IFSys
Intelligent Flying System

project in brief

system overview

current activities
project in brief

- student project
- Berlin Institute of Technology

- our aims:
  - use of theoretical principles
  - development of an UAS
  - automatic observation flights
  - encourage teamwork
  - setup of an lecture

- financed by institute
- supported by sponsors
- assistance of thesises
UAV: Unmanned Aerial Vehicle
UAS: Unmanned Aerial System

different control options
- automatic
- radio controlled
civil operations:
- disaster monitoring / environment
- communication platform
- Agriculture and forestry
- science

expanding markets
high technology
project in brief

- Take off run
- Scan pattern (geo-/airmass ref.)
- Descent
- Flare/Decrab
- Time
- Altitude
- Lift off/ Cimb
- 70-100m
- Roll out

design mission

- 1000m
- 500m
- Intelligent Flying System
- IFSys
system overview
The prototype ALEXIS (Airborne Laboratory For Experiments on Inflight Systems)

mass: 12,0 kg
wingspan: 4,00 m
performance: 1,50 kW
Payload: approx. 1 kg
The prototype **ALEXIS** *(Airborne Laboratory For Experiments on Inflight Systems)*
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schematic structure:
The prototype **ALEXIS** (Airborne Laboratory For Experiments on Inflight Systems)
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schematic structure:
The **FCC** (Flight Control Computer)
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- data processing
- flight guidance
- communication to ground station (via receiver)
The **FCC** (Flight Control Computer)

- **internal structure**
  - 3.5” embedded PC and PC104 BUS
  - optional power supply
  - COM-port
  - embedded PC
  - CAN/RS232 interface
The sensors

- rudder & elevator
- aileron
- flap
- spoiler
- RC receiver
- radio receiver
- ground station
- actuator unit
- pilot
- Sensoren
The sensors

FCC

- GPS
- Actuator sensors
- Airdata system
- Altitude above ground
- Inertial data
The **sensors**

- The airdata system

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The sensors

- The airdata system
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- Dynamic pressure
- Static pressure

\[ \text{Total pressure} = \text{dynamic pressure} + \text{static pressure} \]
system overview
The IronBird openALEXIS

- „IronBird“ for Hardware-In-The-Loop simulation
- purpose:
  - verification
  - fault detection
The **ground station**

- Live data transfer
- Generation of trajectories
- Live visualization
  - position
  - spatial position
  - system parameters
- Mission management
current activities
Alexis.cpp

Logging improvements
Integration of the Flight Control Laws in the Onboard-Software
Mission management
Datalink

Optimize file requests
Initialisation of the automatic pilot
Definition of interfaces
Generate Code & integrate Code in FCC-Software
Payload management
System monitoring (Voltage, revolutions number, receiving)
FCC to ground station
Interested?

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address to:
Jens Großhans

Participation at any time!

regular meetings at the BIT
(Institute for Aerospace „ILR“, room: F328)