First Person View in Unmanned Aircraft Systems

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Motivation

- Unmanned Aerial Vehicle (UAV), Drohne, ..
- Unmanned Aircraft System (UAS):

„A UAS is the unmanned aircraft (UA) and all of the associated support equipment, control station, data links, telemetry, communications and navigation equipment, etc., necessary to operate the unmanned aircraft.” Feder Aviation Administration (FAA), [8]

- Projekt: Airborne Embedded System
- Zusammenarbeit mit Department FuF
- Einsatz im zivilen Bereich

[7]

[4]

Forschungsthemen optische Systeme

- Navigation (ohne GPS)
- Kartographie
- Positionsermittlung
- Objekterkennung
  - Kollision
  - Personen
- First Person View (FPV)

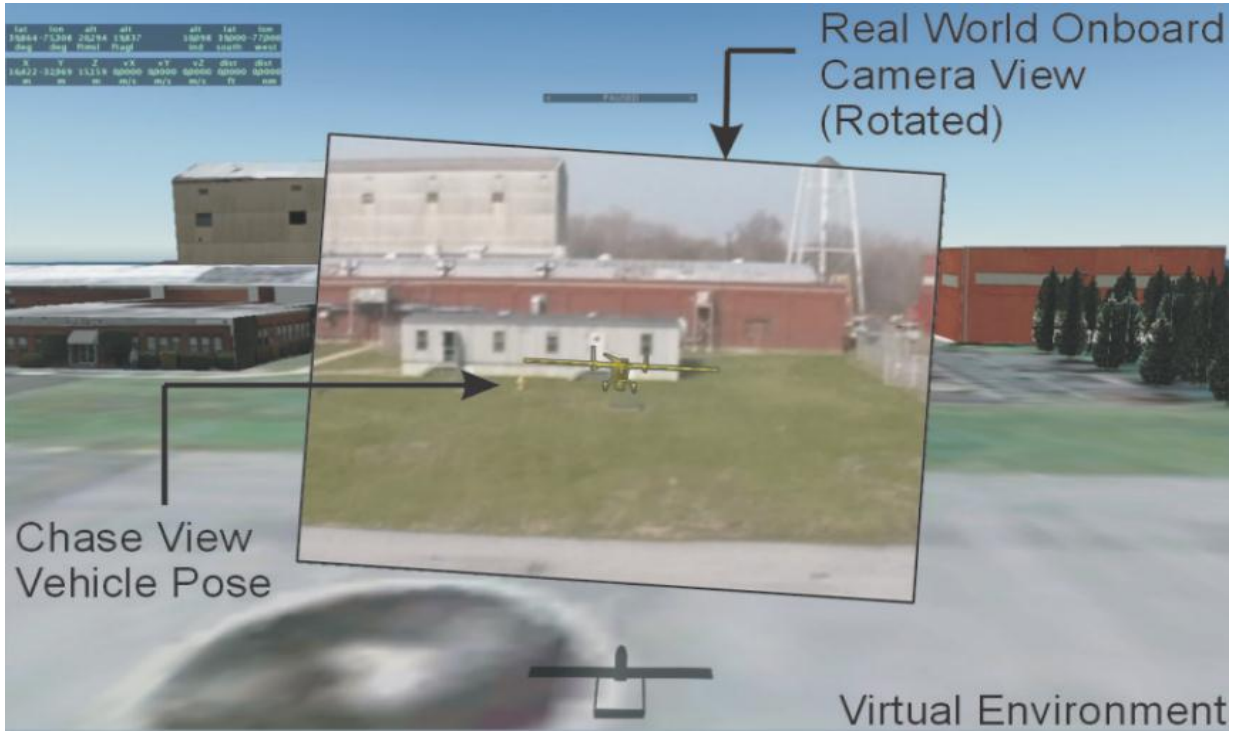
First Person View

- Steuerung UAS sehr anspruchsvoll
- Intuitivere Bedienung
- Verbesserte Sicht
- Herausforderungen
  - Display (Head-Mounted Display (HMD), Monitor, ..)
  - Kommunikation zwischen UAS und Bodenstation
  - Real-time
  - …

[13]

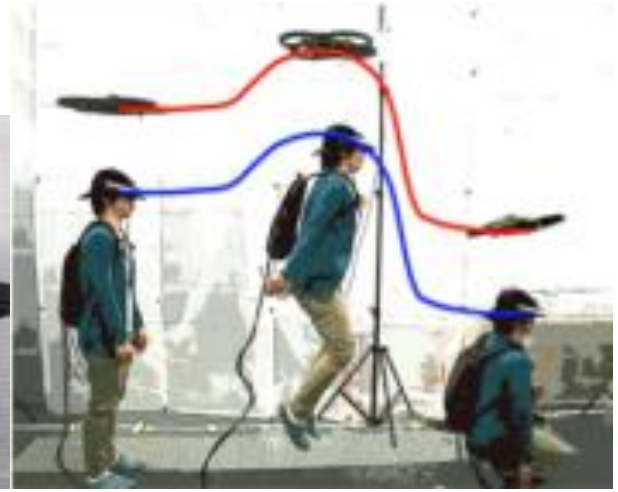
FPV Publikation 1/3

- Improving Unmanned Aerial Vehicle Pilot Training and Operation for Flying in Cluttered Environments [1], Hing et. al
- Drexel Autonomous Systems Laboratory
- Idee: Verfolgeransicht + Virtual Reality
- Methode 1
  - Feature detection & Tracking
  - Reconstruction & Mapping
- Methode 2: Mapping



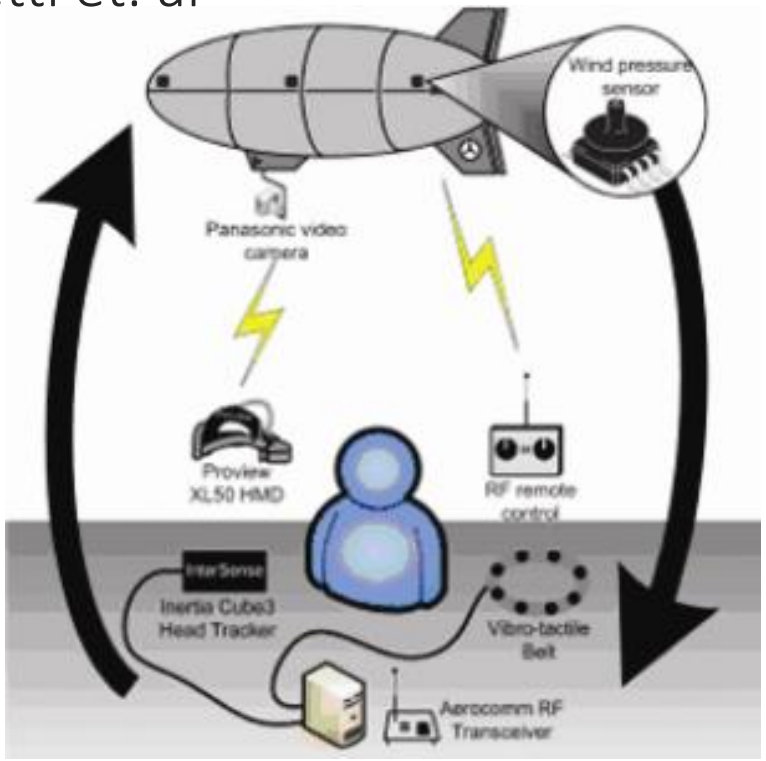
FPV Publikation 2/3

- Flying Head: Head-synchronized Unmanned Aerial Vehicle Control for Flying Telepresence [2], Higuchi et. al
- Flying Head: A Head Motion Synchronization Mechanism for Unmanned Aerial Vehicle Control [3], Higuchi et. al
- University of Tokyo
- Acht Motion-capture Kameras
- Synchronisation von UAS und Benutzer
- Vergleich zwischen HMD und Joystick



FPV Publikation 3/3

- Immersive flight for surveillance applications [4], Righetti et. al
- VRlab, EPFL Schweiz
- Idee: User wird Teil des Interfaces
- Videobrille + Headtracker
- Vibro-tacticle Belt
- Windsensor
- Test mit Benutzern



Mein Fokus

- Virtuelles Cockpit
  - FPV
  - Augmented Reality
- Oculus Rift
  - Erweitertes Sichtfeld
- Erweiterung um Pilotenunterstützung

[14]

Konferenzen

- International Conference on Unmanned Aircraft Systems (ICUAS)
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE Symposium on 3D User Interfaces (3DUI)
- ACM Conference on Human Factors in Computing Systems (CHI)
- IEEE International conference on Intelligent robots and systems (IROS)
- ACM/IEEE International Conference on Human-Robot Interaction (HRI)

Schlüsselfiguren / Organisationen

Schlüsselfiguren

- James Hing, Drexel University Philadelphia - Drexel Autonomous Systems Lab
- Keita Higuchi, University of Tokyo
- Xavier Righetti, École Polytechnique Fédérale de Lausanne - Virtual Reality Laboratory

Andere Organisationen

- UAV Dach Working Group
- UVS International

Quellen 1/2

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- [14] Neuerdings.com. Oculus Rift Teardown: Die Innereien der Virtual-Reality-Brille. http://static.neuerdings.com/1365725045/oculus-rift-ifixit-01.jpg Zugriffsdatum: 01.12.2013

Vielen Dank für Eure Aufmerksamkeit!

Fragen?