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AIR TRAFFIC MANAGEMENT CONSIDERATIONS FOR AIRCRAFT AUTONOMOUS EMERGENCY SYSTEMS

Presented by PLC

SUMMARY

Autonomous flight capabilities are being integrated into traditional aircraft platforms by avionics and aircraft manufacturers. These systems are intended to take over partial or complete control of the aircraft's flight path when the flight crew is unable to effectively manage the situation, or when automated systems assess an insufficient or unsuitable reaction by the crew.

The Air Traffic Management (ATM) community is still not well-informed on these autonomous intervention features. Therefore, present ATM frameworks do not completely understand or handle the operational, procedural, and safety implications for surrounding traffic and Air Traffic Controllers.

This paper aims to examine the significance of aircraft autonomous emergency systems in ATM. Furthermore, it aims to outline their advantages while also analysing the issues they raise. This paper exclusively addresses those embedded within traditionally piloted aircraft and does not pertain to remotely piloted or unmanned aerial vehicles (RPAS/UAVs).

1. INTRODUCTION

1.1. The swift development of aircraft with autonomous systems or technology, used in the event of aircrew incapacitation, has the potential to drastically alter the field of ATM. Autonomous aircraft systems will augment pilots by automating the routine flight tasks such as system monitoring, separation management and compliance with air traffic control instructions and providing a high level of onboard automation capability and real-time decision making. These developments aim to not only reduce human error, but also improve general flight safety and efficiency in more congested airspace.

1.2. Manufacturers of aircraft and avionics providers are increasingly equipping conventionally piloted aircraft with automated technologies capable of changing the aircraft's trajectory without flight crew input which will apply in case of pilots' incapacitation. Although these technologies are mainly intended to serve as safety nets in case of emergencies, such as pilot incapacitation or loss of situational awareness, they have important operational ramifications for both the ATM system as a whole and Air Traffic Controllers (ATCOs).

1.3. As is evident, the integration of aircraft autonomous systems into aircraft avionics, to aid during emergencies, creates new dynamics with numerous advantages. But it also brings up issues and concerns about who is responsible for trajectory

management and flight safety. This occurs when modern automation technologies enable the decision-making process to move from ground-based air traffic controllers to onboard systems. The integration of autonomous activities and their interaction with conventional air traffic control operations must be carefully evaluated, particularly in terms of their impact on controller workload and airspace layout.

2. DISCUSSION

2.1. Autonomous emergency systems leverage sensors, automation, and artificial intelligence to enhance safety, particularly in scenarios where human reaction may be delayed or insufficient. In the event that a pilot is incapacitated or unable to respond, several avionics technologies may allow an aircraft to take over flight. They may activate emergency squawk codes, automatically descend, navigate, land without pilot input, and in some situations communicate their intentions to Air Traffic Control (ATC).

2.2. While such features may become essential in the future and offer significant safety benefits, a careful balance must be maintained. Continued research is required to determine which are appropriate, and how they should be used, to genuinely enhance safety. There is always risk that added automation could increase system complexity and workload, potentially introducing unintended challenges (These features might be essential in the future and boost safety, but a fine line should be drawn, and research should be done to determine which features and how they should be used to potentially improve safety, rather than creating more complexity in the airspace instead of solving problems.)

2.3. Various manufacturers are creating different autonomous aircraft emergency systems that can be integrated in both military and commercial aircraft.

2.4. Dassault Automatic Descent Mode

2.4.1. Dassault was the first to introduce the Automatic Descent Mode (ADM) feature, which has been certified by the FAA and EASA since 2013.[1] When autopilot is active, the aircraft is over 30,000 feet and the cabin altitude is 9,700 feet or higher, ADM - which is built into a number of Falcon models- is triggered. After engaging, the aircraft makes a 90° left turn and enters altitude pre-select at 15,000 feet. "ADM" is pronounced in the FMA panel's center. The plane maintains 250 knots when it reaches 15,000 feet. Until autopilot is disengaged, ADM stays activated.[2]

2.5. Airbus Automatic Emergency Descent System

2.5.1. The automatic emergency descent (AED) system, originally introduced with the A350-1000, has since been incorporated into the A350-900 as well.

2.5.2. In case of depressurisation, the system is activated and alerts the crew. If the crew does not react within 15 seconds of the alert, the AED system activates the autopilot to start a rapid descent. If HDG (Heading) mode is set, the aircraft will fly straight at the predetermined heading. If the aircraft was previously in NAV (Navigation) mode, the lateral guidance positions the aircraft in a right offset of approximately 3 nautical miles (NM) along the current flight plan leg.

2.5.3. The system lowers the aircraft to a safer altitude, where oxygen levels are sufficient for passengers and crew. The descent target is set to FL100 or the Minimum Off-

[1] JetForums website (2013) Available from: https://jetforums.net/threads/easy-ii-granted-faa-and-easa-approval-for-falcon-7x.915/#:~:text=This%20approval%20makes%20the%20enhanced%20flight%20deck,*%20Take%20Off%20and%20Go%20Around%20(TOGA) [Last accessed 30 October 2025]

[2] Honeywell website (2013) Available from: https://aerospace.honeywell.com/us/en/pages/automatic-descent-mode-adm-your-ticket-to-operational-safety [Last accessed 30 October 2025]

Route Altitude (MORA) plus a terrain clearance buffer, whichever is higher. In automatic mode air traffic control will also be informed of the emergency action by the AED squawking 7700. During the descent, the system is also designed to avoid terrain. [3]

2.6. Defence Advanced Research Project Agency (DARPA)

2.6.1. The Defence Advanced Research Projects Agency (DARPA) and the U.S. Army conducted a demonstration in 2018 in which Army pilots used supervised autonomy to guide an optionally-piloted helicopter through a sequence of missions to showcase technology created by DARPA and Sikorsky, a Lockheed Martin company. [4]

2.6.2. During the demonstration, a commercial S-76B helicopter passed over a small group of people, landed in a nearby field after swerving to avoid a car, and then rose to hover for a few minutes. The pilot used supervised autonomy to do the maneuvers in a plane that was outfitted with DARPA's Aircrew Labour In-Cockpit Automation System (ALIAS). Advanced automation and less pilot workload are made possible by ALIAS's integration with a helicopter's current systems. From takeoff to landing, it can allow a helicopter to do complex tasks, including managing unforeseen circumstances.

2.6.3. Sikorsky and DARPA demonstrated to senior Department of Defense officials and U.S. military service members in July 2024 and later in October 2024, how an operator in the cabin or on the ground can effortlessly fly and control the Optionally Piloted Black Hawk helicopter by entering high-level mission goals using a tablet. These systems are not yet certified as of this writing. [5]

2.7. Garmin Autoland

2.7.1. In an effort to save an aircraft that could otherwise be lost due to pilot incapacitation, Garmin has created the Emergency Autoland (EAL) system. It is designed to provide assistance and can be turned on manually or automatically. Cabin depressurisation, unstable flying that necessitates LVL (level) mode for a period of time, and prolonged pilot inactivity are examples of automatic EAL activation occurrences. Upon activation, the system locates an appropriate destination airport, uses radiotelephony to communicate its intentions while autonomously flying the aircraft to an approach and landing.

2.7.2. The Garmin EAL has already received FAA and EASA certification for the Piper M600 SLS, Cirrus Vision Jet G2 and G2+, Daher TBM 940 and 960, Hondajet Elite II, and several King Air models (such as the 350 and certain 200 and 300 series) It can also be found in other aircraft with specific G1000 NXi and G3000 flight decks, as well as the Cirrus SR22 G7+.[6] [7] [8]

2.7.3. A passenger can manually activate Garmin Autoland, should the pilot become unable to operate the aircraft. Autoland can also activate automatically. The airplane

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[3] 100 knots website (2025) Available from: https://www.100knots.com/airbus-a350s-automatic-emergency-descent-aed-a-revolutionary-safety-innovation-in-commercial-aviation/ [Last accessed 27 October 2025]

[4] Military Embedded Systems Website (2018) Available from: https://militaryembedded.com/unmanned/test/autonomous-flight-control-demonstrated-via-sikorsky-darpa-alias-tech [Last accessed 27 October 2025]

[5] Lockheed Martin (2024) Available from: https://news.lockheedmartin.com/2024-12-11-Sikorsky-to-Demonstrate-Flight-Autonomy-to-U-S-Marine-Corps [Last accessed 27 October 2025]

[6] Garnin Website (2020) Available from: https://www.garmin.com/en-US/blog/aviation/garmin-autoland-achieves-easa-and-faa-certification-on-daher-tbm-940/ [Last accessed 27 October 2025]

[7] Garnin Website (2025) Available from: https://www.garmin.com/en-US/newsroom/press-release/aviation/garmin-autoland-and-autothrottle-now-certified-for-retrofit-installations-in-select-beechcraft-king-air-350-aircraft/ [Last accessed 27 October 2025]

[8] Garnin Website (2020) Available from: https://www.garmin.com/en-US/newsroom/press-release/aviation/2020-faa-certifies-cirrus-vision-jets-safe-return-becoming-the-first-jet-aircraft-to-be-certified-with-garmin-emergency-autoland/ [Last accessed 27 October 2025]

manufacturer can configure many of these methods that can trigger the emergency autoland to activate automatically. For instance, Autoland can be activated automatically by using Emergency Descent Mode (EDM). If the pilot hasn't communicated with the flight deck in a long time, the flight deck will ask the pilot if they are alert by displaying a message on the flight display. At that moment, Autoland would not activate and the pilot would acknowledge the message by pressing a soft key on the flight deck. EDM has the ability to activate automatically if the pilot has gotten hypoxic and is not conscious. At this point, Autoland will automatically engage and land the aircraft if the pilot continues to avoid interacting with the flight deck, and EDM will descend the aircraft to a lower altitude. If the aircraft is in Level Mode for a long time (the length of time is adjustable by the aircraft Original Equipment Manufacturer - OEM - the source company of a particular aircraft component), there is another instance of an automatic Autoland engagement. Additionally, Autoland can engage automatically if aircraft OEM can detect that the pilot hasn't engaged with the flight deck for a predetermined period of time during specific periods of the day (day vs. night).

2.7.4. Depending on the airframe's particular configuration, there is a brief delay before autonomous control starts (between 0 and 10 seconds for human activation and 2 minutes for automated activation) to allow for cancellation in the event of an unintentional activation. By pressing the AP button on the autopilot controller or the red autopilot disconnect button on the yoke, EAL operation can be stopped at any moment.[9]

2.7.5. However, there is cause for concern in the event that the emergency autoland system is activated inadvertently, due to a possible technology glitch. For example, shortly after the Cirrus SF50, N442CV, was hit by an unidentified item during approach into Austin Bergstrom International Airport (AUS), Austin, Texas, on September 14, 2024, the aircraft's emergency autonomous landing system was activated. According to the pilot, the airplane's Emergency Autoland (EA) sequence was triggered as a result of the accident.[10] According to preliminary data retrieved from the aircraft's central maintenance computer, the emergency autoland system was activated twice for periods of 10 seconds. In the end, the pilot successfully landed the aircraft at AUS.

2.7.6. To choose the most suitable landing location within a 200 nautical mile radius, Garmin Autoland considers weather, terrain, fuel availability, and runway availability. Additionally, the aircraft can comply with TCAS Resolution Advisory messages. In order to avoid bad weather conditions or choose an airport with clear visibility and no precipitation, it gives preference to airports to stay out of congested airspace and takes into account weather information from sources like SiriusXM and Iridium datalinks. Along the way to the airport, the algorithm avoids obstacles and accounts for runway length, type, and length.[11]

2.7.7. Following activation, EAL will perform the following:

- Choose the 7700 transponder code.
- Announce its intentions using automated radiotelephony calls on 121.500 MHz and the active frequency.
- Pick an appropriate airport for landing.

[9] Garnin Website Available from: https://support.garmin.com/en-US/?faq=J7xLDwJyjy0sCg3uQJRQi8 [Last accessed 27 October 2025]

[10] Aviation Safety Network (2024). Available from: https://asn.flightsafety.org/wikibase/457334 [Last accessed 21 August 2025]

[11] Twin and Tu. Available from:https://www.twinandturbine.com/garmin-autoland-an-inside-look-at-general-aviations-latest-revolutionary-break-through-safety-technology/#:~:text=After%20the%20passenger%20pushes%20the,change%20based%20on%20changing%20conditions. [Last accessed 28 October 2025]

- Use the Satcom datalink to notify Garmin that it has been activated.
- Unless near terrain or obstructions, fly level and straight for 25 seconds.
- Start autonomous turns and descent towards the destination airport. [12]

2.8. Controllers' Actions

2.8.1. The EAL's behaviour includes many additional details, especially in relation to the transmissions on the frequency that declare the aircraft's intentions. Consequently, it is imperative that the ATCOs become acquainted with the nature of EAL's operations. ANSPs should evaluate their procedures and training in order to take into account the operational elements of autonomous aircraft emergency systems in general. ATCOs should be involved and trained to handle scenarios in which these systems are activated, and ANSPs should ensure that controllers are adequately informed about autonomous aircraft emergency system engagements, from the ground to the area control. It is crucial that the controller is prepared for this kind of interaction and is not taken by surprise.

2.8.2. When aircraft autonomous emergency systems are activated, both the workload and the complexity are likely to increase, as they do in any other emergency situation. In such a scenario, the affected aircraft needs extra monitoring and timely decision-making to ensure safe separation with other traffic. The risk of loss of separation may increase as the aircraft selects and executes its own trajectory and communicates this information over the frequency. The same is true for their descent, where the ATCO must actively manage surrounding traffic, clear the aircraft's path, and facilitate a safe and orderly descent regarding nearby traffic.

2.8.3. The concern of whether controllers will be promptly informed that an aircraft is under autonomous control is directly linked to their requirement to deconflict nearby airspace in a short period of time. How can the ATCO be guaranteed that they will have enough time to provide sufficient separation from the other traffic, given there is currently no standard ICAO message or phraseology to announce autonomous emergency operations? Currently the crew notifies the ATCO of the emergency, as soon as it occurs, and the ATCO provides separation to the emergency aircraft. It should be ensured that ATCOs are provided with sufficient and equivalent time if autonomous emergency systems are activated.

2.9. European SESAR SOLO and RESPONSE projects

2.9.1. Autonomous emergency autoland procedures due to pilot incapacitation and its effects on air traffic management are the subjects of two ongoing projects by SESAR (Single European Sky ATM Research), the European air traffic control infrastructure modernisation program and the technological cornerstone of the EU's Single European Sky policy. These projects are called SOLO (Single Pilot Line Operations) and RESPONSE (Reduced or Single Pilot Operation Incapacitation Safety Enhancement). IFATCA participates in both projects as a member of their advisory board, which convenes on a regular basis to discuss research findings and share viewpoints.

2.9.2. European SESAR SOLO

2.9.2.1. SOLO is a project under Air-Ground integration and Autonomy flagship. Project partners are Airbus [Coordinator], ATR, DFS, DSNA, ENAIRE, CRIDA, Indra, NATS

[12] CAA UK (2024), SN-2024/009: Garmin Emergency Autoland. Available from: https://www.caa.co.uk/our-work/publications/documents/content/sn-2024009/ [Last Accessed 21 August 2025]

and EUROCONTROL.[13],[14] The objective of SOLO is to address the impact on the ATM operations arising from the situation of flight crew incapacitation. This impact will be addressed, by considering the needed aircraft onboard automation functions to safely guide the aircraft to the nearest suitable airfield as soon as possible, under full supervision of the different ATC sectors and of the airline Flight Operations Center. Furthermore, by including the strategic need for coordination between the ATC and Airline Flight operations center. The main point of the discussion around SOLO is, what should ATC do or expect. Validations and simulations were conducted at the end of 2025 by DFS and CRIDA.

2.9.2.2. During the first SOLO Advisory Board meeting, which took place in April 2025 in Toulouse, some main points of concern were raised. For example, a question was raised regarding if the aircraft should follow a contingency trajectory (free route to the Initial Approach Fix (IAF) or their flight plan (published WP, routes). IFATCA, and Air Traffic Controllers European Unions Coordination (ATCEUC) representatives agreed that whatever is faster is better. The more time the incapacitated aircraft is in the air, the more it can cause disturbance.

2.9.2.3. There has also been discussion on whether an aircraft with emergency autoland engaged should have a dedicated squawk or should just squawk emergency code 7700. A dedicated squawk for aircraft experiencing pilot incapacitation, along with the label and the highlight in the controller working position, was suggested during the second advisory meeting in December 2025.

2.9.2.4. Another topic of discussion has been whether emergency autoland should be considered an emergency or a priority. It has been commonly agreed that it should be considered an emergency, although the aircraft can fly autonomously, as it is a clear case of loss of redundancy. However, a balance should be found between allowing runway use and not permitting landings, from the moment the emergency autoland is engaged. DFS, during their simulations, evaluated runway stoppage 25 nautical miles prior to the landing of the incapacitated aircraft, while CRIDA suggested extending it to 50 nautical miles. The aircraft's ability to autonomously detect obstacles on the RWY and perform go-around is not guaranteed by current technological advancements. Therefore, it is advised to develop the systems and functions further and include airport operators in additional research to gather their input.

2.9.2.5. Regarding communication, the automated messages can be transmitted by the aircraft when the frequency is not in use. After the initial messages on the active frequency, the system switches to the emergency frequency, which normally is not congested. It should be mentioned, nevertheless, that ATCOS are not required or even able to listen to the emergency frequency in many different sectors across different nations. VHF frequency free slot detector function will be activated, to identify free slots for transmission of voice messages on the active ATC VHF frequency without overlapping other transmissions and transmit the generated voice messages. However, is the aircraft capable to re-transmit the previous message when the ATC requests “say again”? There is still no clear answer to this question and the need for this function is being analysed. This issue can arise mainly when the first two transmissions are made on the active frequency. The project managers of SOLO have indicated that the "Say-again" function has not been considered. The initial message has a higher probability of not being captured, however, according to them, information from this initial message can be retrieved as this is repeated

[13] SESAR Ju. Available from: https://www.sesarju.eu/projects/SOLO/ [Last Accessed 13 December 2025]

[14] CORDIS EU. Single pilOt Line Operations Available from: https://cordis.europa.eu/project/id/101114589 [Last Accessed 13 December 2025]

multiple times in both the active and emergency frequencies within a few minutes following incapacitation.

2.9.2.6. A potential change to the tasks of an ATCO after pilots' incapacitation and engagement of aircraft autonomous landing systems would be, to coordinate with the Operations Ground Assistance (OGA) of the airline through their supervisor about the aircraft state, the planned trajectories and its intentions. The Controllers participating in CRIDA validations declared that they do not support single pilot operations or total incapacitation emergency operations in the absence of an OGA. However, concerns were expressed that the ATC Supervisor and OGA's communication would be error-prone and might take too long to establish.

2.9.2.7. In terms of the aircraft's behaviour during validations, the common segment will be followed for seven minutes if the incapacitation is announced during the enroute flight phase, and it will follow the common segment for three minutes once the aircraft has already entered the Terminal Area (TMA) in which the landing airport is situated. However, during the discussion on how to modify the behaviour with regard to the airspace or the flying phase, various suggestions were made. For instance, it was explained how to determine whether the aircraft has reached its top of descent, or a specific distance from the landing airport.

2.9.2.8. The most crucial question is, of course, who will be responsible for aircraft separation while the emergency autoland procedure is in progress and the trajectory is selected exclusively from the aircraft automated system. The Advisory Board sessions have not provided a definitive response to this query. The validations revealed that simulations were unrealistically "perfect" in terms of ATCOs' roles, workloads, and situational handling; real workloads would undoubtedly be higher. Using the automated transmissions on the emergency frequency, the controllers were able to develop a strong common situational awareness during simulations. Total crew incapacitation incidents did not have any negative impact on situational awareness; however, it is uncertain if this will also hold true in the event of an unexpected crew incapacitation of a controlled aircraft.

2.9.2.9. It should be made clear at this point that, in the event of an emergency, the aircraft has taken over decision-making, and the responsibility as well, about the trajectory to be followed or any other actions by the pilots, or in the case of the autonomous emergency systems. Information sharing is more crucial on the ATCO side so that the controllers can keep other traffic apart from emergency traffic. In addition to establishing a safe area surrounding the aircraft where autonomous emergency aircraft systems have been activated, it is important not to engage the controller in giving orders to the aircraft and anticipate that it will comply.

2.9.2.10. During the second advisory board meeting, IFATCA expressed concerns that it would be extremely difficult for ATCOs to handle such a situation in the future without standardising the behaviour of several autonomous aircraft emergency capabilities, which would greatly increase the workload. In response, the SOLO project management stated that the goal of the project is to collaboratively build a concept between aircraft manufacturers and ANSPs, including standard procedures for ANSPs and requirements for aircraft (regardless of make). The standardisation and regulation roadmap to modify EASA regulations and ICAO standards is part of the solution.

2.9.3. RESPONSE projects

2.9.3.1. SESAR RESPONSE project researches how to develop SiPO (Single Pilot Operation) partial and full incapacitation responses so that an aircraft can return to

land at an airfield in both states. .[15,16] SOLO and RESPONSE provide an overlapping exploration of incapacitation of a crew member in both Dual Pilot Operation and SiPO configurations. SOLO is exclusively focused on incapacitation in SiPO and return to land. RESPONSE will explore a range of scenario episodes with two pilots incapacitated as well as SiPO.

2.9.3.2. The extent of collaboration between ATCOs and the aircraft's digital assistants or the operation ground assistance was considered at the first RESPONSE International Advisory Board meeting in May 2025 as well as at the second one in November 2025. Ground assistance, ATCOS, pilots as well as machine assistants need to coordinate effectively and purposefully during an emergency autoland procedure. However, the issue of responsibility and the process by which it will be established remains the primary concern. As previously mentioned, since the aircraft is not operating in compliance with its clearance, it would be difficult to assign responsibility as long as the controller responds "reasonably" given the circumstances. As a result, it is important to establish precise protocols and procedures. It shall be ensured that the Controller is aware of their roles and duties and that decision-making accountability is clearly delineated.

2.10. Currently, IFATCA has no policy regarding aircraft autonomous emergency systems in the TPM. ICAO does not provide any standards or recommended practices yet, so manufacturers are free to design the systems how they want without commonality in their behaviour. For instance, in the European (EUR) region, the pilot should initiate a turn away from the assigned route or track before commencing an emergency descent.[17] The pilot should descend midway between and parallel to a convenient pair of organised tracks in the North Atlantic (NAT) region.[18] These system's behaviours should be the subject of SARPs and /or PANS, in order to achieve a level of standardisation. The UK Civil Aviation Authority issued a Safety Notice last year, regarding the Emergency Autoland (EAL) system, to inform airspace users and air traffic services (ATS) staff of the existence of EAL, outline its method of operation, and highlight considerations that should be made in the event of activation.[19]

2.11. Current ICAO regulations pertain to emergencies and contingencies, although they predominantly rely on pilot discretion, judgment and 'common sense'. There are no standard flight procedures for aircraft autonomous emergency systems, similar to existing procedures such as Radio Communication Failure (RCF). Because there are no clearly defined procedures or standards and insufficient information is available, ATCOs are not appropriately trained to undertake these additional responsibilities. Without international standardisation and harmonisation, aircraft autonomous emergency systems should follow existing international, regional, or local procedures used in the airspace. An ATCO cannot be held responsible for situations caused by inadequate training, particularly when an aircraft's autonomous emergency system does not adhere to the established procedures and protocols in that airspace. Manufacturers currently design these systems in different ways because no guidelines or best practices exist. While autonomous safety systems are positive and should be supported, they must be internationally standardised to avoid increasing risk and to improve overall safety in air traffic control.

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[15] SESAR Ju. Available from: https://www.sesarju.eu/projects/RESPONSE [Last Accessed 13 December 2025]

[16] CORDIS EU. REduced or Single Pilot Operation iNcapacitation Safety Enhancement Available from: https://cordis.europa.eu/project/id/101166998 [Last Accessed 13 December 2025]

[17] ICAO Doc. 7030 (Regional Supplementary Procedures). EUR. 9.1.1.1.

[18] ICAO Doc. 7030 (Regional Supplementary Procedures). NAT. 9.1.1.2.

[19] CAA UK (2024), SN-2024/009: Garmin Emergency Autoland. Available from: https://www.caa.co.uk/our-work/publications/documents/content/sn-2024009/ [Last Accessed 21 August 2025]

2.12. Raising awareness among ATCOs of aircraft autonomous emergency system behaviour is challenging without predetermined, internationally harmonised procedures. It is not optimal to expect an ATCO to understand and anticipate every possible system action when manufacturers implement differing designs with distinct behaviours. Without global standardisation ATCOs should not be held accountable for a loss of separation arising from such autonomous system actions. While ATCOs have a duty of care, that duty cannot reasonably extend to managing a complex and diverse range of unharmonised system responses without adequate training and worldwide procedural alignment.

2.13. IFATCA is in favour of emergency descent and landing procedures, as they are likely to save lives. In several instances emergency autonomous features have already saved lives.[20] Nonetheless, safety will only improve if these systems are well understood. This requires clear, risk-based procedures, agreed contingency protocols for autonomous emergency operations, international standardisation, and appropriate training for all involved.

2.14. In terms of standardisation, systems ought to act in the same way. For example, squawk the appropriate code, use PANS-ATM phraseologies to transmit on specific frequencies, or use ICAO Level 4 English. The ATCOS would greatly benefit from such a development in terms of training and handling such circumstances.

3. CONCLUSION

3.1. The development of air traffic control procedures and system indicators to efficiently identify aircraft operating under autonomous emergency control should be encouraged, since the operational reality of autonomous emergency systems in conventionally flown aircraft is becoming more widely acknowledged.

3.2. In order to integrate air traffic management viewpoints into the design and certification processes of autonomous technologies; as well as to create international standards encompassing phraseology, flight plan indicators, and controller response protocols to encourage harmonisation and safety in increasingly automated airspace environments; it is critical to work closely with the ICAO, industry stakeholders, and manufacturers.

3.3. Training for controllers that focuses on comprehending autonomous emergency system behaviour, triggers, and proper operational handling should be implemented in order to guarantee safe and effective air traffic control. Furthermore, it shall be ensured that the ATCO is aware of their roles and duties and that decision-making accountability is clearly delineated.

4. DRAFT RECOMMENDATIONS

4.1. It is recommended that the following be accepted as a provisional policy and inserted into the AAS section of IFATCA's TPM.

AAS 1.XX AIRCRAFT AUTONOMOUS EMERGENCY SYSTEMS
IFATCA policy is:

[20] AvBrief (2025), Autoland Saves King Air, Everyone Reported Safe. Available from: https://avbrief.com/autoland-saves-king-air-everyone-reported-safe/ [Last Accessed 22 December 2025]

IFATCA recommends the establishment of risk-based procedures and contingency protocols for autonomous emergency aircraft systems.

Aircraft autonomous emergency systems shall act in accordance with ICAO procedures for conventionally piloted aircraft to ensure they operate consistently across different regions.

Comprehensive training and guidance material should be developed and provided to ATCOS regarding aircraft autonomous emergency systems.

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5.3. 100 Knots Website (2025) [HTML]. Retrieved from https://www.100knots.com/airbus-a350s-automatic-emergency-descent-aed-a-revolutionary-safety-innovation-in-commercial-aviation/

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https://www.caa.co.uk/our-work/publications/documents/content/sn-2024009/

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