PW1000G to power Irkut MC-21 family.

Pratt & Whitney's geared PW1000G turbofan has been selected to power the Irkut MC-21 family. Being the third aircraft family that has selected the PW1000G, the MC-21 is placed to compete with the 737NG & A320 families. The MC-21 is scheduled to enter service in 2016.

Pratt & Whitney (PW) announced at the end of 2009 that its PW1000G will now also power a new Russian commercial passenger aircraft, the Irkut MC-21. This means PW has now won a third airframe to be powered by their geared turbofan.

The PW1000G is a geared turbofan; a design which involves inserting a fan drive gear system between the fan and the low pressure compressor. This results in fewer engine stages and higher bypass ratios without increasing the size of the turbine *(See PW1000G tests confirm performance predictions, Aircraft Commerce, February/March 2009, page 6)*.

The Irkut MC-21, also known as the Irkut MS-21 and UAC MS-21, will be powered by a Russian engine for its domestic market. The PurePower PW1000G will equip aircraft for the rest of the world. Irkut, Yakovlev and Tupolev have all worked together to develop this new aircraft design, all being part of the government backed organisation, United Aircraft Corporation (UAC). The new aircraft design has also had assistance from Sukhoi Corporation and Ilyushin. A subsidiary of the former (Sukhoi Civil Aircraft Company) being responsible for the design and manufacture of the MC-21 wings. The wings, by 2015, are hoped to be a composite material design which would bring the total composite material on the aircraft from 33% up to 40-45%.

A distinct area of the design brief was for the aircraft to compete in the A320 family and 737 marketplace. Since the MC-21 design is to use up to 45% composite material, as well as advanced metal alloys, it claims that it will be 10-15% more efficient than similar sized Airbus and Boeing aircraft, although an exact model-for-model comparison has not been made available. The use of a new generation onboard system and an advanced engine will assist this. Hamilton Sundstrand has signed a deal with Irkut to supply systems for the MC-21.

There are plans for three variants of the MC-21 that include the -200 series (150+ passengers), -300 series (181+ passengers) and -400 series (212+ passengers). The family of aircraft are thus aimed to compete almost directly with the A319, A320 and A321.

Plans for a smaller variant (originally the -100 series carrying 132 passengers) have been dropped, so as not to compete with a larger variant of the Sukhoi Superjet 100.

The seat numbers suggest that the aircraft are planned as direct competition for the traditional A320 family, 737NG family, 757 as well as the Tupolev Tu-204. In addition, as a new design with new technology, it could be seen as competition for the manufacturers of large regional jets that are looking to stretch their designs. In addition to basic models, UAC plans on introducing an extended range (ER) model. The manufacturer has stated that due to reconfiguration software, it would be possible for a customer to modify their aircraft at any point in it's life cycle. The company is also looking into an MC-21-200LR, a very long-range (LR) model, that would have an additional 1,500km flight range on the ER model. The first flight is planned for 2014, with the aim to enter the aircraft into service in 2016.

Although specific up-to-date details of the capabilities of this new family of aircraft are scarce, and despite the likelyhood of the aircraft predominantly selling in Russia (thus a limited market place for a western engine) PW are taking their new customers seriously. As would be expected of an aircraft for the Russian market, the MC-21 has been designed to deal with all climatic zones, adverse weather conditions as well as high airfields.

The MC-21 will require more thrust from its engines than is currently available with the PW1000G. PW has welcomed the new airframe, saying that 'the MC-21 program will allow Pratt & Whitney an opportunity to extend its PW1000G engine models to the 30,000lbs thrust class'. Something that could also interest their current PW1000G customers for future stretched variants.

A test schedule has already been developed, with core testing continuing throughout January 2010 and the full engine testing is to take place this summer (2010). This schedule is in place to ensure that 'the PurePower engine program supports the Irkut MC-21 development timeline'. One factor that makes this tie-up a serious possibility is that PW will contract Irkut and United Engine-Building Corporation with the MC-21's PW1000G engines.

The combination of new airframe and engine design will result in an aircraft that plans to be within CAEP 6 margins by 50% and CO2 emissions reduced by 15-25% per passenger seat compared to previous similar sized aircraft. There will also be a noise margin to Stage IV of 15EPNdB.

Irkut claims the MC-21 will also be 10-15% more efficient than the 737NG and A320 families. One factor will be a 15% lower fuel burn than the A320. One major advantage the MC-21 will have is a competitive list price. The initial target list price is $35 million. AC

MC-21 SPECIFICATIONS

	MC-21-200	MC-21-300	MC-21-400
Seats - single-class layout with 32"pitch	150	181	212
Seats - high density with 29-30" pitch	162	198	230
Range - with full load (km)	5,000	5,000	5,500
Maximum take off weight (kg)	67,600	76,180	87,230
Engine thrust lbs	27,558	30,865	34,392
Cruise speed (M)	0.80	0.80	0.80
Cargo capacity (cu.m)	37.4	53.3	70.1