Commission Delegated Regulation (EU) 2020/2034 of 6 October 2020 supplementing Regulation (EU) No 376/2014 of the European Parliament and of the Council as regards the common European risk classification scheme (Text with EEA relevance)

COMMISSION DELEGATED REGULATION (EU) 2020/2034

of 6 October 2020

supplementing Regulation (EU) No 376/2014 of the European Parliament and of the Council as regards the common European risk classification scheme

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) No 376/2014 of the European Parliament and of the Council of 3 April 2014 on the reporting, analysis and follow-up of occurrences in civil aviation, amending Regulation (EU) No 996/2010 of the European Parliament and of the Council and repealing Directive 2003/42/EC of the European Parliament and of the Council and Commission Regulations (EC) No 1321/2007 and (EC) No 1330/2007[(1)], and in particular Article 7(6) thereof,

Whereas:

(1) The Commission, in close cooperation with the Member States and the European Union Aviation Safety Agency ('Agency') through the network of aviation safety analysts, developed a methodology for the classification of occurrences in terms of safety risk, by taking into account the need for compatibility with existing risk classification schemes. The common European risk classification scheme ('ERCS') was developed by 15 May 2017 in accordance with the target date set out in Article 7(5) of Regulation (EU) No 376/2014. The ERCS should be now set out in this Regulation.

(2) It should support the competent authorities of the Member States and the Agency in their assessment of occurrences, its key purpose should be the identification and classification in a harmonised manner of the level of risk posed by each occurrence to aviation safety. Its purpose should not be the identification of the outcome of the occurrence.

(3) The ERCS should also allow for the identification of rapid actions needed in reply to high-risk safety occurrences. It should also enable the identification of key risk areas from aggregated information and the identification and comparison of their risk levels.

(4) The ERCS should facilitate an integrated and harmonised approach to risk management across the European aviation system and therefore enable the competent authorities of Member States and the Agency to focus on safety improvement efforts in a harmonised manner as part of the European Plan for Aviation Safety referred to in Article 6 of Regulation (EU) 2018/1139 of the European Parliament and of the Council[(2)].

(5) Commission Implementing Regulation (EU) 2019/317[3] laying down a performance and charging scheme in the single European sky establishes the rate of runway incursions and separation minima infringement at Union level with a safety impact as the indicators to be monitored on an annual basis during the third reference period (RP3) that covers the calendar years 2020 to 2024 inclusive. This Regulation should be applied as of l January 2021 to align the use of the ERCS with the start of the RP3 second annual monitoring period and ensure the harmonised assessment of occurrences,

HAS ADOPTED THIS REGULATION:

Article 1

Subject matter

This Regulation sets out the common European risk classification scheme (ERCS) for the determination of the safety risk of an occurrence.

Article 2

Definitions

For the purposes of this Regulation, the following definitions shall apply:

(1) ‘European risk classification scheme’ or ‘ERCS’ means the methodology applied for the assessment of the risk posed by an occurrence to civil aviation in the form of a safety risk score;

(2) ‘ERCS matrix’ means a grid made up of the variables described in Article 3(3) which serves for the illustrative representation of the safety risk score;

(3) ‘safety risk score’ means the result of the risk classification of an occurrence by combining the values of the variables described in Article 3(3);

(4) ‘high-risk area’ means an area where an aircraft impact would cause numerous injuries, result in a high number of fatalities, or both because of the nature of the activities in that area, such as nuclear or chemical plants;

(5) ‘populated area’ means an area with clustered or scattered buildings and a permanent human population, such as city, settlement, town, or village;

(6) ‘life changing injury’ means an injury reducing the person’s quality of life in regard to reduced mobility or reduced cognitive or physical ability in daily life.

Article 3

Common European risk classification scheme

1 The ERCS is set out in the Annex.

2 The ERCS shall address the safety risk of an occurrence and not its actual outcome. The assessment of each occurrence shall determine the worst likely accident outcome that the occurrence might have led to, and how close to that accident outcome the occurrence was.

3 The ERCS shall be based on the ERCS matrix composed of the following two variables:

a severity: identification of the worst likely accident outcome that would have resulted if the occurrence under assessment had escalated into an accident;

b probability: identification of the likelihood of the occurrence under assessment to escalate into the worst likely accident outcome referred to in point (a).

Article 4

Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

It shall apply from 1 January 2021.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 6 October 2020.

For the Commission

The President

Ursula VON DER LEYEN

ANNEX

The common European risk classification scheme

The ERCS shall consist of the following two steps:

STEP 1: Determination of the values of the two variables: severity and probability.

STEP 2: Scoring of the safety risk within the ERCS matrix based on the two determined values of variables.

STEP 1: DETERMINATION OF THE VALUES OF THE VARIABLES

1. Severity of the potential accident outcome

1.1. Identification

The identification of the severity of the potential accident outcome shall follow the following two steps:

(a) a determination of the most likely type of accident that the occurrence under assessment could have escalated to (the so called key risk area);

(b) a determination of the potential loss of life category based on aircraft size and proximity to populated or high-risk areas.

There are following key risk areas:

a. airborne collision: a collision between aircraft while both aircraft are airborne; or between aircraft and other airborne objects (excluding birds and wildlife);

b. aircraft upset: an undesired aircraft state characterised by unintentional divergences from parameters normally experienced during operations, which might ultimately lead to an uncontrolled impact with terrain;

c. collision on runway: a collision between an aircraft and another object (other aircraft, vehicles, etc.) or person that occurs on a runway of an aerodrome or other predesignated landing area. It does not include collisions with birds or wildlife;

d. excursion: an occurrence when an aircraft leaves the runway or movement area of an aerodrome or landing surface of any other predesignated landing area, without getting airborne. It includes high-impact vertical landings for rotorcraft or vertical take-off and landing aircraft and balloons or airships;

e. fire, smoke and pressurisation: an occurrence involving cases of fire, smoke, fumes or pressurisation situations that may become incompatible with human life. This includes occurrences involving fire, smoke or fumes affecting any part of an aircraft, in flight or on the ground, which is not the result of impact or malicious acts;

f. ground damage: damage to aircraft induced by operation of aircraft on ground on any other ground area than a runway or predesignated landing area, as well as damage during maintenance;

g. obstacle collision in flight: collision between an airborne aircraft and obstacles rising from the surface of the earth. Obstacles include tall buildings, trees, power cables, telegraph wires and antennae as well as tethered objects;

h. terrain collision: an occurrence where an airborne aircraft collides with terrain, without indication that the flight crew was unable to control the aircraft. It includes instances when the flight crew is affected by visual illusions or degraded visual environment;

i. other injuries: an occurrence where fatal or non-fatal injuries have been inflicted, which cannot be attributed to any other key risk area;

j. security: an act of unlawful interference against civil aviation. It includes all incidents and breaches related to surveillance and protection, access control, screening, implementation of security controls and any other acts intended to cause malicious or wanton destruction of aircraft and property, endangering or resulting in unlawful interference with civil aviation and its facilities. Includes both physical and cyber security events.

The potential loss of life shall be categorised in the following way:

(a) more than 100 possible fatalities – where the occurrence under assessment involves at least any of the following:
- one large certified aircraft with more than 100 potential passengers on board;
- an equivalent size aircraft for cargo;
- one aircraft of any type in a heavily populated area or in a high-risk area or both;
- any situation involving any type of aircraft where more than 100 fatalities may be possible;

(b) between 20 to 100 possible fatalities – where the occurrence under assessment involves at least any of the following:
- one medium certified aircraft with 20 to100 potential passengers on board or equivalent size for cargo aircraft;
- any situation where 20 to 100 fatalities may be possible;

(c) between 2 to 19 possible fatalities where the occurrence under assessment involves at least any of the following:
- one small certified aircraft with up to 19 potential passengers on board;
- an equivalent size for cargo aircraft;
- any situation where 2 to 19 fatalities may be possible;

(d) 1 possible fatality – where the occurrence under assessment involves at least any of the following:
- one uncertified aircraft, that is aircraft not subject to European Union Aviation Safety Agency certification requirements;
- any situation where a single fatality may be possible;

(e) 0 possible fatalities – where the occurrence under assessment involves personal injuries only, regardless of the number of minor and serious injuries as long as there are no fatalities.

1.2. Determination

The severity of the accident shall result in one of the following severity scores:
- **'A'** which stands for no likelihood of an accident;
- **'E'** which stands for an accident involving minor and serious injury (not life changing) or minor aircraft damage;
- **'I'** which stands for an accident involving a single fatality, life changing injury or substantial damage accident;
- **'M'** which stands for a major accident with limited amount of fatalities, life changing injuries or destruction of the aircraft;

— **'S'** which stands for a significant accident with potential for fatalities and injuries;
— **'X'** which stands for an extreme catastrophic accident with the potential for significant number of fatalities.

The severity score shall be calculated by combining the key risk area and the potential loss of life as laid down in the following table:

KEY RISK AREA	CATEGORY	SEVERITY SCORE
Airborne collision	More than 100 possible fatalities	X
	Between 20 to 100 possible fatalities	S
	Between 2 to 19 possible fatalities	M
	1 possible fatality	I
Aircraft upset	More than 100 possible fatalities	X
	Between 20 to 100 possible fatalities	S
	Between 2 to 19 possible fatalities	M
	1 possible fatality	I
Collision on runway	More than 100 possible fatalities	X
	Between 20 to 100 possible fatalities	S
	Between 2 to 19 possible fatalities	M
	1 possible fatality	I
	0 possible fatalities	E
Excursions	Between 20 to 100 possible fatalities	S
	Between 2 to 19 possible fatalities	M
	1 possible fatality	I
	0 possible fatalities	E
Fire, smoke and pressurisation	More than 100 possible fatalities	X
	Between 20 to 100 possible fatalities	S
	Between 2 to 19 possible fatalities	M

	1 possible fatality	I
Ground damage	Between 2 to 19 possible fatalities	M
	1 possible fatality	I
	0 possible fatalities	E
Obstacle collision in flight	More than 100 possible fatalities	X
	Between 20 to 100 possible fatalities	S
	Between 2 to 19 possible fatalities	M
	1 possible fatality	I
Terrain collision	More than 100 possible fatalities	X
	Between 20 to 100 possible fatalities	S
	Between 2 to 19 possible fatalities	M
	1 possible fatality	I
Other injuries	Between 20 to 100 possible fatalities	S
	Between 2 to 19 possible fatalities	M
	1 possible fatality	I
	0 possible fatalities	E
Security	More than 100 possible fatalities	X
	Between 20 to 100 possible fatalities	S
	Between 2 to 19 possible fatalities	M
	1 possible fatality	I
	0 possible fatalities	E

2. Probability of the potential accident outcome

The probability of the worst likely accident outcome shall be obtained by using the ERCS barrier model defined in Section 2.1.

2.1. ERCS barrier model

The purpose of the ERCS barrier model is to assess the effectiveness (that is the number and the strength) of the barriers in the safety system laid down in the Table in Section 2.1.1 which were remaining between the actual occurrence and the worst likely accident outcome. Ultimately, the ERCS barrier model shall determine how close the occurrence under assessment has been to the potential accident.

2.1.1. Barriers

The ERCS barrier model consists of 8 barriers, ordered in a logical sequence and weighted as per the following table:

Barrier number	Barrier	Barrier weight
1	'Aircraft, equipment and infrastructure design', includes maintenance and correction, operation support, the prevention of problems related to technical factors that could lead to an accident.	5
2	'Tactical planning', includes organisational and individual planning prior to the flight or other operational activity that supports the reduction of the causes and contributors to accidents.	2
3	'Regulations, procedures, processes', includes effective, understandable and available regulations, procedures and processes that are complied with (with the exclusion of the use of procedures for recovery barriers).	3
4	'Situational awareness and action', includes human vigilance for operational threats which ensures identification of operational hazards and effective action to prevent an accident.	2
5	'Warning systems operation and action' that could prevent an accident and which are fit for purpose, functioning, operational and are complied with.	3
6	'Late recovery from a potential accident situation'	1

7	'Protections', when an event has occurred, the level of the outcome is mitigated or prevents the escalation of the occurrence by intangible barriers or providence	1
8	'Low energy occurrence' scores the same as 'Protections', but for low-energy key risk areas only (ground damage, excursions, injuries). 'Not applicable' for all other key risk areas.	1

2.1.2. Barrier effectiveness

The effectiveness of each barrier shall be classified as follows:

— **'Stopped'** if the barrier prevented the accident from occurring;

— **'Remaining Known':** if it is known whether the barrier remained between the occurrence under assessment and the potential accident outcome;

— **'Remaining Assumed':** if it is assumed that the barrier remained between the occurrence under assessment and the potential accident outcome;

— '**Failed Known':** if it is known that the barrier has failed;

— **'Failed Assumed':** if it is assumed that the barrier have failed even if insufficient or no information is available to determine this;

— **'Not Applicable':** if the barrier is not relevant to the occurrence under assessment.

2.1.3. Barrier assessment

The barriers shall be assessed in two steps:

Step 1: To identify which of the barriers defined in the table in section 2.1.1. (1-8) stopped the occurrence from escalating into the potential accident outcome (referred to as the 'stopping barrier').

Step 2: To identify in accordance with section 2.1.2 the effectiveness of the remaining barriers. The remaining barriers are those barriers listed in the table in section 2.1.1 which are placed between the stopping barrier and the potential accident outcome. The barriers listed in the table in section 2.1.1 which are placed before the stopping barrier shall not be considered to have contributed to the prevention of the accident outcome and consequently those barriers shall not be scored as 'Stopped' or 'Remaining'.

2.2. Calculation

The probability of the potential accident outcome is the numerical value resulting of the following steps:

Step 1: A sum of all the barrier weights (1 to 5) laid down in the table in section 2.1.1 of all the assessed barriers that were scored either 'Stopped', 'Remaining known' or 'Remaining assumed'. The 'Failed' and 'Not Applicable' barriers shall not be counted for the final score, as those barriers could not have prevented the accident. The resulting barrier weight sum is a numerical value between 0 and 18.

Step 2: The barrier weight sum corresponds to a barrier score between 0 and 9 as per the following table, covering the full range between strong and weak remaining barriers.

Barrier weight sum	**Corresponding barrier score**
0 No barriers left. Worst likely accident outcome realised.	0
1-2	1
3-4	2
5-6	3
7-8	4
9-10	5
11-12	6
13-14	7
15-16	8
17-18	9

STEP 2: SCORING OF THE SAFETY RISK WITHIN THE ERCS MATRIX

The safety risk score is a two-digit value where the first digit corresponds to the alphabetic value resulting from the calculation of the severity of the occurrence (severity score A to X) and the second digit represents the numerical value from the calculation of the corresponding score of the occurrence (0 to 9).

The safety risk score shall be put into the ERCS matrix.

For each given safety risk score there is also a numerical equivalent score for aggregation and analysis purposes which is explained below under '**Numerical equivalent score'**.

The ERCS matrix reflects the safety risk score and the numerical associated figures of an occurrence as follows:

SEVERITY			CLASSIFICATION (ERCS Score)									
Potential Accident Outcome	**Score**											
Extreme catastrophic accident with the potential for significant number of fatalities (100+)	**X**	*Pending Risk Assessment*	X9	X8	X7	X6	X5	X4	X3	X2	X1	X0
Significant accident with potential for fatalities and injuries (20-100)	**S**		S9	S8	S7	S6	S5	S4	S3	S2	S1	S0
Major accident with limited amount of fatalities (2-19), life changing injuries or destruction of the aircraft	M		M9	M8	M7	M6	M5	M4	M3	M2	M1	M0
An accident involving single individual fatality, life changing injury or substantial aircraft damage	I		I9	I8	I7	I6	I5	I4	I3	I2	I1	I0
An accident involving minor and serious injury (not life changing) or minor aircraft damage	**E**		E9	E8	E7	E6	E5	E4	E3	E2	E1	E0
No likelihood of an accident	**A**		*No Implication to Safety*									
	Corresponding Barrier Score		**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
	Barrier Weight Sum		17-18	15-16	13-14	11-12	9-10	7-8	5-6	3-4	1-2	0
			PROBABILITY OF THE POTENTIAL ACCIDENT OUTCOME									

In addition to the safety risk score and to facilitate the determination of the urgency of the recommended action to be taken about the occurrence, the following three colours could be used in the ERCS matrix:

Colour	ERCS score	Meaning
RED	X0, X1, X2, S0, S1, S2, M0, M1, I0	High risk. Occurrences with the highest risk.

YELLOW	X3, X4, S3, S4, M2, M3, I1, I2, E0, E1	Elevated risk. Occurrences with intermediate risk
GREEN	X5 to X9, S5 to S9, M4 to M9, I3 to I9, E2 to E9.	Low risk occurrences

The green area of the matrix contains lower risk values. They provide data for in-depth analysis on safety related occurrences that could, either in isolation or in conjunction with other events, increase the risk values of such occurrences.

Numerical equivalent score

Each ERCS score is assigned a corresponding numerical value of risk magnitude to facilitate the aggregation and numerical analysis of multiple occurrences with an ERCS score:

ERCS Score	X9	X8	X7	X6	X5	X4	X3	X2	X1	X0
Corresponding numerical value	0,001	0,01	0,1	1	10	100	1000	10000	100000	1000000
ERCS Score	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0
Corresponding numerical value	0,0005	0,005	0,05	0,5	5	50	500	5000	50000	500000
ERCS Score	M9	M8	M7	M6	M5	M4	M3	M2	M1	M0
Corresponding numerical value	0,0001	0,001	0,01	0,1	1	10	100	1000	10000	100000
ERCS Score	I9	I8	I7	I6	I5	I4	I3	I2	I1	I0
Corresponding numerical value	0,00001	0,0001	0,001	0,01	0,1	1	10	100	1000	10000
ERCS Score	E9	E8	E7	E6	E5	E4	E3	E2	E1	E0
Corresponding numerical value	0,000001	0,00001	0,0001	0,001	0,01	0,1	1	10	100	1000

Both column 10 and the row A in the matrix bear the value 0 as the corresponding numerical value.

(**1**) OJ L 122, 24.4.2014, p. 18.

(**2**) Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91 (OJ L 212, 22.8.2018, p. 1).

(**3**) Commission Implementing Regulation (EU) 2019/317 of 11 February 2019 laying down a performance and charging scheme in the single European sky and repealing Implementing Regulations (EU) No 390/2013 and (EU) No 391/2013 (OJ L 56, 25.2.2019, p. 1).

Changes to legislation:
There are currently no known outstanding effects for the Commission Delegated Regulation (EU) 2020/2034.