DEVELOPMENT OF MILITARY LAND SYSTEMS
PROSPECTS FOR THE EUROPEAN INDUSTRY

A SYNDEX PRESENTATION

1ER FEBRUARY 2022

CONTENTS

#1 OVERVIEW OF THE MGCS

METHODOLOGY

All the information presented in this section comes from public data.

Press sources :

FOB, "MGCS: Behind the Armour, the Pursuit of a Comprehensive Land Combat System", Parts I, II and III, June 2020

Les Echos, "Char franco-allemand: les négociations prennent du retard", March 2021

La Tribune, "FCAS, Eurodrone, Tigre, MGCS, Maws: d'un hiver désespérant à un été prometteur", May 2021, and "Armement: les clés du succès pour une coopération militaire réussie", June 2021

Zone militaire Opex360, "Future battle tank: 'The ball is in the court of German manufacturers', insists Mme Parly", December 2021

L'Usine nouvelle, "La nouvelle coalition au pouvoir en Allemagne menace-t-elle les exportations d'armement de la France", December 2021

THE MGCS PROGRAMME: WHAT IS IT AND WHAT ARE THE MAIN ISSUES?

MGCS: Main Ground Combat System.

1. A military programme designed to replace the Leclerc and the Leopard II by 2045: the MGCS is based on a set of combat vehicles of different ranges and weights, rolling or flying, with various armaments.

2. A Franco-German programme under German leadership (mirroring the FCAS, under French leadership) with a very high level of technological innovation. Today, it involves three industrialists (Nexter and KMW - KNDS - as well as Rheinmetall) and can probably involve other countries and other industrialists.

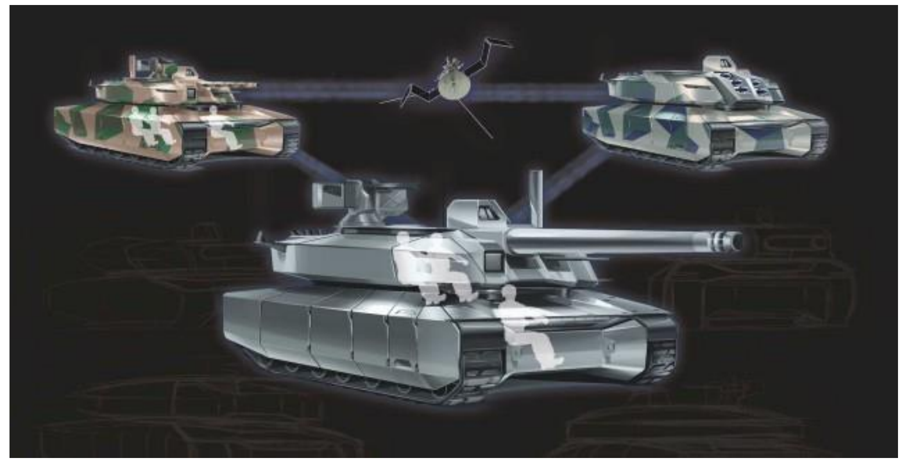
3. A programme built on the "Best Athlete" principle: the most recognised industrialist in each area of the project is in charge. However, the sharing of tasks and specialisations is not self-evident and is currently blocking the progress of the programme.

4. A programme carried by two European powers (for the time being) with common interests but with different visions, which may also contribute to making its future uncertain.

1 MGCS: WHAT IS IT?

The MGCS (Main Ground Combat System) is a Franco-German programme for the development of a "decision ground combat system", to prepare the succession of the Leclerc and the Leopard II in a "system of system" logic. The two companies carrying the programme are KNDS (Nexter + KMW) and Rheinmetall.

- In 2012, the Franco-German duo announced their intention to jointly replace their battle tank fleet. In 2020, the first phase of the architecture study was officially launched (SADS 1 contract).
- The MGCS aims to be not just a tank but a collection of combat vehicles that can share, distribute and merge information. The programme will have a strong focus on automation, teleoperation and robotisation through artificial intelligence.
- *"From the point of view of armaments policy, the MGCS is, on the one hand, a technology driver in the field of land systems and, on the other hand, it can provide the necessary impetus for a long-term reorganisation, first of the Franco-German industry and then of the European land systems industry,* report written in 2020 by the Federal Ministry of Defence in Germany.



Overview of the French vision of MGCS - source: FOB.

The MGCS programme aims to structure the future of operational capabilities and the industrial sector.

1 A SCHEDULE CONSIDERED VERY AMBITIOUS FOR MGCS

To date, the MGCS programme is at the beginning of phase 2: a first SADS 1 contract costing €30m for both countries was launched in 2020 and is due to last 18 months. But the most costly and significant stage has not yet begun (SADS 2), notably because the distribution of pillars between manufacturers has not been decided.

2015 2018	2020 2025	2028	2035
Phase 1 Study of concepts	**Phase 2** Technology Development and Demonstration (TDP) 30m (SADS 1) and €200m (SADS 2)	**Phase 3** Demonstration of a complete system (FSD)	**Phase 4** Implementation and industrialisation

Phase 1 – **Objective: to** arrive at a common vision between France and Germany. This phase is concluded with the signing of a letter of intent by both ministries on 19/06/2018.

Phase 2 – **Objective: to** define the architecture of the system and the R&D activity. An intermediate stage is planned for 2022.

- A first contract notified in 2020: SADS 1, for €30m - creation of the company ARGE (RM + KNDS).
- A 2e SADS 2 contract is to be funded by France and Germany to the tune of 200 M€. Objective: support for the realisation of 14 *Main Technological Demonstrators.*

This is a delicate stage because it is a question of knowing which industrialist will head each pillar.

Phase 3 – **Objective: to** lead to the assembly and evaluation of a first demonstrator of the system.

Phase 3 would start in 2024: it is partly integrated with the previous phase.

Phase 4 – First deliveries: 2035. Full deployment expected: 2045.

2 MGCS IS PART OF A FRANCO-GERMAN COOPERATION OF GEOPOLITICALLY AND INDUSTRIALLY COMPLEX MILITARY PROGRAMMES

- **FCAS:** the Franco-German future aircraft programme, recently joined by Spain, is to replace the Rafale and Eurofighter by 2040.
  - Executed by a Dassault/Airbus prime contractor, FCAS was awaiting a favourable vote by the Bundestag parliamentarians in June 2021 to finance the key stage of the programme. 1.3 billion was granted by the Finance Committee.
  - The procurement office of the Bundeswehr (German army) expressed doubts that the project was in German interests. It is therefore requesting that the final contract be re-notified, probably at the end of August 2022.
  - In addition, FCAS is still blocked by complex discussions between Dassault and Airbus' German and Spanish subsidiaries over workload and intellectual property.
- **MGCS:** Mirroring FCAS, MGCS was to follow the same schedule.
  - Unlike FCAS, MGCS has not been submitted to the Bundestag for approval. Indeed, there is no question today of going beyond the system architecture definition phase (SADS 1) entrusted to KNDS and Rheinmetall.
  - The division of tasks between the two countries and through them, between the three industrialists, remains under debate since Rheinmetall joined the consortium.
- **Two other Franco-German armament projects are currently at a standstill:** the MAWS programme (patrol boat replacement) and the modernisation of the Tiger helicopter. In both cases, Germany has for the moment decided to renovate its equipment by buying from the United States.

The evolution of the MGCS is therefore very uncertain today, and is part of a voluntary but fragile Franco-German cooperation for various reasons (see points 3 and 4).

2 COLLABORATION ON A MILITARY PROGRAMME AT SEVERAL SCALES AND LEVELS OF INVOLVEMENT (1/2)

MGCS is under German leadership, mirroring FCAS, under French leadership

- How does this work in practice? In 2020, the draft study indicated that a joint programme team would soon be created and hosted in Germany.
  - The German side makes the first proposals on the topics to be addressed, and France asks for possible adjustments.
  - If there is disagreement, the points to be discussed are taken up to a high political level to be decided (each country has an equal number of votes).
- The load is divided 50/50 between France and Germany. However, this division would only apply to the study phases, as the production load has not yet been negotiated.

MGCS also aims to consolidate the KMW/Nexter (KNDS) pairing

- For Nexter and KMW, this programme would give substance to the KNDS strategic vision, E-MBT being already a milestone (E-MBT is a Leopard chassis and a Leclerc turret, with obviously new technological developments).

2 COLLABORATION ON A MILITARY PROGRAMME AT SEVERAL SCALES AND LEVELS OF INVOLVEMENT (2/2)

MGCS leads to cooperation between countries and industry which should be expanded over time

- Several countries have already made requests for information: Poland, Spain, Italy, the United Kingdom, Sweden and Belgium.
  - Some of them are part of the "Leopard Club" and would be well advised to join the programme.
  - Behind these countries, new industrialists could thus put forward their expertise on one or more aspects of the programme.
- Already at the level of the Franco-German couple, KNDS and Rheinmetall will certainly not remain the only ones involved in MGCS.
  - In France, the interest of Arquus (motorisation, robotics, maintenance, etc.), Thales (sensors, etc.), Cilas (lasers, sensors) and MBDA (missiles) and Safran (sensors, optronics) was mentioned.
  - In Germany, Hensoldt for the sensor part and Diehl Defence for the protection part have expressed their interest.
  - It should be noted that some of these manufacturers are already involved in FCAS. Some of them are even at the head of certain pillars (Thales, Safran, MBDA, and Hensoldt participation).

3 MGCS: THE 'BEST ATHLETE' POSITION AND INDUSTRY COLLABORATION ARE DIFFICULT PRINCIPLES TO APPLY

- In each of the different pillars of the programme, the "Best Athlete" principle is applied: in other words, **entrusting the most reputable industrialist in a technology with the task of developing it in the framework of a shared project.**
    - But this principle is not so easy to apply, especially for very strategic functions of the programme such as the cannon, for example, whose expertise is claimed by both Nexter and Rheinmetall. The French and Germans have not managed to agree on the leadership distribution over the 13 pillars of the programme.

- In the context of an international collaborative programme, industrial property remains a crucial issue.

The background

The industry's own knowledge, which is the core of the business.

Industrial property can be analysed from two angles.

The foreground

The knowledge that develops within the project.

This background does not have to be disclosed.

On this issue of intellectual property, debates between industrialists would delay the progress of the negotiations.

The foreground, which will develop as the project mobilises new technologies (which is particularly the case at MGCS or FCAS), will necessarily have to be shared between the industrialists who will collaborate on the programme.

4 FRANCE AND GERMANY, TWO DIFFERENT VISIONS (1/2)

While France and Germany have strong interests in developing a common military defence programme, each country has a different vision of what it should be. These differences can be explained by each country's own military history and practices.

Is a European defence arc so obvious to both countries?

- For France, MGCS is part of the Titan programme, which should ensure the renewal of the heavy segment of its army (after Scorpion, in the middle segment). The components of this programme must be part of European cooperation.
- Does Germany share this view? NATO remains strongly the global security framework. The German army's equipment is already aligned with that of the United States. By way of comparison, while the NGF, the aircraft at the heart of the FCAS, is intended to replace the Rafale in France, Germany sees the new aircraft more as a complement to the F-18s already ordered from Boeing.
- The newly elected coalition in Germany refers in its contract to "enhanced cooperation" between the EU and NATO. However, the terms "European defence" are not present, and the text instead promotes an "offensive disarmament policy" that would be "restrictive in terms of arms exports" (source: *L'Usine nouvelle*, December 2021).

A different vision which can also be explained by the place occupied by the army in each country

- In France, the army is very closely linked to an ultra-centralised state strategy; in Germany, armaments are seen as a strategic industrial sector on the same level as other industrial sectors such as the automobile industry. Major armaments projects are thus examined to find the best quality-price ratio.

4 FRANCE AND GERMANY, TWO DIFFERENT VISIONS (2/2)

France and Germany will also have to agree on their conception of the programme.

French preferences		German preferences
Mostly manned vehicle solutions	VS	Mainly robotic machines
A pack of manned/unmanned vehicles, broken down by capacity	VS	A system centred on a single major platform
A classic heavy choice, with a crew of 3 or 4 people, and less ambition in robots	VS	A light mother tank with only 2 crew members and a high level of automation + semi-autonomous escort vehicles around

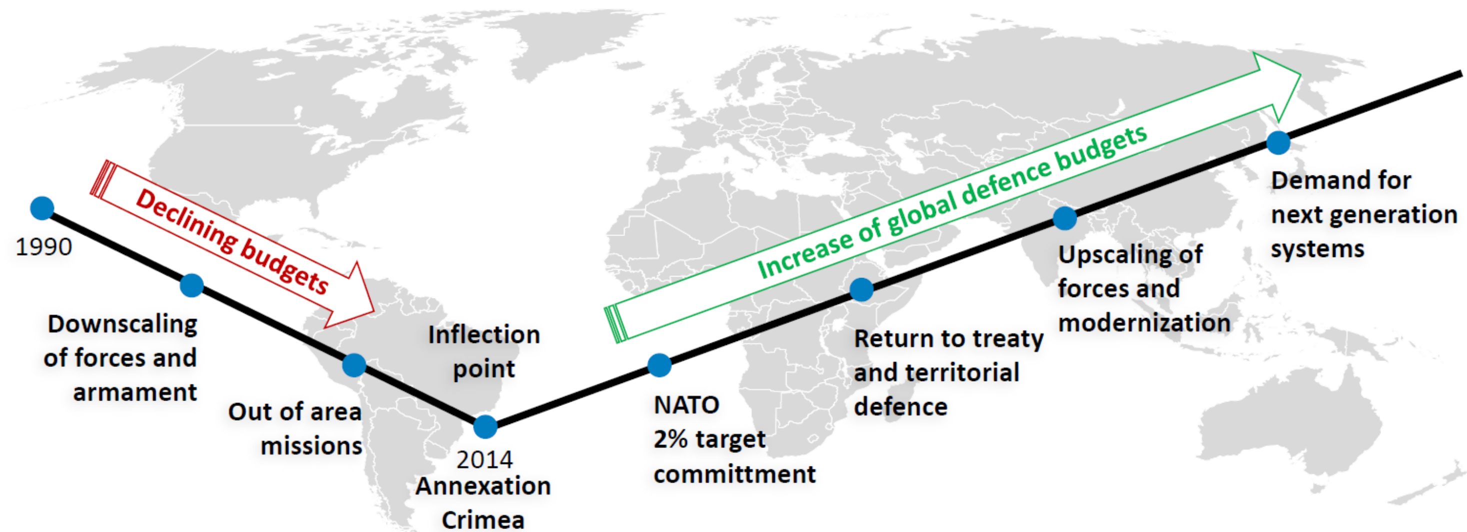
Source: ***FOB*****, "Behind the Armour, the Pursuit of a Comprehensive Land Combat System", Parts I, II and III, June 2020.**

WITH SEVERAL CONVERGING INDICATORS, THE DEFENCE MARKET IS A BUOYANT MARKET

The MCGS is therefore contributing to the important prospects of the European defence market. In the longer term, CIFS can also be mentioned.

Defence

Managing the super cycle



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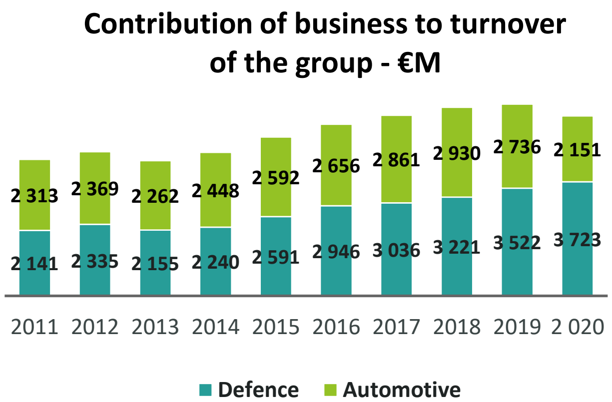
#2

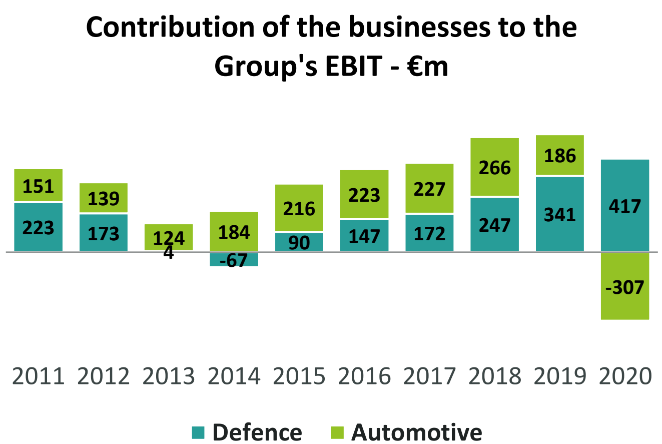
A SITUATION THAT SEEMS TO BE DIFFERENT FOR THE TWO MAIN PLAYERS IN LAND DEFENCE

#2A Strong growth at Rheinmetall...

Defence activities driving the group's growth

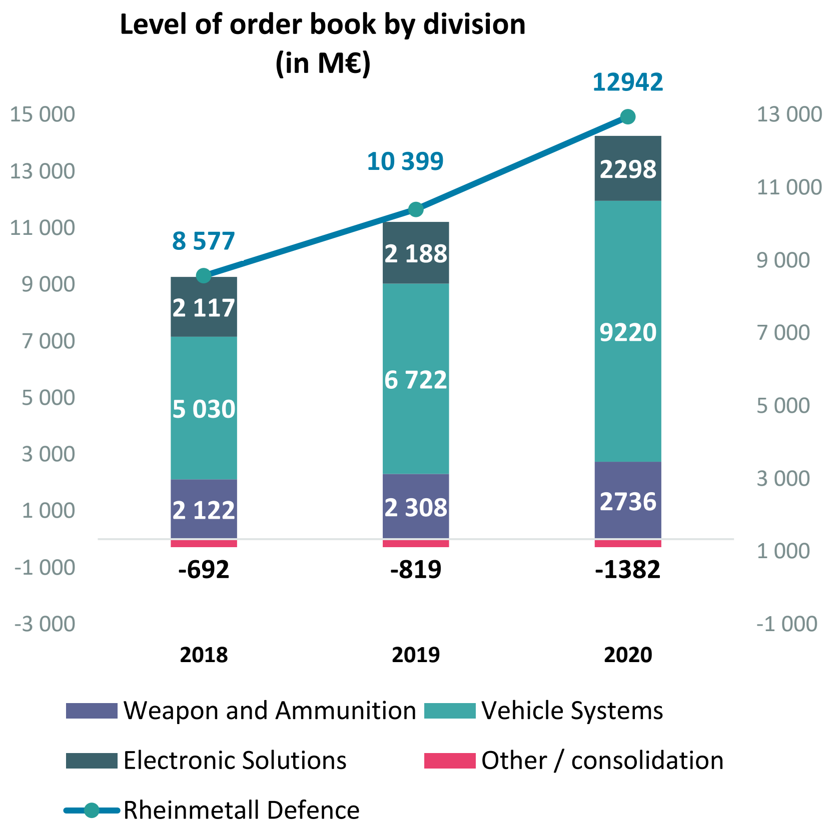
IN 2020, THE GROWTH OF THE DEFENCE BUSINESS WILL NO LONGER BE ABLE TO COMPENSATE FOR THE LOSSES OF THE AUTOMOTIVE BUSINESS





- **For the past two years, only the Defence business has seen an increase in turnover** (+6%, i.e. +€201 million in 2020):
  - in 2019, it was the only contributor to the group's growth (+9.4%);
  - **In 2020, this growth is no longer sufficient to compensate for the decline in the Automotive business** (-21% compared to 2019), which has an impact on the group, whose turnover is thus down by -6%.
- **The contribution of the Defence business to the group's EBIT continues to increase** after a first year in 2019 when it exceeded that of the Automotive business. In 2020, **this increase does not prevent the group's EBIT from falling significantly (-83% compared to 2019)**, due to the negative result of €307m for Automotive.
- **The group explains the poor results of its Auto business by mainly exogenous factors**: the pandemic (turnover) and exceptional costs (EBIT). However, the activity of the Auto business had begun to decline in 2019.
- The group's net result amounts to € 1 million. However, Rheinmetall will pay **€86 million in dividends to its shareholders for the** year 2020.
  - The dividend per share will increase from €2.4 on the 2019 results to €2 on the 2020 results.

THE ORDER BOOK CONTINUES TO GROW, PARTICULARLY IN EUROPE AND INTERNATIONALLY



- In 2020, "order intake will exceed €6 billion for the first time ever," says Rheinmetall's annual report.
- In 2020, the order book continues to grow significantly (+24%) for all divisions.
- **These increases, which can be seen in particular at Vehicle Systems, are mainly linked to two programmes**:
  - Lynx infantry vehicles sold to Hungary;
  - the Boxer order for Australia, acquired in 2018.
- Other orders mentioned by the group are attributed to the MIV (Mechanised Infantry Vehicle) modernisation programme for the British Army and logistics vehicle contracts for Germany.

STRONG PROFITABILITY GROWTH FOR RHEINMETALL DEFENCE

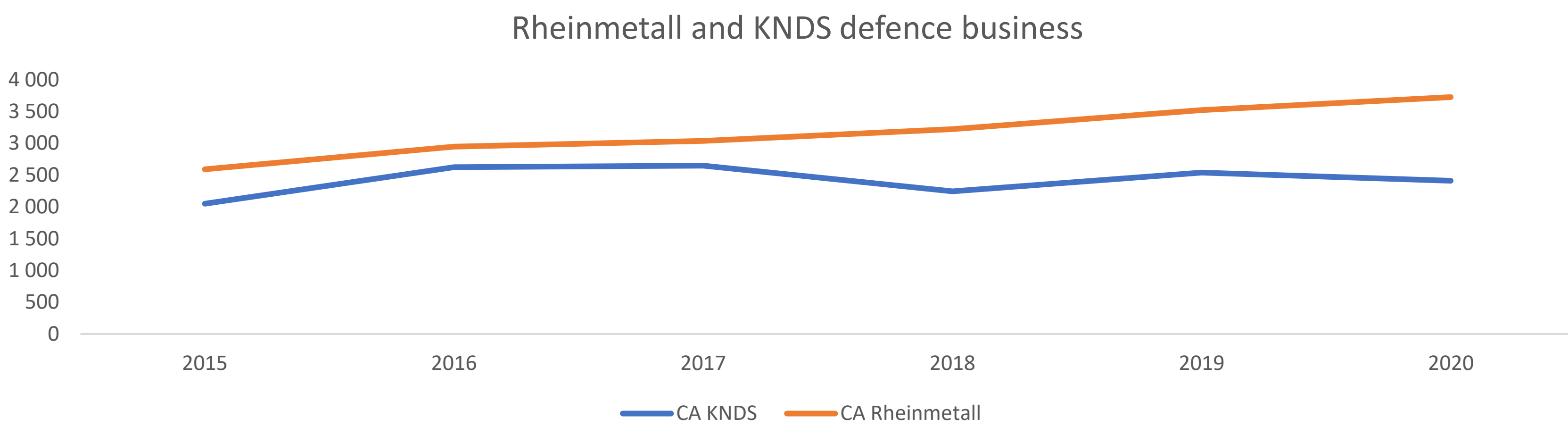
Over the last three years, profitability has increased for all divisions.
In 2020, Weapon and Ammunition achieves a highly profitable margin of 15%.
In 2020, this division accounted for 45% of Rheinmetall Defence's operating profit.
Growth is also very important for Electronic Solutions, whose profitability will jump from 5% in 2018 to 10% in 2020.

Divisions	In M€	2018	2019	2020
Weapon and Ammunition	CA	1 056	1 018	1 196
	Operating profit	121	123	185
	Margin	11 %	12 %	15 %
Vehicle Systems	CA	1 568	1 787	1 823
	Operating profit	108	150	150
	Margin	7 %	8 %	8 %
Electronic Solutions	CA	839	948	931
	Operating profit	46	75	93
	Margin	5 %	8 %	10 %
Rheinmetall Defence	CA	3 221	3 522	3 723
	Operating profit	254	343	414
	Margin	8 %	10 %	11 %

#2B

… and a widening gap with KNDS?

THE CREATION OF KNDS DID NOT ALLOW NEXTER AND KMW TO OVERTAKE THE DEFENCE ACTIVITIES OF RHEINMETALL



- In parallel with the growth of its defence business, Rheinmetall is experiencing an increase in profitability.
  - And so seems to be on a virtuous cycle.
- On the KNDS perimeter, turnover is rather stable with a deterioration in profitability.
- In 2020, Europe represented :
  - 77% of KNDS sales for a total of €1.9 billion;
  - 64.1% of Rheinmetall's sales of €2.3 billion.

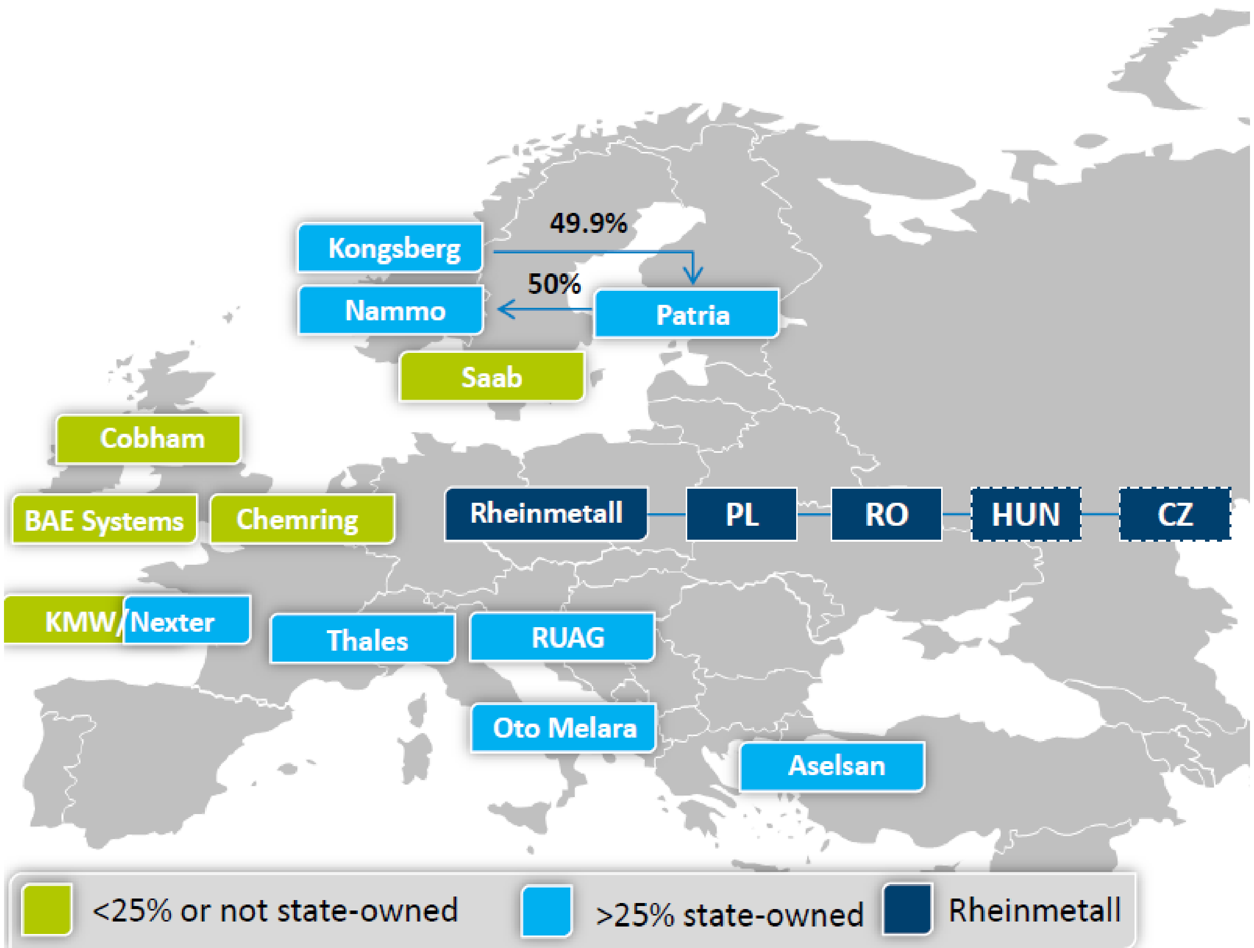
#3

WHAT ARE THE MEDIUM-TERM DEVELOPMENTS?

#3A The continuation of merger operations

And under what flag?

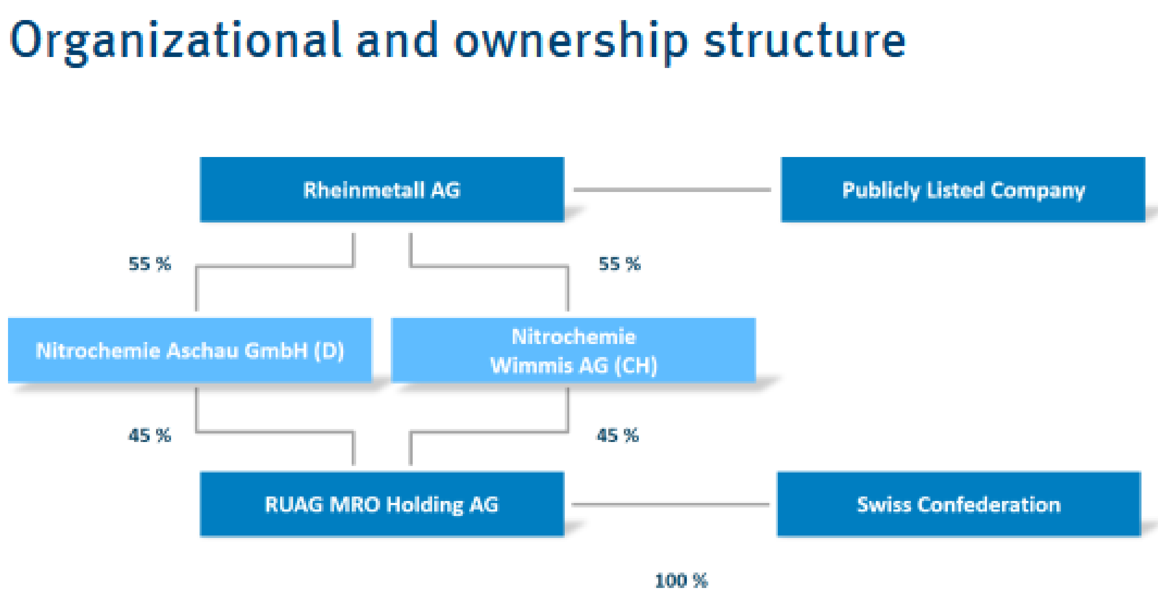
STATE PARTICIPATION IN THE CAPITAL REMAINS IMPORTANT



Source: Rheinmetall Corporate, November 2020 presentation.

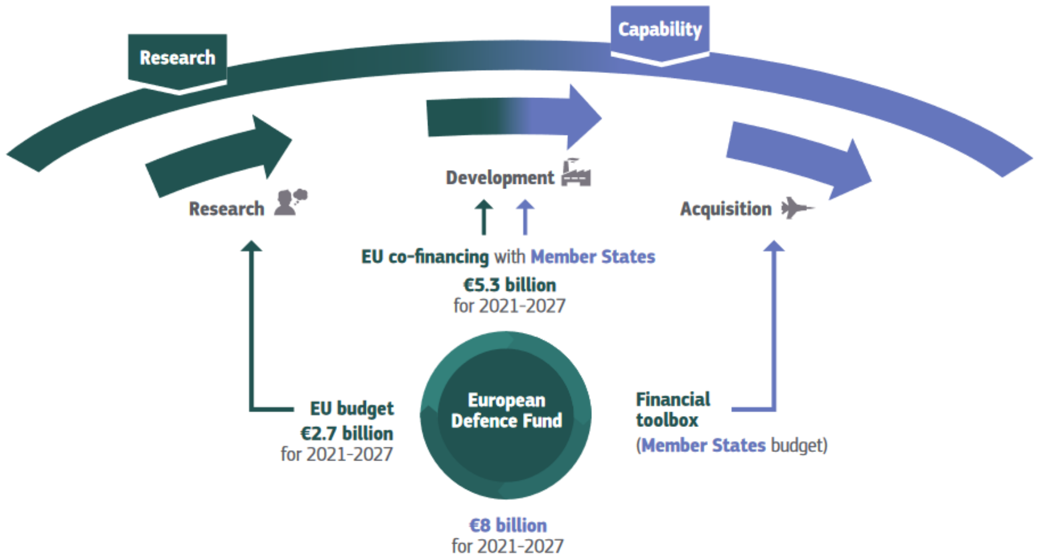
TOWARDS A CONSOLIDATION OF THE POWDER KEGS IN EUROPE?

- The European market is largely concentrated on two players:
  - the French company Eurenco, the remainder of the SNPE group, owned by Giat and therefore the French state;
    - The company is currently modernising its Sorge site with a view to doubling its production capacity,
  - Nitrochemie, a 55% subsidiary of Rheinmetall and 45% of Ruag (Switzerland - see organisation chart below).



#3B Tensions in R&D funding

EUROPE HAS ACQUIRED A TOOL TO CONSOLIDATE BUDGETS AND INCREASE EFFICIENCY...



A COLLABORATIVE TOOL TO REDUCE FRAGMENTATION AND INEFFICIENCIES

Lack of cooperation between Member States in the field of security and defence is estimated to cost between €25 billion and €100 billion every year.

Currently, the defence capability planning and around 80% of defence procurement is run on a purely national basis, leading to a costly duplication of defence capabilities.

Only 9% of research and technology in the field of defence is conducted in cooperation between Member States.

… BUT WITH WHAT RUNOFF ON THE GROUND?

... BUT WITH WHAT RUNOFF ON THE GROUND? (2/2)

The EDIDP was a precursor to the European Defence Fund.
In 2020, ground combat accounted for only 5.6% of the year's funding.
If we add the €7m of "precision strike" which funds programmes on indirect fire and guided munitions, the whole represents 10% of the EDIDP for 2020.

#3C Increased pressure from shareholders?

AND WHAT ARE THE TRADE-OFFS BETWEEN SHORT AND MEDIUM/LONG TERM?

- Although the main defence companies are directly owned by governments, they are also owned (to a greater or lesser extent) by investors.
- They are looking for value, mainly through two vectors:
  - dividend payments ;
  - the resale of the shares at a capital gain.
- In both cases, companies should have positive changes in their results.
- But these companies are currently in a potentially complicated situation:
  - increased competition and pressure on margins;
  - significant investment in R&D;
  - significant investment in renewing or increasing production capacity;
  - acquisition of new skills ;
  - launch of new products involving industrial risks;
  - ...
- The risk is that companies will reduce or postpone future investments in order to maintain or increase their shareholders' remuneration and thus mortgage the medium/long term in favour of the short term.

#3D Relocation of industrial facilities?

RHEINMETALL AND KNDS STILL HAVE A STRONG PRESENCE IN WESTERN EUROPE

RHEINMETALL LOCATIONS

KNDS LOCATIONS

- With increasing demands for offset, what might be the shift to Eastern Europe in the medium term (or to other countries, e.g. the Middle East)?
- The evolution of the car model could also create temptations.

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