av LA80KA Martin Storli

Radio Mobile kan lastes ned her: http://www.cplus.org/rmw/english1.html

Terrengdata for Norge kan lastes ned her: <u>http://www.scannernytt.info/RadioMobileNorge.rar</u>

Simulering av dekningen til Oslogruppens nye D-STAR repeater LD1OT.

<u>Tekniske data om LD1OT:</u>

Posisjon LD1OT: 59°59'09" Nord, 010°40'16" Øst Frekvens: 434,575 MHz Antennens høyde over bakken: 12 m Utgangseffekt: 15 watt Antennegain: 8,3 dB Transmisjonstap i kabler og filtre etc: ca 7-8 dB Mottakerfølsomhet: ca. 0,25 μV

Portabel motstasjon:

ICOM IC-E92D Posisjon LA4O: 59°57'45" Nord 10°54'21" Øst Frekvens: 434,575 MHz Antennens høyde over bakken: 1 m Utgangseffekt: 5 watt Antennegain: 2 dB Transmisjonstap i kabler og filtre etc: ca 0 dB Mottakerfølsomhet: ca. 0,25 μV

av LA8OKA Martin Storli

Opprettelse av kart:

- File

.\net1.map properties				
- and a map brober and				
entre 45°18'00,0''N 073°18'00,0''W 18T XR 33285 17683	Size (pixel) Width(pixels) 1901	Height (j 1021	pixels)	Extract
45,3 -73,3	Size (km) Width(km)	Height (I	km)	Cancel
Use cursor position	93,10	50,00		45°31'30''N 073°53'44''W
World map	Elevation data source	or path	Top layer	Top Right 45°31'30''N
Select a city name	DTED 🔻 radio'	vradiomobile/data	Browse	072142161W
Enter LAT LON or MGRS	None 💌 dioma	ibile\data\europa	Browse	Bottom Left 45°04'30''N 073°53'44''W
Select a unit	None 🔻 c		Browse	Bottom Right 45°04'30''N
	None 🔽 c		Browse	072°42'16''W
Adjust units elevation	None 🔻 c		Browse	
Merge pictures	Lanore missing files		Bottom layer	
Force gray scale	Initialize matrix with eleva	tion (m)	· · ·	
i oloo glay oodio				
Trykk "Enter LAT LON	or MGRS".			
WGS coordinates	of Mondy .]	
Latitude 59 * 59	'09 " N	ОК		
Longitude 010 * 40	'16 "E	Cancel		
Latitude 59,98583				
Longitude 10,67111				
MGRS 32V NM 93244	51011			
Tilnass størralsan nå ka	tet com anabet			
Size (pixel)	iet som ønsket.			
Width(pixels) 1901	Height (pixels)			
Size (km)				
Width(km)	Height (km)			

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50,00

93,10

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- Se til at programmet peker til riktige terrengdata filer:

– Elevation data so	urce	
	Drive or path	Top layer
DTED 💌	radio\radiomobile\data	Browse
None	diomobile\data\europa	Browse
None	c	Browse
None	C	Browse
None 💌	c	Browse
Ignore missing	g files	Bottom layer
Initialize matrix wit	h elevation (m) 0	

- For å få tilgang til kart fra internett skal filen Map_Link.txt se slik ut:

🖡 Map_Link.txt - Notepad		×
File Edit Format View Help		
www.expedia.com virtualearth.net map.access.mapquest.com google.com		>
For the Radio Mobile program to enable access to each of those servers, the apostrophe must be removed. Doing so, you will have access to services subjects to copyrights. Read first the links below for the terms and conditions.		
http://www.expedia.ca/daily/enc4105/service/legal.asp http://www.google.com/apis/maps/terms.html http://www.mapquest.com/about/copyright.adp		
Pour accéder à chacun ce ces serveurs il faut enlever l'apostrophe au début de la lig Noter que ce faisant, vous accédez à des services qui sont sujets à des droits d'auté Veuillez consulter les liens suivants pour connaître les conditions qui s'appliquent	gne. eur. :	
http://www.expedia.ca/daily/frc3084/service/legal.asp http://www.google.com/apis/maps/terms.html http://www.mapquest.com/about/copyright.adp		
		Y
	>	1.12

- Kryss av for "Merge Pictures":
 - Adjust units elevation
 - Merge pictures
 - 🔲 Force gray scale

- Trykk "Extract":

Extract

av LA80KA Martin Storli

- Vinduet for internett kart kommer frem:

😕 Merge pictures over\net1.bmp		
Source C Another picture	MapPoint selection Personnal use	Draw
 Internet LANDSAT - World Internet Terraserver - USA Internet Tiger - USA Internet Toporama - Canada Land Cover 	North America Europe Brazil Asia and Pacific The World	Cancel Operation Copy Add Multiply
 ADRG - CADRG Internet MapPoint Internet VirtualEarth Internet MapQuest Internet GoogleMap 	C Other	Contrast=1 ← → → → → → → → → → → → → → → → → → → →

- Velg
 - Internet MapPoint
 - o Europe
 - o Add
- Trykk "Draw":

Draw

- Velg "Keep in a new picture".



av LA8OKA Martin Storli

Nå er kartet opprettet. Nå skal vi gå videre og opprette de to radiostasjonene våre.

- File
- Unit Properties

🐕 Units properties		
Unit 1 Unit 2	Name Elevation (m) Unit 1 0	ОК
Unit 3 Unit 4 Unit 5 Unit 6 Unit 7	Copy 00*00'00,0''N 000*00'00,0''E Paste Image: Locked 31N AA 66022 00000 Paste	Undo unit
Unit 8 Unit 9	Enter LAT LON or MGRS	Maus dawn
Unit 10 Unit 11 Unit 12	Place unit at cursor position	Move down
Unit 13 Unit 14	Place cursor at unit position	Export
Unit 15 Unit 16	Add unit to cities.dat	Import
Unit 17 Unit 18 Unit 19	Get unit from cities.dat	Clear all
Unit 20 Unit 21 Unit 22	Style	Sort
Unit 23 Unit 24	✓ Enabled C Left	Apply style
Unit 25 Unit 26 Unit 27	No label BackColor ForeColor	
Unit 28 Unit 29 Unit 30 Unit 31	Show only units that are members of a visible network	X Example

- Velg "Unit 1".

• Trykk "Enter LAT LON or MGRS":

😌 WGS co	ordinates	X
Latitude	59 * 59 '09 " N	ОК
Longitude	010 * 40 '16 " E	Cancel
Latitude	59,98583	
Longitude	10,67111	
MGRS	32V NM 93244 51011	

- Skriv inn navnet:

ļ	Name
	LD10T

- Velg "Unit 2" og gjenta det samme for LA4O.
- Trykk "OK".

OK

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På kartet har nå de to stasjonene våre dukket opp:



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Nå er kartet, og de to radiostasjonene våre opprettet, nå skal vi knytte radiostasjonene våre sammen ved å opprette et nettverk.

🔀 Networks properties		
List of all nets	Default parameters Copy Net F	Paste Net Cancel OK
Net 3 Net 4 Net 5 Net 6 Net 7 Net 8 Net 9 Net 10 Net 11 Net 12 Net 13 Net 13 Net 14 Net 15 Net 16 Net 15 Net 16 Net 17 Net 18 Net 19 Net 20 Net 21 Net 22 Net 23 Net 24 Net 25	Net name D-STAR repeater Oslo Minimum frequency (MHz) 432 Maximum frequency (MHz) 438 Polarization Image: Vertical Mode of variability Image: Open structure Mode of variability Image: Open structure Image: O	Surface refractivity (N-Units) 301 Ground conductivity (S/m) 0,005 Relative ground permittivity 15 Climate Climate Climate Continental sub-tropical Maritime sub-tropical Desert Continental temperate Maritime temperate over land Maritime temperate over land Maritime temperate over sea

- Fyll inn parametrene som ønsket, slik som frekvens, polarisasjon og ønsket kvalitet (Mode of Variability).

av LA80KA Martin Storli

Trykk "Topology" og velg parametrene som ønsket:

-

-

s Networks properties					
List of all nets	Default parameters Copy Net Paste Net Cancel O	ĸ			
D-STAR repeater Oslo Net 2 Net 3	Parameters Topology Membership Systems Style	,			
Net 5 Net 6 Net 7 Net 8 Net 9 Net 10 Net 11 Net 12 Net 12 Net 13 Net 14 Net 15 Net 15 Net 16 Net 17 Net 18 Net 19 Net 19 Net 19 Net 20 Net 20 Net 21 Net 22 Net 22 Net 22 Net 22 Net 25	 Visible Voice net (Command/Subordinate/Rebroadcast) Data net, star topology (Master/Slave) Data net, cluster (Node/Terminal) 				
Net 23					
rykk "Systems" vel	g "System 1" og skriv inn ønskede parametre:				
rykk "Systems" vel Vetworks properties	g "System 1" og skriv inn ønskede parametre: Default parameters Copy Net Paste Net Cancel O	K			
rykk "Systems" vel Vetworks properties ist of all systems LD10T System 2 System 3	g "System 1" og skriv inn ønskede parametre: Default parameters Copy Net Paste Net Cancel O Parameters Topology Membership Systems Style	K			
Tykk "Systems" vel Networks properties ist of all systems LD10T System 2 System 3 System 4 System 5	g "System 1" og skriv inn ønskede parametre: Default parameters Copy Net Paste Net Cancel O Parameters Topology Membership Systems Style Select from Radiosys.dat	к ,			
Tykk "Systems" vel Networks properties ist of all systems LD10T System 2 System 3 System 3 System 5 System 5 System 6 System 7 System 8	g "System 1" og skriv inn ønskede parametre: Default parameters Copy Net Paste Net Cancel O Parameters Topology Membership Systems Style Select from Radiosys.dat LD10T	K			
ykk "Systems" vel Networks properties ist of all systems LD10T System 2 System 2 System 3 System 4 System 5 System 5 System 6 System 7 System 7 System 7 System 9 System 11	g "System 1" og skriv inn ønskede parametre: Default parameters Copy Net Paste Net Cancel O Parameters Topology Membership Systems Style Select from Radiosys.dat • System name LD10T Transmit power (Watt) 15 (dBm) 41.8	K			
ykk "Systems" vel Networks properties ist of all systems LD10T System 2 System 2 System 4 System 5 System 5 System 5 System 6 System 7 System 7 System 7 System 10 System 11 System 12 System 13	g "System 1" og skriv inn ønskede parametre: Default parameters Copy Net Paste Net Cancel O Parameters Topology Membership Systems Style Select from Radiosys.dat • System name LD10T Transmit power (Watt) 15 (dBm) 41.8 Receiver threshold (µV) 0.25 (dBm) -119	K			
rykk "Systems" vel Networks properties ist of all systems List of all systems LD10T System 2 System 2 System 3 System 4 System 5 System 5 System 5 System 7 System 7 System 7 System 7 System 10 System 11 System 13 System 13 System 14 System 15	g "System 1" og skriv inn ønskede parametre: Default parameters Copy Net Paste Net Cancel O Parameters Topology Membership Systems Style Select from Radiosys.dat System name LD10T Transmit power (Watt) 15 (dBm) 41.8 Receiver threshold (µV) 0.25 (dBm) -119 Line loss (dB) 8 (Cable+cavities+connectors)	K			
rykk "Systems" vel Networks properties ist of all systems List of all systems LD10T System 2 System 3 System 4 System 5 System 5 System 5 System 7 System 7 System 7 System 7 System 8 System 9 System 10 System 11 System 12 System 13 System 13 System 14 System 15 System 16 System 17 System 17 System 18	g "System 1" og skriv inn ønskede parametre: Default parameters Copy Net Paste Net Cancel O Parameters Topology Membership Systems Style Select from Radiosys.dat ▼ System name LD10T Transmit power (Watt) 15 (dBm) 41.8 Receiver threshold (µV) 0.25 (dBm) -119 Line loss (dB) 8 (Cable+cavities+connectors) Antenna type omni.ant ▼ View	K			
rykk "Systems" vel Networks properties ist of all systems List of all systems LD10T System 2 System 3 System 4 System 5 System 5 System 5 System 7 System 7 System 7 System 10 System 10 System 10 System 11 System 12 System 13 System 13 System 14 System 15 System 15 System 17 System 17 System 18 System 19 System 19 System 20	g "System 1" og skriv inn ønskede parametre: Default parameters Copy Net Paste Net Cancel O Parameters Topology Membership Systems Style Select from Radiosys.dat System name LD10T Transmit power (Watt) 15 (dBm) 41.8 Receiver threshold (µV) 0.25 (dBm) -119 Line loss (dB) 8 (Cable+cavities+connectors) Antenna type omni.ant View Antenna gain (dBi) 8.3 (dBd) 6.15	K			
rykk "Systems" vel Networks properties ist of all systems List of all systems LD10T System 2 System 3 System 4 System 5 System 5 System 5 System 7 System 7 System 7 System 9 System 9 System 10 System 11 System 12 System 12 System 13 System 14 System 15 System 15 System 16 System 17 System 17 System 18 System 19 System 19 System 20 System 21 System 22 System 23	g "System 1" og skriv inn ønskede parametre: Default parameters Copy Net Paste Net Cancel O Parameters Topology Membership Systems Style Select from Radiosys.dat System name LD10T Transmit power (Watt) 15 (dBm) 41.8 Receiver threshold (µV) 0.25 (dBm) -119 Line loss (dB) 8 (Cable+cavities+connectors) Antenna type omni.ant View Antenna gain (dBi) 8.3 (dBd) 6.15 Antenna height (m) 12 (Above ground)	K			
rykk "Systems" vel Networks properties ist of all systems List of all systems LD10T System 2 System 3 System 5 System 5 System 6 System 7 System 7 System 10 System 10 System 10 System 11 System 12 System 13 System 13 System 14 System 15 System 16 System 16 System 17 System 18 System 18 System 18 System 19 System 21 System 21 System 23 System 23 System 24 System 25	g "System 1" og skriv inn ønskede parametre: Default parameters Copy Net Paste Net Cancel O Parameters Topology Membership Systems Style Select from Radiosys.dat System name LD10T Transmit power (Watt) 15 (dBm) 41.8 Receiver threshold (µV) 0.25 (dBm) -119 Line loss (dB) 8 (Cable+cavities+connectors) Antenna type omni.ant View Antenna gain (dBi) 8.3 (dBd) 6.15 Antenna height (m) 12 (Above ground) Additional cable loss (dB/m) 0 (If antenna height differs) —	к "			

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Velg "System 2" og skriv inn ønskede parametre:

-

🔏 Networks properties		×
List of all systems	Default parameters Copy N	let Paste Net Cancel OK
LD10T LA40 System 3 System 4	Parameters Topology	Membership Systems Style
System 4 System 5 System 6		Select from Radiosys.dat
System 7 System 8 System 9	System name	LA40
System 10 System 11 System 12	Transmit power (Watt)	5 (dBm) 37
System 12 System 13 System 14	Heceiver threshold (µV)	U.25 (GBm) (-119
System 15 System 16 System 17	Antenna type	omni.ant
System 18 System 19 System 20	Antenna gain (dBi)	2 (dBd) -0,15
System 21 System 22 System 23	Antenna height (m)	1 (Above ground)
System 24 System 25	Additional cable loss (dB/m)	0 (If antenna height differs)
1	Add to radiosys.dat	Remove from radiosys.dat

av LA80KA Martin Storli

-

Trykk "Membership" og velg radiostasjonene som inngår i nettverket:

List of all nets	Default parameters	Copy Net	F	aste Net	Cancel	OK
D-STAR repeater Oslo Net 2 Net 3 Net 4 Net 5 Net 6 Net 7 Net 8 Net 9 Net 10 Net 11 Net 12 Net 13 Net 14 Net 15 Net 16 Net 15 Net 16 Net 17 Net 18 Net 19 Net 10 Net 11 Net 12 Net 20 Net 21 Net 22 Net 23 Net 23 Net 25	Parameters List of all units ✓ LD10T ✓ LA40 Unit 3 Unit 4 Unit 5 Unit 6 Unit 7 Unit 8 Unit 9 Unit 10 Unit 11 Unit 13 Unit 14 Unit 15 Unit 16 Unit 17	Topology		Antenna C System Antenna C System C Othe	Systems of D-STAR repe- A40 a height (m) em 1 er 0,5	Style ater Oslo

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av LA8OKA Martin Storli

Trykk "Style" og velg ønskede parametrene:

🔀 Networks properties	×
1	Default parameters Copy Net Paste Net Cancel OK
	Parameters Topology Membership Systems Style
	Propagation mode Normal Use "Two Rays" for Line-Of-Sight
	✓ Draw a green line if RX relative signal (dB) is >=
	3 ▼ Else draw a yellow line if RX relative signal (dB) is >=
	-3
	Else draw a red line
	✓ Draw lines with dark background Note that if the net topology is type cluster and number of hops>0, then the color yellow is not used and the threshold is set to 0 beth for groop and red

- Trykk "OK".

-

- Man kan nå se at man har fått en link mellom radiostasjonene våre:



av LA8OKA Martin Storli

Nå skal vi se på forbindelsen mellom radiostajonene våre i detalj.

- Tools
- Radio link
- Vi får opp dette vinduet med detaljer om radioforbindelsen mellom stasjonene våre:

🕅 Radio Link											
Edit View Swap											
Azimuth=101,1* Elev. angle=-1,408* Obstruction at 12,88km Worst Fresnel=-0,9F1 Distance=13,30km PathLoss=147,5dB E field=24,5dBµV/m Rx level=-103,5dBm Rx level=1,50µV Rx Relative=15,6dB											
Transmitter		S5	Receiver LA40		S6						
, Role Tx system name Tx power Line loss Antenna gain Radiated power Antenna height (m)	Master LD10T 15 W 8 dB 8,3 dBi EIRP=16,07 W 12	41,76 dBm 6,15 dBd + ERP=9,8 W Apply	, Rx syster Required Antenna Line loss Rx sensit Antenna	Slave n name LA40 E Field 8,94 dBµV/r gain 2 dBi 0 dB ivity 0,25 µV height (m) 1	m -0,15 dBd -119,04 dBm Apply						
- Net D-STAR repeater 0)slo	•	Frequency Minimum 432	(MHz) Maximum 438	Apply						

av LA8OKA Martin Storli

Nå skal vi beregne dekningen til LD1OT ved å bruke LA4O som mobil TX.

- File

_

X

- Radio coverage
- Combined cartesian og velg de ønskede parametre:

		LD10T		
LA40			10440	- Cance
Unit 3		Antenna pattern	In network	
Unit 4		omni.ant 💌	D-STAR repeater Oslo	 Load setti
Unit 5		·	-	
_uunic 6 ⊒Unit 7		Dener estevals(*)	Use network antenna settings	Save setti
Unit 8		Beam azimutnį j	📃 🔲 Save raster data to file	
Unit 9		Ju	File units not selected	Load da
Unit 10			Save coverage pictures in "frame:	s'' directory
Unit 11 □_U_aa_12		Draw pattern	Maximum range (km)	
Unit 13		View pattern	Link Direction	de
Unit 14				
Unit 15			C Mobile Rx	All picture
Unit 16		Antenna height (m)	Mobile Tx	C Selection
Unit 17		12		
Unit 19			Signal range to draw	
Unit 20			C S-Unit From	m (>=)
Unit 21			• dBm	7
Unit 22			To	(<)
Unit 23			-67	
Unit25			⊂ dBµV/m	
Unit 26			Draw size (pixels)	Color
🗌 Unit 27	~		5 Rain	how 🗌 Solid
/kk "Draw" [.]				
D				
Draw				
lg "Keep in a	new pict	ure".		
ep MapPoint in (picture ?		×	
🔘 Keep in actu	al picture		UK	
G Keep in a no	winichure			
iveep in a ne	mpicture			
C Keep volatile				
C Do not keep				
 Do not keep 				

av LA80KA Martin Storli

-

Man får nå opp et kart med beregnet dekning for LD1OT med et håndapparat:

