From:	[redacted]
To:	Manston Airport
Subject:	New submission.
Date:	15 June 2021 09:32:23
Attachments:	Aircraft pollution 2020 3.pdf pollution from expansion 21-5-21.pdf pdf on particulants for aircraft 2018.pdf Thanet District Council LAQM Annual Status Report 2017 i Executive Summary.pdf Manston DCO News.pdf OAPS against hub.zip

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To RH Grant Shapps.

I am Ronald Blay I run a group "OAPs agaist a 24/7 freight terminal and am sending our submission in hoping it will be read and taken notice of its content I am talking about the defunct airport Manston that has now been closed seven years and has not been missed, there was some time ago a DCO by RSP to get control and reopen it as a 24/7 freight terminal there were a number of public meetings and the evidence put forward was judged by government officers,

Examining Authority Kelvin MacDonald BSc(Hons) FAcSS FRTPI CIHCM FRSA – Lead Member Martin Broderick BSc MPhil FIEMA – Panel Member Jonathan Hockley BA(Hons) DipTP MRTPI – Panel Member Jonathan Manning BSc(Hons) MA MRTPI – Panel Member Here is the result

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Given all the above evidence, **the ExA concludes that the levels of freight that the Proposed Development could expect to handle are modest and could be catered for at existing airports (Heathrow, Stansted, EMA, and others if the demand existed). The ExA considers that Manston appears to offer no obvious advantages to outweigh the strong competition that such airports offer. The ExA therefore concludes that the Applicant has failed to demonstrate sufficient need for the Proposed Development, additional to (or different from) the need which is met by the provision of existing airports. Since then this result was ignored by the government who decided to pass it. A JR was mounted by crowd funding and RSP backed out and the bid was squashed by the government.**

Once again it is being racked over and more submissions have been called for,

Our town of Ramsgate is a holiday resort and former fishing port it was one of the worst bombed seaside towns in the last war when we feared an invasion, but now we are faced with another fear the threat to our health, quality of life, pollution from the deadly particulates, and the noise that heavy old aircraft flying over day and night will bring. Airport supporters many who do not live in this town call me a scare monger , but there is a huge amount of evidence from qualified medical teams that have done lengthy studies on this world wide health problem that proves my point that a freight terminal on the door step will kill our town and some residents in it. In the times we are in now with all the talk of global warming carbon emissions must be cut down and as a large aircraft burns a gallon of kerosene every second a freight airport that is proven to be not needed and miles from the

nearest city should not be built too add to the carbon b build up we already have. I do hope whoever has the burden of decision will choose the right path to spare us this terrible threat to our health and quality of life . I have added a huge amount of information to back the fight for the residents of this lovely town of Ramsgate *Ronald Blay.*

As the world gets hotter and more crowded, our engines continue to pump out dirty emissions, and half the world has no access to clean fuels or technologies (e.g. stoves, lamps), the very air we breathe is growing dangerously polluted: nine out of ten people now breathe polluted air, which kills 7 million people every year.

The health effects of air pollution are serious – one third of deaths from stroke, lung cancer and heart disease are due to air pollution. This is having an equivalent effect to that of smoking tobacco, and much higher than, say, the effects of eating too much salt.

Air pollution is hard to escape, no matter how rich an area you live in. It is all around us. Microscopic pollutants in the air can slip past our body's defences, penetrating deep into our respiratory and circulatory system, damaging our lungs, heart and brain.

Air pollution is closely linked to climate change - the main driver of climate change is fossil fuel combustion which is also a major contributor to air pollution - and efforts to mitigate one can improve the other. This month, the UN Intergovernmental Panel on Climate Change warned that coal-fired electricity must end by 2050 if we are to limit global warming rises to 1.5C. If not, we may see a major climate crisis in just 20 years.

Meeting the goals of the Paris Agreement to combat climate change could save about a million lives a year worldwide by 2050 through reductions in air pollution alone. The economic benefits from tackling air pollution are significant: in the 15 countries that emit the most greenhouse gas emissions, the health impacts of air pollution are estimated to cost more than 4% of their GDP.

"The true cost of climate change is felt in our hospitals and in our lungs. The health burden of polluting energy sources is now so high, that moving to cleaner and more sustainable choices for energy supply, transport and food systems effectively pays for itself," says Dr Maria Neira, WHO Director of Public Health, Environmental and Social Determinants of Health.

Climate change

Expansion of English airports could threaten climate commitments – report

Impact on climate of expansion plans at regional airports has been underestimated, report finds

Stansted is one of four airports that have overestimated the economic benefit of expansion, ignoring climate damage. Photograph: Andy Rain/EPA

Matthew Taylor

Fri 21 May 2021 00.01 BST

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The climate impact of expansion plans at regional airports in England has been dramatically underestimated and would threaten the UK's legally binding commitments, according to a report published ahead of a key summit later this year.

The study from the New Economics Foundation (NEF) calculated that proposals to expand four airports in England will lead to an increase in emissions up to eight times higher than previously claimed.

The report also found that plans to expand Bristol, Leeds Bradford, Southampton and Stansted airports had overestimated their economic benefit – ignoring up to £13.4bn worth of climate damage the plans could cause.

Alex Chapman, the author of the report, said the findings raised concerns about the level of scrutiny the proposals had received.

"The secretary of state should step in and conduct an independent review of all four of these proposals and their compatibility with the UK's climate targets," he added.

The report found:

- All four airports relied on currently unproven and undeveloped technologies to deliver rapid fuel-efficiency savings over the next few decades.
- Three out of the four – Bristol, Leeds Bradford and Stansted – only took account of the climate impact of outbound flights, not the emissions from those arriving at the airport.
- Bristol, Leeds Bradford and Stansted did not account for the impact of non-CO_2 emissions such as aerosols, water vapour and nitrogen oxides, which can double or even triple the climate impact of airport expansions.
- Leeds Bradford, Southampton and Stansted did not put a monetary value on the climate impacts of expansion and have therefore overestimated the projects' economic benefits in each region.

The expansion plans have already met fierce opposition from local groups, environmentalists and climate scientists over the past 18 months. Last week in a letter to ministers, groups opposing planned expansions said the UK government must suspend all the plans until it sets out how they fit with its legally binding climate targets and the advice of its own experts.

This week teenagers from West Yorkshire hand-delivered a petition with more than 54,000 signatures to the communities secretary, Robert Jenrick, calling for a public inquiry into Leeds Bradford airport expansion plans.

In total there are expansions planned at seven airports in England: Leeds Bradford, Luton, Bristol, Southampton, Heathrow, Stansted and Manston – all of which are at various stages in the process. Campaigners are also expecting Gatwick to imminently submit plans to increase capacity.
According to the NEF report, Leeds Bradford and Bristol's expansion plans would cause six times more emissions than previously thought, Stansted eight times and Southampton 1.5 times.
It says that the four schemes are likely to account for an increase in annual airport-level emissions of up to 3.7m tonnes of CO2 and CO2-equivalent in 2035, the year of the government's new climate target. The equivalent to putting about 1.8m additional cars on Britain's roads.

The airports defended the climate impact of their expansion plans.

Steve Szalay, operations director at Southampton airport, said it was "wholly committed to working with the wider aviation industry to tackle climate change through new technologies and the introduction of new, more sustainable fuel, however we appreciate that there isn't an overnight solution".

"With that in mind we have delivered a worst-case scenario in the environmental impact assessment presented during our recent planning application which would see just a 164-metre extension to our existing runway, this conservative approach doesn't rely on fuels or technologies that are under development and includes all in-bound and outbound flights."

A spokesperson for Leeds Bradford airport (LBA), said its plans were "not about expansion, but about achieving what we already have consent to do in a more sustainable way".

"Development will make LBA an outstanding net zero airport with a much-improved passenger experience, connecting Yorkshire with other parts of the country and the world for business and tourism."

A spokesperson for Bristol airport said it had a "comprehensive package of measures … to minimise the adverse environmental impacts of an additional 2 million passengers".

"Expanded capacity at Bristol airport will offer passengers more routes and flights from the south-west directly, create jobs, facilitate inward investment and inbound tourism, and support greener and more sustainable, regional economic growth."

A spokesperson for Stansted airport said: "Our proposals would mean a small increase in the number of passengers that could use Stansted, but they would not mean an increase in the permitted number of flights. The application to increase the number of passengers using the airport has now gone through a public inquiry with evidence from all parties on all relevant topics, including climate impacts, presented to an independent panel of inspectors. We now await the inspectors' report."

…

Analysis of the particle size distribution near the civil airport runway

Analysis of the particle size distribution near the civil airport runway

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Abstract. Particles emitted from internal combustion engines are extremely dangerous to human health due to their very small size. Attempts to reduce particles emissions from motor vehicles, result in the installation of additional filters to purify the exhaust gases. In the case of aircraft, any interference in the exhaust system of the jet engine is unacceptable. For this reason, aircraft are an important source of particles emission in the regional aspect, so that airports can be considered as particles emission sources. The article evaluates the impact of aircraft take-off and landing operations on the concentration of particles in the ambient air. The measurements were carried out at the civilian airport area near the runway. Based on the measurements carried out, it was found that airport operations cause relevant changes in the concentration and size distribution of particles in the ambient air.

1. Introduction

Exhaust emission from internal combustion engines is the subject of analyses and scientific research due to its strict connection with deterioration of air quality and negative impact on human health. All over the world, and in particular in Europe, strict emission limits are introduced [1, 2]. In addition, new approval procedures are created to better simulate the actual conditions of vehicle operation [3, 4]. In the case of automotive, it is possible to purify the exhaust gases by aftertreatment systems. Due to the design and principle of turbine engines operation the above solution is impossible to implement in aviation [5].

One of the basic issues in case of assessing air quality is the concentration of particles [6]. Particles is a term generally used for the type of air pollutants, consisting of a complex of different mixtures of suspended particles that differ in size, composition and location. The main sources of this type of pollution include: factories, power plants, incinerators, motor vehicles and many more. The basic division of particles results from their aerodynamic diameter, which allowed to determine two main groups: PM2.5 and PM10 (Particulate Matter) for diameters smaller than 2.5 μm and 10 μm respectively [7]. The dynamic development of the particles issue and changes in their properties depending on their size forced a more detailed division. Ultrafine particles were assumed to be particles with a diameter of less than 1 μm and fine particles or nanoparticles are particles smaller than0.1 μm.

The pollution of the atmosphere with particles emitted by aircraft engines has a negative effect on human health. Particles with a diameter of 10 μm or less can cause diseases of heart and lungs, and related deaths. The intensity of diseases is combined with the long-term effects of particles in the environment. They contribute to the occurrence of diseases such as asthma and bronchitis. They are

also one of the causes of cardiac arrhythmia and heart attacks. The most serious problems result from the interaction of fine particles. The lowest resistance to the negative effect of particles is demonstrated by people with heart and lung diseases, the elderly and children [8].
Determining the air quality is done by measuring the mass concentration of particulates (PM10 and PM2.5) in the air. The above method is ineffective due to the lack of determination of the particle number. Particularly dangerous are small particles with very small mass. Measuring only the mass content of particles in the air, without specifying their dimensions and number, it is not possible to determine the air quality effectively [9].

In the case of aircraft, regulations regarding particle emissions are reduced only to determination the Smoke Number parameter, which does not reflect the significance of the problem of particles emission especially theirs number [10]. Due to the lack of the possibility of testing exhaust emissions from aircraft engines in real flight conditions, measurements of air quality in the area of the airport are increasingly being conducted. The latest publications on particle measurements in airport areas are aimed at estimating the actual emission of PN (particle number) and its impact on air quality.

2. Methodology of the research

2.1. Purpose and conditions of the research

The purpose of the research was to determine the impact of take-off and landing operations on the concentration of particles in the air and their dimensional distribution. To achieve the goal, measurements of the particle number concentration in the vicinity of the civilian airport runway were made (Fig. 1).

Fig. 1. Poznan-Lawica airport and measuring area.

The research place was the Poznan-Lawica airport, located in close proximity to the city centre. The measuring apparatus was placed at a distance of 350 m from the threshold of the runway. The research was carried out on January 8th, 2018. Atmospheric conditions were typical for this season in Poland, the ambient temperature was 7°C and the windless conditions prevailed. The landings and take-offs of aircraft are dependent on the direction of the wind. Due to the windless conditions, ton that day the flight tower allowed pilots to choose from which direction they wanted to approach landing or take-off.

The tests consisted in measuring the concentration of the particles number in the air and its changes during the take-off or landing of an aircraft. In addition, the dimensional distribution of particles was measured. On the day of the tests, the aircraft performing the operations were Boeing 737-800 (Fig. 2a) and Bombardier CRJ-900 (Fig. 3a). The Boeing 737 was equipped with two jet engines CFM56-7B (Fig. 2b) while the Bombardier CRJ-900 had two CF34-8C jet engines (Fig. 3b). Technical specification of those two engines can be found in the Table 1.

a) b)

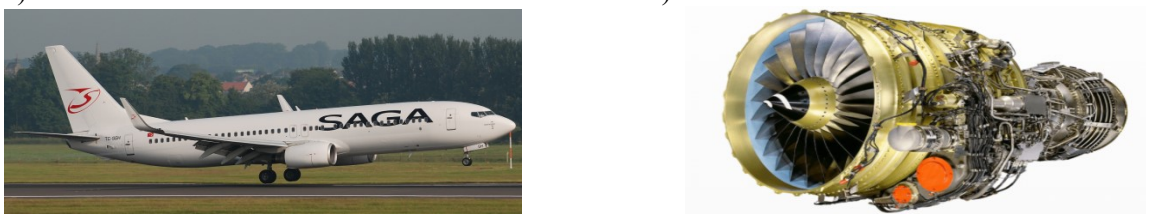

Figure 2. The view of Boeing 737-800 (a) and CFM56-7B jet engine.

a) b)

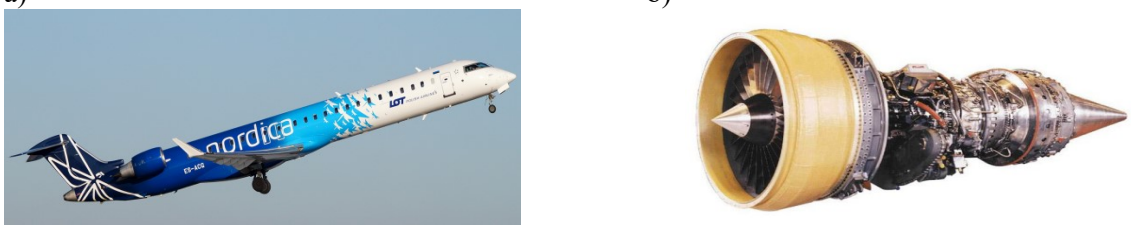

Figure 3. The view of Bombardier CRJ-900 (a) and CF34-8C jet engine.

Table 1. Technical specification of CFM56-7B and CF34-8C jet engines.

Parameter	CFM56-7B	CF34-8C
Maximum take-off thrust [kN]	108	62
Bypass Ratio [-]	5.1	5.1
Overall pressure ratio [-]	33	28
Thrust/weight ratio [-]	5.2	5.7
Weight [kg]	2370	1089
Length [mm]	2628	3251

2.2. Measuring apparatus

Measurement of particle diameters was performed with an EEPS 3090 (engine exhaust particle sizer™) (Fig. 4). It enabled the measurement of a discrete range of particle diameters (from 5.6 nm to 560 nm) on the basis of their differing speeds. The degree of electric mobility of particulate matter is changed exponentially, and measurement of their size is carried out at a frequency of 10 Hz.

Figure 4. The view and location of measurement equipment.

The sample is routed through a dilution system and to the spectrometer while maintaining at the desired temperature. The initial filter retains particles with a diameter greater than 1 micron, which are outside of the measuring range of the device. After passing through the neutralizer the particles are directed to the charging electrode; after getting electrically charged they can be classed by their size.

The particles deflected by the high-voltage electrode go to an annular slit, which is the space between the two cylinders. The gap is surrounded by a stream of clean air supplied from outside. The exhaust cylinder is built in a stack of sensitive electrodes isolated from one another and arranged in a ring. The electric field present between the cylinders causes the repulsion of particles from the positively charged electrode; then the particles are collected on the outer electrodes. When striking the electrodes, the particles generate an electric current, which is read bya processing circuit.

The measuring apparatus was set up in the approach axis for the landing and take-off of passenger aircraft. The measurements were divided into three phases: pre-landing measurement – to determine the measurement background; measurement during the landing – to determine changes in the concentration of particles during the landing operation; measurement after landing – to determine the maximum concentration of particles.

3. Research results and their analysis

The purpose of the measurements was to determine the change in the particles concentration in the ambient air caused by the aircraft take-off and landing. In addition, the particles size distribution was determined. The measurements were taken during single take-off operation of Bombardier CRJ-900 and its two landings, also the measurements were carried out during landing operation of Boeing 737.

The value of the particles concentration before the Bombardier's take-off operation was $1.8 \cdot 10^4$ cm–3. The aircraft's take-off caused a thirty-fold increase in the concentration of particles to the level of $5.2 \cdot 10^5$ cm^{-3} (Fig. 5a). The presented results of the particles concentration measurements in function of time were divided into four phases: reference level, take-off, dispersion and again reference level. The reference level corresponds to the particle concentration before the take-off or landing operation. The dispersion phase is the period in which the particle concentration stabilizes and equalizes to the level of the measuring background. In the case of Bombardier's take-off the dispersion phase lasted for 250 seconds. The average size distribution of particles during take-off and the phase of dispersion is shown in the Figure 5b. The dominant particles are from 6 to 15 nm. This is a characteristic dimensional distribution of particles for aircraft engines. Particles with these diameters are at the measurement limit. In spite of their very large number, they are invisible to the human eye, therefore they do not pose a threat. The fact is that they are the most dangerous to human health.

a) b)

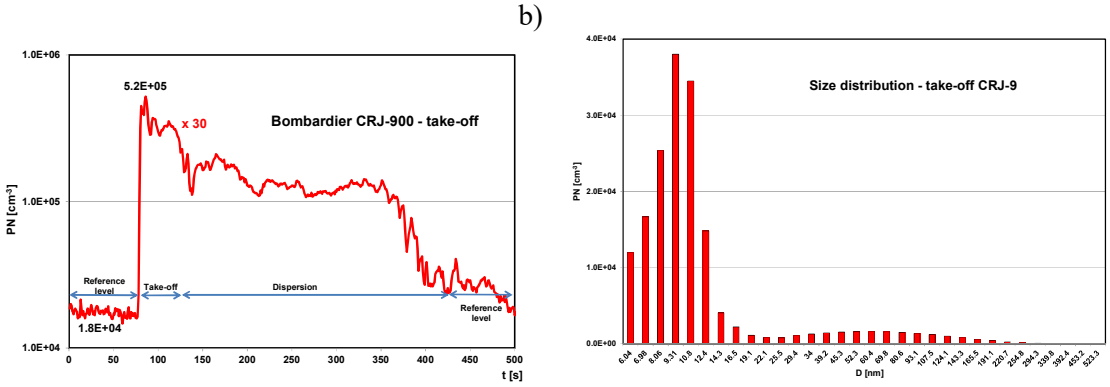

Figure 5. Total concentration of particles (a) and size distribution (b) during CRJ-900 take-off.

The value of the particles concentration before the Bombardier's landing operation was $1.1 \cdot 10^4$ cm^{-3} and was assumed as reference level. The aircraft's landing operation caused a twenty two-fold increase in the concentration of particles to the level of $2.4 \cdot 10^5$ cm^{-3} (Fig. 6a). The dispersion phase lasted for 200 seconds and was characterized by a turbulent course.

The average size distribution of particles during take-off and the phase of dispersion is shown in the Figure 6b. The dominant particles are from 6 to 15 nm, close to log-normal distribution. Particles with the smallest dimensions had the highest concentration. The resulting distribution is significantly different from the dimensional distribution determined during the start of the same aircraft model.

a) b)

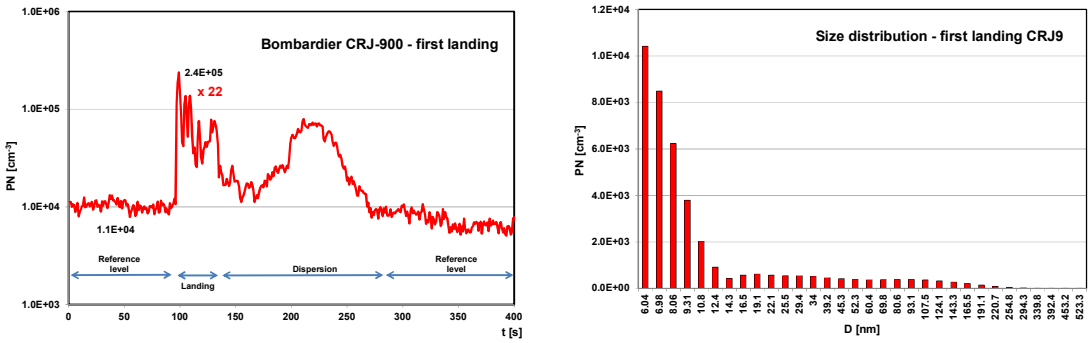

Figure 6. Total concentration of particles (a) and size distribution (b) during CRJ-900 first landing.

The value of the particles concentration before the Bombardier's second landing was $6.9 \cdot 10^3$ cm^{-3} and was assumed as reference level. The aircraft's landing operation caused almost twenty-fold increase in the concentration of particles to the level of $1.3 \cdot 10^5$ cm^{-3} (Fig. 7a). The dispersion phase lasted for 100 seconds. The dilution of particles emitted by the aircraft was regular. A clear landing and dispersal phase cannot be determined because the measurement results show only the dilution phase.

The average size distribution of particles during landing and the phase of dispersion is shown in the Figure 7b. The dominant particles are from 6 to 15 nm, close to normal distribution. The obtained dimensional distributions during landings differ, but the fact is that the dominant particles are those with diameter 6–15 nm.

a) b)

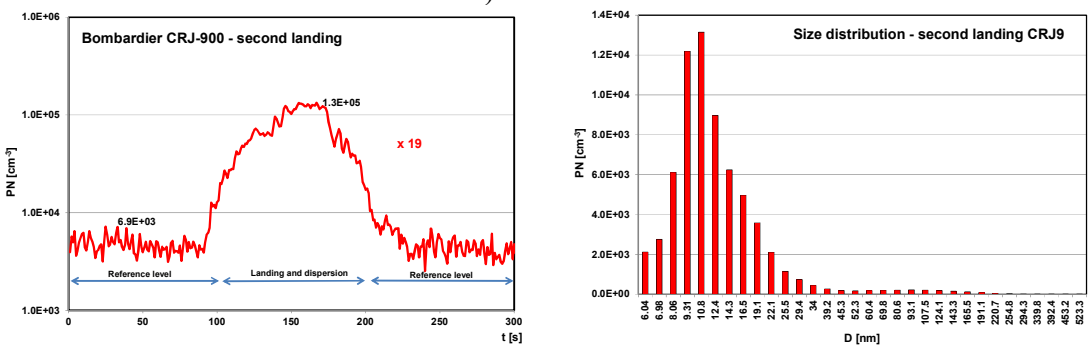

Figure 7. Total concentration of particles (a) and size distribution (b) during CRJ-900 second landing.

The value of the particles concentration before the Boeing landing was $4.7 \cdot 10^3$ cm^{-3} and was assumed as reference level. The particles concentration after landing was one thousand bigger and reached $1.3 \cdot 10^5$ cm^{-3} (Fig. 8a). The dispersion phase lasted for 200 seconds. The dilution of particles emitted by the aircraft was regular.

The average size distribution of particles during landing and the phase of dispersion is shown in the Figure 8b. The dominant particles are from 6 to 15 nm, close to normal distribution. The larger concentration of particles in the ambient air after Boeing landing is caused by the fact that it is equipped with twice as large engines as the Bombardier. This involves more thrust and a proportionally greater flue gas stream, which results in increased particles emissions.

a) b)

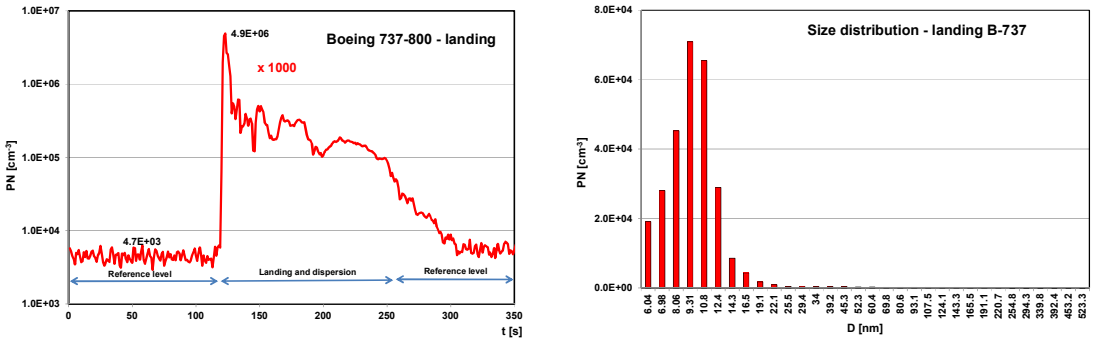

Figure 8. Total concentration of particles (a) and size distribution (b) during B-737 landing.

4. Summary

Based on the results of the tests, it was found that take-off and landing of the same model of aircraft show a different impact on the air in the area of the airport. During the start, the concentration of particles in the ambient air is clearly higher than after landing, while the dimensional distributions obtained in both cases are similar, the dominant particles are in the range of 6–15 nm. It was noted that the dispersion phase, whether the spread of particles and reducing their concentration takes up to twice as long in the case of take-off rather than landing. Landing operation of an aircraft equipped with engines with twice bigger maximum thrust resulted in up to fifty times greater increase in the concentration of particles in the air in comparison to smaller aircraft. The dimensional distribution of solid particles did not differ significantly from the distributions obtained in the case of aircraft equipped with smaller engines.

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Thanet District Council LAQM Annual Status Report 2017 i Executive Summary: Air Quality in Our Area Air Quality in Thanet Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas1,2 . The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion3 . The Local Air Quality Management (LAQM) system, as set out in Part IV of the Environment Act 1995, places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedances are considered likely, the local authority must declare an Air Quality Management Area (AQMA) and prepare an Action Plan setting out the measures it intends to put in place in pursuit of the objectives. The district of Thanet is located on the eastern side of Kent, in the south-east of England. It has a combination of coastal, urban and rural environments and includes the main towns of Margate, Ramsgate and Broadstairs. It is a popular holiday and day trip destination and, as a result, sees the number of people/vehicular movements grow considerably in the summer months. There is also a working port at Ramsgate. The main source of air pollution in the district is road traffic emissions from major roads, notably the A28, A299, A254, A255 and A256. An Air Quality Management Area (AQMA) was declared in March 2006 for The Square, Birchington, where exceedances of the annual mean objective for nitrogen dioxide (NO2) were predicted. A second AQMA was declared at High Street, St Lawrence in April 2010. These two AQMAs were incorporated into a single Thanet Urban AQMA in 2011.

Manston DCO News

Saturday, 18 July 2020

Need

In the advice to the Secretary of State " SoS" (document TR020002-005347-TR020002 Final Recommendation Report to DfT) the examiners:

Examining Authority
Kelvin MacDonald BSc(Hons) FAcSS FRTPI CIHCM FRSA – Lead Member
Martin Broderick BSc MPhil FIEMA – Panel Member
Jonathan Hockley BA(Hons) DipTP MRTPI – Panel Member
Jonathan Manning BSc(Hons) MA MRTPI – Panel Member

set out a complete chapter (Chapter 5) where they discussed "Need" (pages 54-103).
Their conclusion on page 103 stated:

Given all the above evidence, **the ExA concludes that the levels of freight that the Proposed Development could expect to handle are modest and could be catered for at existing airports (Heathrow, Stansted, EMA, and others if the demand existed). The ExA considers that Manston appears to offer no obvious advantages to outweigh the strong competition that such airports offer. The ExA therefore concludes that the Applicant has failed to demonstrate sufficient need for the Proposed Development, additional to (or different from) the need which is met by the provision of existing airports.**

This report was written in the 3 months after the examination concluded in July 2019 and passed to the SoS for the Department of Transport "DoT" to make their decision. In January 2020 the DoT delayed the decision and then further delayed this to the 10th July. The decision was announced on the 9th July and was a Yes against the advice given by the four experts noted above.

What the Examiners would have been unable to forecast was the Coronavirus Pandemic which has decimated the aviation industry.
This collapse of short and long haul flights has has two consequences:
1. The airport which handles most air freight is Heathrow. 67% of all air freight is carried in the belly of long haul passenger

planes and this has dropped by 90% and according to most experts will not recover for 3-4 years.
2. This has meant air freight will need freighter only aircraft to carry freight for the next 3-4 years providing a boost to this niche market.

The problem for freight managers is consumer confidence is still low so the demand has also dropped and most of the World will enter a recession and currently no expert can predict when this will recover.
If freighters are to be used the upside is there is plenty of slots at all the airports to cater for this usage, certainly enough to not need a new airport in the South East for the foreseeable future.

To get back to the report I will not seek to post all 50 pages but will concentrate on the conclusions, the viewer can read the full report by clicking in the link above.

5.7. CONCLUSIONS (page 98)
5.7.1. The ExA is mindful that the ANPS does not have effect in relation to an application for development consent for an airport development not comprised in an application relating to the Northwest Runway at Heathrow and associated proposals for new and reconfigured terminal capacity and, therefore, the application is examined under s105 of the PA2008.
5.7.2. **Nevertheless, the ANPS remains an important and relevant consideration** in the determination of such an application, particularly where it relates to London or the South East of England.
5.7.3. Government policy states that the Government is minded to be supportive of all airports which wish to make best use of their existing runways, including those in the South East (ANPS paragraph 1.39).
5.7.4. The ExA considers that the Applicant's forecasts, when seen in the light of the historical performance of the airport **seem ambitious**. Previously the airport did not go above around 50,000 tonnes of cargo and 200,000 passengers a year, compared to the 340,000 tonnes and 1.4mppa forecast now.
5.7.5. The ExA accepts in this context that the investment levels proposed for the airport are at a different level to that previously spent on the site and notes anecdotal evidence that British Airways was previously in discussion with Infratil but pulled out due to a lack of investment and failure of the operator to provide a state-of-the-art facility. However, conversely SHP make reference to Wiggins Group investing £6 to 7m on new aprons and taxiways to increase freight capacity to 200,000 tonnes per annum [REP5-028].
5.7.6. Although to a certain extent it may be a cause and effect situation, it is also reasonable to suggest that the previous operators of the airport, either Wiggins Group (of which one member of the Applicant's team was also involved) or Infratil, an experienced airport operator, would have invested more heavily had there been a reasonable prospect of this investment being repaid through increased traffic levels. While at this time the new integrators were not around, Heathrow and Gatwick were at similar levels of constraint.

Capacity
5.7.7. The third runway would clearly add to capacity substantially at London Heathrow. The ANPS states that the Government estimates that a new runway at Heathrow would result in an additional 43,000 long haul flights. This would provide more space for cargo, a greater frequency of services, and boost trade and GDP. It appears to the ExA that Heathrow would be able to accommodate the projected 3m tonnes of air freight per annum in due course and that more markets would likely be served by routes from the Northwest Runway at Heathrow, should demand exist. Heathrow is the **dominant** airport in the UK for air freight, and the proposed third runway would build upon this, providing significant new opportunities for bellyhold freight via new long-haul routes. While the 3m tonnes of freight would not be achieved overnight it would be a substantial uplift from the almost 1.7m tonnes carried in 2017 and supply could rise roughly with demand.
5.7.8. London Stansted has reached agreement, subject to the signing of a Section 106 Agreement with Uttlesford DC, to increase caps on the airport from 35mppa and 274,000 air movements including 20,500 air cargo movements, to 44.5mppa and 285,000 movements respectively. While a substantial part of the business at Stansted is passenger focused, **the Airport clearly provides an important base for freight,** with capacity for both integrator traffic (Fed-Ex) and general freight. The Applicant's view is that Stansted airport has made a strategic choice to prioritise passengers over freight but **this is not objectively supported** by the evidence.
5.7.9. Stansted is clearly a busy airport and becoming busier. However, from the evidence provided there appears to be a degree of capacity left at the airport, including for freight movements with the airport forecasting a growth to some 376,000 tonnes per year by 2028 from a level of 236,892 tonnes in 2017, involving 16,000 cargo movements a year (from 10,126 in 2017) and an increasing amount of bellyhold cargo alongside the predicted growth in passenger numbers.
5.7.10. EMA is a major integrator hub **with significant growth potential**. Given levels of passenger throughput at the airport, it is unlikely that there will be significant strategic conflicts between passenger and cargo traffic. The ExA does not consider that there is 'substantial circumstantial evidence' that there is likely to be little if any scope for general cargo operators to stay overnight at EMA and it appears that the airport seeks to attract both integrator and general freight traffic. Evidence is also noted of germinative Amazon Air operations at the airport (via DHL), **and the substantial new warehouse and sorting centre adjacent to the airport** [REP05-029].
https://www.nwleics.gov.uk/pages/east_midlands_gateway DCO granted

Demand and forecasts
5.7.11. The ExA does not agree that zero growth forecast by the DfT is a pragmatic view due to lack of capacity; the Department does not claim to model freight in detail and have labelled it as an assumption. From the evidence provided there is no clear view of the levels that demand for air freight may grow, but levels of growth that do occur are likely to be accommodated by the proposed new runway at Heathrow, should this occur.

5.7.12. Should this not occur, there may be more demand available elsewhere, although given the preponderance of facilities in northern Europe it may be that this increases trucking levels rather than leading to a substantial growth in levels of freight being handled at other UK airports. Furthermore, growth in bellyhold at Gatwick and at other airports outside the South East may occur.
5.7.13. The Applicant's Azimuth Report [APP-085] is a comprehensive document but the weight that the ExA can place on its forecasts is reduced by the lack of interview transcripts available, and of the size and sample frame of many of the interviewees, when considering the size of the forecasts that are generated and there is little evidence that academic and industry experts have validated the approach of the Azimuth Report. Furthermore, there is little evidence that capacity available elsewhere such as at EMA, or the impact of the proposed Northwest Runway at Heathrow have been taken into account in the production of the forecasts.
5.7.14. The Northpoint Report [REP4-031] provides a valuable alternative source to 'back up' the Azimuth Report. However, the limitations identified within its model, particularly those considering the scope for migrating between types of carrier and the impact of price (particularly when considering differences between bellyhold and pure freight, and trucking) appear to the ExA to be substantial limitations in the case of the Proposed Development and a more detailed model assessing such variables was not available to the ExA.
5.7.15. The forecasts of Boeing and Airbus are useful in terms of noting overall levels of global air cargo growth and provide support for the Northpoint analysis. The ExA do note however the previous considerable overestimation of the number of freighters by these aircraft manufactures.
5.7.16. The Avia Solutions Report forecast [REP3-276 report available in Library] provides a comprehensive view of the viable potential of Manston Airport. The ExA note that this report is independent; the brief from TDC did not indicate any desired outcome and required an independent assessment advising whether or not it is possible to run a viable and economically sustainable free-standing airport operation from Manston. While the report was written in 2016 this remains relatively recent and it concludes that, even with a generous assumption over air freight captured from trucking, airport operations at Manston are very unlikely to be financially viable in the longer term, and almost certainly not possible in the period to 2031.
5.7.17. While the Avia Solutions Report's conclusions were based on viability, this arises in the report from the authors' assessment of potential and forecasts for the airport – in other words, the need for the development. Also of note is that the report considered capacity squeezes and a major retail group, akin to Amazon basing themselves at the airport; neither possibility led to a different conclusion. Due to the independence and depth of this report, the ExA place **significant** weight on its findings.
5.7.18. On the basis of the evidence provided, the ExA considers that the predominance of bellyhold freight in the UK market as opposed to pure freight is to a large extent a by-product of the dominance of Heathrow in the UK aviation market. The effect of the size of Heathrow, and the vast range of destinations that are available from this hub airport have led to the strength of bellyhold freight for UK purposes, particularly when coupled with the relative ease of access to the large hub airports and pure freight airports in northern Europe. Trucking is a necessary mechanism to complete this overall market pattern and allows access to the population and manufacturing capacity of northern Europe. In the ExA's view air freight would still primarily be attracted to the airports with **the widest possible global networks for reasons of economies of scale.**
5.7.19. It also appears logical to the ExA that bellyhold freight would be **significantly cheaper** than pure freight and that this in itself also helps to explain the dominance of bellyhold over pure freight, with much pure freight dedicated to express integrators who can charge more for express delivery times.
5.7.20. The Applicant considers that Manston could act in a complementary role to bellyhold freight at Heathrow and integrator freight at EMA.
5.7.21. However, the ExA's analysis of the predominance of bellyhold freight in the UK (above) suggests that there is little complementary role to be had – while some oversized freight items may be too large or bulky for bellyhold travel, the vast majority of general freight can be carried in bellyholds.
5.7.22. A useful point is made by the Applicant noting that the cargo industry is fundamentally changing, and that this change needs an innovative response which cannot be provided at constrained South East airports. However, the change proposed by the Applicant appears to be largely based on new integrators who would offer similar comprehensive delivery patterns and structures to established integrators but with less strict time restrictions. In the view of the ExA then the likely locations for such integrators are likely to be closer to the centre of the country than Manston. While Manston can clearly offer good quick access to London and much of the South East*, a more central positions within the UK offers more potential customers than just London and the South East can provide; within a three hour drive from Manston only the South East and parts of the East of England can be reached, whereas most of England and Wales is within three hours of EMA.
* **Editor's note:** *The conclusion (tempered by the second sentence is slightly odd considering Heathrow is served by the M4 and M25, Gatwick by the M23 (with the M25 20 minutes away), and the East Midlands by the 8 lane M1. Manston is dual carriageway until the Hoath Way junction on the M2 some 35 miles away with a further 10 miles to the M25 and Dartford river crossing which for those in the area hold ups are a regular occurrence especially at the river crossing.*

Summary
5.7.23. The ExA is **not convinced** that there is a substantial gap between capacity and demand for general air freight within the South East at present. Capacity is available or could be available at other airports within the South East or at other airports within reach of the South East should the demand exist, and such capacity could largely be achieved relatively simply through permitted development rights or existing facilities.
5.7.24. The ExA is of the opinion that general air freight would continue to be well served in the UK with spare capacity at Stansted in the short term (to 2030) and the proposed Northwest Runway at Heathrow in the longer term, and that new integrators are more likely to wish to be sited in a more central location. If constructed and operated then the Proposed

Development could carry out a role within the market focused on perishables and oversized niche freight as previously but it seems unlikely that tonnage achieved will be significantly more than previously handled. Without the proposed Northwest Runway at Heathrow more demand may be available but the ExA's conclusions relating to new integrators, that is that they would be more likely to base themselves in a more central location to their other logistical operations, remain valid.
5.7.25. The Applicant argues that price is not the only determinant in where freight business may go – factors such as facilities, speed, handling efficiency and location all count too. While the ExA agree with this view, it seems logical to assume that price is the main component in any decision made and that bellyhold freight will generally be cheaper. If demand were present, then facilities could be constructed at other airports where speed and handling efficient could be largely matched to the Applicant's plan and the ExA is not convinced that the location of the Proposed Development is entirely favourable.
5.7.26. In terms of passenger traffic, the full extent of the Azimuth Report forecasts [APP-085] may be difficult to reach. However, the ExA considers that there would be a market for passenger traffic from the airport although the extent to which such traffic would be viable for the airport operators has not been assessed in depth.
5.7.27. GA was not examined in depth in the Examination, and the Azimuth Report [APP-085] does not cover the subject in detail. Nevertheless, the ExA notes the support for GA facilities in the APF and the NPPF (paragraph 104) and the representations received on this matter.
5.7.28. Appendix 1 of the Applicant's Overall Summary of Need Case [APP11-013] states that little weight should be afforded to the submissions of SHP given the withdrawal of this company's objection to the Proposed Development *. In this context however the ExA note the comments of York Aviation, which states that they strongly refute criticism of their work by the Applicant in its written answers and consider that they have "provided substantial and well evidenced responses throughout the process" [REP11-070].
*** Editor's note** The request by SHP to withdraw its representations was made less than five hours before the Examination closed at 23:59 on 9 July 2019. On that basis, the ExA determined that it was received too late in the Examination for the ExA to properly consider the request or the implications for other Interested Parties. SHP's representations therefore remain part of the Examination Library. This determination has been communicated to IPs via the s51 advice pages on the National Infrastructure Planning website.

Given all the above evidence, **the ExA concludes that the levels of freight that the Proposed Development could expect to handle are modest and could be catered for at existing airports (Heathrow, Stansted, EMA, and others if the demand existed). The ExA considers that Manston appears to offer no obvious advantages to outweigh the strong competition that such airports offer. The ExA therefore concludes that the Applicant has failed to demonstrate sufficient need for the Proposed Development, additional to (or different from) the need which is met by the provision of existing airports.**

A new study by the Massachusetts Institute of Technology has estimated that long term exposure to aviation related ozone and fine particulates (specifically PM2.5, the smallest particles) contributes to 16,000 premature deaths a year worldwide, costing an estimated $21 billion a year.

Air Pollution Facts

- Air pollution represents a major public health challenge and has been linked to cancer, asthma, stroke and heart disease, diabetes, obesity, and dementia.
- Each year, around 29,000 deaths in the UK are attributable to pollution from particulate matter. NO_2 meanwhile has an effect on mortality equivalent to 23,500 deaths annually in the UK. There is some overlap between the impact of these two pollutants, but it has been estimated that their combined effect could be responsible for 40,000 deaths per year in the UK.
- After central London, the area around Heathrow is the second major hot spot for nitrogen dioxide (NO_2) pollution in London, with breaches of legal limits having been recorded close to the airport for many years.
- Estimates for the cost to the UK economy of deaths attributable to poor air quality vary. A report from the Royal College of Physicians and the Royal College of Paediatrics and Child Health estimated an annual cost exceeding £20 billion, while a study from the World Health Organisation put the figure as high as £54 billion a year for the UK.
- All EU states have committed to air quality standards aimed at protecting public health. The UK has consistently failed to achieve the standards for NO_2 and PM_{10}, and in 2014 the European Commission launched legal action in relation to these breaches. The legal organisation Client Earth is currently pursuing the Government through the UK courts for failing to effectively address NO_2.
- When arguing for a third runway at Heathrow, Gordon Brown's government claimed that air pollution in the area would in fact improve in future as a result of both more efficient aircraft engines and new standards for road vehicles. But in 2008 a BBC Panorama programme revealed that this forecast relied on aircraft technology that was not even on the drawing board. A 2012 paper by Drs Carslaw and Beevers of Kings College London subsequently found, 'strong evidence that there has been no change in aircraft NOx emissions at Heathrow Airport over the past 11 years.'
- Improvements predicted for road vehicles, when reviewed several years after the original modelling, were also found not to be taking place as quickly as the model had assumed.
- A 2015 study by the Massachusetts Institute of Technology revealed that ozone and particulate (PM2.5) pollution from aircraft contributed to 16,000 premature deaths a year worldwide, costing an estimated $21 billion a year.

Air quality

Aircraft engines generally combust fuel efficiently, and jet exhausts have very low smoke emissions. However, pollutant emissions from aircraft at ground level are increasing with aircraft movements. In addition, a large amount of air pollution around airports is also generated by surface traffic.

The main pollutant of concern around airports is nitrogen dioxide (NO2). NO2 is formed by nitrogen oxide (NOx) emissions from surface traffic, aircraft and airport operations. PM2.5 is also of concern, since particulate emissions from jet exhausts are almost all in this fine fraction.

NOx in the lower atmosphere contributes to the production of ozone; ozone in the lower atmosphere is a pollutant, and contributes to global warming. Nitrogen oxides from high-altitude supersonic aircraft are thought to damage the stratospheric ozone layer, the protective layer that filters out harmful radiation from the sun.

The International Civil Aviation Organization (ICAO) sets international standards for smoke and certain gaseous pollutants for newly-produced large jet engines; it also restricts the venting of raw fuels. The latest standards came into effect in 2013 and apply to engine types certified after this date. Reductions in emissions from aircraft engines have generally been lower in recent years than in other sectors, where technologies such as selective catalytic reduction and exhaust gas recirculation have been employed. There are also increasing numbers of larger aircraft movements, which have disproportionately higher emissions than smaller aircraft.

Environmental Protection UK believes that no developments or alterations to the UK aviation infrastructure, air operations or flight scheduling should result in a breach of the EU limit values or UK air quality objectives, or worsen current breaches. Emissions considered must include direct emissions from aircraft, air-side service vehicles and plant, and the surface access required for airports.

Aviation is also a significant source of carbon dioxide emissions, and presents a major threat to Government targets in terms of emissions growth. This is for three reasons, firstly aviation is predicted to grow significantly, secondly emissions at altitude however are thought to have a greater effect on climate change than those at ground level, and finally there is no practical alternative to kerosene fuelled jet engines currently on the horizon. As other sectors reduce emissions aviation is therefore likely to become responsible for a far larger proportion of global climate change emissions.

Aircraft noise and health effects: Recent findings (K Jones, 2016) - CAP 1278: The report examines the evidence to date relating to transportation noise, particularly aircraft noise and the resulting impacts on various health endpoints. Research assessed shows an association with aircraft and road noise and cardiovascular disease. There is emerging evidence to suggest that cardiovascular effects are more strongly linked with night time noise exposure than to day or total (24hr) noise exposure. Regarding aircraft noise and children's learning, further explorations of past studies have taken account of other factors that might account for observed differences, such as air pollution.

- Aircraft Noise and Sleep Disturbance: A Review (K Jones, 2009) - ERCD report 0905: This review examines the physiological implications of noise induced sleep disturbance. It includes research finding that, when the level and duration of noise experienced is the same, aircraft noise is associated with more self-reported sleep disturbance than road traffic noise, and that road traffic noise is associated with more sleep disturbance than railway noise.
- Aircraft Noise, Sleep Disturbance and Health Effects: A Review (K Jones, D Rhodes, 2013) - ERCD Report 1208: This literature review provides an overview of the main findings in environmental noise and health research, and includes the effects of sleep disturbance due to aircraft noise. It finds that above dB Lnight, noise is a significant concern to public health; levels above 55 dB Lnight result in increased risk of heart attacks; and levels above 45 dB Lnight result in increased risk of hypertension, and this can lead to hypertensive strokes and dementia.
- Proposed methodology for estimating the cost of sleep disturbance from aircraft noise (D Rhodes, K Jones, E Weston. 2013) - ERCD Report 1209: This report builds a methodology for estimating the monetary cost of the sleep disturbance caused by aircraft noise - building on work undertaken by the World Health Organisation and the UK Government Interdepartmental Group. It evaluates the loss of productivity resulting from sleep disturbance, and the health impacts resulting from the increased risk of hypertension that can lead to acute myocardial infarction (heart attack), hypertensive strokes or dementia.
- Aircraft Noise, Sleep Disturbance and Health Effects (K Jones, 2014) - CAP 1164
  This paper reviews and takes account of several studies published after ERCD Report 1208 (above) including: two publications that use data around Heathrow airport to investigate cardiovascular impacts of aircraft noise; a meta-analysis of noise and exposure response curves for transportation noise and cardiovascular diseases by Babisch from the Federal Environment Agency in Germany; and a Harvard study that examined the cardiovascular impacts around 89 airports within the USA.

It’s time to wake up to the devastating impact flying has on the environment

Partners

Ready to get over your post-festive comedown by booking an escape to the sun? For many of you, that will involve flying. And while I’m sorry to put a downer on your holiday plans, there are several problems with this from a climate perspective.

The first is that aviation is essentially a fossil fuel industry, one which guzzles an eye-watering 5m barrels of oil every day. Burning that fuel currently contributes around 2.5% to total carbon emissions, a proportion which could rise to 22% by 2050 as other sectors emit less.

The second problem is, as Air Asia puts it, “Now everyone can fly”. And in “generation easyJet”, those who already fly, fly more than ever. This increasing demand from new and existing travellers means the number of passenger aircraft in our skies is set to double by 2035.

The third problem is that unlike other sectors where there might be a greener alternative (solar not coal, LEDs not lightbulbs etc), there is currently no way to fly 8m people every day without burning lots of dirty kerosene. Aircraft are becoming more fuel-efficient, but not quickly enough to offset the huge demand in growth. Electric planes remain decades away, weighed down by batteries that can’t deliver nearly as much power per kilo as jet fuel.

But here’s the peculiar thing: although no other human activity pushes individual emission levels as fast and as high as air travel, most of us don’t stop to think about its carbon impact.

While in many countries new cars, domestic appliances, and even houses now have mandatory energy efficiency disclosures, air travel’s carbon footprint is largely invisible, despite it being relatively much bigger. For instance, a return trip from Europe to Australia creates about 4.5 tonnes of carbon. You could drive a car for 2,000 kilometres and still emit less than that. And the average per capita emissions globally is around 1 tonne.

Several studies have found people to be quite ignorant of how their own flying behaviour contributes to climate change. It’s not hard to see why. Research into airline websites shows little mention of environmental impact. Green NGOs are often quiet on the issue, perhaps being reluctant to “preach” to their members to fly less, and concerned over accusations of hypocrisy as their own staff fly around the world to conferences.

Political leaders are also unwilling to point the finger at passenger-voters. Indeed, Tony Blair asked as prime minister in 2005 “how many politicians facing a potential election would vote to end cheap air travel?” His answer: zero. The political strategy seems to be passing the buck to the airline industry, and hoping for the best.

Aviation is a golden goose for politicians. In the UK, where sources of future post-Brexit economic growth are hard to identify, the industry looks set to continue its enviable historic growth-rate of 4-5% annually. The main problem for airlines now is finding enough space to accommodate planes at crowded airports such as Heathrow. Airlines’ seductive message to politicians is “If you build it, they will come.”

And the primary reason that they will come is because flying is kept artificially cheap, while trains and cars become more expensive. The main reason for this is the so-called “Chicago Convention”, agreed in 1944 by a then much smaller air industry, which prohibits countries from imposing jet fuel tax and VAT on international flights. Taxes on other forms of transport have increased dramatically since 1944 but thanks to the convention aviation has remained almost unscathed. Things have actually moved in the other direction since the 1990s, when an influx of low-cost carriers led to big cost savings and even lower ticket prices.

What is to be done? Aviation, along with shipping, was given special status and excluded from the Kyoto and Paris climate change agreements. The industry was tasked to come up with its own solutions instead. After much foot-dragging, the International Civil Aviation Organisation (ICAO), finally addressed aviation emissions in 2016, proposing a market-based mechanism, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

Under CORSIA, countries’ airlines are given allowances to emit carbon, and if they exceed their allowances (which they will) then they must buy offsets from other sectors. Yet the plan is not nearly radical enough. It doesn’t even come into power for another decade, and it does nothing to stifle demand – unlike a carbon tax.

As we can see, regulating the environmental impact of flying is a complex business. Ignorance and inaction is an appealing reaction to complexity, but we need to act before aviation gobbles up more of the increasingly small wriggle-room for emission cuts. We can try and reduce the number of flights taken, buy carbon offsets for unavoidable flights, and question the broader logic of allowing the industry to grow ad infinitum. Just using a carbon calculator to learn about the carbon impact of our sunny escapades is a good start.

If citizens remain blissfully unaware of aviation emissions, then airlines and governments are unlikely to do anything about them. Alternatively, if governments ever wish to place a global carbon tax on flights, then they will need to create political “buy-in” from citizens who increasingly see cheap flights as a right.

NEWS

Detrimental effects to environment caused by aviation growth

The predicted increase in greenhouse gas emissions could undermine efforts to mitigate climate change and limit the global temperature rise to below the target of two degrees Celsius in the Paris Agreement.

The outgoing Commissioner of Transport Violeta Bulc received the 2nd European Aviation Environmental Report (EAER) which has been prepared and published by the European Union Aviation Safety Agency (EASA), in cooperation with the European Union Environment Agency (EEA) and EUROCONTROL. The report provides an assessment of the historic and forecasted environmental performance of the European aviation sector, along with the latest information on various mitigation measures to reduce the environmental impact of aviation.
The report states that overall environmental impacts from aviation have increased by 10 per cent for CO_2, 12 per cent for NOX (nitrogen oxides) and 14 per cent for noise since 2014. Looking ahead, in the most likely traffic forecast, existing environmental impact mitigation measures are unlikely to counteract the increasing environmental impacts as the number of flights in Europe are expected to grow by 42 per cent from 2017 to 2040. In that same time frame, aircraft CO_2 emissions are predicted to increase by 21 per cent and NOX emissions by 16 per cent. The number of airports that handle more than 50,000 annual aircraft movements is expected to increase from 82 in 2017 to 110 in 2040 and aviation noise may therefore affect new populations in the future.

EASA Executive Director, Patrick Ky, commented: “We need concrete and effective action to reduce aviation emissions over the next 10 years in order to support the Paris Agreement objectives and mitigate climate change. The aviation sector must play its part in this global effort. Addressing noise and air quality issues at a local

level are also critical. Since EASA’s rules and our competencies with regard to environment have been further strengthened by the European Union, EASA now plays a leading role in actively developing and implementing measures to address these challenges in cooperation with our partners.”

Interesting research .....

Study identifies link between air pollution and dementia

Research by academics at King's College London has found that living in a polluted area can increase the risk of dementia by up to 40%. Scientists looked at data on 131,000 Londoners aged above 50, of whom 2,200 developed dementia over seven years. Senior author Frank Kelly said based on the research, it is "very likely that high air pollution alone does not cause dementia but rather it increases the risk of an individual developing it." "Air pollution is linked with many more conditions than dementia and therefore there is now overwhelming evidence that we should be improving air quality in cities to improve public health," he added.

Plane Exhaust Kills More People Than Plane Crashes

Toxic pollutants kill at least ten thousand annually, study says.

3 MINUTE READ

PUBLISHED OCTOBER 10, 2010

There's a new fear of flying: You're more likely to die from exposure to toxic pollutants in plane exhaust than in a plane crash, a new study suggests.

In recent years, airplane crashes have killed about a thousand people annually, whereas plane emissions kill about ten thousand people each year, researchers say.

Earlier studies had assumed that people were harmed only by the emissions from planes while taking off and landing. The new research is the first to give a comprehensive estimate of the number of premature deaths from all airline emissions.

"We found that unregulated emissions from [planes flying] above 3,000 feet [914 meters] were responsible for most of the deaths," said study leader Steven Barrett, an aeronautical engineer at the Massachusetts Institute of Technology in Cambridge.

Airplane exhaust, like car exhaust, contains a variety of air pollutants, including sulfur dioxide and nitrogen oxides.

(Related: "Pollution Can Change Your DNA in 3 Days, Study Suggests.")

Many of these particles of pollution are tiny, about a hundred millionths of an inch wide, or smaller than the width of a human hair.

So-called particulate matter that's especially small is the main culprit in human health effects, especially since the particulates can become wedged deep in the lung and possibly enter the bloodstream, scientists say.

Tracking Toxic Plane Pollution

Barrett and colleagues used a computer model that brought together records of flight paths, the average amount of fuel burned during flights, and their estimated emissions.

The computer model, based on experimental data, has been shown to accurately capture pollution's movement in the atmosphere as well as intercontinental transport of pollution, especially from Asia to North America, Barrett said.

By comparing this data with another atmospheric model, the team was able to track how plane pollutants are likely to move and where the pollutants are most likely to fall to the surface, where people breathe them in.

The study also looked at how human populations are spread around the planet to estimate how the patterns of airplane pollution might up the risk of death. (Test your knowledge of toxic disasters.)

Globally, the team estimated that about 8,000 deaths a year result from pollution from planes at cruising altitude—about 35,000 feet (10,668 meters)—whereas about 2,000 deaths result from pollution emitted during takeoffs and landings.

The most common causes of death due to air pollution are cardiovascular and respiratory diseases, including lung cancer, according to the UN's World Health Organization.

Not in Your Backyard

The locations with the most active airports aren't always the ones that suffer the biggest health impacts, the study suggests.

When a plane flies at cruising altitude above the clouds, wind currents can whisk the pollution far away so that prevailing winds cause the pollution to fall from the sky about 6,000 miles (10,000 kilometers) to the east of the plane's route.

(Also see "Pollution From U.S., Europe, Others Speeding Arctic Warming, Study Says.")

The United States incurs about 450 deaths each year from airplane emissions—only about one-seventh the number of deaths that would be expected if the pollution fell straight to the ground from planes, the study said.

In India, on the other hand, there are an estimated 1,640 deaths per year from airplane emissions—about seven times more deaths than would be expected based on the number of flights that start or finish in the country.

Most of these deaths are caused not by flights over India but from emissions in Europe and North America at high altitude, which then blow across Asia, according to the study, published in the October issue of *Environmental Science & Technology*.

Airplane Pollution Stoppable

Airplane pollution deaths still represent a small share of the toll from all kinds of air pollution.

Emissions from ships, for instance, kill an estimated 60,000 people a year, according to a 2007 study also published in *Environmental Science & Technology*.

And the annual total death toll from air pollution is about a million, according to the United Nations Environment Programme.

However, Barrett said, "aviation is growing fast, so we need to start now" on curbing the death rate.

"Regulators need to explicitly consider the impact of cruise emissions on human health," he added.

Sulfur in jet fuel is a major killer, but for a small additional cost "on the order of [U.S.] five cents a gallon, you can remove the vast majority of the sulfur," he said.

Junfeng Liu, an atmospheric chemist at Princeton University, said the "excellent" study delves into "an important global environmental policy issue."

Airplane-pollution deaths account for about a tenth of all air-pollution deaths with cross-border causes, Liu said. So airplane pollution could be an important focus for environmental regulations in the future.

Indeed the findings may someday influence U.S. policy, according to Lourdes Maurice, the U.S. Federal Aviation Administration's chief scientific and technical adviser for environment.

ANIMALS

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HAT'S OFF

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Our editors' favorite photos from 2009 to today

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Manston Airport
Received 03 October 2018
From OAPs against a24/7 freight Hub
Representation
“ OAPS against a 24/7 freight hub.
I am writing to you today as I represent many of the pensioners on the Nethercourt estate, where we live which is directly under the flight path of the proposed freight hub, many already suffer breathing problems and are annoyed by unusual loud noise. Many moved here to enjoy the autumn of their lives and others have lived here since childhood, Ramsgate is a beautiful town enjoyed by locals and visitors alike. There is now a cloud on the horizon just a big a threat to our quality of life as when we feared invasion it is the reopening of the Manston closed airport as a freight hub which will bring old aircraft just a few feet above our houses every few minutes day and night spraying us with pollution and renting the peace of our town with noise.
NO COUNCILOR. MP or GOVERNMENT OFICIAL HAS THE RIGHT TO DEPRIVE US OF THE RIGHT TO SLEEP {HRA} RUIN OUR QUALITY OF LIFE,DEVALUE OUR HOMES , POISON THE AIR WE BREATH, INTERUPT SCHOOL LESSONS , AND CHOKE OUR ROADS WITH LORRIES. the last owners had very fine plans for the site that would have done the town a great deal of good with jobs and leisure facilities without harming the residents.
A new study by the Massachusetts Institute of Technology has estimated that long term exposure to aviation related ozone and fine particulates (specifically PM2.5, the smallest particles) contributes to 16,000 premature deaths a year worldwide, costing an estimated $21 billion a year
a. Aircraft Noise, Sleep Disturbance and Health Effects: the main findings in environmental noise and health research, and includes the effects of sleep disturbance due to aircraft noise. It finds that above dB Lnight, noise is a significant concern to public health; levels above 55 dB Lnight result in increased risk of heart attacks; and levels above 45 dB Lnight result in increased risk of hypertension, and this can lead to hypertensive strokes and dementia
Each year, around 29,000 deaths in the UK are attributable to pollution from particulate matter. NO2 meanwhile has an effect on mortality equivalent to 23,500 deaths annually in the UK. There is some overlap between the impact of these two pollutants, but it has been estimated that their combined effect could be responsible for 40,000 deaths per year in the UK.
Research by academics at King’s College London has found that living in a polluted area can increase the risk of dementia by up to 40%. Scientists looked at data on 131,000 Londoners aged above 50, of whom 2,200 developed dementia RSP submission In Year 2, 4,852 dwellings are forecast to be exposed to aircraft noise levels above the daytime LOAEL of 50 dB LAeq,16hr, while in Year 20 13,046 dwellings are forecast to be exposed to noise levels in excess of the daytime LOAEL. In Year 2, 10,512 dwellings are forecast to be exposed to aircraft noise levels above the night-time LOAEL of 40 dB a killer of our town and many residents that is in your hands to prevent.
”

Particulate matter from aircraft engines affects airways

Date:

May 16, 2019

Source:

University of Bern

Summary:

In a unique, innovative experiment, researchers have investigated the effect of exhaust particles from aircraft turbine engines on human lung cells. The cells reacted most strongly to particles emitted during ground idling. It was also shown that the cytotoxic effect is only to some extent comparable to that of particles from gasoline and diesel engines.

According to the World Health Organization (WHO), seven million people worldwide die as a consequence of air pollution every year. For around 20 years, studies have shown that air-borne particulate matter negatively affects human health. Now, in addition to already investigated particle sources like emissions from heating systems, industry and road traffic, aircraft turbine engine particle emissions have, in the wake of increasing air traffic, also become more important. As a result, scientific research of the particulate matter from air traffic is important for the development of environmental standards in the aviation sector.

The primary solid particles, i.e. those emitted directly from the source, have the strongest effect on people in its immediate vicinity. However, the toxicity of the solid particles from aircraft turbine engines is still not widely researched. Now a multidisciplinary team, led by lung researcher Marianne Geiser of the Institute of Anatomy at the University of Bern, together with colleagues from Empa Dübendorf and the University of Applied Sciences and Arts Northwestern Switzerland (FHNW), has shown that primary soot particles from kerosene combustion in aircraft turbine engines also cause direct damage to lung cells and can trigger an inflammatory reaction if the solid particles -- as simulated in the experiment -- are inhaled in the direct vicinity of the engine. The researchers demonstrated for the first time that the damaging effects also depend on the operating conditions of the turbine engine, the composition of the fuel, and the structure of the generated particles. The present study was published in the journal *Nature Communications Biology*.

Extremely small particles in the nanoscale range

Particles emitted from aircraft turbine engines are generally ultrafine, i.e. smaller than 100 nm. By way of comparison, a human hair has a diameter of about 80,000 nm. When inhaled, these nanoparticles -- like those from other combustion sources -efficiently deposit in the airways. In healthy people, the well-developed defense mechanisms in the lungs normally take care of rendering the deposited particles ineffective and removing them from the lungs as quickly as possible. However, if the inhaled particles manage to overcome these defense mechanisms, due to their structure or physico-chemical properties, there is a danger for irreparable damage to the lung tissue. This process, already known to researchers from earlier experiments with particle emissions from gasoline and diesel engines, has now also been observed for particle emissions from aircraft engines.

Unique interdisciplinary experimental setup

In innovative, combined experiments, the researchers investigated the toxicity of particles from the exhaust of a CFM56-7B turbofan, which is the most commonly used aircraft turbine engine globally. The turbine was run in climb mode (simulating aircraft take-off and climb) and at ground idling speed at the SR Technics testing facility at Zürich Airport. Within this framework, the researchers were able to use a globally standardized measurement method, applied for the environmental certification of aircraft engines. Fuel composition was also investigated: the turbine engine was run using conventional kerosene Jet A-1 fuel or biofuel. The latter is com-posed of kerosene fuel with 32% HEFA ("hydrogenated esters and fatty acids") from old frying oil, animal fats, algae and plant oils.

An aerosol deposition chamber developed specifically for investigating the toxicity of inhaled nanoparticles in vitro and built at FHNW, made it possible to deposit the generated particulate matter in a realistic way on cultures of bronchial epithelial cells which line the inner surface of bronchi. Thus, the researchers were able to deposit an aerosol directly on human lung cells, which would not have been possible in an experiment with human test persons for ethical reasons. Moreover, the particles were analyzed for their physico-chemical and structural properties to examine possible links with the effects of the particles. "This is a worldwide unique experiment, combining emission measurement technology with medical analyses under realistic conditions," says Benjamin Brem, aircraft turbine engine aerosol researcher at Empa, now at the Paul Scherrer Institute.

Toxicity depends on the operating conditions of the turbines and the type of fuel

The cells were exposed to the aerosol for 60 minutes. During this time, a particulate mass of 1.6 to 6.7 ng (billionths of a gram) per square centimeter of cell surface area was deposited while the turbine was running at ground idling, and 310 to 430 ng while it was in climb mode. This is equivalent to the daily airway intake of mildly polluted rural air with 20 ?g (millionths of a gram) of particles per cubic meter of air up to heavily polluted air in a large city (100-500 ?g of particles per cubic meter of air).

Evidence of increased cell membrane damage and oxidative stress in the cell cultures was identified. Oxidative stress accelerates ageing of cells and can be a trigger for cancer or immune system diseases. The particles turned out to cause different degrees of damage de-pending on the turbine thrust level and type of fuel: the highest values were recorded for conventional fuel at ground idling, and for biofuel in climb mode. These results were surprising. The cell reactions in the tests with conventional kerosene fuel at full engine thrust -- comparable with takeoff and climb- in particular, were weaker than expected. "These results can be partly explained by the very small dimensions and the structure of these particles," says Anthi Liati, specialized in the nanostructure of combustion aerosols at Empa. Moreover, the cells responded to biofuel exposure by increasing the secretion of inflammatory cytokines, which play a central role in our immune system. "This reaction reduces the ability of airway epithelial cells to react appropriately to any subsequent viral or bacterial infections," explains Marianne Geiser.

Overall, according to the researchers, it has been demonstrated that the cell-damaging effect caused by exposure to particles generated by the combustion of gasoline, diesel and kerosene fuel are comparable for similar doses and exposure times. Additionally, a similar pattern was found in the secretion of inflammatory cytokines after exposure to gasoline and kerosene fuel particles.

"The state-of-the-art measurement methods used in our study, the interdisciplinary approach, and the resulting outcomes all constitute a further important step in the research on air pollutants and their effects on human health," says Geiser.

Aerosols: distance from the source is crucial

Aerosols are the finest solid or fluid substance suspended in the air. In combustion processes, the composition of ultrafine particles is highly variable. In addition, aerosols are unstable, and they are modified after their formation. Primary ultrafine solid particles have a high diffusion velocity. As a result, at high concentrations such particles either stick together or attach to other particles. Therefore, the effect of primary ultrafine particles depends on the distance from the source, implying that there is a difference depending on whether a person is close to the source (such as people at the roadside) or at a greater distance (aircraft taxiing or taking off). Further research is needed to clarify how strong the impact would be at a greater distance from an aircraft engine. .

Environmental measures already met -- Switzerland's special commitment

Since the Swiss "Particulate Matter Action Plan" was introduced in 2006, the Federal Office of Civil Aviation (BAZL) has, based on the precautionary principle, advocated the introduction of particulate matter certification for aircraft engines and a particulate matter emission limit at the International Civil Aviation Organization's (ICAO). The BAZL established a measurement infra-structure and created the foundation for the research at SR Technics specifically for this purpose. It has been supporting top-level research in this field, which has significantly improved scientific understanding of aviation emissions and emission measurement technology, through "Special Financing of Civil Aviation" since 2012. The research led to the first global particulate matter standard for measuring particle mass and number in 2016. In February 2019, the ICAO's environment committee, on which all major manufacturing countries were represented, agreed on a recommendation for limits that should apply to new types of engine from 01/01/2023. The results of the present study contributed to establishing these global limits. So far, aviation is the only sector to have introduced global limits on the emissions of ultrafine particulate matter.

Story Source:

Poor air quality at UK airports is a serious concern for many local residents. Official reports often conclude that the main source of air pollution is road traffic, either to or from the airport, or in the vicinity generally. As a result, little attention is given in government policy to ways to minimise emissions from aircraft and other airport related emission sources. Yet there's evidence to suggest that these emissions can sometimes dominate pollutant concentrations close to airports. And while air quality in the Heathrow area frequently hits the headlines because it breaches legal limits, less information is available about smaller UK airports that can have houses situated in close proximity to the boundary fence.

The Government's air quality policy and strategy is also focused on compliance with legal limits rather than taking health-based evidence into account, and there appears to be a widening gap between the two, particularly for particulate matter.

The combustion of aviation fuel by aircraft produces nitrogen oxides (NOX), a major air pollutant associated with severe asthma and other respiratory diseases. In addition, the sulphur content in aviation kerosene fuel produces tiny particles (particulate matter or PM) and is typically between 60 and 70 times higher than in road fuel.

Whether or not these emissions contribute significantly to air pollution for those in the immediate vicinity depends on many factors including weather, wind direction, and background levels to name a few.

However, according to Dr Gary Fuller, a leading air pollution scientist at Kings College London:

"At the perimeter fence, hundreds of metres from the runway, the number of particles can be about the same as these found at the kerb of a busy London street, just a couple of metres from the traffic." (G. Fuller (2018)*The Invisible Killer: the rising global threat of air pollution – and how we can fight back.*)

A research team at Imperial College London (Hansell et al, 2013) looked into possible health impacts of pollution on the 3.6 million people living around London Heathrow Airport. Comparing available health data against flight paths, they found that there were more incidents of adverse health impacts, such as strokes and heart attacks. As these areas are also subject to higher levels of aircraft noise, further studies are underway to see if this correlation with health relates to noise, air quality, or a combination of the two.

Residents living near to the perimeter of Southend Airport, meanwhile, are very worried about emissions coming from a new aircraft holding point on one of the airport's taxiways – just metres from housing and a children's playground – where aircraft engines run for several minutes at a time. The noise from the aircraft, they say, is deafening, and the smell of fumes from the aircraft is very strong. One resident told us that a few days ago they "could smell it in our house and even taste it. … We can't enjoy the garden and can't let the kids out".

The residents have raised the issue with Southend Airport which has advised them that the taxiway is used for reasons of safety and efficiency at its busiest times, and that it would not be cost effective or practical to install a new taxiway away from the residential area. There is currently no Defra guidance on any risk to health from aircraft fumes, the airport has indicated, either for airport staff or members of the public. It has, however, agreed to install an air quality monitor near to the community's homes, initially to measure NO2 levels.

As we argued in our air quality discussion paper, published in advance of the Aviation Strategy Green Paper, there are currently a number of information gaps with respect to air pollution from aviation, including what happens to particulate matter emissions at higher altitudes (they are currently excluded from modelling above the landing and take-off cycle) and what kind of monitoring airports should routinely be undertaking and reporting. Given the many factors that influence air pollution, the Government should, we argue, update its own mapping of air pollution levels around UK airports with respect to legal limit values and WHO recommended maximum levels for pollutant concentrations.

Residents concern over the flight paths To the proposed Manston freight Terminal

Dear Sir's I am writing to you as I represent a group OAPs against a 24/7 freight terminal and we are concerned that proposed flight paths pass directly over our lovely town of 40000 residents that town is called Ramsgate. Here is evidence from Thanet District Council surveys that shows clearly in the years the airport was open with nothing like the aircraft movements that are proposed, the air quality reached danger point, and after the airport was closed the air quality despite more vehicles using the St Laurence high street where the samples were taken the quality of the air was back to normal. There is now irrefutable evidence that the particulates from air craft are dangerous to the health of young and old that's why I am asking that flight paths over our homes and leisure beaches should be barred.

Firstly the pollution threat back in 2010 {when the airport was open to traffic } the air monitors went off the scale with Nitrogen dioxide readings, this was at St Laurence high Street Ramsgate and monitored by Thanet District Council, The readings in 2017 from the same monitor showed the air quality to be back to a safe normal {This is after the airport had been shut three years} this indicates that despite an increase in lorries and cars using this main thoroughfare the pollution has not risen to the very high readings of 2010when the airport was being used . This is proof that Manston reopened as a 24/7 freight hub will threaten the health and well being of all residents that live close too the airport.

In St Laurence High Street Ramsgate stands St` Laurence Church, built in 1062 and in 1439 was struck by lightning leaving the tower with a crack that even with repairs is still somewhat fragile , I bring this too your attention as the flight path passes almost over the top of this old church and the vibrations from large aircraft I am sure will cause untold damage to the structure , just another reason a freight terminal must not happen.

I have included a PDF on the entrepreneur who is using his powers of persuasion to get this failed airport reopened his is a record of cheating and failing , three times at Manston and many times on other ventures. Twenty years ago when the RAF sold it he stated there will be no night flights "My aircraft controllers finish at 200hrs , He lied then because we had unscheduled flights coming in at all hours and will again in his efforts to make money. This long defunct airport is in the wrong place for distribution of goods flanked by sea and thousands of residents who's right to a nights sleep, and clean air to breath will be lost, plus devaluation of property, and disruption of children's schooling.

Ronald Blay, [redacted]