

(1997) **2022**

ANNUAL REPORT

URTEKO TXOSTENA

INFORME ANUAL



25 urte **berdeago** hegan



The Aeronautics and Space Cluster Association of the Basque Country – HEGAN is...

25 years flying greener



1997
Embraer ERJ 45

...Member of



EACP
EUROPEAN AEROSPACE
CLUSTER PARTNERSHIP



SPACETM
aero

...Collaborator of



Asociación Española de Empresas Tecnológicas
de Defensa, Seguridad, Aeronáutica y Espacio

...Registered at



Zientzia, Teknologia
eta Berrikuntzaren
Euskal Sareko
eragileen Erregistroa



Registro de agentes
de la Red Vasca de
Ciencia, Tecnología
e Innovación

1997 »



2022
Embraer C-390

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PRESENTATION

José Julián ECHEVARRÍA
President HEGAN



As every year around these dates, HEGAN invites you to review our Annual Report 2022. It collects the most relevant facts of the activity and news about the aeronautical and space industry in the Basque Country during the past year.

In 2022, our sector was severely punished by the pandemic and the impact on the air transport gradually improved towards levels of activity that are now approaching to those of 2019. Forecasts from OEMs already predicted this. This is undoubtedly very good news for our sector and we hope that it will be further developed throughout 2023. However, at the same time, it has provided us with a significant challenge since it forced us to reactivate all our industry and supply chain in a rather complex environment: with difficulties in the supply of raw materials and a significant escalation in production costs (materials, electricity...), being largely derived from the war in Ukraine.

Despite this complex situation, there are reasons to be optimistic in 2023 when we celebrate the 25th anniversary of the foundation of our HEGAN cluster. Such a major milestone invites us to come back to the origin of the cluster to remember the message from the founding members. They were the managers of the companies who decided, at that time, to promote in the Basque Country a powerful industry committed to the aerospace sector. They got the support from public institutions, who believed in them to achieve that goal. HEGAN was and remains a choral exercise that shows us that, if we have been able to become what we are today, there are reasons to be confident that the future will not be less glorious.

But this is not done just because. In order to achieve this, we must face challenges in multiple areas that will allow us to improve our position in the market. Thus we will protect highly qualified employment generated by this sector, which has been consolidated so satisfactorily over these years.

Probably one of the most important challenges is competitiveness, requiring that we must seek to meet our production processes on an



HEGAN is an example that shows that, if we have been able to become what we are today, we can trust in a bright future...

ongoing basis. On this point, digitalisation will play a key role that our companies cannot ignore. Other factors being also related to competitiveness are, for instance, permanent training of staff and retaining talent in our companies. These persons have versatile profiles, both in technological capabilities, as well as other transversal skills being necessary to work in an increasingly collaborative, inclusive, sustainable, and global sector. We must promote technical vocations among young people since they will be the ones who will create our cluster's future, but also the future of the aeronautical and space industry in our region.

Finally, I would like to highlight an aspect that in our industry is particularly relevant due to the importance and weight in the industrial, technological and innovation fabric that this sector represents. This is the commitment to invest in R&D which has meant another record figure of 132 millions € in 2022 for companies in the sector grouped in HEGAN. In the present difficult times, aeronautical and space activity -being a part of society in general- must advance focusing on environmental protection and technological innovation for the sake of greater sustainability. This is a great challenge and, at the same time, a source of opportunities. In this sense, the slogan for this very special year in which HEGAN turns 25 years is fully aligned with that commitment: "25 urte berdeago hegan"

In conclusion, and taking a look back, it is true that 25 years have passed. However, the enthusiasm, the determination and our commitment to the aerospace industry remain unchanged. Let's go for our 50th anniversary!

AURKEZPENA



*HEGAN ereduak erakusten du gaur egun garenera iristeko gai izan bagara, konfiantza izan dezakegula **etorkizun bikain** batean...*

Urtero garaitu honetan ohikoa den bezala, HEGANek 2022ko Urteko Memoria ezagutzera gonbidatzen zaituzte. Iaz aeronautikaren eta espazioaren industriak Euskal Autonomia Erkidegoan izan zuen jarduera eta aktualitatea jasotzen ditu memoriak.

Pandemiak eta horrek bidaiarien aireko garraioan izan zuen eraginak gogor zigortu zuten gure sektorea, baina suspertzen joan da pixkanaka 2022an, eta 2019an izandako jarduera mailara hurbiltzen joan da, OEMen aurreikuspenek iragarri zutenaren ildotik. Zalantzarik gabe, oso albiste ona da hori gure sektorearentzat, eta 2023an zehar sendotzea espero dugu; baina, aldi berean, erronka handia izan da, gure industria eta hornidura-kate osoa berraktibatzea behartu baikaitu, hain konplexua den ingurune batean: zailtasunak izan ditugu lehengaien horniduran, eta ekoizpen-kostuak (materialak, elektrizitatea) nabarmen igo dira, Ukrainako gerraren eraginez, neurri handi batean.

Egoera konplexua den arren, baditugu arrazoiak 2023an, gure HEGAN kluster honen sorreraren 25. urteurrena ospatzen dugun urte honetan, baikorrak izateko: Horrelako mugari batean, bada nahitaez nabarmendu beharreko zerbait klusterraren jatorriaren historian; une hartan Euskal Autonomia Erkidegoan aeronautikaren eta espazioaren sektorearekin konprometitutako industria indartsu bat bultzatzea eta helburu hori lortzeko prest agertu ziren erakunde publikoen laguntza jasotzea erabaki zuten enpresetako bazkide sortzaileek eta zuzendariak esaten zigutena, hain zuzen. HEGAN jarduera korala izan zen, eta hala izaten jarraitzen du, eta argi erakusten digu horrek, gaur egun garenera iristeko gai izan bagara, etorkizuna ez dela distira gutxiagokoa izango uste izateko arrazoiak ere badaudela.

Baina hori ez da eginda datorren zerbait; hori lortzeko, merkatuan dugun posizioa hobetzen lagunduko diguten hainbat arlotako erronkei aurre egin behar diegu, bai eta sektore horrek sortzen duen eta urte hauetan guztietan horren modu egokian finkatzen joan den kualifikazio handiko enplegua babesteko aukera emango diguten erronkei ere.

Beharbada, lehiakortasuna da erronka garrantzitsuenetako bat, gure produkzio-prozesuak etengabe hobetzea eskatzen baitu. Horrela, digitalizazioak funtsezko zeregina izango du, eta gure enpresek ezin dute hori alde batera utzi. Lehiakortasunarekin zerikusia duten beste faktore batzuk etengabeko prestakuntza eta gure konpainietan dagoen talentuari eustea dira; izan ere, gaitasun teknologikoetan nahiz zeharkako beste gaitasun batzuetan moldakorrek diren profilak dituzte, gero eta elkarlan handiagoa eskatzen duen eta gero eta jasangarri eta globalagoa den sektore batean lan egiteko beharrezkoak direnak, hain zuzen. Bokazio teknikoak sustatu behar ditugu gure gazteen artean, haiek idatziko baitute etorkizuna, ez bakarrik gure klusterrarena, baita gure eskualdeko aeronautikaren eta espazioaren industriarena ere.

Azkenik, gure industrian garrantzi berezia duen alderdi bat nabarmendu nahi nuke, sektore horrek industria-, teknologia- eta berrikuntza-sarean duen garrantziagatik eta pisuagatik. I+Gko inbertsioaren aldeko apustua da; 2022an, errekorren beste zifra bat 132 M €-ko marka lortu da, HEGANeko kide diren sektoreko enpresentzat. Bizitza egokitzen ari zaigun une honetan, aeronautikako eta espazioko jarduerak, oro har gizartearen parte den heinean, kontuan hartu behar du ingurumenaren babesa, bai eta berrikuntza teknologikoa ere, jasangarritasun handiagoa lortu ahal izateko, eta hori erronka handia da eta, aldi berean, aukeren iturria ere bada. Ildo horretan, HEGANek 25 urte betetzen dituen urte berezi honetarako aukeratu duen eslogana guztiz bat dator konpromiso horrekin: “25 urte berdeago hegan”

Amaitzeko, eta atzera begiratzuz, egia da 25 urte igaro direla, baina ilusioak, erabakitasunak eta industria aeroespazialarekin dugun konpromisoak bere horretan jarraitzen dute. Goazen 50.aren bila!

Jose Julián ECHEVARRÍA
HEGANeko lehendakaria

PRESENTACIÓN



HEGAN es un ejemplo que demuestra que, si hemos sido capaces de llegar a lo que somos hoy, podemos confiar en un futuro brillante...

« 2022

Como todos los años por estas fechas, desde HEGAN os invitamos a recorrer esta Memoria Anual 2022 elaborada con el ánimo de recoger lo más relevante de lo que ha sido la actividad y actualidad de la industria aeronáutica y de espacio en el País Vasco durante el año pasado.

Este pasado 2022 ha sido un año en el que nuestro sector, duramente castigado por la pandemia y el impacto que tuvo en el transporte aéreo de pasajeros, ha visto una progresiva recuperación hacia unos niveles de actividad que se van acercando a los de 2019, tal y como ya nos vaticinaban las previsiones de los OEMs. Esto sin duda es una muy buena noticia para nuestro sector y esperamos que se consolide a lo largo de este 2023; pero, al mismo tiempo, ha supuesto un desafío importante, al obligarnos a reactivar toda nuestra industria y cadena de suministro en un entorno cuanto menos complejo: con dificultades en el suministro de materias primas y una escalada importante en los costes de producción (materiales, electricidad...), en gran medida derivados de la guerra en Ucrania.

Pese a esa coyuntura compleja, existen razones para ser optimista en 2023, cuando celebramos el 25 aniversario de la fundación de nuestro clúster HEGAN. Es inevitable, en un hito como este, leer en la historia del origen del cluster lo que nos decían los socios fundadores, directivos de las empresas que en aquel momento decidieron impulsar en el País Vasco una industria potente y comprometida con el sector aeronáutico y del espacio, y recabar el apoyo de las instituciones públicas, que se prestaron entonces a conseguir ese objetivo. HEGAN fue, y sigue siendo, un ejercicio coral que nos demuestra que, si hemos sido capaces de llegar a lo que somos hoy, hay razones para confiar en que el futuro no va a ser menos brillante.

Pero lo anterior no viene dado; para conseguirlo, debemos afrontar retos en múltiples ámbitos que nos permitan mejorar nuestro posicionamiento en el mercado y proteger el empleo altamente cualificado que este sector genera y que, de forma tan satisfactoria, se ha ido afianzando durante todos estos años.

Probablemente uno de los desafíos más relevantes sea el de la competitividad, que requiere abordar de una manera continuada la mejora de nuestros procesos productivos. Aquí la digitalización va a jugar un papel clave que nuestras empresas no pueden obviar. Otros factores igualmente vinculados con la competitividad son la formación permanente de nuestras personas y la retención del talento existente en nuestras compañías, con perfiles versátiles tanto en capacidades tecnológicas como en otras aptitudes transversales necesarias para trabajar en un sector cada vez más colaborativo, inclusivo, sostenible y global. Debemos promover las vocaciones técnicas entre nuestros jóvenes, ya que serán ellos quienes escribirán el futuro, no solo de nuestro clúster, sino también de lo que será la industria aeronáutica y del espacio en nuestra región.

Por último, me gustaría destacar un aspecto que en nuestra industria cobra una especial relevancia por la importancia y peso en el tejido industrial, tecnológico y de innovación que supone este sector. Se trata de la apuesta por la inversión en I+D y que en 2022 ha supuesto otra cifra de récord de 132 M € para las empresas del sector agrupadas en HEGAN. En el momento que nos está tocando vivir, donde la actividad aeronáutica y espacial, como parte de la sociedad en general, debe avanzar en la protección del medioambiente, la innovación tecnológica en aras de una mayor sostenibilidad supone un gran reto y es, al mismo tiempo, fuente de oportunidades. En este sentido, el eslogan para este año tan especial en el que HEGAN cumple 25 años está totalmente alineado con ese compromiso: “25 urte berdeago hegan”

Para terminar, y echando un vistazo atrás, es cierto que han pasado ya 25 años pero la ilusión, la decisión y nuestro compromiso con la industria aeroespacial siguen intactas. ¡A por los 50!

Jose Julián ECHEVARRÍA
Presidente de HEGAN

25 urte berdeago hegan

2



General Assembly

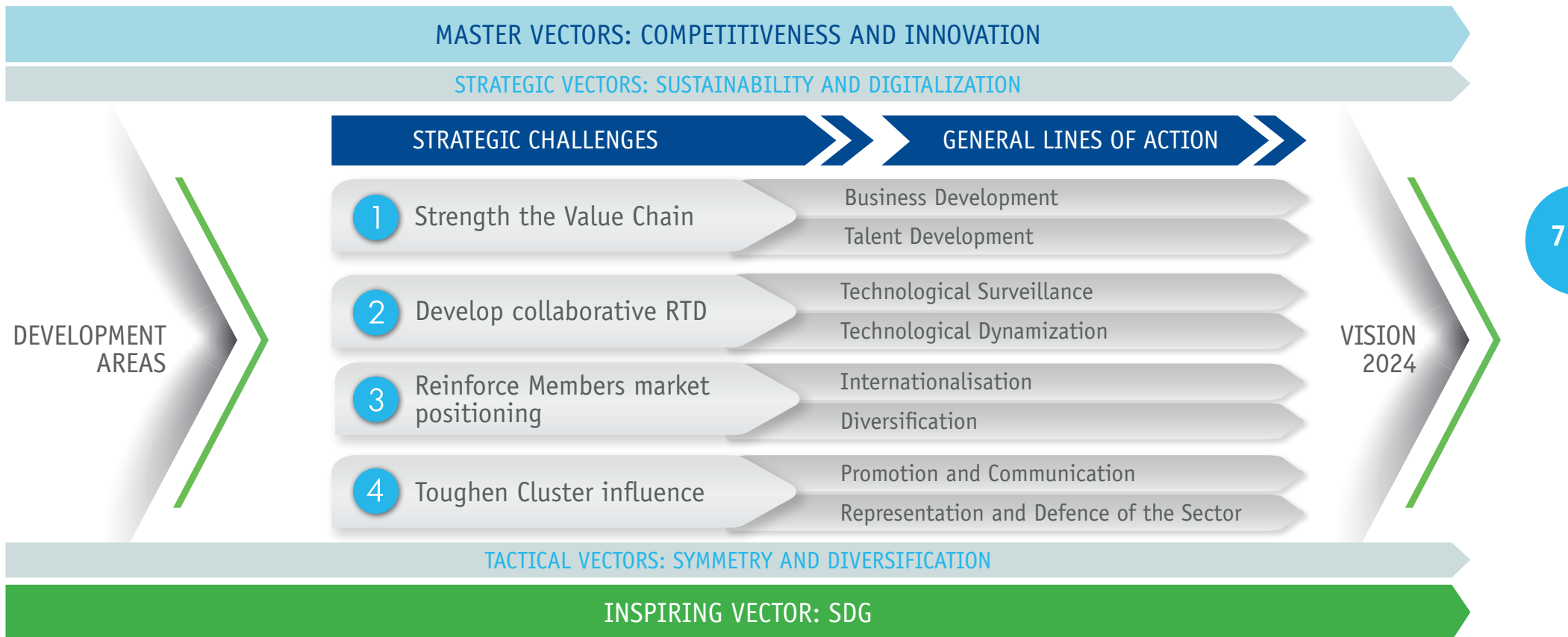
This is the highest-ranking body of the Association. It is made up of all member companies and is the forum through which they can express their wishes.

THE CLUSTER ASSOCIATION

HEGAN is a private non-profit association that brings together the Basque Aeronautics and Space sector, created with the mission of representing and revitalising the sector, to facilitate its competitiveness in the short-, medium- and long-term through cooperation and innovation between companies and other agents, answering cooperatively to its strategic challenges.

Strategic Map 2021-2024

Generated within our Strategic Plan 2021-2024, it includes all the actions that are deployed from the Association that give value to our Members



HEGAN's CREW

Full of enthusiasm and experience works to be a DRIVER of common strategies, a FACILITATOR of joint roadmaps, a DYNAMIZATOR of cooperative projects, a GENERATOR of international projection and a SOURCE of strategic information

Mentxu DÍAZ
Administration

Martín FDEZ. LOIZAGA
Deputy Director

Ana VILLATE
Managing Director

Ana RODRÍGUEZ
Head of Operations

Javier PIÑÁN
Head of Innovation



1997 »

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THE CLUSTER ASSOCIATION

HEGAN CLUSTER

(1966) 1997-2022

1966-1996

STRATEGY & VISION

« 2022

1966

The history of the Basque Aeronautical and Space sector dates back to 1966, when the Company SENER (today **SENER AEROSPACIAL**) signed its first contracts in the space area and started working with ESRO (today ESA) on different programs, such as rocket launch tower in Kiruna, first Ariane rocket, Ulysses space probe or SpaceLab. Subsequently, in 1985, this Company was named a member of the consortium in Europe, Eurojet, on behalf of Spain, beginning the work to define the EJ200 engine.

1992

In 1992, the Basque Government (**EJ/GV**) has commissioned a study on the aerospace sector and its future possibilities in the Basque economy to MONITOR -a Company led by Michael PORTE- and SENER: the "Competitiveness Program aeronautical Cluster of Basque Country" (MONITOR-SENER, 1992). As a result, the Aeronautical and Space sector was included as one of the priority industries for the purpose of the Basque Country's industrial policy. In 1993, the Cluster Technical Committee (COMTEC), embryo of the HEGAN association, met for the first time. In the same year, GAMESA Aeronáutica was born and the first contract with Embraer was signed: ERJ 145.

1986

In 1986, GAMESA - Grupo Auxiliar Metalúrgico, S.A. (today **AERNNOVA**) created Fibertecnica and signed the first contract with CASA (today AIRBUS) for the supply of composite structural components. Later, in 1988, the Company ITP - Industria de Turbopropulsores (today **ITP AERO**) was created in order to manufacture in Spain the nozzle of the EJ200 engine.

1995

In 1995, GAMESA Aeronáutica signed its first contract with Sikorsky and, in 1996, COMTEC agreed to give priority to the establishment of the Aerospace Technology Center (**CTA** in Spanish, from Centro de Tecnologías Aeronáuticas) and the definition of the Cluster Technological Plan (PTCA in Spanish, from Plan Tecnológico del Cluster), being based on the Technological Strategy of the sector in the medium and long term. At the same time, the European aeronautical industry was restructured on the basis of further integration of European companies, This was needed to compete globally with American industry.

The Cluster therefore considers the need to strengthen itself with the incorporation of companies such as the CAPV that were already working for the sector. It becomes a vehicle for SMEs to open up broader national and international markets. On the same date, GAMESA Aeronáutica wins the contract for the production of the fuselage of the SJ30-2 business plane from the American Company Sino-Swearingen. In addition, ITP signs a participation contract with BMW and Rolls-Royce for the BR751 engine, which equips MD95 plane of McDonnell Douglas.

25 urte berdeago hegan

HEGAN CLUSTER

1997-2003

QUALITY &
RELIABILITY

1997 In 1997, the technological infrastructure of the CTA was launched, including test areas and certifications in structures and fluid dynamics. It was also set up as a vertical technological centre, specialised in aeronautical and space technologies, thus complementing the existing technological infrastructure in the Basque Country. Likewise, the **HEGAN Association-Cluster** is created to carry out other actions, added to technology and innovation, as for instance: the development of Value-Chain, People and Internationalization. Through our Association, common policies are established to empower Associates in a collective way. The member companies of the Cluster are still the three FOUNDING companies that was launched in 1993: GAMESA AERONAUTICA (**AERNNOVA**), ITP (**ITP AERO**) and SENER (**SENER AEROESPACIAL**). The latter began to collaborate with NASA.

It is also the year of consolidation for **AERNNOVA** thanks to the success of the ERJ 145 and the launch of the ERJ 135 from Embraer. Also, the agreement between Rolls-Royce and **ITP AERO** was signed. The technology for the design and development of Low-Pressure Turbines was then acquired.

There was a need to jointly guide the improvement of product quality and the management of the Cluster companies, being based on the EFQM Total Quality model, and to prepare a feasibility study launched in 1998. This was carried out via a group of experts, the Cluster Quality Committee, whose objective was to establish a reference for its own Quality Assurance System: HEGAN9000.

That same year, **HEGAN** began activities to promote and disseminate opportunities and participate in R&D projects at all levels -at regional, national and European level- and to review Cluster Technology Plan.

1998 In 1998, **SENER AEROSPACIAL** actively participated in various engine and space programs. Besides, 11 SMEs joined the Association-Cluster: **ARATZ**, BURULAN, FERVILOR, FOTOCORTE, **MESIMA**, **METRALTEC**, NOVALTI, **NUTER**, **SK10**, **SPASA** (these two last companies belonging today to the one of our Main Members of the Cluster: **ACITURRI**) and TECNICHAPA (today **WEC**).

Together with the prolific activity of leading companies, there is an incipient activity in investment, innovation and international projection of small companies, thus contrasting the growth and consolidation of the aerospace sector in the Basque Country. **HEGAN** defines the main lines of the Cluster Strategic Plan 2001-2004. The turnover of the Cluster companies reached 535 million Euros and the number of exports practically doubled between 1998 and 2000.

The year 2000 was the moment when investment in R&D of the Members remained above 20% of investment on sales and when we first organized the **AEROTRENDS** International Congress - New Trends in Manufacturing for the Aerospace Industry.

2003 In 2003, **HEGAN** became the first regional association to be represented in the International Aerospace Quality Group (IAQG), through its European body (EAQG, European Aerospace Quality Group). This showed the interest of its members in excellence regarding management. This fact allowed associated companies to benefit from participating in this forum via cooperation, which is HEGAN's main objective.

For the first time, the diplomas of the first promotion of the "Intensification Course in Aeronautical Technologies" were delivered, taught by the Faculty of Engineering of the UPV/EHU in Bilbao (University of the Basque Country)

HEGAN CLUSTER

2004-2009

TECHNOLOGY & DEVELOPMENT

« 2022

2004

At the end of the year in which the centenary of aviation was celebrated, 2004 started as a year full of satisfaction since the companies have just successfully faced the first major crisis in the sector since the constitution of the Association. The companies were preparing at that time to participate in the A400M. **ITP AERO** successfully obtained its entry with 21% in the TP400 engine that will power this aircraft.

The **HEGAN** Cluster joined as a collaborator of the Spanish Association of Builders of Aerospace Material - ATECMA (today TEDAE) and the first stage of EN9100 aerospace quality was then consolidated, which is a specific standard for the sector. Consequently, 70% of the Members were certified by mid-2004 and the rest would be so in 2005.

2008

Great milestone from 2008 was the agreement reached by **ITP AERO** with Rolls-Royce to participate as a risk and revenue partner in the TrentXWB program, as responsible for the design and manufacture of the low-pressure turbine for this engine. Another major landmark for our companies was the prize awarded to **AERNNOVA**, SK10 and ARIES COMPLEX (the latter two companies belong now to **ACITURRI**) of large work packages for AIRBUS A350XWB program. It must be emphasized though the good positioning of the co-founder Company **SENER AEROSPACIAL** in the Security segment, the creation of new medium and small business groups, the consolidation of systems activity and establishments abroad, as well as the growth of the investment percentage in R&D at 14% of the turnover.

2007

In 2007, 99% of the companies have certified their special processes with the Nadcap certification. The Association, with the collaboration of IH0BE, conducts internal courses on environmental quality. In addition, the first internal auditor course in EN9100 is carried out by and for the associates. An important technological base was consolidated and associated companies entered into European FP7 projects at that time.

AERNNOVA becomes the most important private group in Spain in the manufacture of aeronautical structures and the only Spanish one in the council organized by Airbus for the A350. The decision was made to make important investments in the dollar zone. In the same way, **ITP AERO** is the only Spanish Company to design, manufacture and integrate complete subsystems for engines. Major strategic investment was made in the area of maintenance.

The turnover of the Basque Aerospace Cluster exceeded the barrier of 900 million Euros for the first time and employment surpassed 6,000 people. The proportion of billing located in Basque Country is 63% of the total, being 55% the percentage of employment.

25 urte berdeago hegan

HEGAN CLUSTER

2010-2014

INNOVATION
& ADVANCED
MANUFACTURING

2010

2010 was of great significance for the future of the Cluster due to the start of work on the Airbus A350XWB, mainly in the conceptual and detailed design phases of various components, tooling and certification tests.

2012

As of 2012, the Cluster maintained average annual growth in turnover and employment of more than 5%. This fact made it possible to double these figures every decade since its constitution.

2014

Between 2014 and 2015, other actors joined the Cluster's ranks. On the one hand, the auxiliary industry (machine tools, production equipment, cutting tools...) was essential for the manufacturing process and collaborated closely with the Sector, as a key part of an Extended Value Chain. On the other hand, the Universities as entities contributing significantly to the transfer of technologies to the industrial network and, above all, to create talented people who are an indispensable driving force of the sector.

The Cluster Members continued with their diversification of programmes, customers and projects. They were already working on practically all the most important ones on a global basis. Regarding market positioning, continuous investment effort in R&D is vital. This already had outstanding figures: in 2014, the Members invested 165 million Euros in R&D (almost 10% of their turnover). Moreover, 85% of that total amount was self-financed. In that period of lack of new programs, R&D effort was maintained and focused on projects linked to the improvement of manufacturing processes in order to face any increase in delivery rates and competitiveness demands by customers. As it was already clear in that period, the fact that companies adapted to "Industry 4.0" was essential.

HEGAN CLUSTER

2015-2022

SUSTAINABILITY & RESILIENCY

« 2022

2016

One of the great milestones of recent times was the creation of the Aeronautics Advanced Manufacturing Center (**CFAA** in Spanish, from Centro de Fabricación Avanzada Aeronáutica). That initiative began to take shape in the early years of the decade, it was established in 2014 and it began operating in 2016. The center is a public-private initiative for the development of advanced manufacturing projects, with a direct application in the short term in the Basque companies. It was launched with full support of the **EJ/GV**, through the former Department of Economic Development and Infrastructures and the Provincial Council of Bizkaia (**DFB/FBA**) at the request of a group of companies in the sector led by **ITP AERO** and **DANOBAT GROUP**. The **UPV/EHU** later joined this project, as manager of the centre.

2019

2019 was the year of maximums in the entire history of the Cluster, reaching the highest employment and turnover figures (15,273 people and 2,615 million euros respectively) ever. This happened after a period of high ramp-ups, good prospects, growth and maintenance, plus consolidation of the Members 'presence in the global market.

In the midst of the global health crisis, **HEGAN** generated the Strategic Plan 2021-2024 (PE2124), which is in full swing. The usual master vectors (competitiveness and innovation) are joined by strategic ones (sustainability and digitization), also tactical ones derived from the circumstances of the period (symmetry and diversification), plus an inspiring one (ODS).

2017

And regarding sustainability section, it is worth noting the participation of nine **HEGAN** Members in Clean Sky 2 as Core Partners. They form the basis of 100 European entities of such nature, thus underlining the huge commitment of the cluster members in this area. Added to these nine companies, six more Members also participated in Clean Sky 2. In fact, the Basque Country was the second European region behind Campania (Italy) by number of proposals accepted in 2017 for this initiative. Nowadays, four **HEGAN** Members are part of Clean Aviation JU: **ACITURRI**, **AERNNOVA**, **ITP AERO** and **TECNALIA**.

2018

Based on the premise of the importance of R&D, the **HEGAN** 2017-2020 R&D plan (PIDiH1720) was presented in 2018. Also, a scorecard prioritizing the areas where possible collaborative projects for the period would be being worked on was set up: manufacturing process automation, additive manufacturing, advanced conventional machining, smart factory, machine connectivity and special processes. All this being focused on improving aircraft efficiency and cleaner and more competitive processes.

HEGAN CLUSTER

2015-2022

SUSTAINABILITY
& RESILIENCY

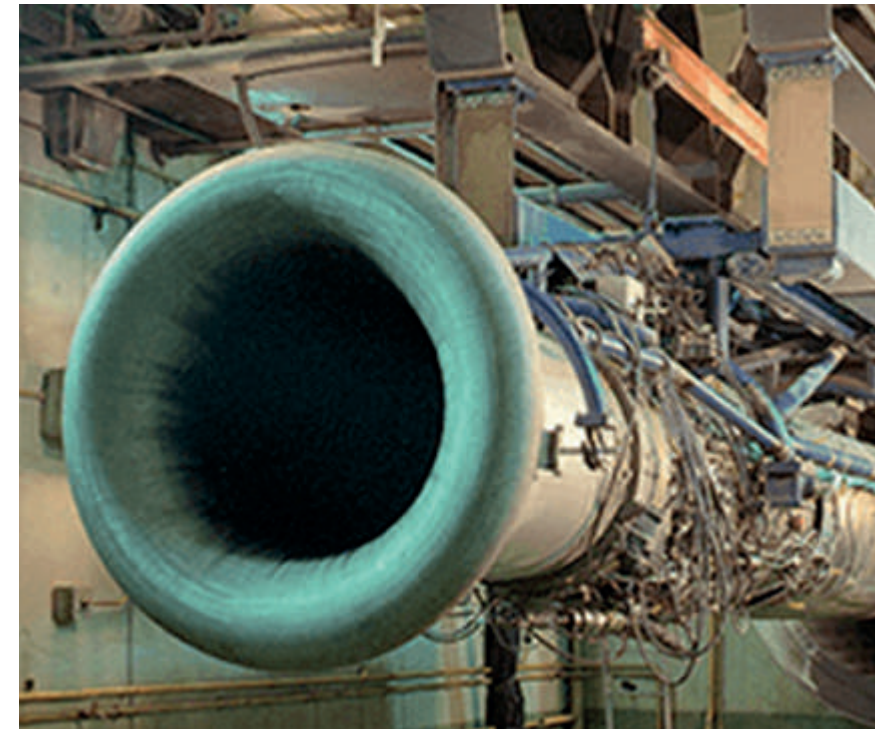
2020 - 2022

The sector is in a stage of recovery after the dramatic collapse caused by the Pandemic situation. Civil aeronautics has been the most affected by the crisis and it is the area where the Cluster monopolized almost all its activity. In this sense, our work from 2020 to 2022 has focused on diversification actions turned towards other niches and subsegments: the Space sector, where it has not been so affected and continues with good prospects in terms of growth or long-term projects such as Zero Emission Aviation, which is expanding as an increasingly tangible opportunity niche and as a global need in order to get a cleaner, more sustainable and fairer world.



1967

Rocket launch tower in Kiruna
(Sweden)



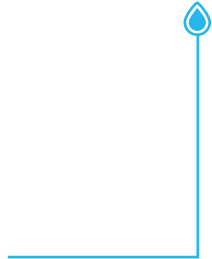
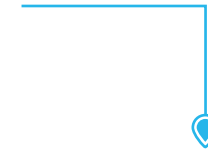
1989

Test bench for the EJ200
development



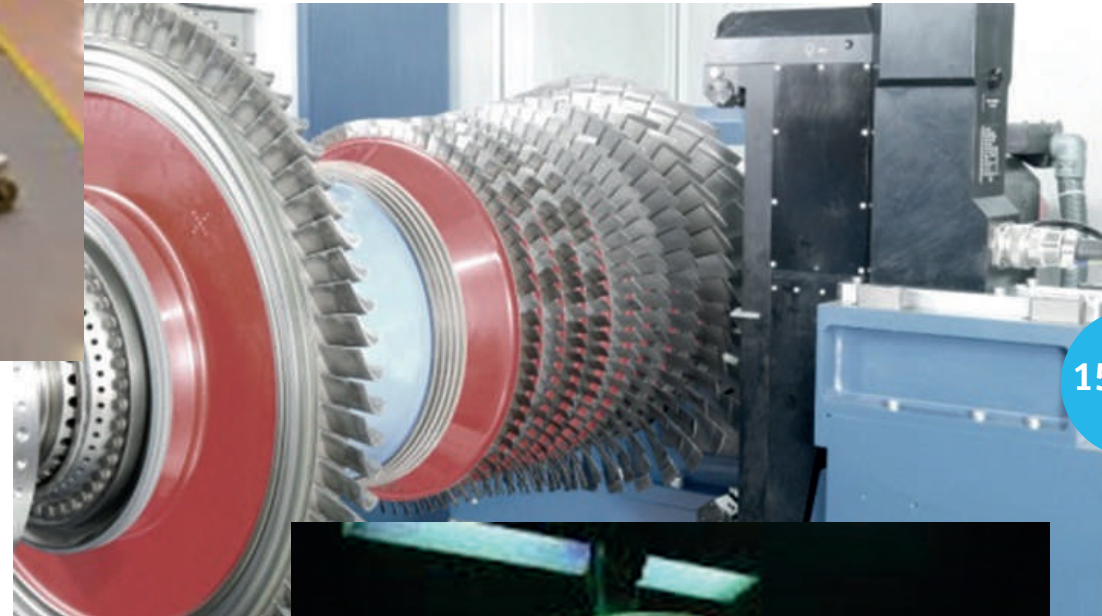
2000

Contract for the Bombardier CRJ 700/900 design and manufacturing



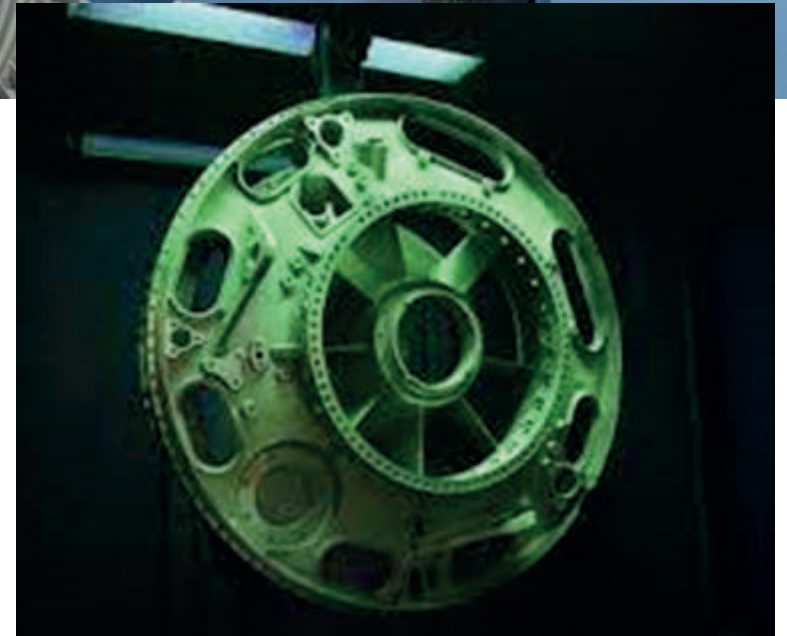
2014

Machine-Tool Manufactures join the Cluster



2017

First deliveries of components for the LEAP-X

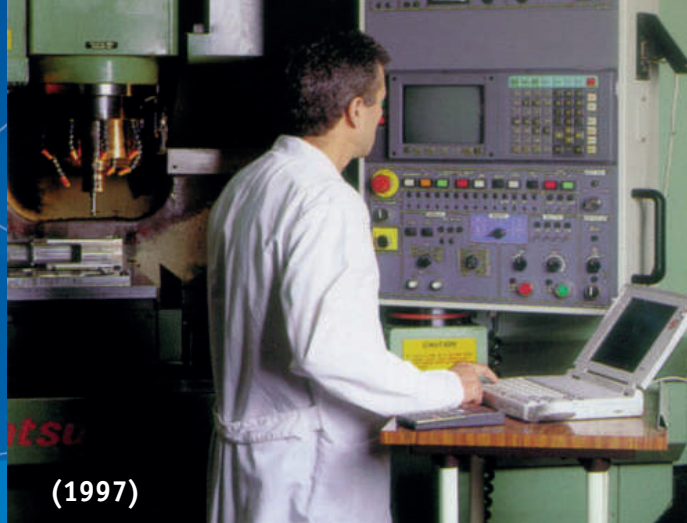


« 2022

25 urte berdeago hegan

3

The Cluster MEMBERS



(1997)

Members in 1997...

ACITURRI
AERNNOVA (Founder)
ALESTIS
ARATZ
ITP AERO (Founder)
MESIMA
METRALTEC
NUTER
SENER AEROESPACIAL (Founder)
WEC

... still associated

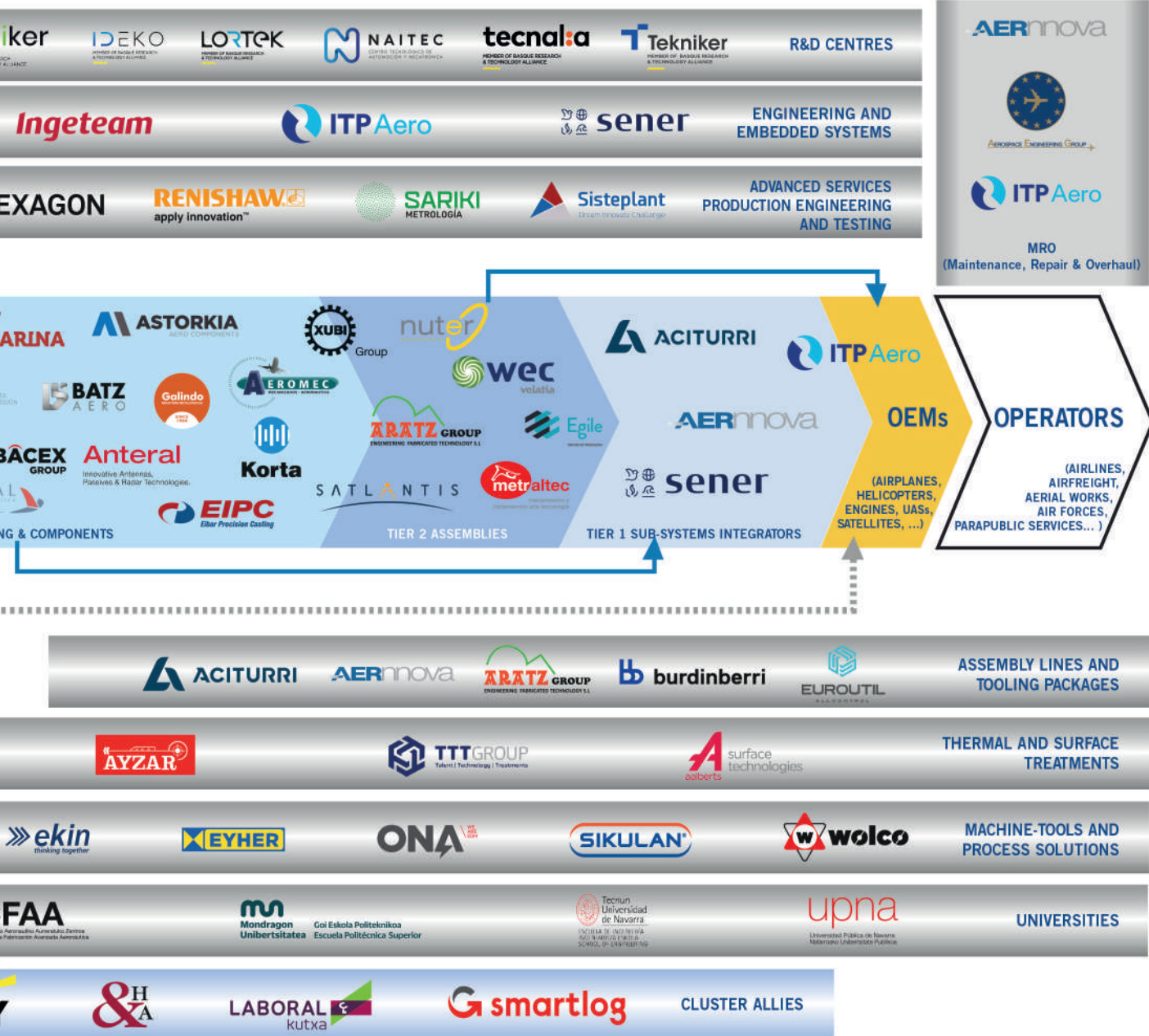
25 years flying greener

Basque AeroSpace



1997 »

Value Chain



reliable Suppliers certified to the Sector's standard:

N9100 Nadcap EN9110
EN9120 Part 21 DOA
Part 21 POA AS13001
ISO14001 Part 145 PECAL
ISO45001 ...

AERNNOVA



ITP AERO



SENER AEROESPACIAL



AALBERTS S. T. TEY



ACITURRI



AEROMEC



AEROSPACE ENG. GR.



AIBE



ANTERAL



ARATZ GROUP



ASTORKIA



AYZAR



BATZ



BURDINBERRI



DANOBATGROUP



DOILAN



DTK



DYFA



EGA MASTER



EGILE



EHAFF



EIBAR PRECISION CASTING



EKIN



ELECTROHILO



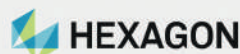
EUROUTIL



EYHER



HEXAGON



INDUSTRIAS GALINDO



INGETEA



KHEGAL AERONAUTICA



KORTA



LAZPIUR



MATRICI



MESIMA



METALURGICA MARINA



MET-MEKA



METRALTEC



METROLOGÍA SARIKI



MICROLAN AEROSPACE



MIZAR ADDITIVE



NUTER



ONA ELECTROEROSION



RENISHAW 	SATLANTIS 	SIKULAN 	SISTEPLANT 	TECNASA 	TM TELLERIA
TTT GROUP 	TUBACEX GROUP 	WEC 	WOLCO 	XUBI GROUP 	AZTERLAN
CEIT 	CIDETEC 	CTA 	GAIKER 	IDEKO 	LORTEK
NAITEC 	TECNALIA 	TEKNIKER 	UNIV. DE DEUSTO 	UPV/EHU 	MONDRAGON UNIB.
TECNUN 	UPNA 	COMPITTE 	DELOITTE 	ERNST AND YOUNG 	HERRERO Y ASOCIADOS
LABORAL KUTXA 	SMARTLOG 				

Industry

R&D. Org

Universities

Allies



The Cluster MEMBERS



1997
Sikorsky S-92

MEMBERS ACTIVITIES

(1997) 2022

Aerostructures

Engines

Systems & Equipment

Space

MRO

R&D Projects



Members Activities
in Detail

2022
NHIndustries NH90



21

HEGAN MEMBERS

(1997)

ACITURRI (+ALESTIS)
AERNNOVA
ARATZ
MESIMA
METRALTEC
NUTER

ADVANCED SERVICES

CTA
MESIMA
RENISHAW IBÉRICA

TREATMENTS

AYZAR
AALBERTS TEY
TTT GROUP

ADVANCED MANUFACTURING

EYHER
DANOBATGROUP

TOOLING

ARATZ
BURDINBERRI
EUROUTIL
INDUSTRIAS GALINDO

COMPONENTS

AEROMEC
AIBE
ASTORKIA
DTK
EIBAR PRECISION CASTING
KHEGAL AERONÁUTICA
MATRICI INNOVATIVE
TECHNOLOGIES
METRALTEC
MIZAR ADDITIVE
NUTER
TM TELLERÍA

The Cluster MEMBERS

AEROSTRUCTURES 2022

TIERs1

ACITURRI
AERONNOVA

DIRECT CLIENTS

ACITURRI
AERONNOVA
AIRBUS
AIRBUS DS
AIRBUS HELICOPTERS
AUBERT & DUVAL
BELL
BOEING
DAG
DASSAULT
EMBRAER
EUROGIFGHTER
FIGEAC AERO
HÉROUX-DEVTEK SPAIN
LAUAK GROUPE
LILIUM
MTORRES
NH INDUSTRIES
PARKER
PILATUS
SIKORSKY
SKF
SONACA
SPIRIT
TAI

CURRENT PROGRAMMES

737ng/Max
777
787
505 Ranger X
747-8I/F
A220
A320 / A320neo
A330 / A330neo / XL Beluga
A350 XWB
A400M
BELUGA XL
CN235, C295
D328 ECO
E-jets E2
FALCON 10X
FALCON Families
H225 / 135
KC-390
LEGACY Family
LILIUM
NH90
PC-24
S-92 / H-92
TIGRE
TYPHOON

(1997)

ERJ 145
S-92
SJ30

The Cluster MEMBERS

(1997)

ACITURRI (+ALESTIS)
ITP AERO
MESIMA
NUTER
SENER AEROESPACIAL
WEC

HEGAN MEMBERS

ADVANCED SERVICES

CTA
MESIMA
METROLOGÍA SARIKI
RENISHAW IBÉRICA

TREATMENTS & SPECIAL PROCESSES

AALBERTS TEY
METRALTEC
TTT GROUP

ADVANCED MANUFACTURING

DANOBATGROUP
EGAMASTER
EKIN
ONA ELECTROEROSIÓN
WOLCO

TOOLING

AIBE
EURUTIL

COMPONENTS

ACITURRI
AEROMEC
ARATZ
ASTORKIA
BATZ
EGILE
EIBAR PRECISION CASTING
ELECTROHILO
LAZPIUR
MATRICI INNOVATIVE
TECHNOLOGIES
MIZAR ADDITIVE
NUTER
TUBACEX
WEC

CLIENTS

ENGINES 2022

TIERs1

ITP AERO

DIRECT CLIENTS

ACITURRI
ASTORKIA
AVIO AERO
BARNES AEROSPACE
CFM INTERNATIONAL
EGILE
GE VERNOVA
GKN AEROSPACE ENGINE SYSTEMS
HEROUX-DEVTEK
HONEYWELL
ITP AERO
MATRICI INNOVATIVE TECHNOLOGIES
PRATT & WHITNEY
ROLLS-ROYCE
SAFRAN AEROBOOSTERS
SAFRAN AIRCRAFT ENGINES
SAFRAN HELICOPTER ENGINES
SAFRAN TRANSMISSION SYSTEMS
SALLÉN AVIACIÓN
WEC

CURRENT PROGRAMMES

BR700
CF34-10
CFM56
EJ200
F136
GE90
GP7000
HTF7000
LEAP 1A/B/C
M88
MTR390-E
PW1000G (GTF)
PW1500G
PW535E
PW800
TP400
TRENT 1000
TRENT 700
TRENT 7000
TRENT 900
TRENT XWB
ULTRAFAN

(1997)

EJ200
TRENT500
BR710/715
ATAR9K50

25

HEGAN MEMBERS

(1997)

...

ENGINEERING

INGETEAM

ADVANCED SERVICES

CTA
RENISHAW IBÉRICA

TREATMENTS & SPECIAL PROCESSES

AALBERTS TEY
METRALTEC
TTT GROUP

TOOLING

INDUSTRIAS GALINDO

COMPONENTS

ACITURRI
AEROMEC
ANTERAL
EGILE
EIBAR PRECISION CASTING
KHEGAL AERONÁUTICA
KORTA
MIZAR ADDITIVE
NUTER
SENER AEROESPACIAL
TECNASA
WEC
WXUBI

The Cluster MEMBERS

SYSTEMS & EQUIPMENT 2022

SCOPE OF SUPPLY

ACTUATORS
 AIR CONDITIONING
 AIR TREATMENT MANAGEMENT
 ANTENNAS
 APUS
 ARCHITECTURE, CRITICAL
 SOFTWARE AND HARWARE
 DEVELOPMENT
 DEFENCE SYSTEMS
 ENGINES-ACTUATORS-
 ELECTRONICAL EQUIPMENTS
 FUEL SYSTEM COMPONENTS
 GROUND EQUIPMENT
 HEAT AND SURFACE TREATMENTS
 HYBRIDATION/ELECTRIFICATION
 HYDRAULIC SYSTEM
 INTERIORS
 LANDIG GEAR
 LUBRICATION SYSTEMS
 MACHINING
 OPTRONIC SYSTEMS TV-
 THERMOGRAPHY
 POWER ELECTRONICS
 RADARS
 TURBOPROP SYSTEMS

DIRECT CLIENTS

AD GROUP	INDRA
AERTEC	INTERSOFT
AIRBUS DS	LIEBHERR AEROSPACE
AIRBUS HELICOPTERS	MARTIN-BAKER
EGILE	RATIER FIGEAC
EIBAR PRECISION CASTING	RAYTHEON
ELBIT SYSTEMS	SAAB DYNAMICS
EUROPAVIA	SAFRAN AEROSYSTEMS
GENERAL ATOMICS	SAFRAN ELECTRONICS & DEFENCE
GENERAL DYNAMICS	SAFRAN LANDING SYSTEMS
GOODRICH	SAFRAN POWER UNITS
HELICOPTERES GUIMBAL	SAFRAN SEATS
HENSOLDT	SAFRAN TRANSMISSION SYSTEMS
HÉROUX-DEVTEK SPAIN	THALES GROUP
HONEYWELL	
IAI	

(1997)

...

HEGAN MEMBERS

(1997)

ACITURRI (+ALESTIS)
ARATZ
NUTER
SENER AEROESPACIAL

ADVANCED SERVICES

CTA
NAITEC

TREATMENTS & SPECIAL PROCESSES

AALBERTS TEY
METRALTEC
TTT GROUP

TOOLING

INDUSTRIAS GALINDO

COMPONENTS

AERNNOVA
AIBE
ARATZ
BURDINBERRI
DANOBATGROUP
MIZAR ADDITIVE
NUTER
TECNALIA
TUBACEX

COMPLETE SUBSYSTEMS

ANTERAL
SATLANTIS

The Cluster MEMBERS

SPACE 2022

TIER 1

SENER AEROESPACIAL

SCOPE OF SUPPLY

ACTUATION
ANTENNAS
DUMMIES
ENGINEERING
EO CAMERAS
HEAT AND SURFACE TREATMENTS
INDUSTRY 4.0 SOLUTIONS AND DIGITAL
FACTORY TECHNOLOGIES
MACHINED COMPONENTS
MECHATRONICS
OPTICAL INSTRUMENTS
OPTICS
PLANETARY EXPLORATION
PROPULSION SYSTEMS
RADARS
SCIENTIFIC MISSIONS
SECTIONS
SPACE IMAGERS
STRUCTURES
TESTING
TOOLING MANUFACTURING

CLIENTS

DIRECT CLIENTS

AIRBUS DS
AIRBUS ONEWEB
ARIANE GROUP
BALL AEROSPACE
CRISA
DHV
ESA
ESO - European Southern Observatory
GEOCOSMOS
INDRA
L3HARRIS
LEONARDO
LOCKHEED MARTIN
MAXAR
NASA
NORTHROP GRUMMAN INTERNATIONAL
PLD
QINETIQ
SATLANTIS
SENER AEROESPACIAL
SPACEX
THALES ALENIA SPACE

(1997)

ESA
NASA

29

(1997)

...

MRO SERVICES

ACITURRI
AERNNOVA
AEROSPACE ENGINEERING GROUP
DANOBATGROUP
EGAMASTER
ITP AERO
METRALTEC
ONA ELECTROEROSIÓN
RENISHAW IBÉRICA

**The Cluster
MEMBERS**

MRO 2022

SCOPE OF SUPPLY

AVIONICS SYSTEMS
COMPOSITE & METAL STRUCTURE REPAIRS
DESIGN OF GSES
DESIGN OF REPAIRS
ELECTRICAL SYSTEMS
FUEL SYSTEMS
FULL MAINTENANCE, INSPECTION AND REPAIR OF ENGINES
HEAT / SURFACE TREATMENTS / SPECIAL PROCESSES
HYDRAULIC SYSTEMS
INSPECTIONS, SPECIAL PROCESSES AND RE-QUALIFICATIONS
MACHINE-TOOLS
MAINTAINABILITY, RELIABILITY ANALYSIS
MODIFICATIONS AT FINAL ASSEMBLY OF OEMS
RETROFITTED CMMS
SALES OF SPARES
SPECIAL HAND-TOOLS
TECHNICAL PUBLICATIONS

CLIENTS

DIRECT CLIENTS

AIRBUS DS
AERNNOVA
AIR FORCES
AIRBUS
EMBRAER
GLOBALIA
IBERIA MAINTENANCE
LEARJET
MHI
MRO COMPANIES
OEMs
OPERATORS
ROLLS-ROYCE
SIKORSKY
TRADING COMPANIES

(1997)

...

31

HEGAN MEMBERS

TRL1



TRL9

(1997)

...

CEIT
CTA
DANOBATGROUP
LORTEK
MONDRAGON UNIBERTSITATEA
NAITEC
TECNUN
TECNALIA
TEKNIKER
UPNA
UPV/EHU-CFAA

AALBERTS TEY
ACITURRI
AERNNOVA
ANTERAL
DANOBATGROUP
EIPC
EKIN
ITPO AERO
KORTA
LAZPIUR
MESIMA
METROLOGÍA SARIKI
SATLANTIS
SENER AEROESPACIAL
TTT GROUP
WEC
WOLCO

The Cluster MEMBERS

R&D 2022

SCOPE OF TECHNOLOGIES

ADDITIVE MANUFACTURING
 ADVANCED MANUFACTURING
 ADVANCED MATERIALS
 AERODYNAMICS
 BIG DATA, DIGITAL TWINS,
 CYBERSECURITY
 DIGITALIZATION
 ECO-DESIGN
 EFFICIENT PROPULSION
 ENGINEERING DEMOSTRATORS
 ENGINEERING MODELIZATION
 EO MISSION SOLUTIONS
 EO OBSERVATION
 FACTORY OF THE FUTURE
 FLUID DYNAMICS
 INDUSTRY 4.0
 JOINING TECHNOLOGIES
 MONITORING
 NEW PROPULSION SYSTEMS (H₂,
 NH₃, SAF, Elect.,....)
 RECYCLABILITY
 ROBOTIZATION AND AUTOMATION
 SENSORIZATION AND CONNECTIVITY
 SPACE TECHNOLOGIES
 SUSTAINABLE PRODUCTION
 THERMOPLASTICS
 TREATMENTS & COATINGS
 ULTRA-EFFICIENT AIRCRAFT
 ARCHITECTURES
 ZERO EMISSIONS

EUROPEAN

CLEAN AVIATION
 CLEAN SKY 2
 EDA
 EDF
 EDIDP
 EDIDP
 EIT Manufacturing
 ESA
 ESA-GSTP
 EUROREGION NAEN
 HORIZON 2020
 HORIZON EUROPE
 Intereg Sudoe
 SESAR
 Smart-EUREKA

REGIONAL

Basque Calls - Ciberseguridad
 Industrial
 Basque Calls - DFA
 Basque Calls - DFB
 Basque Calls - DFG
 Basque Calls - ELKARTEK
 Basque Calls - HAZITEK
 Competitivos
 Basque Calls - HAZITEK
 Estrategicos
 Basque Calls - KONEXIO
 Castilla y León Calls
 Madrid Calls
 Navarra Calls

NATIONAL

AEI - MINCOTUR	PID - CDTI
CERVERA - CDTI	PTA 2021 - CDTI
CIEN - CDTI	PTA 2022-CDTI
DGAM	RETOS Colaboración - CDTI
MCIN	RETOS Excelencia - CDTI
MISIONES - CDTI	

(1997)

...

74

AEROSPACE MEMBERS

4

TIER 1

Aerostructures · Engines ·
Space

7

MID-CAPS

Components · Advanced
Manufacturing · Advanced
Services · Engineering

5

UNIVERSITIES

ETSIB: Master in Aeronautics,
Master in Space CFAA

1

AEROSPACE RTD CENTRE

Certification Testing and RTD
(3 Labs)

9

R&D ENTITIES

With with aerospace
activities (14 labs)

42

SMEs

Subassys · Sub-Systems
· Components · Parts ·
Special Processes · Tooling
· Advanced Services ·
Advanced Manufacturing...
for Aerostructures, Engines,
Systems and Space

6

CLUSTER Allies

Risk & Insurance – Global
Consulting – Intellectual
Property – Legal & Tax –
Financing – Intralogistics

172

FACILITIES AROUND THE WORLD

99 in the Basque Country
45 in the rest of Spain
28 abroad: Brazil, China, Germany,
India, Malta, Mexico, Poland,
Portugal, UK, USA

Facts & Figures 2022

(1997)

16 Members

3 Mid-Caps

11 SMEs

1 Aerospace R&D Centre

1 R&D Entity

17 Facilities in the Basque
Country

Members
aggregate...

...**TURNOVER**
2,377
million €

...**EMPLOYMENT**
15,252
people

(directly generated in all of
their worldwide facilities)

Geographical breakdown:	Turnover (M€)	Increase vs. 2021	Employment	Increase vs. 2021
Basque Country	839	9.5%	4,998	6.8%
Rest of Spain	956	26.6%	6,141	-7.9%
Rest of the World	582	68.1%	4,133	44.8%
TOTAL	2,377	27.3%	15,252	7.5%

R&D Exports	M€	% over Sales	Average % over Sales since 1997
Members R&D investment	142	6.0%	11.2%
Members Exports	1,754	73.8%	69.8%

Cluster Dimension (facilities in Basque Country)

1% of the
Basque
GDP*

4.5% of the Basque
Industrial
GDP*

2.5% of the Basque
industrial
employment*

HEGAN Members Dimension (facilities in Spain)

17%
of the
Spanish
**

1%
of the
European

aerospace **TURNOVER**

29%
of the
Spanish
**

2%
of the
European

aerospace **EMPLOYMENT**

13%
of the
Spanish
**

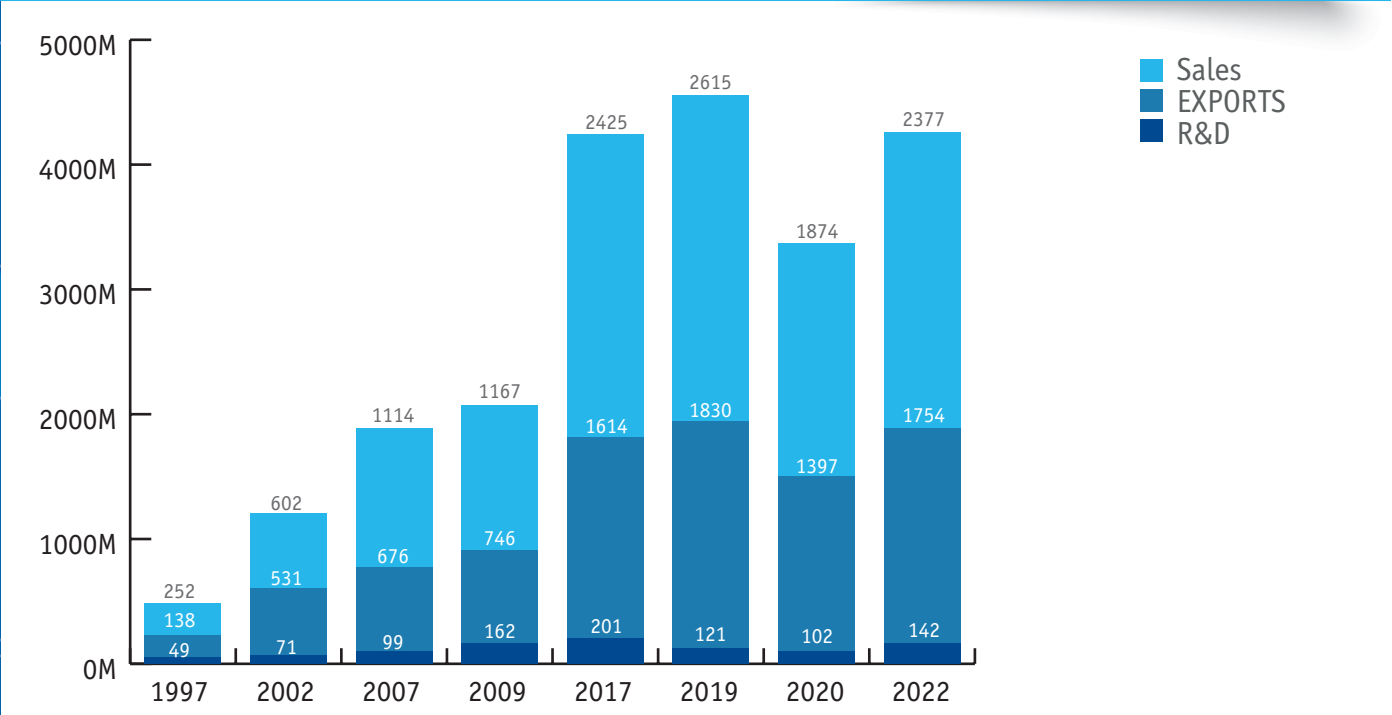
1%
of the
European

aerospace **RD investment**

* EUSTAT 2022
** TEDAE 2021
*** ASD 2021

Facts & Figures 2022

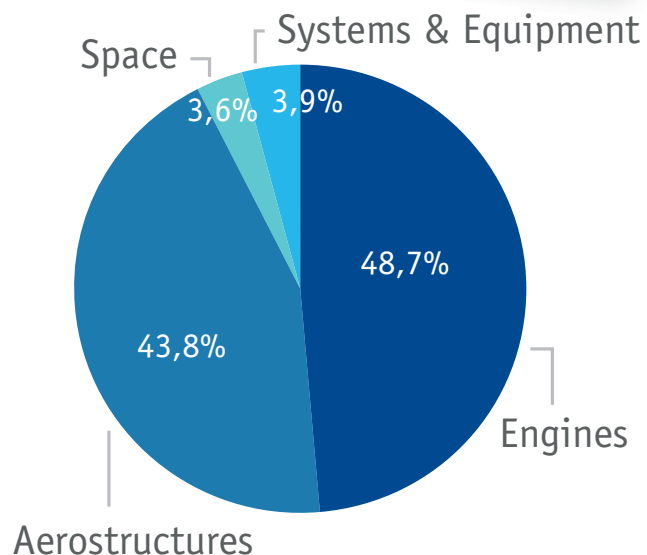
EVOLUTION IN M€



EVOLUTION PEOPLE



Turnover according to Subsectors

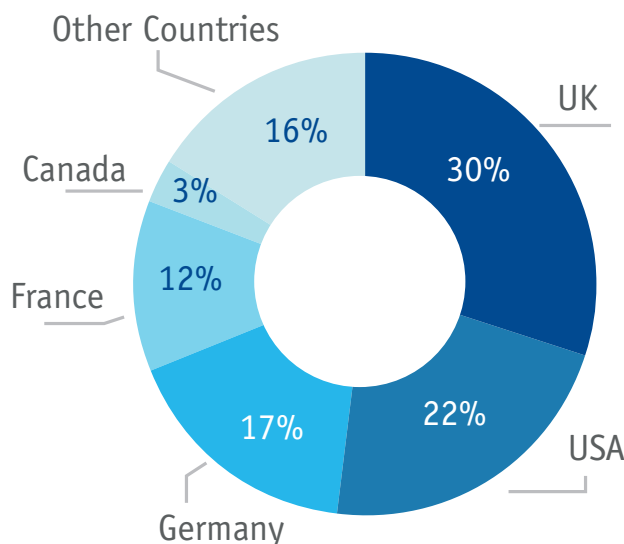


MILESTONES

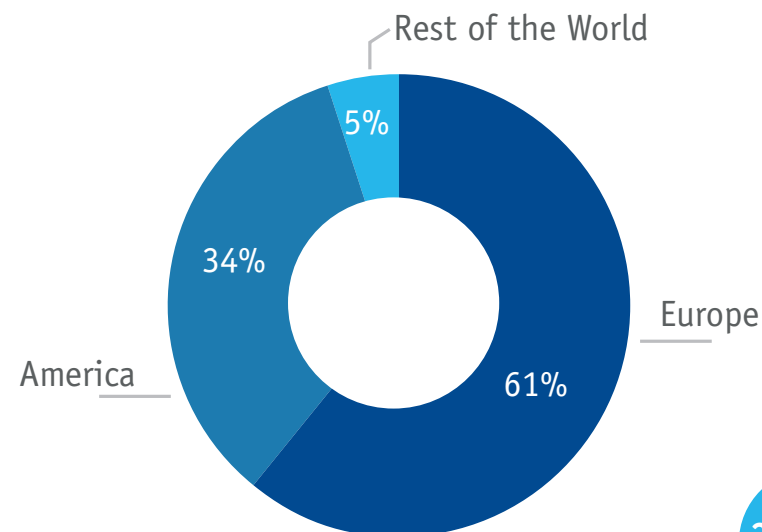
2022 - 25 Years Flying Green
2020 - COVID-19 Pandemic
2019 - All-time Cluster Highs
2017 - 20 Years Flying High
2009 - Great Recession
2007 - 10 Years Flying Together
2002 - 9/11 impact
1997 - HEGAN Founding

EXPORTS

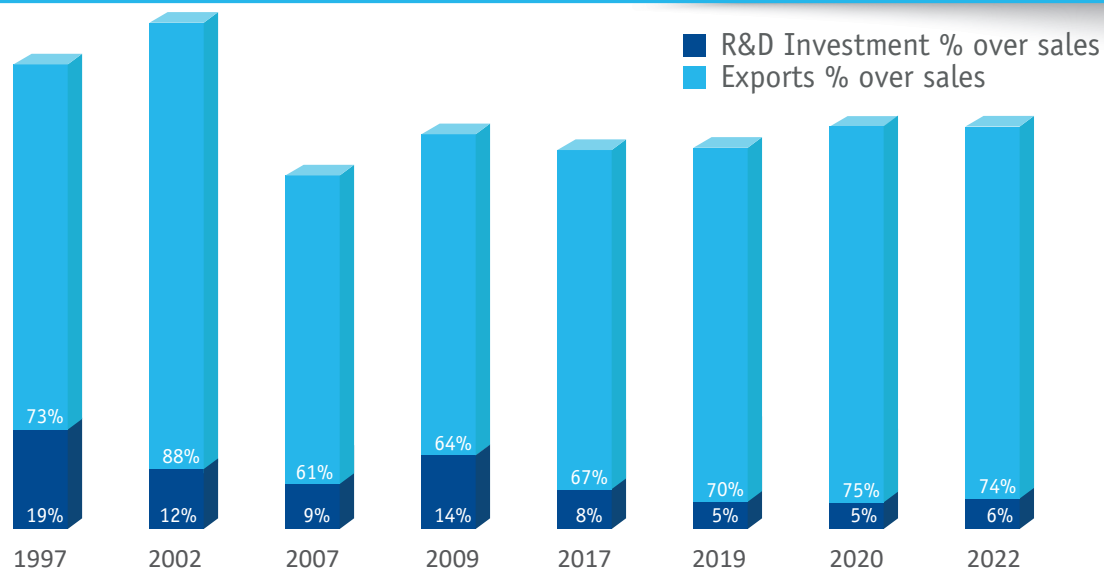
Exports according to Countries



To Continents



EVOLUTION %



R&D Effort

Auto-Financing
Public Support

79.9%

20.1%

R&D Projects active in 2022

231

Members with R&D activity

28

Cumulated investment since 1997 (M€): 3,247

Projects according
to CALL

97

European

64

Basque

48

National

22

Others

Employment According to Qualification

Managers, Engineers & Graduates

TOTAL

36%

FEMALE

51% (1624)

Technicians, Administration & Others

25%

38% (1214)

Manual Workers

39%

11% (341)

Total FEMALE employment:

21% (3179)

Facts & Figures
2022



4

40

Acknowledgements

Ana VILLATE
Managing Director



On behalf of the Hegan team and on behalf of myself, we would like to thank the Members of this Association. You have continued to trust us as a valuable tool for your competitive development and the sustainability of our sector after a year, 2021, which, despite the clear difficulties, is showing signs of a gradual recovery.

This period, including the first months of 2022, has been outstanding in terms of your participation in the initiatives of this Cluster. We have held meetings, sessions, webinars, conferences, workshops, committees, work groups in which we have seen the participation and involvement of a multitude of Associates. Collaborating and working together is essential to consolidate this path of recovery on which we are already walking firmly.

Of course, we extend our acknowledgements to all those who constitute the Euskadi Cluster: Administrations, Agencies, Start-ups... They are all essential pieces towards building the solid framework that supports the development of our Sector, of the Industry, and thus, of our Society



*Thank you
very much
indeed!*

Esker onez Agradecimientos

“ Milesker bihotz- bihotzetik

HEGAN Kluster Elkarteak 25 urte bete ditu; nire esker ona adierazi nahi nuke, urte hauetan enpresa, zentro teknologiko eta unibertsitate guztiek emandako laguntzagatik eta izandako parte-hartzeagatik. 25 urte zuekin, bazkideekin, batera sektorea eta industria lantzen; ilusioz, ahaleginez eta gogobetetasunez betetako 25 urte; gure klusterraren garapenaren alde talde osoak onena ematen jarraitza animatzen gaituzten 25 urte.

Eta gure urteurrenaren urte hau baikorra izan da... Opatzeko eta hausnartzeko unea da, eta zuen ekarpenak funtsezkoak izan dira, sektore aeroespazialaren lorpenak eta erronkak nabarmentzeko. Goranzko joerara itzuli gara; eta, are garrantzitsuagoa dena, enplegua, pertsonak, talentua eta klusterraren benetako motorra handitzea lortu dugu.

Tribuna honetatik, eskerrak eman nahi dizkiegu pertsona guztiei, Klusterraren eta Gizartearen eraikuntzan egiten ari diren lan bikainagatik, eta mundu hau batuagoa, jasangarriagoa eta bidezkoagoa bihurtzeagatik.

Espero dugu gure aletxo jarri izana, gurea, zuena, klusterrarena, guztiona den historia honetan...

Ana VILLATE
Zuzendaria

La Asociación-Cluster HEGAN ha cumplido 25 años; quisiera expresar mi sincero agradecimiento por el apoyo y participación de todas las empresas, centros tecnológicos y universidades en estos años. 25 años trabajando junto a vosotros Socios, el Sector y la Industria; 25 años llenos de ilusión, esfuerzo y satisfacciones; 25 años que nos animan a seguir dando lo mejor de todo el equipo en pos del desarrollo de nuestro Cluster... ¡FELICIDADES – CONGRATS – ZORIONAK!

Y el año de nuestro aniversario ha sido de optimismo... es un momento de celebración y reflexión, vuestras contribuciones han sido esenciales para destacar los logros y desafíos del sector aeroespacial. Volvemos a una tendencia creciente; y lo que es más importante, a un incremento en el empleo, las personas, el talento, el verdadero motor del Cluster.

Desde esta tribuna queremos agradecer a todas esas personas la excelente labor que realizáis construyendo Cluster y Sociedad; y haciendo de este Mundo uno más unido, sostenible y justo.

Esperamos haber puesto nuestro granito de arena en esta historia, la nuestra, la vuestra, la del Cluster, la de todos juntos...

Ana VILLATE
Directora

“ ¡Muchísimas gracias!



HEGAN participated in the international Project co-financed by **INTERREG SUDOE**:

BLOCK4Coop – Cooperation to promote and implement BLOCKCHAIN Technology in the development of Industry 4.0



HEGAN participated in the international Project co-financed by **Euroregion NAEN**:

VALIDDANTENNESS – validation de la fabrication additive d'antennes pour applications spatiales.



EUSKO JAURLARITZA
GOBIERNO VASCO

EKONOMIAREN GARAPEN,
JASANGARRITASUN
ETA INGURUMEN SAILA
DEPARTAMENTO DE DESARROLLO
ECONÓMICO, SOSTENIBILIDAD
Y MEDIO AMBIENTE

HEGAN participated in the regional Project co-financed by **Basque Government**:

H2-4COOP – Dynamization of COOPERATION activities for the use of H2 in the future sustainable air transport



Financiado por la Unión Europea
NextGenerationEU



GOBIERNO
DE ESPAÑA

MINISTERIO
DE INDUSTRIA, COMERCIO
Y TURISMO



**Plan de Recuperación,
Transformación
y Resiliencia**

HEGAN participated in the Project co-financed by **Ministry of Industry, Trade and Tourism**

AeMAQ - Feasibility study for collaborative projects between companies in the aerospace and machine tool sectors



This publication is co-financed by Basque Government

EUSKO JAURLARITZA



GOBIERNO VASCO

EKONOMIAREN GARAPEN,
JASANGARRITASUN
ETA INGURUMEN SAILA

DEPARTAMENTO DE DESARROLLO
ECONÓMICO, SOSTENIBILIDAD
Y MEDIO AMBIENTE

(1997)

25 urte **berdeago** hegan

2022



www.hegan.aero

Photos Courtesy of: ACITURRI, AERNOVA, AIRBUS, DANOBATGROUP, EMBRAER, ITP AERO, METRALTEC, METROLOGÍA SARIKI, NHINDUSTRIES, SENER AEROESPACIAL, SIKORSKY