OPTRONICS TECHNOLOGIES S.A.

# THULIUM FIBER LASERS IN INDUSTRY

## - AN INTRODUCTION –

Γιώργος Παπαστεργίου

2015: Έτος φωτός. Οι ακτινοφυσικοί «παίζουν» σε όλο το φάσμα

Σάββατο 6 Ιουνίου 2015 – Αμφιθέατρο Αρεταίειου Νοσοκομείου

# Σύντομο Ιστορικό Εταιρίας

**1990**

OPTRONICS, ιδρυση 1ης εταιρίας Εφαρμοσμένης Οπτοηλεκτρονικής στην Ελλάδαε

**2000**

Σχεδιασμός 1ου DVA TxRx over fibre @2Mbps line (ESPRIT Project)

**2002**

ISO 9001:2000 Πιστοποίηση Προϊόντων και Υπηρεσιών ο/η και δικτύων ο/ι.

Σχεδίαση και Παραγωγή για F/O Network WDM Monitoring System for OTE.

**2003**

Αλλαγή της εταιράις σε ΑΕ

1ο Τηλ.Εργο ο/ι με το Κλείδι στο χέρι : Μητροπολιτικό Δίκτυο Ο/Ι TELESTET

**2006**

200km Δίκτυο ο/ι με το κλειδί στο χέρι για την ON Telecoms

**2007**

1ο δίκτυο στην Ελλάδα FTTH στον Δήμο Καρδίτσης

**2008**

Η ετιαρία μπαίνει στην ΕΝΑ της Χρ.Α.Αθηνών (OPTRON)

**2009**

- Ανάπτυξη του Fiber Net Series και Προώθηση στην Διεθνή Αγορά (ECOC Vienna, Austria)
- FTTH Συνέδριο στην Αθήνα
- Δίκτυο Οπτικών Ινών Εγνατίας Οδού
- Δίκτυο MAN ο/Ι της Cyta Hellas.
- Δίκτυο MAN ο/ι της Med Nautilus
- Δίκτυο ο/ι στην Electric Power Co of FYROM

**2010**

- Επέκταση Δραστηριότητας για την κάλυψη όλης της Ελλάδος
- Υποκατάστημα Θεσσαλονίκης
- Ανοιγμα Γραφείων και Αποθηκών σε 8 περιοχές της Ελλάδος
- 4ετές συμβόλειο Υποστήριξης με Forthnet SA στην Ελλάδα
- Δίκτυο MAN ο/ι COSMOTE
- Σχεδιασμός και μεταφορά τεχνογνωσίας για το Διεθνές δίκτυο ο/ι της f ALBANIA , ATU

**2011-15**

- 120km Δικτύου COSMOTE
- Συμβόλαιο Υποστήριξης ο/ι με COSMOTE για όλη την Ελλάδα
- Σύμβαση Ανάπτυξης Ηλεκτρονικών και Τηλεπικοινωκών συστηματων στην Νεα Μαρίνα Ρόδου (GPON)
- Προμήθεια και εγκατάσταση Συστημάτων Ελέγχου και Επιτήρησης χώρου στην ΔΕΗ
- 1ο Πιλοτικό Δίκτυο ο/ι στο σπίτι με την Forthnet στην Νέα Σμύρνη.
- Βιομηχανικές εγκαταστάσεις δικτύων
- COORDINATION OF 3 FP7 EU Projects
- Συμμετοχή σε 2 ακόμη EU Research Projects
- ISO14001:2004
- OHSAS 18001:2007

# Αντικείμενο Εταιρίας

| Εμπορική Δραστηριότητα | Υπηρεσίες και Τεχνική Υποστήριξη | Παραγωγή |
|---|---|---|
| ▪ Επιστημονικός και Ερευνητικός εξοπλισμός Εφαρμοσμένης Οπτικής<br>▪ Οπτοηλεκτρονικές Διατάξεις<br>▪ Υλικά Δικτύων Οπτικών, Επικοινωνιών και Δομημένης καλωδίωσης | ▪ Συντήρηση και επισκευή<br>▪ Σχεδιασμός πειραμάτων και οπτικών διατάξεων<br>▪ Συμβουλευτικές εργασίες και μετρήσεις | ▪ Ειδικές Οπτικές Ινες<br>▪ Σχεδίαση και κατασκευή ο/η διατάξεων κατά παραγγελία |

# ISO 9001, ISO 14001, OHSAS 18001

BUREAU VERITAS Certification

**OPTRONICS TECHNOLOGIES S.A.**
79-81, Thessalonikis Str., 183 46 Moschato
GREECE

Bureau Veritas Certification certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

Standards

**ISO 9001:2008**

Scope of certification

**DESIGN, DEVELOPMENT, PRODUCTION, SALES, SERVICES, INSTALLATION, PROJECT MANAGEMENT & COORDINATION AND TRAINING ON OPTOELECTRONICS, FIBRE OPTICS, TELECOMMUNICATION NETWORKS, ICT & AUTOMATION NETWORKS, CCTV AND NETWORK APPARATUS AND SYSTEMS.**

Certification cycle start date: **01 February 2014**

Subject to the continued satisfactory operation of the organisation's Management System, this certificate expires on: **01 February 2017**

Original certification date: **24 August 1999**

**Certificate No. GR13.1307Q** Version 1, Revision date: 01 November 2013

N. TRILIZAS

UKAS MANAGEMENT SYSTEMS 008

Certification body address:
Brandon House, 180 Borough High Street, London SE1 1LB, United Kingdom
Local office:
Bureau Veritas Hellas A.E., 23 Etolikou str., 18545 Piraeus, Greece

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organisation.
To check this certificate validity please call: **+30 210 4063000**

BUREAU VERITAS Certification

**OPTRONICS TECHNOLOGIES S.A.**
79-81, Thessalonikis Str., 183 46 Moschato
GREECE

Bureau Veritas Certification certify that the Management System of th above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed be

Standards

**ISO 14001:2004**

Scope of certification

**DESIGN, DEVELOPMENT, PRODUCTION, SALES SERVICES, INSTALLATION, PROJECT MANAGEMENT & COORDINATION AND TRAININ ON OPTOELECTRONICS, FIBRE OPTICS, TELECOMMUNICATION NETWORKS, ICT & AUTOMATION NETWORKS, CCTV AND NETWORI APPARATUS AND SYSTEMS.**

Certification cycle start date: **01 February 2014**

Subject to the continued satisfactory operation of the organisation's Managemei System, this certificate expires on: **01 February 2017**

Original certification date: **02 February 2011**

**Certificate No. GR13.1307E** Version 1, Revision date: 01 November 2

N. TRILIZAS

UKA MANAGEMENT SYSTEMS 008

Certification body address:
Brandon House, 180 Borough High Street, London SE1 1LB, United Kingdom
Local office:
Bureau Veritas Hellas A.E., 23 Etolikou str., 18545 Piraeus, Greece

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To check this certificate validity please call: **+30 210 4063000**

BUREAU VERITAS Certification

**OPTRONICS TECHNOLOGIES S.A.**
79-81, Thessalonikis Str., 183 46 Moschato
GREECE

Bureau Veritas Hellas A.E. certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

Standards

**OHSAS 18001:2007**

Scope of certification

**DESIGN, DEVELOPMENT, PRODUCTION, SALES, SERVICES, INSTALLATION, PROJECT MANAGEMENT & COORDINATION AND TRAINING ON OPTOELECTRONICS, FIBRE OPTICS, TELECOMMUNICATION NETWORKS, ICT & AUTOMATION NETWORKS, CCTV AND NETWORK APPARATUS AND SYSTEMS.**

Certification cycle start date: **30 January 2014**

Subject to the continued satisfactory operation of the organisation's Management System, this certificate expires on: **30 January 2017**

Original certification date: **31 January 2011**

**Certificate No. GR13.1307S** Version 1, Revision date: 01 November 2013

ΕΣΥΔ Πιστοποίηση ΣΔ Αρ. Πιστ. 204-4

N. TRILIZAS

Certification body address:
Bureau Veritas Hellas A.E., 23 Etolikou str., 18545 Piraeus, Greece
Local office:
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# Lasers in Industry – Thulium Fiber Lasers

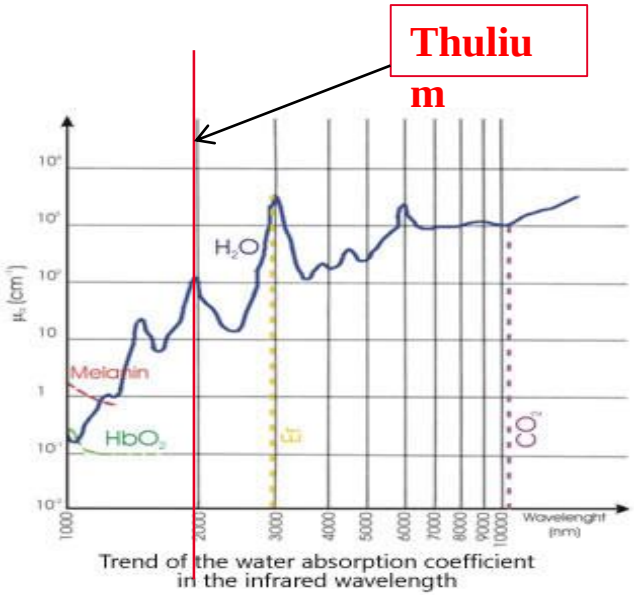
- Holmium-chromium-thulium triple-doped Yttrium aluminum garnet (Ho:Cr:Tm:YAG, or Ho,Cr,Tm:YAG) is an active laser medium material with high efficiency.

| Chemical element | Neodymium | Holmium | Erbium | Thulium | Ytterbium |
|---|---|---|---|---|---|
| Emission wavelength | 1064 nm | 2100 nm | 1540 nm | 1940 nm | 1070 nm |

- Single-element thulium-doped YAG (Tm:YAG) lasers operate between 1930 and 2040 nm.
- Single mode Thulium Fiber Lasers are tuned (by different dopants) to lase from 1900 – 2040nm

# Thulium Fiber Lasers features

- Wavelength corresponds to one of
  H2O absorption peaks (1950nm)
- Eyesafe Wavelength…!!!



Trend of the water absorption coefficient in the infrared wavelength

- Pulse and CW operation
- Pulse repetition (up to 50kHz) – allows good control of pulse duration (100nsec)
- Output Power Control (10-100%)(up to 200W)
- Single mode gaussian beam quality (diffraction limited, Focus precision)

# Thulium Fiber Lasers features

- SIMPLICITY IN USE
  - Single Mode FIBER OUTPUT
  - ROBUST AND COMPACT MAIN UNIT SIZES
  - Ordinary Electric Power Requirements
  - Replaceable parts for maintenance

# Thulium Fiber Laser Applications

- Tm lases in the 1800 to 2200 nm range, corresponding to an atmospheric transmission window
- Eye-safe radar ….!,
- Lidar, remote gas sensing and other military applications
- The wavelength of thulium-based lasers is very efficient for superficial ablation of tissue, with minimal coagulation depth in air or in water.


This makes thulium lasers attractive for laser-based surgeryMedical lasers (laser lithotripsy and other urological procedures such as prostate, tumors, also suitable in gynecological, gastroenterology etc )

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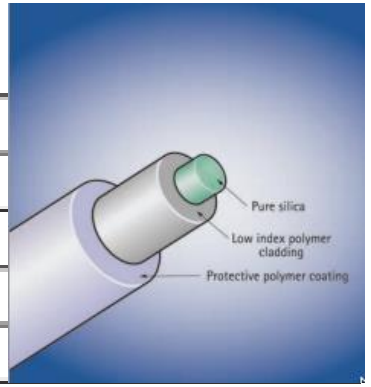
# Thulium Fibre Optic Specs

| Product Code | TDF and TDC |
|---|---|
| Cut-off Wavelength (nm) | 1920 ±60 |
| Core N.A. | 0.10 to 0.25 |
| Inner Cladding N.A. | 0.48 |
| Core Diameter (mm) | 5 to 20 |
| Cladding Diameter (mm) | 125 to 400 |
| Coating Material | UV-curable acrylate for single-clad and UV-curable low-index acrylate for double-clad fibers |




[1] The specifications of Coherent's Tm-doped fibers are custom-tailored to meet the requirements of specific laser designs for defense and medical applications.

## Courtesy of :

- IPG
- Coherent Lasers
- Nufern

IPG PHOTONICS

COHERENT.

www.Coherent.com

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# ΕΥΧΑΡΙΣΤΩ