

# INNOVATION

by INAV

**INAV**  
AVIATION INSTITUTE  
[www.inav.ro](http://www.inav.ro)



INAV can coordinate and manage aircraft development programs in own design and conception with various specialized partners both from Romania and the EU.

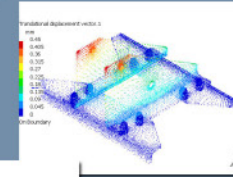
The conceptual and detailed design of aircraft structures, onboard systems and simulations are accomplish with leading industry CAD software solutions.

Aerodynamics and stress calculus and simulations are accomplished by using in-house or commercial software packages.

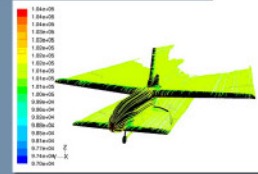
INAV maintain commercial relationships with Romanian aeronautical factories by developing very complex tooling devices and aircraft structures.

## SIMULATIONS

Stress

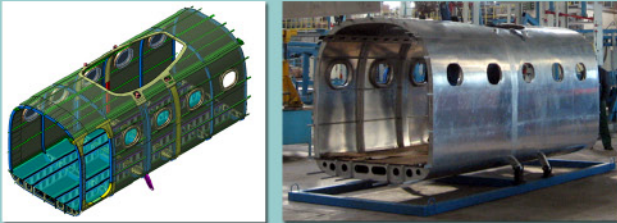


CFD



- specific activities that support the structural design
- analyse, assessment and optimisation for the constructive solutions

## AEROSTRUCTURES DESIGN



Classic structures



Composite structures

- research and development of new aerial vehicles concepts
- 3D modeling of the structures and manufacturing drawings using Catia V5
- structural system integration under civil aviation regulations
- documentation delivery in the customer's requested format

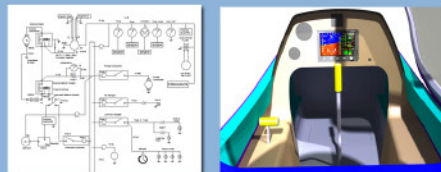
## SYSTEMS



Landing gears



Engine mounts



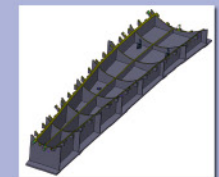
Equipments integration

- systems development and integration for the own or client's projects
- analyse, assessment and optimisation for the constructive solutions

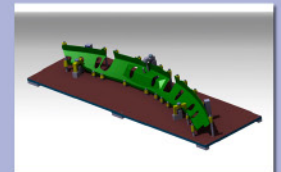
## TOOLING

- tooling concept and design following the customer's requirements
- tooling optimization
- optimization of the manufacturing technologies
- tooling manufacturing support at client site
- tooling homologation assistance

Routing&Drilling



Checking



INAV maintain strong commercial relationships with private companies that provide defence or security services for Romanian government by involvement in R&D projects concerning intelligence-gathering methods, aircrew saving systems or ammo improvement.

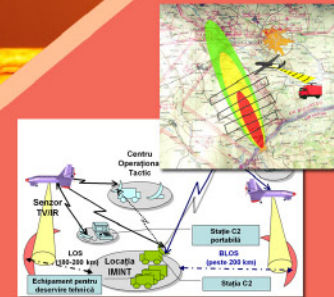
The development activities of these areas could be started from client requirements or European specific research directions. INAV can offer consultancy regarding the generation of operational concepts.

INAV use the research results of materials and technologies for industrial applications in sensible domains.

## CONOPs

INAV developed concept of operation for it's own projects, based on the project requirements.

The Conops take in account the specific regulations.



## DEFENCE



Ammo Launch Control Panel  
(for IAR-330 Puma helicopter)



Anti Runway Penetration  
Guided Bomb



Inflatable Boats

INAV is doing R & D activities for the Romanian MoD, developing projects in different areas as:

- onboard equipments
- ammunition
- life saving equipments

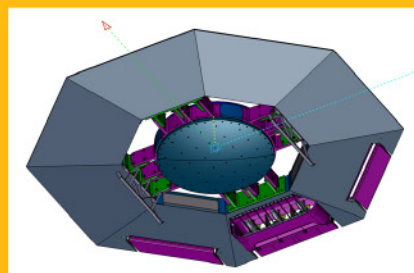
## UNMANNED SYSTEMS



ARGUS XS



ARGUS XL



Underwater ROV



SISAERO



UAVRADS

Unmanned systems developing represent one of the main business directions. Following this, INAV creates it's own line of unmanned aerial vehicles by participating to different project competitions.

- **Argus XS** - small UAV developed for forestry, infrastructure development and real estate business
- **Argus XL** - medium size UAS demonstrator for IMINT missions
- **SISAERO** - VTOL UAV project for law enforcement
- **UAVRADS** - UAV project for radiation detection and assessment
- **Underwater ROV** - developed on the client's requirements and initial sketches

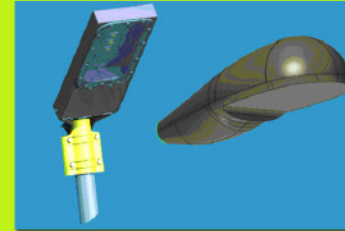
Green energy is a new direction in business development.

In this light, INAV institute is involved in designing wind turbines with nominal power between 5 and 20 kW. The usage of specific design standards, the aerodynamic and stress calculus and simulations together with the 3D assisted design place the wind turbines in the sphere of the high performances products.

Photovoltaic applications have been developed by INAV because of internal market demands. The demonstrators are now in tests at certified laboratories.

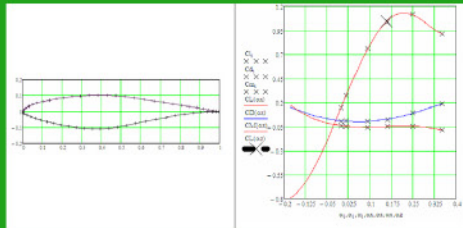
Low power consumption lighting products are developed in partnership with SCR Group's industrial companies.

## LIGHTING

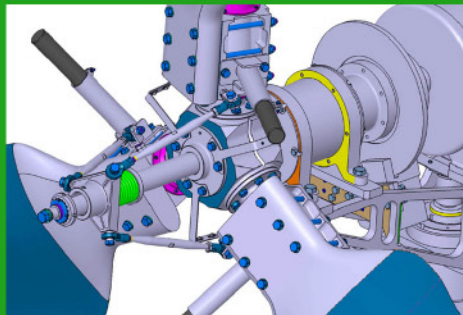


- LED light sources for
- street
  - pedestrian paths
  - parks

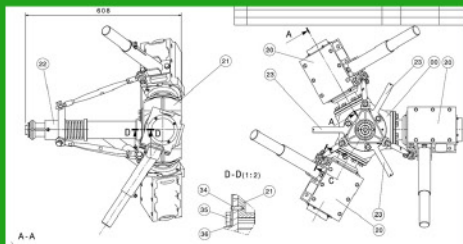
## WIND TURBINES



Calculations



3D design and DMU simulations

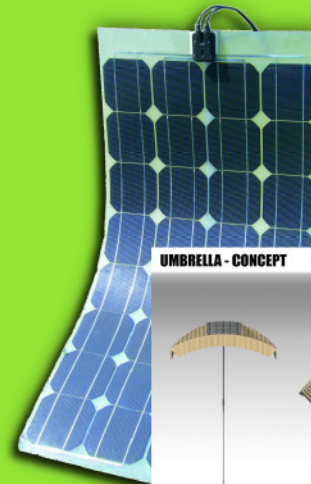


Manufacturing drawings

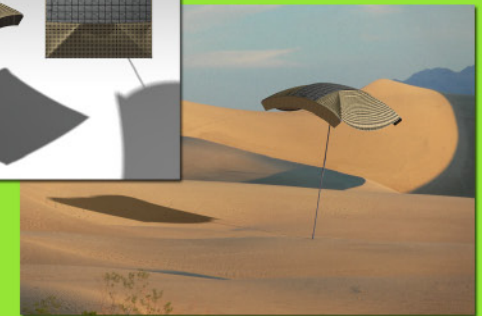
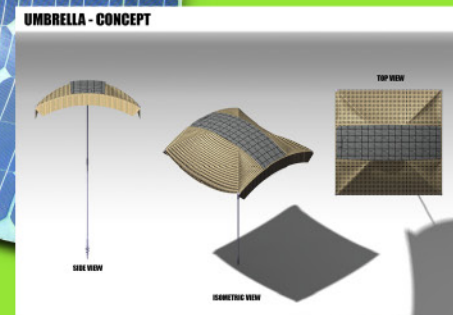


Manufacturing

## PHOTOVOLTAIC APPLICATIONS



UMBRELLA - CONCEPT



General consumer products with embedded solar energy generators

Transport was approached initially as an extension of innovative aviation research applications. Reducing drag in air or water have been themes in fundamental research projects.

Lately, have been designed and manufactured equipment and special systems for both manufacturers or repairs and maintenance companies, in rail industry.

The intellectual property of the manufactured products belongs to INAV and the design was made in accordance with the beneficiaries requirements related to quality and productivity.



## NEW CONCEPTS



Underground train

Using the Dolphin airfoils, was obtained:

- Power economy of over 30 % (proved in the wind tunnel);
- Diminish the piston effect;
- Better comfort conditions in the underground stations due to the diminish of the air flow intensity when the train starts / arrives;
- Weight reduction due to the implementation of aviation technology;
- Low aerodynamic noise;
- A lower temperature in the tunnel.

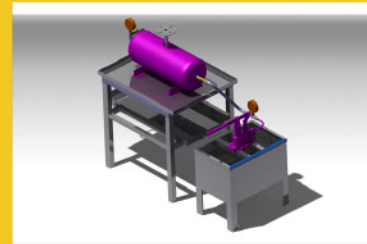


Naval propeller

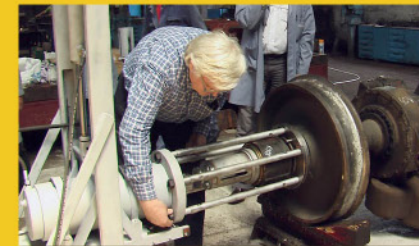
Using the Dolphin airfoils and after tests in the cavity tunnel at ICEPPRONAV Galati, was obtained:

- A higher thrust for a given power;
- A smaller cavitation.

## DEVICES



Valve Testing Stand



Hydraulic Press  
(Mounting/dismounting train bearings)



CARINA  
(Ohmmeter for train coupled axle electric resistance measurement)





**S.C. INAV S.A.**

44A, Ficusului Blvd. Sector 1  
013975 Bucharest, ROMANIA

Phone/Fax: +40 21 232 37 24

+40 21 232 76 67

+40 21 232 68 87

[inav@inav.ro](mailto:inav@inav.ro)

[www.inav.ro](http://www.inav.ro)

*Innovation means risk-taking*