

ACAS II Bulletin

Manoeuvring based on traffic display

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The TCAS II traffic display (also known as a “cockpit display of traffic information” – CDTI) is provided for the purpose of assisting flight crews in the visual acquisition of aircraft in the vicinity and to improve their situational awareness. The traffic display has not been designed for self-separation, nor for sequencing, due to its limited horizontal accuracy.

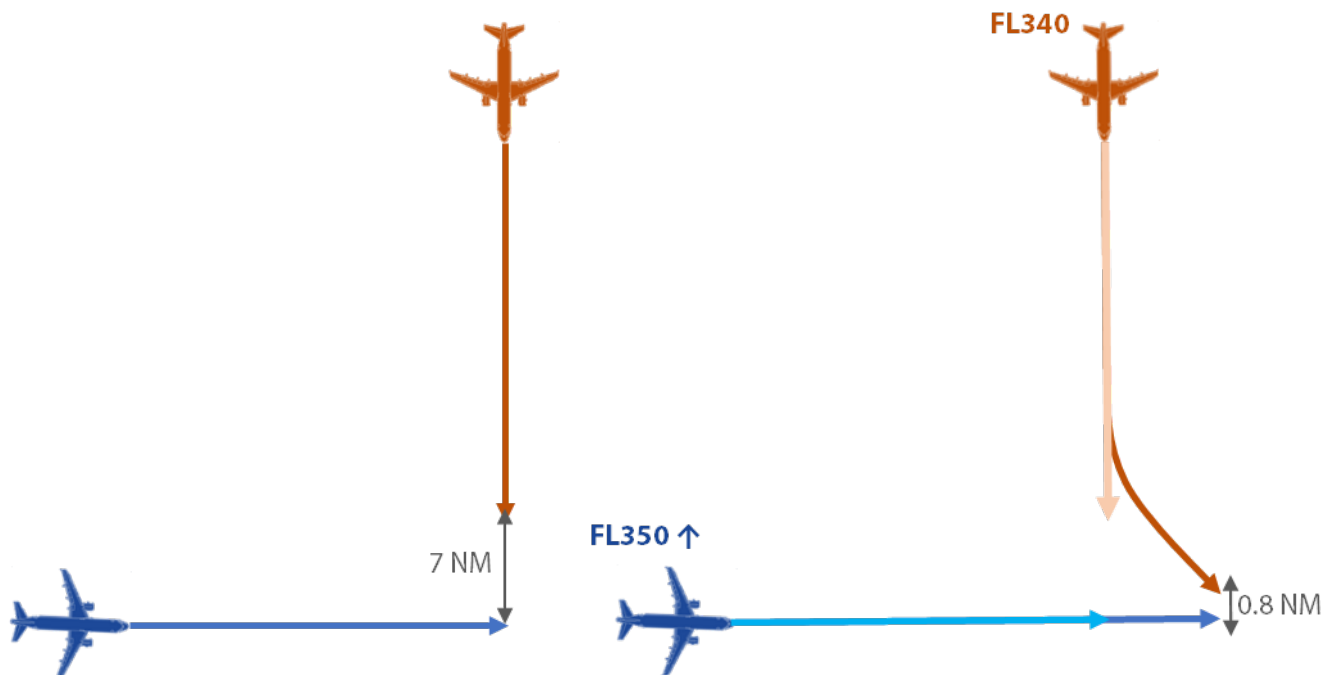
In some cases, flight crews have made their own traffic assessment based on the traffic display information, and manoeuvred in anticipation of, or contrary to, ATC instructions. The following recent case illustrates why such manoeuvres are inappropriate.

The Blue and Orange aircraft were on perpendicularly crossing tracks, at FL330 and FL340 respectively, as illustrated in the diagram below. The expected horizontal separation was 7 NM.

Before the tracks crossed, the Blue aircraft requested FL350. Given the projected horizontal separation of 7 NM (the horizontal separation minimum is 5 NM), the air traffic controller cleared the Blue aircraft to climb to FL350.

Soon after the Blue aircraft commenced the climb, the Orange aircraft unexpectedly turned left approximately 20°. When asked by the controller, the Orange aircraft crew responded they were turning to avoid weather ahead and judged – using their TCAS traffic display – that they were not in conflict with the Blue aircraft.

As a result of the Orange aircraft turn, the projected separation between the two aircraft decreased to 0.8 NM (see the diagram below).



In order to prevent the loss of vertical separation, the controller instructed the Blue aircraft to climb at the maximum vertical speed. The Blue aircraft achieved 2900 ft/min. and thanks to that the loss of separation was prevented.

At the time when the Orange aircraft made its turn, the controller was working on resolving two other conflicts. The unexpected turn and consequent conflict increased the controller's workload and created an unsafe situation.

Subsequently, the Orange aircraft crew stated that they could not notify ATC prior to the turn as the frequency was busy. Further, the crew stated that they had made their avoiding manoeuvre decision observing surrounding traffic on the TCAS traffic display.

Manoeuvres based on the TCAS traffic display are inappropriate and can also be hazardous as the traffic display indications can be misinterpreted because it provides only partial information:

- it has limited bearing accuracy (up to $\pm 30^\circ$ depending on the selected scale);
- it is based upon a moving reference (own aircraft itself is moving, so the displacement of the intruder symbol does not correspond to the intruder's actual ground track);
- the flight crew will not be aware of the trajectory or intentions of other aircraft nor ATC instructions issued to them;
- it lacks track history and a speed vector;
- it lacks identity information (except some modern implementations);
- there is a risk that some aircraft in the vicinity might not be displayed;
- there is a risk that flight crew could attribute a target symbol to the wrong aircraft.

Learning points:

Pilots:

- Avoidance manoeuvres based solely on the traffic display may create a problem or cause a situation to deteriorate;
- TCAS traffic display is not suitable for self-separation;
- TCAS traffic display information is prone to misjudgement.

Controllers:

- Issue heading instructions to reinforce that the aircraft stays on the planned route.

Further reading:

- [EUROCONTROL ACAS Guide](#)
- [ACAS Bulletin no. 7](#) (event 4)
- [ACAS Bulletin no. 6](#)
- [ACAS Bulletin no. 22](#) (events 2 & 3)



Animation of the event described in this Bulletin



Video explaining why TCAS traffic display can be misinterpreted

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