資料 10-CNS 作合 3-4

ACAS への在地上判定の影響

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ACAS における在地上判定の方法

・ 自機の在地上判定　　＝電波高度計測定値
・ 相手機の在地上判定　　＝モード S トランスポンダ応答の VS ビット

ANNEX10 Volume-IV の関連記載事項

4.3.2.1.1.2 ACAS shall not track Mode S aircraft that report that they are on the ground.

Note.— A Mode S aircraft may report that it is on the ground by coding in the capability (CA) field in a DF = 11 or DF = 17 transmission (Chapter 3, 3.1.2.5.2.2.1) or by coding in the vertical status (VS) field in a DF = 0 transmission (Chapter 3, 3.1.2.8.2.1). Alternatively, if the aircraft is under Mode S ground surveillance, ground status may be determined by monitoring the flight status (FS) field in downlink formats DF = 4, 5, 20 or 21 (Chapter 3, 3.1.2.6.5.1).

＝ACAS は On-the-Ground 状態を示すトランスポンダを無視し RA を出さない
＝飛行中のトランスポンダが On-the-Groud 応答すると衝突から保護されない
　　ICAO/ASP/WG および TSG ではこれを議論する予定
　　先の改訂 85 案では悪意の信号による「信号テロ」に脆弱になる
　　トランスポンダの応答機能選択コマンドを追加する代案あり
　　>>>詳細は宮崎が状況説明

4.3.2.2.2.2 ACAS interference limiting inequalities. ACAS shall adjust its interrogation rate and interrogation power such that the following three inequalities remain true, except as provided in 4.3.2.2.2.2.1.

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The variables in these inequalities shall be defined as follows:
it = number of interrogations (Mode A/C and Mode S) transmitted in a 1 s interrogation cycle;
i = index number for Mode A/C and Mode S interrogations, i = 1, 2,..., it;
α = the minimum of α1 calculated as 1/4 [nb/nc] subject to the special conditions given below and α2 calculated as Log10 [na/nb] / Log10 25, where nb and nc are defined as the number of operating ACAS II and ACAS III equipped aircraft (airborne or on the ground) within 11.2 km (6 NM) and 5.6 km (3 NM) respectively, of own ACAS (based on ACAS surveillance). ACAS aircraft operating at or below a radio altitude of 610 m (2 000 ft) AGL shall include both airborne and on-ground ACAS II and ACAS III aircraft in the value for nb and nc. Otherwise, ACAS shall include only airborne ACAS II and ACAS III aircraft in the value for nb and nc. The value of α is further constrained to a minimum of 0.5 and a maximum of 1.0.
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4.3.2.2.2.2.2 Transmissions from ACAS units on the ground. Whenever the ACAS aircraft indicates that it is on the ground, ACAS interrogations shall be limited by setting the number of other ACAS II and III aircraft (na) count in the interference limiting inequalities to a value that is three times the value obtained based on ACAS broadcasts received with a transponder receiver threshold of –74 dBm. Whenever Mode A/C interrogation power is reduced because of interference limiting, the Mode A/C interrogation power in the forward beam shall be reduced first until the forward sequence matches the right and left sequences. The forward, right and left interrogation powers shall then sequentially be reduced until they match the rear interrogation power. Further reduction of Mode A/C power shall be accomplished by sequentially reducing the forward, side and rear interrogation powers.

＝ACAS は自機が地上または低高度にいるかどうかで干渉制限の判定基準を変える。地上近くでは、飛行中の ACAS 数のみならず地上の ACAS 数も追加配慮して質問数を低く制限。
（自機の電波高度計測定値を用いる判断）

4.3.5.4.2 ACAS shall not operate in sensitivity levels 3-7 when own aircraft is below 300 m (1 000 ft) AGL.
＝ACAS は地上近くでは RA を出さない
（自機の電波高度計測定値を用いる判断）

4.3.11.2 DATA TRANSFER BETWEEN ACAS AND ITS MODE S TRANSPONDER

4.3.11.2.1 Data transfer from ACAS to its Mode S transponder:

a) The Mode S transponder shall receive from its ACAS RA information for transmission in an RA report (4.3.8.4.2.2.1) and in a coordination reply (4.3.8.4.2.4.2);

b) the Mode S transponder shall receive from its ACAS current sensitivity level for transmission in a sensitivity level report (4.3.8.4.2.5);

c) the Mode S transponder shall receive from its ACAS capability information for transmission in a data link capability report (4.3.8.4.2.2.2) and for transmission in the RI field of air-air downlink formats DF = 0 and DF = 16 (4.3.8.4.1.2); and

d) the Mode S transponder shall receive from its ACAS an indication that RAs are enabled or inhibited for transmission in the RI field of downlink formats 0 and 16.

4.3.11.2.2 Data transfer from Mode S transponder to its ACAS:

a) The Mode S transponder shall transfer to its ACAS received sensitivity level control commands (4.3.8.4.2.1.1) transmitted by Mode S stations;

Format No. Format name

UF = 16 Long air-air surveillance interrogation

DF = 16 Long air-air surveillance reply

b) the Mode S transponder shall transfer to its ACAS received ACAS broadcast messages (4.3.8.4.2.3.3) transmitted by other ACASs;

c) the Mode S transponder shall transfer to its ACAS received resolution messages (4.3.8.4.2.3.2) transmitted by other ACASs for air-air coordination purposes; and

d) the Mode S transponder shall transfer to its ACAS own aircraft’s Mode A identity data for transmission in an RA broadcast (4.3.8.4.2.3.4.5).

＝ACAS とトランスポンダの間で On-the-Ground データの交換はない

以上