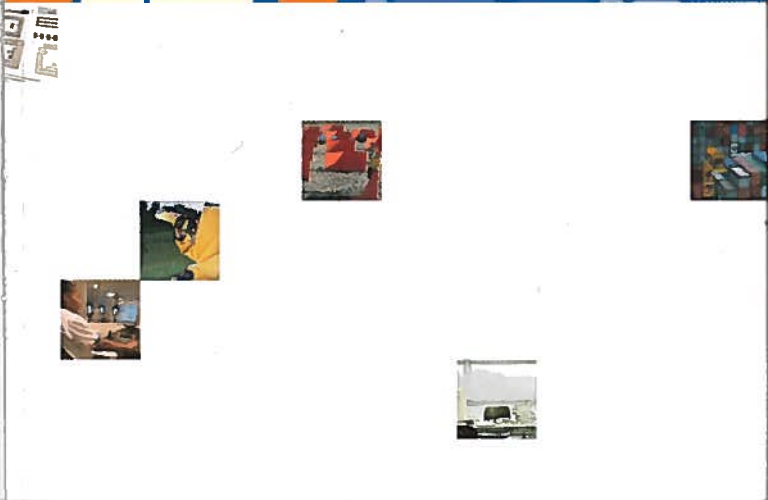


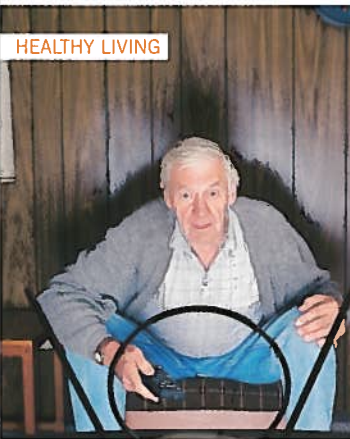
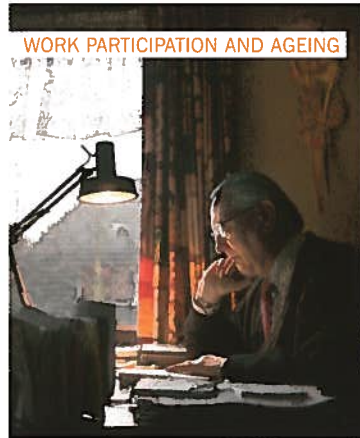
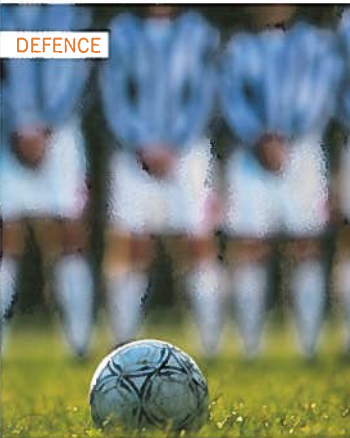
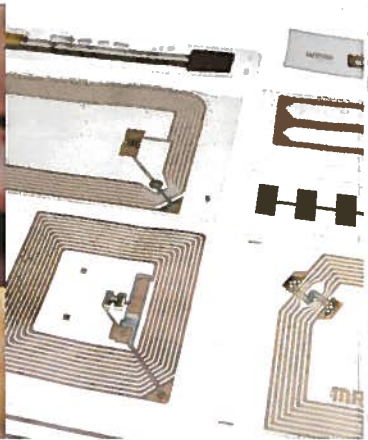
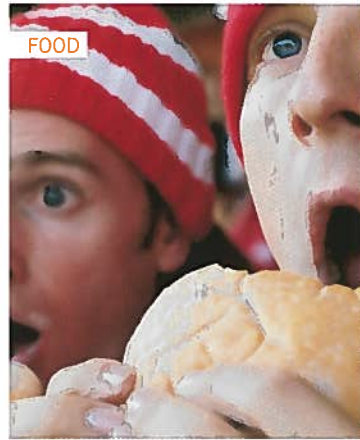
# THE TNO STRATEGY 2007-2010



**TNO | Knowledge for business**







# UNITED IN INNOVATION



# INTRODUCTION

The knowledge TNO develops, integrates, makes applicable and puts into practice only has value if we can use it to have a real social and economic impact. That means ensuring that business and governmental and social organisations reap maximum profit from our knowledge, our network and our synergy. In the end, that is what it is all about for us. That is where TNO stands or falls.

TNO faces a number of interesting challenges in the coming strategy period, 2007-2010, such as the globalisation of knowledge development, the growing dynamics of a very demanding marketplace and the broad spectrum of social developments taking place in the Netherlands and elsewhere in Europe. TNO wants to maintain and reinforce its position as a leading knowledge company in this world.

These are exciting times, demanding much of our creativity, enterprising spirit and combined talents. This brochure, 'The TNO Strategy', provides a brief description of how TNO works, what our ambitions are and how we plan to tackle the challenges ahead in the 2007-2010 strategy period.

TNO Board of Management

Hans Huis in 't Veld (Chair)

Tini Colijn-Hooymans

Cees van Duyvendijk





## OUR POSITION

TNO is a major player in a growing international network comprised of leading scientific institutes, companies with ambitious development profiles, universities and other partners in knowledge. These partners spur us on to leap forward through our research, often together with them. We are also increasingly asked to assume some of the risk in such research. Our development agenda coupled with our application agenda is what distinguishes us from other centres of knowledge. Together, these form the foundation on which TNO is organised, presented and wishes to be evaluated.

All activities we carry out ourselves are performed to the highest international standards and beyond. With science and technology developments rapid and wide-ranging and every conceivable sort of knowledge and product flow taking on a global significance, TNO plans to focus on fewer core areas in the coming years, working more closely with others and disposing of some activities or incorporating them elsewhere.



## OUR ENVIRONMENT

Innovation is essential to enhancing the economic vitality and social well-being of our country. This explains why economic and social issues are so pivotal in our research programmes.

In tackling social issues, TNO combines the hard sciences with the social sciences, often collaborating with other partners in the process. We address economic issues by successfully applying the knowledge generated throughout the organisation in new, top products and services.

With the rise of new economic powers and the dynamics of the market, greater demands are being placed on centres of excellence. Not only must they possess in-depth knowledge and be able to integrate it usefully; they must also remain flexible and dare to assume novel positions. In our case, this means that we have chosen to adopt more open innovation in partnership with other institutes of knowledge, as well as both big businesses and SMEs.

TNO has become much more of a European player. In Europe, too, we continue to strive for top quality and critical mass in particular areas, while choosing strategic partnerships in other areas. At present, we are among the top three RTOs (Research and Technology Organisations) in Europe, together with Fraunhofer Gesellschaft in Germany and VTT in Finland.



## OUR CORE ACTIVITIES

The dynamics of the marketplace and society, not to mention our international standing, have prompted us to introduce new areas of emphasis in our three core activities: the development, application and exploitation of knowledge.

In terms of developing knowledge, the emphasis has shifted to stressing greater coherence among our activities. A crucial part of this is to ensure that the knowledge being developed fits in with the need for knowledge and current developments. We can accomplish this by participating in open innovation and involving the end users in our activities at an early stage. Another way is to enter into strategic partnerships with universities and other knowledge partners in national and international programmes.

The highest priority in terms of applying that knowledge is transferring it to businesses, especially SMEs. In addition, TNO will focus plenty of attention on utilising knowledge through partnerships and on transferring activities or intellectual property. TNO Companies was established specifically to commercialise TNO services, create joint ventures and spin-outs and enable divisions to become independent or be sold.

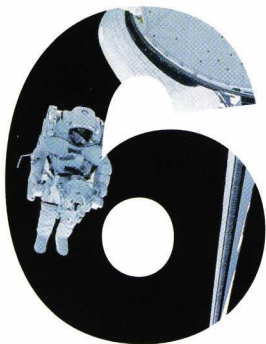




## OUR AMBITION FOR 2010

The TNO of 2010 will be an excellent, professional and independent partner in knowledge for government and business, operating in the Netherlands and the rest of Europe, North America, Russia and East Asia. With its international orientation and considerable contribution to pertinent social debate, TNO supports domestic and other European governmental agencies as a reliable expert and partner in knowledge. We enhance the international competitiveness of Dutch businesses through entering into long-term programmes with business partners and establishing independent companies.

Our licence to operate is the social and economic impact of our efforts, whereby there must naturally be a balance between those efforts and the end results. We aim to become even more effective by making our internal processes and our operations extremely efficient. This is all part of our goal to improve profitability, increase the net turnover per employee and boost our liquidity. Our knowledge base stands or falls with the quality of our people and their multi-faceted talents. And we preserve that status by providing appealing working conditions and ample education opportunities.



## OUR RELATIONSHIP WITH GOVERNMENT

TNO works together with local, regional and national government agencies on knowledge that is economically and socially meaningful, high-grade and reliable. An essential part of this is ensuring that our knowledge is in keeping with the government's fixed strategic policy. We have made significant contributions to solving the Dutch innovation paradox by introducing new research programming and promoting greater business involvement in the research process, among other things. The key to this new research programming is the implementation of demand-driven programmes addressing the themes outlined by the Dutch Cabinet in 2006.

Beyond these demand-driven programmes, TNO must continue to develop its knowledge position. This will require allocating scope and budget for 'knowledge as assets' both within the themes and, to some extent, outside of them (collectively constituting a maximum of 15% of our turnover). This enables us to maintain and keep developing the required knowledge to address future themes, issues and knowledge gaps relevant to our work.



# OUR THEMES

TNO focuses on twelve themes, each of which is related to economic and social knowledge issues faced by our customers. These themes are also related to the Dutch government's strategic policy and Europe's scientific and technological policies. Each theme has an active network of organisations and companies operating, with one department directing operations.

	THEME
1	Public safety
2	Defence
3	Healthy living
4	Food
5	Dealing with a changing society
6	Work participation and ageing
7	Attainability
8	Construction and spatial development
9	Living with water
10	Energy (management)
11	Natural and built environment
12	High-tech systems, processes and materials

DI      Delta Institute  
 ECN      Energy research Centre of the Netherlands

Coordinating ministry	Knowledge institutes potentially involved
Ministry of Interior and Kingdom Relations	TNO, NLR
Ministry of Defense	TNO, NLR, MARIN
Ministry of Health, Welfare and Sport	TNO
Ministry of Agriculture, Nature and Food Quality	TNO
Ministry of Justice	TNO
Ministry of Social Affairs and Employment	TNO
Ministry of Transport, Public Works and Water Management	TNO, MARIN, NLR
Ministry of Housing, Spatial Planning and Environment	TNO, ECN, MARIN, DI
Ministry of Transport, Public Works and Water Management	TNO, DI, MARIN
Ministry of Economic Affairs	TNO, ECN, MARIN
Ministry of Housing, Spatial Planning and Environment	TNO, ECN, DI, NLR
Ministry of Economic Affairs	TNO, MARIN, ECN, DI, NLR

MARIN Maritime Research Institute Netherlands  
NLR Dutch National Aerospace Laboratory



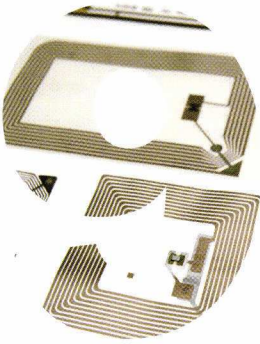
## OUR PEOPLE, OUR APPROACH

TNO wants to continue to be an attractive employer for creative, enterprising employees. Our remuneration levels are in line with market standards and we are adept at balancing collective and individual interests. We also invest greatly in the personal development of our staff.

We aim to fill 80% of our key positions with people from our internal pool and 20% with 'fresh blood'. Employees can expect their managers to clearly impart the company's strategy and vision and create the right preconditions for success. Similarly, management can expect employees to be fully committed to TNO, our stakeholders and their colleagues, while embracing such basic commercial concepts as customer-friendliness, competence and professionalism. They must also be objective and conscientious and possess extensive thematic knowledge. Because we take the collective knowledge of our employees and make it available for a broad range of uses and deployable on many fronts, we can offer a unique proposition for the market for applied knowledge.

In the 2007-2010 period we will be focusing on moderate growth, cost-control, simplifying our account structures and improving our operating results, liquidity and net worth. This will require tight cost control and a focus on investing in knowledge that is the most beneficial to TNO's overall development.





# MARKETS WHERE WE ARE ACTIVE

**AUTOMOTIVE** The primary challenge facing the automotive sector is that of sustainable development and growth. TNO is highly involved in developing safer, cleaner, more fuel-efficient and sustainable forms of transport. TNO's strong international position is attributable to our expertise in control systems development, simulations, tests and validation in the fields of Integral Safety and Sustainable Powertrains.

**AVIATION** The overriding factors in designing and manufacturing new aeroplanes are the flexibility of the production processes, the use of new materials, absolute reliability, environmental-friendliness and low maintenance costs. TNO can assist both producers and purchasing agents in all these areas, be it for the military or civilian market.

**BUILDING AND CONSTRUCTION** Our work for the public and private sectors means taking up the challenge of continuing to develop the built environment on the basis of user requirements, social value and economic yield. TNO wants to work together with these stakeholders to provide direction to the renewal that is necessary so we develop for them new materials, building and construction systems and processes that perform better, are more sustainable and safer. In doing so, we strive for lower lifecycle costs, improved indoor climates and better energy performance for buildings.

**CHEMISTRY** TNO has a broad base of expertise in the field of chemistry, expertise that can be applied throughout the entire chain – from conception to industrial process. This includes safety and registration issues. Under ideal circumstances, we bring this to bear in partnerships with innovative chemical engineering firms.

**DEFENCE INDUSTRY** TNO works with the defence related industry and SMEs, both at home and internationally, to develop knowledge, products and services that can be used by the armed forces and security organisations. We participate in international materials development programmes that are mainly administered by the European Defence Agency, NATO or Defence ministries.

**FOOD** Health, safety, quality and product and process innovation are crucial issues when dealing with the food supply. With its advice and research, TNO helps companies and government agents realise their goals of ensuring the health and safety of food. In addition, TNO researches and develops innovative food concepts to meet market demand.

**FOREIGN DEFENCE** And much as we perform research for the Dutch Ministry of Defence, our services are increasingly in demand among foreign armed forces, NATO partners in particular. This often occurs in the context of multilateral projects or in the form of supplying products and services that were originally developed in the Netherlands.

**HIGH-END EQUIPMENT** There is a great deal of activity in this market, by large and small businesses alike. TNO works with all the parties to develop a whole range of advanced products, from micro-devices and advanced measuring instruments to equipment for the semi-conductor industry. In the course of this, TNO has acquired a wealth of experience in the fields of optical instrumentation, mechatronic products and embedded systems.

**ICT** In diverse public and economic sectors, TNO assists its customers, in thought and deed, to successfully apply, embed and adopt ICT. Our input is pragmatic and geared to helping them apply state-of-the-art technology for business development. This means taking the practical implications for operations into account, as well as ensuring that the solutions chosen are future-proof.

**MARITIME** For centuries, the Netherlands has enjoyed a thriving maritime industry. TNO deploys its extensive military and civilian maritime know-how in a range of activities: ship building, internal navigation, ports and waterways, maritime services, offshore sector, fisheries, water sports and shipping. We are the innovation partner and supplier of specific expertise for the public and private sector alike. The Royal Netherlands Navy also makes frequent use of our knowledge and expertise.

**MEDICAL** We work closely with care providers and medical equipment manufacturers in applying our expertise in the fields of nanomaterials, microsystems and mechatronics. We concentrate our efforts on achieving cost efficiency in the healthcare chain, focusing on quicker treatment, more effective medicines and assistive technologies for home care.

**NATURAL AND BUILT ENVIRONMENT** Our mobility activities, household and industrial activities impact the environment adversely. TNO is working on solutions to the associated problems, training our expertise on noise pollution and the emissions of environmentally damaging substances as well as studying their impact on man and the environment. Other areas of focus are evaluating and managing safety and environmental risks associated with industrial accidents with hazardous materials.

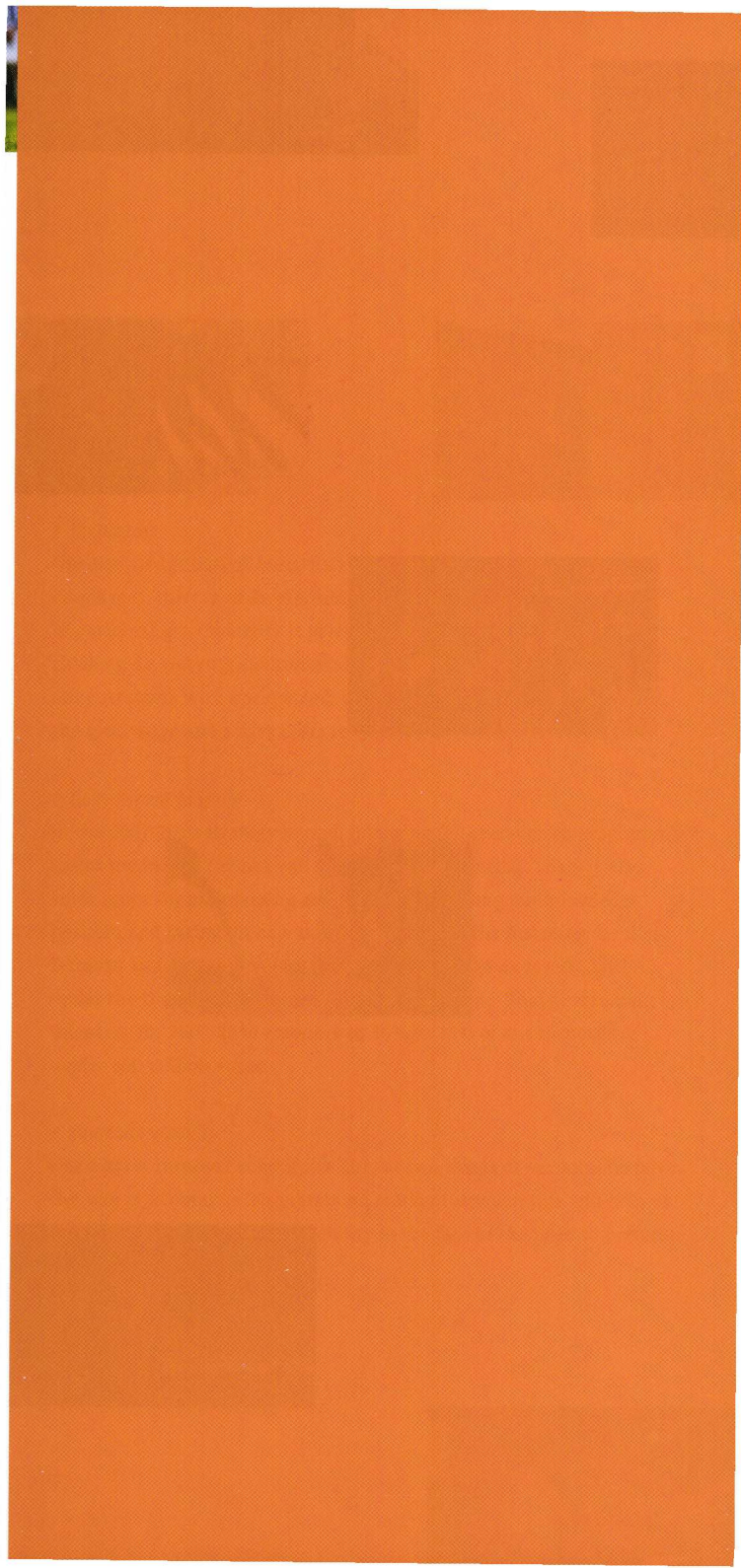
**OIL AND GAS** The intelligent use of our natural resources is vital for Dutch society and the economy. To meet the ever-growing demand, we must find ways of exploiting and producing both small and complex reservoirs. But exploiting them sustainably and profitably will require entirely new concepts for extraction systems. In this highly specialised field, TNO works for both the oil and gas industry and national agencies in charge of a country's subsurface resources.

**PHARMA** The pharmaceutical and biotechnology industry values TNO as an innovative partner. TNO works with its international customers to develop new medicines. From our offices in the Netherlands, the United States and Japan, we assist pharmaceutical and biotechnology companies with directly applicable knowledge.

>> page 20

# SUMMARY 2007-2010







## PREVENTION AND CARE

The healthcare system is facing a number of huge challenges. TNO works with business, governments, care institutions and healthcare funds to foster quality, competence and safety in healthcare.

In terms of Prevention and Care we can supply research, consultancy, monitoring, supervision and customised training that produce practical, useful and creative solutions. The focal topics in this area are: Youth, Health through exercise and Quality in the care sector.

**PROCESSING INDUSTRY** The Netherlands is home to many leading multinationals in the processing industry. And TNO has a vast store of knowledge for this market in-house. Our areas of expertise encompass bioconversion and separation technology, environmental quality and surroundings, environmental and safety risk management, and the development and optimisation of production processes. Our customers include companies in the chemical engineering industry, the water-related industry and the oil and gas industry, producers of residues, and users of sustainable resources.

**SAFETY** The threat of incidents resulting from a natural disaster or terrorism in the Netherlands is increasing. TNO supplies knowledge and advice that helps make the Netherlands a safer place. Advanced technologies and knowledge of processes form the essential foundation for this. TNO wears a variety of hats in this regard, operating as both centre of excellence and think tank, impartial referee and certification institute.

**SPACE** TNO has held a leading international position in this market for over thirty years. We develop specialised optical measuring instruments, such as those used to observe the Earth from space. We also make the instruments used to calibrate satellites from Earth. Many of our endeavours take place in an international context, such as with the European Space Industry, but we also work with commercial companies.

**SPORTS** Imagine clothing that could help prevent sports injuries or a device that registers the exact point at which an athlete assumes an incorrect posture. These are examples of some of the innovations in the field of sports that will play a greater role in the years to come. Athletes want to go higher, faster and further. TNO has the kind of in-house expertise that can tell them how to do just that.

**SUBSURFACE** Society is facing a huge challenge to try to safeguard the safe, clean and sustainable use of soil and water in delta areas. Space, above and below the surface, is coming under increasing pressure and demand is growing for raw materials like building materials, (ground)water and energy from the same subterranean source – with conflict of interests in spatial planning the upshot. TNO's top quality expertise in the fields of soil systems and (ground)water systems as well as water purification and spatial planning helps these challenges be met.

**TELECOMMUNICATIONS** Cable companies, telephone operators, service providers, policy-makers and telecom companies all turn to TNO when they need a partner in innovation. And, to a growing extent, content suppliers are becoming our customers, too. TNO has a wide-ranging palette of expertise at its fingertips, with which it can help customers set up new telecommunications services or optimise existing services or infrastructures. More precisely, we possess knowledge in the relevant technology, processes, organisation, financing, regulation, markets and user preferences.

**TRAFFIC AND TRANSPORT** Traffic and transport are the backbone of our mobile society. The issues that come to the fore in this area are often complex and demand innovative multidisciplinary solutions. Within TNO we combine vehicle engineering expertise, broad experience with ICT applications, knowledge of driver behaviour and of the traffic system in a social context, including the quality of life and the environment as well as problems of space. Our work focuses on improving the quality and efficiency of traffic and transport systems.

**WORK** TNO creates innovations aimed at fostering and securing the best possible deployment of human resources in the workplace; everyone should be able to work enjoyably in a healthy, safe and productive environment, even to an advanced age. We place our unique combination of knowledge development, research, consultancy and implementation at the disposal of government agencies and social and labour organisations, working in national and international networks.



## OUR CORE AREAS

Our expertise is grouped under five cohesive core areas, each of which is associated with certain major issues facing our society. The core areas are:

### TNO QUALITY OF LIFE

TNO Quality of Life devises innovative products and services aimed at improving people's health and their ability to function.

In the near future, we will be focusing primarily on:

- safe, healthy food and innovative food products;
- safety and effectiveness of medicines;
- safety of chemical substances;
- healthy lifestyles with sufficient physical exercise and prevention of excess weight;
- effective prevention and treatment of disease, targeting youngsters and the elderly;
- innovations in healthcare;
- safe and healthy working environments that contribute to greater productivity and make the option of working later in life more appealing.

We possess an internationally competitive knowledge base in life sciences and social sciences that helps us meet our goals. And we are continually investing in revitalising that knowledge base. Our customers come from the pharmaceutical, chemical and food industries all around the world. In the fields of labour and healthcare we work for the Dutch government, labour

organisations and healthcare institutes. We have also developed special programmes for SMEs. And we commercialise our knowledge through patents and licences and by establishing new companies.

#### TNO DefenCE, SECURITY AND SAFETY

TNO Defence, Security and Safety is the strategic partner of the Dutch Ministry of Defence. We translate innovation into tangible military applications. We also come up with innovative solutions to secure the overall safety of society, supporting efforts in police services, detection, anti-terrorism, crisis management and disaster relief. Beyond that, we work with businesses. Our target markets are defence, the defence industry, security and safety, aeronautics and maritime.

Our mission for the 2007-2010 strategy period is to increase our added value to the customer. One way of doing this is to guide our research efforts according to the proven method of demand-driven programmes. We will also be ramping up our international collaborations and assume a greater role as a knowledge broker in terms of developing and applying knowledge. Partnership, domain knowledge and the integration of technologies – those are the key concepts we plan to use to devise total solutions that truly support our customers' business processes. Finally, we plan to increase our public visibility by assuming a prominent presence in the public discourse surrounding safety issues.

#### TNO SCIENCE AND INDUSTRY

TNO Science and Industry serves as a partner to its customers, contributing significantly to their technological innovations. By taking a multidisciplinary approach and availing ourselves of our reservoir of acquired knowledge, we have a way of combining the unfamiliar to arrive at surprising solutions. We work on systems to be applied in industry, the transport sector, the processing industry and space, but also ones that serve the needs of people themselves, their health and their interactions with others. We make smaller, smarter systems and contribute to the ongoing integration of systems and components.

We plan to increase turnover by 10% a year by earning greater loyalty among major customers, including innovative SMEs.

We can also seek those customers abroad. We will further be limiting our scope of activities to fifteen dominant technological fields, all of which share a logical coherence and possess sufficient mass to be of interest, working with a minimum of 50 FTEs. We will also naturally make every effort to conclude strategic partnerships with complementary knowledge institutes.

#### TNO NATURAL AND BUILT ENVIRONMENT

TNO Natural and Built Environment works with government agencies and business sectors on innovations directly related to the built environment, infrastructure and the subsurface, innovations that will foster sustainable and efficient design, use and management profiles. This kind of work is performed for international organisations; government agencies (including those at the regional and municipal level); water boards; road, rail and port managers; mobility, logistics and infrastructure companies; building engineering companies; the supply industry; the oil and gas sector and the maritime sector.

We aim to earn top-of-mind awareness for issues involving: use of the subsurface, production of mineral resources, mobility, management and maintenance of infrastructure and buildings, renovation and consolidation of the built environment and environmental impact. We also plan to enter into a close partnership with the Delta institute.

#### TNO INFORMATION AND COMMUNICATION TECHNOLOGY

'Innovation through ICT' is the motto of TNO Information and Communication Technology. Our distinctive position in the market is based on our independence, specialities, multidisciplinary approach (technology, market and user) and hands-on experience. We have a two-pronged focus: innovation in the telecommunications sector and the application of ICT in public and economic sectors.

As an independent player, we strive to be our customer's conscience and guide, their proverbial anchor. We help our customers make sensible choices that will not come back to haunt them in the future. This is essential in an ever more competitive marketplace, with shrinking times-to-market and windows of opportunity and accelerated technological



developments. We also generate intellectual property that we place at the disposal of the market through licensing, sales and spin-offs.

In the 2007-2010 strategy period we want to solidify our position in the telecom market and greatly expand our position in the ICT market. We view government as a strategic sector in these efforts. We also plan to actively pursue the establishment of partnerships with international peer organisations.



## TNO COMPANIES

TNO Companies is a holding company for all the privately owned TNO divisions (about ninety companies). Its main task is to commercialise and exploit knowledge resources, most of which were developed by TNO, by:

- Launching a quickly growing number of start-up companies (mostly technological) that translate TNO knowledge into products and services on their own and introduce these onto the market. This entails a) scouting and screening potential start-ups; b) incubating them until the incorporated company is formed and c) coaching them through their initial steps along the commercial path. All the while, TNO Companies is responsible for actively seeking outside financing. The ultimate goal is to eventually sell the start-ups when the time is right.
- Setting up and facilitating joint ventures with strategic partners in the Netherlands and abroad, as commissioned by the TNO core area. These are to be aimed primarily at applied research and product development.

- Commercialising companies selling TNO services that would benefit from being offered under the auspices of a private company, such as the many measuring, testing, inspection and certification services the institute provides. The point of this would be to establish a strong, commercially viable group, TNO Quality, branded for the high-end of the market, that assures quality, multidisciplinary expertise and an abundance of added value.
- Taking over companies or selling divisions and activities that no longer fit in the TNO portfolio.



# OUR KEY FIGURES

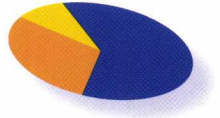
TNO

Number of employees

+/- 4700

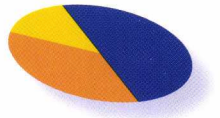
**Distribution of turnover for TNO in the 2007-2010 strategy period:**

- Market turnover in core areas: 55 to 60%
- Government funding: 30 to 35%
- Market turnover from TNO Companies: 10 to 15%



**Market turnover for TNO in the 2007-2010 strategy period:**

- Dutch companies: +/- 50%
- International commissions: +/- 35%
- Dutch government: +/- 15%



Average number of patents

+/- 1000

## CORE AREAS AND TNO BEDRIJVEN BV

### TNO Quality of Life

- Number of employees (nominal) 1050
- Gross turnover for 2005 118 million
- Locations Hoofddorp,  
Zeist, Leiden,  
Delft,  
Groningen,  
Apeldoorn

### TNO Defence, Security and Safety

- Number of employees 1060
- Gross turnover for 2005 133 million
- Locations Den Haag, Rijswijk,  
Soesterberg

### TNO Science and Industry

- Number of employees 990
- Gross turnover for 2005 129 million
- Locations Delft, Eindhoven,  
Helmond, Den Helder,  
Apeldoorn, Enschede

### TNO Natural and Built Environment

- Number of employees 750
- Gross turnover for 2005 91 million
- Locations Delft, Utrecht,  
Apeldoorn, Den Helder

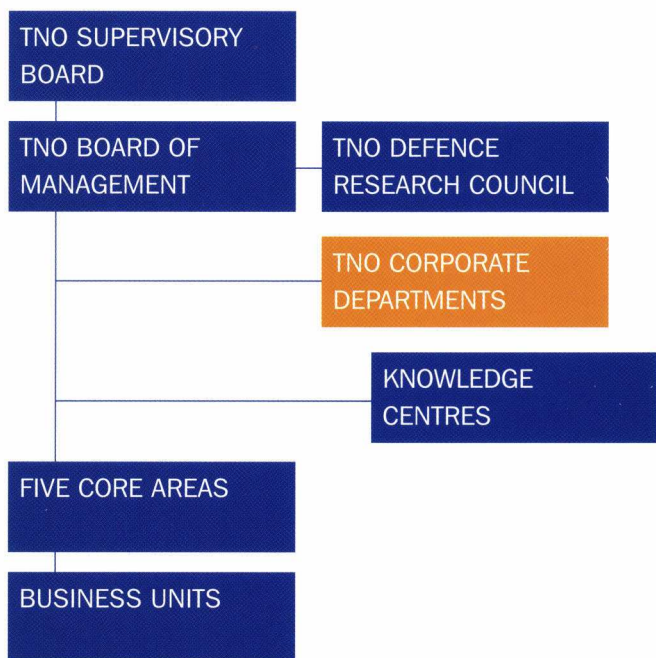
### TNO Information and Communication Technology

- Number of employees 370
- Gross turnover for 2005 41 million
- Locations Delft, Groningen,  
Enschede

### TNO Bedrijven BV

- Number of employees 590
- Consolidated turnover for 2005 65 million
- Locations operating in  
11 countries

# OUR ORGANISATION





# INTERESTED IN TNO?

If you would like to find out more, just click on [tno.nl](http://tno.nl) where you can also request a copy of our quarterly TNO magazine, brochures or our annual review.

If you are looking for something more specific or want to know whether TNO could help you in a particular area, contact the TNO Infodesk. Our assistants will be able to tell you who could best help and put you in touch with the most appropriate TNO professional. That's one way of experiencing our expertise, enthusiasm and commitment for yourself.

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## Colofon

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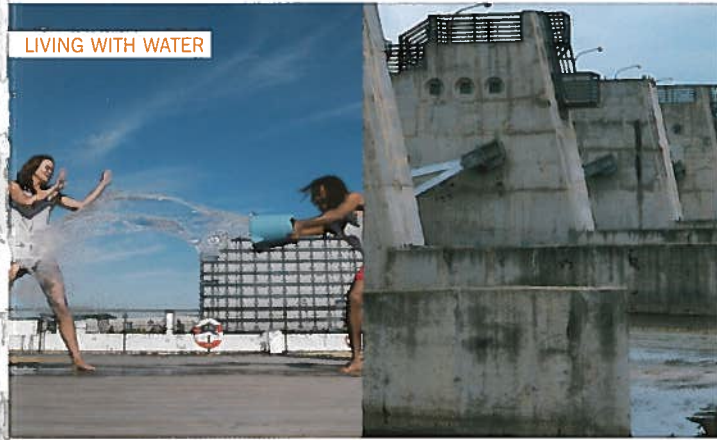
CONSTRUCTION AND SPATIAL DEVELOPMENT



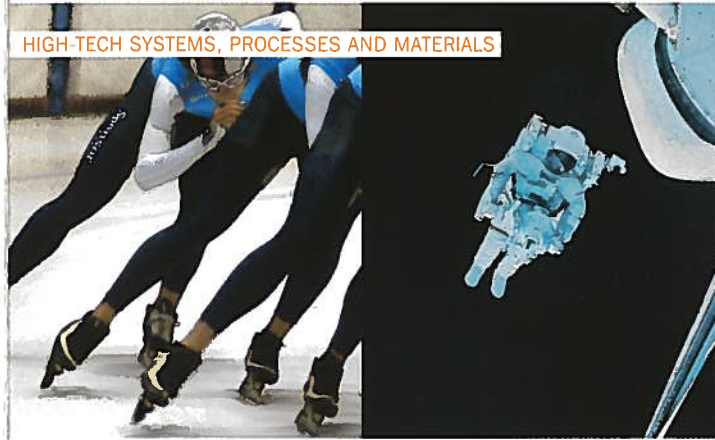
NATURAL AND BUILT ENVIRONMENT



LIVING WITH WATER



HIGH-TECH SYSTEMS, PROCESSES AND MATERIALS



ENERGY [MANAGEMENT]



DEALING WITH A CHANGING SOCIETY





**TNO.NL**