Name: Habib
Last Name: Ghanbarpourasl
Current Position: Associated Professor
Nationality: Khoy/West Azerbaijan/Iran
Phone: +90(506) 0214718
Date of Birth: 09/21/1970
Address: Faculty of Aeronautics and Astronautics, University of Turkish Aeronautical Association
Webpage: http://mch.thk.edu.tr/kadro/
https://aee.thk.edu.tr/en/personel
https://orcid.org/0000-0002-0673-7156
Email: hghanbarpourasl@thk.edu.tr
habib.ghanbarpour@yahoo.com

EDUCATION

2000 - 2007 Sharif University of Technology, Ph.D.
Major: Aerospace Engineering
Advisor: Prof. Pourtakdoust, Ph.D.
Thesis: Application of Nonlinear Adaptive Filters in Integrated Navigation Systems

1996 - 1999 Amirkabir University of Technology, M.S.
Major: Aerospace Engineering
Advisor: Prof. Naghash, Ph.D.
Thesis: Control of Vertical Take-off and Landing Rocket Based on Dynamic Inversion Controller.

1992 - 1996 Amirkabir University of Technology, M.S.
Major: Aerospace Engineering
Advisor: Prof. Salehzadeh, Ph.D.
Thesis: Influence of Fuselage Vibrations in the Dynamics and Control of Rocket Vehicle

ACADEMIC EMPLOYMENT

Feb. 2022 - Present **Associate Professor**, University of Turkish Aeronautical Association
Faculty/Department: Engineering/Aeronautical Engineering
Full time

Feb. 2016 - Sep. 2022 **Assistant Professor**, University of Turkish Aeronautical Association
Faculty/Department: Engineering/Mechatronics
Full time

Jan. 2013 - Jan. 2016 **Assistant Professor**, Sharif University of Technology
Faculty/Department: Aerospace Engineering/Space
Full time

Aug. 2012 - Dec. 2013 **Assistant Professor**, University of Tabriz
Faculty/Department: New Developed Technology/Mechatronics
Part-time

Aug. 2008 - Dec. 2009 **Assistant Professor,** Shahid Beheshti University
Faculty/Department: Emerging Technology/Aerospace

Part-time

Aug. 2006 - Dec. 2007 **Assistant Professor,** Azad Islamic University (Ulum-Tahghighat)
Faculty/Department: Aerospace/Space
Part-time

Aug. 2003 - Dec. 2011 **Assistant Professor**, Malek Ashtar University of Technology
Faculty/Department: Electrical Engineering/Control
Part-time

NONACADEMIC EMPLOYMENT

Jul. 2020 - Up to now **ESEN System Integration**, Researcher, Advisor
Department: Avionics and Control
Part-time

Jul. 2017 - Nov. 2021 **Vestel Savunma**, Researcher, Advisor
Department: Avionics and Control
Part-time

Feb. 2007 - Jan. 2013 **Ata Privet Co.**, Founder, Manager, Designer, Researcher
Department: Guidance/Control, and Navigation
Full-time

Dec. 1999- Mar. 2011 **Aerospace Organization**, Head of department, Designer, Researcher
Department: System, Sensor, Mechatronics, and Navigation
Full-time

Aug. 1997 - Nov. 1999 **Space Transportation Research Center,** Designer, Researcher
Department: System, Control
Full-time

Sep. 2006 - Jan. 2011 **Ata Privet Co.**, Founder, Manager, Designer, Researcher
Department: System, Guidance, and Navigation
Part-time

HONORS AND AWARDS

2015 **Best Paper (two papers)**
The First National Navigation Conference

2013 **Military Invention Rank 3**
Attitude Independent Three Axes Magnetometers Calibration

2007 **First Ranked Ph.D. Student**
Awarded by Sharif University of Technology

2006 **Distinguished Employee**
Iranian Aerospace Organization

2004 **Best Paper**
3rd International Aerospace Engineering Conference

PROJECTS

Current Projects:

Tightly integration of two GPS and IMU (Tübitak Project)
Attitude Determination by Carrier Phase of GPS and IMU Integration (Tübitak Project)
New Generation Automated Helicopter (Advanced Technology)
Attitude Determination Test System Using four Cameras (Advanced Technology)
Relative Navigation for Landing Systems (Advanced Technology)

Finished Projects:

Integration of Magnetometer/IMU/Alt for Pedestrian Navigation (Aselsan)
Signal Processing of Two-Degree Gun Stabilized Platform (Aselsan)
Precise Elements Laboratory (Sharif University)
Space measurement and navigation laboratory (not completed - Sharif University)
Designing software for simulation, guidance, control, and navigation of a smart mortar
Modeling and identification of a mortar's fuse
Design and manufacturing of a guided smart mortar
Design and manufacturing of helicopter launcher system vibration analyzer
Design and manufacturing of a miniaturized measuring system for mortar
Design and hardware loop simulation of the sonar target tracking system
Design and manufacturing of a miniaturized attitude heading reference system
Design and software in loop implementation navigation/guidance/control/flight mechanics system of cruise vehicle
Design and manufacturing low-cost system for navigation of sounding rocket
Identification, calibration, and design a new algorithm for navigation IRS-p5 and IRS-p6
Design and manufacturing of camera-based star sensor
Design and Manufacturing of FOG Gyroscope
Design and Development of Guidance, Navigation and Control System Software for Train
Flowing/Avoidance of UAV and Implementation of Software in the Loop
Identification of the hydraulic control system for a wing control system
Missile Simulation (flight dynamics, control systems, guidance loop, seeker ...)
Camera-based optical seeker design and test
A naval missile system design
Design and implementing robust control algorithms for Unmanned Aerial Vehicle for different regimes
Design and implementing of guidance and control algorithms for the diving phase of Unmanned Aerial Vehicle

PUBLICATIONS

ISI AND SCI JOURNAL ARTICLES

1. **H. Ghanbarpourasl**, Serkan Zobar "Kalman Filtering with Linear State Equality Constraints: A Method Based on Separating Variables", IEEE *Access*, March. 2022, 10.1109/ACCESS.2022.3163399.
2. **H. Ghanbarpourasl**, "Spacecraft Attitude Determination by Using of Electrostatically Suspended Gyroscope with Rotating Rings", Proceedings of the Institution of the iMeche, Part G: Journal of Aerospace Engineering, March. 2021, https://doi.org/10.1177/0954410021996152
3. **H. Ghanbarpourasl**, "Attitude Reconstruction from Strapdown Rate Gyros Using Power Series", The Journal of Navigation, March. 2021, DOI: https://doi.org/10.1017/S0373463321000023
4. **H. Ghanbarpourasl**, "Minimum Variance Pole Placement in Uncertain Linear Control Systems", IEEE Transactions on Aerospace and Electronic Systems, Nov. 2020. DOI. 10.1109/TAES.2020.3040055
5. **H. Ghanbarpourasl**, "Pseudo-linear Inertial Navigation Algorithm", Chinese Journal of Aeronautics, Oct. 2020, DOI: https://doi.org/10.1016/j.cja.2020.09.025
6. **H. Ghanbarpourasl**, "Robust Initial Alignment of Strapdown Inertial Navigation System", Proceedings of

the Institution of the iMeche, Part G: Journal of Aerospace Engineering. May 2020 DOI: 10.1177/0954410020920473

7. **H. Ghanbarpourasl**, D. Firuzabadi, "Integration of Inertial Navigation System with Consecutive Images of a Camera by Relative Position and Attitude Updating", Proceedings of the Institution of Mechanical Engineers, Part G, May 2019. DOI: 10.1177/0954410019852818.
8. **H. Ghanbarpourasl, K. Youde-Han**, "Investigation on Influence of Parameter Uncertainties in Position Tracking of Robot Manipulators," Technicki Glasnik Technical Journal, March 2019, Vol 13, No. 1, DOI: 10.31803/tg-20180921100632.
9. **H. Ghanbarpour Asl**, "Minimum-Time Path Planning for Robot Manipulators using Path Parameter Optimization with External Force and Frictions," Technicki Glasnik Technical Journal, March 2019, Vol 13, No. 1, DOI: 10.31803/tg-20181112104935.
10. H. Nobahari, **H. Ghanbarpur asl**, and S. F. Abtahi, "A Back Propagation Approach to Compensate Velocity and Position Errors in an Integrated Inertial/Celestial Navigation System Using Unscented Kalman Filter," Part G- Journal of Aerospace Engineering. Vol. 228, No., 10, Aug. 2014, DOI: 10.1177/0954410014539295
11. **H. Ghanbarpour Asl**, S.H. Pourtakdoust, M. Samani, "A New Non-linear Algorithm for Complete Pre-Flight Calibration of Magnetometers in the Geomagnetic Field Domain," Proceedings of the IMechE, Volume 223, Part G- Journal of Aerospace Engineering, June 2009, DOI:10.1243/09544100JAERO485.
12. Pourtakdoust S. H., **H. Ghanbarpour Asl**, "An Adaptive Unscented Kalman Filter for Quaternion Based Orientation Estimation in Low-Cost AHRS," Journal of Aircraft Engineering and Aerospace Technology, Vol. 79, No. 5, pp. 485-493, Emerald Group Publishing, 2007, DOI: 10.1108/00022660710780614.

OTHER PEER REVIEWED JOURNAL ARTICLES

1. **H. Ghanbarpour Asl,** "Adaptive Iterative Learning Control Algorithm with Large Uncertainties in System Parameters", International Journal of Computer Science Issues, Vol. 16. N0.5, Sep. 2019.

2. Wisam J. Khudhayer, **Habib Ghanbarpourasl**, Hassan T. Jalel , Hadi R. Al-Dayyeni, "Enhanced Heat Transfer Performance of a Flat Plate Solar Collector using CuO/water and TiO2/water Nanofluids", International Journal of Applied Engineering Research, Vol. 13, No. 6, 2018, pp. 3673-3682.

3. H. Nobahari, **H. Ghanbarpur Asl** and S. F. Abtahi, "A Quaternion Based Back Propagation Approach to Compensate Velocity and Position Errors in an Integrated Inertial/Celestial Navigation System Using Unscented Kalman Filter," Journal of Sharif, Oct. 2015. (In Persian).

4. H. Ashtari, **H. Ghanbarpour Asl**, "Vehicle Localization by Using of Line-of-Sight Measurements," Aerospace Mechanics Journal," Vol. 12, No. 1, Jul. 2015. (In Persian).

5. S. Mohammadloo, **H. Ghanbarpour Asl**, M. V. Arbabmir, "Design of a Navigation System for an Unmanned Aerial Vehicle Equipped with a Bearing-Only Sensor," Aerospace Science and Technology Journal, Vol. 2, No.1, 2014. (In Persian).

6. Sedaghat H., Toului A., **Ghanbarpour Asl H.,** "Automatic Triangle, Star Identification and Improvement of Search Speed," Journal of Space Science and Technology (JSST), Iranian Aerospace Society, Vol. 4, No. 3 & 4, 2011 (In Persian).

7. **Ghanbarpour-Asl H.,** Pourtakdoust S. H., "Attitude Estimation Using Strapdown IMU and Altimeter Integration for Maneuvering Vehicles," Amirkabir Journal of Science and Technology, Volume 41, No.1, December 2009, DOI: 10.22060/MEJ.2009.254 (in Persian).

8. **Ghanbarpour Asl H.,** Pourtakdoust S. H., "UD Covariance Factorization for Unscented Kalman Filter using Sequential Measurements Update," International Journal of Engineering and Applied Sciences, Vol. 3, No. 8, 2007.

9. Pourtakdoust S. H., **Ghanbarpour Asl H.,** "Heat Control of a bar with Point Sensors and Heaters with Variable Boundary Condition," Osveh Journal, No. 2, Vol. 7 & 8, June 2006 (In Persian).

10. Havangi R., Teshnelab M., **Ghanbarpour Asl H**., "INS/GPS Combination and Performance Improvement using Adaptive Fuzzy Kalman Filter," The Modarres Journal of Electrical Engineering Journal, Vol. 4, Issue 1, summer and Autumn 2004, pp. 67-80. (In Persian).

SUBMITTED MANUSCRIPTS FOR JOURNALS

1. **H. Ghanbarpourasl**, "Roll and Pitch Determination by Integration of IMU and Altimeter for Maneuvering Flights", Submitted to IEEE Transactions on Aerospace and Electronic Systems, Sep. 2022.

CONFERENCE PAPERS

1.**Habib Ghanbarpourasl**, Gautham Gopan, Mohammed Shafi, S Mohammed Shalik Ershad, Mithileysh Sathiyanarayanan, "Integration of Sensor Fusion for Enhancing GPS Navigation", 2021 5th International Symposium on Multidisciplinary Studies and Innovative Technologies (ISMSIT), 978-1-6654-4930-4/21/$31.00 ©2021 IEEE, DOI: 10.1109/ISMSIT52890.2021.9604755.

2. **H. Ghanbarpourasl**, A New Way Points Tracking Controller for Industrial Manipulators, World Conference on Science Engineering and Technology (WCSET), 9-20 April 2021 (Antalya/Turkey).

3. İsmail Uzunlar, Coşku Kasnakoğlu, **H. Ghanbarpourasl**, "Yüksek Manevra kabiliyetine Sahip Hava Aracı için Dinamik Tersleme Metodu ile Kontrolcu Tasarımı", 8. Ulusal Havacılık ve UzayKonferansı, Eylul 2020. (In Turkish).

4. Majd Ajroudi, Ibrahim Arda, Dikko Ladan-Baki, **H. Ghanbarpourasl,** Cetin Senturk, Tahsin Cagrı Sisman, "Uzaklık Degisimi ve Aci Verisi Tek Koklu Yorunge on Belirleme Yontemi Gelistirilmesi", Ulusal Havacılık ve Uzay Konferansı, Eylul 2020, Ankara. (In Turkish)

5. Tahsin Cagrı Sısman, Mert Can Arabacı, Hatice Merve Cırtıl, Bahadır Erdenk, Mert Kaya, Kursat Yrniduğan, Mehmet Fatih Erturk, **H. Ghanbarpourasl**,"Doppler ölçuümlerinin Optimazasyonla Yorunge tespitinde Kullanıla-ması ",Ulusal Havacılık ve UzayKonferansı, Eylul 2020, Ankara. (In Turkish)

6. Osameh Ali Al-kafaji, **H. Ghanbarpourasl**, "Assessment of a Parabolic Solar Energy Collector for a Refrigeration Cycle", 5th International Conference on Engineering Sciences, Turkey, 2019.

7. M. Oksuz**, H. Ghanbarpourasl**, L. Canan, "Pole Placement and LQR Controller Performance: DC Motor-Arm System a Comparative Study" Automatic Control National Meeting, Turkey, Aug. 2018 (In Turkish).

8. **H. Ghanbarpourasl**., Shahgholiyan M. B., "Attitude Independent Calibration and Localization of Camera in Three Dimension," Accepted to Publish in Modern Achievement on Aerospace and Related Science. Summer 2015 (In Persian).

9. **H. Ghanbarpour asl**, Shahgholiyan M. B., "Calibration of IMU and Camera Relative to Each Other based on Batch Least Squares Errors," The First National Navigation Conference, February 2015 (In Persian).

10. H. Nobahari, **H. Ghanbarpour asl**, F. Abtahi, "Compensation of Position and Velocity Errors in an Integrated Inertial/Celestial Navigation System using Propagation, Smoothing and UKF," First National Conference, Tehran, Iran, February 2015 (In Persian).

11.Mahdiyun S. H., **Ghanbarpour Asl H**., "Integration of IMU and Camera for Positioning of a Mobile Robot," Proceedings of the 13th Iranian Aerospace Society Conference, February 2014, (In Persian).

12. Mohammadloo S., Arbabmir M. V., **Ghanbarpour Asl H**., "New Constrained Initialization for Bearing-Only SLAM," IEEE International Conference on Control System, Computing and Engineering, November 2013.

13. Arbabmir M. V., **Ghanbarpour Asl H**., Dehghani H., "Optimal Selection of Joint Points in Sequential Image for Error Compensation of Inertial Navigation System in a UAV," 7th Image Possessing and Machine Vision Conference, 2012 (In Persian).

14**. Ghanbarpour Asl H**., Jafari A., Pourtakdoust S. H., "Integrated Attitude Estimation utilizing Star Sensor and Gyroscopes via Multiplicative Quaternion Filters," Proceedings of the 10th Iranian Aerospace Society Conference, February 2011, Iran (In Persian).

15. **Ghanbarpour Asl H**., Pourtakdoust H., "Aircraft Aerodynamic Parameter Estimation by Separation of State And Parameters in Estimation Problem," Proceedings of the 10th Iranian Aerospace Society Conference, Jan, 2011 (In Persian).

16. **Ghanbarpour Asl H**., Jafari A., Pourtakdoust S. H., "Increased Star Identification Search through Catalogue for a Satellite with Star Sensor," Proceedings of the 8th Iranian Aerospace Society Conference, February 2011, Iran (In Persian).

17. Nilfrushan O., Nikkhah A. A**., Ghanbarpour Asl H**., "An Integrated Inertial Navigation System Design for Carrier Missile," Proceedings of the 8th Iranian Aerospace Society Conference, February 2011, Iran (In Persian).

18. Samani M., **Ghanbarpour Asl H**., Pourtakdoust H., "Satellite Orbit Estimation by Radar Measurements and Linearized Kalman Filter," Proceedings of the 10th Iranian Aerospace Society Conference, February 2011, Iran (In Persian).
19. Arbabmir M. V., **Ghanbarpour Asl H**., Dehghani H., "Error Correction of Inertial navigation system by Sequential Image without using any Map Information," 10th International Conference of Aerospace Engineering, Jan. 2011 (In Persian).
20. Arbabmir M. V., **Ghanbarpour Asl H**., Dehghani H., "Error Correction of Inertial navigation system for UAV by Sequential Image In Unknown Environments," Proceedings of the 19th International Conference of Electrical Engineering, 2011 (In Persian).
21. Mohamadloo S., **Ghanbarpour Asl H**., "Path Design for Autonomous UAV by Using of Localization and Mapping Algorithm," Proceedings of the 12th International student Conference of Electrical Engineering, Tabriz., 2010 (In Persian).
22. Mohamadloo S., **Ghanbarpour Asl H**., "Real Time Navigation and Surveying for Flying Robot," Proceedings of the 9th International Conference of Aerospace Engineering, 2010 (In Persian).
23. Shekari M., **Ghanbarpour Asl H**., Sadati H., "Optimal Control of a UAV Path by using of Quaternions," Proceedings of the 8th Iranian Aerospace Society Conference, Jan. 2009 (In Persian).
24. Mohamadloo S., **Ghanbarpour Asl H**., Khugar A R., "Pitch Control of a Micro UAV Via Neural Networks," 8th International Conference of Aerospace Engineering, Jan. 2009 (In Persian).
25. **Ghanbarpour Asl H**., Pourtakdoust S. H., "UD Covariance Factorization for Unscented Kalman Filter using Sequential Measurements Update," Proceedings of the World Academy of Science, Engineering and Technology, Vol. 25, November 2007, ISSN: 1307- 6884, Italy.
26. **Ghanbarpur Asl H**., Pourtakdoust S. H., "A New Kalman Filter for Nonlinear Systems with Non-Gaussian Noise," Proceedings of the 6th Iranian Aerospace Society Conference, February 2007, Tehran, Iran. (In Persian).
27. **Ghanbarpour Asl** H., Pourtakdust S. H., "A Robust Algorithm for MEMS Vertical Gyro in Accelerated Motions," First International Navigation Systems Symposium, Tehran, Dec. 2006 (In Persian).
28. Abaszadeh A., **Ghanbarpour Asl H**., ygmai Kh., "Integration of Inertial Navigation and Visual Navigation Systems," 13th Electrical engineering Conference, Zanjan, May 2005 (In Persian).
29. **Ghanbarpour Asl H**., Pourtakdust S. H., "Smart Cantilevered Supersonic Panel with LQG Control under Random Gust Excitation," Proceedings of the 3rd Iranian Aerospace Society Conference, 2004 (In Persian).
30. **Ghanbarpour Asl H**., Khayyat A. A., "Control of a Fighter by Using of Sensitivity Functions and Robust Filter," Proceedings of the 3rd Iranian Aerospace Society Conference, 2004 (In Persian).
31. Abedi A. A., **Ghanbarpour Asl H**., Lotfi Rad M., "A New Method for GPS Ambiguity Resolution," Proceedings of the 3rd Iranian Aerospace Society Conference, 2004 (In Persian).
32. Abedi A. A., **Ghanbarpour Asl H**., Lotfi Rad M., "Improvement of Speed and Reliability of GPS Ambiguity Resolution," 12th International Conference of Electrical Engineering, Mashhad, April 2004 (In Persian).
33. Hvangi R., **Ghanbarpour Asl H**., Teshnelab M, "GPS/INS Integration by Using of Adaptive Fuzzy Kalman Filter," 12th International Conference of Electrical Engineering, Mashhad, April 2004 (In Persian).
34. **Ghanbarpour Asl H**., Pourtakdust S. H., "Adaptive Control of Dynamically Unknown Systems Based on Neural Network and Extended Kalman Filter," 11th International Mechanical Engineering Conference, Tehran, 2003.
35. **Ghanbarpour Asl H**., Naghash A., "Control of a Rocket for Vertical Take-off and Landing based on Dynamic Inversion Method," Proceeding of the First Iranian Organization Conference, Tehran, 2000 (In Persian).

TEACHING EXPERIENCE

Courses for Undergraduate: Robotics, Advanced Robotics, Flying Robots, Mechatronics Instrumentation, Dynamics, Inertial Measuring Systems (Lab), Inertial Sensors, Orbital Mechanics, Fundamentals of Space Engineering, Statistic and Probability for Engineering, Flight Mechanics, Automatic Control Systems I and II, Modern Control, Advanced Dynamics, Space Mechatronics.

Courses for Graduate	Automatic Flight Control Systems, Orbit, and Attitude Determination/Estimation, Applied Remote Sensing, Satellite System Design, Guidance, and Navigation, Nonlinear Control Systems, Inertial Navigation Systems, Advanced Inertial Navigation Systems**,** Advanced Guidance, Gyroscopes and Accelerometers, Control of Aerial Vehicles, Integrated Navigation Systems, Gyroscopic Systems, Space Navigation Systems, Aircraft and Spacecraft Instruments, Advanced Mathematics.
Courses for Industries	Nonlinear Filters for Target Tracking, Applied Inertial Sensors, Calibration and Tests of Sensors, Identification of Aerodynamics Parameters, Applied Navigation Systems, Applied Integrated Navigation System, Applied Autopilot Design, Advanced Orbital Mechanics

SUPERVISED THESIS

Master Thesis	IMU Fault Detection and Increasing of its Reliability Integration of two IMU and Improvement of Accuracy /Fault Detection Robust Control of a Typical Vertical Gyro Stochastic Errors' Modeling of FOG Gyro using Allan Variance and Spectral Methods Robot Localization with Bearing Sensor and IMU Attitude Independent Calibration of IMU Train Avoidance/Flowing of a UAV based on Particle Filter and Optimization Methods Control System design for Path Tracking of a UAV with Inverse Dynamic Method Alignment of the Inertial Navigation Systems by Using of Robust Kalman Filter Stable Platform Simulation, Control, and Error Analysis Attitude and Position Control for UAV by Using of Quaternions UD Factorization of Kalman Filter for GPS/INS Integration Modeling and Closed Loop Identification of Hydraulic Servo Mechanism Aircraft Parameter Identification from Real Tests Development of Software for Radar Tracking based on Unscented Kalman Filter Nonlinear Error Modeling and Compensation for IMU/INS Development triangle search method for star sensor Calibration of Camera /IMU Integration of Inertial Navigation System and Camera for a Moving Robot Integration of INS and Star Sensor for Lang Range Ballistic Missile Orbit and Attitude Estimation of a Satellite with Integration of Star and Earth Sensors Optimal Control of Magnetic Suspend Gyroscope A New Method for Simultaneously Localization and Mapping for a Cruise Vehicle Attitude and Orbit Estimation by using Images of Earth and Stars Guidance and Control of the moon Landing System by Dual Quaternions Attitude Estimation by Integration of Code Phase Measurements and Rate Gyros Landing Control of Moon Lander by Using of Dual Quaternions
Ph.D. Thesis	Path Planning for a Manipulator with Considering Friction and External Forces using Path Parameter

TEACHING QUALIFICATION

Sharif University: 3.5 / 4
MalekAshtar University of Technology: 3.7/4
University of Turkish Aeronautical Association: 3.6/4

COLLABORATION WITH OTHER COUNTRIES

Tabriz University (Iran): Attitude heading Reference System for a Moving Robot Project
SRM University (India): Internship Student Guidance
MIT Squares Company (UK): Project