

# Aqib Habib

📍 Munich, Germany    📞 +4917624051283    ✉ aqib.habib@tum.de    🔗 LinkedIn    📁 Portfolio

## EDUCATION

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### M.Sc Aerospace Engineering

Technical University of Munich

Expected Note: 1,8/1,0

Apr 2024 – Present

Munich, Germany

### M.Sc Mechatronics, Robotics, and Automation Engineering

National University of Sciences and Technology

Grade: 1,25/1,0

Sep 2023 – May 2024

Islamabad, Pakistan

### BE Mechanical Engineering

National University of Sciences and Technology

Main Note: 1,3/1,0

Minor Degree in Computer Science with 1,1/1,0 Note

Sep 2018 – Jun 2022

Islamabad, Pakistan

## PROFESSIONAL EXPERIENCE

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### Institute of Flight System Dynamics

Semester and Master Thesis

- Investigating Extended INDI Controller for eVTOL UAVs.
- Investigating model-based actuator fault detection and diagnosis (FDD) for quadrotors under nominal, faulty, and parametric uncertainty conditions.
- Implementing multiple observer-based residual generation methods (Luenberger, Thau, EKF and UKF) to detect actuator faults using analytical redundancy between measured and estimated states.
- Evaluating fault scenarios, including partial and complete loss of actuator effectiveness, to assess detection sensitivity and robustness.
- Demonstrating that residual-based detection schemes can identify actuator faults with high sensitivity and low false-alarm rates.

Jun 2025 – Present

Munich, Germany

### Dynamic Biosensors GmbH

Working Student in Production

- Supported assembly, verification, and quality assurance of precision biosensor machines in a production environment.
- Collected, documented, and reviewed test data for anomaly tracking, quality documentation, and corrective action support.
- Contributed to process reliability, traceability, and structured technical documentation to support consistent production workflows.
- Worked in a quality-focused environment requiring accuracy, coordination, and disciplined follow-up of technical issues

Oct 2025 – Jul 2026

Munich, Germany

### Microbubbles GmbH

Working Student Design and Prototyping

- Supported the development of mechanical and aerodynamic assemblies using SolidWorks.
- Fabricated prototype parts using SLA additive manufacturing, milling, and laser cutting.
- Assisted in assembly, experimental testing, and technical documentation.
- Developed Python and VBA tools to improve design iteration and workflow automation.

Sep 2024 – Jun 2025

Munich, Germany

### Turkish Aerospace Industries

Structural Design Engineer

- Designed aircraft structural components of a vertical stabiliser and wing for a high performance aircraft demonstrator using CATIA V5.
- Produced engineering drawings with GD&T and supported detailed design documentation for manufacturing.
- Performed structural analysis using ANSYS Mechanical to support design development and verification.
- Collaborated with manufacturing and integration activities involving additive manufacturing, milling, laser cutting, and composite-related assembly.

Jan 2023 – May 2024

Ankara, Türkiye

## TECHNICAL SKILLS

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**CAD & Design** – CATIA V5, SolidWorks, & ANSYS | **Manufacturing & Testing** – CFRP, & Additive Manufacturing | **Documentation** – SAP, LaTeX, MS Office, & MS PPT | **Analysis & Simulation** – MATLAB, Simulink, & Simscape | **Programming & Data** – Python, C++, Git, and Linux

## CERTIFICATIONS

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Drone Pilot License A1/A3 [🔗](#) | Modern Robotics: Mechanics, Planning, and Control [🔗](#) | Aerial Robotics Specialization [🔗](#) | Control Design Onramp with Simulink [🔗](#) | Additive Manufacturing Specialization [🔗](#)

## LANGUAGES

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English – C2 | German – B1

## SELECTED PROJECTS

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| <b>Actuator Fault Detection Strategies for a Quadrotor UAV</b> <a href="#">🔗</a>                                                                                                                                                                                                                                                                                                                                                                                                    | Jun 2025 – Mar 2026 |
| Investigated model-based actuator fault detection and diagnosis for quadrotors under nominal, faulty, and uncertain conditions. Implemented observer-based residual generation methods, including Luenberger, Thau, EKF, and UKF, to detect partial and complete actuator effectiveness losses. Evaluated fault scenarios to assess sensitivity, robustness, and false-alarm behaviour, demonstrating reliable residual-based fault detection performance.                          |                     |
| <b>Development of Autonomy Stack for Multirotor in ROS2</b> <a href="#">🔗</a>                                                                                                                                                                                                                                                                                                                                                                                                       | Oct 2025 – Mar 2026 |
| Developed and integrated key autonomy modules for a ROS2–Unity quadrotor simulation stack, including a geometric tracking controller, minimum-snap trajectory planning pipeline, camera calibration workflow, EKF-based state estimation, and mission-level state machine for subterranean UAV exploration. The work supported end-to-end autonomous flight through waypoint generation, dynamic constraint tuning, visual calibration, control, estimation, and system integration |                     |
| <b>Student Team Horyzn</b> <a href="#">🔗</a>                                                                                                                                                                                                                                                                                                                                                                                                                                        | Oct 2024 – Sep 2025 |
| <i>Flight Testing and Control Member</i><br>Coordinated safety-critical UAV control system development for a manned octacopter in the GoAero Safety Challenge, implementing robust control strategies and MATLAB-based control allocation algorithms to ensure mission-specific stability, performance, and safety.                                                                                                                                                                 |                     |
| <b>IMechE UAS Challenge Pakistan, Student Competition</b> <a href="#">🔗</a>                                                                                                                                                                                                                                                                                                                                                                                                         | Sep 2022 – Apr 2024 |
| Evaluated UAV concepts and flight demonstrations, coordinated stakeholders, ensured rule compliance and technical documentation, and received the Best Judge Award.                                                                                                                                                                                                                                                                                                                 |                     |
| <b>Design and Manufacturing of Tilt Wing/Tilt Rotor CFRP eVTOL UAV</b> <a href="#">🔗</a>                                                                                                                                                                                                                                                                                                                                                                                            | Sep 2022 – Dec 2022 |
| Designed and validated UAV aerodynamic and structural assemblies using SolidWorks and MATLAB/Simulink, supporting prototyping and airframe manufacturing with carbon-fibre composites and additive manufacturing.                                                                                                                                                                                                                                                                   |                     |
| <b>Design and Manufacturing of Fixed Wing CFRP eVTOL UAV</b> <a href="#">🔗</a>                                                                                                                                                                                                                                                                                                                                                                                                      | Apr 2021 – Jun 2022 |
| Designed, analysed, manufactured, and validated a fixed-wing eVTOL UAV airframe using SolidWorks, ANSYS FEA, carbon-fibre composites, additive manufacturing, and Pixhawk/ArduPilot flight-control systems.                                                                                                                                                                                                                                                                         |                     |
| <b>BAJA Society of Automotive Engineers, Student Competition, Arizona USA</b> <a href="#">🔗</a>                                                                                                                                                                                                                                                                                                                                                                                     | Apr 2019 – Sep 2022 |
| <i>Team Captain and Chief Engineer</i><br>Led a 60-member multidisciplinary engineering team in international vehicle competitions, coordinating chassis, powertrain, suspension, manufacturing, and technical execution while producing GD&T-based engineering drawings and supporting CNC, lathe, laser cutting, and welding processes. Contributed to award-winning results, including 4th place at BAJA SAE Arizona and 2nd overall at the National Piston Cup Challenge.       |                     |