



**Make the skies safe and secure  
with Satellite Security Solutions from Crypto AG**

SATELLITE SECURITY SOLUTIONS



## Satellite communication is efficient but subject to tapping!

Does your organisation operate in remote regions, in mountains, deserts or on the high seas? Would you like to have the capability of establishing broadband connections quickly in conurbation regions without major investment (also as back-up solutions)? Or are you simply seeking independence from terrestrial infrastructure so you can conduct mobile communications any time you wish? You can efficiently meet all these needs with satellite links. Application and services providers make transmission capacity available to you today for voice, fax, data, messaging and video with virtually any bandwidth. You can use stationary, mobile or portable terminals depending on the satellite system involved. In utilising the system, you can opt for

bandwidth leasing or dial-up connections and have a number of rate models to choose from. The investment and operating costs for satellite communication is declining steadily while the available bandwidth is constantly increasing. It is no wonder that the advantages of publicly accessible satellite communication connections have been recognized by globally active companies as well as governments, foreign ministries and even defence organisations. Regardless of which SatCom services you use, the confidentiality of your sensitive data and information is at risk because almost every satellite channel is systematically monitored and evaluated. The increased use of public access protocols and readily available tapping products make this

task an easy one. Consistent encryption of all transmitted data and information is the only way to eliminate these risks. With a specially designed high-security solution, you can obtain optimum support for your security policy and render your communications untouchable. That is why you should let experienced experts from Switzerland provide you with a solution for handling your security problems. Crypto AG has been working for decades exclusively with encryption technology and has experience in all important satellite systems.



## Instead of taking risks, why not rely on the experience of Crypto AG?

Information security is of eminent importance in satellite communication, but is more elaborate to put in place than in terrestrial communication because of the transmission conditions and processes specific to satellites. For instance, SatCom involves long and differing signal propagation times and changing wave propagation conditions that require adjusted access and transmission protocols. There are also special processes for making efficient use of bandwidth (e.g. proprietary compression technologies) and various ways of establishing a connection (e.g.

dial-up). Encryption technology must be able to handle all these aspects without restriction.

But you do not have to worry about the details. We provide competent assistance in the evaluation and implementation of secure SatCom applications. Basically there are two encryption approaches for this purpose (also available combined, superimposed):

- **Link encryption:** For several communication channels of different services operated jointly; placed at satellite terminal.

- **End-to-end encryption:** Applied singly to the services used, e.g. voice, fax, data, messaging or video; placed at the user's terminal.

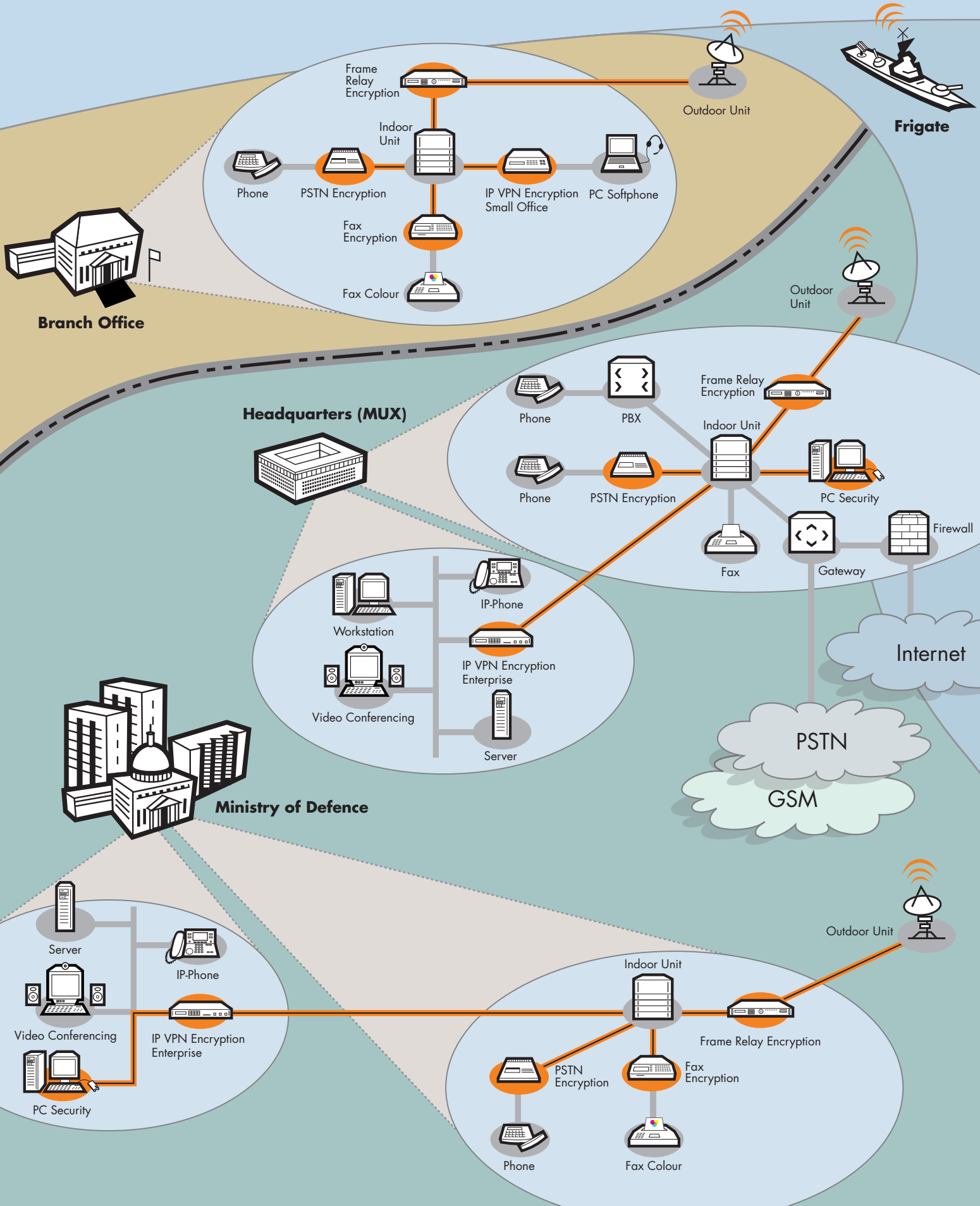
We have tried-and-tested security solutions for many different scenarios. Additional ones can be implemented. We are also a system supplier of total VSAT solutions in cooperation with ND SATCom AG.

	<b>VSAT</b>	<b>DVB-RCS</b>	<b>Inmarsat BGAN</b>	<b>Inmarsat GAN</b>	<b>Thuraya</b>
<b>Voice</b>	<ul style="list-style-type: none"> <li>▪ Frame Relay Encryption (LE)</li> <li>▪ IP VPN Encryption (CE)</li> <li>▪ PSTN Encryption (E2E)</li> </ul>	<ul style="list-style-type: none"> <li>▪ IP VPN Encryption (CE)</li> </ul>	<ul style="list-style-type: none"> <li>▪ PSTN Encryption (E2E) 1)</li> </ul>	<ul style="list-style-type: none"> <li>▪ PSTN Encryption (E2E)</li> </ul>	—
<b>Fax</b>	<ul style="list-style-type: none"> <li>▪ Frame Relay Encryption (LE)</li> <li>▪ IP VPN Encryption (CE)</li> <li>▪ Fax Encryption (E2E)</li> </ul>	<ul style="list-style-type: none"> <li>▪ IP VPN Encryption (CE)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Fax Encryption (E2E) 1)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Fax Encryption (E2E)</li> </ul>	—
<b>Messaging</b>	<ul style="list-style-type: none"> <li>▪ Frame Relay Encryption (LE)</li> <li>▪ IP VPN Encryption (CE)</li> <li>▪ Crypto Field Terminal (E2E)</li> <li>▪ Crypto Ruggedised Workstation (E2E)</li> </ul>	<ul style="list-style-type: none"> <li>▪ IP VPN Encryption (CE)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Crypto Field Terminal (E2E) 1)</li> <li>▪ Crypto Ruggedised Workstation (E2E) 1)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Crypto Field Terminal (E2E)</li> <li>▪ Crypto Ruggedised Workstation (E2E)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Crypto Field Terminal (E2E)</li> <li>▪ Crypto Ruggedised Workstation (E2E)</li> </ul>
<b>Data</b>	<ul style="list-style-type: none"> <li>▪ Frame Relay Encryption (LE)</li> <li>▪ Broadband Encryption</li> <li>▪ IP VPN Encryption (CE)</li> <li>▪ MultiCom Radio Encryption (E2E)</li> </ul>	<ul style="list-style-type: none"> <li>▪ IP VPN Encryption (CE)</li> </ul>	<ul style="list-style-type: none"> <li>▪ MultiCom Radio Encryption (LE) 1)</li> </ul>	<ul style="list-style-type: none"> <li>▪ MultiCom Radio Encryption (LE) 1)</li> </ul>	<ul style="list-style-type: none"> <li>▪ MultiCom Radio Encryption (LE) 1)</li> </ul>
<b>TCP/IP based services (e.g. video conference)</b>	<ul style="list-style-type: none"> <li>▪ Frame Relay Encryption (LE)</li> <li>▪ IP VPN Encryption (CE)</li> </ul>	<ul style="list-style-type: none"> <li>▪ IP VPN Encryption (CE)</li> </ul>	<ul style="list-style-type: none"> <li>▪ IP VPN Encryption (CE)</li> </ul>	—	—

1) Using the ISDN interface, 2) Using the SatCom modem, LE: Link Encryption (protocol independent), CE: Channel Encryption (protocol oriented), E2E: End-to-End Encryption

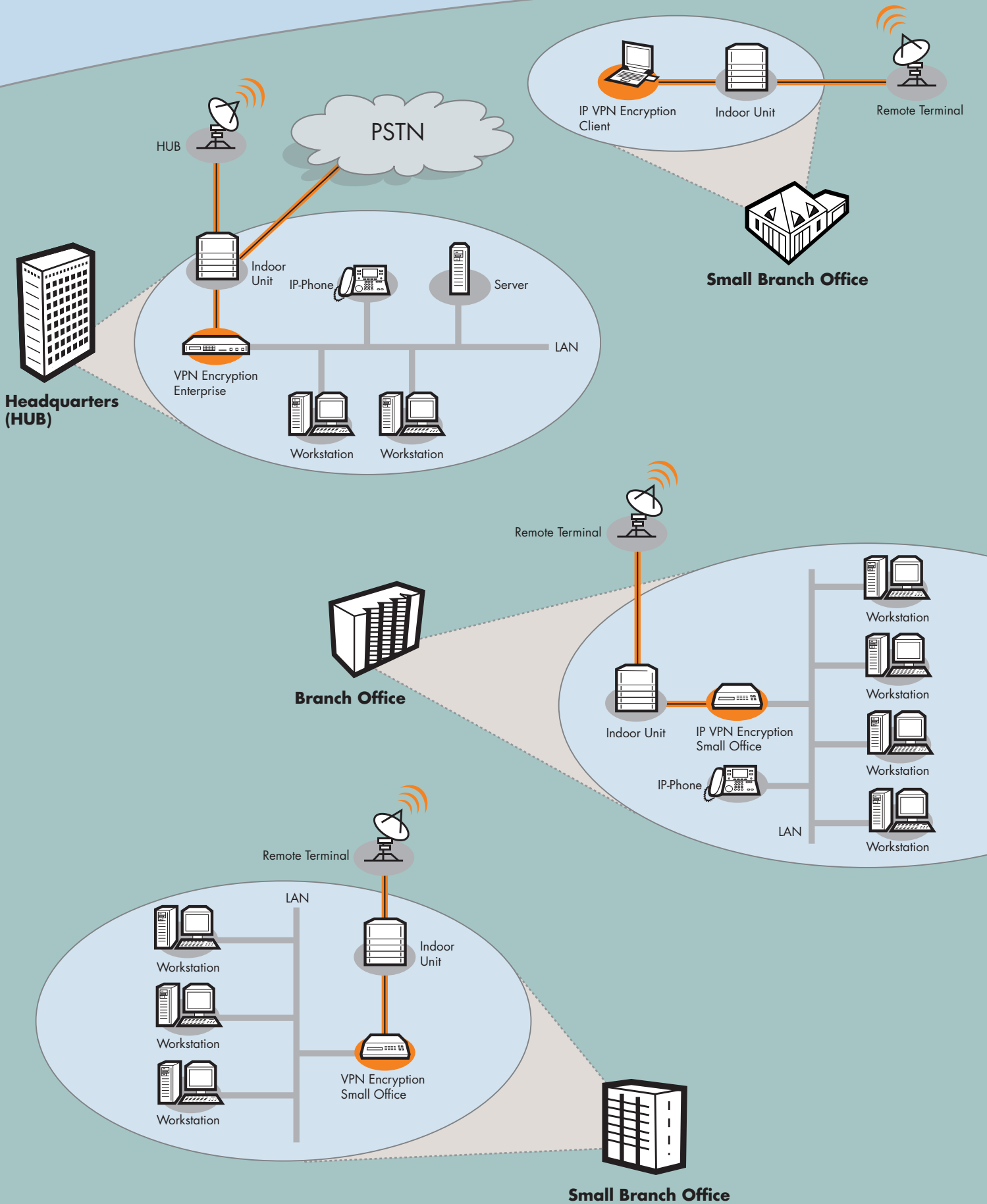
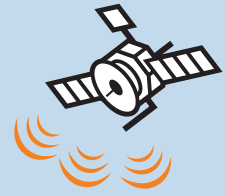
# Configuration examples for Secure Multicom Network on VSAT in a virtual user scenario (e.g. for Peace Keeping Forces)

VSAT  
(e.g. Eurobird)

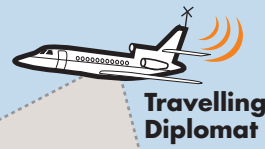


# Configuration examples for Secure IP Network on DVB-RCS in a virtual user scenario

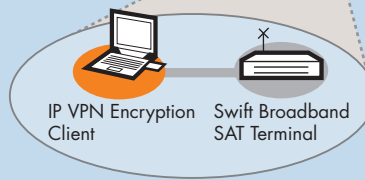
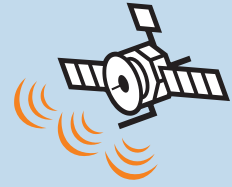
DVB Satellite



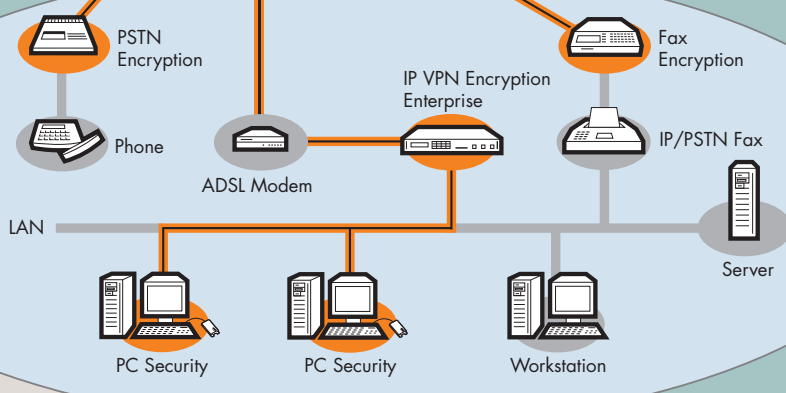
# Configuration examples for Secure Remote Access Network on Inmarsat BGAN in a virtual user scenario (e.g. for Ministry of Foreign Affairs)



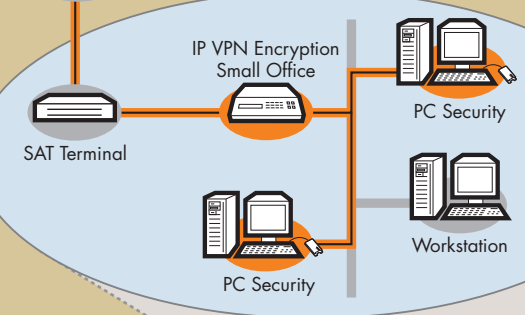
**Inmarsat I-4**



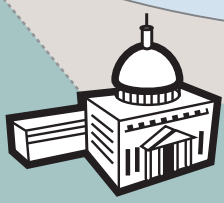
**Untrusted Network**



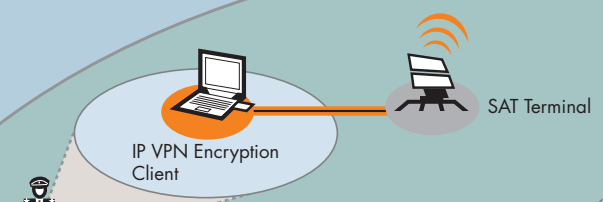
**Secure Network**



**Mission**



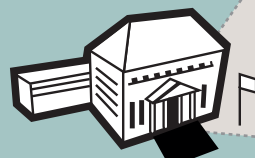
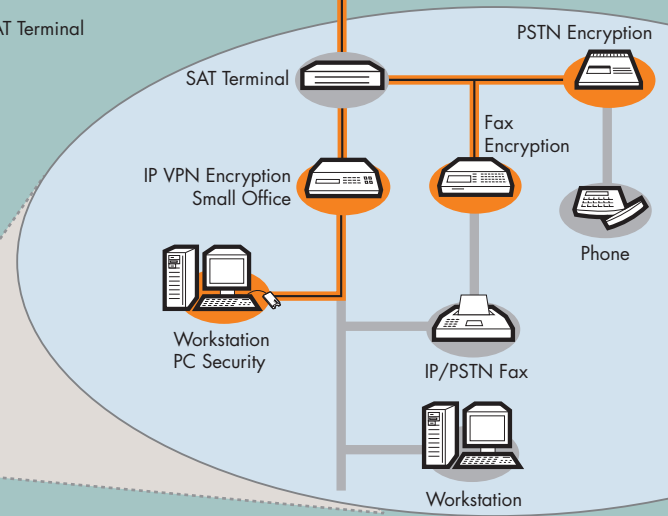
**Ministry of Foreign Affairs**



**Traveller (Military Attachée)**



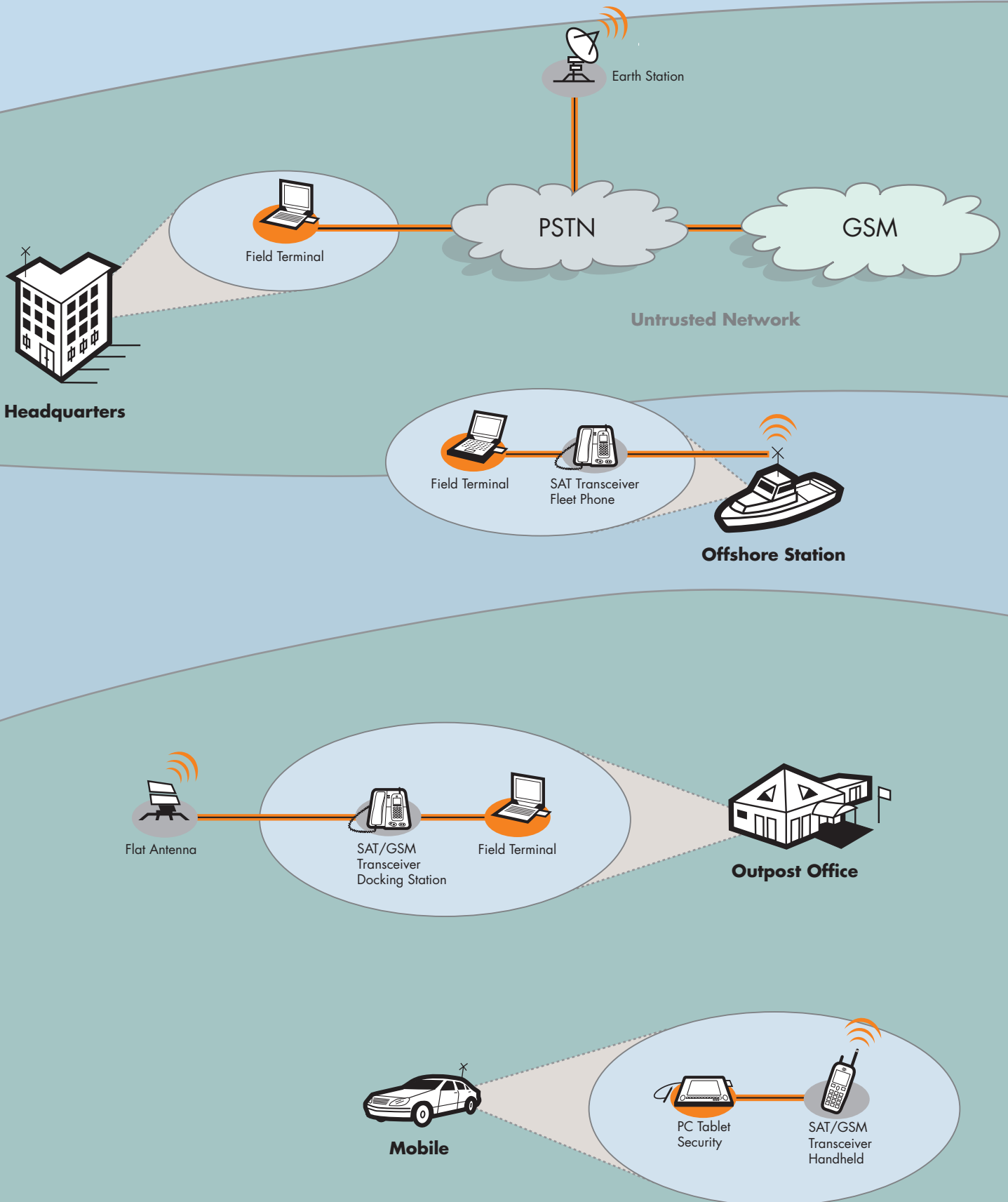
**Secure Network**



**Embassy**

# Configuration examples for Secure Messaging Network on Mobile Satellite Services (MSS) in a virtual user scenario (using low speed data service)

Thuraya or Inmarsat I-4





## Evaluate the optimum SatCom solution for your own needs

What system providers have on offer varies greatly in terms of services, bandwidths, the SatCom terminals required, footprints (reception range/coverage) and mobility. The descriptions below provide you with an overview of the most important and most widely used satellite systems. Drawing on our practical experience with these SatCom systems, we can competently assist you in evaluating what is on offer.

### **VSAT broadband products**

Geostationary VSAT satellites meet the toughest requirements as regards bandwidth, availability and flexibility. They allow services such as video, telephone, fax, data, messaging and remote access. Coverage is practically worldwide because of the many providers in this segment. Users can lease the bandwidths they desire and enjoy round-the-clock availability. Frame Relay and increasingly TCP/IP serve as

the transport layer for the various services and protocols. There are stationary and transportable terminals. Users include governmental organisations, international media, private companies as well as defence organisations with civilian or military systems.

### **Broadcast DVB-RCS broadband products**

Operators of digital broadcast satellites offer broadband services on an additional return channel on their geostationary satellites (digital video broadcast – return channel via satellite). Coverage extends primarily to populated areas. Access is ETSI-standardised and non-symmetrical (up/down). IP-based services such as video, voice (VoIP), streaming and data are thus made available at the satellite stations by the user's own IT infrastructure or over the Internet. User systems typically connect terminals in a star configuration via a HUB and the satel-

lite. The terminals can be employed as stationary or transportable units. They are priced much lower than VSAT systems. Users include media companies, major corporations, and, increasingly, foreign ministries. Broadband services have also begun to be offered via Inmarsat BGAN and Thuraya DSL.

### **Inmarsat satellite systems**

The Inmarsat syndicate already operates four generations (plus sub-groups) of geostationary satellites. Three to four satellites cover the entire earth with their global beams (except the Poles). Additional regional spot beams with strong signals allow small, mobile terminals to be used. The classic Inmarsat services are voice, fax, audio, data, messaging and of late, broadband IP (BGAN), also with streaming. Originally planned just for communications on the high seas, special solutions are now also available for air and land vehicles, alarm/rescue and for portable





operation on missions. Connections are usually routed into terrestrial networks, i.e. into PSTN/GSM and of late, into the Internet.

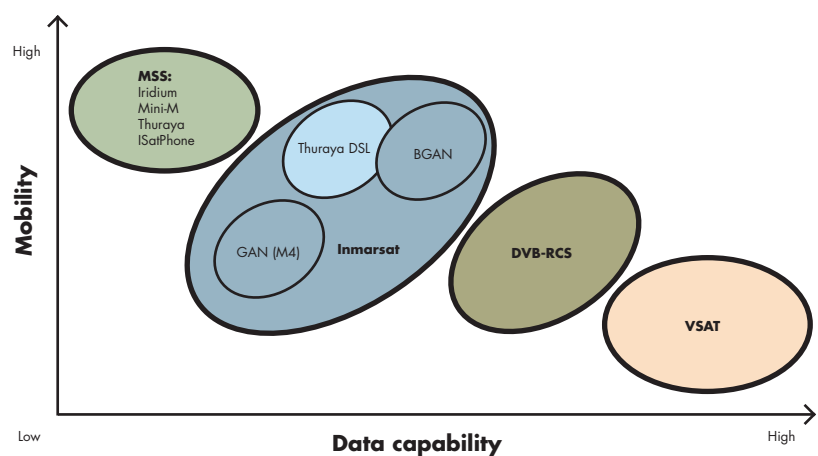
Different kinds of terminals are available for the existing system classes (Inmarsat A, B, C ... M, GAN or BGAN) depending on the services and types of deployment required. Inmarsat has become enormously popular because of sharply declining prices, mobility (smallest antennas are about the size of a DIN A5 page) and ever greater bandwidths. Users include private individuals, companies, NGO's, foreign ministries and the military (especially Navies).

**MSS SAT systems for mobile/portable phone and messaging service**

Systems from different providers are available for MSS (MSS = Mobile Satellite Service). They include geostationary systems such as Thuraya or Inmarsat as well as Low Earth Orbit (LEO)

satellites like Globalstar and Iridium. Large sections of the earth's surface are covered, including part of the Poles. The networks usually have gateways into the PSTN and GSM network. The primary service is telephony, but fax, messaging and data communication are also possible. The terminals have a handheld format and cost about twice what GSM phones do. The com-

munication expenses are not much higher than for terrestrial international telephony.



Evaluation criteria for key satellite technologies based on user needs as regards bandwidth/transmission capability and degree of mobility.



## No-compromise security, trouble-free operations

Drawing on its broad-based technological expertise, Crypto AG guarantees you that an exclusive, consistent security policy will be put in place for your applications. The protection of your sensitive information is ensured by a total system comprising several independent security elements.

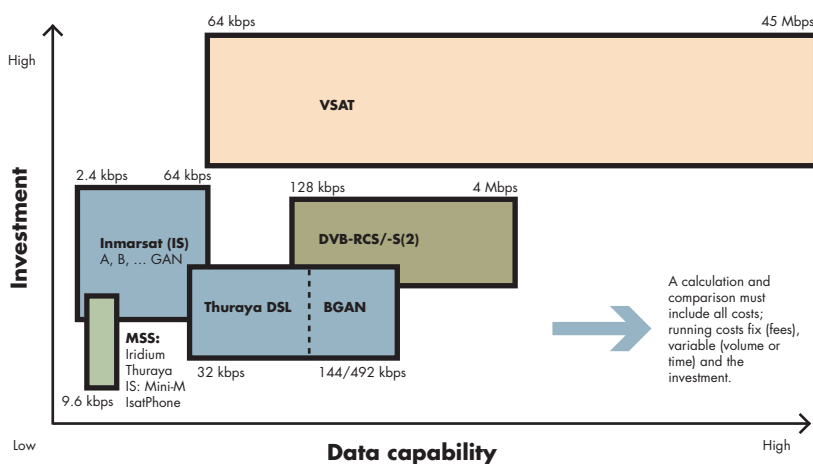
Crypto AG designs a customised security solution for you that encrypts using a symmetrical process, which

is the most secure method. Encryption processes are run exclusively in a separate tamper-proof hardware module protected against network attacks. The Security Architecture of Crypto AG gives you enormous cryptographic potential. The core element is your own exclusive and secret algorithm base that no one else knows or uses.

In everyday operations, a simple computer-based security management

system assists you with the implementation of your security policy. Your security manager can centrally manage all relations you want to have cryptographically protected (organisable in hierarchical groups). We provide you the know-how you need for these tasks as an integral part of the project. The bottom line: You have a customised, high security SatCom solution under your own autonomous control from day one.

We are also there to assist you after the sale. Our tailor-made support services are available to you over the entire service life of your system. That means your investment is safeguarded over the long term.



The most common satellite systems are quite clearly positioned in terms of transmission performance and investment costs, but the operating costs depend heavily on individual user requirements.



## Determine the optimum technology and service package yourself

What do you need to obtain an efficient and secure SatCom solution?

In any case, you need hardware (satellite terminals), software (applications for services), satellite capacity as well as services and a contractual partner for leasing transmission capacity. You can purchase these elements from different suppliers for a given SatCom project or opt for a single total supplier (service or application provider).

To ensure that your information is always protected, you need a further partner, namely, a security specialist with vast experience in implementing encryption solutions for SatCom.

Our services are available to you in four different forms based on your situation:

- As add-on security solutions for satellite systems that you can obtain directly from us or through a system integrator.
  - As total solutions, for which we assume total system responsibility in tandem with strong technology partners.
  - In cooperation with SatCom companies that offer complete systems, also as turnkey total solutions on request.
  - As system integrator for smaller compact solutions (deployable systems) with integrated satellite communication, application and encryption. Our products are appropriately adjusted to whatever option you choose.
- The optimum form of cooperation depends on your individual requirements,

with already existing communication systems or business relations naturally taken into account. The magnitude of our involvement is also geared to the expertise your organisation already possesses. Our great flexibility allows us to take on any role between general contractor and component supplier.



## **Crypto AG – To Remain Sovereign**

Crypto AG is your expert partner for the efficient and secure handling of information. As a legally and economically independent Swiss company, we are not subject to any export restrictions. We have been concentrating on developing, manufacturing and implementing custom security solutions for over 50 years.

Our range comprises the latest technology and comprehensive services. After-sales service and product training that guarantee autonomous operation and high availability are assured over the system's entire lifetime, whatever the user environment.

You too can rely on the expertise and capability of Crypto AG.

Customers from over 130 countries are already doing just that.

[www.crypto.ch](http://www.crypto.ch)

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