# DRASTIC
# Starting a communications project

## Introduction

This document is designed to help you to define your needs and collect the relevant information to start a successful communications project using VSAT and wireless networks in the developing world.

## What are you trying to achieve?

Almost any communications capability you can imagine is possible if the budget is big enough. For example, the entire nation of Tonga is provided with broadcast TV, internet, international fax, phone and cell phone backhaul using VSAT. Whole cities can be covered with wireless networks. At the other extreme, VSAT can be economic for a small office or group of families where only one or two people will be using the connection at any time.

The critical information you need, in order to decide on the appropriate balance between cost and performance is:

1. How many simultaneous users are we providing for?
2. What kind of use do they want to make of internet connectivity?
    a. Percentage of relatively undemanding applications: Instant messaging, browsing, email (with small attachments) and small downloads. [small = less than 500kb]
    b. Percentage of realtime medium bandwidth applications: Voice over IP, streaming audio, etc.
    c. Percentage of high demand applications: video conferencing, video streaming, etc.
3. What level of degradation of performance is acceptable at peak times? [We often find that people who have been living in the developing world think that a connection is fast, when someone who has recently been used to a broadband connection in a “developed” country thinks the same connection is intolerably slow!]

The appropriate technology will be determined from the following information:

1. Where are you based?
2. Where are the users located? (where do we have to get the connection to from a central location?) [It is more cost effective to have fewer VSATs with several clusters of users connected via wireless networking than to have many individual VSATs. Wireless connections can go up to 20Km, subject to terrain. A self completed site survey will verify that particular solutions will be feasible.]

## Keeping it going

Many situations in developing countries are relatively austere environments for communications equipment. Many suppliers cut corners in order to reduce the capital cost of equipment. We would highly recommend that you take a WHOLE LIFE COST view. Engineering the solution correctly in the first place will mean less break-downs, more reliability and a more effective service altogether. You will pay for bandwidth even if your equipment is broken down and you are waiting for spare parts, so it is better to try and avoid breakdowns.

The areas where we suggest particular attention to details are:

1. Electrical power supply
    - Properly stabilized, continuously available, clean power. This will often require gas/solar/wind generation, deep cycle batteries, pure sine wave inverter/charger, voltage stabilizers, etc.
2. Lightning protection

- Proper grounding and surge suppression on VSAT and wireless networking equipment.

## Components of cost

To ensure you consider all the costs of the project, here are some notes on things you might need:

1. Equipment
    a. VSAT Antenna / mount / cabling / grounding / surge suppression / modem* / outdoor electronics
    b. Routers / servers
    c. Wireless access point(s), Customer Premises Equipment, Towers, LAN cabling, grounding / surge suppression, etc
    d. Electrical supply equipment: generators, switches, inverter/charger, batteries, voltage regulators, etc.
2. Bandwidth contract
    a. Consider ACTUAL throughput at peak times, not quoted numbers!
    b. Consider contention and effective contention ratios. (how congested is your shared connection?)
    c. Consider your requirement for some dedicated bandwidth (unshared, CIR)
    d. Consider the efficiency of the VSAT technology you are using. Some (e.g. iDirect) may be up to 30% more efficient at achieving data throughput for a given nominal bandwidth.
    e. Consider length of contract. Short (3-6 month) contracts will be more expensive than a normal 12 month contract. There is probably little benefit for contracting for more than 12 months.
3. Licensing for equipment use for VSAT and Wireless Networking as applicable in the country where you are operating. (In disaster response situations, the Tampere Agreement applies in many countries, which effectively waives licensing requirements.)
4. Shipping and importation costs (much of the equipment originates from the USA.)
5. Installation costs. (Most satellite operators require qualified installers.) This may include:
    a. traveling and accommodation costs for installers and excess luggage for their tools / test instruments.)
    b. Permissions for trenching /penetrating buildings for cables
    c. Possibly custom fabrication for antenna mounts / concrete / labouring costs
    d. Scaffolding, lifting equipment hire, etc for some roof mounted equipment.
    e. Safety equipment / Insurance cover in some installation situations.
6. Spare parts. In situations where there are many users reliant on an installation, it may be expedient to keep some spare components on hand.

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