Contrails & "Chemtrails" – A Second Look!©

by Dan Pemble, Kissimmee, Florida

Following this article, you will find my previously-written article about "Airplane Smoke Trails & Contrails". While I don't proclaim to be an air traffic control expert nor a meteorologist who knows all about upper atmospheric temperatures, winds, and other conditions, I do know a bit about the design, development, manufacturing, testing, certification, delivery, operations, and supporting today's commercial airliners. This is based on my over 40 years of experience in commercial aviation, as afforded to me as an employee of both the McDonnell Douglas Corporation and The Boeing Company in a variety of technical support capacities. In writing this article, I simply wanted to expand a bit on my original (following) article and to share some routine observations of mine, as seen from the back deck of my home here in Kissimmee, Florida.

As I stated, I am not an air traffic control expert; accordingly, I cannot tell you exactly where the most heavily-traveled "air corridors" exist in the USA. However, what I see in the skies on a daily basis from my home here in Central Florida (weather permitting) would tend to indicate the south-to-north corridor for flights originating from Caribbean nations and South America is a major passageway! The following photos are a sampling of the "contrails" from these flights that I photographed today, January 28, 2017.

CONTRAILS

As explained in my original article, contrails are a result of ice crystals that may form from moisture contained in the exhaust of jet engines. The formation of these contrails is entirely dependent upon upper atmospheric conditions, including altitude, winds, moisture content and temperature. As I stated, I am not a meteorologist, but these conditions can obviously be extremely variable from one day to the next. In fact, some days there may be hardly any contrails in the sky at all – regardless of flight activity. Admittedly, when contrails are widened by upper atmospheric winds to the extent that they occlude/obscure sunlight (not that frequently occurring), there is an environmental effect!

"CHEMTRAILS"

This is an absolutely ridiculous on-going myth by the completely uninformed who continue to profess that commercial airplanes have chemical tanks to disperse liquids in a quest to control the environment! Science fiction to the MAX! The only chemicals being introduced to the atmosphere by commercial airliners are emitted from the tail pipes and exhausts of both regular piston engines and jet engines and are far less than all other sources of pollution on the planet! In fact, as stated in my original article, as follows, each successive generation of airplane engines has lesser and lesser polluting emissions.

AIRPLANE SMOKE TRAILS & CONTRAILS ©

by Dan Pemble, McDonnell Douglas/Boeing Field Service Representative (retired September, 2009)

Having worked in commercial and US Naval aviation collectively for almost 44 years, I can say for sure that, since their inception, jet engines have very definitely contributed to global pollution! Every airplane flying at one time created visible smoke trails, like those seen in the following photos. These smoke trails were created by unburned products from the fuel (or the combustion process itself) and included carbon debris, sulfur, and nitrous oxides (NOx). Over the years, each successive generation of jet engines has become more and more efficient with exhausts producing less and less harmful emissions and, today's high-tech engines rarely emit any visible smoke at all.

Smoke Trails from Yesteryear's Aircraft

When speaking of each successive generation of new jet airplane engines being more efficient, it is in terms of Specific Fuel Consumption (SFC). Obviously, the amount of harmful emissions spewed out by a jet engine is directly proportional to the engines SFC; thus, when the SFC is reduced, so too are the emissions. Regarding sulfur content, different grades of petroleum have varying levels of sulfur content. A promising new technology related to reducing harmful emissions from jet engines is "lean blowout detection & avoidance"; such technology, when available on future-generation jet engines, will entail sampling of the engine's exhaust and making real-time adjustments to the engines electronic engine controller (EEC) to the extent possible to minimize "raw" harmful emissions due to rich fuel mixtures (while at the same time not restricting engine thrust levels required for the current flight regime). All modern-day commercial airliners have EEC's that utilize a multitude of inputs to determine the most efficient engine operations and then effect the appropriate engine control during all flight conditions. Of course with the help of science, technological advances in jet engine design to make them more and more efficient and environmentally friendlier will continue for many more years to come.

Regardless of the current state of jet engine technology, at whatever point on earth that air samples may be taken, the samples will contain various types of chemical pollutants. However, this is not to say that all the pollutants are from jet engines. In fact the pollutants are likely most predominantly from all other sources on the planet such as from cars, trucks, buses, boats, factories, and all other sources that use fossil fuels.

At numerous locations throughout the world, we often see varying concentrations of “streaks” in the sky from jet airplanes heading in all directions. Depending on upper atmospheric conditions, sometimes these streaks merge together and remain visible for extended periods. The following photo shows a very high concentration of these streaks, as often is commonly seen in the vicinity of some of the world’s heaviest-travelled air corridors. These streaks are known as “contrails”.

The following passages about contrails are as directly quoted from a Wikipedia web site: https://en.wikipedia.org/wiki/Contrail

Contrails (short for "condensation trails") or vapor trails are line-shaped clouds sometimes produced by airplane engine exhaust, typically at aircraft cruise altitudes several miles above the earth's surface. Contrails are composed primarily of water, in the form of ice crystals. The combination of water vapor in airplane engine exhaust and the low ambient temperatures that often exists at these high altitudes allows the formation of the trails. Impurities in the jet exhaust from the fuel, including sulfur compounds (0.05% by weight in jet fuel) provide some of the particles that can serve as sites for water droplet growth in the exhaust and, if water droplets form, they might freeze to form ice particles that compose a contrail. Their formation can also be triggered by changes in air pressure in wingtip vortices or in the air over the entire wing surface. *(Dan Pemble note: Vortices may also occur at other areas of the fuselage.)*

Depending on the temperature and humidity at the altitude the contrails form, they may be visible for only a few seconds or minutes, or may persist for hours and spread to be several miles wide, eventually resembling natural cirrus or altocumulus clouds. Persistent contrails are of particular interest to scientists because they increase the cloudiness of the atmosphere. The resulting cloud forms may resemble cirrus, cirrocumulus, or cirrostratus, and are sometimes called cirrus aviaticus. Persistent spreading contrails are thought by some, without overwhelming scientific proof, to have a significant effect on global climate. Persistent contrails are sometimes called “chemtrails”in reference to the conspiracy theory regarding the undisclosed spraying of chemical or biological agents by various high-flying airplanes. Unquote.

Please have a look at the noted Wikipedia web site for additional contrail-related information.