Sunghoon Ha

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Education

Korea Aerospace University, Goyang-si, Korea

Mar 2017 – Feb 2024 B.S. in Aerospace and Mechanical Engineering (GPA: 3.65/4.0, *Cum Laude*)

Work Experience

Vehicle HVAC Design Engineer — Hyundai WIA Jan 2024 – Present

- Led mechanical design and development of HVAC modules from concept to mass production for **Kia PV5** and next-generation platforms.
- Engineered internal and external structures optimizing **structural durability, and door sealing performance** through cam-trajectory redesign and reinforcement layout.
- Designed airflow mechanisms tailored to mode-door types (butterfly, flat) and standardized lever components for **cross-platform cost reduction**.
- Enhanced **NVH and thermal performance** by applying dual-injection door rubber materials, refining door geometry, and suppressing abnormal noises such as whistle and booming.
- Strengthened case rigidity by adding ribs to prevent deformation during cockpit module decking and improved **shower duct airflow directionality** through simulation-based optimization.
- Developed and validated a **smart-intake system** that improves linearity of fresh/recirculation air control and prevents ram-air intrusion during high-speed driving.
- Presented technical insights and next-generation HVAC development concepts at the **GM TECH DAY Seminar** (*Oct 2025, Detroit*).

Sergeant — ROK Army, KUH-1 Helicopter Crew(Aviation School) Aug 2018 – Apr 2020

- Served as a KUH-1 Surion helicopter crew member within the Army Aviation School, supporting tactical flight training and operational missions.
- Conducted pre-flight inspections, aerial reconnaissance, and landing-zone assessments. Provided perimeter security during takeoff, landing, and night operations, and participated in emergency-landing and infiltration drills alongside flight officers.

Projects

Research Intern — University of Nevada, Las Vegas (UNLV) Aug 2021 – Jan 2022

- Led **Avatar–Kairos project**, focusing on robot–human interaction using a military-grade mobile robot (Kairos autonomi Uomo 4) integrated with a golf-cart platform.
- Identified and resolved **tele-operation communication issues** between the Operating Control Unit (OCU) and the Kairos robot by reconfiguring radio settings.
- Documented system restoration procedures and created a tutorial page for subsequent students to replicate and maintain the experimental setup.

Capstone Project — Korea Aerospace University Jan 2023 – Dec 2023

- Contributed to a **reusable rocket project**, conducting **roll control experiments** and validating attitude controllers through both tethered and bearing-mounted setups.
- Integrated control algorithms across **MATLAB, Python, and C++**, and designed an **outdoor tethered test rig** with verified power-supply and sensor systems.

Patents & Publications

Patents

- **Lead Inventor** on multiple HVAC and thermal management patents, including:
  - *10-2024-0197822: Air Distributor for Rear HVAC Unit* (under examination)
    Integrated single-door mode unit to reduce package size and cost.
  - *10-2024-0116318: HVAC Apparatus Case* (patent pending)
    Added barrier structure to prevent foreign object buildup in the drain path.
  - *10-2024-0174599: Temperature Door of HVAC for Vehicle* (patent pending)
    Introduced rear-side bypass to pre-mix airflow and minimize temperature gap.
  - *10-2024-0178349: Case for HVAC System* (patent pending)
    Applied dual-joint sealing to prevent condensate leakage and promote self-drying.
  - *10-2024-0180131: Blower of HVAC System for Vehicle* (patent pending)
    Elevated cooling-hole geometry to block water ingress while improving PCB cooling.
  - *10-2025-0005532: Temperature Regulating Door for HVAC System* (patent pending)
    Tuned door opening sequence to enhance refrigerant condensation efficiency.
  - *10-2025-0005531: Intake Apparatus of a Vehicle* (patent pending)
    Improved fresh/recirculated air linearity via internal partition wall.
- **Co-Inventor** on 10+ additional patents in air distribution, HVAC optimization, and EV thermal management systems.

Publications

- Kim, H.U., Jung, J.H., Kim, W.I., Lee, J.G., Yoon, C.S., **Ha, S.H.**, and Kim, U.H. (2025). *A Study on the Temperature Control Performance of an HVAC System through Upper and Lower Power Distribution of a High-Voltage PTC Heater for Electric Vehicles.* HMG Technical Conference, 2025.
- Kwon, M.Y., Jeong, W.J., Yoon, G.H., Kim, G.Y., Won, G.J., Ko, M.J., Kim, D.H., Kim, S.R., Lee, S.J., Choi, N.R., and **Ha, S.H.** (2023). *Design, Fabrication, and Testing of a Reusable Launch Vehicle Prototype System.*

Awards & Honors

- **Hanjin Group Academic Excellence Scholarship (Department Valedictorian)** — Korea Aerospace University (2022)
- **Jeongseok Scholarship**, Merit Based Scholarship — Korea Aerospace University (2017, 2021, 2022, 2023)
- **Excellence Prize**, Capstone Design Competition — Korea Aerospace University (2023)

Skills

CAD/3D	CATIA (Advanced), SolidWorks (Intermediate)
Simulation	ANSYS (Intermediate), MATLAB/Simulink (Advanced)
Programming	Python (Intermediate), C++ (Intermediate), C (Intermediate)
Languages	Korean (Native), English (TOEFL 102; GRE Q168/V153/AWA 3.5)

Leadership & Service

- **Global Mentoring Program — Korea Aerospace University (2022–2023).** Mentored international and first-year students to support academic and campus-life adaptation; provided English-based tutoring in core engineering courses and organized small-group sessions to foster cross-cultural communication and inclusion.