



Testing Centers in Tidal Technology Development



Rick Driscoll
Senior Engineer
Offshore Wind and
Ocean Power Systems

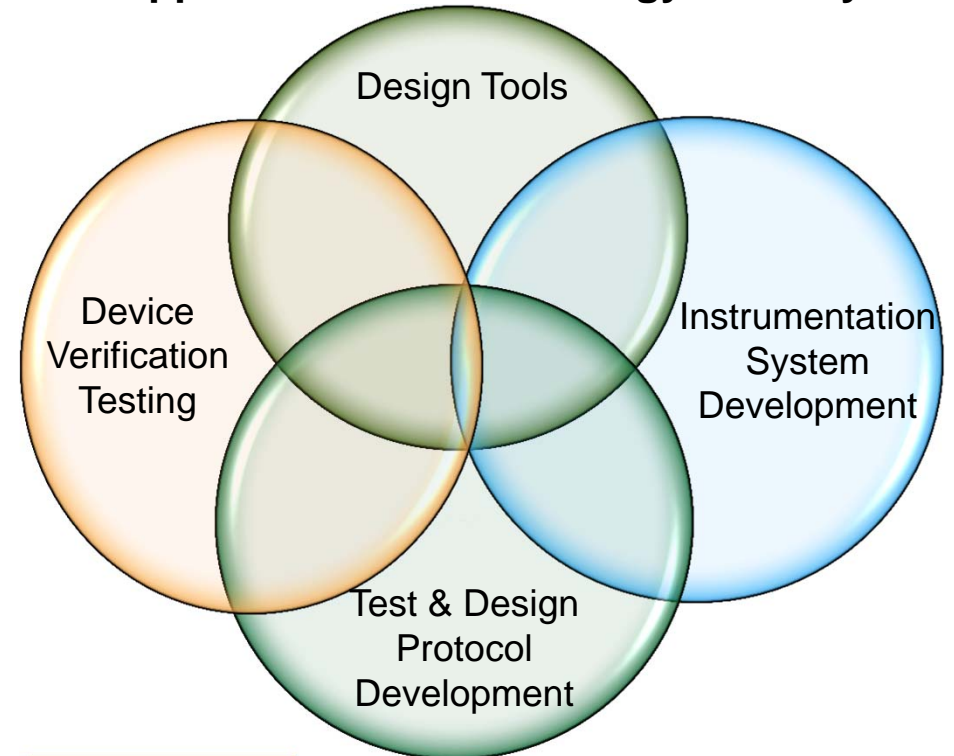
National Renewable Energy Laboratory



MHK Research and Development at NREL

U.S. DEPARTMENT OF
ENERGY | Energy Efficiency & Renewable Energy

An Integrated Research Approach in Support of the Ocean Energy Industry



The NREL Research Team:

- Rick Driscoll
- Levi Kilcher
- Michael Lawson
- Al LiVecchi
- Ye Li
- Marco Masciola
- Walt Musial
- Eric Nelson
- Bob Thresher
- Yi-Hsiang Yu

Building and testing of MHK systems is hard enough – why add the burden, cost and pain of developing your own testing facility? - numerous people



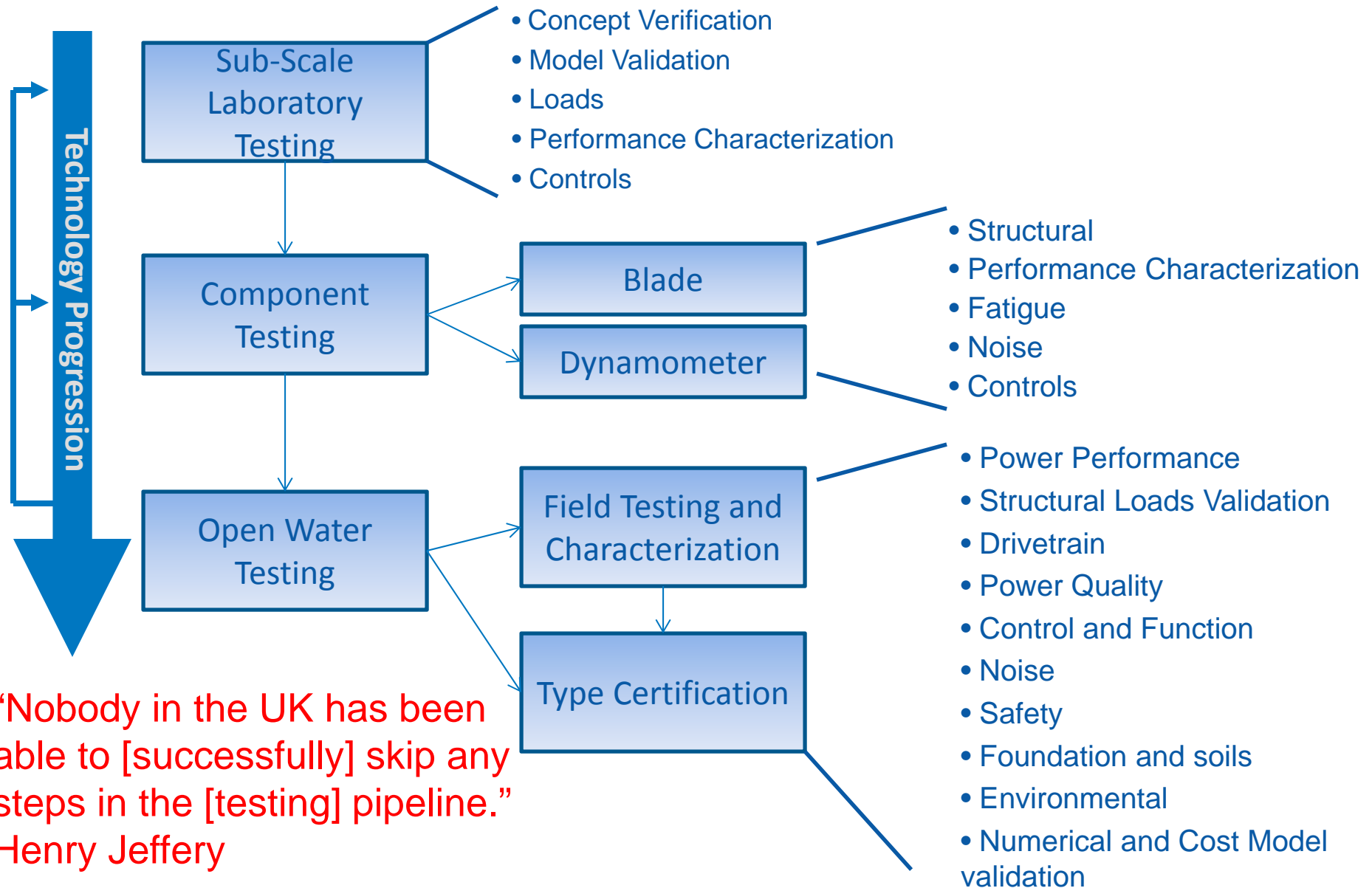
Wind Turbines Still Break!



The ocean is much more challenging and less forgiving



Testing in Technology Development



“Nobody in the UK has been able to [successfully] skip any steps in the [testing] pipeline.”
Henry Jeffery

Some Benefits of Open Water Testing at Centers

Direct Benefits to Technology Developer:

- Reduced technical and financial risk
- Reduced testing cost
- Easier deployment and reduced test duration
- Comprehensive data sets to support design
- Reduced time to market via streamlined permitting

Indirect Benefits:

- Facilitation of innovation
- Promotion of local (home grown) technologies
- Internationally recognized technical expertise
- Established knowledge centers and business corridors
- Practical and experienced based input into international standards development
- Education and workforce development ... jobs



Some Benefits of Open Water Testing at Centers

Facility Capabilities and Attributes

- Installed, robust and integrated infrastructure (cables, instruments, shore facilities, etc)
- Characterized site with long term data sets
- Local expertise and site familiarity
- Local community outreach and trusted reputation
- Established support and logistics infrastructure
- Testing and measurement accreditation
- Established testing and safety protocols

A Few Considerations

- Resource: current speed, bi-directionality, turbulence, etc.
- Site characteristics: depth, bottom type, ambient noise, etc.
- Infrastructure: cables, moorings, grid connection, high quality instrumentation and data acquisition, permitting
- Business model: user facility to full service