

AIRCRAFT ENGINES

GLOBAL NO.1 PARTNER



Since its founding in 1952, Hanwha has grown to become a major player in manufacturing & construction, finance, and service & leisure, while focusing core competencies in chemical, advanced materials, machinery, defense, solar power and finance to secure global competitiveness and strategic growth. Hanwha is on the Fortune Global 500 list and will continue innovative problem-solving efforts to enrich human life and create a sustainable future.

Hanwha will be by your side to provide a happier and brighter tomorrow.



Aerospace & Mechatronics

- Hanwha Corporation
- Hanwha Aerospace
- Hanwha Techwin
- Hanwha Land Systems
- Hanwha Precision Machinery
- Hanwha Defense Systems



Chemicals & Materials

Hanwha Chemical

Hanwha General Chemical

Hanwha Total Petrochemical

YEOCHUN NCC

Hanwha Advanced Materials



Solar Energy

Hanwha Q Cell

Hanwha Solar Power

Hanwha Energy



Construction

Hanwha Engineering & Construction



Finance

- Hanwha Life
- Hanwha General Insurance
- Hanwha Investment & Securities
- Hanwha Asset Management
- Hanwha Savings Bank



Services & Leisure

Hanwha Hotel & Resort

Hanwha Galleria

Hanwha Galleria Timeworld

Hanwha 63 City

Hanwha Station Development

Aerospace & Mechatronics

Through innovation and industrial expertise, **Hanwha** is becoming a strong global player in the aerospace and mechatronics industries with outstanding technology for radars, optronics, avionics, and unmanned control systems. **Hanwha** is developing world-class products in aerospace and mechatronics to help corporations and governments meet their future needs in manufacturing, commerce, security, and travel. **Hanwha** shall continue to pursue technological partnerships with other leading companies to develop solutions that satisfy customers around the globe.

Aerospace

Aircraft Engine & Components,
Flight Control Actuators,
Aerospace Hydraulics & Fuel
Systems, Avionics

Explosives

Commercial Explosives,
Mining Services

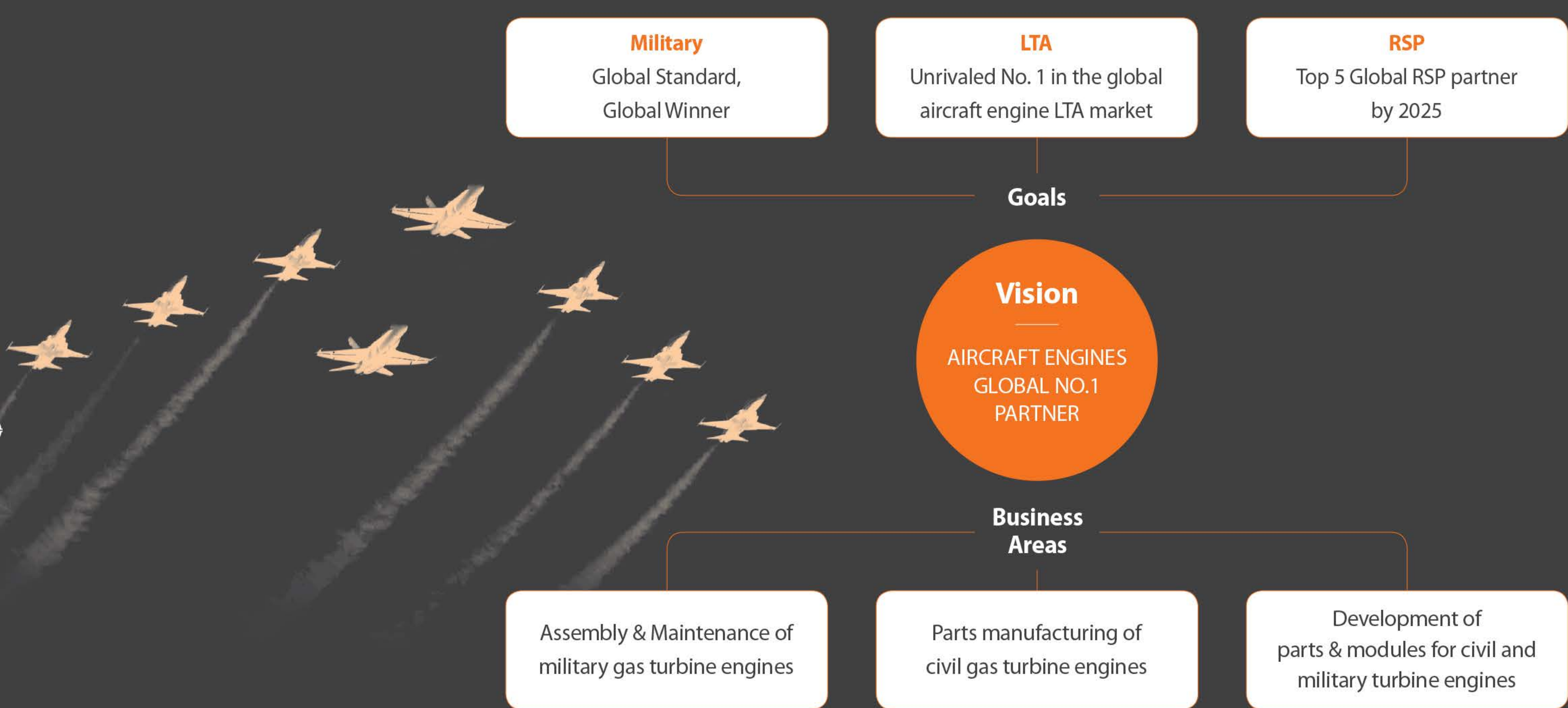
Mechatronics

Monitoring Systems,
Chip Mounters,
Unmanned Robot Systems,
Defense Systems

Hanhwa Aerospace was founded in 1977 based on aircraft engine and film camera businesses. Since then, the company has grown to become a leader in precision machinery and is currently focusing on aircraft engine business.

As South Korea's only aircraft engine manufacturer, Hanwha Aerospace entered the gas turbine engine industry in 1979 with engine overhaul business and since has continued to provide various gas turbine engine solutions around the world for the past 40 years. In 2016, Hanwha Aerospace celebrated the production of their 8000th engine, signed major agreements with GE and Rolls-Royce for the supply of aircraft engine parts and modules, and also signed agreements with Pratt & Whitney for the Singapore JV and for a Risk & Revenue Sharing Partnership (RSP). These achievements helped to reinforce Hanwha Aerospace's position as a reliable partner in the global aircraft engine manufacturing industry. In 2017, the company decided to build a new production site in Vietnam, to improve cost competitiveness and production capabilities.

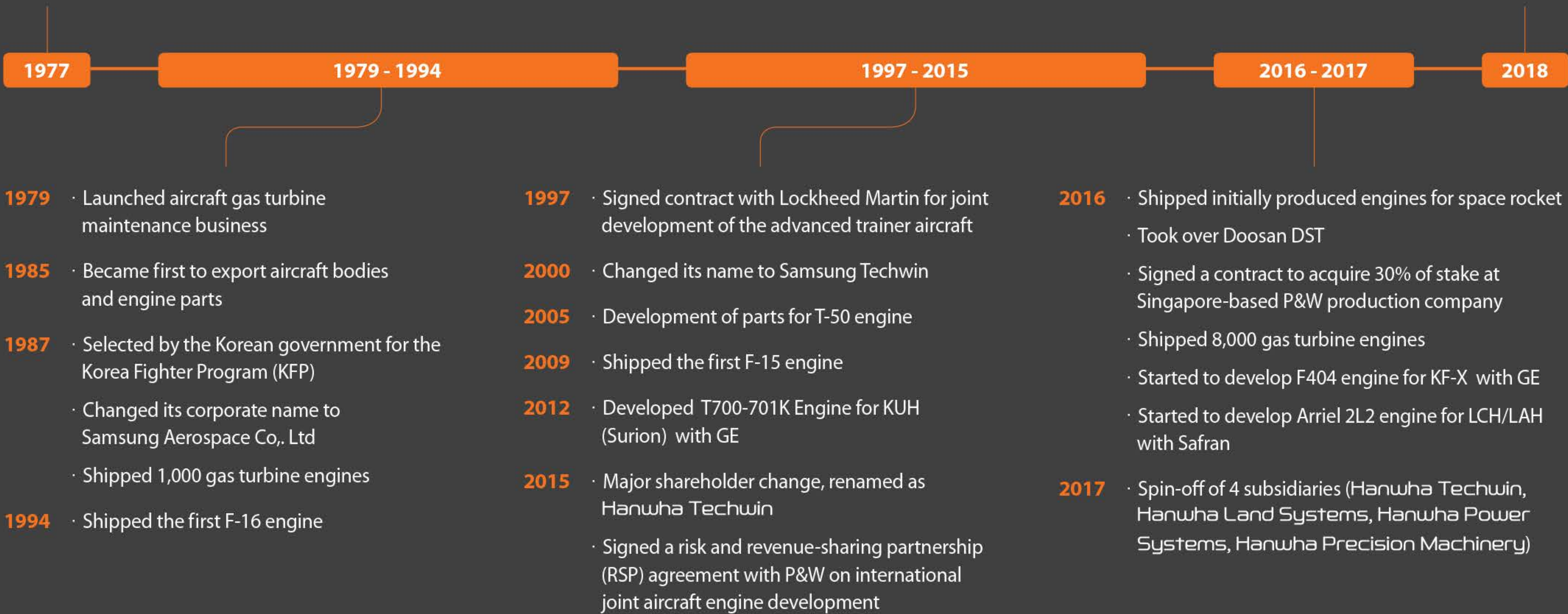
Through pre-emptive response to the fast changing market environment, continuous technology development, and stronger quality competitiveness, Hanwha Aerospace will leap forward to become the Global No. 1 partner for aircraft engines.



HISTORY

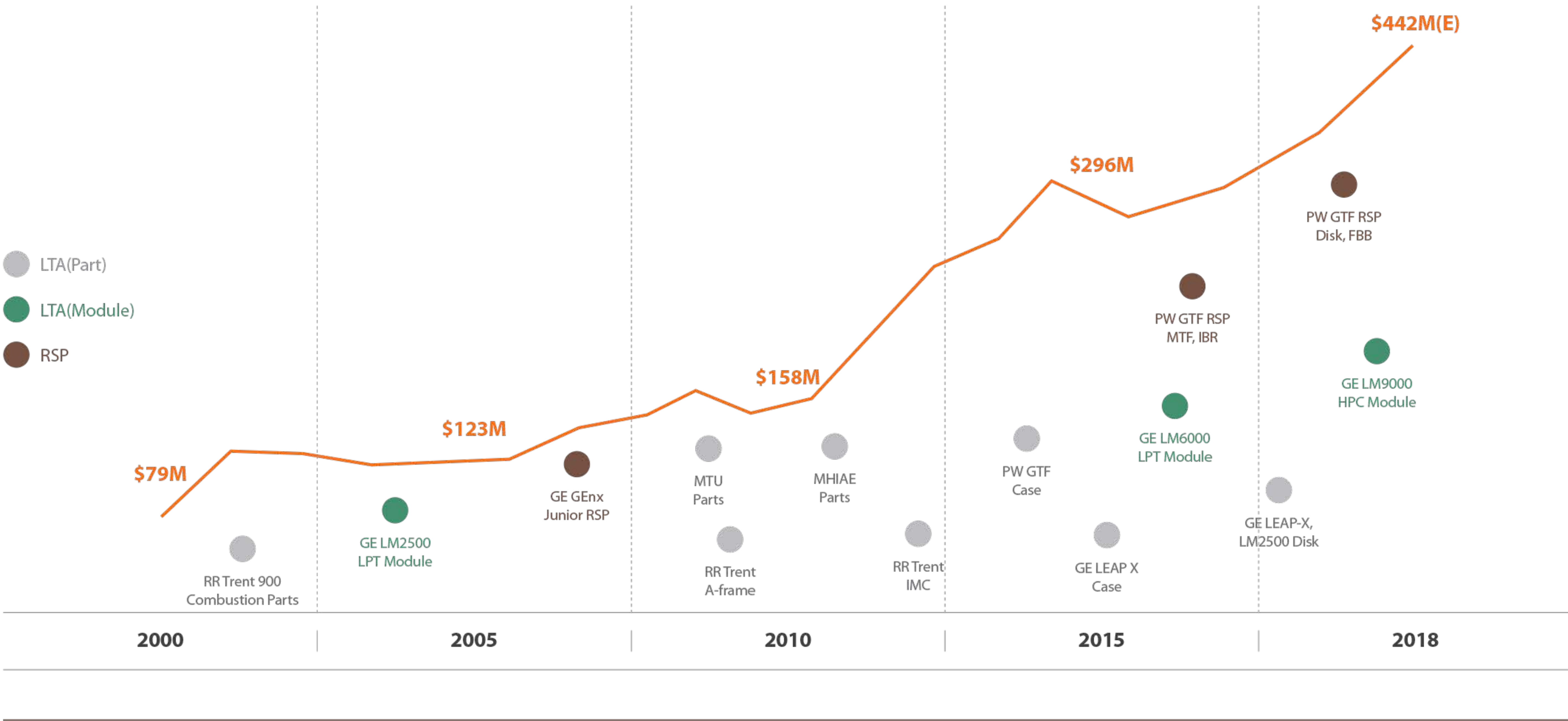
Established as
Samsung Precision

Changed its name to
Hanwha Aerospace

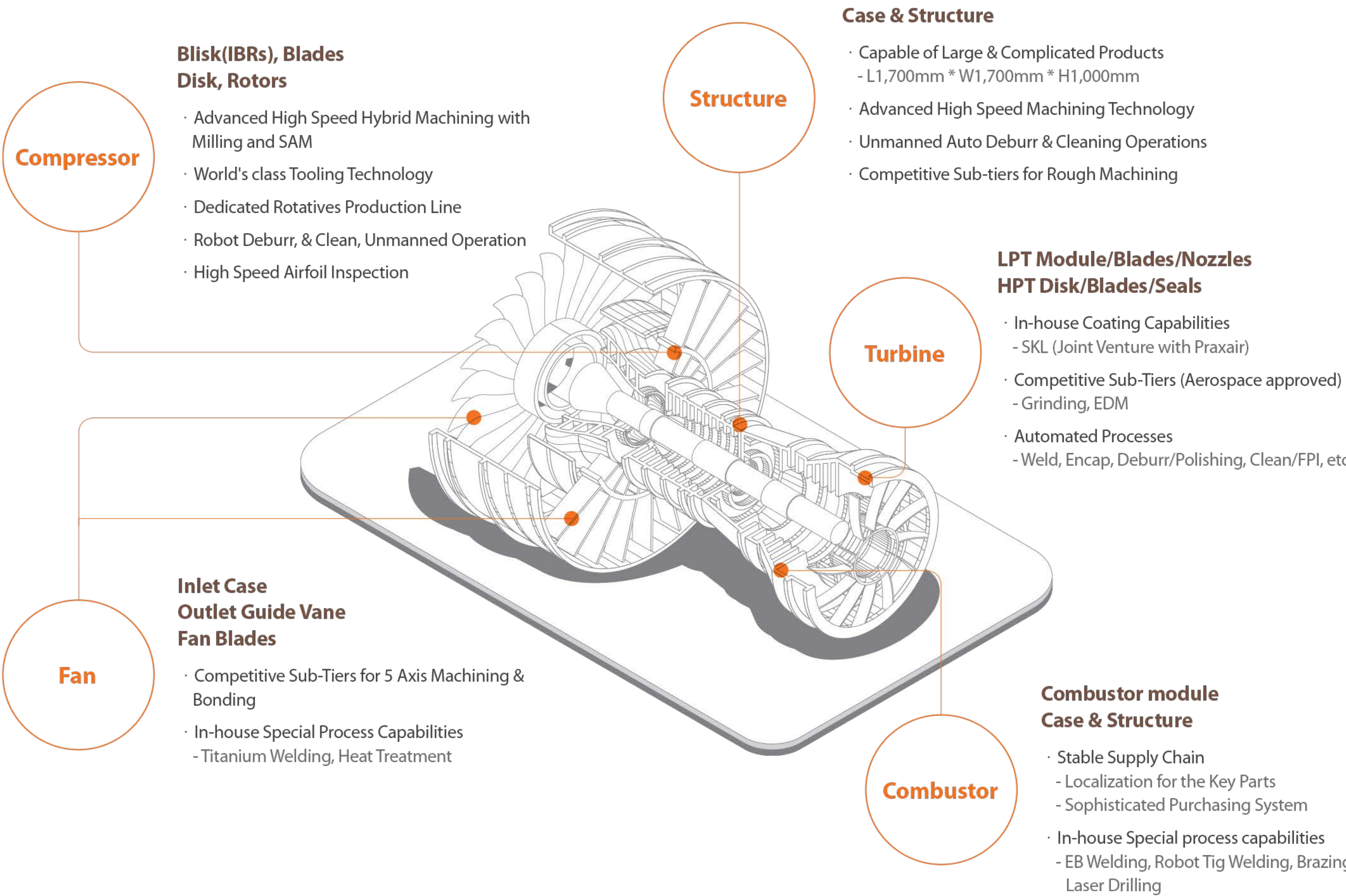


Parts Manufacturing

The parts manufacturing business of Hanwha Aerospace has grown continuously based on cooperation with major OEMs and partners, providing a strong foundation for the company to become a major tier 1 supplier for aircraft engine parts. In order to fully focus on the aircraft engine industry business, we expanded our local production site and are in the process of adding an overseas production site. We are also working hard to increasing LTA and RSP contracts for major engines. Hanwha Aerospace aims to become the No.1 LTA partner as well as join the ranks as one of the Top 5 RSP companies.




Hanwha Aerospace supplies more than 500 parts to major OEMs and partner companies. Based on experience and know-how, we provide a variety of engine parts such as the structure, case, ring, seals, and rotatives which encompass world-class machining technology and quality.




Engine Assembly & MRO

As the main provider for gas turbine engines and MRO services, Hanwha Aerospace contributed to force enhancement and development for self-reliant national defense capabilities of the Republic of Korea military. The customer-oriented engine solutions we have provided consistently over the past 40 years ensures that the ROK military is able to maintain the best military force capabilities at all times. Our proven track record was the foundation for export business and global expansion.




Airforce

F414-GE-400K




KF-X(under development)
Fighter

F100-P&W




F-16, F-15
Fighter




Navy

LM2500-GE




KDX-II / III
Destroyer

GEM42-RR




LYNX
Multi Purpose



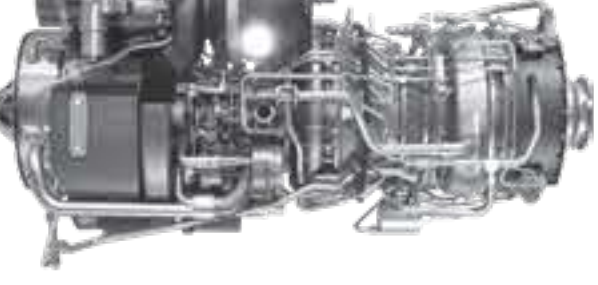
Army

Arriel-2L2-Safran




LAH(under development)
Attacker, Commercial

T700-GE




KUH
Multi Purpose Helicopter




Space

Turbo Pump



KSLV-II
Rocket Launcher


Fuel/Oxidizer valve




KSLV-II
Rocket Launcher

Hanwha Aerospace is a specialized MRO provider for Integrated Logistics Support and consigned maintenance services supporting a variety of domestic and overseas customers in their defense-related needs as well as for power plant facilities. Especially with the implementation of PBL (Performance Based Logistics) services, we have been able to significantly reduce bad inventory and improve the allocation of resources to enhance customers’ operability. Based on initial success, we have now expanded to provide global MRO services.


ILS (Integrated Logistics Support)




Spare Parts




Part Repair




Overhaul




Repair Shop



Technical Manual




Training Aids



Special Fixture/Tools


Global MRO Status




Global MRO Status map showing countries and supported engines:

- Netherlands: T56, F100
- Spain: T53
- Jordan: J85, T53
- UAE: M250
- Saudi Arabia: T56
- Thailand: J85, T53, M250, T56, F100
- Japan: M250
- Philippines: T56
- Indonesia: J85, T53, M250, F100
- Australia: T53, M250
- U.S.A.: J79, T53, M250, T56, F100
- Venezuela: F100
- Colombia: T700

ILS-supported Engines (by OEM)




F414, F404, F110, T700, LM2500, LM500



Pratt & Whitney
A United Technologies Company


F100, PT6A



T56, GEM42, M250

Honeywell

T55, T53



SAFRAN

Arriel

Engine Development

Hanwha Aerospace led the engine development efforts for ROK’s defense industry. Based on co-development experiences gained while working closely with engine OEMs and advances made during the development of the UAV engine, we have expanded our capabilities into APUs and mid-sized turbo fan engines. Based on experience and know-how gained from the successful execution of government funded programs, Hanwha Aerospace is now participating in the development of civil engines.



Hanwha Aerospace’s self-developed proprietary engine and APU are currently used and applied to a variety of ROK military equipment and facilities. Recently, several overseas customers have also shown interest in these products. The thrust and design can be optimized according to end-user requirements, and there are on-going discussions for the sale of final products as well as for license production or co-development taking place.

SS-760K

Turbo-jet engine for ship-launched anti-ship missiles. Currently installed and used in ROK Navy ships and has also been exported.

Thrust (lbf)	975
Gross Wt (kg)	79.9
Dimension (L x D, mm)	1145.5 x 328



STA-100-GB-01

APU for the Korea Utility Helicopter(KUH). Is currently used as the APU for both the civil and military helicopters and can also be used as the PPU for ground weapons.

Power(shp)	100~180
Gross Wt (kg)	57
Dimension (L x D, mm)	800 x 440



STA-150-GB-01

Auxiliary engine for the Command & Control(C2) vehicle’s ECS(Environment control system)

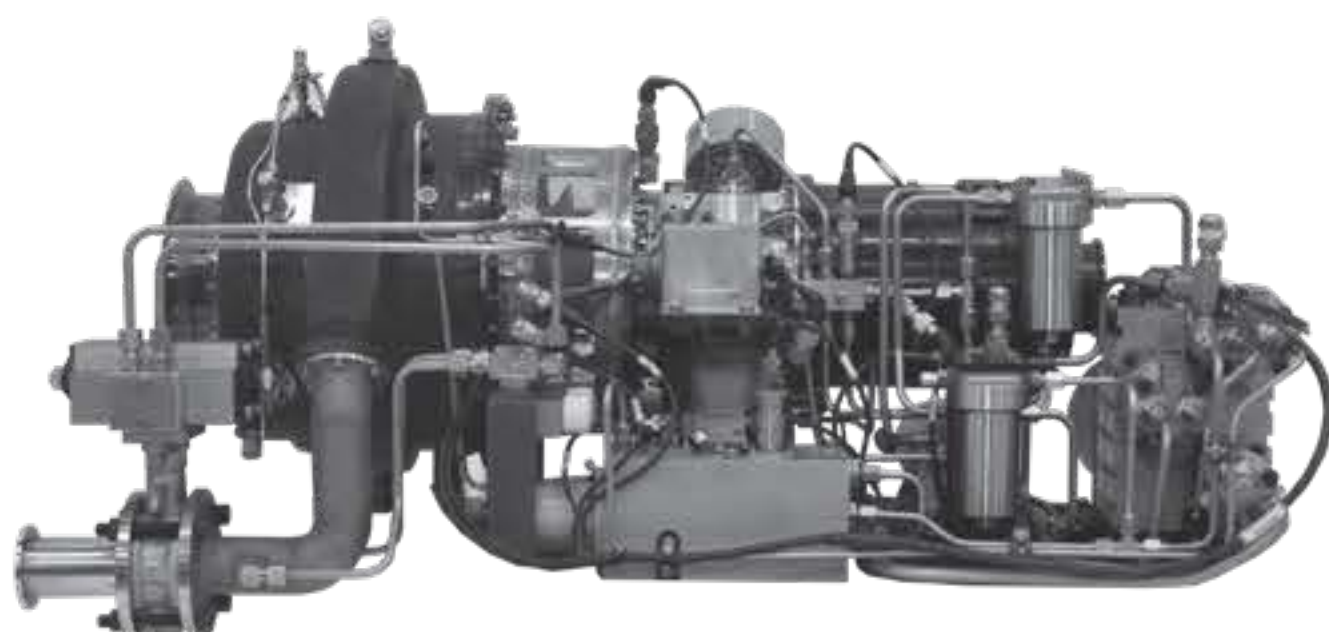
Power(shp)	70~100
Gross Wt (kg)	48
Dimension (L x D, mm)	750 x 442



STA 100-HSG

Auxiliary engine used as a gas generator.

Power(shp)	50~70
Gross Wt (kg)	150
Dimension (L x W x H, mm)	988 x 488 x 478




Site & Strategy

Hanwha Aerospace will achieve customer satisfaction with differentiated production strategies for each site/center. Automated facilities for development as well as production will allow for more timely response to fast-changing market demands. In addition, the new overseas production site will reinforce cost competitiveness while supporting the much-needed increase of production capacity.

Changwon Plant

(Korea Site)



Engineering & Manufacturing Center

The Hanwha Aerospace Changwon Site is where our engineering knowledge and production know-how come together along with our excellent human resources and state-of-the-art systems to ensure the delivery of world-class quality products. Continuous efforts for manufacturing efficiency based on unmanned/automated or non-stop operations are being pursued.

Strengths	Achievements
<div><div>· New machines investment</div><div>· SMART factory adoption</div><div>· Dedicated production lines</div><div>· Dedicated Development Shop</div><div>· Competitive sub-tier cluster</div></div>	<div><div>· Development of New products Entry</div><div>· Assembly & MRO</div><div>· High-End parts production</div><div>· Blisk, disk, complicated case & structure</div></div>


Manufacturing Center

The Vietnam plant of Hanwha Aerospace was established in 2017 as Hanwha Aero Engines as a step towards securing cost competitiveness as a global top tier supplier. With the support and foundation of Hanwha Aerospace’s technical capabilities and know-how, the Vietnam plant will be available to provide differentiated solutions to customers.

Strengths	Achievements
<div><div>· Highly cost competitive</div><div>· Equipped with state-of-the-art machines and facilities</div><div>· Future expansion plans allow for dedicated production lines which are tailored to customer needs</div><div>· Plans to establish on-site coating capabilities</div></div>	<div><div>· Dedicated production base for engine parts</div><div>· Airfoils for Blades and Nozzles</div><div>· Cases, Seals, and Structures</div></div>

Hanwha Aero Engines

(Vietnam Site)



Aerospace R&D Center

(Korea Site)



Research & Development Center

Our Pangyo R&D Center is dedicated to various aspects of engine development. Many core technology research projects for the ROK military were supported or performed by Hanwha Aerospace engineers in Pangyo.

Strengths	Achievements
<div><div>· 130 R&D engineers (Ph.D 24%, M.S. 38%, B.S. 38%)</div><div>· Specialized research and development capabilities for gas turbine engines</div><div>· Cycle analysis</div><div>· Compressor and Turbine Aerodynamics</div><div>· Secondary flow and heat transfer</div><div>· Vibration and Rotor dynamics</div><div>· Bearing and Lubrication systems</div><div>· Fuel systems</div></div>	<div><div>· Module development for RSP</div><div>· Design of indigenous engine</div><div>· Engine Core & Acc. System Development</div></div>

