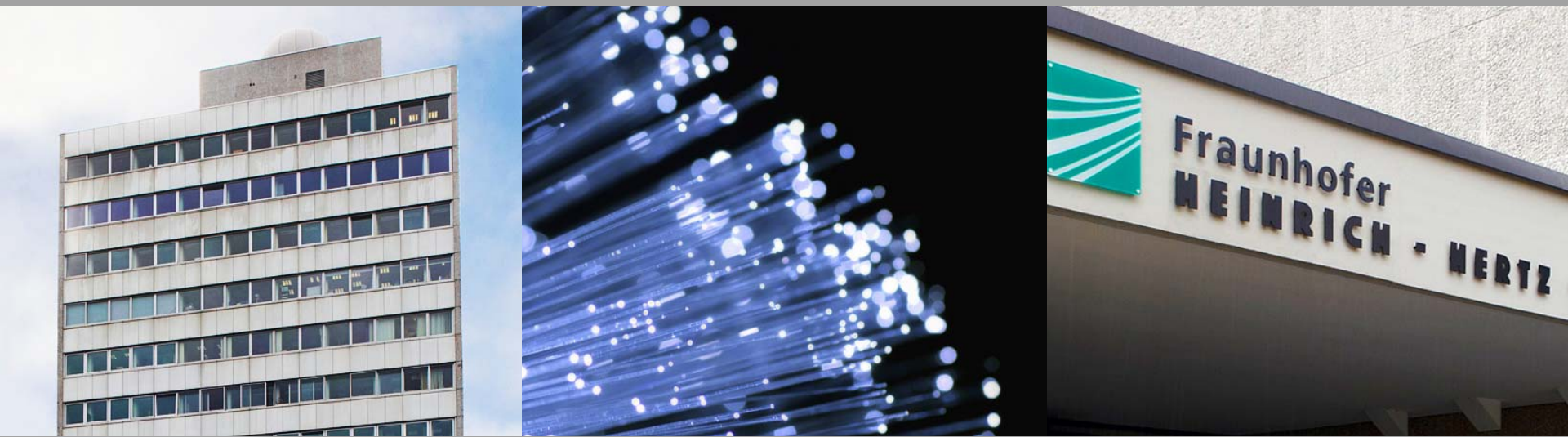


Optical Wireless Communications Beyond Research

Klaus-Dieter Langer



- Introduction, Lessons learned
- Potential applications
- Ways towards the market

- Work on OWC at HHI
 - Infrared since the 1980s
 - Minor activities during the radio boom
 - LED & DSP technologies as new drivers
- Recent results using lighting LEDs
 - Lab trials
 - 230 Mb/s OOK, 500 Mb/s DMT
 - 800 Mb/s DMT (R+G+B)
 - Public demonstrations, e.g.
 - Analog bidi < 100 Mb/s
 - Fully-fledged VLC @ 100 Mb/s using DMT



- OWC is sexy, in particular VLC
 - Headlines around the globe, such as
 - The data shower
 - What you see is what you get
 - Data travelling by light
- Reporters like it, people too, because it is catchy and evident
- Potential users create new ideas, however
 - need support and counseling
 - do not want to take risks (or much invest) for finishing

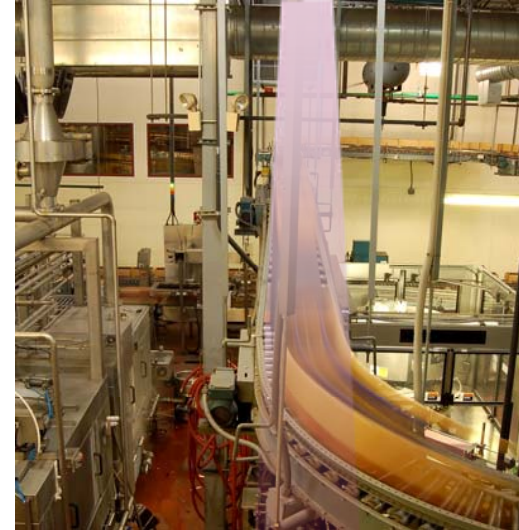
Gap between R&D and product engineering to be bridged !

- Key enablers
 - Use of standard components/technologies
 - Piggybacking
 - Giving competitive edges
- Unique selling points
 - Local wireless speed @ low cost
 - Privacy, interference immunity
 - Wavelength → underwater communications

There are both lots of niches and well-heeled markets waiting for service !

Some potential Applications

- Manufacturing, production lines
- Medical technology
- Local hot-spots
- Underwater (resource exploration, oil & gas extraction)
- We firmly believe that there are more



Source: Nakagawa Labs

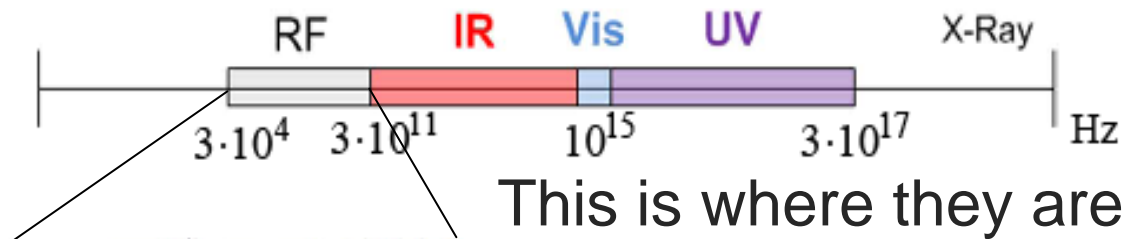


- Looking for alliances
 - Standardization: plenty of boundary points to other domains, more strong players needed
 - Lighting industry: just converting from “box gutters” to electronics engineers → “lookouts”
- Looking for early adopters → advertising, demonstrations
 - Introduction of innovations is a challenge
 - Incumbents only believe what they can see and test
- More R&D
 - Not “higher, faster, farther”, but e.g. optical antennas
- Going the Spin-off way
 - Faced with chicken-egg problem



What next after further few years R&D ?

Wireless will be looking for niches ... of bandwidth

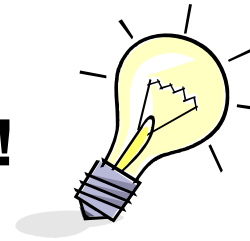


Here they are
not !



Optical spectrum is too huge to be used in fiber only

Discussions are welcome !



find more information at
www.hhi.fraunhofer.de