



A.R.A.K.N.E.S.
Array of Robots Augmenting the KiNematics
of Endoluminal Surgery

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D11.10

Final report on demonstration activities

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RE	Restricted to a group specified by the consortium (including the Commission Service)	
CO	Confidential, only for members of the consortium (including the Commission Service)	

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2	27-11-2012	Arianna Menciassi (SSSA)	Revision of the document
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1 Executive summary

The demonstration plan of the ARAKNES project has been presented and updated in D11.4 (month 6) and in D11.5 (month 24) respectively. At the end of the project, the present deliverable summarizes all the demonstration activities carried out by the Consortium during the 54 months (48 +6 extension months) of the Project. We can divide these demonstration activities in: i) National and International Conference in Europe and ii) General public events.

Regarding the demonstration activities during National and International Conferences and public events, according to the project plan the ARAKNES platform and relative sub-systems have been exhibited at many events, including:

- the 44th congress of the European Society for Surgical Research;
- SMIT International Conferences;
- pHealth 2010;
- Europe's leading ICT research event 2010
- Medica;
- Tuscany Congress on General Surgery;
- Made in Europe event;
- IEEE World Haptics Conference.

Moreover, several laboratory visits have been organized in each partner Institution within the project period and the ARAKNES platform has been described, demonstrated and presented at a large number of visitors.

Two kinds of audience have been addressed:

- people and experts working in the field – these include standard exhibitions, trade conferences and fairs, medical and surgical symposia. In this case, the primary objective is the dissemination of information.
- the general public – this includes short-term exhibitions in museums and events for the general public. This type of events also served to publicise research initiatives funded by the European Union.

Details about the above activities and events are reported in the next sections.

2 ARAKNES demonstration activities

2.1 Introduction

The demonstration of the ARAKNES Platform, as well as the illustration of the novel surgical procedures, is dedicated to the understanding of its principles for a broader public. In this context, we defined a variety of events that enable us to evaluate and demonstrate the single modules and the platform as a whole. With these activities, we aimed to form a demonstrator program which could be shown to an interested public in conferences and presentations. Activities include participation at exhibitions.

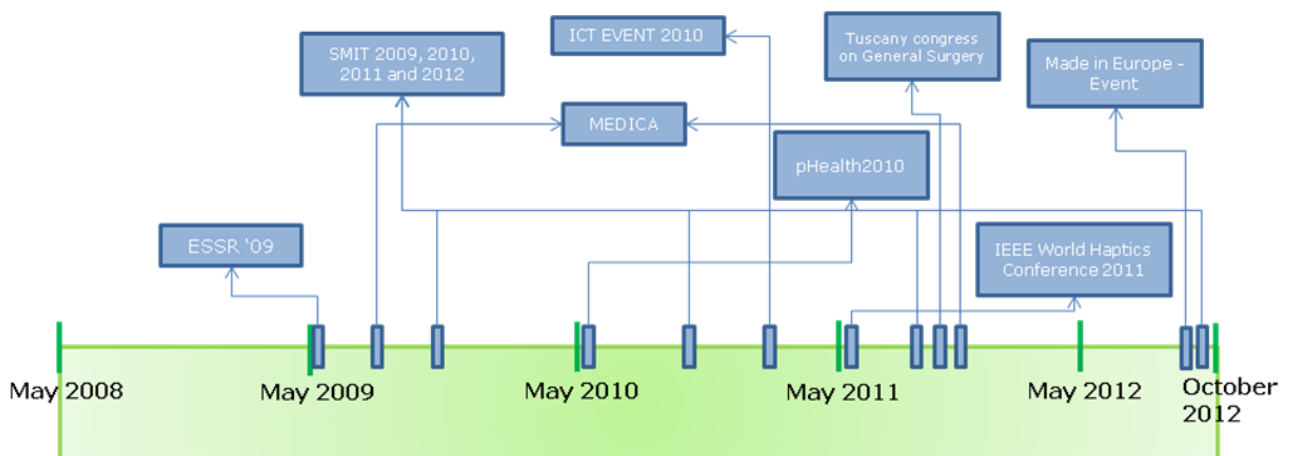


Figure 1. Demonstration planning (that was performed during the project).

The scheme reported above presents the complete list of the demonstration activities of the ARAKNES project. During the 54 months of the Project, the demonstration of the single modules and/or of the complete ARAKNES Platform as well as the illustration of the novel surgical procedure have been presented in the major International Conference in Europe.

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- the general public – this includes short-term exhibitions in museums and events for the general public. This type of events served to disseminate research initiatives funded by the European Union.

Details on the demonstration events have been described in deliverable **D11.4** and **D11.5** and here they are summarized and updated.

As reported in Figure 1, the demonstration events have been carried out between the second and the fourth year (and in the additional 6 extension months). In particular, during the second year of the Project the most important results and the first prototypes have been presented and demonstrated during the 44th congress of the European Society for Surgical Research in a section dedicated to robotics in surgery. In October 2009, 2010, 2011 e 2012 the demonstration plan considered the SMIT conference, one of the most important International conferences for active discussions on new medical treatments, and on the future of medical technologies. Finally, in the last year of the ARAKNES Project the

final products and the animal Lab results have been presented during several international and national events.

2.2 National and International Events for Experts of the field

1) A special session at the 44th Congress of the European Society for Surgical Research (**ESSR'09**), held in Nîmes (France), have been organized by LIRMM from 20 to 23 of May, 2009. The session has been dedicated to robotics in surgery. This conference covered the main advanced research topics in numerous fields of surgery e.g. cardiac surgery, thoracic surgery, vascular surgery, gastrointestinal surgery, hepatobiliary and pancreatic surgery, plastic and reconstructive surgery, orthopaedic surgery and traumatology, urology, gynaecological and obstetrical surgery, neurosurgery. More than 400 surgeons all over Europe have attended the conference and a plenary talk was given by A. Menciassi. More information have been reported on the event website <http://essr2009.ams.fr>.

2) SMIT 2009, SMIT 2010, SMIT 2011, SMIT 2012

The SMIT International Conference is shaping up to be one of the most exciting and important meetings in the medical innovation field with a particular focus on image guided interventional oncology and endoluminal surgery NOTES and NOSCAR. The scope of the SMIT meeting is to link researchers in the field of minimally invasive therapy with medical device companies, and clinical practitioners for new developments for specialties such as surgery, radiology, urology, gynecology, ophthalmology, otolaryngology, neurosurgery, orthopedics, dental medicine, veterinary medicine, etc. The conference also covers development of medical instruments, medical engineering and rapid prototyping. In particular the input from medical experts or clinical engineers can be fruitful for companies to consider new procedures and instruments. Thus, SMIT plays an extremely important role to offer a forum for enthusiastic discussion for new medical treatments, and touching the future of medical technologies. Topics for SMIT are Tumor Ablation and Interventional Oncology, Endoluminal Surgery NOTES and NOSCAR, Surgical Manipulators and Image-guided Robotics, Hybrid OR, Work Flow and Systems Integration, Nanotechnology and Microsystems in Medicine, New Instruments and New Materials, Rapid Prototyping in Medicine, E-Health, MRI Safety, Navigation and Augmented Reality, Molecular Imaging and Targeted Drug Delivery, Model based Therapy and Numerical Simulation and Training. These topics have been presented by an international forum of outstanding endoscopic surgeons, interventional radiologists, biomedical engineers and industrial instrument manufacturers.





The 21st SMIT congress has been held in Sinaia, Romania, October 7-9, 2009 (<http://smit2009.com/Homepage.html>). The conference was dedicated to Nanotechnology, Robotics in Surgery, Robotics in Rehabilitation, NOTES (Natural Orifices Trans Endoscopic Surgery), Operating Theatre of the Future Simulators in Surgical Training, Imaging Guiding Surgery, Endoluminal Surgery, Augmented reality in MIS, Wireless capsule for GI tract.

During the session dedicated to the "Wireless capsule for GI tract", a demonstration activities of the ARAKNES platform has been presented by Prof. Schurr (NVN) together with the VECTOR project demonstration.

A demonstration stand has been organised to show to participants videos and demos of the ARAKNES robot: two posters and some demos permitted to inform several medical doctors and scientists about the main goal of the project, obtaining always good feedback in terms of admiration and interest. During the three days of conference more than 100 brochures were given to people who visited the ARAKNES stand asking information and contacts.

In the same Conference, a dedicated Workshop about "Basic Techniques in NOTES" was organized by KARL STORZ and the Wickham Lecture has been presented by Sir Alfred Cuschieri (SSSA), the Scientific Coordinator for the Medical activities of the ARAKNES Project. Moreover, Pietro Valdastrì (SSSA) presented a short description of the levitation camera of ARAKNES during the Session "Medical Robotic Engineering".

Finally, Mario Giardini (USTAN) has won the best poster award with the work on "Intraoperative optical diagnostic for robotic surgery".

Thursday, October 8 th				Friday, October 9 th			
	Sinaia Casino Theatre	Sinaia Casino Oval Hall	Hotel Palace Sinaia, Hall 1	Sinaia Casino Theatre	Sinaia Casino Oval Hall	Hotel Palace Sinaia, Hall 1	
8:30	ROBOTIC SURGERY Rick Savaux, Irinel Popescu, Eric Laporte Special Lecture 1 - Richard Salava	MEDICAL ROBOTIC ENGINEERING Gernot Kronreif, Michael Grunze, Dan Stokanovic	WORKSHOP N.O.T.E.S	OPERATING THEATRE OF THE FUTURE Sylvain Pissard, William Meng, Cornelis Grimbergen	VIRTUAL REALITY II Jenny Danilovici, Tati Hernes, Greg Buroca	IMAGE GUIDED INTERVENTIONS Thomas Langer, Cheng Song, Joachim Kretzbach Special Lecture 6 - Andreas Melzer	
10:30	Coffee Break	Coffee Break	Coffee Break	Coffee Break	Coffee Break	Coffee Break	
11:00-11:40	11.00-11.40 LESS - LAPARO-ENDOSCOPIC SINGLE SITE SURGERY "OLYMPUS" Pascal Bucher, Thomas Langewieser 11.40-12.30 NITINOL H. Fischer, A. Meizer	CARDIOVASCULAR SURGERY Daniel Wendt, Ionel Droc	WORKSHOP N.O.T.E.S	STATE OF ART OF HYBRID IMAGING OPERATING THEATRES Per Kristian Hal, Toft Hogestuen Hernes	ERGONOMICS IN SURGERY Michael Stark, Sarah Paul, Sánchez-Margallo FM.		
12:30	Lunch						
13:00							
14:00	EDUCATION Special Lecture 2 - Billard Jason, Special Lecture 3 - Jose Schiappa, Special Lecture 4 - Paul Wietter	MISCELLANEOUS Raymond Oskari, Vasile Sartiu	WORKSHOP N.O.T.E.S	12:30 Lunch Symposium Technology of the Hybrid Imaging OR - sponsored by Siemens, Philips, GE FP7 Marie Curie Initial Training Network Event of IHOS European consortium co sponsored by GE, Philips and Siemens, Arno Buecker, Andreas Meizer, Per Kristian Hal Oslo Open and close bore MRI, Philips, Arno Buecker, Hamburg, Germany MRI and surgical suite, GE, Andreas Meizer, Dundee, UK			
15:20	POSTER SESSION - Eric Laporte, C. Cosarescu, (1-15); Cornelis Grimbergen V. Tomulescu (16-30)						
16:00	OPERATIVE ENDOSCOPY A. Arneso, Eli Kinehni Special Lecture 5 - Gerhard Bueess	NANOTECHNICS Dani Dascalescu, Steve Toans	WORKSHOP N.O.T.E.S	NOTES - NOS - SAS Gerhard Bueess, Marco Maria Lenci	TRANSORAL ROBOTIC SURGERY Gregory S. Weinstein, Mustafa Anvari, Serhan Kim	ROBOTICS IN GYNECOLOGY John Roggeys, Angela Mizzone, Galen Gombosi	
17:30				Coffee Break	Coffee Break		
18:00				MICROROBOTS AND ENDOLUMINAL MICROTECHNOLOGIES Nicola Di Lorenzo, Mark Schurr	NESA SESSION Michael Stark, Gheorghe Poltecu		
19:30				General Assembly			

Figure 2. The scientific program of the conference permitted to exploit many moments for the explanation of ARAKNES technologies to medical doctors.



Figure 3. Some pictures of the ARAKNES participation in SMIT 2009.



Figure 4. The video of the bimanual robot insertion attracting interest.



Figure 5. Some colleagues took advantage for talking about technical information.

As planned during the first year of the project, the ARAKNES platform has been also demonstrated by Prof. Arianna Mencias Massimiliano Simi (SSSA) at 22nd SMIT congress (<http://www.smit2010.com/SMIT2010Trondheim/SMIT2010.html>), held in Trondheim, Norway, September 2-4, 2010 together with Vector project demonstration.

In the same Conference, Massimiliano Simi (SSSA) presented part of the ARAKNES-Research Platform results with the talk titled "Development of a Magnetic activated Stereoscopic Camera for Single Port Laparoscopy".

3) pHealth 2010

According to the Demonstration planning defined during the first year, an additional exhibition of the ARAKNES project was held at the 7th International Conference on Wearable Micro and Nano Technologies for Personalized Health (pHealth) in Berlin, Germany, May 26 – 28, 2010 (see picture below).

A mini-symposium has been organized by Prof. Paolo Dario and Prof. Arianna Menciassi (SSSA) to show the new frontiers of the robotic surgery by means of the specific example of the ARAKNES project. ARAKNES prototypes were presented in special glass boxes.



Figure 6. pHealth 2010 leaflet

4) Europe's leading ICT research event 2010

The biennial ICT Event (formerly called the "IST Event") is the most important forum for discussing research and public policy in information and communication technologies at European level. The Event brings together researchers and innovators, policy and business decision-makers working in the field of digital technologies. The ICT Event presents Europe's future priorities for research funding in the ICT area, examines crucial issues of public policy for stimulating innovation through ICT development and uptake

and creates opportunities to establish research and business partnerships and simply keep up to date in what is happening in various ICT research fields.

The ICT Event has been organized by the European Commission's Directorate General for the Information Society and Media and has been hosted by the Presidency of the European Union. Approximately 4,000 - 5,000 delegates have been got together at ICT Event 2010 (http://ec.europa.eu/information_society/events/ict/2010/index_en.htm).

The ARAKNES project has been presented at the ICT event 2010, in Brussels: a demonstration stand has been organised to show to participants videos and demos of the ARAKNES robot.



Figure 7. Some pictures of the ARAKNES participation in ICT event 2010.

5) Medica 2009 and 2011

MEDICA is the largest medical trade exhibition in Europe, opening up many new business opportunities and a chance to access new markets and contacts.

This leading worldwide trade fair, proposes the full range of inpatient and outpatient products and services, technical innovations from over 60 countries and products and services from all over the world. By means of approximately 4,300 exhibitors, over 700 seminars and talks and different theme parks and forums, MEDICA represents the Europe's biggest multi-disciplinary continuous medical education congress, that allows exchange of experience with people from over 100 countries. It is the leading trade fair for industry, medical trade, service providers, science, associations, public body, sickness funds/ private health insurances, hospital doctors, hospital management, hospital nursing staff, hospital operators, doctor's surgeries, physiotherapists/ergotherapists/speech therapists, medical care centres and technical services. The 4,300 exhibitors, from small innovative companies to global players, present a vast array of new products and services regarding to electromedicine, medical technology, operating tables and medical furnishings, laboratory equipment, rescue equipment and emergency medicine, diagnostics, physiotherapy and orthopaedic technology, single use and consumables, information and communications technology, facility management, textiles, building automation and medical services and publications.

MEDICA has a unique programme of supporting events with practical information (MEDICA Congress, Deutscher Krankenhaustag (German Hospital Convention)), forums

for exchanging views (MEDICA Physiotherapy Forum) and continuous medical education events (MEDICA vision, MEDICA business center).

Elena Troia and Valentina Valori (MT) participated in Medica 2009 and 2011 and a list of interesting contacts has been completed. These data are included in the deliverable (see Annex 1).



6) Tuscany Congress on General Surgery – Pontedera, September 2011

A demonstration session of the ARAKNES platform has been performed during a national Congress on General Surgery that was held in Pontedera in September 2011. The SPRINT robot and the preliminary results of the ARAKNES Research platform have been presented during the congress and a dedicated stand has been built up outside the conference room for demo, questions, discussions etc.



Figure 8: Some pictures of the ARAKNES stand organized by SSSA at "Museo Piaggio" in Pontedera (Pisa) during the Congress of general surgery. Several medical doctors asked details about the ARAKNES platform and more than 40 leaflets have been given to the visitors.

7) IEEE World Haptics Conference, Istanbul, June 2011

Last June 2011 EPFL organized a workshop at the IEEE World Haptics Conference, which was held in Istanbul. The goal of this workshop was to bring together medical doctors and engineers specialized in haptic feedback and surgical robotics to discuss the importance of this technology in robotic surgery. The main findings of the ARAKNES project in that area have been shown and discussed with the medical doctors.

A summary of the main discussions was published in the IEEE Transactions on Haptics webpage: "Role of Haptics in Surgical Robotics: Report on a Workshop."
<http://www.computer.org>.



Figure 9: Some of the surgeons and specialists invited to the event (MD Hagen, MD Dominguez and Prof. Kuchenbecker).

A version of the tactile pulse display that EPFL developed within ARAKNES project has been adapted and integrated in a computer mouse as a demonstrator of how tactile feedback can be used for telepalpation.

This demonstrator is exposed in the “Musée de la main” of Lausanne from May 2012 to January 2013 and access by the general public (see Figures below).

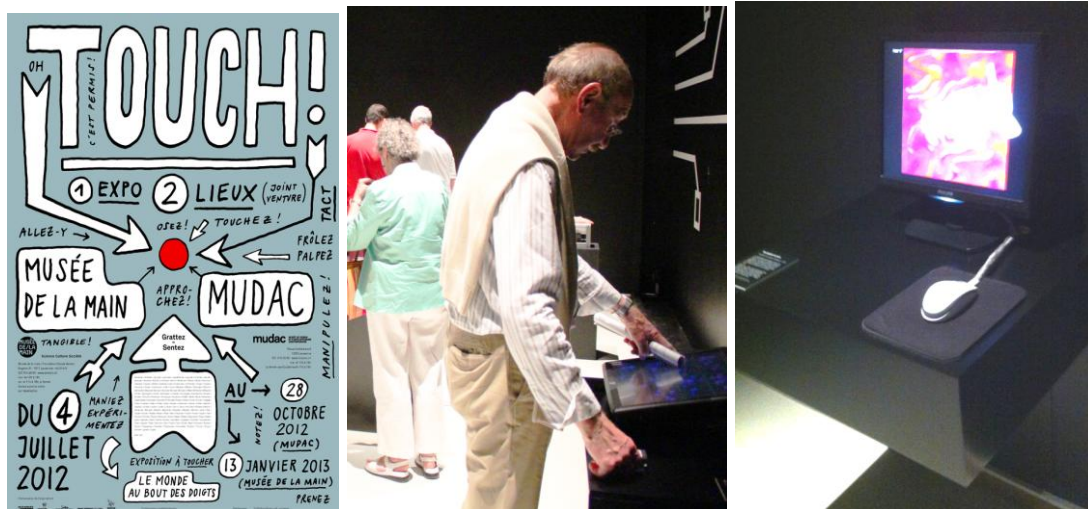


Figure 10: Demonstrator of EPFL tactile system for the general public in the “Musée de la main” (Museum of the hand).

8) Made in Europe – ICT building blocks tackling societal challenges, Brussels, October 2012

The ARAKNES project has been selected as one of the 8 ICT EU funded projects for the organization of the Made in Europe event, held at the European Parliament in Brussels, from 8 to 10 October 2012. Made in Europe is an event which illustrates how research contributes to real-life health, sustainability and mobility applications and services. For two days following the official opening on the 8th of October, individual guided tours have been organized and gave hands-on experience of the research that is done in Europe.

A dedicated stand has been organized by the EU for the ARAKNES platform and demonstrations have been carried out for the guests. Some pictures are reported below.



Figure 11. The ARAKNES project at the "Made in Europe event".

2.3 General public events

During the 54 months of the project, the ARAKNES prototypes have been presented not only during international events, but also at events for general public.

Several laboratory visits have been organized in each partner Institution, and the ARAKNES platform has been described, demonstrated and presented at a large number of visitors (different kinds of public, e.g. industrial delegations, guests from national/international universities, high school classes, and ordinary citizens).



Figure 12. Some college students at the Polo Sant'Anna Valdera, Scuola Superiore Sant'Anna, Pisa (Italy).

3 Demonstration activities @ European Commission during the ARAKNES Review Meetings

3.1 Third Review Meeting

An additional demonstration activity has been performed on May 31-June 1, 2011 in Brussels, in conjunction with the 3rd review of ARAKNES. Many officers of the European Commission observed the developed technologies and asked questions.





Figure 13: Demo session during the ARAKNES 3rd review meeting in Brussels.

3.2 Fourth Review Meeting

An additional demonstration activity has been performed on June 18 and 19, 2012 in Brussels, in conjunction with the 4th review of ARAKNES. An interesting promotional video has been realized by the European Commission Communications Networks, Content & Technology group about the ARAKNES project by using some video, images and interviews collected during the Demo Session.



Figure 14: Demo session and interview during the ARAKNES 4th review meeting in Brussels.

4 Conclusions

In this document, the demonstration activities carried out during the project period by the ARAKNES consortium have been summarized. According to the demonstration activity presented and updated in D11.4 and D11.5 respectively, we can say that the original demo plan of the ARAKNES project have been followed during the years.

Project results, platform and sub-systems have been demonstrated during 7 national and international events and in several general public events organized by the consortium partners. Moreover, additional demonstration activities have been performed during the ARAKNES project review meetings held in Brussels, where in addition to the formal reviewers, many officers of the European Commission and European Commission Communications Networks, Content & Technology group considered the developed technologies.

5 Annex 1 – List of contacts interested in the ARAKNES system

Company	Web site	Contact	email
Tyco Electronics	www.tycoelectronics.com	Cosma Cinzia	ccosma@tycoelectronics.com
Thor	www.thormed.com	Ferenczi Gyorgy Greg Csiszler	george.f@thormed.com hardware@thormed.com
alps	www.alps.com	Paolo Gadda	paolo.gadda@alps-europe.com
innervision	www.medovations.com		
sony	http://www.sony-biz.net/healthcare		healthcare@eu.sony.com
scheuermann+helig	www.sh-gmbh.de		info@sh-gmbh.de
baumann springs	www.baumann-springs.com	Sandro Krebs	sandro.krebs@baumann-springs.com
3dplus	http://www.3d-plus.com/		
mediplus	http://www.mediplus.co.uk/		help@mediplus.co.uk <help@mediplus.co.uk>
Reiner Microtek	www.reinermicrotek.com	Pablo Cajaraille	p.cajaraville@reinermicrotek.com
Bidoia sas	www.bidoia.com	Roberta Bidoia	r.bidoia@bihos.com
Sed.fr	http://www.sed.fr		info@sed.fr
Isa france sas-	http://www.isa-fr.com	Nicolas Tirole	contact@isa-fr.com
halberg precision	www.halberg-precision.com	Gregory Briche	gregory.briche@halberg-precision.com
sycotec	www.sycotec.eu	Martin Ruhdorf	martin.ruhdorf@sycotec.eu
caragh-precision	www.caragh.ie	Richard Gribbons	richardgribbons@caragh.ie
erbe	http://www.erbe-med.com		sales@erbe-med.de
Faulhaber	http://www.faulhaber-group.com/		michael.dunst@faulhaber.de
Maxon	http://www.maxonmotor.com		info@maxonmotor.com
Portescap-Dahanner motion company	www.portescap.com	Simon Pata	simon.pata@portescap.com
PiezoMotor	www.piezomotor.com	Olle Lindkvist	olle.lindkvist@piezomotor.se

micos	www.micos.ws	Wolfgang meienburg	wolfgang@meienburg@micos-online.com
PI	www.Pi.ws	Ulrich Brueggemann	u.brueggemann@pi.ws
Gemu	http://www.gemue.ch		info@gemue.ch
Pyxis	www.pyxis-int.com	Filippo Trascinelli	f.trascinelli@pyxis-int.com
AMT	www.amt-mat.com	Zulkefli Zainal	zulkefli@amt-mat.com
SP medical	www.sp-medical.dk	Palle Sick Borgesen	psb@sp-medical.dk
nolato- injection	www.nolato.com/medical	Pelle Nilson	pelle.nilsson@nolato.com
glubran	www.gemitaly.it	Francoise Raynaud	info@gemitaly.it
gelita medical	www.gelitamedical.com		info@gelitamedical.com
Seritronics spa	http://www.seritronics.it		seritronics@electroniipc.it
flexicare	www.flexicare.com	Thomas Jenkins	thomas.jenkins@flexicare.com
greetmed	www.greetmed.com	Elna zhou	med@greetmed.com
top clean- olanda--	http://www.topcleanpackaging.com	Peter Zegers Cyrille Marechal	pzegers@cartolux-thiers.com c.marechal@tcinjection.com
Medical Tubing	http://www.medical-tubing.com/medical-tubing.html	Macirè Coulibaly	m.coulibaly@medical-tubing.com
HTTP- Meds,LLC			moulette@hitechprofiles.com
Zeus	www.zeusinc.com	Stephen Davis	sdavis@zeusinc.com
UPG Innovative global manuf	www.upgintl.com	Matthew Langton	mlangton@upgintl.com
Medi-globe	www.mediglobe.com	Eva Kurt	eva@medi-globe.cz
relysis medical devices limited	http://relisysmedicaldevices.com/	Srinivasa Rao	info@relisysmedical.com
optima	www.optima.se	Soren Apell	soren@optima.se
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galmed	www.galmed.com.pl	Pawel Meger	biuro@galmed.com.pl
mednet	www.medneteuropa.com	Matthias Heinz	matthias.heinz@medneteuropa.com
nakan-resilia arkema group	www.arkema.com	Andrea Zanichelli	andrea.zanichelli@arkema.com
pmh portugal	www.pmh.pt	Ana Costa	pmh.geral@pmh.pt

sterne- elastomer-mi ha mandato preventivo e nn è buono	www.sterne.elastomeres.com	Jean Claude Scardigli	contact@sterne- elastomeres.com
origin3d	www.origin3d.com	Julien Boutaud	julien.boutaud@origin3d.com
nanon	www.nanon.dk	Thomas Christensen	tc@nanon.dk
melitek	www.melitek.com	Jesper Laursen	jl@melitek.com
saint-gobain	http://www.medical.saint-gobain.com/	Brad Hanson	bradley.e.hanson@saint-gobain.com
biw.de	www.biw.de	Claudia Milting	cmilting@biw.de
polycine gmbh	http://www.polycine.com/	Christian Kunz	c.kunz@PolyCine.com
kelcourt.com	www.kelcourt.com	Sebastian Sia	sebastian.sia@kelcourt.com
kast	www.kast.co.il	Meir Kristal	meirk_kast@kanavim.com
jenoptik	www.jenoptik-ps.de	Mr Ingolf Reischel	ingolf.reischel@jenoptik-ps.de
hund Wetzlar	www.hund.de	Burkhard Wetz	B.wetz@hund.de
MGB endoskopiche	www.mgb-berlin.de	Johannes Tschepe	tschepe@mgb-berlin.de
modulight	www.modulight.com	Rami Valli	rami.valli@modulight.com
ETView	www.etview.com	Elias Daher	elias@etview.com
laser components	www.lasercomponents.com	Manfred Mair	m.mair@lasercomponents.com
fujikura	www.fujikura.co.jp		
limbs&things	www.limbandthings.com	Nick Gerolemou	nick@limbsandthings.com
VDL Wientjes	www.vdlwientjes.com	Chris Mulder	cmulder@vdlwientjes.com
Sklar instruments	www.sklarcorp.com	JoAnne Stephens	international@sklarcorp.com
omnivision	www.ovt.com	Matthew Whitcombe	mattw@ovt.com
vistamed	ww.vistamed.net	Ann-Marie Shivan	ashivnan@vistamed.net
altimex	www.silalt.co.uk	Robert Dijkstra	altimex@kpn-officedsl.nl
fluortek	www.fluortek.com	Debbie Auser	email@debbieauser.com