

# JIHOON LEE

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Ph.D. Candidate

## EDUCATION

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<b>Seoul National University, Seoul, Republic of Korea</b> <i>M.S.-Ph.D. Integrated Course in Aerospace Engineering</i> <i>Flight Dynamics and Control Lab</i> <i>Supervisor: Youdan Kim</i>	<i>Sep 2014 - Present</i>
<b>Yonsei National University, Seoul, Republic of Korea</b> <i>B.S. in Astronomy (Double Major)</i>	<i>Mar 2013 - Aug 2014</i>
<b>Yonsei National University, Seoul, Republic of Korea</b> <i>B.S. in Mechanical Engineering</i> <i>Thesis: Modeling and PIDE Control Simulation of a Quadrotor</i> <i>Supervisor: Jongsoo Lee</i>	<i>Mar 2010 - Aug 2014</i>
<b>Sangam High School, Seoul, Republic of Korea</b>	<i>Mar 2007 - Feb 2010</i>
<b>Yeongnam Middle School, Seoul, Republic of Korea</b>	<i>Mar 2004 - Feb 2007</i>
<b>Seoul Shinyoung Elementary School, Seoul, Republic of Korea</b>	<i>Mar 1998 - Feb 2004</i>

## SKILL

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<b>Discipline:</b>	Aerospace Engineering, Mechanical Engineering, Astronomy
<b>Expertise:</b>	Control, Optimization, Modeling, Simulation, Motion Planning, Filtering
<b>Languages:</b>	Korean (Native), English (Professional Working Proficiency)
<b>Programming:</b>	MATLAB, Simulink, C, C++, Python, LaTeX
<b>Software:</b>	MATLAB, Simulink, LabVIEW, X-Plane, GMAT, SolidWorks, XFLR5, Fluent, STK

## RESEARCH EXPERIENCE

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<b>Flight Dynamics and Control Lab, Seoul National University, Seoul, Republic of Korea</b> <i>Research Assistant</i>	<i>Sep 2014 - Present</i>
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## PUBLICATION

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### JOURNAL

- [J1] **Jihoon Lee**, Seong-hun Kim, Hanna Lee, Youdan Kim, "Performance-Oriented Gain Self-Scheduled Parameter-Varying Control of Asymmetric Variable-Span Morphing Unmanned Aerial Vehicle," In Preparation.
- [J2] **Jihoon Lee**, Heein Park, Youdan Kim, Chan Gook Park, and Jae Hong Lee, "Multi-level Indoor Path Planning and Clearance-based Path Optimization for Search and Rescue Operations," *Fire Safety Journal*, Under Review.
- [J3] Sangmin Lee, Hyeonngwan Kang, **Jihoon Lee**, and Youdan Kim, "Optimal Policy of Pitch-Hold Phase for Mine Detection of UAVs Based on MixedInteger Linear Programming," *International Journal of Aeronautical and Space Sciences*, In Press.  
[DOI: 10.1007/s42405-022-00454-7]
- [J4] **Jihoon Lee**, Suwon Lee, Youngjun Lee, Youdan Kim, Yongjun Heo, and Taedong Yoon, "Performance Verification of a Target Tracking System with a Laser Rangefinder," *IEEE Access*, Vol. 9, 2021. 30993-31009.  
[DOI: 10.1109/ACCESS.2021.3060061]

- [J5] **Jihoon Lee** and Youdan Kim, "Neural Network-Based Nonlinear Dynamic Inversion Control of Variable-Span Morphing Aircraft," *Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering*, Vol. 234, No. 10, 2020, pp. 1624-1637.  
[DOI: 10.1177/0954410019846713]
- [J6] Seokwon Lee, **Jihoon Lee**, Somang Lee, Hyunjin Choi, Youdan Kim, Seungkeun Kim, and Jinyoung Suk, "Sliding Mode Guidance and Control for UAV Carrier Landing," *IEEE Transactions on Aerospace and Electronic Systems*, Vol. 55, No. 2, 2019, pp. 951-966.  
[DOI: 10.1109/TAES.2018.2867259]

## CONFERENCE

- [C1] Sangmin Lee, Hyeonggwang Kang, **Jihoon Lee**, and Youdan Kim, "Optimal Policy of Pitch-Hold Phase for Mine Detection of UAV based on Mixed-Integer Linear Programming," *13th Asia-Pacific International Symposium on Aerospace Technology (APISAT 2021)*, Jeju, Korea, Nov. 2021.
- [C2] Hyeonggwang Kang, Sangmin Lee, **Jihoon Lee**, Youdan Kim, Jinyoung Suk, and Seungkeun Kim, "Altitude Tracking of UAV with Pitch-Hold Constraint Based on Model Predictive Control for Mine Detection," *21st International Conference on Control, Automation and Systems (ICCAS 2021)*, Jeju, Korea, Oct. 2021.  
[DOI: 10.23919/ICCAS52745.2021.9649884]
- [C3] **Jihoon Lee**, Seong-hun Kim, Seungyun Jung, Hanna Lee, and Youdan Kim, "Aircraft Autopilot Design Using Asymmetric Variable-Span Wing Morphing," *32nd Congress of the International Council of the Aeronautical Sciences (ICAS 2021)*, Shanghai, China, Sep. 2021.
- [C4] Seungyun Jung, **Jihoon Lee**, Seong-hun Kim, Hanna Lee, and Youdan Kim, "Disturbance Observer-Based Pitch Autopilot for Morphing UAV during Transition Phase," *2020 AIAA Science and Technology Forum and Exposition (SciTech 2020)*, Orlando, FL, Jan. 2020.  
[DOI: 10.2514/6.2020-1087]
- [C5] **Jihoon Lee**, Seungyun Jung, Seong-hun Kim, Hanna Lee, and Youdan Kim, "Flight Control of Asymmetric Variable-Span Morphing Aircraft Using Nonlinear Dynamic Inversion," *11th Asia-Pacific International Symposium on Aerospace Technology (APISAT 2019)*, Gold Coast, Australia, Dec. 2019.
- [C6] Seong-hun Kim, **Jihoon Lee**, Seungyun Jung, Hanna Lee, and Youdan Kim, "Deep Neural Network-Based Feedback Control for Dynamic Soaring," *21st IFAC Symposium on Automatic Control in Aerospace (ACA 2019)*, Cranfield, UK, Aug. 2019.  
[DOI: 10.1016/j.ifacol.2019.11.079]
- [C7] Hanna Lee, **Jihoon Lee**, Seong-hun Kim, Seungyun Jung, and Youdan Kim, "Adaptive Control Allocation-based Control Design for Non-affine Morphing Aircraft System," *9th European Conference for Aeronautics and Space Sciences (EUCASS 2019)*, Madrid, Spain, Jul. 2019.  
[DOI: 10.13009/EUCASS2019-163]
- [C8] **Jihoon Lee**, Seong-hun Kim, Seungyun Jung, Hanna Lee, and Youdan Kim, "Linear Parameter-Varying Control of Variable Span-Sweep Morphing Aircraft," *Guidance, Navigation, and Control Conference, AIAA Science and Technology Forum and Exposition (SciTech 2019)*, San Diego, CA, USA, Jan. 2019.  
[DOI: 10.2514/6.2019-0106]
- [C9] Hanna Lee, **Jihoon Lee**, Seong-hun Kim, Seungyun Jung, and Youdan Kim, "Control Design for Morphing Aircraft Based on Frequency-Appportioned Control Allocation," *10th Asia-Pacific International Symposium on Aerospace Technology (APISAT 2018)*, Chengdu, China, Oct. 2018.
- [C10] **Jihoon Lee**, and Youdan Kim, "Quasi-LPV Modeling and Parameter-dependent Optimal Control of Morphing Wing Aircraft," *31st Congress of the International Council of the Aeronautical Sciences (ICAS 2018)*, Belo Horizonte, Brazil, Sep. 2018.
- [C11] **Jihoon Lee**, Seong-hun Kim, Seungyun Jung, Hanna Lee, and Youdan Kim, "Sliding Mode Control Design for a Multidimensional Morphing UAV," *6th European Control Conference (ECC 2018)*, Limassol, Cyprus, Jun.

2018.

[DOI: 10.23919/ECC.2018.8550259]

[C12] **Jihoon Lee**, and Youdan Kim, "Neural Network-Based Nonlinear Dynamic Inversion Control of Variable-Span Morphing Aircraft," *8th European Conference for Aeronautics and Space Sciences (EUCASS 2017)*, Milan, Italy, Jul. 2017.

[DOI: 10.13009/EUCASS2017-195]

[C13] **Jihoon Lee**, Seokwon Lee, Somang Lee, Youdan Kim, Jungha Park, Seungkeun Kim, and Jinyoung Suk, "Stochastic Approach to Risk Evaluation for UAV Landing on an Aircraft Carrier," *7th Asia-Pacific International Symposium on Aerospace Technology (APISAT 2015)*, Cairns, Australia, Nov. 2015.

[C14] Somang Lee, **Jihoon Lee**, Seokwon Lee, Youdan Kim, Jinyoung Suk, and Seungkeun Kim, "A Study on Autonomous UAV Take-off and Landing on a Carrier," *7th Asia-Pacific International Symposium on Aerospace Technology (APISAT 2015)*, Cairns, Australia, Nov. 2015.

## NATIONAL CONFERENCE

[NC1] **Jihoon Lee**, Hyeonggwang Kang, Sangmin Lee, Youdan Kim, Jinyoung Suk, Seungkeun Kim, "Control Surface Modeling and Control Authority Analysis for Longitudinal Motion of Control-Configured Vehicle," *2021 KSAS Fall Conference (KSAS 2021F)*, Jeju, Korea, Nov. 2021.

[NC2] Heein Park, **Jihoon Lee**, Youdan Kim, Chan Gook Park, and Jae Hong Lee, "Development of an Indoor Path Planning System for Search and Rescue Operations of the Firefighters," *2021 IPNT Conference (IPNT 2021)*, Gangneung, Korea, Nov. 2021.

[NC3] **Jihoon Lee**, Suwon Lee, Youngjun Lee, Youdan Kim, Young-jun Heo, and Tae-dong Yoon, "Maneuvering Target Tracking with Anomalous Measurement Errors of Laser Range Finder," *2020 KSAS Fall Conference (KSAS 2020F)*, Jeju, Korea, Nov. 2020.

[NC4] **Jihoon Lee**, Seungyun Jung, Seong-hun Kim, Hanna Lee, and Youdan Kim, "Modeling and Simulation of Asymmetric Variable-Span Morphing Aircraft," *2019 KSAS Fall Conference (KSAS 2019F)*, Jeju, Korea, Nov. 2019.

[NC5] Hanna Lee, Seong-hun Kim, **Jihoon Lee**, Seungyun Jung, and Youdan Kim, "Partially Model-Free Control Design for Morphing Aircraft using Adaptive Dynamic Programming," *2019 KSAS Fall Conference (KSAS 2019F)*, Jeju, Korea, Nov. 2019.

[NC6] Hanna Lee, Seong-hun Kim, **Jihoon Lee**, and Youdan Kim, "Morphing Aircraft Inverse Dynamics Learning and Control Based on Gaussian Processes," *2019 KSAS Spring Conference (KSAS 2019S)*, Buan, Korea, Apr. 2019.

[NC7] **Jihoon Lee**, Seong-hun Kim, Seungyun Jung, Hanna Lee, and Youdan Kim, "Performance Map of Morphing Aircraft for Hierarchical Control," *2018 KSAS Fall Conference (KSAS 2018F)*, Jeju, Korea, Nov. 2018.

[NC8] Hanna Lee, **Jihoon Lee**, Yongjun Seo, and Youdan Kim, "Robust Closed-loop Control Allocation for Morphing Aircraft," *2018 KSAS Fall Conference (KSAS 2018F)*, Jeju, Korea, Nov. 2018.

[NC9] **Jihoon Lee**, Seungyun Jung, S. Kim, Hanna Lee, Youdan Kim, and Jaesung Bae, "Hierarchical Flight Control System for Morphing Aircraft," *2018 SASE Fall Conference (SASE 2018F)*, Gyeongju, Korea, Nov. 2018.

[NC10] Hanna Lee, **Jihoon Lee**, Seong-hun Kim, Seungyun Jung, and Youdan Kim, "Control Design of Variable Span-Sweep Morphing wing UAV Using control Allocation," *2018 KSAS Spring Conference (KSAS 2018S)*, Goseong, Korea, Apr. 2018.

[NC11] **Jihoon Lee**, Seungyun Jung, Seong-hun Kim, Hanna Lee, and Youdan Kim, "Quasi-Linear Parameter-Varying Modeling of Variable-Span Morphing Aircraft Longitudinal Motion," *2017 KSAS Fall Conference (KSAS 2017F)*, Jeju, Korea, Nov. 2017.

[NC12] Seong-hun Kim, **Jihoon Lee**, Seungyun Jung, and Youdan Kim, "Spectral Analysis of Model Reference Adaptive Control System," *2017 KSAS Fall Conference (KSAS 2017F)*, Jeju, Korea, Nov. 2017.

- [NC13] Byunghoon Kim, Suwon Lee, Jaeho Lee, Somang Lee, **Jihoon Lee**, Namhoon Cho, Youdan Kim, and Gwanghyeok Ju, "Conceptual Study of an AOCS Simulator and Three Dimensional Visualization Environment for Lunar Orbiter," *2017 KSAS Spring Conference (KSAS 2017S)*, Samcheok, Korea, Apr. 2017.
- [NC14] **Jihoon Lee**, Seong-hun Kim, Seungyun Jung, Jaesung Bae, Seungkeun Kim, and Youdan Kim, "Flight Control of a Variable Span Morphing Wing UAV," *2017 KSAS Spring Conference (KSAS 2017S)*, Samcheok, Korea, Apr. 2017.
- [NC15] Seungyun Jung, Seong-hun Kim, **Jihoon Lee**, Jaesung Bae, Seungkeun Kim, and Youdan Kim, "Flight Control of a Variable Span Morphing Aircraft during Transition Phase," *2017 KSAS Spring Conference (KSAS 2017S)*, Samcheok, Korea, Apr. 2017.
- [NC16] Suwon Lee, **Jihoon Lee**, Byunghoon Kim, Youdan Kim, and Gwanghyeok Ju, "Grid Modeling of Solar Radiation Pressure and Effect on Earth-Lunar Transfer Trajectory," *2017 KSAS Spring Conference (KSAS 2017S)*, Samcheok, Korea, Apr. 2017.
- [NC17] **Jihoon Lee**, Suwon Lee, Byunghoon Kim, Youdan Kim, and Gwanghyeok Ju, "Spacecraft Attitude Maneuver Control Using Linear Model Following Nonlinear Adaptive Controller," *2016 KSAS Spring Conference (KSAS 2016S)*, Goseong, Korea, Apr. 2016.
- [NC18] Byunghoon Kim, Namhoon Cho, Jaeho Lee, Somang Lee, **Jihoon Lee**, Suwon Lee, Youdan Kim, and Gwanghyeok Ju, "A Primary Study on the Control System for Lunar Orbiter Using Autocode Generation," *2016 KSAS Spring Conference (KSAS 2016S)*, Goseong, Korea, Apr. 2016.
- [NC19] **Jihoon Lee**, Seokwon Lee, Somang Lee, Donghae Kim, and Youdan Kim, "Risk Evaluation Scheme in Automatic Aircraft Carrier Landing Using Artificial Neural Network," *3rd Aviation-Specialized University Conference*, Seoul, Korea, Feb. 2016.
- [NC20] **Jihoon Lee**, Seokwon Lee, Jungha Park, Youdan Kim, Seong-hun Kim, and Jinyoung Suk, "A Decision Making Technique for UAV Automatic Carrier Landing System," *2015 KSAS Spring Conference (KSAS 2015S)*, Jeongseon, Korea, Apr. 2015.

## PROJECTS

<b>Development of Location System for Firefighters Based on Wireless Communication</b> <i>National Fire Agency</i> <i>Research Assistant</i> - Path Planning System Development	<i>Jan 2021 - Dec 2022</i>
<b>Development of Ground Control and Communication System for VTOL Fixed-Wing Drone</b> <i>Agency for Defense Development</i> <i>Research Assistant</i> - Modeling	<i>May 2021 - Feb 2022</i>
<b>Development of Target Tracking Algorithms</b> <i>LIG Nex1 Company Ltd.</i> <i>Research Assistant</i> - Target Tracking System Development - Source Code Development	<i>Jan 2020 - Aug 2020</i>
<b>Development of an SMPC Flap Module for Morphing Wings</b> <i>Ministry of Trade, Industry and Energy</i> <i>Research Assistant</i> - Flight Control System Development - Modeling - Simulator Development	<i>Jun 2016 - Dec 2020</i>
<b>Development of Guidance, Navigation, and Control Algorithms and Corresponding Source Code for Experimental Lunar Orbiter</b>	<i>Sep 2014 - Jun 2017</i>

*Ministry of Science, ICT and Future Planning*

*Research Assistant*

- Attitude Control System Development
- Mission Design

**Guidance/Control Study for Take-off and Landing on a Ship**

*Nov 2014 - Dec 2015*

*Agency for Defense Development*

*Research Assistant*

- Decision Making System Development
- Simulator Development

## **EXPERIENCE**

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**International Workshop on Space Development: Theory and Practice (SpaceDTP)** *July 18, 2018 - July 29, 2018*

*Hosted by the Youth Space Center, Bauman Moscow State Technical University*

*Supported by the Korea-Russia Science and Technology Cooperation Center (KORUSTEC) through the 2018 Korea-Russia Rising Researcher Training Program*

*Invited as a Korean delegate*

## **AWARD**

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**Grand Prize (Awarded by the Minister of Land, Infrastructure and Transport)**

*Feb 2016*

*3rd Aviation-Specialized University Conference, Mayfield Hotel, Seoul, Republic of Korea*

*Title: Risk Evaluation Scheme in Automatic Aircraft Carrier Landing Using Artificial Neural Network*