Crosswind and tailwind for aeronautical purpose: how to calculate them?

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Crosswind and tailwind components are operational parameters, not required from nor usually delivered by the Met Service supplier. So, these components are currently calculated from the reported geographic wind and its variations (of speed and direction).

It is a simple trigonometric calculation for the average values, but not for the gusts, the direction of which is unknown in the reported parameters.

The easiest method is to combine the average wind direction with the gust speed. But this doesn’t take into account the wind speed and wind direction variability.

Reference values of crosswind and tailwind gusts were calculated from the raw instantaneous wind measurements and compared with several calculation methods.

The results are presented in the poster and are surprising, for tailwind gusts when the wind is crossing the runway.