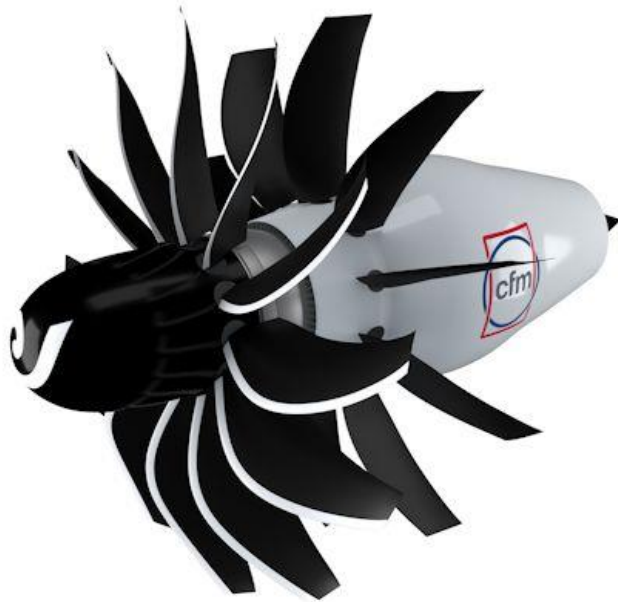


GE CFM “RISE” ENGINE CONCEPT[©]

by Dan Pemble, McDonnell Douglas/Boeing Representative (retired September/2009) – December 2, 2022

The following pages contain an article I wrote on November 9, 2022 as titled: WILL UN-DUCTED FAN (UDF)/ULTRA-HIGH BYPASS (UHB) ENGINES BE GIVEN A 2ND LOOK FOR FUTURE AIRCRAFT? Please read on.



The above is a GE CFM ‘RISE’ engine concept currently under development for possible installations on future aircraft. RISE is an acronym meaning: Revolutionary Innovation for Sustainable Engines. As you can see in the above photo, this engine has a single front-mounted “fan” and has variable “stator vanes” to direct the thrust - in lieu of dual-counter-rotating-rear-mounted-fan-equipped engines as tested years ago by McDonnell Douglas and Boeing. Please note that the photo of the A380 Propulsion Demonstrator in my following article shows the RISE-type engine installed in the engine No. 2 position. Actually at the time I wrote my noted article, strangely enough, I was unaware of the RISE engine development, even though there was a GE press release on June 14, 2021, per the following link:

<https://www.ge.com/news/press-releases/ge-aviation-and-safran-launch-advanced-technology-demonstration-program-for>

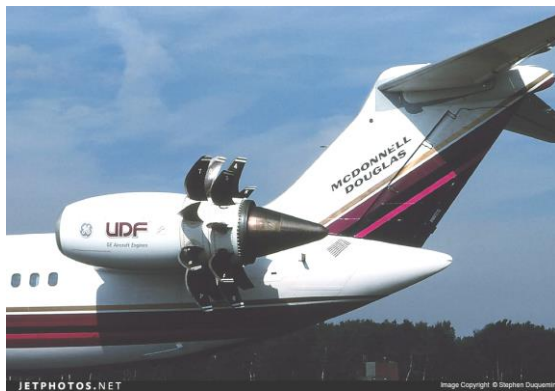
Obviously, the answer to the question in my following article is YES indeed! The concept of future-generation aircraft being equipped with UDF and UHB-type engines is actively being explored!



WILL UN-DUCTED FAN (UDF) /ULTRA-HIGH BYPASS (UHB) ENGINES BE GIVEN A 2ND LOOK FOR FUTURE AIRCRAFT?©

by Dan Pemble, McDonnell Douglas/Boeing Representative (retired September/2009) – November 9, 2022

Interestingly, during the 1980's, both the McDonnell Douglas (MDC)-Long Beach division and The Boeing Company were seriously exploring options related to installing UDF/UHB type engines on their future aircraft. This came about as a result of NASA's predictions that such engines could save 25-40% on fuel consumption as compared to the then-available conventional-jet engines. So, needless to say, both these giants in the commercial aircraft production business began some robust flight testing! Following are some photos of a MDC MD-81 equipped with two types of engines and a Boeing 727 equipped with a GE engine.



MD-81 GE ENGINE INSTALLATION



MD-81 PWA/ALLISON ENGINE INSTALLATION



B727 GE ENGINE INSTALLATION

MDC conducted over 90 test flights with the MD-81 UHB DEMO aircraft and The Boeing Company also conducted a number of flights. On September 4, 1988, a McDonnell Douglas MD-81 equipped with a GE Un-Ducted Fan (UDF) engine performed at the world-famous Farnborough Air Show! A remarkable feat, but there were still many unanswered questions related to this technology when both MDC & Boeing considered its viability for application to their future aircraft; such questions included: the world-wide average fuel costs, initial engine costs, engine reliability, comparative maintenance costs, cabin noise/vibration levels, acceptability by travelers, etc.? Although it was conceivable that airplanes equipped with these engines could be delivered in the 1990's, no such commercial airliners were ever built; amongst other reasons, fuel costs at the time were relatively low and the manufacturers of conventional jet engines were promising that each successive new generation of engines would be more and more fuel efficient.

As noted, both MDC and Boeing decided to shelve all plans related to equipping future generation airplanes with the noted UHB/UDF engines. Interestingly enough, MDC actually had a series of MD-91X, MD-92X and MD-93X UHB-equipped aircraft on the drawing board, as summarized below, and as derived from various stretches of the MD-80 airframe. These aircraft could have been available in the 1990's, but were never to be.



The proposed passenger capacity for each of these models was as follows:

-91X: 100-110

-92X: 150

-94X: 160-180

Boeing also had a potential aircraft in mind that was known as the 7J7; it was to have two rear-fuselage-installed UHB engines and would carry 150 passengers.

Before moving on, I think it could be of interest to you as a reader of this article to see both the MDC MD-81 UHB and the Boeing B727 UDF demonstrators in action! So, please do explore the following links:

MD-81: <https://www.youtube.com/watch?v=1BMNaXc1rL8>

B727: <https://www.youtube.com/watch?v=APzO7OVGakw>

AND NOW:

It's interesting to note that 2 of the world's major airframe manufacturers have now resurrected the decades-old technology in showing interest towards the UHB concept: Airbus, who is now testing a GE "open fan" engine on an A380, and Embraer, who is proposing an "advanced turbo prop" to be installed at the rear-engine locations on their 70-90-seat E-195 derivative. This is very interesting for sure. More thrust with less fuel as seemingly are available with UHB/UDF engines means less tail pipe emissions!



SO:

Are we now heading back to where we started from over 30 years ago? It seems we may be going in that direction but only time will tell!

Who amongst all of us as aviation enthusiasts does not relish each and every new innovation!? No matter what direction the future may take as related to the installation of UDF/UHB engines being installed on yet-to-be developed aircraft, the pioneering efforts of MDC and Boeing engineers and others during past years should never be overlooked!

