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THE FUTURE OF COMMERCIAL AVIATION
The Future: My Aspiration Statement

The experience of commercial aviation should become one that is comfortable, affordable and respectful.
Factors to be Considered

- Demographics (Population)
- Environment
- Politics
- Economics
- Culture and Society
- Technology
If No Changes Are Made...

Table (i): A summary of aircraft emission scenarios and forecasts for the UK: 1990-2050

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<tr>
<td>Digest of UK Energy Statistics bunker fuel and kerosene emissions (MtC)</td>
<td>5.1</td>
<td>9.7</td>
<td>-</td>
<td>-</td>
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<td>UK total aviation emissions (DfT, 2004, <em>Aviation and Global Warming</em> central case, paragraph 3.57; +3 SE runways by 2030) (MtC)</td>
<td>4.6</td>
<td>8.8</td>
<td>10.8</td>
<td>14.9</td>
<td>17.7</td>
<td>18.2</td>
<td>17.4</td>
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<tr>
<td>UK total aviation emissions (Tyndall, 2005, no infrastructure constraints) (MtC)</td>
<td>-</td>
<td>8.1*</td>
<td>12</td>
<td>17</td>
<td>21</td>
<td>26</td>
<td>32</td>
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<tr>
<td>UK air passengers (DfT, 2004, <em>Aviation and Global Warming</em> central case, +3 SE runways by 2030) (mppa)</td>
<td>-</td>
<td>180</td>
<td>263</td>
<td>379</td>
<td>480</td>
<td>577</td>
<td>670</td>
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<tr>
<td>UK air passengers (Tyndall, 2005, no infrastructure constraints) (mppa)</td>
<td>-</td>
<td>169*</td>
<td>277</td>
<td>445</td>
<td>615</td>
<td>851</td>
<td>1,178</td>
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Table from the Tyndall Centre for Climate Change Research in the UK in 2005
Expected Future*

- Air traffic is expected to **double** by 2035.
- By the year 2030, if advancements in sustainable energy and energy efficiency continue to progress and receive more support, there will be **less demand for the use of fossil fuels**.
- Since technologies such as solar and wind energy are temperamental, it seems **unlikely** that commercial airplanes will cease to produce carbon emissions.

* Based on conversations with Environmental Engineers from Skanska
If more stationary powerhouses such as factories and power-plants become more energy efficient and stop using natural oil, its value will decrease. In this case, airplanes will be able to still run on kerosene and other fuels and still remain cheap.

If air travel is cheaper, than the process of going to the airport will hopefully more hassle free. Already there are breakthroughs in terms of security; technology is being developed so that it detects weapons as well as respects the privacy of people.

By 2040 it should be "run of the mill."
New Materials: Enabled Aerospace Advances

Engineering, Operations & Technology | Boeing Research & Technology

Global Technology

1970’s – 1990’s
- High Strength, Damage Tolerant Al
- 7050, 7150, 7055
- Fiberglass
- CRES
- Ti

1940’s – 1960’s
- Low Strength Al
- 2024, 7075
- Wood and Fabric

2000’s
- Carbon Thermoset Composites
- Ti

Tremendous strides in Material Science over the last century
Higher performance at lower cost
Timeline: Technology

- 2020: Plans are made federally to reduce the emissions of planes.
- 2030: These technologies are manufactured
- 2040: These technologies are implemented in airlines
Horizon 2020

- Primarily concerned with decreasing the environmental impact in the aviation sector.

- Environmental Data Models and Interface Development in Aviation (ENDAMI) set up an advisory board of supplying companies for the aviation sector to use their knowledge and create new materials and programs that are more environmentally friendly.

- Building new software to guide change and are partnering up with other organizations to make it happen.
2030:D Double Bubble Aircraft
About the Double Bubble

- Designed to use 70% less fuel. Will reduce noise, lower nitrogen oxide emissions and can use shorter runways.
- Engines sit at rear of fuselage rather than wings to let slower moving air enter the engines (meaning less fuel consumption).
- Slightly longer flight time and more stress on engines.
- Hopes to be in the sky by 2035.
Airport Security

- The ideal is that the TSA generate technology that is thorough yet non-invasive.

- Danger is racial profiling and intrusive scanners.

- By 2030, hopefully a balance between security and respect for privacy will be established.
Politics/Population

- As the population increases, there will be **more demand for commercial flights**
- Like the EU, the United States needs to implement a future program like Horizon 2020 to **outline guidelines**.
- Plans should be finished by 2020 and carried out in 2030 and 2040
It is most likely that the prices will decrease over time as flights will become more popular.

2020: Fuel is slightly more expensive due to supply and demand, but newer technologies are in the process of being developed.

2030: Investments are made in environmentally technologies.

2040: Flights are cheaper since planes use less fuel.
Culture and Society

- **Danger**: If sensationalism of a “war on terror” creates panic
- **Danger**: If simple questioning becomes racial profiling/harassment
- **Preferred**: People of lower socioeconomic status will be able to access flights if prices decrease
- Check-in will probably become completely automated.
- **Likely**: More multimedia entertainment will be available on planes for those who pay extra
Negative Future

- Another threat to national security creates more security at airports.
- The government gives permission for airport security to racially and ethnically profile passengers, creating tension and frustration as well as violation of privacy.
- The growing demand of flights exceeds environmentally friendly technology and pollution increases exponentially.
Preferred Future

- Cheaper flights
- Effective security that does not violate the privacy of passengers
- Environmentally friendly technology
- http://www.youtube.com/watch?v=xoiDFA2Mc7Y
- http://www.youtube.com/watch?v=gd4gAHmRJWo
- http://www.foe.co.uk/resource/reports/aviation_tydall_research.pdf
- http://www.youtube.com/watch?v=gZgC8Fln-FQ&feature=related
- http://www.youtube.com/watch?v=YyCTpZvjW1U
- http://www.youtube.com/watch?v=rouOrvftl4c