August 9, 2015

The Contrail Deception Revealed by Examing the High Bypass Turbofan [1]

Cogeneration is a term that describes the thermodynamically efficient use of fuel that re-uses the heat produced by combustion instead of releasing it directly into the environment as "waste heat". WIKI

Similarly, in a High Bypass Turbofan (HBT), heat from the combustion phase is not discarded into the environment as waste heat until it is used a second time to heat the air traveling through the bypass thrust phase.

The HBT is known as a flow-cycle engine as opposed to a simple, no-bypass "jet" engine. The ingenious design employs a cogeneration process where "waste heat" from the combustion chamber is used a second time to heat the air from the bypass phase in order to provide 80% of total thrust. This design greatly reduces the potential for contrail formation where 80% of the thrust is developed

without adding water vapor to engine exhaust. Furthermore, any water vapor from the combustion phase that could contribute to contrail formation is mixed with the non-combusted bypass thrust, thereby causing the water vapor exiting the combustion stage to be negligible as it is subsumed by the larger volume of ambient bypass air mixing at the point of engine exhaust.

In this video we see the cogeneration effect take place in the HBT where the bypass air flows across the exterior surface of the combustion stage. The transfer of heat by induction expands the air in the bypass stage to increase total thrust to 80% without adding water vapor to the exhaust. The extreme efficiency of this design translates to much less water vapor available for contrail formation by virtue of much less fuel available for combustion.

Jet turbofan engine https://www.youtube.com/watch?v=KjiUUJdPGX0

EPA: Aircraft Contrail Fact Sheet

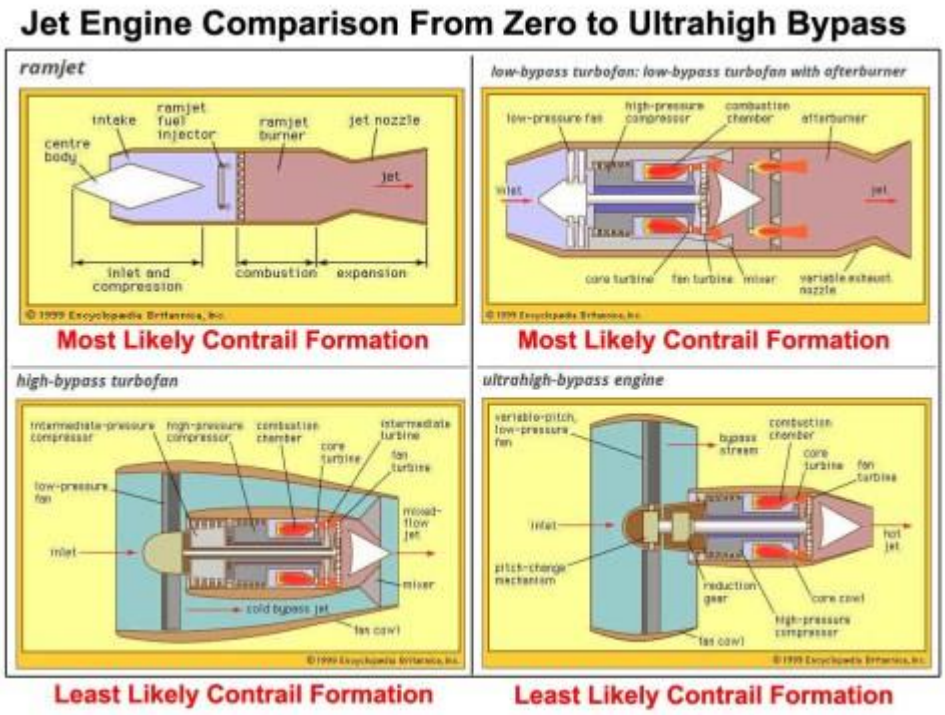
"Aircraft engines emit water vapor, carbon dioxide (CO2), small amounts of nitrogen oxides (NOx), hydrocarbons, carbon monoxide, sulfur gases, and soot and metal particles formed by the high-temperature combustion of jet fuel during flight. Of these emittants, only water vapor is necessary for contrail formation."

The High Bypass turbofan design uses only 15 to 20% of air intake for the combustion phase with 80% of thrust developed in the bypass phase with no opportunity to add additional water vapor for contrail formation. Furthermore, the mixing of combustion thrust with bypass thrust at high exit temperatures, significantly neutralizes or dilutes whatever water vapor is contained in the 20% combustion phase. These two conditions significantly lower the probability of visible contrail formation in the High bypass turbofan.

THE PROBLEM: We can find no convincing explanation as to why the sky can be completely free of contrails for an entire day while measured relative humidity at flight level (30-40k ft.) is no different than the previous day when unusual appearing, persistent contrails are inexplicably seen filling the sky with often, bizarre patterns from horizon to horizon.

This article explores the rarely discussed reasons why the high-bypass turbofan design will only form visible contrails under elevated conditions of relative humidity compared to older, low-bypass and no-bypass jet engines.

High Bypass jet engine design used in almost all commercial and military transport aircraft requires significantly high relative humidity at flight level in order to generate a normal, water vapor contrail.



The main products of hydrocarbon fuel combustion in a jet engine are carbon dioxide and water vapor.

In older designs of Ramjet and "low-bypass" jet engines, contrails were readily formed at altitudes above 26,000 feet when water vapor (produced by fuel combustion) raised the relative humidity past the saturation point of the atmosphere outside the aircraft.

Water vapor, blown out the engine exhaust would form a visible contrail of ice crystals as it cooled at a distance of approximately one and one-half wing-spans behind the engine. Tiny particulates of sulfur in the jet exhaust would allow the super-cooled water to crystallize into the familiar jet contrail formation that almost always dissipated within several seconds behind the aircraft.

How a High-Bypass Jet Works

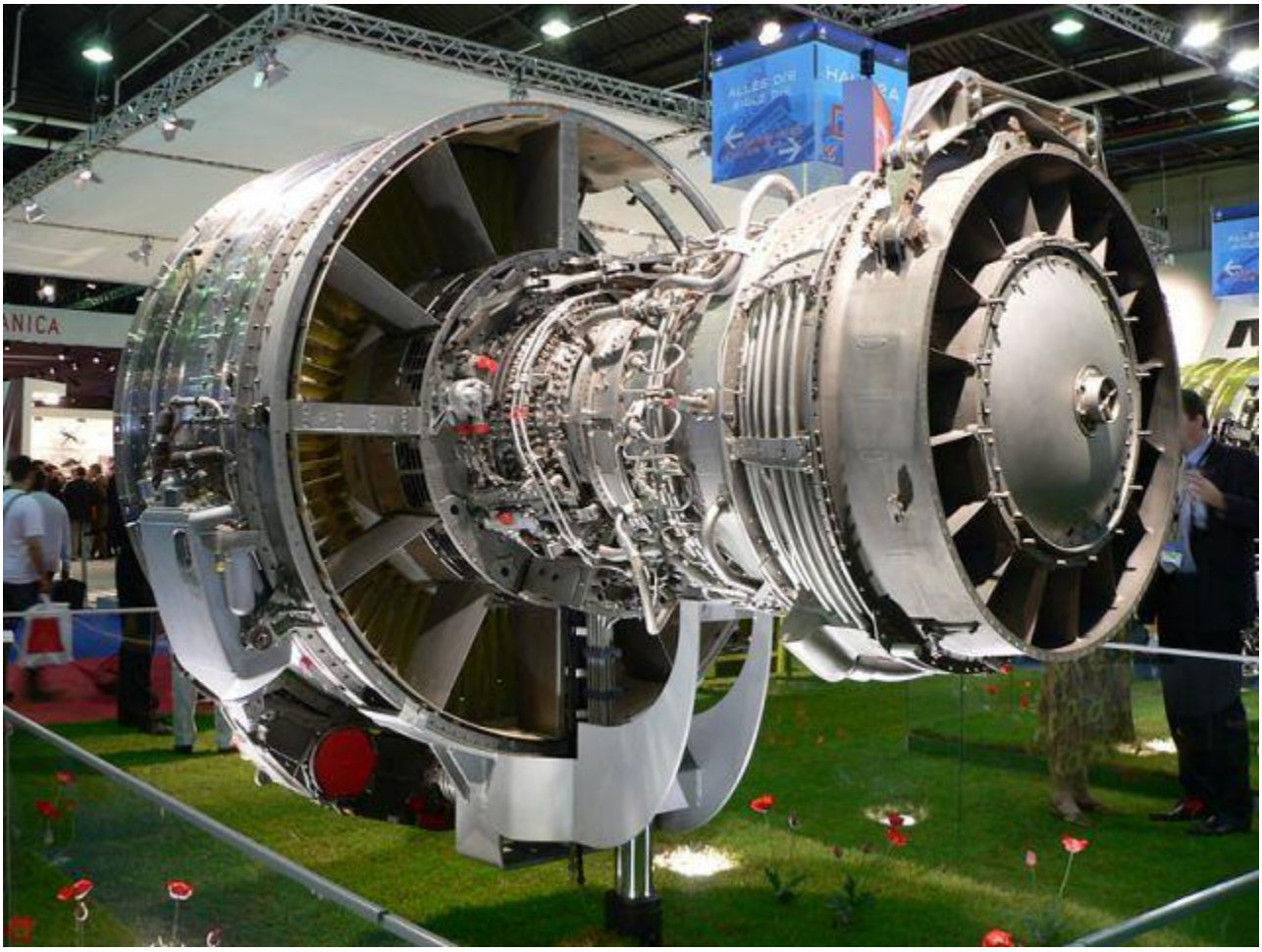
The efficiency of high bypass jet engine design is a radical departure from the older low-bypass engines.

Why Modern High Bypass Jet engines almost never produce contrails:

The term "high bypass" refers to the high ratio of thrust produced by air that is not subjected directly to hydrocarbon fuel combustion. Since 80% of the air

providing thrust bypasses direct combustion it is not capable of producing the water vapor required to form a contrail.

At high altitudes this water vapor emerges into a cold environment, and the local increase in water vapor can raise the relative humidity of the air past saturation point. The vapor then condenses into tiny water droplets which freeze if the temperature is low enough. These millions of tiny water droplets and/or ice crystals form the contrails. The time taken for the vapor to cool enough to condense accounts for the contrail forming some way behind the aircraft's engines. At high altitudes, supercooled water vapor requires a trigger to encourage deposition or condensation. The exhaust particles in the aircraft's exhaust act as this trigger, causing the trapped vapor to rapidly condense. Exhaust contrails rarely occur below 8,000 m (26,000 ft), only if the temperature there is below −40 °C (−40 °F), and if the relative humidity is over 60%. (Wiki)



The CFM56 first ran in 1974[1] and, despite initial export restrictions, is now one of the most common turbofan aircraft engines in the world, with more than 20,000 having been built[2] in four major variants. It is most widely used on the Boeing 737 airliner and, under military designation F108, replaced the Pratt & Whitney

JT3D engines on many KC-135 Stratotankers in the 1980s, creating the KC-135R variant of this aircraft. It is also the only engine (CFM56-5C) used to power the Airbus A340-200 and 300 series. The engine (CFM56-5A and 5B) is also fitted to Airbus A320 series aircraft. (Wiki)

Addendum:

A few people have asked me to comment on Urlich Schumann's article: "Influence of propulsion efficiency on contrail formation" (PDF)

Most importantly, Schumann's article has nothing to do with a much different issue of "persistent contrail" (PC) formation that is the basis of the geoengineering observations complaints as "chemtrails".

Also, the author is presenting his unproved hypothesis on normal contrail formation based on modeling when the "art" of "modeling" does not have the best of reputations. This article appears to be contrived to add plausible deniability as "cover" for the covert chemtrail operation. Like the 9/11 false flag, every massive deception is provided with many "cover" stories to deflect criticism and to justify labeling informed skeptics as "conspiracy theorists".

When you read closely, Schumann admits to many uncertainties in the modeling. One of the key quotes is the assertion that <u>contrails can be entirely eliminated by reducing power.</u> …. In fact, "reduced power" is normal operation in all aviation scenarios at cruise altitude where HBT is used. See page 396 :

"an aircraft may avoid contrail formation, at least near threshold conditions, by flying with reduced power."

Source: http://chemtrailsplanet.net/2015/08/09/the-contrail-deception-revealed-by-examing-the-high-bypass-turbofan/