Journal of Public Transportation Community
Vol. 6 No. 1, March 2026, pp. 12-24
Online: https://ejournal.poltekbangsby.ac.id/index.php/jptc/about
e-ISSN :2808-3393

Analysis of The Malfunction And Handling of The Access Control Intercom At An Airport Boarding Lounge

Sari Nastiti Nalurita[1], Juvinal Ximenes c[2], Ade Irfansyah[3], Teguh Imam[4]
[1]Politeknik Penerbangan Surabaya, Indonesia
[2]UNITAL, Timor-Leste
[3]Politeknik Penerbangan Surabaya, Indonesia
[4]Politeknik Penerbangan Surabaya, Indonesia
Correspondence author: Sari Nastiti Nalurita, aqilzayyan745@gmail.com, Indonesia

Abstract

The access control intercom is part of an airport's physical security system that connects Aviation Security (AVSEC) officers in the field with the On Duty (OD) monitoring room through a structured cabling network. On 24 January 2025, a malfunction was found in the intercom at Boarding Lounge Garbarata Way Gate B5, Terminal 1B (BL GW B5) of Soekarno-Hatta International Airport, where the device could not place a call to the AVSEC OD room. This article aims to analyze the cause of the malfunction and document the repair process. The method used was field observation and systematic troubleshooting, consisting of inspecting the intercom's condition, conducting a comparative test on a similar unit, and checking the LAN cable network using a LAN Tester. The inspection showed that the comparison intercom functioned normally, while the LAN Tester test on the faulty unit showed only two of nine pins lit (eight data pins and one ground pin), indicating a broken cable path. Further tracing found that the LAN cable on the intercom side was severed, which was attributed to termite damage and is consistent with the minimal maintenance during the approximately four years Terminal 1B was not in operation after the pandemic. The repair was carried out by re-crimping the LAN cable, and the test results showed all pins functioning normally and a successful call to the AVSEC OD room. This case study emphasizes the importance of preventive maintenance and network infrastructure monitoring for rarely used facilities to maintain the reliability of airport access control systems. The study is limited to a single case, and photographic evidence of the cable damage is not presented.

Keywords: access control, intercom, troubleshooting, LAN cable, AVSEC

Article History:
Received: 12 December 2025 ; Reviewed : 24 December 2025; Accepted: 23 January 2026; Published : 1 April 2026
DOI: 10.46491/jptc.v6i1.2859
How to cite : Nalurita, S. N., Ximenes, J., Irfansyah, A., & Imam, T. (2026). Analysis of the Malfunction and Handling of the Access Control Intercom at an Airport Boarding Lounge. ***Journal of Public Transportation Community*****, 6(1), 12–24.** https://doi.org/10.46491/jptc.v6i1.2859

© 2026 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution Share Alike (CC BY-SA) license (**https://creativecommons.org/licenses/by-sa/4.0/**)

Introduction

Aviation safety and security (AVSEC) is a primary aspect that every airport operator is required to uphold, as regulated under the provisions of the International Civil Aviation Organization (ICAO), which have been adopted into

the national aviation system (Candra Susanto & Keke, 2019). In addition to passenger and baggage screening, these provisions also require physical access control to restricted areas of the airport, including boarding lounges and passenger transit areas, in order to prevent unauthorized parties from entering flight operational areas.

An access control system generally consists of several integrated components: an identification device such as a fingerprint reader or RFID card, a magnetic lock as the door-locking mechanism, an emergency break glass as an emergency evacuation route, and an intercom as the direct communication medium between field officers and the monitoring room. The reliability of access control to restricted areas has been shown to influence the performance of the overall airport security system (Uchroński, 2020), and decisions on airport security technology are commonly analysed in terms of their effect on system performance (Hunt et al., 2021).

One important component of the access control system is the intercom, which functions as an emergency communication channel between AVSEC officers at a checkpoint and the On Duty (OD) room as the security monitoring center. Unlike identification devices, which operate independently, the intercom's performance depends entirely on the structured cabling infrastructure that connects it to the switch and the central server. The transmission medium commonly used is Unshielded Twisted Pair (UTP) cable with RJ45 connectors, installed according to either the straight or cross cabling standard depending on the type of devices being connected. A fault in even a single cable segment -- whether due to non-standard installation or physical damage -- can cut off the entire communication path, making network testing an essential diagnostic step in troubleshooting cable-based devices such as the intercom. Studies on twisted-pair cabling show that cable condition directly affects link performance (Bin Asrokin & Bin A. Rahim, 2018), that faults in unshielded twisted pair cables can be detected and localized using reflectometry (Idellette Judith et al., 2023), and that machine-learning approaches have been applied to twisted-pair fault diagnosis (Abdel Karim, 2026; Ghazali et al., 2022). If the endpoint is also powered over the same cable (Power over Ethernet, PoE), a cable break can additionally interrupt the power supply, so that the device appears completely inactive; PoE interfaces depend on power detection and maintain-power mechanisms to keep the powered device supplied (Li & Zhu, 2017, 2020; Xiao, 2018).

Network infrastructure reliability is a particular challenge for facilities that are not continuously used, since minimal maintenance activity can accelerate the degradation of physical components such as cables. Humidity, temperature, and ageing are known to degrade the insulation of low-voltage cables (Kang & Kim, 2020; Tawancy & Hassan, 2016), and termites are a documented cause of damage

to buildings and timber structures (Kim & Chung, 2022; Omudu et al., 2025), although studies specific to termite damage on communication cables remain scarce. Continuous infrastructure monitoring, including through Internet of Things (IoT)-based approaches that enable early detection of faults before they affect operations, has been widely developed as a preventive maintenance solution for various building monitoring and control systems (Witczak & Szymoniak, 2024). On the other hand, strengthening technicians' competency in diagnosing network faults is also shaped by direct involvement in handling problems in the field, which has been shown to contribute to the work readiness of aviation vocational technicians (Lubis, 2021) and to the alignment of technical understanding with industry work systems (Darni et al., 2025).

On 24 January 2025, the Safety and Security Electronic Services (SSES) Unit of Terminal 1A received a report that the intercom at BL GW B5 could not place a call to the AVSEC OD room. The literature reviewed above addresses identification devices, infrastructure monitoring, and maintenance planning in general, but it does not describe the diagnosis of cable-borne faults in intercom units at facilities that have been idle for long periods; this study addresses that gap through a documented single case. This article aims to (1) systematically analyze the cause of the malfunction through cable network testing, (2) document the handling steps and repair verification carried out, and (3) relate the field findings to the literature on the reliability of access control systems and the importance of preventive maintenance of airport network infrastructure.

Research Method

This study uses a descriptive qualitative method with a case study approach, as put forward by Baxter and Jack (2008), which systematically describes the process of identifying the cause and handling the malfunction of a single access control intercom unit, as is commonly used in applied, field-practice-based research in the aviation security field (Ulfa, 2022). This approach was chosen because the problem under study is specific to a single event (single case) and requires a narrative-technical tracing of the root cause, rather than hypothesis testing on a large sample. A similar approach has been used in research evaluating airport security technology (Hofer & Wetter, 2012), showing that a descriptive case study is effective for revealing the cause and handling process of a problem in depth for a single unit of study. Data collection techniques were carried out in three ways: direct observation at the incident site, comparative testing and technical network measurement using a LAN Tester, and documentation of each stage of the tracing and repair process in the form of photographs and field notes.

Data were collected directly at the incident site, at the Safety and Security Electronic Services Unit, Terminal 1A, Soekarno-Hatta International Airport (airport operator name withheld for double-blind review). The object of this study is one access control intercom unit that malfunctioned at Boarding Lounge Garbarata Way Gate B5, Terminal 1B (BL GW B5), based on a report from an AVSEC officer who was conducting equipment storage checks for aviation security facilities on 24 January 2025.

The tools used in the troubleshooting process included: a mini Phillips screwdriver to open the intercom cover; a LAN Tester to test, diagnose, and verify the Ethernet cable network connection through LED indicators on 8 data pins and 1 ground (G) pin; RJ45 connectors and a crimping tool to reattach connectors to cable that had been cut and stripped; and wire cutters to cut UTP cable to the required length. The LAN Tester was selected as the primary diagnostic instrument for its ability to quickly verify cabling continuity and pin order without requiring a full teardown of the cable path. The LAN Tester verifies cable continuity and pin order only; it does not test power delivery or network-layer connectivity, which were confirmed by the final test call to the AVSEC OD room.

The troubleshooting stages carried out were as follows: (1) checking the location of BL GW B5 and confirming that the intercom was physically powered off; (2) conducting a comparative test by checking the function of a similar intercom unit at BL GW B4 to confirm that the problem was local, not system-wide; (3) removing the intercom using a mini Phillips screwdriver to access the LAN cable connector at the back of the device; (4) checking the LAN cable network connection from the switch in the Air Handling Unit (AHU) room to the intercom using a LAN Tester; (5) analyzing the LAN Tester test results and physically tracing the cable path at the point identified as faulty; (6) carrying out the repair by cutting and re-crimping the cable according to the standard straight-cable pin order; and (7) conducting a retest using the LAN Tester as well as a direct test call to the AVSEC OD room to verify the success of the repair.

Results and Discussion

Object Profile and Scope of the Study

The object of this study is one access control intercom unit installed at Boarding Lounge Garbarata Way Gate B5, Terminal 1B (BL GW B5), Soekarno-Hatta International Airport, under the management of the Safety and Security Electronic Services Unit of the airport operator. Terminal 1B was recorded as not fully operating for approximately four years after the COVID-19 pandemic, so routine maintenance and inspection activity for security electronic facilities in that terminal also declined in intensity. Prolonged idle periods during the

COVID-19 pandemic have been reported to degrade aviation assets, for example corrosion damage in stored aircraft structures (Ignatovich et al., 2022), and airport operations recovered slowly afterwards (Kazda et al., 2022), with lessons also drawn for airport security operations (Tidhar, 2022). This condition is an important context for understanding the root cause found in the case discussed.

Working Principle of the Access Control Intercom and Transmission Medium

The access control intercom operates as part of an access control system integrated with a fingerprint reader, magnetic lock, and emergency break glass at a single access point. When an officer presses the call button on the intercom, an audio signal is sent through the data path to a network switch connected to the central server, then forwarded to the receiving device in the AVSEC OD room. The transmission medium used is Unshielded Twisted Pair (UTP) cable, category Cat5e to Cat8, with RJ45 connectors at both ends. There are two commonly used cabling methods: straight cable to connect different types of devices (such as intercom to switch) and cross cable to connect similar devices. An error in cable pin order or physical damage to any one of the eight wires inside the UTP cable can cause a complete signal-transmission failure, making testing with a LAN Tester -- which verifies the continuity of all data and ground pins -- a basic first-line method for isolating faults in a cable network (Bin Asrokin & Bin A. Rahim, 2018), commonly complemented by reflectometry-based fault localization (Idellette Judith et al., 2023) and physical-layer diagnosis (Xiong et al., 2025). Current intercom technology is also moving toward integration with Web of Things-based services, which enable remote monitoring of device status over the same data network used for the voice-communication path, so that connectivity faults have the potential to be detected earlier, before they affect call functionality (Huang et al., 2022). Intercom functions are also implemented over IP networks, as in VoIP-based intercom designs (Li et al., 2014), which makes the network cable part of the call path.

Problem Identification

Based on a report from an Aviation Security (AVSEC) officer on 24 January 2025, the intercom at BL GW B5 could not place a call to the AVSEC OD room. This condition had the potential to hinder emergency communication between field officers and the security monitoring center in situations requiring a rapid response, given that the intercom is the primary communication channel at an access point not always directly reachable by officers.

Diagnosis and Malfunction Analysis

Diagnosis was carried out in stages in accordance with the method described above. Technicians from the Terminal 1A SSES Unit, together with the

authors, checked the location of BL GW B5 and found the intercom powered off. To confirm that the problem was local, a comparative test was performed on the BL GW B4 intercom, which functioned normally, allowing the possibility of a system-wide or central-server failure to be eliminated. The intercom was then removed using a mini Phillips screwdriver to access the LAN cable connector, and the network connection from the switch in the Air Handling Unit (AHU) room to the intercom was checked using a LAN Tester. The test results showed that only pins 2 and 6 of the 8 data pins and 1 ground pin that should have been active were lit, indicating a broken cable path. A summary of the inspection stages is presented in Table 1.

Table 1 Access Control Intercom Inspection Stages and Results

No.	Inspection Stage	Method / instrument	Result	Remarks
1	Physical condition of BL GW B5 intercom	Visual check	Off/not powered	Faulty
2	Comparative test, BL GW B4 intercom	Functional comparison with a similar unit	Functioning normally	Good
3	Network test with LAN Tester (initial)	LAN Tester	Only pins 2 and 6 lit	Damaged
4	Physical tracing of LAN cable	Physical tracing (visual)	Cable severed (attributed to termite damage)	Damaged
5	LAN Tester test after re-crimping	LAN Tester	Pins 1-8 and G lit	Normal
6	Test call to AVSEC OD room	Test call	Call connected successfully	Normal

Table 1 shows that both the comparative test with a similar intercom and the cable-path test with the LAN Tester point to the same single fault location -- only two of nine pins (data and ground) lit during testing -- indicating a broken cable path leading to the BL GW B5 intercom.

Figure 1 presents a flowchart that summarizes the entire diagnosis and handling process, from checking the physical condition and comparative testing, through cable-path testing with the LAN Tester, to the re-crimping process and final verification via a test call to the AVSEC OD room.

Based on this finding, a physical trace was carried out by opening the small protective conduit located beside the intercom. This trace found that the LAN cable on the intercom side had been severed, with the damage attributed to termites. This finding is consistent with the condition of Terminal 1B, which was not fully operating for approximately four years after the pandemic, so periodic inspection and maintenance of the cable path did not run optimally during that period. The causal link between the idle period and the termite damage is inferred and is not supported by maintenance records in this study.

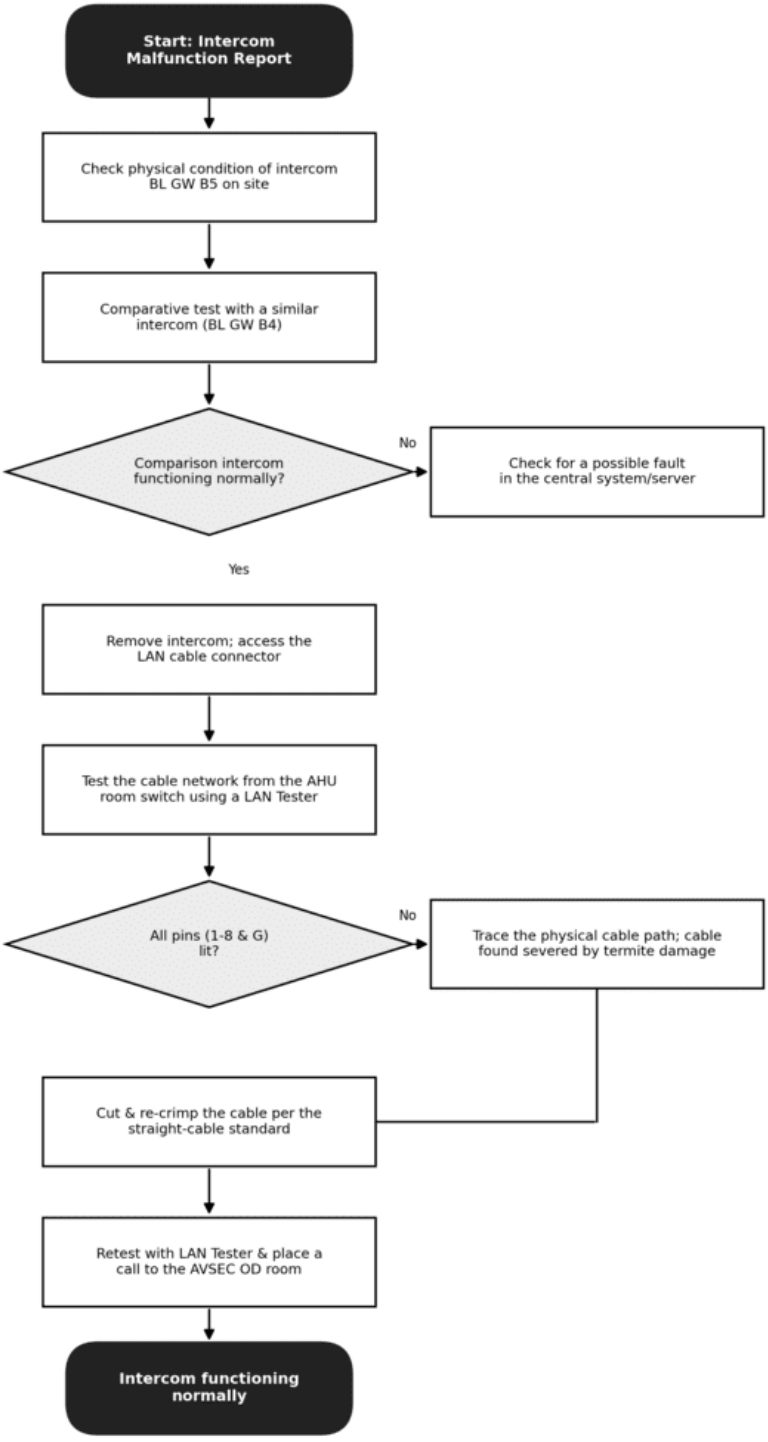


Figure 1 Flowchart of the Access Control Intercom Malfunction Diagnosis and Handling Process (Source: Processed by the Authors, 2025)

Handling and Repair Verification

The repair was carried out by cutting the damaged section of cable, stripping the protective sheath, and arranging the eight internal wires according to the standard straight-cable pin order, then attaching a new RJ45 connector

using a crimping tool. After the crimping process was completed, a retest was performed using the LAN Tester, which showed all pins (1-8 and G) lit normally, indicating that the cable path was properly connected. The repaired cable was then reattached to the back of the intercom, and a direct test call was made to the AVSEC OD room. The test results showed that the call connected successfully, confirming that the intercom was functioning normally again.

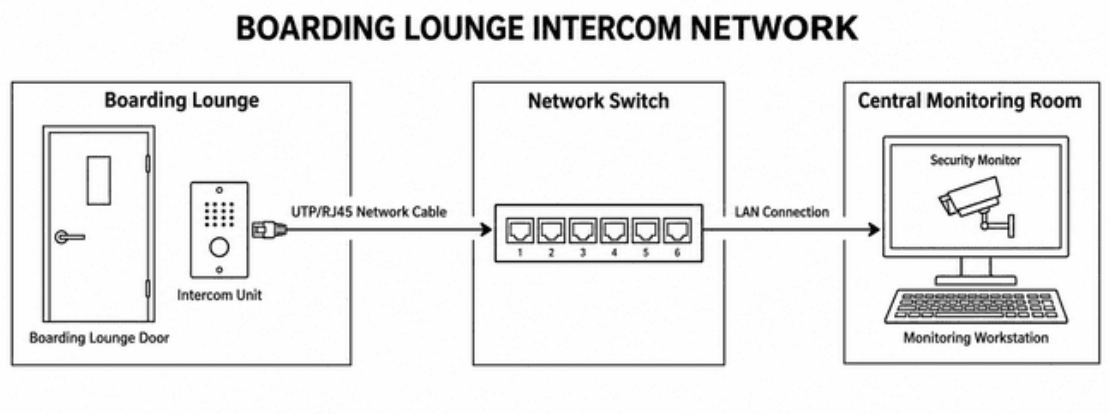


Figure 2 Conceptual Illustration of the Access Control Intercom System at an Airport Boarding Lounge

Figure 2 presents a conceptual illustration of the access control intercom system at a boarding lounge, showing the connectivity between the intercom unit, the UTP/RJ45 network cable, the switch, and the central monitoring room, as a visual complement to the explanation of the system architecture described in the previous section.

Comparison with Other Physical Security Systems

The access control intercom is one of several complementary layers of an airport's physical security system, alongside baggage screening, fire detection, and officer supervision. Unlike these, its function as a real-time communication channel depends on the reliability of the physical cable infrastructure rather than on sensors or detection algorithms. Reliability assessments of airport security operations likewise consider the dependability of the technical and human elements of the screening process (Zýka & Drahotský, 2019). The reporting and escalation procedure applied when an access control component malfunctions also depends on the consistent implementation of Standard Operating Procedures by AVSEC officers (Ulfa, 2022).

Importance of Preventive Maintenance and Infrastructure Monitoring

This case study shows that faults in physical infrastructure such as network cabling can develop gradually and go undetected without routine maintenance or monitoring, particularly for rarely used facilities. Technology-based monitoring, including Internet of Things (IoT)-based systems, has the potential to detect network faults before they cause total device failure (Witczak &

Szymoniak, 2024), in line with the authors' recommendation in the initial report to develop a monitoring application for access control equipment similar to a CCTV monitoring system. Determining an optimal preventive maintenance period has been reported to reduce expected downtime while improving equipment reliability (Al-Duais et al., 2022), a principle that could be applied to an inspection schedule for intercom cable paths in terminals that are not fully operating. Reviews of predictive maintenance similarly describe condition monitoring and data-driven diagnosis as means of reducing unplanned downtime (Carvalho et al., 2019; Zonta et al., 2020).

Operational Implications and Improvement Recommendations

The findings of this case study have broader implications for the management of security electronic facilities in terminal areas that are not continuously in operation. Terminal 1B, which was not fully used for approximately four years, shows that an inactive period for a facility does not mean freedom from infrastructure-damage risk; on the contrary, the absence of routine maintenance activity during that period actually accelerated the degradation of physical components such as network cabling exposed to environmental conditions without supervision. This implication is relevant not only to the access control intercom, but also to other aviation security electronic facilities that depend on similar cable infrastructure, such as CCTV, alarm systems, and other emergency communication devices.

Based on this single case, the following recommendations are proposed as suggestions that have not yet been tested. First, establishing a periodic inspection schedule that continues to be carried out even when an area or terminal is not fully operating, particularly to check the physical condition of cable paths at points vulnerable to environmental factors such as humidity and cable-damaging insects. Second, using cable materials with a termite-resistant protective sheath, or installing cables inside tightly sealed conduit in high-risk areas. Third, developing an IT-based network infrastructure monitoring system that can automatically detect connectivity faults and provide early notification to technicians, in line with the trend of developing Internet of Things-based monitoring and control systems for various building infrastructures (Witczak & Szymoniak, 2024). Fourth, systematically documenting the fault and repair history of each access control unit, so that recurring damage patterns can be identified earlier for long-term preventive maintenance planning. Fifth, strengthening technician competency in recognizing human-error factors and maintenance-procedure limitations that can slow fault detection, given that the human factor -- from procedural understanding to decision-making during inspection -- remains an important determinant of the effectiveness of aviation security equipment maintenance (Olaganathan, 2024).

Discussion

This case shows that a functional failure of the access control intercom does not always originate from damage to a core electronic component, but can also be caused by environmental factors affecting the supporting infrastructure -- in this case, cable damage attributed to termites. Root-cause analysis of network failures has been studied as a way to support fault resolution (Wankvar & Witayangkurn, 2025). The comparative diagnostic approach -- comparing the faulty unit with a similar, normally functioning unit -- proved effective in eliminating the possibility of a systemic failure from the early stage, allowing the tracing to be focused on the specific cable path. Given that the access control intercom is part of the AVSEC system, which must meet operational standards in accordance with ICAO regulations (Candra Susanto & Keke, 2019), the reliability of this device needs to be maintained through preventive maintenance and periodic inspection, particularly for facilities that are not continuously used. Implementing a routine maintenance schedule, using cable with termite-resistant protection, and developing a network infrastructure monitoring system can be further steps to reduce the risk of operational disruption to access control in the future.

This study has several limitations. First, it covers a single intercom unit and a single event, so the findings cannot be generalized. Second, the LAN Tester showed continuity on pins 2 and 6 only, whereas the cable is described as severed; which conductors were damaged, where along the cable, and how this relates to the intercom being found powered off (for example, whether power is delivered through the network cable) were not examined. Third, photographic evidence of the termite damage, the cable installation date, maintenance records, and a source for the approximately four-year non-operation of Terminal 1B are not presented, so the causal link between the idle period and the damage is inferred. Fourth, the cable type and length, power-delivery measurements, and network-layer tests before and after the repair, as well as the duration of the outage, are not reported. Future studies should document these data, inspect other cable paths in the same terminal, and complement continuity testing with reflectometry-based localization and power-delivery measurements (Idellette Judith et al., 2023; Xiao, 2018).

Conclusion

The malfunction of the access control intercom at Boarding Lounge Garbarata Way Gate B5, Terminal 1B, Soekarno-Hatta International Airport was traced to a LAN cable severed on the intercom side. The damage was attributed to termites and is consistent with the minimal maintenance during the approximately four years Terminal 1B was not fully operating after the pandemic. Comparative diagnosis and staged testing with a LAN

Tester isolated the fault to the specific cable path without dismantling the entire access control system. Re-crimping the LAN cable restored all pins to normal, and a test call to the AVSEC OD room connected successfully. These findings are limited to a single case. They indicate that the reliability of the access control intercom depends on the condition of its cable infrastructure, which is vulnerable to environmental factors, so periodic preventive maintenance, more resistant cable materials, and infrastructure monitoring are suggested.

Acknowledgements

The author expresses gratitude to the agencies, companies, and institutions that have offered support in conducting research and/or writing publications

AI Declaration

The author acknowledges the use of artificial intelligence (AI) tools in supporting the preparation of this manuscript. The author remains fully responsible for the accuracy, originality, and integrity of the research and its findings.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

No funding was received for this work.

References

Abdel Karim, A. K. (2026). Multi-fault diagnosis in twisted-pair cables of networked control systems using transferometry. *Eng, 7*(9), Article 471. https://doi.org/10.3390/eng7090471

Al-Duais, F. S., Mohamed, A.-B. A., Jawa, T. M., & Sayed-Ahmed, N. (2022). Optimal periods of conducting preventive maintenance to reduce expected downtime and its impact on improving reliability. *Computational Intelligence and Neuroscience, 2022*, 1-11. https://doi.org/10.1155/2022/7105526

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report, 13*(4), 544-559. https://doi.org/10.46743/2160-3715/2008.1573

Bin Asrokin, A., & Bin A. Rahim, M. K. (2018). Performance evaluation of two port and four port measurement for twisted pair cable. *International Journal of Electrical and Computer Engineering (IJECE), 8*(4), 2624–2632. https://doi.org/10.11591/ijece.v8i4.pp2624-2632

Candra Susanto, P., & Keke, Y. (2019). Implementasi regulasi International Civil Aviation Organization (ICAO) pada penerbangan Indonesia [Implementation of International Civil Aviation Organization (ICAO) regulations in Indonesian aviation]. *AVIASI: Jurnal Ilmiah Kedirgantaraan, 16*(1), 53-65. https://doi.org/10.52186/aviasi.v16i1.23

Carvalho, T. P., Soares, F. A. A. M. N., Vita, R., Francisco, R. da P., Basto, J. P., & Alcála, S. G. S. (2019). A systematic literature review of machine learning methods applied to predictive maintenance. *Computers & Industrial Engineering, 137*, Article 106024. https://doi.org/10.1016/j.cie.2019.106024

Darni, R., Harisman, Y., Sukma, D., Fitriana, E., Sulistiobudi, R. A., & Herayono, A. (2025). Work readiness in vocational education: Perception and correlation between measurement level and system integration. *TEM Journal, 14*(2), 1388-1397. https://doi.org/10.18421/TEM142-39

Ghazali, N. B., Seman, F. C., Isa, K., Ramli, K. N., Abidin, Z. Z., Mustam, S. M., Haek, M. A., Abidin, A. N. Z., & Asrokin, A. (2022). Twisted pair cable fault diagnosis via random forest machine learning. *Computers, Materials & Continua, 71*(3), 5427–5440. https://doi.org/10.32604/cmc.2022.023211

Hofer, F., & Wetter, O. E. (2012). Operational and human factors issues of new airport security technology-two case studies. *Journal of Transportation Security, 5*(4), 277-291. https://doi.org/10.1007/s12198-012-0096-5

Huang, H.-Y., Fanjiang, Y.-Y., Hung, C.-H., & Lee, C.-A. (2022). Design and implementation of a smart intercom system through web services on Web of Things. *Telecom, 3*(4), 675-691. https://doi.org/10.3390/telecom3040036

Hunt, K., Agarwal, P., & Zhuang, J. (2021). Technology adoption for airport security: Modeling public disclosure and secrecy in an attacker-defender game. *Reliability Engineering & System Safety, 207*, Article 107355. https://doi.org/10.1016/j.ress.2020.107355

Idellette Judith, H. S., Cocquempot, V., & Degardin, V. (2023). Fault detection and localization in unshielded twisted pair cable based on observability analysis and reflectometry experimental measurements. *Measurement Science and Technology, 35*(1), Article 015034. https://doi.org/10.1088/1361-6501/ad0069

Ignatovich, S., Yutskevych, S., & Makarov, I. (2022). Features of aircraft structures corrosion damage during storage under COVID-19 restrictions. *Procedia Structural Integrity, 36*, 66–70. https://doi.org/10.1016/j.prostr.2022.01.004

Kang, S.-D., & Kim, J.-H. (2020). Investigation on the insulation resistance characteristics of low voltage cable. *Energies, 13*(14), Article 3611. https://doi.org/10.3390/en13143611

Kazda, A., Badanik, B., & Serrano, F. (2022). Pandemic vs. post-pandemic airport operations: Hard impact, slow recovery. *Aerospace, 9*(12), Article 810. https://doi.org/10.3390/aerospace9120810

Kim, S.-H., & Chung, Y.-J. (2022). Analysis of factors affecting termite damage to wooden architectural heritage buildings in Korea. *Forests, 13*(3), Article 465. https://doi.org/10.3390/f13030465

Li, S., Jiang, B., Yang, Z., & Song, F. (2014). Research on channel-multiplexed home intercom system based on VoIP. *Journal of Computers, 9*(1), 52–58. https://doi.org/10.4304/jcp.9.1.52-58

Li, Y., & Zhu, Z. (2017). A 30-W 90% efficiency dual-mode controlled DC–DC controller with power over Ethernet interface for power device. *IEEE Transactions on Very Large Scale Integration (VLSI) Systems, 25*(6), 1943–1953. https://doi.org/10.1109/TVLSI.2017.2662662

Li, Y., & Zhu, Z. (2020). Adaptive maintain power signature scheme for power over Ethernet system. *IET Power Electronics, 13*(2), 295–299. https://doi.org/10.1049/iet-pel.2019.0491

Lubis, M. R. (2021). Pengaruh On The Job Training (OJT) Flight Operations Officer (FOO) terhadap kesiapan kerja [The influence of On the Job Training (OJT) for Flight Operations Officers (FOO) on work readiness]. *SKYHAWK: Jurnal Aviasi Indonesia, 1*(2), 85-91. https://doi.org/10.52074/SKYHAWK.V1I2.14

Olaganathan, R. (2024). Human factors in aviation maintenance: Understanding errors, management, and technological trends. *Global Journal of Engineering and Technology Advances, 18*(2), 92-101. https://doi.org/10.30574/gjeta.2024.18.2.0021

Omudu, E., Avar-Tsue, S., & Upwa, E. (2025). Termite damage to buildings in Benue State, Nigeria: Termite diversity and nature of attacks, economic cost of maintenance and residents' perception and control. *American Journal of Entomology*. https://doi.org/10.11648/j.aje.20250904.12

Tawancy, H. M., & Hassan, M. (2016). On the degradation mechanism of low-voltage underground cable with poly(vinyl chloride) insulation. *Journal of Materials Engineering and Performance, 25*(6), 2288–2295. https://doi.org/10.1007/s11665-016-2109-1

Tidhar, R. (2022). Airport security: Lessons learned from the COVID-19 pandemic. *Journal of Airport Management, 16*, 134. https://doi.org/10.69554/mtpx3856

Uchroński, P. (2020). Assessment of the impact of the restricted areas access control management on the airport security system. *WUT Journal of Transportation Engineering, 129*, 101–112. https://doi.org/10.5604/01.3001.0014.4407

Ulfa, R. (2022). Implementasi standar operasional prosedur oleh petugas Aviation Security (AVSEC) guna pengoptimalan keamanan dan keselamatan penerbangan di Bandar Udara Nusawiru Pangandaran Jawa Barat [Implementation of standard operating procedures by Aviation Security (AVSEC) officers to optimize flight safety and security at Nusawiru Pangandaran Airport, West Java]. *Jurnal Manajemen Dirgantara, 15*(2), 287-291. https://doi.org/10.56521/manajemen-dirgantara.v15i2.764

Wankvar, T., & Witayangkurn, A. (2025). Automated root cause analysis of network failures in IP/MPLS network using machine learning and case-based reasoning. *IEEE Access, 13*, 111542–111554. https://doi.org/10.1109/ACCESS.2025.3583817

Witczak, D., & Szymoniak, S. (2024). Review of monitoring and control systems based on Internet of Things. *Applied Sciences, 14*(19), 8943. https://doi.org/10.3390/app14198943

Xiao, Z. (2018). An efficient power over Ethernet (PoE) interface with current-balancing and hot-swapping control. *IEEE Transactions on Industrial Electronics, 65*(3), 2496–2506. https://doi.org/10.1109/TIE.2017.2739693

Xiong, Y., Xie, J., Hu, Y., Huang, H., Wang, T., Yang, J., & Zuo, Y. (2025). Research on the physical layer diagnosis of an Ethernet-based train communication network. *Transportation Safety and Environment, 7*, Article tdaf033. https://doi.org/10.1093/tse/tdaf033

Zonta, T., da Costa, C. A., da Rosa Righi, R., de Lima, M. J., da Trindade, E. S., & Li, G. P. (2020). Predictive maintenance in the Industry 4.0: A systematic literature review. *Computers & Industrial Engineering, 150*, Article 106889. https://doi.org/10.1016/j.cie.2020.106889

Zýka, J., & Drahotský, I. (2019). Methodology for assessing the impact of workplace ergonomic factors on airport security screener's reliability and performance. *Journal of Tourism and Services, 10*(18), 104–116. https://doi.org/10.29036/jots.v10i18.88