# **Autonomous Aerobatics on Commanded Paths**

**Cyber-Physical Systems**Project Work  
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**Content:**

1. Overview
   1. Features of the Control Structure  
      Description of working principle,   
      Picture of whole control structure (abstracted), (ABr)  
      Features: Easy Path Generation with construction kit principle?; Path of time containing velocity, too; New control structure of throttle; Simulation of GPS-signal loss with estimation of the position.
   2. Underlying Work  
      Naming the papers we have used. Mark out the own work: Path of time, throttle control structure.
2. Details
   1. Interface with the Simulation Environment  
      Available sensor data, output signals for steering the airplane.
   2. User Interface  
      Possibilities of Communication, Adjusting, and Path Commanding.
   3. Path Generation  
      Details on how Path is constructed (absolute <-> relative coordinates).  
      Special case: Roll-maneuver.  
      Explaining the Look-Ahead Distance and giving proper values.
   4. Processing of Control Variables  
      Processing the sensor Data.  
      From Desired Path to Acceleration.  
      Computing the desired Speed. (ABr)
   5. Controller Structure  
      Forumlas, structures, and descriptions of the controllers for throttle, elevator, aileron, and rudder. (ABr)
   6. GPS signal estimation  
      Description of the working principle. (ABr)
3. Results  
   What is working fine? Where is still work that has to be done?