U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Air Traffic Organization Policy

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SUBJ: Radio Communications Requirements for Air Traffic Control Facilities

This order establishes Air-To-Ground (A/G) communications requirements. It provides guidance for policy implementers to use for future changes or new installations. These policy updates will help ensure service as new systems and other changes take place.

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Chapter 1. General Information

1. Purpose of This Order. This order establishes the system requirements for providing air-to-ground (A/G) radio communications for the National Airspace System (NAS).

2. Audience. Air Traffic Organization (ATO) headquarters and field organizations that are involved with the policy implementation, operation and support of A/G radio communications services.

3. Where Can I Find This Order. You can find this order on the Directives Management System (DMS) website: https://employees.faa.gov/tools_resources/orders_notices/.

4. What This Order Cancels. Replaces the intent of FAA Order 6510.4A, Radio Communications Requirements for Air Traffic Control Facilities, cancelled 6/25/09.

5. Explanation of Policy Changes. This order identifies four general requirements common to all A/G radio communications services as well as service specific requirements. It defines primary services and changes the definition of back-up equipment. It changes the term “one-for-one equipment” to “main and standby radio equipment.”

Chapter 2. A/G Communications Facilities Requirements

1. General Requirements. ATO organizations must meet A/G communication requirements by establishing, modifying or relocating A/G communications facilities in the National Airspace System (NAS). Most common events that generate A/G communication requirements are: New air traffic procedures; airspace redesign; changes to air traffic procedures, flight routes, traffic volumes, or frequency protected service volumes (FPSV); or expiring property leases.

a. Frequency Management. The frequency spectrum is critical in the implementation, relocation, and operation of any A/G communication facility. In accordance with the latest version of FAA Order 6050.32 Spectrum Management Regulations and Procedures Manual, the following frequency requirements must be considered for any A/G communication implementation:

(1) The Spectrum Engineering Group Frequency Management Officer (FMO) must engineer frequencies in accordance with the latest version of FAA Order 6050.32 to support validated Air Traffic Control (ATC) functions.

(2) The FMO must engineer A/G frequencies that meet co-site, co-channel and adjacent channel criteria within the boundaries of a defined FPSV to prevent harmful radio frequency interference in the NAS.

(3) Facilities must not be commissioned at any location without coordination with the appropriate Planning and Requirements (P&R) Office and Spectrum Engineering Group.

(4) No facility is authorized to transmit without a valid Facility Transmitting Authorization (FTA).

(5) An FTA authorizes the use of A/G frequencies within a designated FPSV and for specific air traffic control functions. Frequencies must not be changed from function to function, sector to sector, between facilities, or used outside the designated FPSV without coordination with the appropriate Operations Support Group (OSG), Planning and Requirements (P&R) Office and approval from the Spectrum Engineering Group. Exceptions are listed in paragraphs 5(a) and 5(b).

(a) In the event of an operational emergency, ATC personnel may use frequencies as required to mitigate the emergency for a period of time not to exceed 24 hours without approval from Spectrum Engineering Group.

(b) ATC personnel may use frequencies assigned to high altitude sectors combined with low altitude sector(s), provided the boundaries of the underlying low sector lie within the geographic boundaries of the high sector. This does not imply that the coverage at the lower altitude will be the same as the higher altitude. Local Air Traffic personnel determine if such usage is suitable for operations.

(6) The number of frequencies required per facility must be the minimum necessary to perform the assigned ATC functions.

(7) The FMO must assign Very-High Frequency (VHF) and/or Ultra-High Frequency (UHF) at facilities when there is a requirement to provide air traffic services via air-ground radio communications.

(8) Dedicated back-up or spare frequencies must not be permitted at any location.

(9) The FMO may authorize a Traffic Overload Frequency (TOF) in addition to the frequency assigned for a particular service volume where air traffic requirements exist for dividing the service volume during periods of high volume traffic.

(10) Emergency frequencies 121.5 and 243.0 MHz must be used for distress calls only.

b. Coverage. The following ATO organizations together with OSG, and P&R Offices are responsible to ensure proper radio coverage for A/G communication facilities:

- For new facilities, Engineering Services must perform coverage analysis and ensure proper radio coverage.

- For airspace redesign, Spectrum Engineering Group must perform coverage analysis and ensure proper radio coverage.

- For operational facilities that experience radio coverage problems within an ATC's area of jurisdiction, Operations Engineering Support Group (OESG) must perform the required radio coverage analysis and take corrective action to provide the required radio coverage.

These organizations must consider the following requirements:

(1) Each ATC's area of jurisdiction must have at least one Remote Communication Facility (RCF) to provide proper radio coverage. An ATC area of jurisdiction may have additional RCFs if required.

(2) When more than one RCF is required e.g. for large ATC area of jurisdictions, all RCFs transmitting on the same frequency must use a transmitter lockout method such as a select-key configuration.

c. Diversity, Redundancy, and No Single Point of Failure. Engineering Services must design the diversity, redundancy and no single point of failure of A/G communications facilities based on the criticality of its service. The following FAA Orders must be used to determine diversity, redundancy and no single point of failure of A/G communications facilities:

(1) FAA Order 6000.36, Communications Diversity.

(2) FAA Order 6580.6, Remote Communications Facilities Siting Process.

(3) FAA Order 6580.3, Remote Communications Facilities Installation Standard Handbook.

(4) FAA Order 6950.2, Electrical Power Policy Implementation at National Airspace System Facilities.

d. Transmitter Lockout. Transmitter lockout prevents transmitting on multiple transmitters on the same frequency for a single ATC area of jurisdiction. This lockout will prevent simultaneous ground transmissions that cause heterodyne tone interference. Transmitter lockout must be engineered for:

(1) Select-key configuration.

(2) Selection from Remote Center Air-To-Ground (RCAG) to Back-Up Emergency Communications (BUEC).

(3) Selection from Remote Transmitter Receiver (RTR) to Emergency Communications System (ECS).

2. A/G Communications Service Specific Requirements. The following are A/G radio communications facility requirements specific to en route, terminal, and flight services. A/G communications facilities are defined as providing either primary or backup communications. A/G radio communications are defined as critical, essential, or routine services. Critical, essential, and routine services have specific operational availability requirements defined in FAA Order 6000.36, Communications Diversity.

a. En Route Facilities. A/G communications facilities providing services to en route operations requirements:

(1) Remote Center Air-to-Ground (RCAG)

(a) Provides primary critical Air/Ground Communications to Air Route Traffic Control Center (ARTCC) and Combined Center Radar Approach Control (CERAP) facilities for ATC.

(b) Provides coverage for each ATC sector with one or more sites as required.

(c) Operates in either Paired or Selective Channel configurations so that ATC has individual main and standby control of transmitters and receivers.

(2) Back-Up Emergency Communications (BUEC)

(a) Provides back-up in the event of an RCAG equipment failure or if the facility is taken out of service.

(b) Should be located in a manner to provide necessary coverage for the sector or portions of the sector that its respective RCAG channel covers, but preferably not at the same physical site as the RCAG.

(c) Telecommunications pathways and commercial power sources should be separate and diverse from the RCAG that it is backing up as per FAA Order 6000.36, Communications

Diversity; and FAA Order 6950.2, Electrical Power Policy Implementation at National Airspace System Facilities.

(d) May be used when ATC coverage within the ATC's area of jurisdiction is not met by its respective RCAG. After coordination with P&R, OESG and Spectrum Engineering Group, every effort should be made to have the RCAG(s) provide proper coverage.

(3) Remote Communications Outlet (RCO)

(a) Provides Primary and Essential Air/Ground Communications to Air Route Traffic Control Center (ARTCC) facilities for Air Traffic to be able to monitor and respond to emergency calls only on frequencies 121.500 and 243.000 MHz.

(b) May be configured as split, selective, or paired channel VHF and/or UHF control circuits depending on the operational requirement.

(c) Does not require standby or back-up.

b. Terminal Facilities. A/G communications facilities providing services to terminal operations requirements:

(1) Remote Transmitter Receiver (RTR)

(a) Provides Primary Critical Air/Ground Communications to Air Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) facilities for ATC.

(b) Is available at each operational ATCT and TRACON position to provide coverage with one or more sites as required.

(c) Can also provide coverage to broadcast Routine (Non-Critical, Non-Essential) Automated Terminal Information Service (ATIS). In this case, the RTR is used in a transmitter-only radio configuration with no requirement for standby or backup.

(2) Remote Communications Outlet (RCO)

(a) Provides Primary Essential and Routine Air/Ground Communications to Terminal Radar Approach Control (TRACON) facilities for Air Traffic to be able to monitor and respond to emergency calls on frequencies 121.500 and 243.000 MHz.

(b) May be configured as split, selective, or paired channel VHF and/or UHF control circuits depending on the operational requirement.

(c) Does not require standby or back-up.

(3) Emergency Communications System (ECS)

(a) Provides back-up of critical Air/Ground Communications in the event of an RTR equipment failure or if the facility is taken out of service.

(b) Should be established for critical RTR frequencies serving TRACONs and ATCTs when Air Traffic has determined a requirement for it.

(4) Transceiver Communications Equipment (TCE)

(a) Are portable, tunable and battery-powered VHF and/or UHF emergency transceivers.

(b) Must be provided in accordance with the National Approved Facility Emergency Contingency Plan.

(c) Are intended to be used during catastrophic failure of existing communications system equipment.

c. Flight Service Facilities. A/G communications facilities providing services to flight service operations requirements:

(1) Remote Communications Outlet (RCO) & Self Sustaining Outlet (SSO)

(a) Provides Primary Essential and Routine Air/Ground Communications to Automated Flight Service Station (AFSS) and Flight Service Station (FSS) facilities for Air Traffic advisory service.

(b) May be configured as split, selective, or paired channel VHF and/or UHF control circuits depending on the operational requirement.

(c) Does not require standby or back-up.

(2) Transceiver Communications Equipment (TCE)

(a) Are portable, tunable and battery-powered VHF and or UHF emergency transceivers.

(b) Must be provided in accordance with the National Approved Facility Emergency Contingency Plan.

(c) Is intended to be used during catastrophic failure of existing communications system equipment.

3. Other Facilities. Ground Communications Outlet (GCO) and Limited Airport Radio Telephone System (LARTS) are used for supplemental ground-ground communications in the En route, Terminal, and Flight Service environment. GCOs and LARTS are functionally identical; however, a GCO is a non-Fed facility typically owned by an airport sponsor and a LARTS is an FAA-owned facility. Specific usage of a GCOs and LARTS are listed in the definition section of this order.

Chapter 3. Administrative Information

1. Distribution. This order is distributed to all ATO business units and support offices at Washington Headquarters, service centers and service areas, and the William J. Hughes Technical Center and Mike Monroney Aeronautical Center.

2. Definitions. The superscript noted at the end of each definition below correlates to the list of reference FAA orders in Chapter 3, Paragraph 3.

a. Advisory. Additional services and information related to weather, traffic and bird activity provided by ATC.[1]

b. ATC. The primary purpose of ATC worldwide is to ensure safety of flight, prevent collisions, organize and expedite the flow of air traffic, and provide information and other support for pilots. ATC is a critical service provided by ground-based controllers who direct aircraft on the ground and through controlled airspace to provide safe separation and vectoring of aircraft. It can also provide advisory services to aircraft in controlled and non-controlled airspace.

c. ATC area of jurisdiction (Operational Service Area). A distinct airspace with defined vertical and horizontal limits within which an assigned operational air traffic control function is defined, and therefore there is a requirement for radio coverage from one or more A/G communications facilities. When a single frequency is engineered and protected within the boundaries of an ATC area of jurisdiction, the ATC area of jurisdiction and the FPSV are the same.

d. Backup. Provides a service independent of the primary main or standby equipment including telecommunications path, buildings, etc. BUEC, ECS and TCE facilities are backup systems but TCE should be used only during catastrophic emergencies. [2]

e. Backup Emergency Communications (BUEC) Equipment. Main only fixed-tuned VHF and UHF transmitters and receivers. BUEC equipment is intended for use only as backup when the normal remote communications air-ground facility (RCAG) equipment is not available.

f. Critical. Functions or services which, if lost, would PREVENT the NAS from exercising safe separation and control over aircraft. Critical services require Emergency Systems to back-up the Primary System. [2]

g. Emergency Communications System (ECS). Main only for use as back-up to terminal primary equipment, ie, RTR's.

h. Essential. Functions or services which, if lost, would REDUCE the capability of the NAS to exercise safe separation and control over aircraft. Essential services do not require Emergency Systems to back-up the Primary System.[2]

i. Facility Transmitting Authorization (FTA). A document that authorizes FAA transmitters to transmit on a specific frequency, power level, latitude and longitude,

antenna height, and other associated technical parameters and conditions of operation. The document is specific to a facility type, location identifier, service volume and type of service. It is issued by Spectrum Engineering Group and provides evidence that a valid frequency assignment has been approved by the National Telecommunications and Information Administration (NTIA) and is registered in the Government Master File.

j. Frequency Protected Service Volume (FPSV). A distinct airspace with defined vertical and horizontal limits within which an assigned frequency is authorized for use and engineered to be free of known interference sources. These limits are used to determine frequency protection from other frequency assignments.

k. Ground Communications Outlet (GCO). A GCO is a non-Fed facility typically owned by an airport sponsor and used as follows in the various service environments

(a) Flight Service Station - An unattended remotely controlled ground-ground communications facility. Pilots at uncontrolled airports may contact ATC, including FSS via VHF to a telephone connection to obtain an instrument clearance, close a VFR or IFR flight plan, or get updated weather information prior to takeoff. The GCO system is intended to be used only on the ground

(b) En Route and Terminal - The establishment of GCO equipment at airports provides for real time ground-to-ground communications between pilots and ATC services at ARTCC's and TRACON's. Active GCO's can minimize arrival, departure, and search and rescue delays. The GCO system is intended to be used only on the ground.

l. Limited Airport Radio Telephone System (LARTS). A LARTS is an FAA-owned facility and used as follows in the various service environments

(a) Flight Service Station - An unattended remotely controlled ground-ground communications facility. Pilots at uncontrolled airports may contact ATC, including FSS via VHF to a telephone connection to obtain an instrument clearance, close a VFR or IFR flight plan, or get updated weather information prior to takeoff. The LARTS system is intended to be used only on the ground.

(b) En Route and Terminal - The establishment of LARTS equipment at airports provides for real time ground-to-ground communications between pilots and ATC services at ARTCC's and TRACON's. Active LARTS can minimize arrival, departure, and search and rescue delays. The LARTS system is intended to be used only on the ground.

m. Main and Standby Radio Equipment. Two fixed-tuned transmitters and two fixed-tuned receivers installed on a given frequency. Either transmitter or receiver is fully capable of day-to-day use by Air Traffic personnel, and can be used interchangeably as the need arises.[1]

n. Paired Channel. Provision for simultaneous keying of a VHF and UHF transmitter (nonselective keying) and individual main and standby control of transceivers over a single circuit.

o. Primary System. Provides a service that satisfies the day-to-day requirements of the FAA and includes both main and standby equipment with fixed-tuned VHF and UHF radios. Primary systems used for Critical and Essential services require Main and Standby. Advisory services are considered Routine and can be Main Only and do not require Standby.[2]

p. Radio Channel. A set of radio equipment with a transmitter and receiver pair for a given frequency. Included with the radio channel is any cabling, antennas, communications gear and control equipment that allows ATC use.

q. Remote Center Air/Ground Communications (RCAG). The primary facility for en route Air-Ground Communications.

r. Remote Communication Facility (RCF). A communication facility remotely controlled by Air Traffic Control personnel. RCAGs, BUECs, RTRs, ECSs, and RCOs are specific types of RCFs

s. Remote Communications Outlet (RCO). An unmanned communications facility remotely controlled by Flight Service or Air Traffic Control personnel. As a secondary function, an RCO may be used to relay control messages in locations where RCAG coverage is inadequate to the task or as a potential back-up frequency for en route and terminal functions through FSS personnel. An RCO may be VHF or UHF radios and may include both main and standby or main only equipment depending if the service provided is considered essential or routine.

t. Remote Transmitter and Receiver (RTR). The primary facility for terminal Air-Ground Communications.

u. Routine. Functions or services which, if lost, would NOT SIGNIFICANTLY DEGRADE the capability of the NAS to exercise safe separation and control over aircraft. Routine services do not require Standby equipment for the Primary System or an Emergency System back-up. [2]

v. Selective Channel. Provision for individual keying and control of a VHF and/or UHF transmitter over a single circuit.

w. Select key configuration. Two or more primary sites in the same FPSV operating on the same frequency.

x. Self-Sustaining Outlet (SSO). A self-powered radio communications facility. It is functionally identical to an RCO; however, these facilities are established in remote areas usually on mountain tops or located in an isolated area lacking roads or power where there are no telecommunications and power utilities available.

y. Split Channel. Separate and distinct circuit to individually key and control a VHF and UHF transmitter and receiver.

z. Split Site. Radio configuration where the transmitters are located in a geographically or physically different location than the receivers for a particular frequency.

aa. Transceiver Communications Equipment (TCE). Battery powered transceivers located at FSS, ATCT and TRACON facilities for the purpose of being used during catastrophic failure of the communications system. Transceivers are completely independent from the facility communications system, but because of their design, may have limited capability in terms of power output, number of channels, interference rejection, and coverage. They are intended to provide limited communications for occurrences such as loss of AC power, cut cables, or failure of radio equipment.

bb. Traffic Overload Frequency (TOF). An additional frequency assigned so that a service volume can be divided during periods of high volume traffic.

3. Related Publications. The following publications are the primary references used for the definitions listed above. The superscript noted at the end of each definition in Chapter 3 Paragraph 2 correlates to the FAA order below where the definition was referenced.

a. FAA Order 7110.65, *Air Traffic Control*[1]

b. FAA Order 6000.36, *Communications Diversity*[2]