HYPER-G

NEXT-GEN 4G & 5G MOBILE CELLULAR DATA

SATMARIN is a global satellite VSAT and TVRO service provider specialized in delivering turn key state of the art solutions for the maritime commercial, offshore and leisure market.

EXOFLUX is the terrestrial equivalent of Satmarin, specialized in fixed and mobile VSAT connectivity, SNG, 3G/4G/5G and a wide range of other communication solutions.

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HYPER-G MOBILE TERMINAL

The Hyper-G Series deliver unparalleled mobile 2G/3G/4G/5G connectivity and value. Its technical capabilities make it ideal for both operations and crew welfare services. It's easy to install and comes pre configured to your requirements.

SYSTEM HIGHLIGHTS

- 36 Custom designed high gain antennas outperforming any omnidirectional solution available on the market
- Wide elevation for long distance performance on moving vessels
- Selects up to 6 individual LTE connections based on performance and availability
- Available in LTE, LTE-A and LTE-A-Pro version
- No signal loss due to long RF cable runs
- Single coaxial or Power / Data connection

SERVICE HIGHLIGHTS

- Fully pre-configured unit includes activated SIM cards
- No on board configuration required.
- Drop in solution when replacing existing coax based systems
- Customized configuration available
- Remote performance monitoring

MODEM OPTIONS

- LTE, LTE-A, LTE-A-PRO
- CAT 4, CAT 6, CAT 11, CAT 18 combinations
- Regional
- Global

BDU-ADU CONNECTION OPTIONS

- Single Coax (up to 1 Gbps)
- Power + RJ45 (1 Gbps up to 2.5 Gbps)
- Power + Fibre (> 2.5 Gbps)

DATA DISTRIBUTION OPTIONS

- Load balanced
- Bonded

FORM FACTOR

- Desktop
- Rack Mounted

Models and prices on request

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SPECIFICATIONS

TECHNICAL SPECIFICATIONS

POWER SUPPLY

- Control Unit & Power Supply: 110 - 240 V AC
- Antenna: 18-30V DC (powered by BDU or external PSU)

WEIGHT

- Control Unit & Power Supply: 1.2 kg
- Antenna: 8.5 kg

DIMENSIONS

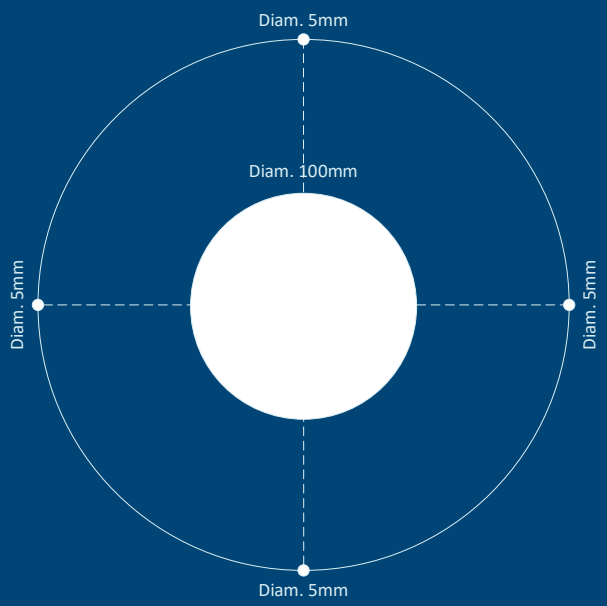
- Control Unit & Power Supply: 252 x 252 x 44 mm
- Antenna: 560 mm diameter x 270 mm height

OPERATING TEMPERATURE

- Control Unit & Power Supply: -25°C to 45°C
- Antenna: -25°C to 50°C

MOUNTING PATTERN

- 235mm radius 4 x 5mm
- Standard VSAT mount adapter available



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LOCATION

BELOW vs ABOVE DECK

The Hyper-G maritime cellular terminal will guarantee you an as stable and distant data connection as possible.

To achieve this the Hyper-G has been designed to gain as much signal as possible and to reduce signal loss to the bare minimum.

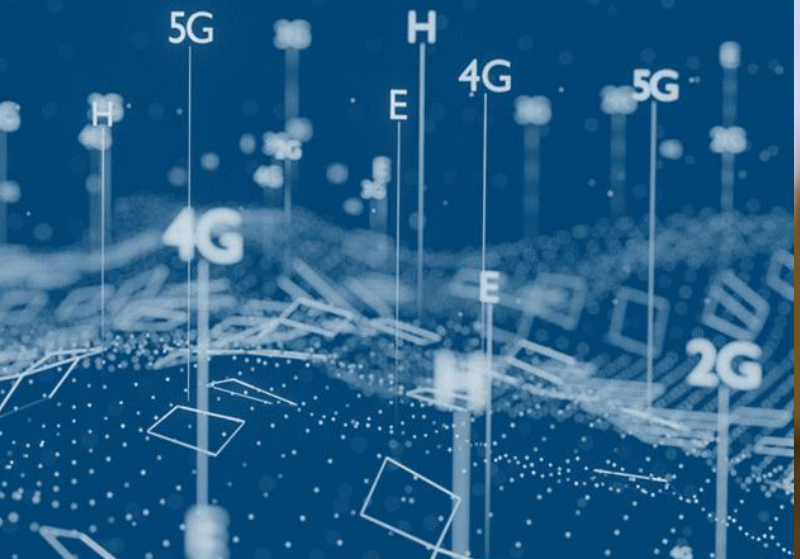
While antennas are usually mounted high up a mast we often discover the actual cellular router to be below deck. While this makes access to the cellular router easier it also adds in cabling between the cellular router and the actual antenna.

The benefit (gain) of the antenna is then often lost due to the attenuation (signal loss) of the longer cables. This results in poorer reception, lower speeds, higher latency and diminished range.

At Satmarin Exoflux we put the cellular modem as close as possible to the antennas and are able to achieve minimal signal loss and increased stability, gain, speed and distance.

The drawback of above deck cellular routers is that if a SIM card needs to be changed in the unit this can be less convenient than when the unit is below deck. But then how often do you switch SIM cards?

While this can be a concern when switching SIM cards often, we believe that the advantages outweigh the disadvantages by a landslide



PERFORMANCE

MAXIMUM DISTANCE

The maximum distance between the ship and the Mobile Service Provider's masts is limited by the signal strength received and transmitted by both sides and the necessity for the signal to be within the line-of-sight (or reflection)

Clear line-of-sight is a primary requirement to establish a connection between the Hyper-G and the Mobile Service Provider's Mast (Node). The higher the Node is located the further it will be able to connect.

Equally the higher the antenna is mounted on the ship, the longer the distance will be that it can cover.

Next time you hear about distances achieved … ask for the conditions and elevation, it makes a huge difference.

Maximum Distance in Km.		Height of Node in m.							
		25	50	100	150	200	250	300	400
Antena Height in m.	5	26	33	44	52	58	64	70	79
	10	29	37	47	55	62	68	73	83
	20	34	41	52	60	66	72	78	87
	30	37	45	55	63	70	76	81	91
	40	40	48	58	66	73	79	84	94

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PERFORMANCE

RADIATION ANGLE & BEAMWIDTH

Omni-directional antennas increase their power by reducing the angle at which they transmit and receive.

The more powerful the omnidirectional antenna the smaller the beam angle that your antenna can use. For a wider beam the same power needs to be distributed over a wider area and therefore loses its strength

Hyper-G has a 60° elevation angle allowing for -30° to +30° inclination while still achieving optimal signal transmission and reception.

9dB omni
12° angle
Can reach the Node
Unstable when > 6° inclination

9dB omni
12° angle
Sufficient power but overshoots the Node

4dB omni
40° angle
Can't reach the Node due to insufficient power

10dB Hyper-G
60° horizontal angle
Can reach the Node even in heavy weather with inclination from +30° to -30°

10dB Hyper-G
60° elevated angle
Especially designed Hyper-G models are available for river cruises where Cellular Towers are located on hills alongside the river.

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HYPER-G SERVICE QUALITY

SERVICE QUALITY

The available bandwidth at a Cellular Tower is one of the key factors in how much data can be transferred to and from the Cellular Tower. When crowded, during an event, capacity might be reduced due to the amount of connected users.

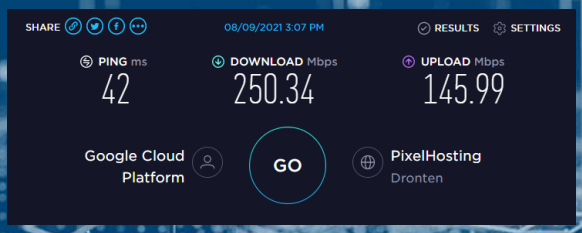
Hyper-G Advantage: With its 6 directed antennas and individual modems Hyper-G will target the best Cellular Tower in each direction, connect and combine the data to achieve highest possible up and download speed achievable.

The newer 5G modems with ultra low latency are only as good as the service that is being provided by the Cellular Tower (see above) You might get the same performance with an 4G modem as with a 5G one especially when trying to cover large distances. The costs and power requirements of the higher end modems are more important and (at this time) not always the best choice. Hyper-G can be equipped with modems from CAT4 to CAT20.

Antenna Performance: Directing an individual antenna to a Cellular Tower will allow it to achieve higher throughput and/or cover larger distances. While directional antenna do only cover a part of the 360° view, they all together cover it with more signal strength. Resulting in a more stable signal.

Throughput achieved while on a highway at 120km/h. The download might be expected, the upload is exceeding regular mid range routers by far.

Reliable and high throughput upload can be a key requirement for industrial and media applications



Live comparison on a single ship simultaneously between a regular mid range 4G Router and a Hyper-G unit. The Hyper-G will offer more stability at the edge, when the regular 4G can't keep the signal.

CHOOSING DATA SIMs

STEERED VS. NON-STEERED

The advantage of using a non-steered SIM is that no individual network has priority. This allows to seamlessly change between networks, they are more flexible and effective.

Steered SIM Cards use one primary network that only steers to another if the network drops. This one primary network has preference over all other networks that may be available. A steered SIM doesn't prioritize the strongest connection available.

POOLABLE vs. NON-POOLABLE

Poolable SIM cards can be used together over several devices and use the rate of a subscribed volume pool.
Non-Poolable SIM cards are limited to their individual bundle

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BONDING / BALANCING

Load balancing is used to efficiently distribute the resources of multiple Internet service providers (ISPs) on one device among many clients and connections.

Bonding is used to utilize the resources of multiple ISPs in order to achieve higher speeds for a single connection.

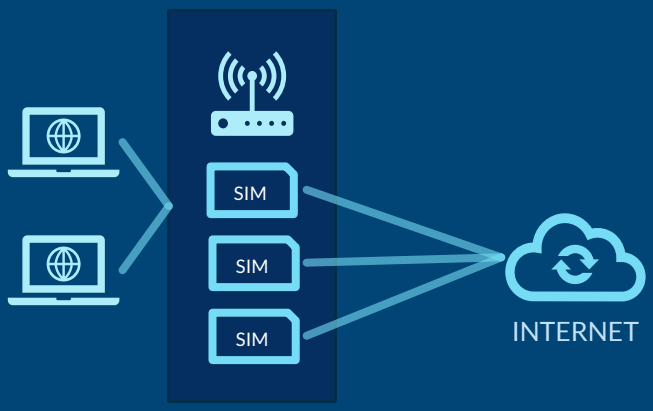
Therefore, load balancing is usually used to provide better service to an entire network by distributing existing resources (such as a large Wi-Fi network), while bonding is used where having the maximum speed for a single connection is required (such as video streaming or large file download and upload).

LOAD BALANCING

When you use apps on your devices, information travels to the internet through network sockets – think of them as tubes. A load balancer works by distributing these sockets across all of the Internet connections you are currently using. In this way, load balancing prevents overloading a single connection, thereby increasing overall performance.

So, as long as your apps use lots of sockets, a load balancer does its job and you get faster Internet. General web browsing and torrenting are the most common scenarios for which load balancing should be sufficient.

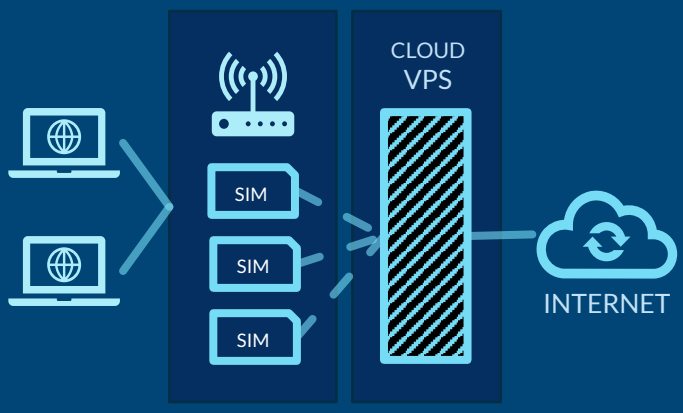
However, other activities that use only a single network socket to connect to the Internet will not be optimized through load balancing. For instance, video streaming, VPN connections, and large file transfers are not sped up by a load balancer.



BONDING

As mentioned above, load balancing optimizes Internet traffic per sockets. Channel bonding, on the other hand, goes one step further and optimizes traffic into even smaller chunks of data called network packets. Following the 'tubes' analogy for sockets, we can think of these network packets as the 'liquid' that flows through those tubes.

Broadband bonding makes it possible to spread these individual packets across multiple Internet connections. By splitting all your web traffic at the packet level, even large, single-socket transfers, such as VPN connections, video streaming, and file transfers, can be given a major speed boost!



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