Universidade Vigo

With the collaboration of

PARQUE NACIONAL MARÍTIMO TERRESTRE DAS ILLAS ATLÁNTICAS DE GALICIA

AEBAM
ASOCIACIÓN ESPAÑOLA DE BASURAS MARINAS

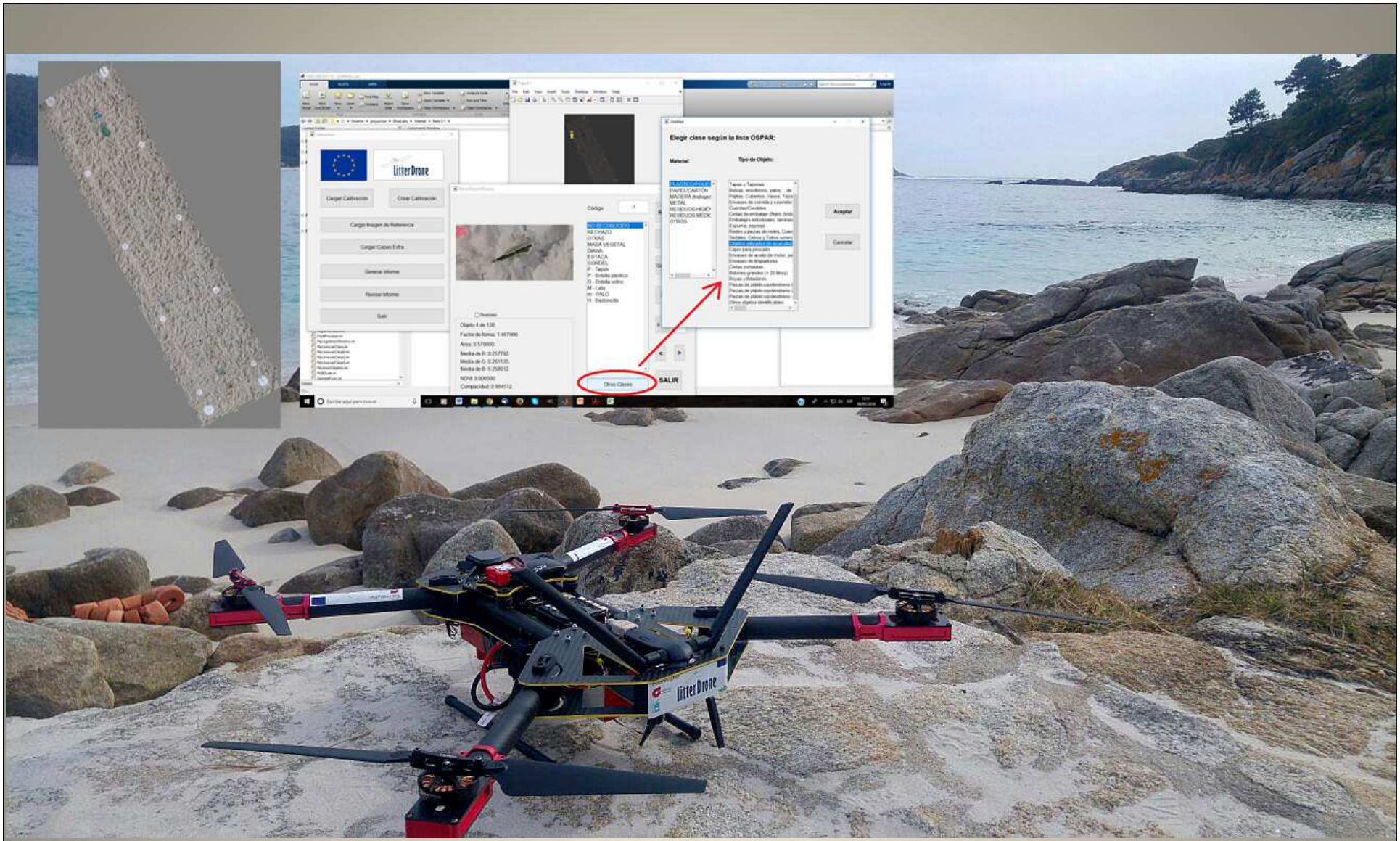
LitterDrone

# "Development and Exploitation of Innovative Tools for Remote Marine Litter Control and Management through UAV's"

Co-funded by the European Union

Supported by

ecoembes
El poder de la colaboración




Drone-based image acquistion + Computer based image analysis.

The PROJECT

# LitterDrone

# ¿WHAT IS MARINE LITTER?

**Man made solid waste that, for any cause, are abandoned in marine or coastal environment**

SOURCE: PNUMA

# LITTERDRONE ORIGIN

- **Marine litter characterization as a key factor to eradicate them.**
- **Official monitoring program for marine litter on beaches (MAPAMA).**
- **Standardization and automation of marine litter characterization.**

SOURCE: Surfrider España

DIC: Drones International Congress, Ourense, 2018.

# "DEVELOPMENT AND EXPLOITATION OF INNOVATIVE TOOLS FOR REMOTE MARINE LITTER CONTROL AND MANAGEMENT THROUGH UAV'S" (LITTERDRONE)

- **Main objective: development of innovative tools for control and management of marine litter on coastal areas**
- **Application of new technologies (UAV's + digital imaging) versus traditional characterization (on foot)**
- **Training of expert people in the use of these new innovative tools**
- **Analysis of the arrival of the new tools to the market**

DIC: Drones International Congress, Ourense, 2018.

# FUNDED BY EU (BLU-LABS PROGRAM)

- EASME/EMFF/2016/1.2.1.4 - Blue Labs - innovative solutions for maritime challenges.
- Support from EcoEmbes.

ecoembes
El poder de la colaboración

- Three partners.

Universidade Vigo

AEBAM
ASOCIACIÓN ESPAÑOLA DE BASURAS MARINAS

# The Partners

LitterDrone

# AEBAM:
# ASOCIACIÓN ESPAÑOLA DE BASURAS MARINAS
# (SPANISH MARINE LITTER ASSOCIATION)

AEBAM
ASOCIACIÓN ESPAÑOLA DE BASURAS MARINAS

**Non profit organization founded in 2015**

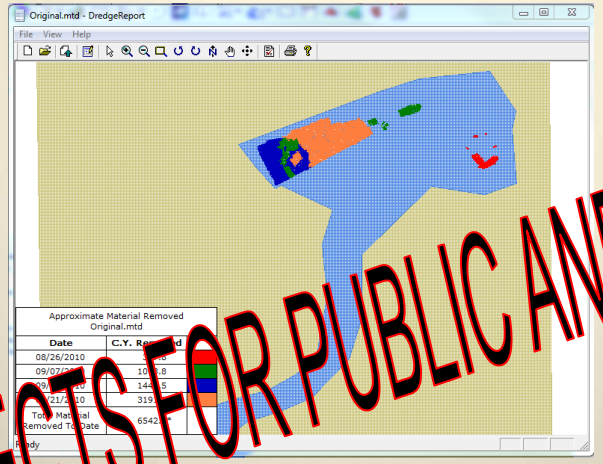
Agència de Residus de Catalunya
Generalitat de Catalunya
ADEGA
AMBIENT EUROPEO
HyT
0 asociación vertidos cero
FUNDACIÓN GLOBAL NATURE
ITSAS GELA · PASAIA ·
marine services
"SIEMPRE QUE VAYAS A SURFEAR RECOGE ALGO DE LA PLAYA"
CLEAN SURF
www.surf-and-clean.com
SURFRIDER FOUNDATION EUROPE

DIC: Drones International Congress, Ourense, 2018.

# GRAFINTA S.A.

- Enterprise established 1964.
- Since the beginning, GRAFINTA S.A. has been involved in distributing instrumentation and solutions for the surveying and mapping industry, hydrography, oceanography, GPS and navigation.

- **DELPH SEISMIC+.**
  - Hesperides BIO vessel.
- **DELPH SONAR.**
  - GEOMYTSA.




**NAVANTIA**
**U.P. ASTILLERO**
**CARTAGENA**


SEVERAL PROJECTS FOR PUBLIC AND PRIVATE ENTITIES

DIC: Drones International Congress, Ourense, 2018.

# University of Vigo

Universidade Vigo

- Number of Degrees: 54.
- Master Programs: 74.
- Students: 20826.
- Departments: 47.
- Campus: 3.
- Schools/Colleges: 21.


GPI

Image Processing

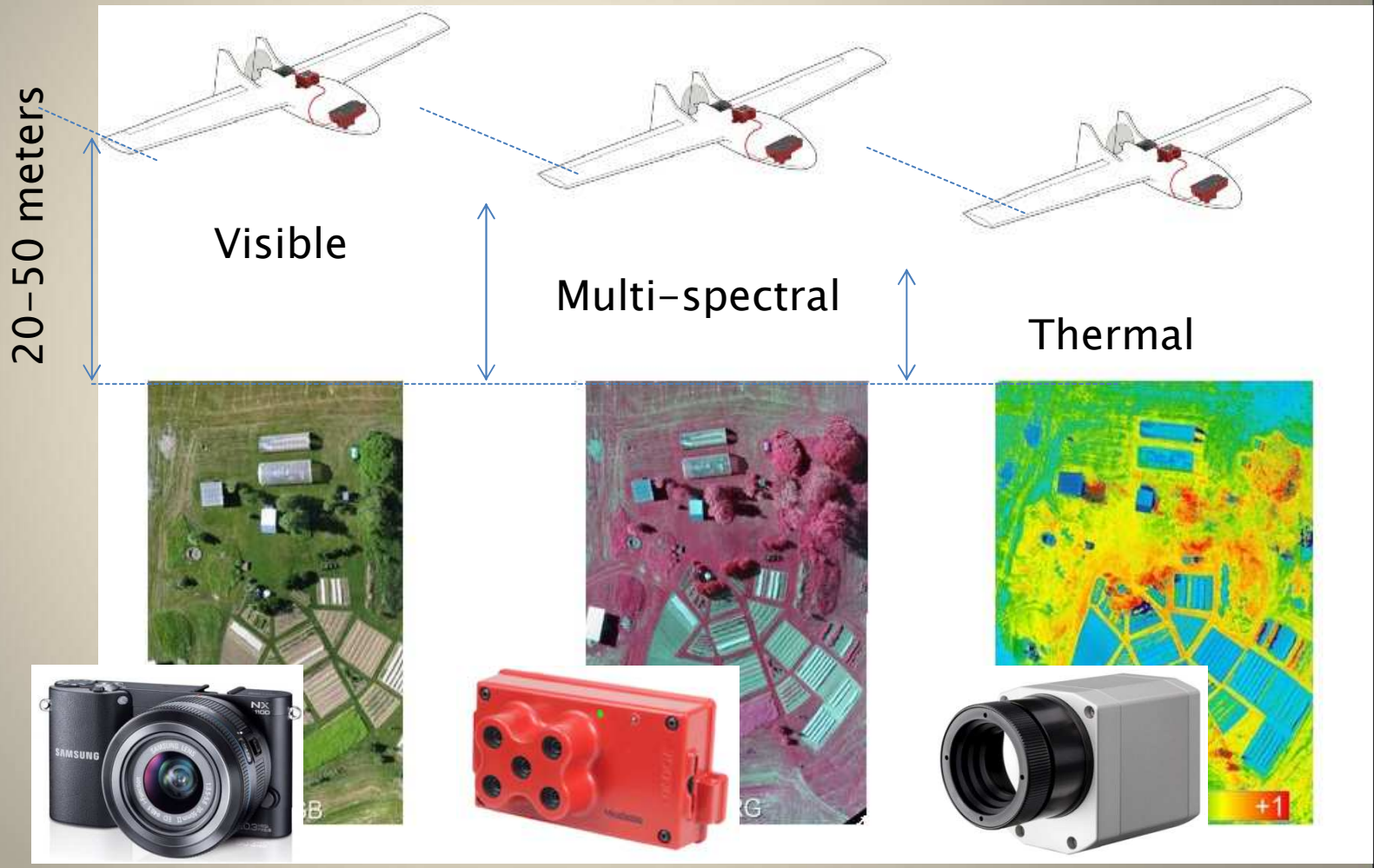
Marketing & Strategy

DIC: Drones International Congress, Ourense, 2018.

Drones & flights

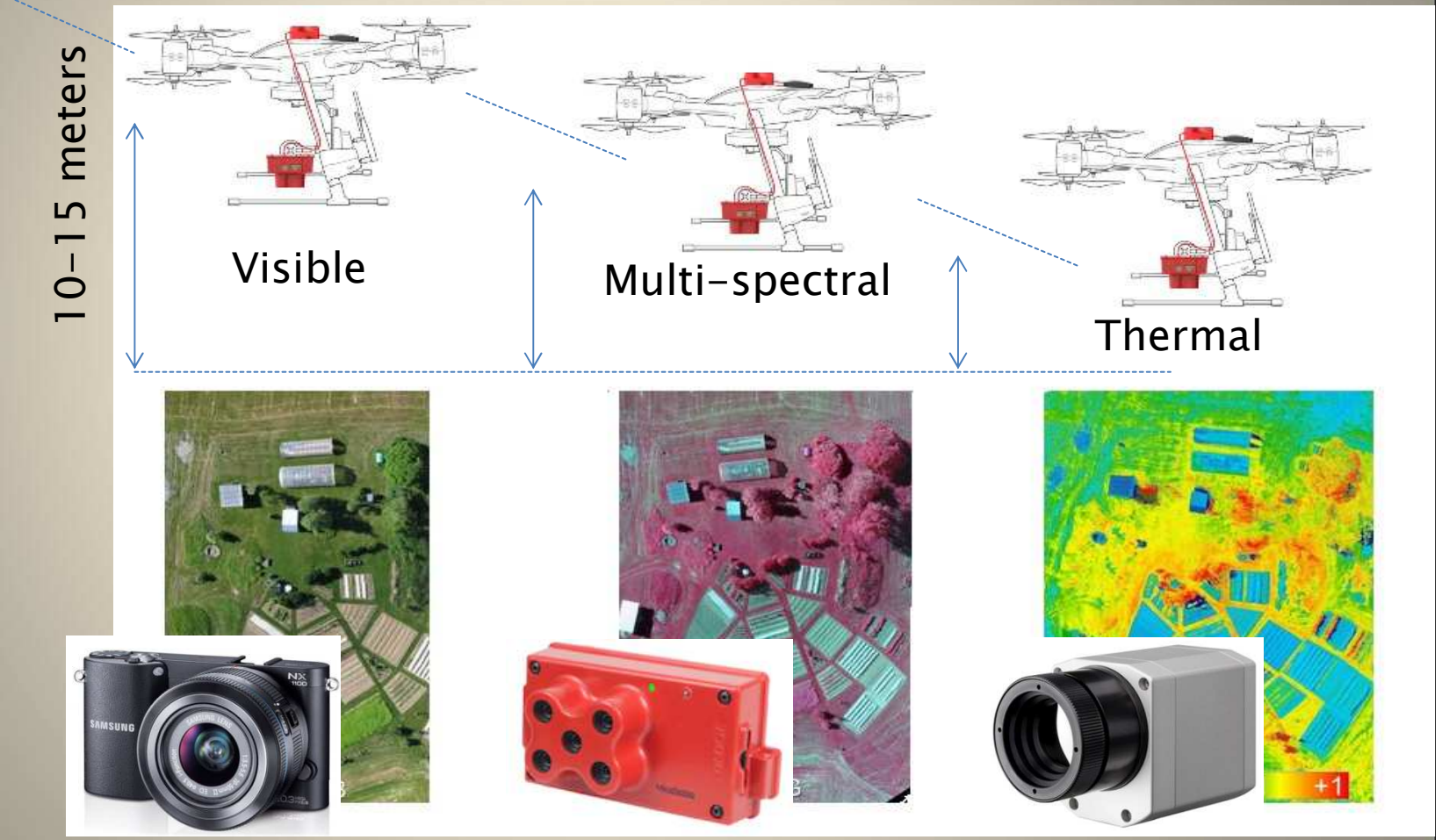
# LitterDrone

# UAV's & Cameras




DIC: Drones International Congress, Ourense, 2018.

# UAV's & Cameras

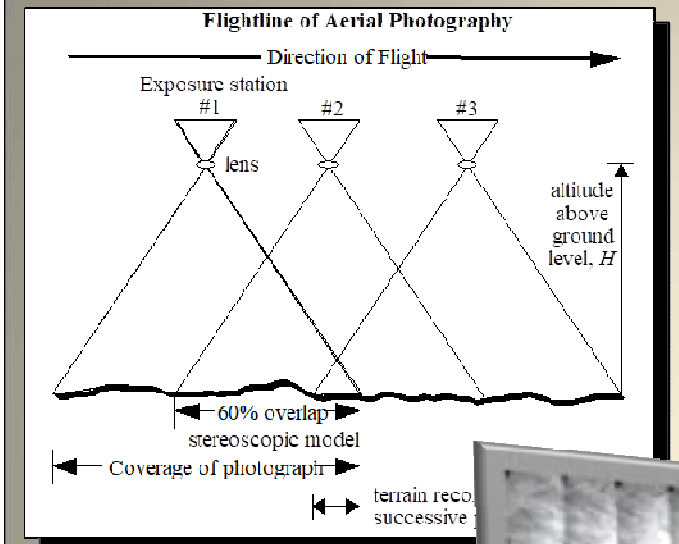


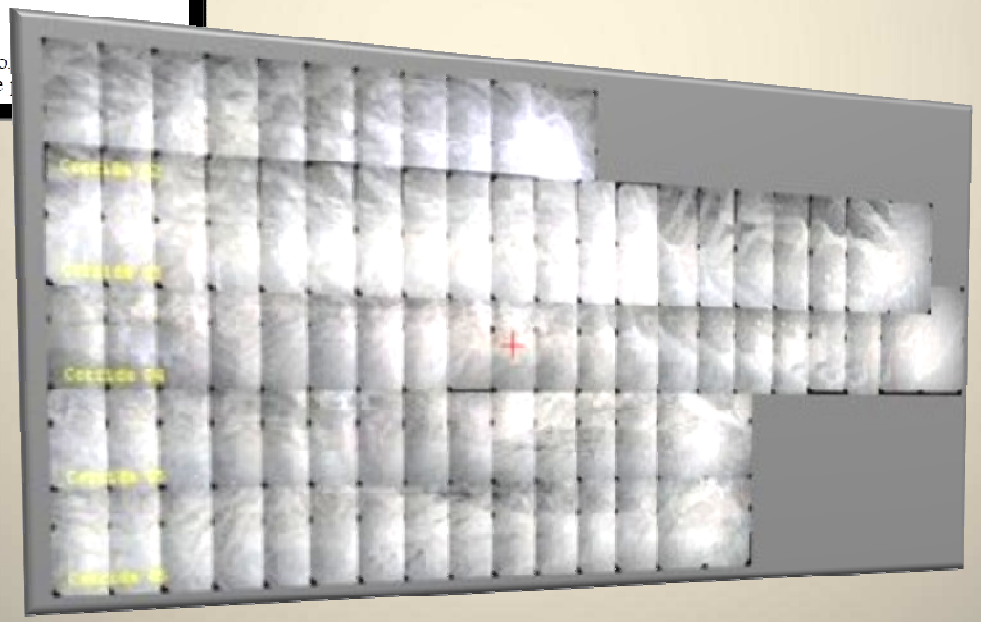

DIC: Drones International Congress, Ourense, 2018.

# Real Flights

DIC: Drones International Congress, Ourense, 2018.

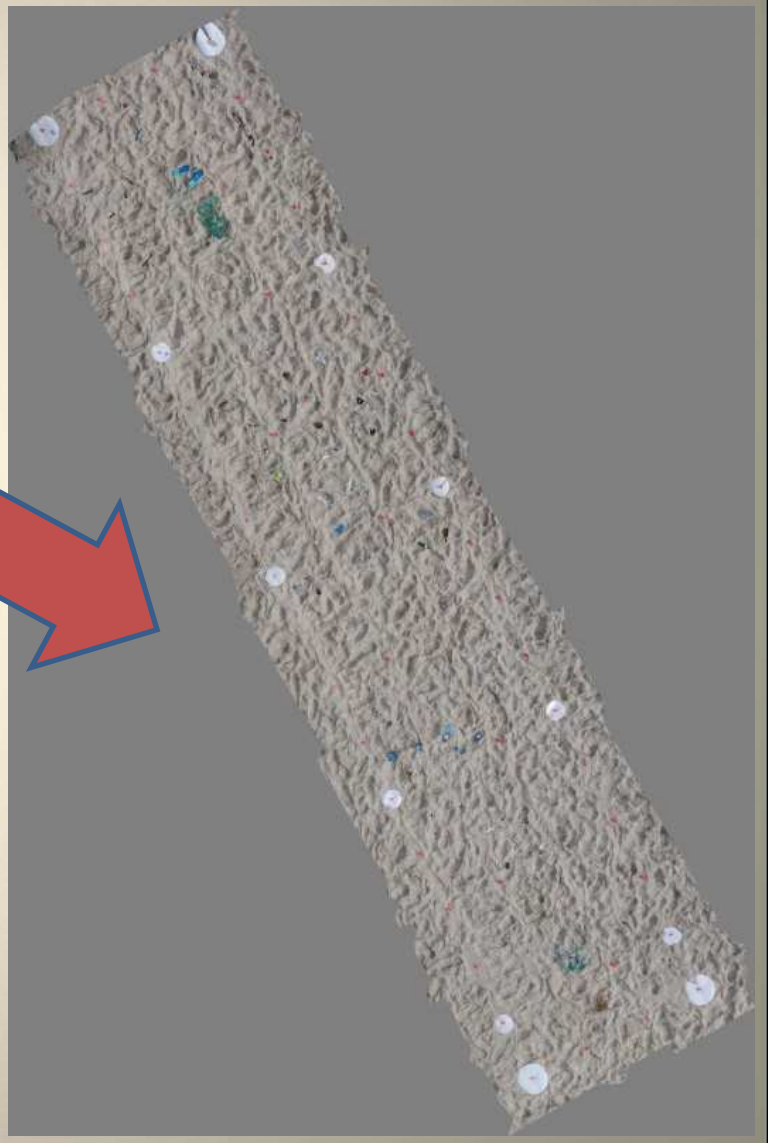
# Image Acquisition: Othophoto



DIC: Drones International Congress, Ourense, 2018.

# Image Acquisition: Othophoto



Photomodeler: from photos to Orthophoto (georreferenced, exact).

DIC: Drones International Congress, Ourense, 2018.

# Test Zone

- Flying on one of the monitored beaches: “playa de Rodas” (Galician Atlantic Islands Maritime-Terrestrial National Park).
- Detection of true marine litter and comparison with official data.
- Flying on another (non monitored) beach.

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DE GALICIA

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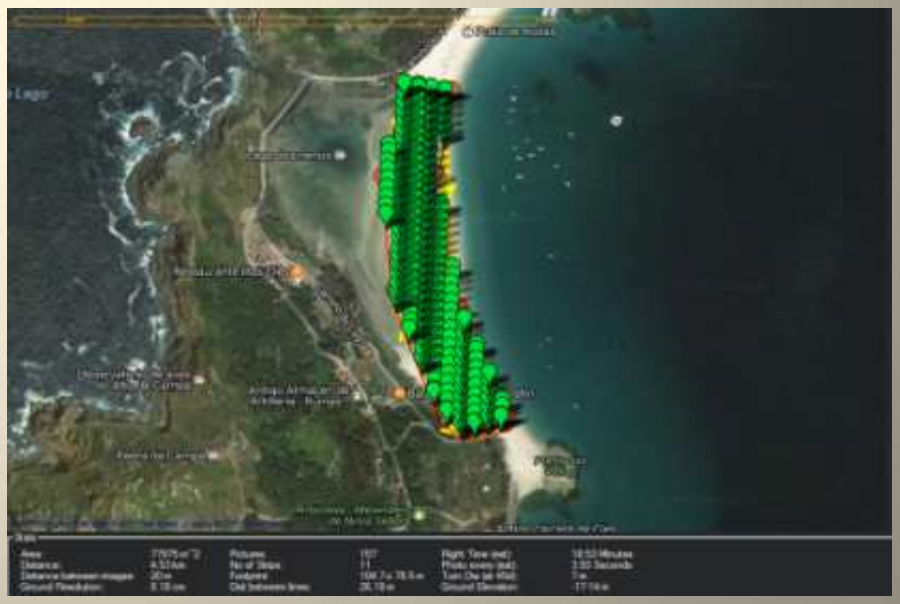
DIC: Drones International Congress, Ourense, 2018.

# Real Flights


Flight transects

Flight with individual photo shots labelled



DIC: Drones International Congress, Ourense, 2018.

# Image processing

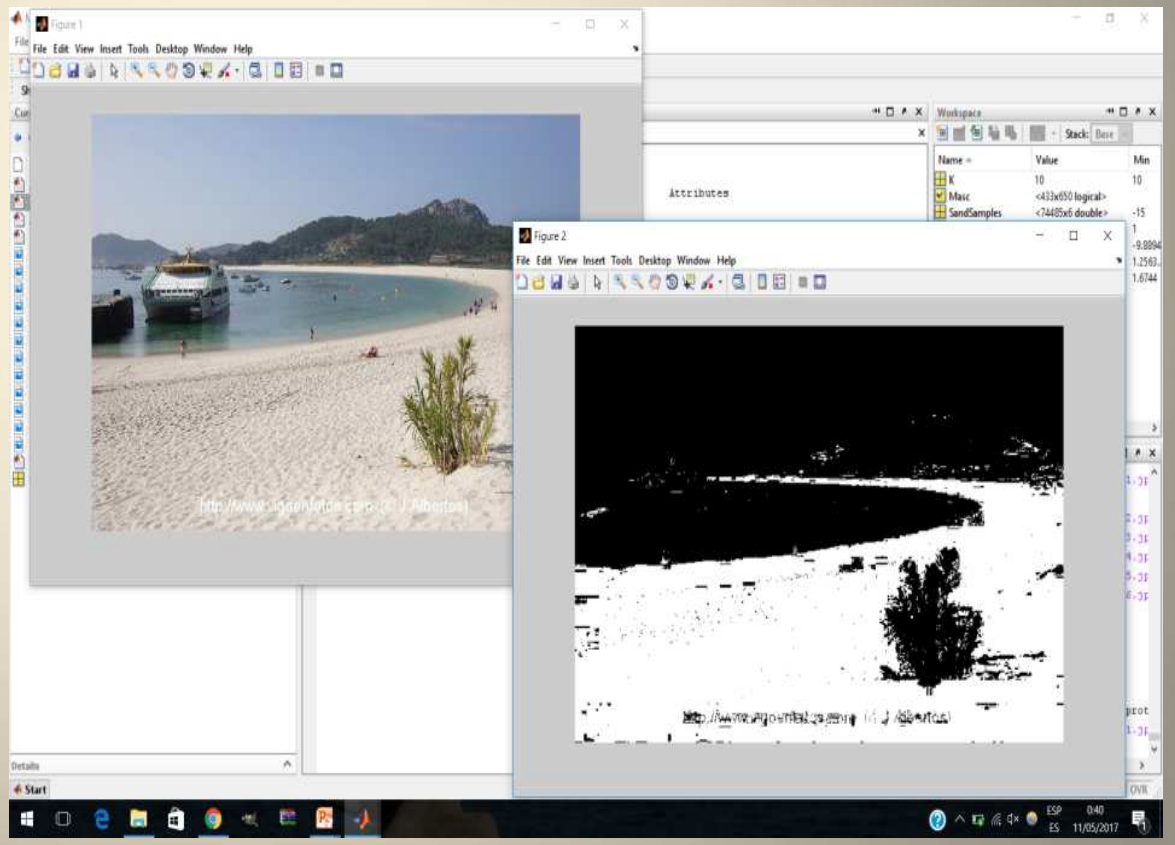
# LitterDrone

DIC: Drones International Congress, Ourense, 2018.

# Image Processing

**Objects detection with beta version:**
sand characterization

IMAGE TYPE:
RGB (VISIBLE, CONVENTIONAL CAMERA).




DIC: Drones International Congress, Ourense, 2018.

# Object Detection

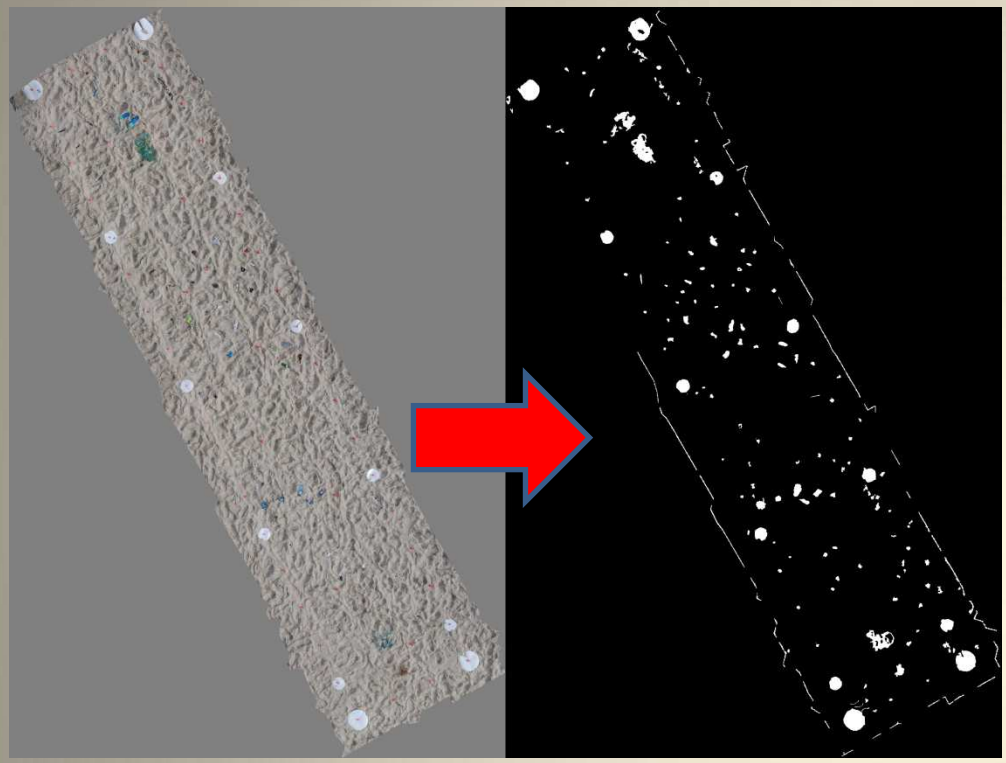
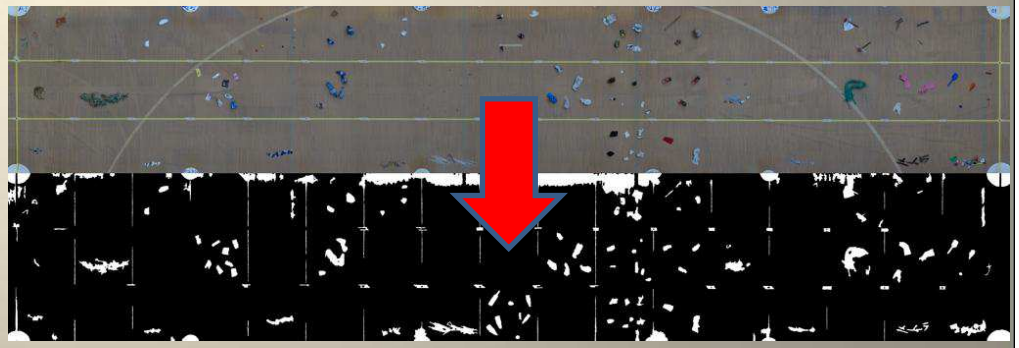
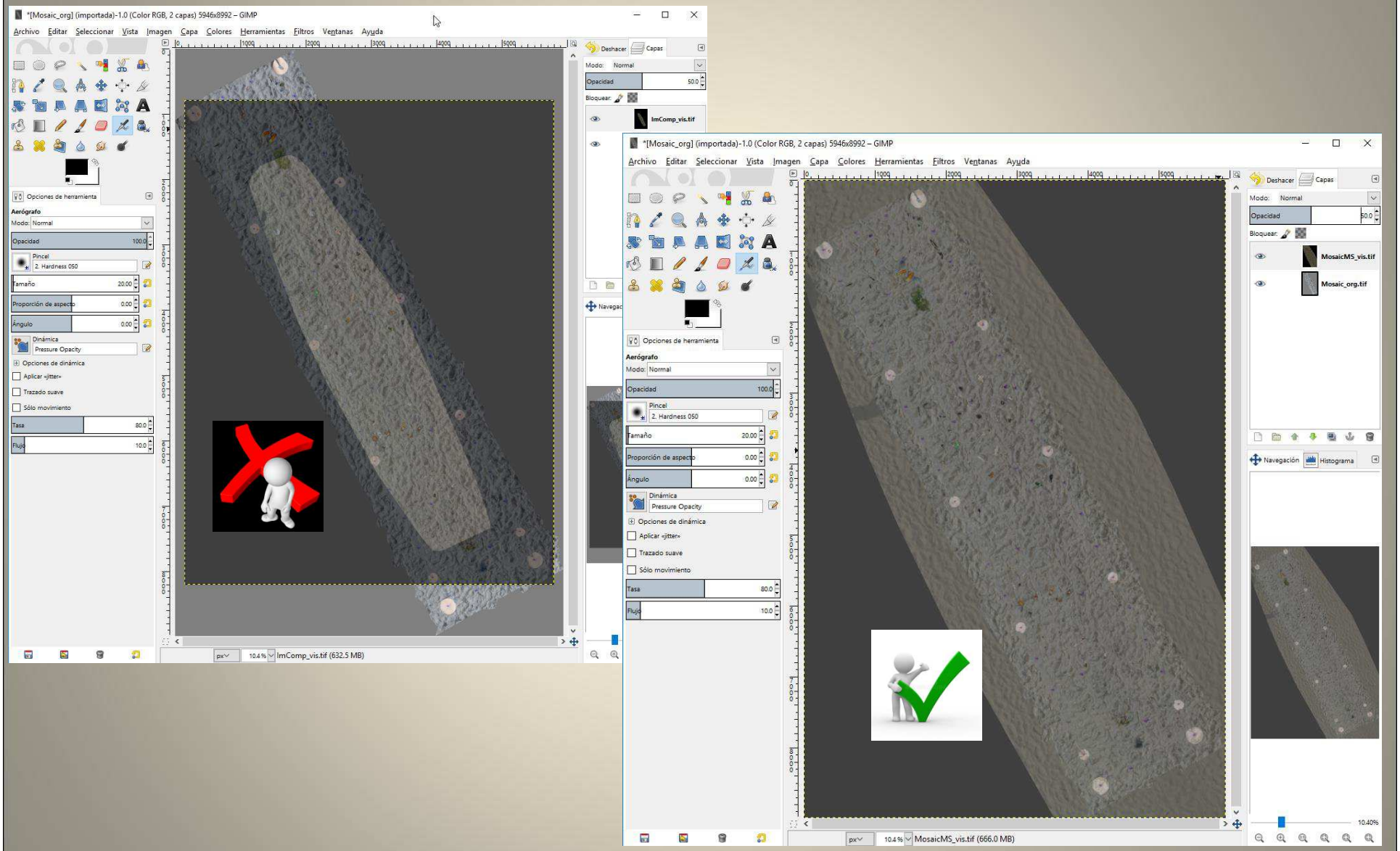


IMAGE TYPE: RGB (VISIBLE, CONVENTIONAL CAMERA).



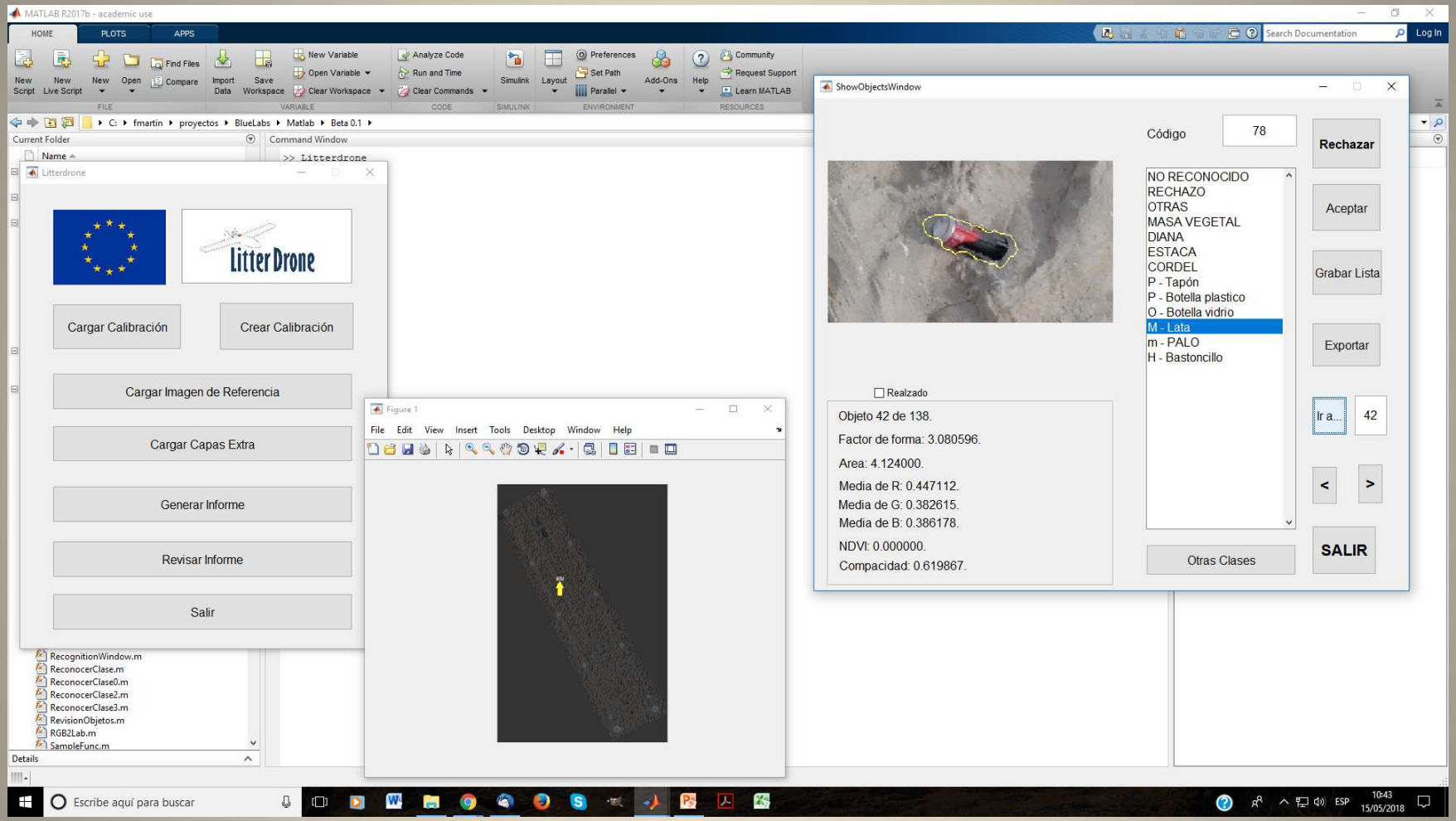
DIC: Drones International Congress, Ourense, 2018.

# Image Superposition




DIC: Drones International Congress, Ourense, 2018.

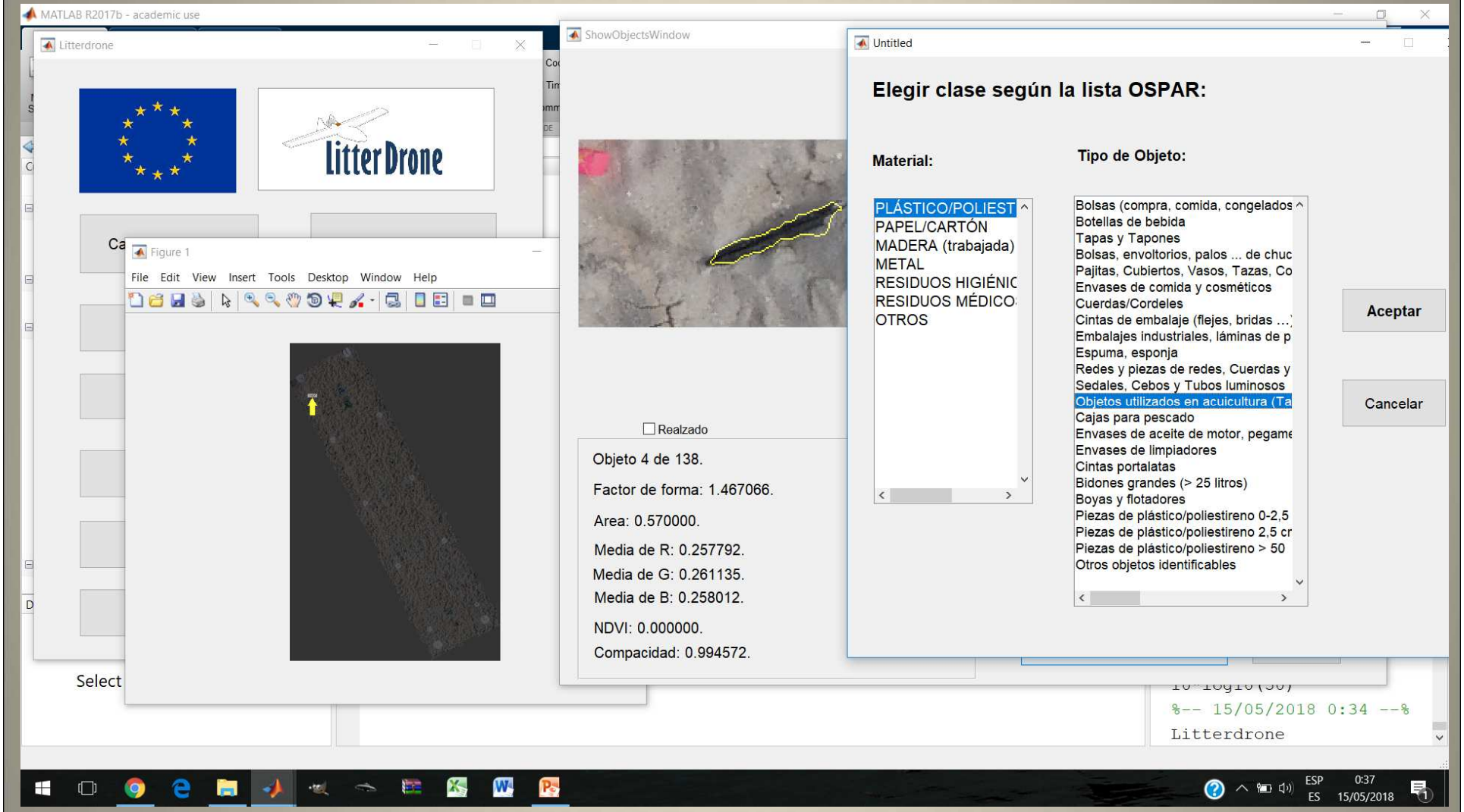
# Object Recognition




Automatic recognition of more common objects: lids, bottles, cans, sticks… and also auxiliary objects (white targets).

DIC: Drones International Congress, Ourense, 2018.

# Object Recognition




Human correction of non recognized objects.

DIC: Drones International Congress, Ourense, 2018.

Market research

# LitterDrone

Grupo de investigación I-Mark

Universidad de Vigo

# Market Research and Business Model

- **PHASE 1:** Contributed Value and Market Niches
- **PHASE 2:** Marketing Plan Strategy
- **PHASE 3:** Feasibility

DIC: Drones International Congress, Ourense, 2018.

# TASKS

Grupo de investigación I-Mark
Universidad de Vigo

| | |
|---|---|
| **Phase 1: Contributed Value** | **TASK 1.1: Qualitative analysis: market research, PESTEL, SWOT (DAFO)**<br><br>**TASK 1.2: Suitability study product/market niche** |
| **Phase 2: Strategic Planning** | **TASK 2.1:** Marketing purposes<br><br>**TAREA 2.2:** Qualitative analysis: market profile<br><br>**TAREA 2.3:** Positioning strategy<br><br>**TAREA 2.4:** Marketing mix |
| **Phase 3: Feasibility** | Foresight Analysis |

DEPARTAMENTO ORGANIZACIÓN DE EMPRESAS Y MARKETING

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# Conclusions

# LitterDrone

# Conclusions

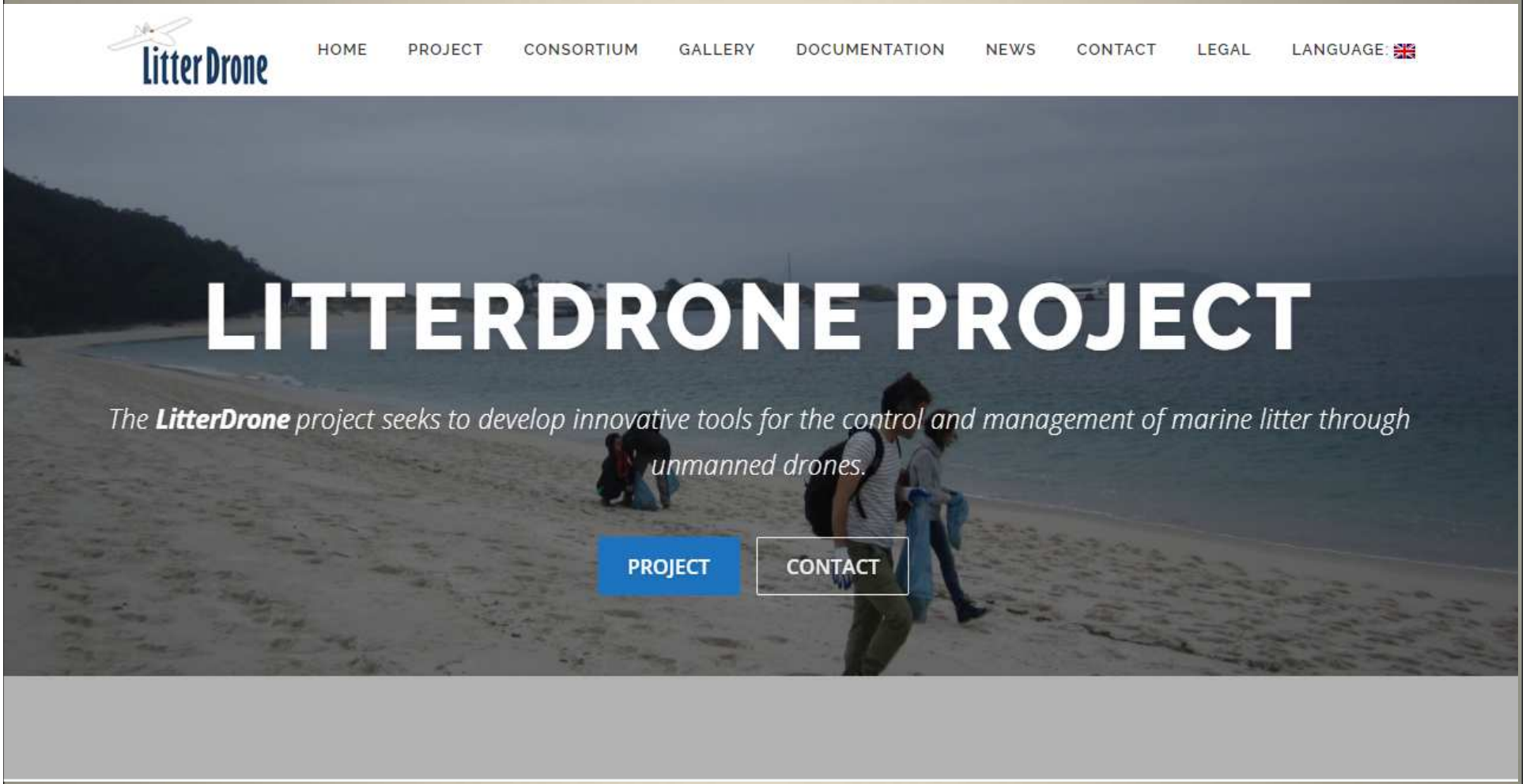
- Interesting project ending at January 2019.

- Pending work:
  - Testing new cameras.
  - Improving object recognition.
  - Market research.

**MEETING OF DRONE TECNONOLOGY, REMOTE SENSING AND COMPUTER VISION, MORE PROJECTS OF THIS KIND ARE EXPECTED IN THE FUTURE.**

DIC: Drones International Congress, Ourense, 2018.

# Thank you....




www.litterdrone.eu