of KESTREL and ViDAR Software for Africa & Europe (4)
- Automatic detection and tracking of objects and persons on the ground or in the water
- SI *Multi-Vision Fan*^{VIDAR} for large area maritime surveillance missions

Project

UNIVERSAL^{UAV}

SI is currently developing an unmanned aerial vehicle system for multiple special missions.

- It consists of an unmanned aircraft vehicle (UAV) built from GFRP/ CFRP(Glass/Carbon Fiber Reinforced Plastics) composites and a mobile ground station where the missions are planned, controlled and evaluated.
- The UAV can carry multiple high definition IR/EO camera systems like Wescam MX-10 or SI's *Multi-Vision Fan*^{ViDAR} as well as data link systems, which transmit all video and flight data to the ground station in real time using innovative data compression methods.
- Fully autonomous flights and manual control (fly-by-wire)
- Jamming resistent GPS receiver

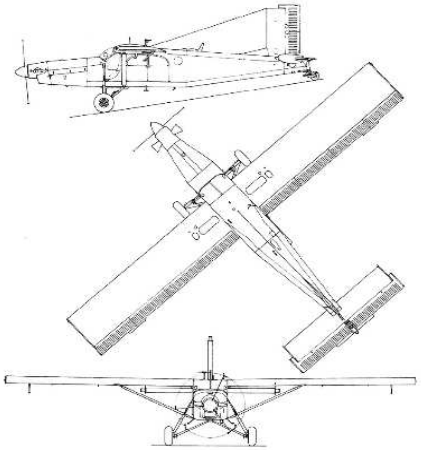
(1) IR : Infrared, *E/O :* Electro-Optical *(2) LIDAR:* Light Detection And Ranging
(3) SAR : Synthetic-aperture radar *(4) KESTREL* and *ViDAR* are products of Sentient Vision Systems Pty Ltd

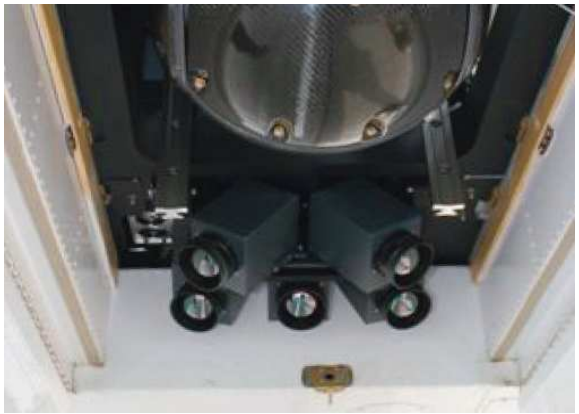
Airborne Camera Deployment System - CAMLIFTER

Factory Option for Pilatus PC6 Turbo Porter

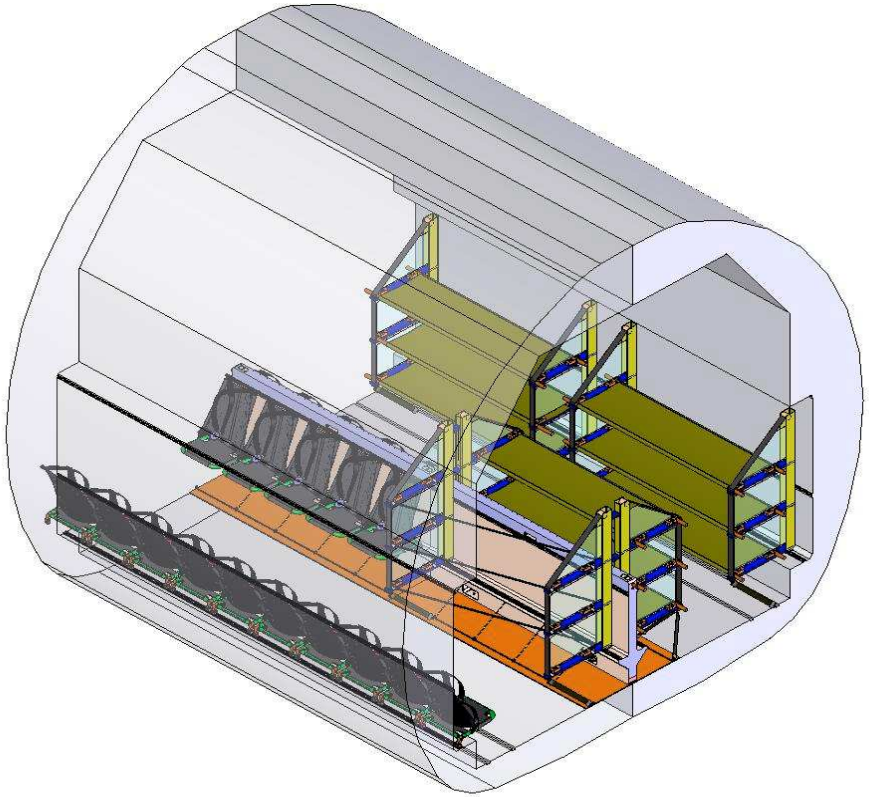
SCHWEITZER INGENIEUR GMBH

PILATUS

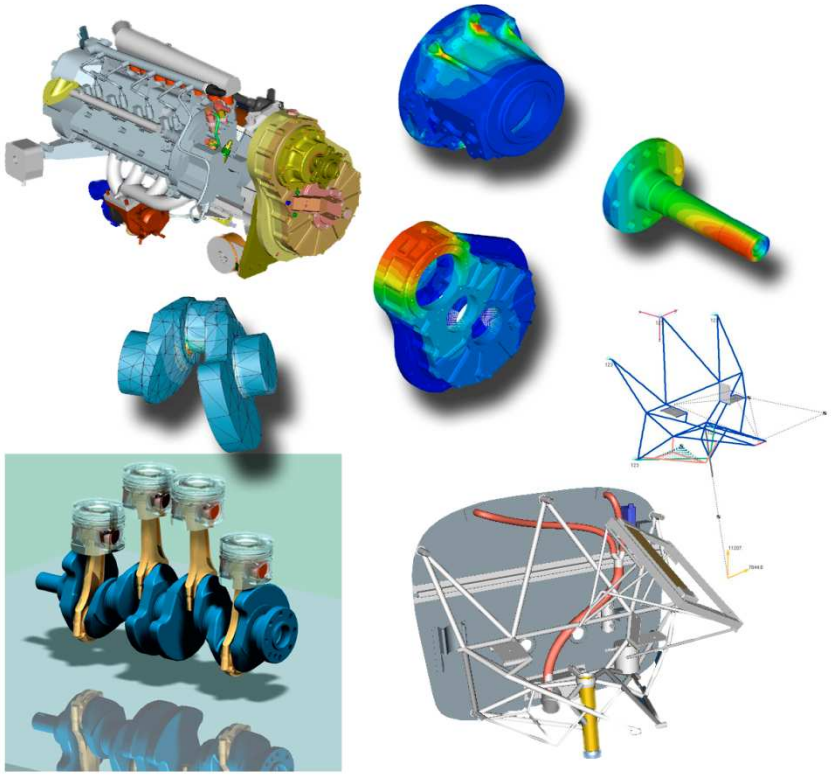


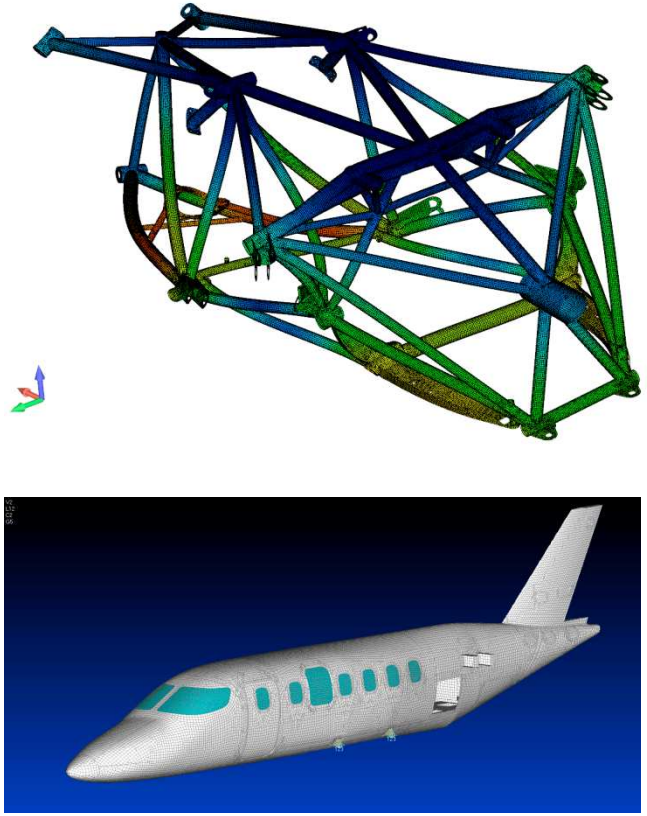


Mission Equipment & Interior



CAE Simulation & Optimization





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UNIVERSAL UAV

Civil UAV

Professional UAV

- Drones used for surveillance missions in small areas
- Excellent handling
- Advanced photo and video system
- Detection and tracking of objects

Agricultural UAV

- High payload
- Range of different sensors
- Advanced digital imaging of the fields

Military UAV

Reconnaissance UAV

- RQ-1 / MQ-1 Predator (USA)
- Long autonomy
- Surveillance of large areas
- High altitude
- Advanced cameras : infrared, night vision, electro-optical

UCAV (Unmanned Combat Aerial Vehicle)

- X-47 Pegasus
- High speed
- Sophisticated Ground station that can control several UAV
- Flights under extreme conditions

UNIVERSAL UAV

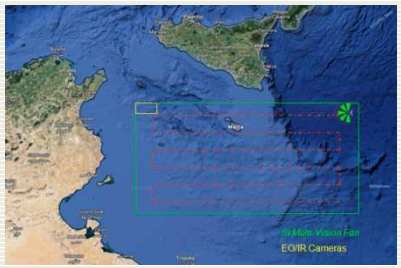
UNIVERSAL^{UAV} Project

UNIVERSAL^{UAV}	
Technical Features	▪ **Length:** 3m ▪ **Span:** 5m ▪ **Weight:** 150-250kg ▪ **Maximum altitude:** 5 000m ▪ **Cruising Speed:** 240km/h ▪ **Endurance:** 10h+ ▪ **Twin Engine** ▪ **Material:** Aviation Grade GFRP/CFRP Composites ▪ Direct Tracking System with 200 km operation radius ▪ Generic Ground Station with DFS/PHOENIX radar display
Presentation to the Public	▪ Presentation of the drone at Le Bourget in 2013 ▪ Several Letters of Intent received from large companies ▪ The project Generic Ground Station was proposed in the EU-program Horizon 2020 and awarded twice by a “Seal of Excellence”
Cameras	▪ **High End Military Gimbal Cameras with 10” turret** ▪ Daylight and Infrared Camera with extreme zooming quality ▪ Unmatched resolution in bad weather conditions like fog, rain, snow, drizzle, etc. ▪ Laser Range Finder and Laser Illuminator ▪ ***MVF^{ViDAR} (Multi-Vision Fan^{ViDAR})*** ▪ Visual Detection and Ranging for maritime EO/IR imagery ▪ Automatically detects, highlights and tracks sea surface contacts including fast boats, small wooden or rubber vessels and people in the water

UNIVERSAL^{UAV} Missions

Illegal Immigration via Land & Sea / Search & Rescue

- Example of a potential mission



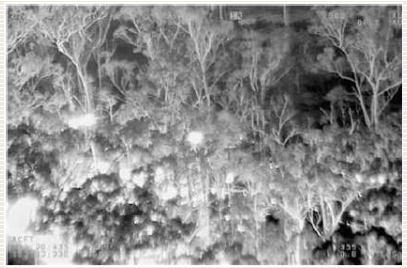
- Unknown object on the sea in infrared mode. Zooming-in shows small jetbike, maybe illegal

- Switching to the daylight mode shows tourist

Detection of Wild Fires and Support of Wild Fire Forces

- Example of a potential mission

- Comparison of wild fire with daylight camera (left picture) and infrared camera (right picture), showing flame front.



- Superior zooming and stabilisation quality show details down to tree level. Individuals can be detected and rescued.

Detection of Drug Plantations

Smuggling of Drugs and Weapons

Sea Pollution

Illegal Fishing

Detection of Land and Sea Mining

Illegal Woods Clearing

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KESTREL LAND MTI / MARITIME

SI is Authorized Reseller of *Sentient Vision Systems Pty Ltd.* for the S/W products KESTREL and ViDAR in the sales regions:

EUROPE & AFRICA

Free pricing of S/W licenses. Training & Support.

- **Homeland Security**
- **Search & Rescue**
- **Anti-Piracy**
- **Counter Narcotics**
- **People Smuggling**

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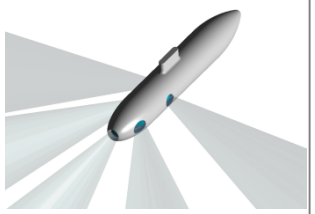
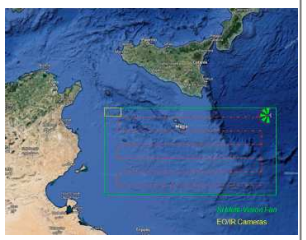
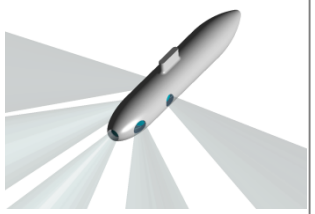
MVF^{ViDAR} (Multi-Vision Fan^{ViDAR})

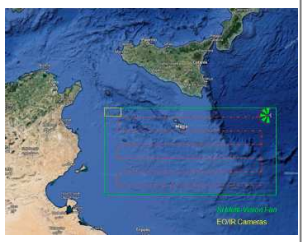




Visual Detection and Ranging for Maritime EO/IR Imagery	
Product	▪ *Multi-Vision Fan^{ViDAR}* is an innovative optics system developed by SI for the surveillance of large sea areas for manned and unmanned aircraft. Using a fan of E/O cameras along with *SentientVision's* superresolution software ViDAR enables the automatic detection and tracking of small objects with an unmatched footprint. ▪ Onboard processing of the videos ensures only detected objects are transmitted for analysis, dramatically reducing bandwidth requirements. GPS coordinates of detected objects can be cross-cued to EO/IR gimbal cameras to zoom-in for identification and classification.
Key Features	▪ *MVF^{ViDAR}* : - Automatically detects, highlights and tracks sea surface contacts including fast boats, small wooden or rubber vessels and people in the water. - Provides thumbnail images and locations of detected objects for sensor operators - Enables cross-cueing of other sensors for interrogation and classification - Allows passive search and track for drug interdiction in covert environments
Main Advantages	▪ **Increased EO/IR search coverage in excess of 120 times** - Automated embedded processing combined with a scanning 9-megapixel sensor significantly extends range of visual detection and coverage. ▪ **Real time small object detection** - Automatic real-time detection of small, low electronic signature objects on the sea surface ▪ **Compliment to existing systems** - Detects objects that are too small for radar ▪ **Easy integration with low Size, Weight and Power (SwaP)** - Low weight, low power, flexible and easy to integrate
Sensor	▪ *MVF^{ViDAR}* is an airborne persistent Wide Area Maritime Search System that autonomously detects objects on the ocean surface and provides the operator with a detailed image of objects that other search methods often lack. ▪ Objects detected are sent to the operator as both thumbnail and map location, allowing the operator to select an object of interest with the secondary sensor

MVF^{ViDAR} (Multi-Vision Fan^{ViDAR})

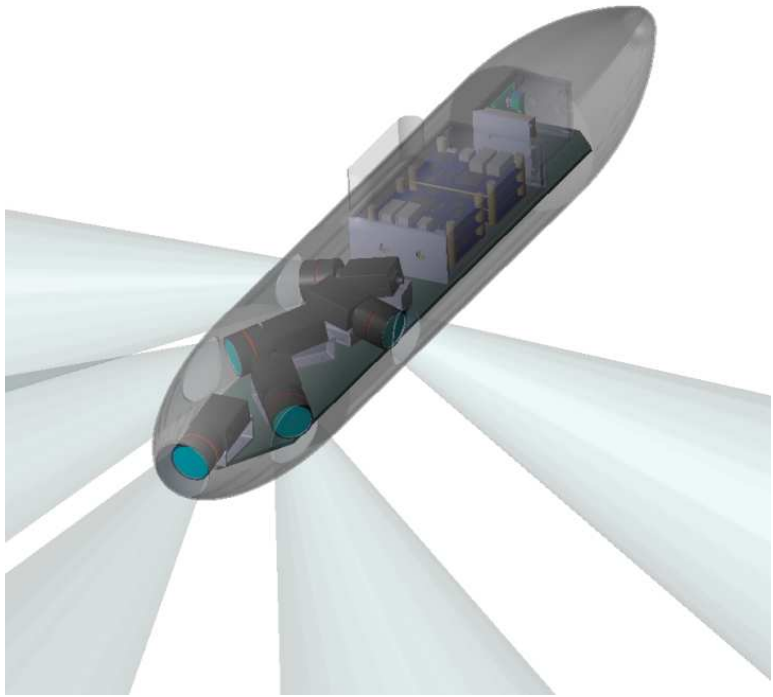




Visual Detection and Ranging for Maritime EO/IR Imagery

MVF^{ViDAR} (Multi-Vision Fan^{ViDAR})

Visual Detection and Ranging for Maritime EO/IR Imagery



Detection Ranges

Single Person in Water: 1.5 km

Rubber Boat / Jet Ski: 13 km

Small Vessel: 30 km

Cargo Ship: 55 km

Features

- 5x 9 MP E/O video camera /
- 9 fps @ 3376 x 2704
- On-Board Video Processing
- Combined FoV 180°
- Data Transmission via Sat Link

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Generic Ground Station

Generic Ground Station

Features / Options

- Multi-Screen Console for 1 pilot and 1 operator
- Scalable Range and Data-Links (direct-line / satellite/ 3G&4G)
- Simultaneous Use of 4 UAVs (fixed wing / helicopter / multicopter)
- DFS PHOENIX ATC Radar Display
- ATC Radio Communication
- Data Demultiplexing
- Video Acquisition & Distribution
- Alarm-handling Software
- Automatic Object Classification
- Map Mosaicking
- Map Overlays / Scenarios
- Server Management
- Archive

Thanks!

For further information please contact:

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