3 COMMUNICATION FACILITIES AND NAVIGATION AIDS

3.1 COMMUNICATIONS SERVICE PROVIDER

Riyadh Air utilizes two primary networks: ACARS and the Aeronautical Telecommunications Network (ATN). ACARS is compatible with FANS (Future Air Navigation Systems) and utilizes VHF, and SATCOM for information transfer, while ATN, specifically ATN B1, relies solely on VHF for its communication needs.

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3.2 AIRCRAFT EQUIPMENT

The following table provides a detailed documentation of the communications and surveillance equipment installed on each aircraft type in Riyadh Air's fleet. This table is a reference for understanding the specific capabilities and features of the communication and surveillance systems across different aircraft types.

Fleet	Registration	VHF – DL	SATCOM	ADS-B OUT	ADS-B IN
B787	ALL	Yes	Yes	Yes	Yes

Table 1 - Aircraft Equipment

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3.3 AIRCRAFT CAPABILITY

The following table is outlining the air traffic capabilities of each aircraft type in our fleet, with specific reference to FANS (Future Air Navigation Systems), PBCS (Performance-Based Communication and Surveillance), and ATS (Air Traffic Services) capabilities. This table serves as a tool for understanding the unique air traffic capabilities of each aircraft, ensuring that flight crews and operational staff are equipped with the necessary information regarding the technological and navigational features specific to each aircraft model.

Fleet	Reg	ATS			PBCS		FANS		
		Oceanic	D-ATIS	PDC/DCL	RCP 240	RSP 180	FANS 2	CPDLC	ADS-C
B787	All	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 2 - Aircraft Capability

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3.4 AIR TRAFFIC SERVICES (ATS)

All Boeing 787 aircraft are equipped with datalink capabilities, enabling them to effectively communicate with Air Traffic Services (ATS) capable of supporting datalink. Aircraft ATS capabilities include requesting and receiving oceanic clearances, Digital-Automatic Terminal Information Service (D-ATIS) information, as well as Pre-Departure Clearance (PDC) and Departure Clearance (DCL) via datalink.

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3.5 PERFORMANCE BASED COMMUNICATIONS AND SURVEILLANCE (PBCS)

Performance Based Communications and Surveillance (PBCS) integrates Performance Based Communication (PBC) and Performance Based Surveillance (PBS) within air traffic services, focusing on specific communication and surveillance performance standards. Aimed at alleviating congestion in the North Atlantic (NAT) airspace, PBCS reduces separation minima between aircraft to enhance airspace capacity. It employs RCP 240 and RSP 180 specifications for lateral and longitudinal separation. Compliance with these standards in the NAT High-Level Airspace (HLA) is mandatory. Riyadh Air's fleet is fully capable of meeting these requirements, with compliance monitored through FANS 1/A, CPDLC, and ADS-C performance, encompassing transaction time, continuity, availability, and integrity as per the RCP 240 and RSP 180 criteria. PBCS capabilities for each RX aircraft are included on the ATS Flight Plan.

Flight crew may refer to Route Manual / Air Traffic Control / Performance Based Communications and Surveillance for additional information on PBCS.

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3.6 AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST (ADS-B) / CONTRACT (ADS-C)

3.6.1 ADS-B (Automatic Dependent Surveillance-Broadcast)

ADS-B is a satellite-based surveillance system where aircraft determine their position via satellite navigation and broadcast it periodically. This system enhances safety by making an aircraft visible in real time to ATC and other ADS-B In equipped aircraft.

The ADS-B system encompasses two primary functionalities: ADS-B Out and ADS-B In. The ADS-B Out feature is responsible for transmitting critical flight data such as identification, position, altitude, and velocity. This transmission ensures that the aircraft is visible and trackable by both ATC and other aircraft equipped with ADS-B In technology.

ADS-B In allows the reception of broadcasts from other aircraft and ground stations. This includes accessing weather information through the Flight Information Service-Broadcast (FIS-B), receiving traffic updates via the Traffic Information Service-Broadcast (TIS-B), and enabling direct communication with nearby aircraft. The integration of these features provides significant benefits for flight operations, including enhanced traffic awareness around the aircraft, real-time weather reports, and improved navigational updates.

3.6.2 ADS-C (Automatic Dependent Surveillance-Contract)

The ADS-C system functions based on a specific contractual agreement that determines the type of information transmitted and the timing of these transmissions. It is primarily utilized in remote and oceanic areas, characterized by longer interval updates, typically occurring around every 10 minutes. This makes it particularly suited for areas where traditional surveillance coverage is limited.

In comparison to ADS-B, ADS-C has several distinct operational differences:

1. **Transmission Method:** While ADS-B transmits data via the aircraft's Mode S Transponder, ADS-C relies on the ACARS network facilitated through satellite communication.
2. **Broadcast vs. Contract**: ADS-B operates on a broadcast model, continuously transmitting data to any receiver within its range. In contrast, ADS-C works on a contract basis, sending information only to a specific ground station with which it has an established contract.
3. **Update Frequency**: ADS-B offers more frequent position updates, providing a more accurate and real-time depiction of the aircraft's location for ATC. On the other hand, ADS-C updates are less frequent, making it less suitable for real-time tracking but adequate for longer-duration monitoring.

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3.6.3 Flight Plan and Operational Requirements

To indicate an aircraft's capability to engage in ADS-B operations, Field 18 of the ICAO flight plan will be automatically annotated by the flight planning system with "RMK/ADSB".

Note: *Flight crew must ensure the accurate entry of the ADS-B identifier in the Flight Management Computer. This identifier must include the flight number or alphanumeric callsign, preceded by the assigned 3-letter ICAO airline code (e.g., RXI 001).*

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3.7 FUTURE AIR NAVIGATION SYSTEMS (FANS)

Data-link systems based on ACARS include FANS 1/A+, FANS 1/A, and ADS-C (Automatic Dependent Surveillance-Contract), which provide comprehensive coverage for communication and surveillance needs across various mediums.

Boeing 787 aircraft are equipped with FANS 2, an advanced iteration of the FANS concept, integrating features from both FANS A+ and FANS B+. FANS 2 enhances the capabilities of aircraft communication and navigation systems, making them more efficient and reliable. This system is designed to operate over both the ACARS and ATN networks, providing flexibility in communication channels.

Flight crew should refer to *the Route Manual / Air Traffic Control / Controller Pilot Data Link Communication (CPDLC) / Flight Crew Procedures for further information on specific CPDLC procedures.*

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3.8 CONTROLLER PILOT DATALINK COMMUNICATIONS (CPDLC)

CPDLC is a two-way data-link system allowing air traffic controllers to transmit non-urgent pre-formatted messages to aircraft as an alternative to voice communications. Globally implemented in varying stages, CPDLC allows controllers to issue ATC clearances, radio frequency assignments, and requests for information. Pilots can respond to messages, request, and receive clearances, and report information. A 'free text' option is available for non-standard exchanges.

CPDLC aims to reduce ATC frequency congestion, increase sector capacities, handle more pilot requests simultaneously and reduce miscommunication risks.

3.8.1 Pre-Departure Clearances (PDC)

Pre-Departure Clearances are produced by ATC at specific airports in Australia and Canada. To utilize this service, operators must subscribe through an Airline Operational Communication (AOC) service provider, such as Honeywell's Global Data Center. The process involves the applicable ATC unit transmitting PDCs to the service provider, where they are stored in the provider's system. Subsequently, the service provider disseminates the clearance to the aircraft using the Aircraft Communications Addressing and Reporting System (ACARS) network.

Note: *As there is no direct link between controller and crew, the PDC requires verification by means of a voice readback to ATC.*

3.8.2 Departure Clearance (DCL)

Unlike PDC, DCL facilitates a direct exchange between ATC and the flight crew. When a request is initiated by the flight crew, it is transmitted via data link to the controller. The controller, in turn, sends the required clearance directly back to the aircraft via the same data link system. Flight crew should note that if they do not transmit a departure clearance readback within a time limit specified by the individual Air Traffic Service Unit, the system will automatically cancel the clearance along with an instruction to revert to voice procedures.

Note: *When a CPDLC DCL is accepted by the flight crew, no voice readback is required*.

3.8.3 CPDLC DCL

In the United States, the CPDLC – DCL system utilizes a FANS-1/A+ CPDLC connection to establish direct communication between the controller and the pilot. This system requires the flight crew to execute a logon process, similar to connecting to an Air Traffic Service Unit (ATSU) provider while airborne.

Note: *The CPDLC-DCL logon address for all US aerodromes is KUSA.*

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3.9 Digital ATIS/ VOLMET

The provision of Digital Automatic Terminal Information Service (DATIS) accessible via ACARS is indicated for each aerodrome in the AGC (Aeronautical Ground Communication) chart's Communications section. This feature allows flight crews to retrieve up-to-date ATIS information digitally for specific aerodromes.

For monitoring weather conditions enroute, flight crews can select the 'enroute' option on the DATIS request interface. This action will generate a D-VOLMET (Digital VOLMET) report for the specified station. Each D-VOLMET report encompasses weather reports for multiple aerodromes located in the proximity of the station, offering a comprehensive overview of the meteorological conditions in that region. The D-VOLMET service is commonly referred to as “Enroute ATIS”.

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3.10 COMPANY COMMUNICATIONS

Company Datalink Communications serve as a vital channel for continuous two-way communication between Riyadh Air aircraft and the Operations Control Center (OCC). This system is essential for flight watch, flight following, and provides substantial support in planning and dispatch. The datalink system is configured to facilitate various types of messages, enhancing operational efficiency and response times. Message types include:

1. Free Text: For customized communication needs.
2. Ramp Service Request: To coordinate ramp services.
3. Load sheet Request: For obtaining necessary load sheet information.
4. Delay Reports: To communicate and document flight delays.
5. Diversion Report: For reporting and managing flight diversions.

Note: *The datalink communication system ensures that flight crew can remain in contact with the OCC regardless of the aircraft's geographic location.*

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3.11 SELCAL

SELCAL-equipped aircraft, including those of Riyadh Air, are each assigned a unique four-letter SELCAL code.

However, due to the increasing number of aircraft globally and the limited pool of unique codes, some SELCAL codes may be assigned to multiple aircraft. These are typically allocated to operators in different regions to reduce the chances of frequency overlap. Nonetheless, overlaps can still occur, which requires flight crews to be vigilant. Flight crew must ensure that they respond only to communications intended for their aircraft and avoid mistakenly accepting clearances meant for another aircraft with the same SELCAL code.

3.11.1 Aircraft SELCAL Codes

The following table documents the SELCAL code for each aircraft in Riyadh Air's fleet.

Aircraft Registration	SELCAL Code
Add registration	Add code

Table 3 - Aircraft SELCAL codes

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3.12 SURVEILLANCE

3.12.1 Flight Following

Flight Following involves the real-time recording of departure and arrival times by operational personnel to track the progress and confirm the arrival of flights. Riyadh Air utilizes the NetLine/Ops ++ system for this purpose.

The Fleet Watch Management system is configured to process and log timing data received from IATA standard movement messages as well as OOOI (Out of the gate, Off the ground, On the ground, Into the gate) messages transmitted by the onboard ACARS system. Flight status, including on-time or delays, is visually indicated by a color-coded system on the graphical display.

The flight bar is designed to automatically transition to a transparent display upon the aircraft's arrival at the destination. This change occurs when the system receives 'On the ground' and 'Into the gate' ACARS timings or IATA standard movement messages from the destination airport's personnel. The receipt of the 'IN' message by the system signifies the completion of a flight.

OOOI messages are transmitted to the NetLine/Ops ++ operations control system, typically within 10 minutes of issuance. Additionally, all stations within the Riyadh Air network are required to submit IATA standard departure and arrival movement messages to the OCC no later than 10 minutes following the aircraft's 'Off the ground' and 'Into the gate' times. For Flight Following purposes, OOOI messages are the primary source of information, while IATA standard messages are used as a secondary reference.

3.12.2 Flight Monitoring

Riyadh Air uses the Lido/Winds Aircraft Tracking System to monitor all flight operations. The Lido system enables:

1. The consistent exchange of all pertinent operational information between the flight crew and the OCC.
2. OCC to provide support to flight crew during in-flight emergencies or security issues. Assistance can also be provided on flight crew request to address operational issues.

3.12.3 Aircraft Tracking

Aircraft Tracking is the systematic recording of an aircraft's four-dimensional position – latitude, longitude, altitude, and time – at intervals of 15 minutes or less. This process begins with the filing of an ATS flight plan and concludes upon the flight's completion or cancellation. Aircraft tracking serves as a fundamental component of the Global Aeronautical Distress and Safety System (GADSS), by:

1. Facilitating the prompt identification and location of aircraft.
2. Minimizing the dependence on procedural methods for position determination.

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3. Guaranteeing the availability and dissemination of precise aircraft position data.
4. Enhancing the efficiency of air traffic services and support for Search and Rescue (SAR) operations.

Aircraft Tracking incorporates the use of Automatic Dependent Surveillance-Broadcast (ADS-B), which is integral to the monitoring process. ADS-B enhances Aircraft Tracking by providing real-time, four-dimensional position data of aircraft. This data is automatically reported through ground-based and space-based ADS-B systems, ensuring consistent updates at intervals of 15 minutes or less throughout the entire flight operation, including in oceanic and remote areas.

In the context of Riyadh Air's tracking and alerting protocols, ADS-B serves as a primary source of position information. It enables OCC to maintain situational awareness of the fleet, contributing to the swift identification and location of aircraft. The ADS-B data feeds into the LIDO/Winds Aircraft Tracking System, facilitating an accurate and dynamic aircraft position display on the operational map.

3.12.3.1 4D/15 Tracking

The Riyadh Air aircraft tracking system complies with the 4D/15 tracking GADSS mandate, handed down by ICAO. In the event that an aircraft does not report its position within a 15-minute timeframe or deviates laterally greater than 50nm laterally, or 6000 feet vertically from its flight plan route, an alert is triggered. These alerts prompt OCC to initiate communication with the aircraft using multiple channels, including ACARS and satellite communication.

If communication attempts are unsuccessful or a second 4D/15 missed report occurs OCC is responsible for immediately contacting the appropriate Air Traffic Service Unit (ATSU) where the aircraft position was last known to ascertain the current position/status of the aircraft.

3.12.3.2 ADT (Aircraft Distress Tracking)

Distress Tracking is activated when a flight enters a known state of distress outside of normal flight operating parameters and will be activated by an on-board distress tracking device ELT (DT) operating independently from other systems. The ELT(DT) will transmit position reports at one-minute intervals via existing emergency radio frequencies and the INMARSAT and COSPAS SARSAT satellite networks to SAR authorities and affected ANSPs. Distress tracking messages will alert and be accessible to the OCC via the ICAO “LADR” (Location of an Aircraft in Distress) repository.

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