Foreign economic activity transforming in the aerospace sphere by the COVID-19 impact

O N Kushnirenko[1,2] and O S Zarudna[1]

[1] Department of Industrial Policy, Institute for Economics and Forecasting NAS of Ukraine, 26 Panasa Myrnoho str., Kyiv 01011 Ukraine

[2] Corresponding author e-mail: kyshnoksana@gmail.com

Abstract. The authors identified the threatening challenges of the coronavirus pandemic for aerospace development and the transformation of international relations in the context of COVID-19 Among them are: border closures, heightened security concerns in isolation, blockage of labour migration, disruption of intermediate goods supply networks, reduction of operating activities, working capital shortfall, loss of income, deteriorating financial stability and solvency, increasing the probability of failure. The results of the assessment of losses in the aircraft industry of Ukraine showed that compliance with the strict requirements of counteracting the pandemic, has reduced the length of value chains in which Ukrainian manufacturers are integrated. The authors identified priority measures to getting over the "survival" mode posed by the pandemic COVID-19 for the aerospace sector. A specified consequence provoked by the crisis makes strengthening the public-private partnership in these areas imperative, in particular, the intensification of international cooperation and promoting the development of innovation ecosystems in the regional dimension.

A global change in the organization of the world's production has occurred In the context of the Pandemic the COVID-19. The coronavirus pandemic has posed unprecedented challenges to national Governments, not only to the health and lives of their populations, but also to the survival of national economies. Changes that have taken place in international relations have led to a reduction in overall trade and economic relations between countries. Now the risks of their further complication remain high. The new normality in which the world found itself after the COVID-19 pandemic has changed the traditional business models of the world market, forcing humanity to be prepared and adapt to new challenges related to increasing isolation and quarantine. Uncertainty is a characteristic feature of today and only the ability and adaptability to new internal and external challenges will be a key sign of future development. Strict isolation measures due to the coronavirus pandemic have led to such threatening consequences as:

- border closures;
- blocking of labor migration flows;
- violations of the supply chains of intermediate goods;
- reduction of operating activities;
- lack of working capital, reduced profitability, deteriorating financial stability and solvency, increasing the likelihood of bankruptcy;
- growing business demand for state aid.

This is especially felt in the aerospace industry. Reducing airport congestion means not only the scaling down of their activities in 2020, but also the closure of commercial space, the termination of airport service companies and declines in operating income.

The Ukrainian aerospace industry is a consolidated sector that has a full cycle of aircraft development and manufactures aircraft and space equipment, as well as parts and components, with significant competitive advantages. This is due to the historical aspects of many years of experience in the formation of the aviation industry, the availability of engineering personnel, a network of educational institutions that provide training of appropriate qualifications and material and technical base of production.

Today, Ukraine is one of the participants in world production in the field of aircraft construction and ranks 51st among other countries involved in the global aircraft production network (table1).

Table 1. Ukraine's place in the world export of the aviation and space fields in 2019

Commodity code and title by Ukrainian Classification of Commodities in Foreign Trade	Ranking in world exports	Share in world exports, %
88 Aircraft, spacecraft, and parts thereof	51	0.3
8801 Balloons and dirigibles; gliders, hang gliders and other non-powered aircraft	20	1
8802 Powered aircraft "e.g. helicopters and aeroplanes"; spacecraft, incl. satellites, and suborbital	52	0
8803 Parts of aircraft and spacecraft of heading 8801 or 8802, n.e.s.	46	0.1
8804 Parachutes, incl. dirigible parachutes and paragliders, and rotochutes; parts thereof and accessories	45	0
8805 Aircraft launching gear (excluding motor winches for launching gliders); deck-arrestor or similar	58	0

Source: compiled for [1].

The strong export orientation of the aerospace sector has led to a high dependence on the world situation, state monetary policy and the exchange rate. At the same time, there is an expansion of specific product groups imports (8805 Starting equipment for aircraft), deteriorating foreign trade balance (figure 1, table 2). According to the statistics of the Department of Statistics, the total sales of services for the repair and maintenance of aircraft and spacecraft amounted to UAH 333.7 million, of which more than a third was provided outside Ukraine (130 million).

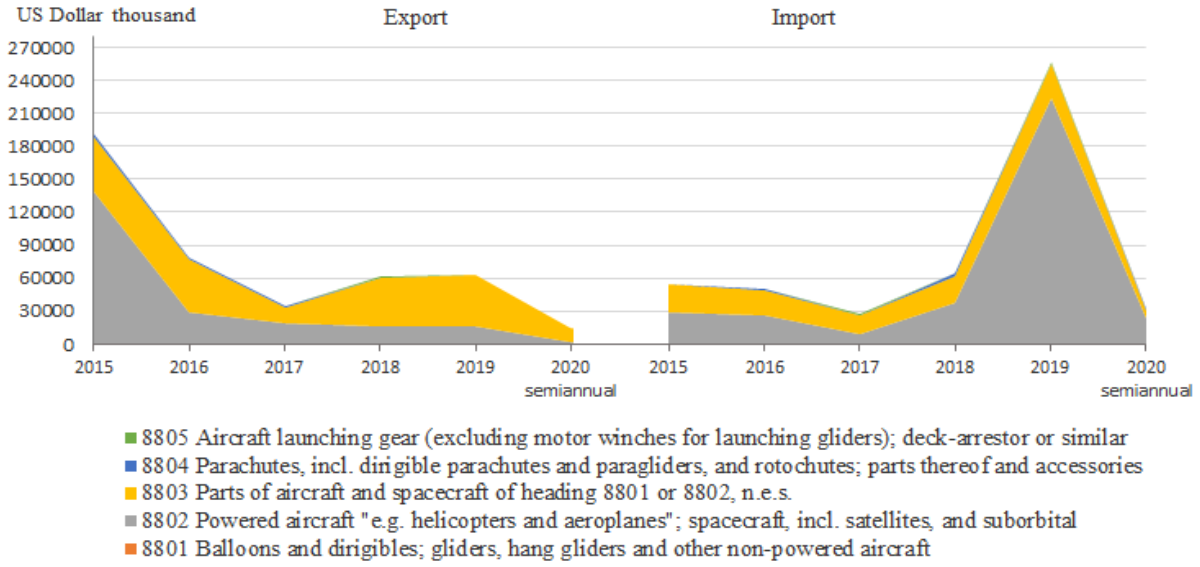

Figure 1. The dynamics of Ukraine's foreign trade in the aviation and space fieldsin 2015–2020
Source: compiled for [1, 2].

Table 2. Ukraine's foreign trade in the aviation and space fields in 2015-2020, US Dollar thousand

Commodity code and title by Ukrainian Classification of Commodities in Foreign Trade	2015	2016	2017	2018	2019	2020 semi-annual
Exported value						
88 Aircraft, spacecraft, and parts thereof	246403	190636	34639	61051	63466	15009
8801 Balloons and dirigibles; gliders, hang gliders and other non-powered aircraft	458	486	524	632	510	223
8802 Powered aircraft "e.g. helicopters and aeroplanes"; spacecraft, incl. satellites, and suborbital	184186	137644	18838	16148	15019	2205
8803 Parts of aircraft and spacecraft of heading 8801 or 8802, n.e.s.	59341	50282	14144	43315	47865	12551
8804 Parachutes, incl. dirigible parachutes and paragliders, and rotochutes; parts thereof and accessories	2267	2030	821	772	62	30
8805 Aircraft launching gear (excluding motor winches for launching gliders); deck-arrestor or similar	152	194	312	184	10	0
Imported value						
88 Aircraft, spacecraft, and parts thereof	54860	50470	27152	64043	257038	31292
8801 Balloons and dirigibles; gliders, hang gliders and other non-powered aircraft	26	35	65	77	76	3
8802 Powered aircraft "e.g. helicopters and aeroplanes"; spacecraft, incl. satellites, and suborbital	28875	26138	8986	37240	223813	23510
8803 Parts of aircraft and spacecraft of heading 8801 or 8802, n.e.s.	25428	23059	17530	24135	31401	7577
8804 Parachutes, incl. dirigible parachutes and paragliders, and rotochutes; parts thereof and accessories	531	652	213	2455	153	67
8805 Aircraft launching gear (excluding motor winches for launching gliders); deck-arrestor or similar	0	586	358	136	1595	135

Source: compiled for [1, 2].

Systematic reform of the aerospace industry through its transformation aimed at bridging the gap between the export-oriented production sector and air transport was identified as an urgent requirement. Due to the inconsistency of the legislative actions of the Government, the policy of the ministries, which leads to contradictory decisions on interstate cooperation and critical imports, the lack of a balanced defense-industrial and military-technical policy.

In particular, public procurement is a sensitive issue. In January-May of the current year, the volume of public procurement for the provision of services for the repair and maintenance of air transport decreased by 13.2% compared to the corresponding period of 2019. This decrease in statistical data was due to a partial lack of price information on procurement of services for repair and maintenance of aircraft, as a result of which the volume of public procurement in a particular category decreased by 94.3%. At the same time, there was a purchase of services for the repair and maintenance of helicopters, and the volume of purchases for services for the repair and maintenance of military aircraft, missiles and spacecraft increased by 28.8%. Some steps have already been taken: the Ministry of Strategic Industries was established in the summer of 2020 and the Defence Procurement Act finally passed. This is the framework within which access is provided to the aviation products to foreign suppliers, on condition that preference is given to producers located in the customs territory of Ukraine, as well as to producers providing more favourable conditions of detention, maintenance and repair of delivered products; the programme on international investment agreements supports the process for negotiating international investment agreements at the bilateral, regional and multilateral levels.

Figure 2 presents the consequences of the transformation of foreign economic activity in the aerospace sector, which we can consider as threatening challenges and opportunities.

Figure 2. Key challenges of international aerospace trade

The crisis caused by COVID – 19 is exacerbating threats to air travel and service in the short term, while also providing some opportunities that will emerge in the medium and long term. It is possible to change the model of operation of some low-cost companies, in particular, from transit to direct, which leads to a reduction in long-distance passenger flights, but at the same time expands the possibilities of increasing domestic flights. The introduction of innovative logistics solutions to reduce costs leads to a reduction in global value chains, in which Ukrainian producers are also integrated.

The reduction of scheduled flights and the demand for certain destinations may lead to an increase in charter passenger flights that will require maintenance under quarantine conditions.

At the same time, air transportation is becoming an important coordinating component in the fight against Covid-19 and provide prompt shipment of goods, relocation of medical teams, repatriation of citizens. This requires the strengthening of measures aimed at traffic safety. The World Health Organization, the European Union, and other countries around the world have developed guidelines and recommendations for the disinfection of aircraft premises, the safety of passenger and cargo services, the safety of crews, and more. This opens the market for services related to the sanitation of aircraft, cargo,

etc. For airports, this means the creation of additional facilities for sanitary needs, which involves the temporary modification of existing airport facilities. Another service is the installation and automatic contactless check of passengers for symptoms.

The priority measures to getting over the "survival" mode posed by the pandemic COVID-19 for the aerospace sector are:

- quick response to change and readiness to adapt to the global environment of new technologies requires not only the implementation of innovations, but also quality engineering support. For projects that require accurate knowledge of technological and economic intricacies in this area, it is necessary to attract and implement specialized engineering companies that know the market well, master new and most cost-effective developments that allow you to build complex technological chains;
- development of joint collaboration in the ecosystem "engineering-automation-mechanical engineering", which is a classic example of the value chain and contributes to the strengthening of the ecosystem and the creation of new solutions in aircraft construction;
- reducing costs and maximizing the potential of airlines to return on their assets through cooperation with global (and already domestic) specialized companies that use additive technologies and accumulate staff capable of developing digital production, and provide their customers with opportunities to systematize methods of analytical data exchange and accurate updating of information, improvement of offers of after-sales service, other services on standard and provided service;
- support for the formation and development of a sectoral innovation ecosystem for aircraft construction and aviation services (creation of viable infrastructure elements - industrial parks, business incubators, technology R&D transfer centers, innovative development Funds, innovation competitions - as a method of filtering the best ideas, concepts and ready-made prototypes for industrialists, incubators and accelerators for industrial startups - for growing the most promising innovations, assessment centres and technology parks with equipped R & D laboratories, etc. for testing and customization). Innovative solutions should include new partnerships, especially with the private sector;
- investments flow can be secured through the combination of financial, development and asset management strategies, including a greater use of public-private partnerships, innovative funding schemes. This perspective applies, in particular, to the field of leasing of high-tech equipment, which would allow to renew the aircraft fleet;
- support for research and development, in particular using the opportunities of international grant funding, such as Horizon 2020 for the promotion of Ukrainian aviation, exchange of experience and training of specialists for specialized universities. In particular, the National Aerospace University. ME Zhukovsky "Kharkiv Aviation Institute" simultaneously participates in 5 aviation projects Horizon 2020, which aim to organize communication activities (creating a platform for collaboration, conducting specialized training to find European partners, to prepare and submit project applications), and participate in specific production projects (development of new methods of manufacturing parts from composite materials using 3D printing, participation in the international project CleanSky 2, which creates the next generation of civil aviation);
- development of international cooperation for the implementation of joint projects in the field of development and production of aviation products, maintenance of aircraft and the provision of services for its repair and modernization;
- improving the procedure of public procurement in the application of price and other preferences based on the practices of foreign countries in compliance with international law;
- improving the quality of aircraft repair services, timely delivery of spare parts, components, etc., due to the slowdown in the modernization of air transport by carriers.

If we talk about the future of the aerospace industry after the pandemic, its further development depends on the tools of state support, namely the development of a common vision of entrepreneurs,

local and central government, science and the public to ensure the advancement of national policy interests through the pursuit of multilateral cooperation for the benefit of all.

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