At the point of closest approach, the aircraft coordinates are (x_o, y_o, z_o) and the heading of the aircraft is *H*. If the flight trajectory is a straight line, the azimuth to the point of closest approach, *A*, is related to the aircraft heading:

$$H = A - 90°$$

If the ground speed of the aircraft is v, the aircraft position after time t will be:

$$x = x_o + vt \sin H$$

$$y = y_o + vt \cos H$$

$$z = z_o$$

The azimuth to the aircraft at time t is:

$$A = \arctan (x/y)$$

but the infrasonic signal from the aircraft will be delayed by a time interval Δt:

$$\Delta t = D/c$$

where c is the speed of sound and D is the slant range to the aircraft:

$$D = \sqrt{(x^2 + y^2 + z^2)}$$

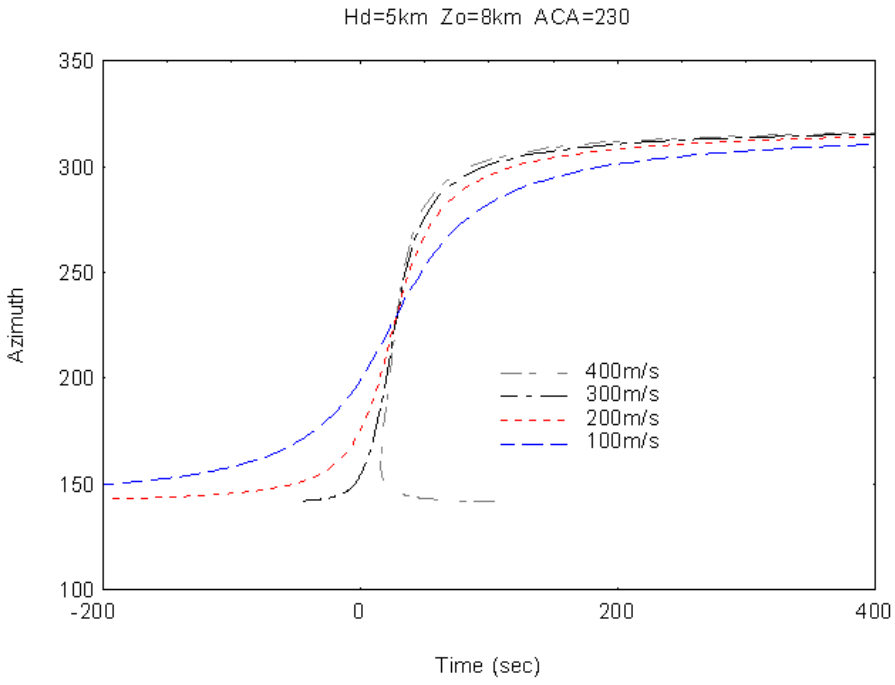

Fig. 5. Simulated variations of the azimuth to the aircraft for three subsonic aircraft speeds and one supersonic. Horizontal distance at ACA is 5 km.