FIVE AND NINE PLUS

THE OFFICIAL NEWSLETTER OF THE APPLEDORE AND DISTRICT AMATEUR RADIO CLUB

Club Callsigns: G2FKO and GX2KKO
Website: www.adarc.co.uk

CLUB OFFICERS

President	Terry Adams	G4CHD	Committee	Ben Louder	2E0FTZ
Chairman	Mike Wogden	G4KXQ		Mark Wildig	G6BNB
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			Exam Secretary	John Lovell	G3JKL
			Editor	Mike Wogden	G4KXQ

Mikewogden@gmail.com

EDITORIAL

I was somewhat disappointed to miss Terry's rescheduled talk on aerial modelling at the June meeting; I'm told the talk was well received. This was the first meeting where the club offered on-line streaming of the talk available on YouTube. Thanks to Ben Louder, 2E0FTZ for organizing the streaming. The talk is available for any members who missed the evening or anyone needing a re-cap. https://www.youtube.com/live/7NAjqv8yqZw?si=Ab45EBYlI0gZtfw5. Just search for ADARC Appledore and District Amateur Radio Club on YouTube.

Terry has kindly supplied me with his presentation material from the talk and I have included it in this newsletter.

It is the club's intention to stream all the club meetings on-line going forward but we will be live streaming using another platform with access restricted to club members. The recorded stream will be available on YouTube after a suitable delay.

This month's July meeting will be a return of the club quiz. I will be hosting the evening and have prepared the questions, a mixture of Amateur Radio technical knowledge and trivia. We are looking for two teams of up to 3 players to contest the evening.

I received an email this week from Jackie Hewitt, Mike G4NCU's widow. She explained that she had donated one of Mike's collection of Morse Keys to the National Radio Centre at Bletchley Park. Accompanying the key was a short note mentioning Mike's membership and involvement with ADARC

CLUB MEETINGS

Meetings are held on the third Monday of the month at the **Appledore Football Social Club** starting at 7.30pm for 8.00pm. Visitors are always welcome. For further information, please contact the Secretary, John

I'm sure all members will be aware that Len M0SXY passed away after a short period in hospital. Terry has kindly prepared the following obituary for us:

Len M0SXY SK

Len (M0SXY) was a long standing and proud member and supporter of ADARC.

After Brian (M0BRB) became SK, Len took over the running the Zepp Net despite struggling at times with just a few participants. It was in recognition of this that in 2023, Len was awarded the Jim McFee Cup. Len was a lover of vintage radio gear and loved, like most amateurs, to find a bargain at a Club Bring & Buy. He was an avid reader of the 5&9 and was trying to collect all of its back copies. Len will be sadly missed. The Club sends deepest sympathies to Len's family and friends at this difficult time.

DATES FOR THE DIARY

We have recently heard from the organizer of the Bideford Fair, the Fair was postponed in May due to the poor weather forecast. The new date is Saturday 2nd August. Please could all members consult their diaries so we can discuss at the July meeting if we are able to support the re-arranged date.

The weekend of 27th and 28th September will be 'Railways on The Air' where we intend to operate for the Bideford Heritage Railway at the old Bideford Railway Station, East the Water.

73 Mike (G4KXQ)

SOUTH WEST REPEATER NEWS

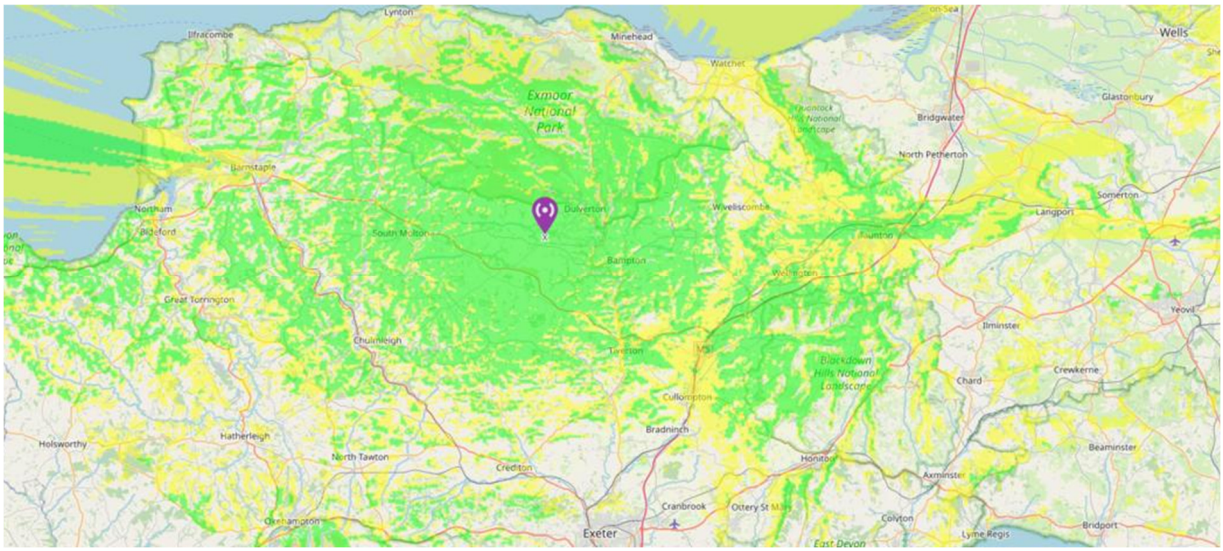
Thanks to Tom G0FGI for this month's repeater news:

There is a new 70cm repeater on Exmoor GB3JH currently operating on FM. Repeater keeper is Jon G6ASK. Full detail in RSGB repeater listings.

Current Status: Operational, Repeater: Yaesu DR-2XE, Duplexer: Procom DPF70/6N
Antenna: Diamond X-300 at 9m AGL, Feeder: EcoFlex 10
Locator: IO81EA, Grid Ref: SS869248
Ouput: 430.8625 MHz, Input: 438.4625 MHz, Offset: +7.6 Mhz, CTCSS: 77 Hz
SQL tail length: 2500 ms, TOT: 5 minutes, Bandwidth: 12.5 kHz
Polarisation: Vertical, Azimuth: Omni, Power: 25w ERP

During thunderstorms or periods of high wind it is likely the repeater will be shut down and the antenna disconnect and/or the mast dropped.

Please note that there is currently no pip or tone between transmissions. In the mean-time let the carrier drop to reset the time out timer :-)



Club Program

July 21st 2025	Quiz Night –	Quizmaster Mike G4KXQ
Aug 18th 2025	Talk on the film industry special effects	Mark G6BNB
Sept 15th 2025	Antenna Build - Practical	Mike G4KXQ, Mark G6BNB
Oct 20th 2025	On-Line Talk - Guide to using satellites in amateur radio	Tim GW4VXE
Nov 17th 2025	Bring & Buy	
Dec 15th 2025	Christmas Party	
Jan 19th 2026	External Speaker	TBC
Feb 16th 2026	To Be Confirmed	
March 16th 2026	Annual General Meeting	

LOCAL NETS

Weekday Zepp FM Net: Mon/Tues/Thurs/Fri :
145.450MHz - 4pm - 5pm
Wed via GB3DN - 4pm - 5pm

2m Elevenses FM Net: Mon/Wed/Fri :
11 - 12.00 noon via GB3DN Net Control ; Mike (G3PGA)

Friday Night 2m Net: Friday : 145.450 FM, 8 -9pm

Sunday Top Band Net: Sunday 1.860 MHz
9.30 - 10.15am
(LSB - 32W pep max)

2m SSB Nets: Wed: 8 - 9pm 144.260MHz USB SSB (Vertical polarised)
Sun: approx 10.30am (follows Top Band Net) 144.260MHz USB SSB (Vertical polarised)

Sunday FM Net: Sunday: 11 to noon via GB3DN
Net Control : Chris (G0FJY)

Note :- FM Nets which use GB3DN as shown above will continue despite the recent changes. GB3DN is disconnected from the Wires-X/ Southern Fusion Room just before the listed start and end of each FM Net

DX NEWS

Contest Calendar

Contest Highlight of the month is the RSGB IOTA Contest which is held on the weekend of July 26-27

Contest Name	Contest Start & End Time
July 2025	
LABRE DX Contest	0000Z, Jul 19 to 2359Z, Jul 20
Russian Radio Team Championship	0700Z-1459Z, Jul 19
YOTA Contest	1000Z-2159Z, Jul 19
Feld Hell Sprint	1200Z-1359Z, Jul 19
IARU Region 1 70 MHz Contest	1400Z, Jul 19 to 1400Z, Jul 20
RSGB International Low Power Contest	0900Z-1200Z and 1300Z-1600Z, Jul 20
FRAPR 10M Contest	0000Z, Jul 26 to 2359Z, Jul 27
MARAC US Counties QSO Party	0000Z, Jul 26 to 2400Z, Jul 27
RSGB IOTA Contest	1200Z, Jul 26 to 1200Z, Jul 27
August 2025	
10-10 Int. Summer Contest, SSB	0001Z, Aug 2 to 2359Z, Aug 3
European HF Championship	1200Z-2359Z, Aug 2
ARRL 222 MHz and Up Distance Contest	1800Z, Aug 2 to 1800Z, Aug 3
SARL HF Phone Contest	1400Z-1700Z, Aug 3
WAE DX Contest, CW	0000Z, Aug 9 to 2359Z, Aug 10
YB Bekasi Merdeka Contest	1200Z, Aug 9 to 1159Z, Aug 10
SKCC Weekend Sprintaton	1200Z, Aug 9 to 2400Z, Aug 10
SARL HF Digital Contest	1300Z-1600Z, Aug 10
SARTG WW RTTY Contest	0000Z-0800Z, Aug 16 and
	1600Z-2400Z, Aug 16 and
	0800Z-1600Z, Aug 17
Russian District Award Contest	0800Z, Aug 16 to 0800Z, Aug 17
SARL Youth QSO Party	1200Z-1300Z, Aug 16
Keyman's Club of Japan Contest	1200Z, Aug 16 to 1200Z, Aug 17
Feld Hell Sprint	1600Z-1759Z, Aug 16

Data Thanks to WA7BNM Contest Calendar

From	To	DXCC Entity	Call	Column6
25/06/2025	31/07/2025	Morocco	CN2DX [spots]	By F5LRL fm nr Kenitra; 40-6m; CW SSB FT8; to continue until Aug 30
28/06/2025	14/07/2025	St Pierre & Miquelon	FP [spots]	By KV1J as FP/KV1J fm Miquelon I; HF + 6m; mainly SSB FT4 FT8, some CW; QSL via KV1J (B/d) or Club Log OQRS
08/07/2025	06/08/2025	Benin	TY5FR	By DL1BUG fm Cotonou (JJ16fi); 80-10m; CW SSB; 100; QRV for IARU HF; QSL via DL1BUG Buro or Club Log OQRS
11/07/2025	25/07/2025	Iceland	TF	By VE2XB as TF/VE2XB; 80-10m
12/07/2025	05/08/2025	Nicaragua	YN2RP	By NN3RP fm Granada; 40-10m; CW SSB + digital
13/07/2025	19/07/2025	Mozambique	C93RRC	By OK8AU UA3QLC R7AL fm Chiloane I (IOTA AF-098); HF; CW SSB FT8; 2 stations
14/07/2025	20/07/2025	Honduras	HQ9HC	By WA5LEE W5BAK WB5HJV W5WK WP4VW fm Roatan I (IOTA NA-057); HF
14/07/2025	23/07/2025	Svalbard	JW0V	By OK2WX; 160-6m; CW SSB FT8
16/07/2025	19/07/2025	Dodecanese	SV5	By WJ2O fm Rhodes as SV5/WJ2O; HF; QSL via N2ZN
17/07/2025	24/07/2025	Aland Is	OH0	By DL4XT as OH/DL4XT; 40 20 15 10m; CW SSB; QSL via Club Log OQRS
17/07/2025	25/07/2025	Maldives	8Q7YY	By OH7O fm Rakeedhoo I; HF; mainly SSB, some FT8
24/07/2025	02/08/2025	Svalbard	JW	By SP9HGN as JW/SP9HGN fm SOTAs JW/VS-265, JW/VS-413, JW/MS-154; 40-10m; SSB FT8; EFHW
22/07/2025	25/07/2025	Fiji	3D2XD	By OM2DX; 60-6m; 100w; holiday style operation
25/07/2025	30/07/2025	Tonga	A32DX	By OM2DX; 60-6m; 100w; holiday style operation
26/07/2025	09/08/2025	Iceland	TF	By F5TGR as TF/F5TGR; 40 30 20 15 12 10m; CW FT8 SSB; QSL via Club Log OQRS
28/07/2025	01/08/2025	Rodrigues I	3B9SP	By DK6SP; 40-6m; CW SSB FT8
02/08/2025	08/08/2025	Ogasawara	JD1BRC	By JH7CSU fm Higashi-machi, Chichijima; HF; mainly CW
02/08/2025	10/08/2025	Mayotte	TO3K	By IV3JVJ IK3ZAQ IZ3NYS fm IOTA AF-027; 80-6m; CW SSB FT8 FT4; 100w; QSL via IV3JVJ
03/08/2025	18/08/2025	South Cook Is	E51KEE	By ZL2KE fm Rarotonga I; 40-10m; CW SSB; QSL via Club Log OQRS or IK2DUW
08/08/2025	11/08/2025	Br Virgin Is	VP2V	By KK4LWR as VP2V.KK4LWR and KD8RTT as VP2V/KD8RTT fm Tortola I; HF, focus on 6m; 100w; QSL via home_call direct
15/08/2025	29/08/2025	Greeland	OX	By DL6YYM as OX/DL6YYM fm IOTA NA-134 (Aug 15-18) and NA-018 (NA-018); HF; CW; QRP
16/08/2025	23/08/2025	Guatemala	TG4	By KT8X as TG4/KT8X; 40-6m; CW + digital; holiday style operation
17/08/2025	25/08/2025	Dodecanese	SV5	By N3JWJ as SV5/N3JWJ fm IOTA EU-001; HF; FT8; QSL via Club Log OQRS

Data courtesy of Ng3K.com DX Operations : 2025

LOCAL REPEATERS/GATEWAYS

Frequencies are those transmitted and received by the Repeater

GB3DN VHF FM/C4FM Repeater - Stibb Cross
Tone 77Hz (for analogue FM) TX 145.6375 RX 145.0375, Default Digital Connection : Wires-X Southern Fusion http://www.g0rql.co.uk/gb3dn.htm. Keeper Tony G1BHM

GB7FB UHF DMR Repeater - Bideford TX 439.475 RX 430.4750 Colour code 5 Slot 1 Local RF/DoD Slot 2 SW Cluster . Keeper Drew M0MFS

GB3LZ VHF FM/C4FM Repeater - Winkleigh
Tone 77Hz (for analogue FM) TX 145.6625 RX 145.0625, Digital Connection : Wires-X SOUTHERN ENGLAND. Keeper Simon G4MQQ

GB7LZ UHF DMR Repeater - Winkleigh
TX 430.9125 RX 438.5125 Colour code 1, Slot 1 Talkgroup 9 local and direct dial, Slot 2 South West Cluster. Keeper G4MQQ

MB6DT VHF Fusion Gateway - Barnstaple
Frequency 144.8125 MHz. Gateway. Keeper Darren (2E0LVC)

GB7TG - UHF DMR Repeater - Wembworthy
TX 430.9750 RX 438.5750 Colour Code 7, Default Connection : Slot 1 Local/DoD Slot 2 SW Cluster Keeper G7SOJ

GB3NX VHF FM AllStar Repeater- Holsworthy Beacon
Repeater TX 145.5875 RX 144.9875, Tone 77Hz, Connection SW AllStar Network (SWAN) Keeper G1BHM

GB3BU - UHF DMR Repeater - Bude
TX 430.9625 RX 438.5625 Colour Code 1
Default Connection: Slot 1 Local/DoD Slot 2 SW Cluster Keeper G1BHM

GB3JH – UHF Analogue Repeater – Tiverton
TX 430.8625 RX 438.4625, Tone 77Hz – Keeper G6ASK

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DESIGN OF COMPACT 20m DELTA LOOP ANTENNA USING SIMULATION SOFTWARE - Terry Adams (G4CHD)

Introduction

I have always had a fascination with the Delta Loop antenna because of the ease with which it can be supported by a single pole. However, at my present QTH, HF antennas for various reasons need to be unobtrusive. Hence the interest in using simulation software to try to design a low height Delta Loop for 20m with a low angle DX radiation pattern and a low SWR eliminating the need for an ATU.
It will be assumed that the antenna is constructed using pvc coated copper wire and supported with a non conducting pole eg fibre glass telescopic pole, which can therefore be ignored in the antenna design.[Fig 1]

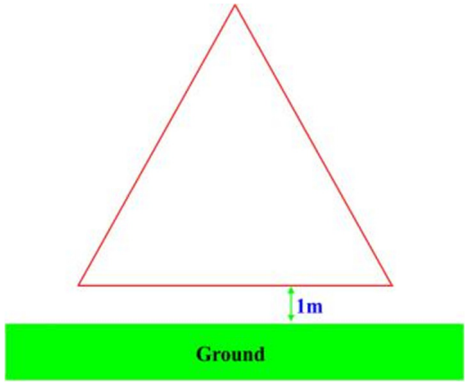


Fig 1

The Delta Loop will be in the vertical plane with one corner at the top and bottom wire horizontal and 1m above ground **(Fig 1)**

Choice of Software

There are several free to download simulation programs of which MMANA GAL and EZNEC are my personal favourites. However I recently became aware that the author of EZNEC, Roy Llewallen W7EL, retired a few years ago and that from the beginning of 2022, the professional version EZNEC Pro/2+ became a free download and therefore was my choice in this article.

XYZ Coordinate System

Whichever software is used, any antenna must be constructed from straight wires, each of which must have its ends defined using the xyz coordinate system **(Fig 2)**.
Z is the height of the point above ground. Y can be considered as the distance of the point behind or in front of the page. As the Delta Loop lies entirely in the page (ie it's 2 dimensional) then Y is 0 for all points of the antenna. Finally, X can be considered as the horizontal distance from the origin where X=0.

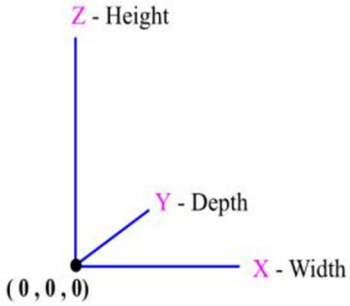


Fig 2

Basic Full Wave Delta Loop

Consider a basic 20m Delta Loop designed for 14.2MHz ie having a wavelength of approx 21m. A fundamental design requirement for any HF loop antenna is that its **circumference is one wavelength.**

Hence for the three sided Delta Loop antenna designed for a wavelength of 21m (assume equal sides and hence equal 60 degs internal angles) each side will be 7m long **(Fig 3).**

Consider the bottom horizontal **wire 1**. Both ends are 1m above ground hence Z=1 for both ends. As stated earlier, Y=0 for both ends of wire 1. Finally, if we assume X=0 for the left end and since wire 1 is 7m long then X=7 for the right end **(Fig 3).** Consider now **wire 2**, its lower end must have identical coordinates to the end of wire 1 as this is a software requirement for **two wires to be electrically connected**. The upper end of wire 2 has an X coordinate half way between the X values for the ends of wire 1 ie X=3.5 and Y=0 at both ends of wire 2. Finally, the Z value is the height of the loop above ground ie 1m plus the height of the loop 6.1m which needs some trigonometry to calculate which gives simply 0.866 x length of wire 3 ie 6.1m approx to give Z=7.1. **Wire 3** uses the end coordinates of wires 1 and 2 to be electrically connected to those wires.

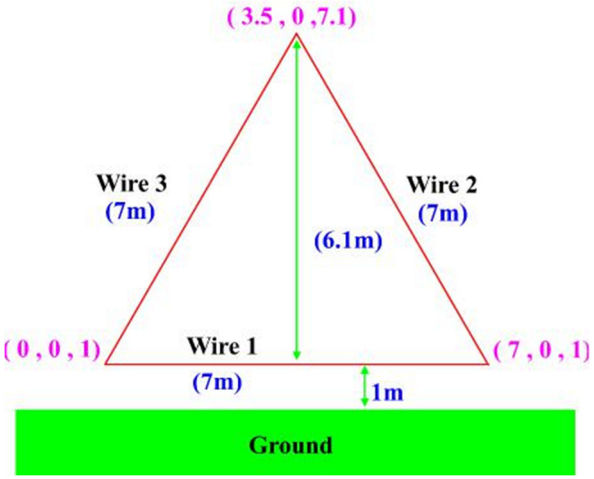


Fig 3

Now that we have the antenna coordinates, we are ready to enter them into the EZNEC simulation software

Setting Up EZNEC Pro/2+

This is not an in depth guide but my settings may be a useful starting point.

The opening window **Fig 4** is the Control Centre which initially displays the last used settings.

There are a few general initial settings namely :-

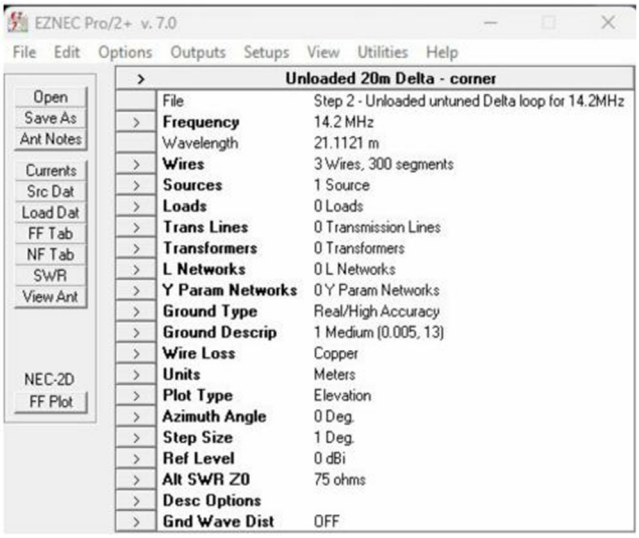


Fig 4

1. **Design Title** (top shaded area) - max 30 characters
2. **Ant Notes** - text description of design

The following can also be set :-

3. **Frequency** - enter operating frequency in MHz
4. **Ground Type -** I selected Real and High Accuracy
5. **Ground Description** - right click to open ground descriptions and choose accordingly
6. **Wire Loss -** select antenna wire material - I selected Copper
7. **Units -** I selected Metric
8. **Plot Type and Azimuth Angle -** I selected Elevation and 0 degs to show side view the radiation pattern

Can now enter each wire's coordinates by clicking Wires which opens the following window **(Fig 5)**

Wires

Wire Create Edit Other

Coord Entry Mode | Preserve Connections | Show Wire Insulation | Show Loss

Wires

No.	End 1				End 2				Diameter	Segs	Insulation			Wire Loss		
	X (m)	Y (m)	Z (m)	Conn	X (m)	Y (m)	Z (m)	Conn	(mm)		Diel C	Thk (mm)	Loss Tan	R (ohm-m)	Perm	Type
1	0	0	1	W3E2	7	0	1	W2E1	0.6	100	3.5	0.33	0.05	1.74E-08	1	Copper
2	7	0	1	W1E2	3.5	0	7.1	W3E1	0.6	100	3.5	0.33	0.05	1.74E-08	1	Copper
3	3.5	0	7.1	W2E2	0	0	1	W1E1	0.6	100	3.5	0.33	0.05	1.74E-08	1	Copper

Fig 5

Ensure that both Show Wire Insulation and Show Loss are selected to show all of the table.

Each row contains an individual wire's details ie end coordinates as determined previously, wire diameter, number of segments (I used 100), Insulation thickness and Dielectric Constant (right click data cell and select insulation type) and Wire Loss which was previously entered. Note that a right click in any Type cell allows the material to be changed (eg if adding an Aluminium pole)

Having now defined the antenna shape, the feed point must be selected. I first tried the centre of wire 1 but the resulting radiation was predominantly vertical, so instead I chose one end of wire 1. Click on **Sources** to open - **(Fig 6).** As the feed point is at the junction of wires 1 and 3, the source type must be SV (Split Voltage). The Voltage Amplitude of 70V (represents approx 100W).

Sources

Source Edit

Sources

No.	Specified Pos.		Actual Pos.		Amplitude	Phase	Type
	Wire #	% From E1	% From E1	Seg	(V, A)	(deg.)	
1	1	0	0	1	70	0	SV

Fig 6

A visual representation of the design can be shown by clicking on the View Ant button. Hovering the mouse pointer over either half of any wire reveals an information window giving wire length and coordinate details.be reduced in both height and overall size.

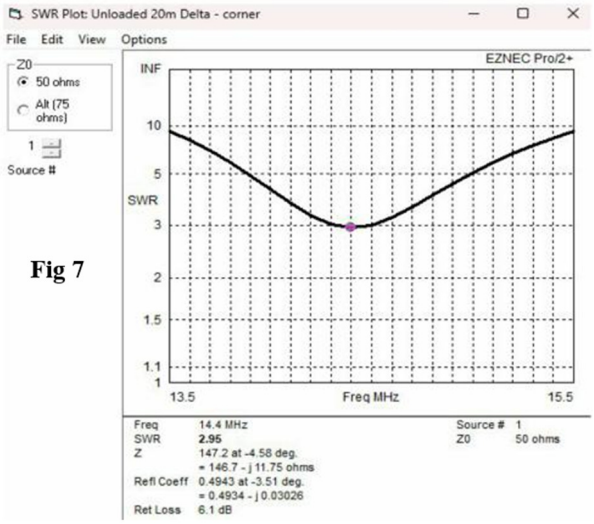


Fig 7

Fig 7

We are now in a position to do an SWR Plot by clicking the SWR button and selecting suitable Start, Stop and Step Frequencies eg 13.5, 15.5, 0.1 and then Run **(Fig 7).**

This can now be followed by an Elevation Radiation Plot by clicking FF Plot **(Fig 8).**

The SWR Plot shows that a basic 20m Delta Loop fed at a lower corner would need to be fed via a 4:1 balun and the Radiation pattern shows both low angle and vertical radiation. The resonant frequency is 14.4MHz showing that the antenna should be slightly larger.
However the purpose of this article was to investigate whether this basic Delta Loop design could be reduced in both height and overall size.

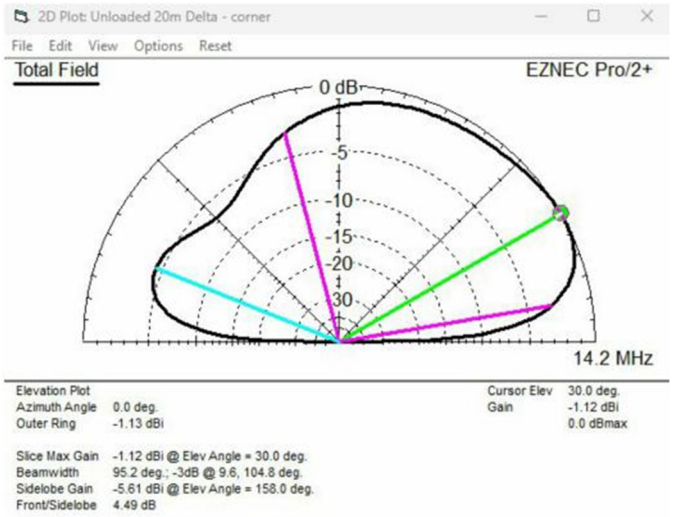


Fig 8

Whenever antenna size reduction is considered, two alternatives immediately come to mind, introducing a loading coil or a capacity hat. The latter is difficult to envisage for a closed loop hence I concentrated upon adding a loading coil which raises two questions - where to insert it and what inductance should it have.

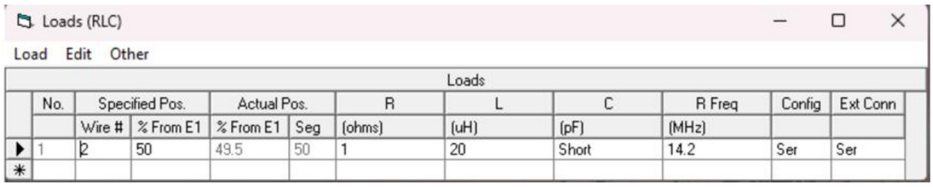
The first question - where to put it - is I think relatively easy since the inductive reactance of a coil depends on rf magnetic field within it which in turn requires rf current. It therefore seemed logical that the most effective place for the coil was at a position of maximum current.

A basic property of any Full wave Loop antenna is that **there are two positions where the current is a maximum - namely at the feed point and diametrically opposite**.

As to the placing and inductance value of the coil, I started with 50uH at the feed point but after trying many combinations, I finally settled on 20uH at the centre of wire 2 ie diametrically opposite the feed point.

Final EZNEC Design

To add a load to your design, click on **Loads** to open window **(Fig 9)**



	No.	Specified Pos.		Actual Pos.		R	L	C	R Freq	Config	Ext Conn
		Wire #	% From E1	% From E1	Seg	(ohms)	(uH)	(pF)	(MHz)		
▶	1	2	50	49.5	50	1	20	Short	14.2	Ser	Ser
*											

Fig 9

This shows an inductive load of 20uH placed 50% from E1 on wire 2 with a resistance of 1 ohm.

An SWR plot was run with a lower Start frequency of 5MHz as I had no idea how much the inductance would reduce the resonant frequency. In fact the 20uH coil reduced the resonant frequency to 10.2MHz necessitating a size reduction of the antenna in the ratio of 10.2/14.2 ie approx 0.7.

This is best achieved by opening the Wires window and clicking the top Wire tab to reveal a list of options. Select Group Modify and set the first wire to 1 and the last to 3 and click OK - all three rows in the Wires table will be highlighted so that any change to one wire affects all others equally. Now select Change Loop Size and select Circumference and Multiply By and enter 0.7 followed by OK. Unfortunately this also increases the height of wire 1 above ground as shown by the z values of wire 1. To return the height to 1m select Change Height By and enter the required reduction. Rerun the SWR Plot but now starting at eg 13MHz and if the resonant frequency is still

too low, repeat the loop size and height adjustments.

The final Delta Loop dimensions are - all three sides 4.63m (will depend upon wire insulation) and antenna overall height approx 5m with base wire 1m above ground.

The SWR at 14.2MHz is almost 1;1 (**Fig 10**) and the radiation pattern (**Fig 11**) is almost omnidirectional with a main lobe at 26 degs. The 20uH coil consisted of 22 turns of 0.9mm dia enamelled copper wire wound closely on a 4cm dia acrylic former.

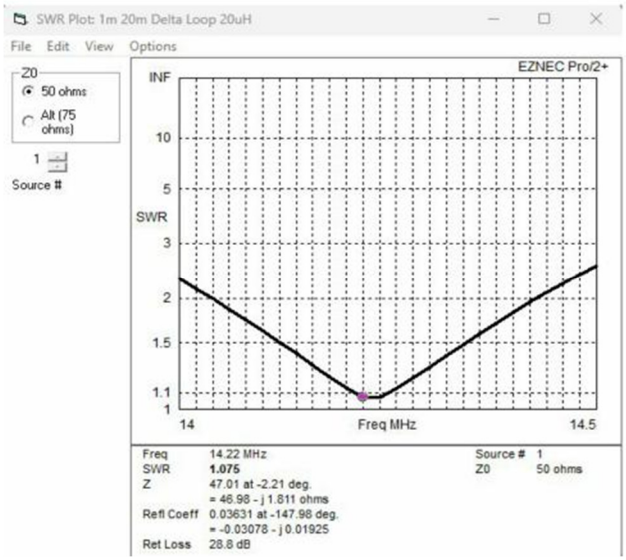


Fig 10

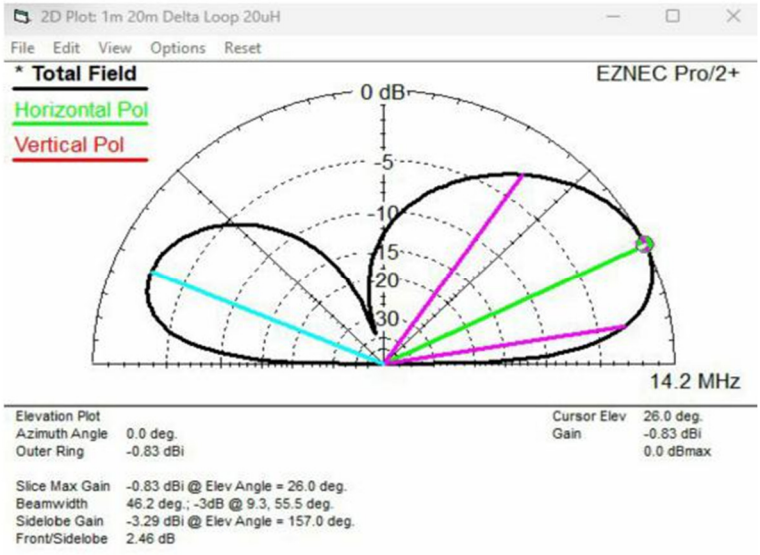


Fig 11

A prototype antenna was built starting with two 7.5m antenna wire lengths - ie one for wire 3 and top half of wire 2 and the other for wire 1 and the bottom half of wire 2 (**Fig 12**). Connections to the coil can be made permanent at this point and one egg insulator threaded on each wire. The two initial wire lengths can be equally trimmed at the feed point and resonant frequency checked with eg a MFJ Analyser until resonance at around 14.2MHz is achieved. The connections to the eg balun can then be made more permanent.

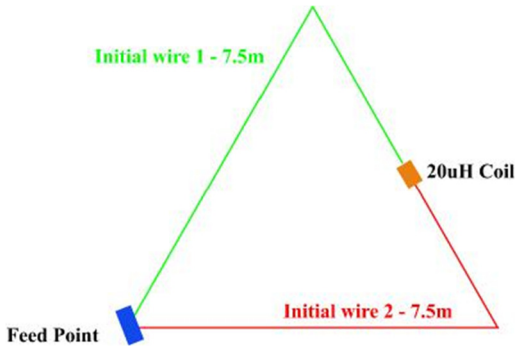


Fig 12

It was not found necessary to feed the antenna via a 1:1 balun which is my preference - a simple SO259 dipole centre can be used. The resultant wire lengths were very close to the predicted theoretical values.

The antenna was supported from a telescopic fibre glass pole and several daytime QSOs achieved using just under 100W from an FT891 with conditions less than optimum. Most contacts were in keeping with a single hop distance associated with a 26 deg take off angle ie approx 1000km but one good 2 way contact with the East coast of the USA has been achieved. It is hoped to fully test the antenna when better conditions prevail.

I'm sure this design is not unique but it was derived entirely from scratch and even if the results aren't earth shattering, gave me an enormous sense of satisfaction - so why not give it a go! It's an ideal mono band antenna if you have only a small garden and need to keep the antenna height relatively low.