Flight tests of an Air Force variable sweep wing F111 test aircraft modified with the NASA supercritical wing airfoil are scheduled to begin late this week in a joint Air Force-NASA program at NASA's Flight Research Center, Edwards, Calif.

Purpose of the joint program is to investigate the application of supercritical wing to highly maneuverable aircraft in the transonic speed range. The tests will be conducted by NASA's Flight Research Center.

Studies conducted by the Air Force's Flight Dynamics Laboratory and others indicated the supercritical wing would provide an increase in tactical advantage on certain military aircraft, particularly in the transonic speed range where air-to-air combat frequently takes place.

These studies indicate the use of the supercritical wing should provide improved maneuvering, expanded buffet-free performance and increased high altitude performance.

The new wing has a shape almost directly opposite conventional shapes. It has a flat top with the rear portion of the bottom side curved upwards. The shape of the airfoil is based upon research conducted by Dr. Richard T. Whitcomb in wind tunnels at NASA's Langley Research Center.

These wind tunnel studies show the new wing shape could delay the rise in aerodynamic drag and allow the aircraft to cruise more efficiently at the higher speeds. Earlier this year, flight tests conducted by NASA's Flight Research Center of a supercritical wing on a modified F8 jet demonstrated the new airfoil permitted the craft to operate approximately 15 per cent more efficiently under test conditions. The wing tested was representative of a wing that would be used on commercial jet transports.

The General Dynamics F111 was selected as the test aircraft because its sweep wing capabilities will permit a wide range of conditions for flight tests at speeds ranging from 0.6 Mach (330 mph) to 2.2 Mach (1450 mph). Emphasis will be placed upon the transonic speed range, 0.7 Mach (480 mph) to 1.4 Mach (925 mph).

Data will be used to verify wind tunnel prediction and other ground based studies. Full scale flight demonstrations are also expected to uncover possible problem areas as well as help pave the way for production on future aircraft.