The JAviator: A High-Payload Quadrotor UAV with High-Level Programming Capabilities

Rainer Trummer

Computer Sciences Workshop ‘08
Department of Computer Sciences
University of Salzburg, Austria

Computational Systems Group

The JAviator (Java Aviator) Project

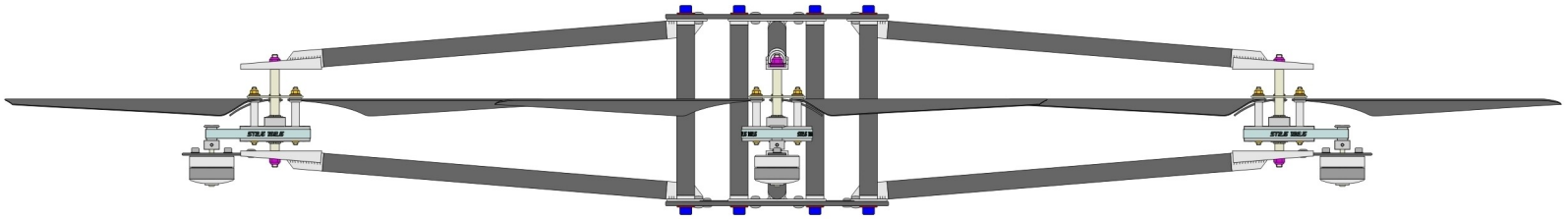
- Collaborative research project of the
  - Computational Systems Group, Department of Computer Sciences, University of Salzburg
  - IBM T. J. Watson Research Center, Hawthorne, New York, USA

- Primary project goals are to
  - develop high-level real-time and concurrent programming abstractions for Java
  - provide an infrastructure that is time-portable
  - verify system on UAV (unmanned aerial vehicle)

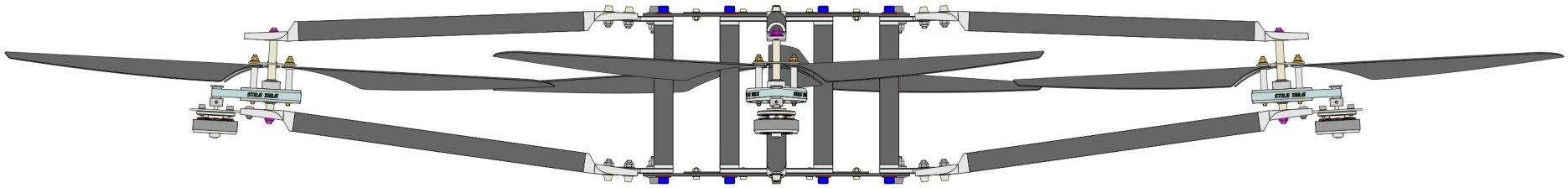
JAviator Design Evolution

- Prototype version: JAviator V1
  - Entirely hand-manufactured (including motors)
  - Total diameter (over spinning rotors): 1.1 m
  - Empty weight (including electronics): 1.9 kg

JAviator Design Evolution

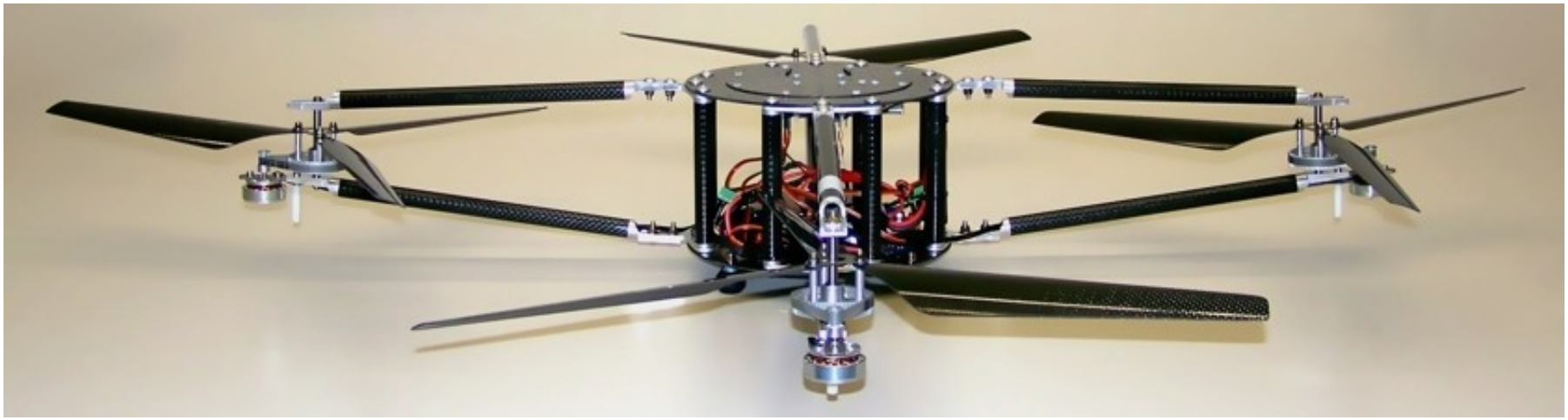


JAviator Design Evolution

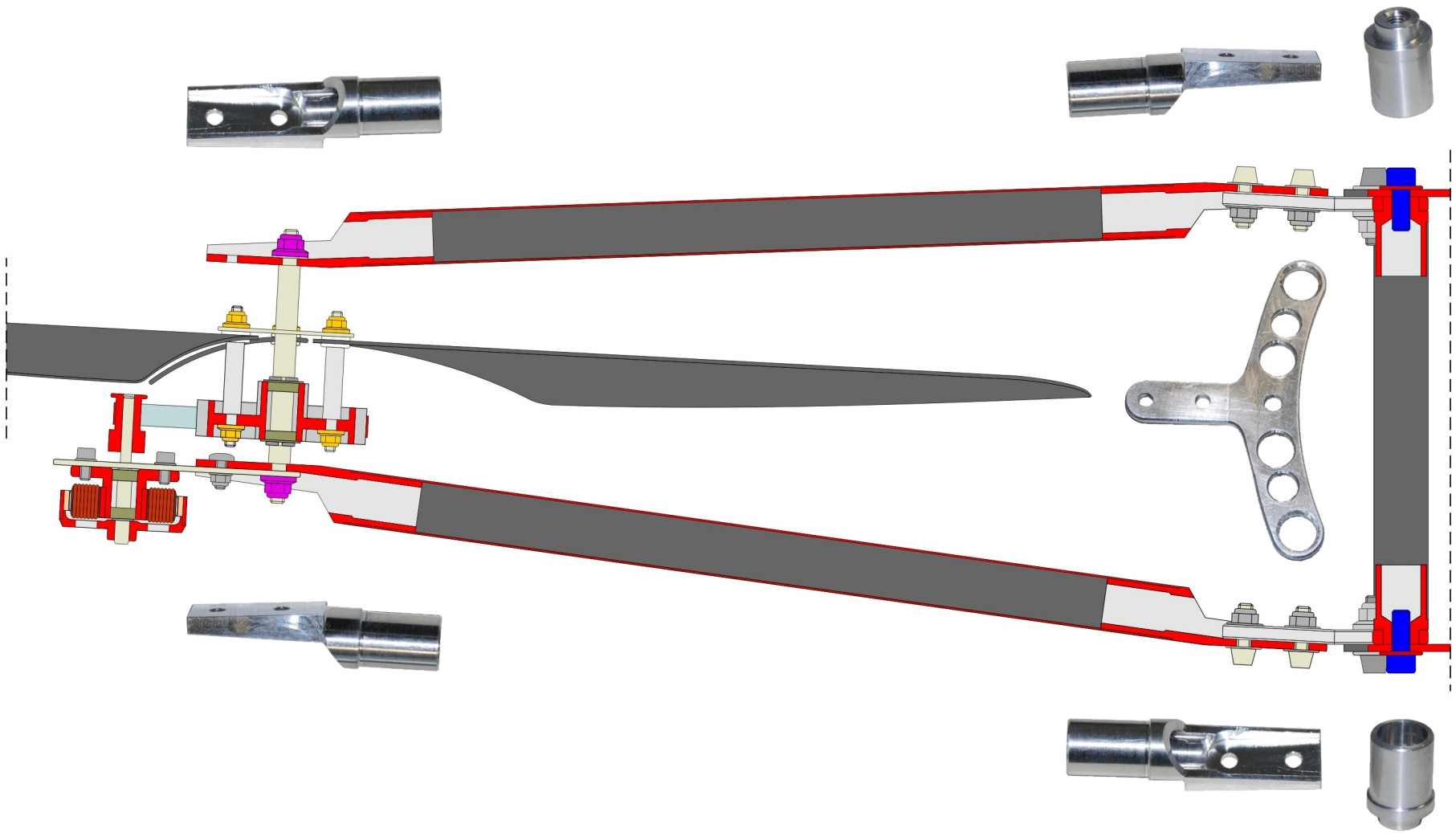


JAviator Design Evolution

- Advanced version: JAviator V2
  - CNC-fabricated, flow-jet, and laser cut components
  - Total diameter (over spinning rotors): 1.3 m
  - Empty weight (including electronics): 2.2 kg



Side-Arm Details



Frame Construction

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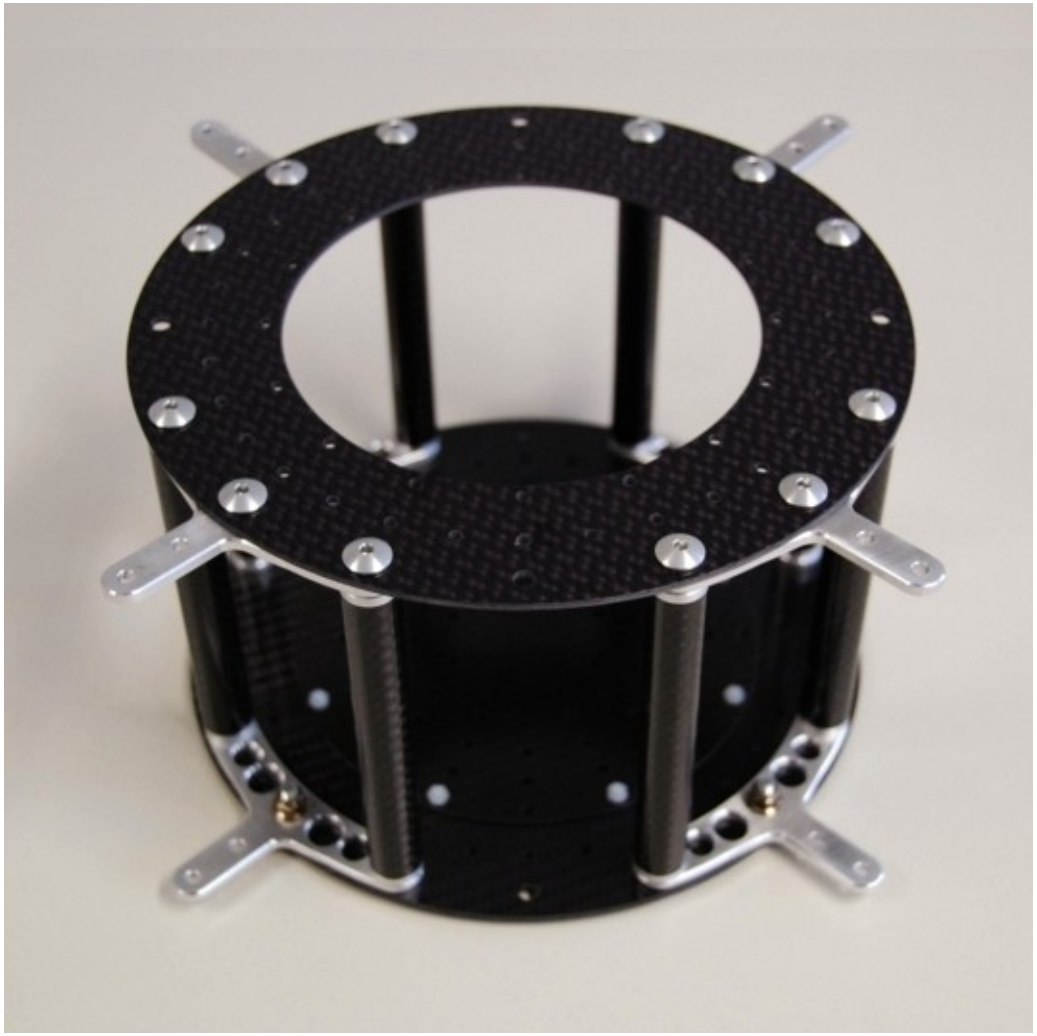

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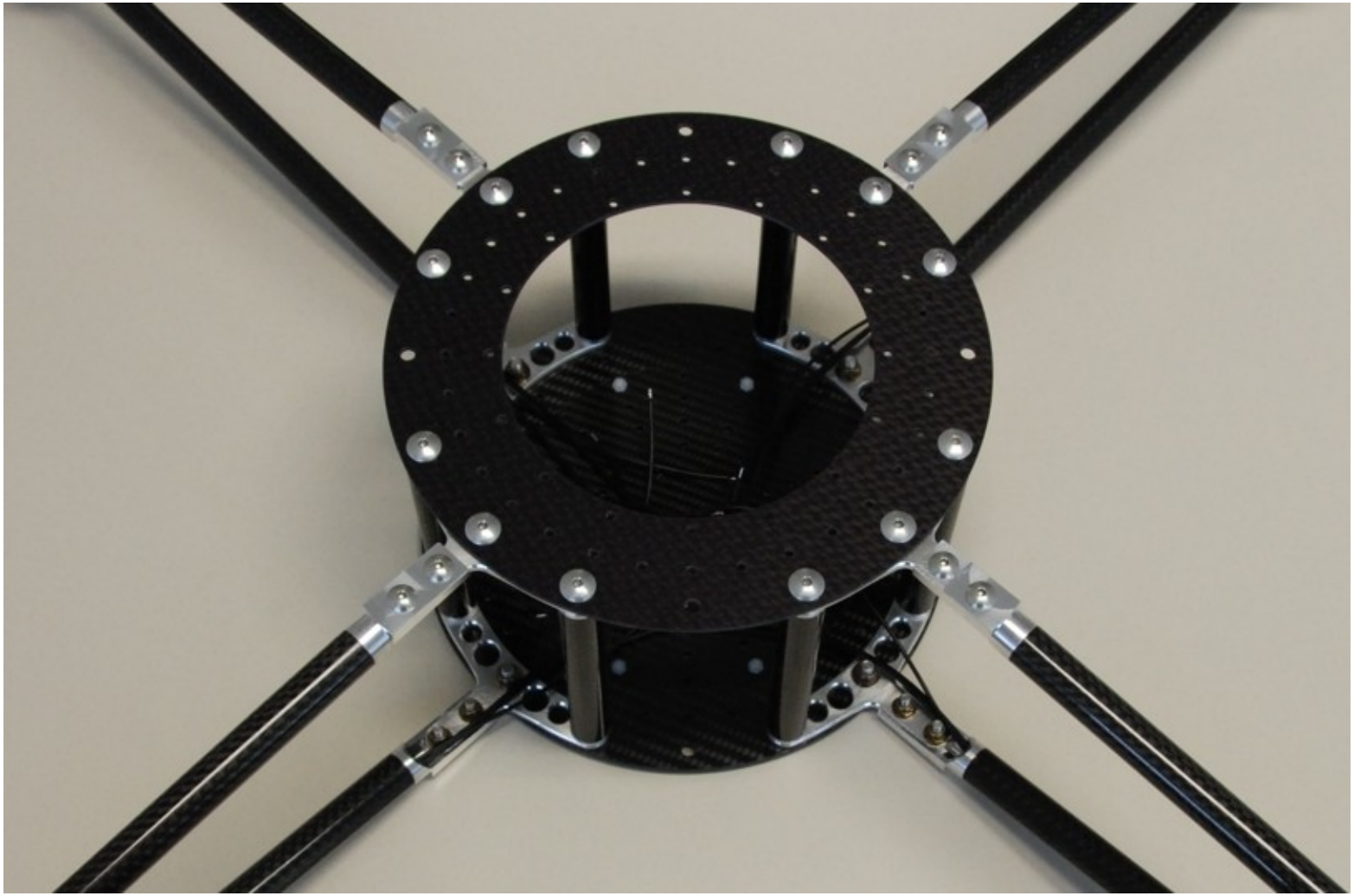

Frame Construction

Propulsion System

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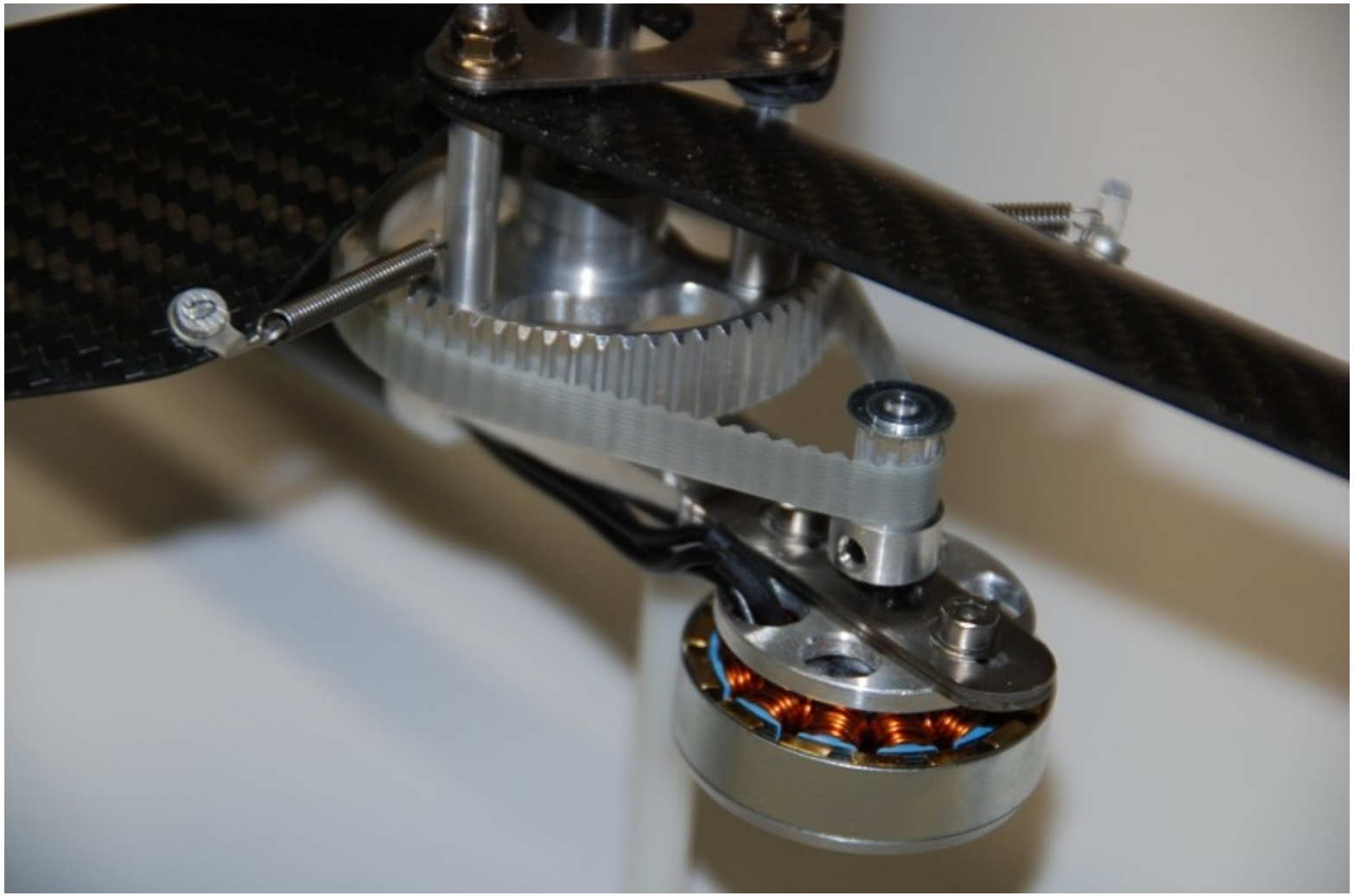
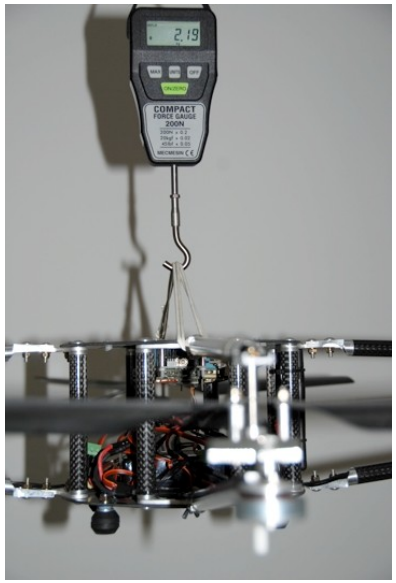
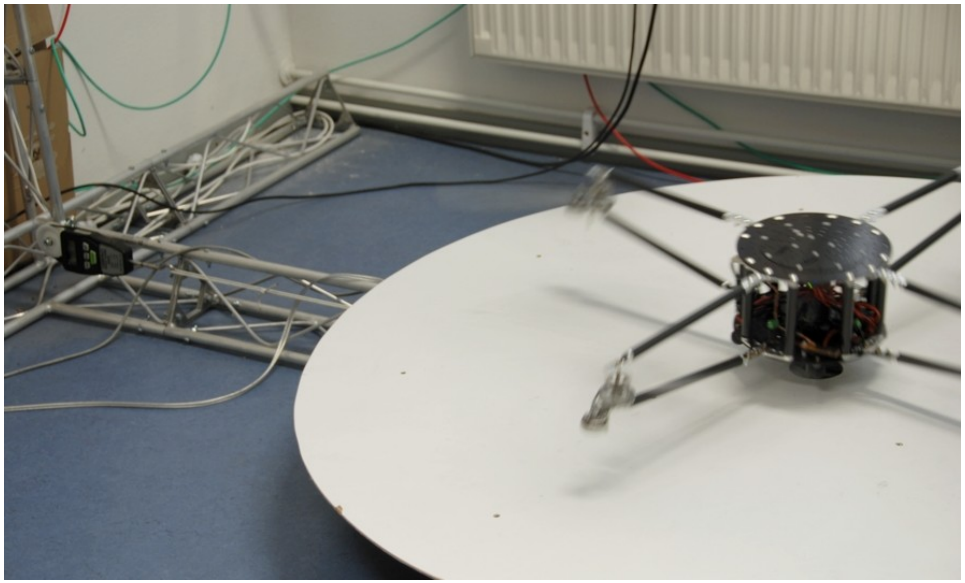
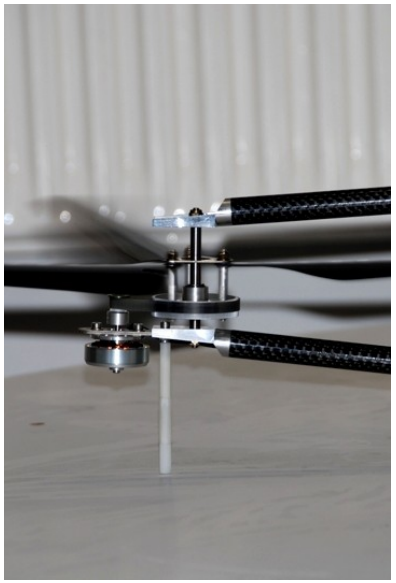


Propulsion Capacity

- Maximum lift capacity: 5.4 kg
  - 2.2 kg empty weight + 3.2 kg payload
- Maximum flight time: 40 min
  - 40 min w/o payload down to 8 min with 3.2 kg



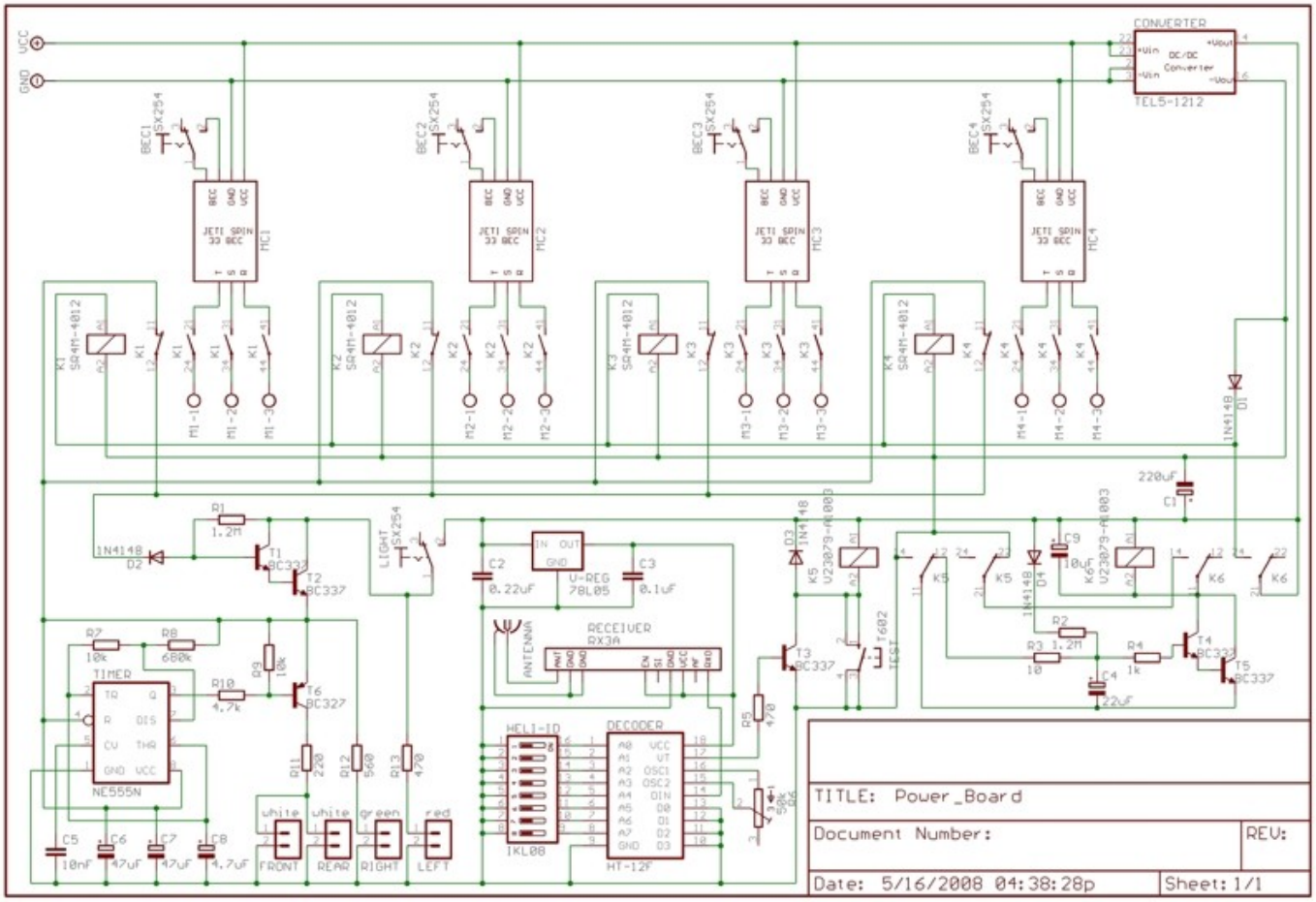




Power Board Design

- Need for central board containing ...
  - four motor controllers
  - high-current circuit breaker
  - R/C emergency shutdown
  - signal-lights mechanism
  - low-voltage power supply

Power Board Design



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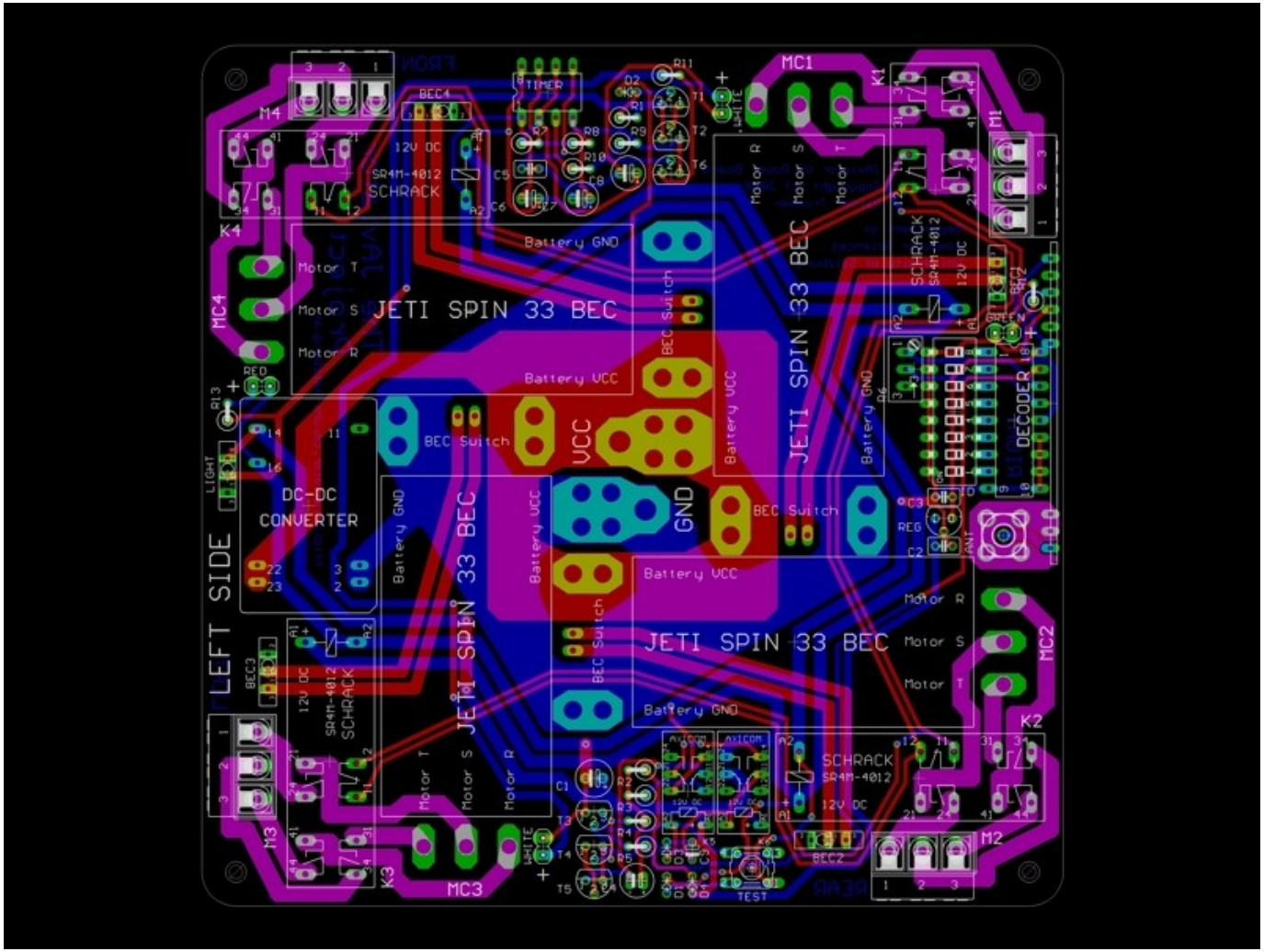

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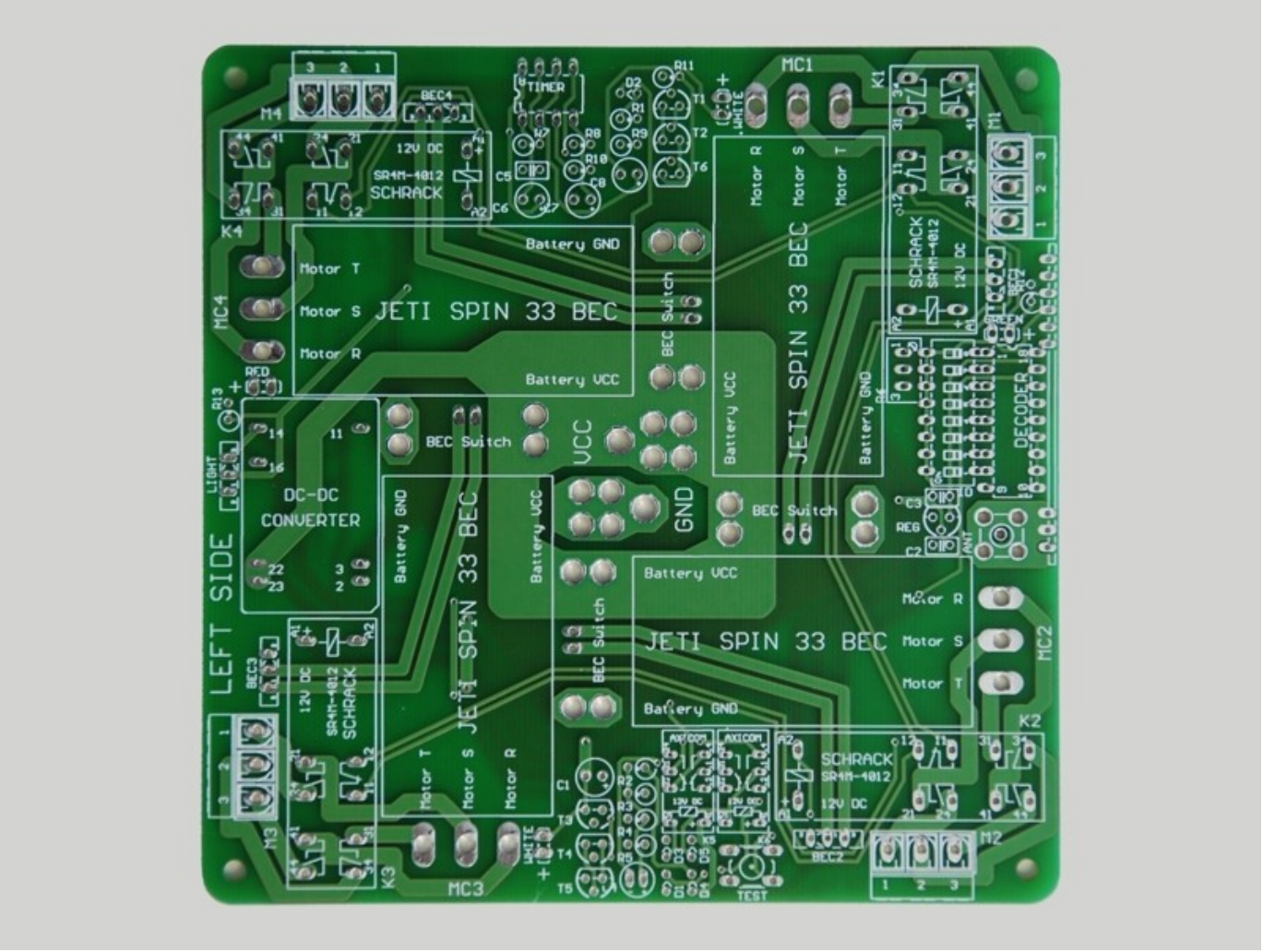

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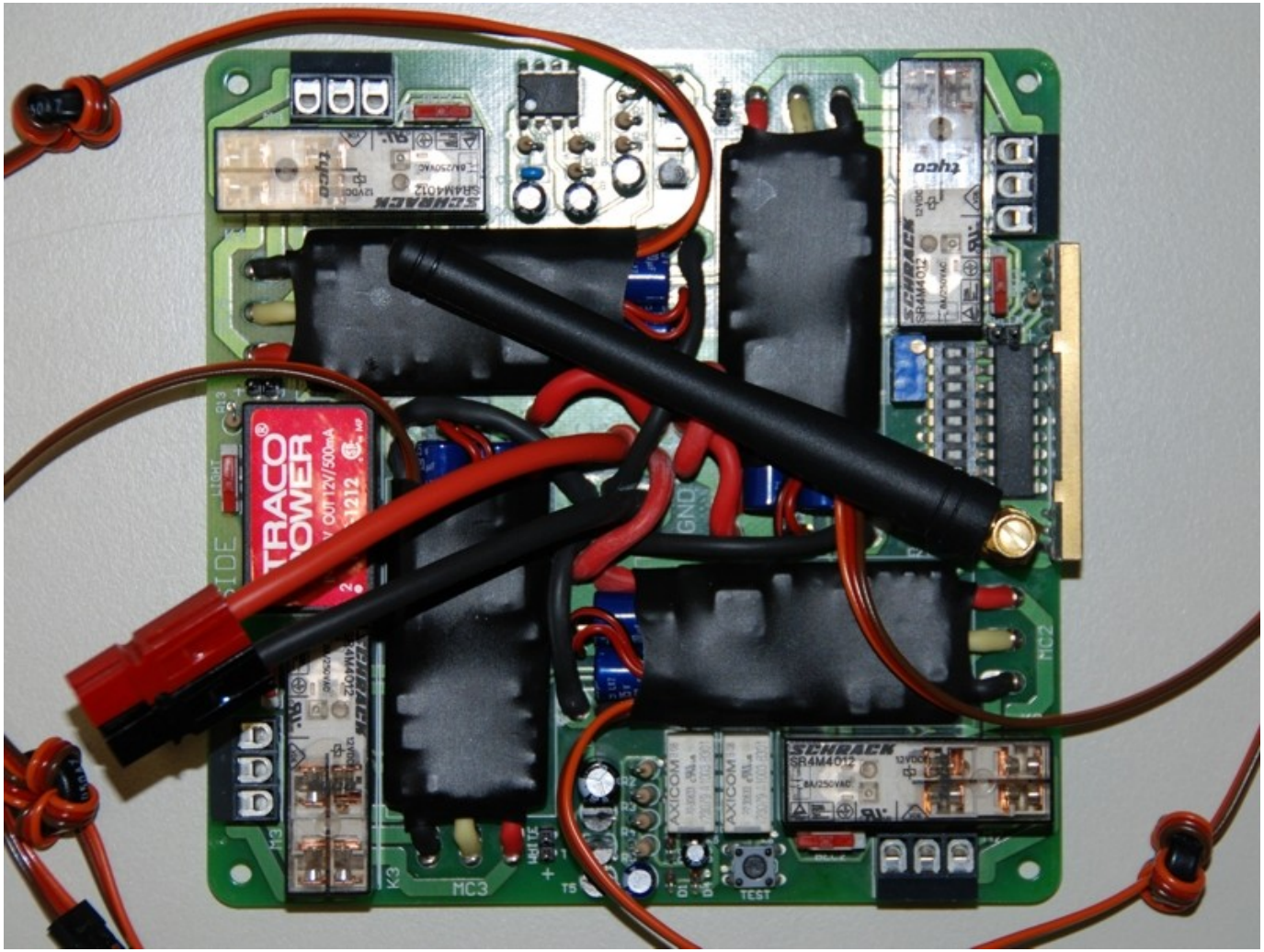
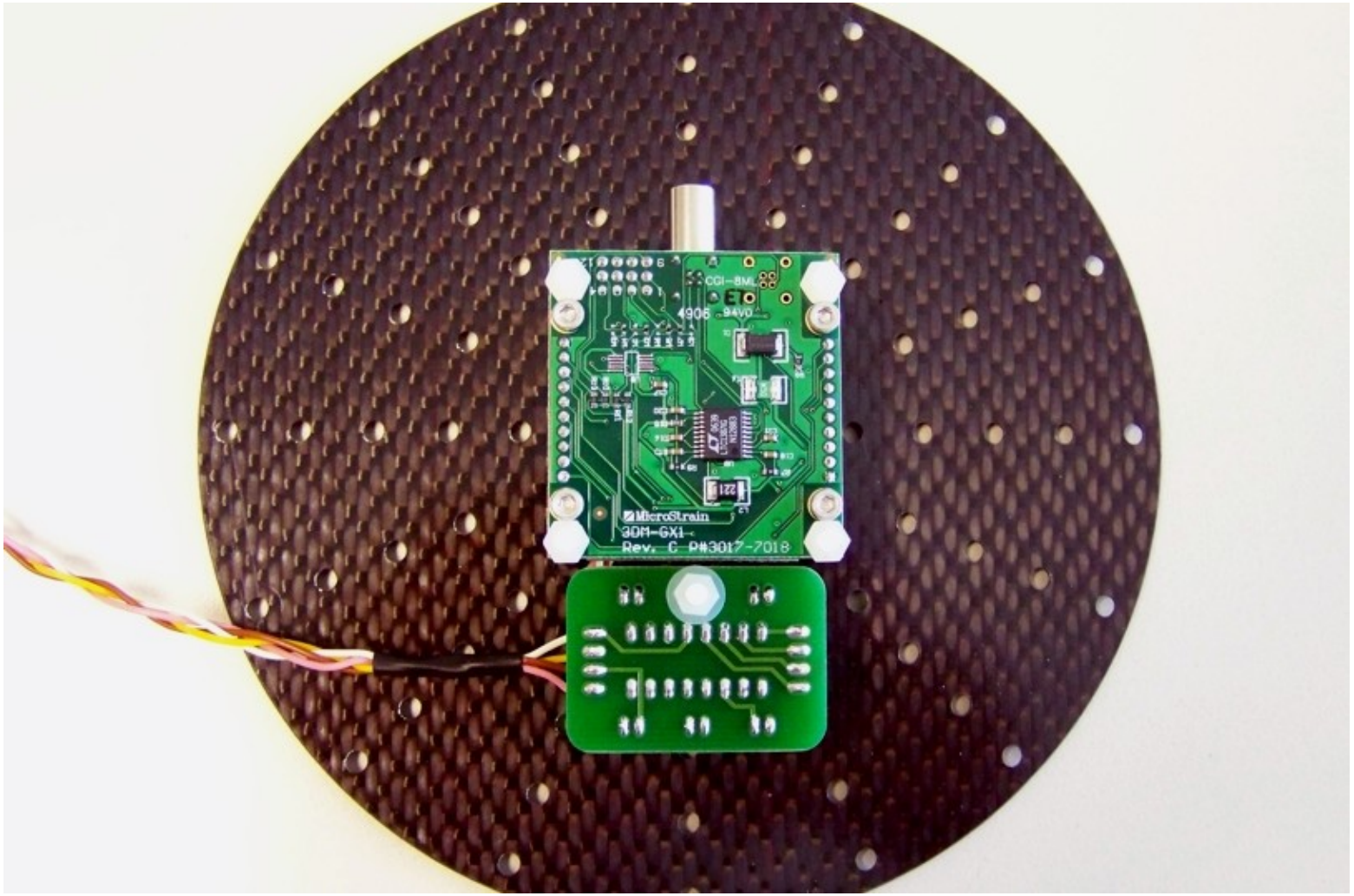


Avionics System



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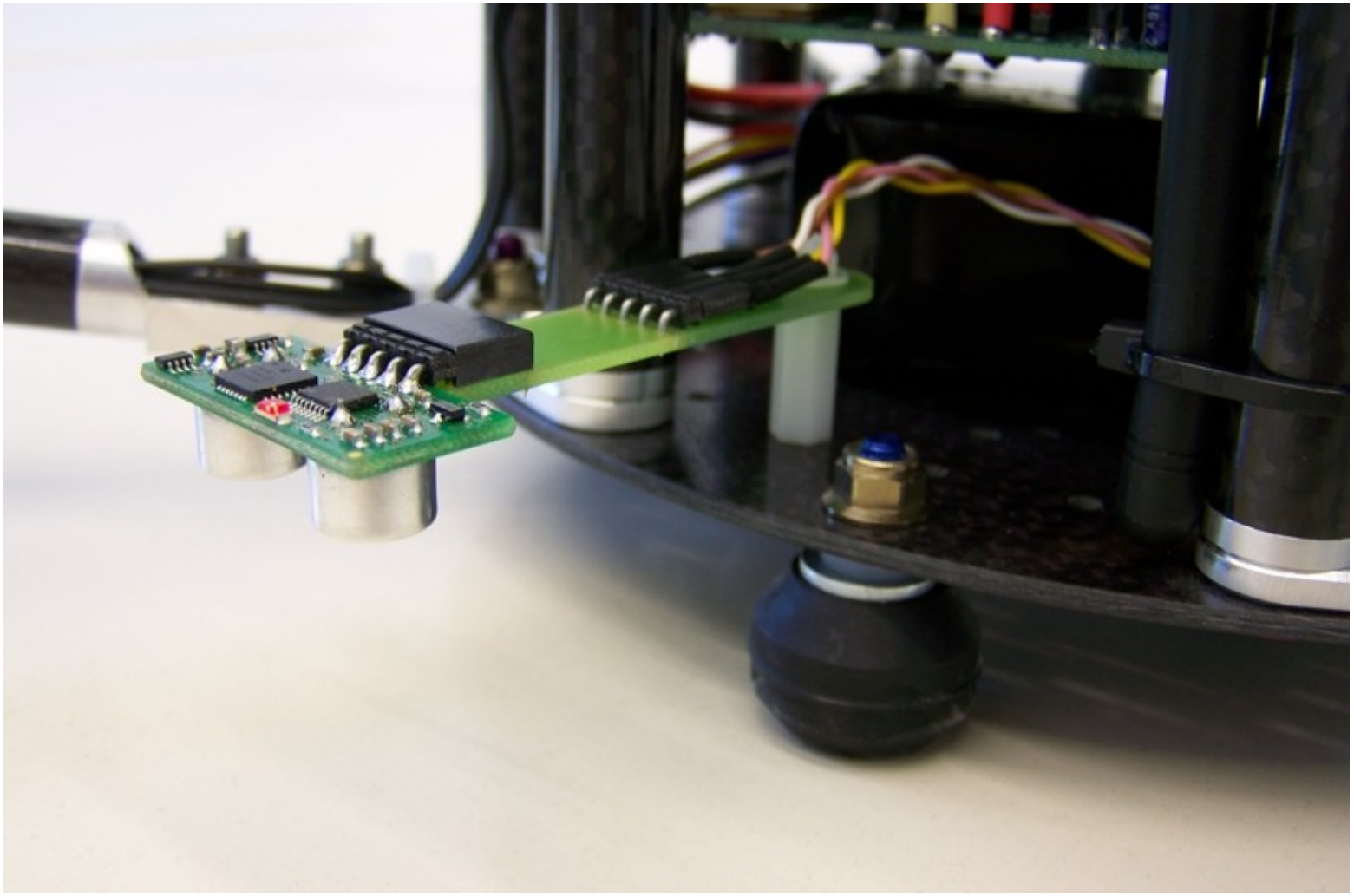

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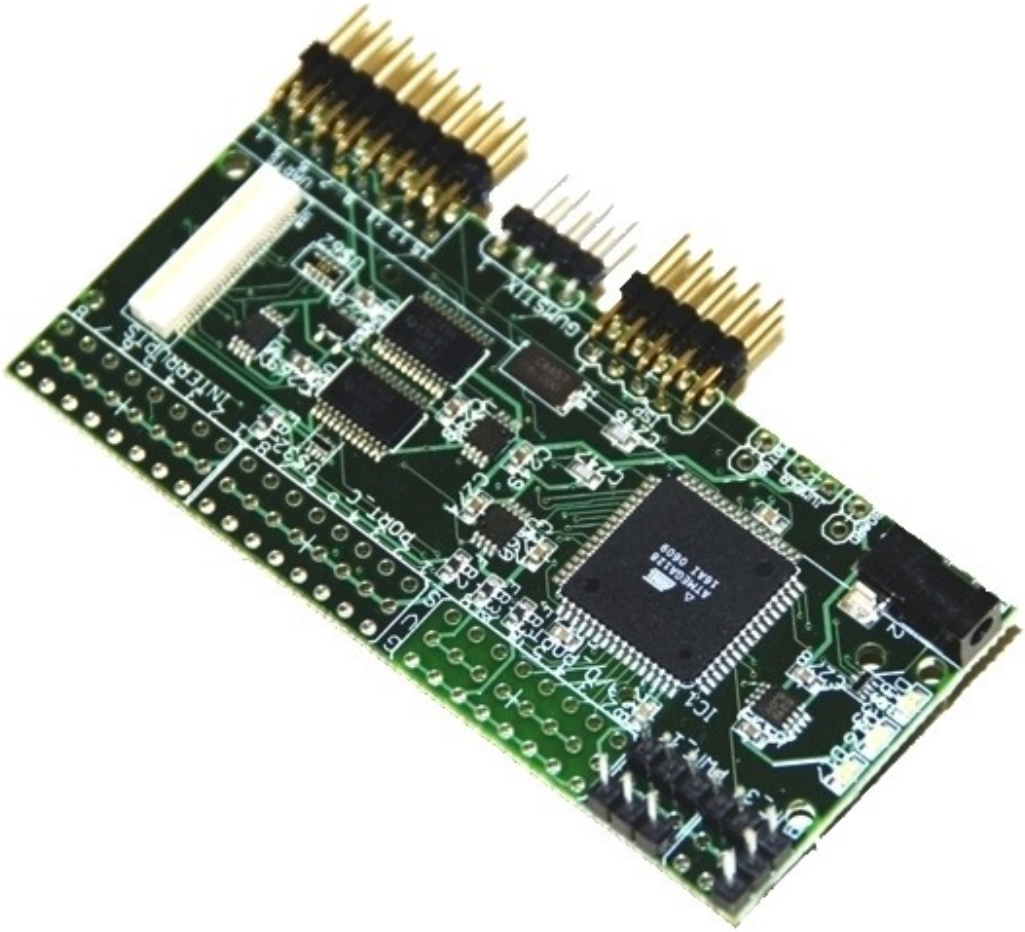

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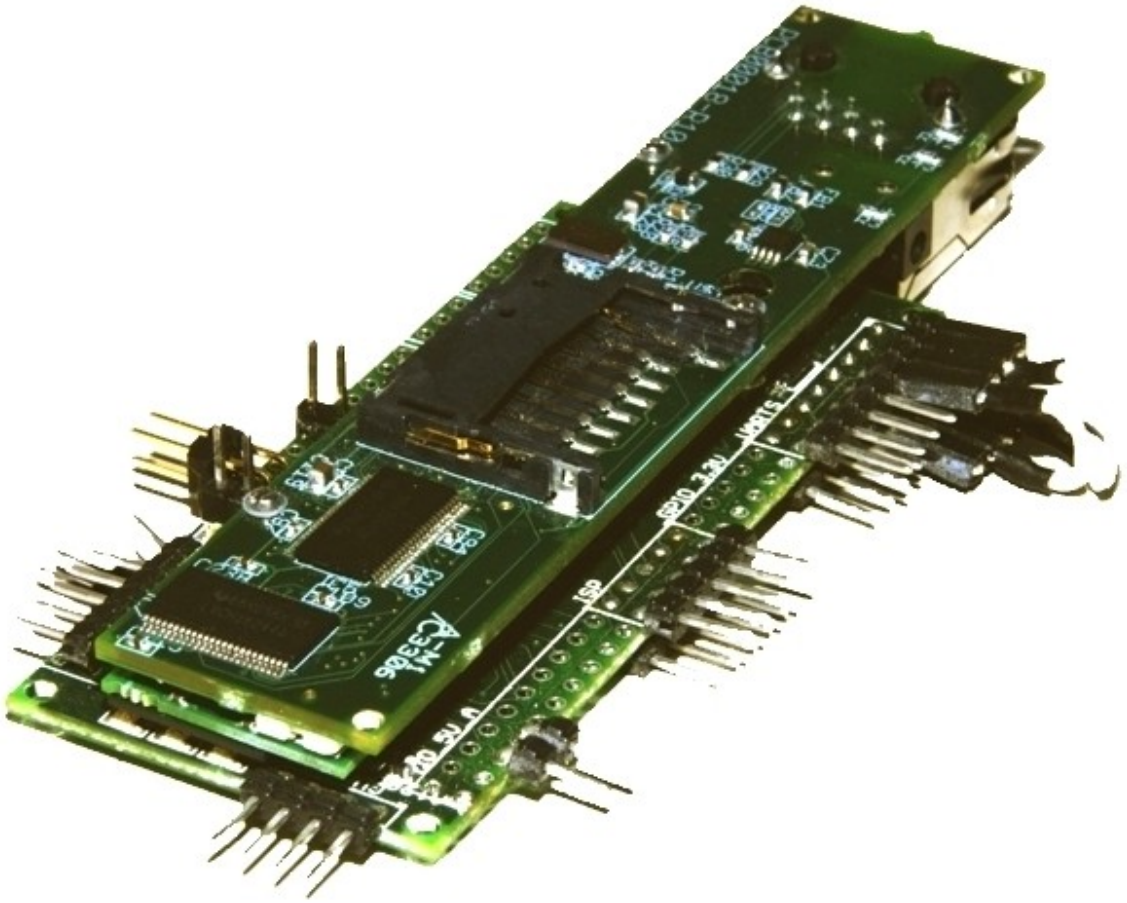
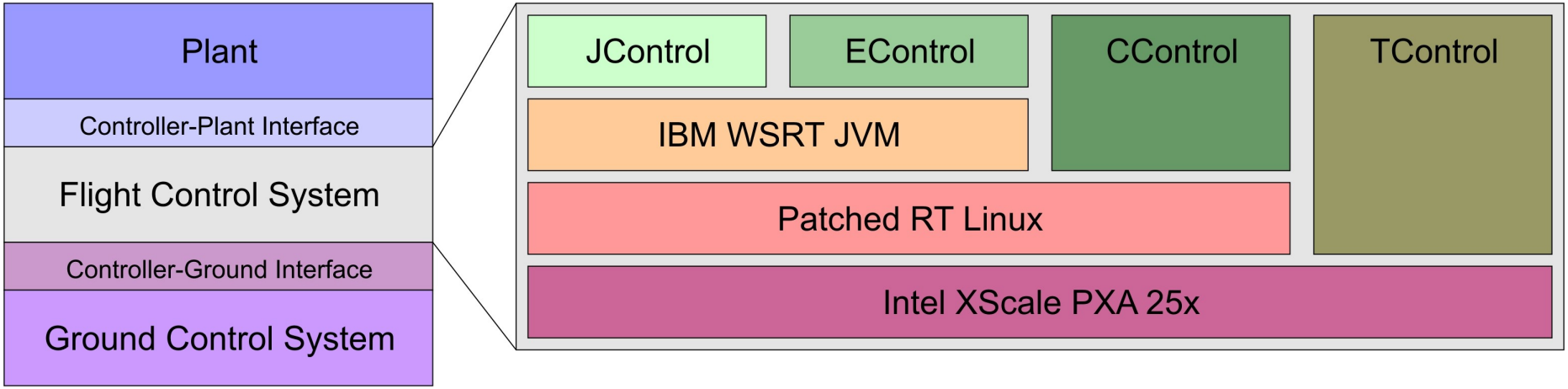


Software System



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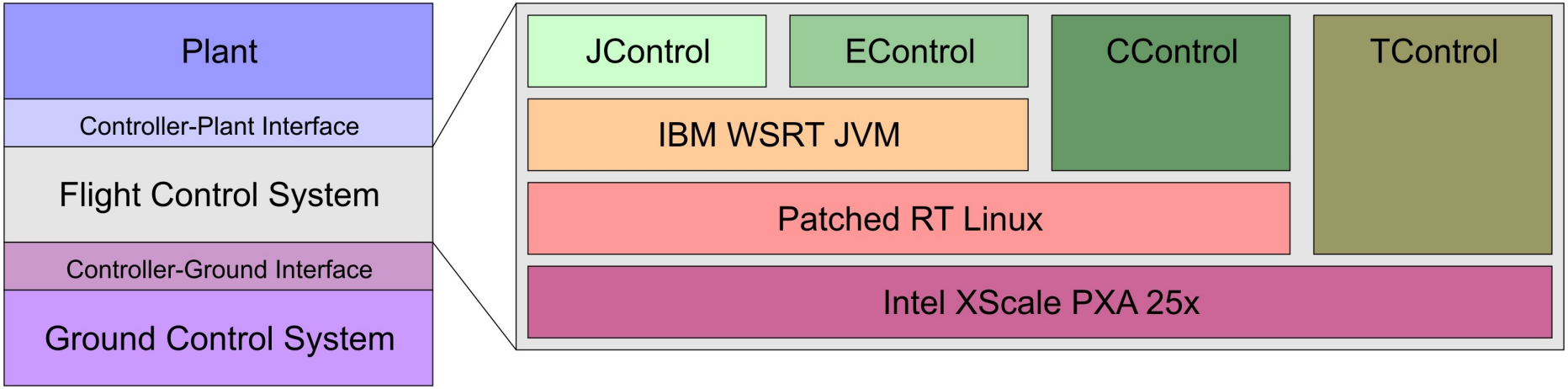

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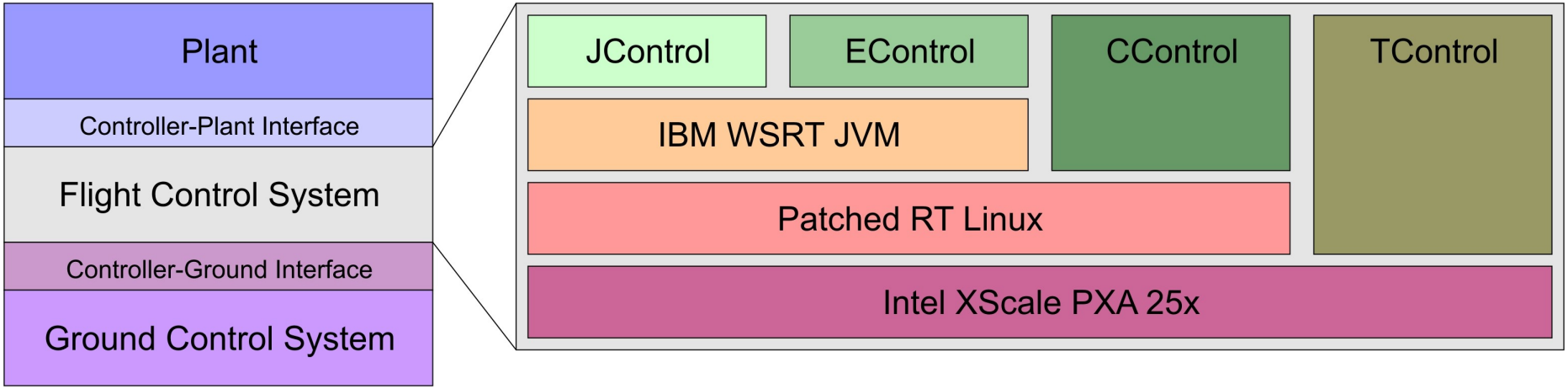

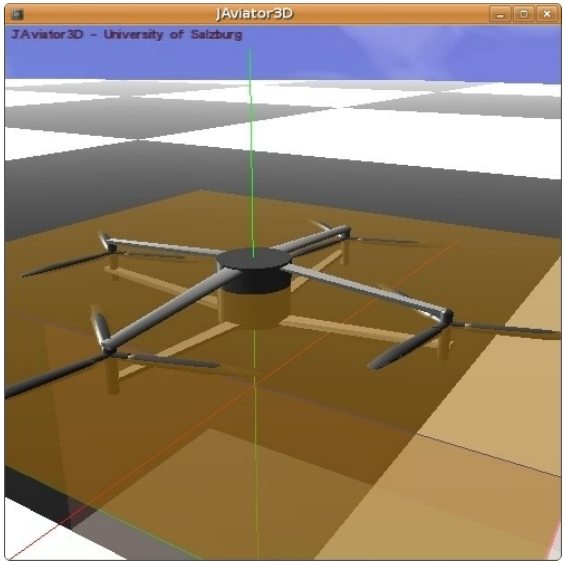

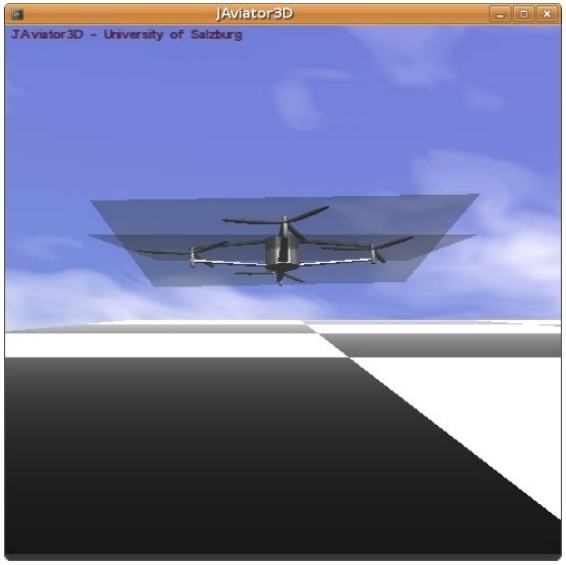

Upcoming Event

Thank You and ...

Aloha!