



NOISE REDUCTION ACTION PLAN 2022 - 2026





REVIZIJE DOKUMENTA RECORD OF DOCUMENT REVISIONS	VERZIJA VERSION	DATUM DATE	OPIS DESCRIPTION	REVIDIRANA STRANICA ILI PODRUČJE PAGE OR CHAPTER REVISED	AUTOR AUTHOR
	V0	23/03/2015	Original document	-	G.Špoljar
	V1	23/02/2016	Passenger and aircraft movements data	Page 2	G.Špoljar
			Traffic data and main airlines	Page 5	
			Obligation of noise monitoring to airport operators	Pages 6, 7	
			Results of measuring noise levels for the year 2014 and 2015	Pages 10 - 12	
			Operating procedures	Pages 13 - 15	
			External communication	Page 16	
	V2	03/05/2019	Passenger and aircraft movements data	Page 2	G.Špoljar
			Traffic data and main airlines	Page 5	
			Regulations	Page 6, 7	
			Results of measuring noise levels for the year 2017 and 2018	Page 10 - 12	
			Operating procedures	Page 13 - 15	
	V3	22/08/2022	Zagreb Airport / Franjo Tuđman description	Page 3 - 5	G.Abramović
			Glossary	Page 5	
			Introduction	Page 6	
			Regulation	Page 7	
			Noise Monitoring and software	Page 10 - 11	
	Proposed action plan for Noise reduction	Page 13 - 18			

DISTRIBUCIJA DOKUMENTA DISTRIBUTION LIST	Vidi CC-IMS-FO-001-1 / See CC-IMS-FO-001-1
---	--

SVRHA DOKUMENTA PURPOSE OF THE DOCUMENT	To manage and where possible reduce impact of noise from aircraft at Zagreb Airport/Franjo Tuđman establish a concept for assessing and controlling environmental noise.
--	--

PODRUČJE PRIMJENE SCOPE OF APPLICATION	Zagreb Airport/Franjo Tuđman
---	------------------------------

REFERENTNI DOKUMENTI REFERENCE(S)	Priručnici Manuals	/	➤
	Postupci Procedures	/	➤
	Obrasci Forms	/	➤



SADRŽAJ DOKUMENTA CONTENT OF THE DOCUMENT	1. Zagreb Airport/Franjo Tuđman	3
	2. Glossary	5
	3. Introduction	6
	4. Regulation	7
	5. Noise Monitoring Equipment and Software	10
	6. Proposed action plan for Noise reduction	13

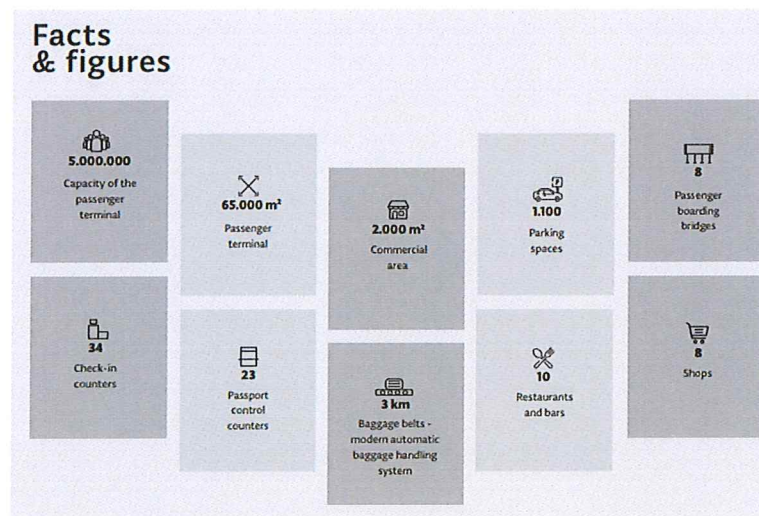
IZRADIO / PREPARED BY:	Gabrijela Abramović	Quality Manager	22/08/2022	
PREGLEDAO/ REVIEWED BY:	Davorin Škaro	Senior Associate for Integrated Management System	22/08/2022	
KONTROLA KVALITETE/ QUALITY BY:	Lana Modić	Officer for integrated management system	22/08/2022	
ODOBRIO/ APPROVED BY:	Huseyin Bahadır Bedir	President and CEO	01/09/2022	



1. Zagreb Airport/Franjo Tuđman

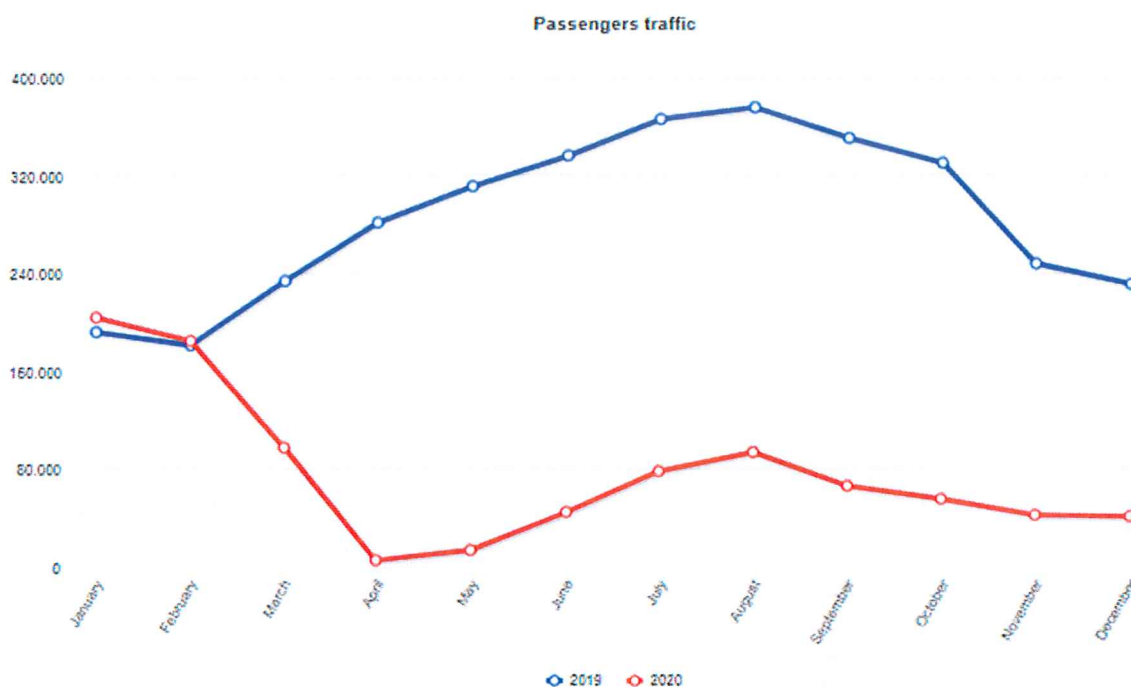
Zagreb Airport/Franjo Tuđman (hereinafter: LDZA) is an airport located around 19 kilometers South-East from the center of Zagreb. LDZA represents a mixed airport where one runway is used both for civil and military purposes and airport of the capital city.

Within the 292 ha concession area, LDZA is equipped with one runway of 3,250 m length and 45 m width, allowing 30 operations per hour. The runway thresholds are made of concrete, and the middle part is made of asphalt.



In addition to being a vital component of Croatia's transport infrastructure, MZLZ was in 2019, before occurrence of a pandemic caused by the Covid 19, one of the busiest in Southeast Europe, handling 3.435.531 passengers and 45.061 aircraft movements. The impact of Covid -19 Pandemic caused a significant drop in traffic not only at International Zagreb Airport but also at other airports.





During the closing process of the Concession Project of Zagreb Airport several environmental studies have been carried out to:

- (1) guaranty the environmental status of the site;
- (2) define the environmental action plan to be implemented by MZLZ; and
- (3) confirm the legal compliance of the current operations at the airport.

As a result of these studies, IFC requested from MZLZ the implementation under a very strict timeframe of a specific environmental action plan (Environmental and Social Action Plan - ESAP). Amongst the 6 actions listed in this document, one refers to noise reduction.

Indeed, airports have a range of impacts relating to social, economic and environmental areas, both positive and negative. They act as important economic generators, providing jobs, encouraging inward investment and boosting tourism. Unfortunately, there are some negative impacts for those that live and work around airports. One of the major impacts is noise and this remains a significant issue for people living or working close to airports or under flight paths. Thus, MZLZ intention is to have a very real long term and continuous commitment to, where possible, reducing this noise within its sustainability agenda.

As such MZLZ is acutely aware of its responsibilities to the local population as both a major employer and a concerned neighbour. Thus, MZLZ takes its responsibilities very seriously regarding the impact our business may have on some members of the local community and this Noise Action Plan is one of many ways its endeavours to satisfy its environmental obligations.

This action plan is designed to demonstrate how MZLZ is dedicated to take note of the concerns and suggestions from local stakeholders and to minimize the adverse effects of aircraft operations on the local community.

This Noise Reduction Action Plan is a living document and, as such, is under constant review. It is based on the strong environmental commitment and the wide environmental knowledge of MZLZ's major shareholders. It shall be reviewed in due time and improved so as to ensure its continuous effectiveness.



MZLZ will conduct an active engagement with its neighbours, where possible, to reduce the noise intrusion to as many people as possible whilst still complying with national and international regulatory constraints. The major goal of this plan is to address all the concerns of our neighbours; and to provide a robust method of finding amicable and safe solution to major noise issues. These will include not only aircraft movements but engine testing, aircraft turnarounds, aircraft taxiing, aircraft holding, noise reporting and monitoring and improvement of information to neighbours. Where possible, MZLZ will reduce noise associated with the airport through achievable and realistic targets.

2. Glossary

dB(A)	A measure of sound pressure level („A“weighted) in decibels.
$L_{Aeq,T}$	The A-weighted equivalent continuous sound pressure level which is a notional continuous level that, at a given position and over the define time period, T, contains the same sound energy as the actual fluctuating sound that occurred at the given position over the same time period, T.
L_{day}	The L_{Aeq} over the period 0700 - 1900, local time (for strategic noise mapping this is an annual average).
$L_{evening}$	The L_{Aeq} over the period 1900 – 2300, local time (for strategic noise mapping this is an annual average).
L_{night}	The L_{Aeq} over the period 2300 - 0700, local time (for strategic noise mapping this is an annual average).
L_{DEN}	The L_{Aeq} over the period 0000 - 2400, but with the evening values (1900 - 2300) weighted by the addition of 5 dB(A) and the night value (2300 - 0700) weighted by the addition of 10 dB(A).
MZLZ	Međunarodna Zračna Luka Zagreb d.d. (International Zagreb Airport) the Concessionaire pursuant to the concession agreement with the Republic of Croatia dated 11 April 2012.
LDZA	Airport Zagreb/Franjo Tuđman ICAO code
NMT	Noise monitoring Terminals
ENM	Environmental Noise Model
INM	Integrated Noise Model
ECAC	European Civil Aviation Conference



3. Introduction

MZLZ cannot take aircraft noise away and so it is inevitable that some noise will be experienced by people living in the vicinity of the airport or under flight paths.

Therefore, MZLZ commits to work on noise reduction wherever possible and this is why the following long-term objective for the management of aircraft noise has been set: "To limit aircraft noise impacts and gain the trust of our stakeholders that we are using best practicable means to achieve this goal, and to continue this approach into the future, within the framework established by government."

The following five key themes have been set for over the coming years:

1. Reducing noise impacts wherever practicable. This includes:
 - a. Quietest practicable aircraft operations
 - b. Effective and credible noise mitigation schemes.
2. Engaging with communities affected by noise impacts to better understand their concerns and priorities, reflecting them as far as possible in airport noise strategies and communication plans.
3. Influencing planning policy to minimize the number of noise-sensitive properties around our airports.
4. Organizing ourselves to continue to manage noise efficiently and effectively.
5. Continuing to build on our understanding of aircraft noise to further inform our priorities, strategies and targets.

These themes establish a framework for the airport's Noise action Plan and help to inform local community of its priorities.



4. Regulation

INTERNATIONAL	UN	ICAO		WHO	
	UN Chicago Convention	ICAO Volume 1, Annex 16 Aircraft noise certification chapters	Global Air Navigation Plan 2016 - 2030	Resolution A33/7 Balanced Approach to Aircraft Noise Management	WHO Noise and Health Guidelines
EUROPEAN	EU			ECAC	
	EC Directive 2002/49 Environment Noise Directive	EU Regulations No. 1139/2018 Basic Regulation No. 748/2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations No. 598/2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC	EU Regulations No. 716/2014 Common Pilot Project	Single European Sky Regulation No. 1070/2009	



NATIONAL	Croatian Government		
	Air Traffic Act, Official Gazette 69/09, 84/11, 54/13, 127/13, 92/14	Noise Protection Act (Official Gazette, No, 30/09, 55/13, 153/13, 41/16, 114/18)	Rulebook on the establishment of rules and procedures regarding implementation of operating restrictions for aircraft noise at the airports in the territory of the Republic of Croatia (Official Gazette, NNo.39/13
	Airport		Airport Noise Committee
LOCAL	Noise Reduction Action Plan		

	Governing Body
	Implementation Body

The Croatian Government fully recognizes the ICAO Assembly 'balanced approach' principle to aircraft noise management. The 'balanced approach' consists of identifying the noise problem at an airport and then assessing the cost-effectiveness of the various measures available to reduce noise through the exploration of four principal elements, which are:

- Reduction at source (quieter aircraft)
- Land-use planning and management
- Noise abatement operational procedures (optimizing how aircraft are flown and the routes they follow to limit the noise impacts)
- Operating restrictions (preventing certain (noisier) types of aircraft from flying either at all or at certain times).

The International Civil Aviation Organization (ICAO) encourages states not to apply operating restrictions as a first resort but only after consideration of the benefits to be gained from other elements of the balanced approach.

ICAO states that operating restrictions are not employed as a first resort and that they are only employed after careful consideration of the benefits to be gained from all other elements of the balanced approach. This forms part of the Government's 'control, mitigate and compensate' approach that is included in the Future of Air Transport White Paper. The White Paper recognizes that today's aircraft are much quieter than their predecessors, but that increased activity might still lead to a deterioration of the noise environment around airports.

Within the national framework, the Republic of Croatia has regulated aircraft noise by way of an Act restricting the obligation of noise monitoring to airport operators (Air Traffic Act, Official Gazette 69/09, 84/11, 54/13, 127/13, 92/14). It has set forth:



- (Article 122) Air navigation service provider, aircraft pilots, aircraft operators and aerodrome operators are obliged to take measures of aircraft noise protection, in accordance with the regulation adopted pursuant to this Act or EU regulations;
- (Article 123) The aircraft noise and the exhaust gases that aircraft produce during take-offs and landings must be below the prescribed maximum levels of noise and exhaust emissions established by the regulation adopted pursuant to this Act or EU regulations. Aircraft noise which an aircraft makes during taking off and landing must be below the prescribed maximum levels of noise defined by EU regulation. Civil jets referred to in Chapter 2 Annex 16 of the ICAO can operate at Croatian airports only if they meet noise requirements. Aircraft pilots are also obliged to adhere to the procedures stipulated by the Ordinance regarding noise reduction when taking off or landing;
- (Article 124) An airport Operator operating an airport on which traffic of military jet airplanes and/or scheduled air services are carried, with more than 50 000 operations during the preceding year, is obliged to ensure constant measuring of noise on the aerodrome and its surroundings. The results of noise measuring shall be used to produce noise maps and action plans in the part relating to air traffic. Terms and methods of noise measuring shall be determined by regulations adopted pursuant to this Act or EU regulations;
- (Article 125) On the basis of results of noise measuring from Article 124, the airport operator has the obligation to establish aircraft noise protection areas in which noise level equivalent exceeds 67 dB (A), i.e. 75 dB (A).

Indeed, as stated by the Ministry of Health in its letter dated 7th January 2013 to the Ministry of Maritime Affairs, Transport and Infrastructure, "Regarding the implementations of measures of protection from air traffic noise, the regulations of the Air Traffic act (Official Gazette, No. 69/09, 84/11, 54/13, 127/13, 92/14) are applied as a special regulation in relation to the valid Noise Protection Act (Official Gazette, No, 30/09, 55/13, 153/13, 41/16, 114/18). The Ministry of Maritime Affairs, Transport and Infrastructure confirms in its letter to ZAL (Republic of Croatia - Ministry of Maritime Affairs, 1st February, 2013) that "with regard to noise generated by airport operations, only the Croatian Air Traffic Act (Lex Specialis) is applicable to Croatian Airports".

On the basis of Article 149 of the Air Traffic Act (Official Gazette, No. 69/09, 84/11, 54/13, 127/13, 92/14), the Minister of Maritime Affairs, Transport and Infrastructure brought Regulations on the establishment of rules and procedures regarding the introduction of operating restrictions for aircraft noise at airports in the territory of Croatia.

Main objectives of Rulebook on the establishment of rules and procedures regarding implementation of operating restrictions for aircraft noise at the airports in the territory of the Republic of Croatia (Official Gazette, No.39/13) are:

- a. prescribing rules to facilitate the introduction of operating restrictions in a uniform way at the airports on Croatian territory in order to limit or reduce the number of people that significantly affected the harmful effects of aircraft noise,
- b. defining the legal framework aimed at the protection of equal position of all market participants,
- c. promote the development of the capacity of airports in harmony with the environment,
- d. facilitate the achievement of specific targets of reduction of aircraft noise in a way adjusted to each individual airport,
- e. continuous improvement of available measures to reduce aircraft noise at airports in order to achieve the best performance with the lowest cost.



Within the context of the international and national framework it advises that LDZA having less than 50 000 movements during the preceding year will implement a noise reduction plan on totally voluntary basis. MZLZ is aware that its commitment toward local community the warranty of its future sustainable development as most solutions should be delivered locally.

5. Noise Monitoring Equipment and Software

Since 2006, Zagreb Airport has installed a system of noise monitoring, consisting of 5 Noise monitoring Terminals (NMT), and 1 computer program: Environmental Noise Model (ENM), used to monitor and analyse data received from monitoring terminals.

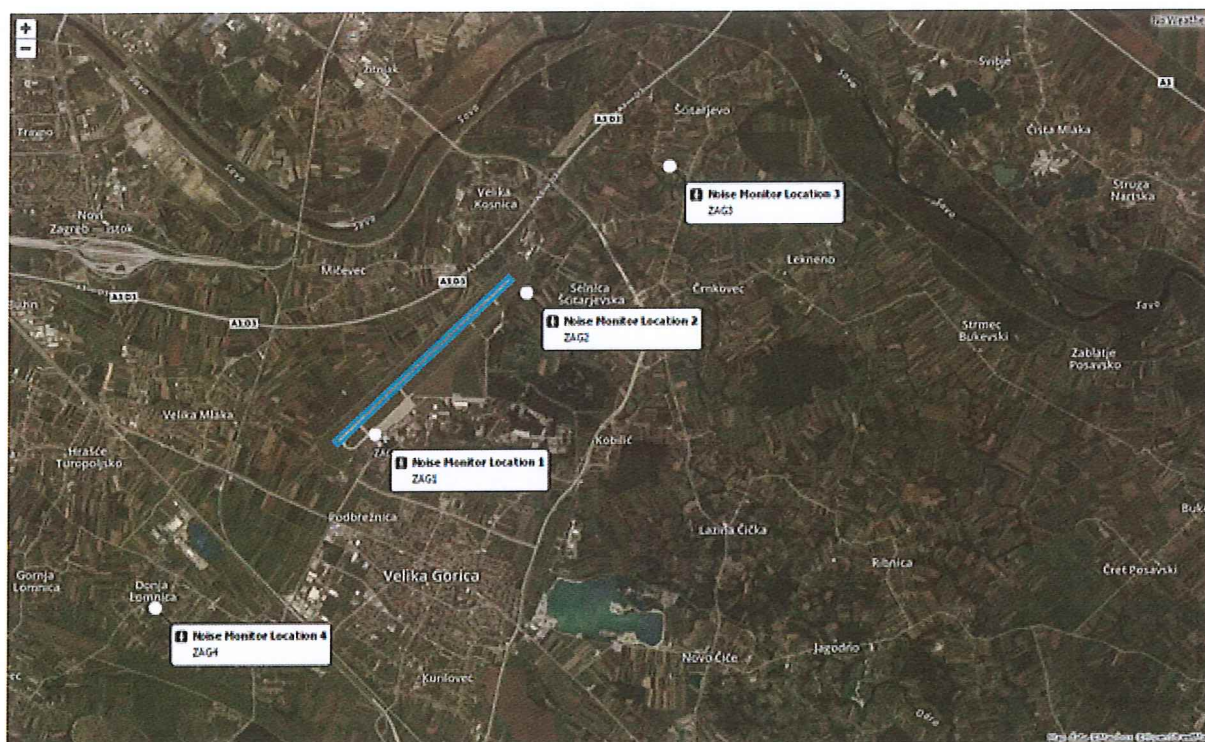
In 2014, MZLZ completed the upgrade of the system for noise monitoring. Thus, the noise monitoring system includes a connection to the radar of Croatia Control (Croatian air traffic control) which benefits are speed and accuracy of processing of flights operating data. In this way MZLZ obtains accurate information of aircraft movements over districts in its immediate vicinity and allow for the automatic correlation of landing and take-off operations with noise levels on monitoring terminals.

System of Noise Monitoring at Zagreb Airport International has four fixed Noise Monitoring Terminals:

- NMT1 is located near runway threshold 04,
- NMT2 is located near runway threshold 22,
- NMT3 is located in district of Obrezina,
- NMT4 is located in district of Donja Lomnica.

And 1 mobile station which monitor the level of noise every year from 1 June to 1 October. During this period MZLZ conducts testing of the minimum duration of fifteen days at every control point of emission according to yearly noise measuring plan:

- Measuring point 5: village Črnkovec,
- Measuring point 6: village Velika Kosnica,
- Measuring point 7: village Pleso, and
- Measuring point 8: town Velika Gorica.
- Measuring point 9: village Selnica Šćitarjevska



Every five year, a noise chart is produced, which includes operations and characteristics for each type of aircraft.

First step is population exposure analysis. The methodology for conducting the population exposure analysis of the developed strategic noise map follows directly from the EU Directive 2002/49. It should be emphasized that in accordance with the provisions of EU Directive 2002/49, the data on the exposure of the population and housing units for permanent housing are rounded to the full hundred (eg the number of 48 housing is rounded to "0", while the number of 359 inhabitants is rounded to 400 inhabitants).

The second step in the analysis of the results of the strategic noise map is the analysis of the coverage of areas by certain noise levels.

The third step in the analysis of the results of the strategic noise map is the graphical presentation of noise indicators in accordance with the provisions of the Noise Protection Act.



ZAGREB
AIRPORT

Međunarodna zračna luka Zagreb d.d.
International Zagreb Airport Jsc.

NOISE REDUCTION ACTION PLAN

Oz/Ref: CC-IMS-MAN-01-3
Vrijedi od/Eff Date: 01/09/2022
Stranica/Page: 12 / 18



6. Proposed action plan for Noise reduction Monitoring and reporting

Summary of noise level measurements for previous years have been performed and published at MZLZ official web page and is available to all parties from 2014. Noise level analysis is performing on monthly basis and results are presented to the management. Reporting will be on monthly basis for management. At the beginning of each year noise level measurement for previous year will be published on MZLZ official web page.

ACTION	STATUS – NEW, RETAINED, MODIFIED
Noise reporting will be on monthly basis for management.	Retained
At the beginning of each year noise level measurement for previous two years will be published on MZLZ official web page.	Retained

Arriving aircraft

During aircraft approach, engine noise and the 'airframe' affect to the overall noise level. Airframe noise comes mainly from the aircraft's undercarriage and the wing components and is proportionate to the aircraft's speed as it passes through the air. Extending the surface of an aircraft's wing, by deploying slats and flaps, allows the aircraft to fly slower, facilitating a safer landing speed.

Operating procedure „Low Power – Low Drag“ is a technique of noise reduction keeping airframe noise on approach to a minimum by making sure that the landing flaps are extended and the aircraft's undercarriage is lowered as late as possible. This reduces drag and means that less engine power is needed to compensate for that drag. Pilot flies with minimum strength as long as possible, postpones the moment of setting flaps in the position for landing and postpones the moment of pulling out of landing gear - until the optimum moment in the approach phase. By such procedure the flight resistance is reduced to minimum, as well as the landing under increased resistance in shorter time. Such technique of approach must be done in accordance with all flight control requests, specifically observing all rules of safe flight. All aircraft approaching International Zagreb Airport are expected to use low power/low drag procedures.

CONTROL	ACTION	STATUS – NEW, RETAINED, MODIFIED
Low power/low drag	Aircraft approaching the airport are expected to keep noise disturbance to a minimum by using a low power/low drag procedure. MZLZ needs to inform Airline Operation Committee about this procedure.	Retained - Not yet implemented

Operating procedure “Continuous Descent Approach - CDA”

In order to provide better traffic flow and reduce the noise of aircraft in approach, a landing technique called „Continuous Descent Approach“ (CDA) has been developed and is being implemented around the world. When compared to conventional landing technique, enables maintaining of aircraft on greater height, i.e. the postponement of the beginning of aircraft descent from the cruising height -until the moment of crossing the approach line under appropriate final approach glideslope of 3°. A benefit of such technique is



that the engine, during this entire descent procedure, is in the ideal or almost ideal operating mode. Such way of approach has positive effects: seriously reduced noise level, reduced fuel consumption and reduced emission of harmful exhausts towards the inhabited areas under landing corridors in the immediate vicinity of the airport. CDA technique can be applied with any type of aircraft, under the condition that the pilots are prepared and trained for its application, and that the airport and flight control have the adequate equipment for its realization.

CONTROL	ACTION	STATUS – NEW, RETAINED, MODIFIED
Continuous Descent Approach Runway 22	All aircraft approaching the airport on runway 22 are expected to use continuous descent procedures. MZLZ together with ATC will monitor and measure CDO execution, where possible.	Retained - This procedure is published in Croatia Rules of the Air (Article 63).

CONTROL	ACTION	STATUS – NEW, RETAINED, MODIFIED
Continuous Descent Approach Runway 04	All aircraft approaching the airport on runway 04 are expected to use continuous descent procedures. MZLZ together with ATC will monitor and measure CDO execution, where possible.	Retained - This procedure is published in Croatia Rules of the Air (Article 63).

Operating procedure "Precise approach supported by satellite technology"

In order to enable the use of optimal curve approach, as related to the so-far linear approach in the final phase of approach, MZLZ will cooperate with ATC and strongly advocate to ATC that it develops and publish approach charts for optimal curve approach for precision approach Category I through using satellite navigation. Such approach would provide shorter airport approach length, which directly means saving of fuel and avoidance of flight over the inhabited areas, when necessary or justified. Such systems are based on American GNSS under operating name GPS, European satellite system Galileo and on Europe's regional satellite-based augmentation system (SBAS) under operating name EGNOS.

CONTROL	ACTION	STATUS – NEW, RETAINED, MODIFIED
Precise approach supported by satellite technology Runway 04	Non-precision approach procedure with LNAV, LNAV/VNAV and LPV minima is implemented on 25.4.2019. Precision approaches LPV CAT I supported by satellite technology are expected to be implemented by 2030.	New - Non precision approach procedure is implemented on 25.4.2019. by ANSP and published in AIP Croatia. LPV CAT I will be implemented by 2030.



CONTROL	ACTION	STATUS – NEW, RETAINED, MODIFIED
Precise approach supported by satellite technology Runway 22	Non-precision approach procedure with LNAV, LNAV/VNAV and LPV minima is implemented on 25.4.2019. Precision approaches LPV CAT I supported by satellite technology are expected to be implemented by 2030.	New – Non-precision approach procedure is implemented on 25.4.2019. by ANSP and published in AIP Croatia. LPV CAT I will be implemented by 2030.

Less using of reverse thrust during evening and night when safety conditions allow

Using of reverse thrust is temporary opening of system on jet engines for directing of thrust into opposite direction or change of propeller angle of prop-aircraft with aim to direct the thrust forward and thus help slowing down of the aircraft. Using of reverse thrust is used on airports all over the world, has benefits of saving the wearing out of brakes and needing shorter runway for landing. However, from the aspect of noise level, using of reverse thrust is unfavorable, especially for the inhabited areas located in the immediate vicinity of the runway. Many airports forbade the use of reverse thrust for landings during night, i.e. between 22:00 and 06:00 o'clock. Forbiddance of use of reverse thrust has its positive and negative factors. MZLZ needs to inform Airline Operation Committee about this measure and see their react on this idea. Using reverse thrust can be done if it will not have any influence on safety aircraft landing and it is usually forbidden during night. As for now MZLZ has less than 2% night flights (from 10pm – 6am).

CONTROL	ACTION	STATUS – NEW, RETAINED, MODIFIED
Less using of reverse thrust during evening and night when safety conditions allow	All aircraft approaching the airport are forbidden to use reverse thrust for landings during night, i.e. between 22:00 and 06:00 o'clock. MZLZ needs to inform Airline Operation Committee about this measure.	Retained

Departing aircraft

Operating procedure for "Continuous Climb Operations"

Operating procedure for Continuous Climb Operations (CCO) is a procedure approved by aircraft manufacturer and flight control that enables continuous climbing after leaving the runway under the same slope as in landing and climbing phases. Procedure of noise reduction during take-off is changed in relation to conventional take-off in a way that on 1.500 ft above ground level the power is decreased but the aircraft continues to climb with minimum speed of up to 3.000 ft. Only at that altitude the climbing slope decreases and flaps lower. Benefits of this procedure in relation to conventional are seen in avoidance of horizontal segment in climbing. Namely, in conventional procedure, after certain height of climbing the aircraft is being positioned into horizontal flight for a certain time, and after that it again begins to climb. In that horizontal flight it is generated certain noise towards the settlement under the corridor. When we apply CCO procedure, the aircraft continuously climbs and transfers into horizontal flight only when the noise no more can affect the inhabited areas under the corridor, and puts the flaps/wings into configuration which should have been put into much earlier, had the flight been performed in the conventional procedure.



In order to reduce the noise effects to wider surroundings, MZLZ suggests that together with Croatian Air Traffic Control instructions will be issued to airman demanding a decrease of engine power after take-off, from 100 % to the percentage which does not impede the safety of reaching the requested height (altitude) with reference to obstacles on take-off.

CONTROL	ACTION	STATUS – NEW, RETAINED, MODIFIED
Continuous Climb Operations Runway 22	All aircraft departing the airport on runway 22 are expected to use climb operations procedures. MZLZ together with ANSP will monitor and measure CCO execution, where possible.	Retained - This procedure is implemented by ANSP and it is a standard ATCO procedure.

CONTROL	ACTION	STATUS – NEW, RETAINED, MODIFIED
Continuous Climb Operations Runway 04	All aircraft departing the airport on runway 22 are expected to use climb operations procedures. MZLZ together with ANSP will monitor and measure CCO execution, where possible	Retained - This procedure is implemented by ANSP and it is a standard ATCO procedure.

Operating procedures with ATC, airlines and Ground Handling

As a second step in its action toward noise reduction, MZLZ will actively coordinate with the third parties and relevant authorities for the development of a noise reduction action plan through Noise Committee that consist of MZLZ representatives, ATC, CCAA, airline representative and representative of local community.

Testing of aircraft engines on the airport surfaces

With regard to noise produced by operations on the ground, MZLZ refers to noise generated by aircraft during operations of aircraft handling, maintenance and repairs and servicing. Although such type of noise is generally kept under control, in order to avoid complaints from the nearby inhabited population, MZLZ actively monitor the implementation of preventive measures related to noise production of 10 dB or more. Mitigating measures can include a relocation of place for testing aircraft engines on MZLZ engine testing may occur on following locations:

1. Positions on East apron – engine testing allowed only in low engine power: E1, E2, E3, E4, E5, E5R, E6, E7, E7R, E8, E8L, E8R, E8Q, E9, E10, E10R, E11
2. Position on West apron - possible engine testing with much higher power at alternative position WA but all safety parameters must be met.

Testing of aircraft engines is very noisy activity, so that these maintenance operations will be prohibited at night (sleeping time). In case the engines are run near a hangar, the hangar shielding effect can reduce level of noise near hangar of 10 to 25 dB. The most effective noise reduction method when maintaining jet engine, is using of noise deflector. Portable or fixed deflector usually enables reduction of noise level of 10 to 25 dB,



depending on the sound insulation between the silencer and aircraft engine. MZLZ will study the merits of the implementation of such noise deflectors.

During "Noise Committee" this topic will be one of subject for discussion with Croatia Airlines Maintenance Department. The result must be to find optimal location and aircraft position to fulfill all requirements regarding reducing noise during engine testing.

CONTROL	ACTION	STATUS – NEW, RETAINED, MODIFIED
Testing of aircraft engines on East apron	Aircraft engine testing is allowed only in low engine power on following locations: E1, E2, E3, E4, E5, E5R, E6, E7, E8, E8L, E8R, E8Q, E9, E10, E10R, E11 Possible engine testing with much higher power than low engine power at E11 but all safety parameters must be met.	Retained – MZLZ actively monitor the implementation of preventive measures. This topics will be one of subject for discussion with Croatia Airlines Maintenance Department.
Testing of aircraft engines on West apron	Possible engine testing with much higher power at alternative position WA but safety parameters must be met.	Retained – MZLZ actively monitor the implementation of preventive measures.

Using GPU instead of APU

The main source of noise when aircraft is on the ground and being handled – is the operation of aircraft APU system when it is on the apron.

Passenger Terminal has 8 air bridges with integrated GPU power supply. Using those air bridges aircraft will reduce using APU and the result will be less noise during handling. The passenger terminal provides 400 HZ at the gates in the terminal.

GPU system is used at the remote parking positions or in case of failure of integrated GPU power supply on 8 air bridges (PBB).



Passive measures

In case the above measures do not provide satisfying results, it may, subject to applicable law, become necessary to implement passive measures of sound insulation of buildings in zones exposed to exceeded air traffic noise emissions. In such a case the implementation of such activities will be described in an additional action plan.

Passive measures would include manufacture and installation of noise barriers and noise deflectors. Deflectors of engine power should be positioned in place foreseen for engine testing, so that the stream of exhaust gases is redirected from horizontal to vertical. Besides, onto engine testing positions should be put noise barrier walls made of materials, which absorb sound, and direct them to fit the settlements.

Environmental noise charge

If the monitoring determines that the noise made by aircraft at airport is above the noise levels permitted by applicable law, MZLZ may introduce an Environmental noise charge as follows:

1. Implement and collect an environmental noise charge from all departing aircrafts, in order to pay for the noise insulation of houses affected by noise within noise contours defined by applicable law.
2. Implement and collect a penalty fee for those aircrafts that exceed permitted noise levels or do not respect defined corridors, landing and take-off procedures or are flying at lower altitude than permitted, or land during restricted times such as night time.

External communication

The External communication to third parties is realized through:

- the Airport Environmental Committee - to be scheduled at least once per year.
- Communication with local communities
- Complaints and enquiries - MZLZ will continue to offer official website as options for complaints and enquiries.
- MZLZ official website