



OpenLidar in Action: Integrating a scanner module into a robust lidar

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WESC 2017, June 27

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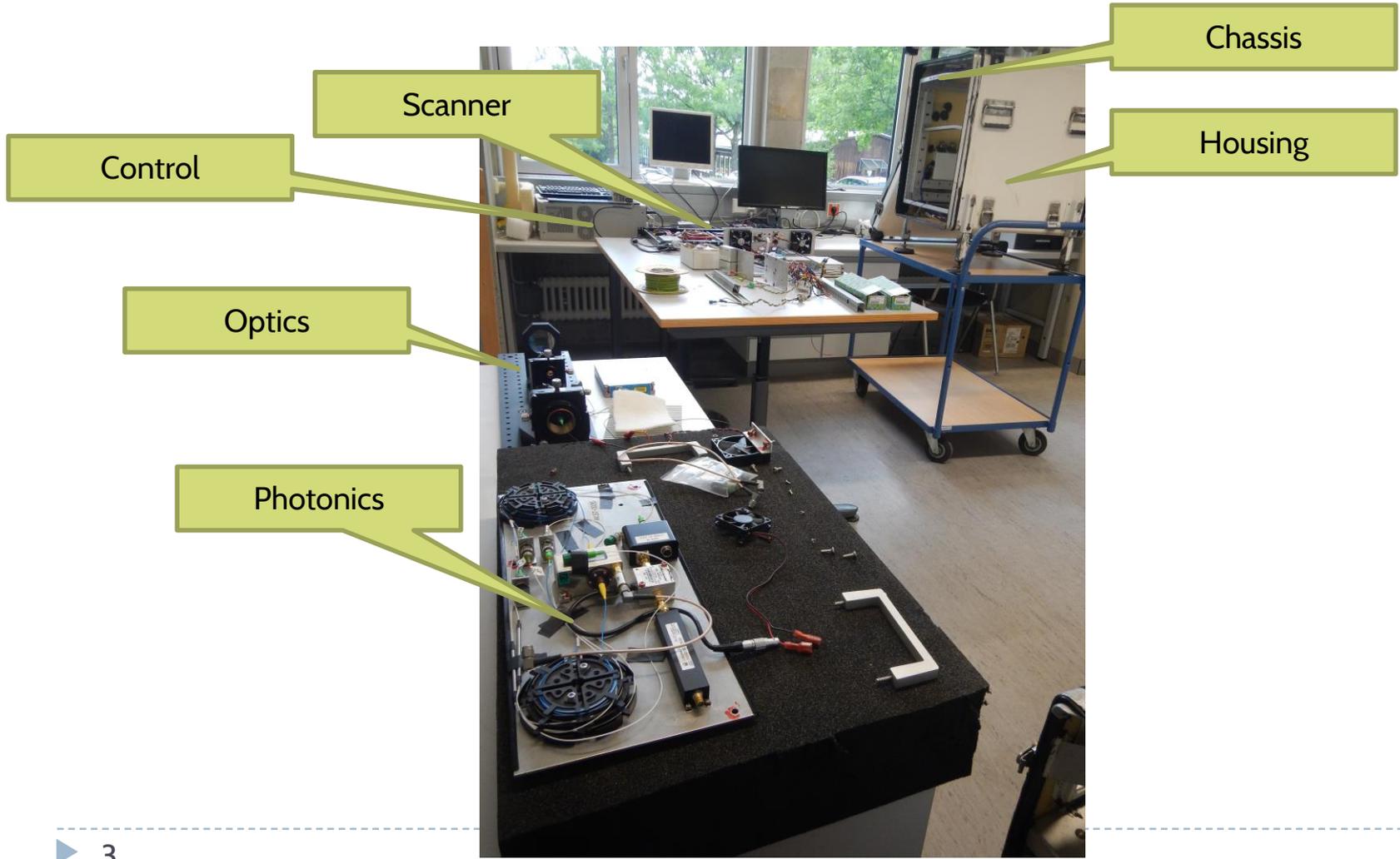
³ DTU Wind Energy, Technical University of Denmark

What is Project ANWIND?



- Development of a compact, powerful and robust lidar scanner in cooperation with OpticSense GmbH
- Project goals
 - To optimize the SWE Scanning Lidar
 - To achieve the highest possible flexibility in wind measurements
 - Have access to lidar control





Control

Scanner

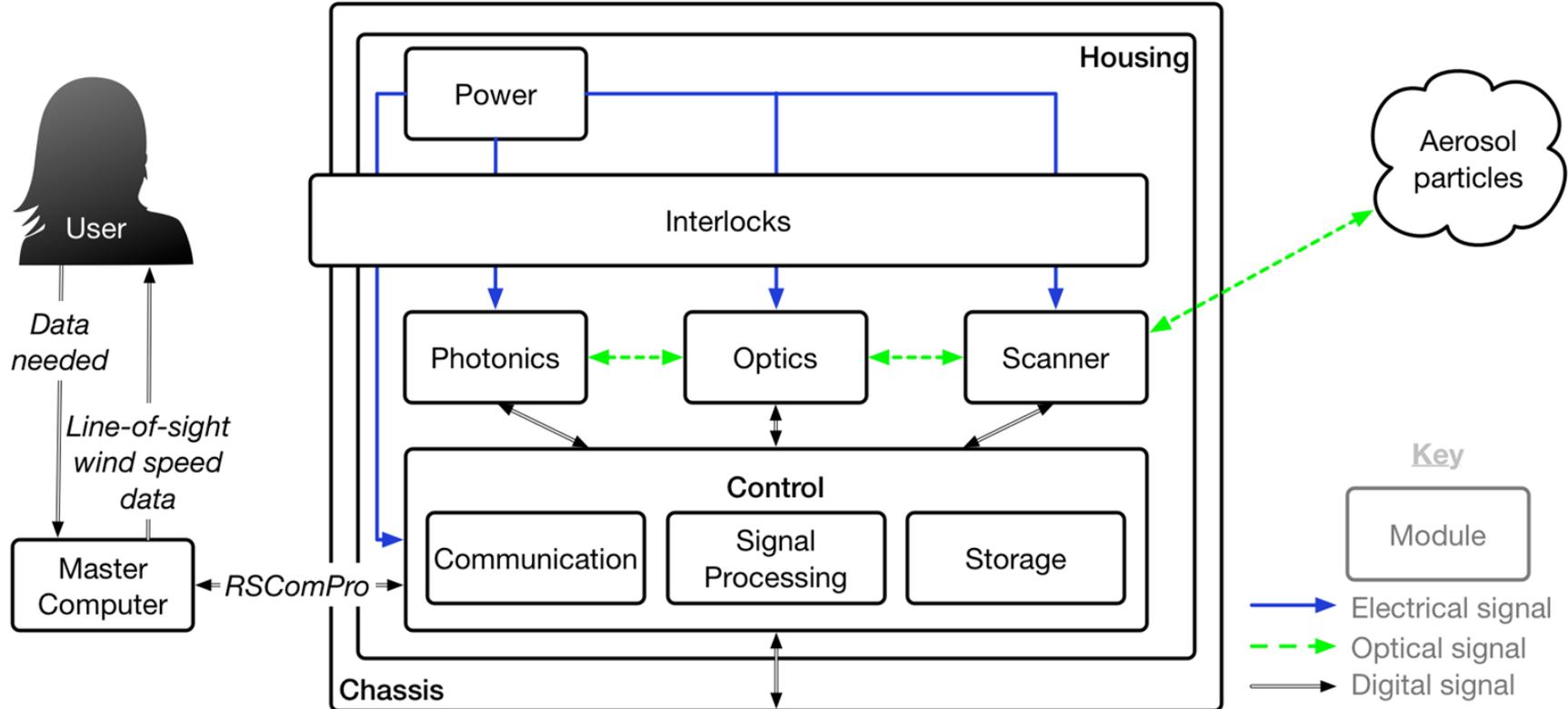
Chassis

Housing

Optics

Photonics

A Modular Architecture



What is OpenLidar?



For more information
www.openlidar.net

Research

- System Simulation
- System Optimization
- Testing new Technologies
- Post Processing Tools

OpenLidar

Prototyping

- Module Design
- Module Prototyping
- System Architecture
- System Integration

Community Exchange

- Website and Wiki
- Documentation
- Code & Data Sharing
- Workshops
- Newsletter

OpenLidar in Action: ANWIND



Goal:

- Use ANWIND as a case study
- Apply OpenLidar concept and learn how to improve it
- High level idealism vs. real live: find out the practical challenges of the concept



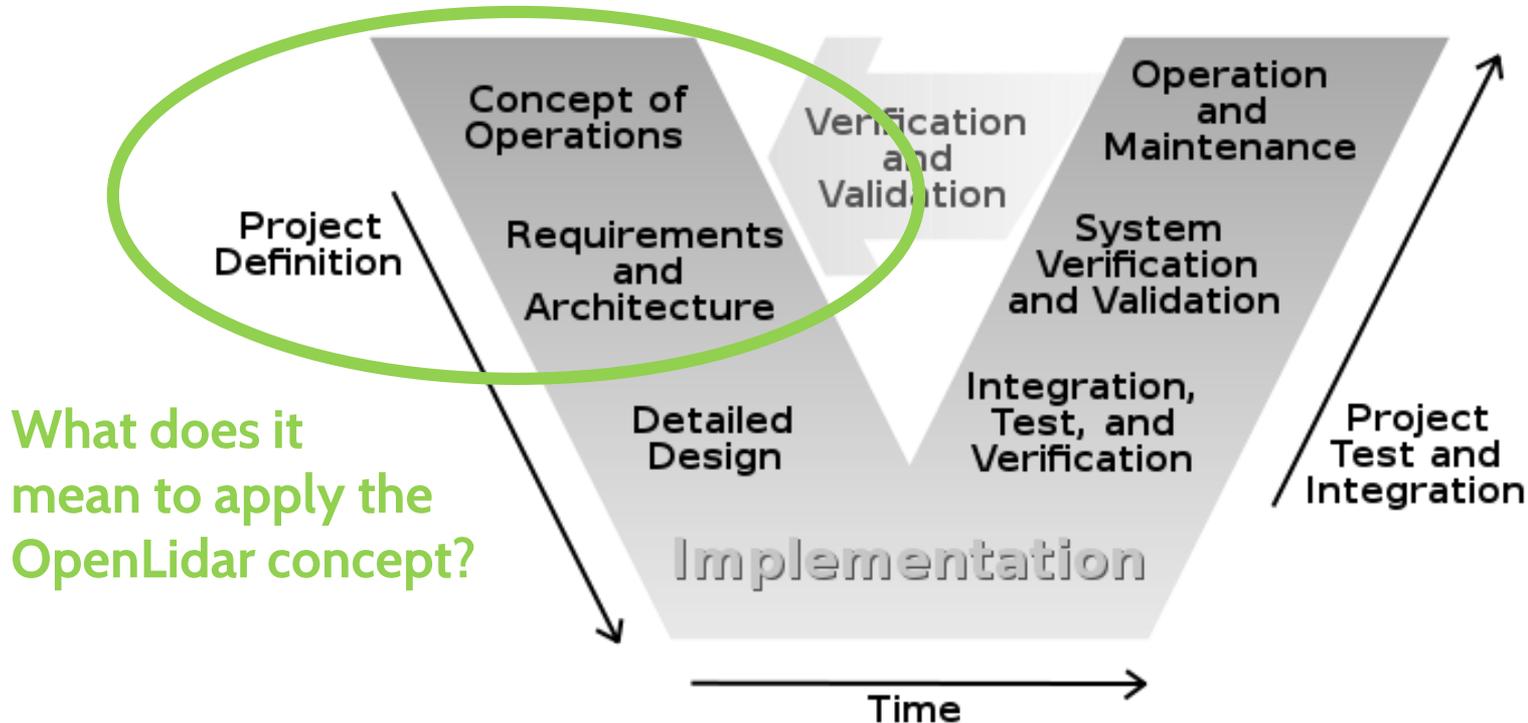
How OpenLidar helps ANWIND



- Helps to integrate scanner and other modules
- Concept for interfaces between modules
- Platform for exchanging experience
- Potential to reuse modules in future

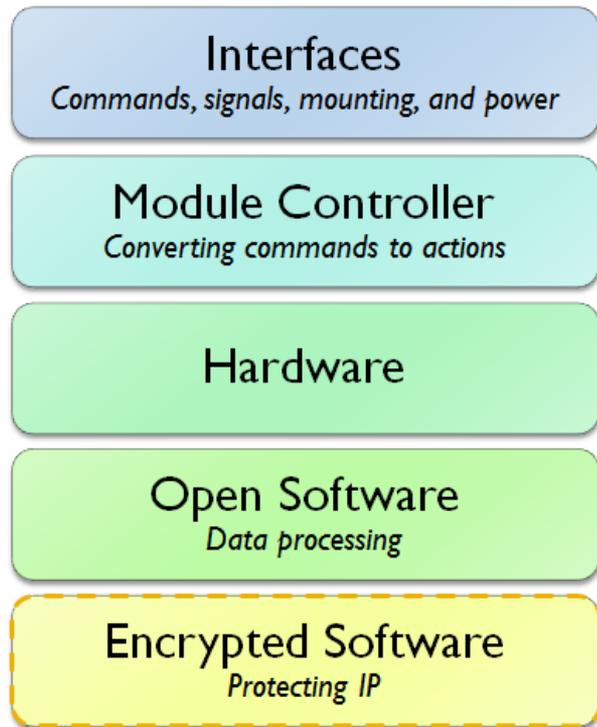


What's happening in ANWIND?



[www.wikipedia.org]

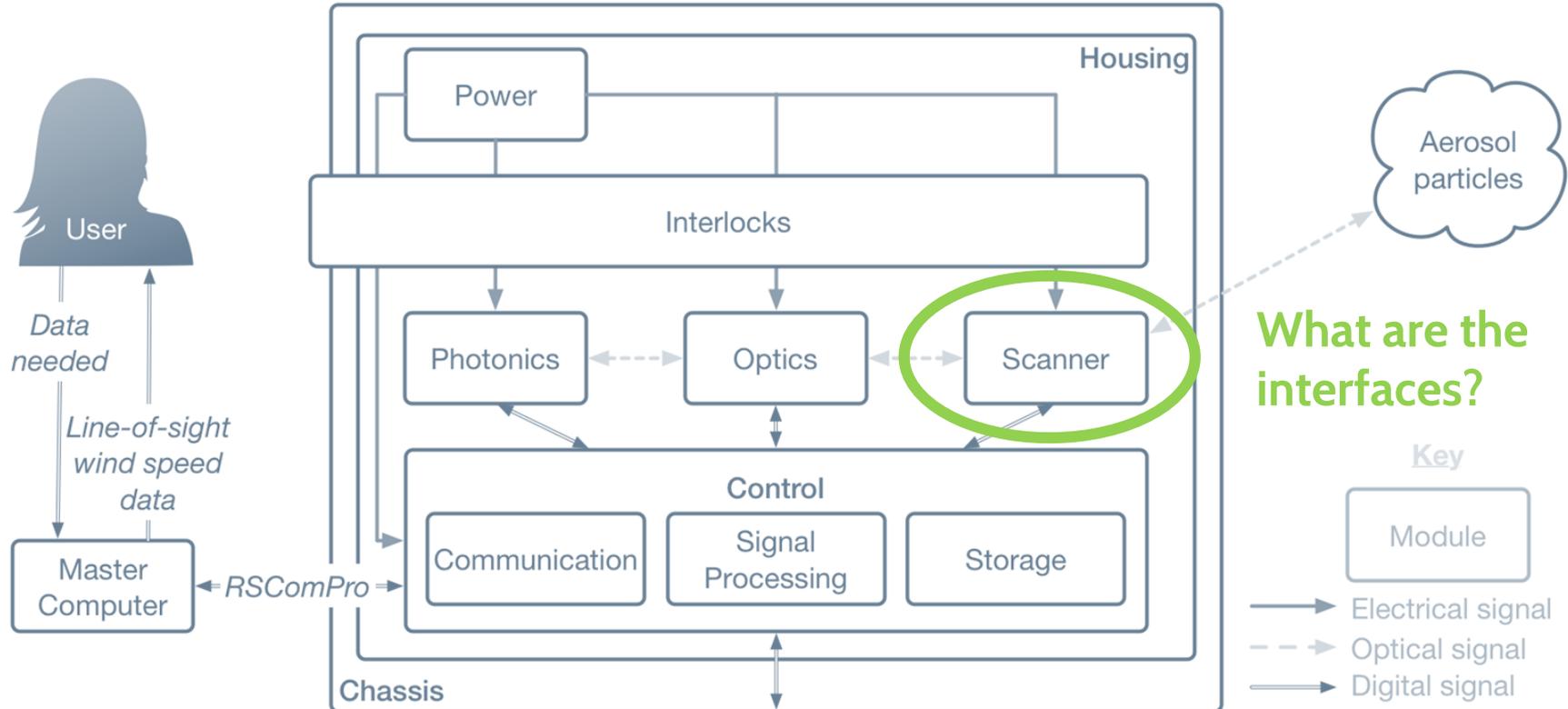
What's in OpenLidar modules?



OpenLidar modular concept:

- Each module comprises components that are well documented
- Modules connect to each other through interfaces
- Modules can be developed independently from each other and then swapped

What goes in, what comes out?



What are the interfaces?

Signal, Mounting and Power Interfaces



Interfaces

Commands, signals, mounting, and power

Module Controller

Converting commands to actions

Hardware

Open Software

Data processing

Encrypted Software

Protecting IP

Lots of questions!

- Scanner degrees of freedom and implementation?
- How many beams?
- How much power?
- ...

→ For true modular design, it would be better to have an external scanner

Command Interfaces



Command interface

- Communication between the modules
 - Commands passed over a data bus
 - Commands have a general protocol, e.g. RSComPro or similar
 - But what are those commands?
- Need for an “OpenLidar command library”, developed and used by the community

How open can OpenLidar be?



INTELLECTUAL
PROPERTY



Openness vs. IP rights



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[www.scanlab.de]



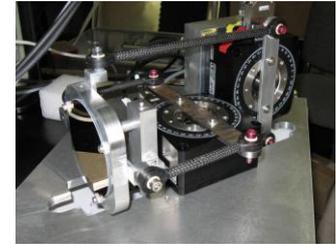
[www.newson.be]



[www.optximaging.com]



[www.newport.com]



Openness vs. IP rights



- Hardware may be patented, manufacturing licenses can be sold
 - Software from component suppliers is sometimes protected
 - Each module developer can choose how open to be
- Defined interfaces allow IP to be protected
- More openness is better for research

What we learned so far

- Modular architecture requires an OpenLidar command library and an external scanner module
- IP protection is not a problem for a scanner module

Next steps in ANWIND

- Finishing of concept phase of scanner module in ANWIND until August 2017
- Refine description of scanner module in the wiki and invite people to contribute

How Can You Get Involved?



- Join the community
- Help refine the OpenLidar concept
- Design and build a module or lidar with these ideas
- Look for funding to explore OpenLidar
- Get students involved

www.openlidar.net

contact@openlidar.net



Let's Talk!



www.openlidar.net

contact@openlidar.net