Case Study: Junkers 87 'Stuka'

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The first attack launched from an airplane was undertaken by Giulio Gavotti in 1911, during the Italo-Turkish war, when Gavotti dropped grenades from his Taube Monoplane (Johnston 2016). A few years later, at the start of World War 1 (WW1), Italy and Russia had developed purpose built bombers, and by the end of WW1 most of the belligerent nations had developed bombing capabilities of their own (citation), using aerodynamically shaped bombs with no guidance or thrust. Typically dropped from a high altitude during horizontal passovers of the target, these bombs had complicated trajectories which were affected by drag and gravity, and which were sighted using fixed sights to provide an estimated impact point without accounting for the prevailing atmospheric conditions (citation). Due to these conditions, bombs had a large circular error probable (CEP) (citation, needs values), limiting bombing to interdiction tactics and precluding the possibility of combined arms operations featuring close air support of ground units (citation).

When compared to modern guided weapons, WW1 era bombs had large circular error probables (CEP), (Nelson 1988) and high altitude, horizontal bombing runs against targets were difficult to execute with precision (citation).

The first preplanned dive bombing attack was carried out against a German supply barge in France, sinking the barge with a 20-pound Cooper bomb (Boyne 2010, p. 72).

The Junkers Ju 87 'Stuka', was a dive bomber developed by Hermann Pohlmann in 1933, and which was first flown in 1935 (Weal 1997, p. 9).

Unusually for a strategic aircraft in World War II, the Stuka had fixed landing gear.(Curry 1988, p. 4)

When calculating operational parameters for the Stuka, it is necessary to consider that the Luftwaffe deployed the Stuka in the Western and Eastern fronts, as well as the Desert and Mediterranean theatres. Accordingly, calculations have been done for the most extreme temperatures where the Stuka operated, as well as the more temperate Battle of Britain temperatures, in order to demonstrate the versatility of the Stuka.

Lowest temperature of operation (Moscow): -45C (Raus 2003) European / Battle of Britain temperatures: Highest temperature of operation ():

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