



## Höhere Technische Bundeslehranstalt Kaindorf an der Sulm Abteilung Informatik

# Diplomarbeit

im Rahmen der Reife- und Diplomprüfung

# Königskarte



Leon Edlinger Paul Gigler Andreas Weissl

> 5BHIF 2024/2025

Betreuer: Prof. DI Johannes Loibner, BSc Projektpartner: Prof. DI Robert Müllerferli

Datum: MISSING DATE

All rights reserved. No part of the work may be reproduced in any form (printing, photocopying, microfilm or any other process) without the written permission of all authors or processed, duplicated or distributed using electronic systems. The authors assume no liability for the functions of individual programs or parts thereof. In particular, they assume no liability for any consequential damages resulting from the use.

The reproduction of utility names, trade names, product descriptions, etc. in this work, even without special marking, does not justify the assumption that such names are to be regarded as free within the meaning of trademark and trademark protection legislation and may therefore be used by everyone.

# Statutory declaration

I declare under oath that I have written the present diploma thesis independently and without outside help, have not used sources and aids other than those indicated and have identified the passages taken from the sources used literally and in terms of content as such.

Ort, Datum	Leon Edlinger
Ort, Datum	Paul Gigler
Ort, Datum	Andreas Weissl

# Abstract

Abstract in English

# Kurzfassung

Kurzfassung in Deutsch

# Thanks

It would not have been possible to carry out this thesis to this extent without the active support of a number of people. We would therefore like to thank everyone who supported us in the implementation of this thesis.

. . .

# **Table of Contents**

1	Introduction 1								
	1.1	Team							
	1.2	Motivation							
<b>2</b>	Tecl	Technologies 1							
	2.1	LaTeX							
	2.2	Project Management							
		2.2.1 Trello							
		2.2.2 Sharepoint							
		2.2.3 Discord							
	2.3	Frontend							
	2.0	2.3.1 Dart							
		2.3.2 Flutter							
	2.4	Backend							
	2.1	2.4.1 Java Spring							
		2.4.2 PostgreSQL							
	2.5	Version Control							
	2.0	2.5.1 Git							
		2.5.2 GitHub							
	2.6	Map Data							
	2.0	2.6.1 OpenStreetMap							
		2.6.2 Graphhopper							
	2.7	Development Tools							
	4.1	2.7.1 VS Code							
		2.7.2 IntelliJ							
		2.7.3 Android Studio							
		2.7.4 Postman							
		2.7.5 Figma							
	2.8	Deployment							
	2.0	1 0							
		2.8.2 Uberspace							
		2.8.5 Webinin							
3	Wir	reframes 10							
_	3.1	Admin Ansicht							
	3.2	User Ansicht							
4	Ros	earch Questions 10							
-	4.1	Leon Edlinger							
	4.2	Paul Gigler							
	4.3	Andreas Weissl							
5		al Thoughts 10							
	5.1	Leon Edlinger							
	5.2	Paul Gigler							
	5.3	Andreas Weissl							

## TABLE OF CONTENTS

6 Bibliography				
7	App	pendix	13	
	7.1	Meetings	13	
	7.2	Working Hours	14	
	7.3	Source code directory	15	
	7.4	List of illustrations	16	
	7.5	Abbreviation	17	

## 1 Introduction

#### 1.1 Team

#### 1.2 Motivation

## 2 Technologies

#### 2.1 LaTeX

Hier kommt eine Beschreibung zu Latex hin

### 2.2 Project Management

Hier kommt Text zum Project Management hin

#### 2.2.1 Trello

Hallo, das ist Trello

#### 2.2.2 Sharepoint

und das ein Text zu sharepoint, wieso eigentlich

#### 2.2.3 Discord

und hier nochmal kurz Discord, kennt eh jeder

#### 2.3 Frontend

#### 2.3.1 Dart

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita

Leon Edlinger

kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi. Lorem ipsum dolor sit amet,

#### 2.3.2 Flutter

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi. Lorem ipsum dolor sit amet,

Leon Edlinger

#### 2.4 Backend

#### 2.4.1 Java Spring

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi. Lorem ipsum dolor sit amet,

#### 2.4.2 PostgreSQL

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel

Andreas Weissl 3

### 2.4 Backend

illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi. Lorem ipsum dolor sit amet,

4 Andreas Weissl

#### 2.5 Version Control

#### 2.5.1 Git

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi. Lorem ipsum dolor sit amet,

#### 2.5.2 GitHub

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel

Leon Edlinger 5

### 2.5 Version Control

illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi. Lorem ipsum dolor sit amet,

6 Leon Edlinger

### 2.6 Map Data

#### 2.6.1 OpenStreetMap

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi. Lorem ipsum dolor sit amet,

#### 2.6.2 Graphhopper

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel

illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi. Lorem ipsum dolor sit amet,

## 2.7 Development Tools

#### 2.7.1 VS Code

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

#### 2.7.2 IntelliJ

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

#### 2.7.3 Android Studio

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

#### 2.7.4 Postman

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

#### 2.7.5 Figma

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

## 2.8 Deployment

- 2.8.1 Docker
- 2.8.2 Uberspace
- 2.8.3 Webmin
- 3 Wireframes
- 3.1 Admin Ansicht
- 3.2 User Ansicht
- 4 Research Questions
- 4.1 Leon Edlinger
- 4.2 Paul Gigler
- 4.3 Andreas Weissl
- 5 Final Thoughts
- 5.1 Leon Edlinger
- 5.2 Paul Gigler
- 5.3 Andreas Weissl

# 6 Bibliography

# 7 Appendix

## 7.1 Meetings

Protokolle der Meetings, vielleicht auch ein zeitplan wann immer und wie lang

# 7.2 Working Hours

Arbeitspaket-Nr.	Beschreibung	Dauer
1	Einführung und Einarbeitung	8 h
2	Grundkonzept erstellen	8 h
3	Struktur der App festlegen	6 h
5	Wifi-Socket in App implementieren	39 h
6	Write-Funktionalität in App implementieren	14 h
7	Read-Funktionalität in App implementieren	19 h
8	Trim-Funktionalität in App implementieren	10 h
9	Konfigurationsmöglichkeiten für Flug in App implementieren	16 h
10	Höhenregelung-Funktionalität in App implementieren	14 h
12	Graphische Darstellung der Flugdaten	18 h
14	App testen und debuggen	19 h
26	Gesamtkonzept testen und debuggen	16 h
Summe		

 ${\bf Table\ 1:\ Arbeitszeitnachweis}$ 

# 7.3 Source code directory

Source Code directory, kein plan was des is

## 7.4 List of illustrations

Liste alle abbildungen oder so, ka müss ma uns anschauen

### 7.5 Abbreviation

ADC Analog Digital Converter

API Application Programming Interface

BLE Bluetooth Low Energy
CPU Central Processing Unit
DAC Digital Analog Converter

DAVE Digital Application Virtual Engineer

DSP Digital Signal Processor

FPU Floating Point Unit

FPV First Person View, First Pilot View

GPIO General Purpose Input/Output

GPS Global Positioning System

GUI Graphical User Interface

HDMI High Definition Multimedia Interface

I<sup>2</sup>C Inter-Integrated Circuit

IDE Integrated Development Environment

IP Internet Protocol RPI Raspberry Pi

SD Secure Digital

SPI Serial Peripheral Interface

USB Universal Serial Bus

TCP Transmission Control Protocol

UART Universal Asynchronous Receiver Transmitter

WLAN Wireless Local Area Network

WPA WiFi Protected Access

XML Extensible Markup Language