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Assessing Dutch Defence Needs: Follow-up of Opportunities for Innovation in the Dutch Defence Industry

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Type: Single foresight exercise

Geographic coverage: National (Netherlands)

Organizer: TNO – The Netherlands Organization for Applied Scientific Research (www.tno.nl)

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Purpose

Under the influence of (inter)national technological, political and economic developments, the Dutch defence industry is increasingly intertwined with and developing towards a civilian industry. Consequently, the political responsibilities, attitudes and criteria are changing for both the Ministry of Defence and the Ministry of Economic Affairs. An analysis of the Dutch defence industry helped to determine the main opportunities for innovation in the industry and to identify the complementary technological competences needed to make the most of them. A strategic vision, including options for innovation policy, was developed as well. In this follow-up brief, we reiterate the background, approach and results of the initial foresight study and describe its impact in the years to follow.

Transition of Defence

Historically, 'defence' has supported national strategies in which nations have built their own forces, defence industry and knowledge infrastructure. Consequently, there evolved a demand-driven chain at the national level based on a solid and confidential relationship between the parties in a closed chain, also marking the boundaries between the defence industry and 'civilian' industries. However, technological, political and economic developments in the last twenty years have changed defence radically. Issues such as the end of the Cold War, decreasing defence budgets, international cooperation, international organisation of forces, industries and knowledge infrastructure, growing use of civilian technologies, civilian industries and civilian markets, 'the war on terrorism' and homeland defence have entered the stage. Consequently, the political responsibilities, attitudes and criteria are changing for both the Ministry of Defence and the Ministry of Economic Affairs,

while the defence industry and knowledge infrastructure is increasingly intertwined and developing towards a civilian industry and knowledge infrastructure. This critical transition of the defence chain demands timely strategic information and a vision to anticipate effectively the impact of these changes for the organisation of defence. For the ministries, this means a clear view of responsibilities, effective investment strategies for a capable future force and an effective industry and innovation policy. The defence industry increasingly has to determine its most favourable opportunities for innovation.

Developing a New Strategic Vision

For this reason, the ministries wanted to assess four issues and formed working groups to prepare the strategy. Four groups were formed to

- inventory the relevant international developments,
- determine success factors of international cooperation in procurement,



- determine priority technology areas for the defence industry that are of interest for the domestic market and
- suggest policy instruments to strengthen the strategic vision.

The identification of priority technology areas was the core issue in this project and divided into the following sub-questions:

1. What are the current strengths of the Dutch defence industry?
2. What international opportunities exist for innovation in the defence market?

Structural Approach Based on Clusters

The challenge of the exercise was to systematically translate the two questions into perspectives on technological clusters or innovation opportunities. This makes the outcomes comparable. Every perspective was analysed and then translated into a codified taxonomy of technologies developed by the Western European Armaments Group (WEAG) – a classification system of defence technologies that is generally accepted within the defence sector. This taxonomy includes technology, products and intelligence or, as they are called, ‘underpinning technologies’, ‘systems-related technologies’ and ‘military assessments, equipment and functions’.

Additionally, the WEAG classes were checked for interrelations by forming and interpreting priority clusters that combine specific technologies with products and intelligence. Finally, these priority clusters were compared from the four different perspectives: that of the strengths, opportunities and needs of the Dutch defence industry and the perspective of the civilian market (see Figure 1).



Figure 1: Approach of the study

To determine the strengths of the defence industry, companies were analysed and a computer-aided workshop with industry participation was organised (known as a ‘Group Decision Room’). The innovative opportunities were inventoried based on desk research and interviews with leading parties. Future needs of the military forces were identified and weighted based on investments already planned by the Ministry of Defence. Finally, experts assessed the civilian market based on the most relevant societal challenges.

The analysis of current strengths is elaborated below. For foresight purposes, the results on opportunities for innovation are also included.

Outcomes: New Paradigm of Effectiveness

Military operations are increasingly operations other than war, such as peace operations, foreign humanitarian assistance and other military support to civil authorities. Consequently, governments have shifted attention to effect-based (security) operations as the ultimate goal. In practice, effect-based operations imply that different armies and forces cooperate, resulting in a transformation of a platform-centric force into a network-centric force. The term ‘network-centric warfare’ or ‘network-enabled operations’ broadly describes the combination of emerging tactics, techniques and procedures that a fully or even partially networked force can employ to create a decisive advantage. On the whole, the defence sector still innovates on platforms, weaponry and, increasingly, on intelligence. Figure 3 shows all innovation themes on the agenda of the defence sector.

Innovation themes were divided according to the underlying opportunities for innovation. They were then translated into the WEAG classification system, and finally clusters were identified.

The main clusters are C4I, sensor systems and integrated systems design and development.

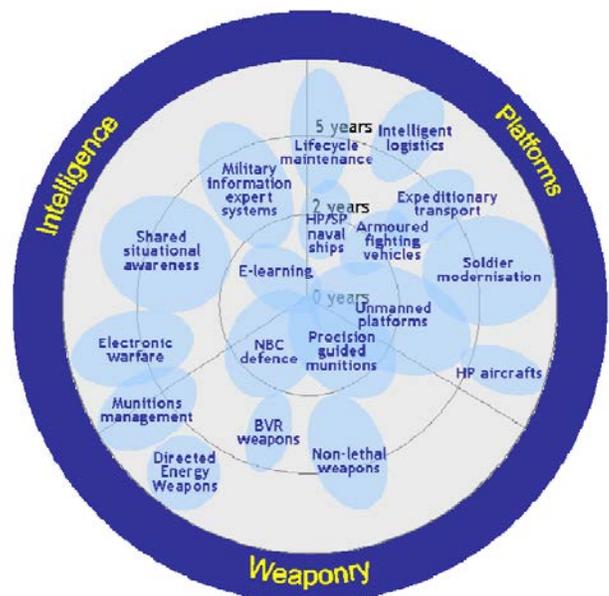


Figure 2: Innovation radar of the (global) defence industry

Information-based Services

The clusters emerging from the four perspectives were compared with each other to identify the main ones. Figure 3 below shows the synthesis.

Type 1 clusters can be regarded as broad, strong clusters with a good industry base and market potential in domestic, international and civilian markets. This first type of cluster represents information-based services for the Dutch industry. Type 2 clusters cover a couple of interesting niche markets. Finally, type 3 clusters are fragmented but might have some niches.

	Technology clusters	Perspective			
		Strengths	Opportunities	Needs	Civil market
Type 1	C4I	++	++	++	++
	Sensor systems	+	++	++	++
Type 2	Integrated system design and development	+	+	+	+
	Simulation, training and artificial environments	+	(+)	+	+
	Electronics and mechatronics	(+)	(+)	+	+
	Advanced materials	(+)	(+)	+	+
Type 3	Propulsion and energy systems	+	=	(+)	=
	Mechanics and hydraulics	+	=	=	=
	Protection and weaponry	=	=	+	=

Legend:

- ++ A broadly represented technology cluster
- + Strong cluster in niches
- (+) Disagreement on potential of cluster
- = Less important, fragmented cluster

Figure 3: Evaluation of the technology clusters

Initial Impact Discussion 2007

In the 2007 brief, some of the impact of the foresight study was already visible and described accordingly: The project was on a highly political trajectory where the interests of industry and the ministries of defence and economic affairs intersected. It led to intensive discussions within the interdepartmental group before the results could be used as input to the national strategy for the defence industry. This, together with the change of government in 2004, considerably prolonged the finalisation of the strategy.

About one year after completion of the project, the ministries determined their defence industry strategy. The project results were largely integrated into the strategy and therefore had a high impact. The technological priorities stated were fully accepted and provided the backbone to the suggested defence innovation policy. The strategy was discussed in Dutch Parliament and will be part of the national policy on the defence industry.

What Does the Dutch Defence Industry Need?

As noted, the results of the 2006 foresight exercise were integrated in the Dutch Defence Industry Strategy of 2007. However, since 2007 the strategic environment in which this industrial sector operates has changed significantly. New forms of conflict have emerged that demand new kinds of responses (e.g. cyberdefence), closer cooperation with coalition partners requires further integration of systems, the financial crisis has had an impact on defence budgets, and finally there is a clear

movement toward an open and transparent European defence market.

These strategic changes have prompted the Dutch Defence Ministry to evaluate the defence industry strategy that was formulated in 2007. A key part of this evaluation is a follow-up foresight exercise to the foresight exercise of 2006 described earlier in this brief. In the original foresight exercise, research addressed three questions concerning the Dutch defence industry: (1) What is the Dutch defence industry good in? (2) What does the market need? (3) What does Dutch defence need? Questions 1 and 2 were answered sufficiently, but changes in the strategic context require that these answers be updated. The answer to 3 was less detailed and still requires more extensive study.

This follow-up foresight exercise is planned for 2012 and will be performed by The Hague Centre for Strategic Studies and TNO. It aims to examine whether the identified technology clusters are still relevant or whether they need to be adjusted or extended in light of the developments in the last five years. The approach is mostly modelled after the previous foresight exercise.

Several other forward-looking activities in the past five years will provide key input for the follow-up foresight study, including an exploration of the Dutch defence force of the future (Ministerie van Defensie, 2010) and a NATO study of the future of joint operations (NATO, 2011).

The follow-up foresight study will be organised along three main topics:

Needs: The future needs of Dutch defence will be investigated, including the innovation characteristics of required (new) capacities, the attention paid to speeding-up

the lifecycle of innovations and capacities, and the role of defence in this lifecycle of capacities and innovations.

Strengths: The strengths of the Dutch defence industry will be analysed using datasets gathered yearly by other organisations based on interviews and surveys of industrial organisations.

Opportunities: Interviews and focus group sessions will provide the basis for analysing the Dutch defence industry's projections of its future opportunities. This analysis will be accompanied by an international comparison and a separate analysis by the organisations performing the follow-up foresight exercise.

In a synthesis phase, representatives from ministries, industry and knowledge institutions will be brought to-

gether in a workshop session where the final conclusions and recommendations of the study will be formulated.

Foresight Impact

The foresight exercise described in the original brief had a high level of impact in one specific area: the Dutch defence industry strategy. The study results have proven to be useful to the relevant ministries in formulating a defence industry strategy. This usefulness is further illustrated by the fact that a follow-up study was requested and has been initiated. It is expected to provide input to update the defence industry strategy.

Sources and References

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