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NEW SATELLITE COMMUNICATIONS NETWORKS FOR IP SERVICES

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1. REASONS FOR DEPLOYING SATELLITE NETWORKS IN SCADA and VIDEO SURVEILLANCE SYSTEMS

2. SATELLITE NETWORKS ADVANTAGES

3. SATELLITE NETWORK BASIC TECHNICAL CHARACTERISTICS

4. TYPE OF SERVICES IN SATELLITE BROADBAND NETWORK

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REASONS FOR DEPLOYING SATELLITE NETWORKS IN SCADA and VIDEO SURVEILLANCE SYSTEMS

1. LATEST HARDWARE AND SOFTWARE DEVELOPMENT HAS INTRODUCED NEW GENERATION OF SATELLITE IP BASED COMMUNICATION SYSTEMS

2. MULTI-BEAM SATELLITE COVERAGE WITH HIGH DATA RATES 70Gbps AND ABOVE

3. SIGNIFICANTLY DECREASED HARDWARE AND SERVICE PRICES

4. OVERCAMING POTENTIAL DISADVANTAGES OF EXISTING SCADA NETWORKING SOLUTIONS

5. INTEGRATION OF ALL IP BASED SERVICES

6. NO LICENSE REQUIREMENTS FROM THE RATEL

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SATELLITE NETWORKS ADVANTAGES

1. HIGH DATA RATES
2. PRICES SIMILAR TO TERRESTRIAL ADSL SERVICES
3. LOW HARDWARE PRICES
4. HIGH RELIABILITY - OVER 99%
5. SYSTEM TRANSPARENCY FOR OLD AND NEW SCADA SYSTEMS
6. BEST SOLUTION FOR RURAL AREAS
7. POSSIBILITIY TO USE VoIP
8. CONNECTING POINT ANYWHERE WITHIN THE SATELLITE FOOTPRINT

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SATELLITE NETWORK BASIC TECHNICAL CHARACTERISTICS

1. SATELLITE POSITION 9° East
2. DATA RATES Up To 6Mbps (Upload) and Up To 20Mbps (Download)
3. FREQUENCY BAND 20/30GHz
4. PROPAGATION ATTENUATION COMPENSATED BY USING ACM
5. SIMPLE AND RELIABILE EQUIPMENT EVEN ON CONSUMER LEVEL
6. OUTDOOR UNIT (INTEGRATED BUC, LNB AND FEED) CONNECTED TO INDOOR UNIT WITH ONE COAX CABLE

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TYPE OF SERVICES IN SATELLITE BROADBAND NETWORK

1. CONSUMER TYPE OF SERVICES

- Tooway 2 Lite
- Tooway 8 Lite
- Tooway 12 Lite
- Tooway 18 Lite
- Tooway 18 Max Lite



2. BUSINESS/PROFFESIONAL TYPE OF SERVICES

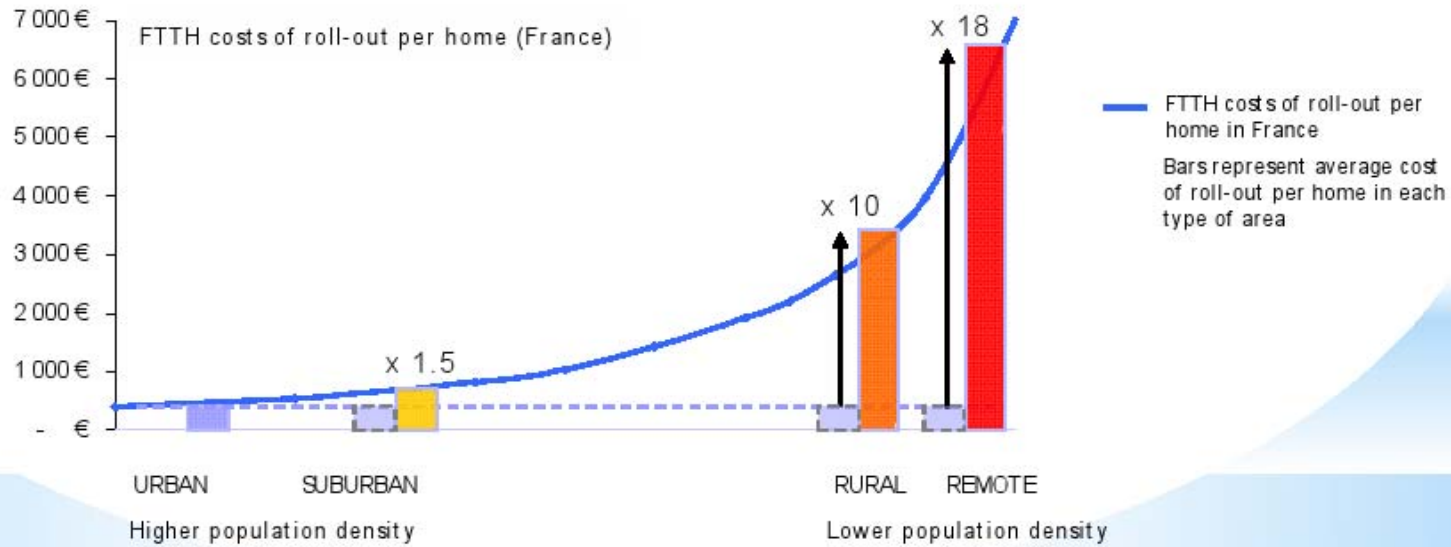
- Telemetry
- Bronze/Silver/Gold
- Symmetric
- Platinum
- Diamond


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Official Distributor
tooway™
LIFTS OFF
on Eutelsat's
KA-SAT satellite!
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COMMUNICATIONS
Skylogic
a eutelsat company

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Digital Divide: an immediate issue - How big is Europe's digital divide?

- 30 million households in Europe have less than 2Mbps broadband
  - Of which 13 million with dial-up Internet access or no connection
- **Main issue is the increasing cost of roll-out of terrestrial technologies in dispersed areas**



Source: Performance Management Partner analysis for the Association des Régions de France

TOOWAY MEANS UP TO 20 Mbps FOR ALL

- Broadband for everyone everywhere
  - Immediately available across extended Europe
  - Full independence from terrestrial networks
- A true always-on service comparable to DSL
  - Available for full triple-play, plus DTH TV reception from neighbouring Ku-band satellites
  - Improved user experience
- Easy operation and installation
  - Easy-to-install and as accessible as satellite television
  - Plug and play
- Breakthrough technology in satellite market
  - Benefiting from successful first-generation satellite broadband deployed in USA by WildBlue to half a million homes, and in Europe by first-generation Tooway™



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KA-SAT: more than consumer broadband

B2B2C	Tooway™	Consumer	
B2B	Professional Data Network	Enterprises and Institutions	
	Satellite News Gathering	News agencies Enterprises	
	Broadcasting	National, regional TV Enterprises	

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Professional Data Network

The solution

- High-throughput solutions with lower cost per terminal, available everywhere in extended Europe
  - can compete with some terrestrial solutions
- Data services already accounts for 16% of Eutelsat revenues*

Addressable markets

- Enterprises, institutions in unserved and underserved areas, mainly
- Enlarging market for satellite thanks to lower cost



Key applications

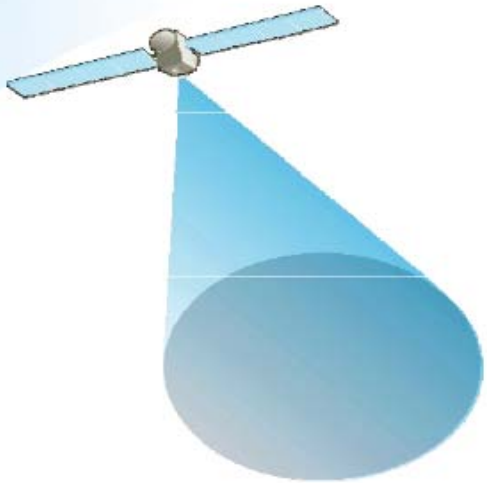
- Professional Internet Access
- Interconnection
- Backup solutions
- M2M/ SCADA
- BTS Interconnection
- Internet Backhaul

*as at 31st December 2010

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What high-throughput satellites add

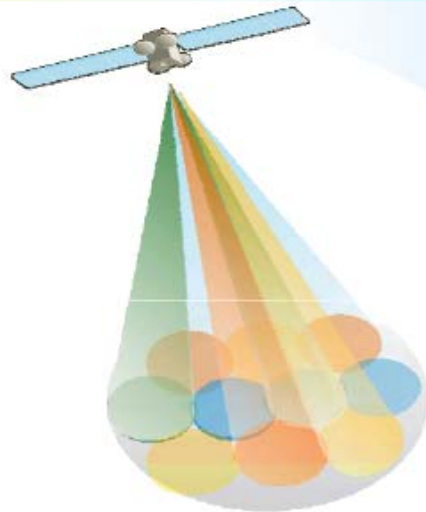
Traditional wide footprint



Optimised for broadcast services

- One signal received simultaneously by unlimited number of users in a wide area covering a continent or more

New-generation HTS



Optimised for IP applications

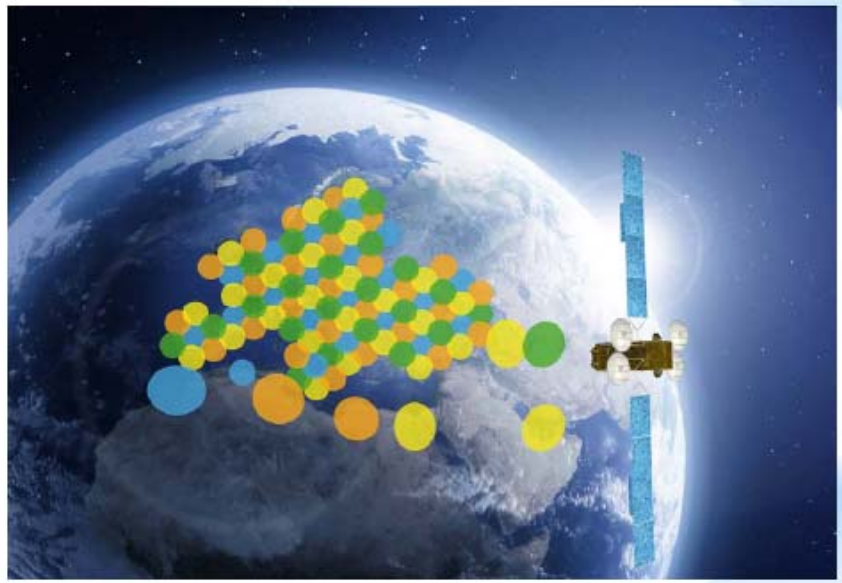
- Multi-beam architecture enabling high frequency reuse to generate significant increase in bandwidth for point to point services (e.g. broadband)
- New markets
- New services

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KA-SAT: the largest HTS in the sky

82 Ka-band spots over extended Europe Frequencies reused 20 times ▶ **More than 70 Gbps total throughput**

10	Gateways all over Europe
82	Ka-band spots of 250km diameter
Over 70 Gbps	Total capacity
55	Countries covered in Europe and Mediterranean Basin
350 M€	Eutelsat investment in KA-SAT satellite and ground segment
9° East	Orbital position, located near Eutelsat's premium HOT BIRD™TV neighbourhood at 13° East
31 May 2011	Launch of services through KA-SAT infrastructure
16 years	KA-SAT lifetime



Illustrative coverage of KA-SAT seen from the sky

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An advanced infrastructure

Pan-European IP infrastructure

- 10 gateways across Europe
- Linked to the main European PoP and Internet backbone
- Integrated satellite system using ViaSat SurfBeam 2





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Technical Details

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How long are the time delays with satellite data transmissions?

Geostationary satellites are located in orbit approximately 36,000 kilometers above the equator. A roundtrip time to a satellite for data needs about 250 msec, the 2-way protocol latency is about 600 msec including SurfBeam 2 system latency. To mitigate latency, which would impact on TCP throughput and web browsing speeds, a Performance Enhancing Proxy (PEP) and Web acceleration are integrated into the SurfBeam 2 modem.

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How stable is the Tooway™ service in bad weather?

At one time heavy rain was thought to be a potential barrier to successful deployment of Ka-band satellite systems. Indeed, the reduction of signal level was so impactful that it was difficult to guarantee a high-quality service. However, Tooway™ automatically responds to rain fade with uplink power control and adaptive data coding techniques (Adaptive Coding and Modulation - ACM) that overcome potential outages, while optimizing the use of satellite transponder bandwidth. This gives the Tooway™ network higher reliability compared to other two-way consumer satellite services offered in Europe.

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What is Ka-band and what are its advantages?

Broadcast satellites principally operate in Ku-band frequencies that have the benefit of offering a broad geographic coverage through a single footprint. Ka-band, which is now beginning to be exploited over Europe, has other benefits:

•More Ka-band bandwidth is allocated to each satellite by the ITU (1 GHz per orbital slot)
•For dedicated two-way communications, spot beam technology allows extensive frequency reuse, effectively lowering the cost of the spectrum
•The larger amount of available bandwidth supports higher transmission rates, supporting higher peak speeds for individual subscribers
•The higher Ka-band frequencies allow smaller antennas to be employed for the subscriber equipment

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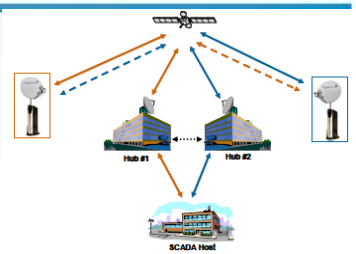
SUPPORTED ALL TCP/IP BASED APPLICATIONS

- SCADA systems
- Video Surveillance
- Security Services
- VoIP
- DTH & IPTV Services

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SCADA SERVICES



Supervisory Control And Data Acquisition services for Oil, Gas, Power Line Industry including Cellular Tower monitoring.

SCADA applications key drivers:

• Very High Availability (all SCADA points can be monitored and commanded any time of the day)

• High Traffic QOS Requirements (accurate real time monitoring with low latency and predictable response times)



• Harsh Locations (solution must be able to adapt these conditions)

• Maintenance Limitations (solution should be robust and reliable with zero down time including maintenance)

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SCADA SERVICES



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SATELLITE TERMINAL KEY FEATURES

TERMINAL AT-A-GLANCE

- Always-on high-speed connectivity
- Sophisticated quality of service (QoS)
- Built-in TCP and web acceleration
- Built-in security against theft-of-service and theft-of-subscriber
- Gigabit Ethernet CPE interface
- Web GUI local management and SNMP-based remote management and control
- Adaptive coding and modulation (ACM) on the forward link—optimized network capacity
- Automatic power control and rate adaptation on the return link—high availability during fades

REGULATORY

Safety	cULus, CE, CB Scheme
EMC	FCC 47 CFR 15B class B, ICES-003, AS/NZS CISPR 22, CE
RoHS	Compliant to RoHS Directive 2002/95/EC
REACH	Compliant to REACH Directive

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SATELLITE TERMINAL KEY FEATURES (CONTINUED)

INDOOR UNIT (IDU) SPECIFICATIONS

FORWARD CHANNEL

Modulation/Coding

- » 16-APSK Rate 2/3, 3/4, 4/5, 5/6, 8/9
- » 8PSK Rate 3/5, 2/3, 3/4, 5/6
- » QPSK Rate 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6
- » Adaptive Coding & Modulation

Symbol Rate 10 to 52 MSym/s

RETURN CHANNEL

Modulation/Coding

- » 8PSK Rate 7/12, 2/3, 3/4
- » QPSK Rate 3/8, 1/2, 5/8, 3/4
- » BPSK Rate 1/2
- » Automatic power control and rate adaptation

Symbol Rate 625, 1250, 2500, 5000 and 10000 kSym/s

USER SPEEDS

Forward Channel	Operator configurable up to 40 Mbits/s
Return Channel	Operator configurable up to 10 Mbits/s

MANAGEMENT

Web GUI local management and SNMP-based remote management and control

NETWORKING

IP Internetworking

- » Transparent TCP and HTTP acceleration
- » Packet classification and filtering
- » Per-flow queuing

POWER SUPPLY

- » 100 to 240 VAC; 50 to 60 Hz

INDOOR ENVIRONMENT

Operational	0° to +40° C
Storage	-35° to +65° C
Humidity	0 to 95% (non-condensing)
Altitude	3000 m
Shock and Vibration	Per ISTA, July 2000, Procedure 1A

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SATELLITE TERMINAL KEY FEATURES (CONTINUED)

INTERFACES

CPE	IEEE 802.3, 10/100/1000 BaseT, RJ-45 connector
Expansion	USB 2.0, type A connector

OUTDOOR UNIT (ODU) SPECIFICATIONS

Input Frequency	18.3 to 20.2 GHz
Output Frequency	28.1 to 30.0 GHz
Nominal EIRP	48.4 dBWi
Nominal G/T	17.5 dB/K
Polarization	Circular, with remote switching option
Mounting	Available pole mount or universal wall mount

OUTDOOR ENVIRONMENT

Power	Supplied by IDU on IFL coax, 30-55 Vdc
Ambient Temperature	-40° to +55° C (up to +80° C survival)
Humidity	0 to 100% (condensing)
Rain	< 100 mm/hr
Wind	45 mph

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AVAILABLE TYPES OF B2B SERVICES

SERVICE CLASSES	KA-SAT Access						
	Telemetry	Bronze+	Silver +	Gold +	Symmetric	Platinium+	Diamond+
Max download Kbps	2000	20000	20000	20000	6000	20000	20000
Max upload Kbps	2000	6000	6000	6000	6000	6000	6000
NPT max download Kbps	128	256	512	768	512	1024	1024
NPT max upload Kbps	128	128	128	256	512	512	1024
IP addressing Static public IP Provided by SKL	1	1	1	1	1	1	1
Monthly volume Allowance, GB	2	25	60	75	75	100	125
Setup fee €/account	40	40	40	40	40	40	40

NOTES: Upload Data Rates Higher than those available in terrestrial networks in majority of cases!

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AVAILABLE TYPES OF B2C SERVICES

Standard packages	tooway 2Lite	tooway 8Lite	tooway 12Lite	tooway 18Lite	tooway 18 MaxLite
Max download, Kbps	2000	8000	12000	18000	18000
Max upload, Kbps	1000	2000	4000	6000	6000
Dynamic private IP @ for CPEs • To access internet (not reachable from internet) • For VoIP as an option (only all SIP incoming connections allowed, only SIP outgoing connection to distributor VoIP GW allowed)	1 +1 optional	1 +1 optional	1 +1 optional	1 +1 optional	1 +1 optional
Consumption Profile, GB (*)	2	8	16	26	50
Price € / Month for consumer	15	22	35	55	89.90
Setup fee € / account	40	40	40	40	40

NOTES: Upload Data Rates Higher than those available in terrestrial networks in majority of cases!

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AVAILABLE TYPES OF CONSUMER SERVICES

SERVICE CLASSES	Tooway S	Tooway M	Tooway L	Tooway XL	Tooway XXL
Max download Kbps	2000	20000	20000	20000	20000
Max upload Kbps	1000	6000	6000	6000	6000
IP addressing Dinamic Private IP Provided by ETS	1	1	1	1	1
Monthly volume Allowance, GB	2	10	20	30	50
Unlimited night Consumption feature **	o	o	•	•	•
Price € / Month for consumer	20	29.9	47	57	79.90
Setup fee €/account	40	40	40	40	40

NOTES: Valid from January 2014

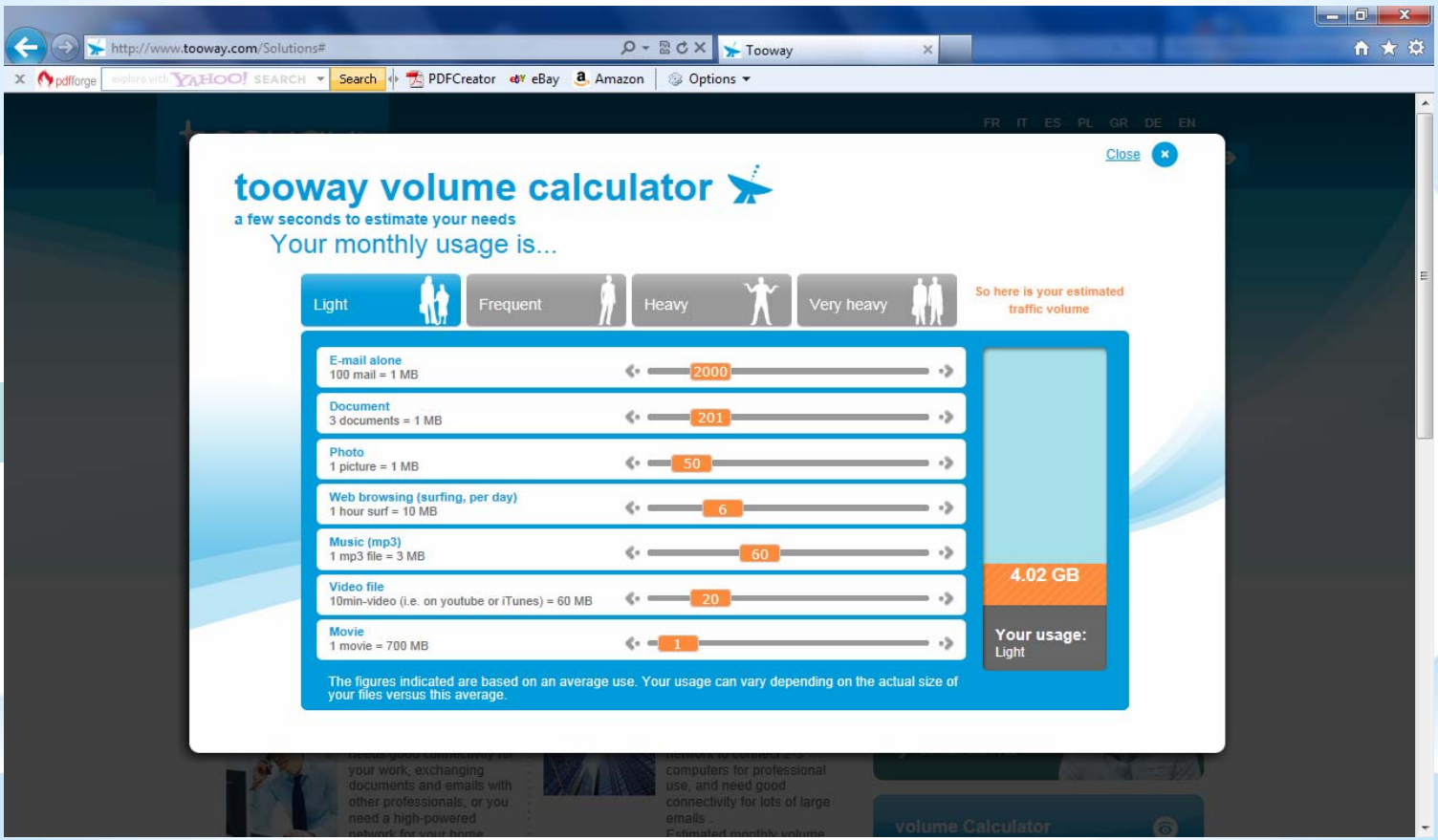
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VOLUME CALCULATOR

- Ukupan mesečni dozvoljeni protok – Monthly Volume Alowance, računa se kao zbir downloada i uploada.
- U tabeli su date smanjene brzine NPT posle utrošenog dozvoljenog mesečnog protoka.
- Svakom korisniku može se na zahtev dodeliti mogućnost korišćenja dodatnog protoka – Volume Booster u paketima od 1, 10, 50, 100 GB sa cenama respektivno od 6, 50, 200, 300 evra. Na ovaj način B2B servis prelazi u flat uslugu
- Za VoIP se može posebno ugovoriti druga javna IP adresa.

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VOLUME CALCULATOR – 4GB EXAMPLE



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OTHER CONDITIONS

- High service availability – over 99%
- Equipment MTBF over 10 years
- Warranty period 12 months
- Maintenance services on call or on a monthly bases

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QUESTIONS?

CONTACT DETAILS:

Vuko Laban dipl.ing.
CEO,
mobile: +381 63 236 331
e-mail: vlaban@laban.co.rs

mr Aleksandar Pastar dipl.ing.
Project Manager,
mobile: +381 64 1707 814
e-mail: apastar@laban.co.rs

LABAN Satcom LTD
Bulevar kralja Aleksandra 101
Beograd
Srbija
phone/fax: +381 11 308 8408
www.laban.co.rs

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