"For the attention of the Manston Airport Case Team" manstonairport@planninginspectorate.gov.uk

Planning Act 2008 and the Infrastructure Planning (Examination Procedure) Rules 2010
Re-determination of the Application by RiverOak Strategic Partners Limited ("the Applicant") for an Order granting Development Consent for the reopening and development of Manston Airport in Kent.

Summary of Response
The SoS Letter TR020002-005360FINAL in Paragraph 2, refers to changes which inform: (a) "the level of need for the services" and: (b) "the benefits that would be achieved from the development"

(a) Need
The Inspectors' assessment showed a lack of need because any unmet demand could be met by other airports which had, (and still have), spare capacity and are better located to serve that need.
These existing airports have invested millions of pounds in the airports and their local areas have invested in improved infrastructure. This includes public facilities such as schools and hospitals, but now that public and private finances have been devastated by the pandemic, East Kent would be unable to provide similar facilities, especially as there is no need for the airport.

Much stronger policies to reduce climate change emissions have come in, and are being further strengthened, as described below.
In addition COP 26 in Glasgow this year, will add to pressure for much greater and more rapid, decarbonisation.
Hence even greater restraints will be put on air transport because of its large climate impacts.

Furthermore the carbon impacts of imports, and probably for exports as well, will need to be accounted for, with increased border tariffs or similar actions, which will make imports more expensive, and further reduce any unmet demand.

In terms of imports and exports, the Applicant may have assumed that Brexit and new border controls, would increase use of their proposed airport. However border issues have been resolved, the Kent Access Permit is no longer required, Operation Brock was removed in April, and traffic flows through the tunnel and on ferries are going smoothly.
So Applicants cannot justify Manston as a faster way through border controls.

Finally, I re-iterate the very important issue of location on the Isle of Thanet. This is as far East that you can go without falling in the North Sea, so is a long way from the markets to which freight would go, or from suppliers of freight to go overseas. So there is no need for a freight airport in East Kent.
The journeys to or from destinations or origins are at high risk of interruption, especially from flooding and congestion, so further diminish any need for an airport at Manston.

Hence as well as the declines due to Covid-19, these factors will prevent any role for the development.

(b) Benefits
Any expected net 'benefit' can only be assessed after all the impacts have been accounted for.
Hence the 'Impacts' also need to be reassessed, and aspects of changes in these impacts are: Noise; Health; Climate Change; Air Pollution and Natural Capital.
My evidence below, shows that the impacts of all these aspects, are now all greater than originally assessed, and also their relative importance is much greater than previously assessed.

So the lack of Need and the much greater Impacts mean that the development is totally unacceptable, and the Application must be Refused.

The SoS also refers to the "currency of the environmental information produced for the application" and clearly the information I provide in about its greater Impacts also means that all the Applicant's data will need to be re-assessed and consulted upon.

1 Noise

1.1 *The Independent Commission on Civil Aviation Noise (ICCAN)*

The Independent Commission on Civil Aviation Noise (ICCAN) had no involvement with the Examination because it was still being set up at that time, but since then it has produced advice on best practice on aviation noise measurement, impacts and management.
For example:
"Number Above (Nx) is the most appropriate complementary metric. This will enable communities to see official data relating to the frequency of significant noise events over their communities." (Recommendation 1 in: 2020_07_16_ICCAN_review_of_aviation_noise_metrics_and_measurement.pdf)
"We see the potential for much improvement in the way in which aviation noise is measured, collected and communicated to the public. " (ibid, Recommendation 6)
"There is increasingly robust evidence on the effects of aviation noise on health and quality of life, as well as on cognition and learning in children."(Page 30, 2021_03_18_ICCAN_report_on_the_future_of_aviation_noise_management.pdf)

ICCAN's most recent newsletter, June 2021 (https://clicks.redcircledigital.co.uk/view_online/view_online.php?token2=hOC35-oNu3yawKOdXgh8X3ofrxnRPY1gSGtuynfeHulJ2EqG4VEOosuFo3laRsfan-b9QIU_pbwr4E6PLztboQ..), says:
"ICCAN's review of SoNA 2014 found that while it had sought to follow best practice there was room for improvement in future attitudinal surveys. **It is highly likely that attitudes to noise have changed drastically** in this time, either through operational changes or due to noise reduction felt as a result of the COVID-19 pandemic."

ICCAN has produced an additional aid to enable noise impacts of flight paths to be assessed.
"This toolkit has been produced to help sponsors plan for public consultations predominantly for Level 1 airspace change proposals under Stage 3A of the Civil Aviation Authority's (CAA) CAP1616 process as they consult with impacted groups, local communities and other airspace users about changes to their departure and arrival routes. It will also be relevant to some Level 2 changes, and the principles in it should equally apply.
ICCAN's focus is noise and the implications any future airspace change may have on people's lives, as they could be exposed to increased or new noise because of the proposals. it is vital that change sponsors ensure noise is appropriately addressed and not conflated with other issues. It is the view of ICCAN that noise and its impacts on people's lives should be a key focus of any consultation." (https://consultation-toolkit.iccan.gov.uk)

All these factors mean that the noise is of much greater importance than at the Examination, so that the the development would have a much greater, and therefore unacceptable, impact on the East Kent population and its visitors.

So the Applicant needs to use and implement all of ICCAN's recommendations to re-assess the noise impacts of the Application.
It also needs to re-assess the impacts of its associated Airspace Change proposals to enable proper assessment of its currently proposed flight paths.

Finally, as ICCAN has not been involved here so far, it is time that the Secretary of State asked for their input.

1.2 *Quota Counts of Aircraft*

The noise management of the airport partly depends on the Quota Counts (QC) of the aircraft. However the Civil Aviation Authority (CAA) has found that some aircraft's actually noise levels lie entirely above their QC bands, and these differences cannot be explained in operational terms (CAA: ERCD Report 0205).
This means that the proposals would have even greater noise impacts than has been assessed so far, consequently with even greater adverse impacts on the area.

1.3 *The CPRE aircraft noise study*

This report from CPRE Sussex based on research by to 70, 19.861.01, July 2019 (https://www.cpresussex.org.uk/wp-content/uploads/sites/16/2020/02/FlightZBlightZCPREZNAvGZFINAL.pdf and https://www.twaang.net/uploads/6/5/1/2/65129163/to70_noise_report_final_v3.pdf), shows that the UK uses 54 dB Lden as an 'Annoyance' threshold value, but other European countries are using much lower noise levels than the UK. The WHO level of 45 dB Lden would mean that five times as many people would be within the existing UK noise reduction focus area.

So clearly the UK standard is inadequate, and if the Application showed WHO contours it would show the true dimensions of the potential and unacceptable annoyance that the Application would cause.

1.4 *EU Noise Action Plans*

A review of EU noise action planning suggests little has been achieved, and it says: "After three rolling cycles of the European Noise Directive (2009-2013, 2014-2018, 2019-2023) the reality demonstrates that overall, there are no significant reductions of populations exposed.

The objective of the END is to reduce people exposed and, therefore, improve the health and quality of life of the European population, and achieving this goal is not being demonstrated."

(ETC/ATNI Report 07/2020: Noise Action Plans. Impact of END on managing exposure to noise in Europe. Update of Noise Action Plans 2019 can be viewed on www.eionet.europa.eu/etcs/etc-atni/products/etc-atni-reports/etc-atni-report-07-2020-noise-action-plans-impact-of-end-on-managing-exposure-to-noise-in-europe-update-of-noise-action-plans-2019)

The UK has been part of these cycles, and as is clear from ICCAN's work, above, people continue to be very annoyed by aircraft noise, and the claimed reductions in noise has not reduced the noise impacts.

Added to the ever-increasing recognition of the very damaging impacts of noise, means that Manston, located so close to the large populations at Ramsgate and elsewhere in East Kent, cannot be approved.

1.5 *Gutenberg Health Study*

Annoyance from different noise sources is associated with atrial fibrillation. This study found significant associations between annoyance caused by noise and Atrial Fibrillation from aircraft noise in daytime and at night during sleep (DOI:https://doi.org/10.1016/j.ijcard.2018.03.126). This is an important health impact and adds to previous links of aircraft noise with ill health.

1.6 *Traffic noise increases acute myocardial infarction (AMI) and congestive heart failure (CHF)*

Recent research (https://ehp.niehs.nih.gov/doi/10.1289/EHP5809) shows that chronic exposure to road traffic noise is associated with elevated risks for AMI and CHF incidence.

These results were robust to various sensitivity analyses and remained elevated after controlling for long-term exposure to Ultrafine particles and nitrogen dioxide. They found near-linear relationships between noise and the incidence of AMI and CHF with no evidence of threshold values.

The proposed airport would generate a lot of traffic, and therefore increase noise and air pollution levels, especially as freight vehicles tend to be diesels and are noisier and more polluting than petrol passenger cars.

Hence this factor is a seriously adverse effect and adds to the evidence against the proposals.

1.7 *Aviation Noise and Heart Attacks*

Swiss researchers have uncovered further evidence of the link between aviation noise and heart attacks.

They studied 24 886 cases of death from cardiovascular disease (CVD) from the Swiss National Cohort around Zürich Airport between 2000 and 2015. For night-time deaths, exposure levels 2 hours preceding death were significantly associated with mortality for all causes of CVD.

The most consistent associations were observed for ischaemic heart diseases, myocardial infarction, heart failure, and arrhythmia. Associations were more pronounced for females and for people living in areas with low road and railway background noise and in buildings constructed before 1970.

A particular strength of this study is the high precision aircraft noise modelling accounting for single, specific flight events, yielding individual aircraft noise exposure estimates with high spatial and temporal accuracy for each death case.

So this means that aircraft noise can actually cause death, as well as causing adverse health impacts.
(Does night-time aircraft noise trigger mortality? A case-crossover study on 24 886 cardiovascular deaths, Apolline Saucy et al, *European Heart Journa*l, Volume 42, Issue 8, 21 February 2021, Pages 835–843, https://doi.org/10.1093/eurheartj/ehaa957)

The conclusions of this research have also been emphasised in an Editorial by the European Society of Cardiology (European Heart Journal (2020) 00, 1–3 doi:10.1093/eurheartj/ehaa984), who conclude that the impacts of this research mean that "a complete ban on nighttime flights must be the consequence. There is now substantial evidence that (aircraft) noise is a cardiovascular risk factor that cannot be modified by patients or doctors, but rather by politicians and the cardiovascular societies such as the ESC and AHA/ACC reinforcing, for example, the new noise limits published in the WHO guidelines concerning road, aircraft, and railway noise."

So Manston cannot go ahead because the proposal would be a completely new source of very loud sounds, which would be above the WHO recommended maximum of 45 L_{DEN}, and the already deprived and precarious health of many people in Thanet would be further deliberately damaged if this proposal went ahead.

1.8 *Noise Management*
The well-respected Noise Bulletin, June 2021, reports on the recent wind turbine conference, organised by Dick Bowdler, who published comments associated with that conference:
For instance, David Michaud from Canada noted: "We find wind turbine complaints were inversely related to annoyance. We think those people who are highly annoyed long term may be that way (in part) because **they've learned complaining does nothing. Whereas in areas where complaints help, they may actually have lower annoyance.**"
But the real learning point was the reaction to Scotland's 'difficult' noise sufferers Aileen Jackson and Rosemary Milne who both have campaigned against their turbines having been disturbed for several years.
Some international delegates expressed amazement that such annoyance has not been dealt with, and it almost felt that many of the acousticians had never really 'met' any real noise sufferers, especially those who now probably know more than them about turbine annoyance.
For their part, **Jackson and Milne repeated their warnings that turbine noise should not be averaged away with long term indicators, nor should sufferers become invisible by large scale annoyance surveys which see those annoyed swamped by the numbers of those further away that are not annoyed**."
(https://www.windturbinenoise.eu/content/conferences/9-wind-turbine-noise-2021/2021-organising-committee/)
Likewise those who have been affected by aviation noise will know that complaining has rarely achieved anything, so give up complaining.
Averaging aviation noise has long been recognised as an inadequate representation of the noise impact.
Similarly, having had 20 years involvement with aviation noise I question why has so little been done when people's health and well being has been so badly affected?

As this is the International Year of Sound it is to be hoped that the potentially huge noise impacts of the Application will be recognised and therefore refused.

2 Health
2.1 *Inequalities*
The Marmot Report (https://www.theguardian.com/uk-news/2021/jun/30/life-expectancy-key-to-success-of-levelling-up-in-uks-poorer-areas-covid-pandemic & https://www.health.org.uk/publications/build-back-fairer-the-covid-19-marmot-review) has revealed that: "The deteriorating health equalities picture in the region and across similarly deprived areas of the country was a result of longstanding, avoidable socioeconomic inequities and ethnic disadvantage, exacerbated by a decade of spending cuts and amplified by Covid and the effect of prolonged lockdowns"
Also: "Government's ambition to level up regional differences has been criticised for overly focusing on large economic infrastructure projects. Marmot's proposals suggest the focus should be widened to address the social conditions that cause inequalities at community level. "Levelling up really ought to be about equity of health and wellbeing".

Hence a decision to approve the Development could lead to a challenge on Human Rights grounds.

These important factors also apply to Paragraph 4 of the SoS letter, so the Applicant needs to revise its noise assessment taking these factors into account.

3 Climate Change

3.1 *The Climate Change Committee (CCC)*

I have not commented on the Sixth Carbon Budget because the CCC's most recent report is: "CCC Progress-in-reducing-emissions-2021-Report-to-Parliament" (https://www.theccc.org.uk/publication/2021-progress-report-to-parliament/) is their most up to date report. This also builds on their Sixth Carbon Budget recommendations.

Although the Government has signed up to the CORSIA scheme, the CCC considers that the scheme does not provide any certainty that offsets in scheme will actually happen, or if they do happen, that they will be maintained in perpetuity. Hence CORSIA as well as being too late for effective action, is also inadequate for reliable removal of emissions, so cannot be included as a way of minimising aviation emissions.

"Carbon offset schemes" used by some airlines have been shown to be based on a flawed system which does not deliver the 'offsets' claimed, and therefore do not reduce the effects of aviation emissions as planned.
See: https://www.theguardian.com/environment/2021/may/04/carbon-offsets-used-by-major-airlines-based-on-flawed-system-warn-experts
The particular research relating to UK airlines is available on:
https://unearthed.greenpeace.org/2021/05/04/carbon-offsetting-british-airways-easyjet-verra/

Many countries appear to rely on Carbon Dioxide Removal (CDR), also known as "negative emissions", but as well as there being no certainty of these being achieved, it is also highly unlikely that there would be enough removals to meet the total global need.
Furthermore analysis by Carbon Brief (https://www.carbonbrief.org/guest-post-emissions-should-fall-twice-as-fast-in-case-negative-emissions-fail?utm_campaign=Carbon%20Brief%20Weekly%20Briefing&utm_content=20210702&utm_medium=email&utm_source=Revue%20Weekly) of new research published in Environmental Research Letters (https://iopscience.iop.org/article/10.1088/1748-9326/ac0749) shows that emissions should be cut twice as fast during the 2020s to keep warming "well below" 2C while insuring against failure of CDR schemes, even if the chances of non-delivery are small.
The benefit of cutting emissions sooner means that sub-1.5 °C targets could be within reach but only if CDR is additional to, rather than replaces, emission reductions.
All this means that more rapid emission reductions as well as future CDR should avoid the current high risks of a tipping point occurring with devastating impacts on the whole country.

So refusing Manston is essential to avoid additional emissions sending us over the tipping point.

As well as Carbon Dioxide Removal being uncertain at present, UK Onward (https://www.ukonward.com/qualifyingfornetzero/) have highlighted that even for basic things such as properly insulating houses requires many more people to be properly trained. So far the Government does not seem to have fully appreciated the importance of this, hence this Report is very significant in emphasising the need for much more training to be provided.
Hence the decarbonisation of existing housing and even new houses, is also uncertain, which means that easy and cost-saving measures to avoid new emissions, such as refusing Manston have a very high priority.

The reference in the first box in Table A6 (below, in bold italics) is to "verifiable greenhouse gas removals", and these are only to be used after all the other actual actions, such as demand side measures.

Demand-side measures, and especially refusing Manston, would be a very simple cost saving way to avoid increasing aviation emissions, and also avoid the consequential emissions from its construction and all the associated traffic, housing etc.
So Manston cannot be approved.

3.2 *The CCC "Progress-in-reducing-emissions-2021-Report-to-Parliament"* (https://www.theccc.org.uk/publication/2021-progress-report-to-parliament/) has numerous sections recommending even stronger action to reduce emissions, and the whole document should be considered in relation to this Application.

Above all, the most relevant section is Table A6, Page 211, " ":

Table A6 Recommendations for the Department for Transport (DfT)		Timing
Aviation	Commit to a Net Zero goal and pathway for UK aviation as part of the forthcoming Aviation Decarbonisation Strategy, with UK international aviation reaching Net Zero emissions by 2050 at the latest, and domestic aviation potentially earlier. Plan for residual emissions (after efficiency, low-carbon fuels, and demand-side measures) to be offset by ***verifiable greenhouse gas removals***, on a sector net emissions trajectory to Net Zero.	2021 Priority recommendation
	Assess the Government's airport capacity strategy in the context of Net Zero and any lasting impacts on demand from COVID-19, as part of the aviation strategy. There should be no net expansion of UK airport capacity unless the sector is on track to sufficiently outperform its net emissions trajectory and can accommodate the additional demand. A demand management framework will need to be developed (by 2022) and be in place by the mid-2020s to annually assess and, if required, control sector GHG emissions and non-CO_2 effects.	2021-22 Priority recommendation
	Take a leadership role within the International Civil Aviation Organisation (ICAO), and work with other high-ambition nations, to set a long-term goal for aviation consistent with the Paris Agreement, strengthen the CORSIA scheme and align CORSIA to this long-term goal.	2021-22
	Continue innovation and demonstration support for sustainable aviation fuel (SAF) technologies, aircraft efficiency measures, hybrid, full electric and hydrogen aircraft development and airspace modernisation. Set out a policy package for supporting the near- term deployment of commercial SAF facilities in the UK (with carbon capture and storage where applicable). Longer-term, support for SAF should transition to a more bespoke, enduring policy to drive uptake.	Now and ongoing Policy package in 2021
	Use aviation tax reform to address price imbalances between aviation and surface transport, encouraging the low-carbon alternative (e.g. rail) for journeys where one exists. Taxation should also be used, alongside improvements in broadband, to embed positive behaviours that have arisen during the pandemic (e.g. replacing business travel with online networking).	2021-22
	Commit to not use credits from the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) for flights covered by the UK ETS unless and until they can satisfy strict eligibility criteria (equivalence, additionality, permanence, sustainability).	2021-22
	Start monitoring non-CO_2 effects of aviation (including through CORSIA for eligible aeroplane operators), set a minimum goal of no further warming after 2050, research mitigation options, and consider how best to tackle non-CO_2 effects alongside UK climate targets without increasing CO_2 emissions.	

I have highlighted some key aspects of this Table.

The first recommendation, "Commit to a Net Zero goal and pathway for UK aviation as part of the forthcoming **Aviation Decarbonisation Strategy**" means Aviation has to join other industries and reduce emissions, so the Application is incompatible with that requirement.

In particular, I consider that the second recommendation: "There should be no net expansion of UK airport capacity" means that there is no scope at all for the Application to succeed.

This view is reinforced by the recent approval of increased throughput at Stansted, which would increase emissions above previous levels, so even 'existing capacity' is too great to meet the CCC requirements.

Furthermore the Airports National Policy Statement (ANPS) only provides for capacity expansion at Heathrow, and

many years of evidence including that of the Airports Commission (2015, the 'Davies Commission', https://www.gov.uk/search/all?keywords=airports+commission&order=relevance), showed that expansion at Heathrow would reduce activity at other airports, and therefore excludes building any new capacity in the UK, and therefore excludes any possibility of this Application being approved.

This CCC recommendation also refers to: "A demand management framework will need to be developed (by 2022)," so this also excludes Manston because it would be unacceptable to create additional traffic in what will then be a demand management situation. It would be inequitable to expect other airports to accept demand management in the face of completely new and additional activity at Manston.

The CCC also recommend "aviation tax reform" which would reduce any economic benefit that Manston might be expected to achieve, and of course would also be a disincentive to use the proposed airport, with its longer distance to its expected markets. This target is also part of Table A2 for the Treasury and A4 for BEIS.

The final recommendation: "Start monitoring non-CO2 effects of aviation (including through CORSIA for eligible aeroplane operators)" means further restraint on aviation activity especially that of freight at Manston because freight aircraft are older, less efficient and heavier aircraft, use more fuel and produce more non-CO2 effects than modern passenger aircraft which also carry freight.

It is also important that two thirds of the amount of climate warming from aviation since 1940, when flying became more common, has been caused by emissions other than carbon dioxide. Carbon dioxide remains in the atmosphere for over 100 years, so all the aviation carbon dioxide is still in the atmosphere.
This is shown on: https://ars.els-cdn.com/content/image/1-s2.0-S1352231020305689-gr3_lrg.jpg

Although the Jet Zero Council has targets to *design* zero emission aircraft to travel 1,000 km with 100 people by 2030, and have zero emission transatlantic demonstrator flight by 2040, that is far too late. This is especially the case because actually mass producing aircraft takes many years, and even then airlines have to pay to replace their existing aircraft, which have a lifetime of 30 years or more.

This means that aviation emissions be rapidly reduced from former levels, so activity must not be allowed to return to pre-pandemic levels if we are to stand any chance of avoiding catastrophic climate change.

This Table, A6, goes on to recommend, as a "2021 Priority recommendation": "Develop the option of applying either border carbon tariffs or minimum standards to imports of selected embedded-emission-intense industrial and agricultural products and fuels. This should include initiating development of carbon intensity measurement standards and fostering international consensus around trade policies through the G7 and COP presidencies. "
For Manston intending to bring freight here, border carbon tariffs are likely to devastate the business case, not only for agricultural products for example, but also because air freight is itself a carbon intense mode and so adds to the carbon of the actual product.
This is also recommended for the COP Unit, FCDO, DfIT.

For the Department for Transport, Table A6: "Decisions on investment in roads should be contingent on analysis justifying how they contribute to the UK's pathway to Net Zero". This means that the emissions consequent upon the required road network changes for Manston and the additional surface traffic associated with the Application would increase emissions, and thereby be unacceptable.

3.3 *CCC Risk Assessment*
The CCC has also produced a risk assessment (see: https://www.ukclimaterisk.org/)
and the CCC is very critical of the UK's lack of progress to date in actually reducing climate risks and emissions.
Efforts to manage climate risks in the UK have been "underfunded and ignored" leaving the nation vulnerable to rising temperatures.
Global warming is already having far-reaching impacts as heatwaves and floods increase in scale and frequency. These are set to worsen, the CCC says, even if emissions are cut dramatically.
This makes adapting to climate change essential, but ministers have failed to grasp the importance of measures such as heat-

resilient homes.
Not only could adequate adaptation save lives and money, the committee says, it would ensure a resilient electrical grid and healthy forests capable of sucking up carbon dioxide, both of which are essential to achieve the UK's legally binding goal of net-zero emissions by 2050.
Due to this, the net-zero goal "will fail" unless the government urgently boosts the nation's climate resilience.

If other sectors fail to achieve Carbon Zero, aviation would have to make greater emissions reductions, so this proposed Development would be even more unacceptable.

In CCRA3 – Briefing – Transport, a Key Message is: "Transport is fundamental to day-to- day life, but regularly faces climate challenges from flooding, heat, erosion, subsidence and extreme weather. As the climate continues to change, the severity of these risks is projected to increase. "
It identifies twelve aspects of risks for transport, all of which need more work doing to manage them effectively:
"I1. Risks to infrastructure networks (water, energy, transport, ICT) from cascading failures
I2. Risks to infrastructure services from river, surface water and groundwater flooding
I3. Risks to infrastructure services from coastal flooding and erosion
I4. Risks to bridges and pipelines from flooding and erosion
I5. Risks to transport networks from slope and embankment failure
I7. Risks to subterranean and surface infrastructure from subsidence
I12. Risks to transport from high and low temperatures, high winds, lightning "
The CCC assessment is that all these risks are of concern, but especially I 1 and I 2 which are already High risk, but of course for Thanet, I 3, 4, 5, and 12 are higher risks because of its situation.
All of these are relevant to Manston, because Manston is on the Isle of Thanet and completely surrounded by water, and both sea and river levels are likely to rise, both in calm times but especially when winds, tides and rainfall combine to exceed design levels of existing infrastructure.
Air freight is at risk both for aircraft being adversely by high temperatures, which has already happened in USA, but also due to runway problems, etc.
Similarly even if aircraft are able to operate, the airport is useless if the connecting roads fail, as has happened in the recent past due to flooding, as shown in my evidence to the Examination,.
I have seen no evidence of assessment of these risks from the Applicant, which suggests that the proposals are not "future proofed" for climate change.
Hence the Application must be refused.

3.4 Other Climate Reports

3.4.1 The New Economics Foundation's Report: "**TURBULENCE EXPECTED** THE CLIMATE COST OF AIRPORT EXPANSION", (https://neweconomics.org/uploads/files/NEF_Turbulence_Expected.pdf May, 2021), shows that the existing assessment of airport climate impacts is inadequate, and underplays the climate damage caused by aviation activity.
Hence this Application has underplayed its climate impacts, and this adds to the need to refuse it.

3.4.2 Another article, (Three ways to improve net-zero emissions targets by Joeri Rogelj, Oliver Geden, Annette Cowie & Andy Reisinger https://www.nature.com/articles/d41586-021-00662-3) highlights the vagueness of climate targets, including those of the UK, and how they will be achieved.
Under the Precautionary Principle, a key requirement of the Government's Sustainable Development Strategy, the Government cannot approve this Application, because it is clearly not compliant with existing targets, and certainly not with improved targets which are needed to satisfy COP 26.

3.4.3 *Aviation Warming Impact much greater than previously calculated*
Aviation emissions, both global and UK, are higher than previous calculations as shown in Carbon Brief by Professors David Lee & Piers Forster, (also "Published in the journal Atmospheric Environment (https://www.sciencedirect.com/science/article /pii/S1352231020305689), who – along with 19 other scientists around the world – recently produced an updated analysis of the present-day climate impacts of aviation.
They find that, when all its impacts are taken into account, aviation represents around 3.5% of the warming impact

caused by humans in the present day. ”
(See attachment “Guest post- Calculating the true climate impact of aviation emissions”)
In other words the warming impact is around 50% greater than previously acknowledged.
Cumulative CO2 emissions is really what matters because of the long lifetime in the atmosphere is very pertinent.
Also that the impacts of non-CO2 emissions are at least twice as much as CO2 emissions.

UK aviation’s CO2 emissions grew by nearly 16% between 2010 and 2018 (and by 124% since 1990) and reached a new record high in 2019. The Climate Change Committee project that aviation will account for 35% of the UK’s residual emissions by 2050, placing a highly restrictive and unfair burden on other areas of the productive economy.

3.4.4 *Canadian Heatwave*
If these facts are not enough, analysis of the recent extreme heatwave in Canada shows that that human-caused climate change made the extreme weather at least 150 times more likely. Authors of the new study said the latest warming surge exceeded even the worst-case scenarios of climate models (https://www.worldweatherattribution.org/western-north-american-extreme-heat-virtually-impossible-without-human-caused-climate-change/ Reported in: https://www.theguardian.com/science/2021/jul/07/world-must-step-up-preparations-for-extreme-heat).

“What everyone needs to take from this study is how the impact of climate change is manifesting today is to a large degree in the strong intensity and frequency of heatwaves,” Dr Friederike Otto, the associate director of the environmental change institute at the University of Oxford, said.
The costs – in terms of deaths, illness, missed work hours and property damage – were growing rapidly, said Maarten van Aalst of the Red Cross Red Crescent Climate Centre and the University of Twente.
The authors' main findings include: “Looking into the future, in a world with 2°C of global warming (0.8°C warmer than today which at current emission levels would be reached as early as the 2040s), this event would have been another degree hotter. An event like this – currently estimated to occur only once every 1000 years, would occur roughly every 5 to 10 years in that future world with 2°C of global warming.”

3.4.5 *Excess deaths from exposure to cold or hot temperatures*
A new report “Global, regional, and national burden of mortality associated with non-optimal ambient temperatures from 2000 to 2019: a three-stage modelling study” (https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00081-4/fulltext) this study is the first to provide a global overview of mortality burden attributable to non-optimal temperatures between 2000 and 2019—the hottest period since the pre-industrial age.
It shows that for the last three year period studied, 2016 – 2019, in the UK, deaths increased due to higher temperatures caused by climate change, and that the greatest increase was in south.
So the climate change is already killing more people, adding to the need for faster action.

3.4.6 *Conclusion on Climate Change*
As the Airport Communities Forum, Aviation Environment Forum and others said in their letter to the Prime Minister and the Secretary of State, with regard to the aviation industry's climate change effects and other adverse environmental impacts: “Its track record to date is dismal.” (Letter 19 November, 2020).

All these factors mean that the UK has to **reduce** its emissions even further and more quickly, and not add more emissions, so new emissions from the proposed Manston Development are unacceptable.

4 Air pollution
Noise, climate change emissions and air pollution are often associated together.
For example the death of Ella Kissi-Debrah, was from asthma caused by air pollution, and her location also had high noise levels and large climate change emissions from the road traffic.

Similar situations will occur in East Kent if the Application goes ahead because of both the air traffic and all the road traffic associated with the airport.

So the airport would be fatal for people in East Kent, from the increased: climate heating; air pollution and noise pollution.

As we have had thousands of avoidable Covid-19 deaths, it would be inadvisable to cause more deaths unnecessarily by approving this Application.

5 Natural capital

The government's "Enabling a Natural Capital Approach" (www.gov.uk/guidance/enabling-a-natural-capital-approach-enca) provides guidance and data on how various environments provide natural capital and on how to assess these benefits.

For example, the proposed site and of-site areas affected by the proposals, includes large areas of grasslands, and the ENCA_Assets_Databook_July_2020_update Sheet 11/11 says: "**Semi-natural grasslands are all grasslands unimproved for agricultural purposes. They once covered a large proportion of the UK's land area, largely the result of low-intensity traditional farming. The extent of semi-natural grasslands is now extremely reduced, with high-diversity grasslands comprising 2% of UK grassland (≥1% of total land area). Semi-natural grasslands are highly valued culturally.**"

So these areas are scarce and highly valuable for the range of benefits described in the guidance, but their value has not, so far, been properly accounted for in the Application assessments.

The guidance also includes the issue of noise, and that the value of change in noise may be greater in or near densely populated locations, than more remote areas, adding to devastating impacts of the proposals on Ramsgate, for instance.

In view of their value, the serious criticisms from the Climate Change Committee and the lack of government action to improve carbon management, it would be unacceptable to allow these valuable areas to be damaged or destroyed by the proposed Development.

6 Environmental Information

The Applicant is asked: "In light of the passage of time since close of the examination, the Secretary of State requests the **Applicant** to consider the currency of the environmental information produced for the application".

In view of the information provided in this response, it is clear that the environmental information and assessments need to be completely revised, although the evidence provided here and by other Interested Parties, should be sufficient to Refuse the Application.

This guest post is by:

Prof David S Lee (https://www.mmu.ac.uk/health-psychology-and-communities/staff/profile/index.php?id=2477), professor of atmospheric science and director of the Centre for Aviation, Transport and the Environment (https://www.cate.mmu.ac.uk/) at Manchester Metropolitan University (https://www.mmu.ac.uk/).

Prof Piers Forster (https://environment.leeds.ac.uk/see/staff/1267/professor-piers-forster)**,** professor of climate physics at the University of Leeds (https://www.leeds.ac.uk/) and director of the Priestley International Centre for Climate (https://climate.leeds.ac.uk/).

Before the Covid-19 pandemic and its lockdown restrictions (https://www.carbonbrief.org/coronavirus-green-recovery-could-prevent-0-3c-of-warming-by-2050), air travel had become an almost unquestioned facet of modern-day life for many affluent nations and individuals – almost as much as the car.

Data for 2018 (https://www.airlines.org/data/) shows the global population flying more frequently – and over longer distances than ever before – with nearly 38m scheduled flights, carrying 4.3bn passengers over a total of 54bn km. Aviation has been growing at around 5% per year before 2020.

But what is the climate cost of all these flights? The oft-quoted fi

is that aviation accounts for around 2% of global CO2 emissions (https://www.atag.org/facts-figures.html). Yet, the impact of aviation on the climate goes beyond just CO2 (https://www.carbonbrief.org/explainer-challenge-tackling-aviations-non-co2-emissions) and its emissions have complicated interactions in the atmosphere that can reinforce the warming impact.

Aviation's climate impacts have been studied for many years, including a special report (https://www.ipcc.ch/report/aviation-and-the-global-atmosphere-2/) by the Intergovernmental Panel on Climate Change (https://www.ipcc.ch/) (IPCC) in 1999, but rarely are all the results pulled together to produce such a comprehensive analysis and assessment based on the best available science.

Published in the journal Atmospheric Environment (https://www.sciencedirect.com/science/article/pii/S1352231020305689), we – along with 19 other scientists around the world – recently produced an updated analysis of the present-day climate impacts of aviation.

We find that, when all its impacts are taken into account, aviation represents around 3.5% of the warming impact caused by humans in the present day.

Below, we unpack this headline result of the study and describe a little of the context.

Unusual sector

When estimating and attributing emissions, aviation is a somewhat unusual sector – 65% of its CO2 emissions (https://www.icao.int/environmental-protection/Documents/EnvironmentalReports/2019/ENVReport2019_pg17-23.pdf) (pdf) are in international airspace and, therefore, do not necessarily "belong" to individual nation states.

In addition, aviation has a large dependence on liquid fossil fuels, stringent safety regulations, as well as a long aircraft development and fleet turnover time. This means that rapid changes to the fleet – such as those being seen in motor vehicles (https://www.carbonbrief.org/factcheck-how-electric-vehicles-help-to-tackle-climate-change) – are simply not financially viable, let alone technologically feasible.

The international aviation sector was not included in the Paris Agreement (https://www.carbonbrief.org/interactive-the-paris-agreement-on-climate-change) on climate change. As a result, it is not addressed by individual nations in their pledges to reduce emissions (https://www.carbonbrief.org/paris-2015-tracking-country-climate-pledges), known as Nationally Determined Contributions (https://www.carbonbrief.org/explainer-what-are-intended-nationally-determined-contributions). Yet, without tackling aviation – and shipping (https://www.carbonbrief.org/in-depth-will-countries-finally-agree-climate-deal-for-shipping), another sector with international emissions – meeting the 2C or 1.5C warming limits of the agreement is made more difficult.

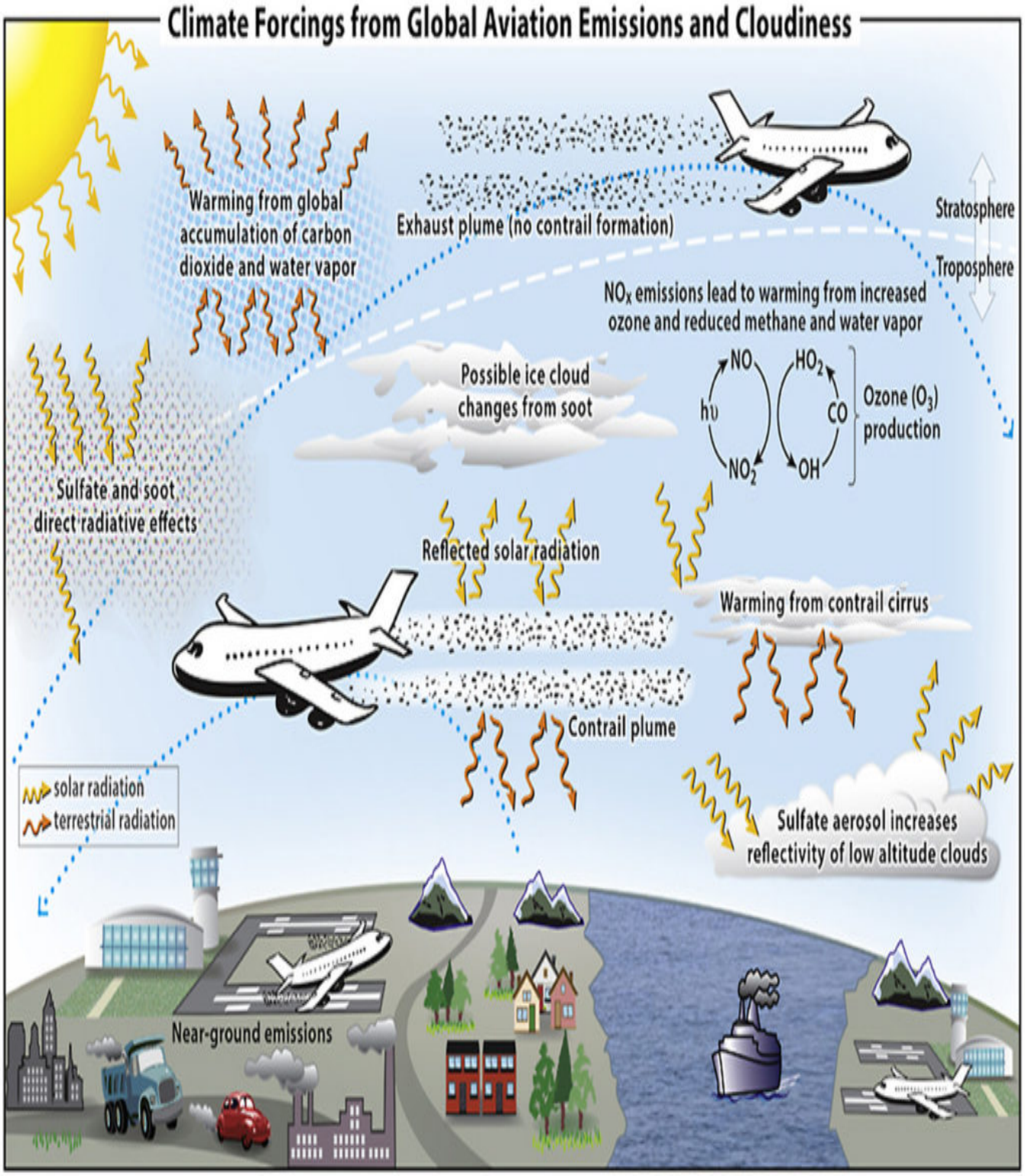
The aviation industry does have Corsia (https://www.carbonbrief.org/corsia-un-plan-to-offset-growth-in-aviation-emissions-after-2020) ("Carbon Offsetting and Reduction Scheme for International Aviation), a scheme agreed in 2016 by 192 countries through the UN's aviation agency (https://www.icao.int/Pages/default.aspx), ICAO. The aim of Corsia is to help the industry reach its "aspirational goal (https://www.icao.int/annual-report-2013/Pages/progress-on-icaos-strategic-objectives-strategic-objective-c1-environmental-protection-global-aspirational-goals.aspx)" to make all growth in international flights after 2020 "carbon neutral".

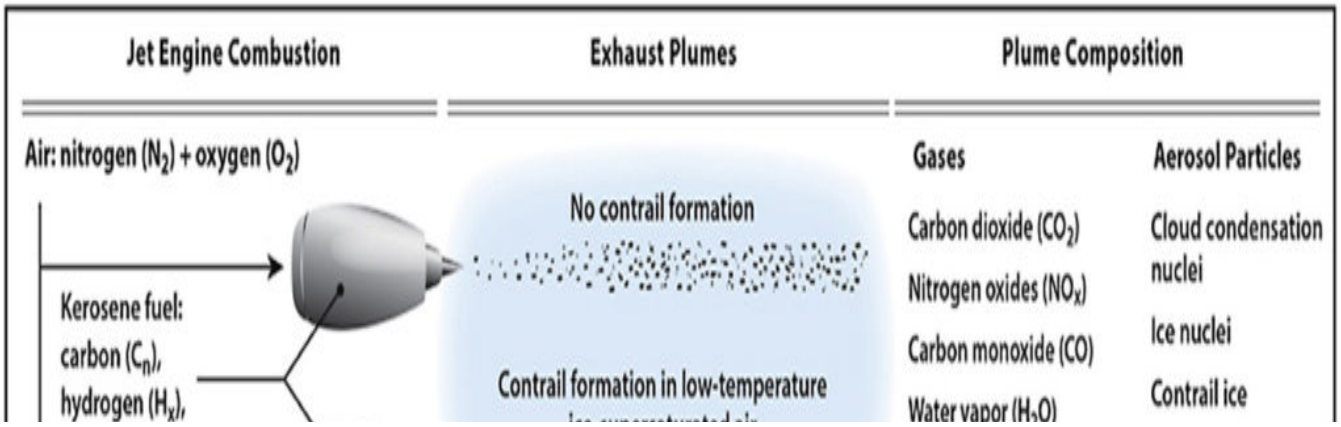
However, Corsia has been subject to criticism (https://www.carbonbrief.org/corsia-un-plan-to-offset-growth-in-aviation-emissions-after-2020#criticisms), not least that, unless it is extended beyond 2035, the scheme will cover only 6% of projected CO2 emissions from all international aviation between 2015 and 2050.

CO2 effects

Despite the lack of coordinated international action, in order to address aviation's climate impacts, it is still necessary to know what they are.

This is no small task, not least because the emissions from aircraft jet engines have a catalogue of direct and indirect impacts on the climate. These are summarised in the graphic below and we'll tackle them in turn in the text below.


Climate Forcings from Global Aviation Emissions and Cloudiness
Warming from global accumulation of carbon dioxide and water vapor
Exhaust plume (no contrail formation)
Stratosphere
Troposphere
NO_x emissions lead to warming from increased ozone and reduced methane and water vapor
Possible ice cloud changes from soot
NO
HO_2
hυ
CO
NO_2
OH
Ozone (O_3) production
Sulfate and soot direct radiative effects
Reflected solar radiation
Warming from contrail cirrus
Contrail plume
solar radiation
terrestrial radiation
Sulfate aerosol increases reflectivity of low altitude clouds
Near-ground emissions


Jet Engine Combustion
Exhaust Plumes
Plume Composition
Air: nitrogen (N_2) + oxygen (O_2)
No contrail formation
Kerosene fuel: carbon (C_n), hydrogen (H_x),
Contrail formation in low-temperature
Gases
Carbon dioxide (CO_2)
Nitrogen oxides (NO_x)
Carbon monoxide (CO)
Water vapor (H_2O)
Aerosol Particles
Cloud condensation nuclei
Ice nuclei
Contrail ice

Aviation's CO2 emissions are a relatively easy component to understand. Using historical data, we calculate that the total historical cumulative emissions of CO2 amount to some 32.6bn tonnes since 1940, nearly 50% of which were emitted over the past 20 years.

To put these emissions in context, they are ~2.4% of global emissions from fossil fuel combustion, cement production and land-use change (for 2018). Of course, cumulative CO2 emissions are what really matter, rather than an individual year, because of the long lifetime that CO2 has in the atmosphere.

However, aviation's CO2 emissions are not the sector's only climate impact – in fact, we calculate that they represent ~34% of the "effective radiative forcing" (ERF) of the sector.

(ERF is the imbalance in the Earth-atmosphere energy system since pre-industrial times (https://www.carbonbrief.org/challenge-defining-pre-industrial-era) and is measured in Watts per square metre. It is used as a metric of climate change to enable comparisons between different greenhouse gases and other impacts that affect the climate system – such as a change in albedo (https://climate.ncsu.edu/edu/Albedo) – as it has an approximately linear relationship with global average surface temperature change.)

The other 66% of ERF comes from non-CO2 impacts, principally from contrail cirrus and emissions of nitrogen oxides (https://en.wikipedia.org/wiki/NOx) (NOx).

In addition, there are potentially large impacts of non-CO2 emissions from soot and sulphur, which form "sulphate aerosols (https://en.wikipedia.org/wiki/Sulfate_aerosol)" and affect both high-level and low-level clouds. However, the magnitude and even the sign of these impacts – whether they have an overall warming or cooling effect – is not totally clear based on current science.

Non-CO2 effects

Of these non-CO2 effects, the largest is from "contrail cirrus". These are high-level clouds that can form from the archetypal contrails that aircraft leave in their wake.

Contrail cirrus clouds form when water vapour in the atmosphere condenses onto soot particles kicked out from an aircraft's jet engines. When the temperatures are cold enough – typically -30C or lower – clouds of ice crystals form. If they are persistent, these ice crystals can spread from line-shaped structures into large thin sheets of cirrus clouds, high in the atmosphere at cruising altitudes of aircraft (around 8-12 km high).

These clouds cause cooling by reflecting solar radiation during the day and also warming by trapping outgoing infrared radiation. However, they have an overall warming signal, lasting up to around 18 hours (and an average of eight).

The second largest non-CO2 effect on climate from aviation is from NOx emissions. NOx is created by the aircraft jet engines from the combination of atmospheric nitrogen and oxygen. The high pressures

and temperatures of the engines make conditions almost perfect for NOx formation – such that reducing NOx emissions is a major engineering challenge.

NOx emissions play a role in the formation of another greenhouse gas, ozone (https://www.eia.gov/tools/faqs/faq.php?id=84&t=11) (O3), which is not directly emitted, but is formed and destroyed in the atmosphere by highly complex chemistry.

And it gets more complicated still. NOx emissions result in an increased level of the hydroxyl radical (https://en.wikipedia.org/wiki/Hydroxyl_radical), OH. These are highly reactive molecules that destroy methane (https://www.carbonbrief.org/scientists-concerned-by-record-high-global-methane-emissions) in the atmosphere. As methane is a potent greenhouse gas, its destruction by hydroxyl radicals has a cooling effect.

Aircraft emissions also cause reductions in water vapour in the stratosphere and more general background ozone, which represent additional smaller cooling responses. However, in sum, the forcing from aircraft NOx has a warming effect.

Finally, there are also rather small additional non-CO2 impacts from the direct emissions of water vapour and soot, which have a warming impact, and a cooling effect from sulphate particles that are formed from the emission of sulphur dioxide from trace amounts of sulphur in the fuel.

Overall impact

The charts below illustrate the different emissions from aircraft and their wider impacts between 2000 and 2018.

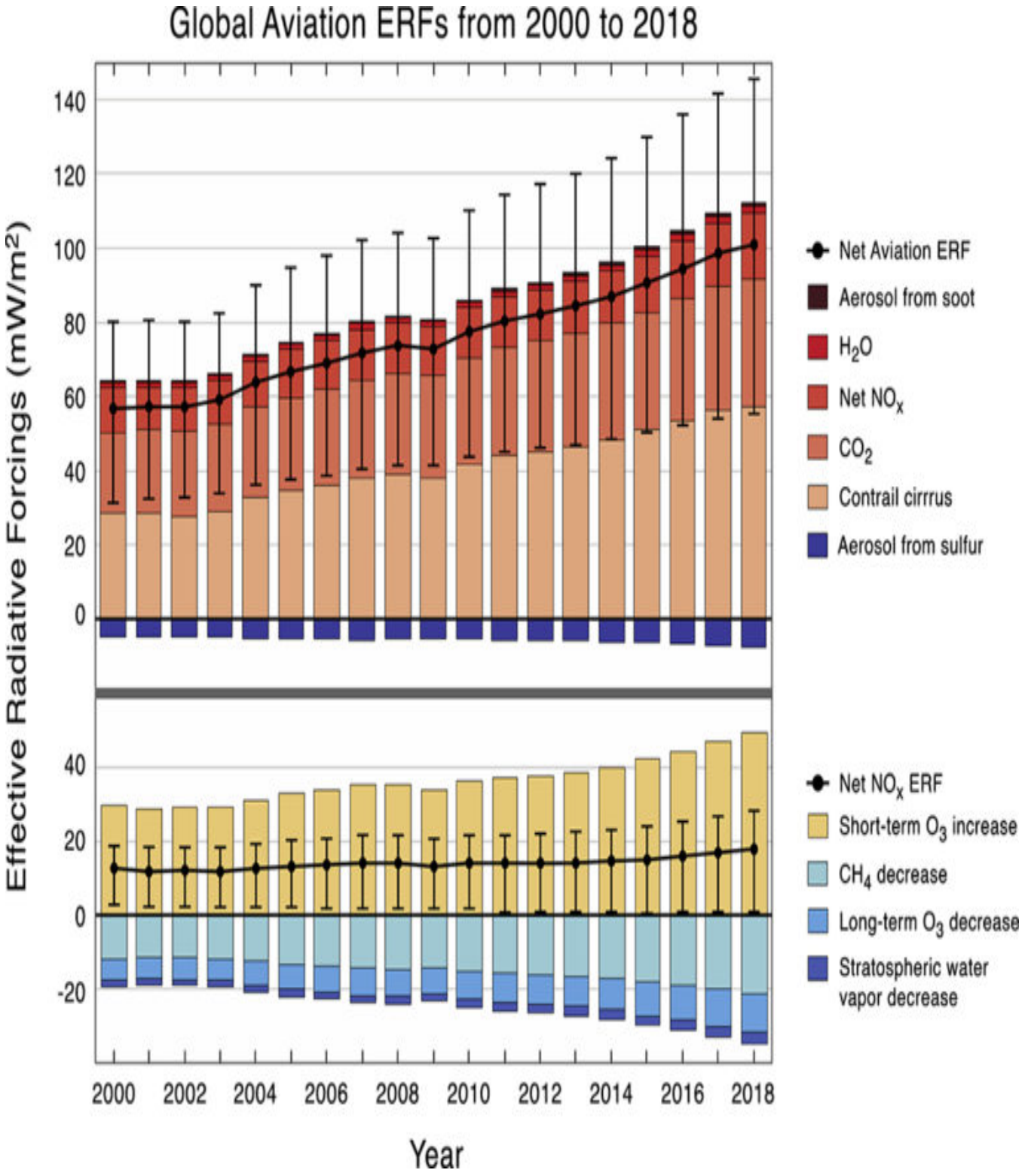
The upper chart includes all of these impacts. The red bars of different shades highlight that contrail cirrus and CO2 are the two principal warming impacts of aircraft emissions, with smaller contributions from NOx and soot. Aerosols formed from sulphur (blue bars) have a small cooling effect.

The black line shows the overall warming impact of aviation when all of these effects are taken into account. This warming impact has increased from around 56m W/m2 in 2000 to 101m W/m2 in 2018.

All together, aviation represents around 3.5% of present-day radiative forcing. Thus, even though it accounts for around 2% of CO2 emissions, its impact on the climate is much larger.

The lower chart unpacks the specific impacts of NOx, including the warming caused by the short-term increase in ozone (yellow bars), the cooling (blue bars) caused by destroying methane, long-term decline in ozone, and a reduction in stratospheric water vapour.

The uncertainties in the estimates for the climate impact of aviation (shown as error bars) is dominated by non-CO2 emissions. It should also be noted that some effects cannot yet be quantified – including aerosol-cloud interactions of sulphur and soot emissions – and these effects remain a scientific priority.



Timeseries of calculated ERF values and confidence intervals for annual aviation forcing terms from 2000 to 2018. The top panel shows all ERF terms and the bottom panel shows only the NOx terms and net NOx ERF. Positive bars (red/orange/yellow) indicate forcings with a warming impact, while negative ones (blues) have a cooling effect. Source: Lee et al (2020 (https://www.sciencedirect.com/science/article/pii/S1352231020305689))

Air travel after Covid

While we have estimated the impact of the global aviation industry on the climate in recent years, 2020 will likely look very different.

But what will be the long-term impact of the Covid-19 pandemic on air travel? We did not consider future pathways within our study, but Covid restrictions have shown how quickly travel behaviours can change.

Currently, there are industry forecasts (https://airlines.iata.org/analysis/traffic-recovery-slower-than-expected) that imply a range of recovery rates over the next few years and that, ultimately, the sector's traffic may return to pre-Covid levels (https://www.rolandberger.com/en/Point-of-View/How-the-COVID-19-crisis-is-expected-to-impact-the-aerospace-industry.html) – and, thereafter, continue to increase.

Unless things change after Covid, the recent restrictions will not make a large difference on aviation's CO2 impacts. It is cumulative CO2 that matters rather than a single year's emissions – and as traffic recovers, the non-CO2 impacts return.

If aviation recovers and continues to expand as previously, aviation emissions could grow to become a dominant portion (https://www.carbonbrief.org/aviation-consume-quarter-carbon-budget) of human emissions as other sectors decarbonise.

Alternatively, corporations might find it unproductive and expensive sending their workers to business meetings now that video

conferencing options have become embedded in daily life. Similarly, with many holidaymakers eschewing international travel in favour of domestic destinations, regional tourism could become an increasingly popular choice.

The aviation sector itself is calling (https://www.iata.org/en/pressroom/pr/2020-07-09-01/) for more investment to recover and decarbonise. However, unless measures to limit fossil fuel usage are also introduced, the sector will remain incompatible with the Paris ambitions.