Evaluating Market and Environmental Impacts of an N+3 Supersonic Aircraft

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NASA's Supersonics Project suggests that by 2035 an "N+3 generation" (three generations of technology beyond today's level) supersonic transport (SST) could be developed, produced and in operation. Several studies explored how a 100-passenger N+3 SST developed by Lockheed Martin Advanced Development Programs would interact with the existing subsonic fleet and how its operations would impact environmental emissions. Through an allocation tool representing a majority of commercial airline operations with at least one airport in the US, studies integrated an N+3 SST into a subsonic fleet. Results indicate that when the allocation tool seeks to maximize time savings for passengers, the N+3 SST is best used on routes longer than 4,500 nmi, on average. However, if the allocation seeks to maximize fleet productivity, the N+3 SST operates on shorter routes with an average length of about 1,000 nmi. Environmentally, allocating an N+3 SST to minimize total fleet block hours leads to the lowest CO_2 emissions, given reasonable estimates about the future fleet's emissions. From an economic standpoint, minimizing total fleet block hours leads to the lowest direct operation costs (DOC) for the airline, whereas maximizing productivity leads to the highest DOC for the airline.