

Deutsches Zentrum für Luft-  
und Raumfahrt (DLR)  
Königswinterer Straße 522-524  
53227 Bonn

## **Selection Workshop and Proposal Presentation**

**ARESONUS :  
Altus. Repetitio. Sonus. - Measuring of  
infrasound/aerosonic in the stratosphere**

**Presenting Team ARESONUS:** Niclas Bierwisch, Sabine Köhler, Sven Malag



# Agenda

1. Goals and purpose of ARESONUS
2. Scientific background
3. Team and organisation
4. Technical requirements and project design



# 1.Goals and motivation

- ▶ Building a reference data bank
  - ▶ Creation of sound level-height model
- ▶ Recognition signal, a.o. infrasound reference database
- ▶ Secondary goal: possible proof of ELFI´s swinging
- ▶ Stratosphere: natural reduction of higher frequencies



# 2. Scientific background

## 2.1 Sound in general

- ▶ Sound
  - ▶ Mechanical waves
  - ▶ Physically: air pressure fluctuations
  - ▶ Frequency: number of oscillations per second → Hz
  - ▶ Sound level: height of air pressure fluctuations → dB



# 2. Scientific background

## 2.2 Infrasound

- ▶ Infrasound
  - ▶ Frequenz  $< 20$  Hz
  - ▶ Large wavelength
  - ▶ Attenuate less → travels further



## 2. Scientific background

### 2.3 Infrasound sources

#### natural

- ▶ Geological activity
- ▶ Waves
- ▶ Thunderstorms

#### artificial

- ▶ Traffic
- ▶ Air turbines
- ▶ Blastings



## 2. Scientific background

### 2.4 ELFI (Extremely Low Frequency and IMU)

- ▶ Aim: evolve a system for non-stationary measurement of electromagnetic waves in low frequency
- ▶ Goal: Measuring Schumann resonance 7 Hz
- ▶ System: magnetic loop antenna
- ▶ Problem: antenna swung in magnetic field of earth and generated strong induction voltages



# 3. Team and organisation

## 3.1 The ARESONUS team

Member	Main purpose
Niclas Bierwisch	Management and Organisation
Sabine Köhler	Documentation
Sven Malag	Software Engineering
Ria Bele Pohley	Outreach
Johann Stiebritz	Testing and Hardware Engineering

- ▶ Additionally every team member is included in designing and mechanical engineering tasks





# 3. Team and organisation

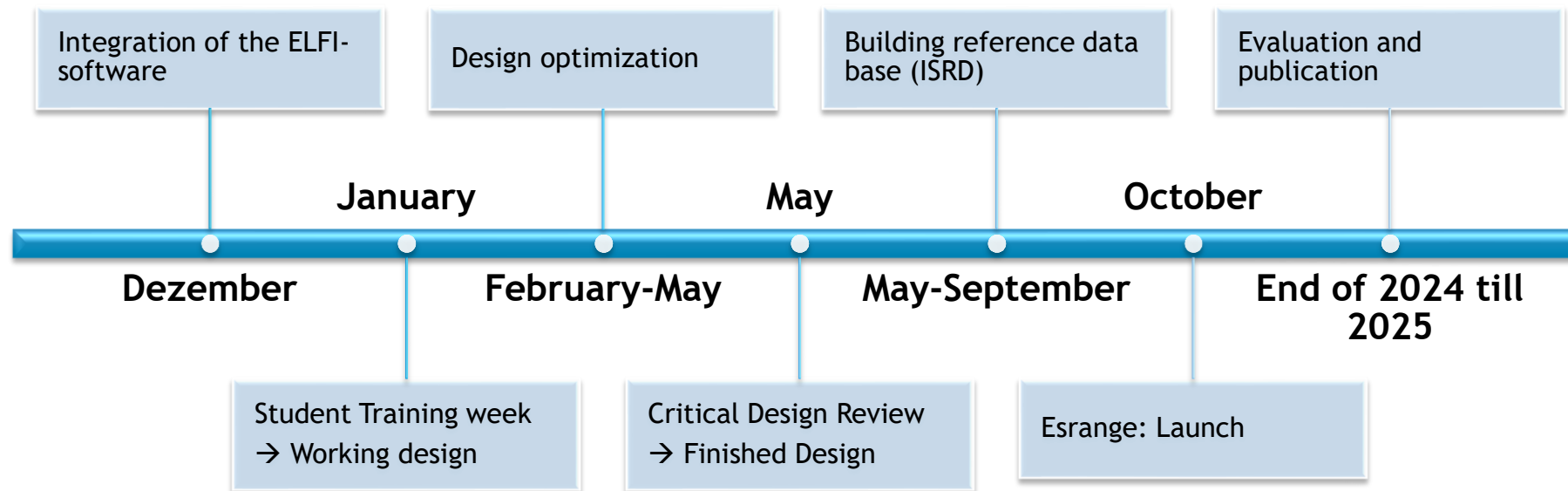
## 3.2 Outreach

- ▶ Regular publishing at least once a Month
- ▶ Social Media: X(former Twitter), Instagram, Facebook
- ▶ University: contributing in Newsletter,  
creating webpage on universities website
- ▶ Newspaper artikel



# 3.Team and organisation

## 3.3 Time schedule



# 3.Team and organisation

## 3.4 Sponsoring

- ▶ Mikrophone ISV1611-infra sponsored by **ROGA Instruments**

[SELBSTAUFGENOMMENES BILD VON MIKROFON}



# 4. Technical requirements and project design

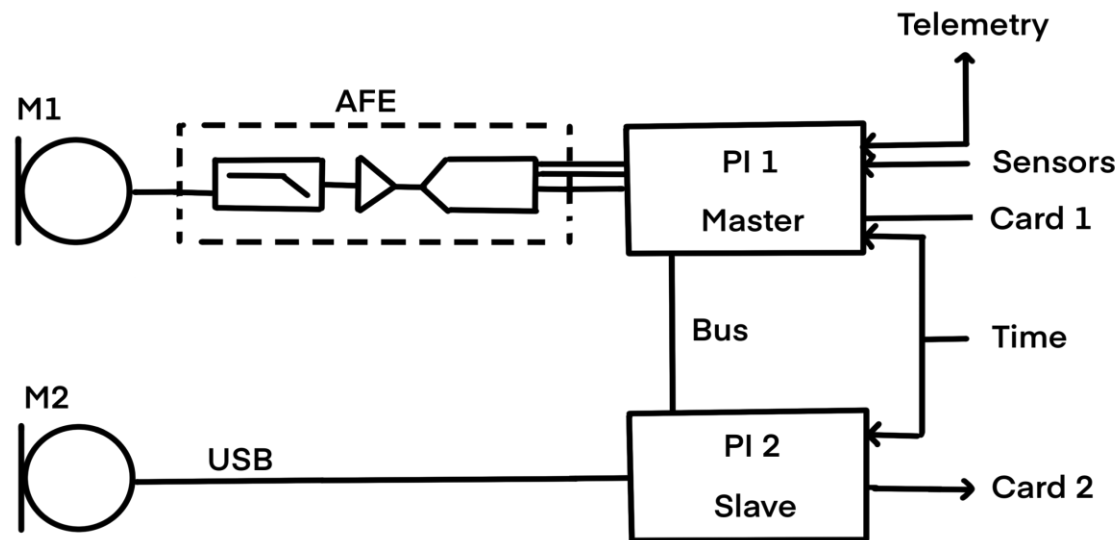
## 4.1 Technical requirements

- ▶ Data rate 2.5 - 4 Mbyte/min
- ▶ Total mass approximately 5 kg  
(+5-10 kg for lowering construction with self build microphone)
- ▶ Power supply approximately 125 Wh
- ▶ Sources of disturbance (external): Fans, pumps, motors, moving parts
- ▶ Sources of disturbance (caused by us): Motor while lowering microphone



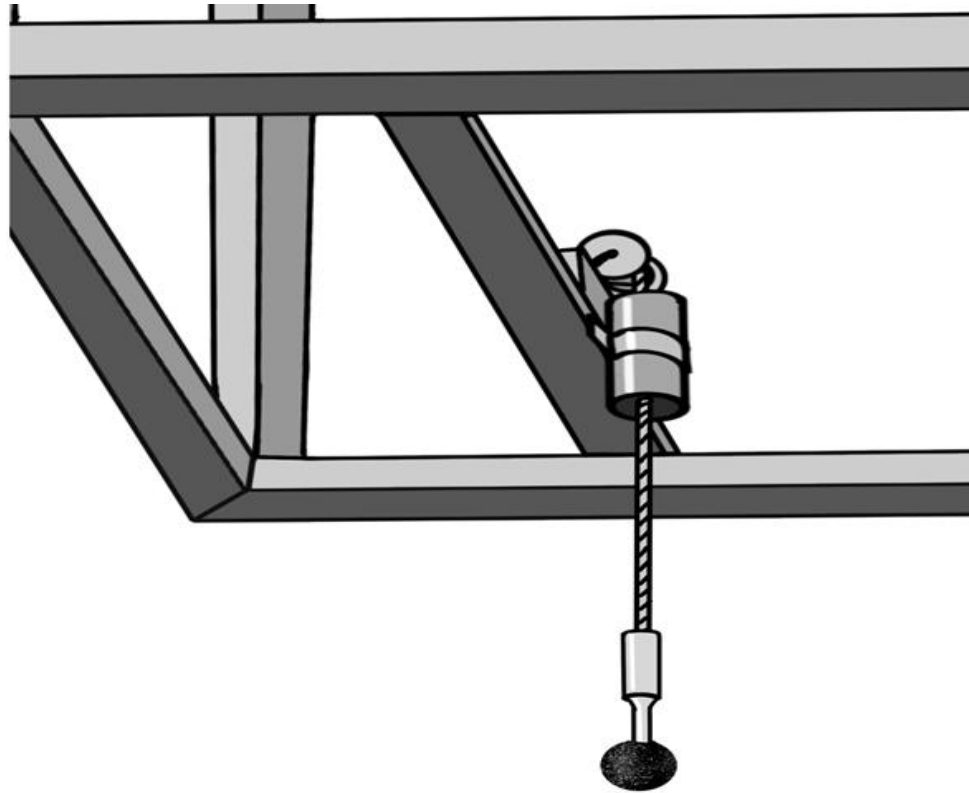
# 4. Technical requirements and project design

## 4.2 Measuring setup



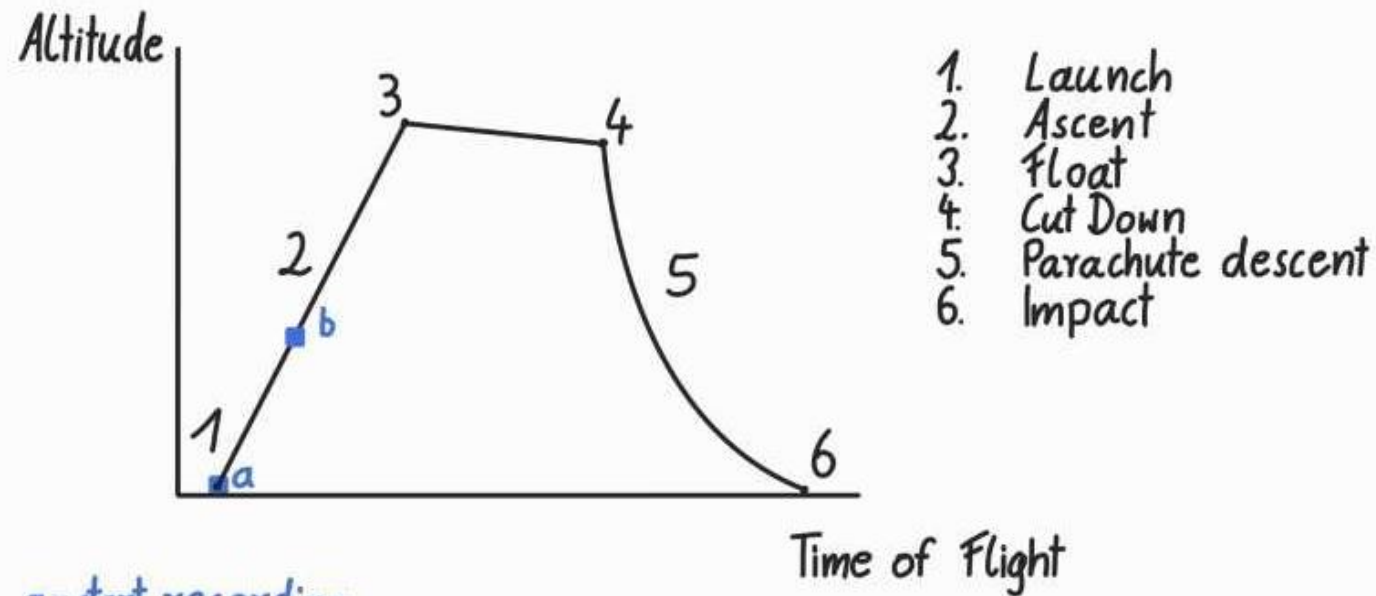
# 4. Technical requirements and project design

## 4.3 Gondola Placement



# 4. Technical requirements and project design

## 4.4 Flight timeline



a-start recording

b- Extend micro