

SESAR		Active							LOC/APT	
AOP18		Runway Status Lights (RWSL)								
REG	ASP	MIL	APO	USE	INT	IND	NM	MET	AIS	USP

Subject matter and scope

Runway Status Lights (RWSL) system is an automatic independent system based on aerodrome surveillance data that can be used on airports to increase safety by preventing runway incursions. The RWSL will provide an independent system that uses A-SMGCS surveillance data to dynamically switch on and off additional and dedicated airfield lights on RWY and on the runway entry TWY.

It will directly inform the flight crews / vehicle drivers about the instantaneous runway usage. Runway status lights switched "on" is an indication that the runway is unsafe for entering (for line-up or crossing) or for taking-off.

The new airfield lights, can be composed of:

- Runway Entrance Lights (REL): sets of red lights illuminating runway entrances when it is not safe to enter or cross the runway;
- Take-off Hold Lights (THL): sets of red lights illuminating along the axis of a runway in front of a departing aircraft when it is unsafe to take-off from that runway due to an obstacle (vehicle or aircraft) already occupying or entering the runway ahead;
- Runway Intersection Lights (RIL): sets of red lights illuminating along the axis of a runway near the intersection with another runway (crossing runways only) when it is not safe to go through the intersection. Note that no validation could be performed on the operational requirements related to crossing runways (RIL) within associated SESAR R&D project.

The system is meant to be compatible with airport operations and independent of ATC clearances, even if TWR will have access to the status of the REL and THL, with no change in their operating methods, except in case of flight crew request or failure of the system.

The purpose of the RWSL system is to act as a safety net for flight crew and vehicle drivers, thus reducing the number of runway incursions without interfering with normal runway operations.  
It is recommended to implement RWSL at medium to highly utilized airports with complex runway and taxiway lay-out.

NOTE: In ICAO Annex 14, Volume I, RWSL is designated under the term "Autonomous Runway Incursion Warning System (ARIWS).

NOTE FOR MILITARY AUTHORITIES: It is the responsibility of each military authority to review this Objective IN ITS ENTIRETY and address each of the SLoAs that the military authority considers RELEVANT for itself. This has to be done on top and above of the review of "MIL" SLoAs which identify actions EXCLUSIVE to military authorities.

Applicability Area(s) & Timescale(s)

Applicability Area (Subject to local needs)					
Timescales:		From:	By:	Applicable to:	
IOC used for Analytics functioning only - not for implementation planning		31/05/2019		Applicability Area	
FOC used for Analytics functioning only - not for implementation planning			01/01/2030	Applicability Area	

References

European ATM Master Plan

OI step -		<a href="#">[AO-0209]-Enhanced Runway Usage Awareness</a>									
	Enablers -	AERODROME -ATC-66	AERODROME -ATC-87	AIRPORT-49	PRO-246	REG-0201 AOP16					
Legend:	WXYZ-001	Covered by SLoA(s) in this objective		WXYZ-002 zzz	Covered by SLoA(s) in another objective Objective covering the enabler			WXYZ-003	Not covered in the Implementation Plan		

Applicable legislation

ICAO Annex 14 (Aerodromes), Volume I
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Essential Operational Changes

Airport and TMA performance
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<b>AOP18</b>	<b>Runway Status Lights (RWSL)</b>
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SESAR Solution

#01 - RunWay Status Lights
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ICAO GANP - ASBUs

SURF-B2/2	Comprehensive vehicle driver situational awareness on the airport surface
SURF-B2/3	Conflict alerting for pilots for runway operations

Deployment Programme

- none -	
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European Plan for Aviation Safety

MST.029	Implementation of SESAR Runway safety solutions
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Operating Environments

Airport
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Stakeholder Lines of Action (SLoAs)

SloA ref.	Title	From	By
AOP18-REG01	Promulgate the procedures for use of RWSL		
AOP18-ASP01	Install RWSL management tool		
AOP18-ASP02	Upgrade TWR CWP to interface with RWSL management tool		
AOP18-ASP03	Develop and implement procedures for the use of RWSL		
AOP18-ASP04	Develop safety assessment of the changes imposed by RWSL		
AOP18-ASP05	Train all relevant staff in the use of RWSL		
AOP18-APO01	Upgrade Airfield Ground Lighting system to provide the Runway Status Lights		
AOP18-APO02	Install RWSL management tool		
AOP18-APO03	Develop and implement procedures for the use of RWSL		
AOP18-APO04	Develop safety assessment of the changes imposed by RWSL		
AOP18-APO05	Train all relevant staff in the use of RWSL		
AOP18-USE01	Develop the procedures for use of RWSL		
AOP18-USE02	Train all relevant staff in the use of RWSL		
AOP18-INT01	Develop the standards for operational use of RWSL		
AOP18-INT02	Develop the standards for RWSL design and approval		
AOP18-INT03	Develop standard interfaces and information exchanges of RWSL Management Tool		
Description of finalised and deleted SLoAs is available on the eATM Portal @ <a href="https://www.eatmportal.eu/working/depl/essip_objectives">https://www.eatmportal.eu/working/depl/essip_objectives</a>			

Expected Performance Benefits

Safety:	Less severe and less frequent runway incursions due to an increase of runway usage awareness through accurate and timely indication of runway occupancy.
Capacity:	-
Operational Efficiency:	More efficient control of surface traffic.
Cost Efficiency:	-
Environment:	-
Security:	-

Detailed SLoA Descriptions

AOP18-REG01	Promulgate the procedures for use of RWSL	From:	By:
		-	-
Action by:	Regulatory Authorities		
Description & purpose:	Establish and promulgate the procedures for use of RWSL applicable to flight crews, vehicle drivers and aerodrome TWR.		

AOP18		Runway Status Lights (RWSL)	
Supporting material(s):	ICAO - Annex 14 - Aerodromes, Volume I and II Url : <a href="https://store.icao.int/">https://store.icao.int/</a> ICAO - Annex 11 - Air Traffic Services Url : <a href="https://store.icao.int/">https://store.icao.int/</a> SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		
ATM Master Plan relationship:	<a href="#">[PRO-246]-Procedures for standardised response to Runway Status Lights</a>		
Finalisation criteria:	1 - The procedures for use of RWSL applicable to flight crews, vehicle drivers and aerodrome TWR have been promulgated		
AOP18-ASP01	Install RWSL management tool	From: -	By: -
Action by:	ANS Providers		
Description & purpose:	This action is applicable to ANSP only, where ANS Provider is in charge of (responsible for) airfield ground lighting system at the aerodrome. Otherwise the action is on Airport Operator.  An RWSL management processor (tool) will be needed to implement the RWSL safety logic, using the A-SMGCS surveillance data as input to switch on and off the Runway Status Lights accordingly.		
Supporting material(s):	ICAO - Annex 14 - Aerodromes, Volume I and II Url : <a href="https://store.icao.int/">https://store.icao.int/</a> EASA - EASA deliverable of SLoA INT02. EUROCAE - EUROCAE deliverable of SLoA INT03 SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		
ATM Master Plan relationship:	<a href="#">[AERODROME-ATC-87]-RWSL management tool fed with airport surveillance data to determine runway usage and to control the airfield Runway Status Lights</a>		
Finalisation criteria:	1 - The RWSL management tool has been installed		
AOP18-ASP02	Upgrade TWR CWP to interface with RWSL management tool	From: -	By: -
Action by:	ANS Providers		
Description & purpose:	Although the RWSL are provided as a safety net to pilots and vehicle drivers, status information and service control will be needed in TWR. For that purpose, the Tower CWP needs to be interfaced to the RWSL management tool to display the appropriate status information and provide the appropriate control functions.  An enhanced A-SMGCS Core Surveillance function might be required to ensure that the Runway Status Lights are switched on/off at the right time, without downgrading the runway capacity.		
Supporting material(s):	ICAO - Annex 14 - Aerodromes, Volume I and II Url : <a href="https://store.icao.int/">https://store.icao.int/</a> EUROCONTROL - SPEC-171 - EUROCONTROL Specification for Advanced-Surface Movement Guidance and Control System (A-SMGCS) Services - Edition 2.0 / 04/2020 Url : <a href="https://www.eurocontrol.int/publication/eurocontrol-specification-smgcs-services">https://www.eurocontrol.int/publication/eurocontrol-specification-smgcs-services</a> EASA - EASA deliverable of SLoA INT02. EUROCAE - EUROCAE deliverable of SLoA INT03 SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		
ATM Master Plan relationship:	<a href="#">[AERODROME-ATC-66]-Tower A-CWP interfaced to the Runway Status Lights management tool</a>		
Finalisation criteria:	1 - The TWR systems have been upgraded		
AOP18-ASP03	Develop and implement procedures for the use of RWSL	From: -	By: -
Action by:	ANS Providers		
Description & purpose:	The procedures specifying responsibilities and actions that should be taken by TWR in relation to RWSL warnings and the handling of conflicts between RWSL warnings and ATC clearances issued to vehicle drivers and flight crews, should be developed and implemented.		
Supporting material(s):	EUROCONTROL - SPEC-171 - EUROCONTROL Specification for Advanced-Surface Movement Guidance and Control System (A-SMGCS) Services - Edition 2.0 / 04/2020 Url : <a href="https://www.eurocontrol.int/publication/eurocontrol-specification-smgcs-services">https://www.eurocontrol.int/publication/eurocontrol-specification-smgcs-services</a> ICAO - Deliverable of SLoA INT01, ICAO PANS ATM Amendment on RWSL. SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		

AOP18		Runway Status Lights (RWSL)	
ATM Master Plan relationship:	<a href="#">[PRO-246]-Procedures for standardised response to Runway Status Lights</a>		
Finalisation criteria:	1 - The procedures specifying responsibilities and actions that should be taken by TWR in relation to RWSL have been published in the Operations Manual applicable to the TWR controllers 2 - RWSL is in operational use		
AOP18-ASP04	Develop safety assessment of the changes imposed by RWSL	From: -	By: -
Action by:	ANS Providers		
Description & purpose:	Develop safety assessment of the changes, notably upgrades of airport and ATS systems to support RWSL. The tasks to be done are as follows: - Conduct hazard identification, risk assessment in order to define safety objectives and safety requirements mitigating the risks; - Develop safety assessment; - Deliver safety assessment to the NSA, if new standards are applicable or if the severity class of identified risks is 1 or 2. This safety assessment shall be based on fully validated/recognised method.		
Supporting material(s):	ICAO - Annex 14 - Aerodromes, Volume I and II Url : <a href="https://store.icao.int/">https://store.icao.int/</a> ICAO - Deliverable of SLoA INT01, ICAO PANS ATM Amendment on RWSL. SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a> EUROCONTROL - Safety Assessment of Runway Status Lights (RWSL) available upon request (nm.airports@eurocontrol.int)		
Finalisation criteria:	1 - The safety argument for all changes, generated by the deployment of this functionality, has been delivered by the ANS Provider to the NSA.		
AOP18-ASP05	Train all relevant staff in the use of RWSL	From: -	By: -
Action by:	ANS Providers		
Description & purpose:	Train TWR controllers in the responsibilities and actions (including phraseology) that should be taken in relation to RWSL warnings and the handling of conflicts between RWSL warnings and ATC clearances issued to vehicle drivers and flight crew.		
Supporting material(s):	ICAO - Deliverable of SLoA INT01, ICAO PANS ATM Amendment on RWSL. SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		
Finalisation criteria:	1 - TWR controllers training in accordance with agreed training requirements and programme has been completed.		
AOP18-APO01	Upgrade Airfield Ground Lighting system to provide the Runway Status Lights	From: -	By: -
Action by:	Airport Operators		
Description & purpose:	The Airfield Ground Lighting system should be upgraded to provide the Runway Status Lights, i.e. the Take-off Hold Lights (THL) and Runway Entrance Lights (REL).		
Supporting material(s):	ICAO - Annex 14 - Aerodromes, Volume I and II Url : <a href="https://store.icao.int/">https://store.icao.int/</a> EASA - EASA deliverable of SLoA INT02. SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		
ATM Master Plan relationship:	<a href="#">[AIRPORT-49]-Airfield Ground Lighting system upgraded to provide the Runway Status Lights</a>		
Finalisation criteria:	1 - Runway Status Lights installed within Airfield Ground Lighting system		
AOP18-APO02	Install RWSL management tool	From: -	By: -
Action by:	Airport Operators		
Description & purpose:	An RWSL management processor (tool) will be needed to implement the RWSL safety logic, using the A-SMGCS surveillance data as input to switch on and off the Runway Status Lights accordingly.		
Supporting material(s):	ICAO - Annex 14 - Aerodromes, Volume I and II Url : <a href="https://store.icao.int/">https://store.icao.int/</a> EASA - EASA deliverable of SLoA INT02. EUROCAE - EUROCAE deliverable of SLoA INT03 SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		

AOP18		Runway Status Lights (RWSL)	
ATM Master Plan relationship:	<a href="#">[AERODROME-ATC-87]-RWSL management tool fed with airport surveillance data to determine runway usage and to control the airfield Runway Status Lights</a>		
Finalisation criteria:	1 - Controllers training in accordance with agreed training requirements and programme has been completed.		
AOP18-APO03	Develop and implement procedures for the use of RWSL	From: -	By: -
Action by:	Airport Operators		
Description & purpose:	The procedures specifying responsibilities and actions that should be taken by vehicle drivers in relation to RWSL warnings and the handling of conflicts between RWSL warnings and ATC clearances should be developed and implemented.		
Supporting material(s):	ICAO - Annex 14 - Aerodromes, Volume I and II Url : <a href="https://store.icao.int/">https://store.icao.int/</a> EUROCONTROL - SPEC-171 - EUROCONTROL Specification for Advanced-Surface Movement Guidance and Control System (A-SMGCS) Services - Edition 2.0 / 04/2020 Url : <a href="https://www.eurocontrol.int/publication/eurocontrol-specification-smgcs-services">https://www.eurocontrol.int/publication/eurocontrol-specification-smgcs-services</a> ICAO - Deliverable of SLoA INT01, ICAO PANS ATM Amendment on RWSL. SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		
ATM Master Plan relationship:	<a href="#">[PRO-246]-Procedures for standardised response to Runway Status Lights</a>		
Finalisation criteria:	1 - The procedures specifying responsibilities and actions that should be taken by vehicle drivers in relation to RWSL have been published in the Operations Manual applicable to the drivers. 2 - RWSL is in operational use		
AOP18-APO04	Develop safety assessment of the changes imposed by RWSL	From: -	By: -
Action by:	Airport Operators		
Description & purpose:	Develop safety assessment of the changes, notably upgrades of airport and ATS systems to support RWSL. The tasks to be done are as follows: - Conduct hazard identification, risk assessment in order to define safety objectives and safety requirements mitigating the risks; - Develop safety assessment; - Deliver safety assessment to the NSA, if new standards are applicable or if the severity class of identified risks is 1 or 2. This safety assessment shall be based on fully validated/recognised method.		
Supporting material(s):	ICAO - Annex 14 - Aerodromes, Volume I and II Url : <a href="https://store.icao.int/">https://store.icao.int/</a> ICAO - Deliverable of SLoA INT01, ICAO PANS ATM Amendment on RWSL. SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a> EUROCONTROL - Safety Assessment of Runway Status Lights (RWSL) available upon request (nm. airports@eurocontrol.int)		
Finalisation criteria:	1 - The safety argument for all changes, generated by the deployment of this functionality, has been delivered by the Airport Operator to the NSA.		
AOP18-APO05	Train all relevant staff in the use of RWSL	From: -	By: -
Action by:	Airport Operators		
Description & purpose:	Train airport vehicle drivers in the responsibilities and actions (including phraseology) that should be taken in relation to RWSL warnings and the handling of conflicts between RWSL warnings and ATC clearances.		
Supporting material(s):	ICAO - Annex 14 - Aerodromes, Volume I and II Url : <a href="https://store.icao.int/">https://store.icao.int/</a> ICAO - Deliverable of SLoA INT01, ICAO PANS ATM Amendment on RWSL. SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		
Finalisation criteria:	1 - Vehicle drivers training in accordance with agreed training requirements and programme has been completed		
AOP18-USE01	Develop the procedures for use of RWSL	From: -	By: -
Action by:	Airspace Users		
Description & purpose:	The procedures specifying responsibilities and actions that should be taken by the flight crew in relation to RWSL warnings and the handling of conflicts between RWSL warnings and ATC clearances, should be developed.		

AOP18		Runway Status Lights (RWSL)	
Supporting material(s):	ICAO - Deliverable of SLoA INT01, ICAO PANS ATM Amendment on RWSL. SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		
ATM Master Plan relationship:	<a href="#">[PRO-246]-Procedures for standardised response to Runway Status Lights</a>		
Finalisation criteria:	1 - The procedures specifying responsibilities and actions that should be taken by flight crew in relation to RWSL have been published in the Operations Manual applicable to the flight crew		
AOP18-USE02	Train all relevant staff in the use of RWSL	From: -	By: -
Action by:	Airspace Users		
Description & purpose:	Train flight crew in the responsibilities and actions (including phraseology) that should be taken in relation to RWSL warnings and the handling of conflicts between RWSL warnings and ATC clearances.		
Supporting material(s):	ICAO - Deliverable of SLoA INT01, ICAO PANS ATM Amendment on RWSL. SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		
Finalisation criteria:	1 - Flight crew training in accordance with agreed training requirements and programme has been completed.		
AOP18-INT01	Develop the standards for operational use of RWSL	From: -	By: -
Action by:	ICAO		
Description & purpose:	Establish standard procedures specifying responsibilities and actions that should be taken by flight crews, vehicle drivers and aerodrome ATC in relation to RWSL warnings and the handling of conflicts between RWSL warnings and ATC clearances.  Publish the procedures in ICAO PANS-ATM.		
Supporting material(s):	EUROCONTROL - SPEC-171 - EUROCONTROL Specification for Advanced-Surface Movement Guidance and Control System (A-SMGCS) Services - Edition 2.0 / 04/2020 Url : <a href="https://www.eurocontrol.int/publication/eurocontrol-specification-smgcs-services">https://www.eurocontrol.int/publication/eurocontrol-specification-smgcs-services</a> SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		
ATM Master Plan relationship:	<a href="#">[PRO-246]-Procedures for standardised response to Runway Status Lights</a> <a href="#">[REG-HNA-20]-Regulatory provisions for RWSL</a>		
Finalisation criteria:	1 - The amendment to ICAO PANS-ATM containing the procedures has been published		
AOP18-INT02	Develop the standards for RWSL design and approval	From: -	By: -
Action by:	EASA		
Description & purpose:	Amend regulatory material by aligning ADR.OPS and CS-ADR-DSN with ICAO Annex 14 Amdt. 13A. Include under ADR.OPS. the operational requirements of ARIWS, as described in ICAO Annex 14; Include in the Certification Specifications for aerodrome design the technical specifications of RWSL;		
Supporting material(s):	ICAO - Annex 14 - Aerodromes, Volume I and II Url : <a href="https://store.icao.int/">https://store.icao.int/</a> SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		
ATM Master Plan relationship:	<a href="#">[REG-HNA-20]-Regulatory provisions for RWSL</a>		
Finalisation criteria:	1 - Amendment to ADR.OPS containing the operational requirements of ARIWS has been published 2 - Amendment to CS-ADR-DSN containing the technical specifications of RWSL has been published		
AOP18-INT03	Develop standard interfaces and information exchanges of RWSL Management Tool	From: -	By: -
Action by:	EUROCAE		
Description & purpose:	The standard defining interfaces and information exchanges of Runway Status Light Management Tool should be developed.		
Supporting material(s):	ICAO - Annex 14 - Aerodromes, Volume I and II Url : <a href="https://store.icao.int/">https://store.icao.int/</a> SJU - SESAR Solution 01: Data Pack for Runway status lights Url : <a href="https://www.sesarju.eu/sesar-solutions/runway-status-lights">https://www.sesarju.eu/sesar-solutions/runway-status-lights</a>		
ATM Master Plan relationship:	<a href="#">[STD-016]-ED-87E MASPS for A-SMGCS including Airport Safety Support Service Routing Service and Guidance Service using airfield ground lighting infrastructure</a>		
Finalisation criteria:	1 - EUROCAE standard on the interfaces and information exchanges of RWSL Management Tool has been published		



