iMEX.A

Engineering consulting

Rome, *Ministry of Foreign Affairs* - 22 June 2012

About us

iMEX.A is a young and dynamic engineering company involved in the following sectors:

- Aerospace

- Mechanics

- ICT

- Electronics

- Optics

- Mathematical Engineering

iMEX.A expertise

- <u>Mechanical Design</u>
  - ➤ Design of electro-mechanical devices
  - ➤ 3D & 2D CAD models
  - ➤ Structural analysis via multi-physics FEM (e.g., fluid-structure interaction, magnetic-structural interaction, thermo-mechanical simulations)

- <u>Artificial Intelligence</u>
  - ➤ Monitoring and diagnostics of dynamic systems
  - ➤ Acquisition, representation and management of knowledge
  - ➤ Development of a supervision system to substitute the human operator or to assist him to take a decision

iMEX.A expertise

- ICT
  - ➢ Digital Signal Processing
  - ➢ Digital Automatic Controls (Microcontrollers, FPGAs, Digital Filters)
  - ➢ Tracking control systems (precision control of the inverter and its control/interfacing systems)
  - ➢ Drivers developing
  - ➢ Global Optimisation Techniques

iMEX.A expertise

- <u>Optics</u> (theory and tests on optical bench)
  - ➤ Design of optical instrumentation (telescopes and receivers), systems and lenses
  - ➤ Testing of optical components: sphericity test of lenses
  - ➤ Measurements of polarization and measurement of depolarization of optical components
  - ➤ Measurement of aberrations
  - ➤ Interferometry and diffraction
  - ➤ Photonics: waveguides (optical fibers) and optical fibers coupling

iMEX.A experience

▪ <u>National Institute of Metrological Research</u> (iNRiM)
- ➢ Optical experimental setup building for interferometry, spectrometry and the national length standard
- ➢ Programming of PID automatic control systems for frequency stabilisation of lasers and the length standard
- ➢ Simulation of a novel interferometry system with sub-wavelength resolution on a 64-bit multi-processors Intel pc, using MPI libraries
- ➢ FEM study of the attachment of a crystalline structure on a test-rig designed for the study of optical physics phenomena
- ➢ Training courses for the use of FEM software

iMEX.A experience

- <u>Thales Alenia Space Italia</u> (3-year project financed by Regione Piemonte and named *STEPS*)
  - ➢ Design of a supervision module for the autonomous management of the docking procedure (on ground) between lunar rovers based on the formalism of the artificial intelligence
  - ➢ Fluid dynamics simulations (CFD) of new air filtration systems for space uses (lunar and martian dust)

Thanks a lot!

Luca Derosa
CEO of iMEX.A

e-mail: luca.derosa@imexa.it
skype: imex.a
phone: +39-011-0375395
cell: +39-348-9219345
website: www.imexa.it
address: via R. Martorelli 45, Torino (Italy)