

Innovative! Cost Effective Solutions for  
Precision Performance NanoScale E-Beam  
Lithography!



# Corporate Introduction of CRESTEC CORPORATION Expert in E-Beam Nanofabrication

David López-Romero Moraleda. Technical Support  
Manager, Crestec Corporation Spain Branch.

*"Financiación-Internacionalización-Cooperación. Iniciativas y Programas para Empresas Nanotecnológicas"*  
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# Corporate Profile of CRESTEC

- **Trade Name** CRESTEC CORPORATION
- **Type of Business** Manufacturer
- **Established** February 10,1995
- **Issued Capital** ¥ 45,000,000.-
- **President** Hideyuki Ohyi
- **Settlement Term** September
- **Head Office** 1-9-2, Owada-machi, Hachioji-shi,  
Tokyo 92-0045, Japan
- **Tel** +81-(0)42-660-1195
- **Fax** +81-(0)42-660-1198
- **E-Mail** info@crestec8.co.jp
- **URL** http://www.crestec8.co.jp
- **Bank** Sumitomo Mitsui  
Banking Corporation  
The Tama Shinkin Bank
- **Office Hour** Mon. to Fri, 9:00 to 18:00

# Our main business activities

◆ **Core Technology** : **Electron Beam (EB) Nanolithography Technology**

◆ **EBL Equipment Division**

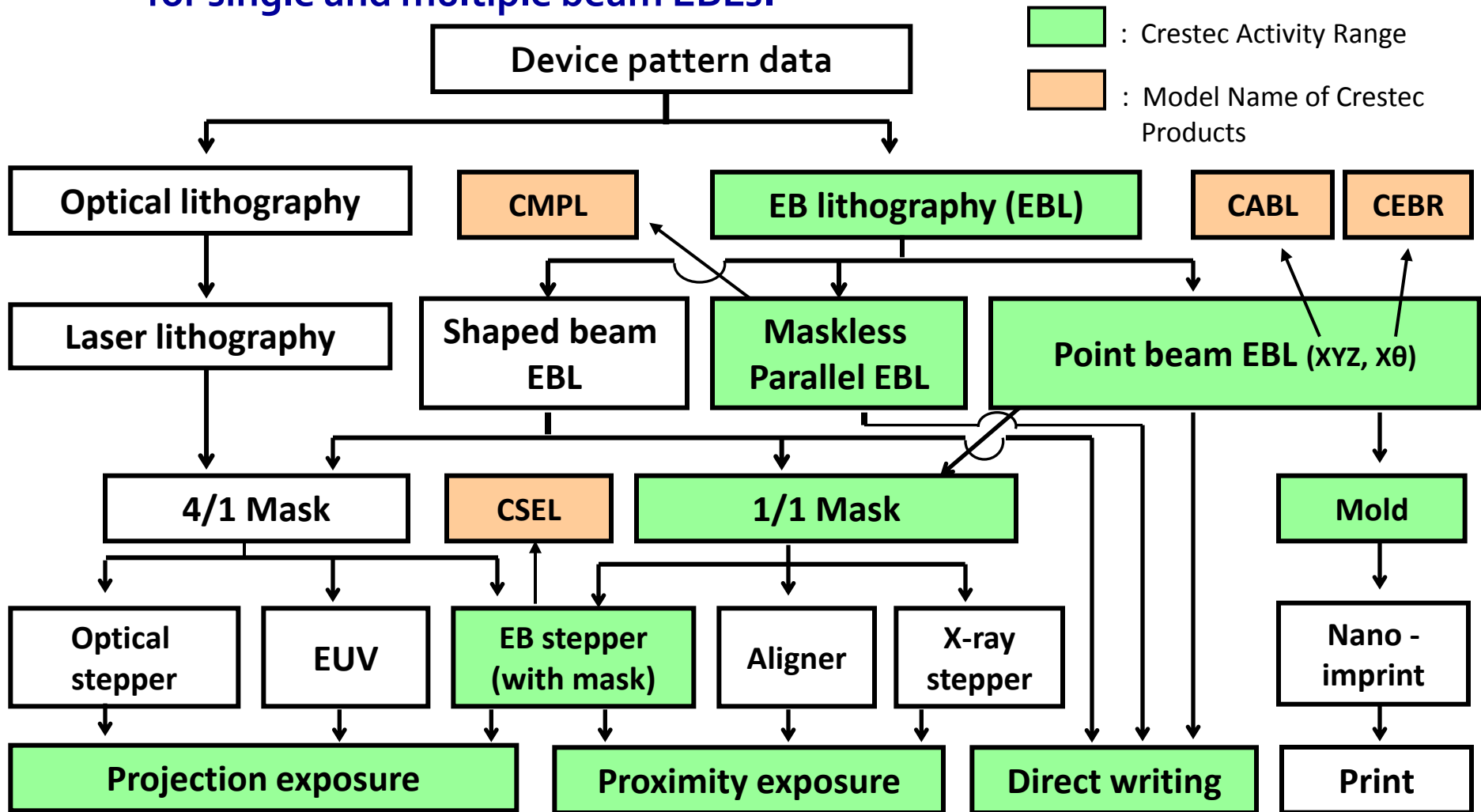
**A) Infrastructure Product** : **XYZ High Resolution EB Lithography System (CABL)**  
: **Unique Features of MODEL CABL-UH Series (130 kV)**

**B) Development of new product** : **Surface Electron Emission Lithography System (CSEL)**  
: **Maskless Massively Parallel EB Lithography System (CMPL)**

◆ **Outsourcing Division** : **Foundry Service**  
**A) Main Service** (EB exposure and development on Wafers from customer)  
: **R&D based on customer's demand**

# Outline of Lithography Technology

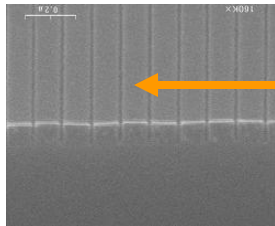
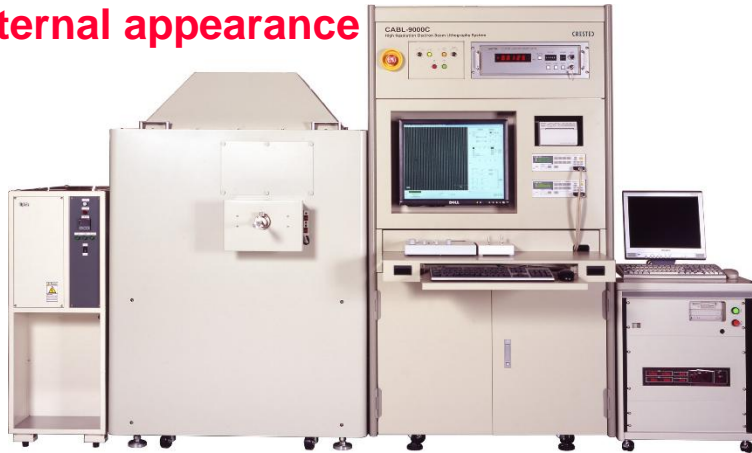
Crestec is producing and developing 2- types of equipment for single and multiple beam EBLs.



# XYZ Type High Resolution EBL System

## Model CABL-9000C series

**CABL-9510C**  
**External appearance**

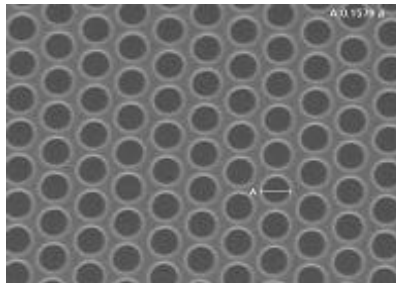


← **5.6nm isolated lines**

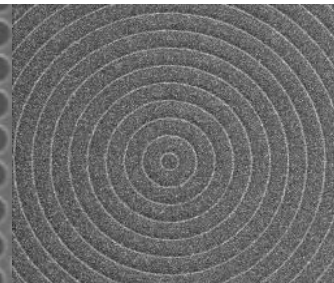
### Special features

- TFE 50kV, 4", 6" or 8" stage
- High resolution better than 10 nm
- High accurate stitch writing for long time by specially designed precise laser interferometer
- Multi-user environment (PC controlled EOC =Recipe )
- Self environment control –Noise reduction from thermal fluctuation, stray magnetic field and floor vibration
- Flexible writing methods (vector, vector R-theta, raster, spot, axial symmetrical, field size modulation, multi-mode, 3D, etc.)
- R&D and production uses
- CE marking

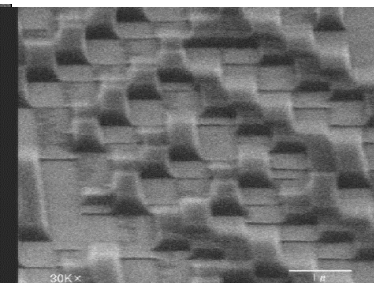
**Spot & Defocus**



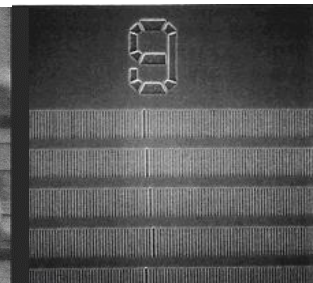
**Vector R-theta**



**Raster**



**Field size modulation**



Pitch

200.0 nm

200.1 nm

200.2 nm

200.3 nm

200.0 nm



# ULTRAHIGH RESOLUTION EBL SYSTEM

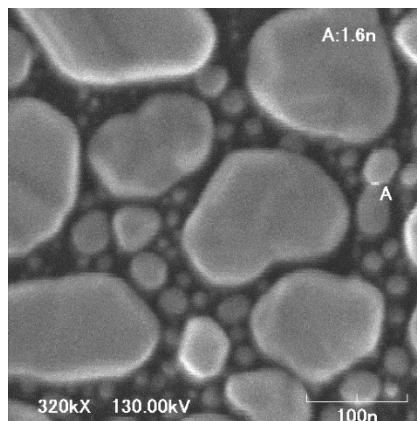
## Unique Features of MODEL CABL-UH Series

- ◆ Vacc: **130kV** Max (25-130kV, 5kV steps)
- ◆ **Single-Stage Acceleration** capability up to **130kV** to minimize Electron Gun length for achieving negligible Coulomb blur.
- ◆ **Micro-Discharge Free** Electron Gun.
- ◆ Beam Diameter: **<1.6nm (1.1nm theoretically)**
- ◆ Capability of Fine Line: **<5nm**
- ◆ **Electrostatic Lens** between emitter and anode is designed to achieve very low aberration and short-range minimized crossover image at the center of blanking electrodes.
- ◆ **Ultra-stable** write capability is achieved using dual thermal controllers.

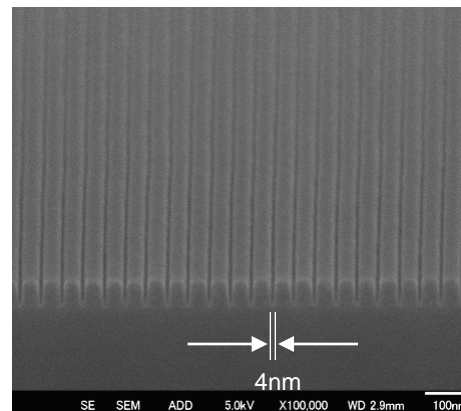
### CABL-UH130 (130kV)



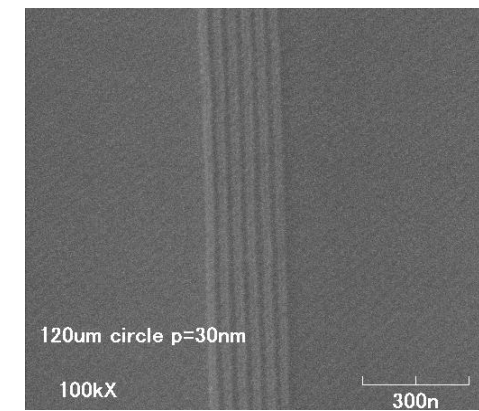
1.6nm beam size



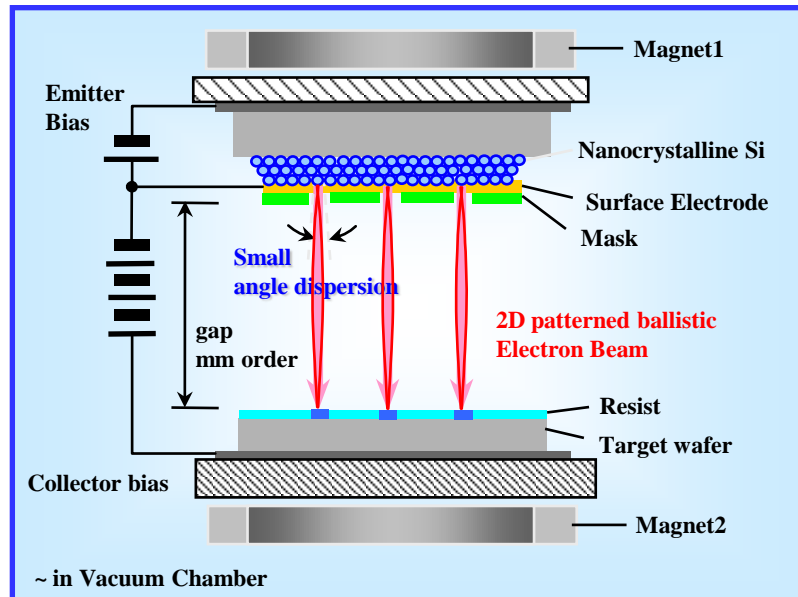
Isolated 4nm line



hp 15nm L/S



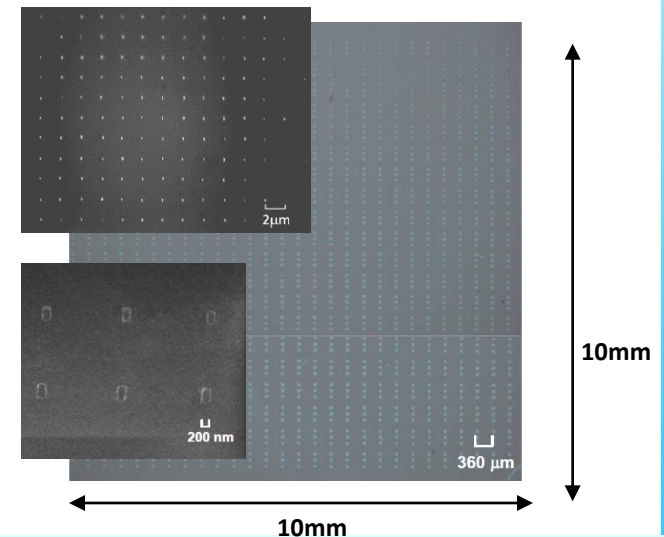
# Surface Electron Emission Lithography System ( Model : CSEL series)



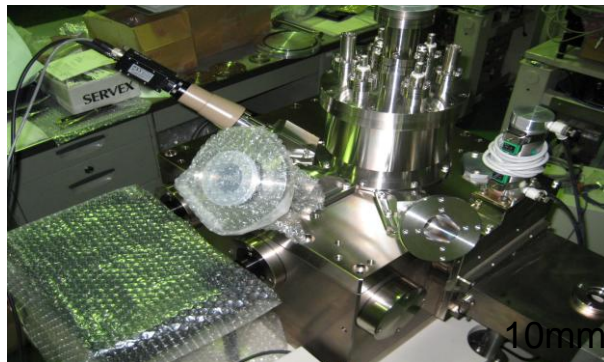
## Special features

- Massively parallel silicon nanowires give you surface coherent electron emissions which is almost like non-contact nanoimprint to exposure mask patterns by 1 shot.
- Being expected as one of candidate for next generation lithography method.
- Proof of concept has been done beyond 30 nm L&S .
- Si quantum nanowire e-guns (SEED) are Japan-originated technology.
- $\alpha$  tool production for high-bright LED, etc.

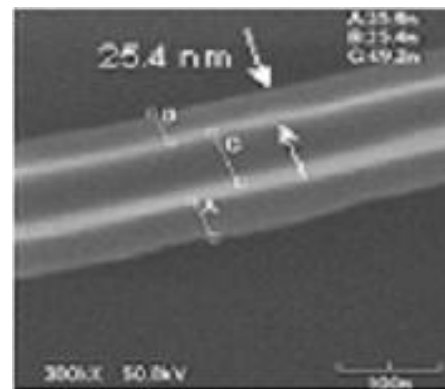
POC: One shot exposure of 10mm sq.



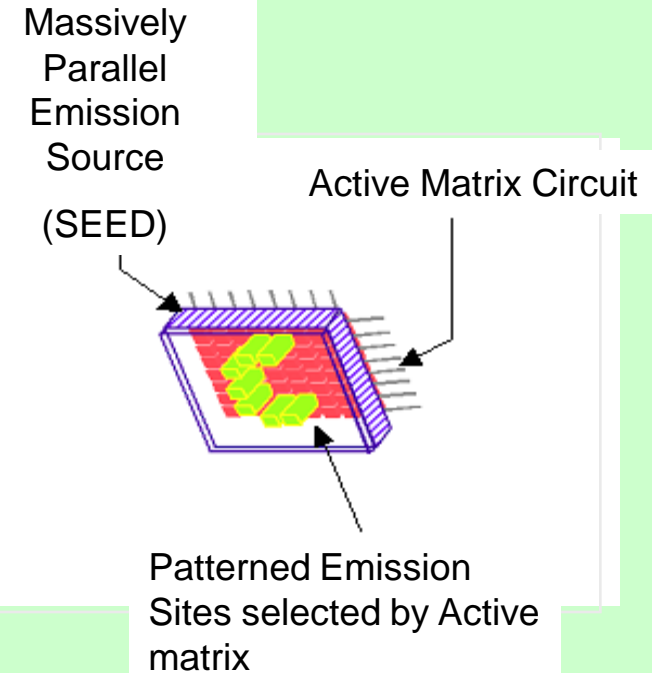
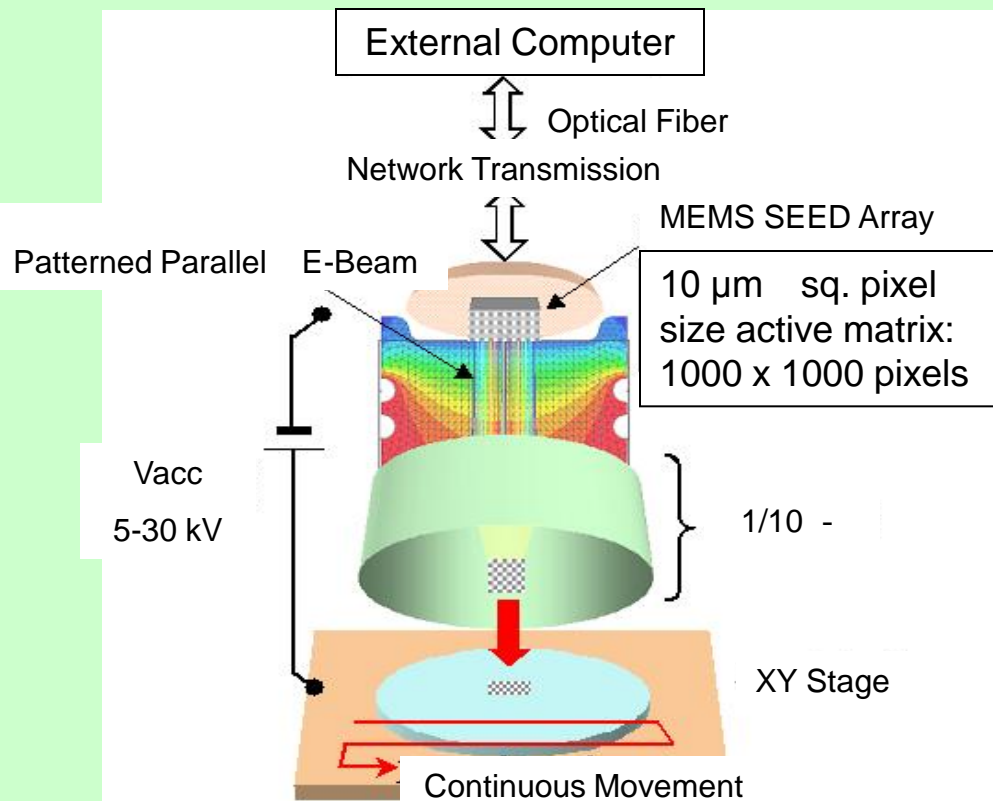
Prototype of CSEL



Sub 30 nm L&S



# Maskless Massively Parallel EB Lithography System Model CMPL-6000 (Under Development)



Crestec, Tohoku Univ. and TUAT are jointly developing supported by the Cabinet Office in Japan.



# Funding & Internationalisation

## Vision:

- **Distribute high-performance e-beam lithography systems for the production of Nanotechnology to meet and resolve specific needs of our customers:**
  - ◆ Next generation semiconductors
  - ◆ Plasmonic devices (Sub-5 nm gaps)
  - ◆ Quantum effect devices
  - ◆ Nano-photonic devices
  - ◆ Nano-bio devices
  - ◆ Creation of new material patterns without resist
  - ◆ Integrated MEMS/NEMS
  - ◆ Next generation storage devices
  - ◆ Advanced nano-devices and structures

## Targets:

- Enhance our visibility in the European market.
- Position in the European market through continuous improvement.
- Provide high level support for solving problems in Nanotechnology.

# Funding & Internationalisation

## Funding needs:

- **Colaboration with ISOM-UPM to share facilities to provide solutions to customers.**
- **Settlement business in Spain.**
- **Develop 'EB-Stepper', being expected as one of candidate for next generation lithography method.**

# Major Customers over the World (14 Countries and Regions)



# CRESTEC CORPORATION

<b>Crestec Corporation – Japan</b>	<b>Crestec Europe office (Spain)</b>
<p data-bbox="285 558 689 825"><b>1-9-2 Owada-machi, Hachioji City, 195-0045 Tokyo Japan.</b></p> <p data-bbox="285 932 928 1172"><b>Tel No: +81 (0)42 660 1190 Fax No: +81 (0)42 660 1198 E-mail: <a href="mailto:sales@crestec8.co.jp">sales@crestec8.co.jp</a> URL: <a href="http://www.crestec8.co.jp">http://www.crestec8.co.jp</a></b></p>	<p data-bbox="1052 558 1680 853"><b>ISOM-UPM E.T.S.I de Telecomunicación, Avenida Complutense nº 30, "Ciudad Universitaria". 28040 - Madrid (España)</b></p> <p data-bbox="1052 946 1680 1118"><b>Contact: Mr. David López-Romero Tel No: +34 696027887 E-mail: <a href="mailto:dlromero@isom.upm.es">dlromero@isom.upm.es</a></b></p>

# **Thank you for your attention!**

## **Crestec Corporation**

**URL: <http://www.crestec8.co.jp/>**

**Email: [sales@crestec8.co.jp](mailto:sales@crestec8.co.jp)**