



Sonera Laajakaista Satelliitti

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3.11.2011

Ka-sat uuden sukupolven satelliitti,
joka laukaistiin radalle Joulukuussa 2010.
Satelliitti tehty erityisesti palvelemaan laajakaistatarpeita.

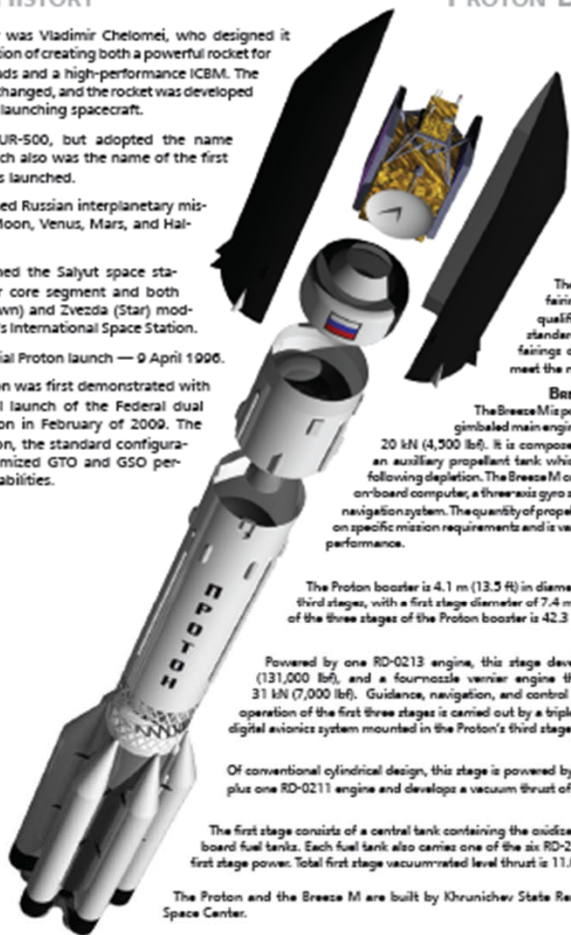


THE VEHICLE

PROTON HISTORY

- Lead designer was Vladimir Chelomei, who designed it with the intention of creating both a powerful rocket for military payloads and a high-performance ICBM. The program was changed, and the rocket was developed exclusively for launching spacecraft.
- First named UR-500, but adopted the name "Proton," which also was the name of the first three payloads launched.
- Proton launched Russian interplanetary missions to the Moon, Venus, Mars, and Halley's Comet.
- Proton launched the Salyut space stations, the Mir core segment and both the Zarya (Dawn) and Zvezda (Star) modules for today's International Space Station.
- First commercial Proton launch — 9 April 1996.
- Phase III Proton was first demonstrated with the successful launch of the Federal Dual Express mission in February of 2009. The Phase III Proton, the standard configuration, has optimized GTO and GSO performance capabilities.

PROTON DESCRIPTION



TOTAL HEIGHT
38.2 m (125 ft)

GROSS LIFTOFF WEIGHT
705,000 kg (1,554,000 lb)

PROPELLANT
UDMH and NTO

INITIAL LAUNCH
15 July 1967
Proton-1 Spacecraft

PAYLOAD FAIRINGS
There are multiple payload fairing designs presently qualified for flight, including standard commercial payload fairings developed specifically to meet the needs of our customers.

BREEZE M UPPER STAGE
The Breeze M is powered by one pumped-gimballed main engine that develops thrust of 20 kN (4,500 lbf). It is composed of a central core and an auxiliary propellant tank which is jettisoned in flight following depletion. The Breeze M control system includes an on-board computer, a three-axis gyro stabilized platform, and a navigation system. The quantity of propellant carried is dependent on specific mission requirements and is varied to maximize mission performance.

PROTON BOOSTER
The Proton booster is 4.1 m (13.5 ft) in diameter along its second and third stages, with a first stage diameter of 7.4 m (24.3 ft). Overall height of the three stages of the Proton booster is 42.3 m (138.8 ft).

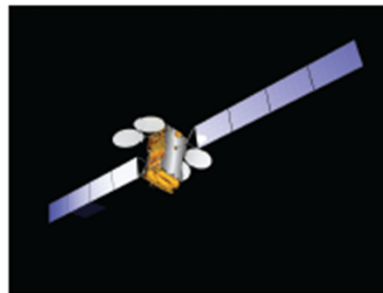
THIRD STAGE
Powered by one RD-0213 engine, this stage develops thrust of 583 kN (131,000 lbf), and a four-nozzle vernier engine that produces thrust of 31 kN (7,000 lbf). Guidance, navigation, and control of the Proton M during operation of the first three stages is carried out by a triple redundant closed-loop digital avionics system mounted in the Proton's third stage.

SECOND STAGE
Of conventional cylindrical design, this stage is powered by three RD-0210 engines plus one RD-0211 engine and develops a vacuum thrust of 2.4 MN (540,000 lbf).

FIRST STAGE
The first stage consists of a central tank containing the oxidizer surrounded by six out-board fuel tanks. Each fuel tank also carries one of the six RD-276 engines that provide first stage power. Total first stage vacuum-rated level thrust is 11.0 MN (2,500,000 lbf).

The Proton and the Breeze M are built by Khronitchev State Research and Production Space Center.

THE SATELLITE



SATELLITE OPERATOR

Eutelsat
www.eutelsat.com

SATELLITE MANUFACTURER

EADS Astrium
www.astrium.aedz.net/

PLATFORM

Eurostar E3000

SEPARATED MASS

6150 kg

SATELLITE DESIGN LIFE

15 Years

SATELLITE MISSION

Eutelsat's KA-SAT is the first, in Europe, of a new generation of high throughput satellites optimized for consumer broadband services and targeting users located beyond range of high-speed terrestrial networks. Fully operating in Ku-band frequencies and with total throughput of 70 Gigabits per second, the satellite will be located at Eutelsat's 9 degrees East position. Through a configuration of 82 spotbeams and a ground infrastructure of ten gateways connected to the Internet, service will be provided across Europe and the Mediterranean Basin. In addition to supporting expansion of Eutelsat's Tooway™ consumer broadband service, KA-SAT will open new resources for telecom operators, broadcasters and ISPs, for data and video services.

Mission Overview



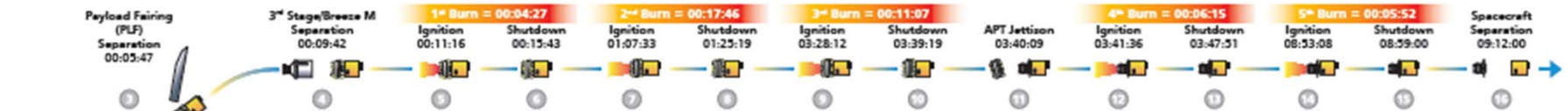
Experience ILS: Achieve Your Mission
QUALITY | PERFORMANCE | EXPERIENCE | DEDICATION

www.ilslaunch.com

KA-SAT

- 12th Proton Launch in 2010
- 8th ILS Proton Launch in 2010
- 64th ILS Proton Launch Overall
- 6th Eutelsat Satellite Launched on Proton
- 13th EuroStar Satellite Launched on ILS Proton

THE MISSION



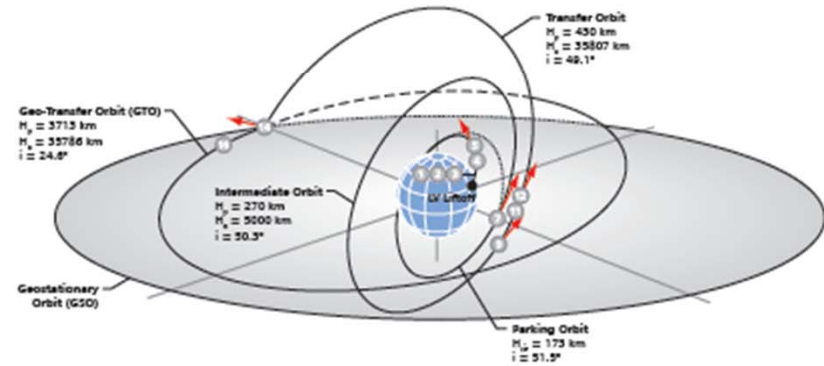
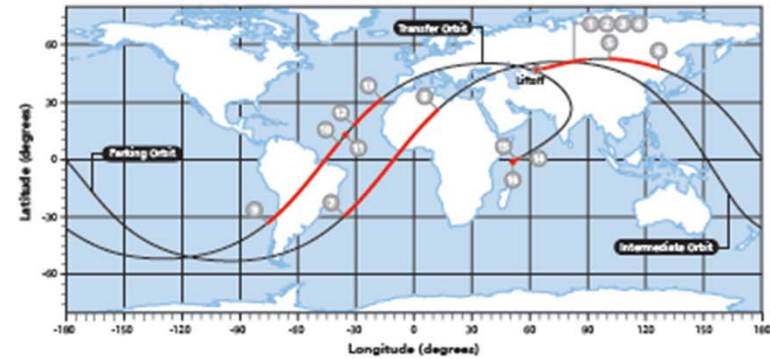
MISSION DESCRIPTION

The Proton M launch vehicle, utilizing a 5-burn Breeze M mission design, will lift off from Pad 39 at Baikonur Cosmodrome, Kazakhstan, with the KA-SAT satellite on board. The first three stages of the Proton will use a standard ascent profile to place the orbital unit (Breeze M upper stage and the KA-SAT satellite) into a sub-orbital trajectory. From this point in the mission, the Breeze M will perform planned mission maneuvers to advance the orbital unit first to a circular parking orbit, then to an intermediate orbit, followed by a transfer orbit, and finally to a geosynchronous transfer orbit. Separation of the KA-SAT satellite is scheduled to occur approximately 9 hours, 12 minutes after liftoff.



PROTON ON PAD 39

GROUND TRACK



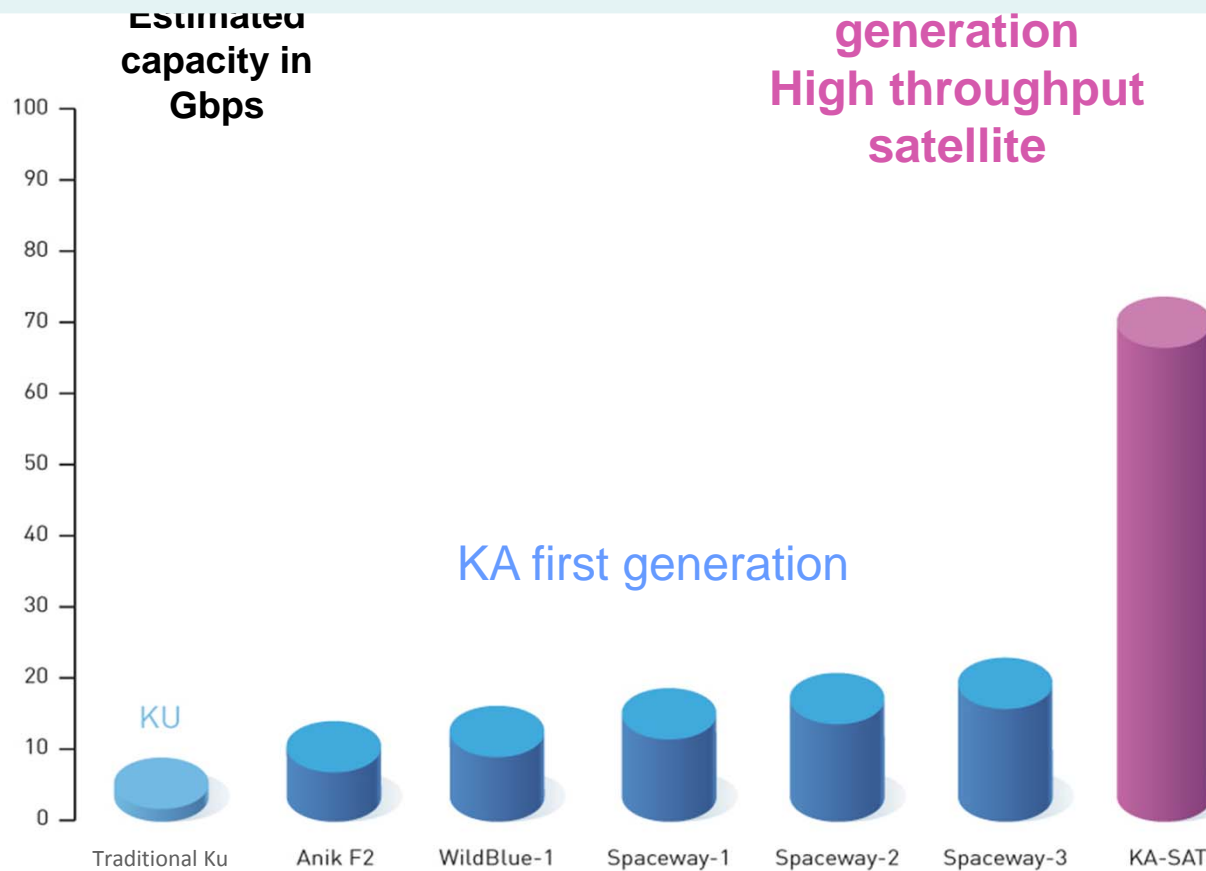
FLIGHT DESIGN



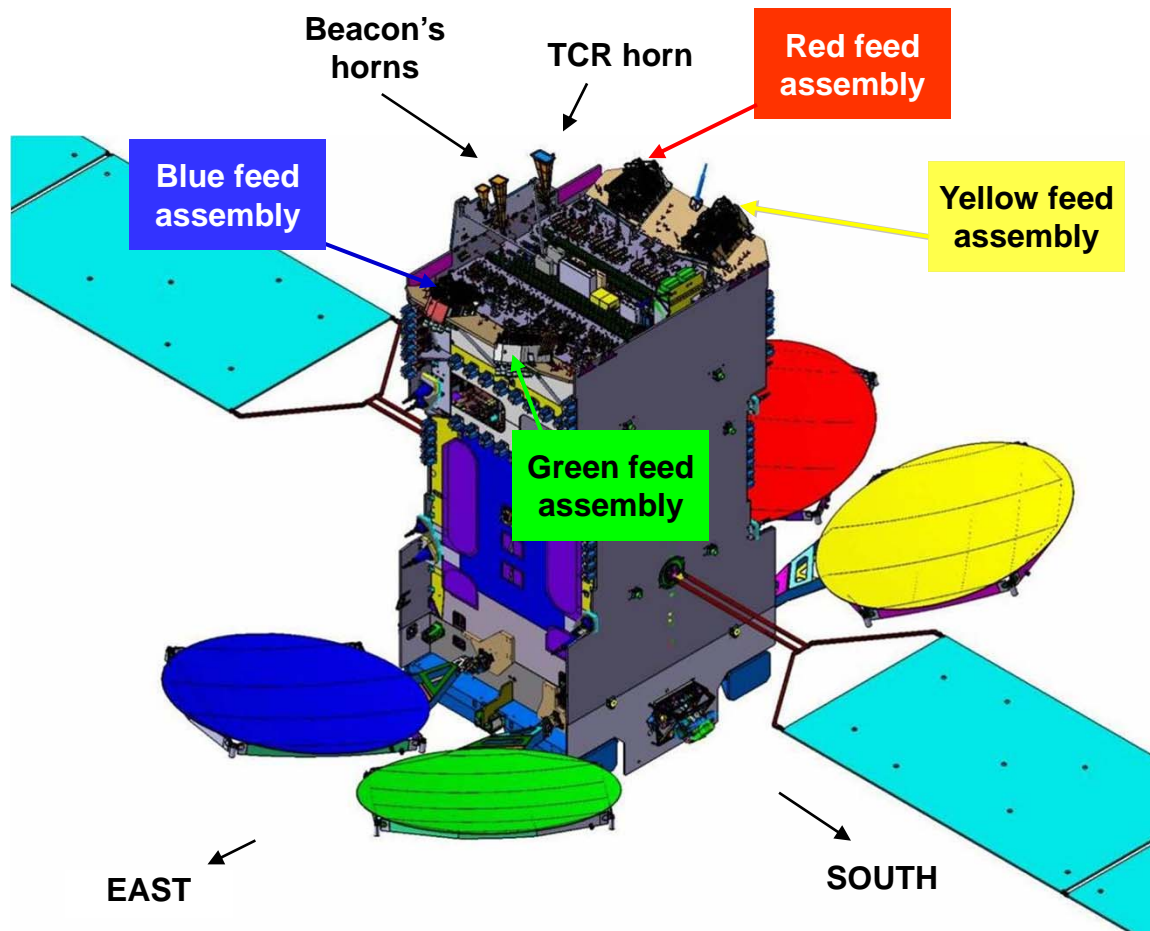
ASCENT PROFILE

KA-SAT 35 x more capacity than traditional broadcast satellite

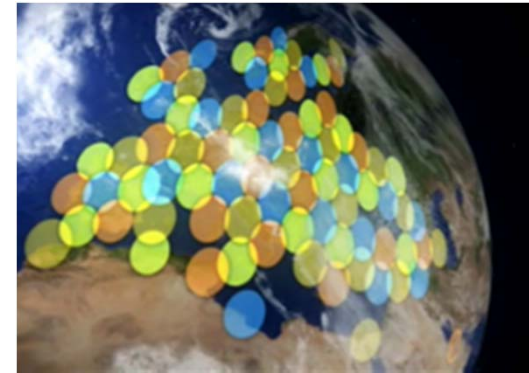
This increase of capacity makes satellite connectivity affordable both for consumers and for business applications



KA-SAT satellite deployed configuration in orbit



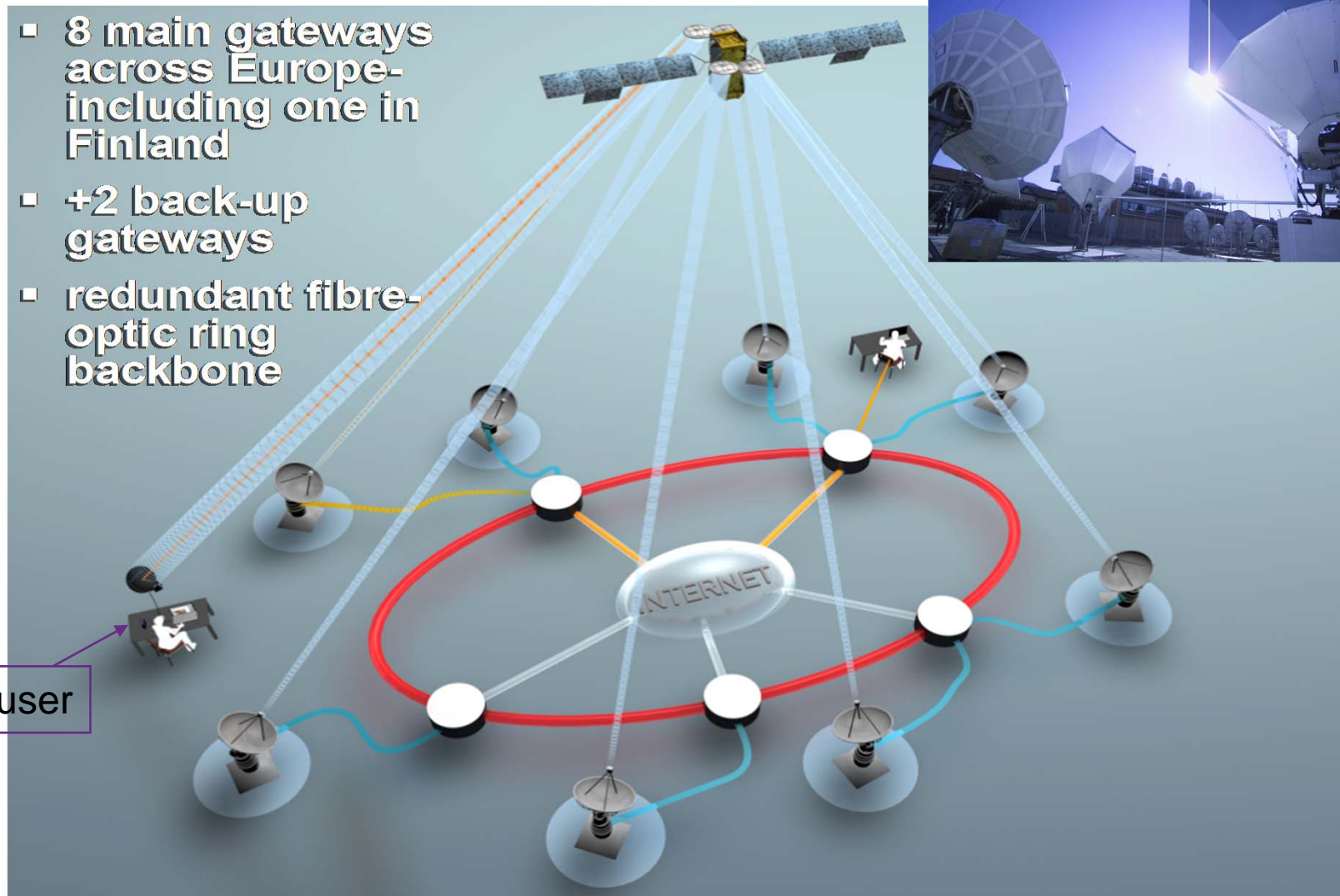
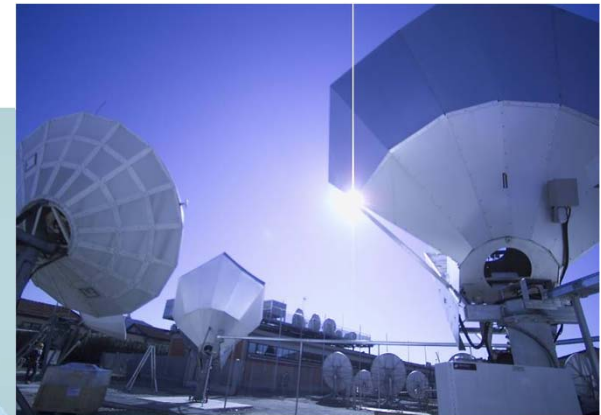
- Four antennas:
 - One antenna per colour
 - ~20 feeds in each array
 - 2.6m diameter deployable reflectors



Verkon rakenne

Network description

- 8 main gateways across Europe including one in Finland
- +2 back-up gateways
- redundant fibre-optic ring backbone

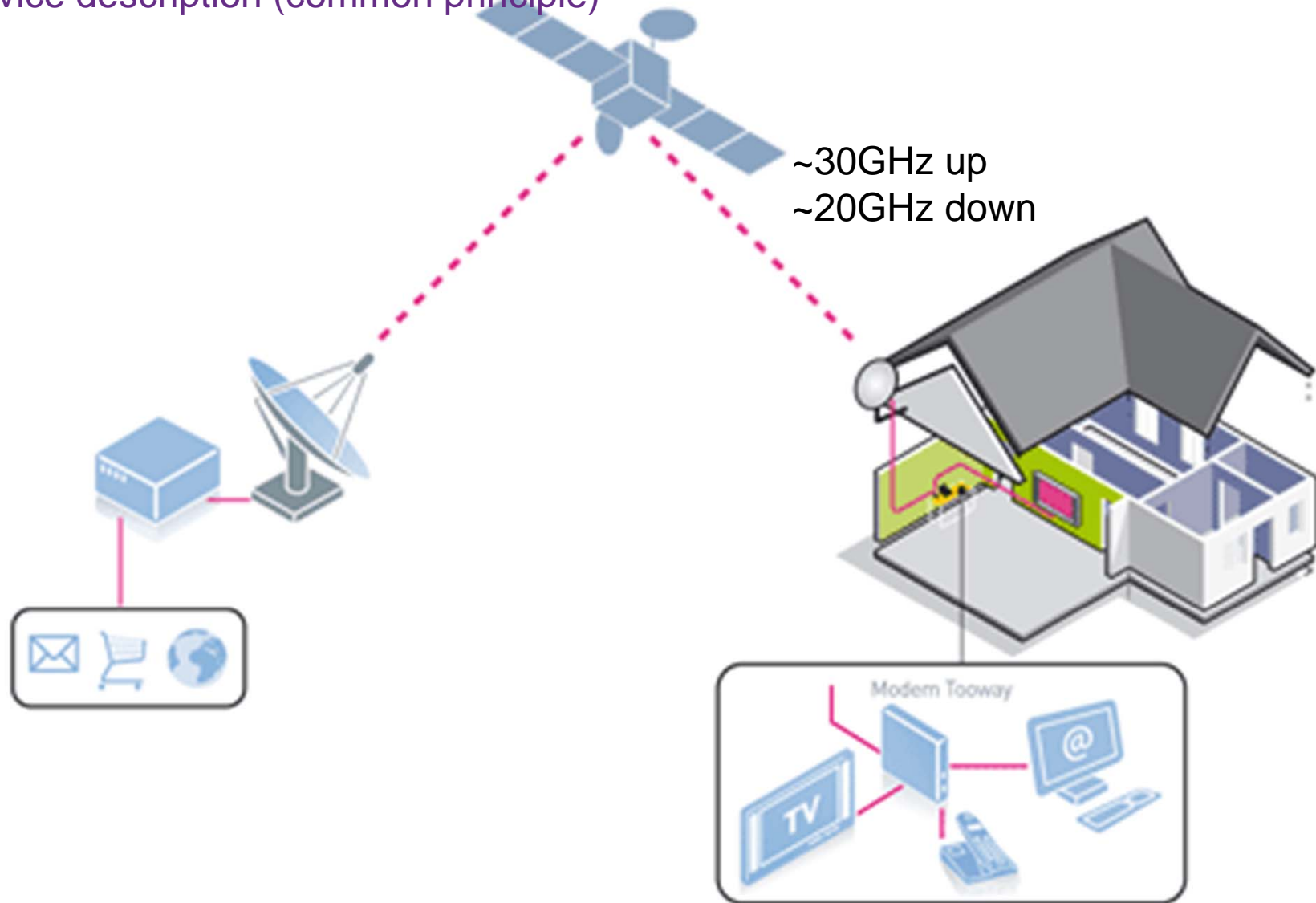


End-user

The KA-SAT Europe-wide ground segment network

Palvelun periaate

Service description (common principle)

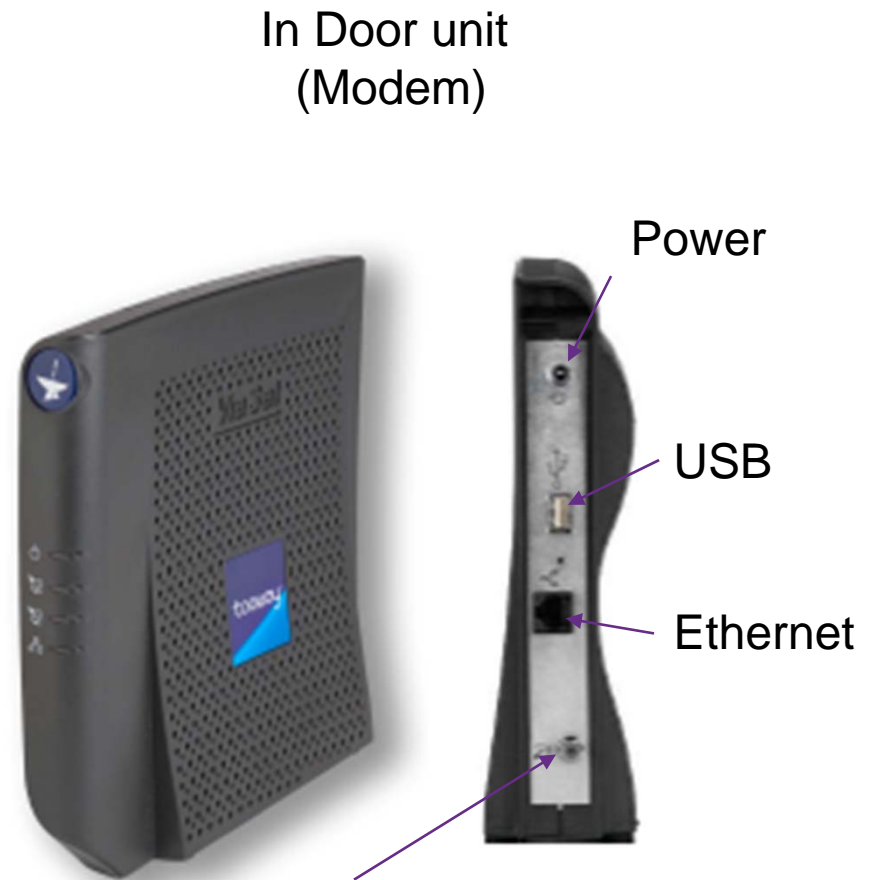


Asiakaslaitteet

End-user devices



Out Door unit
(Antenna)



In Door unit
(Modem)

Power

USB

Ethernet

- Tietokone ei tarvitse erillisohjelmia
- Ethernet liitännänsä voi liittää tietokoneen suoraan tai reitittimen/WLANin

Outdoor (antenna) connection



Triple Play

- Telephony
- Broadband Internet
- TV channels received from neighbouring satellites

Small dish 71cm
plug and play modem



10 Mbps / 4 Mbps

1 cable

Integrated self pointing

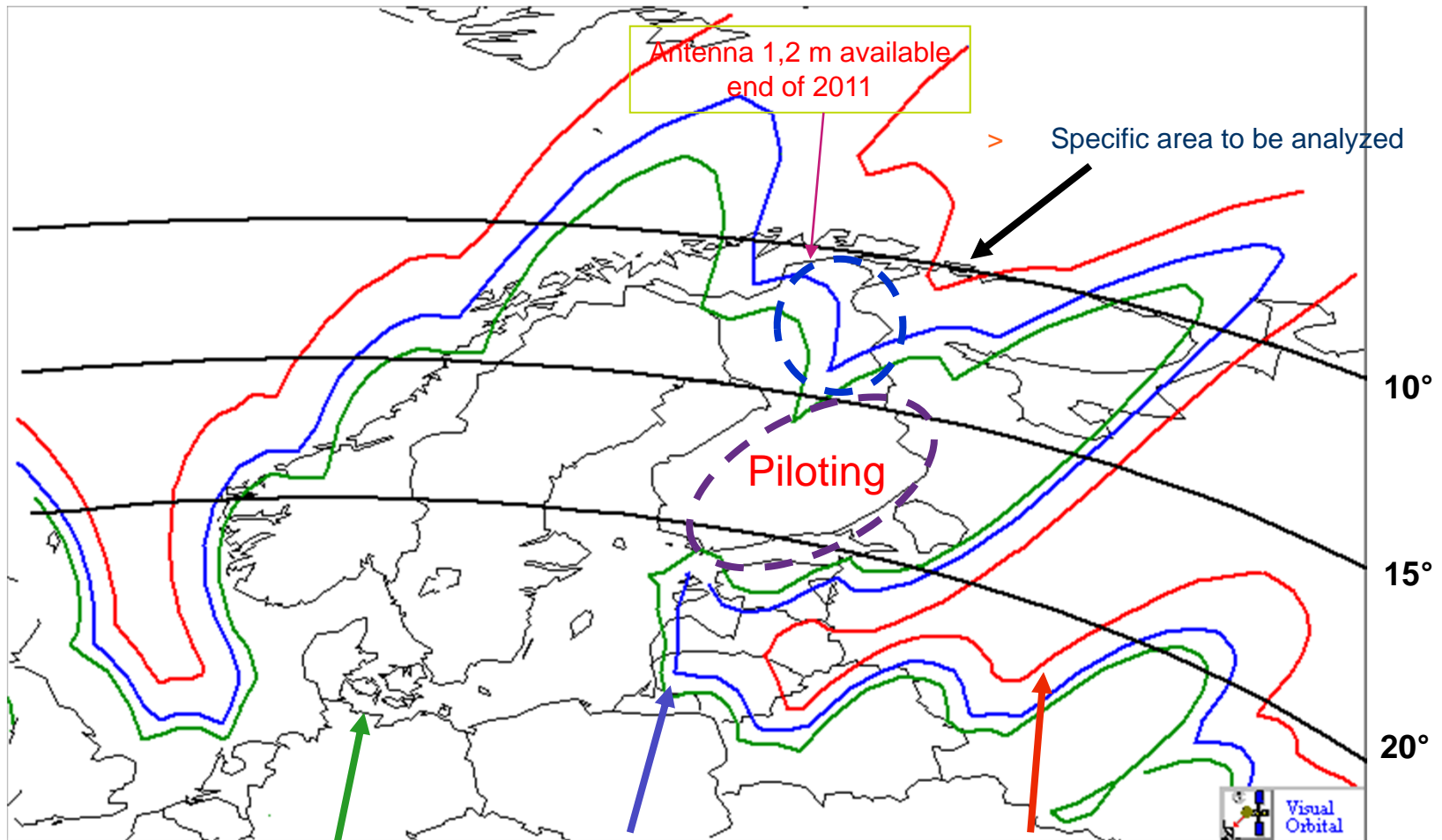
Integrated Ku TV reception

No polarisation tuning

More powerful, more convenient to install

Satelliitin peittoalue Skandinaviassa

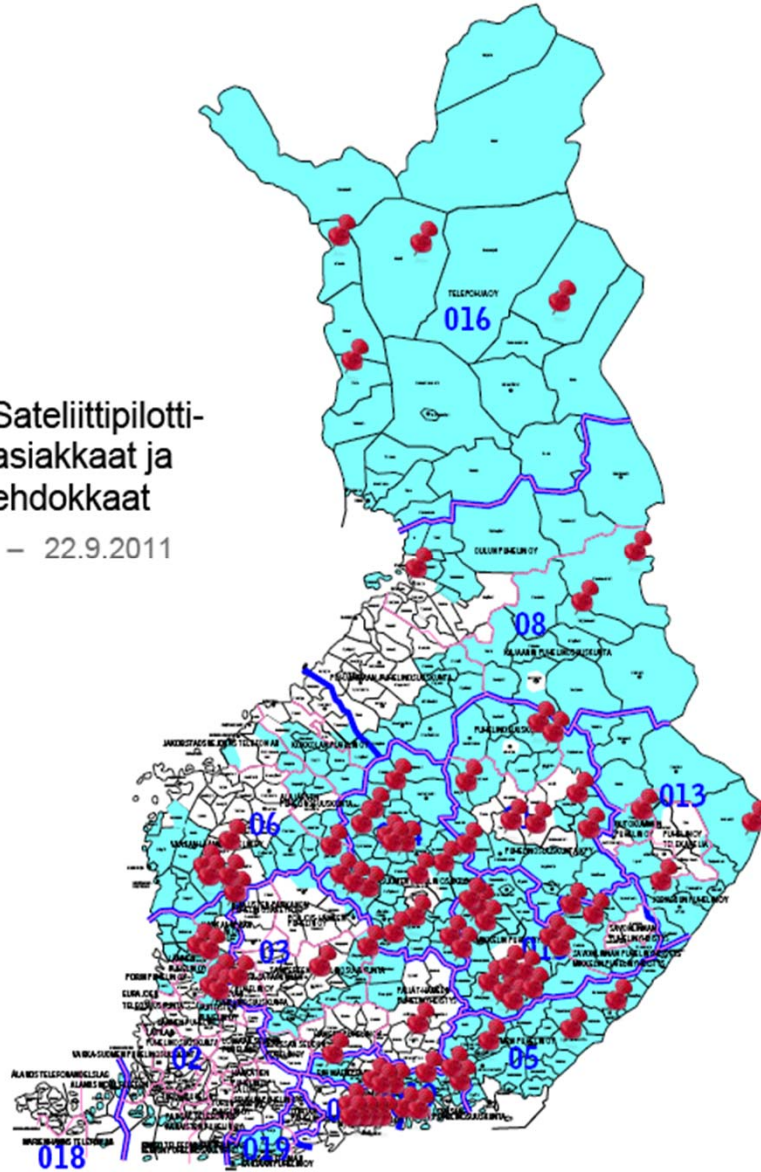
Zoom over Nordic countries



- > 77 x 72cm antenna dish size
- > Nominal service
- > 120cm antenna dish size
- > Nominal service
- > 120cm antenna dish size
- > Shaped service

Sateliittipilottiasiakkaat

- Sateliittipilotti-asiakkaat ja ehdokkaat
– 22.9.2011



Liittymätyypit ja datapaketit

Standard service packages

| Standard packages | 6M/1M | 8M/2M | 10M/2M | 10M/4M |
|---|---------------------|-------------|-------------|-------------|
| Max download, Kbps <small>Speed on the second generation surf-beam technology or 4096 Kbps on the actual generation</small> | 6M | 8M | 10M | |
| Max upload, Kbps <small>Speed on the second generation surf-beam technology or 512 Kbps on the actual generation</small> | 1M | 2M | | 4M |
| | Datapaketti | Datapaketti | Datapaketti | Datapaketti |
| 4 Week aggregated volume consumption, GB (*) | 4 GB (Gigatavua) | 8GB | 13 GB | 25 GB |

- Lisädatapaketit (Volume booster) 1GB suuruisina
- FAP (Fair Access Policy)

Typical User Profiles



Light usage

You need the internet for browsing the web and keeping in touch with family and friends. You send quite a lot of emails, and maybe use

[online chat](#) and Facebook. Our estimate of a 4 GB monthly data allowance would allow you roughly:-

- 2000 emails
- 210 documents
- 60 music tracks
- 90 hours of browsing
- 20 video clips
- 130 photos or images
- 2 downloaded movies

4GB



Frequent usage

You need broadband to be able to reliably surf, send emails, download music. You regularly use YouTube and exchange documents and photos shop occasionally

[online](#). Our estimate of a 8 GB monthly data allowance would allow you roughly:-

- 3200 emails
- 300 documents
- 90 music tracks
- 180 hours of browsing
- 35 video clips
- 180 photos or images
- 5 downloaded movies

8GB



Heavy usage

You work from home and occasionally send and receive large emails or files. You have more than one computer at home, and maybe a smart phone. You watch

[TV](#) over the internet as well as shopping regularly online. Our estimate of a 13 GB monthly data allowance would allow you roughly:-

- 4800 emails
- 480 documents
- 160 music tracks
- 270 hours of browsing
- 60 video clips
- 310 photos or images
- 8 downloaded movies

13GB



Very heavy usage

You need a powerful connection to support 3 or 4 computers for work use or family use. You regularly send and receive large emails, and enjoy the rich variety of multi media websites on the

[web](#)

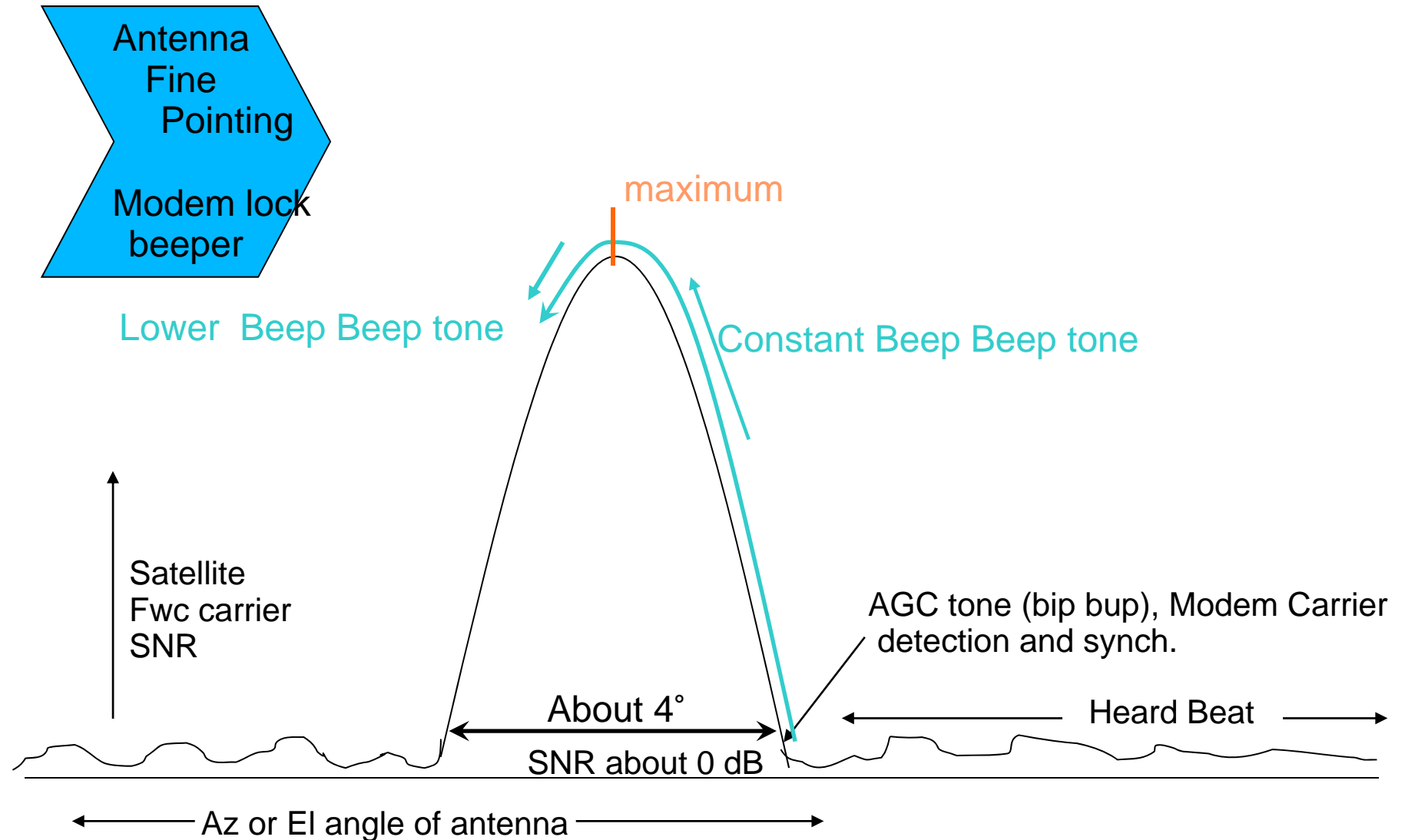
. Our estimate of a 25 GB monthly data allowance would allow you roughly (split over several PC's):-

- 6000 emails
- 690 documents
- 220 music tracks
- 420 hours of browsing
- 90 video clips
- 440 photos or images
- 14 downloaded movies

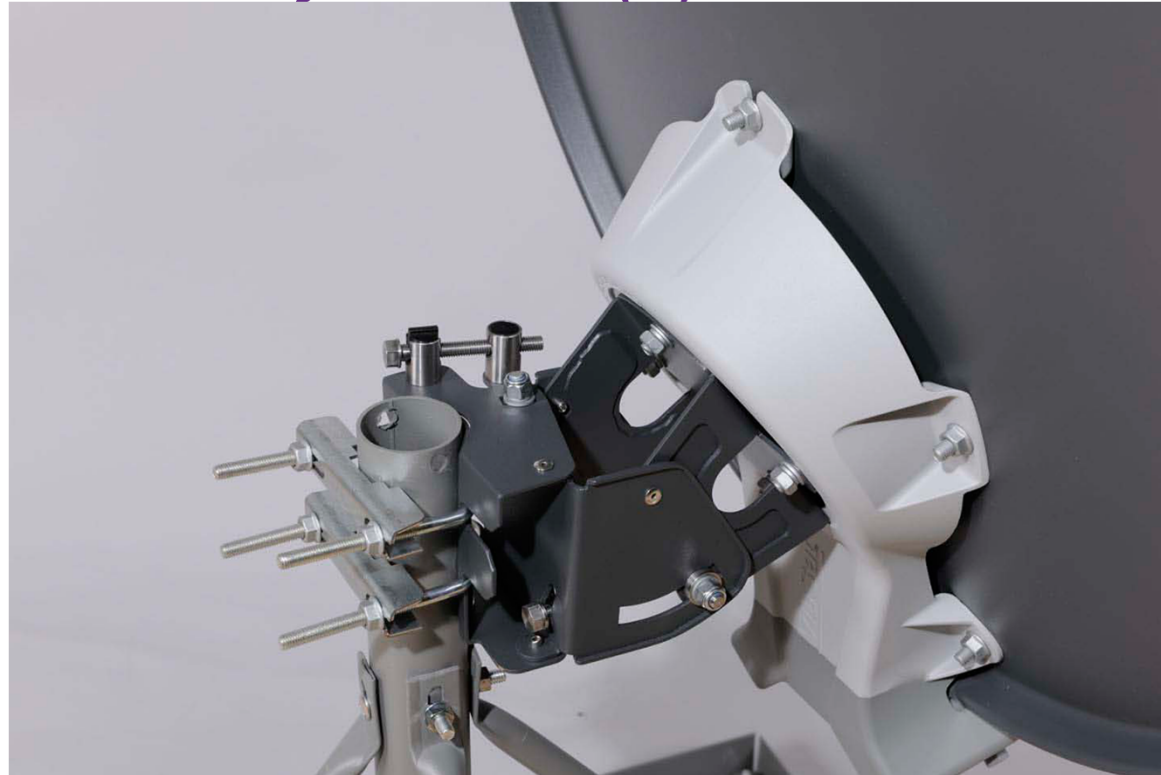
25GB

Antennin suuntaus

Pointing Beeper process

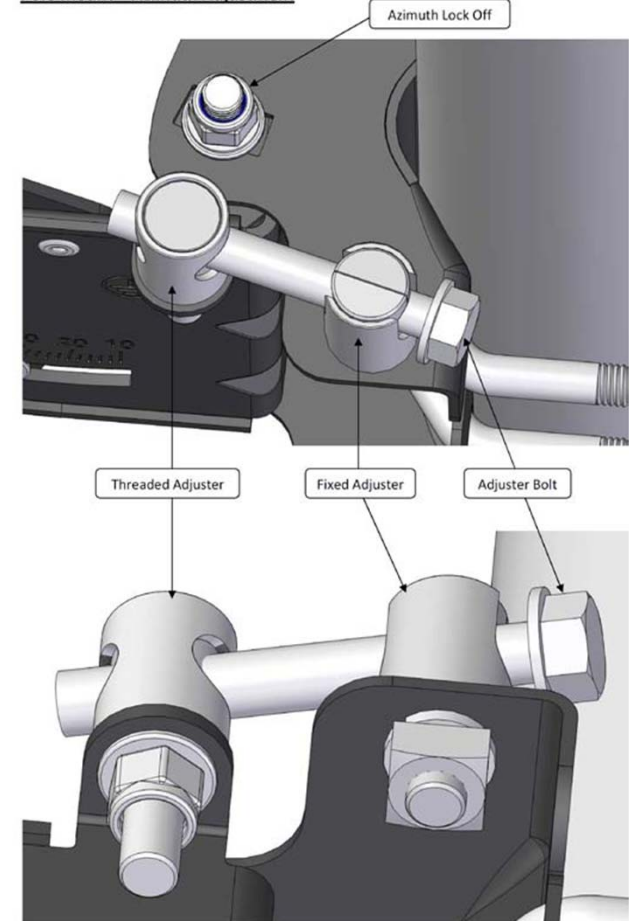


Az/EI adjustment (E)



> Az adjustment

Pole Mount – Azimuth Adjustment



> EI adjustment



Käyttäjänäkymä (asennus vaihe jne..)

Terminal GUI

The image displays four screenshots of the ViaSat terminal GUI, arranged in a collage. Each screenshot features the 'ViaSat' logo and 'tooway' branding at the top.

- Basic Status:** Shows a navigation menu with 'HOME', 'MODEM', and 'TRIA'. The 'MODEM' and 'TRIA' sections are highlighted with green checkmarks and icons of a modem and a satellite dish, respectively.
- Modem Status:** Shows a navigation menu and a 'MODEM STATE' section. The 'MODEM STATE' section contains a table with the following data:

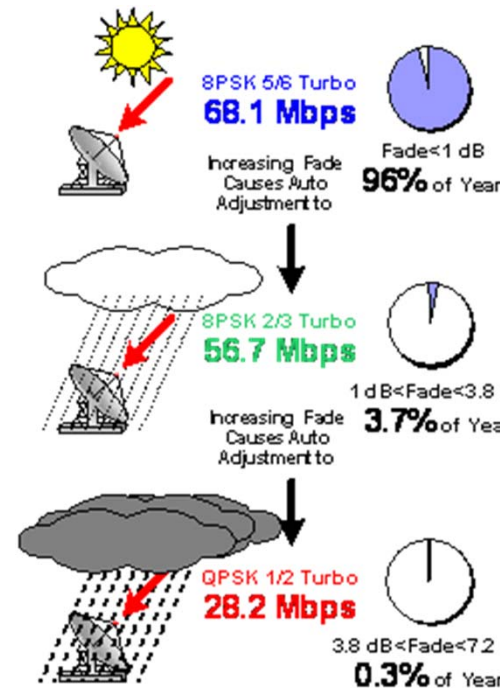
| Status | Scanning | Uptime | 000:00:17:05 |
|-----------------------------|---------------|-------------------|------------------|
| IDENTIFICATION | | | |
| IP Address | 0.0.0.0 | MAC Address | 0:a0:bc:25:d0:4d |
| Software Version | UT_1.0.3.0.17 | Hardware Version | UT_7 |
| Serial Number | 283710281059 | | |
| INTERFACE STATISTICS | | | |
| Transmitted Packets | 746 | Transmitted Bytes | 338,461 |
| Received Packets | 1,703 | Received Bytes | 188,760 |
| Loss of Sync Count | 0 | | |
- Installation Configuration:** Shows a navigation menu and a 'SELECT YOUR BEAM COLOUR' section. It features five satellite dish icons with color-coded beams: BLUE, ORANGE, PURPLE, MAGENTA, and CUSTOM. Below the icons is a 'Satellite ID:' input field.

Adaptive Coding and Modulation (ACM) today

SurfBeam's downstream ACM and upstream adaptive fade mitigation provide high availability and high efficiency

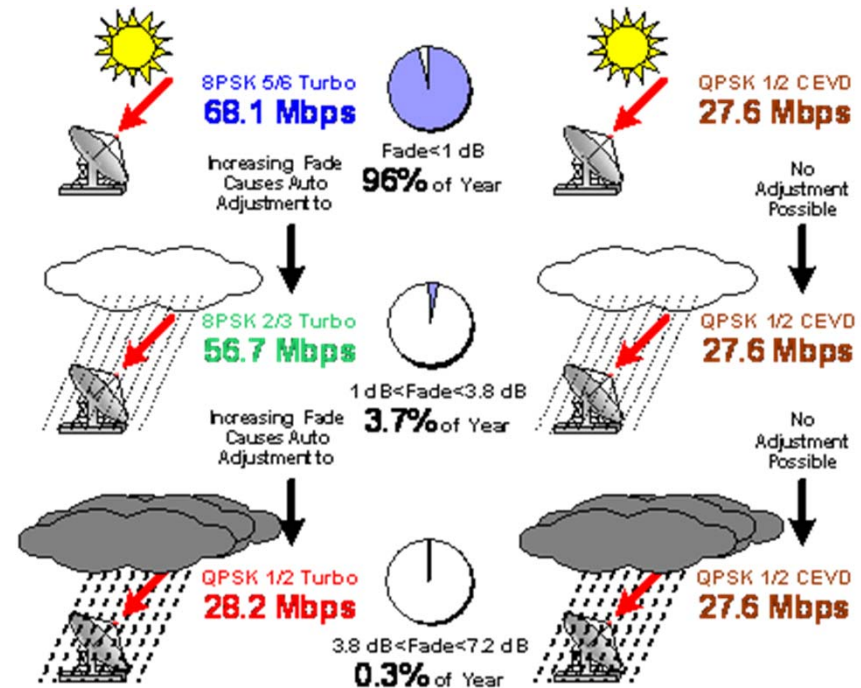
- Terminals in Clear-Sky receive packets at high Information Rate
- Transmissions to terminals experiencing fade are automatically sent at a more robust code point
- Large throughput advantage, since clear sky conditions usually prevail (typ. 95+%)
- Static systems must transmit at the more robust code point at all times to achieve desired availability
- Leapfrog will be most efficient than Surfbeam

Adaptive Coding and Modulation



ACM Throughput:
67.56 Mbps
Averaged over Year

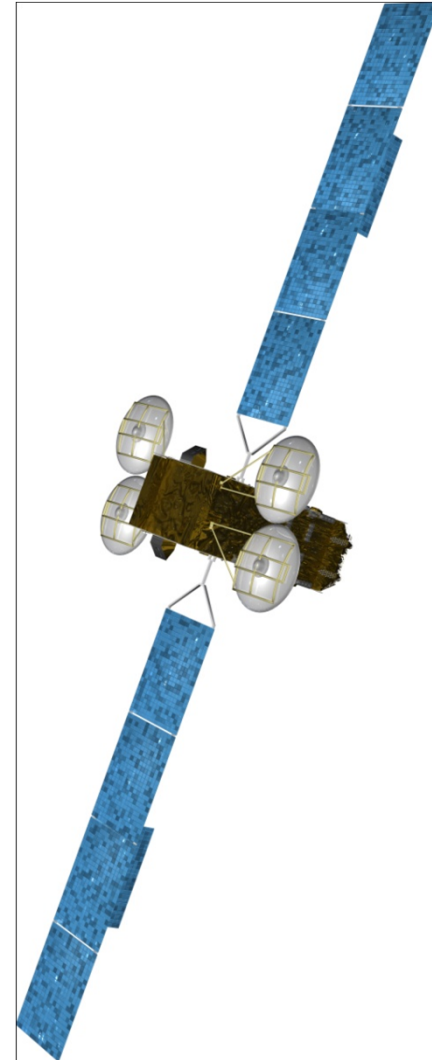
Constant Coding and Modulation



CCM Throughput:
27.6 Mbps
Averaged over Year

Sonera Laajakaista satelliitti yhteenveto

- Laajakaistaliittymä, joka toteutetaan satelliittijärjestelmän ja palvelun kautta.
 - Suuri kapasiteetti verrattuna aikaisimpiin satelliittitoteutuksiin
 - Suuremmat siirtonopeudet, uusi teknologia (mm. ACM).
 - Helpompi asentaa ja käyttää (ei esim. erillisohjelmia tietokoneissa)
 - Hinnaltaan edullisempi (alkaen n. 40 €/kk; 6M/1M ja 4GB)
- Satelliitti laukaistu joulukuussa 2010
- Perustuu uuteen, maailman tehokkaimpaan tietoliikennesatelliittiin (70G)
- Nopeus jopa 10/4 Mbits
 - Liittymäkohtaiset datapaketit + lisäpaketit
 - FAP (Fair Access Policy)
 - Professionaaliset liittymät
- Saatavuus koko Suomeen alueella; Elevaatio huomioitava (esteetön näkyvyys satelliittiin saatava aikaan)
- Päätelaitteet: Antennilaitteisto 0,8m-1,2M, sisäyksikkö eli modeemi (Ethernet liitäntä). Ensimmäiset 1.2 m antennit saapuivat 18.10.11
- Tavoitteena kaupallinen asteittainen palvelun käynnistäminen 2011 aikana. Pilottivaihe menossa.





Kiitos!

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