RUNWAY COLLISION PREVENTION

A FIRST FOR EUROPE!

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RWSL – Runway Status Lights – is a newly installed system intended to improve airport safety by indicating to pilots when it is unsafe to cross, enter or take off from a runway. It has been deployed on runway 09R/27L at Paris-CDG in a joint initiative of the airport operator Groupe ADP and the French ANSP the DSNA. Operational evaluation began on 28 June 2016.

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The principle of an RWSL system was initially imagined and developed in cooperation between the FAA and the MIT Lincoln Laboratory as part of an ongoing effort to explore new technology in the face of concern in the FAA at the continuing prevalence of serious runway incursions. Between 2005 and 2009, part of the system was tested at Dallas/Forth Worth Airport (KDFW), Los Angeles (KLAX) and San Diego (KSAN). In respect of what had been developed in the USA, EUROCONTROL decided in 2008 to create a workgroup to evaluate the possible use of RWSL in Europe. In parallel, the "Local Runway Safety Team" of Paris-CDG studied the possible deployment of RWSL and Groupe ADP and DSNA were persuaded that the implementation of the system on the inner runways could be a great step forward in preventing runway incursion.

RWSL is an automatic and autonomous advisory back-up system designed to prevent and reduce the severity of runway incursions. The implementation on the field consists of 2 types of lights:

The Runway Entrance Lights (RELs) at each holding point of the northern inner runway 09R/27L, consist of a series of red in-pavement lights spaced evenly along the taxiway centreline from the holding line to the runway edge, plus one placed near the runway centreline.

Like RELs, THLs indicate runway status.

The Take-off Hold Lights (THLs) consist of two double rows of red in-pavement lights each side of the runway centreline, grouped into sets at each potential line-up point on the runway.

RWSL uses both primary and secondary surveillance radar to dynamically turn on/off lights which directly indicate runway occupancy status to pilots or vehicle operators.

The main purpose is to improve airport safety by indicating when it is unsafe to cross, enter or take off from a runway.

Airplane 1 is cleared to cross 27L (THL turns ON ahead of Airplane 2 lined-up)
Airplane 3 is landing on 27R.

Airplane 4 is cleared for take-off, then it begins its take-off roll.
(RELs turn ON and then, each one turns OFF anticipating Airplane 4).


PARIS-CDG

On the A-SMGCS display in the Tower, activation of the lights is shown to the controller so that they are immediately aware.

The development of RWSL for Paris-CDG has faced a range of challenges, particularly in the coordinating its implementation with the A-SMGCS system and in terms of human factors issues.

The system as originally defined is intended to work autonomously using the ground movement situation provided by the A-SMGCS. During the development RWSL had to be adapted to the available radar system and its input sources. Although 'AVISO' – the CDG A-SMGCS – was well developed and efficient enough to provide a ground situation display to controllers, the precision needed to make RWSL operative was a step further. However, eventually, after considerable effort by the development team, this was achieved.

The safety case has been developed in coordination with EUROCONTROL. The human factor aspect was also a challenge to overcome. As explained, RWSL signals consist only of red lights conveying to the pilots the danger of entering or crossing the runway, or taking-off. The extinction of the lights has no meaning, and green lights aren't turned on once the reds are off. The crews have to fully understand the meaning of the lighting system and must not assume that the lights going out means they then have a clearance to enter the runway or to take-off. This is a key point in the process of the implementation of RWSL, as those lights are the only information given to the pilots. If their presence or absence were to be misunderstood, hazardous situations could be created by the system, in a completely counterproductive manner. To establish this understanding, Groupe ADP and DSNA have used all means of communication at their disposal to reach the maximum number of pilots who may operate to Paris-CDG: letters to the airlines, aeronautical publications and especially working closely together with the two main user airlines, Air France and
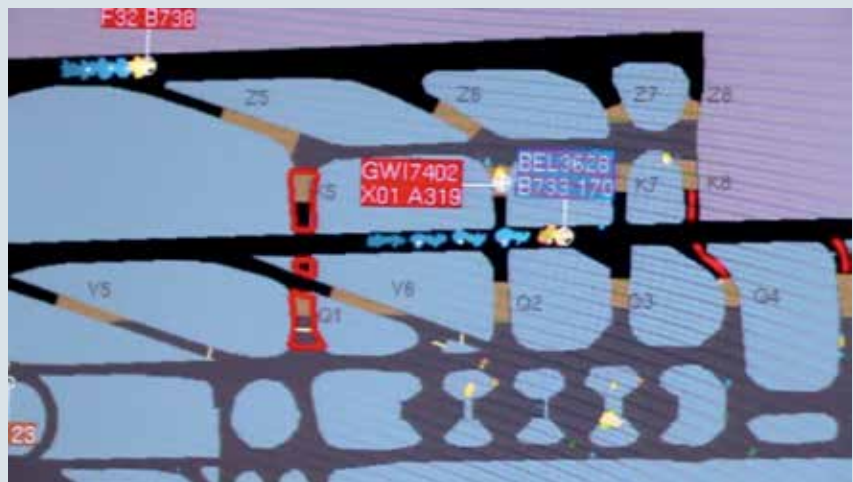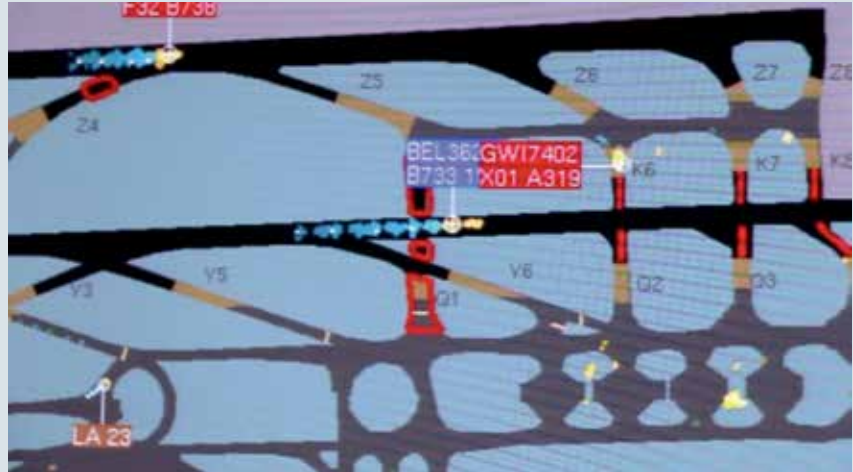
EasyJet. A training session to the system with four scenarios has been developed with the direct support of EUROCONTROL presenting animations for raising Runway Users awareness about RWSL operational principles (https://www.eurocontrol.int/runway-status-lights-rwsl-fr).

RWSL has already proved its value. On 22 August, an Airbus A340-600 on runway 09R was cleared for a rolling take off while it was still on its way to the holding point. One minute later, an Airbus 319 had vacated the outer runway 09L after landing. Unfortunately the controller – due to a misunderstanding of the actual situation – cleared that aircraft to cross runway 09R, on which the A340 was taking off. The RWSL red lights turned on in front of the A319, and the crew reacted as intended by stopping their aircraft before the runway contrary to the clearance they had received. The system prevented its first runway incursion at Paris-CDG that night. 🔁