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SECTION 77 TOWN AND COUNTRY PLANNING ACT 1990 – REFERENCE OF APPLICATIONS TO THE SECRETARY OF STATE FOR COMMUNITIES AND LOCAL GOVERNMENT

TOWN AND COUNTRY PLANNING (INQUIRIES PROCEDURE) (ENGLAND) RULES 2000

REBUTTAL PROOF OF EVIDENCE OF

CHRIS ROBERTS

NUCLEAR SAFETY WITH REGARD TO FLIGHT OPERATIONS

21st April 2011

In respect of:

Planning Application Reference:	Y06/1647/SH (New Terminal Building)
Planning Application Reference:	Y06/1648/SH (Runway Extension)

relating to land at London Ashford Airport, Lydd, Romney Marsh,

Kent, TN29 9QL

LYDD London Ashford Airport

1. Introduction

1.1 My name is Christopher Roberts. I am a self-employed aviation consultant after a full career as a professional pilot and aviation manager.

1.2 I joined the Royal Air Force from school and was trained as a pilot. I served on fighter aircraft, on the RAF Aerobatic Team the 'Red Arrows', as a Qualified Flying Instructor (QFI), as a Qualified Weapons Instructor (QWI) and as a test pilot at the Aeroplane and Armament Experimental Establishment (A&AEE), Boscombe Down, after graduating from the Empire Test Pilots School (ETPS).

1.3 Under Defence Council arrangements to provide test pilots to UK industry I was transferred to British Aerospace (BAe) and became Chief Test Pilot after serving in a number of roles including Project Test Pilot, Senior Experimental Test Pilot, and Programme Manager. During this period I was made a Fellow of the Royal Aeronautical Society (FRAeS) and received two awards for services to test flying.

1.4 After retiring from BAe I joined Airtours International Airways (subsequently renamed MyTravel International Airways) as a senior first officer on MD83 aircraft. I gained my command first on Airbus A320 and 321 flying short haul routes within Europe and North Africa, and then on the Airbus A330 flying international routes.

1.5 I took on a number of management roles that were carried out whilst continuing as an operating captain; Base Captain at Luton Airport then Gatwick Airport, Simulator Technical Standards Manager and Flight Operations Auditor. Finally I was made the General Manager of the airline at Gatwick Airport, and I stopped flying after 39 years as a professional pilot.

1.6 I retired from MyTravel shortly before my 60th birthday and have carried out many tasks as a consultant including simulator qualifications, training and management development. I have advised airlines on regulatory matters regarding EU-OPS, and qualification for the IATA Operational Safety Audit (IOSA).

1.7 Recently I completed my participation in the European Aviation Safety Agency's (EASA) Commercial Aviation Safety Team (ECAST), on behalf of the UK Air Safety Group (ASG), The Parliamentary Advisory Council for Transport Systems (PACTS) and the Brussels based European Transport Safety Council (ETSC).

1.8 I have been a Member of the CAA/MOD UK Airproximity Board for 10 years.

2. Scope of evidence

2.1 My evidence principally deals with flight operational aspects in relation to nuclear safety that have been raised by LAAG. I outline techniques used by Commercial Air Transport (CAT) pilots to ensure that they do not infringe restricted areas. Industry standard procedures are applied to any regulatory and legal requirements for aircraft to avoid objects (aerials, buildings, mountains etc) or airspace (danger zones, air traffic zones, noise abatement etc). Aircraft using London Ashford Airport (LAA) will be operated to these procedures and standards.

2.2 I note that another aspect of nuclear safety also raised by LAAG relates to potential terrorist activity within a hijack scenario; I also address this and demonstrate why it is not a justified concern in respect of what is proposed.

2.3 As part of familiarising myself with the Application Proposals for the purposes of addressing these issues, I have also seen various other assertions, inaccuracies or misconceptions expressed by LAAG on flight operational aspects which LAAG seek to rely upon in respect of nuclear safety issues as well (for example in Ms Auty's latest Supplementary Statement). I am also aware that Mr Maskens has given evidence about some of these issues and is preparing a Note to the Inquiry in respect of some of these issues. I have addressed some of these issues below in order to assist the Inquiry particularly where relevant to the general issue of how aircraft will use the Airport and how that will relate to (amongst other things) nuclear safety. This includes interpretation of aviation regulations, and the application of industry standard operating procedures for situations that arise on a daily basis for professional pilots qualified to engage in CAT operations.

2.4 In so far as material to the issues above, I relate my assessment of the ability to operate CAT safely from LAA with the presence of the nuclear power station to the planning of business opportunities in CAT. For the reasons set out in more detail below, it is my professional opinion that the development proposed for LAA properly takes into account the needs of future operators who might wish to use larger aircraft like the B737 and Airbus A319.

2.5 As part of my evidence, I provide a number of explanations of the overall regulatory environment and established procedures to demonstrate the sophistication of CAT in the 21st century. It is no longer the case that public transport is allowed to be undertaken using ad-hoc techniques in reaction to unforeseen events due to a poor level of awareness, experience or ability. The entire environment that the fare paying passenger is subjected to is now one of advanced preparation using full risk assessment processes for every activity and follows international standards subject to regular auditing. These processes are ones that will apply to any such operations at LAA.

2.6 Aviation has never been safer than it is today. This is due to the quality of modern aircraft, associated maintenance and the development of operational flight standards. I consider that the proposed development at LAA reflects a proper anticipation of the requirements for the forecast operations.

3. Aircraft types and associated performance

3.1 The proposal to extend the runway at LAA will increase the size of aircraft that could operate CAT services, including Boeing B737-800 and Airbus A319. Within LAAG documents there are various statements asserting that these aircraft will not have the performance to operate from Lydd, due to runway take off and landing limitations and within a restricted airspace environment and that the use of such aircraft will present unacceptable nuclear safety risks. I do not agree.

3.2 The two types of aircraft that represent generally the largest that might be operated at the Airport are not equal. The A319 is the smaller aircraft at a maximum take off weight of 64 tonnes carrying a maximum passenger load of 156. The B737-800 is materially larger at a maximum take off weight of 79 tonnes, carrying 189 passengers. However, both aircraft have ranges of 6,000 to 7,000 km so they are more than capable of a UK and European CAT operation from LAA.

3.3 I note that LAAG's concerns about certain aspects of the operation in fact relate to the larger aircraft, the Boeing B737-800, whereas concerns about the A319 do not seem to be covered in the same way suggesting that LAAG accepts that the A319 can operate from LAA. It appears to be the Boeing 737-800 that is the focus of LAAG's assertions, although strangely, some of the issues raised relate to any aircraft, including those that have already successfully and safely operated from LAA without any runway extension. There are a number of basic misconceptions that underlie LAAG's evidence.

3.4 First, it needs to be borne in mind that aircraft such as the B737-800 and A319 do not normally need to be operated at their maximum weights; short haul operations within Europe do not require this. Indeed, take off weights may in fact be dictated by the maximum allowable landing weight at the destination. Fuel consumption is related to weight so the lowest possible landing weight is important from a business standpoint as well as for environmental reasons. The B737-800 can in fact carry 21 tonnes of fuel, but most European destinations are not far enough to need even half of this capability, so in practical terms this reduces the normal maximum take off weight of this aircraft operating to European destinations to less than 70 tonnes, and closer to the maximum take off weight of an A319.

3.5 I note that in various places in his evidence Mr Spaven for LAAG seeks to make points about the B737-800 in a way which assumes it is operating at the maximum take off weight, but he does not apply these fundamental considerations of the proposed short haul range and the fuel limitations or requirements in consequence. For example, the airline that is the biggest operator of the B737-800 in Europe uses around 67 tonnes as a normal maximum take off weight for much of its schedule.

3.6 Secondly, there have been over 6,000 Boeing 737s built, but only one third of them are the -800 version. Therefore an airline that might wish to operate from LAA in other versions has a potential choice from a pool of about 4,000 aircraft. For example, the B737-700 carries 149 passengers, similar to the A319, at a maximum take off weight some 9 tonnes less than the -800 version. The -700 has a similar range to the A319 but nevertheless neither the -700 nor the 319 would need to use maximum fuel uplift for most destinations in Europe.

3.7 Thirdly, it is not uncommon to use an aircraft such as the Boeing 737-800 in an environment where the full take off capability cannot be used during certain operations. Airlines that operate from a number of airports often operate a common type/version to amortise overheads on aircraft acquisition, maintenance and crew training across a greater operating basis. Commercial considerations would thus place fleet utilisation financial benefits ahead of some load factors.

3.8 My experiences during short and long haul flying included the need to manage aircraft performance shortfalls when weather conditions or restrictions are not at the optimum for the schedule, for example operating the Airbus A320 from Humberside, the larger A321 from Bristol, and the big A330 from Newcastle; there are many other examples around Europe. Schedules are established taking into account the diurnal variations of meteorological conditions and the annual statistics of typical weather factors, in addition to marketing opportunities. CAT route dynamics work this way, whatever the sizes of the aircraft and airports.

3.9 On any one occasion, or any one day of operation a number of factors come into play that dictate the actual operating capacity of the schedule, when departing from a particular runway. Many of these factors are listed below and they all have to be taken into account on every occasion. Every flight must take place with the regulatory and safety requirements fulfilled. Any one, or multiples, of these factors may either constrain or enhance the performance capability.

a. Air Temperature
b. Ambient Pressure
c. Wind Direction
d. Wind Strength
e. Wind Characteristics
f. Visibility
g. Cloud Base
h. Precipitation
i. Runway Condition
j. Passenger Numbers
k. Passenger Type
l. Passenger Baggage
m. Freight
n. Load Distribution
o. Catering Configuration
p. Aircraft Configuration Deviation
q. Minimum Equipment Conformity
r. Destination Weather
s. Route Weather
t. Route Fuel Requirements
u. Fuel Reserve Requirements
v. Alternate Airfield Selection
w. Air Conditioning Packs
x. Flap Setting
y. Thrust Setting
z. Relationship of V1 to VR and V2

3.10 In the above list is a number of factors that directly alter the take off weight other than those relating to fuel requirements for the route. For example in the LAAG statements assumptions are made that aircraft will be fully loaded and maximum weights for passengers are quoted. However, there is a substantial difference in passenger and baggage weight when comparing different forms of public transport. It is not appropriate, as Mr Spaven does, to calculate a passenger load based on all adult passengers each with cabin and hold baggage allowances. Children travel too. The regulatory 'standard' weight for a child is 35kg whilst adults are 76kg. Passengers are learning to travel with less baggage so payloads vary by a large amount.

3.11 Whatever types of aircraft are being considered for a CAT operation it needs to be emphatically pointed out that all of the regulations, performance requirements, airworthiness criteria and industry operating procedures are the same for all aircraft over 5.7 tonnes and no operator is allowed to operate unsafely.

3.12 In summary the maximum performance capability of an aircraft type is not used on all routes and for all types of CAT. Route requirements dictate the take-off weight. CAT operators will select the right aircraft type, or variant of an aircraft type, when planning their schedule.

4. CAT operations financial viability

4.1 With a full understanding of what commercial targets are in place, potential CAT operations can then be properly assessed. The provision of an airport and facilities is separate to the decisions that might be taken by an operator looking for new routes. The validity of the LAAG contention that an inability to operate to the full capability of a particular aircraft type or version means that no operation could or should take place is entirely illogical and contrary to established practice. The specific nature of any proposed operation will dictate the financial viability of what can be carried out.

4.2 Both the airport and the operator must obtain their respective regulatory and licensing clearances for any operation to take place. Whatever constraints that might or might not become apparent, it is the responsibility of the operator to adapt their operation to fulfil their regulatory and legal requirements. It is paramount that a safe operation takes place, so it is the route structure that needs to be tailored to the facilities and runway conditions.

4.3 There are variations within an aircraft's type certification, the associated airworthiness clearances and the manufacturer's performance data that render specific assumptions and restrictive views about future business opportunities beyond the sort made by Louise Congdon as unjustified. The aviation business environment changes from year to year with developments in technology and changes to the economic circumstances or market forces prevailing. For example, only a few years ago it would have been considered inconceivable that a major airline would operate an Airbus out of

London City Airport to New York. At that stage the Airbus type concerned was not even cleared to operate at the glidepath approach angles required for City airport, but the manufacturer and airworthiness certification authorities responded to the needs of the operator by modifying the aircraft.

4.4 For the City Airport operation the Airbus aircraft have been configured internally according to the business model, and the schedule to the USA via Shannon has been creatively established to compensate for any disadvantages due to the restricted size of the runway.

4.5 All airports and all commercial operators have finite limits that mark the boundaries of their operations, whether they be the biggest aeroplanes like the Boeing 747, from the biggest airports like Gatwick, or the smallest aircraft from the smallest airports. The lesson is that assumptions about the viability of an operation, where airport and/or aircraft limitations might appear to be limiting factors are wholly inappropriate.

4.6 The advent of what is commonly called the 'low cost' airline has altered the dynamics of business models of all CAT operations. Whilst aspects like charging high rates for hold baggage can be controversial, such charging arrangements nevertheless represent an operating cost reduction. In this example discouraging passengers from having unnecessary baggage reduces the weight of the aircraft and this reduces the fuel burn giving a double benefit.

4.7 In summary the extent to which any commercial operation is enhanced by a runway extension is different from a discussion as to whether the B737-800 is able to take full advantage of its capability and size. The proposed runway extension will provide scope to develop flying operations in this south east corner of the UK. The provision of services by either the airport or the operators is not dependant on public finances. This is private enterprise.

5. Nuclear Safety

5.1 In LAAG/10/A at paragraph 6.15 concerns are expressed about an airliner on ILS for runway 21, having suffered an unspecified failure that would prevent it from turning right, on the basis that it could subsequently be instructed to turn left because ATC could not get confirmation of a cessation of range firing. The assumption must be that the aircraft is considered to be controllable in a turn to the left. The stated concerns based on this scenario are perverse for the following reasons.

5.1.1 First, the unspecified failure LAAG appear to have envisaged would need to have multiple aspects, not just a failure bringing down primary systems but also back up systems. The pilots' emergency drills to restore the systems would need to be ineffective. The scenario therefore amounts to a supposition that the fundamental design of the aircraft and that the entire airworthiness certification process might have been flawed. Indeed, the nature of an extreme failure of this kind is so unlikely that it may well have been previously discounted according to international standards of failure mode analysis.

5.1.2 Second, the rate at which the aircraft systems would have to break down in the scenario postulated so as to render design criteria flawed and recovery drills ineffective would need to be extremely fast and to occur with virtually no warning.

5.1.3 Third, the postulated failure of the procedure to have the range firing stopped itself is predicated on an assumption that such an arrangement is fundamentally unsound. But there is no basis for this. Not only are such arrangements between ATC and control centres for live firing ranges common, but cease fire arrangements form part of any range's essential safety procedures. There are a multitude of reasons why a range might need to cease firing at extremely short notice and therefore all ranges have a very well developed, tested and practiced processes of internal communications and procedures for the control of live firing. Neither the government nor the public would permit the operation of a firing range which was unable to cause an immediate cease fire. Thus an ATC unit would only be using a process that already exists and must exist; LAA is not depending upon setting up a system for the cessation of live firing in D044 at short notice. It already exists. An agreement with the range authority has been obtained and a suitable line of communication exists.

5.1.4 LAAG's scenario is therefore predicated on dealing with an incalculably rare multiple-failure-modes aircraft event taking place suddenly, on an uncommon missed approach (go-around) from runway 21 ILS, when D044 is active, and in circumstances when ATC has been unable to have firing stopped despite the existence of a specific procedure for this to occur. Accepted principles of failure analysis are such that multiples of unrelated failures of this kind are discounted because the statistical likelihood of the events occurring at the same instant is far too extreme.

5.1.5 Moreover, quite apart from the extreme improbability of all those events occurring, even if they did there is no basis for assuming that the resulting scenario would then itself pose any actual material nuclear risk. Any left turn in this scenario would only bring an aircraft closer to the nuclear power station than is normally the case. But even then, there would still be some margin because the supposed flight path of such an aircraft would not be over the nuclear power station.

5.2 LAAG/10/A at paragraph 6.16 appears to suggest that certain ILS approaches would be too difficult for professional airline pilots. This amounts to a contention that the same conditions would be outside the design envelope of auto pilot systems, because the CAT industry standard is for ILS to be flown by auto-pilot down to decision height. There is no substance to this claim. The minimum crew for CAT is two pilots therefore the situation is not vulnerable to one pilot getting too busy or stressed to be aware of everything going on.

5.2.1 Modern flight management and auto pilot systems are designed to fly the aircraft throughout the operating envelope. These auto systems are actually better at coping in the more difficult situations than the human is, and the computers do not just manage the descent angle and the flight direction, they manage the speed. The crew will be aware of the tailwind and will configure the aircraft early and accordingly to ensure that the approach is achievable.

5.2.2 Professional pilots are entirely capable of operating the aircraft manually in the circumstance referred to in LAAG/10/A paragraph 6.16, even if they choose (unwisely) to deviate from the normal operating procedures to use the auto pilot. They will still be aware of the tailwind and will configure the aircraft early to ensure that the approach is achievable. One pilot handles the aircraft and the other pilot monitors the conditions and acts as an aide memoir and assistant, to ensure that they are collectively performing to the required standard.

5.2.3 The design of CAT aircraft of this class is such that there is a margin of performance available to manage abnormal descent profiles. Two examples are the need to achieve continuous descent profiles for noise abatement, and decelerating ILS profiles for runway utilisation where precise and minimum spacing between aircraft is needed. The aerodynamic and engine management implications of these examples are the same as tailwind and/or steep glidepath approaches, therefore the conditions that are perceived to be a potential problem at LAA should actually be described as being within design standard.

5.2.4 Approaching to land with a tailwind is a common experience at airports around Europe where local winds are affected by terrain (valleys, mountains etc) even when the surface wind is a headwind for the runway. Professional pilots are practiced at managing these tailwind approaches as they regularly encounter them.

5.2.5 In LAAG/10/A at paragraph 6.16 there is an emotive comment referring to *"the steepest allowable glidepath"*, in what appears to be a suggestion that there is something unusual or wrong with a glidepath that is .5° more than the normal. There are in fact many ILS glidepaths set to 3.5° in Europe (5 in the UK) and again professional pilots are experienced at such approaches. In reality it is not until a glidepath exceeds 3.5° by a significant amount that difficulties might arise, and in fact the design standard of modern aircraft has moved towards glidepath angles of 5°, an angle already in use in the UK.

5.2.6 The combination of a tailwind of 10kt and a glidepath angle of 3.5° is not near the edge of the operating envelope of Boeing 737 or Airbus A319 aircraft. The crew would be well aware of this combination and have many means at their disposal to manage the approach to ensure that the glidepath and localiser are intercepted correctly and subsequently maintained.

5.2.7 The final point in LAAG/10/A at paragraph 6.16 is the suggestion or assertion that a 5° offset approach path is difficult. That is incorrect. An offset approach of 5° is only a minor inconvenience for a pilot, and is not at all difficult to manage. Any inference that to *"align with the runway at a late stage in the approach"* must be a difficult task is not correct. This class of CAT aircraft are designed to fly and land in very turbulent conditions and with strong crosswinds, so they have high stability with responsive controls and high control power. Adjusting by only 5° from an offset approach is not significant and the pilot has plenty of time for the minor manoeuvre through the final 500ft of descent, which is carried out in visual contact with the runway.

5.2.8 ILS standards are published in the International Civil Aviation Organisation (ICAO) document 8168. Historical data shows that the 5° offset approach angle procedure is safe and effective. It has proved to be straightforward.

5.2.9 Altogether the aspects raised by LAAG do not in fact bring any significant increase in the likelihood of a missed approach. However, a go-around is not in any way a complex manoeuvre so in the event of it ever being needed, it should not be described as an exacting task. CAT pilots are required specifically to carry out a briefing on the missed approach procedure before embarking on an approach to land. They will discuss the procedure, all of the requirements and verbally rehearse the actions and individual responsibilities that would need to be carried out.

5.3 In LAAG/10 it has also been suggested that approaches using the NDB or RNAV might be the choice of the day. They appear to contend that such use would result in unacceptable aircraft flight paths towards the nuclear power station due to the location of the NDB beacon and/or the different approach angle offsets as compared with the ILS. These concerns are misconceived for a number of reasons.

5.3.1 In CAT operations every airport will be the subject of a specific set of instructions in the company operations manual. This manual (made up of many parts in many forms and in many different documents) is the CAA/EASA approved manual that is the basis of the airline's Air Operators Certificate (AOC). The operations manual overrides all other regulatory documents in so much as the operations manual may never exceed any of the legal or regulatory requirements, but may add further constraints on the operating crews. Pilots are not permitted to operate outside their company operations manual, other than in exceptional or emergency circumstances that affect flight safety. Simply put, when an air transport operator elects to operate into LAA they must publish a section in the operations manual to issue appropriate instructions to the crews.

5.3.2 NDB and RNAV facilities are non precision approach aids and have larger offset approach angles and higher approach minima than ILS. The use of NDB or RNAV in preference to ILS is counter productive because ILS is a precision approach aid, is very reliable and has back up systems as part of the design and installation. CAT aircraft only use NDB or RNAV when there is no ILS; it is an industry standard to use ILS in preference to inferior systems. The operations manual would require use of the ILS, and pilots would not be free to choose.

5.3.3 Aircraft arriving from the south or south west would be able to leave controlled airspace by descent in the usual way, and the location of LAA facilitates an ILS interception from an anticlockwise arc procedure after flying down the Channel. This approach phase would begin about 25nm before LAA and would have bigger track mile benefits than the proposal from Mr Spaven in LAAG/10/J paragraph 4.

5.3.4 CAT pilots do not just decide in the heat of the moment what they will do, how they will approach an airport or where they will go when the situation does not turn out as they expect. Everything is planned, discussed in advance and executed as per the operations manual.

5.3.5 Any aspects to the operation at Lydd that might need to be considered for inclusion in the operations manual will be as a result of frequent safety audits, negotiation between the operator concerned and the airport, and underwritten by the CAA/EASA on approving the operations manual. This is the nature of the way the industry is regulated.

5.4 The other aspect of the purported concern over nuclear safety that has been raised by LAAG is that relating to terrorism in a hijack context. It appears to be asserted that as CAT aircraft would presumably continue to be a target, the proximity of LAA to the power station provides a convenient local aiming point. These concerns are misconceived and nothing more than completely unjustified scare-mongering on any objective appraisal:

5.4.1 The international requirements to prevent public transport aircraft from being hijacked have been fully embraced by the UK Department of Transport. Indeed the UK was at the forefront of designing the safety systems and the means of implementation that have been adopted internationally.

5.4.2 Fundamentally protection against hijack forms at least two parts. First, various forms of screening prevent terrorists from boarding aircraft, and second a barrier technique prevents any terrorist on an aircraft from gaining access to the flight deck and subsequently flying into a ground installation as per New York and Washington.

- Airport security issues at LAA would need to follow UK requirements for all airports. It can thus be taken that the potential hijack scenario is in fact addressed at the first stage.

- But in any event, no aircraft is allowed to operate CAT flights unless it is equipped with all of the required security facilities.

In simple terms this includes a lockable steel door between the passenger cabin and the flight deck. The door must be locked as soon as the pilots are ready to carry out their final actions and put the aircraft underway.

- There is an arrangement for cabin crew to gain access to the flight deck but this cannot be achieved without the pilots' agreement. Therefore it is not possible for any terrorist, having bypassed airport security, to gain access to the flight deck and take control of the aircraft by overpowering the cabin crew.

- In the event of the terrorist organisation developing a means of forcing the steel door to the flight deck open it cannot be done without considerable time and activity, and this cannot be carried out stealthily without the pilots becoming aware of what is going on. Aircraft departing LAA would be a long way outbound before there was any chance of the aircraft being used as a weapon, even if there was any chance at any stage throughout any flight.

5.5 In summary, I am in no doubt that the proximity of LAA to the power station is not a degradation of nuclear safety from any security standpoint. Furthermore, routine operations to and from the airport will not constitute an increased risk of over flight or vector confliction.

6. Feasibility of depicted flight paths

6.1 In LAAG/10/B at paragraph 4 titled 'Feasibility of depicted flight paths' Mr Spaven asserts in sub paragraph 4.4 that *"for commercial airliners departing from runway 21 when the Lydd Range is active, the radius of turn required to avoid the range by an adequate safety margin would in turn require a bank angle which is unlikely to be achievable under European air safety rules."* The European air safety rules that Mr Spaven refers to are EU-OPS. I understand that Mr Maskens has already refuted Mr Spaven's claim and I agree with Mr Maskens.

6.2 What is commonly called EU-OPS is the harmonisation of aviation requirements across Europe for CAT. EEC Regulation No 1899/2006 became directly applicable law across the EU and superseded certain elements of the UK Air Navigation Order (ANO). No exemption is permitted within the UK that is not applicable right across Europe. EU-OPS are not only *'air safety rules'*. Part 1 of EU-OPS contains the legal requirements whilst the second part contains Acceptable Means of Compliance (AMC). AMC are not legal requirements; they are the recommended means of complying with Part 1. Operators are free to offer an alternative means of compliance for the regulator's (EASA) consideration.

6.3 Mr Spaven refers to EU-OPS paragraph 1.495 and to the AMC to 1.495 that lie within EU-OPS Subpart G covering aircraft Performance Class A. This is the process that EU-OPS uses to ensure that CAT operators adhere to Performance Class A requirements, a separate set of regulations that aircraft must comply with in order to achieve a Certificate Of Airworthiness for CAT. Performance Class A covers all multi-engine turbojet aircraft, and turbo propeller powered aircraft with seating for more than 9 passengers, or a maximum take-off weight exceeding 5700kg.

6.4 Paragraph 1.495 specifically covers Take off Obstacle Clearance and more directly relates to post take-off manoeuvring to avoid obstacles (aerials, buildings, mountains etc). The major significances of the detail in paragraph 1.495 are the parameters for the emergency turn for obstacle clearance that apply in the event of a power unit failure after the critical point during take off. Under these circumstances the aircraft needs to be turned at the lowest practicable height and therefore paragraph 1.495 is not directly relevant to the context that LAAG is putting it forward for runway 21 at LAA.

6.5 Considering twin engine aircraft such as the Boeing 737 and Airbus A319 at the most critical point on take off, Performance Class A aircraft can either continue on the remaining engine or stop in the remaining runway length. The decision point is based on a speed referred to as V_1. Thus before this speed an engine failure results in the crew deciding to stop, but after this speed they must continue the take off on one engine. After a failure the aircraft will leave the end of the runway (TORA) at only a few feet above the ground, perhaps only 15 ft in wet runway conditions. The preferred and safest flight path is to continue straight ahead climbing, so in the case of restricted airspace (like D044) it is usual for a procedure to be in place to clear the aircraft through the restricted airspace, as there is at LAA. In this case the ICAO standard emergency procedure comes into play in which the aircraft is flown straight ahead for up to 25 miles, and follows a specific vertical profile laid down by the aircraft manufacturer and published in the operations manual. Where straight ahead is not available, particularly in the case of a near obstacle (say a mountain) there needs to be an emergency turn procedure to avoid a collision.

6.6 All runways are the same in this respect regardless of their actual length, largely because CAT aircraft normally take off using less than full power, and the pilots calculate power requirements for any take off run so that the V_1 criteria as described always apply. Where an aircraft that has suffered an engine failure must turn to avoid an obstacle the restrictions outlined in EU-OPS paragraph 1.495 come into play, requiring a progressive increase in bank angle as height is gained (and also takes into account increases in minimum flying speed due to the application of bank angle).

6.7 Without an engine problem the aircraft leaves the runway very shortly after the position that V_1 was achieved (V_1 is normally close to V_R, the speed at which the pilot pitches the aircraft up to take off). All of this is well before the end of the runway (because there would be enough room to stop without running off the end if an engine fails). Thus a high rate of climb results because a twin engine aircraft like the Boeing 737 operating on both engines has twice the power needed to fly safely from the runway, and the aircraft will be above the 400ft restriction in EU-OPS paragraph 1.495 before the end of the runway.

6.8 A further fundamental point needs to be clarified at this stage. The radius of turn that an aircraft flies is a function of bank angle and True Air Speed (TAS). This is regardless of the type of aircraft. Moreover the TAS component has a greater effect on turn radius than bank angle. When a particular radius of turn is required, and bank angle is restricted to a certain maximum, then for CAT operations the normal procedure is to use the appropriate TAS.

6.9 It is simply not right, as Mr Spaven claims, that it would be necessary to apply excessive bank angle; there is no need to exceed normal operating criteria or obtaining special clearances. TAS is managed by calculating the correct speed to fulfil the radius requirements and the pilots reduce power after take off, (or they might keep power up and pitch the aircraft into a steeper climb to arrest acceleration at the desired TAS). Of course it is necessary that the TAS selected needs to be at an appropriate margin above minimum flying speed, and the use of wing leading edge slats and wing trailing edge flaps set to suitable angles achieves the desired margins. Performance Class A aircraft have a number of configurations of slats and flaps for this type of purpose.

6.10 This is all a routine application of flying procedures for CAT operations from many airports around Europe, and airline pilots are well practiced both in the air and in the simulator, where they must demonstrate their ability twice a year as part of their licensing requirements. Moreover, the autopilot, autothrottle and computer based Flight Management Systems (FMS) are designed to fly the aircraft through these manoeuvres without pilot intervention. Usually automatics are engaged within the first 100ft of climb after take off, even after an engine failure.

6.11 Many airports require aircraft to manoeuvre immediately after take off and a particularly significant example is Salzburg where very large mountains are very close to the airport. Aircraft must achieve turning departure profiles at low airspeeds for fundamental survivability; there is no straight ahead option at Salzburg from runway 16 (into the valley towards the mountains) with or without an engine failure.

6.12 As to the parameters from runway 21 at LAA, the closest distance from the end of the TORA that D044 airspace is encountered is 1.3 nm. Thus using a bank angle below 30° (to give the pilots a few degrees handling margin), a turn radius of less than 1nm can be achieved using a TAS of up to 180kt. At such a TAS and bank angle the turn would be the industry standard 'Rate 1'. This gives a good margin in an environment where no minimum is laid down. Even at maximum take off weight the B737-800 is able to operate at such speeds by using appropriate flap and slat angles.

6.13 Taking off from runway 21 the aircraft would be turned right at 500ft or the upwind end of the runway (the end of the TORA). There are incorrect references in the LAAG documents to a turn position further on, at the railway track. This position is about .1nm closer to D044, but even so would not be a problem.

6.14 It is usual to use TAS rather than the groundspeed that Mr Spaven refers to. Wind changes considerably between the surface and 2000ft, in both direction and strength, and as the aircraft is turning during this climb the groundspeed is variable. Selecting a constant TAS establishes the turn performance and it takes little time to carry out a 90° turn to clear D044, only 30 seconds. Therefore with the margin available the mean wind vector between the surface and 2000ft would not be significant, but anyway the pilots have this information displayed to them on the aircraft electronic displays.

6.15 These electronic displays are based on double or triple inertial navigation systems backed up by GPS and are accurate to within a few metres. The aircraft colour electronic displays show the actual aircraft track, wind speed, wind direction and desired flight profile. Visual references may also be used but they are not necessary. Manually flying such a profile is straightforward using standard techniques, but usually such departures are carried out on autopilot under FMS control.

6.16 LAAG appears to allege that the pilots might not be able to see sufficiently well where they need to go. This is not true of the visibility from the flight decks of these aircraft. Moreover the electronic aids described will allow the turn to be accurately carried out without looking at the terrain.

6.17 In summary therefore the statement *"for commercial airliners departing from runway 21 when the Lydd Range is active, the radius of turn required to avoid the range by an adequate safety margin would in turn require a bank angle which is unlikely to be achievable under European air safety rules"* is not correct. It does not take into account all aerodynamic principles or CAT standard operating procedures. These modern aircraft are equipped with state of the art avionics and are fully compliant with all regulatory criteria and would be able to achieve this turn well within European air safety rules.

7. Arrivals on runway 03

7.1 In LAAG/10/A paragraph 4 using the Saab 340 as illustration Mr Spaven asserts that non Group 1 aircraft could not land on runway 03 using a circling approach when D044 range is active. The detail given in his appendix 7 (Saab 340B Aircraft Operations Manual flight procedures) contradict his assertion.

7.1.1 His appendix 7 shows a ground track described as approximate and shows a required distance of 1.6 statute miles from the runway for the procedure. The distance available is 1.3 nautical miles and converts to 1.5 statute miles. This fulfils the requirement for approximately 1.6 statute miles.

7.1.2 Mr Spaven asserts emotively that circling approaches are generally regarded by pilots flying large commercial passenger aircraft to be one of the most exacting flight procedures. This is not correct. Furthermore the Saab 340B is not a large aircraft. The circling approach is not difficult for professional pilots flying CAT aircraft. My experiences of CAT operations included routine and regular needs to fly circling approaches in the Airbus A320, Airbus A321 and the very big Airbus A330 carrying 363 passengers. The airline also used Boeing 757, Boeing 767 and DC10 on the same routes. Moreover we enjoyed flying circling procedures and looked forward to the occasions when they we needed.

7.1.3 Mr Spaven further asserts that assumptions have been made that adversely affect the pattern shown in the diagram in his appendix 7. He is not correct.

- The ground track of the aircraft in the turn and the groundspeed do take into account the effects of wind. Wind effects are allowed for by reducing timing (as shown in the diagram); 30 seconds, adjusted by 1 second for each knot of wind speed, is specified so that the aircraft achieves the correct position to start the turn.

- Recommended procedures published by aircraft manufacturers do take the aircraft's handling characteristics into account. The time required to apply bank angle is included.

7.1.4 In LAA/3/D in paragraph 3.2 Mr Maskens is correct when he states that the operations manual will state any additional criteria needed for a circling approach and landing on runway 03. He also states that approved operators are already using their circling procedures without infringing the danger area.

7.2 In summary, non Group 1 aircraft are able to land on runway 03 using a circling approach when D044 range is active, and are doing so at present.

8. Summary and conclusions

8.1 In my evidence I have explained that:

8.1.1 CAT has never been safer than it is today due to the quality of modern aircraft, the maintenance requirements and operational flight standards. Advanced planning is required for every activity.

8.1.2 For all types of aircraft being used for CAT the regulations, performance requirements, airworthiness criteria and industry operating procedures are all laid down in the same for all operators.

8.1.3 The extent to which any commercial operation is enhanced by a runway extension depends on the commercial aims of the operation. Short haul routes in the UK and Europe do not all require aircraft operation at maximum weights.

8.1.4 There are many business models for CAT operations ranging from full conventional schedules to niche market opportunities. Aircraft capabilities are ever increasing and the economic climate continually changes requiring operators to adapt accordingly.

8.1.5 There are many versions of the B737 that with the A319 will be able to operate on UK and European routes from the LAA extended runway.

8.1.6 The proximity of LAA to the power station is not a degradation of nuclear safety from any security standpoint.

8.1.7 CAT operations to and from LAA will not constitute an increased risk of over flight or flying in close proximity to the nuclear power station.

8.1.8 CAT aircraft will not need to use NDB or RNAV procedures for normal operations.

8.1.9 The 5° offset ILS with 3.5° glidepath is entirely suitable for LAA without an increase in the number of missed approaches.

8.1.10 Commercial aircraft departing from runway 21 when D044 is active are able to follow EU-OPS requirements and standard industry procedures to achieve the radius of turn required to avoid the range safely.

8.1.11 Non Group 1 aircraft are able to land on runway 03 using a circling approach when D044 range is active