

Building a future we can all trust

Thales Laser

12 Décembre 2024

www.thalesgroup.com



2023 key figures



81,000
employees



68 countries
A global footprint



€4 bn*
* including €1,1 bn
in self-funded R&D



€18.4 bn
revenues



LASER SOLUTIONS

A world leader in high-power solid-state laser systems

- Over **40 years of laser expertise**
- **World record 1 petawatt (PW) laser** with the BELLA system (USA) in 2012
World record 10 PW with ELI-NP system (Romania) with one beam in 2019
- Laser solutions for **industrial processes** and new **medical applications**
- **World's only company** to send operational laser to Mars (with CNES and NASA) in 2011 and 2020
- Long-standing laser research partnership between Thales and Gérard Mourou, winner of 2018 **Nobel Prize in Physics**

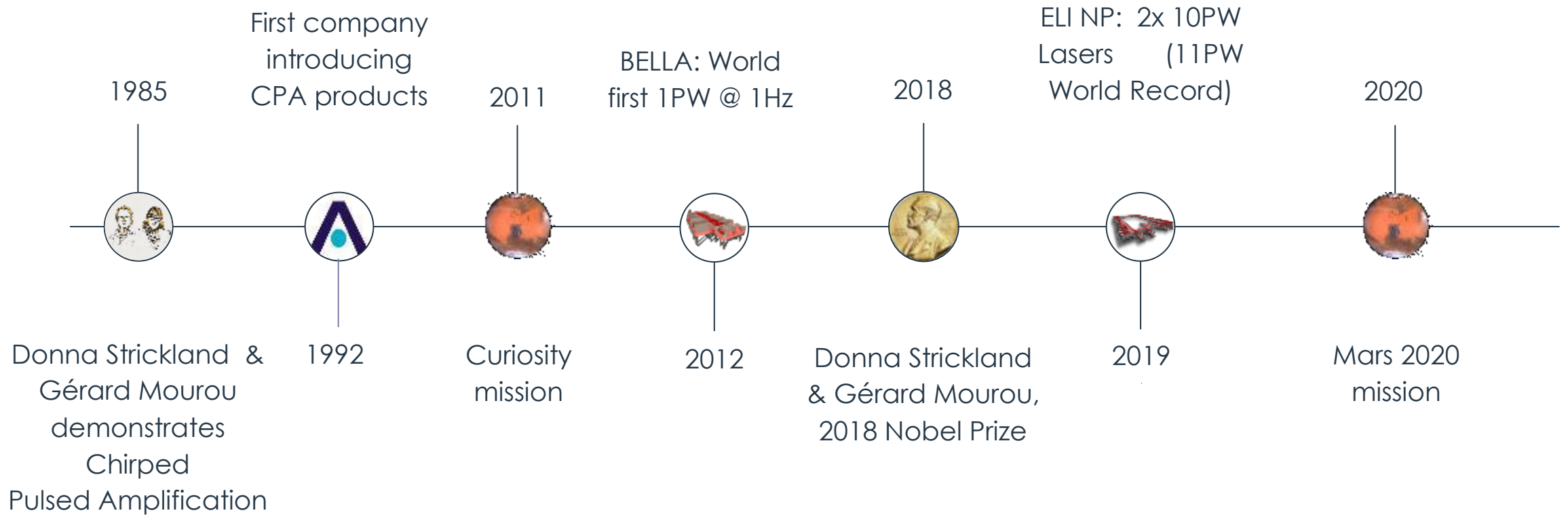


Gérard Mourou
2018 Nobel Prize
in Physics

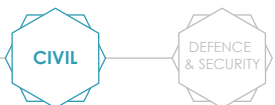


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35 YEARS OF EXPERTISE IN LASER

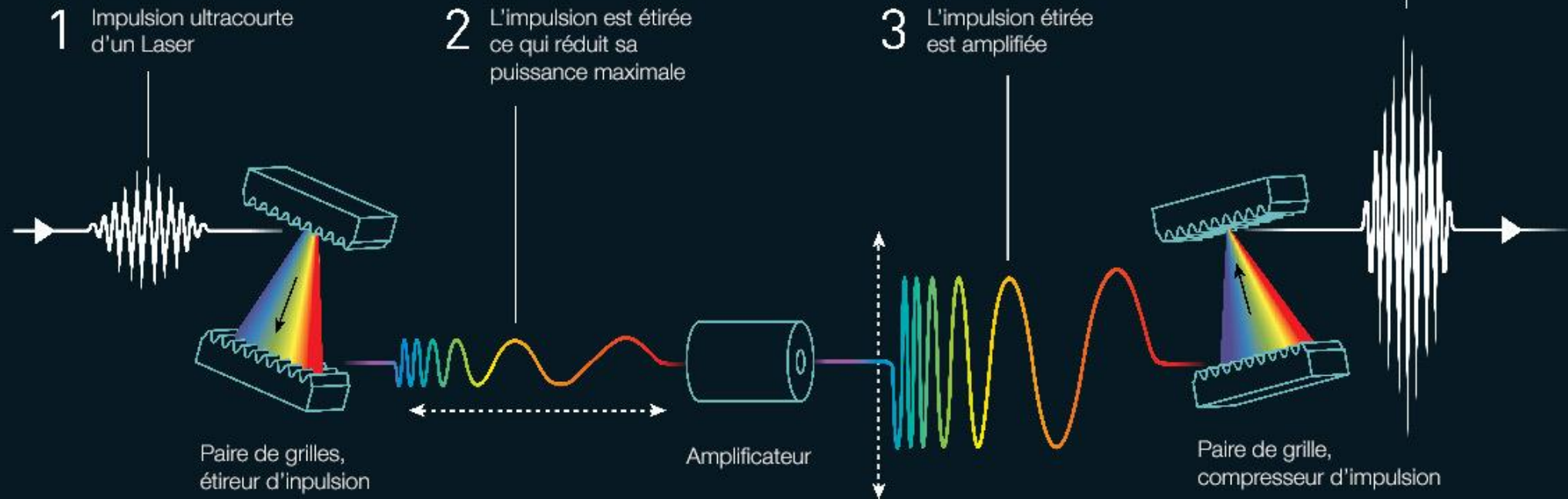


Unique expertise for extreme laser systems



THE HEART OF PW-CLASS LASERS: CHIRPED PULSE AMPLIFICATION

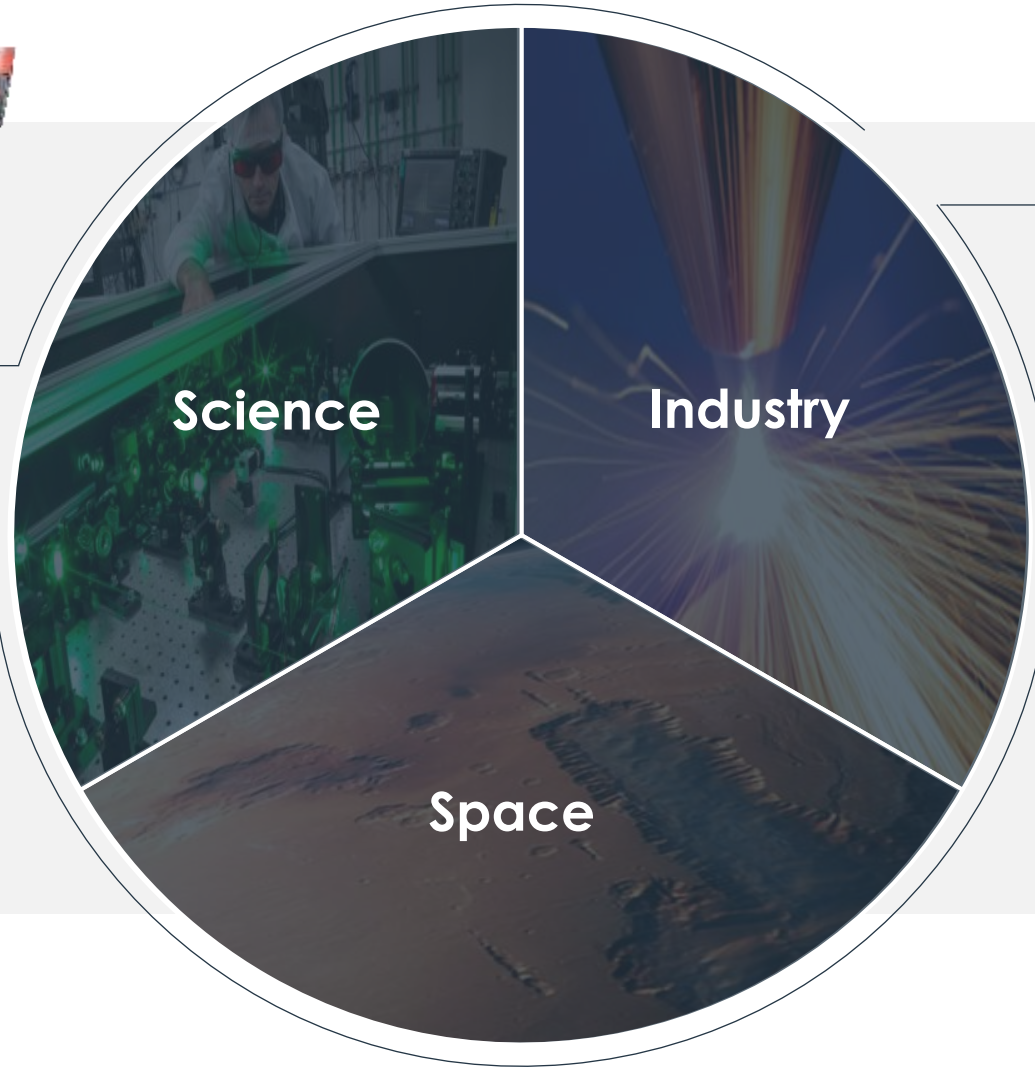
CPA amplification d'impulsion par dérive de fréquence



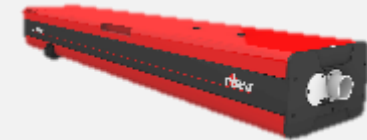
LASER ACTIVITY



Femtosecond



Nanosecond



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MARKETS AND APPLICATIONS

SCIENCE



Pumping Laser
Ti:Sa



Electrons & ions
acceleration

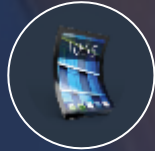


Plasma Physics



X Ray
generation

INDUSTRY



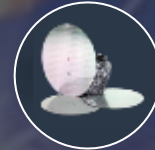
OLED Lift Off



Laser Shock
Peening



Non
Destructive
Testing



Silicon
Annealing



Isotope
production



Particle
therapy

SPACE/DEFENSE



LIBS Curiosity
rover



Moon ranging



Space debris
removal



Defense



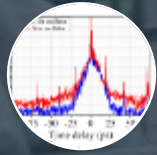
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OUR FUTURE TOGETHER

SCIENCE



10PW Beam
Dump



Contrast
improvement



TiSa gain
module



OPCPA

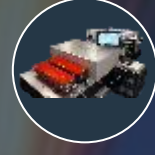


Damage
threshold on
coatings

INDUSTRY



THEIA



Simple CPA



< 40fs fiber
oscillator



RHEA
5,5J @ 5Hz



Data science

SPACE



A Journey to
Mars



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Nanosecond products



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NANOSECOND PRODUCTS

Diode pumped

THEIA
700mJ @200Hz

ETNA HP
170W @10kHz

Flashlamp pumped

SAGA HP
1,8J @5-10Hz

RHEA
5,5J @10Hz

GAIA HP
16J @1-5Hz

ATLAS
30J @0,1Hz
100J @0,017Hz



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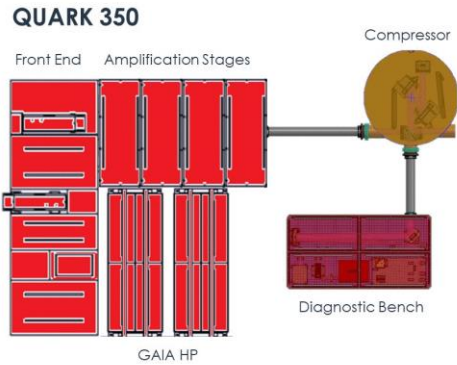
The background of the slide is a dark, starry space scene. In the center, a white hexagonal frame is superimposed over a small, circular aerial view of a city and a beach. The city features modern buildings, green parks, and a sandy beach with turquoise water. The text 'Femtosecond systems' is centered within the hexagon in a white, sans-serif font.

Femtosecond systems

QUARK FAMILY

Building Blocks

Custom system using our proven building blocks



Easy to use

User interface based on TANGO Software



Services

Range of customized services : Global service contract, Data monitoring, Hands on training, Qualification of critical components, Daily reliability



Advantages

- Very high contrast thanks to XPW filter
- Patented solutions to optimize laser performances
- Room temperature cooling system for highest reliability
- Optimized **embedded diagnostics** for easy operation
- Versatile** and **evolutive software** architecture
- Dedicated options** for experience optimization
- Be part of User **Community**
- High level customer service** for training, maintenance and support for experimental campaign

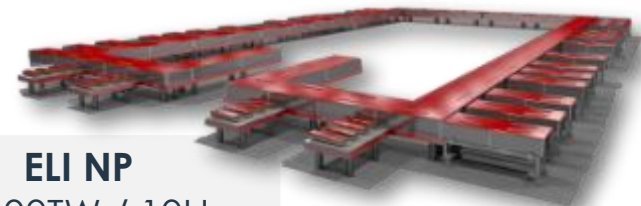


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QUARK COMMUNITY



CALA (3PW)
90J / 1Hz



ELI NP
2x 100TW / 10Hz
2x 1PW / 1Hz
2x 10PW / 1sh/min

LBNL BELLA
1,3PW / 1Hz



3 PW

10 PW



1 PW

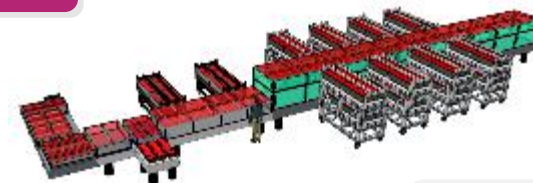
2 PW

SCAPA
350TW / 5Hz



350 TW

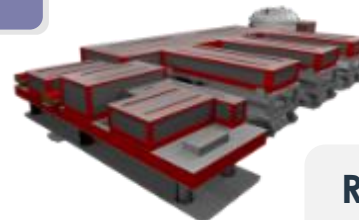
500 TW



Peking Univ
2PW / 1Hz

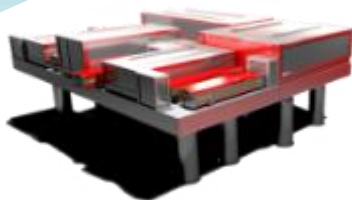
45 TW

200 TW



Riken Harima
2x 500TW / 1Hz

USC
45TW / 10Hz



DESY 200TW/5Hz
Peking Univ 200TW/5Hz
Weizmann 2x100TW/1Hz



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ELI NP SYSTEM

Thales joined the Extreme Light Infrastructure for Nuclear Physics (**ELI-NP**) program in 2013 to develop the High Power Laser System (HPLS), the **most powerful system of its kind in the world**.

This laser will support research in nuclear physics and help advance human understanding of the physics of matter



Thales intervene by

- ◆ **Operating** the system from laser preparation to experiences management
- ◆ **Training** ELI NP team regarding our dedicated program launched in 2019 for our users
- ◆ **Maintaining** the system with preventive and corrective maintenance



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ELI NP - A LONGTERM RELATIONSHIP



HPLS
2013-2019

2x10 PW laser system



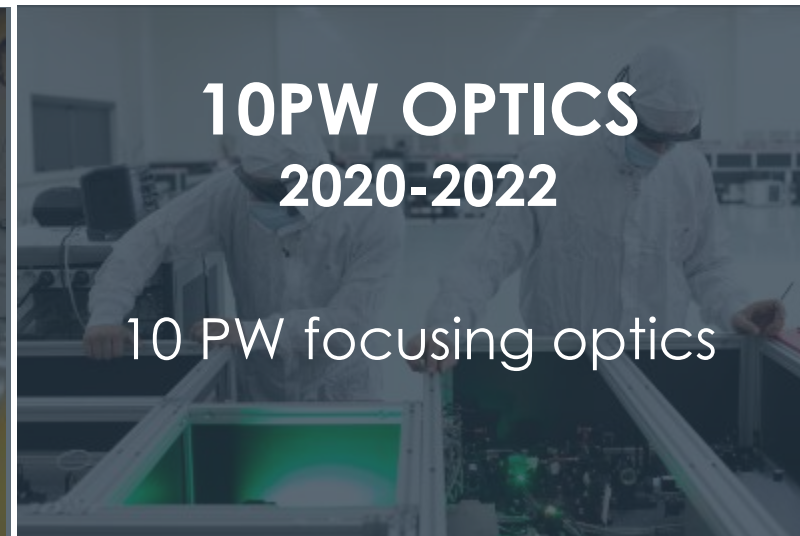
SERVICES
2020-2025

Operation and maintenance of the Thales systems



LBTS
2017-2020

Beam transport of the 2x10 PW beams to experimental areas



10PW OPTICS
2020-2022

10 PW focusing optics



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