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# A Multidimensional Definition of Robotic Autonomy

Possibilities for Definitions and Regulation

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Definition of Robotic  
Autonomy

April 14<sup>th</sup>, 2015

## Robotic Autonomy

- The concept of „meaningful human control“ is supposed to restrain autonomy but both are hardly defined yet.
- Autonomy within complex systems is especially difficult to specify.
- BUT: It should be possible to define several single vectors to grasp autonomy.

# Vectors of Autonomy

- Time
- Space
- Sensors/recognition, processing, manipulation
- Interaction and communication
- Dealing with/ handling of errors (rate, tolerance)
- Self-preservation

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## Cumulative Criteria and Thresholds

- New definition of robotic autonomy to be regulated:

“A system that exceeds a  
– technically **and** politically defined –  
threshold of several accumulated qualitative criteria.”

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## Cumulative Criteria and Thresholds

### ■ Groups of criteria for vectors

- Physics: time, space, energy
- Sensors: quality, quantity, capabilities
- Weapons: quality, quantity, impact
- Human control: steering, veto
- Machine: errors, fault tolerance, self-preservation

# Cumulative Criteria and Thresholds

## Pros

- calculable
- reproducible
- negotiable (political)
- verifiable
- transparent

## Problems

- Use of software
- Unwanted effects during cumulation

## Cons

- techno-centric
- complex