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Start your mission with DLR.

The German Aerospace Center DLR has a dual mandate as the national research center for aeronautics and space, and as the space agency of the German federal government. Approximately 8000 people work for DLR on a uniquely diverse range of topics spanning the fields of aeronautics, space, energy, transport and security research. They collaborate on projects extending from fundamental research to the development of the innovative applications and products of the future. If the idea of joining a top-class team of researchers working in a supportive, inspirational environment appeals to you, then why not launch your mission with us?

Our institute **Communications and Navigation** in **Oberpfaffenhofen** near Munich is offering a

Master Thesis project

on Secure Routing in Flying Ad-hoc Networks (FANETs)

Your mission:

Current communication in aeronautics mainly uses plain VHF radio and is therefore vulnerable to attacks. As aeronautical communications research group we are working on the L-band Digital Aeronautical Communications System (LDACS), a modern broadband, digital data link for aeronautical communications. The Air-Ground protocol is on the verge of being standardized by ICAO and IETF, including a full security architecture. However, the Air-Air protocol is at its infancy. Only first proposals for Layers 1 and 2 exist and initial proposals have been made for a security architecture.
You will help shaping the LDACS A/A security protocol by assessing different routing protocols and their security implications. For this you will have a look at the many proposed routing protocols for FANETs from the literature, and evaluate their security. Then, you combine these results with your knowledge in the Cyber Security domain to assess how different routing protocols influence the integrity and authenticity of connections. Finally, you put this into the perspective of an LDACS A/A link.

Questions you might answer about different routing protocols during your research could be: what information is needed for the routing protocol and is that expected to be available? How can the protocol be misused by an attacker (e.g., MITM, sinkhole, location spoofing)? What countermeasures work against these attacks? How do parties know who they are communicating with? How efficient can partly intact connections be reused? How well does it scale?

Your qualifications:

- B. Sc. in Computer Science, Mathematics or a related field
- Broad knowledge in Cyber Security
- Excellent programming skills in Python3
- Proficiency in English (spoken and written)

Your benefits:

Look forward to a fulfilling job with an employer who appreciates your commitment and supports your personal and professional development. Our unique infrastructure offers you a working environment in which you have an unparalleled scope to develop your creative ideas and accomplish your professional objectives. Disabled applicants with equivalent qualifications will be given preferential treatment.

If you have any questions concerning specific aspects of the project, please contact **Lennart Jansen** by calling **+49 8153 28 4021** or mailing **leonardus.jansen@dlr.de**.

DLR **Deutsches Zentrum für Luft- und Raumfahrt**
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