



United Nations  
Educational, Scientific and  
Cultural Organization



UNESCO Chair on Landscape,  
Cultural Heritage and Territorial Governance  
BENECON Research Centre of Competence of  
the Campania Region for Cultural Heritage,  
Ecology and Economy, Naples, Italy

# LAND, AIR TRANSPORT, MARINE SURVEY SERVICES AND MONITORING OF THE TERRITORY, ENVIRONMENT, CULTURAL AND BUILDING HERITAGE

## Synthetic Scenery of Knowledge Activities Data Cloud and Monitoring Knowledge

Realizzazione di un piattaforma WebGIS  
DATA-BASE Informativo della  
Provincia di Caserta



Rilievo Aereo Reggia di Caserta  
Sensore Iperspettrale CASI-1500  
Rappresentazione RGB



Rilievo Aereo giardino della Reggia di Caserta  
Sensore Iperspettrale CASI-1500  
Rappresentazione RedVeg



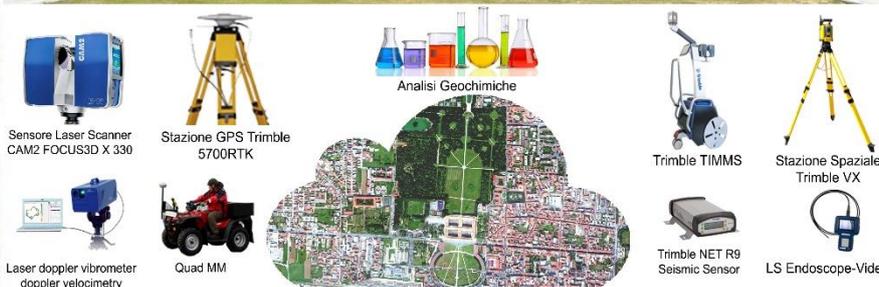
Rilievo Aereo del Real Sito di Carditello  
Sensore Iperspettrale CASI-1500  
Rappresentazione RGB



Rilievo Aereo del Real Sito di Carditello  
Sensore Iperspettrale CASI-1500  
Rappresentazione RGB



Benecon S.C.a.R.L. | Cattedra UNESCO on Landscape, Cultural Heritage and Territorial Governance



Rilievo e WebGIS  
dall'Acquedotto Carolino ai giardini della  
Reggia di Caserta



Web-GIS del percorso dell'acquedotto  
"Carolino" dalla sorgente del Fizzo al  
Parco della Reggia di Caserta fino al  
Real Sito di Carditello



Web-GIS dei Torrioni dell'Acquedotto  
"Carolino" dalla sorgente del Fizzo al  
Parco della Reggia di Caserta fino  
al Real Sito di Carditello



Analisi SPR Georadar system  
Caratterizzazione strutturale e mappatura  
degli elementi in pietra della Reggia di Caserta



Analisi SPR Georadar system  
Caratterizzazione strutturale e mappatura  
degli elementi in pietra della Reggia di Caserta



The Benecon University Consortium is managed by Prof. Arch. Carmine Gambardella, UNESCO Chair on Landscape Cultural Heritage and Territorial Governance and operates nationally and internationally. In the international framework the University Consortium ideated and manages the interactive and geo-referred Web-GIS of all the 800 UNESCO Chairs in the world with which has developed a series of cooperations and scientific experiments using in house technologies in the following sectors:

- Aerial and satellite remote sensing
- TABI 1800 – TSR THERMAL SEARCH & RESCUE
- TABI 320
- Hyperspectral remote sensing with CASI 1500 sensor
- Acquisition with Lidar sensor
- Acquisition with very high resolution photographic camera
- Characterization of Polluted Sites
- Identification of Superficial Archaeological Sites
- Machine Learning and Clustering Forecasting Scenarios
- Precision agriculture
- Environmental Chemistry
- Environment and Health
- Urban Planning
- Marine Remote Sensing and Underwater Robotics
- Distance and in presence learning
- Web-Gis, Urban and Territory Planning



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# Platforms

## Benecon Platforms

### Equipment \_TECNAM P2006T Special Mission Platform Aircraft



Military Airport of Capodichino Naples



At the end of 2018, the BENECON University Consortium equipped itself with a 4-seater twin-engine Tecnam P2006T SMP (*Special Mission Platform*) aircraft. The concept of the plane arose from the will to perform aerial remote sensing actions and to control the environmental matrices (air-land-water) for the complex representation of cultural heritage, both material and intangible. So, special hatches were designed specifically to put up the hyperspectral, thermal and photographic BENECON sensors on the aircraft.

The TECNAM SMP is based on the revolutionary aircraft TECNAM P2006T, the only twin engine aircraft that can fully match all the today special missions' purposes due to its characteristics.

- Fully CS/FAR 23 IFR certified – both analogue and glass cockpit available and validated in many foreign countries in addition to EASA/FAA.
- Low acquisition cost.
- Single pilot operations approved also in IFR.
- Extremely low operation and maintenance costs.
- High flexibility with both Aviation and Automotive fuel (up to 10% ethanol content) approved, also mixed in any ratio
- High payload capacity with special weight saving program
- Wide speed range (cruise from 55 to 145 kts)

Moreover, Benecon equipped the aircraft with the latest Garmin G1000 NXI navigation version, ready for connection with satellite communication systems.



Benecon's Aircraft (*Tecnam P2006T-SMP*)



Cockpit of Benecon's Aircraft



Hutch specifically designed for the aircraft



TABI-1800 TSR installed on Benecon's Aircraft



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# Fully Operative Aircraft

# Benecon Fully Operative Aircraft

M\_D ARM002 REG2020 0066277 11-12-2020



P.d.C.: Sezione Pianificazione, Sorvoli e Concorsi - tel. 06 4986 5555

*Comando Squadra Aerea  
Stato Maggiore*

A: ELENCO INDIRIZZI ALLEGATO

Allegati: n° 2 (DUE)

**OGGETTO:** BENECON SCARL - NULLA OSTA UTILIZZO AREA MILITARE AEROPORTO di CAPODICHINO – ANNO 2021.

**Riferimento:** a. fgl. BENECON SCaRL datata 09/12/2020 (in allegato);  
b. e-mail Comando Aeroporto Capodichino (non a tutti).

In merito a quanto chiesto con il foglio a riferimento a., preso atto di quanto esposto con l'e-mail a riferimento b., si rilascia il nulla osta all'utilizzo dell'area militare dell'Aeroporto di Napoli Capodichino per le operazioni legate ad attività di ricerca ed acquisizione dati che saranno effettuate dall'aeromobile di seguito elencato:

OPERATORE	TIPO A/C	MARCHE/CALL SIGN
BENECON SCaRL	TECNAM P2006T	I-CABE

Il presente Nulla Osta è valido dal 01/01/2021 al 31/12/2021 ed è rinnovabile, atteso che, entro il 14/12/2021, ne venga chiesta l'estensione per iscritto agli aventi causa.

Si precisa, inoltre, che il presente benestare è subordinato:

- alle prioritarie esigenze di Forza Armata;

Si rimane a disposizione per ogni eventuale chiarimento in merito.

d'ordine  
**IL CAPO SALA SITUAZIONI DI VERTICE**  
(Col. A.A.r.n.n. Pil. Gianluca CHIRIATTI)

Compilatore: PM Pietro MONTEDURO - tel. (+39) 06 4986 5555



BENECON s.c.a.r.l.

[info@bencon.it](mailto:info@bencon.it)

Ufficio Aeroportuale  
Roma Ciampino

DIREZIONE AEROPORTUALE TOSCANA  
UFFICIO AEROPORTUALE TRAPANI  
STATAEREO 3° REPARTO – SALA SITUAZIONI FAX 06/49865296  
MAX AVIATION [maxaviation@pec.it](mailto:maxaviation@pec.it)

OGGETTO: SCALI A CARATTERE SALTUARIO SU AEROPORTI MILITARI – ANNO 2021

In riferimento all'istanza datata 10/12/2020, informasi che la **BENECON s.c.a r.l.** opererà sugli aeroporti militari di **PISA, TRAPANI** e **VITERBO**, avendo il Ministero della Difesa Aeronautica rilasciato il NULLA OSTA permanente allo svolgimento dell'attività aerea civile sui medesimi.

L'operatività sui citati aeroporti potrà svolgersi alle seguenti condizioni:

- OPERATORE AEREO: **BENECON s.c.a r.l.**
- TIPO/MARCHE AEROMOBILI **Tecnam – P2006T marche I-CABE**
- SCOPO DEL VOLO **Attività di ricerca scientifica**
- APPLICABILITA' **ANNO 2021**

**Il presente nulla osta è condizionato al rispetto della normativa emergenziale COVID 19.**

La predetta attività dovrà essere svolta nel rispetto delle seguenti disposizioni:

- Subordinatamente alle esigenze prioritarie di Forza Armata, militari, operatività di base;
- Al tassativo rispetto delle norme contenute in AIP Italia e NOTAM di aggiornamento;
- Al preventivo coordinamento ed accettazione del piano di volo da parte dell'Autorità Militare presente sull'aeroporto di destinazione.

Resta ferma la responsabilità del pilota di accertare preventivamente la compatibilità delle infrastrutture e dei servizi aeroportuali rispetto alle caratteristiche d'impiego dell'aeromobile utilizzato.

**RIPORTARE IL NUMERO DI PROTOCOLLO DELLA PRESENTE NOTA NEL PIANO DI VOLO, CASELLA 18.**

La presente autorizzazione è valida a condizione che il titolare abbia dato comunicazione e si sia accertato del ricevimento della stessa ai seguenti indirizzi, **Aeroporto Trapani** fax 0923/321036, **Aeroporto Pisa** fax 050/506001, **Aeroporto Viterbo** fax 0761/355303, **Comando Aeroporto Viterbo** fax 0761/3552396.

Distinti saluti.

Il Responsabile  
Renato Manna

(documento informatico firmato digitalmente ai sensi dell'art. 24 D.Lgs. 82/2005 e ss.mm.ii.)

SL/



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# Mission

# BENECON Mission

## The New Generation

Benecon has been carrying out aircraft monitoring, for years and also on public order, with its own platform, sensors and personnel. In support of the aircraft platform, it also has the infrastructures and authorizations to fly, the pilots, the ground management personnel of the aircraft. Benecon's thermal and hyperspectral sensors are at the forefront. Also, Benecon has radar sensors. For this reason, Benecon is able to operate autonomously, without delay and without the need for waiting times for any kind of aircraft monitoring missions. Additionally, to complete the production chain, Benecon has staff for data acquisition, registration of data in universally accepted formats, autonomous processing and extraction of value-added information from remote sensing data.



### Tecnam P2012 Sentinel SMP

Benecon, after the interesting and successful operations done with the Tecnam P2006T-SMP is interested in expanding its fleet adding the brand new Tecnam P2012 Sentinel SMP.

This latter airplane is a Twin Engine aircraft with Piston Efficiency and Turboprop Capabilities, the ultimate TECNAM Special Mission Platform aircraft, without compromises on any front.



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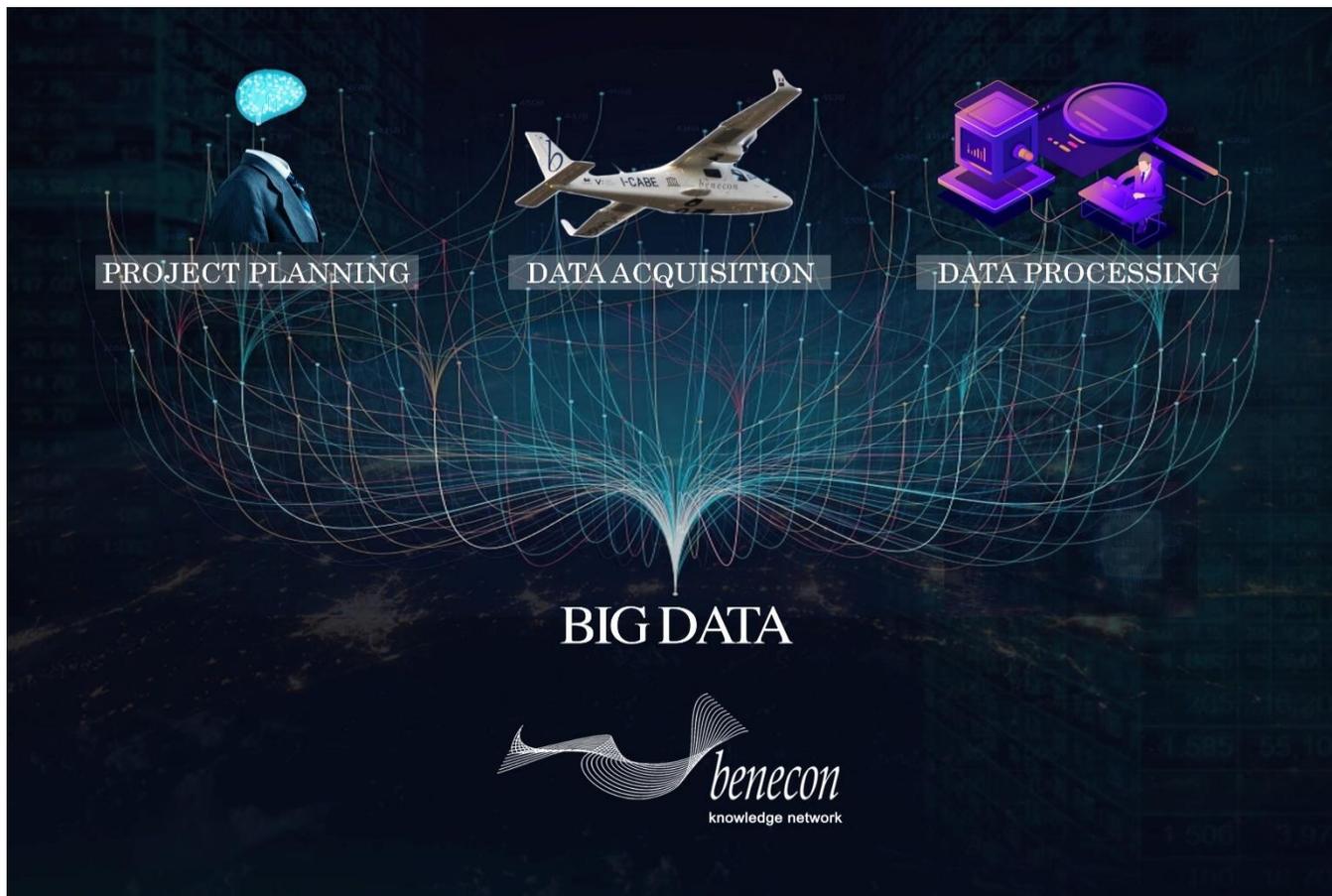
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# Operational Scenarios

## BENECON Operational Scenarios

APPLICATIONS	Airborne Sensors				
	CASI-1500	TABI-320 TABI-1800-TSR	LiDAR ALS 50II	PhaseOne	Sonde Atmosferiche
Localization and monitoring of landfills and micro landfills	✓	✓	✓	✓	
Monitoring of mining areas, anthropogenic and natural radioactivity mapping	✓		✓	✓	
Localization of illegal crops	✓			✓	
Fires Warning	✓	✓		✓	
Perimeter of flooded areas	✓	✓		✓	
Road cadastre		✓			
Precision agriculture food/no food	✓	✓	✓	✓	
Thermal dispersion of the building heritage		✓			
Perimeter of building modifications	✓		✓	✓	
Monitoring or networks and infrastructure	✓	✓	✓	✓	
Network and structure under trace identification	✓	✓			
Marine and land search and rescue	✓	✓			
Characterization of atmospheric particulate matter					✓
Sampling of environmental matrices	✓	✓			✓

# BENECON Rapid Response Team



## Aerial and Satellite Remote Sensing Activities Agenda

### ATTIVITÀ DI TELERILEVAMENTO AEREO 2020

	sito	committente	missione
Giu 01 – Nov 01	Albania	Repubblica Italiana, Ministero degli Interni / Repubblica Albanese, Ministero degli Interni / Progetto SANCAS (Support to Anti Cannabis Strategy Air Surveillance)	Sicurezza
Set 18	Sarno (Salerno)	Attività di ricerca del Consorzio Benecon Scarl	Ambientale / Sicurezza

### ATTIVITÀ DI TELERILEVAMENTO AEREO 2019

	sito	committente	missione
Apr 15	Colfelice e Roccasecca (Frosinone)	Forza di Polizia	Ambientale
Apr 16	Colfelice e Roccasecca (Frosinone)	Forza di Polizia	Ambientale
Apr 17	Villa di Briano (Caserta)	Forza di Polizia	Ambientale
Mag - Ott	Albania	Repubblica Italiana, Ministero degli Interni / Repubblica Albanese, Ministero degli Interni / Progetto SANCAS (Support to Anti Cannabis Strategy Air Surveillance)	Sicurezza
Ott 19	Monte di Procida, Bacoli, Pozzuoli, Napoli (NA)	Attività di ricerca del Consorzio Benecon Scarl	Ambientale / Sicurezza
Ott 26	Monte di Procida, Bacoli, Pozzuoli, Napoli (NA)	Attività di ricerca del Consorzio Benecon Scarl	Ambientale / Sicurezza
Ott 19	Ischia, Pompei, Caserta	Attività di ricerca del Consorzio Benecon Scarl	Ambientale / Sicurezza
Ott 26	Ischia, Pompei, Caserta	Attività di ricerca del Consorzio Benecon Scarl	Ambientale / Sicurezza
Set 07	Cava Alma, Villaricca (Napoli)	Forza di Polizia	Ambientale

### ATTIVITÀ DI TELERILEVAMENTO AEREO 2018

	sito	committente	missione
Apr - Ott 18	Albania	Repubblica Italiana, Ministero degli Interni / Repubblica Albanese, Ministero degli Interni / Progetto SANCAS (Support to Anti Cannabis Strategy Air Surveillance)	Sicurezza
Gen 18	Napoli, Afragola	Forza di Polizia	Ambiente

### ATTIVITÀ DI TELERILEVAMENTO AEREO 2017

	sito	committente	missione
Mag - Ott 17	Albania	Repubblica Italiana, Ministero degli Interni / Repubblica Albanese, Ministero degli Interni / Progetto SANCAS (Support to Anti Cannabis Strategy Air Surveillance)	Sicurezza
Apr - Mag 17	Campobasso, Sepino	Forza di Polizia	Ambiente
Apr 17	Caserta, Carditello	Forza di Polizia	Ambiente
Mar 17	Cassino	Forza di Polizia	Ambiente

### ATTIVITÀ DI TELERILEVAMENTO AEREO 2016

	sito	committente	missione
Dic 16	Vibo Valentia	Forza di Polizia	Ambiente
Ott 16	Nuoro, Orani	Forza di Polizia	Sicurezza
Set 16	Grosseto, Civitella Paganico e Cinigiano	Forza di Polizia	Sicurezza
Ago 16	Vibo Valentia	Forza di Polizia	Sicurezza
Ago 16	Rieti, Amatrice	Forza di Polizia	Ambiente
Lug 16	Napoli, Ercolano e Torre del Greco	Forza di Polizia	Ambiente
Giu 16	Albania	Repubblica Italiana, Ministero degli Interni / Repubblica Albanese, Ministero degli Interni	Sicurezza
Mag 16	Ascoli Piceno; Fermo	Forza di Polizia	Ambiente
Gen 16	Provincia di Lecce	Procura di Lecce / Forza di Polizia	Ambiente

#### ATTIVITÀ DI TELERILEVAMENTO AEREO 2015

	sito	committente	missione
Dic 15	Napoli, Pompei	Forza di Polizia	Ambiente
Ott 15	Caserta, Maddaloni	Forza di Polizia	Ambiente
Set 15	Reggio Calabria, Rizziconi	Forza di Polizia	Sicurezza
Ago 15	Cosenza, Corigliano e Rossano	Forza di Polizia	Ambiente
Giu 15	Albania	Repubblica Italiana, Ministero degli Interni / Repubblica Albanese, Ministero degli Interni	Sicurezza
Giu 15	Provincia di Caserta	Forza di Polizia	Ambiente
Giu 15	Vercelli	Forza di Polizia	Ambiente

#### ATTIVITÀ DI TELERILEVAMENTO AEREO 2014

	sito	committente	missione
Dic 14	Frosinone, Cassino	Comune di Cassino	Ambiente
Ott 14	Cagliari; Ogliastra; Nuoro	Forza di Polizia	Sicurezza
Giu 14	Albania	Repubblica Italiana, Ministero degli Interni / Repubblica Albanese, Ministero degli Interni	Sicurezza
Apr 14	Provincia di Lecce	Procura di Lecce / Forza di Polizia	Ambiente
Apr 14	Genova	Forza di Polizia	Ambiente

#### ATTIVITÀ DI TELERILEVAMENTO AEREO 2013

	sito	committente	missione
Set 13	Caserta, Sessa Aurunca	Comune di Sessa Aurunca	Ambiente
Giu 13	Albania	Repubblica Italiana, Ministero degli Interni / Repubblica Albanese, Ministero degli Interni	Sicurezza
Feb 13	Provincia di Caserta	Procura Santa Maria Capua Vetere	Ambiente

#### ATTIVITÀ DI TELERILEVAMENTO AEREO 2012

	sito	committente	missione
Giu 12	Albania	Repubblica Italiana, Ministero degli Interni / Repubblica Albanese, Ministero degli Interni	Sicurezza
Mag 12	Caserta, San Tammaro	Forza di Polizia	Ambiente
Mag 12	Ragusa, Comiso	Forza di Polizia	Sicurezza

#### ATTIVITÀ DI TELERILEVAMENTO AEREO 2011

	sito	committente	missione
Giu 11	Roma, Pontina	Forza di Polizia	Sicurezza
Feb 11	Provincia di Caserta	Procura S.Maria Capua Vetere	Ambiente
Feb 11	Pompei	Forza di Polizia	Ambiente



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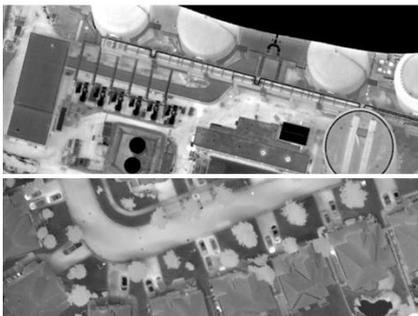
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# Sensors

# Thermal-Sensors

## TABI 1800 – TSR Thermal Search & Rescue Airborne Broadband Imager Broadband thermal sensor

The TABI 1800 – TSR THERMAL SEARCH & RESCUE sensor records the radiation emitted by surfaces in the thermal infrared wavelengths with spatial resolution of 10 cm / 1.25m. Sensitive to thermal differences of



### CARATTERISTICHE

Tipo sensore	Thermal pushframe
Canali spettrali	1
Range spettrale	3.7 – 4.8 microns
Pixel (Across track)	1800
Total Field of view	40°
Risoluzione spaziale	10 cm - 1,25 m
Massima altitudine	10.000 ft (3.000 m)
Temperature registrate	da -20 a +60°C

### CAMPI DI APPLICAZIONE

- Mappatura delle dispersione termiche
- Mappatura linee elettriche
- Umidità del suolo
- Mappatura condotte sepolte
- Stratigrafia e geologia strutturale
- Mappatura degli hotspot
- Vulcanologia
- Mappatura delle anomalie termiche

### DIMENSIONI, PESO e ALIMENTAZIONE

ITEM	L / H / P (cm) / Peso (kg)
SHU e ICU	35,5 / 61,4 / 39,6 / 31
Monitor 15"	42,3 / 32,2 / 10,3 / 10
Alimentazione	24 – 32 VDC, (A VDC)

### DATI OTTENIBILI

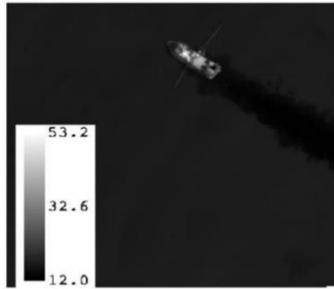
Immagini iperspettrali RAW

Immagini GeoTIF rappresentative della temperatura superficiale

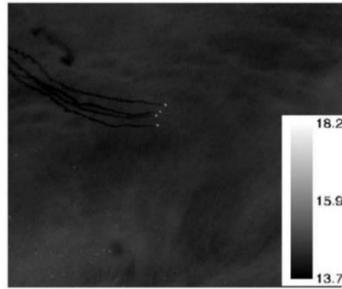
just 0.05 °C, the TABI can be driven slowly or quickly, the very high spatial resolution of the mapper and the speed of data processing are not affected.

[www.youtube.com/watch?v=CchASLA2Aj4](http://www.youtube.com/watch?v=CchASLA2Aj4)

Daytime test flight 05-12-13, Vancouver Island, Canada



Fishing vessel and trail



Animals (birds) and trail



Linear



2% Linear

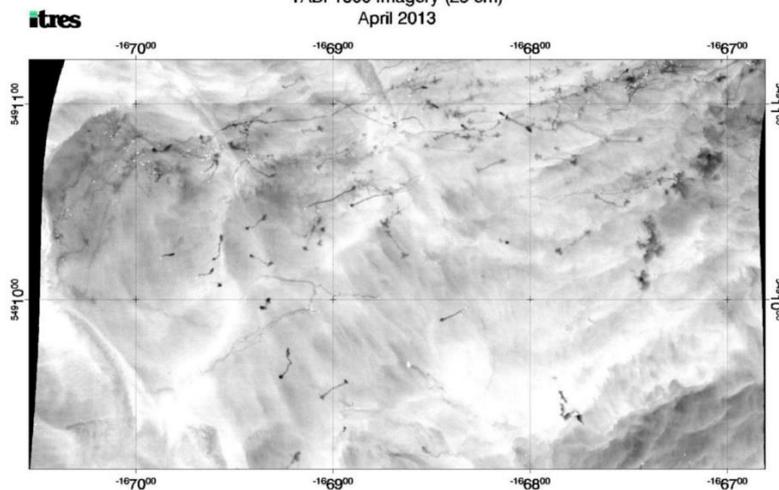


equalization

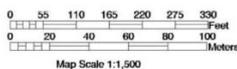
TSR1800 sensitivity range – depending on image display enhancement (scaling), various scene aspects can be derived from real-time corrected images.



TABI-1800 Imagery (25 cm)  
April 2013



Acquired at 1:00 PM  
Flying height was 2,028 feet above sea level.  
Aircraft speed was approximately 130 knots.

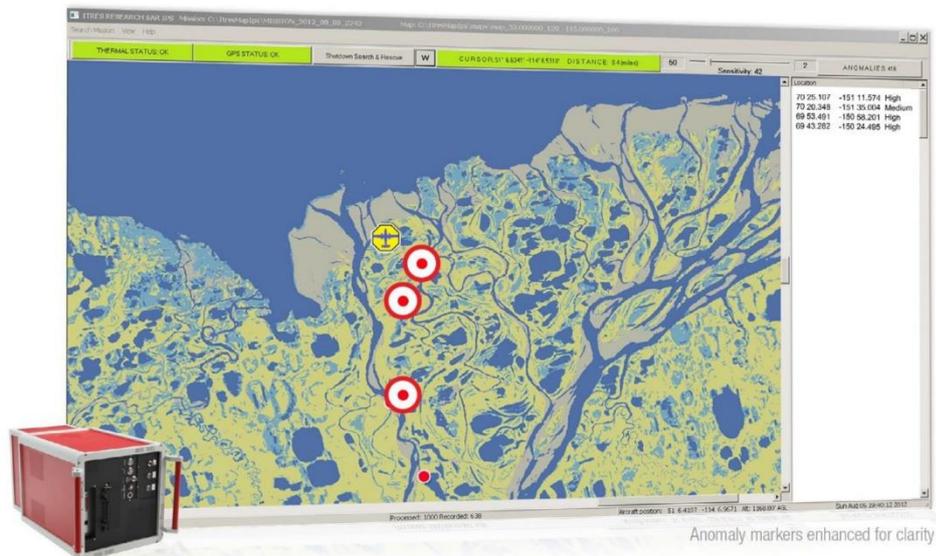


Map Scale 1:1,500

Note birds and tracks in the water

# TSR-1800: THERMAL SEARCH & RESCUE

airborne automated search & spotting



Search a wider area, faster, at high resolution:

e.g. at 20cm resolution:

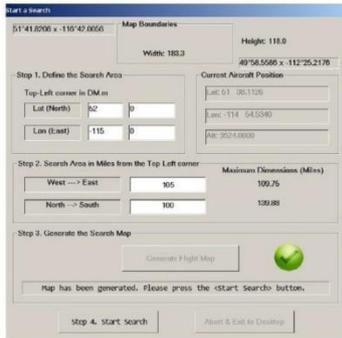
Cover 344km x 360m (~123km<sup>2</sup>) per hour @ 180 knots



HYPERSPECTRAL & THERMAL REMOTE SENSING

# TSR-1800 SNAPSHOT

Automatically detects & reports thermal anomalies / 0.05°C sensitivity / Anomaly detection alerts / On-the-fly detection sensitivity slider / Moving map display with aircraft location / Interactive geo-cursor coordinates show distance to aircraft / Detailed, customizable basemap / Real-time georeferenced, high resolution thermal thumbnails / Waterfall display of entire thermal image



Define custom search area



High resolution thermal thumbnails (brighter pixels=warmer temperatures, darker=cooler)



Alternatively view a waterfall display of the thermal image as the data are acquired and undergo first-order, real-time geocorrection

## How High and How Fast?

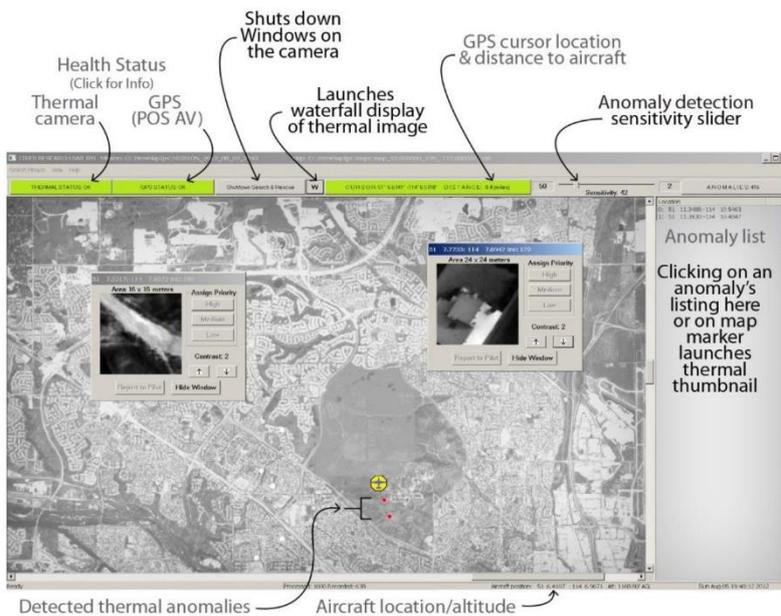
The TSR-1800's automated thermal anomaly detection is made possible by the TABI imager's high temperature and spatial resolution capabilities. Flying low (~500m or 1627 feet above ground level) achieves a small ground footprint (20cm) for each pixel. Flying 150m or 488' AGL leads to 6cm pixels.

Searches can also be conducted at high ground speeds (170-300 knots).

The TSR-1800 automatically adjusts its search parameters every minute based on changing aircraft speeds to optimize target detection.

0.05° C detectable temperature differences.

Wide swath coverage is provided by the imager's 1800 across-track pixels, meaning that while flying at ~1000' AGL (12cm resolution) the imaged track on the ground is ~220m (722').



HYPERSPECTRAL & THERMAL REMOTE SENSING

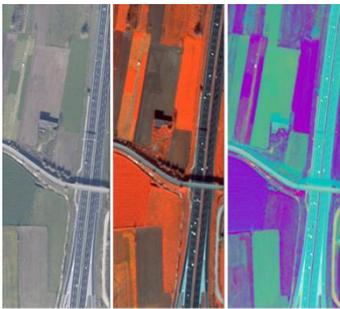
# Hyperspectral Sensors

## CASI 1500 – Visible Near Imager Hyperspectral sensor from visible to near infrared

The Hyperspectral sensor CASI 1500 realizes VNIR all-in-one images, up to 288 bands can be used, which ensure maximum resolution in the visible and near infrared (visible-near infrared). Used on board the aircraft, it allows a variety of environmental, forest, agricultural and wetland applications, for the classification of organic and inorganic materials on the ground according to the relative "spectral signature"

### APPLICATIONS

Classification of the vegetation  
localization of illegal crops and invasive species



Water Quality  
Wetlands  
Precision Agriculture  
Anomalies detection  
Network and infrastructure monitoring  
Landfills, micro-dumps and environment anomalies  
detection

### CARATTERISTICHE

Tipo sensore	Iperspettrale pushbroom
Canali spettrali	288
Range spettrale	0,38 – 1,05 microns <i>(ultravioletto - infrarosso vicino)</i>
Pixel (Across track)	1500
Total Field of view	40°
Risoluzione spaziale	20 cm - 1,5 m
Massima altitudine	10.000 ft (3.000 m)
Temperature registrate	da -20 a +60°C

### DIMENSIONI, PESO e ALIMENTAZIONE

ITEM	L / H / P (cm) / Peso (kg)
SHU	47,0 / 46,7 / 53,5 / 25
ICU (singolo)	48,3 / 17,8 / 52,3 / 16
Monitor 15"	41,0 / 30,9 / 6,52 / 8
Alimentazione	24 – 32 VDC, 13,5 A

### DATI OTTENIBILI

Immagini iperspettrali RAW

Immagini GeoTIF rappresentative delle diverse combinazioni di bande

# Photographic Sensor

## Phase One 150MP Aerial Solution

Phase One 150MP Aerial Solutions is fully integrated system based on the iXM-RS high-resolution metric camera. The Aerial solution includes the camera and additional components, such as: the iX Controller, Somag stabilizer, Applanix GPS/ IMU unit and the Phase One flight planning and management software iX Plan and iX Flight as well as iX Capture.



# IXM-RS150F Camera

Equipped with a **full frame sensor** (14204 x 10652), and a **3.76-micrometer pixel size** that enables higher ground resolution from a higher flight altitude and provides a larger aerial coverage resulting in higher aerial survey productivity.

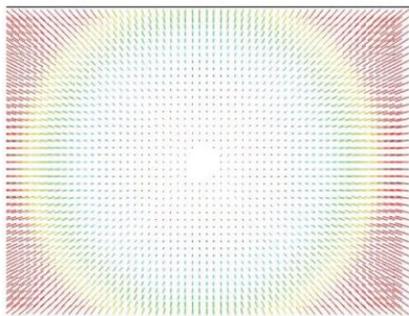
The camera comes with one of **eight RS lenses** ranging from 32mm to 180mm focal length, and the 300mm **RSM lens**, all equipped with a **central leaf shutter** to ensure geometrically correct aerial images.

Designed and built for aerial photography by Rodenstock and Schneider Kreuznach, the lenses are factory **calibrated for infinity focus** and equipped with a central leaf shutter speed up to 1/2500 sec. It offers high capture speed of 2 fps for an array of flight conditions. The RS lenses opening angle is specially fitted for oblique and lidar systems.

- BSI CMOS sensor
- High dynamic range of 83 dB
- Fast image capture rate of 2 frames per second
- Recommended for high quality 3D city models

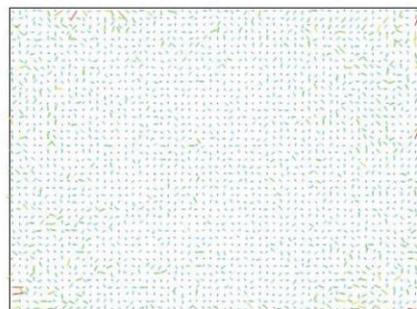
*“The iXM-RS150F is a highly productive 150-megapixel aerial survey camera”*

## Camera Distortion Model



Distorted Image

200 pix



Undistorted Image

1 pix



1. The distortion model of the camera corresponds to a standard Brown-Conrady symmetric radial distortion model.
2. Images captured with the camera may be easily transformed to an undistorted image with a maximal residual of less than 1  $\mu\text{m}$ .

# Specialised equipment

## LEICA ADS40 Digital aerophotogrammetric camera

It allows the acquisition of tricoid stereophotogrammetric images (forward, nadir, backward) useful for the preparation of digital numerical maps of the territory; the images are read in the visible and infrared spectrum.



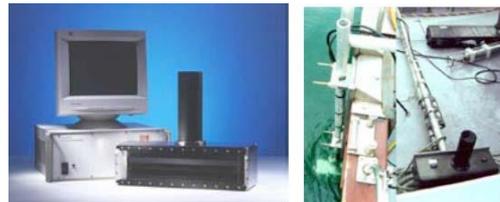
## LIDAR LEICA ALS50II Sensor

It allows the punctual three-dimensional reading of the territory from which to extract very high definition DSM and DTM models. LIDAR scans can be integrated with images from ADS40 useful for photorealistic modeling of the point cloud.



## Multibeam Reson Seabat 8125 Sensor

It allows continuous and real-time three-dimensional detection of sea, river and lake bottoms, through the processing of point models from which DSM models and high-precision bathymetric maps can be extracted.



## ROV Nautec Perseo underwater

The Remotely Operated Vehicle allows real-time video and photographic exploration of sea, river and lake bottoms up to a depth of 800 meters; the taking of material samples for classification and targeted analysis; the three-dimensional detection of the seabed in combination with the Multibeam Reson Seabat 8125 sensor.



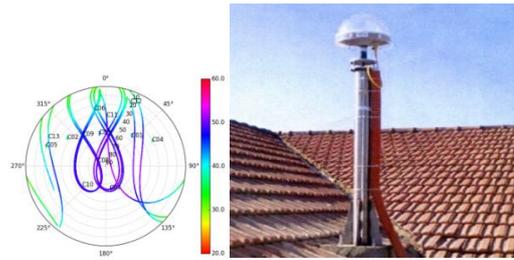
## Sonardyne Scout USBL/ Sub-bottom profiler Innomar SES2000

It is a real-time dynamic underwater acoustic positioning system for divers, ROV systems and towfish. Positioned on a boat, the system simultaneously performs the functions of depth sounder and geological profiler.



## GNSS Trimble NetR5 Antennas

These are the leaders of the Benecon geodetic network in Campania, open to GPS, GLONASS and GALILEO satellite protocols.



## Laser Scanner 3D RADAR Z Sensor/ Laser Scanner 3D TOF Trimble GX Sensor/ CAM2 LASER SCANNER FOCUS3D X 330 Sensor

The two 3D laser scanner sensors - the first at "phase time", the second and the third at "time of flight" allow high-precision three-dimensional detection from urban to architectural scale, with real-time restitution of point cloud models oriented and photo-realistic.



## TRIMBLE R10 GNSS System / GPS Trimble 5700RTK Station / Spaziale Trimble VX Station

The high-precision topographic instruments allow georeferenced metric surveys of large portions of the territory, of architectural artifacts, of infrastructures; they are also used to support three-dimensional laser scans.



## Laser Scanner 3D CAM2 Platinum FaroArm

The sensor - created for very high precision industrial applications - is the best technological solution for the real-time three-dimensional detection of morphologically complex plastic objects of medium and small size. The versatility of acquisition is particularly suitable for works of art and archaeological finds.



## Sistema SPR georadar

Multi-frequency consisting of a two-channel acquisition unit for the simultaneous management of two monostatic antennas, 600 MHz and 1600 MHz antennas, "K2" software for data acquisition and "IDS\_Gred" for data processing.



## Sistema georadar Aladdin

IDS for the acquisition of high resolution 3D images, including the three-channel acquisition unit, a 2 GHz high frequency bipolar antenna, PSG (Pad Survey Guide) data acquisition guide, software "Gred-3D" data processing.

