Technical opportunities and limits for UAS applications

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CURPAS e.V.
Civil Use Remotely Piloted Aircraft Systems

our research topics:


public infrastructures

Olympic Wintergames Soshi


industrial parks


technical infrastructure

INDUSTRY 4.0

analysis	systems design	assistance
• **Big Data** analysis • visualisation • process analysis **examples :** • passenger flows • on-site-traffic • document flows	• business processes • IT-conceptions **examples :** • simulation transportsystems • inbound control	• realisation • models of operation **examples**: • AGVS • people flows • mission planning drones

safety

MOBILE ASSETS MANAGEMENT
- methods and tools for production and logistics -

basic technologies

detection/identification | positioning/locating | communication

CURPAS e.V.
Civil Use Remotely Piloted Aircraft Systems

In the German Capital Region Berlin/Brandenburg the association CURPAS e.V. was established as an incubator for civil applications based on leading-edge technologies and industrial standards.

We initiate innovation

the prognosis:

we have emerging markets ahead …

- screening agriculture, forestry
- land surveying
- security patrols
- situation analysis
  - police
  - fire fighters
  - disaster control
  - rescue services
- screening of historical buildings
- identification of thermal losses
- inspections
  - i.e. buildings (i.e. crack detection)
  - chimneys, pylons …
  - exhaust systems
  - biogas plants (i.e. gas losses)
  - solar plants (i.e. cold/hot spots)
  - power supply lines
  - water pipelines (leakage)
  - transport infrastructures (i.e. highways, railway tracks)
- surveillance construction progress

Drones: opportunities

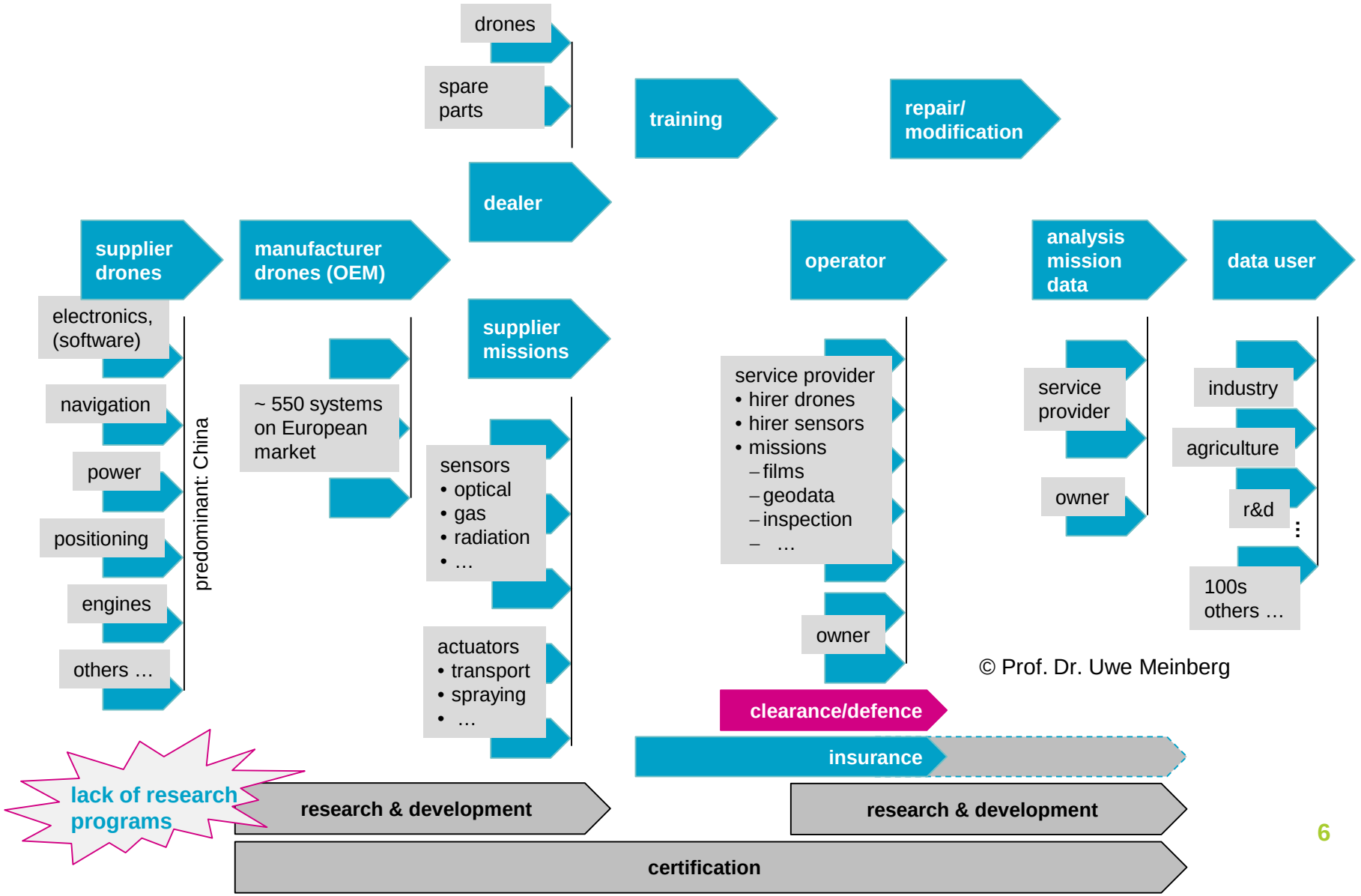
The common opinions:

Drones will revolutionise a lot of businesses.

Drones will initiate completely new businesses.

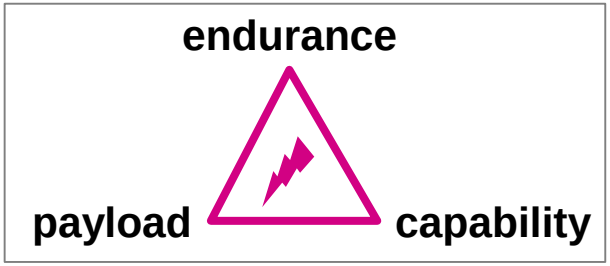
Drones will even be a part of Industry 4.0
– and of the upcoming Digitalisation as well …

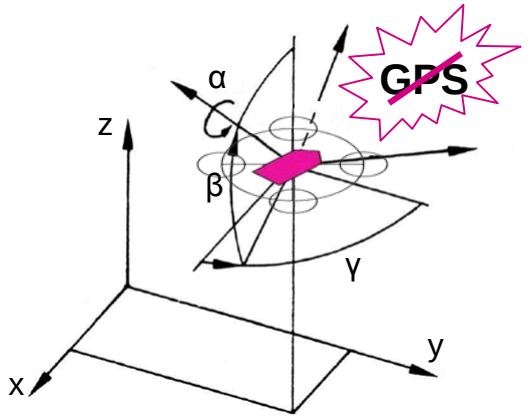
the drones value chain (SMEs are predominant)



limits | operations

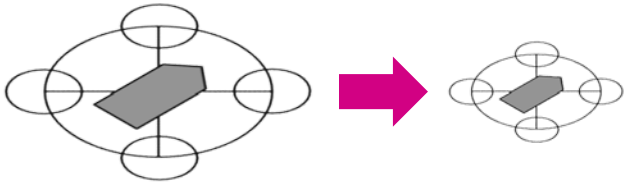
- **enhancement**
  (leight-weight, energy, engines, …)





- **exact and precise positioning** (in particular for landing)

- **indoor operation: downsizing**



- **bioinspired flight control**

limits | sub-systems and missions

- **localisation / navigation: 3D-SLAM**
  (**S**imultaneous **L**ocalization **A**nd **M**apping)

$$P(x_t|o_{1:t}, m_t) = \sum_{m_{t-1}} P(o_t|x_t, m_t) \sum_{x_{t-1}} P(x_t|x_{t-1}) P(x_{t-1}|m_t, o_{1:t-1})/Z$$

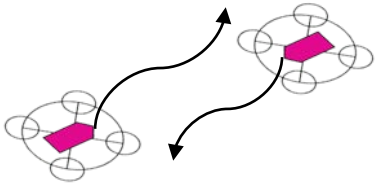
- **autonomous operation / artificial intelligence**

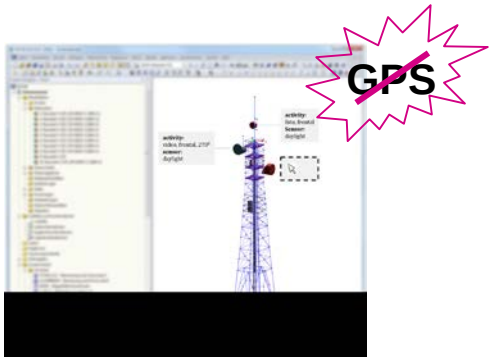
uncertain reasoning

Turing Test

neural networks

- **detect-and-avoid**





- **mission-planning and –operation**
  (augmented reality)

new!

- **enforcement and clearance / defence - growing importance!**

limits | data-analysis

We are confronted with BIG-DATA.

The main topic of research is:

"CAA" – Computer Aided Analysis

this means in particular: fully automated processing (e.g. of images) **…**

An interesting open topic:

what's about data collected "along the way" during missions?

e.g. traffic-data collected during a transport mission …

result

Technologies for drones have to bring them to the level of professional **tools!**

Drones should support business – along the whole value chain.

Aside the previously mentioned limits and derived research topics we need **standards**!

(mechanical, electrical, digital etc.)

The currently available proprietary systems will not lead to an emerging market.

Questions or comments?

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source: "Guard from Above"