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KNOWLEDGE FOR ACTION

AERONAUTICS INDUSTRY: IS THE POST-COVID RECOVERY COMPROMISED BY THE WAR IN UKRAINE?

SYNDEX

WORKING PAPER

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A WAR WITH CASCADING REPERCUSSIONS AS THE INDUSTRY BEGINS TO RECOVER

Unlike the 2014 conflict (Crimea and Donbass), the war that broke out at the end of February will have numerous repercussions on an aeronautics sector that was hoping to see a strong rebound in 2022 after the Covid shock. The extent and duration of the effects remain unknown, but we are trying to summarise the issues at stake.

The main questions raised by the war in Ukraine :

- An immediate and medium-term effect on passenger demand?
- A disruption of airline operating parameters?
- A reduction in deliveries and MRO for the aviation industry?
- Higher production costs for industry?
  - Cost of energy
  - Cost of certain raw materials
  - Focus on titanium
- More immediate difficulties for the space industry?
- An increase in military expenditure to the benefit of certain industrialists in the sector?

Photo © Antonov Airlines

Less income?

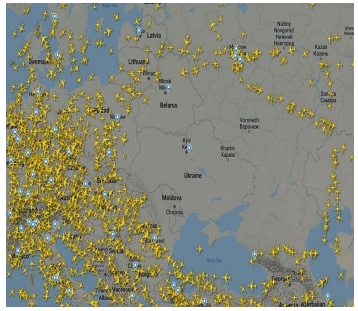
More costs?

No more delays?

What are the risks for the sector?

LITTLE IMMEDIATE EFFECT ON DEMAND, BUT HIGHER RISK IN THE MEDIUM TERM - *NOT YET QUANTIFIED BY IATA*

Russia and Ukraine account for only a marginal share of world air traffic (1.3% for Russia and 0.8% for Ukraine according to IATA). However, the war is having multiple consequences on the traffic and results of airlines.



Fewer passengers and revenues and higher costs for the airlines... fewer planes to deliver in the medium term?

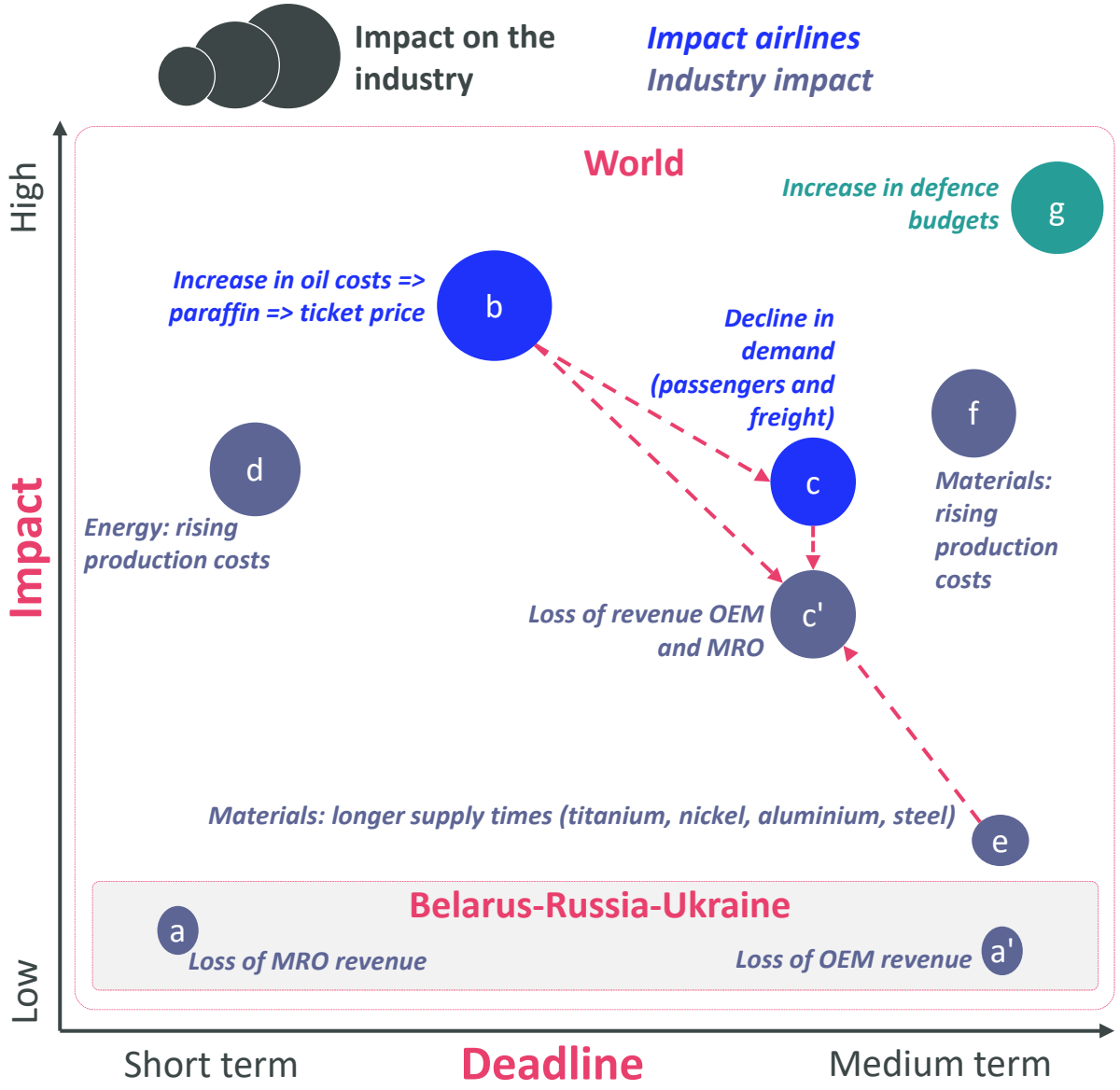
- Instantly, the war is causing a drop in revenue for airlines: there have been no flights between Russia and Europe and North America since late February. But the disappearance of this part of the world's air traffic will only lead to a small drop in revenue for the airlines.
- The rise in oil prices does not always have an immediate effect on airline operating costs, as some airlines have fuel purchases covering the coming weeks or months. Others have already passed on their higher costs in ticket prices, which may reduce demand (or limit the post-Covid increase in demand).
- On the other hand, the closure of Russian airspace as a retaliatory measure will substantially lengthen the duration of flights between Asia and Europe, and therefore the operating costs of the companies... with a risk of a drop in demand.

Decline in company revenues ▼

Decline in company revenues ▼▼

Decline in company revenues ▼▼▼

FOR THE INDUSTRY: VARIOUS EFFECTS, WITH VARYING TIMEFRAMES



With regard to the Belarus-Russia-Ukraine market: a relatively limited loss of revenue, with an immediate drop in MRO revenue (**a)** from airlines in the zone, followed by a drop in OEM revenue (**a'**).

An immediate increase in production costs (**d)** linked to the cost of energy.

A double increase (immediate and future) in the cost of paraffin (**b)** leading to a decrease in traffic (**c)** and industry revenues (**c'**).

From the summer onwards and the depletion of stocks, there is a risk of longer supplies (**e)** for certain raw materials, amplifying the loss of income (**c')**, and a risk of increased production costs (**f**).

In the medium term, part of the sector will be able to benefit from the certain increase in defence budgets (**g**).

Short term

THE WAR IN UKRAINE: WHAT CONSEQUENCES?

The first effects are immediate, although relatively limited.

Less MROs with companies in the area

Stopping operations with companies in the zone: a relatively small loss of revenue, but for how long? Companies risk replacing Western players with third-party players, notably Chinese.

Fewer deliveries of new aircraft to airlines in the region

A few dozen aircraft (≈70 Airbus and Boeing) will not be delivered this year, a small volume compared to the 1,200 aircraft theoretically due to be delivered in 2022.

Higher energy costs affecting production costs

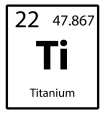
Production processes are being amplified by the inflation in energy costs that has already begun, which is penalising suppliers of forged and machined parts whose ability to raise their selling prices is limited.

Medium term

THE WAR IN UKRAINE: WHAT CONSEQUENCES?

Russia and Ukraine account for a very small share of global air passenger traffic (1.3% for Russia and 0.8% for Ukraine, according to IATA).

A problem: the supply of materials including titanium



VSMPO supplies about 40% of the titanium used by the French aerospace industry, which has built up stocks for a few months.

VSMPO is not (yet?) subject to EU+US economic sanctions, but the entire industry is shifting to other suppliers, with the risk of significant pressure on lead times and costs.

SSJ 100

Loss of revenue from the SSJ 100 programme, for which Safran supplies the nacelles, landing gear and a specific engine in a JV with a Russian company (NPO).

Knowing that, in any case, Russia had begun a programme of 'Russianisation' of the non-Russian equipment on this aircraft.

General decline in traffic, deliveries and MRO

As the level of traffic is directly correlated to the macroeconomic context, there is a non-negligible risk that the sector's rebound dynamic will run out of steam in a few months' time, once all the inflationary effects have been implemented.

Long term

THE WAR IN UKRAINE: WHAT CONSEQUENCES?

Several consequences in the short and medium term, not all of the same magnitude. In any case: a situation that can only be conjectured about at present, and which should be monitored.

The effects of prolonged or extended conflict?

The outbreak of the war at the end of February created a new situation, which has nothing to do with the war waged in Crimea in 2014 and in the Donbass since, and whose effects for the aviation industry have been limited on the whole (except in terms of flight safety: see flight MH370).

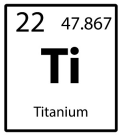
The aeronautics industry will undoubtedly have to adapt to lasting consequences, which in turn opens up a wide field of possibilities:

- **Alteration of the post Covid recovery dynamics ?**
- **Alternative supply chains and capacity building necessary for industrial autonomy and sovereignty, e.g. via relocation?**
- **Acceleration of roadmaps linked to the decarbonisation of propulsion, in a context of permanently expensive paraffin?**

Increase in military spending

On the other hand, European military spending is likely to be revised upwards in the coming months, which may 'benefit' part of the French aeronautics industry.

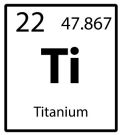
ONE PROBLEM: TITANIUM SUPPLY 1/3



Titanium accounts for about 15% of the B787 and 14% of the A350, but it is used in all models, and the world's 1er supplier is Russian. But alternatives to VSMPO exist.

- Titanium is extracted from a number of relatively common types of ore (mainly ilmenite, rutile, anatase), which are mined in many countries. The main ilmenite-producing countries are Australia, China, Norway, Vietnam, India, Ukraine and the USA. The main rutile producing countries are Australia, South Africa, Sierra Leone, USA, Ukraine. China alone is estimated to have 30% of the proven mineral reserves.
- To forge titanium, the ore must first be transformed into titanium sponge. The production capacities in this area are Russian, Chinese, Japanese, Ukrainian and Kazakh.
- For titanium dedicated to aeronautics, the Russian smith VSMPO is unavoidable with almost 30% of the world market (50% of Safran and Airbus supplies, 30% of Boeing's, 20% of Rolls Royce's, almost 100% of Embraer's...), but three American players control the market for "semi-finished products" intended for the aeronautics market:
  - Allegheny Technologies, Titanium Metals and RTI International Metals.
  - Between them, they account for 60% of world production.
- **The European aerospace industry can therefore source its materials elsewhere than from VSMPO: in the United States but also in Saudi Arabia, where a new titanium sponge production plant started up in 2019 with a theoretical capacity of 15,600 tonnes per year.**

ONE PROBLEM: THE SUPPLY OF 2/3 TITANIUM



A situation that is generally manageable in the short term, but a major risk for costs and supply times beyond the summer?

- The global aerospace industry consumes less than 80,000 tonnes per year of the 160,000 tonnes produced globally, but the volumes used by aerospace have been increasing by almost 10% per year since 2015.
  - The world's 1er blacksmith with a 25% to 30% market share is Russian (VSMPO), which supplies the entire global aerospace industry.
  - The French industry consumes around 25,000 tonnes of titanium each year, of which 10,000 tonnes are imported from VSMPO.
  - Some French manufacturers are 80% dependent on VSMPO.
- **Even before the outbreak of the war, the major contractors had built up stocks to cope with the rise in the price of titanium. But the whole sector does not have them, and these stocks only provide visibility for a few months, in the face of a crisis with repercussions that will probably last much longer:**
  - **Safran and Airbus have built up stocks for a few months (summer 2022).**
  - **VSMPO is not (yet?) subject to the EU+US economic sanctions, and Airbus is continuing to buy from the Russian manufacturer, but all the other players in the industry are switching to other suppliers, with the risk of significant pressure on lead times and costs.**
  - **Some SMEs and SMIs that have not secured their long-term supplies have already experienced an increase of almost 100% in the cost of titanium since the end of February.**

A PROBLEM: THE SUPPLY OF TITANIUM 3/3

22 47.867
Ti
Titanium

France has the capacity to supply the industry by recycling offcuts (which represent up to 80% of the titanium purchased), thanks to an Aubert & Duval subsidiary... which should initially be ramped up as Aubert & Duval recovers.

- In 2017, Eramet set up a French plant (Saint-Georges de Mons) to produce titanium ingots by recycling: EcoTitanium, which is 21.75% owned by Aubert & Duval, but has yet to ramp up production.
  - EcoTitanium is owned by UKAD (43.5%), ADEME (41.3%) and Crédit Agricole Centre France (15.2%) via its equity investment subsidiary CACF Développement.
    - UKAD is a 50/50 JV between Aubert & Duval and UKTMP International, the latter being a Kazakh group and world leader in titanium ingots
- EcoTitanium was expected to be fully operational in 2022, but Aubert & Duval's difficulties and the Covid crisis have limited its development: the company achieved a turnover of barely €3.8m in 2020 for a net loss of -€37m.

The takeover of Aubert & Duval by Airbus and Safran (and Tikehau ACE) should therefore make it possible to secure EcoTitanium's capacities in the medium term, and to limit the dependence of European manufacturers on foreign suppliers.

PRESSURE ON OTHER RAW MATERIALS AND COSTS

In addition to titanium, other strategic raw materials for the aeronautics industry are already experiencing pressure on volumes and/or prices.

- The crisis is exacerbating tensions over the supply of nickel, aluminium and steel.
- The increase in volumes enjoyed by the industry has led to a decrease in stocks since autumn 2021, well before the realisation of a major risk linked to the Ukrainian situation. The sector began to coordinate its supplies (which remain low compared to other industries) at the end of 2021.
- Since the end of February, the sector has been hit hard by the sometimes dizzying rise in prices:
  - Nickel suddenly went from €20,000/tonne to €100,000/tonne, partly due to speculation by one player in the market, before "coming down" to over €30,000/tonne.
  - The cost of aluminium rose from $2,900/tonne in January to over $4,000/tonne in early March, before falling back to $3,200/tonne.
  - Steel production costs are soaring.

1 A price issue

2 A problem of volume availability

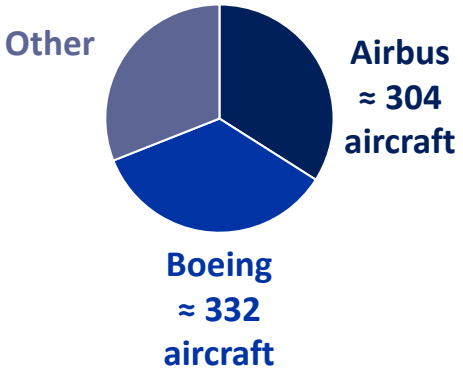
3 The sector is trying to coordinate and pool its supplies, but its influence remains weak compared to other sectors

STOPPING MRO OPERATIONS WITH COMPANIES IN THE RUSSIA-UKRAINE AREA

An obvious, but relative, shortfall.

- The Russian fleet in service before the start of the war is estimated at just under 900 aircraft, including about 600 Airbus+Boeing (332 Boeing and 304 Airbus operated by Russian airlines, with a preponderant share of leasing), i.e. less than 3% of the world fleet (>100pax).
- At least for the (unknown) duration of the sanctions, the high-margin MRO business will be halted, with companies going to local or even Chinese third parties and cannibalising part of their fleets, as is the case with Iranian companies.
  - However, the shortfall is relative: for example, the CFM+Leap fleet installed by the end of 2021 represents over 32,000 engines worldwide by the end of 2021.
  - In addition, for information: since mid-February, some leasers from Ukrainian airlines have repatriated their aircraft to Western Europe, which makes it possible for them to return to service with other airlines in the medium term.
  - For the leasers of Russian companies, the situation is more difficult: it is not possible to reallocate the 600 leased aircraft that make up the Russian fleet, of which only fifty or so were recovered by the leasers before the start of the war - Russia is also threatening to nationalise these aircraft.

Russian fleet in service
≈ 900 aircraft



A risk of a lasting exit of the Russian fleet from MRO flows, with a rise in power of Chinese players on Airbus + Boeing aircraft and equipment?

FEWER AIRCRAFT TO BE DELIVERED FOR AIRBUS AND BOEING?

Note: from one source to another (Simpleflying, SeekingAlpha, ch-aviation...), the figures vary slightly... but the orders of magnitude are close.

AIRBUS

Airbus: some 30 aircraft will not be delivered in 2022

16 A320neo aircraft for S7 Airlines, Smartavia and Nordwind Airlines, at a list price of $720m

12 A350-900s for Aeroflot at a list price of $1.95 billion, of which 2 would already be assembled

BOEING

Boeing: some 40 planes to be delivered in 2022

6 B777-200F for AirBridgeCargo

37 B737 MAX8 for UTair, Ural Airlines, and S7 Airlines

It should be noted that the B737 MAX had not yet been recertified in Russia before the sanctions began.

- **Compared to the order books of Airbus and Boeing, and to the total deliveries expected in 2022 (≈1200 Airbus+Boeing), the exposure to the Russian-Ukrainian crisis is very low.**
- **In addition, it is likely that these few dozen aircraft will be delivered to other airlines sooner than expected.**

THE SPECIFIC PROBLEM OF SPACE: RUSSIA IS UNAVOIDABLE

Europe is dependent on Ukraine and Russia in several ways, and the crisis reveals the relative autonomy of a sector that is essential to French (and more widely European) sovereignty.

- Since the end of February, the space industry, which guarantees access to space and therefore makes a major contribution to French sovereignty, no longer has Russian or Ukrainian Antonov aircraft to transport Airbus and TAS satellites to their launch pads, nor the Soyuz launcher to put these satellites into orbit from Kourou, Baïkonour or Vostotchny, nor the engines to propel these satellites and the Italian Vega C launcher.
- The situation is all the more delicate as the launch schedule was well supplied for all the players (military, institutional and commercial, European and American).
  - With a rebound in space telecoms, but that could be compromised
  - Some launches, particularly institutional ones, were instantly delayed by a year at the end of February (Galileo for example)
- The situation is all the more critical as Ariane 6 is not yet available, the Italian Vega launcher is suffering from difficulties, and the projects for small European launchers are still at the project stage.

THE WAR IS LEADING TO A DEFINITE INCREASE IN DEFENCE BUDGETS, FROM WHICH PART OF THE INDUSTRY WILL UNDOUBTEDLY BENEFIT

A general increase in military spending is underway in Europe. More broadly, the defence industry is buoyed by a general rearmament: global geopolitical tensions are even higher than a few months ago.

- Defence budgets are expected to increase in Europe, as evidenced by the increasing number of announcements to this effect (Sweden, Finland, Germany...). The outbreak of the war prompted a coordinated and instantaneous European reaction, but in terms of defence, each country risks pursuing its own objectives.
- The German position also illustrates the ambiguity of the real benefits for European manufacturers in the sector:
  - On the one hand, Germany announces the creation of a special €100 billion fund to increase military spending.
  - ... but, in the meantime, Germany confirms its intention to acquire F35s to replace its Tornado fleet...
  - ... which reinforces fears about the continuation of the SCAF programme (especially as Spain is also expected to buy the F35 in its naval version).
- **The reality of the impact on European industry remains unknown:**
  - **How much of the budget increase will be allocated to army formats?**
  - **What future for joint programmes?**
  - **What are the consequences in a context of numerous and expensive purchases of American equipment?**

QUESTIONS TO ASK MANAGEMENT BODIES

- **Questions to be asked by employee representative bodies and organs:**
- What exposure of the current and future year's turnover to Russian, Belarusian and Ukrainian customers and prospects?
- What dependence on Russian, Belarusian and Ukrainian suppliers? Which materials, which parts, with what level and visibility of stocks, which possible alternatives and at what costs and deadlines?
- What are the consequences on production costs (material/parts purchases and energy costs)?
- Are the 2022 budget targets (orders, turnover, cost plan, results, cash) being called into question? To what extent?
- What is the adaptation plan? What savings are being targeted, and by what means?

The war in Ukraine is causing a loss of bearings at a time when the sector was hoping to conform and accelerate its post-Covid recovery.

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Syndex, an expert at your side to understand, anticipate and act. Points of vigilance depending on the evolution of the situation, in particular after the summer.

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