

# iSat

Precision RF integration

## Satellite Technology Products and services Overview



- *Fixed Groundstation Systems*
- *Roof Mounts and Flyaways*
- *Satellite Hub/modem platforms*
- *Video Broadcast Platforms*
- *RF feed design and production*
- *Inclined orbit tracking*

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## About iSat

At iSat we are experts in the design, integration and support of satellite groundstations and mobile satellite terminals. Whether you need:

- One off terminals for very specific jobs
- Multiple systems for a network rollout project
- Ongoing production to support your managed satellite services

We can provide for your needs and we're confident we can exceed your expectations. We also provide the following services which you can select from to compliment the delivery of your system and ensure that it is properly supported throughout its operational life.

Installation and commissioning services

Specialist RF components design

Factory Acceptance testing

Ongoing systems support

Full project management

Antenna range testing



*Cody Technology park, Farnborough,  
where our office is located.*

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# Precision RF design - Our Ethos

In everything we do we aim for the highest levels of precision, but this is especially true of our system specification and design methods. In the satellite industry the word 'Precision' is synonymous with 'expensive'. At iSat we want precision to translate into value not extra expense, so we approach our terminal design with this in mind.

We pay attention to every fraction of every dB or loss and gain of every single component we use. Just one benefit of this level of precision is that we can minimise the amount of amplifier power needed to fit your link budget.

The amplifier will usually be the highest cost item within a system. Being able to specify and mitigate system losses accurately before purchase could mean the difference between buying a 10Watt or a 20Watt amplifier to meet your link budget. Based on average industry pricing this is likely to mean a saving of thousands of dollars per antenna system. Look at our example below:

Centre Freq (MHz)	Freq Range (MHz)	Insertion Loss (dB)	Return Loss (dB)	Rejection (dB @ MHz)	Power Handling (W)	Connectors
7850	7250-8450	≤1.5	≥15	≥40@DC-6300&9400-12000	5	SMA-F

Passband:	From 7.25 GHz to 7.75 GHz
Passband Insertion Loss at Bandedges:	0.45 dB max, 0.35 dB typical
Passband Return Loss / VSWR:	18 dB min

Take a look at these excerpts from the datasheets of an X-band filter made by a well known manufacturer Vs our X-band filter. The first filter may perform just as well as ours, but in a link budget we would have to assume a loss of 1.5dB as the manufacturer has specified a cautious ballpark figure. As our filter has a specified maximum insertion loss we have an extra 1.05dB of power in the link budget, which can easily translate to a step down in amplifier power needed.





## Fixed Ground Station Systems

Over the years we at iSat have provided many remote ground station terminals for satellite applications covering X, C, Ku and Ka bands and ranging in antenna size from small fixed remote systems to large motorised hub antennas with tracking capability.

Our methods and attention to detail ensure that you don't just get a generic system that we've sold a hundred times, you get a system tailored to your exact needs at a competitive price.

*External shelter built to protect outdoor equipment from the hot sun and improve the aesthetics of the antenna site.*



*One of our 6.3m installations for Cable and Wireless Seychelles.*

Planning and procurement for antenna systems can be quite complicated and technical discussion around requirements can be equally confusing. To lighten the load on our customers we've reduced our need for information to just 5 key parameters which will tell us everything we need to know to start specifying and designing your system:

1. Transmission Band
2. Reception Band
3. Minimum required uplink EIRP Figure
4. Minimum required antenna G/T Figure
5. Antenna location dimensions and blockages



## Fixed Ground Station Systems

Once our 5 Key parameters are defined, you can choose from our standard options to roundoff your system package and/or specify any specialist requirements you have.

### Standard Hardware options include:

- Single Tx chain or redundant
- Single Rx chain or redundant
- Cold Spares
- Lightning and surge protection
- External lighting
- Fixed or motorised with tracking
- Out of band management capability
- In band management capability
- Full System Warranty
- De-icing systems
- Outdoor Equipment Cabinets
- Bespoke Brackets and fixings
- Outdoor Mains distribution panel



A 2.4m Ka band system installed for Es'Hailsat in Qatar



## Roof mounts & Flyaways



*2.4m C-band auto acquisition and tracking system for SNG applications in Mauritania*

iSat regularly works with military and newsgathering organisations building systems for applications where mobility is absolutely essential. In this area we focus on the weight, size, ease of carriage and ease of setup. This means that when you arrive at a transmission location, you will spend a minimal amount of time preparing the technology, maximising the time you have to do what you do best.

### Key Metrics for portable antennas

- Weight and packed size
- Number of bags/cases
- Setup and acquisition time
- Skill level of operator
- Public safety
- Number of components parts



*Vehicle mount conversion from Ku to X-band for a customer in Canada*

Whether you need a man portable system in a single rucksack, a large portable system in flight cases or even a vehicle mounted and fully automated system, we have the experience to guide you through the process of turning your operational requirements into technical requirements. Then once you know exactly what you need, we can build it for you.





## Satellite Hub/Modem Platforms



*One of many racks that make up the containerised mobile satellite Hub which we designed and built for Paradigm*

We have experience in working with many of the well known satellite modem platforms and network topologies and currently supply the following brands:

**UHP Networks**

**Newtec (Dialogue)**

**Comtech**

We can guide you through the benefits of each and help you decide which platform and topology best suits your needs.

We also have well established relationships with system manufacturers and can call on the very best of expert support in design, configuration and bandwidth optimisation



*IP video platform built for Kuwait TV*



## Video Broadcast Platforms

Tv broadcast is one of the environments where we do a lot of work. Whether it's broadcast contribution links, direct to home platforms or even portable systems for newsgathering and video backhaul, we understand the specific technologies that are unique to video over satellite. Our technical staff have even spend some of their careers working in Master Control Rooms and Broadcast Teleports.



**Video compression/encoding platforms**

**Live TV contribution systems**

**Video and audio routing/switching**

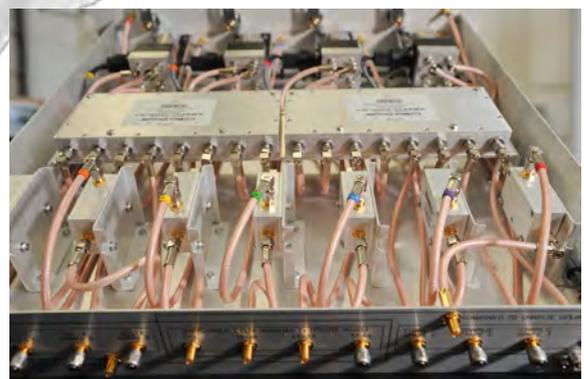
**Talkback communications**

**L-band routing/switching**

**Redundancy systems**

**Video monitoring**

*Rack mountable assembly designed and built by iSat to provide L-band signal distribution*





## RF Feed production

The standard method of RF feed production within the industry uses injection moulding. This can be a very expensive method of production if a relatively small amount of feeds are needed, due to the cost of design and manufacture of a mould template.

At iSat we use a machining method to produce our feeds. This simplifies the design process and eliminates the cost of a mould. This means that for manufacture of smaller numbers of feeds (typically 100 or less) we can beat the cost of most of the big manufacturers.



*Our Circular Ka band feed developed for use with Nilesat 201's Ka band transponders*

*Our Ka band M4 feed which is currently in live use and enabling the sale of Es'Hailsats inverted Ka band space segment, where the Reception frequency is higher than the transmission frequency*



This has been a very successful venture for iSat, and we have helped numerous satellite operators to improve the commercial viability of their 'awkward' bandwidth by manufacturing feeds that fit their transponder frequencies exactly.

This can lead to improvements in bandwidth efficiency and has often enabled the sale of bandwidth which was previously unsaleable.



## Our feed production process

1. Once we receive the requirements for a feed, we pass them to our RF design engineer, who designs all of the internal cavities of the feed and uses RF modelling software to test the expected performance of the design.
2. We receive a completed cavity design from the RF engineer and pass it on to our draughtsman, who then designs the external dimensions and mechanical parts of the feed, and prepares all of CAD drawings
3. We pass our CAD files to our manufacturing partner, who can manufacture the feed in batches with discount based on the quantity of each batch.
4. We receive the finished components parts of each feed and assemble them in our workshop, integrating any required filtering or switching capability required to create a full feed assembly.
5. We test each feed assembly individually for performance and functionality, before applying a paint finish if required and package the feeds.
6. You receive the finished product ready to bolt straight onto your antenna, with individual test results for each feed to prove its performance.



*One of our feed kits fresh from the manufacturer ready for assembly and testing.*



## Inclined Orbit Tracking



This motorised feed assembly and controller is iSat's innovation project. Although still in development, we already have a working model and expect to release the product in the 1st Quarter of 2019.

It's tracking performance will compete with currently available solutions but at a fraction of the cost.

### Current tracking Methods

**Beacon Tracking**—The traditional method of Geo-satellite tracking is based around constantly adjusting the antenna position to find the best receive level of a signal downlinked from the satellite. The problem with this method is that it needs to constantly point the antenna away from the satellite in multiple directions in order to find out where the best receive level is by comparison. This method results in fluctuations in received signal power at each end of the link and is also susceptible to interference which can cause loss of the tracked satellite completely.

**External positional data tracking**—More recently, a new tracking solution has emerged which uses very accurate positional data gathered by agencies which track celestial objects and make the data available online. An antenna can then track the required satellite by knowing exactly where it is and exactly where it will be at a given time. This eliminates two of the big drawbacks of beacon tracking although current solutions are rather more expensive.



## Inclined Orbit Tracking

### Our method

Our tracking feed is an evolution of the external positional data tracking method, in which the antenna reflector is fixed and the feed moves along a single axis of travel. Add in some positional data and some clever maths and we now have a tracking solution which is far more accurate and reliable than beacon tracking and significantly cheaper than any other commercially available solution. Not to mention it can be retro-fitted to an existing fixed antenna so you can go inclined with minimum effort and minimum cost.

We have a wealth of technical information and business case examples for this product so get in touch if you want to investigate the product further.

***This product has the potential to literally half your bandwidth fees for a one off cost of less than \$10,000 and installation only takes a few hours***

*Our development model has been accurately tracking NSS7 for months*



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# Technical Training

Our training packages are very comprehensive and provide industry recognised qualifications. Below is our standard training package template which can be further tailored to suit specific needs:

## 1. Online Pre-Training

To supplement our own training, we use an online training package supplied by the Global VSAT Forum (GVF). This course takes around **5-15 hours of study** ranging from basic satellite and antenna theory to antenna installation and commissioning and practical exercises

## 2. Instructor lead training (4 Days)

- 1 Day satellite theory overview (classroom)
- 1 Day system specific theory (classroom)
- 1 Day installation and commissioning (practical)
- 1 Day System specific troubleshooting (Practical)

## 3. Practical Assessment (GVF HOST-B 1 Day)

All students are individually assessed on practical installation skills, antenna construction and accurate antenna pointing.

### Certification

Providing the students pass the Online Pre-training and the practical assessment, they will receive the 'Basic Satcom Professional' accreditation from the Global VSAT Forum. They will also receive a 12 month subscription to the GVF online training platform allowing them to complete further online training and upgrade their accreditation to 'Advanced VSAT Professional' free of charge.



## Additional Services

Repairs and Returns— We have an online portal for our customers to register any equipment faults and initiate the returns process and gain progress updates during the repair process. We are also happy to deal with repairs under manufacturers warranty and coordinate reporting and shipping so you only have one point of contact for your systems support.

Installation services—If you require installation and commissioning of your system we can provide experienced field engineers to do the job. For any project where we perform the installation, we also give 6 months of free technical support (Expenses only will be charged for on-site support)

Technical Support—We can provide technical support for any of your satellite systems whether they were sold by us or not. For larger projects where the requirements dictate specific technical support terms, we can provide ongoing support contracts at fixed cost. This way you can budget your system accurately by eliminating the uncertainty of future technical support costs.

Project Management—For larger or longer running projects we can appoint a project manager dedicated to running just your project. This way you can leave all of the project groundwork to us, leaving you free to concentrate on the key operational and budgetary decisions.



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