

Willkommen  
Welcome  
Bienvenue



## What makes a building smart?

Swiss-US Innovation Days  
New York, August 22, 2017  
Dr. Peter Richner  
Deputy Director

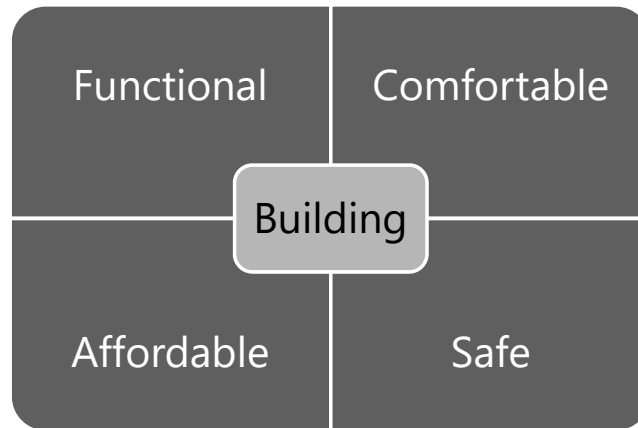
## Definition of *SMART*



Having or showing a quick-witted intelligence.



## What is the function of a building?



## What is a good building?

- A building which provides
  - Functional, comfortable, affordable and safe space
- In a **ressource efficient** manner

Clear task, known since centuries

**PROBLEM  
SOLVED!**

## What is a good building?

- A building which provides
  - Functional, comfortable, affordable and safe space
- In a **ressource efficient** manner

Clear task, known since centuries – where is the problem?

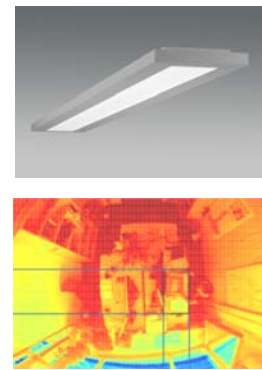
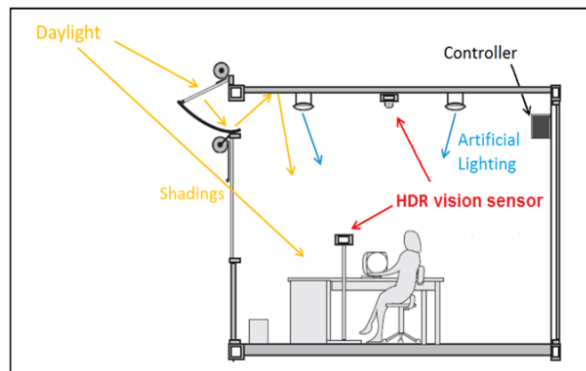


## Short Term Dynamics

- Day – night cycles
- ...

## Short term dynamics: Integrated Blinds and Lighting Control

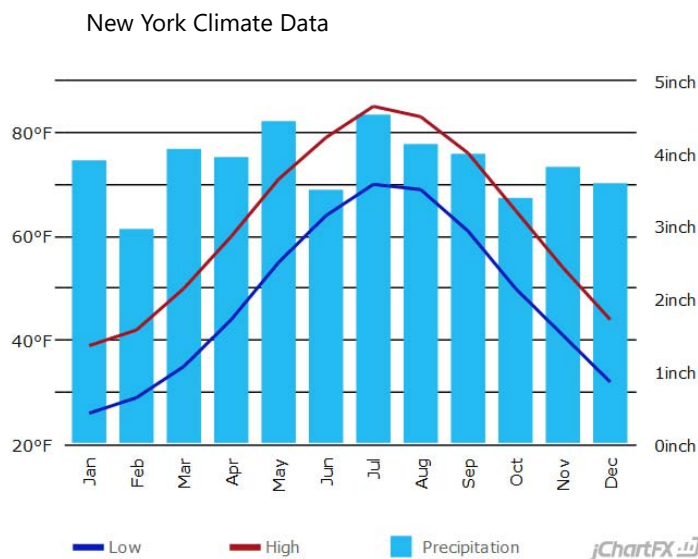
- Movable Textile Blinds and Dimmable LED-based Lighting (KNX/DALI)
- > 30% electricity saving compared to state of the art



Workplane Illuminance  
User Presence

Motamed et al., „Toward an integrated platform for energy efficient lighting control of non-residential buildings“, SBE, June 15-17 2016, Zürich.  
DPMA Patentanmeldung DE 10 2016 007 074.9, „Lighting Control System“, June 15<sup>th</sup> 2016, München.

## Mid Term Dynamics



Mid-Term Dynamics  
 Challenges of highly glazed buildings:  
 Use of Daylight/Overheating in Summer/Solar Gains in Winter

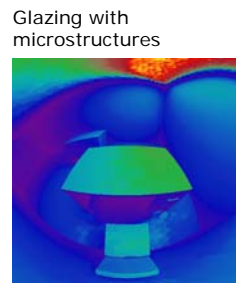
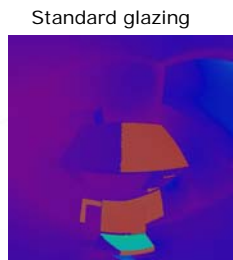
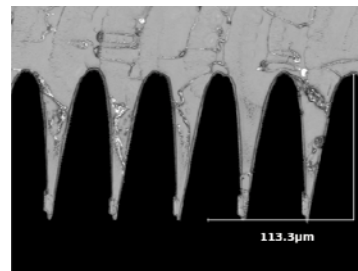
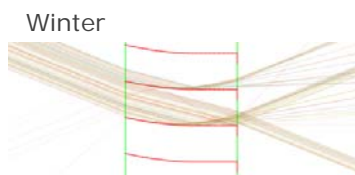


Library in Shenzhen (22° 32' 0" N / 114° 8' 0" E), China



Source: J. Gong; EPFL

Dynamic Glazing



Idea: J. Gong, A. Kostro, A. Motamed, A. Schüler; EPFL  
 Cooperation: P. Hoffmann, Empa  
 Industrial Partner: A. Hafner

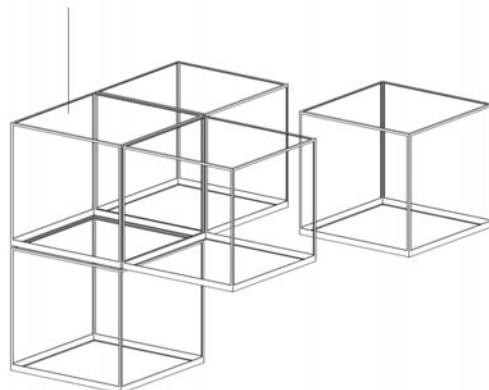
BASF

## Long Term Dynamics

- Ageing society
- Climate change
- ...

## Long-term dynamics «Steel Case»

REGELMODUL  
3.0 x 3.0 x 3.0 m



Julia Hemmerling, Msc ETH Arch. ,  
Prof. Dr. Joseph Schwartz, Dr. Schwartz Consulting AG

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## Long-term dynamics «Steel Case»



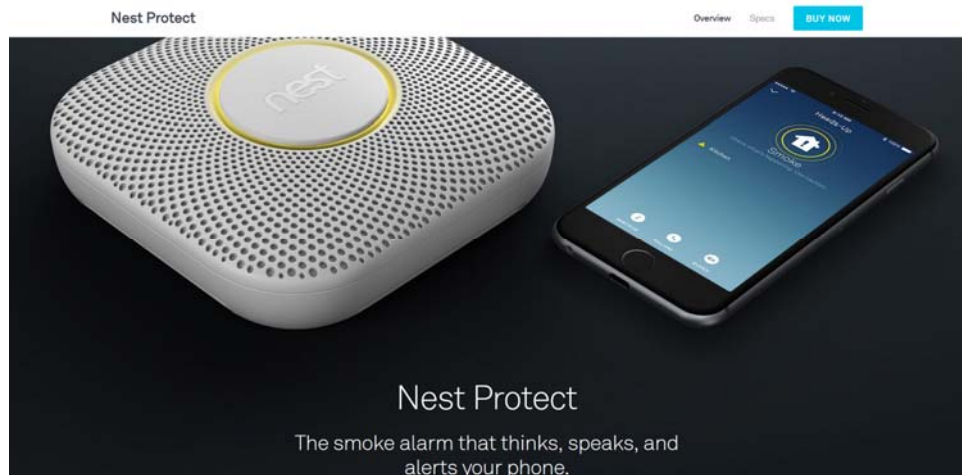
Julia Hemmerling, Msc ETH Arch. ,  
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## Single Events

- Earthquakes
- Fire
- Burglary
- ...



## Single Events



## A smart building is ...

- A building which provides
  - Functional, comfortable, affordable and safe space
- In a resource efficient manner

and

- ***Is able to react to short-, mid- and longterm dynamics in an intelligent manner***

Thank you very much for your attention

