Perspectives on the Development of Low-Altitude Aircraft within the Emerging Pillar Industry

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Low-Altitude Economy: National Strategic Imperatives

- In December 2023, the Central Economic Work Conference emphasized that we should advance the development of a modern industrial system through technological innovation and foster strategic emerging industries, including biomanufacturing, commercial aerospace, and the low-altitude economy.
- In March 2024, the State Council's Government Work Report proposed "actively developing new growth drivers such as biomanufacturing, commercial aerospace, and the low-altitude economy."
- In March 2025, the State Council's Government Work Report called for "launching large-scale application demonstration initiatives for new technologies, products, and scenarios, and promoting the safe, healthy development of emerging industries including commercial aerospace, the low-altitude economy, and deep-sea technology."
- In October 2025, the *Recommendations of the CPC Central Committee for Formulating the 15th Five-Year Plan for National Economic and Social Development* highlighted accelerating the cluster development of strategic emerging industries such as new energy, advanced materials, aerospace, and the low-altitude economy.
- In March 2026, The State Council's Government Work Report proposed "fostering emerging pillar industries, including integrated circuits, aerospace, biomedicine, and the low-altitude economy."

Box 3 Cultivation and Development of New Industries and New Tracks

01 Integrated Circuits

02 Embodied AI
Coordinate the layout of embodied AI training facilities, advance sim-to-real co-training and evolution, develop embodied models and algorithms that integrate high-level and low-level cognition, achieve breakthroughs in core robotic bodies and key components, and accelerate the upgrading and deployment of diverse embodiments, including humanoid robots.

03 Biomanufacturing

04 Advanced Batteries
Accelerate breakthroughs in critical materials such as high-capacity electrode materials, high-conductivity electrolyte materials, and composite current collectors; develop high-end manufacturing equipment and processes, including high-precision coating and high-density stacking; and expand the applications of high-safety, high-energy-density batteries across next-generation smart terminals, advanced energy storage systems, and electric transportation.

05 Commercial Aerospace

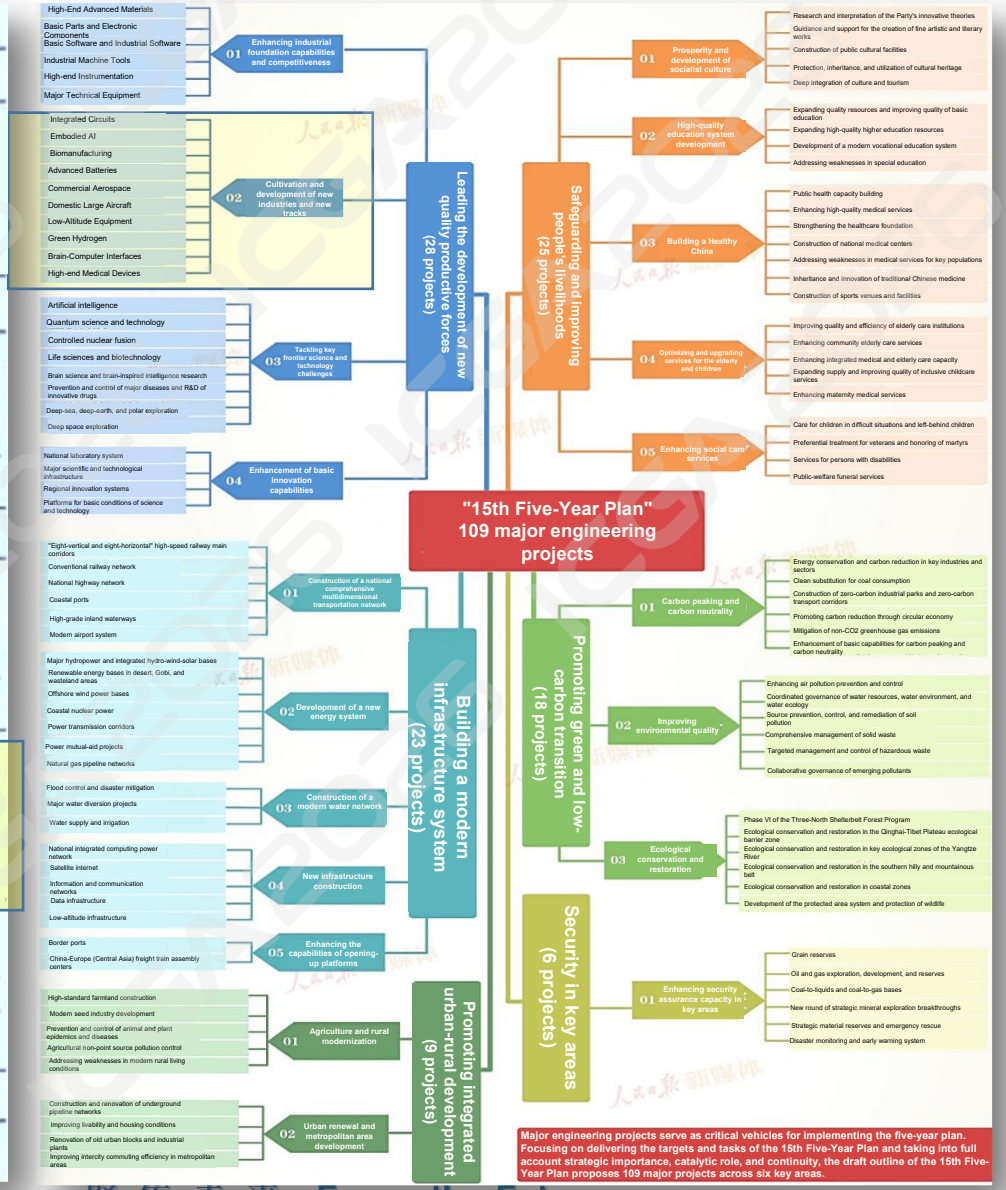
06 Domestic Large Aircraft
Advance the production ramp-up and supply chain ecosystem for the C919 aircraft; pursue the development and application of C919 derivatives (including the high-plateau variant), C909 variants, and new energy aircraft; and accelerate technical breakthroughs on the C929 aircraft alongside the validation and application of the CJ-1000A engine.

07 Low-Altitude Equipment
Accelerate the development of advanced low-altitude equipment, including heavy-payload fixed-wing UAVs and long-endurance VTOL aircraft; achieve breakthroughs in critical technologies such as intelligent flight, electric propulsion, and hybrid power systems; and reinforce the development and deployment of technologies and solutions for low-altitude traffic management and low-cost UAV security and defense.

08 Green Hydrogen
Upgrade hydrogen production equipment powered by renewable energy, accelerate the validation of safe, cost-effective technologies for large-scale hydrogen storage and transportation, optimize hydrogen infrastructure deployment, extend the green hydrogen value chain into green ammonia, green methanol, and sustainable aviation fuels (SAF), and expand hydrogen applications across transport, power generation, and industrial sectors.

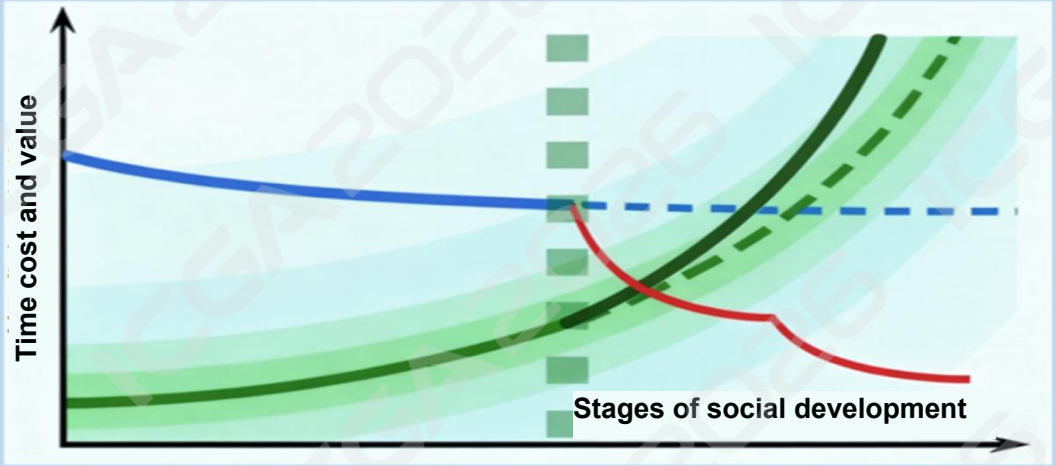
09 Brain-Computer Interfaces

10 High-end Medical Devices



Understanding the significance of advancing the low-altitude economy

The low-altitude economy represents the upgrading and development of regional and national economies driven by overall social progress and modernization that result from deploying aircraft to develop low-altitude airspace and the parallel growth of supporting ground-based industries.



Social Value of Aircraft

The low-altitude economy is an integrated economic form driven by low-altitude aviation activities, spurring innovation across related industries and scenario applications.

— *Statistical Classification of the Low-Altitude Economy and Its Core Industries (Trial)*, F.G.D.K [2025] No. 1676



Low-altitude Economy Value Chain

- Report by the U.S. Office of Technology Assessment: Aircraft development generates a 1:15 catalytic multiplier effect on related industries
- Boeing research: The input-output ratio of the commercial aircraft industry can reach 1:80, with a technological spillover effect of 1:16
- Analysis by Japan's Ministry of International Trade and Industry (MITI): In terms of value per unit weight, if ships are valued at 1, automobiles at 9, color TVs at 50, and computers at 300, jetliners reach 800 and aero-engines reach 1,400

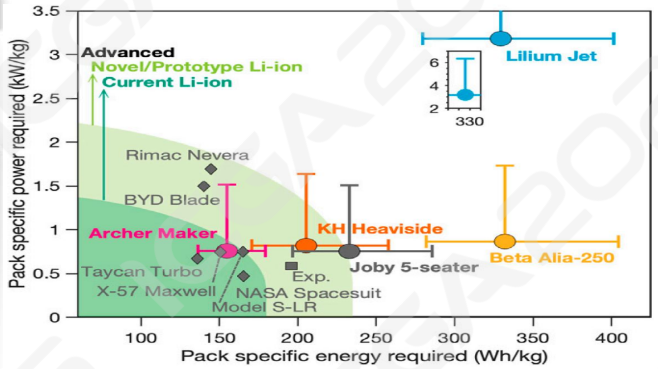


Comparison of Value per Unit Weight Across Selected Industries

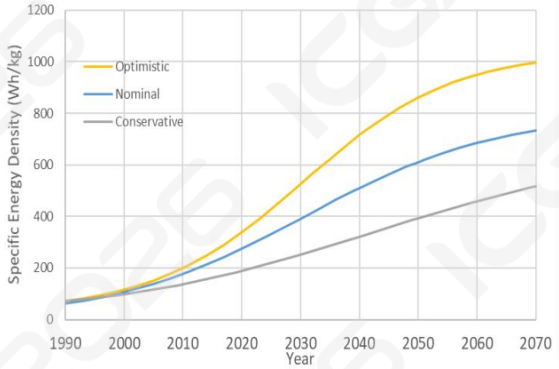
Electrification characteristics of helicopters

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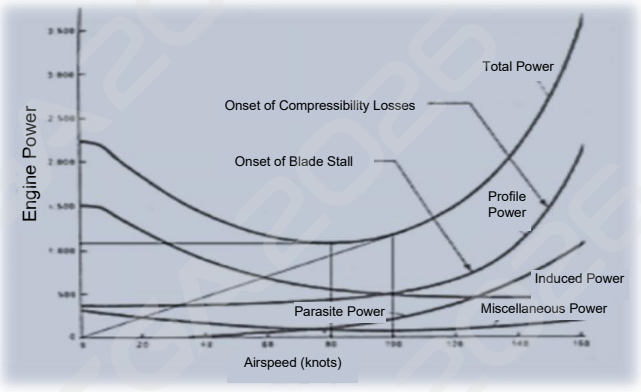




Battery Pack Energy Density and Power Density Development Roadmap
[CICC Research]



Battery Capability Development Forecast Chart
[IEEE, CA, USA, 2022]



Characteristics of Helicopter Flight Power Requirement

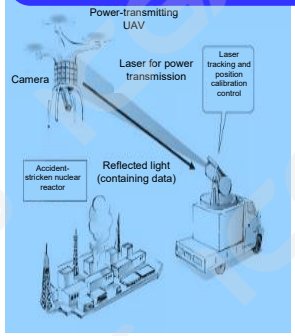
	Takeoff Weight (T)	Internal Fuel (Kg)	Takeoff Power (Kw)	Endurance (h)	Fuel Output Energy Density (W.h/Kg)	Battery Weight for Equivalent Output Energy (T)	*Equivalent Fuel Weight Endurance (h)*
Z-8	13	3080	3000	4	3040	33.43	*0.4*
Z-11	2	423	440	3.5	2840	4.29	

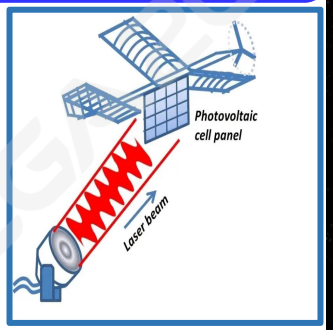
Charge-Discharge Cycles?

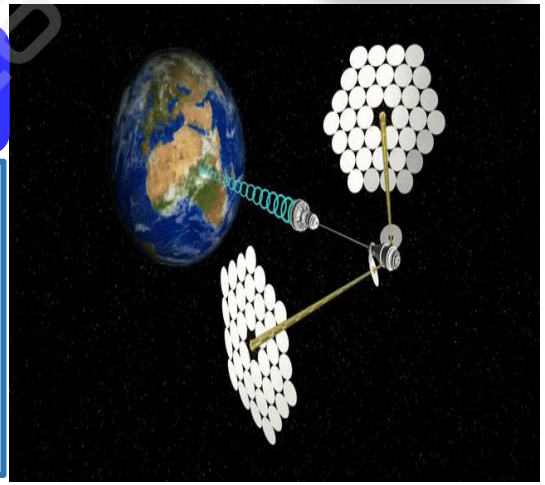
Battery	2025	2027	2030	2035
System	◆ **Mass Production** Safety: No thermal runaway propagation Energy density: 220 Wh/kg Discharge rate: 5C Cycle life: 1,200 cls ◆ **Application Verification** Energy density: 280 Wh/kg	◆ **Mass Production** Safety: No thermal runaway propagation Energy density: 280 Wh/kg Discharge rate: 5C Cycle life: 1,500 cls ◆ **Application Verification** Energy density: 330 Wh/kg	◆ **Mass Production** Safety: No thermal runaway propagation Energy density: 330 Wh/kg Discharge rate: 4C Cycle life: 1,500 cls ◆ **Application Verification** Energy density: 400 Wh/kg	◆ **Mass Production** Safety: No thermal runaway propagation Energy density: 400 Wh/kg Discharge rate: 4C Cycle life: 1,000 cls ◆ **Application Verification** Energy density: 500 Wh/kg
Cell	◆ **Mass Production** Energy density: 320 Wh/kg Discharge rate: 5C Cycle life: 1,500 cls ◆ **Application Verification** Energy density: 370 Wh/kg	◆ **Mass Production** Energy density: 370 Wh/kg Discharge rate: 5C Cycle life: 2,000 cls ◆ **Application Verification** Energy density: 420 Wh/kg	◆ **Mass Production** Energy density: 420 Wh/kg Discharge rate: 4C Cycle life: 2,000 cls ◆ **Application Verification** Energy density: 500 Wh/kg	◆ **Mass Production** Energy density: 500 Wh/kg Discharge rate: 4C Cycle life: 1,200 cls ◆ **Application Verification** Energy density: 700 Wh/kg

— MIIT, Low-Altitude Aircraft Power Battery Technology Roadmap (2025 Edition)

Long-Range Wireless Power Transfer Technology





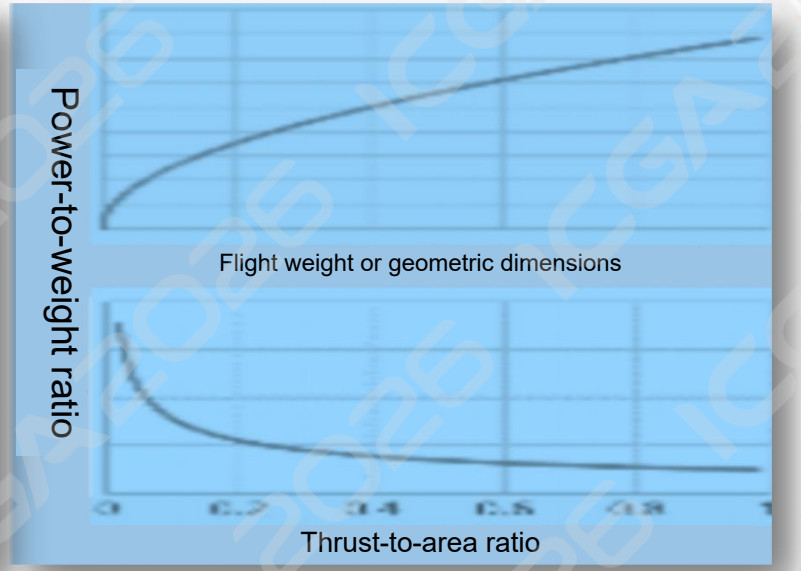


Top 10 Breakthrough Technologies — *MIT Technology Review*

…he Future

Overview of EVTOL Configuration Technologies





$$T=k\sqrt[3]{2\rho AP^2}$$

$$k = k_l k_r k_p k_\alpha k_s$$

T Rotor lift
ρ Atmospheric density
A Rotor disk area
P Rotor power
k_l Error degree of slipstream theory application;
k_r Rotor disk radius influence factor (decreasing as radius decreases)
k_a Aerodynamic advancement level of blades
k_a Degree of deviation between rotorcraft operating point and design point
k_s Rotor downwash fuselage blockage factor



Fixed multicopter



Compound wing

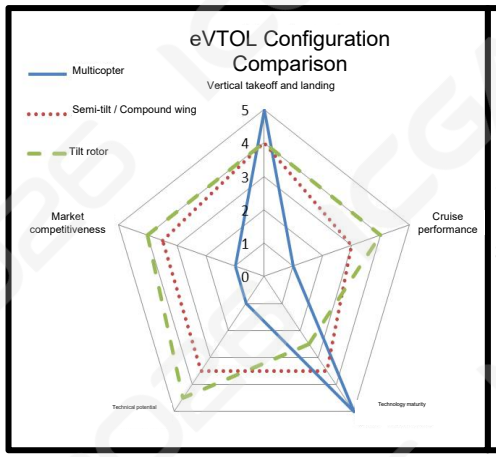


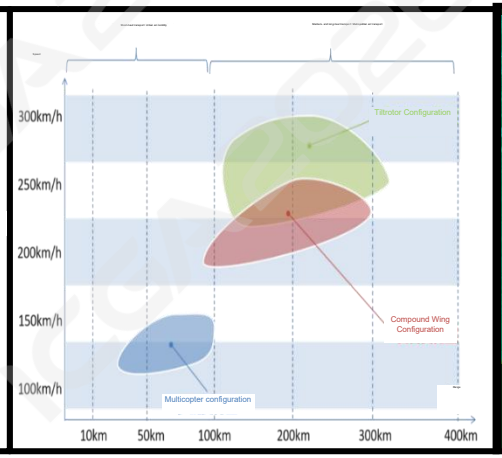
Tilt rotor

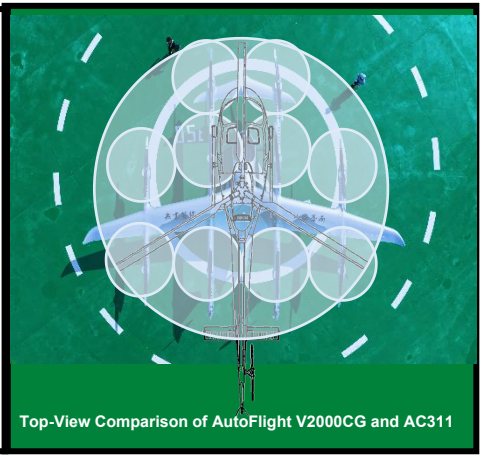
eVTOL Type	Fixed Multicopter Configuration	Compound Wing Configuration	Tiltrotor Configuration
Maximum Takeoff Weight (kg)	＜1500	1000-2500	1800-3200
Cruise Speed (km/h)	70-150	150-250	200-350
Range (km)	<100	80-250	100-300
Payload (kg)	＜250	300-500	400-600

Statistics of Global eVTOL Characteristics

Required Power-to-Weight Ratio for Vertical Takeoff

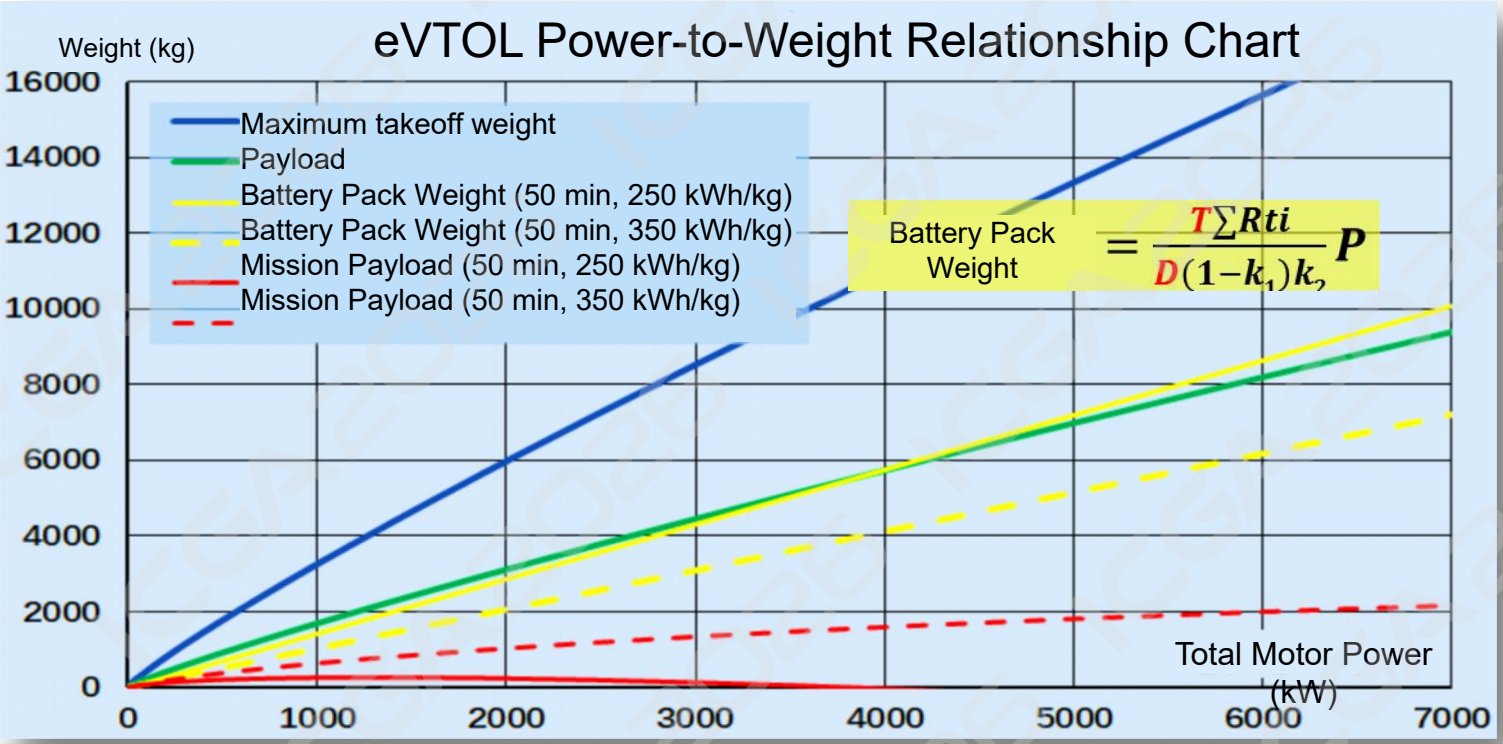






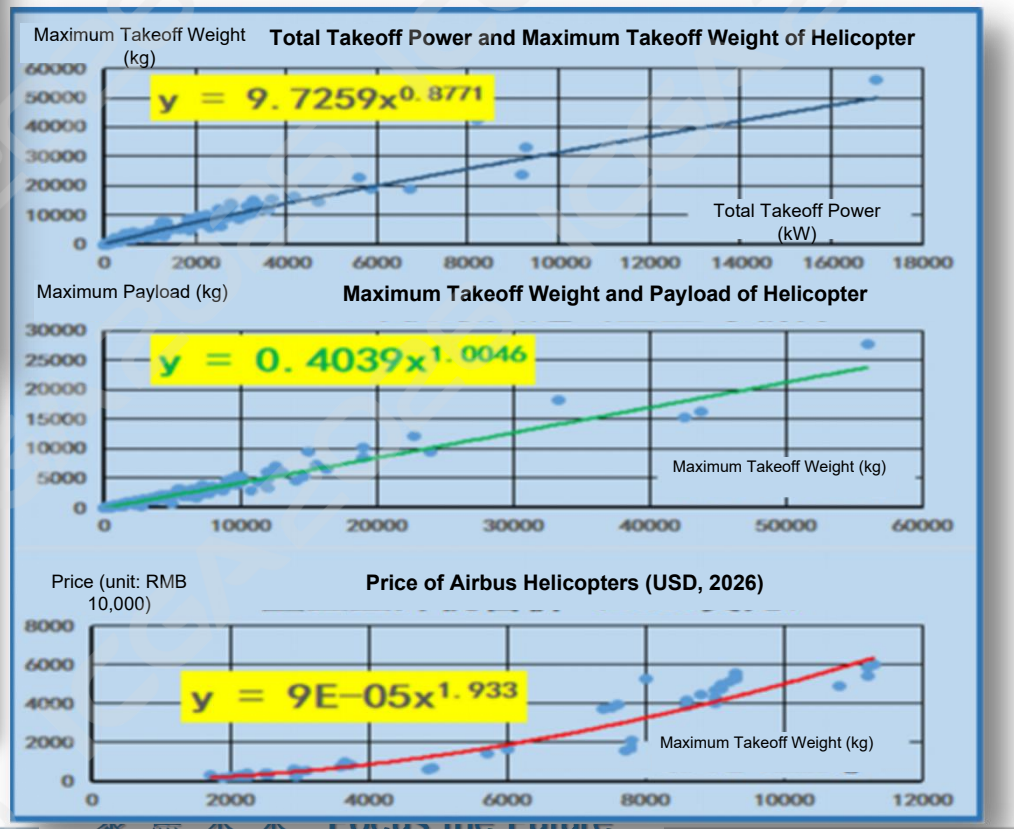
Discussion on Technical Characteristics of eVTOL Configurations

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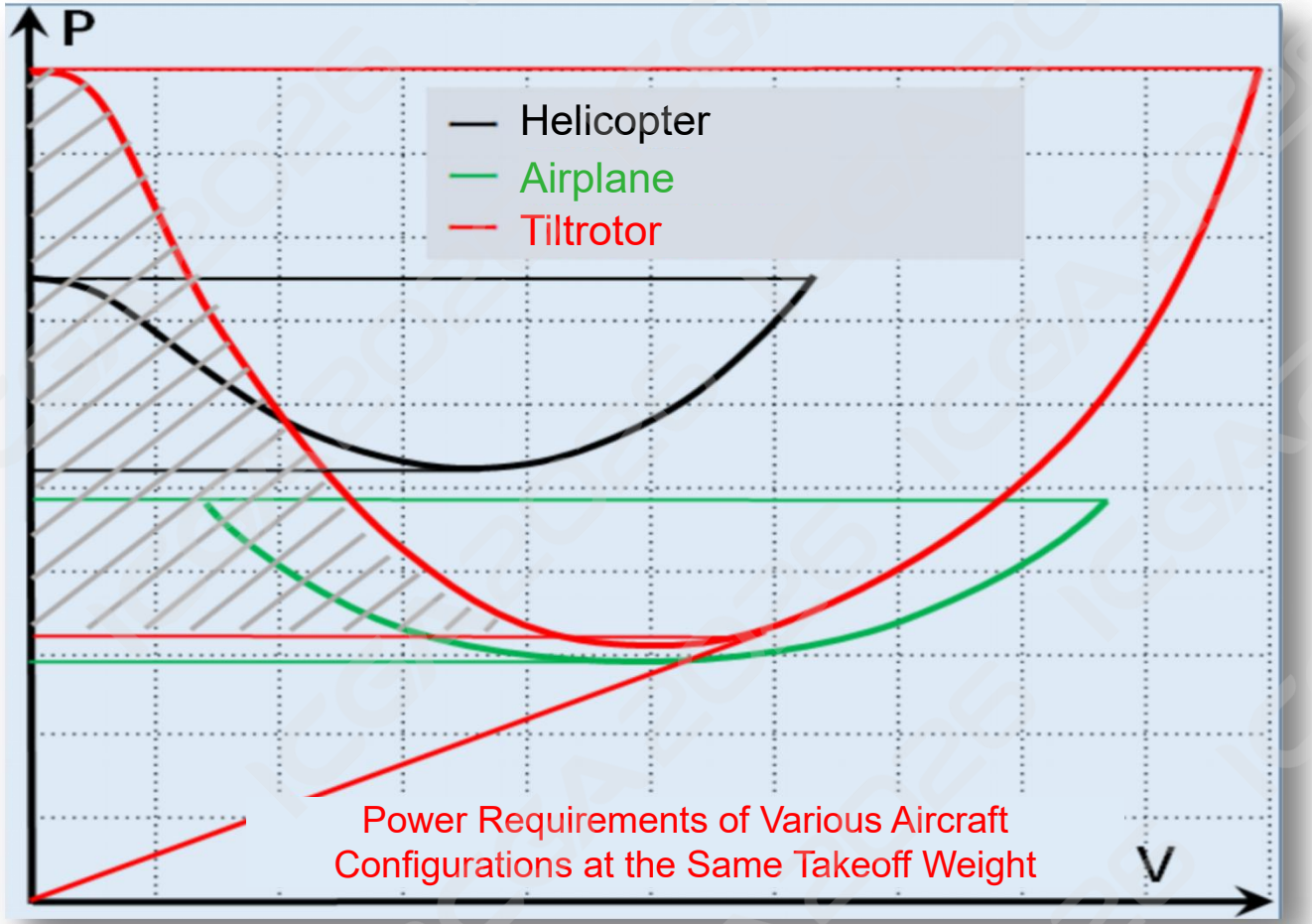


Aircraft model	Configuration	Number of Motors	Total Power	Maximum Takeoff Weight	Empty Weight	Passenger Capacity	Flight Endurance at Full Passenger Capacity	Flight Range at Full Passenger Capacity	Payload Ratio
EHang EH216-S	Multicopter	16	144	620	310	2	25	30	0.5
ZeroG ZG-ONE	Multicopter	6	120	780	430	2	25	30	0.449
Volocopter 2X (Germany)	Multicopter	18	180	900	500	2	27	35	0.444
AutoFlight Prosperity I	Compound wing	10+3	1170	2200	1160	5	75	250	0.473
Volant VE25	Compound wing	8+2	1080	2500	1500	6	51	200	0.4
EVT ET9	Compound wing	8+1	900	2200	1060	5	60	240	0.518
Embraer Eve (Brazil)	Compound wing	8+2	640	2000	1146	4	42	180	0.427
ZeroG ZG-T6	Tiltwing	6	900	2500	1500	6	90	300	0.4
Joby S4 (USA)	Tiltwing	6	920	2400	1496	5	30	161	0.377
Aerofugia AE200	Compound tilt	8	960	2500	1776	6	48	200	0.290
Archer Midnight (USA)	Compound tilt	12	1300	3402	2497	4	40	160	0.266

Endurance T (min)	50
Hover and transition proportion t_1	10%
Cruise proportion t_2	90%
Cruise power / maximum power R	20%
Battery pack energy density D (Wh/kg)	250
Energy loss ratio of eVTOL to helicopter	88/85
Battery safety margin K1	20%
Battery degradation coefficient K2	80%
Hover efficiency ratio of compound tiltrotor to helicopter	0.758
Payload ratio	0.5

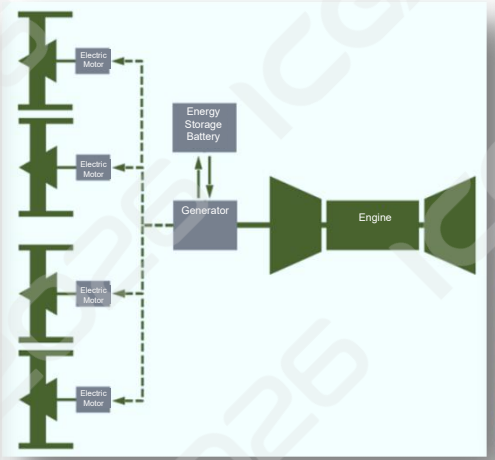


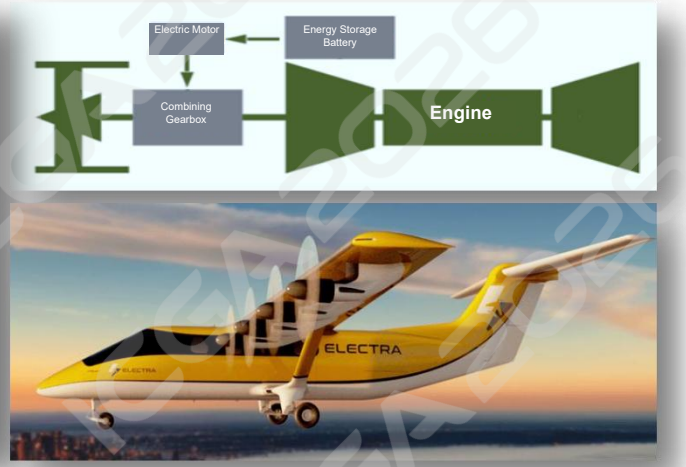
Impact of Electric Propulsion Advances on Aircraft

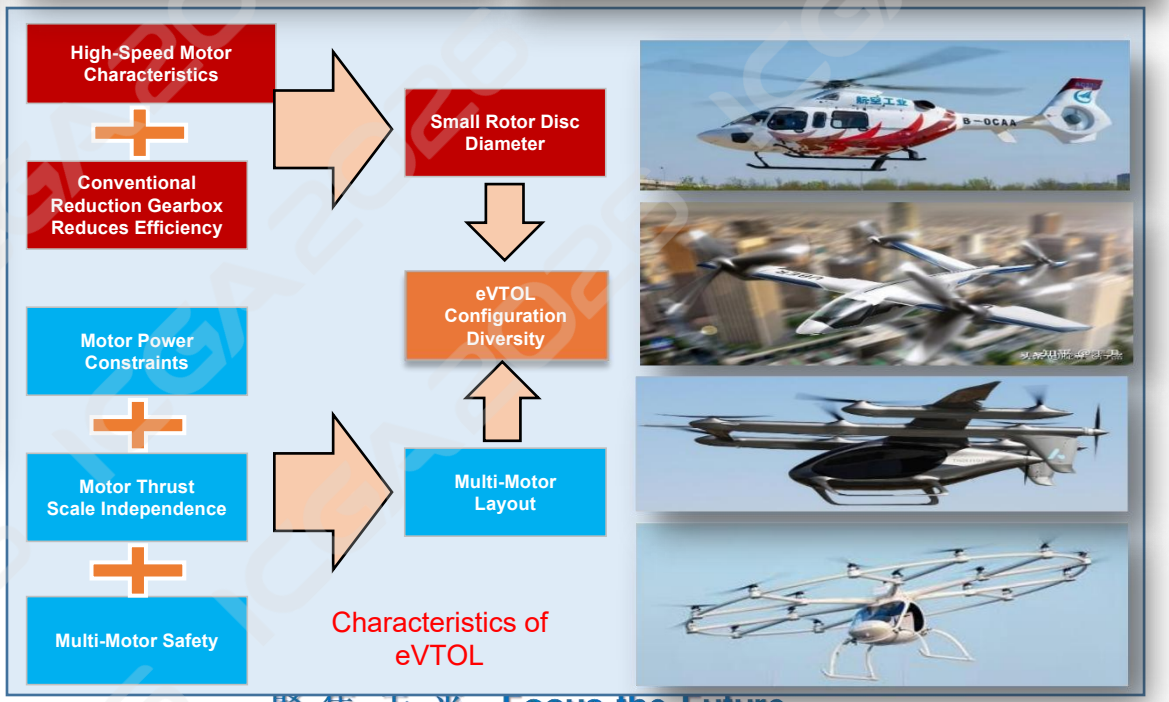


Power Requirements of Various Aircraft Configurations at the Same Takeoff Weight

Approximate Total Power Ratio			
	Takeoff		Endurance/Takeoff
Helicopter/eVTOL	0.75	Helicopter	0.70
Propeller Aircraft/Helicopter	0.65	Propeller Aircraft	0.60







Purchase Price and Cost Comparison Across Typical Application Scenarios

Manufacturer & Model	Price
EHang E216 (China)	RMB 2.39 million / USD 410,000
TCab Tech E20 (China)	RMB 8 million / USD 1.13 million
Embraer Eve	USD 3.75 million
Archer (USA)	USD 4.5 million
Lilium (Germany)	USD 6.5 million

Typical Application Scenarios	Mode of Transportation	Estimated Price	Estimated Time
Shanghai Lingang – Hongqiao Transportation Hub Distance: 70 km (Air) 88 km (Ground)	eVTOL	RMB 1,188	20 minutes
	Luxury Chauffeured Car	RMB 890	90–120 minutes
	Chauffeured Car	RMB 510	90–120 minutes
	Taxi	RMB 280	90–120 minutes
	Metro	RMB 11	150 minutes
Disney-Mount Putuo Distance: 150 km (Air) 315 km (Ground)	eVTOL	RMB 6,600	47 minutes
	Helicopter	Approx. RMB 30,000	47 minutes
	Luxury Chauffeured Car	RMB 4,000	240 minutes
	Chauffeured Car	RMB 2,000	240 minutes
Bird's Nest-Badaling Great Wall Commute + Aerial Tour Distance: 70 km (Air) 80 km (Ground)	eVTOL	Approx. RMB 5,000	30+30 minutes
	Luxury Chauffeured Car + Helicopter	RMB 1,000 + RMB 10,000	90+30 minutes
	Chauffeured Car + Helicopter	RMB 600 + RMB 10,000	90+30 minutes
Nantong-Shanghai Ruijin Hospital Medical Transport Distance: 90 km (Air) 105 km (Ground)	eVTOL	Approx. RMB 4,000	30 minutes
	Helicopter	Approx. RMB 20,000	35 minutes
	Ambulance	RMB 1,000	100 minutes

Empirical Data on U.S. Helicopter Components/Systems

No.	Component/System Name	Weight Proportion (%)	Cost Proportion (%)
1	Wing (if any)	<1	<1
2	Rotor	17	12
3	Empennage	1	1
4	Airframe Structure	21	21
5	Landing Gear	5	2
6	Nacelle	1	3
7	Propulsion System	31	32
8	Flight Control System	6	10
9	Auxiliary Power System	<1	1
10	Instrumentation Equipment	2	2
11	Hydraulic System	<1	<1
12	Pneumatic System	0	0
13	Electrical Power System	4	4
14	Avionics System	3	5
15	Equipment/Furnishing System	4	3
16	Air Conditioning and Air Supply System	1	2
17	Anti-icing System	<1	<1
18	Control System	<1	<1

Classic 2-Ton Class Helicopter Hourly Life-Cycle Cost (LCC) Breakdown

Aircraft model	Ecureuil (AS350B3)	BELL407
Typical Aircraft Configuration Price	¥ 25,000,000.00	¥ 32,000,000.00
Annual Utilization (Hours)	300	300
Hourly Aircraft Depreciation	¥ 8,333.33	¥ 10,666.67
Maintenance and Aviation Material Cost	¥ 2,500.00	¥ 3,200.00
Captain's Annual Salary	¥ 4000.00	¥ 400,000.00
First Officer's Annual Salary	¥ 200,000.00	¥ -
Other Personnel's Annual Salary	¥ 100,000.00	¥ 100,000.00
Personnel-to-Aircraft Ratio	6	6
Hourly Compensation	¥ 3,333.33	¥ 2,666.67
Crew Training Cost	¥ 80,000.00	¥ 80,000.00
Hourly Amortized Training Cost	¥ 266.67	¥ 266.67
Hangar/Airport Rent	¥ 2,000,000.00	¥ 2,000,000.00
Office Space Rent	¥ 200,000.00	¥ 200,000.00
Amortized Operating Premises Rent	¥	3
Hourly Fuel Consumption	¥	0
Fuel Price	¥	0
Hourly Fuel Cost	¥ 1,080.00	¥ 1,080.00
Insurance Rate	¥ 0.03	¥ 0.03
Hourly Amortized Insurance Cost	¥ 2,500.00	¥ 3,200.00
Operating Cost/Hour	¥ 18,747.00	¥ 21,813.00

Battery Cost: 10% of total aircraft cost; Replacement Interval: 1.5 years

Thank you for listening!

Feedback and comments are welcome!!

