RECAT-EU

for Paris-CDG & Le Bourget

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IMPLEMENTED

A FINE-TUNED WAKE VORTEX RECATEGORISATION

AT PARIS-CDG & LE BOURGET AIRPORTS TO OPTIMISE SEQUENCING ON ARRIVAL

DSNA, the French air navigation service provider, has put into service RECAT-EU at Paris-CDG & Le Bourget airports, a new wake turbulence scheme developed by EUROCONTROL for Europe to apply to arrival traffic. A first in Europe!

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MINISTÈRE
DE LA TRANSITION
ÉCOLOGIQUE
ET SOLIDAIRE

DSNA

EUROCONTROL

"CDG 2020", A STRATEGIC PLAN
FOR HIGH-PERFORMING AIRPORT OPERATIONS

The impact of traffic growth in Paris airspace is amplified by significant seasonal trends, a concentration of demand during peak morning landing and take-off periods and an increased percentage of heavy aircraft types. To safely increase runway capacity up to 82 incoming flights per hour by 2020 at Paris-CDG airport, DSNA and its partners – Groupe ADP, the Paris Airports operator, and Air France – have jointly drawn up an ambitious performance roadmap. In this regard, **the European Wake Separation Recategorisation (RECAT-EU) has** been identified as a lead project in the safety and ATC capacity domains.
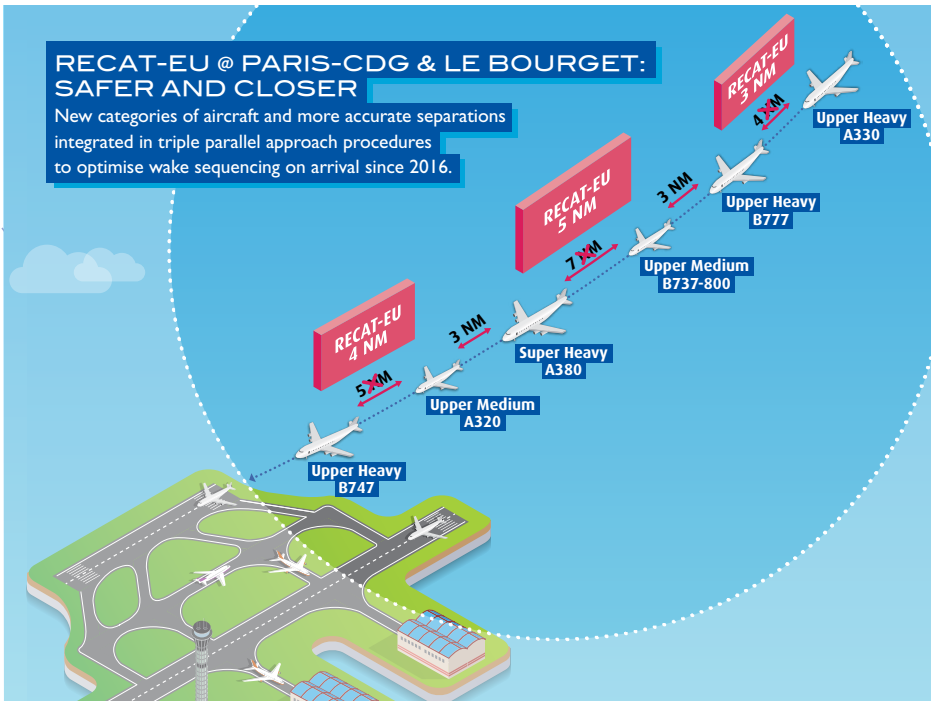

Paris-Le Bourget: *1st European business airport.*
Its location near Paris-CDG airport requires strong ATC coordination between the two air navigation service units.

Paris-Charles de Gaulle: *4 runways, 3 control towers, 1,500 flights per day. During peak hours, 1 take-off every 50 seconds and 1 landing every 50 seconds.*

RECAT-EU @ PARIS-CDG & LE BOURGET: SAFER AND CLOSER
New categories of aircraft and more accurate separations integrated in triple parallel approach procedures to optimise wake sequencing on arrival since 2016.

RECAT-EU 3 NM
4 NM — Upper Heavy A330

RECAT-EU 5 NM
3 NM — Upper Heavy B777
7 NM — Upper Medium B737-800

RECAT-EU 4 NM
3 NM — Super Heavy A380
5 NM — Upper Medium A320

Upper Heavy B747

A MAJOR ACHIEVEMENT

Within CDG TMA, for the incoming flights at Paris-CDG & Le Bourget airports, 6 categories of aircraft and separation between leader / follower aircraft have been defined.

With RECAT-EU, the approach controller fully optimises approach separation minima, with a reduction of up to 30% of spacing distance depending on the sequencing of aircraft.

RECAT-EU AT PARIS-CDG & LE BOURGET,
THE OPERATIONAL CONCEPT

With the modernisation of airline fleets and the boost in technology, ICAO wake vortex separation rules in 4 categories of aircraft need to be updated to streamline a number of over-conservative separations. For example, both A320 and EMB 145 are in the Medium category while their wingspans have a difference of more than 12 metres.

EUROCONTROL has adapted the ICAO standards to improve runway throughput in major European platforms. RECAT-EU defines 6 categories of aircraft taking into account the strength and evolution of the wake turbulence generated and the resistance characteristics of the following aircraft. The two ICAO categories Medium and Heavy are divided, each one into 'Upper' and 'Lower'. Aircraft wake data collected with Light Detection and Ranging (LIDAR) radar at Paris support these reduced minima.

On this basis, Paris-CDG and Le Bourget Air Navigation Services have deployed this new standard, adapted to the aircraft mix that operate to the airports, delivering safe and more accurate separations between pairs of aircraft. **RECAT-EU @ Paris-CDG & Le Bourget** was born!

The A320 family and B777/A330/A340 represent more than 70% of the arrival traffic mix during the two main key peak hours. It was a critical change to reduce the spacing between these types of aircraft. Benefits are also expected for new aircraft types such as the A320 Neo, B737 Max family, B777/787, A350/A330.

A380: separation reduction behind this giant has had a significant impact on capacity considering the very large separation previously imposed by an ICAO State letter. This was revised and included an extension of the Light wake category, increasing the associated separation providing better protection for the most vulnerable aircraft types.

Breakdown of incoming aircraft categories

Paris-Le Bourget

Paris-CDG
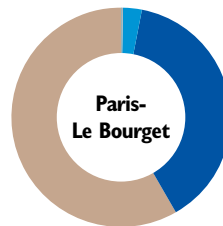
- ● **Super Heavy** (A380)
- ● **Upper Heavy** (B787/B777, A350/A330)
- ● **Lower Heavy** (B767/B757)
- ● **Upper Medium** (A320/A321, B737-800)
- ● **Lower Medium** (EMB190, ERJ145, CRJ-700, ATR42/72)
- ● **Light** (DA10/20, Learjet 60, DO328)
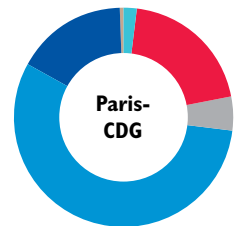
10TH OCTOBER 2014

The European Aviation Safety Agency (EASA) endorsed EUROCONTROL's safety case report. The major European airports can now use RECAT-EU wake turbulence separation scheme as a basis to update their current schemes and their national regulation.

22ND MARCH 2016

Implementation of RECAT EU within CDG TMA for Paris-CDG and Le Bourget airports. RECAT deployment was accompanied by a comprehensive air traffic controller training programme and stakeholder awareness information.
In the near future, fine-tuned time based separations on departure will also be implemented supporting the full potential of RECAT-EU's expected capacity benefits.

BENEFITS WITH
RECAT-EU @ PARIS-CDG & LE BOURGET

SAFETY

> **Increased flexibility in traffic separation delivery**
Going from four to six categories, the controller's task is facilitated.

> **A better integration of light aircraft and differences in tonnage**
Aircraft are better protected when sequenced in the various traffic mixes.

CAPACITY

> **Enhanced runway throughput**
Paris-CDG capacity at peak periods has increased by 2-4 aircraft movements per hour.

> **Peak throughput maintained with unfavorable traffic mix in adverse situations**
Paris-CDG: closure of inner runway / runway 27R with RECAT-EU: 11% increase in the average throughput; no loss of throughput with 2 X Heavies and Super; actual separation reduced by 1 nautical mile (NM).

Separation distribution between Upper Medium (follower) and Upper Heavy (leader) on arrival

Rate observed

- June 2016 (27R): 1,318 Pairs
- June 2015 (27R): 797 Pairs

1 NM

Distance separation (NM)
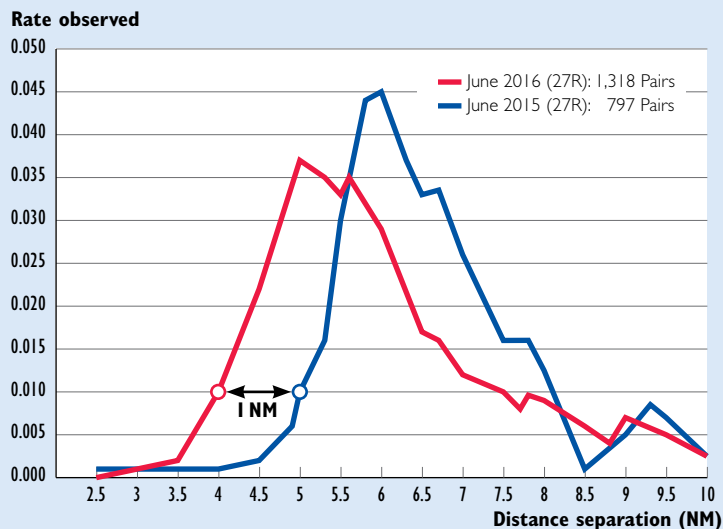
Thanks to RECAT-EU, separation has been reduced by 1 NM.

AIRFRANCE

''RECAT-EU enables an increase of the runway throughput without any onboard technology upgrade. This a good point!
Thanks to a deployment in full collaboration with the airlines, and especially an information campaign targeting our pilots, this DSNA initiative rapidly demonstrated operational benefits and improved our punctuality during summer 2017's peak hours.''

Olivier JANICAUD *Air France OCC*

EUROCONTROL

''Paris-CDG is a pioneer for RECAT-EU implementation in Europe. CDG has demonstrated that this innovative concept facilitates high performance for the Single European Sky.
Leipzig-Halle airport also deployed RECAT-EU to update its wake turbulence scheme to optimise their Heavy freight peaks. Vienna and London-Heathrow have planned deployment of RECAT-EU in 2018.''

Vincent TREVE *EUROCONTROL Runway Throughput Project Manager*

About DSNA
DSNA, the French Air Navigation Service Provider, handled 3.1 million flights in 2017 with the record one-day peak in Europe: 11,016 flights on July 7th, 2017.
DSNA is member of FABEC, SESAR JU and the A6 Alliance. It is also member of the consortium in charge of SESAR Deployments.