



EUROCONTROL

# Impact of ATM related strikes on the European ATM network

ATM ON  
STRIKE!

STRIKE!





# 1. INTRODUCTION

Since the Single European Sky (SES) framework was adopted in 2004 by the European Union, the European air traffic management (ATM) system has experienced significant pressure to improve its performance. Since 2012, ATM performance is regulated, monitored and overseen at the European level in the areas of capacity, environment, cost-efficiency and safety. This development has been supported at operational level by the establishment of the network manager function for the pan-European ATM network, regional cooperative mechanisms known as functional airspace blocks (FABs), and at the infrastructure level through the launch of the SESAR project, comprising development and deployment activities to modernize ATM.

The European ATM system was able to absorb a traffic increase of 60% in 27 years, growing from 5.8 million flights in 1995 to 9.25 million in 2022. Over that period there was a 50% reduction in the average (en-route) delay per flight from 3.23 minutes to 1.67 minutes. Effective capacity of the network increased over this period in line with traffic demand.

Traffic disruptions related to adverse or extreme weather conditions, technological system upgrades, exceptional events, crisis situations as well as industrial action in the form of strikes has impacted the efficiency and continuity of air navigation services and therefore air traffic. This has, in several instances, led to severe disruption of airline operations due to substantial delays caused to the provision of Air Traffic Services. In technical terms, these delays are called Air Traffic Flow Management (ATFM) delays. These events have also led to cancellations of flights and re-routings which result in increased fuel burn and associated emissions. ATFM delay due to industrial action has been one of the contributors to the failure to meet the EU SES performance targets.

Whereas industrial action normally occurs on a relatively small number of occasions each year and is of limited duration (a few hours to 48 hours) the impact of each event can create major traffic disruptions which are particularly challenging for the European network

This disruption is largely due to the monopolistic situation and network dimension of the ATM industry but in some cases may also be linked to the lack of efficient social dialogue in the sector of air traffic

control. Evidence shows the impact of these strikes on aviation and the European economy as a whole may be considerable even though they occur in only one or a few Member States<sup>1</sup>. On a general note, the impact of strikes appears to be more detrimental to the network and to produce more ripple effects for other States if they occur in the core of the network.

ATM related strikes are today subject to a close monitoring by the EUROCONTROL Network Manager with the contribution of all operational stakeholders. Coordinated management takes place in order to mitigate their impact. However, they cannot all be addressed in the same way, as their level of predictability, their impact and their nature can differ.

Before analysing more in detail the impact of strikes on the European ATM network, in terms of ATFM delays and re-routings, it is important to note that air traffic controllers have specific working conditions. Their work is organised in shifts, which include work on days or nights, during weekends and bank holidays. Given the high level of safety required in performing air navigation services, air traffic controllers have substantial responsibilities and work under significant pressure. During peak traffic time, leave of ATCOs is not necessarily handled in a restrictive way. During these periods it is also not easy to get additional capacity at short notice and for a limited time, due to the very specific experience and licensing rules of ATCOs. This is not the case in the airline industry where maximum resources are planned during peak times.

In general, ATM strikes result in a reduction in staff resources to control air traffic in the European ATM network. Limited staff availability in the event of a strike results in a reduction of delivered capacity in certain air traffic control centres as a limited number of sectors are kept open. In addition, the capacities of the remaining available sectors might suffer further reductions. Safety and capacity constraints meant that traffic cannot be fully reallocated through the functioning sectors. The capacity constraint on multiple sectors, added to their geographical situation, make the planning of traffic difficult for the ANSPs. To ensure safety as a matter of priority, ATM strikes inevitably result in a reduction of capacity in the airspace of the ACC/State concerned and also in congestion in the airspace of neighbouring States/ACCs.

<sup>1</sup> see e.g. <https://www.eurocontrol.int/publication/impact-strikes-european-aviation>



ATM preparation for a strike day involves complex coordination mechanisms between the EUROCONTROL Network Manager, ANSPs, airlines and the military. In some cases, the complexity is increased by the uncertainty regarding the precise number of staff on strike. Ideally, an advanced notice of two weeks indicating the exact percentage of staff striking would allow a more detailed preparation of mitigation measures.

Very importantly, and as acknowledged by this study, the right to strike is a fundamental right enshrined in the EU Charter on Fundamental Rights and primarily governed by national laws. The EU Charter on Fundamental Rights specifies that the right that workers and employers, or their respective organisations, have in taking collective action to defend their interests, including strike action, has to be exercised “in accordance with EU law and national laws and practices”.

This study aims to collect and evaluate data on the impact of recent strikes, and assess, from a strictly operational and practical point of view, the impact of possible measures that could mitigate the severe disruptions caused by industrial action on the network. This study does not aim to take any position on the political or legal feasibility of the possible measures being assessed in the context of this study.

This study was carried out on the request of and under the guidance of the European Commission Directorate General for Mobility and Transport (DG MOVE) as a follow-up to the 2017 Staff Working Document with a view to conduct a factual analysis of the impact of ATM strikes on the network and to test various mitigating measures.

## 2. METHODOLOGY

In 2017 the EC issued a Staff Working Document<sup>2</sup> and adopted a Communication<sup>3</sup> in which it notably recommended to preserve overflights of Member States affected by strikes, as ensuring 100% continuity of service for flights crossing the airspace of strike-affected Member States would reduce considerably the impact on the entire European Air Traffic Management network. From an aviation and Single Sky perspective it is obviously a prime objective to ensure continuity and that passengers can travel freely across Europe.

The high-level conclusions of the abovementioned study are summarised below:

### **Main different practices and legal positions between Member States identified in the Staff Working Document:**

- Huge variations in number of strike days as well as accumulated cost of cancellations per Member State
- Varying levels of social dialogue in Member States

- Diversity and complexity of Member States legal norms regarding strikes
- Very different minimum notification periods in Member States in case of strikes
- Minimum levels of service for overflights and for departing/arriving flights differing in both cases greatly between Member States

<sup>2</sup> SWD(2017) 207 final: Practices favouring Air Traffic Management Service Continuity.

<sup>3</sup> Communication from the Commission on Aviation: Open and Connected Europe, COM(2017) 286 final.

The present study uses as background and reference framework the work published in 2017, as referred to above, as well as the information collected at that stage, especially as regards national rules related to strikes. It is understood that this information generally is up to date.

**This study has four main tasks:**

- It establishes a baseline showing impacts of strikes on the entire European network on the basis of strikes that took place in the years 2018-2022 for both arrivals/departures and overflights;
- It puts forward a list of possible mitigating measures to be analysed;
- It analyses (locally and network-wide) impacts of a number of possible mitigating measures identified on the basis of the 2017 study compared to the baseline;
- It proposes a ranking of the possible mitigating measures according to their impacts (locally and network-wide) and their practical feasibility

Impacts are measured in terms of three indicators, namely flight cancellations (including an estimation of those for which expected flight plans were not submitted due to announced strikes), delays and extra distance flown/CO<sub>2</sub> emissions. The baseline aims to quantify these indicators, and the analysis of the mitigating measures explores possible improvements measured by these indicators.

The list of possible mitigating measures analysed in this study, and possible variations, is summarised below. The different measures are intended to represent key elements for network planning, namely sufficient time, certainty and flexibility:

- 1) Minimum strike notice period
  - a) With limited certainty of exact capacity of the concerned airspace due to uncertainty as to the number of participating ATCOs
  - b) With full certainty (predictability) of capacity of the concerned airspace
- 2) Provide continuity of service to overflights:
  - a) Via limited routes to be kept open
  - b) Temporary capacity increase in neighbouring control areas
  - c) To all overflights
- 3) Use of Military ATCOs as complement to Civil ATCOs (following the possibilities granted by recent the Commission Implementing Regulation<sup>4</sup> providing enhanced mobility options and streamlined qualifications for air traffic controllers).

<sup>4</sup> *Commission Implementing Regulation (EU) 2023/893 of 21 April 2023 amending Regulation (EU) 2015/340 laying down technical requirements and administrative procedures relating to air traffic controllers' licences and certificates*

# 3. DISRUPTIONS TO AVIATION CAUSED BY STRIKES DURING THE PERIOD 2018-2022

The overall impact of the ATC strikes between 2018-2022 is indicated below. 99% of the non-operated schedules concerned short and medium haul flights. The flights not operated are calculated as the difference of the number of flights on the industrial action day against a reference day, which is same day of the week, either the week before or the week after. The reasons for the non-operated schedules are not entirely known and they might relate to a certain extent to other causes than the ATC industrial actions.

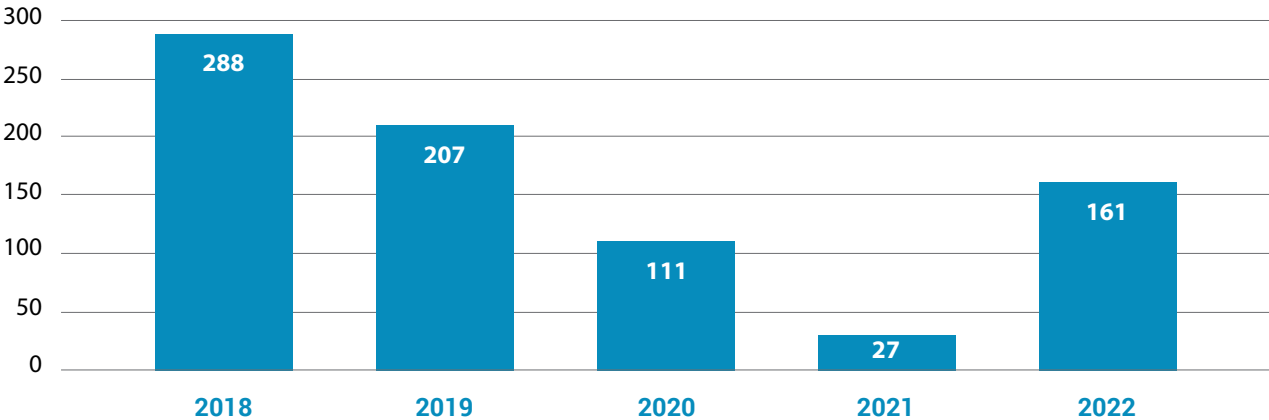
- Cost per additional mileage flown (5 Euro/Nautical Mile flown)

It can be observed that the cost of the strikes for the airspace users over the period 2018-2022 amounted to a total of around 800 M€.

The graph below indicates the costs of the strikes for the airspace users for the period 2018-2022. It is based on the following parameters <sup>5</sup>:

- Cost of delay (100 Euro/minute)
- Cost of flight cancellations (18,570 Euro/flight cancelled)

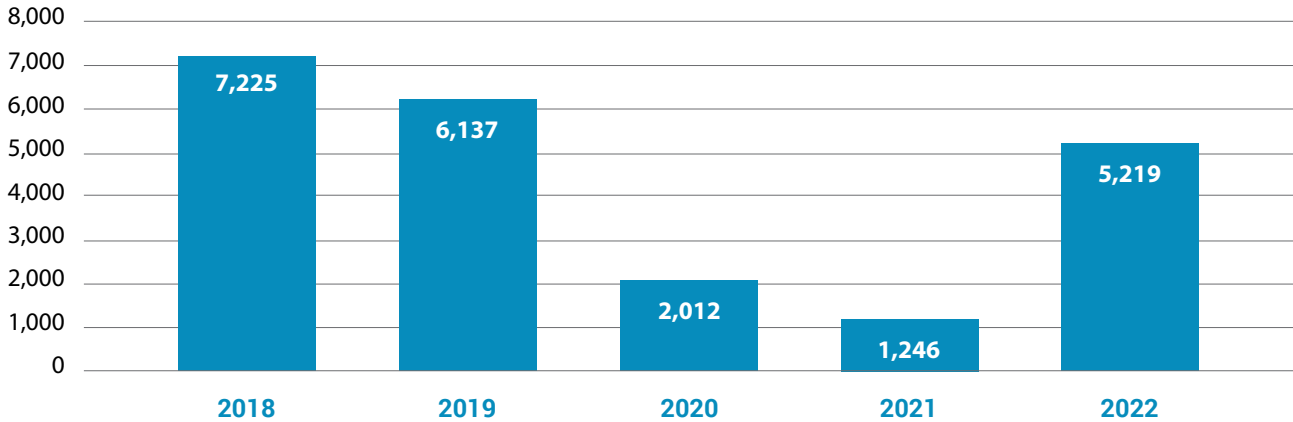
**COST IMPACT OF STRIKES (million Euro)**



<sup>5</sup> <https://www.eurocontrol.int/publication/eurocontrol-standard-inputs-economic-analyses> .

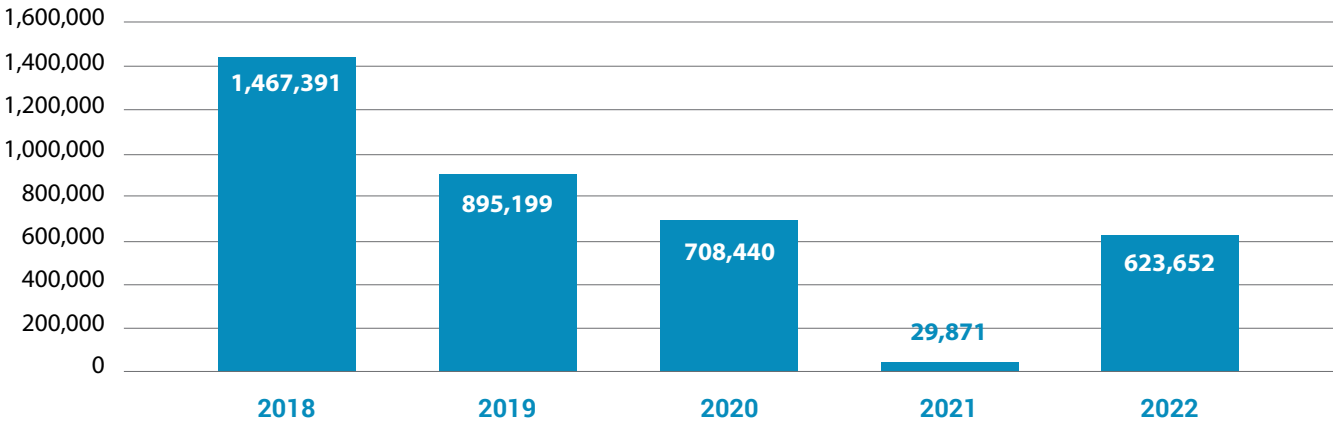
The graph below indicates the number of non-operated schedules due to ATC industrial actions.

### NUMBER OF NON-OPERATED SCHEDULES



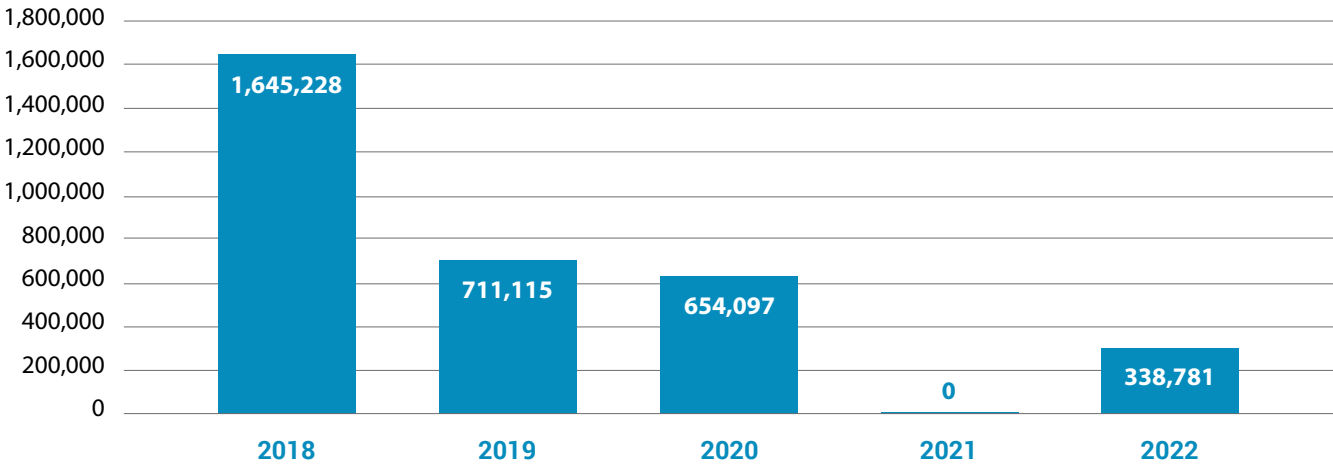
The graph below indicates the amount of ATFM delay due to ATC industrial actions between 2018-2022, at European ATM network level.

### ATFM DELAY DUE TO ATC INDUSTRIAL ACTIONS (minutes)



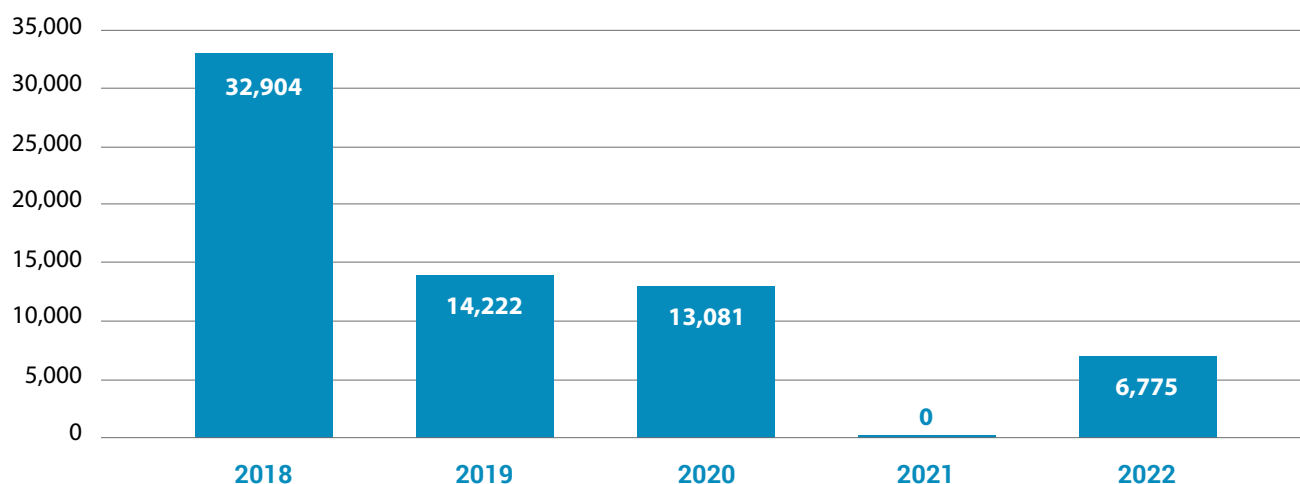
The graph below indicates the amount of extra mileage flown due to ATC industrial actions between 2018-2022.

### EXTRA MILEAGE FLOWN DUE TO ATC INDUSTRIAL ACTIONS (Nautical Miles)



The graph below indicates the amount of extra CO<sub>2</sub> emissions due to ATC industrial actions between 2018-2022.

### EXTRA CO<sub>2</sub> EMISSIONS DUE TO ATC INDUSTRIAL ACTIONS (Tons CO<sub>2</sub>)



The proportion of ATC strikes varies considerably over the past five years for the following reasons:

- In 2018, 2019 and 2022, the European ATM network experienced very high air traffic and capacity delivery problems in many States/ANSPs. At the same time, the impact of ATC strikes generated substantial additional costs for airspace users.
- In 2023, the impact of the industrial actions in France continued and until mid 2023 it represented approximately half of the European ATFM delay. See also the paper published by EUROCONTROL on 18 April 2023.<sup>6</sup>
- At the beginning of 2020, a number of ATC industrial actions in France generated very high delay. Due to the COVID crisis, as from March 2020, air traffic decreased significantly and, as a result, there were no capacity problems anymore and almost no ATFM delays. Consequently, the delay caused at the beginning of the year by the industrial actions represented a very high cost for the airspace users.
- In 2021 there were very few industrial actions and their impact on the ATM network capacity was very low, taking also into consideration the low levels of traffic due to the COVID crisis;

Between 2018-2022, the main industrial actions were recorded in France, and to a lesser degree in Greece and Italy. In 2019 there was also an ATC strike in Belgium but with very low impact. Due to the nature of the strikes in each country, these are being assessed separately.

<sup>6</sup> <https://www.eurocontrol.int/publication/impact-strikes-european-aviation>





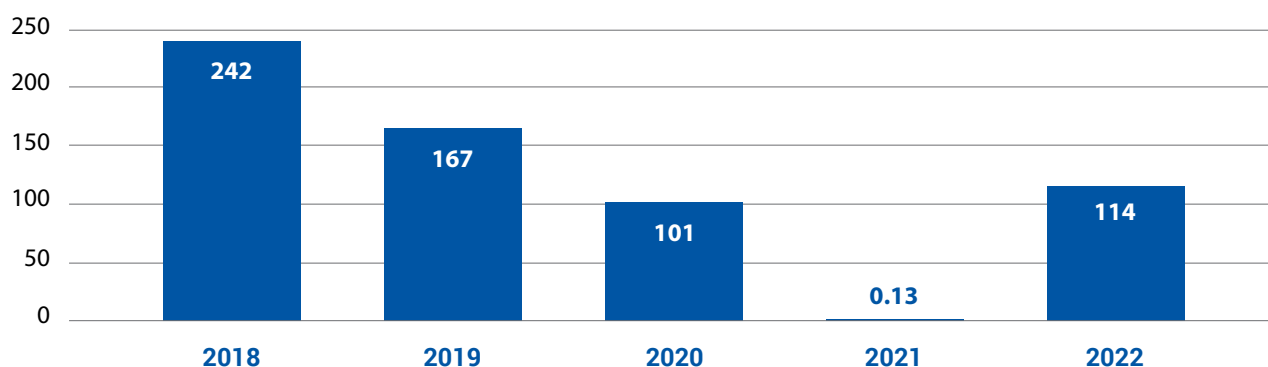
# FRANCE

The overall impacts of the ATC strikes in France, including the impact on adjacent areas, are set out in the tables below. 99% of the non-operated schedules concerned short and medium haul flights. The flights not operated are calculated as the difference of the number of flights on the industrial action day against a reference day, which is the same day of the week, either the week before or the week after. It is not always possible to establish with certainty the reasons for the non-operated schedules. It can't be excluded that they might relate to a certain extent to other causes than the ATC industrial actions.

The graph below indicates the costs of the strikes in France for the airspace users for the period 2018-2022. It is based on the following parameters:

- Cost of delay (100 Euro/minute)
- Cost of flight cancellation (18,570 Euro/flight cancelled)
- Cost per additional mileage flown (5 Euro/Nautical Mile flown)

## COST IMPACT OF STRIKES IN FRANCE (million Euro)

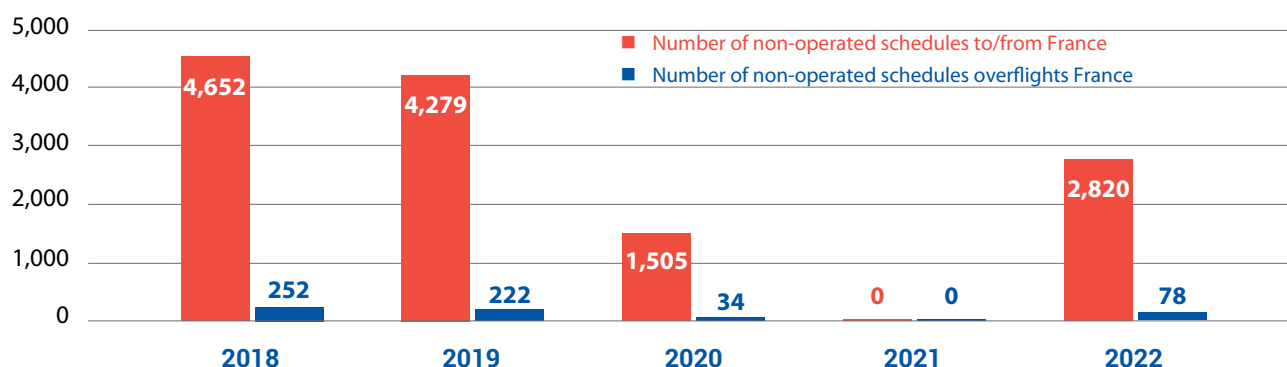


It can be observed that the cost of the French ATC strikes for the airspace users over the period 2018-2022 amounted a total of 624 M€.

off-load the constrained sectors in France, i.e to avoid the French airspace. In some cases the airspace users accept a higher delay and operate through the French airspace. Additionally, the French authorities provide advice to the airlines on the percentage of flights that might need to be cancelled to/from a selected list of French airports. This advice is followed to a very large extent by the airlines.

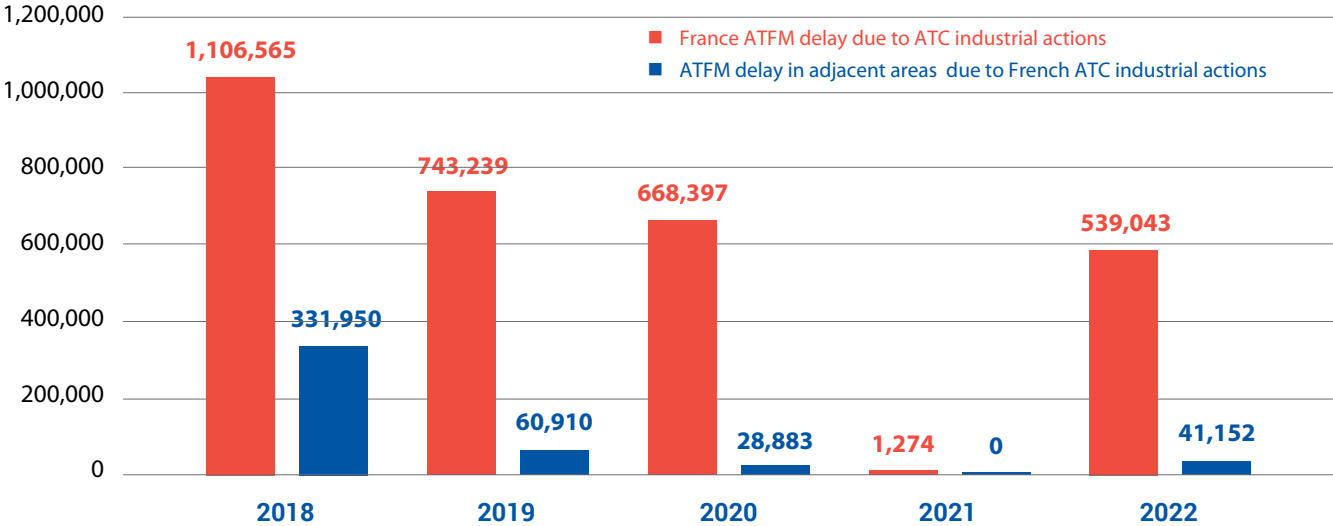
The graph below indicates the number of non-operated schedules due to ATC industrial actions in France between 2018-2022, split between flights to/from France and overflights. The overflights appear to be less impacted since network measures offer solutions to

## NON-OPERATED SCHEDULES DUE TO FRENCH STRIKES



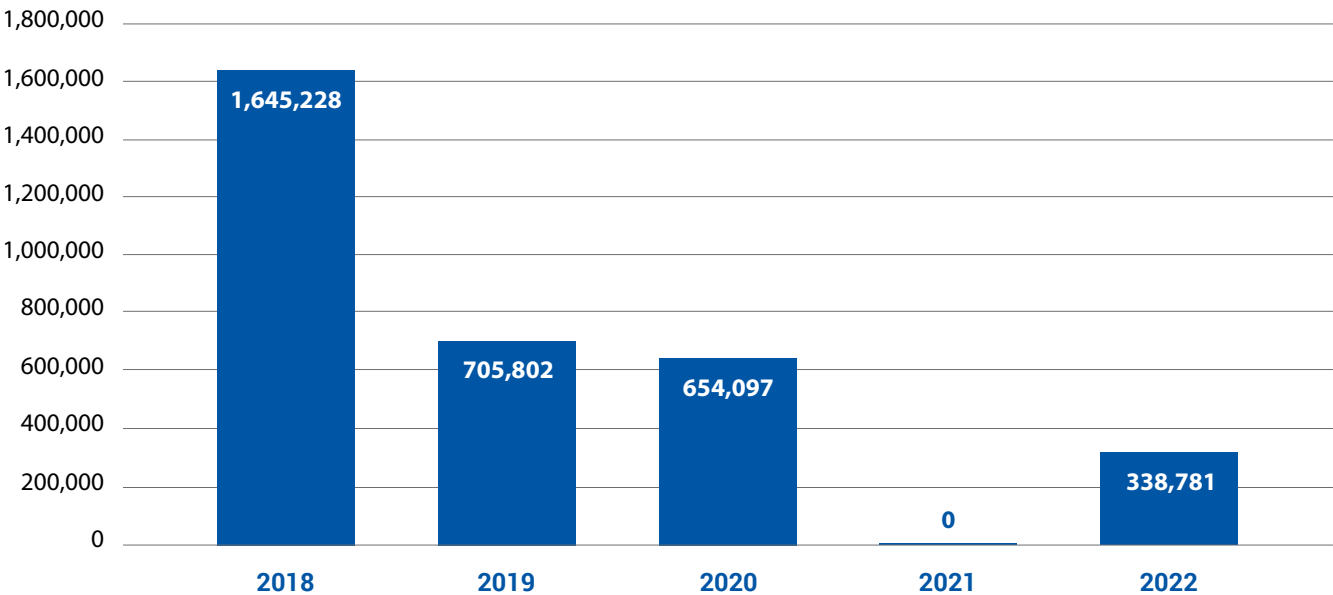
The graph below indicates the amount of ATFM delay due to ATC industrial actions between 2018-2022, in France, including the impact on adjacent areas.

**EN-ROUTE ATFM DELAY - FRENCH INDUSTRIAL ACTIONS (minutes)**



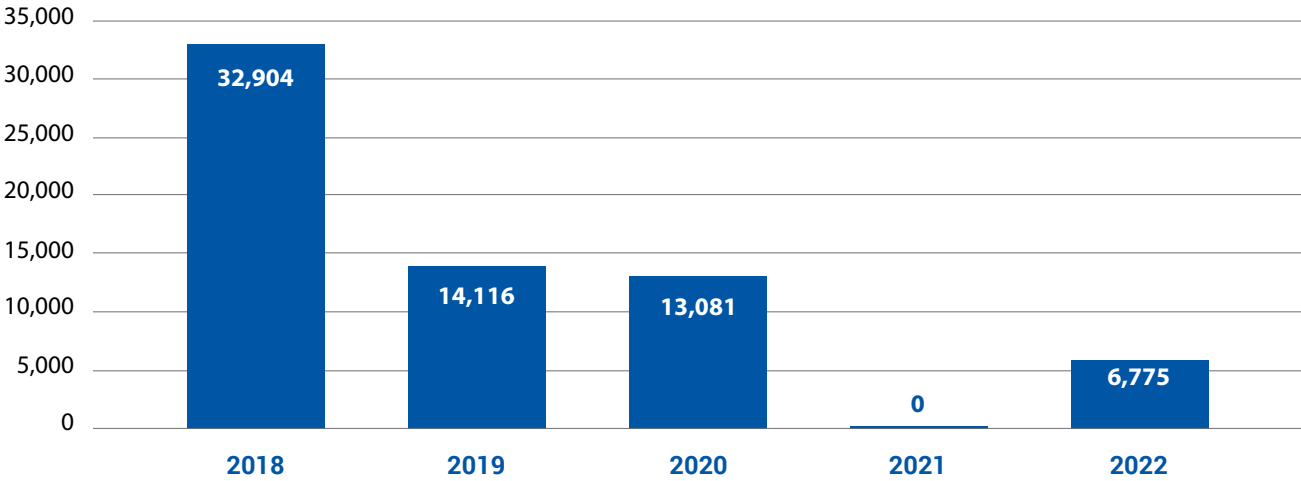
The graph below indicates the amount of extra mileage flown due to ATC industrial actions in France between 2018-2022.

**EXTRA MILEAGE FLOWN DUE TO ATC INDUSTRIAL ACTIONS IN FRANCE (Nautical Miles)**



The graph below indicates the amount of extra CO<sub>2</sub> emissions due to ATC industrial actions in France between 2018-2022.

**EXTRA CO<sub>2</sub> EMISSIONS DUE TO ATC INDUSTRIAL ACTIONS IN FRANCE (Tons CO<sub>2</sub>)**



In case of ATC industrial action, each Area Control Centre in France reacts differently to a call for strike. This is mainly related to the fact that in France air traffic controllers are affiliated to different unions. The level of representation of those unions in the ACCs is different and each union has a different approach for responding to a call for strike. As a result, the outcome and the impact of a strike might vary considerably in the French ACCs.

through French airspace. This has a very significant impact on the overall network operations as it generates unexpected overloads on a high number of ANSPs in the network, leading to very high delays and severe impact in terms of lack of predictability for airline operations. In addition to the very high ATFM delay, there is also significant environmental impact. The EUROCONTROL Network Manager implements a complex and workload intensive mitigation plan fully coordinated with DSNA, adjacent ANSPs, Airports, Military authorities, AOs, EUROCONTROL, adjacent States and FAA/NAV Canada.

ATC strikes in France vary considerably in terms of duration, follow up at each ACC level, application of the minimum service, etc. Airspace users are requested, but not obliged to reduce the number of flights to/from some French airports to a proportion that is defined for each strike. In general, between 20-30% of the flights having origin/destination French airports might be cancelled, but these cancellations are not mandatorily requested by the French authorities, they are just recommended. Some flights are guaranteed, especially those providing for territorial continuity. As a result, the strike impact is very high for all flights operating



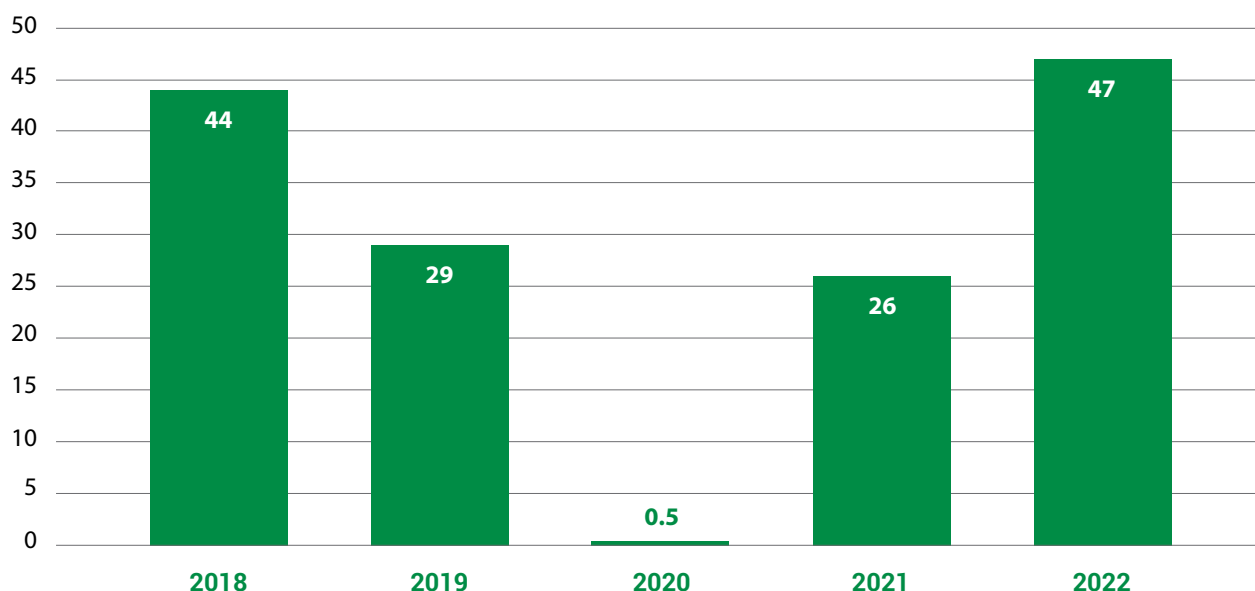
# ITALY

The overall impacts of the ATC strikes in Italy, including the impact on adjacent areas are set out in the tables below. 100% of the non-operated schedules concerned short and medium haul flights. The flights not operated are calculated as the difference of the number of flights on the industrial action day against a reference day, which is the same day of the week, either the week before or the week after. The reasons for the non-operated schedules are not entirely known and they might relate to a certain extent to other causes than the ATC industrial actions.

The graph below indicates the costs of the strikes in Italy for the airspace users for the period 2018-2022. It is based on the following parameters:

- Cost of delay (100 Euro/minute)
- Cost of flight cancellations (18,570 Euro/flight cancelled)
- Cost per additional mileage flown (5 Euro/Nautical Mile flown)

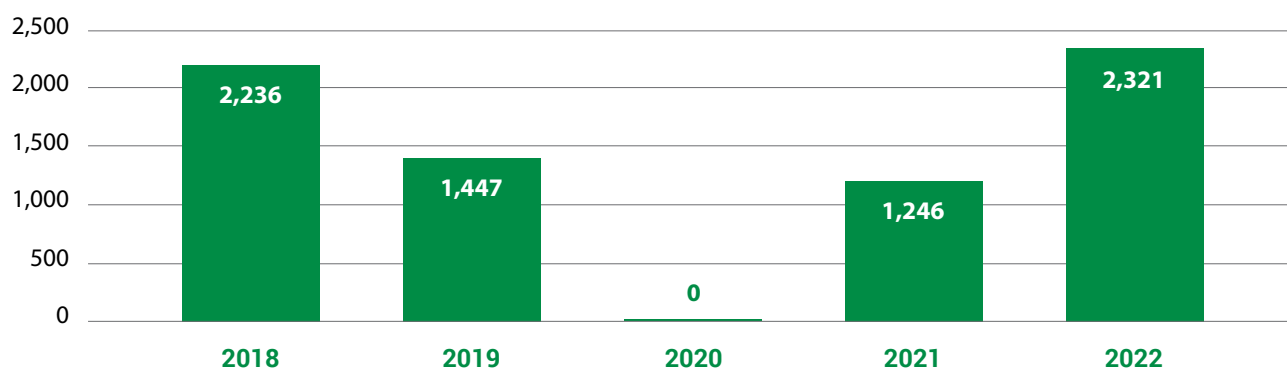
## COST IMPACT OF STRIKES IN ITALY (million Euro)



It can be observed that the cost of the Italian ATC strikes for the airspace users over the period 2018-2022 amounted a total of 147 M€.

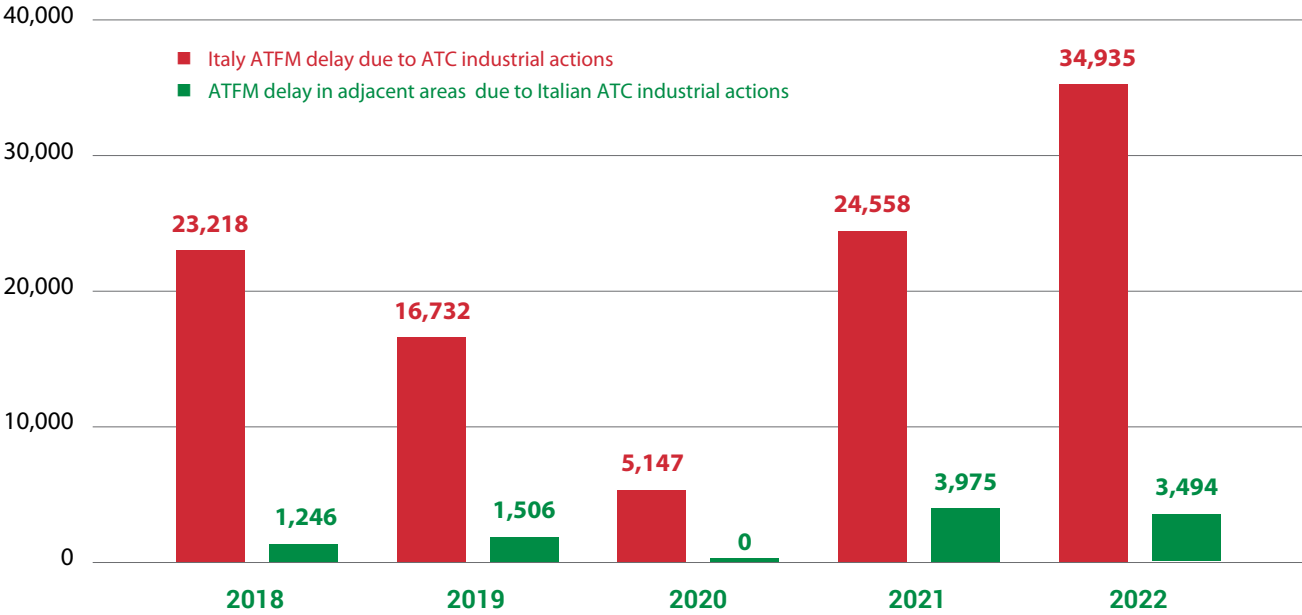
The graph below indicates the number of non-operated schedules due to ATC industrial actions in Italy between 2018-2022. The numbers indicated concern only flights to/from Italy as the Italian strikes do not impact overflights.

## NUMBER OF NON-OPERATED SCHEDULES TO/FROM ITALY



The graph below indicates the amount of ATFM delay due to ATC industrial actions between 2018-2022, in Italy, including the impact on adjacent areas.

**ATFM DELAY DUE TO ITALIAN INDUSTRIAL ACTIONS (minutes)**



An ATC strike in Italy usually lasts 4 hours and no restrictions are imposed on overflights, intercontinental arrivals, ATFM exempted flights. Additional flights are authorised (e.g. flights to/from islands, 1 domestic city pair connection per Airline, a number of intercontinental departures and other categories). All the other flights to/from Italy are not authorised to operate. As a result, the strike impact is high on short/medium haul and domestic flights for the period of the strike. It has low impact on network operations, normally generates very low ATFM delay and has no additional environmental impacts.

No additional distance flown was recorded for Italy as the Italian strikes do not impact overflights.



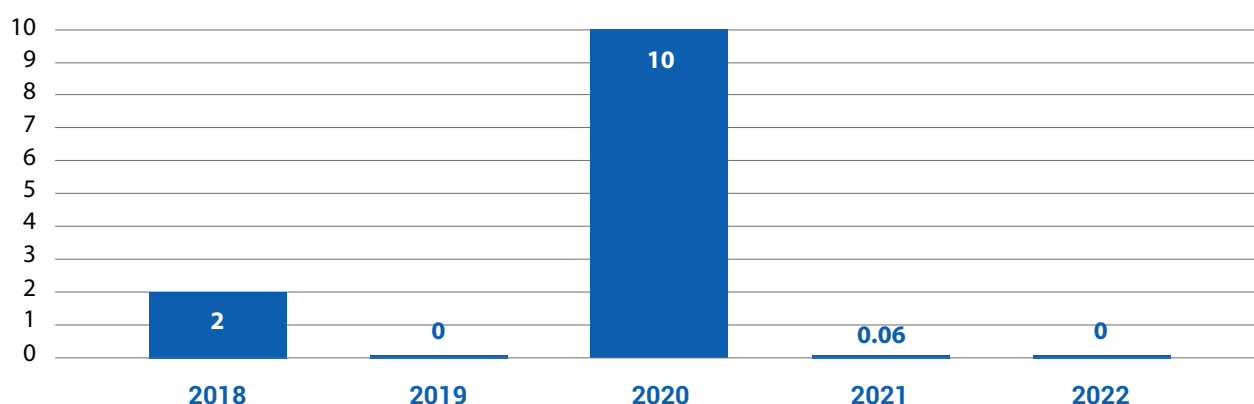
# GREECE

The overall impacts of the ATC strikes in Greece, including the impact on adjacent areas are set out in the tables below. 100% of the non-operated schedules concerned short and medium haul flights. The flights not operated are calculated as the difference of the number of flights on the industrial action day against a reference day, which is the same day of the week, either the week before or the week after. The reasons for the non-operated schedules are not entirely known and they might relate to a certain extent to other causes than the ATC industrial actions.

The graph below indicates the costs of the strikes in Greece for the airspace users for the period 2018-2022. It is based on the following parameters:

- Cost of delay (100 Euro/minute)
- Cost of flight cancellations (18,570 Euro/flight cancelled)
- Cost per additional mileage flown (5 Euro/Nautical Mile flown)

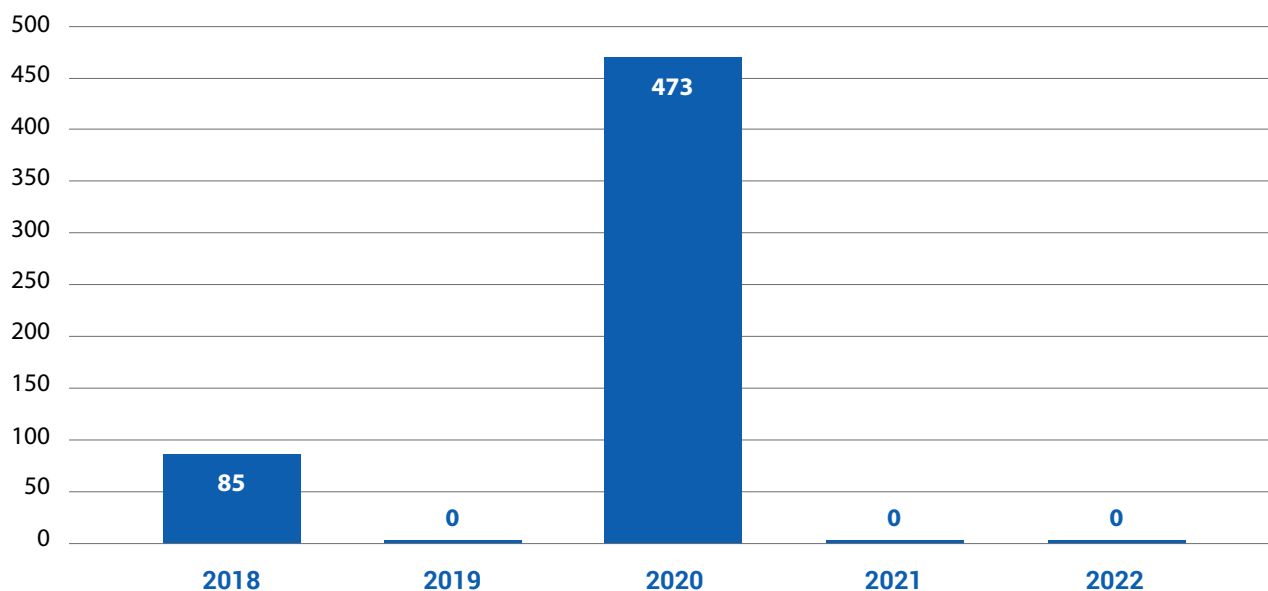
## COST IMPACT OF STRIKES IN GREECE (million Euro)



It can be observed that the cost of the Greek ATC strikes for the airspace users over the period 2018-2022 amounted a total of 12 M€.

The graph below indicates the number of non-operated schedules due to ATC industrial actions in Greece between 2018-2022. The numbers indicated concern only flights to/from Greece as the Greek strikes do not impact overflights.

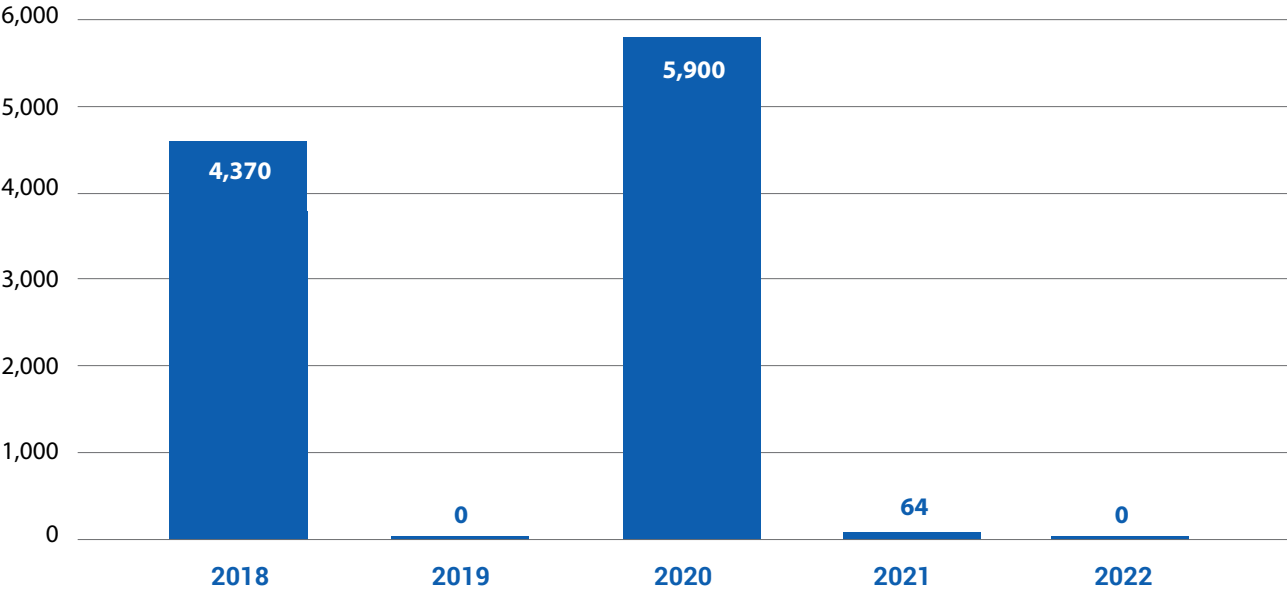
## NUMBER OF NON-OPERATED SCHEDULES TO/FROM GREECE





The graph below indicates the amount of ATFM delay due to ATC industrial actions between 2018-2022 in Greece including the impact on adjacent areas.

**ATFM DELAY DUE TO GREEK ATC INDUSTRIAL ACTIONS (minutes)**



An ATC strike in Greece usually lasts 4 hours and no restrictions are imposed on overflights. All the other flights to/from Greece or domestic flights are not authorised to operate. As a result, the strike impact is high on short/medium haul and domestic flights for the period of the strike. It has low impact on network operations, normally generates very low ATFM delay and has no additional environmental impacts.

## 4. 2023: AN EXCEPTIONAL SITUATION

Between 1 March and 9 April 2023, there were 34 days with industrial action impacting air transport in Europe, mostly in France but also, to a lesser extent, in Germany. As context, for the whole of 2022, there were 5 days of industrial action in France. The 34 days of strikes in 2023 potentially impacted 237,000 flights (flights to, from or across the countries mentioned above, mainly France). 30% of daily European flights were potentially impacted by industrial action in France. As a result of the application of the industrial action, many flights were delayed or cancelled. Compared to a normal day, there were 2.5 times more cancelled flights in France.

Strikes in France also had a severe impact on traffic in other countries, in particular its neighbours. Spain had 394 daily departing flights delayed as a direct result of the strikes, followed by the UK (209) and Italy (152). However, in terms of share of departing flights affected by the strike, Belgium was the most impacted with 20%, followed by Portugal (16%), Spain (15%) and Morocco (15%). Most of these affected flights were not flying to France but were overflying France en-route to another

country. For Spain this was 88% of its affected flights (345 out of 394), whereas for the other States between 66% and 77% of their impacted flights were overflights rather than flights to France. The average ATFM delay per delayed flight for those flights departing from the impacted States was between 19 and 27 minutes with an average of 23 minutes.

In addition to the impact on passengers, the strikes in France had also a large environmental footprint. It is estimated that, between 7 March and 9 April 2023, additional 48,000 NM were flown each strike day, with an average additional 386 tons of fuel burnt and more than 1,200 tons of CO<sub>2</sub> emissions.

The cost to aircraft operators of cancellations between 7 March and 9 April 2023 was 8M€ per day on average. The costs of delays were an additional 6M€ per day on average.

## 5. POSSIBLE SCENARIOS FOR MITIGATION MEASURES AND ANALYSIS

This section describes the scenarios of mitigation measures, which will be analysed in this study.

### The scenarios simulated are:

- **Scenario 1A**  
Minimum strike notice period 5 days – limited certainty of capacity of concerned airspace
- **Scenario 1B**  
Minimum strike notice period 5 days – full certainty of capacity of concerned airspace
- **Scenario 1C**  
Minimum strike notice period 15 days – limited certainty of capacity of concerned airspace
- **Scenario 1D**  
Minimum strike notice period 15 days – full certainty of capacity of concerned airspace
- **Scenario 2A**  
Provide continuity of service to overflights – limited routes to be kept open
- **Scenario 2B**  
Provide continuity of service to overflights – temporary capacity increase in neighbouring ANSPs
- **Scenario 2C**  
Provide continuity of service to all overflights
- **Scenario 3**  
Use of military ATCOs as complement to civil ATCOs

# SCENARIO 1A

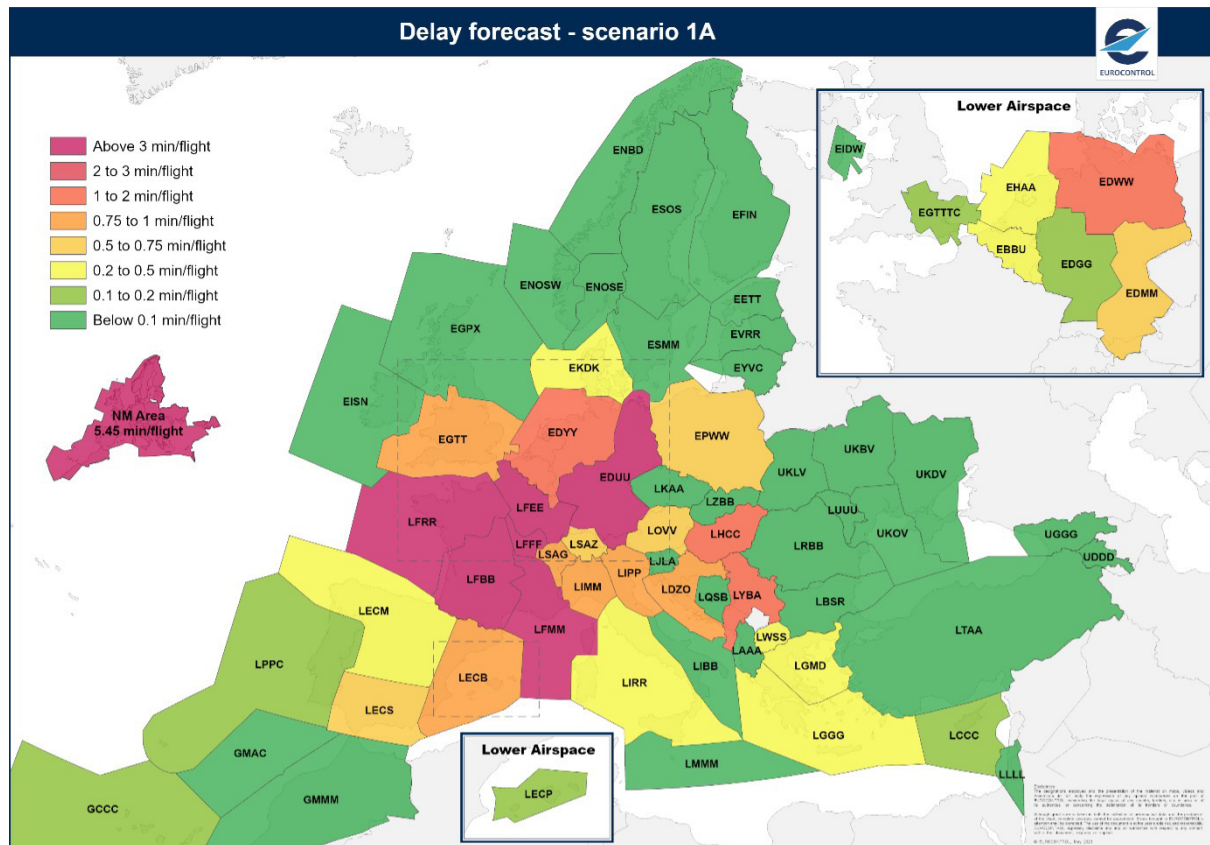
## MINIMUM STRIKE NOTICE PERIOD 5 DAYS – LIMITED CERTAINTY OF CAPACITY OF CONCERNED AIRSPACE

The study assesses the impact on the European ATM network for all scenarios. They take into account the actual traffic and capacity situation as documented in the NOP 2023-2027 by the EUROCONTROL Network Manager. For simulation purposes, the French airspace has been used and the scenarios described above have been applied. This choice has been made in order to include in the simulation scenarios situations that have been experienced at network level.

This study provides qualitative evaluations and quantitative evaluations from an operational point of view with focus on delay, and environmental impact and possible flight cancellations impact. The evaluations have been made for an average 2023 traffic sample. The simulations take into account the current network capacity situation and the limited options available to re-route traffic outside the airspace subject to an ATC strike. In this scenario, we assume that the common minimum strike notice period is 5 days and that we have limited knowledge of the actual number of ATCOs working and therefore of capacity of the airspace.

Such a scenario, with a relatively short notice period of 5 day, limits the possibility of fully negotiating mitigation actions at network level, and clear assumptions cannot be made on the capacity to be delivered, which reduces the predictability of the traffic in the network and has a significant impact on a large number of ANSPs in the network. For simulation purposes, the assumption made for this scenario is that a minimum service of 50% capacity is granted, based on previous experiences.

The map below indicates the delays expected at network level. Globally, delays are expected to be 3.3 times higher than during a normal average day in the network. In addition, re-routings are expected to generate approximately 140,000 NM flown extra representing an environmental impact of approximately 2,800 tons of CO<sub>2</sub>. A large number of ANSPs would be overloaded with significant additional delay being generated as a result of the strike. In addition to the above, approximately 2,000 flights might not be able to operate due to very high delays.



# SCENARIO 1B

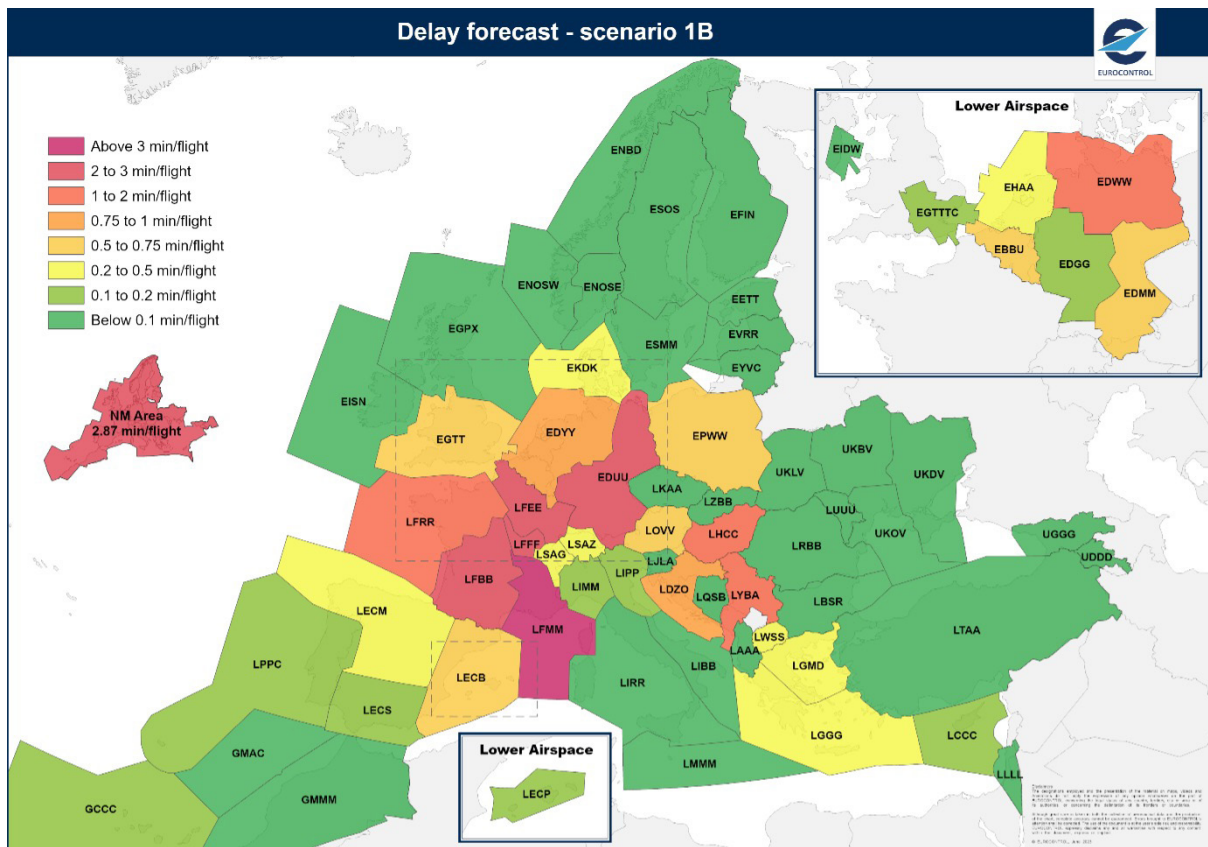
## MINIMUM STRIKE NOTICE PERIOD 5 DAYS – FULL CERTAINTY OF CAPACITY OF CONCERNED AIRSPACE

In this scenario, we assume that the common strike notice period is 5 days and that we have full knowledge of the actual number of ATCOs working and therefore of capacity of the airspace.

Such a scenario, with a relatively short notice period of 5 day, limits to a certain extent the possibility of fully negotiating network measures. However, the scenario is based on the assumption that a larger number of ATCOs will be available (assumption that a minimum 70% capacity is granted; this is an average level of capacity, based on situations experienced with previous ATC strikes), which will enable keeping some volatility in the network under control and limits the impact on a large number of ANSPs in the network.

The map below indicates the delays expected at network level. Globally, delays are expected to be 77% higher than during a normal average day in the network.

In addition, re-routings are expected to generate approximately 80,000 NM flown extra representing an additional environmental impact of approximately 1,600 tons of CO<sub>2</sub>. The overload of adjacent ANSPs would be limited with some additional delay being generated as a result of the strike. In addition to the above, the level of unaccommodated flights would be between 300-500 flights, most of them flights operating to/from France and domestic French flights. The level of unaccommodated flights represents those flights that would encounter heavy delays not being able to operate on the same day. The number of the flights unaccommodated is normally handled through recommendations made to the airlines by the French authorities to cancel 20-30% of the flights to/from some French airports. There is no need to cancel overflying traffic.



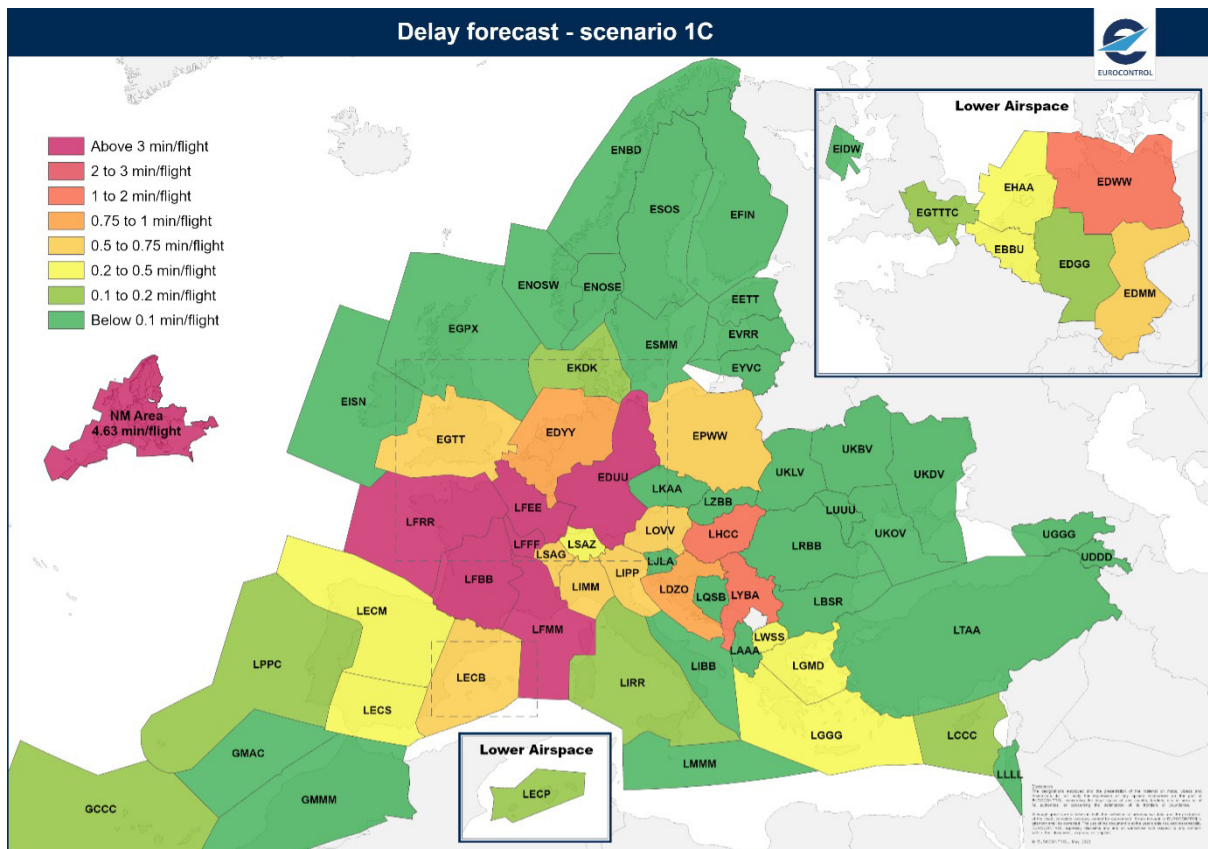
# SCENARIO 1C

## MINIMUM STRIKE NOTICE PERIOD 15 DAYS – LIMITED CERTAINTY OF CAPACITY OF CONCERNED AIRSPACE

In this scenario, we assume that the common minimum strike notice period is 15 days and that we have limited knowledge of the actual number of ATCOs working and therefore of capacity of the airspace.

Such a scenario creates uncertainty on the expected capacity, increases volatility in the network and has a significant impact on a large number of ANSPs in the network. On the other hand, it allows for more time - 15 days - to develop additional network measures and negotiating possible adaptations of the services delivery. The operational impact simulation is addressing a combination of the positive and negative aspects indicated above making the assumption that the presence in some centres is higher and that the minimum service is not applied. For simulation purposes, the assumption made for this scenario is that a minimum service of 50% capacity is granted, based on previous experiences.

The map below indicates the delays expected at network level. Globally, delays are expected to be 2.8 times higher than during a normal average day in the network. In addition, re-routings are expected to generate approximately 120,000 NM flown extra representing an environmental impact of approximately 2,400 tons of CO<sub>2</sub>. A large number of ANSPs would be overloaded with significant additional delay being generated as a result of the strike. In addition to the above, approximately 1,500 flights might not be able to operate due to very high delays.





# SCENARIO 1D

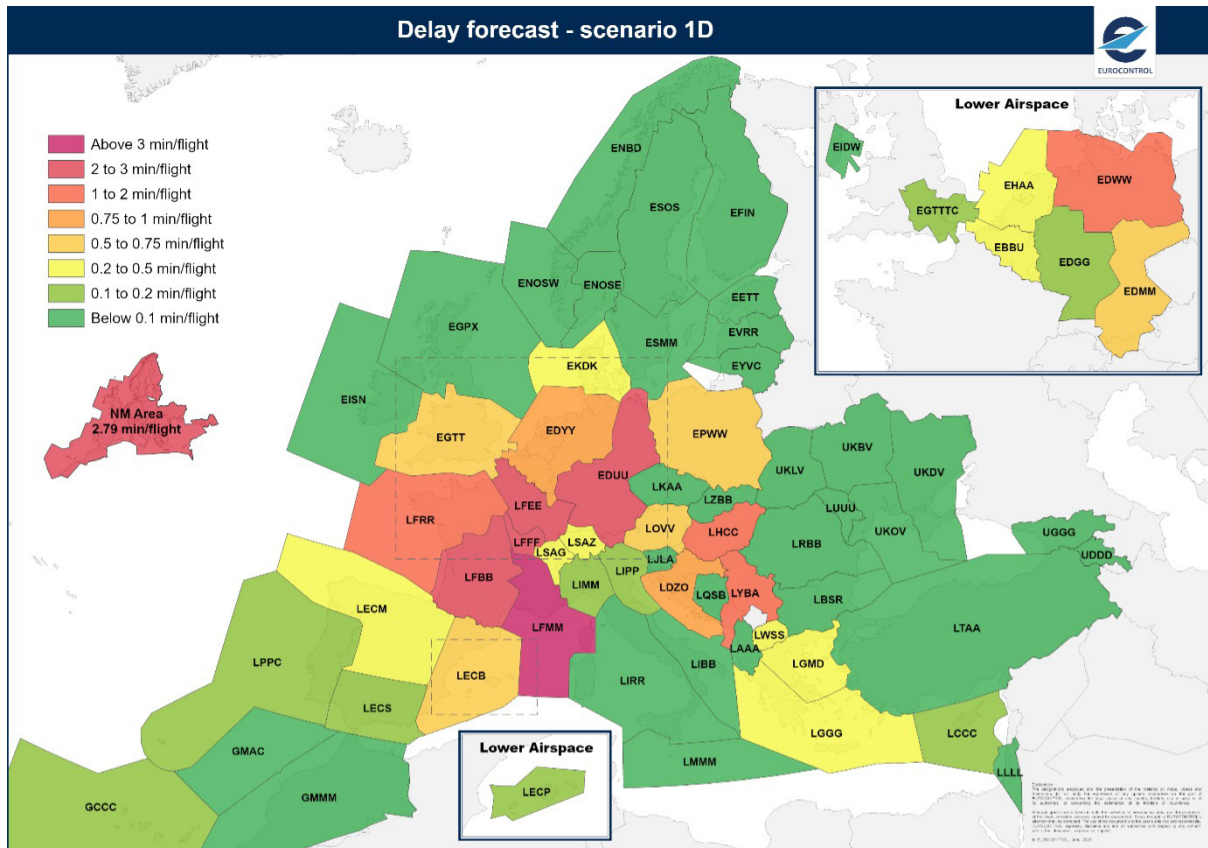
## MINIMUM STRIKE NOTICE PERIOD 15 DAYS – FULL CERTAINTY OF CAPACITY OF CONCERNED AIRSPACE

In this scenario, we assume that the common minimum strike notice period is 15 days and that we have full knowledge of the actual number of ATCOs working and therefore of capacity of the airspace.

Such a scenario, gives the possibility to have sufficient time to negotiate network measures, it is assessed on the assumption that a large number of ATCOs will be available (assumption that a minimum 70% capacity is granted; this is an average level of capacity, based on situations experienced with previous ATC strikes), keeps volatility in the network under control and limits the impact on a large number of ANSPs in the network.

The map below indicates the delays expected at network level. Globally, delays are expected to be 72% higher than during a normal average day in the network.

In addition, re-routings are expected to generate approximately 80,000 NM flown extra representing an additional environmental impact of approximately 1,600 tons of CO<sub>2</sub>. The overload of adjacent ANSPs would be limited with some additional delay being generated as a result of the strike but with lower levels of volatility. In addition to the above, the level of unaccommodated flights would be around 300 flights, most of them flights operating to/from France and domestic French flights. The level of unaccommodated flights represents those flights that would encounter heavy delays not being able to operate on the same day. The number of the flights unaccommodated is normally handled through recommendations made to the airlines by the French authorities to cancel 20-30% of the flights to/from some French airports. There is no need to cancel overflying traffic.





# SCENARIO 2A

## PROVIDE CONTINUITY OF SERVICE TO OVERFLIGHTS – LIMITED ROUTES TO BE KEPT OPEN

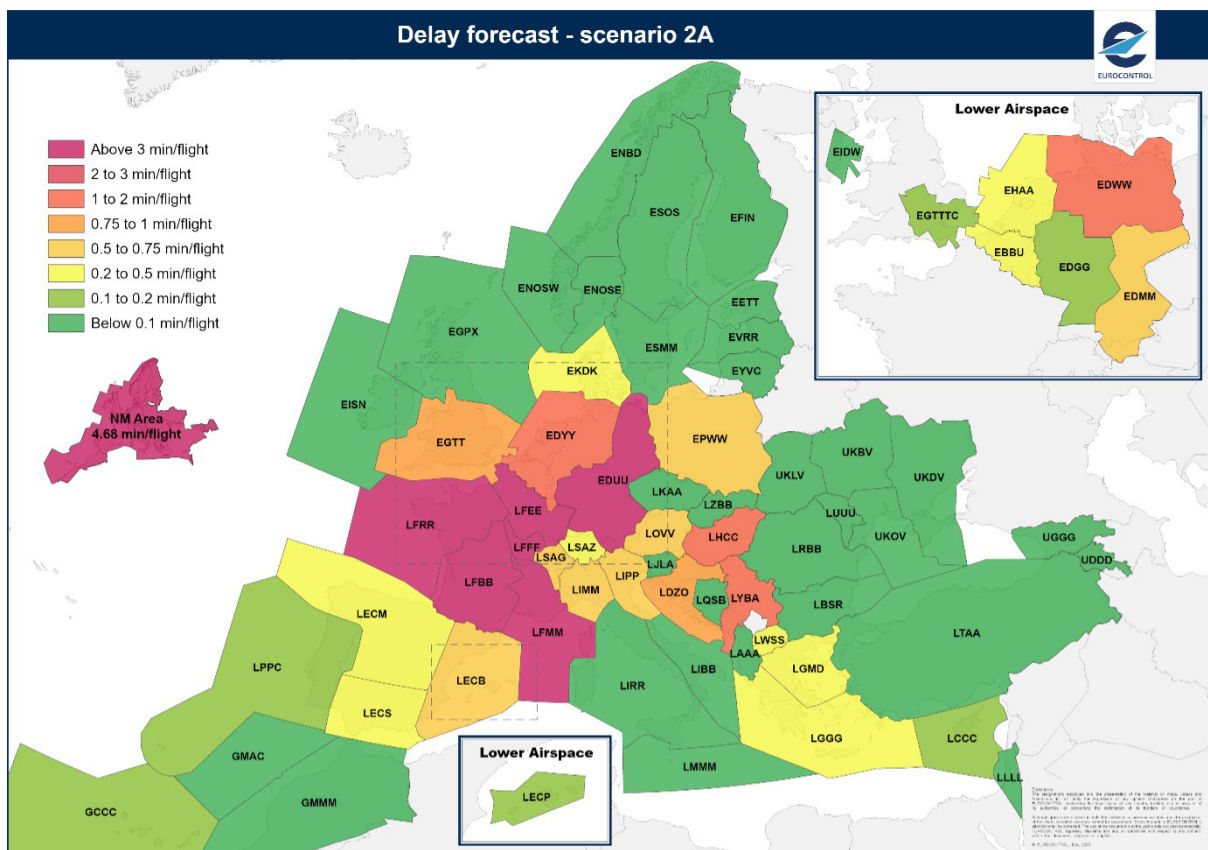
In this scenario, we assume that ANSPs provide continuity of service to overflights, but limited to certain routes that are kept open and keeping in mind that a certain amount of ATCOs will have to manage flights to/from France. The routes in question could be routes between main hubs.

For simulation purposes, the assumption made for this scenario is that a minimum service of 50% capacity is granted, based on previous experiences.

Under such circumstances, the number of flights that would be able to cross the French airspace is assumed to be almost equal with the number of overflights. Another assumption would be that not all flights to/from France or domestic French flights would be cancelled and that approximately 50% of them would be allowed to operate.

The map below indicates the delays expected at network level. Globally, delays are expected to be 2.8 times higher than during a normal average day

in the network. In addition, re-routings are expected to generate approximately 90,000 NM flown extra representing an environmental impact of approximately 1,800 tons of CO<sub>2</sub>. A large number of ANSPs would be overloaded with significant additional delay being generated as a result of the strike. In addition to the 50% strategic flight cancellations to/from France, the level of unaccommodated flights still remains very high, to approximately another 1,000 flights. As a result, only 25% of the flights operating to/from France and domestic French flights would be able to operate. The level of unaccommodated flights represents those flights that would encounter heavy delays not being able to operate on the same day. The number of the flights unaccommodated is normally handled through recommendations made to the airlines by the French authorities to cancel 20-30% of the flights to/from some French airports. There is no need to cancel overflying traffic.



# SCENARIO 2B

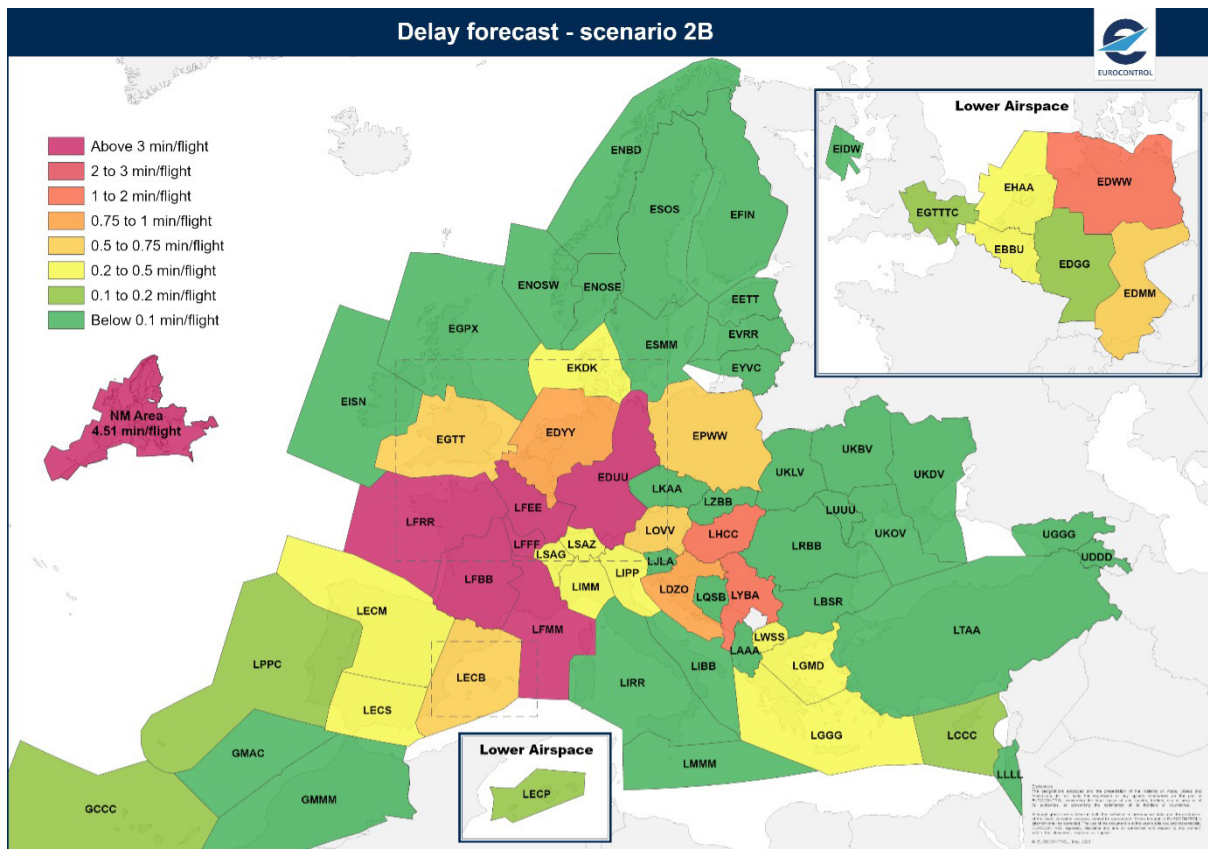
## PROVIDE CONTINUITY OF SERVICE TO OVERFLIGHTS – TEMPORARY CAPACITY INCREASE IN NEIGHBOURING ANSPs

In this scenario, we assume that ANSPs provide continuity of service to overflights by rerouting some flights around the area of the strike to neighbouring ANSPs, who will manage these flights, but limited to the extra capacity that can be established by these neighbouring ANSPs.

For simulation purposes, the assumption made for this scenario is that a minimum service of 50% capacity is granted, based on previous experiences. Under such circumstances, the number of flights that would be able to operate through the French airspace is almost equal with the number of overflights. Another assumption made is that capacity in neighbouring areas could increase by 5% allowing a higher number of flights to be re-routed.

The map below indicates the delays expected at network level. Globally, delays are expected to be 2.7 times higher than during a normal average day in the network. In addition, re-routings are expected to generate

approximately 110,000 NM flown extra representing an environmental impact of approximately 2,200 tons of CO<sub>2</sub>. A large number of ANSPs would be overloaded with significant additional delay being generated as a result of the strike. In addition to the above, the level of unaccommodated flights still remains very high, to approximately 800 flights that represents, in average, 20% of the flights operating to/from France and domestic French flights. The level of unaccommodated flights represents those flights that would encounter heavy delays not being able to operate on the same day. The number of the flights unaccommodated is normally handled through recommendations made to the airlines by the French authorities to cancel 20-30% of the flights to/from some French airports. There is no need to cancel overflying traffic.



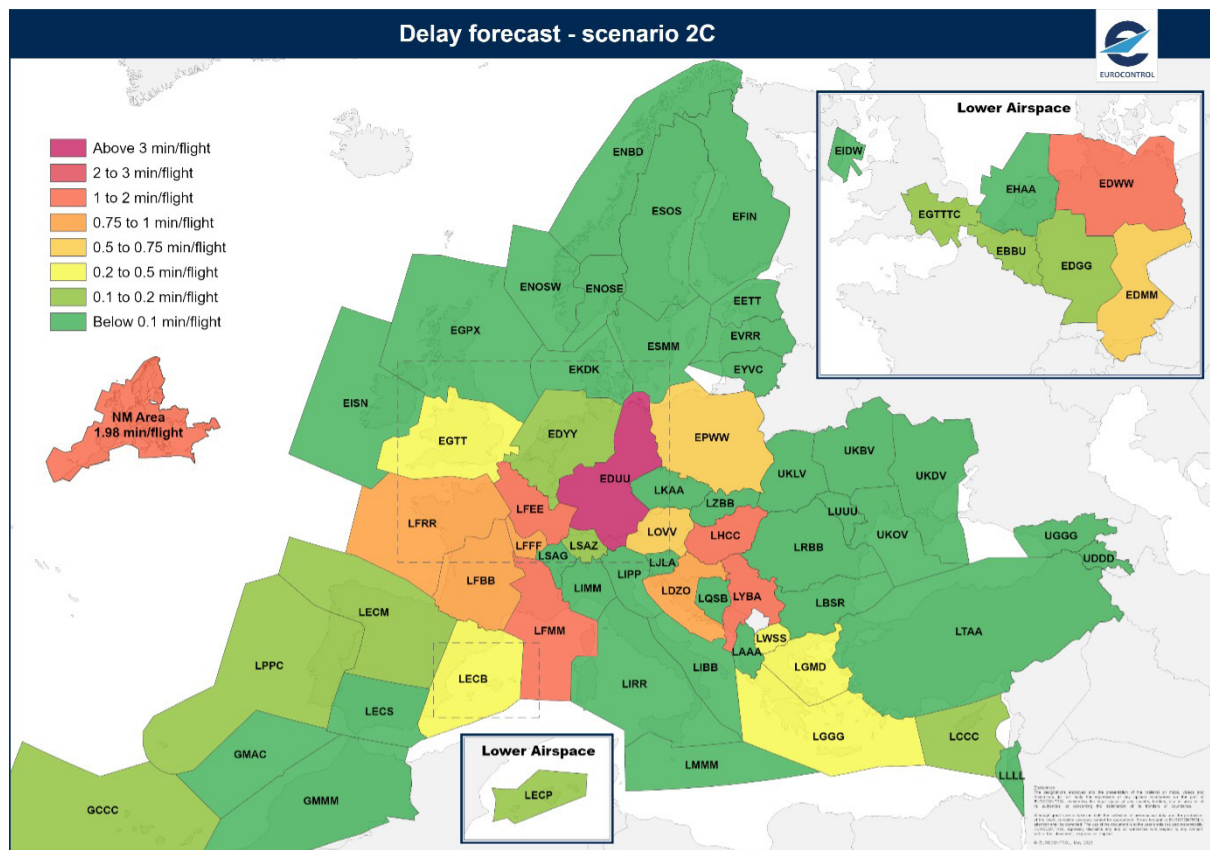
# SCENARIO 2C

## PROVIDE CONTINUITY OF SERVICE TO ALL OVERFLIGHTS

In this scenario, we assume that continuity of service to overflights is provided by the ANSP by dedicating necessary resources to overflights and by reducing other areas of activity correspondingly.

For simulation purposes, the assumption made for this scenario is that a minimum service of 50% capacity is granted, based on previous experiences. Under such circumstances, the number of flights that would be able to operate through French airspace is almost equal to the number of overflights; almost all flights operating to/from France or domestic French flights would have to be cancelled. Under those circumstances, almost all flights operating to/from France or domestic French flights would have to be cancelled.

The map below indicates the delays expected at network level. Globally, delays are expected to be only 22% higher than during a normal average day in the network. In addition, re-routings are expected to be very limited with almost no additional environmental impact. In this case, the number of unaccommodated flights would be almost equal with the flights to/from France or domestic French flights and, as a consequence, all those flights would have to be cancelled for the period of the strike.



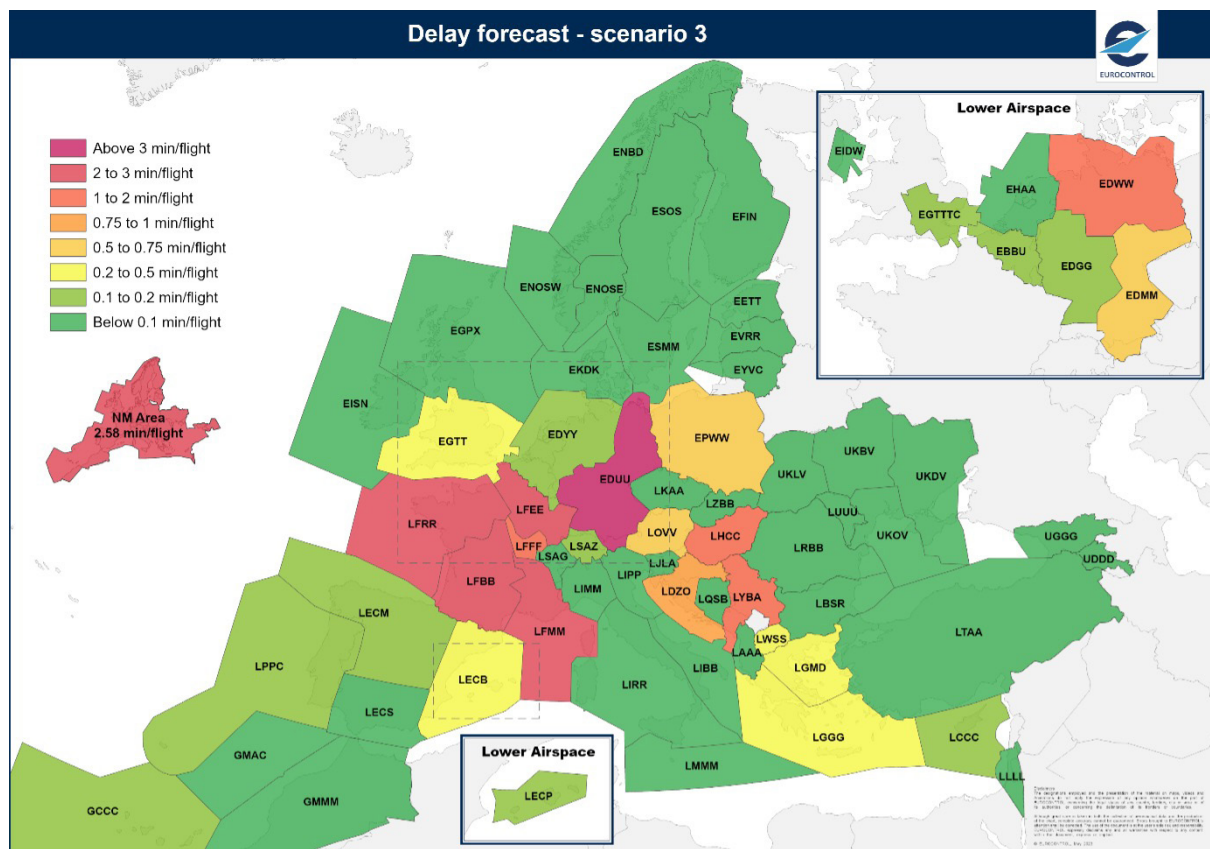
# SCENARIO 3

## USE OF MILITARY ATCOs AS COMPLEMENT TO CIVIL ATCOs

In this scenario, we assume that ANSPs facing strikes and thus having a reduced number of ATCOs, have the possibility to revert to military ATCOs to complement the workforce for civil aviation and in that way to increase the level of service provision.

The assumptions made for this scenario take into account the recently adopted Commission Implementing Regulation<sup>7</sup> providing the possibility for enhanced mobility options of ATCOs and streamlined qualifications for air traffic controllers. For simulation purposes, based on previous experiences, the assumption used is that a minimum service of 50% capacity is granted for the civil ATCOs and that the military ATCOs would represent approximately 25% of the total number of civil ATCOs. As a result, a minimum service of 75% capacity would be applicable. In addition, some re-routings would be applied to the neighbouring ANSPs. Other combinations of civil/military service provision could be also considered as assumptions.

The map below indicates the delays expected at network level. Globally, delays are expected to be 58% higher than during a normal average day in the network. In addition, reroutings are expected to generate approximately 80,000 NM flown extra representing an environmental impact of approximately 1,600 tons of CO<sub>2</sub>. The overloads on the adjacent ANSPs would be limited. The level of unaccommodated flights would remain low and it would be in the order of 300 flights per day. The number of the flights unaccommodated is normally handled through recommendations made to the airlines by the French authorities to cancel 20-30% of the flights to/from some French airports. There is no need to cancel overflying traffic.



<sup>7</sup> Commission Implementing Regulation (EU) 2023/893 of 21 April 2023 amending Regulation (EU) 2015/340 laying down technical requirements and administrative procedures relating to air traffic controllers' licences and certificate



## 6. FEASIBILITY ASSESSMENT AND PROPOSED RANKING OF POSSIBLE SCENARIOS

This section evaluates the feasibility of each of the scenarios and their ranking, primarily from an operational and practical perspective.

The ranking of the scenarios below has been done on the basis of their delay and additional environmental network impact, on the possible consequences for flight cancellations and on their feasibility in the short/medium term to put such measures in place, irrespective of political and legal considerations.

Scenario	Delay increase (% compared to normal)	Route extension impact (NM)	Environmental Impact (tons of CO <sub>2</sub> )	Non-operated schedules impact (flights)	Assessment	Ranking
<b>2C</b> provide continuity of service to all overflights	22%	0	0	Almost all flights to/from France and domestic French flights	This scenario scores best on all variables and has almost no network impact. It follows the approach of Greece and Italy, where this measure already is in place. This would entail limiting the duration of the strike to 4-6 hours, like it is the case in Greece and Italy, requesting the cancellation of flights to/from the concerned state, while allowing inter-continental arrival/departures and other types of flights (e.g. territorial continuity). While this scenario is good from a network perspective, it might have the drawback of cancelling for a limited period of time flights to/from France	1
<b>1D</b> common minimum strike notice period 15 days – full certainty of capacity of concerned airspace	72%	80,000	1,600	300	This scenario would provide the necessary time and certainty to plan, and to implement mitigating measures, in case of a strike. Depending on the number of ATCOs confirming their participation to the strike, this scenario can have a very low impact on the assumption that 70% of the capacity is available. A longer preparation time also reduces network volatility. It also reduces the need to massively cancel flights to/from France.	2
<b>1B</b> common minimum strike notice period 5 days – full certainty of capacity of concerned airspace	77%	80,000	1,600	300-500	This scenario provides a relatively short notice period for network planning purposes but certainty on the number of ATCOs being operational during a strike. Depending on the number of ATCOs confirming their participation to the strike, this scenario could have a very low impact on the assumption that 70% of the capacity is available	3
<b>2B</b> provide continuity of service to overflights – temporary capacity increase in neighbouring ANSPs	370%	110,000	2,200	800	This scenario would be partially feasible considering that increasing capacity at short notice in neighbouring ANSPs might not be always possible. Nevertheless, the operational impact still remains high. It would however depend on the willingness of ANSPs to cooperate and to apply such an approach everywhere in the network.	4

Scenario	Delay increase (% compared to normal)	Route extension impact (NM)	Environmental Impact (tons of CO <sub>2</sub> )	Non-operated schedules impact (flights)	Assessment	Ranking
<b>1C</b> common minimum strike notice period 15 days – limited certainty of capacity of concerned airspace	380%	120,000	2,400	1,500	This scenario would provide the necessary time to plan for mitigating network measures but it would at the same time give little certainty on the number of ATCOs being operational.	5
<b>2A</b> provide continuity of service to overflights – limited routes to be kept open	380%	90,000	1,800	1,000	This scenario would maintain certain routes open, which may raise issues with the airspace users on the traffic flows to be covered and cause congestion on those routes. In addition, it would not be compatible with Free Route Airspace, already implemented in most States. As a result, there might be a number of practical issues in its implementation.	6
<b>3</b> use of military ATCOs as complement to civil ATCOs	58%	80,000	1,600	300	This scenario has a limited network impact but it will require a significant number of actions to be taken (feasibility demonstrated by EASA, civil training and licensing of military ATCOs, ensuring that competences are maintained on a permanent basis and that a sufficient number of military ATCOs are available for this task, acceptance by civil ATCOs, etc). It might not be readily available in the short term.	7
<b>1A</b> common minimum strike notice period 5 days – limited certainty of capacity of concerned airspace	430%	140,000	2,800	2,000	This scenario provides a short planning horizon and uncertainty of the available ATCOs, which does not allow for advanced network planning and therefore has a very high operational impact.	8

#### From a network perspective:

- **the most promising scenario** from an operational perspective for the European network would be the Scenario 2C (provide continuity to all overflights, as described in the corresponding parts of Chapter 5) as this scenario would have a negligible network impact. However, it would have as a consequence the cancellation of all flights to/from France and of the domestic French flights.

**Note:** this scenario is modelled on the approaches existing today in a number of European countries (e.g. Italy, Greece, Spain), which may have a different national context and regulatory framework.

- **the second and the third most promising scenarios** are the Scenarios 1D (Minimum strike notice period 15 days – full certainty of capacity of concerned airspace) and 1B (Minimum strike notice period 5 days – full certainty of capacity of concerned airspace),

as described in the corresponding parts of Chapter 5. These scenarios are increasing predictability and leave the necessary time for preparation and coordination. The longer the period of notification and the certainty of the number of controllers, the better for network performance and planning.

- **the fourth most promising scenario** would be the Scenario 2B provide continuity of service to overflights – temporary capacity increase in neighbouring ANSPs, as described in the corresponding parts of Chapter 5. The drawback of this scenario from an operational perspective would be the need and possibility of having additional capacity on a short notice from neighbouring ANSPs. This could be probably negotiated if the strike notice would be of 15 days.

All the other scenarios do not offer significant additional benefits for the network performance compared to the current situation.



# 7. CONCLUSION

As shown by the above statistical data, strikes remain a major issue for the European network causing significant delays, disruptions to airline operations and significant impact on the environment.

As shown by the statistics in this document, France has by far the biggest number of strike days, causing the most delays and environmental impact. The organisation of the strikes results in substantial unpredictability and volatility impacting the whole of the European ATM network as well as airline operations and passengers.

EU Member States have widely differing rules when it comes to regulating air traffic control strikes. The approach currently chosen and applied by Italy, Greece and Spain in case of ATC strikes generates the lowest impact on the network, ensures predictability and provides continuity for all overflights with minimum disruption. The generalisation of such an approach is recommended on a network-wide basis in the case of ATC strikes. This would however require a change in regulatory approach in some Member States.

In summary, all scenarios simulated appear to be feasible from an operational and network perspective, some of them are already implemented today in some States while some of them might not be possible in the shorter or even the longer term.

**In terms of network impact and feasibility, the proposed ranking is as follows:**

- **Scenario 2C**  
Provide continuity of service to all overflights
- **Scenario 1D**  
minimum strike notice period 15 days -  
full certainty of capacity of concerned airspace
- **Scenario 1B**  
minimum strike notice period 5 days -  
full certainty of capacity of concerned airspace
- **Scenario 2B**  
Provide continuity of service to overflights -  
temporary capacity increase in neighbouring ANSPs
- **Scenario 1C**  
minimum strike notice period 15 days -  
limited certainty of capacity of concerned airspace
- **Scenario 2A**  
Provide continuity of service to overflights -  
limited routes to be kept open
- **Scenario 3**  
Use of military ATCOs as complement to civil ATCOs
- **Scenario 1A**  
minimum strike notice period 5 days -  
limited certainty of capacity of concerned airspace

The feasibility of the solutions is described in Section 6.

**STRIKE!**



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