

What's SATVOICE I can hear?

OPSGROUP Team
13 September, 2021



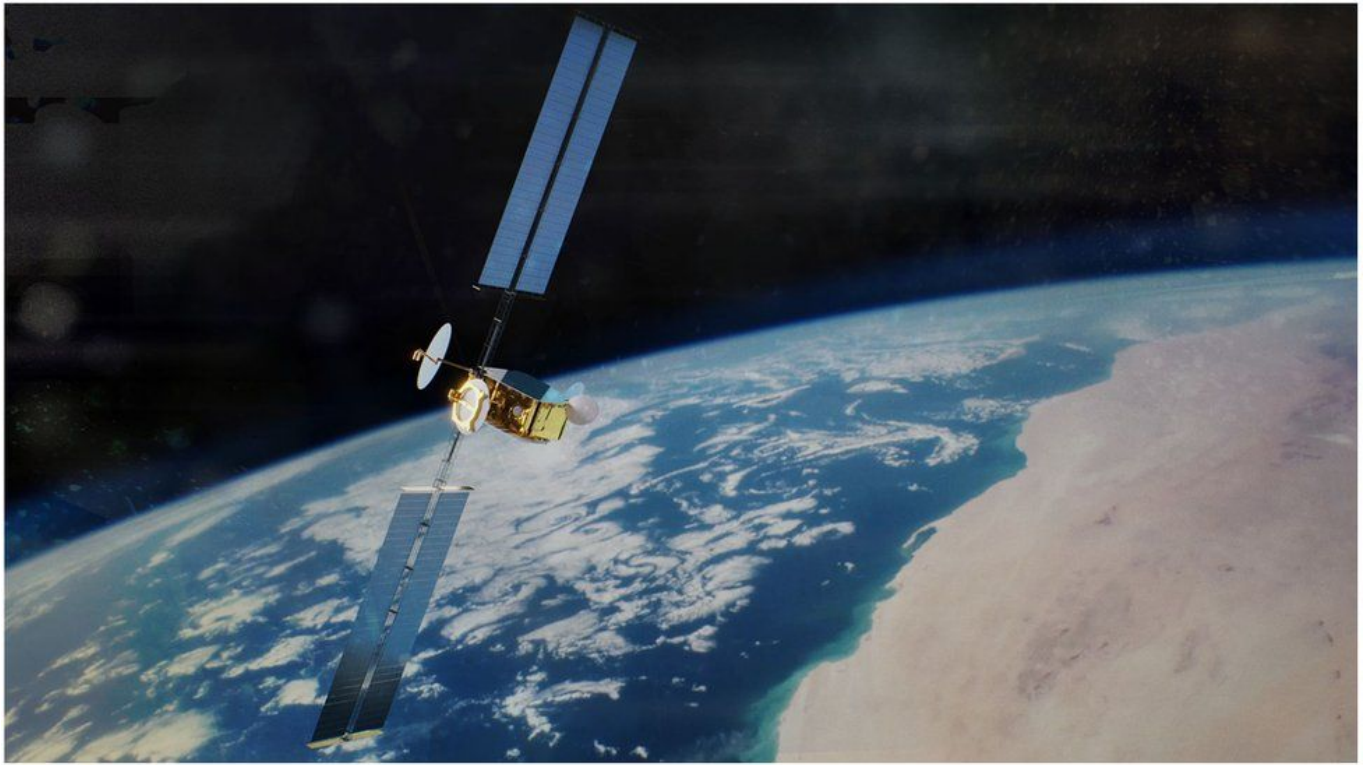
SATVOICE. Easy peasy. Well, until until you're routing from San Francisco to Tokyo for the first time in your shiny new G550 and its 2am, you're passing W177°, you think you filed M3 but aren't sure if you're actually M2, and there is a full moon and now you're not so sure anymore...

Here is a look at **some common questions about SATVOICE** which we have seen come up.

Feel free to send us more. We aren't experts but know one folk who are.

What is SATVOICE?

Satellite voice communications. Sometimes it is lumped in with SATCOM but this can include messaging systems as well (your Datalink type things). The 'VOICE' bit is the giveaway – we are specifically talking about *talking*.



An INMARSAT satellite

What is it used for?

Communicating.

More specifically, **communicating over big areas** where there are not many ground stations (which you need for VHF comms). SATVOICE systems *can be (and note the asterix there) used as a **Long Range Communications System (LRCS)**.

So, SATVOICE is talking, via satellites, and it can be used to do things like **give voice position reports**. It is also sometime used as a backup when HF is not functioning. **What it is not (currently) is a replacement for HF**. Just as CPDLC isn't allowed as a replacement because it is not suitable for emergency of non-routine comms.

Where can I use it?

Anywhere where there is satellite coverage. And anywhere where ATC are using it as a means of LRCS. They may not be capable.

For example, the FAA provide Inmarsat and Iridium SATVOICE services for air-to-ground (and vice versa) calls directly with Oakland, NY and Anchorage ARTCCs, and New York and San Fran radio. These are, again, supplemental to HF which means **they don't expect you to use it unless there is some issue with HF**. Times of bad HF propagation like HF blackouts would be a good time to give SATVOICE a go.

Right now, **SATVOICE is not the primary means of communication** in many spots. VHF and HF remain the main ones, with Datalink comms (CPDLC). So it is unlikely you will be using it all that much, unless something else is not working. When you are in CPDLC/ADS-C airspace, the controller is normally going to communicate via Datalink. They might elect to use SATVOICE, but **it is not a replacement for ADS-C/CPDLC or HF/VHF**.

So you also need to check out the airspace you're flying into. The AICs will generally contain info on

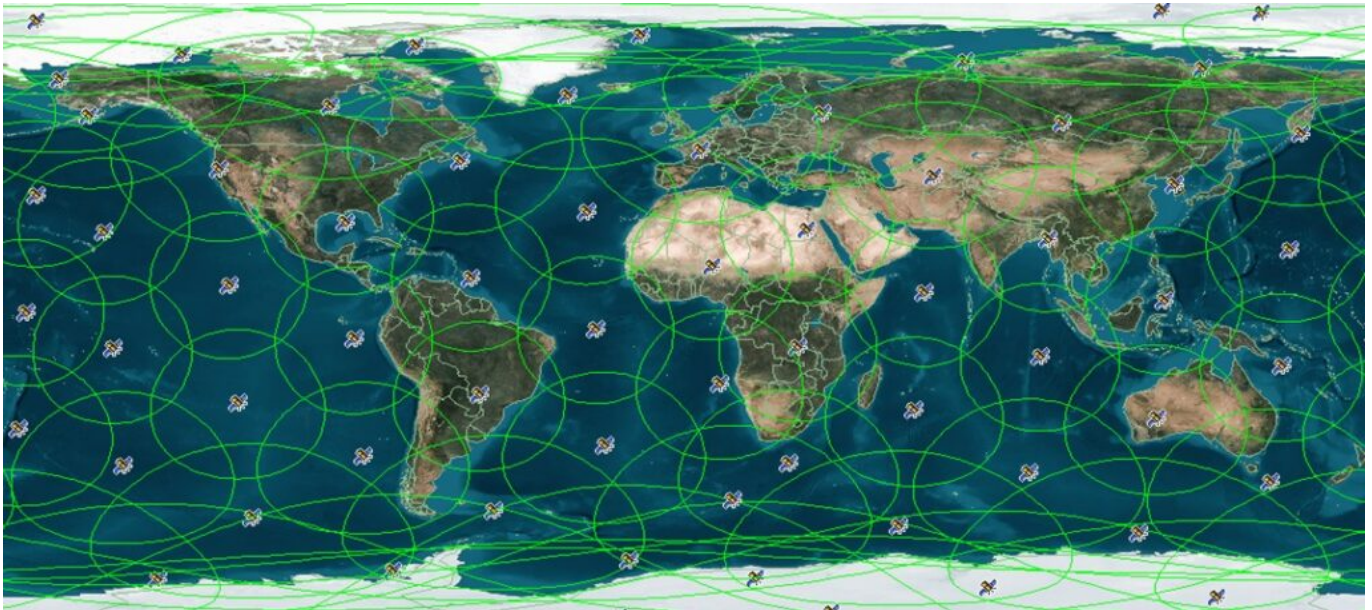
whether an airspace/ ATS has SATVOICE capability.

ICAO says - *“Some ANSPs may allow the flight crew to use SATVOICE only for certain types of communications (e.g. of an urgent nature) or may place limitations on use of SATVOICE directly to the controller. Other ANSPs may allow its use only as an additional capability to existing radio equipment carriage requirements.” (Section 3.4, SVGM).*

So, where CAN'T I use it?

Inmarsat satellites are geostationary and orbit around the equator which means **above a latitude of 82° North (and South)** you are in a satellite-less areas because of the (often debated, definitely real) curvature of the earth means a lack of line of sight which is required for your communications to be able to bounce back and forth from the satellites.

Some manuals suggest you **might start to run into a bit of trouble from 70°N**, and that trouble is **most pronounced on the W120 longitude**. It is also dependant on atmospheric conditions, where your antenna is and what services are contracted though.



An image of the satellite positions and coverage of the Iridium Network

Iridium satellites do not suffer the same SATCOM shadow because they operate in a low earth (as opposed to geostationary) orbit.

So, in the **NAT HLA** where HF is mandatory, and where Datalink is also mandatory (except for the bits where it isn't), **you are going to need HF and Datalink**. Not one or the other. If an airspace requires two LRCS then one can be SATVOICE, but the other must be HF.

If the airspace requires 1 LRCS then that means HF.

So, you cannot use your SATVOICE system as a “get out of cancelling a flight” free card if your HF is broken and you are routing through somewhere which requires LRC systems onboard.

Which brings us to the asterix...

The Asterix

***SATVOICE can be approved as a Long Range Communications System (LRCS)** but whether it qualifies is something you will need to check, and that is most easily found in your MEL. It comes down to the **Required Communications Performance (RCP)** of your system.

In other words, just because you have a SATVOICE system onboard and are in a spot where ATS utilises SATVOICE, does not mean you are automatically allowed to do so. Not even if you put it on your flight plan.

RCP240 is the number to know – to be PBCS (performance based communication and surveillance) eligible your aircraft system must achieve **RCP240 (and RSP180) standards**. RCP240 is the max number of seconds (the transaction time) taken for a controller to issue an instruction and receive a response.

Your RSP180 is the surveillance standard, the RCP240 is the comms standard. We wrote all about PBCS here if you need a recap.

Oceanic RCP specifications (applies to CPDLC)

RCP Specification	Transaction Time (sec)	Continuity	Availability	Integrity
400	$\frac{400}{350}$	$\frac{0.999}{0.95}$	0.999	Malfunction = 10^{-5} per flight hour
240	$\frac{240}{210}$	$\frac{0.999}{.95}$	$\frac{0.999 \text{ (safety)}}{0.9999 \text{ (efficiency)}}$	Malfunction = 10^{-5} per flight hour

Oldie but still what you need to know

What do I need to do to use it then?

Go back up to our bit about having an approved system and it being in your MEL...

And read this bit as well.

So, **you need it in your MEL/MMEL**, and what that means is having a system which meets the requirements laid out by your authority.

The FAA put out this info on getting approved. AC 20-150B – ‘Airworthiness Approval of Satellite Voice (SATVOICE) Equipment Supporting Air Traffic Service (ATS) Communication.

It is an AIC about getting airworthiness approval for SATVOICE, and contains all the design considerations, software requirements, minimum performance requirements, CVR, and a lot of other things you probably need to know about.

ICAO recommend that Operators need to establish policy and procedures for crew involved in SATVOICE ops. This includes descriptions of the system operating procedures, limitations, flight planning requirements, what to do if it doesn't work... Check out **section 3.3.3 of the ICAO SVGM manual** for more on this.

In summary - your system needs to be approved. To be approved it needs to meet certain standards and criteria. You also need to have procedures and policy in place for the operation of the system.

Where is all the official info on this?

In **ICAO Doc 9869**, also known as the **PBCS manual**, also known as the **GOLD manual** (because its full title is Global Operational Data Link). You can find the 2017 edition of this in our Doc Library if you want to take a look.

Here is the ICAO SVGM (Satellite Voice Guidance Manual) which we mentioned.

Then there is **ICAO Doc 7030** which contains regional supplementary procedures and will contain some info on Datalink, for example, over the North Atlantic.

I have the system and the approval, but need to find a number?

Well, this is where it can get a little tricky. There are different systems. **Inmarsat** and **Iridium**.

There is also **MTSAT**, the Japanese geostationary satellite network.

If you have Inmarsat satellite compatible system then you can use those **SATCOM short codes (the six digit ones starting with a 4)**. You can also dial the 10-digit PSTN phone number. The 6 digit numbers are converted to the PSTN number as they wiggle through the Inmarsat system.

PSTN, incase you're going to ask, is the **Public Switched Telephone Network** which is what the aeronautical SATVOICE system uses. So these are what you want to call via your Iridium system.

Numbers are generally to be found in places like the AICs, in your Jeppesen, LIDO, or whatever other chart and manual provider you are signed up to.

One tip, when you do dial up – don't be yakking away like you're on a normal telephone. The operator the other end is going to expect standard radio etiquette. Callsigns, readbacks and all that.

What do I put in my flight plan?

You need to include your SATVOICE capability and you do this in **Item 10** by inserting either:

- **M1** for Inmarsat RTF capability;
- **M2** for MTSAT RTF capability;

- And/or an **M3** for Iridium RTF capability.

In **Item 18** you insert the aircraft registration and also the **indicator code** and the **aircraft address** expressed in the form of an alphanumerical code of 6 characters.

If you are operating through airspace requiring HF and yours is broken, then you may be able to file with only your SATVOICE system as the LRCS if it is a flight to return the aircraft for HF maintenance.

Again, just having a system and whacking the info about it onto a flight plan does not qualify you to use it. **It needs to be approved.**

U.S. DEPARTMENT OF TRANSPORTATION				MASTER MINIMUM EQUIPMENT LIST	
FEDERAL AVIATION ADMINISTRATION					
AIRCRAFT: GULFSTREAM G-V, GV-SP, GV-SP (G550), GV-SP (G500), GIV-X, GIV-X (G450), GIV-X (G350)			REVISION NO: 8 DATE: 11/07/2014		PAGE NO: 23-14
1. SYSTEM, SEQUENCE NUMBERS & ITEM		REPAIR CATEGORY			
		2. NUMBER INSTALLED			
		3. NUMBER REQUIRED FOR DISPATCH			
		4. REMARKS OR EXCEPTIONS			
23 COMMUNICATIONS					
17. High Frequency (HF) Communication Systems		D	-	-	Any in excess of those required by 14 CFR may be inoperative.
		C	2	1	(O) May be inoperative while conducting operations that require two LRCS provided: a) SATCOM Voice or Data Link operates normally, b) Alternate procedures are established and used, c) SATCOM Voice coverage is available over the intended route of flight, and d) If SATCOM Voice is to be used over the intended route of flight, SATCOM Voice short codes (INMARSAT) or direct dial commercial numbers (IRIDIUM) must be available. If not available, prior coordination with appropriate ATS (FIR) facility is required. NOTE: SATCOM Voice is to be used only as a backup to normal HF Communications.

An HF MEL

What if I get a random SATVOICE call?

You should only act on the clearances or instructions given to you if a SATVOICE call has a priority level 2/High/Q12 or 1/EMG/Q15. You might have to disconnect and initiate a new call to get confirmation that it is something to act on, and not just some rogue person who has discovered a way to call you on it.

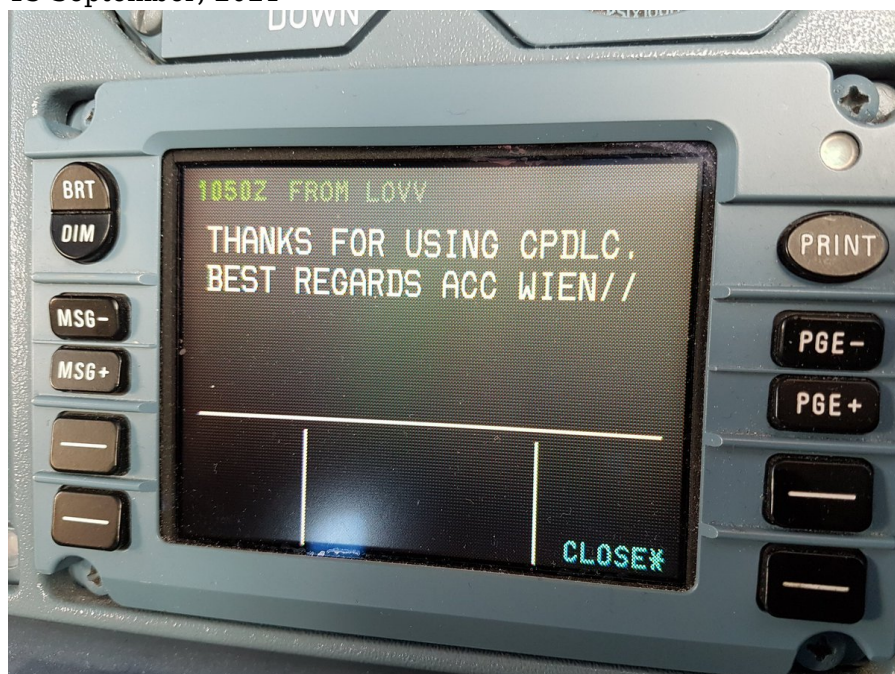
I am not signed up to any provider. Can I still just sort of call?

If you can answer this then please send us your info ☐

Iridium Fault Fixed

David Mumford

13 September, 2021



Last week **we reported on an equipment issue with Iridium** satcom that prompted a ban by a number of Oceanic ATC agencies. Some aircraft were receiving massively delayed clearances sent by ATC via CPDLC - and one took the instruction and climbed 1000 feet, even though the message was meant for the flight the aircraft operated previously.

Here were the areas which had previously published Notams restricting the use of Iridium: Brazil Atlantico (SBAO), Auckland (NZZO), Chile (SCIZ), Japan (RJJJ), Anchorage (PAZA), Oakland (KZAK), New York (KZNY and KZWY).

However, all FIR's have now removed their notams which banned the use of Iridium for CPDLC and ADS-C. This has happened after tests were performed last week using Iridium SATCOM which confirmed that Iridium no longer queues CPDLC uplinks for more than five minutes.

Article header photo by @Zelgomat

Oceanic ATC's tell us their position on Iridium Satcom

David Mumford
13 September, 2021



Last week **we reported on an equipment issue with Iridium** satcom that prompted a ban by a number of Oceanic ATC agencies. Some aircraft were receiving massively delayed clearances sent by ATC via CPDLC – and one took the instruction and climbed 1000 feet, even though the message was meant for the flight the aircraft operated previously.

Today, we checked-in again with all the oceanic ATC centres, to see what their current policy is on the issue.

EGGX/Shanwick told FSB that they are aware of the issue, reviewed it, but have decided not to ban the use of Iridium for either CPDLC or ADS-C just yet. LPPO/Santa Maria have the same position. So, in this airspace, you can use Iridium, for now.

CZQX/Gander said they did a safety analysis of it, and decided not to ban it. They have all kinds of conformance alerts in place to prevent any problems from happening – so if aircraft deviate they get notified immediately.

BIRD/Reykjavik aren't that concerned about the issue – they use HF most of the time anyway.

Chile (SCIZ)

Japan (RJJJ)

Anchorage (PAZA)

Oakland (KZAK)

New York (KZNY and KZWY)

All these centres have published Notams instructing crews not to use Iridium for CPDLC **or ADS-C**. Until the fault is fixed, in those regions you'll have to either use HF for ATC comms, or use another SAT provider.

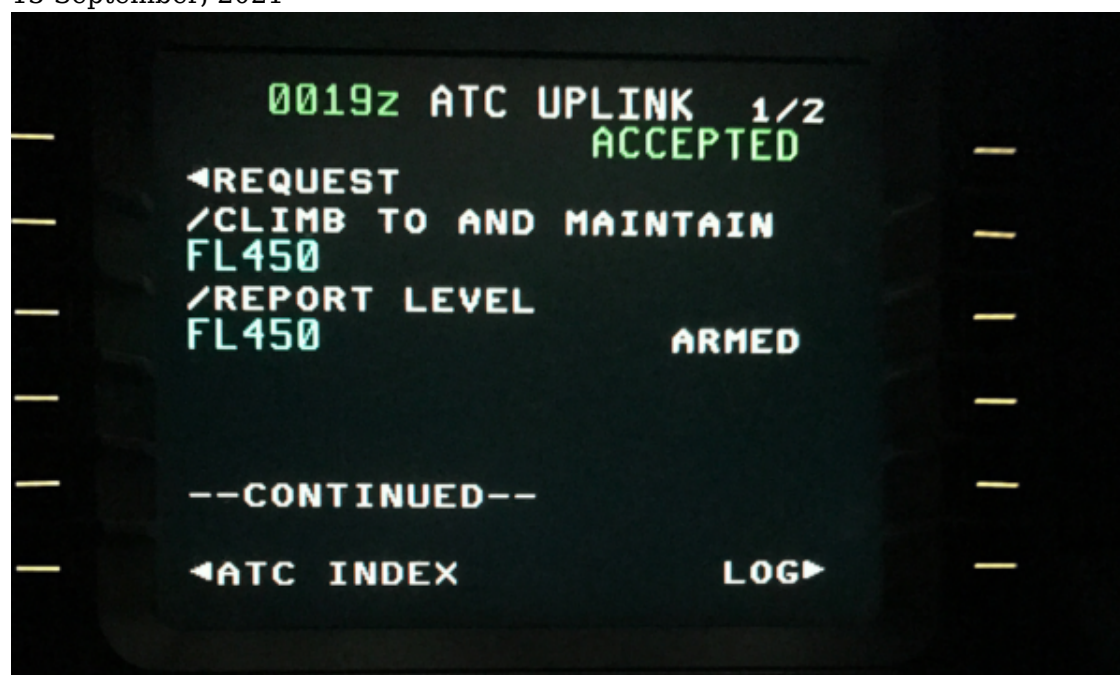
Auckland (NZZO) and **Brazil (Atlantico SBAO)** have applied the ban to CPDLC alone. Use ADS-C if you like.

From Iridium themselves, they told FSB: “We’ve updated their queue management system. Every minute, there is a queue check. If there is any message that is older than 4 minutes, it marks as timed out, and will not be delivered. This update was done at ground level, so it does not require any software updates by the user. We’re still waiting on feedback from FAA workgroup on the fix and if it’s sufficient to allow use of Iridium for CPDLC and ADS-C.”

That’s it for now! We’ll keep you posted, or, even better – tell us below in the comment section if you hear news.

Iridium fault prompts ban by Oceanic ATC

Declan Selleck
13 September, 2021



Aircraft Operators using the Iridium Satellite service for ATC comms should be aware of an equipment issue that has prompted a ban by a number of Oceanic ATC agencies in the last few days

Right now, Chile (SCIZ), Japan (RJJJ), Anchorage (PAZA), Oakland (KZAK), New York (KZNY and KZWY) have all told operators **not to use Iridium for CPDLC or ADS-C**. Until the fault is fixed, in those regions you’ll have to either use HF for ATC comms, or use another SAT provider. Auckland (NZZO) and Brazil (Atlantico SBAO) have so far only applied the ban to CPDLC alone. Nothing has been published yet by Gander (CZQX), Shanwick (EGGX), Reykjavik (BIRD) or Santa Maria (LPPO) – although we’re keeping a close eye on them for any update.

Here’s what happened:

On Sep 12th, an Alaskan Airlines flight had a failure of their CMU (Comms Management Unit) that caused the Iridium connection to stop working. An ATC message was sent to the aircraft but not delivered. On the

next flight, the CMU power was reset and corrected the issue, and the pending message was delivered. The CMU did not recognise the message as being old, and so it was presented to the Flight Crew as a control instruction. **FSB understands that this aircraft took the climb instruction and executed the level change**, climbing 1000 feet .

Another flight, operated by Hawaiian out of Oakland, had a similar problem. This aircraft had both Iridium and Inmarsat on board, and during the flight switched over to Inmarsat as the provider. An ATC message was routed via Iridium, but didn't reach the aircraft before the switch. Some 23 hours later, on the next flight, Iridium was activated again and again the ATC message presented as a "live" instruction. On this occasion, the crew queried the instruction and did not climb.

The problem in simple terms is that if ATC sends a CPDLC message like "**Climb FL370**", which is obviously only valid for "right now", but another crew gets the message hours later, then you have a very high risk of the new crew accepting that and climbing.

For now, Iridium has a plan to fix the ground side to not allow older SBD messages to be delivered, and they say they are testing it at the moment and expect to release it soon.

OpsGroup members will be updated directly on further news.

Notam copies below:

ANCHORAGE PAZA A0626/17 - USE OF CPDLC AND ADS-C VIA IRIDIUM SATCOM IS PROHIBITED WITHIN THE ANCHORAGE OCEANIC, DOMESTIC AND ARCTIC FLIGHT INFORMATION REGIONS (FIRS). SFC - UNL, 13 OCT 19:40 2017 UNTIL 13 NOV 00:00 2017 ESTIMATED.
CREATED: 13 OCT 19:35 2017

NEW ZEALAND AUCKLAND NZZ0 B4985/17 - USE OF CPDLC (DATALINK) VIA IRIDIUM SATCOM IS PROHIBITED WI NZZ0 FIR. COMMUNICATION WI NZZ0 FIR IS TO BE VIA HF RDO ON THE APPROPRIATE SP6 FREQ. OPERATORS USING IRIDIUM SATCOM MAY CONTINUE TO USE ADS-C FOR POSITION REPORTING WI NZZ0 FIR. HF VOICE POSITION REPORTS ARE NOT REQUIRED UNLESS SPECIFICALLY REQUESTED.
08 OCT 21:56 2017 UNTIL 08 JAN 21:00 2018 ESTIMATED.
CREATED: 08 OCT 21:56 2017

OAKLAND KZAK A4306/17 - FOR ACFT EQUIPPED WITH IRIDIUM SATCOM, USE OF CPDLC AND ADS-C VIA IRIDIUM SATCOM IS PROHIBITED WITHIN OAKLAND CENTER OCEANIC AIRSPACE. COMMUNICATION WITH KZAK MUST BE VIA HF FOR IRIDIUM USERS.
13 OCT 19:49 2017 UNTIL 31 DEC 23:59 2017. CREATED: 13 OCT 19:54 2017

NEW YORK KZNY A0334/17 - USE OF CPDLC AND ADS-C VIA IRIDIUM SATCOM IS PROHIBITED WITHIN NEW YORK CENTER OCEANIC AIRSPACE. 13 OCT 19:27 2017 UNTIL 30 DEC 08:00 2017. CREATED: 13 OCT 19:38 2017

NEW YORK KZWY A0502/17 - USE OF CPDLC AND ADS-C VIA IRIDIUM SATCOM IS PROHIBITED WITHIN NEW YORK CENTER OCEANIC AIRSPACE. 13 OCT 19:27 2017 UNTIL 30 DEC 08:00 2017. CREATED: 13 OCT 19:36 2017

BRAZIL ATLANTICO SBA0 N0095/17 - FOR ACFT EQUIPPED WITH IRIDIUM SATCOM, USE OF CPDLC IS PROHIBITED WITHIN ATLANTICO CENTER OCEANIC AIRSPACE. FLIGHT CREWS CAN LOG ON SBA0 TO ALLOW THE USE OF ADS-C FOR POSITION REPORTING. COMMUNICATION WITH SBA0 MUST BE VIA HF. IF USING ADS-C POSITION REPORTING, HF VOICE POSITION REPORTS ARE NOT REQUIRED

UNLESS SPECIFICALLY REQUESTED. 15 OCT 12:00 2017 UNTIL
13 JAN 12:00 2018. CREATED: 15 OCT 01:22 2017

JAPAN FUKUOKA RJJJ J7236/17 - FOR ACFT EQUIPPED WITH IRIDIUM SATCOM, USE OF
CPDLC AND ADS-C VIA IRIDIUM SATCOM IS PROHIBITED WITHIN FUKUOKA OCEANIC
AIRSPACE. COMMUNINCATION WITH RJJJ MUST BE VIA HF FOR IRIDIUM USERS. 16 OCT
10:08 2017 UNTIL UFN. CREATED: 16 OCT 10:09 2017