International Journal of Social Sciences and Management Review

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

THE AIR TRAFFIC CONTROL SYSTEM INTEGRATION OF BIH INTO A SES

ANA LAZAROVSKA
Atlantic International University, Pioneer Plaza, 900 Fort Street Mall #905,
Honolulu, HI 96813, United States

https://doi.org/10.37602/IJSSMR.2025.8521

ABSTRACT

Bosnia and Herzegovina fully took control of its airspace on December 5, 2019, culminating a gradual process that began in 2007, with the final handover managed by BHANSA, and officially assumed complete responsibility for air traffic control on March 31, 2021. This transition marked a significant step in asserting national sovereignty, improving aviation safety, and enhancing efficiency, especially given the country's strategic location in European airspace. Currently, air traffic management responsibilities are fragmented among agencies such as BHDCA, FEDCAD, and RSCAD, which hampers operational efficiency, but Bosnia is actively working to modernize its ATM system through collaborations with Eurocontrol, adopting advanced technology, integrating systems, and establishing a dedicated BHANSA to align with EU standards, foster economic growth, and ensure safer, more efficient air traffic operations across its territory.

Keywords: airspace, management, navigation, aeronautics

1.0 INTRODUCTION

The air traffic system is divided into three basic components:

- Infrastructure (airports and airways with the means that define them)
- Aircraft, or aircraft that use the infrastructure
- Air traffic control and aircraft guidance

Air traffic control is responsible for managing and supervising all aircraft within a designated airspace, ensuring safe separation by monitoring flight plans, engine start, taxi, takeoff, cruise, descent, landing, and parking. Controllers track each aircraft’s altitude, position, and trajectory to prevent collisions, especially focusing on IFR flights where pilots have limited external visibility, requiring precise coordination and real-time adjustments to maintain safety and efficient traffic flow.

Bosnia and Herzegovina's air traffic control responsibilities are shared among the BHDCA, FEDCAD, and RSCAD, with recent legislative and strategic developments, including the adoption of a new Law on Aviation and the Framework Plan for ATM development, setting the stage for a comprehensive ATM system. The initiative aims to foster expert and political consensus on the nation's ATM Strategy, developed collaboratively by the BHDCA Project Team and Eurocontrol, to modernize and enhance civil aviation infrastructure and management within the country.

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

2.0 ORGANIZATIONAL STRUCTURE OF AVIATION IN BIH

The main national stakeholders related to ATM in Bosnia and Herzegovina are as follows:

- Ministry of Defense of Bosnia and Herzegovina
- Ministry of Communications and Transport of Bosnia and Herzegovina
- BHDCA – Civil Aviation Directorate of BiH
- BHANSA – Agency for providing services in air navigation of Bosnia and Herzegovina
- Ministry of Transport and Communications of the Republic of Srpska
- RDCAD – Civil Aviation Directorate of the Republic of Srpska
- Ministry of Transport and Communications of the Federation of Bosnia and Herzegovina
- FEDCAD – Civil Aviation Directorate of the Federation of Bosnia and Herzegovina

A. Trade sector

Within the Ministry of Communications and Transport of Bosnia and Herzegovina, the Transport Sector has the following responsibilities:

- This role involves developing, preparing, and implementing regulations governing international and inter-entity transport modes such as road, rail, air, and pipelines to ensure safe, efficient, and compliant operations across different jurisdictions,
- The individual actively participates in drafting and overseeing the execution of bilateral agreements related to the transportation of goods and passengers, ensuring that all actions align with the shared interests of the involved countries,
- The conclusion of international contracts and agreements in the field of international transport is essential for establishing clear legal frameworks, defining rights and obligations of parties, and ensuring smooth and efficient cross-border transportation of goods and passengers. Such agreements facilitate international trade by addressing issues like liability, insurance, documentation, and dispute resolution, ultimately contributing to the stability and predictability of global logistics operations. Properly drafted contracts also mitigate risks and foster cooperation among diverse stakeholders, ensuring compliance with international standards and fostering sustainable development in international transport,
- Bosnia and Herzegovina cooperate with other countries and foreign institutions through various international organizations and treaties, including its membership in the United Nations, the European Union (as a potential candidate), the Council of Europe, and the Organization for Security and Co-operation in Europe (OSCE). These collaborations facilitate diplomatic relations, regional stability, economic development, and adherence to international standards. Additionally, Bosnia and Herzegovina participates in bilateral agreements and multilateral partnerships to promote peace, security, and cooperation with its foreign counterparts,
- This organization appears to be responsible for managing and regulating international and inter-entity transport operations within Bosnia and Herzegovina, including issuing permits, licenses, and documents for cross-border transport, coordinating schedules, and ensuring compliance with bilateral and multilateral

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

agreements such as the CEMT permits. It also collaborates with neighboring countries through the Stability Pact and engages with local authorities, such as entities and the Brčko District, to facilitate smooth transport activities and policy coordination.

B. BHDCA

The Bosnia and Herzegovina Directorate of Civil Aviation (BHDCA), established in 1997 within the Ministry of Communications and Transport, functions as the sole regulatory and supervisory authority for civil aviation in the country, overseeing aircraft registration, certifications, permits, and safety standards. It aligns its practices with international and regional organizations such as ICAO, ECAC, JAA, EUROCONTROL, and EASA, ensuring compliance with global standards and enhancing air navigation safety and security. The BHDCA's responsibilities are governed by the Law on Aviation and related internal regulations, reflecting its role in maintaining the safety, security, and efficiency of civil aviation operations in Bosnia and Herzegovina.

C. Directorate General of Civil Aviation

The organizational structure of the Directorate General of Civil Aviation is as follows:

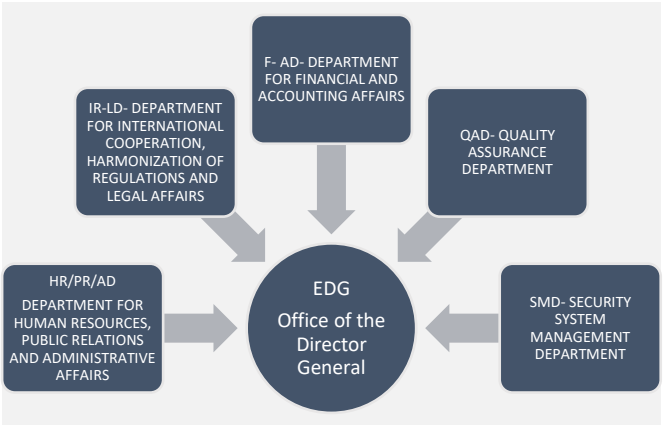


Fig. 1 Organizational structure of the Directorate General of Civil Aviation

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

D. Aviation Safety and Security Sector

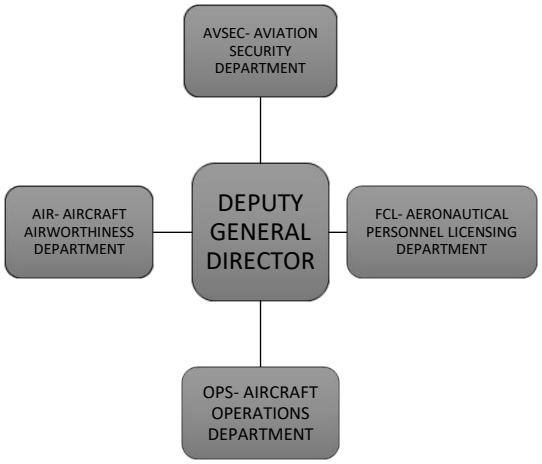


Fig. 2 Organizational structure of the Aviation Safety and Flight Safety Sector

E. Air Navigation and Airports Sector

Fig. 3 Organizational structure of the Sector for Air Navigation and Airports

F. BHANSA

The Law on the Agency for the Provision of Air Navigation Services was adopted by Bosnia and Herzegovina's Parliamentary Assembly in 2009, following Article IV.4.a) of the Constitution, establishing the agency as a legally independent, non-profit institution headquartered in Mostar, responsible for air navigation services.

According to legal regulations, BHANSA is obliged: Airspace management services encompass a comprehensive range of functions essential for ensuring safe and efficient air navigation, including providing communication, navigation, and surveillance services; delivering aeronautical information and meteorological services; coordinating search and rescue operations; offering professional education and training for air traffic controllers; managing export and import activities related to the agency's needs; and executing other

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

activities that support the safety of air navigation. These integrated services and operations are vital for maintaining the integrity, safety, and efficiency of airspace utilization.

BHANSA (Bosnia and Herzegovina Air Navigation Services Agency) manages air traffic services within the Sarajevo FIR and potentially beyond through international agreements, with its organizational structure comprising the Agency Council and Agency Management, which includes a director and two deputy directors. The members of the Management are appointed by the Council of Ministers following a public competition and recommendations from the Agency Council, while the Agency Council itself is appointed by the Council of Ministers based on proposals from the Minister of Communications and Transport of Bosnia and Herzegovina.

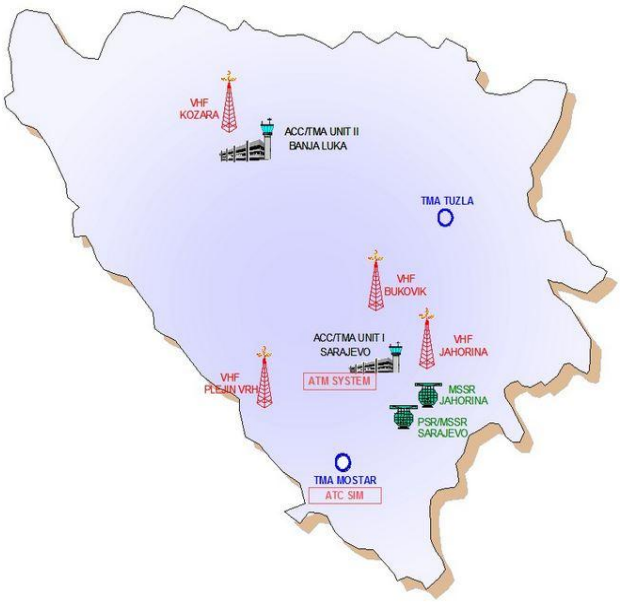


Fig. 4 Organizational chart BHANSA

G. FedCAD and RSCAD

FedCAD, the Federal Directorate for Civil Aviation, is responsible for a broad range of tasks within the Federation, including planning, development, and standardization of airport facilities and equipment, air traffic control, coordination of air carriers, and ensuring air traffic safety. It oversees aeronautical inspections, flight permits, airport management, and statistical analysis, while also managing air navigation, rescue services, and communication systems. Additionally, FedCAD is involved in training personnel through specialized institutions and companies, executing federal laws related to civil aviation, and performing other tasks essential to maintaining a safe, efficient, and well-regulated civil aviation sector. FEDCAD provides comprehensive air traffic control services in the Sarajevo, Mostar, and Tuzla regions, including tower, approach, radar, and maintenance services for navigation and surveillance systems within the Sarajevo TMA/CTR. The Sarajevo CTR extends up to 6,000 feet AMSL, while the TMA begins at 1,000 feet AGL outside the CTR, starting at 6,000 feet AMSL and up to flight level 160 (FL160), ensuring safe and efficient management of both arriving and departing flights within these controlled airspace zones.

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

Fig. 5 TMA Sarajevo

Mostar Airport's TMA extends from 1500 feet AGL outside the CTR up to FL160, with the CTR itself extending up to 6000 feet AMSL, which is approximately 6000 feet above the airport elevation, while the aerodrome control services (TWR), approach/procedural control services (APP/PROC), and radio navigation and communication system maintenance are critical components of its air traffic management, ensuring safe and efficient operations within this controlled airspace.

Fig. 6 TMA Mostar

Tuzla Airport's TMA (Terminal Maneuvering Area) extends from 1500 feet AGL (or 5500 feet AMSL) outside the CTR up to FL160, providing controlled airspace for arriving and departing aircraft, while the CTR (Control Zone) extends up to 5500 feet AMSL for aerodrome control, including TWR, approach control (APP/PROC), and maintenance services for radio navigation and communication systems.

Fig. 7 TMA Tuzla

RSCAD provides comprehensive air traffic control services in the Banja Luka TMA/CTR, including aerodrome TWR services, approach procedural control, and maintenance of radio navigation and communication systems within the Republic of Srpska. The Banja Luka CTR extends up to 5500 feet AMSL, while the TMA begins at 1000 AGL outside the CTR, effectively starting at 5500 feet AMSL, with its upper limit reaching FL120. This layered structure ensures coordinated management of aircraft movements both within the controlled airspace and during approach phases.

Fig. 8 TMA Banja Luka

3.0 NAVIGATION SYSTEMS AT AIRPORTS IN BOSNIA AND HERZEGOVINA

A. Sarajevo Airport Navigation Systems

The Sarajevo Airport Air Traffic Control Center demonstrates professionalism and responsibility by utilizing advanced technology and comprehensive training to manage airport and approach air traffic control, providing essential services such as pre-flight information, meteorological reports, and technical support for radio navigation devices, supported by modern equipment including ILS/DME CAT I, NDBs, terminal secondary radar, and VOR/DME, all housed within the airport complex to ensure safety and efficiency in air traffic operations.

Table 1 Sarajevo Airport Navigation Systems

IDENTIFICATION (ID)	STATION	PLANT	PURPOSE	COORDINATES		REMARK
1	2	3	4	5		6
AS	SARAJEVO	NDB	A	434959.38 N	181831.46 E	NIL
BHS	SARAJEVO	LLZ12	A	434906.46 N	182052.08 E	ILS CAT I
BHS	SARAJEVO	DME12, GP12	A	434946 N	181918 E	NIL
IL	SARAJEVO	NDB	A	434928.05 N	182002.53 E	Coverage 25 NM
KEB	SARAJEVO	DVOR/DME	E	435601.89 N	182659.34 E	Coverage 150/80 NM
KG	SARAJEVO	L	A	435253.08 N	181037.23 E	Coverage 25 NM
SAR	SARAJEVO	NDB	A, E	435600	182700	Coverage

				N	E	50 NM
KIS	SARAJEVO	VOR/DME	A	440105.79 N	180346.79 E	Domet 25 NM

B. Mostar Airport Navigation Systems

Table 2 Mostar Airport Navigation Systems

IDENTIFICATION (ID)	STATION	PLANT	PURPOSE	COORDINATES		REMARK
1	2	3	4	5		6
DNC	MOSTAR	NDB	A	430814.84 N	175050.54 E	Coverage 50 NM
MA	MOSTAR	NDB	A	431305.65 N	175116.24 E	Coverage 40 NM
MSR	MOSTAR	DVOR/DME	A, E	431540.88 N	175120.63 E	Coverage 50 NM

C. Banja Luka Airport Navigation Systems

IDENTIFICATION (ID)	STATION	PLANT	PURPOSE	COORDINATES		REMARK
1	2	3	4	5		6
BAL	BANJA LUKA	LLZ17	A	445540.28 N	171803.59 E	ILS CAT I
BLK	BANJA LUKA	NDB	A	450542.94 N	171528.59 E	Coverage 50 NM
LAK	BANJA LUKA	VOR/DME	A	445629.89 N	171745.51 E	Coverage 50 NM
LU	BANJA LUKA	L	A	445739.75 N	171732.46 E	Coverage 25 NM
NA	BANJA LUKA	L	A	445519.60 N	171809.01 E	Coverage 25 NM
	BANJA LUKA	GP17	A	445700.44 N	171748.34 E	From threshold 17 OM 4.89 NM is intersected at an altitude of 490 M MM 0.51 NM is intersected at an altitude of 65 M

D. Tuzla Airport Navigation Systems

IDENTIFICATION (ID)	STATION	PLANT	PURPOSE	COORDINATES		REMARK
1	2	3	4	5		6
TLA	TUZLA	LLZ09	A	442726 N	184434.72 E	ILS CAT I
TLA	TUZLA	DME09, GP09	A	442730.65 N	184245.4 E	NIL
TZU	TUZLA	VOR/DME	A	442724.50 N	184407.00 E	NIL
TU	TUZLA	NDB	A	442838.18 N	182858.88 E	NIL
ZV	TUZLA	NDB	A	442751.81 N	183850.78 E	NIL

4.0 AERONAUTICAL - TECHNICAL SYSTEMS

The Sarajevo FIR's VHF radio coverage is strategically provided from Jahorina, Kozara, Bukovik, and Plejin vrh, with Eurocontrol overseeing the position selection to ensure capacity

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

and reliability for voice data transmission between ACC units and terminal ATC services. Radar surveillance demands at least double coverage through mutual coordination with neighboring countries, leading to the installation of a new radar on Jahorina, while the existing Sarajevo Airport radar will be integrated into the BiH ATM system. The BH ATM system necessitates a highly reliable, continuous communication network—both air/ground and ground/ground—to guarantee uninterrupted connectivity essential for safe and efficient air traffic management.

The BHANSA navigation infrastructure on Jahorina – Paloševina includes a secondary radar MSSR (Radar Mode S), twelve R&S Series 4200 VHF/UHF radio devices (main and standby), and antennas, forming a robust system for aircraft identification, positioning, and altitude measurement. This setup supports critical air-to-ground communication, ensuring high reliability and availability, which are essential for safe and efficient air traffic management. The secondary radar facilitates automatic feedback broadcasting, allowing timely corrections and minimizing subjective errors in aircraft guidance, thereby enhancing safety and operational precision in the airspace. The ATC Simulator in Mostar is designed to incorporate advanced simulation technology, including integrated radar, to effectively train Air Traffic Control personnel across Bosnia and Herzegovina, particularly in ATS units. The system's capability to replicate the operational environment will support both general training and specialized on-the-job training (OJT) for radar approach controllers, ensuring they are proficient in managing the BHATM system's specific requirements. This comprehensive setup aims to enhance operational safety, efficiency, and the readiness of ATC staff by providing realistic, immersive training scenarios that mirror real-world conditions. The ATC simulator features various working positions including Student Controller (TCWP), Flight Data Operator (FDO), Exercise Supervisor (EXE SUP), Pseudo Pilot (PIL), and Exercise Preparation (EXE PREP). The communication infrastructure comprises VHF/UHF radios and antennas installed across Bukovik, Kozara, and Plejin vrh locations, with Bukovik housing 22 R&S Series 4200 radios (Main + Standby) and FFT for radar data accuracy checks, Kozara equipped with 22 similar radios and antennas, and Plejin vrh equipped with 12 radios and antennas. These components collectively enable robust simulation and communication capabilities essential for training and operational exercises.

A. Communication infrastructure

The communication infrastructure outlined emphasizes a robust, scalable network supporting multiple virtual networks with dedicated bandwidth allocation, built on a backbone topology similar to service provider models, ensuring high availability through dual, physically distinct transmission paths and reserve components at each node. End systems, such as AFTN and AIS terminals, are considered clients connected via a single access point, with standardized equipment at nodes for ease of maintenance, including hot swapping capabilities. The network prioritizes Quality of Service (QoS), dynamic bandwidth management, fallback procedures, and rerouting to maintain reliable performance, with a preference for IP and MPLS protocols to enhance flexibility, scalability, and efficient traffic management. The BHATM network is designed to support comprehensive operational data and voice communication needs, including radar data, flight plans, AFTN messages, AIS data, and meteorological information, ensuring reliable transport for these critical applications. It must also be scalable to accommodate future operational voice communication requirements, utilizing a pure IP-based system for non-

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

operational voice communications, thereby enhancing efficiency and interoperability. Additionally, all non-operational data must be integrated into this network, ensuring seamless connectivity and centralized management, which aligns with modern standards for secure, high-capacity, and flexible communication infrastructure in aviation and related operational environments.

B. ATC Simulator

The Mostar simulator facility will feature advanced integrated radar systems tailored for comprehensive ATC training across Bosnia and Herzegovina, including specific components for BHATMS and radar approach controllers' pre-job OJT. The facility will support various roles such as Student Controller (TCWP), Flight Data Operator (FDO), Exercise Supervisor (EXE SUP), Pseudo Pilot (PIL), and Exercise Preparation (EXE PREP), ensuring a versatile environment for both initial training and real-time exercise management, thereby enhancing the competency and readiness of ATC personnel in the region. The ATC training facility's core components include a comprehensive radar simulator and a data preparation program suite, designed to facilitate seamless training and operational readiness. The radar simulator must support operational adaptation and progression training for both civilian and military personnel across various duties such as en-route, off-route, TMA, and approach/TMA, and be available for use at least six months before the operational target day for new BHATM systems. Additionally, it should accommodate ongoing refresher courses to ensure personnel maintain proficiency, thereby ensuring a fully integrated and effective training environment. The radar simulator must establish a unidirectional data link with the operational online system to transmit live data, including radar sensor outputs, flight plans, inter-centre communications, and meteorological information, supporting realistic training scenarios. It should also facilitate data recording, playback, handling, and control of training activities, with seamless interconnections to other subsystems. The data preparation device must generate and convert training data into compatible formats, distribute it within the training environment, and enable student assessment through statistical analysis of recorded data, ensuring comprehensive, realistic, and evaluative training operations.

5.0 AIRSPACE OF BOSNIA AND HERZEGOVINA

Bosnia and Herzegovina, under its constitutional and legal framework, exercises sovereign control over its airspace, which extends from the land and coastlines up to the international altitude limit of FL660, in accordance with international law and the Chicago Convention. The country's Constitution explicitly grants BiH the authority to oversee air traffic, and its Law on Aviation stipulates that air navigation services are provided by designated air traffic control providers, managing both civil and military air traffic within its airspace. Thus, BiH maintains full sovereignty and operational authority over its airspace, aligning with international standards and legal obligations.

A. Current organization of airspace in BiH

The Sarajevo Flight Information Region (FIR), established by ICAO in 1996 and documented in ICAO EUR ANP Doc 7754, designates Bosnia and Herzegovina as responsible for air traffic

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

management within its airspace, which includes uncontrolled Class G airspace from ground level up to FL 100, excluding terminal-controlled areas (TMA) and controlled zones (CTR).

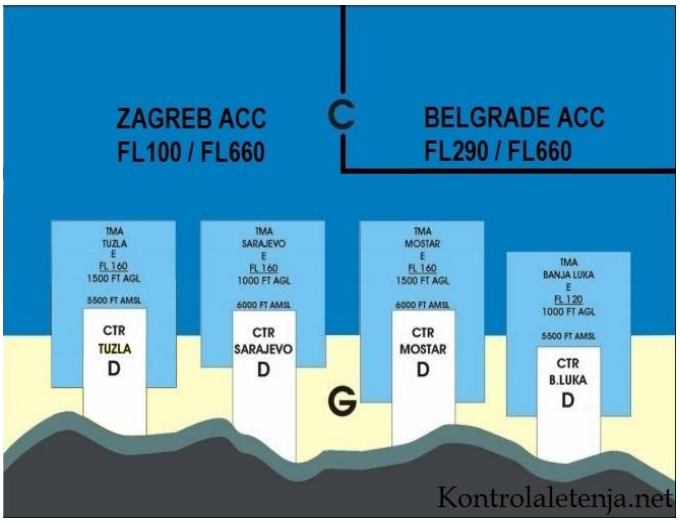


Fig. 9 Current organization and classification of airspace within the Sarajevo FIR

The introduction of Class G airspace up to 9500 ft MSL within the Sarajevo FIR enhances VFR operations outside the TMA, while the establishment and upcoming redesign of CTR zones around Mostar, Tuzla, and Banja Luka airports, with their specific shapes, vertical limits, and ICAO-compliant approach and departure procedures, aim to improve airspace management and safety in Bosnia and Herzegovina.

Fig. 10 Terminals in FIR Sarajevo

TMA areas around CTR zones are defined with varying shapes and vertical limits, with Banja Luka's TMA extending up to FL 125, Mostar and Tuzla up to FL 155, and Sarajevo up to FL 165, incorporating a network of conventional departure and arrival procedures; further classification details will be published once final decisions are made.

International Journal of Social Sciences and Management Review

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

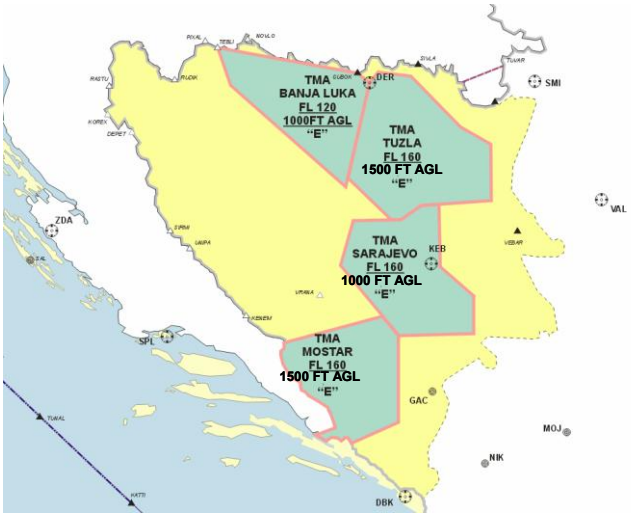


Fig. 11 Terminal air traffic control zones (TMAs) in BiH

The Sarajevo FIR's lower and upper airspaces are both classified as Class C, with the lower airspace now extending from 9,500 ft MSL to FL 325 since November 2014, featuring RNAV RNP5 routes aligned with neighboring FIRs, while the upper airspace from FL 325 to FL 660 primarily caters to international transit traffic, also utilizing RNAV RNP5 routes and developed in cooperation with EUROCONTROL.

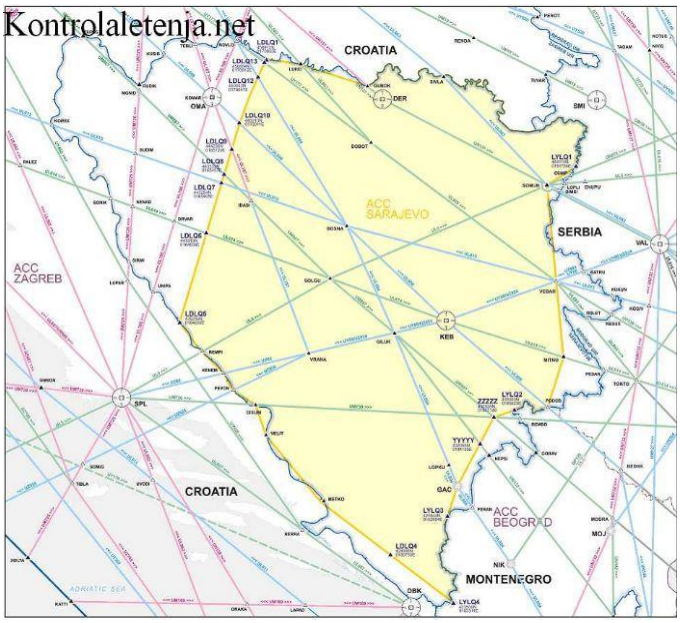


Fig. 12 Route network in the lower airspace of Bosnia and Herzegovina

Since Bosnia and Herzegovina's airspace management was transferred to BHANSA in November, the upper limit was increased to FL 325, but due to the lack of a dedicated air traffic management system and personnel, the country relies on Croatia and Serbia for upper airspace control under temporary agreements, with Belgrade managing the east and Zagreb the west, resulting in a segmented, complex, and less economical air traffic control setup.

International Journal of Social Sciences and Management Review

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

Fig. 13 Flight control jurisdiction of neighboring states in the upper airspace of Bosnia and Herzegovina

Following the Bosnian War, airspace control was initially managed by Zagreb and Belgrade, with Bosnia and Herzegovina designated as a "no-fly zone" under NATO supervision, but after peace was established, control reverted to Croatia and Serbia based on ICAO recommendations and bilateral agreements in 1999. Croatia Control (CCL) and the Serbia and Montenegro Air Traffic Services Agency (SMATSA) provided services for the upper and lower airspace, while entity-specific providers handled the final controlled areas (TMA). The division of airspace control is delineated at flight level FL 285, with Croatia responsible for the lower airspace (FL 095 to FL 285) and the western upper airspace (FL 285–FL 460), delegated respectively to Croatia and Serbia, ensuring managed civil traffic flow over Bosnia and Herzegovina.

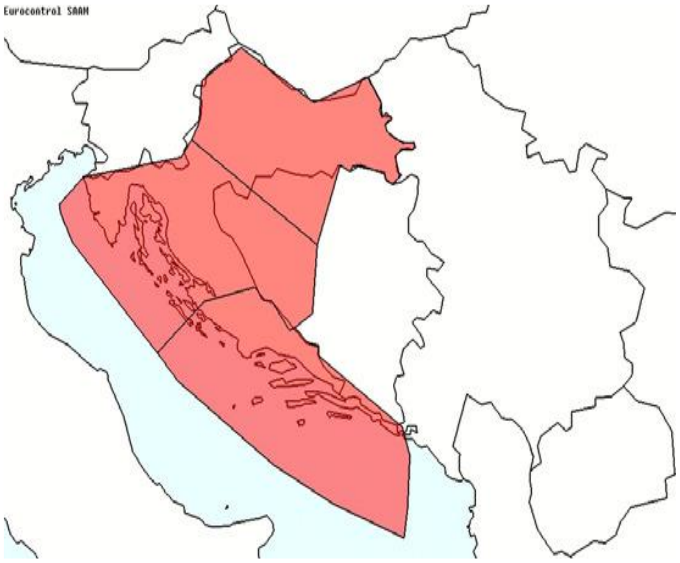


Fig. 14 Western part of upper airspace of Bosnia and Herzegovina incorporated into UPPER sector of Croatia

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

Fig. 15 The eastern part of the upper airspace of Bosnia and Herzegovina delegated to SMATSA

Since 2014, Bosnia and Herzegovina has progressively taken control of its airspace, initially managing lower altitudes and gradually expanding to upper airspace control, following agreements that transitioned responsibilities from international military forces to the national civil aviation authorities, notably BHANSA and the entity civil aviation directorates. This shift marked a significant step toward sovereignty over its airspace, which had previously been under international control or limited to airport vicinity, with full control expected to be achieved by November 2015. The process was guided by the Law on Aviation and delegation decisions, aiming to establish a sustainable, autonomous air traffic management system that supports both safety and national interests.

B. Building the BiH airspace management system

Bosnia and Herzegovina's air traffic management system is designed around a unified approach, comprising two operational units—one in Sarajevo and another in Banja Luka—that collectively provide area air traffic control services. The operational framework was shaped by EUROCONTROL simulations projecting traffic volumes up to 2020 and regulations from the European Commission’s SES initiative, which aim to enhance regional airspace efficiency through potential functional airspace blocks. This structure ensures that operational responsibilities, functions, and the organization of control rooms align with regional traffic demands and regulatory standards, facilitating coordinated, safe, and efficient air traffic management across the country's airspace. The ACC Units in Sarajevo and Banja Luka collaboratively manage Bosnia and Herzegovina's airspace by operating interconnected data processing and radar systems; Sarajevo's unit owns the primary RDPS and FDPS systems for main area control, while Banja Luka's unit maintains an auxiliary system supporting technical verification, system updates, and integration of approach control, ensuring effective sectorization and operational safety across the country's airspace. The air traffic control infrastructure in Bosnia and Herzegovina includes control centers in Sarajevo and Banja Luka, complemented by four ATSU units at Sarajevo, Banja Luka, Mostar, and Tuzla airports, with ATSU Sarajevo situated in the tower building at Sarajevo Airport. This unit handles ATC, FIS,

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

and alerting services within the Sarajevo controlled area, utilizing both tower and ground positions that share a common data source via a connection to the BHACC data processing system, ensuring coordinated and efficient air traffic management across these key locations. The ATSUs in Banja Luka, Mostar, and Tuzla are strategically positioned within their respective tower buildings to provide essential air traffic management services such as ATC, FIS, and ALR within their TMAs and CTRs, with Banja Luka's unit sharing some equipment with the BHACC center but without direct connection to the DPS, while Mostar's unit will facilitate simulator installation for training purposes, and Tuzla's unit will operate independently without DPS connection, ensuring localized and efficient air traffic control operations at each airport.

6.0 POSITION OF BOSNIA AND HERZEGOVINA IN EUROPEAN AIRSPACE

The reopening of Kosovo's upper airspace for civil traffic in April 2014 marks a significant development in regional and European air traffic management, highlighting the importance of Bosnia and Herzegovina's strategic position in the continent's airspace network. This initiative, achieved through cooperation among neighboring countries, air navigation service providers, and support from Hungary, HungaroControl, and Eurocontrol, enhances regional flight efficiency by shortening routes, reducing costs, and promoting airspace normalization. Bosnia and Herzegovina's role remains crucial in maintaining this strategic corridor, facilitating smoother, more efficient air traffic flow across the region and contributing to the broader European aviation stability and integration.

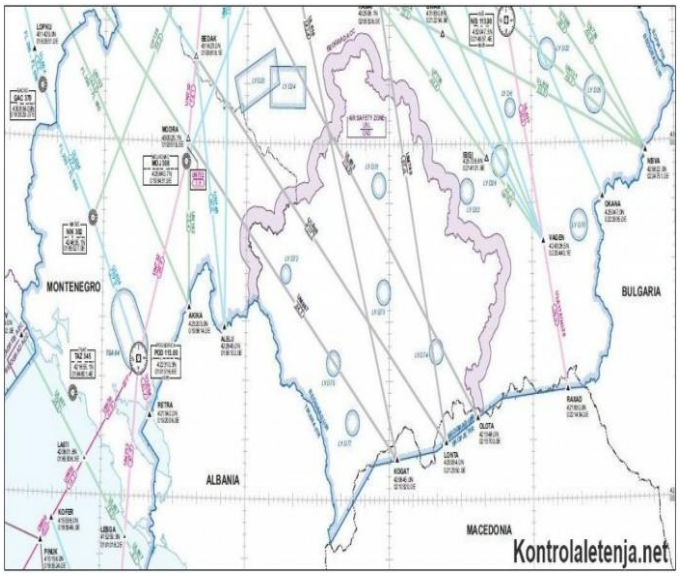


Fig. 16 Route network over Kosovo airspace

The opening of Kosovo's airspace for civil traffic is significant for Bosnia and Herzegovina as it enhances air connectivity, leading to increased overflight traffic and consequently boosting revenue from airspace usage fees. This development not only facilitates more efficient flight routes, reducing travel time and costs but also positions Bosnia and Herzegovina more prominently within the European air traffic network, potentially attracting more airlines and passengers, thereby contributing to economic growth and regional integration.

Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

Fig. 17 Bosnia and Herzegovina's airspace in the context of European airspace after the opening of airspace over Kosovo

Bosnia and Herzegovina has made significant strides in integrating into the international civil aviation community, joining key organizations such as ICAO in 1993, ECAC in 2002, EUROCONTROL in 2004, the European Common Aviation Area in 2006, and JAA in 2008, reflecting its commitment to aviation safety and cooperation. The country also engaged in regional airspace optimization by signing the FAB CE agreement in 2011, aimed at enhancing airspace efficiency and capacity across Europe. These milestones demonstrate Bosnia and Herzegovina's dedication to aligning its civil aviation sector with international standards and regional cooperation frameworks, facilitating safer, more efficient air travel and positioning it as an active participant in European and global aviation networks.

A. State of European airspace and implementation of SES

The escalating air traffic across Europe has led to significant congestion, straining existing air traffic management systems that are reaching their capacity limits, resulting in substantial delays costing airlines between 1.3 and 1.9 billion euros annually, with waiting times totaling around 350,000 hours. This congestion is driven by the increasing number of flights, overflights, sports, military operations, and other airspace uses, which current control systems cannot efficiently accommodate, exacerbating delays, slot losses, and economic inefficiencies. To address these pressing issues, innovative solutions such as implementing advanced digital traffic management technologies, optimizing airspace usage, and expanding capacity are urgently needed to reduce delays and improve operational efficiency across European skies. The SES project, initiated under the ECAA agreement and adopted by the European Commission in 2001, aims to create a unified and efficient European airspace by integrating national air traffic management systems into functional airspace blocks, or FABs, based on operational needs rather than national borders. This initiative seeks to enhance safety, increase capacity, and improve the efficiency of air traffic flows across Europe by rationalizing border areas and streamlining control services, ultimately overcoming fragmentation and fostering a seamless, long-term air traffic management system that responds to operational demands rather than regulatory constraints. The SES project aims to revolutionize European airspace management by restructuring airspace to optimize traffic flows, thereby enhancing capacity and efficiency. Its core objectives focus on reconfiguring the airspace layout to accommodate

Volume: 08, Issue: 05 September - October 2025

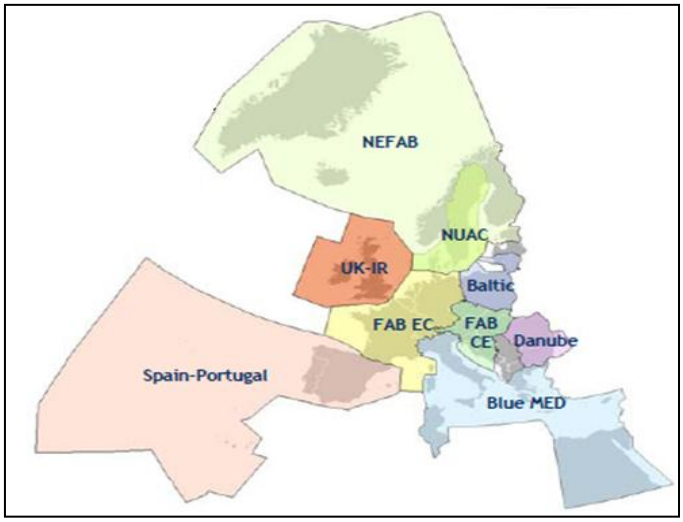
ISSN 2582-0176

increasing traffic demands, expanding operational capacity, and streamlining air traffic management processes to ensure safer, more reliable, and efficient air travel across Europe. The new international framework for European air traffic management emphasizes the separation of regulatory responsibilities from service provision, exemplified by Bosnia and Herzegovina's creation of BHANSA to delineate these roles from the Directorate for Civil Aviation BHDCA, facilitating cross-border service provision. Additionally, it seeks to establish unified rules and standards—covering areas like in-flight data exchange and telecommunications—by translating international regulations into national laws to ensure consistent implementation across countries, thereby enhancing efficiency, safety, and cooperation in European airspace.

In 2008, an initiative was proposed to establish FABs and their layout was defined. In July, the European airspace was united into 9 FABs, as follows:

- Baltic FAB – Lithuania and Poland,
- Blue Med - Italy, Greece, Cyprus, Malta (Tunisia, Egypt and Albania),
- Danube FAB- Bulgaria and Romania,
- FAB Central Europe – Austria, Bosnia and Herzegovina, Croatia, Slovenia, Slovakia, Czech Republic and Hungary,
- FAB Europe Central – France, Germany, Switzerland, Belgium, Netherlands, Luxembourg (UK collaborative partner),
- NUAC Programme – Denmark and Sweden
- NEFAB – Norway, Finland, Estonia, Iceland, Denmark and Sweden,
- SW Portugal-Spain FAB – Spain and Portugal,
- FAB UK Ireland – Great Britain and Ireland.

The figure illustrates the layout of Functional Airspace Blocks (FABs) established as of July 2008, highlighting the collaborative efforts to streamline air traffic management across European countries, including our country which is part of FAB CE alongside six other nations. Notably, the statuses of certain countries like Kosovo, Macedonia, Serbia, and Montenegro remain undefined, reflecting ongoing geopolitical and administrative considerations in regional integration and coordination within the European airspace.



Volume: 08, Issue: 05 September - October 2025

ISSN 2582-0176

Fig. 18 FAB initiatives from 2008

B. The position of Bosnia and Herzegovina in the SES project

Bosnia and Herzegovina, as part of the FAB CE, the Central European Functional Airspace Block, collaborates with Austria, Croatia, the Czech Republic, Hungary, Slovenia, and Slovakia to optimize air traffic management across over 529,497 km², encompassing 63 control sectors and 8 ACCs. Since the 2008 feasibility study and master plan approval, member states have committed to implementing European Commission and Eurocontrol requirements through coordinated investments aimed at reducing delays, enhancing safety, and ensuring economic viability. However, progress varies among countries, necessitating Bosnia and Herzegovina to undertake specific measures and fulfill its obligations to fully integrate into this collaborative framework, thereby improving operational efficiency and safety standards in line with regional and European goals. The successful implementation of this process requires comprehensive support from all project stakeholders, including government ministries led by the Ministry of Transport and Communications, regulatory bodies like the BHDCA and Directorate of Civil Aviation, and operational agencies such as BHANSE-BH. The government's role encompasses providing essential resources—adequate human capital, modern technical infrastructure aligned with European standards, and harmonized procedures to optimize efficiency. This collaborative approach aims to enhance overall system performance, projecting a 3-4% increase in financial and economic profitability compared to a non-integrated system.

7.0 CONCLUSION

Bosnia and Herzegovina's strategic airspace position underscores its importance in European air traffic, emphasizing the country's goal of Euro-Atlantic integration and sovereignty over its air navigation services. Currently, the fragmented system, shared with neighboring Croatia and Serbia, hampers efficiency and economic benefits. To address this, the BiH Civil Aviation Directorate is developing the "BiH ATM Strategy" to modernize and unify air traffic control through advanced equipment, system integration, and human resource development. This initiative aims to eliminate reliance on external agencies, enhance national revenues, improve employment prospects, and align with EU standards by establishing a dedicated BiH Air Traffic Control Agency (BHANSA), thereby ensuring greater sovereignty, safety, and efficiency in BiH's airspace management.

REFERENCES

Strategija razvoja Sustava za upravljanje zračnim prometom u Bosni i Hercegovini "ATM strategija BiH'', BHDCA, Sarajevo 2005.

"Okvirni plan za izradu strategije upravljanja zračnim prometom u Bosni i Hercegovini", (Air Traffic Management – ATM), Direkcija za civilno zrakoplovstvo (BHDCA), Sarajevo 2004. Godine

Obrad Babić, Feđa Netjasov: „Kontrola letenja", Saobraćajni fakultet Univerziteta u Beogradu, Beograd, 2011.

Šefkija Čekić: „Osnovi metodologije i tehnologije izrade znanstvenog stručnog dijela“, Fakultet za saobraćaj i komunikacije, Sarajevo, 1999.

Prof.dr.Steiner, Mihetec,dipl.ing, Upravljanje zračnim prometom, Sveučilište u Zagrebu, Fakultet prometnih znanosti, Zagreb, 2008.

Local Single Sky ImPlementation (LSSIP) Bosnia and Herzegovina, Year 2012 – Level 1, Eurocontrol

Local Single Sky ImPlementation (LSSIP) Bosnia and Herzegovina, Year 2011 - 2015 Level 1, Eurocontrol

Internet source:

http://www.eurocontrol.int/

http://www.bhdca.gov.ba/

http://www.bhansa.gov.ba/

http://www.mkt.gov.ba/

http://kontrolaletenja.net/

