

**22<sup>nd</sup> MEETING OF THE  
INFORMAL SOUTH PACIFIC AIR TRAFFIC SERVICES COORDINATING GROUP  
(ISPACG/22)**

(Papeete, Tahiti – 12-14 March 2008)

**Agenda Item 5: Identify Future Work Programmes**

**Availability of Flight Levels Above FL410**

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**SUMMARY**

Within controlled airspace, ATC are unable to assign to IFR aircraft even levels above FL410 because they are not included in the table of cruising levels, Appendix 3, Annex 2. This means that for an increasing number of modern aircraft able to operate in this altitude band, aircraft operating efficiencies are not being optimised and carbon footprints are higher than technically necessary.

**1.0 Background**

1.1 ICAO Annex 2 Chapter 5 section 5.2 states the following in respect of IFR flights within controlled airspace:

*5.2.2 An IFR flight operating in cruising flight in controlled airspace shall be flown at a cruising level, or, if authorized to employ cruise climb techniques, between two levels or above a level, selected from:*

- a) the tables of cruising levels in Appendix 3; or*
- b) a modified table of cruising levels, when so prescribed in accordance with Appendix 3 for flight above FL 410; except that the correlation of levels to track prescribed therein shall not apply whenever otherwise indicated in air traffic control clearances or specified by the appropriate ATS authority in Aeronautical Information Publications.*

1.2 In support of this Annex 2 requirement, Doc 4444 (PANS-ATM) Chapter 5 Section 5.3.3 (titled: Assignment of cruising levels to controlled flights) states:

*5.3.3.8 The cruising levels, or, in the case of cruise climb, the range of levels, to be assigned to controlled flights shall be selected from those allocated to IFR flights in:*

- a) the tables of cruising levels in Appendix 3 of Annex 2; or*
- b) a modified table of cruising levels, when so prescribed in accordance with Appendix 3 of Annex 2 for flights above FL 410; except that the correlation of levels to track as prescribed therein shall not apply whenever otherwise indicated in air traffic control clearances or specified by the appropriate ATS authority in AIP's.*

1.3 This means that within controlled airspace VFR levels cannot be assigned to IFR flights but that IFR levels can be assigned to VFR flights. Above FL410 the only levels allocated to IFR flights in the table of cruising levels are levels at odd altitudes.

1.4 In some areas of the world ATC frequently assign, either following pilot request or to achieve separation, levels that do not correlate to track in accordance with the table of cruising levels. In airspace controlled by New Zealand such levels are appended as "non-standard" to highlight this fact.

- 1.5 ICAO Annex 2 Chapter 5 section 5.3 states that in respect of IFR flights outside of controlled airspace the applicable table of cruising levels applies as published, that levels must correlate with track.
- 1.6 There are few areas left in the world where airspace above FL410 is not controlled airspace.

## 2.0 Discussion

- 2.1 An increasing number of new aircraft types are now capable of, and certificated for, flight in the levels between FL410 and FL510. Supersonic executive aircraft are now being designed, and these aircraft may operate at levels above FL510.
- 2.2 These aircraft have sophisticated flight management systems that provide the flight crew with optimum cruise level for a given cost index of operation. It is important on long duration flights, and flights through areas of disruptive weather systems, that the optimum cruise level is made available for use by such aircraft.
- 2.3 Currently the only option for ATC when a pilot indicates a preference to operate at one of the even levels above FL410 is a block clearance between two odd levels or flight at and above an odd level.
- 2.4 As numbers of aircraft using this stratum of airspace are expected to increase, this may create issues for ATC where flights are in proximity to each other. For example aircraft A requests FL440 but is cleared at block FL430 to FL450. Aircraft B requests FL420 but due to separation requirements is restricted to FL410. If both aircraft were able to be cleared at their requested levels vertical separation would have been in place.
- 2.5 While cruising at 1000ft below optimum may seem only a small disadvantage, it can impact a long duration flight if the aircraft is below optimum for an extended period.
- 2.6 The issuance of block clearances has human factors implications. These clearances are not common when compared to clearances at a specific level, require additional data to be displayed on ATS situation displays and flight progress strips, and require additional data to be passed to the next controlling sector. Prior approval of the next controlling sector may also be required before or during the passing of flight plan data. Issuing to a pilot a block clearance in response to a request to operate at a specific level increases the risk of error both on the flight deck and in the ATS environment.
- 2.7 There appears to be no technical reason why ATC cannot assign to controlled flights even levels above FL410 as long as there are systems in place to ensure that the correct vertical separation (2,000ft) is applied between each aircraft pair where horizontal separation does not exist.

## 3.0 Proposal

- 3.1 Even levels cannot be added to the content of the tables in Annex 2 Appendix 3 because this table is also for use within uncontrolled airspace. These levels are not for use in uncontrolled airspace.

- 3.2 Because these levels will not be part of the content of the tables they will in effect be random levels available within controlled airspace only in any direction. They will in effect always be “non-standard” levels.
- 3.3 To mitigate any risk to their use they should only be used when the ATS provider has a conflict alert system that ensures correct application of vertical separation.
- 3.4 A statement should be added to both tables, beneath the last line of each of the columns, such as:

*FL420, FL440, FL460, FL480, FL500 etc are available for use within controlled airspace provided that the ATS provider has in use an operative conflict alert system and 2,000ft separation is assured.*

#### **4.0 Recommendation**

- 4.1 ISPACG participants are invited to comment on the proposal so an ISPACG position can be tabled at the Separation and Airspace Safety Panel (SASP) when they consider an amendment to Annex 2 to make these flight levels available for assignment to IFR aircraft operating within controlled airspace.

### APPENDIX 3. TABLES OF CRUISING LEVELS

The cruising levels to be observed when so required by this Annex are as follows:

- a) in areas where, on the basis of regional air navigation agreements and in accordance with conditions specified therein, a vertical separation minimum (VSM) of 300 m (1 000 ft) is applied between FL 290 and FL 410 inclusive.\*

TRACK**											
From 000 degrees to 179 degrees***						From 180 degrees to 359 degrees***					
IFR Flights Altitude			VFR Flights Altitude			IFR Flights Altitude			VFR Flights Altitude		
FL	Metres	Feet	FL	Metres	Feet	FL	Metres	Feet	FL	Metres	Feet
-90			-	-	-	0			-	-	-
10	300	1 000	-	-	-	20	600	2 000	-	-	-
30	900	3 000	35	1 050	3 500	40	1 200	4 000	45	1 350	4 500
50	1 500	5 000	55	1 700	5 500	60	1 850	6 000	65	2 000	6 500
70	2 150	7 000	75	2 300	7 500	80	2 450	8 000	85	2 600	8 500
90	2 750	9 000	95	2 900	9 500	100	3 050	10 000	105	3 200	10 500
110	3 350	11 000	115	3 500	11 500	120	3 650	12 000	125	3 800	12 500
130	3 950	13 000	135	4 100	13 500	140	4 250	14 000	145	4 400	14 500
150	4 550	15 000	155	4 700	15 500	160	4 900	16 000	165	5 050	16 500
170	5 200	17 000	175	5 350	17 500	180	5 500	18 000	185	5 650	18 500
190	5 800	19 000	195	5 950	19 500	200	6 100	20 000	205	6 250	20 500
210	6 400	21 000	215	6 550	21 500	220	6 700	22 000	225	6 850	22 500
230	7 000	23 000	235	7 150	23 500	240	7 300	24 000	245	7 450	24 500
250	7 600	25 000	255	7 750	25 500	260	7 900	26 000	265	8 100	26 500
270	8 250	27 000	275	8 400	27 500	280	8 550	28 000	285	8 700	28 500
290	8 850	29 000				300	9 150	30 000			
310	9 450	31 000				320	9 750	32 000			
330	10 050	33 000				340	10 350	34 000			
350	10 650	35 000				360	10 950	36 000			
370	11 300	37 000				380	11 600	38 000			
390	11 900	39 000				400	12 200	40 000			
410	12 500	41 000				430	13 100	43 000			
450	13 700	45 000				470	14 350	47 000			
490	14 950	49 000				510	15 550	51 000			
etc.	etc.	etc.				etc.	etc.	etc.			

\* Except when, on the basis of regional air navigation agreements, a modified table of cruising levels based on a nominal vertical separation minimum of 300 m (1 000 ft) is prescribed for use, under specified conditions, by aircraft operating above FL 410 within designated portions of the airspace.

\*\* Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the appropriate ATS authorities, grid tracks as determined by a network of lines parallel to the Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

\*\*\* Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.

*Note.— Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (Doc 9574).*

b) in other areas:

TRACK*											
From 000 degrees to 179 degrees**						From 180 degrees to 359 degrees**					
IFR Flights Altitude			VFR Flights Altitude			IFR Flights Altitude			VFR Flights Altitude		
FL	Metres	Feet	FL	Metres	Feet	FL	Metres	Feet	FL	Metres	Feet
-90			-	-	-	0			-	-	-
10	300	1 000	-	-	-	20	600	2 000	-	-	-
30	900	3 000	35	1 050	3 500	40	1 200	4 000	45	1 350	4 500
50	1 500	5 000	55	1 700	5 500	60	1 850	6 000	65	2 000	6 500
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90	2 750	9 000	95	2 900	9 500	100	3 050	10 000	105	3 200	10 500
110	3 350	11 000	115	3 500	11 500	120	3 650	12 000	125	3 800	12 500
130	3 950	13 000	135	4 100	13 500	140	4 250	14 000	145	4 400	14 500
150	4 550	15 000	155	4 700	15 500	160	4 900	16 000	165	5 050	16 500
170	5 200	17 000	175	5 350	17 500	180	5 500	18 000	185	5 650	18 500
190	5 800	19 000	195	5 950	19 500	200	6 100	20 000	205	6 250	20 500
210	6 400	21 000	215	6 550	21 500	220	6 700	22 000	225	6 850	22 500
230	7 000	23 000	235	7 150	23 500	240	7 300	24 000	245	7 450	24 500
250	7 600	25 000	255	7 750	25 500	260	7 900	26 000	265	8 100	26 500
270	8 250	27 000	275	8 400	27 500	280	8 550	28 000	285	8 700	28 500
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370	11 300	37 000	380	11 600	38 000	390	11 900	39 000	400	12 200	40 000
410	12 500	41 000	420	12 800	42 000	430	13 100	43 000	440	13 400	44 000
450	13 700	45 000	460	14 000	46 000	470	14 350	47 000	480	14 650	48 000
490	14 950	49 000	500	15 250	50 000	510	15 550	51 000	520	15 850	52 000
etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.

\* Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the appropriate ATS authorities, grid tracks as determined by a network of lines parallel to the Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

\*\* Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.

*Note.— Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (Doc 9574).*