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From Technology Transfer To Start-up Creation

– The European Space Incubator Network

The ESA Technology Transfer Programme (TTP) has grown since its inception in 1990 into an efficient machine creating many spin-off success stories. The Programme now has a well-established team, a sound methodology, access to networks like SPACELINK, the European technology brokers' network, access to funding, a close relationship with the European Commission (DG Research) and strong political support throughout Europe. Today, more than 150 space technology transfers have been successfully achieved to such non-space sectors as medicine, textiles, automobiles, the oil & gas industry, etc. These transfers represent a turnover in excess of 150 MEuro for the donor and receiver companies, and a projected estimated turnover of about 1 BEuro by 2005.

The trend towards the creation of start-up companies from the ESA/TTP spin-off process began some four years ago. Already, about 20 such new companies have been created successfully in Europe thanks to the 'virtual' business incubation process provided by the TTP.

A famous example is provided by Anson Medical, founded by Tony Anson, a researcher at Brunel University's Institute for Bioengineering in the United Kingdom. Tony was investigating applications for a novel smart material called a Shape Memory Alloy (SMA). SMAs had been considered for use in space for various micro-actuation applications, such as the controls in bio-experiments, deployment of micro-solar arrays and antennas, etc. Tony was also investigating the use of these materials for medical and industrial markets. The UK SPACELINK representative, JRA Technology Ltd., encouraged Tony to promote his concepts through the ESA TTP and such was the interest in potential medical devices incorporating these materials that he decided to leave the University and set up a spin-off company, Anson Medical Ltd. Anson Medical was provided with support and assistance by the ESA TTP and JRA, who in the early stages identified prospective partners and licensee organisations, and helped the company to secure public R&D funding,

including both EUREKA and CRAFT grants from the European Union. In 2001, Anson Medical was acquired by the UK-quoted company Lombard Medical plc for in excess of 40 MEuro. The company is continuing the development of SMA medical devices, with several nearing the completion of early medical trials.

More examples of successful spin-offs from ESA's Technology Transfer Programme are given in the accompanying panels.

There is now beginning to be a real awareness of the possibilities for exploiting space technologies and systems in the non-space sector thanks to the:

- space Technology Transfer portfolio of over 450 space technologies that are available for transfer and licensing
- applications of existing space systems in such domains as global navigation (GNSS), Earth observation, and satellite communications
- EC-ESA common strategy for space, signed in November 2000, aimed at developing more market-oriented programmes, such as the Galileo and GMES.

As a consequence, greater opportunities are being given to entrepreneurs to innovate and create their own companies dealing in space-related products and services, where 'Space for Business' can be the new maxim.

New opportunities are nice, but it is a tough challenge to progress from an initial idea to actually developing a start-up company and convincing investors to put their money into space-technology-related products and services. Space has historically been considered as 'a business for large players' and a 'niche market', with 'long times-to-market' and often with fierce terrestrial competition, the telecommunications sector being a good example. Consequently, seed capital is hard to come by.

Therefore, to progress beyond the TTP support and the virtual incubation process, ESA and the EC are supporting the creation of physical business incubation centres, within an organised network (ESINET), aimed at boosting entrepreneurship in Europe and in Canada. These

'incubators' are providing entrepreneurs, innovative start-ups, Technology Transfer spin-offs and spin-ins, and early-stage new businesses, with operational services and

know-how to get space-technology-related projects off the ground and help them to develop into viable businesses.

Dynamic Material Devices (DMD) Ltd.

DMD was established by Tony Anson, shortly after he set up Anson Medical, to investigate industrial applications of SMA. Since his partial retirement from Anson Medical Ltd in 2001, he has been devoting his efforts to the expansion of DMD. Early-stage venture finance is currently being sought for the company to fund the development of various products, including one potential breakthrough product in the computer-memory field. The ESA TTP and JRA have provided support to DMD to aid its expansion and JRA has acquired a share-holding in the company. Many of the expressions of interest in the SMA technology identified during the early stages of Anson Medical's development through the ESA TTP were from industrial companies, and DMD intends capitalising on these.

REM Ltd.

Like Anson Medical and DMD, REM Ltd. was founded by a researcher working in Brunel University's Physics Department. Dr. Andrew Holmes-Siedle has worked in the area of Radiation Field-Effect Transistors (RADFETs) for a number of years, and he set up REM to commercialise various RADFET-based sensor devices that he had invented. The company has already proved reasonably successful and further expansion and development of its product range are planned. REM has received considerable support from SPACELINK over the years, including numerous introductions to potential end-users and licensees for the technology. JRA has also generated considerable media interest in this technology, with numerous articles on the technology appearing in the press. The technology also featured in a short film produced in the United Kingdom.

Radiation Systems Ltd.

Radiation Systems Ltd. was established by Dr. ?? Ramsden, a researcher in the Astronomy Group at Southampton University. He has been involved in the development of detectors and imaging systems for gamma-ray astronomy for many years, and has pioneered the development of instrument techniques for this area of high-energy astrophysics. Radiation Systems was set up to commercialise a patented high-resolution gamma-ray spectroscopic detector invented by Dr Ramsden and colleagues in his research group. The technology has significant potential for application in cancer diagnosis, particularly in the detection of breast cancer and also the resulting spread of cancer cells throughout the lymphatic system. Radiation Systems is being supported by the ESA TTP and JRA. JRA provided guidance on the protection and exploitation of its intellectual property, and also on the proposed evolution of the company. Co-funding for a market research/feasibility study has recently been made available by ESA.

Telelogic-QSS UK Ltd.

Dr. Richard Stevens founded a company to commercialise a requirements-management software tool based on concepts he had originally developed while working at ESA/ESRIN in Frascati, Italy. The company, called QSS Ltd., devised a software package called 'DOORS', which was based around the core software technology developed at ESRIN. QSS experienced considerable growth and expansion in the 1990s, with the company successfully entering the US market during this period. The growth of QSS has been such that its DOORS software package is now widely considered to be the de facto standard in requirements management. QSS was acquired by the Swedish company Telelogic in 2000 for in excess of 120 MEuro.

JRA has been a significant user and promoter of the DOORS software tool. In 2000 the two companies entered into a strategic alliance to jointly market the software package to public and private organisations operating in the aerospace sector. Several JRA personnel are fully trained DOORS implementers, and JRA has introduced the tool into the UK Ministry of Defence's validation and verification process for the EuroFighter project.

MRPB Ltd.

This company grew out of the efforts of the Microwave Radiation and Biological Processes research group of scientists and engineers who began working together in the 1990s. The aims of the Group are to explore and seek to characterise the relationship between microwave radiation and biological processes



ESINET

Launched in Brussels in July 2002, ESINET is the European network of space-related incubators able to link existing

and, based upon an enhanced understanding of that relationship, to develop diagnostic, therapeutic and analytical techniques and devices.

The members of the Group are the millimetric wave group at Rutherford Appleton Laboratories and Astrium plc, who have produced many devices for space applications (mainly Earth observation), and also the University of Wales College of Medicine and the Cardiff and Vale National Health Service Trust.

In 2000, the Group received 15 kEuro in support from the ESA TTP towards a programme and business planning exercise, and in September that year was successful in attracting investment from the Cardiff Partnership Fund towards the establishment of a spin-off company (MRBP Research Ltd.) in recognition of the commercial potential of the work. The bulk of the experimental work to date has been undertaken at the Rutherford Appleton Laboratory, making use of the very sophisticated on-site facilities and equipment available there. In 2001, the ESA TTP contributed 50 kEuro to support the transition of key research staff from the academic to a commercial environment.

The company is currently working to increase its Intellectual Property base and is looking for second-stage funding.

AK Rainbow Ltd.

Prof. Anthony Campbell became one of the first beneficiaries of the ESA TTP when he acquired one of the earliest photon-counting devices incorporating the novel ESTEC matrixing software (which constituted the first ESA TTP transfer success in the form of a licence granted to Photek Ltd. in the UK, facilitated by JRA Technology).

Professor Campbell has used the device to further his research into the use of bioluminescence techniques for biomedical research. More specifically, he is researching into living-cell signalling mechanisms, as well as developing a range of novel bio-luminescent assays using proteins extracted from fireflies and glow-worms.

Recently, Prof. Campbell has formed AK Rainbow Ltd. as a potential vehicle to exploit his patented discoveries. JRA Technology is advising the company on set-up and intellectual-property exploitation issues.

TEVE

TEVE is a start-up company founded by Mr Roberto Zannini, which is active in slope consolidation. The company co-operates with major Italian companies working in the same field. He has developed and patented the prototype of a cage able to perform deep drilling on rocky walls. The company is further developing the concept within the framework of a co-operative project with Space Application Services in Belgium, and the department of Mechanical Engineering of the University of Genoa (Italy), both of which are already involved in space tele-operation and robotics applications.

Iris-Tech

Iris-Tech is a spin-off company of Iris SpA providing personalised solutions for the use of network technologies. The structure of the company and its highly qualified staff are tailored to the rapid development of the 'made-to-measure' applications demanded by today's technologically sophisticated market. Iris-Tech is specialized in the development of complex applications through the web, interfacing them with the most common databases used as management tools, and in the recovery of data to be exported on the Internet. The company is currently involved in the development and validation of vision technologies for completely automated quality management in textile companies, based on the parent company's unique experience in applying space-borne vision technologies.

Systela Sas

Systela is a start-up company founded in November 1999 by André Carrion and Eric Harle for developing and assembling an electric motor and battery kit for bicycles. This kit can be installed on almost every kind of bike in a matter of seconds. The enabling technologies have been developed within European space programmes. Systela's policy is to exploit mass-production opportunities to reduce manufacturing costs, thereby increasing the market for its products.

national and regional incubators in the ESA Member States, in the EU Countries, and in the EU Candidate Member States. ESINET consists so far of 25 Incubators in 14 countries, making it the first network of its kind to link space-related business and technology centres throughout Europe.

The ESINET objectives are to:

- *promote the creation of new enterprises:* ESINET will allow the exchange of best practices and experiences with other incubators, especially when the transfer of space technologies and the use of space systems are involved

- *facilitate technology transfer between the space and ground sectors:* ESINET will be used to facilitate the extraction of space technologies from ESA and other European space organisations

- *help start-up enterprises gain access to finance, advise them on Intellectual Property Rights (IPR), networking, marketing and legal matters, and provide consulting services:* ESINET will provide powerful consulting resources in order to help entrepreneurs build competitive businesses
- *establish strategic trans-national partnerships and networks:* ESINET will provide start-up transnational partnership opportunities for participating, for instance, in EU and ESA proposals

- *build gateways for international markets:* ESINET will provide start-ups with the commercial introductions/partnerships needed to expand their activities further in Europe

- *form a critical mass to achieve visibility with major venture capitalists and European institutions:* ESINET will make the space incubators and start-up companies visible at a European level to investors or associations of investors. It will also improve the dialogue between entrepreneurs, ESA and the EC.

A new and important member of ESINET is the European Space Incubator (ESI) inaugurated in December 2002 and hosted by ESA/ESTEC in Noordwijk (NL). It will be established with a seed capital fund of 25 MEuro, and will be at the disposal of all ESINET entrepreneurs.

