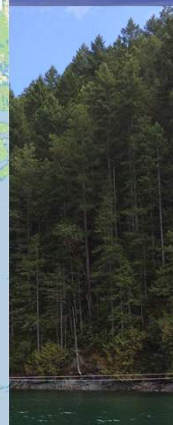
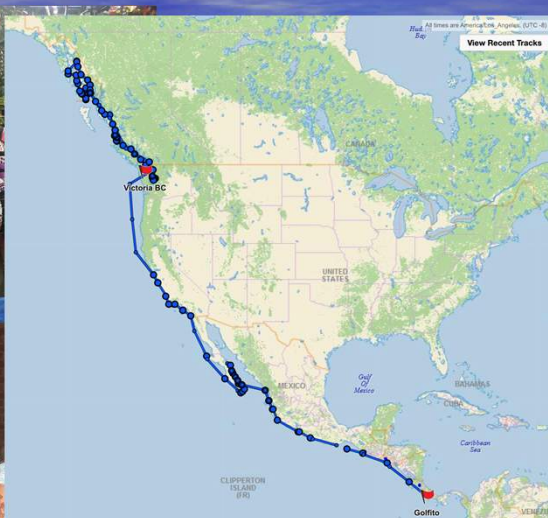


# Communications for Cruisers:

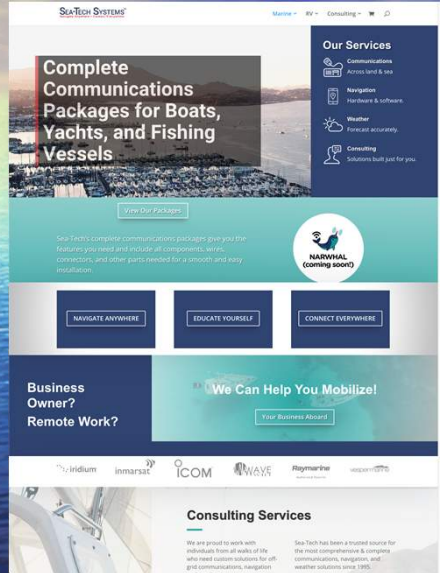
*from the Dock to the Ocean*

Presented by Richard Anderson

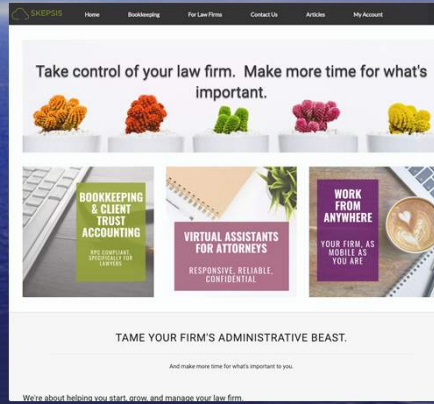
## Introduction



# Today



The screenshot shows the SeaTech Systems website. The main headline is "Complete Communications Packages for Boats, Yachts, and Fishing Vessels". A sidebar lists services: Communications (Access land & sea), Navigation (Hardware & software), Weather (Forecast accuracy), and Consulting (Solutions made just for you). A "View Our Packages" button is present. Below, there are three buttons: "NAVIGATE ANYWHERE", "EDUCATE YOURSELF", and "CONNECT EVERYWHERE". A section titled "Business Owner? Remote Work?" features the text "We Can Help You Mobilize!" and a "Your Business Aboard" button. The footer includes logos for iridium, inmarsat, ICOM, WAVE, and Raymarine, along with a "Consulting Services" section.



The screenshot shows the DEEPSIS website. The main headline is "Take control of your law firm. Make more time for what's important." Below this are three service cards: "BOOKKEEPING & CLIENT TRUST ACCOUNTING", "VIRTUAL ASSISTANTS FOR ATTORNEYS", and "WORK FROM ANYWHERE". A central text reads "TAME YOUR FIRM'S ADMINISTRATIVE BEAST." and "And make more time for what's important to you." The footer states "We're about helping you start, grow, and manage your law firm."





*First Priority*

**SAFETY**

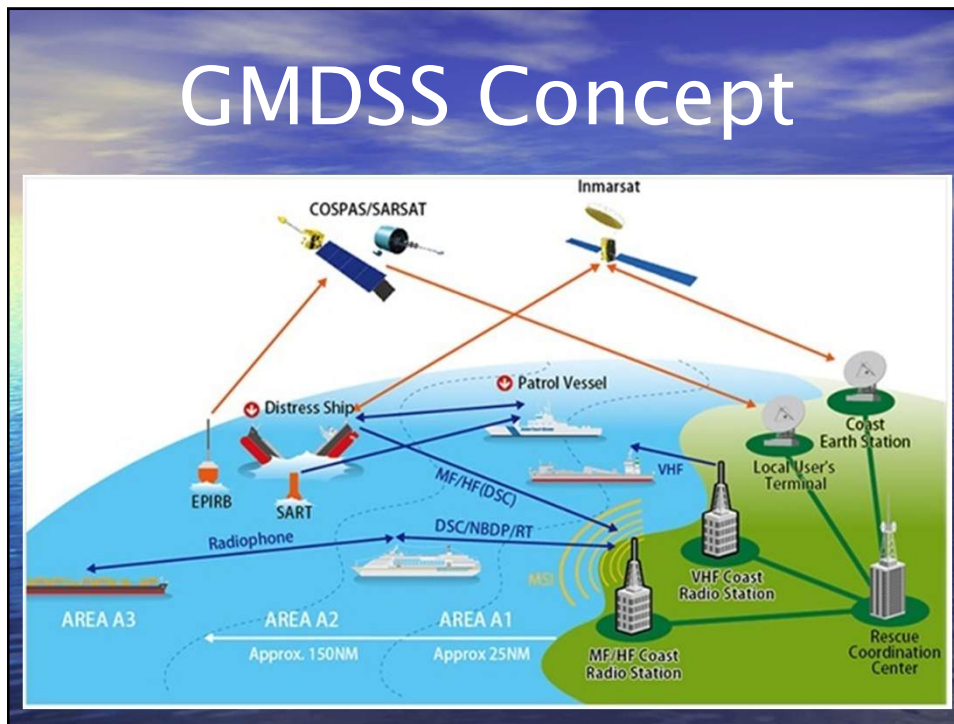


**GMDSS**

Global Maritime Distress  
Safety System

SOLAS (Safety of Life at Sea)  
Convention

# GMDSS Concept



## DSC

Digital Selective Calling



MMSI Number  
Maritime Mobile Service  
Identity Number

<http://wireless.fcc.gov/uls/>

Create an FRN, then apply for license  
License Type = "SA"

# Marine VHF (all boats)



DSC Distress Button

**PRO**

Inexpensive  
Digital Selective Calling (DSC)  
NOAA Weather  
Ubiquitous

**CON**

Short Range (20nm)



20 miles?

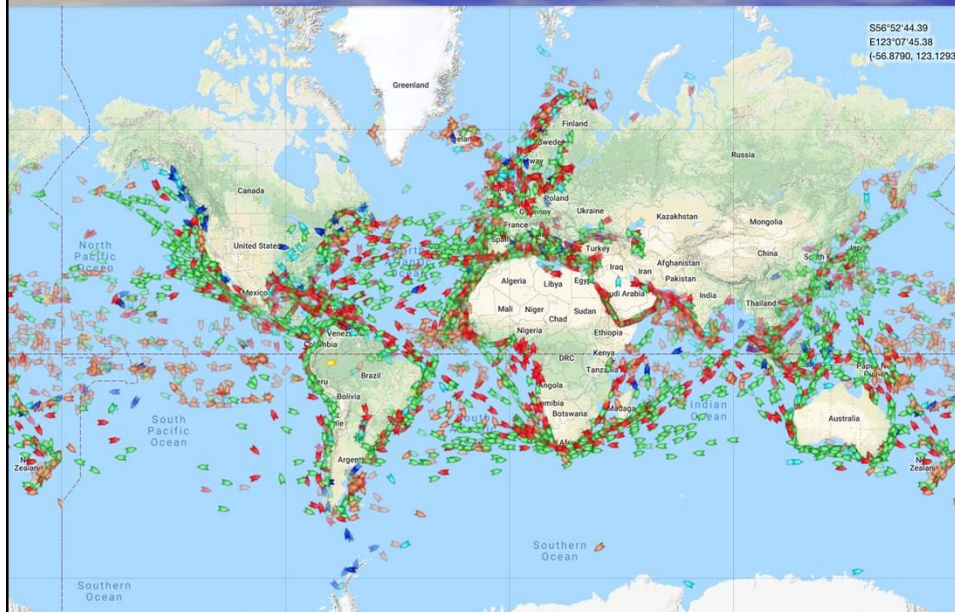
But what about  
beyond 20 miles?

HF DSC  
(Offshore Boats)

M802  
Pre-2020



# With HF DSC You Are Not Alone



## DSC *Not Just For Emergencies* Individual Calling



# AIS

## Automatic Identification System

### A & B

# AIS Receiver



The image displays two different AIS receiver configurations. On the left is a 'Black Box Style' receiver, a small black rectangular unit with a label that includes 'ICOM' and 'AIS Receiver'. On the right is an 'Integrated with VHF Radio' receiver, which is a larger black unit with a color LCD screen showing a compass rose and the number '16', and various control buttons and knobs.

Black Box Style

Integrated with VHF Radio



# AIS Class B Transponders



Black Box  
Style

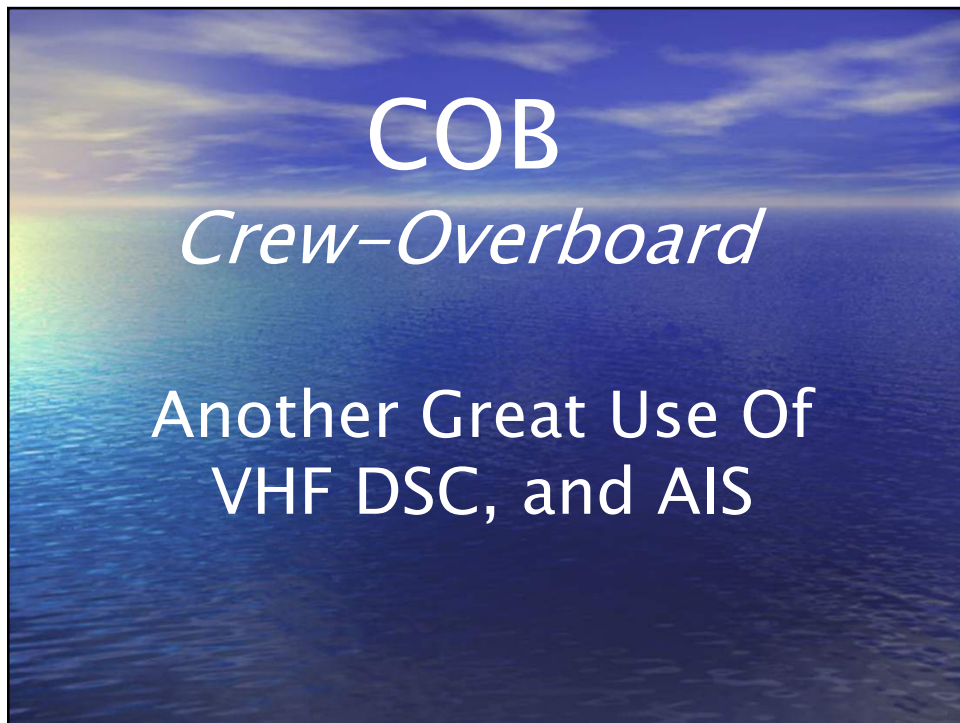
With  
Display

# VHF Radios with AIS Class B Transponders *(NEW)*



B&G V60-B  
Available  
Now

Vesper Cortex  
Available  
VERY SOON



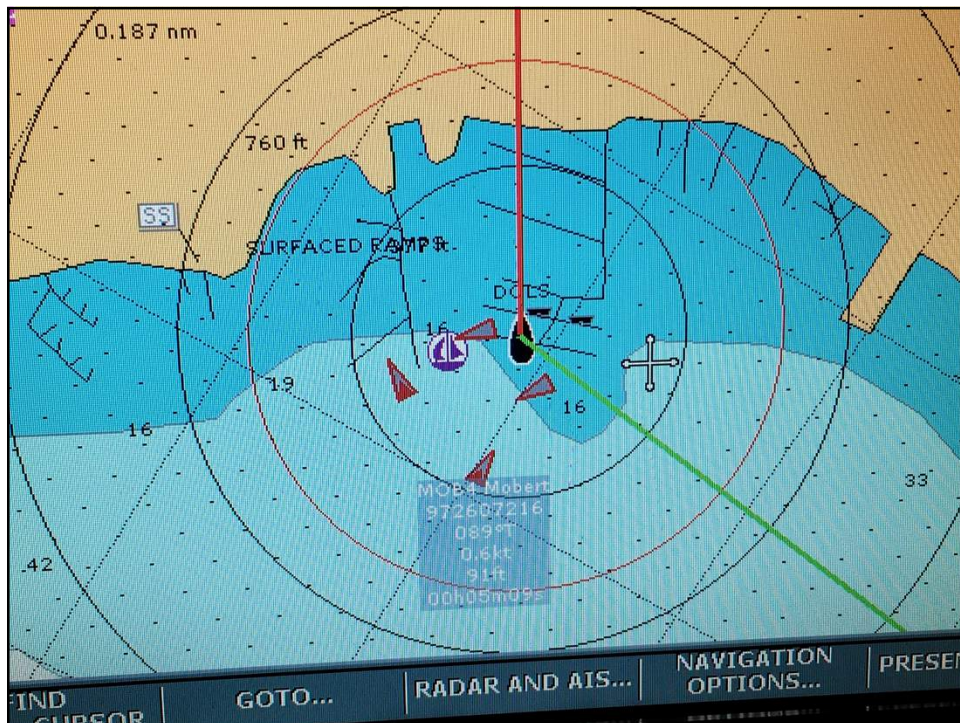


# DSC/AIS SART

(part of GMDSS)



Search and Rescue Transponder  
GPS + VHF DSC + AIS





## PRO

Portable  
Waterproof  
Notifies the most immediately  
available responders

## CON

Short Range (VHF)  
Limited use for singlehanders

## PLB

(not part of GMDSS)



Personal Locator Beacon  
406 MHz  
Satellite Relayed Distress  
Manually Activated

## PRO

Portable  
Waterproof  
Global Satellite Coverage  
Necessary for Single handers

## CON

Doesn't notify nearby ships  
Not automatically activated

## Vessel Distress

Public SAR Services  
(no subscription)

Private SAR Services  
(subscription fees)

# EPIRB

(Part of GMDSS)  
(No subscription)



Emergency Position Indicating  
Radio Beacon  
Some new units have AIS Distress  
Transponders built-in

## PRO

Portable  
Waterproof  
Global Satellite Coverage  
AIS versions Notify Nearby ships

## CON

No Two-Way Communication



# GEOS SAR

(not part of GMDSS)  
(requires subscription)

SPOT/SPOTX Messenger  
Garmin InReach

Iridium Go!  
Globalstar Sat-Fi2

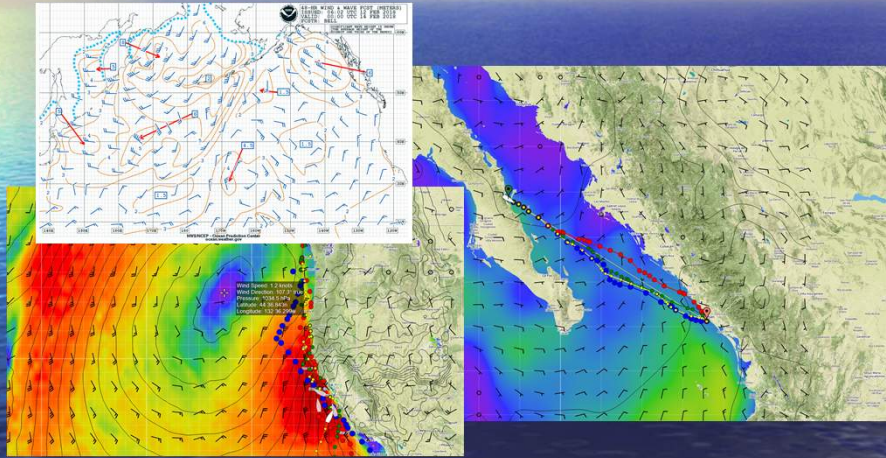
Iridium Extreme (9575)  
Inmarsat ISatPhone2

*All these devices have other uses as well!*

*Second Priority*

Weather Forecasts

# Weather forecasts Passage Planning



## Weather Sources

Broadband:  
noaa.gov, windy.com, etc

HF Radio:  
WeatherFax, TELEX, NAVTEX

Email:  
GRIBs, Text Forecasts

# GRIB Requestors

PredictWind  
ZyGRIB  
GRIB Explorer  
Airmail (Saildocs)

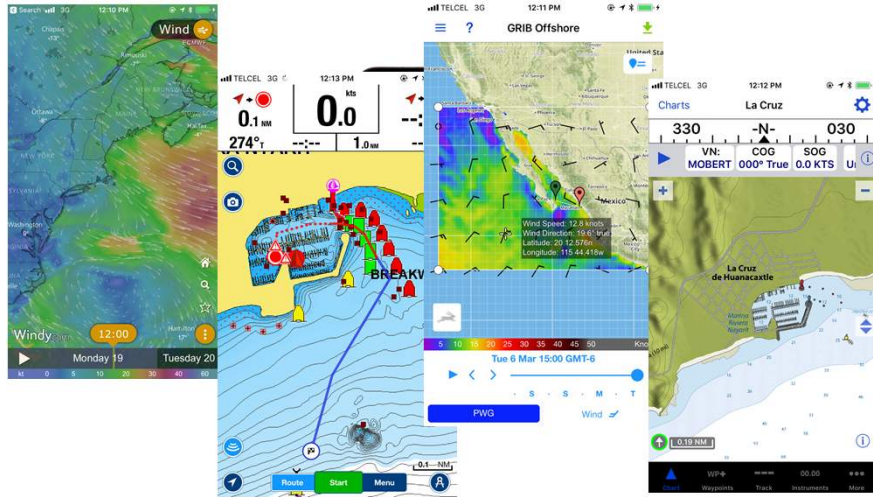
*Also built-in to many nav software programs*

# Private Weather

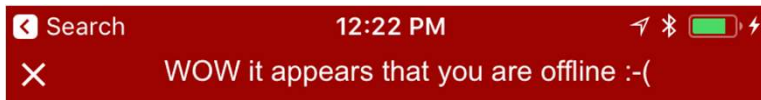
PredictWind  
Theyr  
WeatherNet  
FastSeas  
Weather Router



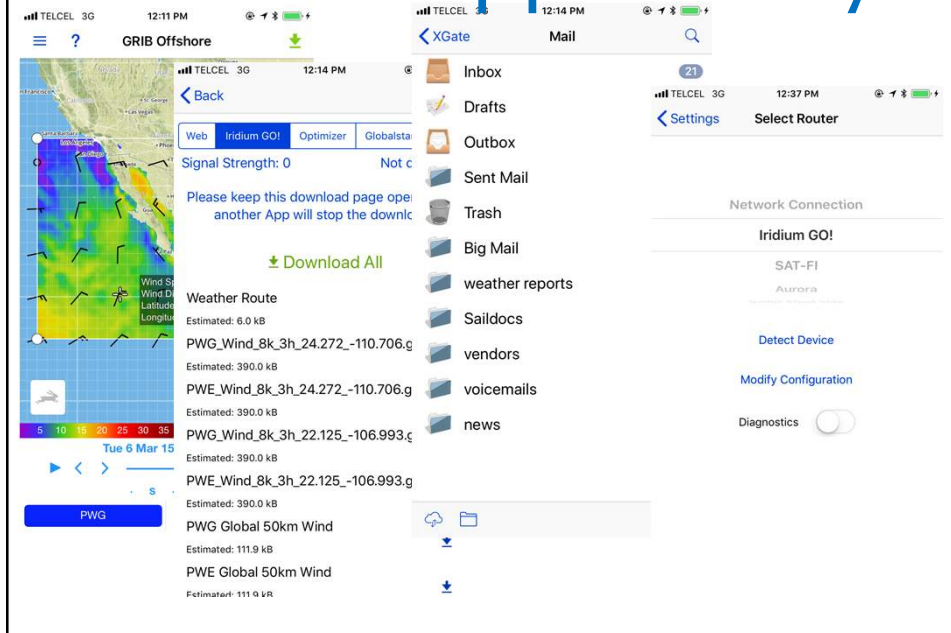
# Smart Phone



# Choose Apps Wisely



# Choose Apps Wisely



*Okay, So How Do  
We Get Internet and  
Email On The Boat?*

# Wi-Fi

*Wireless Networking*

It's Everywhere  
Often Free  
Built-in to your computer  
and Smartphones





## PRO

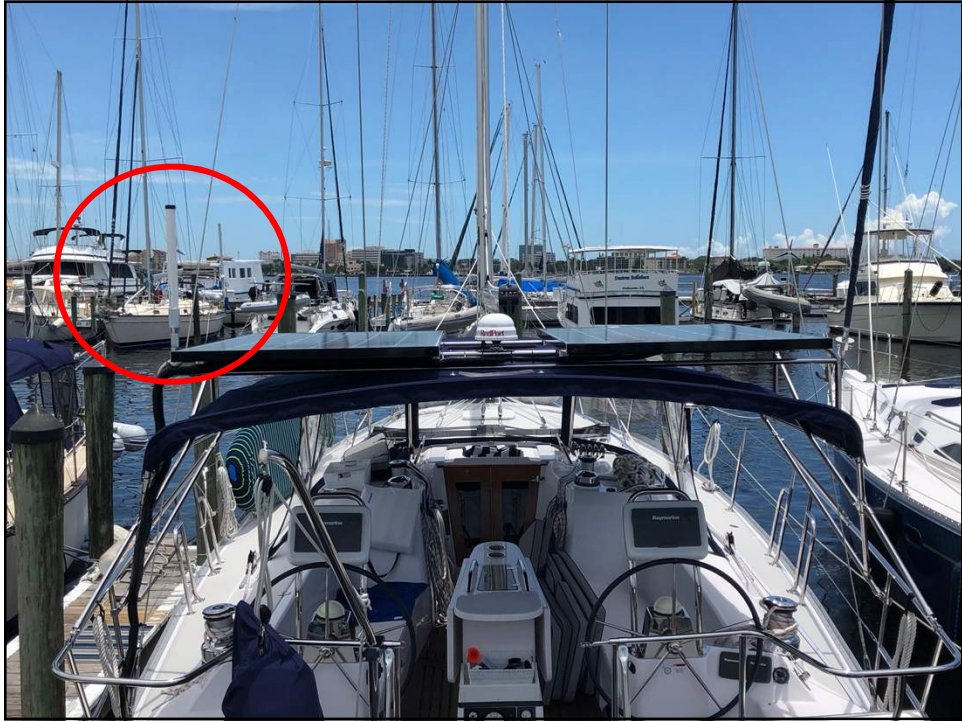
Universally Available  
Inexpensive or Free

## CON

*Cruiser Congestion Syndrome*  
Most Marina's don't do it well  
Generally Not Secure  
**Very Short Range (Marina)**

## Long Range WiFi







# Cellular 3G/4G/LTE

Global

Extensive Coverage

High-Speed

Voice, Text

Full Internet Access





# SIM Cards

*Subscriber Identity Module*

Roaming SIMs

Local SIMs

Prepaid or Postpaid

## TRAVEL FRIENDLY CELLULAR OPTIONS

- T-Mobile USA (for periodic international travel)
- Google Fi (for more extended travel)
- Local In-Country SIM Cards (cheapest data)
- Telestial/OneSIMCard (good while moving between countries or where in-country SIMs are hard to get or more expensive)

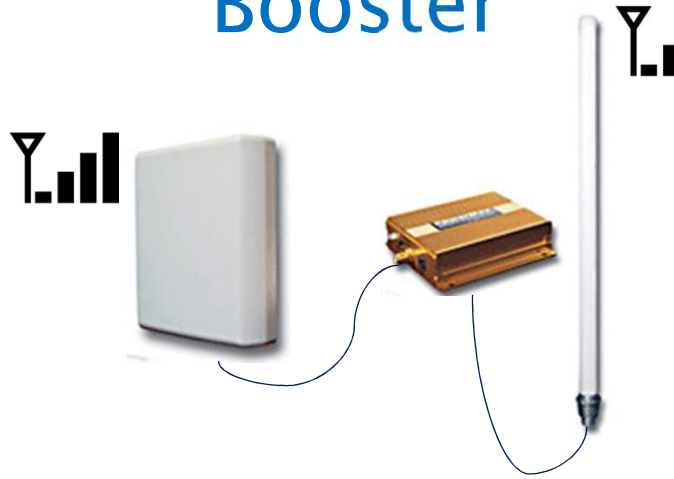
### PRO

Available  
Inexpensive  
Broadband  
Secure

### CON

Roaming Charges  
Sometimes Not Broadband  
Short Range (Coastal)

## Long Range Cellular “Booster”



## Long Range Cellular “Router”

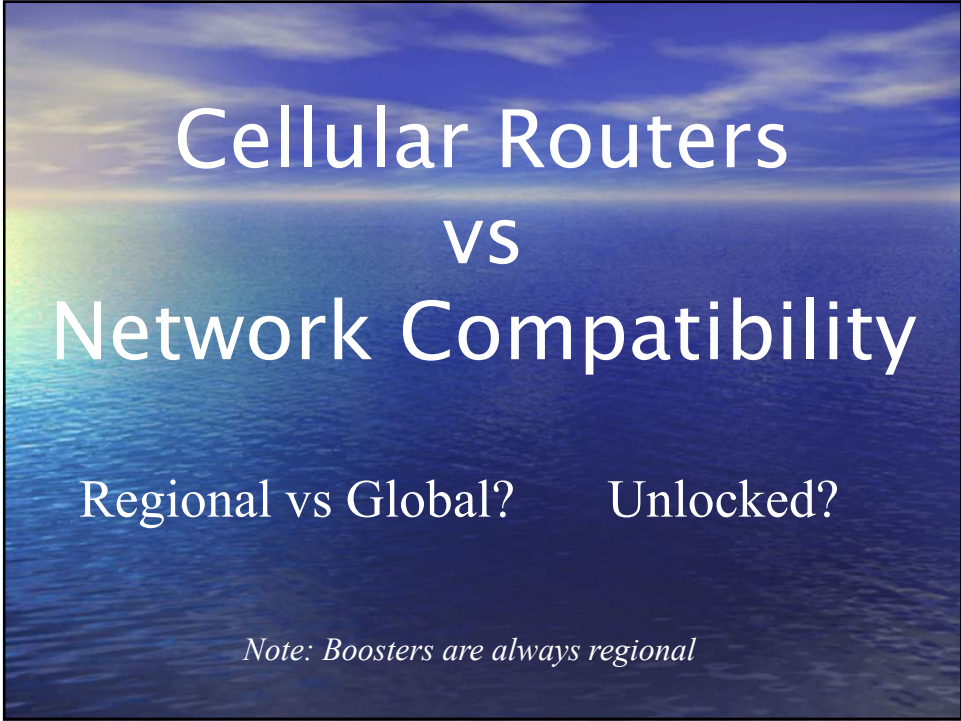






# Long Range Cellular AND WiFi Router





# Cellular Routers vs Network Compatibility

Regional vs Global?      Unlocked?

*Note: Boosters are always regional*



## What About 5G?

Short Answer..  
Don't worry about it.





*What About  
Offshore? Like  
WAAYYY Offshore?*



## HF SSB Radio

High Frequency Single  
Sideband Transceiver

*Email, NOAA WeatherFax,  
and GRIB Files over Radio!*

# (New 2020) Icom M803 HF SSB



## Versatile

Cruiser Nets

Email (incl. GRIBs)

WeatherFax

Navtex

Telex

Telephone Patch

Saildocs

Weather Router

# HF SSB E-Mail System



Worldwide Service

## HF SSB Radio Email Service Providers

[sailmail.com](http://sailmail.com)

[winlink.org](http://winlink.org)

UUPlus



## PRO

Long Range Safety  
Versatile  
Inexpensive to Operate  
Email, GRIBs, SailDocs

## CON

Up-Front Cost  
Learning Curve  
Variable Radio Propagation  
Not True Internet

*Okay, But I Need  
More Than Just  
Email..*



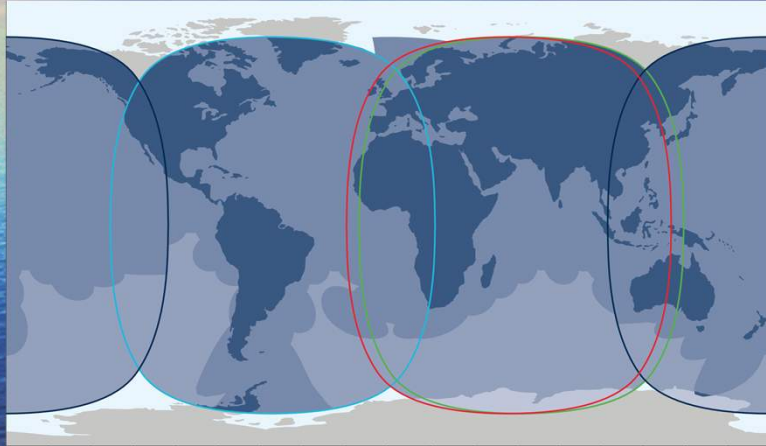
# Satellite Options

## DON'T PANIC!

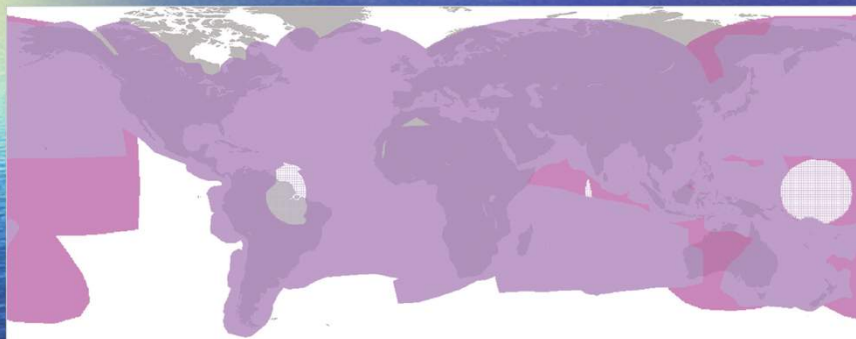
You don't have to win the lottery to be able to afford today's satellite phone



# INMARSAT GEO COVERAGE (Bent-Pipe/Geo)

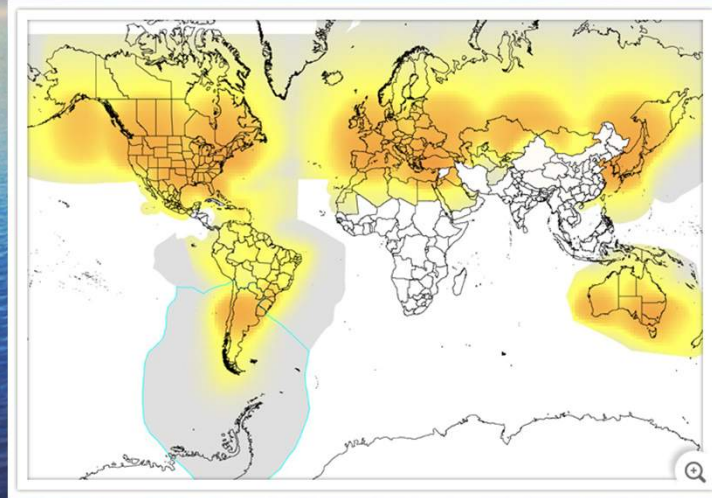


# KVH GEO COVERAGE (Bent-Pipe/Geo)

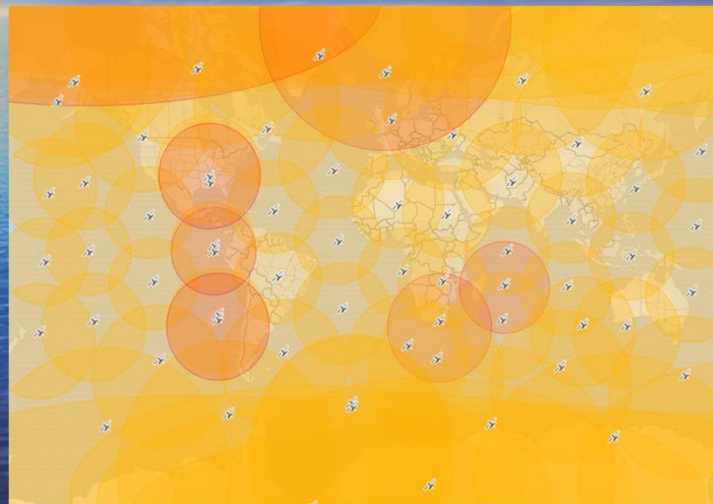




# GLOBALSTAR LEO COVERAGE (Bent-Pipe/LEO)



# IRIDIUM LEO COVERAGE (Cross-Link/LEO)



# Portable Satellite Phones

Voice, SMS, Email, GRIBs



## Add an Optimizer



Connect to your SatPhone via WiFi  
Email and Weather Downloads via SatPhone

## Marine Kits



Better signal, easier data connections,  
and easier to keep powered



# Iridium Go!



- Works with Smartphone
- Unlimited SMS
- Unlimited Data
- Compressed Email
  - Small attachments
- Weather GRIBs
- 100% Global Coverage
- Suspend-able Monthly Plans

## Wireless WiFi Hotspot

*(Good for small emails and GRIBs... no web browsing)*

# GlobalStar Sat-Fi2



- Works with Smartphone
- Compressed Web
- Emails w/attachments
- Whatsapp, iMessage, FB Msgr
- Weather
- File downloads
- 100% Global Coverage

## Wireless WiFi Hotspot

*(Larger Emails, Whatsapp, supports Some Web Browsing)*

# Inmarsat Portable BGAN



- Web Browsing
- Emails w/attachments
- WhatsApp, Facebook Msgs
- Weather
- File downloads
- YouTube
- Skype
- Remote Desktop

## Wireless WiFi Hotspot

*(Web Browsing, downloads, remote desktop, YouTube, video conferencing, and more)*

## PRO

Versatile

Worldwide Service Available

Affordable

Portable (take it anywhere)

## CON

Snail Slow Data

No Web Browsing

# Installed Satellite Phones

Voice, SMS, Email, GRIBs

## Fixed Satphones



Voice, SMS, Email, GRIBs



## PRO

Worldwide Service  
(Iridium 100% global)  
No Moving Parts  
Relatively Low-Cost Hardware  
Integrate with Onboard Network

## CON

High Data Cost  
Slow Data Speeds

## Satellite Phone Speed Enhancement Options

- Web/Email Compression
  - CruisersEmail
  - OCENSMail
- Weather Retrieval
  - PredictWind Offshore
  - Weather4D



## Email Data Usage Comparison

### 32KB Text-only Email      2MB Email w/Photo

Outlook/Apple Mail

60KB

Data used

Outlook/Apple Mail

2.7MB

Data used

With *CruisersEmail*

4.4KB

Data used

With *CruisersEmail*

1.97MB

Data used

1300% SAVED

30% SAVED

What Do You  
Really Want?

# Broadband at Sea

Voice, Web, Email,  
Weather, YouTube,  
Skype, WhatsApp, More

## Fixed LEO Systems (no moving parts)



Medium speed data for web, weather, voip, and more  
(100% global coverage)



## Fixed GEO Systems (moving dish inside dome)



Higher speed data for web, weather, voip, and more  
(Worldwide coverage but with gaps)

## PRO

- Worldwide Service
- Relatively High-Speed Data
- Relatively Low Cost of Data
- Integrate with Onboard Network
- Conference Calling
- Better Voice Quality

## CON

- Large and Expensive Hardware
- Higher Minimum Monthly Costs

\$3k-10k

## Leisure BGAN

150-464 kbps



- Compressed Web
- Compressed Emails w/attachments
- Whatsapp, iMessage, FB Msgr
- Weather
- File downloads
- Remote Desktop possible on higher speeds

Inmarsat Broadband  
Global Area Network

\$7k

## Iridium Certus

750 kbps (*NEW*)



- Web Browsing
- Emails w/attachments
- WhatsApp, Facebook Msgr
- Weather
- File downloads
- YouTube
- Skype
- Remote Desktop
- 100% Global Coverage

Iridium's NEXT  
Generation Satellite

\$17k+

## Mini-VSAT 5 Mbps+



- Web Browsing
- Emails w/attachments
- WhatsApp, Facebook Msgr
- Weather
- File downloads
- YouTube, NetFlix
- Skype
- Remote Desktop
- 100% Global Coverage

## (Mini) Very Small Aperture Terminal

\$25k+

## VSAT Guaranteed Performance Unlimited Usage



- Performance Set to your needs and budget!
- Unlimited Use for a Flat Fee/Month
- No Overages
- No Throttling
- Coverage Varies by provider and your needs

## Very Small Aperture Terminal



# How Fast?

Email an iPhone Photo:

This message is 2.2 MB. You can reduce message size by scaling the image to one of the sizes below.

Small (43.2 KB)

Medium (126 KB)

Large (923 KB)

Actual Size (2.2 MB)

Emailed Photo	<u>Iridium</u> Handheld Or Go!	<u>Inmarsat</u> Fleet One	<u>Globalstar</u> Sat-Fi2	<u>Iridium</u> Certus	<u>KVH</u> v3HTS
43KB	~3 min	~4 secs	~5 secs	<1 sec	<1 sec
126KB	>7 min	~11 secs	~15 secs	~1.5 secs	<1 sec
923KB	>52 min	<2 min	~2 min	~10 secs	~2 sec
2.2MB	>2 hrs	~3 min	~4.5 min	~24 secs	~4 secs

# How Much\$?

Email an iPhone Photo:

This message is 2.2 MB. You can reduce message size by scaling the image to one of the sizes below.

Small (43.2 KB)

Medium (126 KB)

Large (923 KB)

Actual Size (2.2 MB)

Emailed Photo	<u>Iridium</u> Handheld	<u>Inmarsat</u> Fleet One	<u>Globalstar</u> Sat-Fi2	<u>Iridium</u> Certus	<u>KVH</u> v3HTS
43KB	\$5.00	\$0.21	\$0.21	\$0.30	\$0.04
126KB	\$11.00	\$0.63	\$0.63	\$0.86	\$0.12
923KB	\$75.00	\$4.50	\$4.50	\$6.30	\$0.90
2.2MB	\$300.00	\$11.00	\$11.00	\$15.40	\$2.18

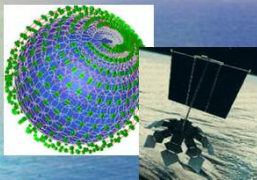
# PRO

Global Broadband Internet  
Netflix!  
Your Business Aboard  
Wow!

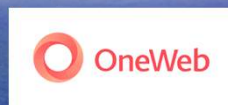
# CON

Expensive Hardware  
Expensive Base Fees  
Inmarsat and VSAT have gaps

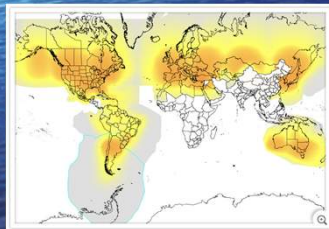
# But, but.. Elon Musk!!



Remember Teledesic?



Astronomers already upset



You can never have enough ground stations

# Satellite Messengers And Trackers



## SPOT

Pre-set Outgoing SMS  
Tracking  
GPS  
SOS(GEOS)



## SPOTX

Two-Way SMS  
Tracking  
GPS  
SOS(GEOS)  
Compass  
Waypoints



## INREACH

Two-Way SMS  
Tracking  
GPS  
SOS(GEOS)  
Spot Weather  
Mapping

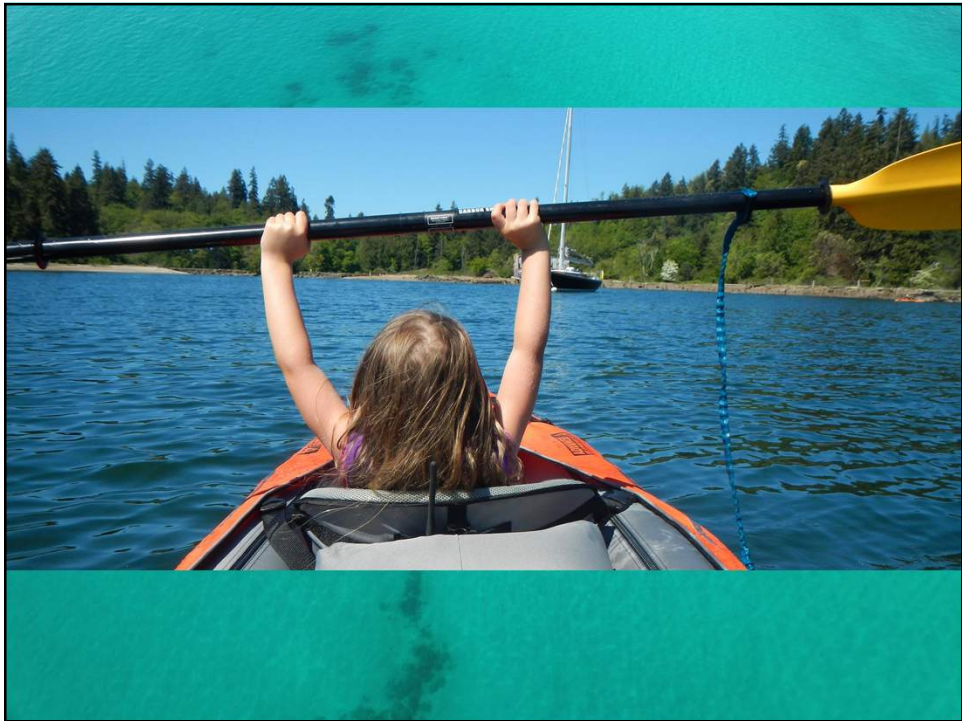
## PRO

Inexpensive  
Simple Messaging  
Online Map Based Tracking  
Unlimited Messaging Plans

## CON

Yearly Service Charges  
No Calls, No Email, No Gribs









# How To Stay In Touch

**SEA-TECH SYSTEMS™**  
Navigate Anywhere • Connect Everywhere

[www.sea-tech.com](http://www.sea-tech.com) 206-792-9540

# The Choice is Yours





## T-Mobile – US SIM with Roaming



Free Roaming

5GB/Mo in CA/US  
(LTE)

Unlimited Slow Data  
(200+ countries)

*Great for Mexico and  
Temporary Cruising*

## TelCel – Local Mexico SIM



\$400MXN for 5GB

~\$4/GB

*Carlos would love to have  
your Business!*

## Claro – Local C.America SIM



\$20USD for 4GB

~\$5/GB

*Carlos would love to have  
your Business here too!*

## Fi – US SIM with Roaming



\$20/Month Min

\$10/GB

\$80/Month Max

15GB LTE/Month

*Google Fi  
Flat Rate International Data*

## Telesial – Global SIM



Depending on Country:

\$6/GB

\$20/GB

\$70/GB

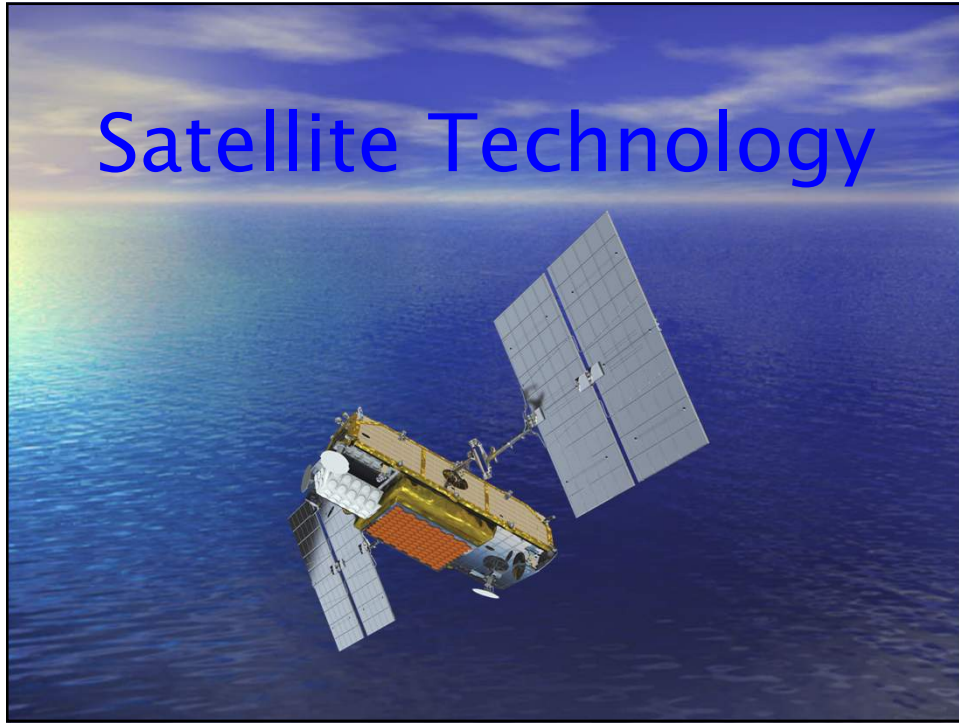
*True Roaming SIM  
Variable Rate International Data*



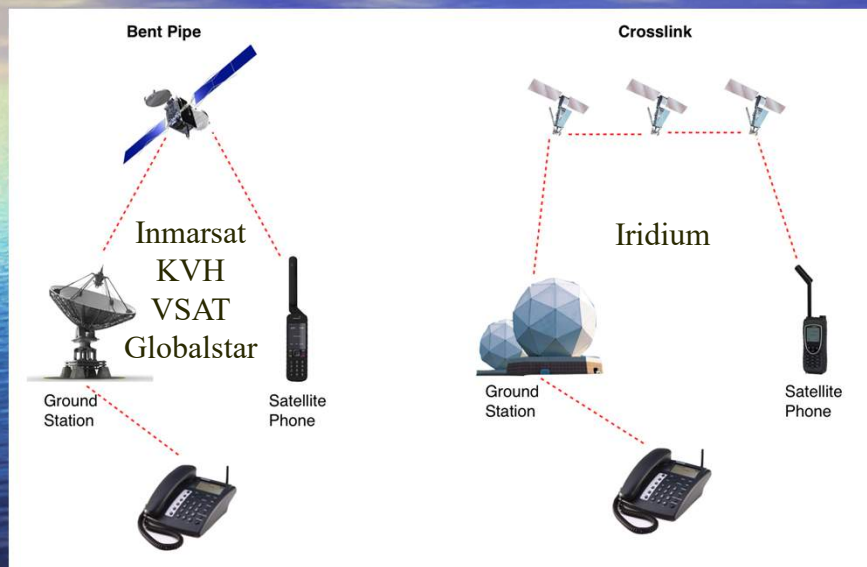
*BaTelCo –  
We'd love to have your business*



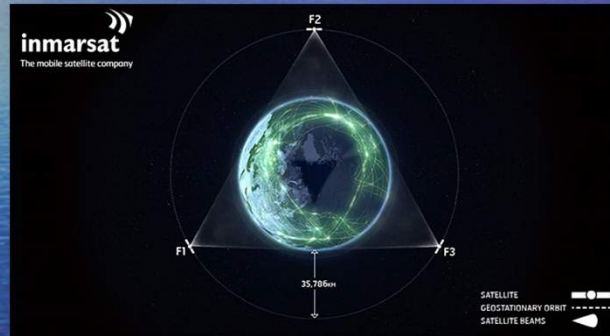
# Satellite Technology



## NETWORK TYPES

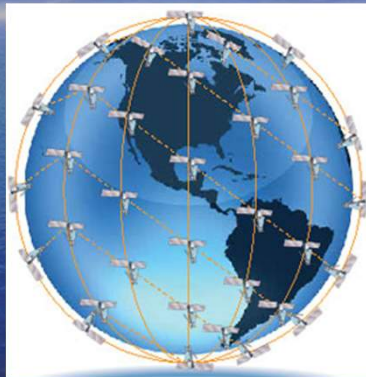


# Geostationary



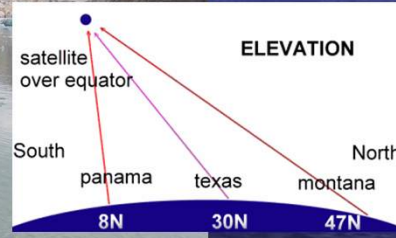
GEO

# Low Earth Orbit



LEO

# GEO OBSTRUCTIONS



S. SAWYER GLACIER, S.E. ALASKA (58N LATITUDE)  
GEO SAT SOUTHERLY 23DEG ABOVE HORIZON  
SIGNAL BLOCKED BY FJORD WALLS