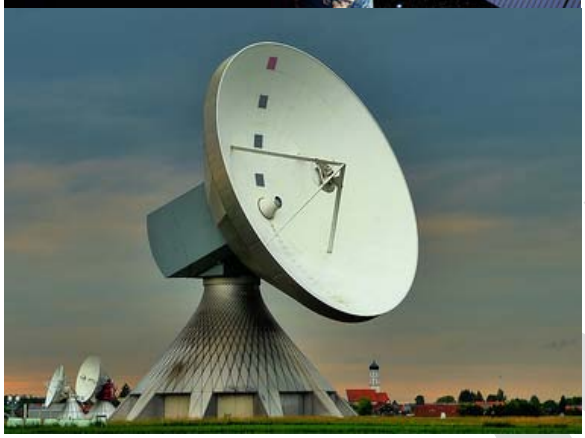

Working Draft

Satellite Voice Guidance Material (SVGM)

Version 0.2

Working Draft – 27 Jan 2011

International Civil Aviation Organization

Inter-Regional SATCOM VoiceTask Force (IRSVTF)

Revision History

Date	Description of changes	Version
13-Jul-10	Initial working draft	
26-Jan-11	Added Joint working relationship with ICAO SATCOM Voice TF, added version control.	0.1
27-Jan-11	Added material from IRSVTF/1 meeting. First TF baseline. no track changes.	0.2

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FOREWORD.

Editor's note 1. — To be developed.

Editor's note 2. — While editor's notes appear throughout, the entire document is a working draft and should be treated as such. Comments and contributory material can be submitted to "Elkhan NAHMADOV" enahmadov@paris.icao.int and "Tom KRAFT" tom.kraft@faa.gov.

Chapter 1. Definitions

Editor's note 3. — To be developed.

Chapter 2. Overview of satellite voice communications

2.1 General

2.1.1 Oceanic and remote airspace flight communications have historically been conducted with high frequency (HF) radios due to the advantage of being able to transmit and receive air/ground communications for thousands of miles. The HF communication centers are designated by air traffic service providers (ATSP) for air traffic control (ATC) services. By comparison, controllers use very high frequency (VHF) radios for line-of-sight coverage of approximately 200 miles and the radio transmission does not follow the curvature of the earth. Following the advent of satellites operating in the appropriate spectrum for use with ATC communications, new technologies were endorsed by ICAO in 1991 and have since updated communications, navigation, and surveillance (CNS) for air traffic management (ATM).

2.1.2 In 1995, the initial future air navigation system (FANS 1/A) provided an integrated CNS package. In addition to required navigation performance (RNP) and global navigation satellite system (GNSS) capabilities, FANS 1/A includes controller pilot data link communications (CPDLC) and automatic dependent surveillance – contract (ADS C) capabilities using satellite communications (SATCOM), VHF, and HF data links. At the same time, aircraft became equipped with SATCOM voice capability.

2.1.3 In 1996, the FAA recognized technological advances in communications by a rule change to Title 14 Code of Federal Regulations (CFR) sections 1.1 and 121.351 that included use of a new term - long range communication system (LRCS). 14 CFR section 1.1 defines LRCS as “A system that uses satellite relay, data link, high frequency, or other approved communication system which extends beyond line-of-sight.” Examples of systems that meet this definition are HF voice, HF data link (HFDL), SATCOM voice and SATCOM data link.

2.1.4 The regulations, therefore, now address long range communication requirements in terms of LRCS. With that as a basis, an aircraft on extended over water segments unable to utilize line-of-sight systems must have at least two operational LRCSs to honor regulatory communication requirements (unless specifically excepted under 14 CFR section 121.351(c)). In addition, HF voice is the only LRCS currently acceptable for air traffic control communications in all areas. Therefore, in areas requiring two operational LRCSs, at least one must be HF-voice and in areas requiring one LRCS, that system must be HF voice.

2.1.5 SATCOM voice and data have proven to be effective and reliable long range communication systems since their introduction into service. Flight crews are now using SATCOM voice instead of HF voice for non-routine communications or when HF voice was not operational due to atmospheric conditions. Some regulatory authorities have granted some operators dispatch relief for a limited time whereby the aircraft may be dispatched for a limited period (5 days) with only a single operational HF radio system and an operational SATCOM voice system. In the interest of lowering operational costs, streamlining operational efficiency and providing better communication tools, aircraft operators are turning to SATCOM voice and data link capability to meet long range communication system (LRCS) requirements. These capabilities include Inmarsat SATCOM voice using geosynchronous orbit satellites and Iridium SATCOM voice, which uses satellites in a low-earth orbit.

Chapter 3. Administrative provisions related to satellite voice operations

3.1 ATSP and aero radio service provision

3.1.1 When providing SATCOM voice services, ANSPs and aero radio facilities should provide these services consistent with voice communication procedures, regardless of the technology used.

3.1.2 System validation

3.1.2.1 Provide updated aircraft Satcom telephone lists to ANSP.

3.1.2.2 Provide a reliability and availability factor of at least 99.9%.

3.1.2.3 Provide security provisions IAW SVTF findings (ie - CLI/PIN).

3.1.2.4 Provide service outage/return to service reports.

3.1.2.5 Provide ATSP priority level.

3.1.3 Aeronautical information, notifications, and interfacility agreements

3.1.3.1 The ATSP should notify operators of SATCOM voice services using the AIP or NOTAM. Notification includes:

a) Procedures for publishing contact information, that is associated with current airspace boundaries, e.g. specific SATCOM voice numbers for applicable facilities; and

b) Requirements for use, e.g., criteria for when to contact the ATC facility or aero radio; and

c) Flight plan form and submission requirements.

3.1.4 ??Approval?? considerations for CSP

Editor's note 4. — Need definition for CSP (Chapter 1). CSP is considered to include both satellite and network service providers.

Editor's note 5. — The following areas need to be addressed.

1. *Approval by whom?*
2. *It's envisioned that each state would not need to approve every CSP.*
3. *Current EASA rules imply that a state of residence of the CSP (in this case a*

satellite) is to be responsible for it's approval and certification, as well as on going oversight and audits. (check IMO approval processes for CSP). This is just an example.

4. Are the current Annex 10 provisions adequate? Additional questions relating to Annex 10 and other guidance material.

a) Do they ensure inoperability?

b) Will the interface to the end users be the same regardless of which CSP is used?

c) Compatible and interoperability security requirements and automation.

d) Questions were raised about the OPLINKP and SARPS amendment timeframes and processes to allow progressing upgrade of SATCOM voice.

3.1.4.1 The CSP should meet the performance criteria for communication services, in accordance with Annex 10 and other ICAO guidance material for SATCOM to include GOLD. The CSP should be approved as meeting these standards.

3.1.4.2 The CSP should meet the performance criteria for communication services, in accordance with Appendix A.

3.1.4.3 For those situations when a CSP cannot continue to provide SATCOM voice communications, it should inform ATSPs and operators in accordance with established coordination procedures.

3.1.5 Radio facility considerations

3.1.5.1 Many radio facilities provide the capability to initiate and receive SATCOM voice calls. However providing SATCOM voice radio services at a full operational level means more than simply accepting and placing a SATCOM voice call. The necessary infrastructure will need to be developed and implemented to provide the capability to handle the expected SATCOM voice traffic demand.

3.1.5.2 When supporting satellite voice communications, radio facilities should establish procedures that:

a) Enable operators to register SATCOM voice capabilities and means to contact the aircraft. (only applies to MEL relief)

b) Ensure ANSPs and radio operators receive the relevant information needed to establish two-way communications with the aircraft.

c) Maintain, on a 28-day update cycle, INMARSAT's and Iridium's master aircraft phone number list as new SATCOM radio facilities become operational. (we might need to have the operators also file the aircraft phone number in the flight plan in case they change equipment during the 28 day cycle).

d) Ensure users are notified when service conditions change, i.e., service outages, degraded performance, restoration of service.

3.1.5.3 When supporting satellite voice communications, radio facilities should provide automation support that allow the radio operator to provide SATCOM voice services for the intended operations in accordance with performance specifications provided in Appendix A. The automation support should include capabilities that allow the radio operator to:

a) Place and receive SATCOM telephone calls to either the INMARSAT or Iridium access points.

b) Obtain the correct authorization Personal Identification Number (PIN) for both INMARSAT and Iridium networks to place authorized ATC calls.

c) Answer and route incoming SATCOM voice calls to the appropriate SATCOM/radio operator.

d) Auto-dial capability to enable rapid call setup times.

e) Accept a new call from a flight crew as a participant of an existing SATCOM voice communication already in progress, e.g., the new caller should be able to hear the transmission already in progress and standby for an opportunity to intervene. (This is an example of "Conference", …)

f) To exchange air traffic control information with ATC.

3.1.6 Satellite voice service

3.1.6.1 The following criteria apply to the voice satellite service:

a) The ground earth station should be capable of preventing unauthorized calls to aircraft;

b) The satellite service should enable ATS access to the aircraft voice channel when required regardless if the flight crew are engaged in another call of a lower priority . If passenger services are also provided on the same system used by the flight crew, passenger calls should be preempted if calls of a higher priority are placed to the flight deck.

c) The SATCOM voice system should provide Caller ID information for display to the receiving party.

Note.— This guidance material supports both Iridium and INMARSAT communications. INMARSAT systems typically support several levels of SATCOM voice communications. Iridium systems are typically single channel or duel channel voice systems dedicated for flight deck communications. Iridium based systems will require additional infrastructure in the Ground Earth Station to implement the necessary priority services needed for ATC communications.

3.1.7 Monitoring system operations

3.1.7.1 The ATSP and its CSP(s) should retain records for at least 30 days to allow for accident/incident investigation purposes. The ATSP and CSPs should make these records available for air safety investigative purposes on demand. These recordings should allow replaying of the situation and identifying the SATCOM voice communications between the radio operator/controller and the flight crew.

3.2 Operator eligibility

3.2.1 Operational authorization to use satellite voice communications

3.2.1.1 If changes to the Minimum Equipment List (MEL) are desired to allow dispatch with one satellite voice communication system and only one HF radio system, the operator should obtain operational authorization from the State of the Operator or State of Registry.

Editor's note 6. — What about CPDLC for MEL considerations?

3.2.1.2 Aircraft operators should meet the following criteria:

a) Distribute advisory information within the flight operations department to ensure that all personnel concerned are aware of SATCOM concepts and procedures associated with the use of SATCOM for routine ATC communications (i.e. phreasiology).

b) Assess operational requirements, establish policy and procedures, and incorporate them in appropriate documents, including:

1) Procedures to ensure that each participating aircraft is registered with their communication service provider;

2) Flight crew responsibilities for establishing and maintaining HF/VHF voice communications (SELCAL) with the appropriate OCA/FIR's;

3) Procedures on use of SATCOM voice in accordance with ATC communication procedures and guidance material provided in Chapter 5, including its use in relationship to other means of communication on the specific aircraft, e.g., CPDLC/ADS-C, FMS WPR, Oceanic clearance;

4) Contact information for the Aero Radio/ATS unit;

Editor's note 7. — For contact information, change to read ANSP. Just an idea.

5) Procedures when SATCOM voice fails;

6) Procedures for reporting problems associated with SATCOM voice to appropriate monitoring agencies.

3.2.2 Aircraft equipage

Editor's note 8. — Need to address FAA-specific references.

3.2.2.1 The installations should be approved by the State of Registry or State of the Operator in accordance with FAA AC 20-150 (or equivalent), and verified to comply with the following:

a) RTCA DO-210D, Minimum Operational Performance Standards for Geosynchronous Orbit Aeronautical Mobile Satellite Services (AMSS) and

b) ARINC 741, Aviation Satellite Communication System.

c) Add ARNIC 761(Iriduim & Inmarsat-2G)

d) ARINC 781 (Inmarsat-3G)

Note.— The above criteria apply only to the SATCOM voice installation when used for ATC communications. The communication equipment requirements as prescribed for the airspace operated in or by the State of Registry or State of the Operator are beyond the scope of this document.

3.2.3 Maintenance and in-service difficulties

3.2.3.1 The operator should establish procedures to report any problems its flight crews and dispatchers have with SATCOM voice operations in accordance with normal reporting practices.

3.2.3.2 The operator should establish procedures to ensure its flight crews and dispatchers are notified of significant degradation of SATCOM service, e.g., outage.

Editor's note 9. — Maybe include some guidance on managing SIM cards during maintenance and other relevant information

3.3 Flight planning

3.3.1 The operator should ensure that the proper information is included in the ICAO flight plan. Until Amendment 1 to the PANS/ATM becomes valid in November 2012 the following procedures should be followed.

a) Insert in item 10, Equipment, the letter "Z" to denote "other equipment".

b) Insert in item 18, Other information, the text "COM/" followed by the word SATVOICE, followed by further identification of the type of equipment such as INMARSAT or IRIDIUM.

Example:

(FPL-ACA101-IS
-B773/H-SHXWZ/SD
-EGLL1400
-N0450F310 L9 UL9 STU285036/M082F310 UL9 LIMRI
52N020W 52N030W 50N040W 49N050W
-CYQX0455 CYYR
-EET/EISNN0026 EGGX0111 020W0136 CYQX0228 040W0330
050W0415 REG/CFIUV SEL/FQHS COM/SATVOICE INMARSAT
CODE/C0173E)

3.3.2 After Amendment 1 becomes valid, the appropriate indication(s) should be inserted in item 10, namely "M1" for an INMARSAT RTF capability, "M2" for an MTSAT RTF capability and/or "M3" for an Iridium RTF capability.

Example:

(FPL-ACA101-IS
-B773/H-SHXWM1M3/S
-EGLL1400
-N0450F310 L9 UL9 STU285036/M082F310 UL9 LIMRI
52N020W 52N030W 50N040W 49N050W
-CYQX0455 CYYR
-EET/EISNN0026 EGGX0111 020W0136 CYQX0228 040W0330
050W0415 REG/CFIUV SEL/FQHS CODE/C0173E)

3.3.3 When the necessary information for establishing contact with the aircraft can be derived from the ICAO 24-bit address, that information should be included in item 18 using the "CODE/" indicator as shown in the above examples.

Chapter 4. Controller and radio operator procedures

Editor's note 10. — Text taken from Kevin Stevens and Radio Operator – Aero radio procedures2 documents. Needs work, some inconsistencies and overlap.

4.1 General

4.1.1 The underlying SatVoice technology lends itself to a conversational mode of communications,;therefore, such use can create misunderstanding and confusion. When using SATCOM voice, normal RTF conventions must be followed in accordance with standard ICAO phraseology, as defined in Annex 10, Volume II, Chapter 5 and Doc. 8400.

4.1.2 On establishing SATCOM contact, care should be taken to ensure positive identification of the aircraft.

4.1.3 If unable to contact the aircraft via SATCOM voice then reversion to any alternative means of communication medium should be followed, including HF, VHF, and Datalink.

4.1.4 Even if there is an automated identification capability, the radio operator or controller must address the aircraft by its identification code Reg # and/or Flight ID for flight safety reasons. Additionally, manufacturers must take into account the human factors elements for ease of use when designing systems.

4.2 Controller procedures

(reserved)

4.3 Radio operator procedures

4.3.1 Incoming calls – flight crew initiated

Editor's note 11. — Insert flow charts

4.3.1.1 For SATCOM voice calls made to a radio station, the radio operator should:

a) ensure the flight identifies itself;

b) respond to an aircraft that identifies itself as "SATCOM" by restating "SATCOM" in conjunction with the aircraft call-sign;

c) receive and read-back the message, if required; and

d) on initial contact allocate the primary and secondary HF frequencies and perform a SELCAL check.

Example:

	<line rings at aero radio>
Flight crew	Arctic Radio, Speedbird 255 SATCOM
Radio operator	Speedbird 255 SATCOM, Arctic Radio, go ahead
Flight crew	Arctic Radio, Speedbird 255, <message> request SELCAL check ABCD
Radio operator	Speedbird 255, Arctic Radio <read back message>, primary 8825 secondary 5598, SELCAL ABCD
	<Arctic Radio initiates SELCAL check>
Flight crew	Arctic Radio, Speedbird 255, Roger, SELCAL OK
Radio operator	Arctic Radio out

4.3.1.2 If the initial call to a radio station is made on SATCOM, the radio operator should:

a) respond to an aircraft that identifies itself as "SATCOM" by restating "SATCOM" in conjunction with the aircraft call-sign;

b) receive and read-back the message, if required; and

c) allocate the primary and secondary HF frequencies and perform a SELCAL check on HF.

Example:

	<line rings at aero radio>
Flight crew	Shanwick, BAW255 SATCOM
Radio operator	BAW255 SATCOM, Shanwick Radio GO AHEAD
Flight crew	Shanwick, BAW255, message>
Radio operator	BAW255, Shanwick Radio <read back message>, primary 8825 secondary 5598, SELCAL ABCD for check
Flight crew	Shanwick, BAW255, READBACK CORRECT, SELCAL OK, OUT

4.3.1.3 If the aircraft is participating in the data link operations (ADS-C, CPDLC or FMC WPR), the radio operator should include the next OCA/FIR frequency information.

4.3.1.4 If the initial call to a radio station has been made on HF, the subsequent call made on SATCOM, the radio operator should:

a) respond to an aircraft that identifies itself as "SATCOM" by restating "SATCOM" in conjunction with the aircraft call-sign; and

b) receive and read-back the message, if required.

Example:

	<line rings in flight deck>
Flight crew	Shanwick, BAW255 SATCOM
Radio operator	BAW255 SATCOM, Shanwick Radio, GO AHEAD
Flight crew	Shanwick, BAW255, <message>
Radio operator	BAW255, Shanwick Radio, <read back message>
Flight crew	Shanwick, BAW255, READBACK CORRECT, OUT

Editor's note 12. — (input from Guidance Material for SATCOM Voice Trial in NAT Airspace, May 2007) follows:

Editor's note 13. — TK – This text may be duplicate of text in Chapter 5 for flight crew procedures.

4.4 Flight Crew Procedures

4.4.1 Calls should normally be made to the radio station facility serving the airspace in which the aircraft is flying. If oceanic airspace has not been entered, the radio station serving the first oceanic centre should be contacted.

4.4.1.1 Initiating calls

When contacting ATC, crews should utilize the safety priority, see type specific guidance in Appendix A (Airbus) and B (Boeing).

4.4.1.2 Accepting calls

Visually confirm the priority of the incoming call and verify that it is an ATC (safety priority) call, see type specific guidance in Appendix A (Airbus) and B (Boeing). Reply to calls with the flight identification.

Calls with other priorities delivering ATC instructions should be disregarded and crews should contact the ATC unit to confirm the validity of the message received.

4.4.1.3 Initial Contact

On initial contact with a radio station flight crews should provide flight identification; append the words "SATCOM voice"; request SELCAL check and frequency assignment. After a successful SELCAL check all subsequent communications with that radio station should be made via SATCOM Voice.

4.4.1.4 SATCOM connection problems

When difficulties arise in establishing a SATCOM Voice connection, reversion to any alternative means of communication medium should be followed, including HF, VHF, and Datalink.

In the event of a known Satcom failure and reestablishment of communications by alternate means, the flight crew should notify the radio station of the Satcom failure.

4.4.2 Outgoing calls – radio operator initiated

Editor's note 14. — Insert flow chart.

4.4.2.1 The method of establishing ground initiated calls will be dependent on the technical/operational implementation at each one of the radio stations. However, some steps should be common to each station regardless of the technical/operational methodology employed. These are:

a) Identify the Inmarsat 8 digits short code of the aircraft;

b) Initiate the dialing sequence;

c) Wait for the flight crew to answer the call;

d) Initiate the conversation; and

e) Terminate the call after the dialog is finished.

4.4.2.2 When initiating a SATCOM voice call, the radio operator should:

a) initiate the dialing sequence;

b) confirm the aircraft call sign prior to delivering the clearance or message;

c) complete the dialogue; and

d) terminate the call after the dialogue is finished.

Example:

	<line rings in flight deck>
Radio operator	Air France 465 SATCOM, Arctic Radio
Flight crew	Arctic Radio, Air France 465 go ahead
Radio operator	Arctic Radio, <message>
Radio operator	Air France 465, <read back message>
Radio operator	Arctic Radio, readback correct, out

Example:

	<line rings in flight deck>
Radio operator	BAW255, Shanwick Radio SATCOM
Flight crew	Shanwick, BAW255, GO AHEAD

Radio operator	BAW255, Shanwick Radio, <message>
Flight crew	Shanwick, BAW255, <read back message>
Radio operator	BAW255, Shanwick Radio, READBACK CORRECT, OUT

4.4.2.3 In cases where an ATC message is urgent or delivery time is critical, SATCOM should not be used, unless no other communications media are available or it is specifically authorized by the ATC unit.

4.4.2.4 In cases where an ATC message contains a clearance or instruction which will change the flight profile, a call-back from the aircraft will be required before delivering the message.

Example:

	<line rings in flight deck>
Radio operator	BAW255, Shanwick Radio, PLEASE CALL ME BACK ON SATCOM FOR ATC MESSAGE
Flight crew	Shanwick, BAW255, WILCO
	<the aircraft then calls aero radio on SATCOM and the message is delivered and read-back as normal>

4.4.3 Loss of SATCOM Voice Connection

4.4.3.1 If the SATCOM voice connection is lost during a communication, the radio operator should:

a) attempt to contact the aircraft on HF (SELCAL);

b) deliver the clearance or receive the message as appropriate;

c) once the transaction is complete initiate a SATCOM Voice call; and

d) if connection fails advise the aircraft to revert to HF voice procedures.

Chapter 5. Flight crew procedures

5.1 General

5.1.1 Operators with data link equipped aircraft (CPDLC, ADS-C, and FMC WPR) operating in airspace where data link services are provided should use data link as their normal means of communications. The flight crew may use SATCOM voice at their discretion, for ATC communications, including position reports, negotiations and requests, when deemed appropriate.

5.1.2 Although the underlying technology lends itself to a conversational mode of communications, such use can create misunderstanding and confusion. Therefore, when using SATCOM voice, normal RTF conventions must be followed identical to HF communications in accordance with standard ICAO phraseology, as defined in Annex 10, Volume II, Chapter 5 and Doc 4444 chapter 12 and Doc. 8400.

5.1.3 The flight crew should use either SATCOM voice or HF voice to contact the radio operator as he/she fells appropriate.

5.1.4 The flight crew should normally make calls to the radio station facility serving the airspace in which the aircraft is flying. If oceanic airspace has not been entered, the radio station serving the first oceanic centre should be contacted. The radio station facilities are interconnected. Therefore, if communications are lost with the current aero radio station attempt contact with any other aero radio station to relay.

5.1.5 If a HF SELCAL check is required before or after entering a FIR, the flight crew should contact the radio operator and complete a HF SELCAL check. A check of the SATCOM voice system similar to a HF SELCAL is not required because the system will alert the crew if the system is not working properly.

5.2 Flight crew initiated

5.2.1 SATCOM short codes are published in State AIPs and some charts. Short codes may be stored in SATCOM avionics for easy access by the flight crew.

5.2.2 When contacting ATC crews should utilize the appropriate safety priority.

Example:

	<line rings at aero radio>
Flight crew	Arctic Radio, Continental 99, position report
Radio operator	Continental 99 Arctic Radio, go ahead
Flight crew	Arctic Radio, Continental 99, <message>
Radio operator	Continental 99, Arctic Radio, <read back message>
Flight crew	Arctic Radio, Continental 99 out

5.2.3 When an onboard systems failure prevents the use of SATCOM or HF voice the flight crew should inform the appropriate ANSP .

5.3 Ground Initiated

5.3.1 The flight crew should visually confirm the priority of the incoming call and verify that it is an ATC priority call. Reply to calls utilizing standard phraseology (see section 5.1.2)

5.3.2 The flight crew should not act on ATC instructions from SATCOM calls with other than ATC priority calls.

5.4 Oceanic clearances

5.4.1 Coordination of oceanic clearances should be in accordance with state AIPs.

5.5 Contingencies

5.5.1 SATCOM busy signal or no answer

5.5.1.1 Normally, when initiating a SATCOM voice call to a radio facility that supports SATCOM voice services, the flight crew should receive an answer. When a SATCOM voice call returns a busy signal or there is no answer, the flight crew should use alternative means of communications.

5.5.2 SATCOM Failure

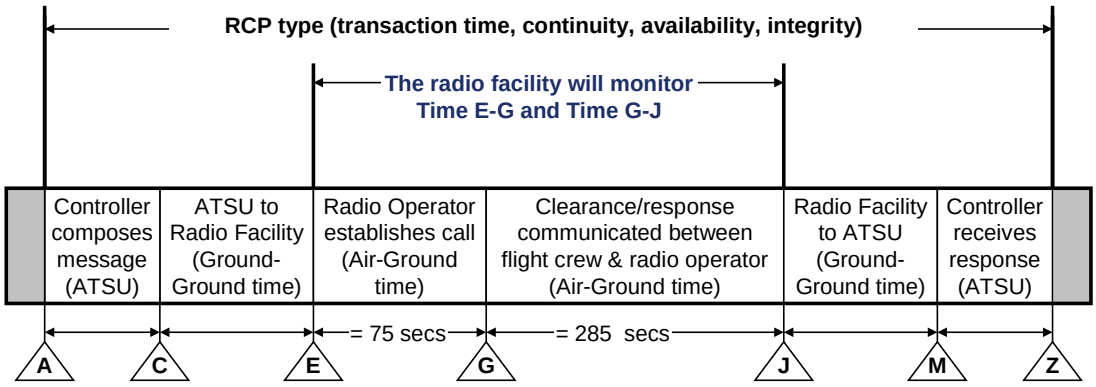
5.5.2.1 If the aircraft SATCOM voice equipment has malfunctioned or for any other reason the SATCOM voice system is unavailable the flight crew should revert to an alternate means of communication.

Appendix A – RCP 400 specification – allocations for radio operator satellite voice

This appendix provides a supplement to the RCP 400 specification provided in the First Edition of the Global Operational Data Link Document (GOLD). The supplement includes the RCP allocations for radio operator satellite voice communications, consistent with RCP 400 "top sheet."

A.1 Terms and definitions

Refer to GOLD, Appendix B, paragraph B.1 for general terms and definitions applicable to RCP specifications. This section provides additional terms and definitions to describe the RCP allocations for radio operator satellite voice communications.



E-G = Time it takes for queuing and the radio operator to establish voice communications
G-J = Time it takes for flight crew and radio operator to communicate the clearance/response

C-E + J-M = 10 sec – assumed time it takes to transit the ground-ground communication link between the radio facility and the ATSU

A-C + M-Z = 30 sec – assumed time for controller/HMI to compose clearance and acknowledge response from flight crew

Total Voice Time (TVT) for RCP 400/V allocation (TVT = A-C + C-E + E-G + G-J + J-M + M-Z)

Figure A- 1. Typical voice communication transaction – controller initiated radio operator satellite voice communication allocation

A.2 RCP 240 specification

Refer to GOLD, Appendix B, paragraph B.2 for RCP 240 specification.

A.3 RCP 400 specification

<table>
<tr><td colspan="4">RCP Specification</td></tr>
<tr><td colspan="2">RCP type</td><td colspan="2">RCP 400</td></tr>
<tr><td colspan="4">Airspace specific considerations</td></tr>
<tr><td>Interoperability</td><td colspan="3">Specify interoperability criteria, e.g. FANS 1/A</td></tr>
<tr><td>ATS Function</td><td colspan="3">Specify ATS function(s), e.g. applicable separation standard</td></tr>
<tr><td>Application</td><td colspan="3">Specify controller-pilot ATC communication intervention capability, e.g. CPDLC application per ICAO Doc 4444, and RTCA DO-306/EUROCAE ED-122, Annex A</td></tr>
<tr><td colspan="4">RCP parameter values</td></tr>
<tr><td>Transaction time (sec)</td><td>Continuity (C)</td><td>Availability (A)</td><td>Integrity (I)</td></tr>
<tr><td>ET = 400</td><td>C(ET) = 0.999</td><td rowspan="2">0.999</td><td rowspan="2">Malfunction = 10^{-5} per flight hour</td></tr>
<tr><td>TT 95% = 350</td><td>C(TT 95%) = 0.95</td></tr>
<tr><td colspan="4">RCP monitoring and alerting criteria</td></tr>
<tr><td>Ref:</td><td colspan="3"><u>Criteria</u></td></tr>
<tr><td>MA-1</td><td colspan="3">The system shall be capable of detecting failures and configuration changes that would cause the communication service to no longer meet the RCP type for the intended function.</td></tr>
<tr><td>MA-2</td><td colspan="3">When the communication service can no longer meet the RCP type for the intended function, the flight crew and/or the controller shall take appropriate action.</td></tr>
<tr><td colspan="4">Notes</td></tr>
<tr><td colspan="4"><u>Note 1</u>.— Rationale for the criteria provided in this specification can be found in ICAO Annex 11, ICAO Doc 4444, ICAO Doc 9689, and RTCA DO-306/ED-122.
<u>Note 2</u>.— The values for transaction times are to be applied to transactions that are representative of communication capability for the controller to intervene with a specific operator, aircraft type, and aircraft identification.
<u>Note 3</u>.— If changes are made to the system capacity limits, as specified by the airspace requirements, and the changes cause the system to perform below the RCP type, this would be considered a change in system configuration.</td></tr>
</table>

A.3.1 RCP 400/D allocations

Refer to GOLD, Appendix B, paragraph B.3.1 for RCP 240/D allocations applicable to CPDLC.

A.3.2 RCP 400/3V allocations

The RCP 400/3V allocations are applicable to radio operator satellite voice communications.

A.3.2.1 Air traffic service provider (ATSP)

A.3.2.2 Communication service provider (CSP)

A.3.2.3 Aircraft system

A.3.2.4 Aircraft operator