

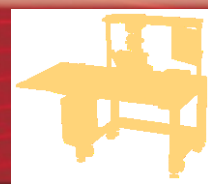
THORLABS

Solutions for the photonics industry:

from a customer's idea to an off-the-shelf product

Dr. Julien Vigroux

Our Product Range



- ▶ Optomechanics
- ▶ Motion Control
- ▶ Optics
- ▶ Fiber
- ▶ Light
- ▶ Light Analysis
- ▶ Imaging & OCT
- ▶ Advanced Applications



Our Competencies

- ▶ Vertically Integrated
- ▶ Extensive Production Facilities that Manufacture more than 90% of Our Products
- ▶ Customization
- ▶ Fast Same-Day Shipment for over 95% of All Items
- ▶ Large Product Portfolio Featured in Catalog & on Web with more than 12 000 products
- ▶ Advanced Service and Technical Support

We Serve Customers ...

... in the Photonics Industry
to Develop Projects
Around Laser Applications.



Picture Courtesy: IPAS – University of Adelaide/Photographer Jennie Groom



We employ ...

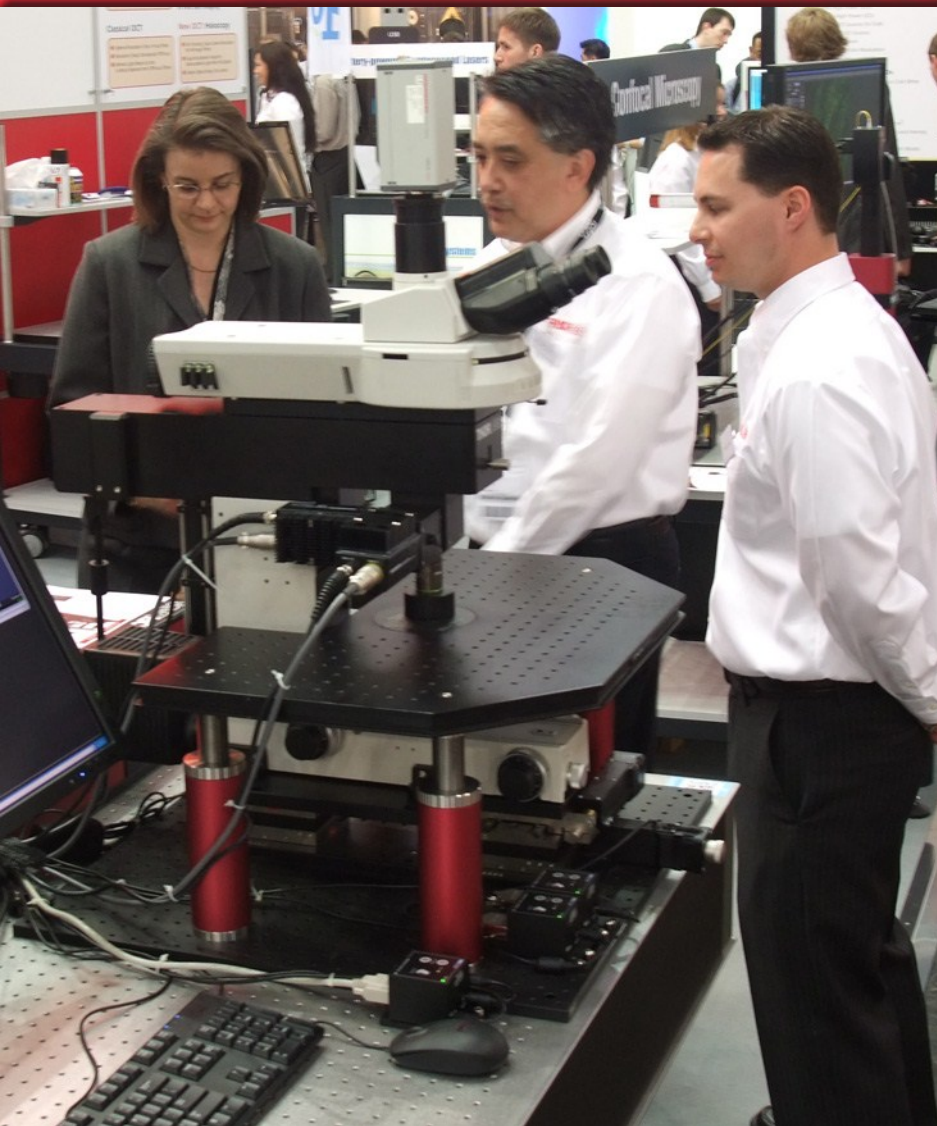
... more than 850 people in the United States, Germany, United Kingdom, France, Sweden, Japan, China, and Brazil.





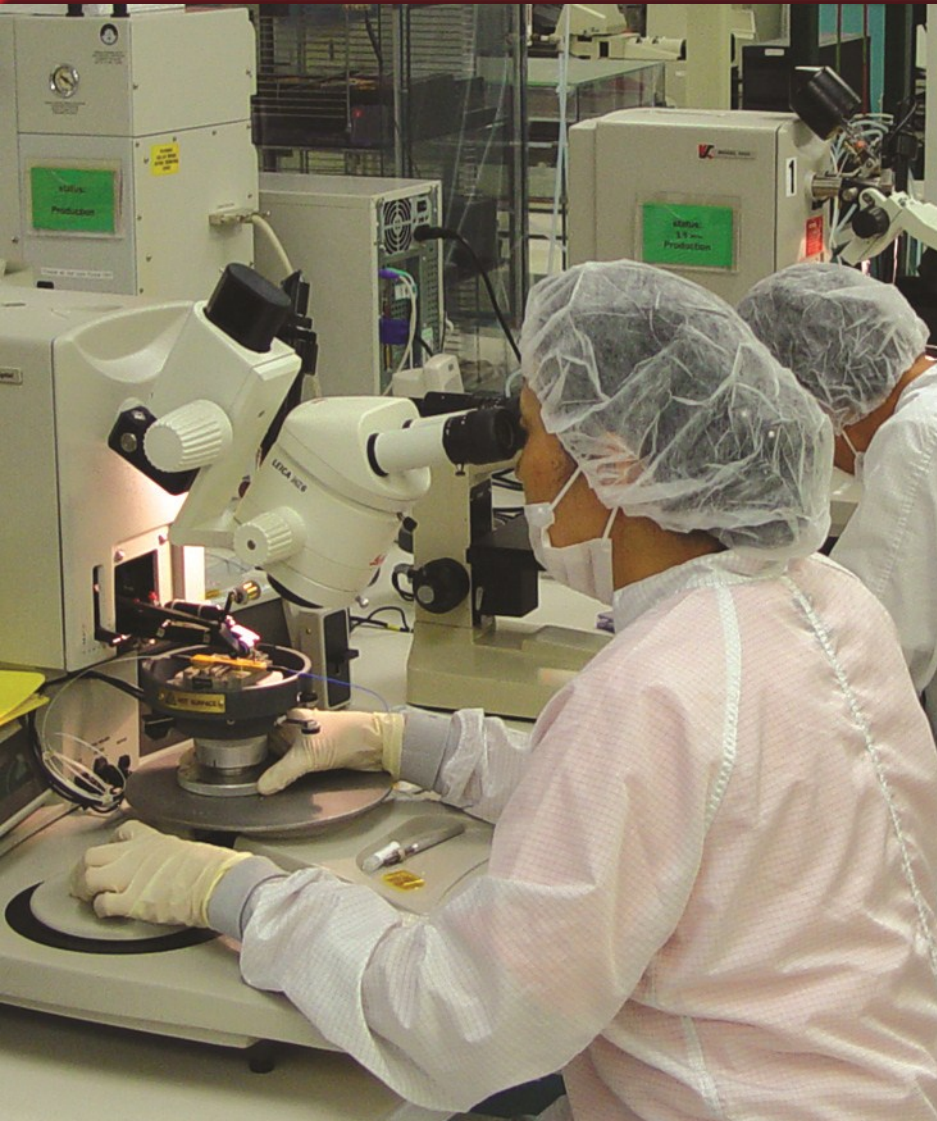
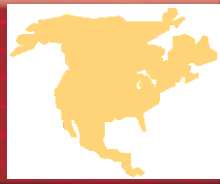
Our Corporate Headquarters and American Distribution Hub Offers

- ▶ Mechanics, Optics, Fiber, Electronics, Imaging, and Software Development
- ▶ Sales & Technical Support
- ▶ Machine Shop and Coating Chambers
- ▶ Marketing and Web Development
- ▶ Lean Manufacturing Capabilities and Synchronized Supply Chain



Thorlabs Imaging Systems is Geared Towards the Life Science Market and Provides

- ▶ Two-Photon Microscopy Systems
- ▶ Confocal Microscopy Systems
- ▶ Components that Allow Customers to Create Novel Systems
- ▶ In-House Software Development
- ▶ Dedicated Life Sciences Sales Personnel
- ▶ Complete Turn-Key Imaging Systems



Optoelectronic Product Technologies Include

- ▶ In-House Indium Phosphide and Lithium Niobate Capabilities
- ▶ III-V Semiconductor and Lithium Niobate Wafer Fabrication
- ▶ Class 100 and 1000 Cleanrooms
- ▶ AR Coating Capabilities



Equipped with a Demonstration Center, Our European Distribution Hub Specializes in

- ▶ Engineering, Manufacturing, and Logistics
- ▶ Optoelectronic Device Development and Manufacturing
- ▶ OCT Design and Customization
- ▶ Lean Manufacturing Capabilities and Synchronized Supply Chain
- ▶ Multi-Cultural and Multi-Lingual Customer Support

Ely, United Kingdom



This Design and Manufacturing Team Provides

- ▶ Vibration Isolation Systems
- ▶ Motion Control Systems
- ▶ Precision Nanopositioning
- ▶ Closed-Loop Feedback and Auto Alignment
- ▶ On-Site Technical and Sales Support



Functioning as our Sales and Support Office for the Nordic Countries, this Office Specializes in

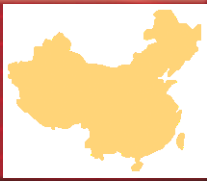
- ▶ Instrument Design, Assembly, and Alignment
- ▶ Optical Spectrum Analyzers, Fabry-Perot Interferometers, Focusing Objectives, Scan Lenses, and Collimators Development





Providing Local Technical Support and an Asian Warehouse, this Growing Office Includes

- ▶ On-Site Optical System Showroom Featuring Optical Coherence Tomography, Beam Diagnostics, and Optomechanical Hardware Systems
- ▶ Rare Earth Optical Fiber Specialists
- ▶ Laser Diode and Passive Component Sourcing



Our New Manufacturing Center Provides

- ▶ Real-Time Sales and Technical Support for China and Asia
- ▶ R&D and Specialized Manufacturing
- ▶ Liquid Crystal Devices, Optical Crystal Devices, and High-Speed Analog Circuits Development



Our Strategic Partners



MenloSystems

BOSTON
MICROMACHINES
CORPORATION

idestaQE
quantum electronics

PicoLuz

PRAEVIUM

- ▶ Thorlabs seeks to form partnerships with researchers and organizations that will facilitate the adaptation of new ideas, technologies, and experimental techniques.
- ▶ These collaborations are an exciting opportunity for us to interact with the amazing community of scientists we are privileged to serve.



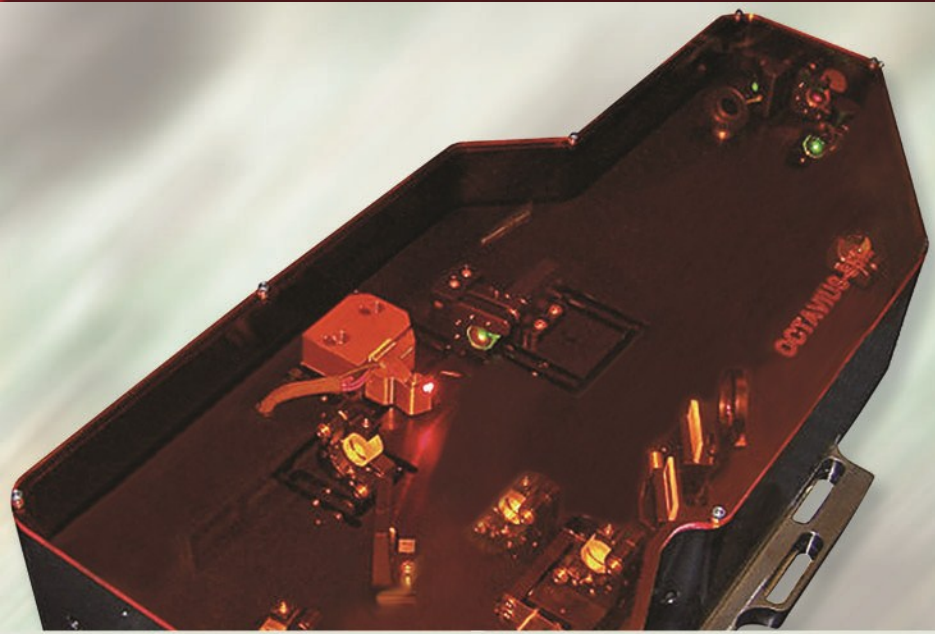
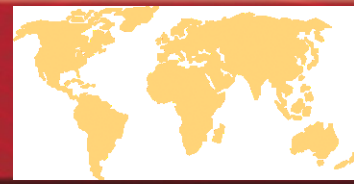
Menlo Systems



- ▶ A Thorlabs' partner since 2001, Menlo Systems originated from the Max Planck Institute for Quantum Optics in Garching, Germany.
- ▶ Pioneered by Professor Hänsch and his team, a revolutionary technique for measuring the frequency of light was developed.
- ▶ This technique was the starting point for the foundation of Menlo Systems in 2001 by Prof. Hänsch, Dr. Ronald Holzwarth, Dr. Michael Mei, and Alex Cable.



Idesta Quantum Electronics



- ▶ Idesta Quantum Electronics was founded in 2010 by Professors Jim Fujimoto and Franz Kärtner, both of the Research Laboratory of Electronics at the Massachusetts Institute of Technology, Alex Cable, and Dr. Peter Fendel.
- ▶ IQE develops and produces products for the ultrafast science and multiphoton microscopy communities.



How do we go from there?

- ▶ Constant Expansion of Product Portfolio
- ▶ Up to 1000 new products per year
- ▶ Collaboration with new exciting research fields for further development and improvement of already existing products

Product development: Requirements

Basic statement:

Thorlabs aims at providing what engineers and researchers need

Implications:

- ▶ Products are in more than 1/3 of the cases based on customer ideas
- ▶ Need for very fast reaction time
- ▶ Need to have at all time an overview of the current technologies relevant for a given field of application
- ▶ Need to have adequate communication channels to gather customer ideas

“You Speak, We Listen!”

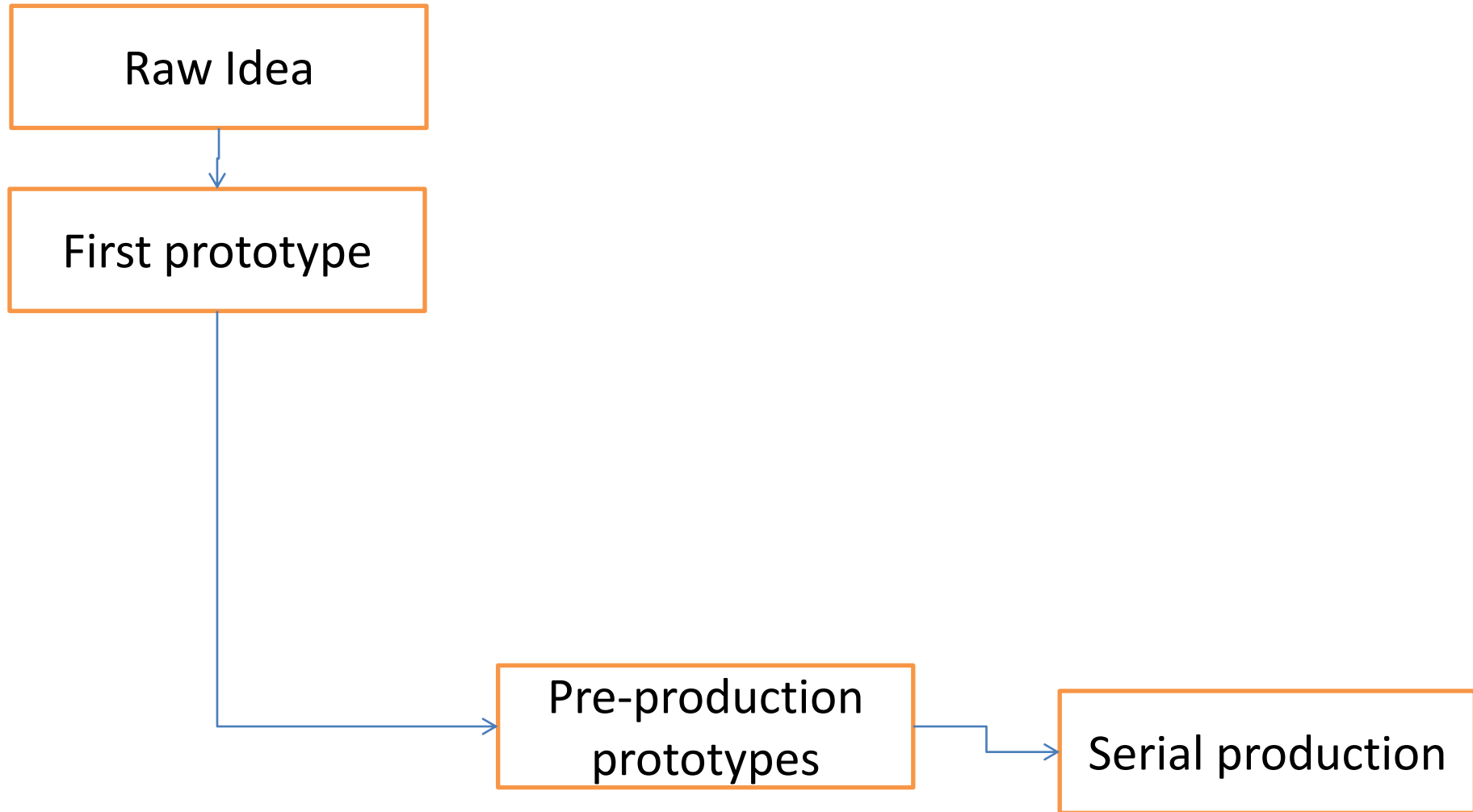


- ▶ Direct Access to *Alex Cable*, the Founder and President of Thorlabs
- ▶ Customer Web Feedback
- ▶ Customized Products
- ▶ Chat Live with Technical and Sales Support
- ▶ International Tool to Capture “Customer Inspired” Products and Improvements (Brainwave)

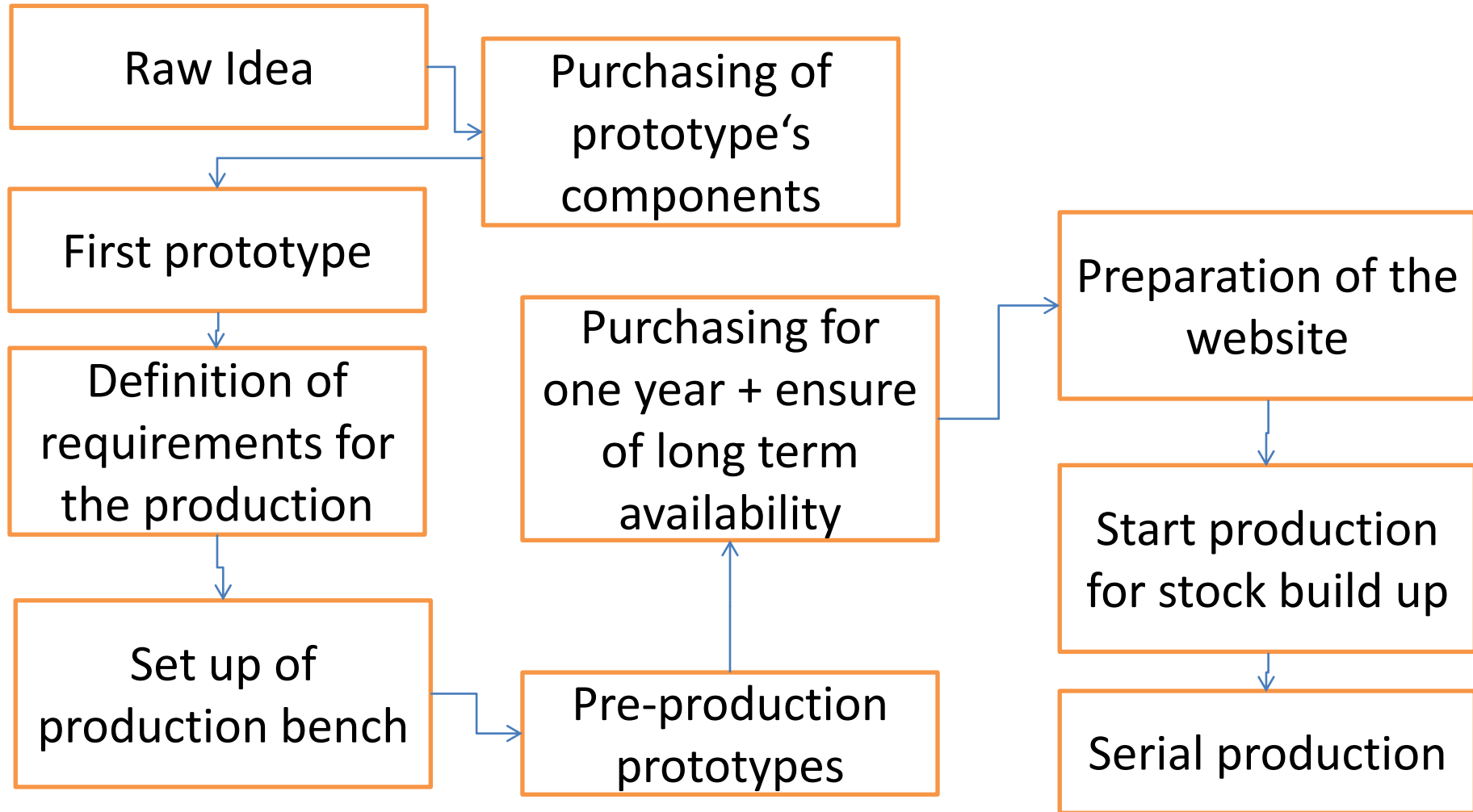
Use of internal Forum: Brainwave

- ▶ The information is accessible to every employee/partners at all time
- ▶ Product developments rely on the common knowledge of many
- ▶ Every department adds his input to the product development (R&D, Sales, Tech Support, Purchasing, Logistic...)
- ▶ No guideline or rules as to whom can post what
- ▶ All customer feedbacks are posted into this forum
- ▶ The Thorlabs community then reacts based on previous experience, know-how and overall interest to decide whether to pursue this product idea

Product development steps



Product development steps



Project summary

- ▶ Basic idea originates usually from customer feedback
- ▶ Streamline of the development to allow fast reaction
- ▶ Extensive in-house testing by beta users to give the best possible ease-of-use
- ▶ Duration from raw idea to product as low as possible
- ▶ A maximum price is defined at the beginning of the project. The margin is capped by Thorlabs strategy

Logistic Aspects

- ▶ Same day shipment for more than 95% of the ordered products
- ▶ More than 85% of all Thorlabs products constantly on stock in our european warehouse
- ▶ based on amount of requests
- ▶ Automized refill of stock based on actual sales numbers through lean production scheme
- ▶ International order processing as well as technical support for efficient treatment of customer requests => team work



**Thank You for Your
Valuable Feedback**

