

# Basic's to decoding Inmarsat L-Band signals using the RSP CHECK YOUR LOCAL LAWS BEFORE DECODING ANY SIGNALS FROM THE INMARSAT SYSTEM



Hardware used

**SDR**: RSP1a SDR from SDRplay https://www.sdrplay.com/rsp1a/



Antenna: Modified GPS patch antenna for L-Band from SDR-Kits, model A154. https://www.sdr-kits.net/L-Band-Receive%20Antenna





Software used SDRuno v1.32 https://www.sdrplay.com/downloads/ VBcable (Donationware) vPack43 https://www.vb-audio.com/Cable/ VAC (Paid for use) v4.60 https://vac.muzychenko.net/en/ JAERO (Free) v1.0.4.9 https://github.com/jontio/JAERO/releases Tekmanoid STD-C Decoder (Paid for use) v1.5.1 Requires Java JRE, check your local laws before using this decoder. http://www.tekmanoid.com/egc.shtml https://www.java.com/en/download/

#### Introduction

(some text taken and edited from the RTL-SDR Blog website)

This document is not a definitive guide to Satcom, L-Band transmission or the Inmarsat system. This is a collection of information that I have found scatter throughout the internet and recompiled into a document, this document. My aim is to help you get started and hopefully guide you in the right direction. *Expect typographical mistakes, inaccuracies, or omissions* Inmarsat is a communications service provider with several geostationary satellites in orbit. Inmarsat provides services such as satellite phone communications, broadband internet, and short text and data messaging services. Geostationary means that the Inmarsat satellites are in a fixed position in the sky and do not move.

The Inmarsat 3-F(x) satellites have transponders transmitting data in L-Band (1.5 GHz) that can be decoded.

The modes we will cover in this document are Aeronautical (Classic Aero or ACARS) and Inmarsat-C (STD-C) using an RSP1a, RSP2/2pro or RSPduo connected to the SDR-Kits modified L-Band patch antenna. The Inmarsat system is not limited to only these types of networks. We are limited to the decoders available.

https://en.wikipedia.org/wiki/Inmarsat

Some regions that use the I-3 satellite services moved and migrated to the Inmarsat I-4 Satellites. See the following document. <u>https://www.inmarsat.com/wp-</u>content/uploads/2018/09/INM C I3 I4 migration guide V3.0.pdf

Two of the most popular decoding applications are JAERO used for ACARS and Tekmanoid STD-C Decoder used for decoding STD-C NCS transmissions on the Inmarsat 3-F(x) satellites <u>https://www.sigidwiki.com/wiki/Inmarsat\_Aero</u> <u>https://www.sigidwiki.com/wiki/Inmarsat-C\_TDM</u>



### Software installation

Virtual Audio Cable: A virtual audio cable allows you to pipe audio from application (SDRuno) into another application (a decoder like JAERO) digitally. I will assume SDRuno is already installed with your device attached and functioning properly.

You can now download a virtual audio cable package. If you already have a virtual audio cable package installed, you can skip to the next section. If you don't have a virtual audio cable application installed, you only need to choose one and only install one of the two, either one works fine

Close any running apps, install the virtual audio cable and reboot your computer. When your computer boots back to your desktop, your computer will now have a virtual audio cable pair installed on the system.

All Control Panel Items					- 🗆 ×
← → × ↑ 🔛 > Control Panel > All	~ Ū	Search Control Panel 🔎			
Adjust your computer's settings					View by: Large icons 🔻
Administrative Tools	AutoPlay	Backup and Restore (Windows 7)	RitLocker Drive Encryption	1	Color Management
🗿 Credential Manager	Date and Time	Default Programs	🤳 Device Manager	<b>S</b>	Devices and Printers
🚱 Ease of Access Center	File Explorer Options	File History	Flash Player (32-bit)	A	Fonts
lndexing Options	Intel® PROSet/Wireless Tools	Reference Options		٩	Mail (Microsoft Outlook 2016) (32-bit)
Mouse	Network and Sharing Center	NVIDIA Control Panel	Phone and Modem	۲	Power Options
Programs and Features	Recovery	Region	RemoteApp and Desktop Connections	p	Security and Maintenance
Sound	Speech Recognition	Storage Spaces	Sync Center		System
Taskbar and Navigation	Troubleshooting	🕵 User Accounts	Windows Defender Firewall	<b>\$</b>	Windows To Go
Work Folders	Yamaha Steinberg USB				

You can verify by going to your Control Panel and double clicking the Sound icon. VB-Cable and Virtual Audio Cable will only install a single virtual audio cable pair, one is for the input (Recording) and one is for the output (Playback). A single pair is all that is needed (as shown below).

Sound						×	Sound	ł						×
Playback	Recording	Sounds	Communications				Playback	Recording	Sounds	Commu	inications			
Select a	playback d	evice belo	w to modify its s	ettings:			Select a	recording	device be	low to n	odify its	settings:		
	Line 2- Stei Defau	nberg UR It Device	22mkll				~	Line 2- Stei Defau	nberg UF It Commu	22mkll inicatior	is Device			
<b>~</b>	Line 1 Virtual Ready	l Audio Ca	able				<b>.</b>	Line 1 Virtual Defaul	l Audio C It Device	able				
Config	gure		Set Def	ault	Properties		Confi	gure			Set Def	ault 🖛	Properties	
			ОК	Cancel	Apply					OK		Cancel	Apply	



#### **JAERO**

(some text taken and edited from the JAERO website)



JAERO is a program that decodes ACARS (Aircraft Communications Addressing and Reporting System) messages sent by satellites (in this case Inmarsat) to Airplanes (SatCom ACARS). This is commonly used when airplanes are well beyond VHF range.

JAERO also allows for decoding and demodulation of voice calls, due to local laws and privacy, I will not show or discuss how to do this. You can find more information about that JAERO feature online.

JAERO can be downloaded from the link provided on the first page of this document. After downloading the installer, simply double click the setup file and install it on your primary drive.



## **Tekmanoid STD-C Decoder**

DRplau

(some text taken and edited from the USA-Satcoms website)



Inmarsat STD-C is a data or message-based system used mostly by maritime operators. An Inmarsat C terminal transmits and receives on L-Band to various geosynchronous satellites that service each major ocean region.

The Tekmanoid STD-C decoder will decode STD-C Inmarsat EGC (enhanced group call) and LES (land earth station) messages. Some of these messages contain private information. Reception of these messages may not be legal in your country; therefore, your local laws should be checked.

The Enhanced Group Call (EGC) service is a message broadcast service with global coverage (except the poles) within the Inmarsat-C communications system. Two of the services provided are:

# FleetNET and SafetyNET

FleetNET is used to send commercial messages to individuals or groups of subscribers (for example, individual companies communicating with their own Mobile Earth Stations (MES). SafetyNET is used for broadcasting Maritime Safety Information (MSI) such as Navigational warnings, meteorological warnings, meteorological forecasts and other safety related information (including Distress Alert Relays) from official sources.



# Basic's to decoding Inmarsat L-Band signals using the RSP

🛠 std-C decoder v1.5.0.1 - tekm	anoid	the second se	- 0 <b>- X</b>
File Display Settings Help			
Signal Volume 4	Statistics Good Frames 🍐 441 Lost Frames 🖤 1 LES/EGC Q 🏦 1 Messages 🔯 43	Tuner         Packet           0         1         2         3         4           0         1         2         3         4           0         1         2         3         4           0         1         2         3         4           0         0         1         2         3         4           0         0         0         1         2         3           0         0         0         0         0         1         2           0         0         0         0         0         0         0         0           0	
Terminal EGC LES			
Date         Pres           2017/12/22         KK           2017/12/22	Source is gerng artisto@crosps.tr gerng artisto@crosps.tr is astoo-gernage.tr is astoo-gernage.tr is astoo-gernade.or is a geng artisto gernage.tr is a geng artisto gernage.tr is astoo is astoo	angin       VIZADA         410       Bytes 1450         411       Bytes 1450         410       Subject         9       Subject         9       Bate         101       To         102       Bate         1031       Fm         1041       Fm         1050       Dear master, Good day.         622       Ve are very pleased to learn that your good vessel is calling to TURKISH         1051       STRATS (DARDANEL & BOSPHORUS) / TURKEY.         2056       Please feel free to contact us for any enquiries that you may have in the         1031       The asses thanky find our company dealts as below;         1042       Please kinkly find our company dealts as below;         1043       Please kinkly find our company dealts as below;         1044       Please kinkly find our company dealts as below;         1045       We are one of the leading lamine Services companies which serves for thell         1046       Please sinkly find our company dealts as below;         1042       Pointdewess with supply & procurement services such as:         1043       Portions, Bond davices, Canine Davice, Sorth Chanp Operations, Cash To Master, General         1044       Provide vessies with supply & procurement services such as:	ľ

The LES station acts as an interface (or gateway) between the Inmarsat space segment and the national/international telecommunications networks.

The Tekmanoid STD-C decoder requires Java JRE in order to run. The link for the Java runtime environment is on page 2 of this document. For information contact the developer direct admin@tekmanoid.com



There are alternatives to using the Tekmanoid STD-C decoder, but in my opinion the other decoders available do not perform as well on low end systems or even work without needing "helper" applications to be installed. Tekmanoid STD-C decoder is very easy to use and works great on my low-end system using minimal system resources.



# Putting all the pieces together

ACARS and STD-C messages will transmit via the Inmarsat satellite deployed within your coverage area/region, you will need to choose the Inmarsat satellite that is closest to your coverage area.

Note that only different frequencies are used between ACARS transmissions and STD-C transmissions. You will only need to receive from one of the available 3-F(x) Inmarsat satellites. L-Band ACARS transmissions are in the 1.545 GHz range but STD-C messages are on fixed frequencies (shown on page 8)



Since STD-C transmissions are broadcasted on fixed frequencies, we want to monitor the TDM NCSC channel, again these are fixed for the following Ocean Regions. Choose the region closest to your location (page 9).

Again, some regions that use the I-3 satellite services moved and migrated to the Inmarsat I-4 Satellites. See the following document. <u>https://www.inmarsat.com/wp-</u> content/uploads/2018/09/INM\_C\_I3\_I4\_migration\_guide\_V3.0.pdf





STD-C transmissions are broadcasted on fixed frequencies, NCSC channel. The NCSC frequency per region is noted below.

Inmarsat satellite: Inmarsat-4 F3 (AOR-W) Direction: 98° West Frequency: 1.537.70 GHz Inmarsat satellite: Inmarsat-3 F5 (AOR-E) Direction: 54° West Frequency: 1.541.45 GHz Inmarsat satellite: Inmarsat-4 F1 (IOR) Direction: 25° East Frequency: 1.537.10 GHz Inmarsat satellite: Inmarsat-4 F1 (POR) Direction: 143.5° East Frequency: 1.541.45 GHz

# **SORPLAC** Basic's to decoding Inmarsat L-Band signals using the RSP

I will assume you have located the Inmarsat satellite that covers your region. I suggest using a compass on your mobile phone to pinpoint the general direction. The direction is in ° (degrees). I am referencing true north, not magnetitic north (traditional analog compass). https://en.wikipedia.org/wiki/Magnetic\_declination

You can also download an app for your smartphone called Satellite AR (Android and IOS). After you locate the correct direction of the Inmarsat satellite, you will want to place the L-Band patch on a flat metal surface. I have read that the receive pattern of this patch antenna is z (about 85-90°, straight up). Point the top of the antenna facing the Inmarsat satellite. Using the roof of my car worked just fine, just remember to point the front of the antenna at the satellite.

https://www.u-blox.com/sites/default/files/products/documents/GPS-Antenna AppNote %28GPS-X-08014%29.pdf





Launch SDRuno and click the PLAY button, remember that if the RSP(x) is in ZERO IF mode, give frequency separation between the VFO (top frequency) and LO (bottom frequency). In LOW IF mode this is not needed. I suggest running a sample rate of 2 MHz, larger bandwidths are not needed.

SETT.	PWR & SNR TO CSV	SDRuno MAIN SP	
-20 -25 dBm -30 -35 -40 -45 -50 -55	S 1 2 3 4 5 6 7 8 9 +10 +20 +30 +40 +50 +60 -104.6 dBm SNR: dB		1.544.651.000 LOH.545000000
-60 -65 -70 -75 -80 -85 -90 -95			
-100 -105 -110 -115 -120 -125 -130		1544650.866 KHz -110.2 dB	
-135 -140 154	4100 1544200 1544300 1544400 1544500 1544600 :	1544700 1544800 1544900 1545000 1545100 1545200 1545	Span 2000 KHz FFT 8192 Pts RBW 244.14 Hz Marks 10 KH
SP	WF SP+WF COMBO	< ZOOM > VFO < RBW >	The second s

The SDR-Kits patch antenna requires that the RSP(x) Bias-T be enabled. The Bias-T option is enabled within the MAIN panel of SDRuno. See the SDRuno manual located here. <u>https://www.sdrplay.com/docs/SDRplay\_SDRuno\_User\_Manual.pdf</u> view page 17.

With the Bias-T enabled. Set the RSP(x) RF GAIN to max. The RF GAIN slider is located on the MAIN panel. See the SDRuno manual located here. https://www.sdrplay.com/docs/SDRplay\_SDRuno\_User\_Manual.pdf view page 17.

For more information about the RF GAIN settings of the RSP(x) https://www.sdrplay.com/wp-content/uploads/2018/06/Gain and AGC in SDRuno.pdf Select the Virtual audio cable as the output in SDRuno, this is selected via the RX Control panel. SETT. button and clicking on the OUT tab.



Upper sideband is recommended but I found the best mode to use for L-Band ACARS or L-Band STD-C decoding is DIGITAL with a filter width of 3k.



Be sure to set a proper step size (right click the RX Control frequency readout). The step size is not important for STD-C transmissions because these signals are only on one frequency for the satellite in your region but L-Band ACARS signals will be on many frequencies. Setting the proper step size will avoid issues when you point and click on signals you want to decode using the JAERO decoder.



5DRplau

You will want to center the signal with a little breathing room within the AUX SP filter passband. The filter slopes are very sharp. Keep the signal centered and away from the extreme edges (red markers).



5DRplay



Select your virtual audio cable within the decoder's audio input preferences.

The Tekmanoid STD-C decoder sound properties are located under Settings in the toolbar menu.



# JAERO's sound settings is located under the Tools menu and Settings.

AFRO	≥ Settings ? ≻	- 6 ×
	Decoding Log Window	
	Do not display SU types	
SUS ALARS C Charmelinito	26 0A C0 00 14 16	
	ACARS window Format 3 V Drop non text messages	
	Beep on multi line text message Output to UDP Iocalhost: 18755	
	ADS data output	
	Enable BaseStation format     0.0.0.0;30003     Behave as clent	
	Logging Directory ers/KD2KOG/AppData_Local/JAERO/logs Enable	
	Detabase	
	URL https://junzisun.com/adb/download	
	Contract Contract	
	CABLE Output (VB-Audio Virtual Cable)	
800 1600	CABLE Output (VB-Audio Virtual Cable)	4800 5600
Volume Signal Data		600 bps V Lodding 900 Hz V AFC on V Display Constellation V
	City of Canal	Freq: 1124.82Hz EbNo: 00dB
······································		∧ 🚽 📼 🦟 ଐ <sub>8/19/2019</sub> 🖓



# Basic's to decoding Inmarsat L-Band signals using the RSP

The Start Status       The Status        The Sta	
Import       Name/company       Terr       Packet         Under some frage       Octor Frage       Octor Frage       Octor Frage       Octor Frage         Under some frage       Octor Frage       Octor Frage       Octor Frage       Octor Frage         Immedia       Octor Frage       Octor Frage       Octor Frage       Octor Frage         Immedia       Octor Frage       Octor Frage       Octor Frage       Octor Frage         Immedia       Octor Frage       Octor Frage       Octor Frage       Octor Frage         Immedia       Octor Frage       Octor Frage       Octor Frage       Octor Frage         Immedia       Octor Frage       Octor Frage       Octor Frage       Octor Frage       Octor Frage         Immedia       Octor Frage       Oct	
Under States       Obs	
BMORE       Cooled Frames       10         BMORE       Cooled Frames       10         BMORE       Cooled Frames       10         BMORE       Cooled Frames       10         BMORE       Coole Frag       Coole Frag         BMORE       Coole Frag       National Brain	
Burger	
County of the second state of the second st	
Description         Description <thdescription< th=""> <thdescription< th=""></thdescription<></thdescription<>	
Differ         Differ <thdiffer< th=""> <thdiffer< th=""> <thdiffer< th="" th<=""><th></th></thdiffer<></thdiffer<></thdiffer<>	
Description     Description     Description     Description     Description       Personal Goo Less     Ender     Final Activity     Final Activity     Final Activity     Final Activity       20140500 04250, 1230	
Farmania         Concentration         Market Biold         Market Biold <th></th>	
Terminal         COC         Less           Data         Market         No         Market         Market         P           Difference         Statem         No         Market         No         Market         Market           Difference         Statem         No         Market         No         Market         Market           Difference         Statem         No         Market         No         Market         Market           Difference         Statem         No         Market         No         Market	
Name         Const         Name         Name <t< th=""><th></th></t<>	
Barket         Bark         <	-
2016000.0273.         2108.0         22         Sartry: Subsch 00.01         (MW III: Nueway Name) MIII: Fetscht         Nueway Binzi         #           2016000.0257.         0002 11         Saltry: Subsch 00.0257.         (MW III: Nueway Name) MIII: Fetscht         Nueway Strate         Saltry: Subsch 00.0257.         (Mu III: Nueway Name) MIII: Fetscht         Nueway Strate         Saltry: Subsch 00.0257.         Saltry: Subsch 00.0257.         (Mu III: Nueway Name) MIII: Fetscht         Nueway Strate         Saltry: Subsch 00.0257.         Saltry: Subsch 00.0257.         (Mu III: Nueway Name) MIII: Fetscht         Nueway Strate         Saltry: Subsch 00.0257.         Saltry: Subsch 00.0257.         (Mu III: Nueway Name) MIII: Fetscht         Nueway Strate         Saltry: Subsch 00.0257.         Saltry: Subsch 00.0257.         Saltry: Subsch 00.0257.         (Mu III: Nueway Name) MIII: Fetscht         Nueway Strate         Saltry: Subsch 00.0257.         Saltry: Subsch 00.0257.         Saltry: Subsch 00.0257.         (Mu III: Nueway Name) MIII: Fetscht         Nueway Strate         Saltry: Subsch 00.0257.         Saltry: Subsch 00.0257.         Saltry: Subsch 00.0257.         (Mu III: Nueway Name) MIII: Fetscht         Nueway Strate         Saltry: Subsch 00.0257.	1.1
22106200 423.0. 1025 1 SAFEYY [RNHET] Names Yamman [MET] Fetcatt I Names Yamma [MET] F	13
221100200 4327 1 1923 31 534 KT 1974 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 221100200 4327 1 1923 31 534 KT 1974 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 221100200 4327 1 1924 31 545 KT 1974 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 221100200 4328 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 231100200 4328 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 231100200 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 231100200 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4338 1 1934 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4334 11 SALAWA 31700 (ME Feicart 1 Makes Fance # 23110020 4343 11 SALA	
221002004222 VALUE	B
2 Hologold 24. José 2 John T. José 2 John T. John J. J	
Dellasord 433 a. 1956 27 SAFEY (PRINT Three Series) (MET Forest Three	
201460704332 VK3 9 SAFETY [V] NUT Navas karang NET Freest II Navas Farice # 20160204332 VK4	
20140500 4332. 1546 0 SATEVY [PRINT] MARKAWAN TANDY (MET Frecast) Hawke France # 152 - 15,000 00-10-10,000 Hard sub-rational france # 152 - 15,000 00-10,000 Hard sub-rational france # 152 - 15,000 Hard sub-rational france # 152 - 15,000 00-10,000 Hard sub-rational france # 152 - 15,000 Hard sub-rational france # 152 - 15,000 Hard sub-rational france # 152 - 150,000 Hard sub-r	
22114620 0432 - 1594 22 SAFEYY [PNIIIT] Names Yammon [MET Forcest 1] Names Fance # U = 25,54,540 00-55,12 = 25,550 00-55	Ha
20106000 0432. 1592 at 52 AFCW [BNHC] Nouvas Narmaj MC] Forcest = Navkas Fance # U 53-4528 050-59.02 Seafast 1, AP Best 306 and Fald 2010 000 0430. 1598 1 Sol And Fald 2010 000 0430. 1598 1 Sol And Fald 2010 000 044.00 Sol And Fald 2010 044.00 Sol An	
27110200.01232 - 1972 9 SAFEYY (SIVET Nawa Yamoya Yang Yel, Firecat 1 Nawa Yamoy ng Yel, Firecat 1 Nawa Yamoy (Sivet Yel) (Siv	
2016/00/04333. 1061 7 Dieferr phylie hanse hanning MET Facesat Namee France nr. 51-55,48 002-54,88 Noble finas Beal ACF Charwick Gas Field 2016/2010430. 13701 4 SAFETY (\$101KT) MET Facesat Name France nr. 51-55,48 002-54,88 Noble finas Beal ACF Charwick Gas Field 2016/2010430. 13701 4 SAFETY (\$101KT) MET Facesat Name France nr. 51-54,48 002-54,88 Noble finas Beal ACF Charwick Gas Field 2016/2010430.	
201865/30 kt-54.0, 13701 4 SAFETY [SN]NET Haavaa Wamng/NET Forecast Nawvaa Fanca w 54-04.480 000-54.92 Swarefor 2.ACP Raveraspura. Gas Field 🔮 🗨 👝	
2018/05/30 04:36:3. 136:38 15 SAFETY  SN MET Navarea Warning/MET Forecast 🔤 NavArea USA East 🗰 54-12:2N 002-27.18 Ensco 92 ACP Caster Gas Field	
2018/05/30 04:41.5 13640 15 SAFFETY [SN]METNavavaa Warning/METForecast 📰 Navavaa USA West 🗰 S4-35.7N 000-26.08 Enseco 121 RCP Breagh Gas Field	
2018/05/20 05:32:4. 13609 20 SAFETY [SN] MET Navarea Warning / MET Forecast DR Navarea United Kingdom #K 54-36.08.002-11.8E Ensice 101 ACP Cygnus Gas Field	
2018050005324_13298 25 SAFETY [3N] INET Navarea Warning / MET Forecast RFN avArea United Kingdom ##	
ZUTEVOJA U DE SATE I NOUTINE UN UNU CARA UNU UNIZ MANA UNU UNU UNU UNU UNU UNU UNU UNU UNU	
DARDET 1942 14 SAFETY [SUIMT] Warren Warring / MET Porceast III Wavaren Inited Kingdom K	
2018/05/20.05/42/0_ 1369 9 SAFETY ISHI MET Navarea Wareing / INET Forecast INF Navarea United Kingdom Ht	
2018/05/20 05:42:2_ 13114 19 SAFETY [SH] MET Havarea Warning / MET Forecast MR NavArea United Kingdom NK 55-05 40 04-35 5K Nobles San Turner AUX Valdemar OIL Flexid	Ses
2018/05/20 05:47/4 14959 1 ROUTINE [FN] Group Call END: 11AD	-
2018/05/30 0554:3_ 13313 24 SAFETY [SN] METRAV Warning to Circular Area Circular Area Circular Area centered at 60.0N,30E with _ #: 36-46, 49: 000-46, 4F. Energy 130	10
201805/00/5575. 13743 0 554FETY [31] ME I Marara Vorman ME I Forecast Marance Me Solo 101/101/101/101/101/101/101/101/101/101	N.
2018/03/00/2014/2014/2014/2014/2014/2014/2014/2	
2018/05/00 063255. 12722 10 SAFETY [SN] NAV Warning Rect Area Rectangular area bounded by 60.00.35.0. # 57-11.78 001-54.8E Maerek Righlander ACP u/o Pierce Oil Pield We	1
2018/05/20 06:32:5_ 12990 3 SAFETY [SHI] NAV Warning RectArea Rectangular area bounded by 60.0N,35.0_ #/ stward United	
2018/05/20 06:32:5 10023 4 SAFETY [SN] NAV Warning Rect Area Rectangular area bounded by 60.0N,35.0 # \$7-51.0N 000-37.0W COSL Ploneer King advanced by 60.0N,35.0	
2018/05/00 06:33:0 14954 2 URBENCY [SNI] Shore-to-Ship Distress Alert Circular area centered at 15:00(17:00 wit). ## #2# 57~55.38 000~56.1# Steena Spey	
UPIBEOS/02/02.31. U20/5 16 SAFETY INII MAY Warming RecCArea Rectangular area bounded by 60.001,52.0. ## S8-01.78 001-42.9E Roman Gerilla 7	
2018/00/00/24-2. 120/1 11 SAFETY 15/1 RAV Warming Rect Area Rectinguing inter bounded by 2018/53. 1302 Easco 80 ACP Beatrice 0:1 Pield	<b>Y</b>
201885/30/06403_ 14960 1 ROUTINE [FN] Group Call EHD 450B FK Start Over User Distance Distanc	+
2018/05/20 06:54:4. 12969 9 URGENCY [SH] SAR Circular area Circular area centered at 38:00,72:0W wit. # 58: 55: 38: 0002 11:32 Subarta Valual act Eduated Circular area	
2018/05/30 07:11:0. 26300 3 DISTRESS [SN] Shore-to-Ship Distress Alert Circular area centered at 23.05,45.0W wit. K S8-56, 3X 002-17, 6E Destress Bersen	-
201805/30 0/2215_ 14961 1 ROUTING (A) CAS END: 87C6 59-35.2N 001-03.2E Safe Boreas ACP u/c Mariner Cil Field	
201800/02/334C4425 1 SAFETY ISUM METAVARAW VARING METAVARAW VARING WALVARA WARAW REALES 44 SP-35.3N 001-03.4E Noble Lloyd Noble ACP u/c Mariner Oil Field 500.000 Mariner Oil Field 500.0000 Mariner Oil Field 500.000 Mariner Mariner Oil Field 500.000 Mariner Oil Field 500.000 Mariner Oil Field 500.000 Mariner Oil Field 500.000 Mariner Mariner Oil Field 500.000 Mariner Oil Field 500.000 Mariner Oil Field 500.000 Mariner Oil Field 500.000 Mariner Mariner Oil Field 500.000 Mariner Field 500	ferme of Use
2016050/01/300_ 13/4/ 0 URKENY 13/18/1 Natarek valing int i forcati in navnek valing int i forcati intervali i	And in case of the local division of the loc

For STD-C decoding use the frequency from page 8 of this document



For JAERO decoding, I suggest you start in the 1.545 GHz portion and observe the constellation in the JAERO decoder.

The signal to noise ratio (SNR) needed for successful decoding in these decoders will need to be greater than 7dB. When working with a weak satellite signals, try decimating the signal using SDRuno's decimation feature. (MAIN panel, DEC).

https://youtu.be/zcs7qw1gEDI

# **Additional resources**



Videos https://youtu.be/NWyYVOdIkoU https://youtu.be/uh7ZJDnORus https://youtu.be/mRXWhk9Gf1g https://youtu.be/pp0JxlpN4XA

SDRuno L-band frequency bank

https://mega.nz/#!jRFRiSaA!CcmRRRpjToxPzyGV9bf7MkDkKnqCYZCwwjC5curWj6g

PDFs:

https://www.inmarsat.com/wp-

<u>content/uploads/2018/08/Aero Service External Com Kit I3 to I4 Transition 21AUG2018.p</u> <u>df</u>

http://seaworm.narod.ru/12/Inmarsat Maritime Handbook.pdf

Websites https://usa-satcom.com/ https://uhf-satcom.com/

I hope this document helps you get started in decoding Inmarsat L-Band transmissions from the I3-F(x) satellites. I am sure I missed some key features, remember this is only a primer/basics to decoding these types of transmissions.

Warmest of 73, Mike-KD2KOG

SDRPlay modules use a Mirics chipset and software. The information supplied hereunder is provided to you by SDRPlay under license from Mirics. Mirics hereby grants you a perpetual, worldwide, royalty free license to use the information herein for the purpose of designing software that utilizes SDRPlay modules, under the following conditions:

There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits or integrated circuits based on the information in this document. Mirics reserves the right to make changes without further notice to any of its products. Mirics makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Mirics assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. Typical parameters that may be provided in Mirics data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters must be validated for each customer application by the buyer's technical experts. SDRPlay and Mirics products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Mirics product could create a situation where personal injury or death may occur. Should Buyer purchase or use SDRPlay or Mirics products for any such unintended or unauthorized application, Buyer shall indemnify and hold both SDRPlay and Mirics and their officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that either SDRPlay or Mirics were negligent regarding the design or manufacture of the part. Mirics FlexiRFTM, Mirics FlexiTVTM and MiricsTM are trademarks of Mirics .

SDRPlay is the trading name of SDRPlay Limited a company registered in England # 09035244.

Mirics is the trading name of Mirics Limited a company registered in England # 05046393