# National
# Defence Industrial Strategy

***HELLENIC MINISTRY OF NATIONAL DEFENCE***

***GENERAL DIRECTORATE FOR DEFENCE INVESTMENT AND ARMAMENTS***

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It gives me great joy to announce the publication of the National Defence Industrial Strategy, through which the Hellenic Ministry of National Defence aims at establishing and maintaining a domestic defence technological and industrial base in strategic areas of defence and security. In this way the speedy and uninterrupted operation of the Armed Forces' chain of supply can be ensured, in time and under any circumstances.

The domestic defence technological and industrial base was developed mainly as a response to the conditions that arose after the Turkish invasion of Cyprus, the revisionist stance of Turkey, and the challenges against Hellenic sovereignty in the Aegean.

The Ministry of National Defence considers the domestic defence technological and industrial base an integral part of the national defence and security, a centre of gravity for the maintenance of the combat readiness of the Armed Forces, and an important factor for the protection of the country's essential security interests, particularly for the security of supply of the Armed Forces in case of crisis, mobilisation or conflict.

To this end, through this National Defence Industrial Strategy, it plans and implements actions that contribute to the maintenance and development of capabilities in the critical strategic areas of defence and security.

The great changes during the past two decades have created a whole new environment for defence industries. The reduction of national defence budgets has caused a fiercer international competition in the defence market. Especially for our country, the prolonged economic crisis has significantly reduced the level of defence expenditure, thus limiting the share that can be claimed by the domestic defence industry.

Furthermore, the crisis has put a lot of pressure on the everyday operation of the defence companies, brought difficulties in retaining their technological level, lack for investments and in taking initiatives, due to the fact that specialized scientific and highly skilled technical personnel is moving abroad.

I would also like to stress the fact that the domestic defence technological and industrial base also contributes to the development of a strong and competitive European defence technological and industrial base, which is called to support the strategic autonomy of Europe, as defined in its recently agreed global strategy.

Within the aforementioned framework, the Ministry of National Defence continues to support the domestic defence industry, which seeks opportunities in foreign markets in order to survive and grow.

In conclusion, the National Defence Industrial Strategy at hand defines the general principles and directions, as well as the proper measures to achieve the above goals. The success of this effort depends on the participation and coordinated action of all parties involved.

Panos Kammenos
Minister of National Defence

The publication of the National Defence Industrial Strategy expresses the Ministry of National Defence's will to establish and maintain a domestic defence technological and industrial base, including research and development, in the critical strategic areas of defence and security, which is necessary for the protection of the country's essential security interests, such as the security of supply and the operational autonomy of the Armed Forces in case of crisis, mobilisation, or conflict.

The regional security conditions, as well as Greece's geopolitical position, place the country to a unique position in terms of defence and security requirements; consequently, Greece needs to ensure the speedy and uninterrupted operation of its Armed Forces' supply chain in terms of equipment, consumables, parts, repair and technical support services, as well as the necessary works, in any case, timely, and under any circumstances.

To this end, our country must maintain in readiness powerful Armed Forces, with high availability of weapon systems. The above require a strong domestic defence industrial and technological infrastructure to maintain and support the weapon systems, especially in critical operational areas.

The National Defence Industrial Strategy at hand is part of the Ministry of National Defence's efforts to establish and maintain, in co-operation with the domestic defence technological and industrial base, the defence infrastructure and the capabilities critical for the Armed Forces' security of supply.

Taking into consideration the current fiscal conditions, the Armed Forces' needs in key strategic areas, as well as the need for long term planning, the Ministry of National Defence is taking actions and measures for the sustainability of the domestic defence technological and industrial base. These measures /actions include the timely programming of procurements, the promotion of research and innovation, the encouragement of the domestic defence industry to seek foreign markets and the promotion of exports, the expansion of the activities of the domestic defence technological and industrial base to dual use products, including non-defence equipment, the exchange of information and the co-operation of all domestic bodies involved in the defence procurements, as well as the revision of the legal framework on defence procurements, in order to boost the speed, transparency, flexibility, effectiveness and efficiency of the procurement system and to introduce the requirement of industrial participation, within the provisions of the EU legal framework.

We expect that the implementation of the actions of the National Defence Industrial Strategy will create the conditions for the development and maintenance of a domestic defence technological and industrial base, which will contribute to the protection of the country's interests and the restructuring of its production base.

DIMITRIS VITSAS
ALTERNATE MINISTER OF NATIONAL DEFENCE

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# Foreword

**1.** The defence and security of each member state is a national responsibility and each EU member state can adopt any measures it deems necessary for its security.

**2.** Greece, which is situated on the geopolitically important south-eastern border of the EU and near areas characterised by great instability, faces conventional threats against its national security, which are expressed as a challenge against its sovereign rights, as well as unconventional threats.

**3.** Consequently, Greece must maintain in readiness powerful Armed Forces, with high availability of weapon systems. This requires, except from high defence budget, a strong domestic defence industrial and technological infrastructure, in order to maintain and support the weapon systems, especially in critical operational areas, so that the security of supply of the Armed Forces will be ensured to the greatest degree possible in case of crisis or conflict.

**4.** To this end, article 3 of law 3978/2011 provides that: *"in order to protect the country's essential security interests and mainly the security of supply and operational autonomy of the Armed Forces, as well as in order to meet the needs that arise in case of crisis, mobilisation, or conflict, the Ministry of National Defence takes all measures necessary to establish and maintain a domestic defence technological and industrial base, including measures for research and development, in certain areas of defence and security. This base will ensure the speedy and uninterrupted operation of the Armed Forces' chain of supply in terms of equipment, consumables, parts, repair and technical support services, as well as necessary works, in any case, timely, and under any circumstances".*

**5.** The main issues that the National Defence Industrial Strategy (NDIS) is called to deal with, are:

(a) The low level of participation of the domestic defence industry in the procurements of the Armed Forces and, consequently, the low level of support provided to the Armed Forces by the domestic defence industry,

(b) The restrictions of the European and national legal framework on both, the domestic industrial participation in the defence procurements and the participation of the domestic industry in the procurements of the Armed Forces, and

(c) The challenges concerning the sustainability of the domestic defence industry.

**6.** This is the framework within which the NDIS was drafted, in order to protect the country's essential security interests, by ensuring a sustainable domestic defence industry. This strategic directive introduces measures and actions in the areas of Armed Forces procurements and broadens the scope of the National Defence Industry.

## Abbreviations

AF: ..... Armed Forces
BRICS:..... Brazil, Russia, India, China, South Africa (Agreement)
C4ISR: ..... Command Control Communication Computation Intelligence Surveillance Reconnaissance
CBRN:..... Chemical, Biological, Radiological, and Nuclear threats
COTS:..... Commercial Off The Shelf
CSDP:..... Common Security and Defence Policy
DA:..... Defence Attaché
DDI:..... Domestic Defence Industry
DDTIB:..... Domestic Defence Technological and Industrial Base
DIP:..... Domestic Industrial Participation
DRTIB:..... Defence Research, Technology, and Industry Board
DRTDP: ..... Defence Research and Technology Development Programme
EAS:..... Hellenic Defence Systems
EDA: ..... European Defence Agency
ELVO: ..... Hellenic Vehicle Industry
EU:..... European Union
GDDIA: ..... General Directorate for Defence Investment and Armaments
GSRT: ..... General Secretariat for Research and Technology
HAI: ..... Hellenic Aerospace Industry
HAV:..... Hellenic Added Value
HEI: ..... Higher Education Institution
HMEI: ..... Higher Military Education Institution
HNDGS:..... Hellenic National Defence General Staff
HTEI: ..... Higher Technological Education Institution
IIRDCP:..... International Integrated Research and Development Co-operation Programmes
IRR:..... Infrared Radiation
ITT:..... Informatics and Telecommunications Technologies
MFA: ..... Ministry of Foreign Affairs
MOND:..... Ministry of National Defence
MOTS: ..... Military Off The Shelf
NDIS: ..... National Defence Industrial Strategy
NDP: ..... National Defence Policy
NDPI: ..... National Defence Planning
R&D: ..... Research and Development
SDRTB:..... Scientific Defence Research and Technology Board
SME ..... Small and Medium Sized Enterprises
TFEU: ..... Treaty on the Functioning of the European Union
URDSE: ..... Unified Register of Defence Sector Enterprises

## Terms

1. **Chain of supply / supply chain (mil.):** the organisation of Armed Forces Units into a network supporting the upstream /downstream flow of equipment, assets, services, and intelligence, from the source to the theatre of operations.
2. **Clusters:** collaborative schemes/cells for technology development.
3. **Domestic defence industry:** All entities active in the production of defence products and services, regardless of their ownership status. Currently, it consists of approximately 30, mainly Small and Medium Sized Enterprises (SMEs), employing approximately 5,000 persons. Some of these are active in the production of commercial equipment, as well as of dual use products.In three of them (Hellenic Defence Systems – EAS, Hellenic Aerospace Industry – HAI, and Hellenic Vehicle Industry – ELVO) the major stockholder is the Hellenic State, while the others are private enterprises.
4. **Dual role/purpose/use:** products and services for both defence/military and civilian applications, including security.
5. **Innovation:** the use of existing and/or new knowledge and/or the transformation of an idea into a product or service; functional production or distribution method - new or improved – or a new method to provide a social service; or the process by which new ideas provide answers to society and economy demands and create new products, industrial standards, services; or business and organisational models which are successfully introduced into an existing market or can create new markets as a result of this process.
6. **Life cycle:** Consists of all potential stages of a product, i.e. research and development, industrial development, production, repair, modernisation, modification, maintenance, logistics, training, testing, decommissioning, and disposal.
7. **Military equipment:** Equipment, specially designed or adapted for military purposes, intended for use as a weapon, ammunition, or ordnance.
8. **Nanomaterials:** Chemicals or materials manufactured and used in the nanoscale. At least one of their dimensions is in the size range 1 – 100 nm.
9. **Offsets:** all kinds of returns provided by the weapon system suppliers as a compensation for a certain procurement of the Armed Forces.
10. **Research and Development (R&D):** all activities involving basic research, applied research, and experimental development; the latter may include the implementation of projects, i.e. technology demonstrators in order to demonstrate the performance of a new method or technology in a relative or typical environment.
11. **Research and Technology:** One of the activities of R&D, which includes all scientific, technological, organisational, financial, and commercial steps, including investment in new knowledge, leading or intended to lead to the development of new products and processes or the improvement of existing ones.
12. **Security of supply (mil.):** ensuring the sustainability and operation of the Chain of Supply (see: Chain of Supply).
13. **Sensitive – Classified equipment / projects / services:** security equipment, projects, and services which are related to, require, or include classified information.
14. **Spin-in:** the adoption of commercial technologies by the defence industry.
15. **Spin-off:** the application of military technologies in commercial products.
16. **Standard:** Technical specification approved by a reputable standardisation organisation, intended to be applied repeatedly or continuously; compliance with it is not obligatory; standards fall into one of the following categories: (a) "International standard": Standard approved by an international standardisation organisation and made available to the public (b) "European standard": Standard approved by a European standardisation organisation and made available to the public (c) "National standard": Standard approved by a national standardisation organisation and made available to the public.
17. **3D printing:** Additive manufacturing method for the manufacturing of 3D objects through the successive addition of successive layers of materials, mainly ceramics and polymers.

# 1. The security challenges faced by Greece and the need to maintain strong Armed Forces

All geostrategic issues that arose during the 20th century remain open today, with historical, ethnic, religious, cultural, racial, energy, and food conflicts evolving and re-emerging. The regional security conditions cause Greece to face both conventional threats against its national security, which are expressed as a challenge against its sovereign rights deriving from international law, as well as unconventional threats (asymmetric or hybrid), which are mainly transnational. The emergence of the aforementioned threats in our territory brings Greece in a unique position in terms of security compared to the other EU Member States.

In order to deal with these threats, Greece utilises and co-ordinates its national potential, which is the sum of the country's diplomatic, economic, military, cultural, and other capabilities. The framework for the development of military power to defend its national security interests is shaped, at its highest level, by the National Defence Policy (NDP).

For the implementation of the NDP, the government relies on the Ministry of National Defence and its Armed Forces, which must maintain a high level of operational readiness and effectiveness in order to deal with the external military threats against national security.

# 2. The need to develop and maintain a strong Domestic Defence Technological and Industrial Base (DDTIB)

## 2.1 Security of supply and operational autonomy of the Armed Forces

In the complex environment (in terms of technology level, as well as of technological dependence) of modern Armed Forces, Greece must maintain a domestic defence technological and industrial base, capable of supporting the operational requirements of the Armed Forces with products, projects, and services, in order to protect essential national interests, such as:

- The security of supply, which is required for the seamless operation of the chain of supply of the Armed Forces in order to maintain their operational autonomy, mainly in case of crisis, tension, or conflict.
- The acquisition of certain operational advantages by the Armed Forces in order to offset the superiority in numbers of certain threats.

## 2.2. Security of supply within the current framework

Within the complex environment of modern weapon systems, where the chains of supply are characterised by technological complexity, dispersion at global level, and a very large number of companies, individual countries, regardless of their capabilities, can not ensure total autonomy in terms of security of supply with own resources. Consequently, Greece, in order to establish/maintain a defence technological and industrial base in critical areas for the protection of its essential security interests, if no other resources are available, is obliged in its defence procurements to seek Industrial Participation from the prospective suppliers/manufacturers, within the EU legal framework.

## 2.3 The contribution of the DDTIB to the development of a strong European defence industry

By bolstering its domestic defence technological and industrial base, Greece will also contribute as an equal Member State to the EU efforts to develop a strong and competitive European Defence Technological and Industrial Base. However, since each Member State's defence and security is a matter of national sovereignty, each EU Member State can adopt measures deemed necessary for its security, and Greece reserves the right to protect its essential security interests within the framework of European legislation and in particular article 346 of the Treaty on the Functioning of the European Union (TFEU), the use of which must be considered on a case by case basis, according to the applicable rules.

### 2.4 Adaptation of the DDTIB to the new environment

The current defence industrial environment is characterised by an increasing dependence on commercial technologies (spin-in), a trend that has grown exponentially since the end of the Cold War. Within this framework, particularly important for the development and maintenance of a domestic defence technological and industrial base, except for targeted research in this area, is the upgrading of research and innovation in the country, as well as the existence of an institutional framework for co-operation among the defence industry, the academic research community, and the competent State authorities.

The aforementioned developments also redefine the role of specialised research in the defence sector, which is mainly intended for the development of solutions for military use and has the inherent characteristics of high cost and risk due to the uncertainty of the use of its results in military applications, compared to commercial research (spin-off).

Regardless of the type of research, the Armed Forces should be encouraged to participate in development projects, funded either from the State budget or other sources, as a strategic partner with significant operational experience, specialised personnel, infrastructure, and resources.

The main advantage of this type of co-operation is the combination of the vast experience of the Armed Forces, as end user of advanced technology, and the proven ability of domestic technological institutions to implement interdisciplinary research, resolving complex technical problems, following broader approaches, and utilising the large scale research infrastructure and the specialised equipment.

These abilities can be further broadened with the participation of higher education institutions and the security forces (Police, Coast Guard, and Fire Service) as research/implementation bodies and end users, respectively, leading, together with the Armed Forces, to dual use products and services.

A prerequisite for the implementation of the above is the existence of an institutional framework laying down the effective relations among the bodies involved.

An additional tool in the area of research that can contribute to the enhancement of the role of the domestic defence industry – which has been used successfully in Greece – is clusters, which create cells for the development of high technology, which is then diffused to the industry to the benefit of all participants.

### 2.5 The conditions for the sustainability of the DDTIB

The domestic defence industry can not meet all of the Armed Forces' needs; and even if the DDTIB develops to a higher level, the Armed Forces are a small-sized market that can not by itself ensure its sustainability.

The axes that currently constitute the model of production orientation of the largest part of the global (and, in particular, the European) defence industry, around which the DDTIB must move in order to enhance its sustainability perspectives, are the following:

- To meet the needs of the Armed Forces with quality characteristics and on competitive terms.
- To become more outward-looking, i.e. to be placed under more favourite terms in the supply chain of the global defence industry.
- To expand its activities to dual use products, as well as to commercial products and services with a common research, technological, and industrial base as military application products.

Towards this scope, the encouragement of public and private sector synergies, as well as the participation of DDTIB in European and multinational co-operative programmes on the basis of the economic effectiveness and efficiency principles, are significant.

## 3. The goals of the National Defence Industrial Strategy

All the above provide the orientation of the National Defence Industrial Strategy (NDIS), which is called to identify the basic functional relations among the bodies involved in the development and

maintenance of a domestic defence technological and industrial base and the necessary actions in order to:

- Ensure the development and long term maintenance of the DDTIB
- Enhance its role in certain critical priority areas related to the country's essential security interests, such as security of supply, operational autonomy, and the acquisition of operational advantages by the Armed Forces
- Enhance the sustainability perspectives of the DDTIB by becoming more outward-looking and expanding its activities to the production of dual use items, as well as to commercial products and services, having a common research, technological, and industrial base with products for military application

Within the framework of the strategic role of the DDTIB, the target is to transform the largest amount of defence expenditure possible into domestic employment, to keep highly specialised technical – scientific personnel in the country, to use existing technology, and in general to contribute to the country's growth.

# 4. Market and environment analysis

## 4.1 Developments in the global defence industry

### *4.1.1 The international security environment and defence expenditure at a global level*

The international security environment has changed dramatically during the past 15 years, thus affecting the global defence equipment market. The cutback in operations in Iraq and Afghanistan was followed by a rise in tension in the Middle East, North Africa, and East – Southeast Asia, resulting in a shift in defence equipment markets.

Global defence expenditure in 2014 amounted at $1,776 bn, down by just 1.7% compared to 2011, which was the peak after thirteen years of continuous rise. The level of global defence expenditure, although distributed differently, is much higher than the last period of the Cold War.

In terms of geographical distribution (2014 data), defence expenditure was reduced in North America, West and Central Europe, Latin America, and the Caribbean, while it saw a rise in Asia, Oceania, the Middle East, East Europe, and Africa.

The top 5 spenders globally in terms of actual amounts spent were the US, China, Russia, Saudi Arabia, and France.

US defence expenditure in that year amounted at $610 bn, down by 19.8% compared to the historical high of 2010, representing 32% of global defence expenditure. The defence expenditure of Europe in total amounted at $386 bn, up by 0.6%, mainly due to the rise of defence expenditure in East Europe by 98% compared to the 2005-2014 period.

Defence expenditure is showing an upward trend in Russia, as well as in certain countries of the Middle East and Asia. The defence expenditure of BRICS (Brazil, Russia, India, China, South Africa), as a percentage of US defence expenditure, has almost doubled (from 30.2% in 2004 to 56% in 2013), while for China it has almost tripled (from 11.5% in 2004 to 27.7% in 2013).

Competition mainly by the US, the EU, Russia, and China for a share in the emerging defence equipment markets of the Middle East and SE Asia leads to a volatile market, in terms of both demand and supply. The rising competition results in a gradual accumulation of significant defence technology/know-how by emerging economies due to the generous offset programmes accompanying the defence equipment procurement contracts.

#### *4.1.2 Security of Supply*

Regarding the security of supply, as it was mentioned before, no country, regardless of its size, can meet its needs for equipment and services autonomously due to the global dispersion of the chains of supply. Even the strongest countries no longer focus on autonomy, but rather on the effective management of the chains of supply and subcontractors at all levels.

#### *4.1.3 Technological dependences and military – commercial sector interactions*

After the end of the Cold War, the technology transfer trend from the military to the commercial sector (spin-off) has been reversed and the increasingly dominant trend is now the transfer of technology from the commercial to the military sector (spin-in). This trend is largely due to the constant evolution of information and communication technologies and causes an increasing dependence of defence products on commercial technologies.

#### *4.1.4 Defence and Security*

The inclusion of defence within the broader concept of security has laid the ground for the development of the production of dual use products. Companies who expanded their production to include such products have seen a rise in their competitiveness in the international market.

#### *4.1.5 Structure and layout of the chains of supply*

The chains of supply of modern weapon systems are characterised by a vertical structure and global dispersion. On top of the pyramid are the main manufacturers and below are the 1$^{st}$, 2$^{nd}$, and 3$^{rd}$ level/tier subcontractors. The main manufacturers are broad corporate structures, "national champions", or multinational corporations that resulted from the rush of mergers and co-operations that followed the end of the Cold War on both sides of the Atlantic.

### 4.2. Developments in the EU defence industry

#### *4.2.1 EU state defence expenditure and the characteristics of the European defence industry.*

The total defence expenditure of EU states was €186 bn in 2013, compared to €204 bn in 2007, while the respective investment expenditure [armaments and research and development (R&D)] was €37.5 bn, compared to €41.9 in 2006.

According to data of the AeroSpace and Defence Industries Association of Europe, total exports of the sector came up to €109 bn in 2014, of which €68 bn outside and €41 bn within Europe. Commercial equipment exports amount at 65% of the total, while the remaining 35% corresponds to military equipment exports (30% within and 70% outside Europe).

Due to the low degree of European integration (CSDP), national priorities and the protection of the essential security interests of the Member States prevail; the result is that the European defence industry is characterised by a great degree of duplication.

Due to the cuts in defence expenditure after the end of the Cold War, as well as the increasing cost of weapon systems, many countries lost the ability to produce complete weapon systems. The defence industry's response to these trends was mergers, first at national and then at European level, as well as co-production programmes.

#### *4.2.2 EU's goal*

Within the framework of the Common Security and Defence Policy (CSDP), the EU with its "Strategy for a Stronger and More Competitive European Defence Industry", launched in 2007, set the goal of "consolidating" the defence industry at European level in order to close the competitiveness gap, mainly with the US.

The measures towards this direction focus mainly on the gradual removal of duplications and overlaps, the support of mergers and co-operative schemes (at national level first), the promotion of bilateral and multilateral production programmes and research and development programmes, the consolidation of demand through common armament programmes, and the consolidation of supply by

the defence industry. Directive 2009/81/EC (applied in contracts for works, supplies, and services in the fields of defence and security) aims at opening the European defence market to competition.

However, the course actually followed by the European defence industry is not in line with the EU's political vision. Due to the emergence of significant new defence equipment markets outside the Euro-Atlantic area, the European defence industries have become more export oriented (55% of the turnover of the European defence industry comes from exports) and what the EU seeks to implement in European territory (co-operations, co-productions, mergers, etc.) is already implemented by its defence industries, but often outside European territory, following the market.

### 4.3 Developments in the domestic defence industry

For many years, Greece has been one of the largest defence equipment importers in the world. However, the participation of its domestic defence industry in Armed Forces armament programmes has been very limited, as was the level of employment in the field, compared to countries with similar defence expenditure levels.

To the production capacity of the defence sector must also be added the military plants and laboratories that are part of the existing Force Structure of the Armed Forces.

The productive capabilities of the domestic defence industry include:

- The production of personnel combat clothing, loads, and gear, including the special protective clothing against chemical, biological, radiological, and nuclear (CBRN) threats
- The manufacture of portable weapon systems (light and heavy arms and weapons)
- The production of active and passive protection systems
- The manufacture of ammunition and the provision of disposal services
- The provision of weapon system interconnection – interoperability services
- The manufacture, maintenance, repair, modernisation, and upgrade of military vehicles, chassis, and trailers, including special vehicles
- The manufacture, maintenance, and operation of mobile field hospitals, kitchens, bakeries, and other mobile field applications
- The construction and modernisation of warships and other floating units
- The manufacture of structural aircraft parts, other spare parts, the repair and maintenance of aircraft engines and the depot level repair and maintenance of aircraft, helicopters, and subsystems thereof
- The manufacture of defence electronics
- The production of all kind mechanical and machined parts and spares for defence equipment
- The production of all kinds of batteries and other electrical and electromechanical equipment, such as equipment for the interconnection of systems and subsystems that can be integrated to main weapon systems
- The development of integrated command and control systems, information systems, secure and/or resistant defence telecommunication systems and relevant training and simulation systems, Electronic Warfare systems and cryptographic systems
- The manufacture of optical, electro-optical, and optronic light amplification and thermal imaging and surveillance systems
- The development of defence software
- The manufacture of individual training systems
- The development of hybrid power generation systems

### 4.4 The main characteristics of the domestic defence industry

### 4.4.1 Threats to its sustainability

The prolonged economic crisis has significantly reduced the level of defence expenditure, thus limiting the share that can be claimed by the domestic defence industry. Furthermore, there is great pressure to the everyday operation of the companies that causes an outflow of specialised scientific and technical personnel and a difficulty to replace it and retain the relevant know-how, an inability to make investments, and a difficulty in taking initiatives.

In addition to the economic crisis, the current legal framework on defence and security procurement as well as certain provisions of Directive 2009/81/EC incorporated into it, do not favour the development of the domestic defence industry. In particular:

1. Law 3978/11 on defence and security procurements, which incorporated the Directive 2009/81/EC, abolished the Domestic Industrial Participation (DIP), the Hellenic Added Value (HAV), and the Offset Benefits. This way there is no technology /know-how transfer to the country for defence procurements from abroad, thus removing the most important source / benefit (for countries like Greece) to develop and sustain a DDTIB.

2. Within the framework of the Directive 2009/81/EC, awarding contracts to the domestic defence industry, except for reasoned exceptions on grounds of protecting essential security interests of the country, is only possible through international tendering procedures, a provision that significantly restricts the domestic defence industry's ability to participate in the Armed Forces procurements.

3. Moreover, the ability provided by the Directive 2009/81/EC to the Main Contractors to chose the subcontractors and the type of works awarded to them, based solely on financial and technical criteria, leads to the further accumulation of industrial activity in the countries that currently already amount to more than 85% of the European production of defence equipment (UK, France, Germany, Sweden, Italy, Spain).

### 4.4.2 Weaknesses

The DDTIB currently lags behind the modern technological requirements of the Armed Forces, a fact that also limits considerably its ability to be more outward-looking. This technological lag is due both to objective reasons, as well as to reasons related to the development model that has been in place for decades. Regarding the objective reasons, the constant cost increase and technological development of modern weapon systems require large companies and developed research, technological, and industrial bases which far exceed the country's capabilities. It should be noted, however, that there are technological areas, such as the areas of Informatics and Telecommunications Technologies and others, where these restrictions do not necessarily apply.

Furthermore, the DDTIB has focused mainly on the domestic market and traditional areas, a fact that prevents its outward-looking orientation (with a few exceptions). Despite the fact that the country has been for decades one of the largest importers of defence equipment in the world, the greatest part of the domestic defence industry's activity was subcontracting work and services, which did not provide the ability to develop innovative products that would allow access to modern chains of supply on competitive terms.

The domestic defence industry's participation in the support and production of spare parts for the Armed Forces' weapon systems and assets is also low. The procurement of weapon systems that took place without the relative follow-on support contracts, so that the domestic defence industry would become part of the chains of supply from the start, caused problems to the Armed Forces and also deprived the industry of significant work share. It should be noted that the above situation is also largely due to the fact that the relevant rights were not conceded by the OEM.

### 4.4.3 Strengths

The DDTIB has gathered significant experience from the (sub) contracting work and the co-production programmes it has implemented, as well as from the support services it has provided for many years to the Hellenic and other Armed Forces. It has great experience in the implementation of international standards due to its participation in international organisations, as well as a remarkable history of compliance with quality indicators. All the above, combined with the country's highly skilled manpower,

can contribute to a wider range of services offered, a more outward-looking orientation, and the production of high value added products, particularly in the areas of new technologies.

#### *4.4.4 Opportunities*

The DDTIB can gradually reclaim its fair share on the support requirements of the Armed Forces. In this, it has few advantages compared to the competition, due to requirements such as the security of supply and the security of information, which in many cases cannot be met to a satisfactory degree by foreign companies.

There are also opportunities for a more outward-looking orientation of the DDTIB through co-operations with countries with which Greece has always had a good relationship.

Exploiting the ability of the Armed Forces to implement joint procurements for dual use technologies/products with other ministries and services involved in the security sector, except for achieving economies of scale, both the defence industry and the defence and security services will benefit. Moreover, the participation of the DDTIB in financed European programmes implemented by joint ventures and even involving partners (companies and/or academic institutions) outside the defence sector would enhance the level of knowledge achieved and create the conditions for the development of upgraded technology and/or dual use products.

The DDTIB can also participate in international programmes, both bilateral and multilateral, in progress, while at the same time benefiting from the relevant provisions of Directive 2009/81/EC. The trend of seeking synergies in the defence sector is constantly rising due to the ever increasing costs and technological complexity of weapon systems. Synergies accumulate productive capacities that usually don't exist in individual countries, divide research costs, limit the risk of failure, and achieve economies of scale.

### 4.5 The level of Research and Innovation in Greece

The expenditure for research and the performance in innovation are an index of the dynamism of countries and of their perspectives for economic growth.

For Greece, this means that the very low expenditure for research (which before the crisis amounted to just one third of the EU average) and the very low performance in innovation (the relevant index is just over 50% of the EU average) support the widespread conclusion that the country has followed a flawed development model in this area.

Except for the low level of financing, the fragmentation and the low interconnection of research and innovation are the main causes of the problem.

The situation is no different in the defence sector, since the relevant expenditure for R&D before the crisis ranged from 0% to 0.06% of the total defence expenditure. In the defence sector, the flaw is more pronounced and cannot be justified by a lack of resources, since the country ranked for many years among the largest defence equipment importers in the world, while since 2001 it was required by law that R&D should be financed with 1% of the budget for armament programmes.

# 5. The critical technological and industrial areas

## 5.1 Identification of Critical Areas

The desired level for the domestic defence industry is to meet the critical operational requirements of the Armed Forces. However, this is not the case, due to the fact that the DDTIB was not active in some of these areas of operational interest to the Armed Forces either because the DDTIB was not timely informed or did not have the ability to respond.

Consequently, there is a technological area, between the critical requirements of the Armed Forces and the capabilities of the DDTIB that must be developed and supported in order to secure the country's essential security interests.

## 5.2 Categorization of Critical Areas

Based on the current situation and estimating future requirements, the critical areas are divided into two categories based on their potential to be sustained / developed in the short or long term.

**A.** *Critical areas where industrial activity must focus as a priority and which are necessary for the security of supply of the Armed Forces and the protection of the country's essential security interests*

- **Weapon Systems.** Maintenance, repair, support, upgrade capabilities of existing weapon systems and assets (air, sea, and land) of the Armed Forces, including the ability to manufacture critical spare parts, provide integrated services for air assets, build and modernise warships and floating craft, produce land transportation and combat vehicles
- **Armament/Ammunition.** Development and production capabilities, including the demilitarisation/disposal thereof
- **Communication, Information, Surveillance, Command and Control Systems.** Security of information, C4ISR, tactical data systems, sensors and land, sea, and air surveillance systems, electro-optical and thermal imaging assets, electronic warfare and self-protection systems, cyber-defence, unmanned surveillance assets, and related software
- **Personnel Protection/Equipment.** Individual gear for physical protection of personnel in the battlefield, individual observation systems, sensors and communication assets
- **Field Facilities and Mobile Systems.** Mobile headquarters, hospitals, kitchens, bakeries, etc. and sustainability and energy efficiency improvement technologies.

**B**. *Technological areas that must be developed domestically and are necessary in order to give the Armed Forces the operational advantage for the protection of the country's essential security interests*

- **Material Technology**. Composite materials and nanomaterials, coating and painting technologies, laser processing, and 3D printing
- **Multidisciplinary System Integration Applications**, such as automatic control and sensors
- **Special Applications**, such as design, development, and manufacture of special mission systems based on specialised specifications in areas such as air defence systems, precision strike systems, mine detection, simulation, intelligent supply, etc.

## 5.3 Reinforcement of Critical Areas

The development and sustainment of the aforementioned areas requires constant effort by the DDTIB in improving its products and services, reducing production costs, integrating new technologies, and promoting innovation.

In any case, if the development and sustainment of the above critical areas, which are of strategic importance for the protection of the country's essential security interests, is not possible by other means, the country will examine the possibility, when awarding defence procurement contracts, to claim Industrial Participation from the prospective suppliers, within the relevant EU legal framework and, in particular, according to the provisions of Article 346 of the Treaty on the Functioning of the European Union.

# 6. Measures and Actions to Support the Critical Industrial Activity Areas

In order to ensure the sustainability of the domestic defence industry and its gradual transformation in order to meet the Armed Forces' requirements on competitive and quality terms, upgrade its presence in the international market, and successfully turn its production to military and commercial, as well as dual purpose, technologies and products, coordinated actions are required by the bodies involved, together with a clear definition of their functional relations, as described in the National Defence Planning, and the actions assigned to each of them.

The actions towards this direction are divided into three main categories: Armed Forces procurements, sustainability of the DDTIB, and monitoring and assessing the implementation of the National Defence Industrial Strategy.

## *6.1 Armed Forces Procurements.*

### *6.1.1 Programming of Armed Forces procurements*

This is a prerequisite for the programming and productive orientation of the DDTIB. Towards this direction, the Ministry of National Defence, through the General Staffs and the GDDIA:

1. Prepares the Armed Forces' budget for main weapon systems and assets and identifies the needs for follow-on support thereof, as well as the necessary support projects and services

2. Evaluates research programme proposals for necessity – feasibility and assigns a priority based on how they meet operational needs

3. Informs, through transparent institutionalised processes, the domestic defence industry on the requirements of the Ministry of National Defence's armament programmes

4. Programmes and updates the operation of an online platform, at Ministry level, where representatives of the DDTIB can be informed on:

- the procedures of concern to them applied within the framework of the National Defence Planning
- defence equipment procurement announcements that can be published, according to applicable law
- non-defence equipment procurement announcements
- Armed Forces specifications
- international organisation announcements, and
- special calls to participate in a technical dialogue before tenders, as well as in negotiations on technical and procedural matters during and after the implementation of contracts.

### *6.1.2 Revision of the legal framework for Armed Forces procurements*

The Ministry of National Defence authorities, taking into consideration the problems that emerged from the application of the current legal framework for defence and security procurements, up to date, launch its revision, taking into account best international practices, in order to:

1. Speed up and enhance the Armed Forces' procurement system in terms of transparency, flexibility, effectiveness, and efficiency.

2. Introduce, within the provisions of the EU legal framework, the Industrial Participation, to be sought by the country from prospective suppliers of defence equipment, in the case of procurements in critical areas where no other means are available to develop/sustain the relative technological and industrial base

3. Adopt a holistic approach towards the Armed Forces procurements, by introducing practices and proven methods/procedures of technologically advanced countries that take into account the overall life-cycle requirements of defence equipment.

### *6.1.3 Specialization of the Procurement Strategy*

The Ministry of National Defence is working on a procurement strategy that will incorporate lessons learned from the past and the best international practices in this field so that:

1. The Armed Forces can procure defence equipment according to specifications, within the time period prescribed, and at the cost set
2. The availability and operational readiness of the equipment remains at the desired levels during their entire life cycle at the lowest cost possible, and
3. The role of the domestic defence industry is established for the protection of the country's essential security interests.

Regarding the establishment of the DDTIB's role for the protection of the country's essential security interests, a decision making process for the procurement of defence equipment is introduced, which includes the following steps:

1. Definition of operational requirements.
2. Examination whether these requirements can be met by an existing COTS (Commercial Off The Shelf) or MOTS (Military Off The Shelf) product or a new product must be developed in the domestic or international market. The selection of the new product must be fully documented and will be considered only on the condition that the Armed Forces have the infrastructure, assets, and know-how to carry out / assess life cycle functions relevant to the original equipment. Exceptions are justified in case of proven low risk and cost.
3. Examination if the operational requirements are related to the protection of the country's essential security interests, in which case:
    a. If the procurement is not related to the protection of the country's essential security interests, the procurement contract is awarded following the implementation procedures prescribed in Directive 2009/81/EC and the national procedures on defence procurement.
    b. If the procurement is related to the protection of essential security interests, the following steps are followed:
        (1) It is examined whether the procurement can be implemented by the DDTIB with reasoned reference to Article 346 TFEU, and
        (2) If the operational requirement cannot be met by the DDTIB, a co-operation with foreign companies is considered. In this case, it is examined whether the implementation of the procurement under Law 3978/11 can protect the country's essential security interests. Otherwise, with reasoned reference to Article 346 TFEU, the highest possible domestic industrial participation is sought in the areas of interest and, mainly, in follow-on support.

In any case, the equipment to be procured must be covered upon acceptance by a follow-on support contract for which the highest possible domestic industrial participation will be sought.

## 6.2 Strengthening the DDTIB

### *6.2.1 Measures to promote exports*

For the enhancement of defence industry exports, the Ministry of National Defence, within the current legal, framework:

1. Co-operates with the other competent Ministries, supporting and encouraging the promotion of our country's industrial capabilities in the areas of defence and security by participating in international exhibitions and in national stands.

2. Assists the Domestic Defence Industry Associations to make use of existing financing options in order to participate in the aforementioned international exhibitions.

3. In co-operation with the Ministry of Foreign Affairs, involves the Defence Attachés and financial and trade affairs officials of the country's diplomatic missions, to promote military equipment exports, as well as bilateral co-operations, particularly in areas where entities of the DDTIB exhibit business interest.

4. Promotes, in co-operation with competent authorities of other Ministries, the development and competitiveness of the country's defence industries by supporting their participation in clusters, as well as in focusing on dual use products.

### *6.2.2 Strengthening research and innovation*

Meeting operational needs through the development of relative technologies is an important parameter guiding defence research and innovation. Within this framework, the Ministry of National Defence:

1. Accepts research programme proposals from private and public entities and universities, which are evaluated by the Hellenic National Defence General Staff to see if they meet its operational requirements

2. Prepares the Defence Research and Technology Development Programme, which includes: (a) programmes serving the basic defence research and technology development areas for meeting the operational requirements and priorities set and approved by the Hellenic National Defence General Staff, and (b) programmes for the development of industrial capabilities in the strategic priority areas included in the NDIS.

3. Conducts, develops, and uses technological research within the framework of the operational needs of the Armed Forces. Furthermore, can participate, together with entities from the scientific community, the DDTIB, and other public bodies, in research programmes of international organisations and international clusters, for the benefit of the Armed Forces, in areas of interest included in the NDIS or set by the GDDIA, in co-operation with the General Staffs and the Hellenic National Defence General Staff for meeting operational requirements

4. Aims at the best possible use of the European Structural Funds, in co-operation with other public bodies (Ministry of Economy, Development, and Tourism, Ministry of Citizen Protection, etc.) if possible, in order to boost competitiveness and innovation and develop further actions in the area of defence research and technology

5. Aims at gradually increasing the amount of funds available for Research and Development

6. Aims at using International Integrated Research and Development Co-operation Programmes (IIRDCP) in order to develop new technologies and deal with the high research and development costs of complex weapon systems.

7. Moreover, the Ministry will establish a Unified Defence Research and Technology Authority for:

- The consolidation and coordination of Armed Forces research centres and the networking with domestic and foreign research centres, the defence industry, as well as the Armed Forces academies.
- The enhancement of research and technology in order to strengthen national defence.

### *6.2.3 Promoting innovative actions*

Within the framework of promoting innovative actions, the Ministry of National Defence hosts special events with distinguished researchers from the domestic and foreign academic community as speakers in order to present innovative ideas and technologies in the area of Defence and Security and holds innovation competitions in the area of defence research and technology with cash prizes and other awards.

### *6.2.4 Seeking co-operation and participation of the DDTIB in the life cycle of defence equipment*

The participation of DDTIB entities in peacetime Armed Forces procurements enhances their sustainability and capabilities for the production of products and the provision of services required by the Armed Forces for operations in case of crisis, tension, or conflict. Consequently, a transparent consultation with the domestic defence industry during all phases of the life cycle of defence equipment is sought and established in order to make the best possible decisions that will provide the required operational characteristics to the Armed Forces and the maximum possible participation of the DDTIB. In particular in:

1. Phase 1 which concerns the definition of operational requirements and of the desired areas domestic research activity.
2. Phase 2 which concerns the procurement and production of the defence equipment and their integration in the Armed Forces. The aim in this Phase is to include in the bid announcements Special Terms related to Security of Supply and Security of Information, within the applicable legal framework, in order the domestic industry to meet the needs of the Armed Forces, especially in case of crisis, mobilisation, or conflict.
3. Phase 3 which concerns the follow-on support of the equipment in order to achieve maximum availability and operational readiness.
4. Phase 4 which concerns the disposal of the equipment by the Armed Forces when it reaches the end of its service life or upon discovering that maintaining it is no longer financially, technically, and operationally beneficial to the Armed Forces. During this phase, solutions can be considered for the transfer of the equipment to other countries by encouraging and enhancing the DDTIB's involvement in a way that creates added value.

On the other hand, within the framework of co-operation and dialogue between the parties involved, the DDTIB presents to the Ministry of National Defence, through events and other transparent procedures:

- The production, co-production, and support capabilities of domestic defence industries, according to the existing infrastructure.
- The experience acquired by the domestic industry from the research, manufacturing, or subcontracting work carried out in armament programmes of national or foreign Armed Forces.

### *6.2.5 Participation of Small and Medium Sized Enterprises (SMEs)*

The co-operation of all competent bodies involved in strengthening the role of SMEs, that comprise the majority of the domestic defence industry, is a constant goal of the Ministry of National Defence. Strengthening the role of SMEs is expected to improve the technology level held by the DDTIB and facilitate the sustainability and development of the domestic defence industrial and technological infrastructure that is considered critical for the protection of the country's essential security interests. Consequently, the Ministry of National Defence:

1. Records, monitors and studies the domestic production capabilities of defence equipment and dual use equipment, as well as the capabilities for relevant services and works by establishing the Unified Register of Defence Sector Enterprises (URDSE), according to the conditions and criteria set for registration in it

2. Provides all possible support and assists SMEs to make use of the initiatives of the European Commission and the European Council concerning the strengthening of the regional SME networks

3. Aims, in co-operation with the DDTIB, at actively participating in the standardisation works of International Organisations in order to contribute beneficially to the shaping of procedures and the definition of defence equipment specifications

4. Aims at the development of dual use products through the co-operation of SMEs with the EDA by using current programmes and available financial resources (European Structural Funds, Horizon 2020, etc.). Furthermore, it facilitates the participation of the domestic industrial base in international co-production programmes, focusing on technological innovation and the transfer of know-how to the DDTIB.

5. Assesses and encourages, in co-operation with DDTIB entities, technology transfer from the military to the commercial sector (spin–off) and vice versa (spin–in), thus broadening the range of works for SMEs and enhancing their sustainability, while at the same time serving the operational requirements of the Armed Forces.

6. Seeks new financing tools, mainly through co-operation with other competent Ministries, as well as through the EU for the development of SMEs.

7. Aims, in co-operation with the DDTIB, at achieving an optimum degree of standardisation in the Armed Forces in order to maintain the required levels of compatibility, interchange-ability, and commonality in the operational, administrative, technical, and material sectors so that interoperability will be achieve in the Armed Forces operations.

8. Promotes synergies in the area of Defence and Security with other competent Ministries, creating new opportunities for the DDTIB, mainly in standardisation, interoperability, procurement, and common chains of supply, given the fact that the Armed Forces co-operate with civilian authorities and contribute assets and personnel in case of emergency.

9. Certifies, through the GDDIA, the products and services of the defence industry, regardless of contractual obligations with the Ministry of National Defence (in case these are intended for third parties). To this end, the GDDIA uses national infrastructure (Defence Industry, Research Centres, Technical Chamber of Greece, Design Offices, Higher Education Institutions, Standardisation Organisations, etc.) and concludes international or other agreements in case there is no national infrastructure or know-how, and complies with the best practices of International Organisations in which participates.

## 6.3 Oversight – Implementation of the NDIS

### *6.3.1 Establishment of the Defence Research, Technology, and Industry Board*

The Defence Research, Technology, and Industry Board (DRTIB) is established, which replaces the Scientific Defence Research and Technology Board (SDRTB), assuming its responsibilities. The DRTIB is also tasked with the following:

1. Submitting proposals for the amendment of the NDIS
2. Submitting proposals for further initiatives and actions in order to achieve its goals
3. Monitoring the implementation of the current NDIS
4. Coordinating the competent bodies for the development of the national defence research, technology and industry.

The composition, responsibilities, and operation of the DRTIB will be defined by the Ministry of National Defence in a relevant regulation upon approval of the present strategy and the amendment of Article 13 of Law 2919/2001 that governs the function of the SDRTB.

For the implementation of the above, the GDDIA, in co-operation with the General Staffs and upon proposal of the DRTIB, prepares:

- An annual implementation action plan of the present strategy, and
- A report on results to brief the political leadership.

## 7. Assessment of the Strategy

The monitoring of the implementation of NDIS measures and actions will be done according to the provisions hereof.

The present strategy will be valid for five years and any amendments will take place upon reasoned proposal of the GDDIA and in agreement with the DRTIB.