

Best Practices in Buying Satellite Antennas and the RF Chain



Teleport operators share best practices in specifying, buying, installing and maintaining antennas and associated radio-frequency equipment.



The Four Nines Project

World Teleport Association
www.worldteleport.org

© 2012 World Teleport Association.
All rights reserved.

December 12, 2012
US\$1650; free to WTA members

Contents

Foreword	4
Introduction	5
Executive Summary	7
Specifying the Purchase	13
Evaluating the Proposals	17
Functional and Design Trade-Offs	20
Evolution in Antenna and RF Technology	26
Installation	29
After-Market Service & Maintenance	35
About the Report	37
About World Teleport Association	37

Best Practices in Buying Satellite Antennas and the RF Chain
is made possible by the financial support of...



XipLink is the technology leader in wireless link optimization using standards based SCPS protocol acceleration, streaming data compression and Internet optimizations to deliver the maximum capacity over stressed wireless communication links. XipLink is a privately owned company with Headquarters in Montreal, Quebec Canada and field personnel worldwide.

WTA's research program is also funded through the generous financial support of WTA's Industry Leaders...



...And Industry Patrons:



Foreword

Halfway through this report, you will read a comment about the purchase of used satellite antennas. When you are buying a used small-to-medium size antenna, one contributor says, you are basically “buying steel.” Carefully shaped and finished steel, certainly, but basically a piece of manufactured metal.

It is the RF chain and the associated electronics connecting to that piece of steel that gives satellite links power to translate between faint signals from



space and the energetic flow of earthbound communications. XipLink is proud to manufacture “network layer” devices, above this RF physical layer of satellite communications equipment, optimizing TCP-IP communications protocol over satellite. In this way, a perfectly engineered RF link is used as the main highway for waveforms and XipLink is used to shuttle end-user traffic such as Web pages or file transfer to the actual end-user, resulting in the best response time and bandwidth utilization possible.

As an example, the XipLink XHO solution provides teleport and network operators immediate bandwidth savings on outbound web traffic without need for any remote optimization equipment. This solution also provides sophisticated class-based queuing for IP traffic management purposes allowing for logical priorities during congestion and split PEP operation to optimize TCP sessions and Internet backhaul access to the Teleport.

XipLink is proud to work with the satellite community and to help increase the profitability of the operators throughout the world. That’s why we are pleased to sponsor *Best Practices in Buying Satellite Antennas and the RF Chain* as a contributing member of the WTA.



Happy Reading,

Jack Waters

CEO

XipLink, Inc.

Introduction

Teleports operate the connecting point where the digital highway meets the skyway. This makes them major ongoing buyers of satellite antennas and the components of the RF chain that converts satellite into terrestrial transmissions and vice versa. According to WTA's *Sizing the Teleport Market 2010*, annual capital investment by teleport operators outpaces that of broadcasters by nearly five times. Collectively, the members of WTA have amassed unmatched experience in purchasing antennas and RF equipment. This report shares that knowledge on the trade-offs between cost and quality, standards-based and proprietary, and investment risk versus revenue opportunity. It explores how to specify, negotiate and manage installation in order to obtain the greatest value and reduce the potential for costly errors, while making the technology provider a partner in the teleport's success.

99.99

The Four-Nines Project

An ongoing effort by World Teleport Association, the Four Nines project promotes best practices in teleport operations, technology and management. It is named for the 99.99% availability standard of a satellite or terrestrial circuit.

A Bridge Over Digital Waters

Satellite antennas are like bridges across rivers. They are the vital connecting link between the digital highway and the skyway, and can also be the choke point that stops business in its tracks. They can represent a very large expenditure and have a very long life. For all these reasons, smart buyers put a substantial amount of time, care and energy into getting the purchase right.

Getting it right involves multiple steps with multiple prospective vendors, and these steps form the basis of this report:

- **Specifying the purchase**, from defining your requirements to writing clear specs and a statement of work
- **Evaluating the proposals**, including price, efficiency and total cost of ownership
- **Deciding on functional and design trade-offs** that deliver the highest value for the lowest cost

- **Integration and installation** to ensure that your requirements are met in the final installed product
- **After-market support** to maintain maximum uptime and protect your investment

Acknowledgements

Best Practices in Buying Satellite Antenna and the RF Chain is based on confidential interviews conducted with the executives of a dozen teleport operators that purchase and install antennas and RF chains. Contributors to this report include the world's largest international and regional teleports in Europe, North America, Latin America, and the Middle East.

- Enterprise/VSAT networks
- GSM voice and data backhaul
- Broadcast/DTH/cable services
- Internet, mobile, and coms-on-the-move services for Maritime and Military applications
- Telemetry, Tracking and Control facilities flying satellites

WTA thanks the following individuals for contributing their time and expertise to the project:

David Amundsen

Director of Engineering
CSC Management, LLC, USA

George Alatsatianos, Director,
Sales Engineering, and **Byron
"Scott" Bowen**, Senior
Engineer, SES Woodbine
SES Global, USA

Pablo Esposito

Sr. Director of Transmission
Operations, TIBA, Argentina

Bruce Dunlop

Vice President Operations
TrustComm, Inc., USA

Doron Eliav

VP Strategic Accounts, **Noga
Sharabani**, Senior Buyer, and
Tuvia Lev, Field Supervisor
Gilat Satellite Networks, Inc.
Israel

Richard A. Hadsall

Senior Vice President & CTO
MTN Satellite Communications
USA

Tomas Lovsin

Managing Director
STN, Slovenia

Yatinder Mahajan

Chief Technology Officer
Du, United Arab Emirates

Bart Palmer

CTO
GlobeCast Americas, USA

John Loke Kar Pun

Vice President, Network
Engineering & Operations
MEASAT, Malaysia

Jose Luis Sanchez

Director of Services Operations,
and **Frank Bourdin**, Manager of
RF Engineering & Operations
Eutelsat, France

Timothy Turk, Sr. Manager, RF
and TT&C Systems Engineering,
and **Reginald Anderson**,
Principal RF & TT&C Engineer,
Intelsat, USA

One operator's "Best Practices"

- Prefer ground to roof mounting
- Buy 4 port antennas for flexibility, although higher in cost
- Do not over-size the antenna: a smaller antenna may not require tracking, which simplifies operation and maintenance.
- Avoid buying used antennas. If you must re-use an old on-site antenna, replace the motor/drive/tracking with new and modern subsystems. This is more cost-effective than purchasing a new antenna.
- Site surveys should be provided by a skilled surveyor with a complete report
- Design enough outdoor space and access for more antennas, and indoor space for additional equipment.
- For C-band projects, always conduct an RFI survey using a qualified party.
- Install redundant transmitters
- Cooling/ventilation of indoor TWTAs is critical. Deploy a completely closed or completely open system – do not mix approaches. Avoid the common mistake of leaving exhaust pipes without filtered inlet pipes directly into the HPA area.
- LNBS are usually acceptable, so avoid the complexity of installing a LNA subsystem.
- Upon installation, test if tracking is really needed. If satellite is stable enough, disable tracking where viable.
- Enforce regular maintenance procedures: grease antenna gears periodically. Remove rust.
- Replace SSPA fans every two years.