



ECARYS

E S 15

SURVEILLANCE • RECONNAISSANCE • RESEARCH
YOUR MISSION - OUR PLATFORM

WELCOME



THE ES15 from ECARYS completes successful surveillance, reconnaissance and research missions

ECARYS AND THE ES15. MODULAR DESIGN. COMPLETE SOLUTION.

ECARYS – a subsidiary of the German aircraft manufacturer STEMME AG – worked with governments, scientists and corporations to design and develop the ES15. This flexible, modular design is now one of the most efficient platforms for airborne surveillance, reconnaissance and research.

When your mission requires that you have an aircraft that has inherent stealth capabilities, noise levels almost to the point of silence, requires flexibility in range, ease of operation and low operational costs, the ES15 delivers.

The multiple applications that the ES15 can be adapted to are possible through ECARYS' three-section modular design. Each section (cockpit, mid fuselage and tail boom) can be

modified with payload sensors and data links.

This is not a concept – the ES15 has been flying successful missions for operations worldwide. For example, Safran Electronics & Defense, a Safran company, uses the ES15 as the basis for its Patroller UAV.

The EASA Certified ES15 from ECARYS is specifically designed for:

- Homeland Security
- Disaster Response
- Law Enforcement
- Search & Rescue
- Geological Challenges
- Environmental Protection
- Communication
- Entertainment

ECARYS FACTS THE COMPANY BEHIND THE ES15

- Established in 1984 in Berlin, Germany
- Located at Strausberg (EDAY) airfield
- Highly experienced R&D capability
- Cooperation projects with Technical University of Berlin and others
- 60 highly skilled employees

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All the essential information and vital statistics for the ES15

QUICK GUIDE TO THE ES15

CONSIDERING ITS STEALTH CAPABILITIES, THE ECARYS ES15 IS A PLATFORM THAT IS DIFFICULT TO IGNORE. THE ES15 IS PROVEN, FLYING AND FLEXIBLE. THIS QUICK GUIDE HIGHLIGHTS THE MAIN BENEFITS



THE ECARYS ES15 is a highly cost-efficient and adaptable platform.

Whether you prize endurance, impressive range, the reduced pilot cost, low initial investment or economical operating costs, the commercial benefits of this aircraft system are easy to see.

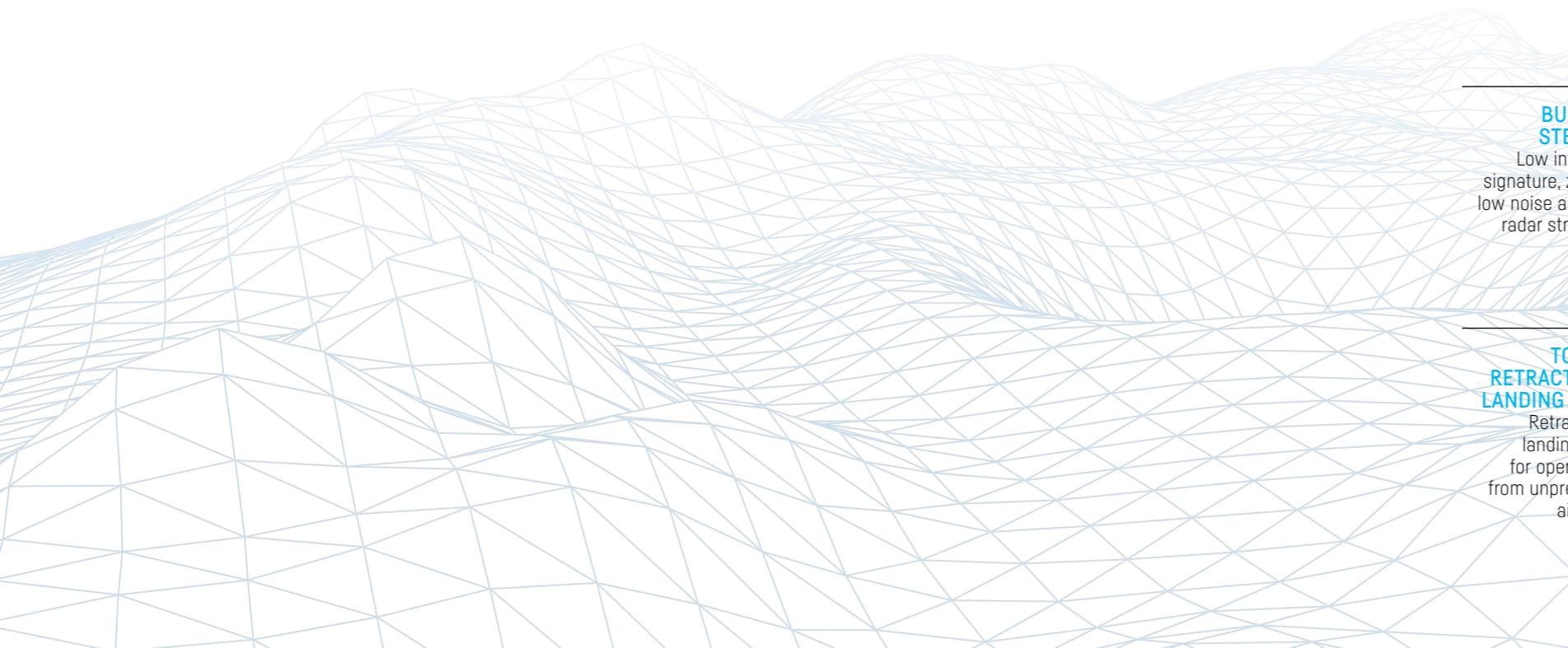
ECARYS was created from a belief that the modular approach on a proven

platform would provide customers with more efficiencies and enable operators to customise as much as their missions require, a tailored solution indeed.

Technological advancements mean equipment is constantly becoming smaller and lighter. The ability to relay information to ground stations now means that aircraft do not require large payload capabilities.

The 770 lb (349 kg) that the ES15 provides is sufficient for the majority of missions and provides solutions for governments and agencies at lower operating costs that are the envy of the industry.

There are many reasons to choose the ES15. ECARYS believes the strongest one is its engineering team and the capability to provide customers with a tailored solution.



MOUNTING POINTS

Flexibility is central to the ES15 with multiple mounting points for payloads



STATE-OF-THE-ART AVIONICS

Bespoke avionics suite according to customers specifications



BUILT-IN STEALTH

Low infra red signature, zero to low noise and low radar structure



TOUGH, RETRACTABLE LANDING GEAR

Retractable landing gear for operations from unprepared airfields



ES15 PLATFORM STRENGTHS

DESIGNED TO DELIVER

LOW COST

Operational costs of less than US\$300 per hour

PAYOUT

Up to 770 lbs of payload potential.

GROUND HANDLING

Wing removal takes less than one hour by 2 people. Transport via trailer. Highly flexible.

PERFORMANCE

Engine - Rotax 914 F Turbo
Speed - 50-146 kt TAS @ FL95

LANDING GEAR

Robust Landing gear - able to take off from a wide variety of runways including grass.

ENDURANCE

10-hour endurance in normal configuration. Up to 20 hrs with long-range option.

RANGE

Range up to 1350 nm with long-range tank.

STEALTH

Near Stealth capabilities due to composite structure and low cross section.

NOISE

At 1000 ft it's a whisper. At 3000 ft you simply can't hear it.

GLIDE RATIO

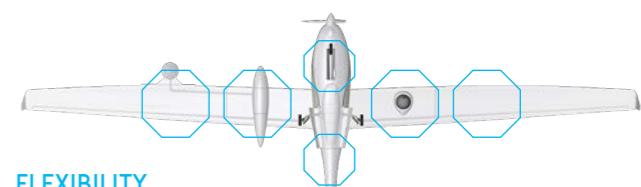
Glide Ratio of 1:36

MANOEUVRABILITY [AILERONS]

High degree of manoeuvrability due to effective ailerons along entire wing length.

HARD POINTS

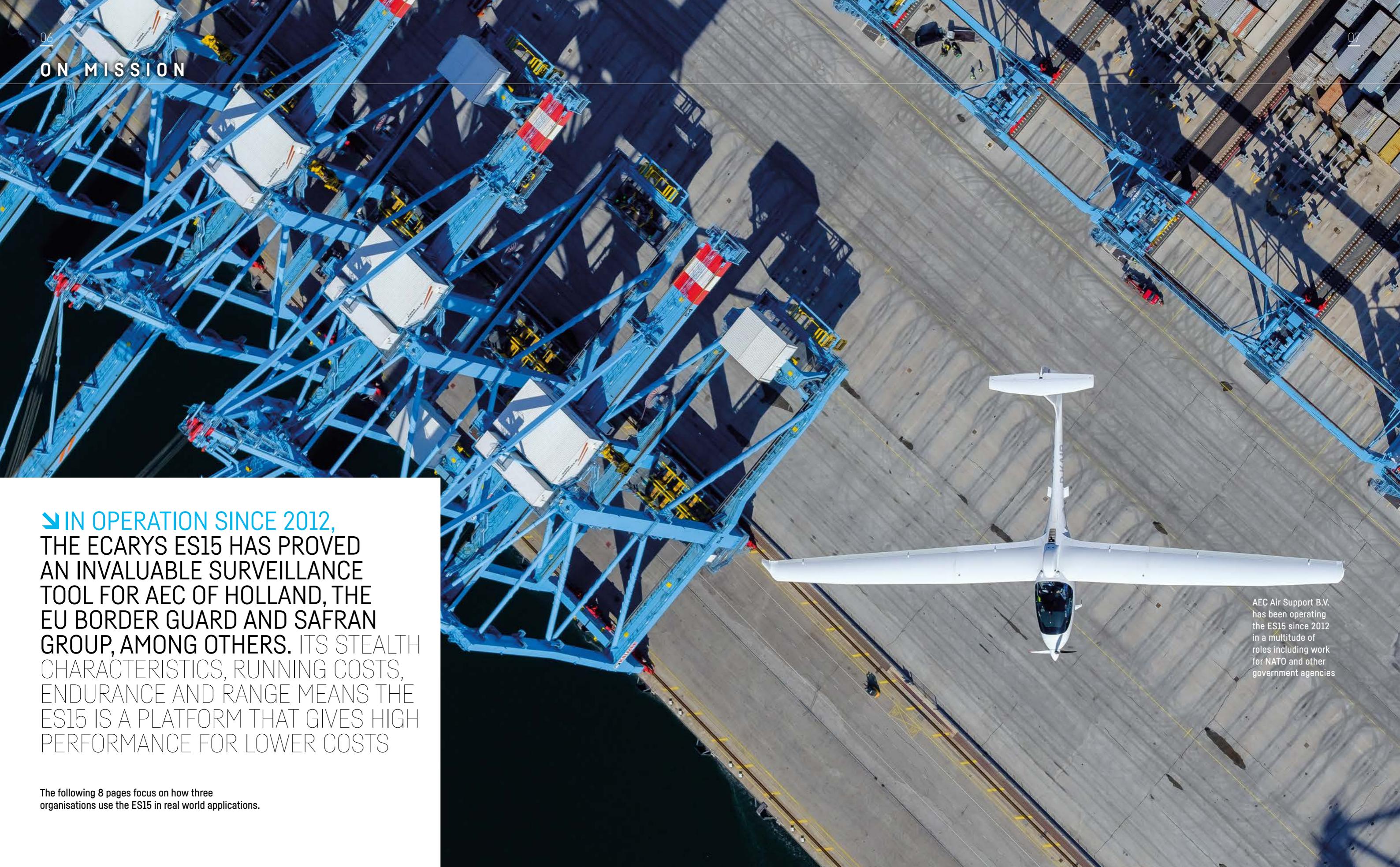
Multiple Hardpoints for payload attachment flexibility - see graphic below



FLEXIBILITY [INSTALLATION POINTS]

External Payloads above centre fuselage, and four points under wings (2 left and 2 right)





IN OPERATION SINCE 2012,
THE ECARYS ES15 HAS PROVED
AN INVALUABLE SURVEILLANCE
TOOL FOR AEC OF HOLLAND, THE
EU BORDER GUARD AND SAFRAN
GROUP, AMONG OTHERS. ITS STEALTH
CHARACTERISTICS, RUNNING COSTS,
ENDURANCE AND RANGE MEANS THE
ES15 IS A PLATFORM THAT GIVES HIGH
PERFORMANCE FOR LOWER COSTS

The following 8 pages focus on how three
organisations use the ES15 in real world applications.

AEC Air Support B.V.
has been operating
the ES15 since 2012
in a multitude of
roles including work
for NATO and other
government agencies

ON MISSION



AEC AIR SUPPORT NETHERLANDS

AEC PROVIDE A WIDE RANGE OF AIRBORNE SOLUTIONS SUPPORTING PRIVATE AND GOVERNMENT ORGANISATIONS THROUGHOUT EUROPE.

AEC Support have operated an ES15 since 2012 for a wide variety of important missions. They use the aircraft for reconnaissance, surveillance, ship monitoring, border patrol, agricultural surveys and law enforcement.

CEO Michel Versteeg chose the ES15 due to its low operational cost, impressive payload capabilities and variety of payload fixing points. ECARYS' modular approach to construction allowed Versteeg to specify bespoke solutions for the wide variety of roles AEC Support operates in.

"For our law enforcement and other sensitive missions, the noise and radar profile really is exceptional," says Versteeg.

"When you compare it with a helicopter or a twin-engine aircraft the difference is outstanding and this means that we are not noticed from the ground. When we are

required to observe and not be noticed, one wonders how this can happen when you have noise pollution audibly viable from the surveillance area.

"With the ES15 we are not noticed. It's incredibly difficult to spot from the ground and even when we are working with the military they struggle to spot us on radar due to the profile of the aircraft.

"Even infra red radar finds it next to impossible due to the heat from the exhausts being directed upwards away from the ground."

Over the last four years, AEC have put 1,000 hours on the ES15 and its on-demand times are impressive. "We've never had to cancel a job in that time frame," says Versteeg, "which is another reason we see the ES15 as an indispensable tool for AEC and our customers."

FOR OUR LAW ENFORCEMENT AND OTHER SENSITIVE MISSIONS, THE NOISE AND RADAR PROFILE IS EXCEPTIONAL

Q&A WITH MICHEL VERSTEEG, CEO OF AEC



Q. How many hours does the ES15 fly each year?

We're using it on average for 200 hours per year.

Q. Do you operate other aircraft?

We do. We have a Learjet, a L39 plus a range of drones. We have a lot of experience in this industry.

Q. What's impressed you most about the ES15?

We spent three days flying over and monitoring NATO operations and not once were we spotted. It's such a difficult aircraft to spot - even by trained observers. Operating costs are impressive as well.

Q. Any downsides?

We've not seen many. As the first to operate the ES15 small problems came up in the early days but ECARYS were always quick to solve them.

Q. What equipment do you have installed?

We have a Wescam camera along with a multitude of sensors and antennas to talk with our ground station in real time. Payload is very good and that's enabled us to have redundancy in the system.

Q. Do you fly the aircraft yourself?

Yes. I've found the aircraft to be a pleasure to operate, it's very stable and simple to land. It doesn't require high pilot skill levels which also has an impact on the levels of staff we require to operate it.

Q. How robust is it?

It's a tough aircraft. We've had ours for over 4 years and it's standing up very well to the rigours of operations.



BORDER GUARD

FOLLOWING A TWO-YEAR EVALUATION PROCESS, A BORDER GUARD IN THE EU ELECTED TO PURCHASE ES15's FOR SURVEILLANCE

THE pressure on governments to monitor their borders is a hot topic. The Border Guard is charged with monitoring and protecting its (and the EU's) borders from people trafficking, smuggling, illegal immigration, arms smuggling, goods smuggling, combating terrorism as well as monitoring all sea, land and air security. It's a big operation and the ES15's are an important tool in carrying out this vital task in an efficient manner.

People don't look up unless they are alerted. It's obvious that the quieter the aircraft the less opportunity to alert those on the ground to the fact that they are being watched and monitored. Operating at 7,000 feet makes the ES15 impossible to hear and if it is spotted at all then the profile is that of a glider. The ES15 doesn't attract attention which makes it ideal for this line of work.

There were a number of other aircraft in the evaluation including twin-engine fixed wing and helicopters. Ease of operation was another major factor in choosing the ES15. Pilot training is less onerous versus jet and twin-engined aircraft and with an hourly operating cost being less than a third of a twin engine aircraft it means that for the same budget the aircraft can provide an eye in the sky for longer periods.

The Border Guard required the ability to provide imagery in real time to teams on the ground who can then direct forces to certain areas. The ES15 has a design that enables clean feeds of data which are not hampered by excessive heat from exhausts or engines. With multiple hardpoints for antennas and space for power and back up power the Payload requirements from the Border Guard matched the ES15 perfectly.

AFTER TWO YEARS OF EVALUATING PLATFORMS THE ES15 BEAT ALL OTHERS TO BECOME THE CHOICE OF A BORDER GUARD FROM THE EU

THE Border Guard operate ES15's following an evaluation which included other single and twin engined fixed wing as well as helicopters.

ON MISSION

SAFRAN PATROLLER FRANCE

THE SAFRAN PATROLLER, BASED ON THE ES15, IS PROOF OF JUST HOW FLEXIBLE A PLATFORM IT CAN BE – FOR BOTH MANNED AND UNMANNED MISSIONS

THE Safran group is one of the world's largest aerospace, defense and security companies, with headquarters in France. Safran has been designing, manufacturing and supporting drones for more than 25 years. Its drones have been operated for nine years in the Afghanistan arena.

The evaluation of the ES15 as a platform for the new Safran Patroller was a process that was filled with detail and analysis – as well as competition from other companies. The decision to choose the ES15 by Safran was based on nine years of operations

of their Sperwer tactical UAV which has logged some 2500 missions in Afghanistan.

The fact that Safran has chosen the ES15 as the basis for its Patroller confirms the flexibility, performance and adaptability of the ES15.

ECARYS and Safran are building the Patroller as a partnership and, as well as being able to operate as a UAV, it will also have the option to be manned and piloted from the left seat.

ECARYS has demonstrated its engineering and management of large projects to keep

this project on track – helping to deliver solutions for homeland security and military customers that demand flexibility.

ECARYS' experience at delivering to major organisations has created a culture within the company that is able to evaluate and respond to wide ranging requests accurately and on time.

ECARYS built the ES15 to be a platform that can be developed and adapted for multi role uses and at the core of this is a team that can help customers to create a platform which is tailor-made to suit their missions.

To find out more about the Safran Patroller visit:
<http://www.safran-electronics-defense.com/aerospace/uav-systems>



PLATFORM

CHOOSING A PLATFORM IS A CHALLENGING PROCESS.

THE ES15 IS FROM A PROVEN AIRFRAME MANUFACTURER AND THE BENEFITS OF ITS DESIGN ARE DIFFICULT TO IGNORE –

PAYOUT, STEALTH-LIKE QUALITIES, ENDURANCE, SPEED, EASE OF OPERATION AND LOW COST.

Simplicity of design, solid track record and available now. The ES15 is a proven platform around the world.

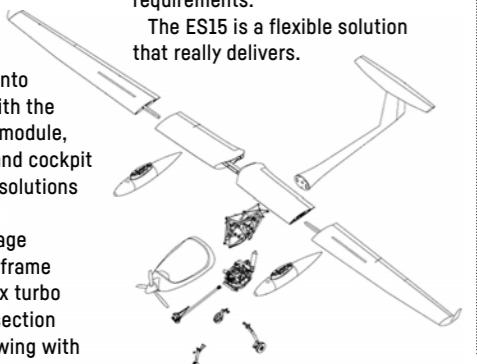


MODULAR DESIGN CONCEPT

ADAPTABLE TO YOUR NEEDS

THE ES15 is working missions around the world every day. When ECARYS designed the concept, modules were taken from proven platforms and its talented engineers set about how to create payload and space to provide a flexible aircraft that delivers.

The design is based on a 59 ft (18 m) wingspan and a retractable tricycle undercarriage which is stable to crosswinds (up to 16 kt) and has a wide wheelbase – ideal characteristics indeed for reliable ground handling and flight operations.



flaps across the entire wingspan. This provides incredible take-off and landing performance which – when combined with the speed brakes – enables the ES15 to operate from unprepared airstrips inaccessible to many other aircraft.

The tailboom section completes this special platform. Throughout each module the ECARYS engineering team can adapt and modify according to the customers requirements.

The ES15 is a flexible solution that really delivers.

The fuselage is divided into three sections, starting with the hybrid composite cockpit module, comprising the propeller and cockpit area. An array of avionics solutions are available.

Second is the mid-fuselage comprising a centre steel frame compartment for the Rotax turbo charged engine. The mid section comprises the cantilever wing with

PERFORMANCE 20-HOUR ENDURANCE

THE ES15 climbs to 7000 ft within 12 minutes, putting its payload to use and being mission successful. With 115 hp in the turbo charged Rotax engine, the performance will meet most mission objectives. An operating ceiling is certified to 16,000 ft.

Depending on the configuration the ES15 can achieve between 10 and 20 hrs endurance.

Burning just 15 litres of fuel per hour means that it is an incredibly efficient and environmentally conscious platform. Financially, it makes a lot of sense. Performance wise, it ticks all the right boxes.

Just as important as its maximum speed is its slow speed flight characteristics – at 50 kts it can perform 30-degree bank turns putting you in control when you need to be focused on a particular spot.

With full payload, operating speeds are as high as 130 kts and max speed is 148 kts giving ample speed to keep on top of a moving situation.

AVIONICS & ELECTRICS STATE-OF-THE-ART

THE Avionics and Electrics are a bespoke solution according to the mission requirements from each customer. Standard avionics are impressive and state of the art and we understand that each customer has varying requirements. The

Electrics are either a 1800 W/28 VDC generator or 3900/28 VDC generator, a 24 Ah/24 VDC buffer battery system and a customer tailored 28 VDC electrical networkbus with sockets. ECARYS is yet to complete a ES15 without customisation of avionics and electrics.



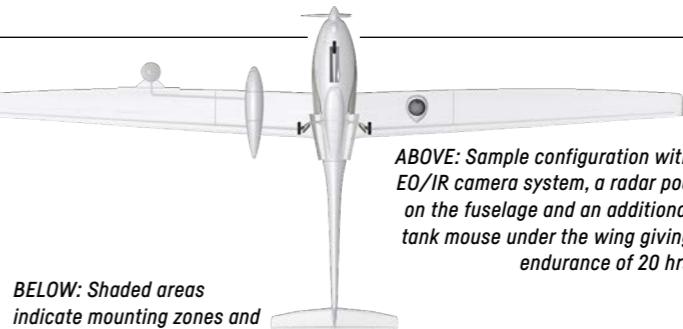
PAYOUT

MULTIPLE PAYLOAD CAPABILITY

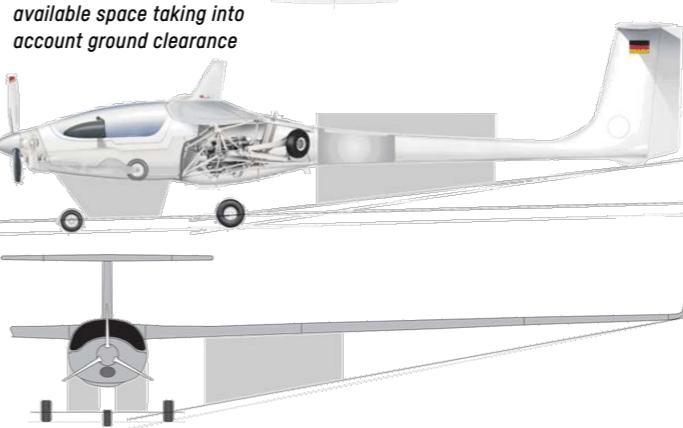
A flexible platform – with multiple payload points and sensor protection by way of an exhaust that points upwards and away from key areas – provides customers with one of the cleanest and useful platforms on the market today.

ECARYS engineers have taken into consideration factors required to mitigate environmental constraints on the payloads such as operational temperatures, humidity, rain, condensation, sand, turbulent airflow, vibration, acceleration, shock, electromagnetic compatibility (EMC), electromagnetic interference (EMI) and others.

There are hard points for payload attachment under the inner wings on both sides as well as on the underside of the fuselage. These are served by separate power supply and cable channels to the payload for heating/cooling ensuring the integrity of the equipment payloads are not compromised.



ABOVE: Sample configuration with EO/IR camera system, a radar pod on the fuselage and an additional tank mouse under the wing giving endurance of 20 hrs



BELOW: Shaded areas indicate mounting zones and available space taking into account ground clearance

HANDLING FLEXIBLE SOLUTION

THE ES15 was designed to be manoeuvred on the ground by hand. Its low weight is a major benefit and adds to the core attribute of being a financially astute choice.

The ES15 takes up a small area of hangar space as the removable outer wings reduce the wingspan to just 19.9 ft (6.07 m). The wings can be fully removed for trailer or container transportation in less than one hour and requires just two people.

The ability to put the ES15 in a trailer or container is vitally important for operational flexibility. It can be moved efficiently and be ready for operations in one hour.

ECARYS offer a 40 ft container which doubles as field maintenance.



PLATFORM

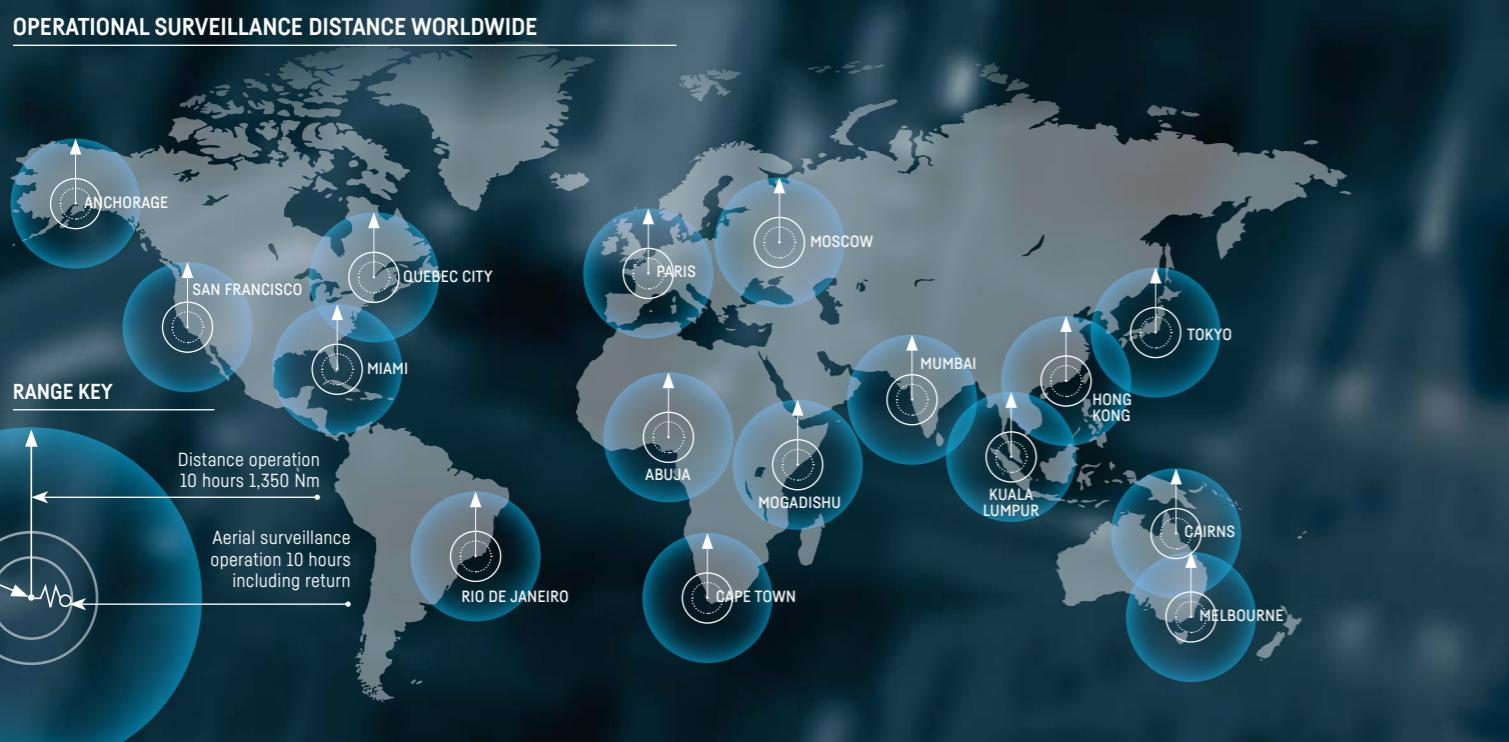
PERFORMANCE BENCHMARKS

ES15 IN COMPARISON TO OTHER PLATFORMS

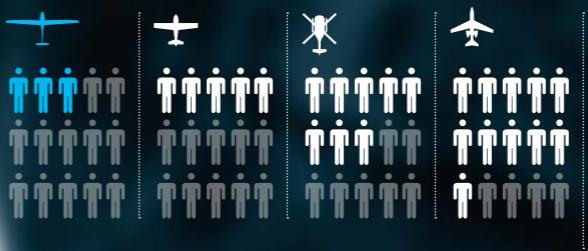
COST EFFECTIVENESS is an area in which the ES15 is hard to beat. From initial investment all the way through to maintenance, fuel to pilot operations - the ES15 is a winning proposition.

Against a helicopter such as a 135 the ES15 is faster, quieter, has three times more range, three times more

endurance, is easier to operate and costs are significantly less. There are pros and cons to every aircraft, depending on the mission, but the facts for ES15 speak for themselves. In the ES15, ECARYS offers a high performance aircraft platform with outstanding core values, low fuel consumption, emissions and maintenance requirements.

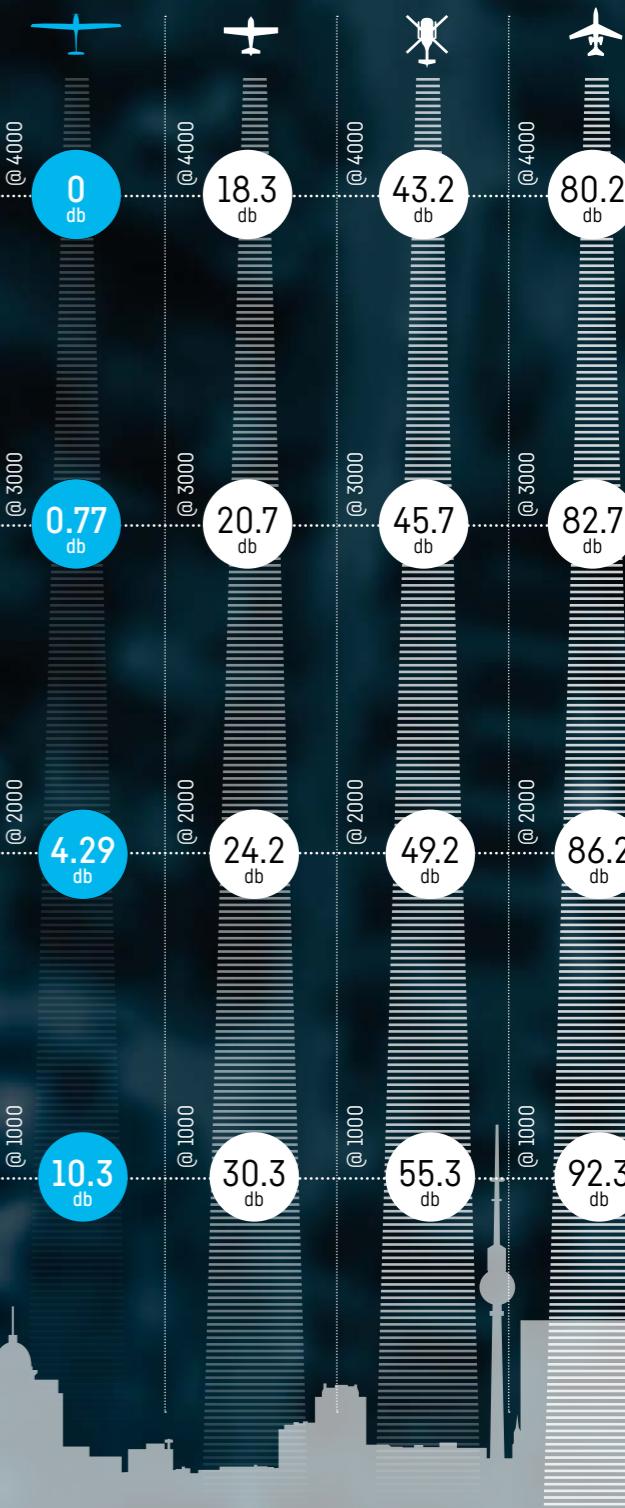


REQUIRED OPERATING CREW BY PERSON



NOISE LEVELS HEARD AT GROUND LEVEL FROM 1000 - 4000 Ft

* Sound levels calculated using the Inverse Square Law.



AIR SPEED Kt



TAKE-OFF DISTANCE & USABLE RWY SURFACES Ft

Key: CONCRETE = C, GRASS = G, DIRT = D



APPLICATIONS

SURVEILLANCE, COMMERCIAL AND SCIENTIFIC

THE ES15's VERSATILITY ALLOWS ORGANISATIONS AND UNIVERSITIES TO CREATE A BESPOKE SOLUTION TO SUIT THEIR SURVEILLANCE, COMMERCIAL AND SCIENTIFIC REQUIREMENTS. LOW NOISE AND EMISSIONS MAKE IT ENVIRONMENTALLY FRIENDLY AS WELL AS COST EFFECTIVE.

SURVEILLANCE

SURVEILLANCE has become an important and integral part of national security and defence – whether that means patrolling borders or tracking and monitoring illegal activity. But there is much more to surveillance, such as tracking environmental events in an increasingly erratic weather system, or monitoring vital infrastructure such as pipelines.

The ES15 is perfectly suited to such missions, combining long range with superb endurance (up to 20 hours flight time) at low cost. The modular design of the ES15 also means hardpoints can be easily adapted to suit specific mission needs – making the ECARYS ES15 a flexible and efficient aerial platform for operators the world over.

With its extremely low noise footprint and low environmental impact, emissions lower than a modern family car, the ES15 also makes a politically astute choice.

EO/IR SENSOR PLATFORMS

The ES15 airborne platform is the ideal aircraft for optical surveillance applications: monitoring, spotting and scanning. The aerial platform is able to carry various types of EO/IR gimbal systems such as Radar or other sensors in underwing pods, or in the front fuselage section.

The ES15 can be equipped with several communication links as well as antennae and additional external fuel tanks with a modified fuel system (allowing for up to 20 hours of flight).

ENVIRONMENTAL PROTECTION

Many different tasks can be fulfilled with various sensors:

- Volcano activity monitoring
- Maritite pollution
- Agriculture & fishing industry monitoring
- Wildlife protection
- Wildfire detection

HOMELAND SECURITY

The ES15 offers a fast aerial overview and the chance to remain over the area in question to provide realtime video and IR images for a better informed decision-making process.

INFRASTRUCTURE MONITORING

Various sensors can be used to detect malfunctions in electrical power lines, oil pipelines and other infrastructure. This permits the inspection of non-visible damage over vast areas.

EVENT SURVEILLANCE

A quiet eye in the sky allows discreet event surveillance enabling security and monitoring to help direct assets on the ground to potential problems. The low noise footprint makes the ES15 less intrusive to broadcasters and event organisers giving peace of mind with zero disruption.



FROM keeping an eye on essential infrastructure to tracking weather events and monitoring borders, ES15 has it covered



APPLICATIONS



COMMERCIAL AND SCIENTIFIC

A platform that can help you deliver the right and extremely competitive price-point for customers is what the ES15 does best. The low operating costs and platform flexibility means that it's being used in a wide range of research and commercial applications right now. We're proud of our links to the global scientific community that are using our aircraft to carry out important life changing work.

BROADCASTING

The ES15 provides a stable platform able to fly at speeds as low as 50kts and remain above the event for hours. As an extremely efficient and quiet platform it is not noticed and is therefore much less of an annoyance for broadcasters and event attendees.



AREA MAPPING

Airborne laser scanning is a rapid, highly accurate and efficient method of capturing 3D data of large areas for:

- Urban area mapping
- Flood zone mapping
- Glacier & snowfield mapping
- Topography & mining sites
- Lakeside & river bank mapping
- Agriculture & forestry sites

SCIENTIFIC RESEARCH

The ES15 provides solutions for many Universities and scientific institutes around the world enabling them to gather data and help solve some of the world's most complicated questions.

- Areas that the ES15 is used:
- Atmospheric Research
- Air Data
- Volcanic Monitoring
- Geological Research
- Lenticular Measurement



OUR aircraft are used around the world for scientific research purposes including the study of lenticular clouds and mountain wave phenomenon

RECONNAISSANCE

THE flexibility of the modular construction, when combined with the payload capabilities, multiple hard points and airframe strength enables operators in the reconnaissance field to conduct a vast array of mission profiles. The key to the ES15's success is its ability to adapt.

SIGINT APPLICATIONS

Intercepting and monitoring communications and signals is an important aspect of national and international security. SIGINT (signals intelligence) applications demand the ability to capture, analyse and transmit survey data via links to ground staff as well as recording the data using onboard hardware storage systems.

The ES15 airborne platform meets these strict requirements for signal intelligence technology for which the modular construction of the platform is well suited.



MILITARY missions are ideally suited to the ES15 platform as proven by the Safran Patroller aircraft, seen here in manned and unmanned configurations

SPECIFICATIONS



ECARYS ES15. RELIABILITY WHERE IT MATTERS

POWER PLANT

ROTAx 914 F Turbo

Max. take-off power MTOP:	115 hp	[115 PS]
Max. continuous power MCP:	100 hp	[100 PS]
Fuel capacity:	35.6 US gal [130 l]	66.0 US gal* [250 l*]
Fuel consumption @ 55% MCP:	3.9 US gal/h	[15 l/h]
Max. range [standard tanks]:	700 nm	[1.300 km]
Max. range [long-range option]:	1.350 nm	[2.500 km]
Endurance:	10 h / 20 h*	

PERFORMANCE & WEIGHTS

Max. take-off mass MTOM:	2,425 lbs	[1.100 kg]
Max. payload:	770 lbs	[350 kg]
Wing span:	59.1 ft	[18 m]
Wing area:	192.7 sq ft	[17.9 m ²]
Height:	8.2 ft	[2.5 m]
Length:	27.9 ft	[8.5 m]
Operating ceiling:	16,000 ft	[4,877 m]
Operating speed [TAS @ FL95]:	50 - 146 kt	[93 - 270 km/h]

* Long-range option



W W W . e c a r y s . c o m

SURVEILLANCE • RECONNAISSANCE • RESEARCH
YOUR MISSION - OUR PLATFORM

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