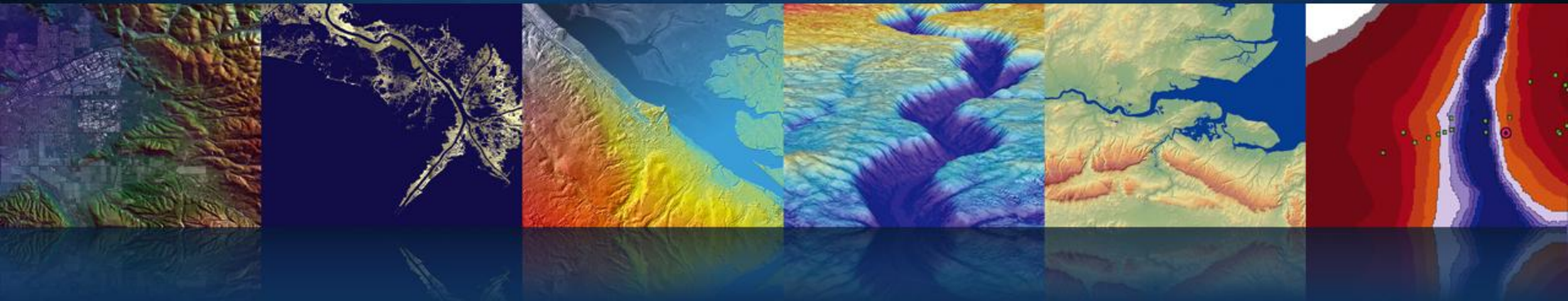


Hypercable telecommunications system design with Intermap Technologies Telecommunication Products

Hypercable



Intermap Online Surface Profiles Hypercable link budget

Hypercable

Terrain Profiles for Microwave Link Planning

Intermap's Online Terrain Profile

- Provide a uniformly accurate, wide-area topographic model of the earth's surface
- Including buildings, vegetation, roads, and natural terrain
- Supports Microwave planning in a unique way to
 - Do feasibility checks in the pre-planning phase
 - Find the best possible sites and height for Antennas
 - Decrease number and costs of site surveys

Terrain Profiles for Microwave Link Planning

Customer Quotes:

Scandinavian Telecom Professional Services Provider:

“We are saving up to 80% of our site visits using this Intermap service”

Operator in Germany:

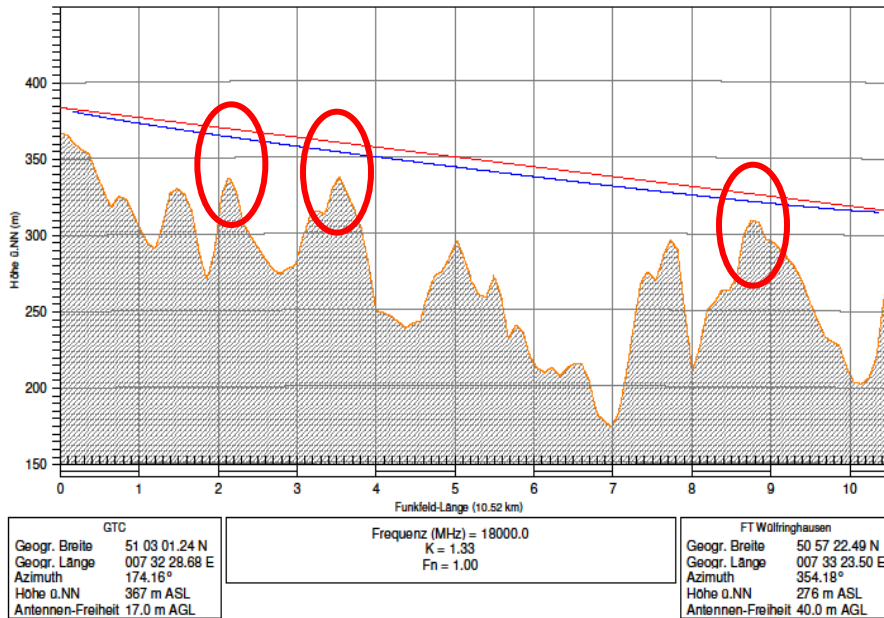
“Our target is to decrease our surveying costs by min. 30%”

Telecom Professional Services Provider:

“By using this Service we have increased our efficiency in the planning”

Data Accuracy makes a difference

Standard Plot



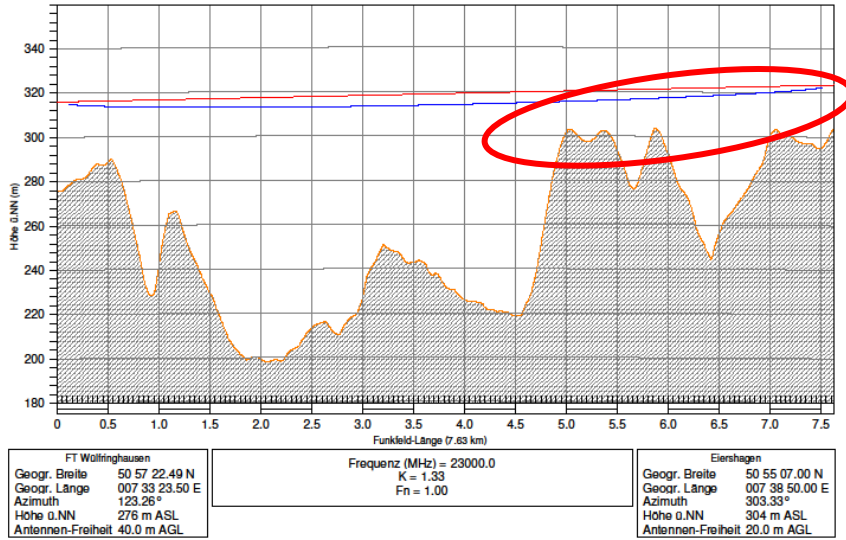
Intermap Plot



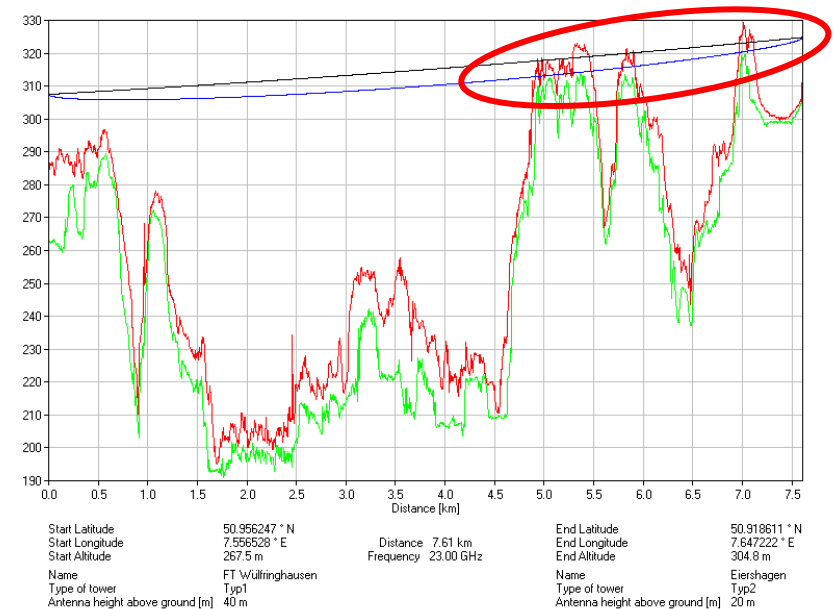
Intermap's Online Terrain Profiles are derived from the Company's high-resolution NEXTMap surface model and allow significantly more precise evaluation of the terrain than standard data.

Data Accuracy makes a difference

Standard Plot



Intermap Plot

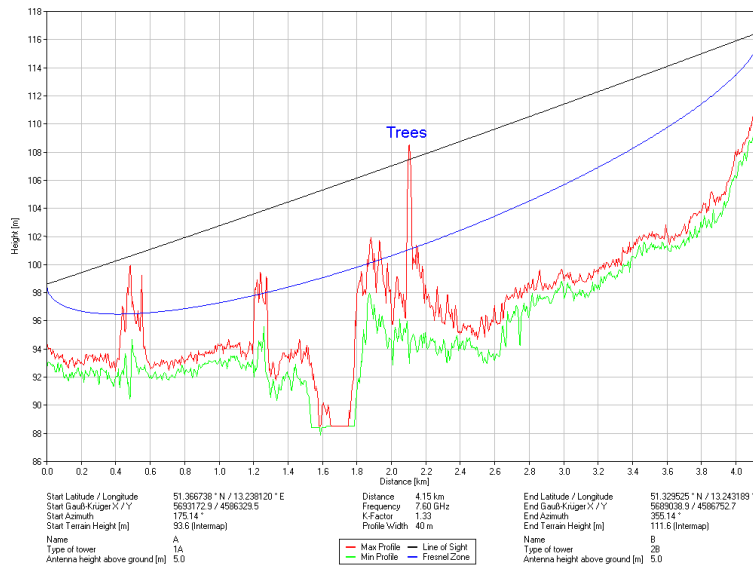


Using highly accurate NEXTMap digital surface models as database for creating Online Terrain Profiles, provides you with realistic information about the height and surface appearance of the Earth surface.

Data Accuracy makes a difference



Standard Plot

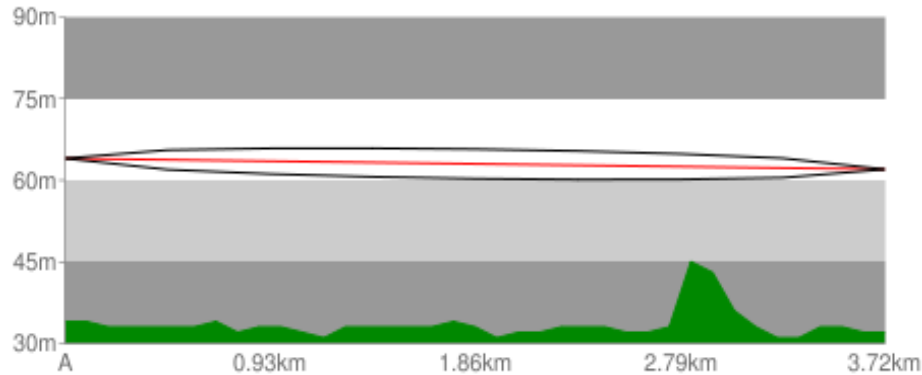


Intermap Plot

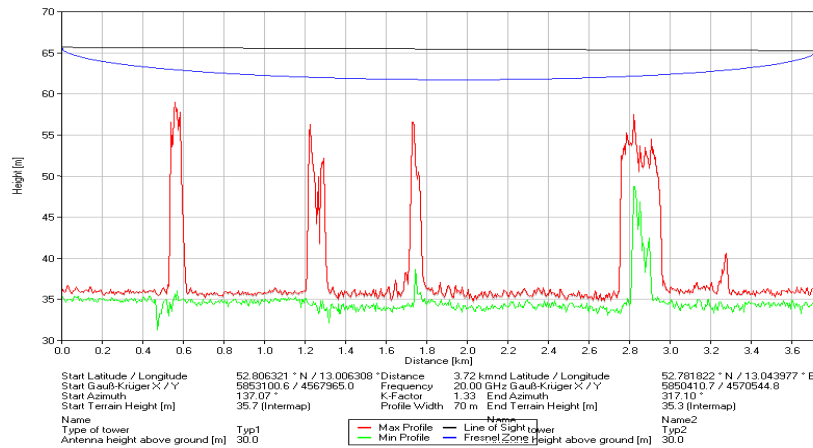
Data Accuracy makes a difference

Steves Path Profile

(Click anywhere in chart area for a bigger, printable version)



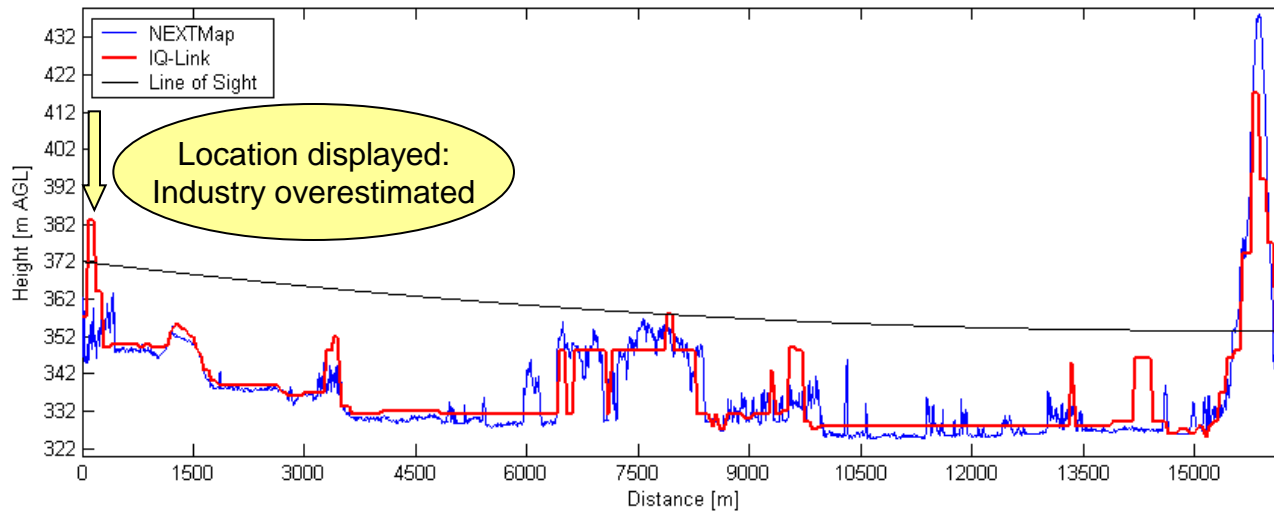
Standard Plot



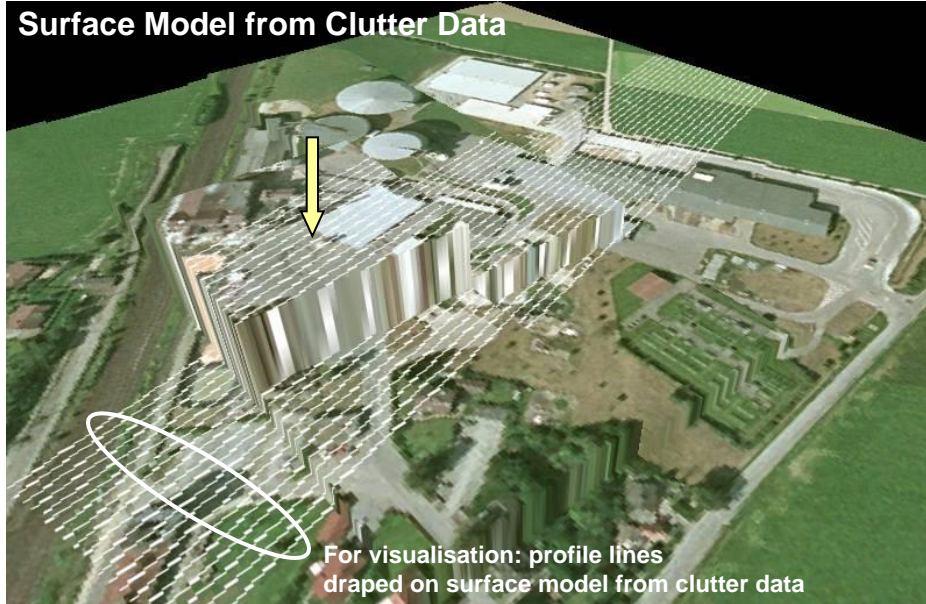
Intermap Plot

Start Latitude / Longitude	52.806321 ° N / 13.006308 ° E	Distance	3.72 km	End Latitude / Longitude	52.781822 ° N / 13.043977 ° E
Start Gauß-Krüger X / Y	5853100.6 / 4567965.0	Frequency	20.00 GHz	End Gauß-Krüger X / Y	5850410.7 / 4570544.8
Start Azimuth	137.07 °	K-Factor	1.33	End Azimuth	317.10 °
Start Terrain Height [m]	35.7 (Intermap)	Profile Width	70 m	End Terrain Height [m]	35.3 (Intermap)
Name		Name		Name2	
Type of tower	Typ1	Antenna height above ground [m]	30.0	Type2	Typ2

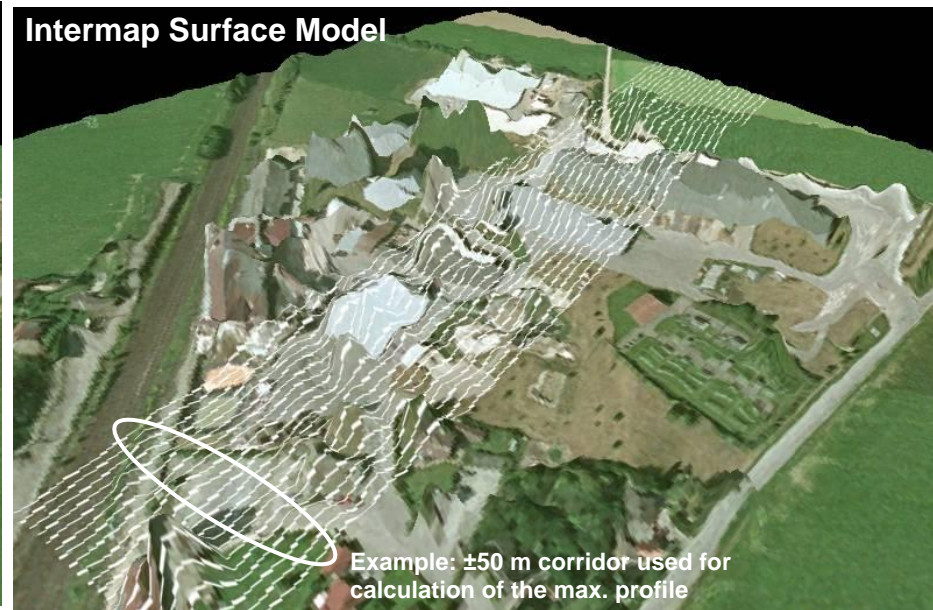
Data Accuracy makes a difference



Surface Model from Clutter Data



Intermap Surface Model



Easy accessible application

Two option to get access:

1. via Intermap's free client:

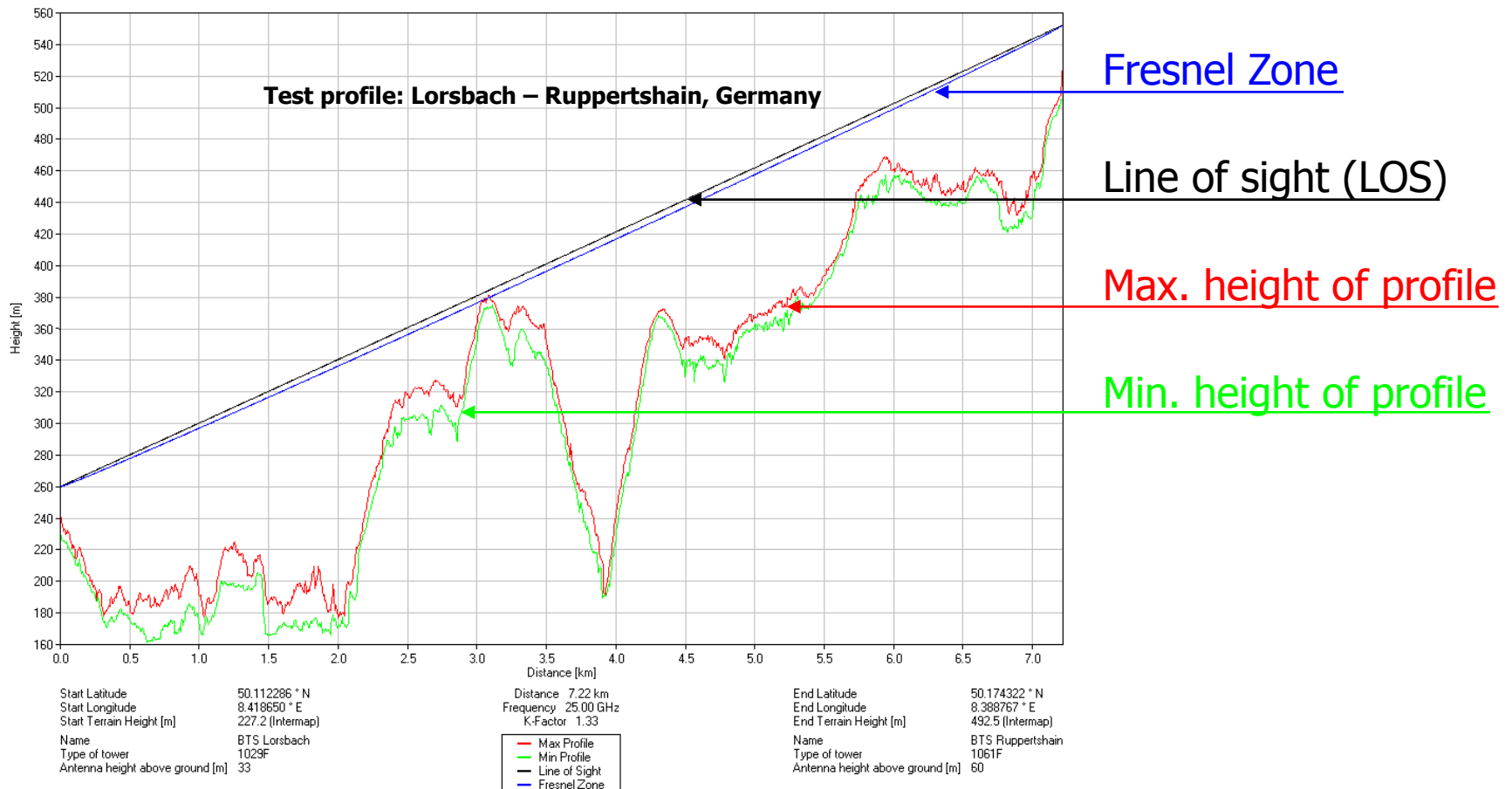
The screenshot shows the 'Intermap Microwave Link Planning Demonstrator 1.0.6.5' window. It features a menu bar with 'Batch', 'Config', and 'Plot'. The main area is divided into two columns for 'Location A' and 'Location B'. Each column has input fields for Start Latitude, Start Longitude, Name, Type of tower, Antenna height above ground [m], and Terrain height [m]. Below these are fields for Profile Identifier, User String, Frequency [GHz], and Profile Width Calculated [m]. At the bottom, there are 'Quit' and 'Get Profile' buttons, the Intermap Technologies logo, and a status bar with the text 'Format: dd.dddddd or dd mm ss.ss or mmmmmmm.m'.

Location A		Location B	
Start Latitude	52.000000	End Latitude	52.100000
Start Longitude	1.000000	End Longitude	1.100000
Name	Name1	Name	Name2
Type of tower	Typ1	Type of tower	Typ2
Antenna height above ground [m]	38	Antenna height above ground [m]	60
Terrain height [m]	Intermap	Terrain height [m]	Intermap
Profile Identifier	MLP_2010-05-20_09-50-27 Demo		
User String	Demo		
Frequency [GHz]	20.00	Profile Width Calculated [m]	40

2. or through a Web browser via www.intermap.com

Online Terrain Profiles – Example profile

Clear and concise profiles for accurate analysis



Fresnel Zone

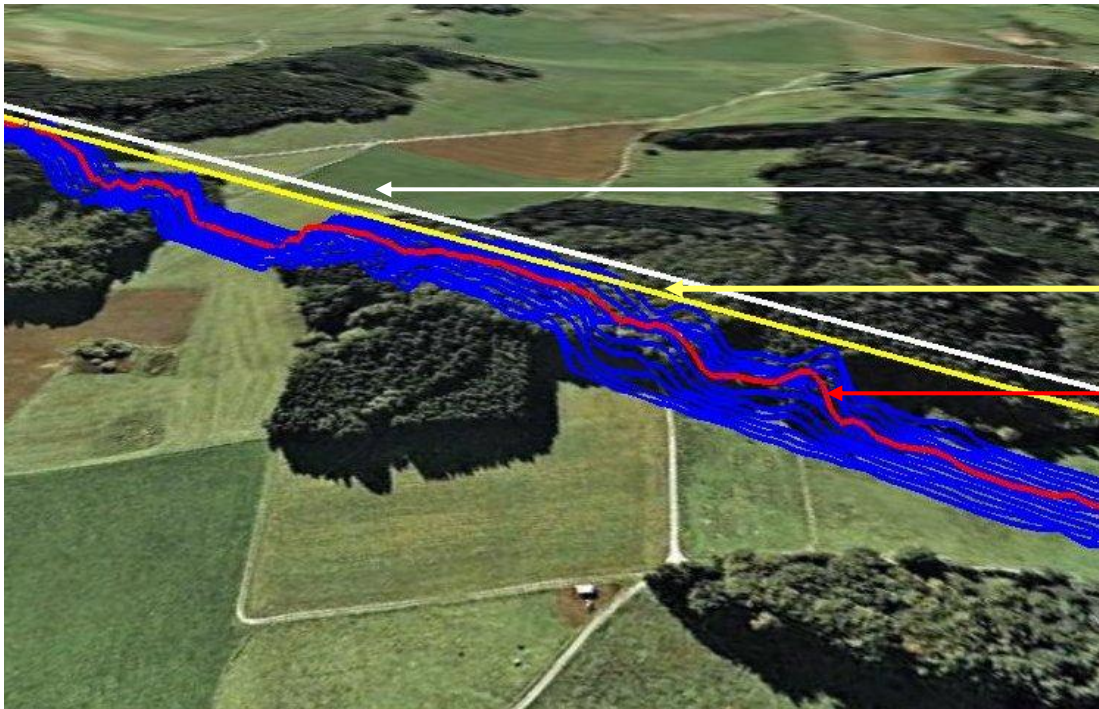
Line of sight (LOS)

Max. height of profile

Min. height of profile

Online Terrain Profiles – Example profile

Visualization of profile over forested areas



Line of sight (LOS)

1st Fresnel Zone

Highest point within
the defined 50m corridor

Height information of
the terrain surface
(incl. vegetation height)

Intermap's Online Terrain Profiles are provided
as .kml and .txt files

Online Terrain Profiles for Microwave Link Planning

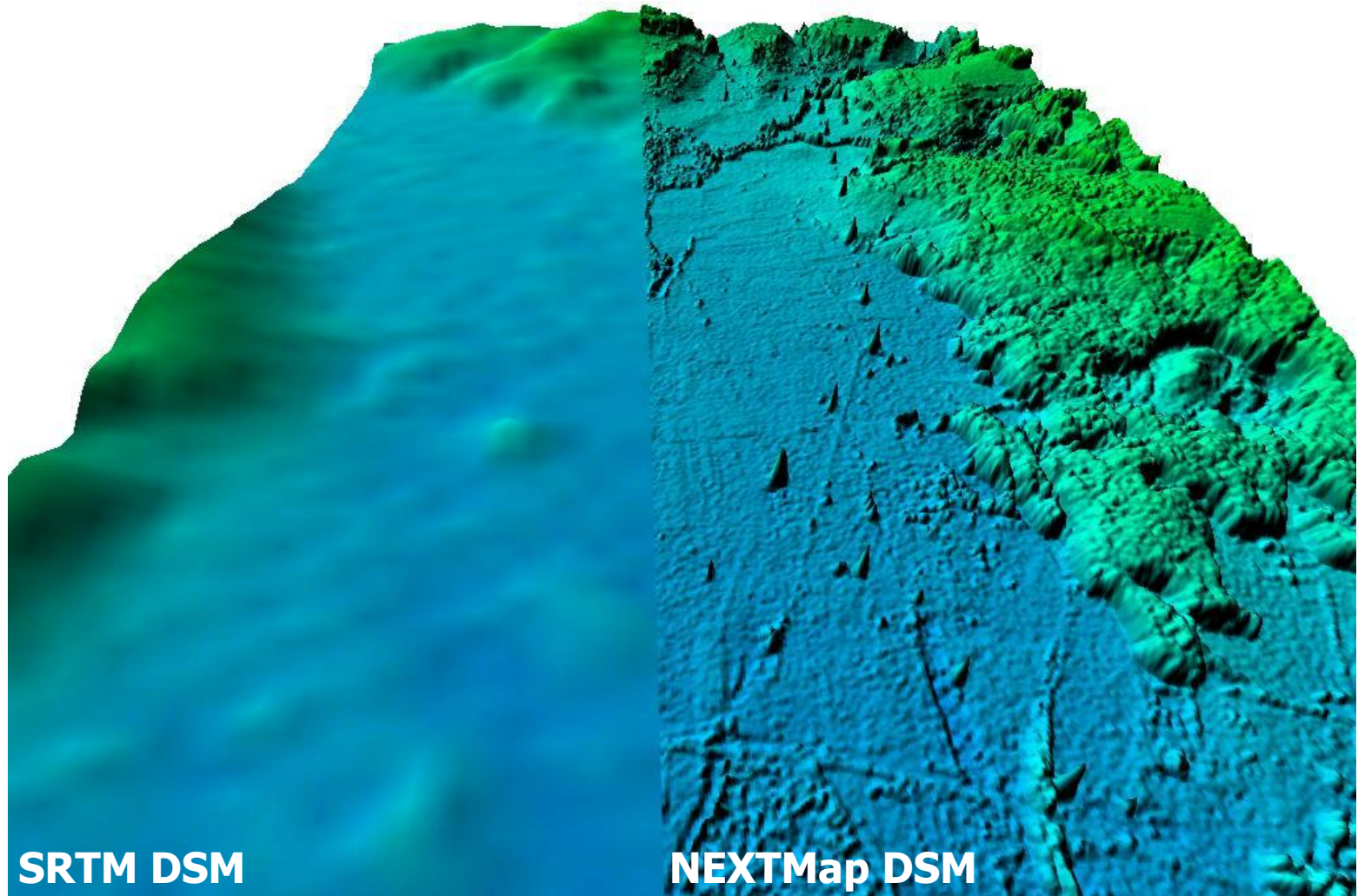
- Complementary Service to existing planning tools for microwave link planning
- Significant accuracy advantage over standard clutter data and terrain models
- Precise data service helping to reduce unnecessary site survey costs
- Enables Efficient and cost-effective planning
- Easy accessible Web-based application

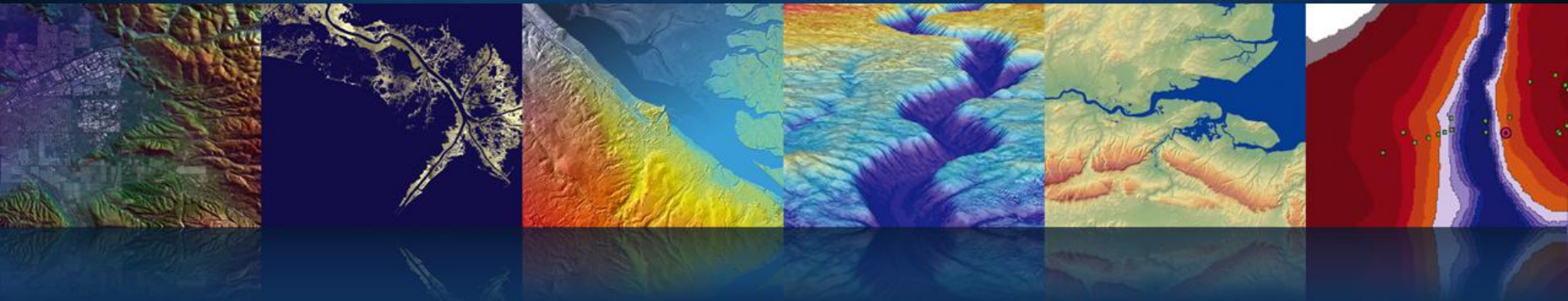
Get a free test account for evaluation

Online Terrain Profiles Specifications

- **Data delivery:** Online via a Web service or free software interface (thin client)
- **Business Model:** Pay per monthly subscription
- **Output format:** Specified by customer
- **Posting:** 5 m
- **Accuracy:** 2 m horizontally and 1 m vertically (RMS error in flat open terrain)
- **Coverage:** Western Europe and US
- **Profile width:** User can specify the corridor width of a profile (in steps of 5 m left and right)
All sub-profiles are merged to a max. and min profile
- **Strengths:** The NEXTMap DSM is ideally suited for unstructured clutter (all types of vegetation, electricity towers, etc.)
- **Limitations:** This product is not applicable to dense urban cores
Intermap is planning to fill in 3D city models with partner data

Data Accuracy makes a difference





NEXTMap[®] for RF Planning

NEXTMap® for RF Planning

Optimum placement of radio towers ensures:

- High service quality
- Revenue increase

Accurate elevation data ensures:

- Optimum placement of radio towers ensures
- Only the minimum number of base stations are installed
- Major cost reduction

Our Customer

Intermap Telecom Market Customers within less than one year:



Intermap first telecom customer:



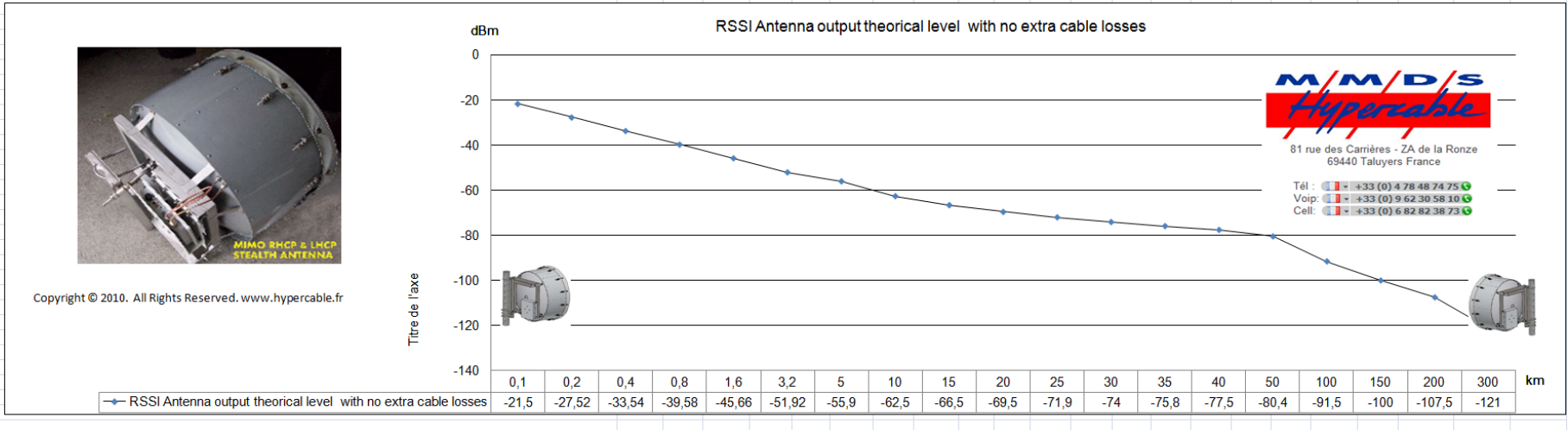
Majority of the operators are paving the way for 4G (LTE)

- First target for LTE is broadband in rural areas
- Frequency for digital dividend will become free soon to be used for LTE planning
- Power of computing has increased, producing accurate large scale predictions of a transmitter service area, using highly accurate data have become a reality
- Intermap elevation data is sole source of accurate, wide-area topographic models of the earth's surface with a uniformly accurate coverage

Hypercable bilans de liaisons 1

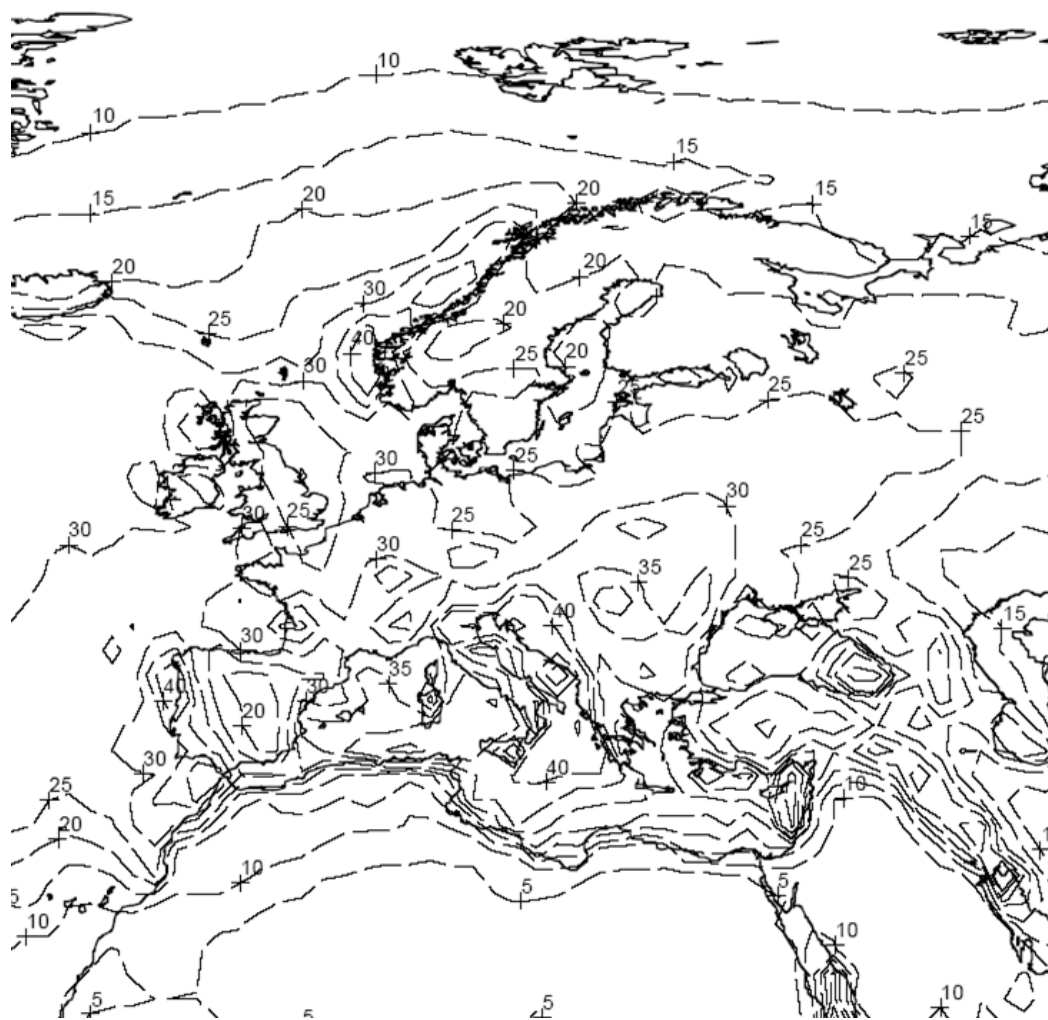
Calculateur Universel

TX Power + Antenna Gain=EIRP from Wi300 in dBW (Remove 30 dB on dBm value)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Operating frequency in Ghz (from 0,001 up to 999 Ghz)	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6
Distance A to B in km	0,1	0,2	0,4	0,8	1,6	3,2	5	10	15	20	25	30	35	40	50	100	150	200	300									
Free space losses from side A to side B	87,5	93,5	99,5	105,5	111,5	117,6	121,4	127,5	131	133,5	135,4	137	138,3	139,5	141,4	147,5	151	153,5	157									
Antenna output RF field level	-21,5	-27,5	-33,5	-39,5	-45,5	-51,6	-56,4	-61,5	-65	-67,5	-69,4	-71	-72,3	-73,5	-75,4	-81,5	-85	-87,5	-91									
Antenna gain (gain enter follow negative sign ex:-29 dB for 72 cm antenna less 3 dB cables=-26dB)	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26									
ATPC max reduction level command in dB	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25									
Extra Cable + Connectors Attenuation (if modem not antenna closed)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
Antenna output level from Stealth MIMO in Dbµv/m	85,5	79,48	73,46	67,42	61,34	55,08	51,1	44,5	40,5	37,5	35,1	33	31,2	29,5	26,6	15,5	7	-0,5	-14									
Antenna output level from Stealth MIMO in dBm	-21,5	-27,5	-33,5	-39,5	-45,5	-51,6	-56,4	-61,5	-65	-67,5	-69,4	-71	-72,3	-73,5	-75,4	-81,5	-85	-87,5	-91									
Antenna output level by Clear Sky ideal conditions OK?		ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok									
Radio Field level in dBm	-47,5	-53,5	-59,5	-65,5	-71,5	-77,6	-81,4	-87,5	-91	-93,5	-95,4	-97	-98,3	-99,5	-101,4	-107,5	-111	-113,5	-117									
Add Gas+rain NOISE Attenuation per km (dB)	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1									
Total Noise Attenuation	0	0,02	0,04	0,08	0,16	0,32	0,5	1	1,5	2	2,5	3	3,5	4	5	10	15	20	30									
RSSI Antenna output theoretical level with no extra cable losses	-21,5	-27,5	-33,54	-39,58	-45,7	-51,92	-55,9	-62,5	-66,5	-69,5	-71,9	-74	-75,8	-77,5	-80,4	-91,5	-100	-107,5	-121									
Antenna Modem OK with noise attenuation ?		ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok									
Modem OK with noise and Extra cable attenuation?		ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok									
Total Fade Margin in dB with gas Rain Noise (equiv to C/N)	73,5	67	61,5	55,4	49	43,1	39,1	32,5	29	26	23,1	21	19	18	14,6	3,5	-5	-12,5	-26									
MIMO RHCP-LHCP increase RSSI level(min 3 dB max 6 dB)	-15,5	-21,5	-27,54	-33,58	-39,7	-45,92	-49,9	-56,5	-60,5	-63,5	-65,9	-68	-69,8	-71,5	-74,4	-85,5	-94	-101,5	-115									



Hypercable bilans de liaisons 2

Calculateur dédié intégrant les "Rain Zones"



Bilan de Liaison 1+0

1,00

Date:

30/01/2011



Projet:

Site A:

A

Site B:

B

Hypercable

Distance entre les sites*

Type de Modulation:	32 APSK	Débit maximum:	100 Mbps
Largeur de canal:	28 MHz		
Mode opérationnel**:	Meilleure sensibilité		
Température Annuelle:	20 °C		
Zone Pluie***:	F		28 mm/h

	Degrees°	Minutes'	Secondes"	
Latitude A:	31	26	14,28	N
Longitude A:	74	13	9,5	E
Latitude B:	31	31	33,04	N
Longitude B:	74	13	20,32	E

Entrée manuelle de distance: 5 km

Distance Calculée: 5,000 km

Puissance émission:

0 dBm

*Puissance émise Maxi: -22...+3

Frequence:

24 GHz

Ant. A hauteur/niveau mer:

650 m

Ant. B hauteur/niveau mer:

300 m

Antennes Comhat (entrée automatique du gain)

Antenne A:

0,6 m

40,3 dBi

Antenne B:

0,6 m

40,3 dBi

Pertes:

0 dB

Niveau du Signal reçu:

-54,67 dBm

Marge de Fading:

* @ 10-3 24,33 dB

* @ 10-6 20,33 dB

Entrée automatique seuil sensibilité

Seuil de réception:

* @ 10-3 -79 dBm

* @ 10-6 -75 dBm

Disponibilité Multitrajectoires(%): Vert Hor

* @ 10-3 100 100

* @ 10-6 99,99999 99,99999

Disponibilité Pluie (%):

Vert

Hor

* @ 10-3 99,99862 99,99742

* @ 10-6 99,99754 99,99558

Multitrajectoires+Pluie dispo.(%): Vert Hor

* @ 10-3 99,99862 99,99741

* @ 10-6 99,99753 99,99557

Questions ?

Contact: Jean-Claude Ducasse
jcducasse@hypercable.fr

