

Centers for UAS Flights in Spain Description

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ABSTRACT

Many researches made by companies or specialized publications (Teal Group, Frost & Sullivan, Defense Electronics, Aviation Week...) indicate that during the next decade a growth is expected in the non triplated aircrafts market and investments, doubling the market in the next 10 years, even reaching a 12% per year growth. If Europe keeps its percentage of contribution on that market, it would mean a volume of around 1100 million dollars per year.

According to the European Commission data, in Europe there are already more than 400 models on their production or development stage, of which 350 are for civil application, and 69 of them are big sized aircrafts. Many of these developments are brought about by small and medium-sized enterprises, in contrast to triplated aircrafts, whose market is controlled by big sized enterprises such as Boeing or Airbus. On a global level, a production of more than 35.000 units of UAS is expected in the next decade.

So far, the use of non triplated aircrafts was limited to the military field, where they mainly performed inspection tasks within the enemy camp in conflicting areas. In recent years, due to the advantages that they have over conventional aircrafts (more autonomy, less operational cost) it is intended to include these aircrafts within the civil field, for both security missions (fire surveillance, search and rescue mission, border control, irregular immigration, fishing activities, sea dumping, drugs traffic or air traffic control) and atmosphere research or Earth surface observation activities (images collection, ecological and environmental disaster management, atmosphere study, etc.).

For the time being, small-sized aircrafts fly under the national normative of radio control with operational restrictions such as always flying line of sight. Big-sized ones fly with special permission on segregated airspace. To achieve the integration of UAS into airspace, flying next to triplated aircrafts, a certification normative should be established, similar to the one valid for triplated aircrafts (FAR in the USA and EASA in Europe), which verifies that aircrafts have been designed, made and kept using appropriate procedures, guaranteeing in that way the security of people on board and inhabitants of the overflownd lands. In the same way, and because of the special features of this kind of aircrafts, some operational procedures should be established.

To achieve the integration of UAS into airspace, the president of the USA, Barack Obama, signed on February the 14th 2012 a reform (FMRA, Modernization and Reform Act) of the FAA (Federal Aviation Administration), which includes the guidelines for the FAA to work in the integration of non triplated airplanes into the civil airspace. Through this Presidential Order, it is expected the coexistence of both types of aircrafts into the American civil airspace in 2015. In Europe, the EASA goal is to get this coexistence in 2016.

To perform the required trials to guarantee security and proper functioning of this kind of aircrafts, Spain, through the INTA (Insituto Nacional de Técnica Aeroespacial - National Institute for Aerospace Technology), is setting up two centers where to perform this kind of trials with non triplated aircrafts. Although both centers are already operational, the two of them are in the process of improvement.

- El Arenosillo Experimentacion Center (INTA/CEDEA): this center is located in Huelva, in the municipality of Mazagon, near to Doñana. The great advantage of this center is that it counts with a big segregated air space over the sea, and the required equipment to control the operations performed on it (communication systems, radars, meteorological center and control center) so it has the optimal conditions to perform flights of prototypes and developing aircrafts with ideal security measures. Currently a project to enlarge the infrastructures is being carried out “Centre of Excellence for Unmanned Systemas “ (CEUS), adding a takeoff and landing strip, paved and unpaved, for aircrafts, hangars, laboratories, support equipment’s (<http://www.inta.es/grandesInstalaciones.aspx?Id=2&SubId=11>).
- The Airborne Investigation Center in Rozas (CIAR) is located in the aerodrome of Rozas (Lugo, Spain). This center is operative since 2012. Currently it is being considered to perform a project to supply the airport of Rozas with laboratories, offices and the required equipments to turn it into a center of environmental investigation and for the development and trial of boardable equipment into aircrafts.

To make this article, both centers locations and facilities have been visited. The CEDEA has been working since mid-60's, so it is already a consolidated center with a wide experience, and more than 300 employees on its facilities. The CIAR was founded in 2012, and there is still only one person on its facilities, so the remaining required staff commute to the center everytime a campaign is carried out. Working people from both centers have been interviewed and flights performed in them have been studied. Both centers are on the improvement stage, so modification projects from the two centers, whose finalisation is due by the end of 2015, have been studied. In 2016 it is expected to go back to the two places to check on the improvements achieved after the refurbishment

1.0 INTRODUCTION

National Institute for Aerospace Technology (INTA), founded in 1942, is a public research establishment attached to Spanish Ministry of Defence (MoD), hence, a governmental organization. Which is under direct Government decisions from State Secretary of Defense.

INTA activites on research trascend the scope of military applications to benefit, through new developments and applications, the most varied areas of activity. Currently, INTA personnel is based in technologists and researchers of the highest level in their areas of competence, while equipping itself with major infrastructures in the form of installations, facilities and laboratories for research, development, measurement and testing, all of them, pioneers in Europe and frequently used by national and international organizations.

INTA carries through its research activities in a highly cooperative environment, in collaboration with other partners in many international programs, participating also in most of international aeronautic and space forums. This internationalization of activities is one of the most significant features of INTA. Summarizing INTA profile in figures, human resources working in INTA and its associated sites consist of more than 1.600 people with facilities situated at several different locations in Spain, each one with a definite purpose.

From administrative point of view, currently INTA has been conceived by regulation as a Public Research Establishment (OPI: Organismo Público de Investigación). This means that it is working under the following framework:

- Autonomous Agency.
- The Spanish Law of Science (Law 14/2011).
- INTA's Statute (Royal Decree 88/2001).
- Government's Facility & Technical Service (Royal Decree 343/2010).
- Regulation for Spanish Military Airworthiness (RAD Royal Airworthiness Decree 2218/2004).

With the following main aims are to support:

- Public, private or mixed Research and Development programs (R&D).
- Industrial and technological industries in general and aeronautical industries and designs in particular.
- Promotion and support of all kind of Defense programs from a technological point of view.
- Technical support to Dirección General de Armamento y Material, (General Directorate for Armament and Materiel, DGAM) in subjects as military airworthiness and military aircraft type certificate issuance.

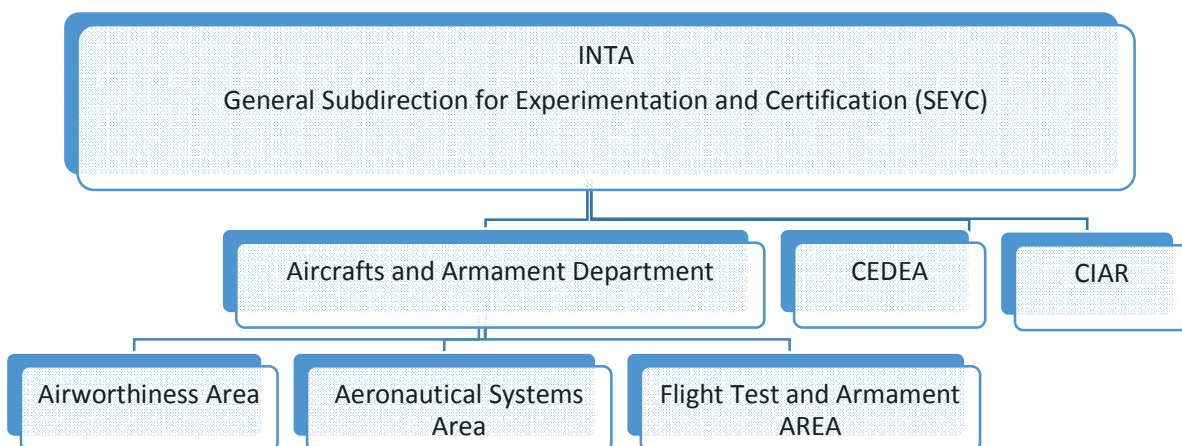


Figure 1. Allows understanding INTA organization for military aeronautical programmes. General Subdirection for Experimentation and Certification (SEYC) is in charge to support DGAM and Industry in terms of certification, qualification, development and experimentation. Additional departments are under direct influence from SEYC. However they are out of the scope of present paper.

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A “full package” certification service is provided by INTA organization:

- Airworthiness technical assistance for type certificate and Experimental flight test authorizations.
- Technical support by Flight Test Ranges Centres.

These activities are fully applicable for Unmanned Aerial Systems.

In the following chapters, the different Areas and Departments, which run a critical role in these activities, will be described.

2.0 TRIALS AND CERTIFICATION CENTERS

To achieve the integration of UAS into airspace, it is necessary to perform development and certification flights on an adapted environment to this kind of aircrafts. To make the most of these aircrafts on a socioeconomical environment as well, it is required to make the integration of payloads and trials adapted to the mission that will be performed. These flights, which are of an experimental nature, must be performed under the security and control measures that guarantee the proper functioning of the trials and the aircraft security, other aircrafts passengers and inhabitants of the overflown lands.

Central Europe airspace is very congested, with no space to generate enough airspace to build a center with these characteristics. Northern Europe has some of these centers: RATUFC in Finland, Vidsel Test Range in Sweden or Roros in Norway. Israel, in spite of being a world leader of the UAS development, does not have any trials center, since these aircrafts are meant to have military uses, and trials are performed on army bases. In the USA there is a base for these trials, “White Sands Missile Range”, located in the south of New Mexico, also military. The same happens in UK, which has the base of Roros, situated in Wales, of a military origin as well. Within the European market, the Spanish centers would count on the weather as a competitive advantage, since some of the previous centers have to remain closed most of the year, with temperatures below 0°C.

In Spain, according to the directives from the Commander-in-Chief of the Army Air Forces, there are only three areas with a preapproved permission to perform flights with UAS: the gunshot area of Bárdenas Reales (reserved to air force), the CEDEA and the CIAR, both centers belonging to the INTA. To perform a flight in one of these three centers, it is required to issue a NOTAM (Notice To Airmen, Información para aviadores) to restrict the airspace to other aircrafts. To fly with an UAS in different areas, it would be required to ask for a special permission, to get the Air Traffic Control or to count on a Non Tripulated Air Systems operator (DUO).

Below the characteristics and capacities of both centers are presented, their improvement projects and campaigns performed in them.

In the following chapters, the different Areas and Departments, which run a critical role in these activities, will be described.

3.0 AIRWORTHINESS AREA

Due to INTA matrix organization, Airworthiness Area (INTA/AWA) is in charge of leading all Certification & Qualification programmes under INTA responsibility. INTA/AWA head is responsible, by regulation (Royal Decree 2218/2004) of following items:

- To support as vocal, the Airworthiness Council of Spanish Ministry of Defense, working organ of the Spanish Military Airworthiness Authority.

- To manage each certification process in order to agree the certification basis through a Certification Plan between the Type Certificate applicant & INTA.
- To guarantee Certification Basis fulfilment for each aircraft, engine and propeller type, with the goal of granting a Military Type Certificate (MTC).
- To issue the appropriate Experimental Airworthiness Certificate (Certificado de Aeronavegabilidad Experimental, CAE), for all tests flights foreseen in Spanish territory in the frame of development, certification or qualification.
- To represent Spanish Military National Airworthiness Authority (NAA) as Spanish Military National Airworthiness Authority Representative (NAAR) during all aeronautical certification processes.
- To issue the final INTA Technical Certificate (ITC), in order to show compliance with certification basis, to the NAA, based on analysis, tests and all kind of needed experimentation and works, in order to secure final safe operation.

Additionally, AWA is in charge of equipments stand alone and aircraft qualification when requested, and their qualification of the integration of equipments if it has been requested for final user (MoD or whoever).

Taking into account these previous statements, INTA organization for aeronautical programmes for National & International interest for Defense, turns from figure 1 (administrative organization) to figure 2 (functional organization).

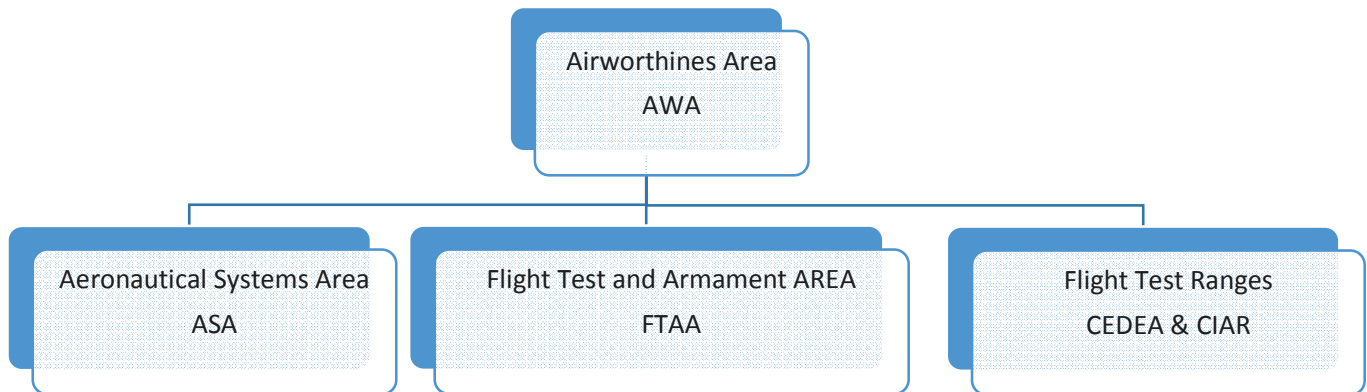


Figure 2. It means that in order to get AWA aims, ASA, FTAA and CEDEA performs all tasks coordinated by an AWA Program Manager, with the responsibility of leading all certification / qualification activities for each program.

4.0 AERONAUTICAL SYSTEMS AREA (INTA/ASA)

This specific technical Area is in charge to provide all human resources in order to provide technical support to the AWA, and analyse the technical and airworthiness features of each system for the aircraft. Each specialist from this Area is responsible of assessing those systems under his responsibility. He/she is in charge to study if they are fit to be on board from a safety point of view and do not present any unsafe features, assuring certification requirements fulfilment. First of all it is necessary to check that “stand alone” equipment has the appropriate qualification. INTA facilities allow to lead a complete equipment qualification process lead from an AWA Program Manager, which can this process leads to a CICA (Certificado INTA de Calificación Aeronáutica - INTA Certificate of Aeronautical Qualification), which can include the approval of a Declaration of Design and performance (DDP) or similar qualification evidences which ensure that the equipment is fit for its purpose and comply with its applicable specifications.

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Once each equipment has been declared as qualified, and therefore, aeronautically compatible, it will be necessary to analyse its integration at aircraft level in order to check compliance with certification / airworthiness requirements agreed by the applicant and INTA. Usually, this goal is reached with all Means of Compliance (MoM) and their related Evidences of Compliant are harmonized between applicant and INTA specialists, in order to cover all the certification basis.

Specialities under ASA range cover all the aircraft, as it follows:

- Environmental.
- Propulsion.
- Electronic warfare.
- Human factors.
- Software.
- Aerodynamic.
- Cockpit.
- Structure.
- Hydraulic system.
- Landing gear.
- Fuel system.
- Oil system
- Electrical system.
- Avionics.
- Instrumentation on board.
- Electrical Generation and Distribution System.
- External lighting.
- Automatic Flight Control System.
- Ballistic protection.
- Armament.
- Electromagnetic Compatibility.
- Safety.
- Communications.
- Navigation
- Powerplant
- Flight Mechanics

5.0 FLIGHT TEST AND ARMAMENT AREA (INTA/FTAA)

This Area has the responsibility to support AWA from aircraft performances, handling qualities and flight manual approval point of view. Generally speaking it means all tasks regarding flight characteristics requirements for Certification and Qualification.

Also, this FTAA provides the following test means and facilities under its responsibility:

- Armament test benches for qualification: vibrations, climatic chamber, environmental endurance, etc.
- Mobile telemetry and communications systems and autotracking capabilities.

Mobile control station technical specifications are the following ones:

- UHF/VHF Communications
- 3 double receivers for diverse frequencies
- Receiver/generator for IRIG B time from GPS signal
- PCM standard receiver IRIG 106 up to 20 Mbps
- Video signal receiver in real time
- IRIG telecomand.
- UHF telecomand.
- Omnidirectional antenna for telemetry
- 4 monitorization spots in real time.
- Postmission data processor sys550 GSWORKS data analysis in real time
- 5 bit synchronizers IRIG 106
- 4 PCM IRIG 106 deconmuters.



Figure 3. INTA mobile station.

Autotracking mobile antenna technical specifications:

- Auto tracking antenna double axis.
- Diameter 6 feet.
- 29 dBi.
- Frequency: Band S 2.2 to 2.4 GHz.
- Angular speed 20 degree/seg.
- Angular accelerations 100 degrees/seg².



Figure 4. Mobile auto tracking antenna.

6.0 ARENOSILLO TEST RANGE (INTA/CEDEA)

6.1 General Description

Arenosillo Test Range (INTA/CEDEA) has been INTA facilities in the south of Spain, supporting activities for aeronautical Military and Civil Aircrafts, certification for solar energy systems and atmospheric studies. In fact, since 1962 supporting Research & Development (R&D) processes for any kind of activities, specially Aeronautical and Scientific programs can be counted among their main activities.

INTA/CEDEA is considered one of the most capable Test Ranges in Europe to support tests for Certification, Qualification and Research & Development activities. Manned and unmanned Aeronautical and ground systems can be validated and tested at its facilities. Additionally, training activities for National and Foreign military corps are one of the most relevant activities. National, foreign, governmental and industrial organizations have been performing experimental activities at INTA/CEDEA facilities since 1962.

INTA/CEDEA added values are based on three important pillars:

- Wide safety test area.
- High specialized instrumentation.
- Stable & suitable weather conditions for test activities.

The main disadvantage of this center is the lack of an aircraft takeoff and landing strip. During the performed flights with UAS, the takeoff took place by the catapult launch and the landings with the parachute recovery. However, this type of operation is very limited, specially for big-sized aircrafts.

To solve these deficiencies, on the 22nd of November 2011 the collaboration agreement between the Science and Innovation Ministry (MICINN), the IDEA agency (Andalusian government regional development agency) and the INTA, to start the CEUS project, aimed to the reconditioning and refurbishment of the center for the present and future non tripulated aircrafts operations. This project considers:

- The building of a take-off/landing strip, of 2000 m in length by 45 m in width, that will allow operations of aircrafts up to 15000 kg of MTOW, as well as another vial of compacted soil of 1500 m in length by 60 m in width.

- Trials platform of 9000 m², taxiing strip and aircrafts parking zone.
- Spacious hangars (40x40x12m) prepared and equipped, with a small garage for tune-up and offices for the staff.

Among the services that this center expects to increase after the refurbishment, there will be the rental of the take-off/landing strip and the airspace use for flights trials, platform for on Earth and taxiing trials and hangars rental. In addition, this center hopes to become a pioneer on training courses for the staff of these activities, introducing simulators for the users training. In this way, it will make the most of the experience gathered by the CEDEA during the operations performed for decades, such as the already existing facilities and equipment in the CEDEA.

This whole project has a budget of 40 millions Euros, and it is being sponsored by the INTA, the Regional Government of Andalusia through the IDEA Agency and the MINECO. Furthermore, as it is a project to develop facilities I+D+i, it counts on FEDER findings. Once it is into operation, it is foreseen the direct hiring as the center technical staff of around 30 people, in addition to the indirect employment, the promotion of the Andalusian airspace industry and the area economy. Enterprises and institutions that develop activities into the I+D+i field have already shown their support for this project, as the Huelva and Seville universities, or the Biological Station of Doñana. The project counts as well with social responsibility measures and the environmental assessment of the Biological Station of Doñana. Once that the works are finished by the end of 2015, the legal conditions of exploitation will be established, according to the existing agreement that already stipulates *grosso modo* the promoters responsibilities, and the exploitation of the center will start. The IDEA agency will assume the economic-administrative management of the center, and the INTA the operational management.

Due to its wide experience, its cutting-edge equipment, its big designated airspace, the favorable weather and the good communications with both international ports and airports, the CEDEA may become the model center for this operations segment, on a high growth market.

INTA/CEDEA is involved in an ambitious expansion program to increase operational capabilities, specially focused in Unmanned Aerial Vehicles (UAVs). This new concept for next future will be able to increase test capabilities from UAV point of view. Expansion is based on a concept of Excellence Centre for Unmanned Systems (CEUS). It has been designed as an expansion from current INTA/CEDEA (Experimental Test Center) experience and capabilities. Based on it, some main ways have been implemented to define its main strategy. CEUS and CIAR, 2 test centers, with ambitious expansion projects based on 40 years experience on the following activities:

- Certification/Qualification activities to integrate systems on aerial platforms.
- Operations of aerial targets and its improvement designs.
- Trayectographic systems.
- Supporting industries and National & Foreign Government forces.



Figure 5. General overview of INTA/CEDEA facilities.

6.2 Test Range Area

Taking into account all restricted areas, test range safety surface reaches 150km x 77km and Flight Level Unlimited (UNL), according to picture 6.



Figure 6. Restricted areas could be booked for customer under requirement in advance, according to its technical needs for tests. Regarding the slots, timing will be available based on test needs without constrains.

INTA/CEDEA is used to attend long campaigns, with full availability in terms of means and staff. INTA/CEDEA is flexible to support tests whatever test slots (since sunrise to sunset if required), including night availability if it will be necessary for whole night. According to customer requirement, is able to react and reschedule flight test activities in real time, if any technical constraint will be presented.

Air Traffic for tests is possible under NOTAM's publications and restricted activated area will be fully available for the customer, without sharing with other users. Each sector activated by NOTAM can be seen in figure 7.

LED's	Coordinates
LED119 ARENOSILLO NORTE SUPERIOR(Golfo de Cádiz)	370900N 0064500W; 365650N 0063410W; 362000N 0072130W; 365530N 0072130W; 370500N 0070710W; 370900N 0064500W.
LED120 ARENOSILLO NORTE INFERIOR ESTE (Golfo de Cádiz)	370900N 0064500W; 365650N 0063410W; 365033N 0064303W; 370537N 0070137W; 370900N 0064500W.
LED121 ARENOSILLO NORTE INFERIOR OESTE (Golfo de Cádiz)	370537N 0070137W; 365033N 0064303W; 362000N 0072130W; 370230N 0072130W; 370537N 0070137W.
LED122 ARENOSILLO SUR (Golfo de Cádiz)	362000N 0072130W; 361330N 0063800W; 355130N 0064230W; 355700N 0072130W; 362000N 0072130W.

Figure 7. AIP Spain publication for INTA/CEDEA Test Areas.

6.3 Instrumentation Unit

From instrumentation point of view, INTA/CEDEA is able to support multiple test scenarios due to its flexible structure, based on a redundant instrumentation system. A net of sensors implemented by optronic systems, RADAR's, IR cameras, telemetry, and tracking systems are able to accommodate for each test scenario, fulfilling multiple test requirements as: some aerial platforms, some targets (aerial and maritime) and whatever system to check, qualify or certify. Mentioned structure can accommodate, for test requirements, trying to optimize all involves means, with a main aim: "to support and secure each operation test in a safe way".

In addition, mentioned structure is able to track and to link data between whatever aerial vehicles, instrumentation and aerial/ground development equipment. It means that INTA/CEDEA is able to support test for aerial vehicles, targets, aerial and ground systems and command unmanned aerial, ground and maritime systems. All systems at the same time or stand alone for each one.

A consequence and added value provided by this instrumentation structure drives to following opportunities:

- To manage in advance "Test Procedure and scheduled Programme" accommodating test means for each requirement, in a flexible way.
- To reschedule in real time, once test has begun, and accommodate to changes based on on-going test results.

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- To evaluate in real time data information by telemetry.
- To evaluate and post processing test data under requirement, based on analysis for all test data recollected.

6.4 Optronic Systems



Three optronic stations according to following capabilities:

- 35 mm high speed film camera (up to 500 fps) with 1.5 to 3 m focal length and 0.32m focal aperture.
- IR sensor (8 to 12 μm) and Field of view of 1.5°.
- Multi focal Length TV camera with selectable focal lengths (1, 2.5 and 5m) with 0.19m focal aperture.
- Range Only RADAR, K-Band, 34 GHz with 40 km maximum range and Moving Target Indicator, being able to continuing tracking of up to 1280 m/s target speed accurately of 1m.
- Doppler Radar 90W.
- Acquisition camera with autofocus and zoom from 2.45° at 27.5°.
- Telemetry Antennas with receiver integrated.
- Auto Tracking Unit processing in real time video signal, up to 5 targets and simultaneous tracking.
- Dynamic behavior: 100°/seg.
- Angular accuracy < 0.75 arcsec.

Figure 8. Optronic platforms at INTA/CEDEA facilities.

6.5 Flight Termination System.



Figure 9. INTA/CEDEA flight Termination System.

- Complete Redundant System
- Carrier Frequency from 400 to 550 MHz
- Output Power 20W + 400W
- Up to 20 Standard IRIG B Tones, 6 simultaneously.
- Antenna Characteristics:
 - Circular Polarization.
 - Horizontal Beam 30° / Vertical Beam 25°.
 - 15 dB gain.

6.6 RADARs



RADAR RIR 779-C:

- Frequency 8,5 to 9,6 GHz.
- Peak Power 250 KW.
- Beam Width 1°.
- Antenna Gain 41 dBi.
- Angular Precision: 0.3 mRad
- Range Precision: 3 mts.
- Angular Tracking Speed: 30°/sec.



RADAR RIR778C:

- Frequency 5,4 to 5,9 GHz.
- Peak Power 1 MW.
- Beam Width 1°.
- Antenna Gain 41 dBi.
- Angular Precision.0.2 mRad
- Range Precision. 3 mts.
- Angular Tracking Speed. 35°/sec.
- SKIN & BEACON Tracking.
- TV & IR Tracking.
- Flight Termination System Associated.



Figure 10. INTA/CEDEA
RADAR's systems.

RADAR RIR779C:

- Frequency 5,4 to 5,9 GHz.
- Peak Power 1 MW.
- Beam Width 0.8°.
- Antenna Gain 46 dBi.
- Angular Precision 0.1 mRad
- Range Precision 3 mts.
- Angular Tracking Speed. 30°/sec.

6.7 Telemetry station.

- TM reception in S and L Band. It is foreseen to implement Band C by end 2015.
- 2 Analog Recorder 2MHz BW.
- 2 Digital Recorder 12Mb/sec.
- De-Multiplexer: 20 Channel.
- Two independent Systems for de-commutation, processing and presentation.

6.8 Communications.

- Internal Radio Communication with encrypted voice capability.
- HF 1,5-30 MHz. Output Power 100W (1000W).
- VHF 115-173.98 MHz (FM) and 115-149.98 MHz (AM). Output Power 10W (50W).
- UHF 225-420 MHz (FM) and 225-399.98 MHz (AM). Output Power 10W (50W).

7.0 CIAR

The Airborne Investigation Center in Rozas is located in the aerodrome of Rozas, in the municipality of Castro del Rey, in the province of Lugo. It was a defence center that, due to its lack of use, was transferred to the INTA in 2011. The INTA lives with the Lugo Real Airclub in the center. The Real Airclub focuses its activities mainly on weekends, festivities and holidays, and the INTA on working days, so the activities of both do not interfere and the coexistence is viable. On the other hand, the general expenses of the aerodrome are shared between the two institutions in proportion to the aerodrome use.

The aerodrome is intended for its use with non tripulated aircrafts. Once the UAS have proved, flying on the CEDEA facilities, that they meet the requirements of security of the applicable legislation, the UAS trials may take place in the CIAR, where the integration of payloads will be performed (as observation cameras, atmospheric measurements probes, or any other equipment developed by the industry) and the required trials will be made for their qualification and operability guarantee. The coexistence of these centers is due to the fact

that de trials delta of the CEDEA is over the sea, what is very good to test an aircraft, but to test an observation camera might have some limitations. For payloads trials the Rozas area has great advantages, as de free electromagnetic radiation area, a low density air traffic and scarce populated areas.



Figure 11. Location of CIAR

The intended campaigns for the CIAR are:

- Trial flights for UAS payloads, to test their right functioning, the integration with the aircraft and detect possible failures.
- Atmospheric investigation campaigns: aerosols, clouds, rain or ice formation.
- Environmental control campaigns, as fire monitoring.
- Telemetry or Earth observation campaigns.
- Campaigns for developing equipment, to be tested or qualified.

In the last two years, several trials campaigns have been made, as flights of SIVA and Atlante aircrafts. Even so the existing infrastructures are not adapted so far and they have some deficiencies.

To adjust the facilities to non tripulated aircrafts operation, the INTA, the Galicia Regional Government and the MINECO intend to initiate a project to support gaps in the existing deficiencies. Among them it is considered:

- The aerodrome fencing, to guarantee security and privacy of the operations: on one hand, there is a hunting area (fallow deer or wild boar) and their entrance into the operations area must be avoid. On the other hand, the privacy of the enterprises operating in the aerodrome must be guaranteed, after all the equipment being tested would be prototypes or on their developing stage, and it is required to guarantee the confidentiality of the achieved results from the potential competition.
- The control tower is in a poor condition and does not meet the security measures, it is required to refurbish the stairs, the lightning and to fix the bell control tower and to install the necessary equipment.

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- Refurbishment of garages, hangars, laboratories... as well as the acquisition of the necessary equipment.
- Platform near the laboratories for the installation of equipment into the aircrafts, as well as taxiways providing access to the airport tarmac.
- Equipment to guarantee the operations security, as aircrafts monitoring and tracing equipment and fire engines.

The estimated budget of this project is of 10 million euros, that will be funded by the Galicia Regional Government and the MINECO. As it is a facility for the technological development, it will count on FEDER funds. The legal form of the center is still being studied. The preferred option is the creation of a joint center of the INTA and the Galicia Regional Government.



Figure12: Landing of SIVA

The project has received the support from almost all the national enterprises in the sector, (Aerlyper, Airbus Military, Cassidian, Cemtum, CTI, GTD, Isdefe, Iqube, ITD y S4A), and it is expected to be finished by the end of 2015.

8.0 CONCLUSIONS

There is already a multitude of small-sized aircrafts, but bigger ones are already being developed, that will take on the market as soon as the normative exists. To achieve a proper integration of UAS into the airspace, it is required to count on airworthiness support and flight test centers with the suitable facilities to run tests and trials. According to this requirements, INTA is able to provide a “full package” for Certification, Qualification and Development activities on Unmanned Systems: technical assistance and flight test centers to complaint this requirements.

Those two developing centers: CEDEA for systems developers and aircrafts operators, and CIAR for subsystems and payloads developers and payloads operators, they will be the ideal facilities for these practices, that will also come with the experience gathered by the INTA for years in both UAS development and certification.

In these centers the INTA investigation aircrafts trials and UAS new developments will be combined, including the advantages of these aircrafts to investigation subjects and promoting the technological innovation and development, guaranteeing the trials security.

It is also expected the incorporation of these centers to the ICTS web, as it is a great opportunity for the Spanish scientists, as they are offered a new channel to obtain funding for their campaigns. Also, it could be a great opportunity to gain funding for the up-dating and renovation of the already existing aircrafts and/or facilities.

ACKNOWLEDGEMENT

José Parejo Bravo Morcillo (CEDEA)
Álvaro Gómez Villegas (CEDEA)
Andrés Fernando Méndez Rodríguez (CIAR)

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