Underground Antennas

Hi my friends. Again we return to the Underground Antennas. I believe it is very interesting thematic for the radio amateur. Lots Underground antennas are history for the radio communication. Lots of them still in the military service…

Credit Line: CQHAM.RU

Forum: Underground Antennas

Below there are pasted some messages from the topic on Underground Antennas from the ham- radio forum on CQHAM.RU. Time of the message is DD/MM/YY/HH/MinMin.

Andrey 1967 (RA6AMP)
05.08.2012 15:38

I was involved in construction of an Underground Antenna in 1985. It was at Saratov Region, RVSN division (**Reference 1**).

There were two trenches in two meter depth and 150- meter length. The trenches were located at 90 degree each other. Cable in diameter 80- 100-mm was placed into the trench in sharp of a snake. Above the cable there were sand and small gravel…

UR7EY

05.08.2012 20:54

Quote from Reference (“Crimea in the WWII 1941- 1945 years. Compendium of the documents and materials”. – Publishing House “Tavpiya”, Simferopol, 1973 (**Reference 2**) about the famous 30- artillery division (**Reference 3**).

“30- artillery division was blocked by German troops at June- 17, 1942. Telephone communication with the division was absent from June -15 when mobile group of German soldiers, that entered inside soviet defense line near Perovskiy sovhoz, destroyed air and underground telephone cable. Radio communication was break off on 16- June when there were destroyed all on- ground antennas. The attempt to establish communication with help of ***underground antenna*** was unsuccessful”.

Figure 1: Shevron RVSN

Figure 2 Shevron RVSN Saratov Region

(***Note I.G.:*** According some my information the 30- artillery division had four underground antennas. There were “trenches” antennas similar to described in the above post by Andrey 1967 (RA6AMP). One antenna had direction of radiation to Moscow radio- center. Second antenna had direction of radiation to Odessa radio- center. Third and fourth antennas were intended for communication with ships on the Black Sea. The two antennas had direction of radiation directed to West and East of the Black Sea.

However a German artillery shell destroyed the feeder shaft to the underground antennas making those ones useless. It was 610-mm shell from mortar “Karl.” The feeder shaft was close to the on- ground antennas and it was destroyed at the same time when the on- ground antennas were smashed. ” **Figure 4** shows a shell from mortar “Karl.” (**Reference 4**))

RT4I

05.08.2012 21:43

I have seen underground antennas in a radio communication center in Saratov Region, Marx- district. The antennas were made from a coaxial cable. The coaxial cable was lying on a gravel “pillow”. Antennas were buried on to 1.5- meter in the ground. Design of the underground antenna was similar to a logo- periodical antenna.

Figure 3 30- Artillery Division- Recent Days

Figure 5 Mortar Karl on Fire Position near 30- Artillery Division

Figure 4 610- mm shell from mortar “Karl”

Bulava

05.08.2012 22:48

About the antenna that is shown on the **Figure 6**. Inside of the “plate” there is a radiation helix made of from a copper strip.

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The antenna is tune up from 1.5- to 30- MHz with help of vacuum capacitors and additional coils… The antenna is working on RX/TX. The “plate” with the antenna parts is filled on by a special plastic.

Figure 6 Underground Antenna

4L1FL

06.08.2012 09:31

There is some more info about the underground antenna “Astra.” It had length near 100- meters and width near 30- 40- meters. Antenna was placed above a slope. Decline the slope in to the direction of the directivity of the antenna is near 5- 10 degree. Antenna was made from pieces of coaxial cables in 50 and 75- Ohm. Joining of the cables was insulated by melted polyethylene in special die mold. The ground on it the antenna was sitting should have special parameters. It was coarse sand. The sand was transported to the antenna place for 40- km.

UN-NS

06.08.2012 10:02

Underground antennas were intended for reception in the VLF (Very Low-Frequency waves). System “V’uyga” used the antennas for VLF reception. However since 1980 the system “V’uyga” was used magnetic loop antennas made in Petropavlovsk Factory.

Note I.G.: System “V’uyga” in the ex-USSR Army was used for assured delivery of orders (issued by a man) and signals (issued by some electronic system) to the army divisions. System “V’uyga” duplicated signals and orders that were transmitting by the usual channels of the communication. System “V’uyga” may use radio frequency bands from VLF to UHF.

LY1SD

06.08.2012 17:45

Quotes from forum at qrz.ru:

“Near Leningrad at one military site there were underground antennas. It was wandering to see feeders going underground… There were RX/TX antennas. I did not test the antennas to TX however to RX the antennas worked fantastic. “

“I was involved in construction of an underground antenna. Inside of the antenna there were 8- 10 broadband conical radiators. Antenna was sitting on a pillow from special sand. Then the antenna was buried by the same sand. After that the construction is covered by asphalt.”

Figure 7 Underground Antenna (?) at Kosvinsky Kamen

UN-NS

10.08.2012 15:42

Figure 6 shows receiving underground antenna for VLF. Inside of the concrete Plate there are two helixes in 200- coils… The helixes are tuned to resonance then by radio amplifier rejected a synphased interference. Tubes 6S3P and 6S4P were used in the amplifier. Coaxial cable RK-100 was used with the antenna.

Underground Antennas

svic

06.08.2012 23:39

I was served in the RVSN. Yes, we had underground antennas…

UN-NS

10.08.2012 09:20

Very interesting underground antenna is installed in the Kosvinsky Kamen (**Reference 5**) . The antenna is TX VLF antenna. There is underground radio communication center. System Kosvinsky Kamen is parts of the “Perimeter” (Dead Hand).

Figure 8 Underground Antenna at Kosvinsky Kamen

Figure 9 Leonid Brezhnev and Supreme Military at one of the Part of the System “Dead Hand”

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4L1FL

17.08.2012 22:39

There is a sketch of the antenna Astra shown in **Figure 10**. Antenna made of from 75 and 50- Ohm Coaxial Cable RK75-4-11 and RK50-4-11. Antenna radiator made of 75-Ohm Coaxial Cable. Collecting line made of 50- Ohm Coaxial Cable. Antenna radiators have non constant length. The length is maximum near the collecting line then gradually decreased to the ends. I do not remember exactly the length now. It was a long time ago at 1968… Feeder from the antenna was going to a four- wire line. The line was going to the communication center. I believe that is a logo periodical antenna with 8- 10- dB gain.

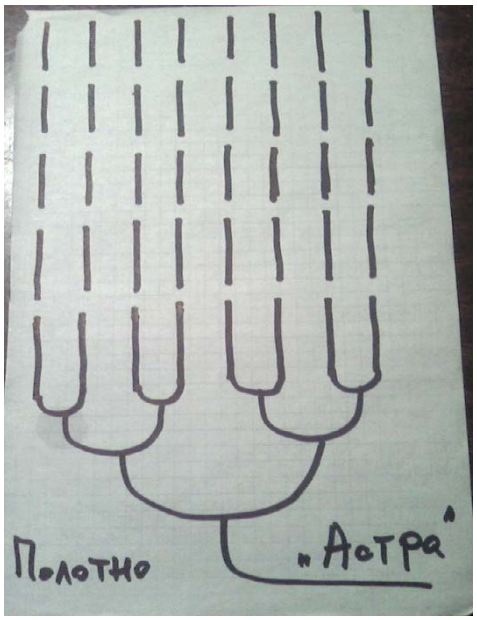
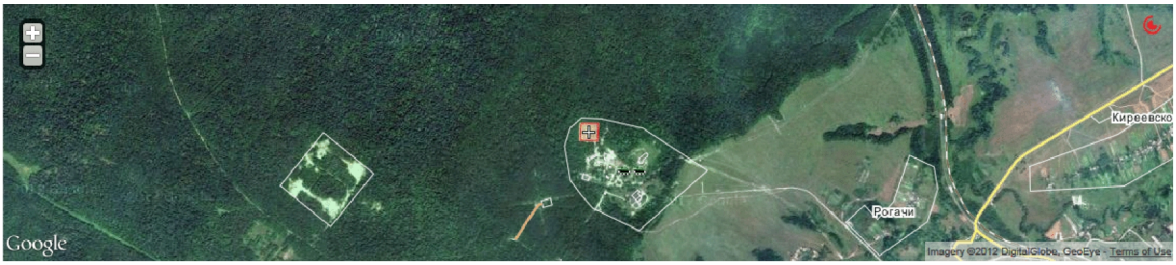


Figure 10 Antenna Astra. Sketch

Google Map view on the demolished underground antenna. It was cable antenna buried up to 50- cm underground.

Coordinates: 53°53'58"N 35°52'37"E
Nearby cities: Kaluga, Orel, Tula



Left:

Former Start Position for **SS-8 (Sasin)**

Right:

Cross- Underground Antenna

Dismantled UR- 100NU (SS-19) ICBM Control Site

***About the Picture See:* Reference 6**

References

Reference 1

About RVSN: http://en.wikipedia.org/wiki/Strategic_Missile_Troops

About RVSN in Saratov Region:

http://ru.wikipedia.org/wiki/%D0%A2%D0%B0%D0%BC%D0%B0%D0%BD%D1%81%D0%BA%D0%B0%D1%8F_%D1%80%D0%B0%D0%BA%D0%B5%D1%82%D0%BD%D0%B0%D1%8F_%D0%B4%D0%B8%D0%B2%D0%B8%D0%B7%D0%B8%D1%8F

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Reference 3

About the 30- artillery division

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Reference 4

About mortar "Karl" http://en.wikipedia.org/wiki/Karl-Ger%C3%A4t

Reference 5

About Kosvinskiy Kamen:

http://masterok.livejournal.com/501495.html

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Reference 6

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Figures taken from "References", CQHAM.RU,
and from open source from the INTERNET