Tesla's Art of Individualisation

An investigation into the understanding of the work of Nikola Tesla and his "Art of Individualisation"

by Arto Juhani Heino (c) 2014

To grasp the impact that Tesla could have had in the seminal Patents 723188 and 725605 was overlooked, due mainly to the bickering and narrow minded attempts of a handful of inventors that were trying to win the radio wars, mainly that of Marconi, Fessenden, Baviera, Braun, Lodge and a few others. In these patents he outlines the true electronic AND gate we take for granted in our current age of computers. Not privy to the details of his Wardenclyff project, he mentions on many occurrences that his "Art of Individualisation" was to be the main base logic to his World Wide System of communication.

First we need to be fully aware that he designed theses ideas in 1900 even before valves were used in any general radio system. Tesla's use of rotating spark gaps and relays were the means which he used to implement most of his ground transmission work, long before others even understood where he was going with his new ideas. The understanding of wave forms was crucial to Tesla and his contemporaries, their were no ready made oscilloscopes, these were 30 years later, Tesla relied on his intuitive understanding of sound and the mirroring of this to electrical activity to extend the Art of electricity into a direction that has been muddied ever since. Lesser mortals used equations to describe this activity thus relegating this deep understanding to the plots of sine and cosines. This clouded the physical phenomena that electricity appeared to the mind of the electrician of the day, thus forming erroneous theories and the beginning of the mental virus that has engaged the physics community ever since.

Tesla was under no such illusion and continued his investigations, cumulating in the announcement of a World Wireless System. The public, the corporate leaders and the scientific community were like a stone age rock throwing mob calling him a heretic and blasphemer that would eventually bury Tesla and his revolutionary ideas. How dare he make power available to the public without charging for the privilege, these were the sentiments of the coal, copper and those industrialists that would benefit from a user pay system; welcome to our current paradigm.

The first understanding is a simplistic sine wave representation of the types of waves that Tesla was employing in his work.

DC	**AC**	**OC**	**IC**
Direct Current	Alternating Current	Oscillating Current	Impulse Current
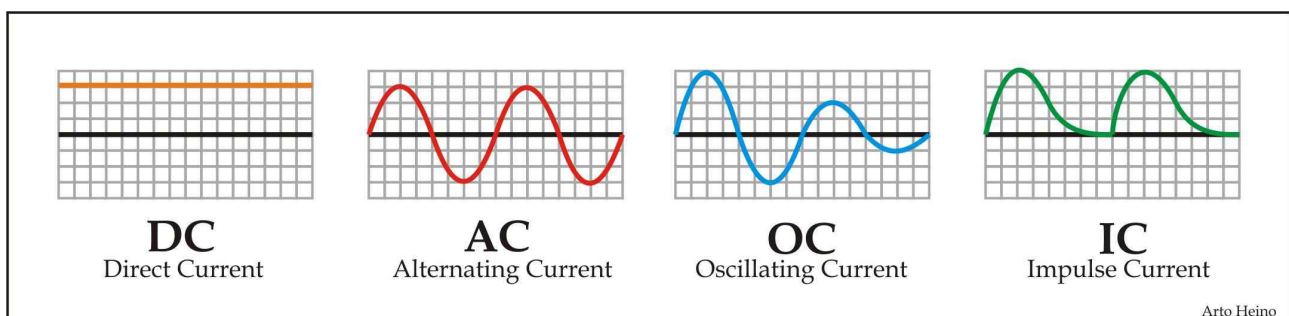
Arto Heino

The Art of Individualization

The Transmitting Circuit
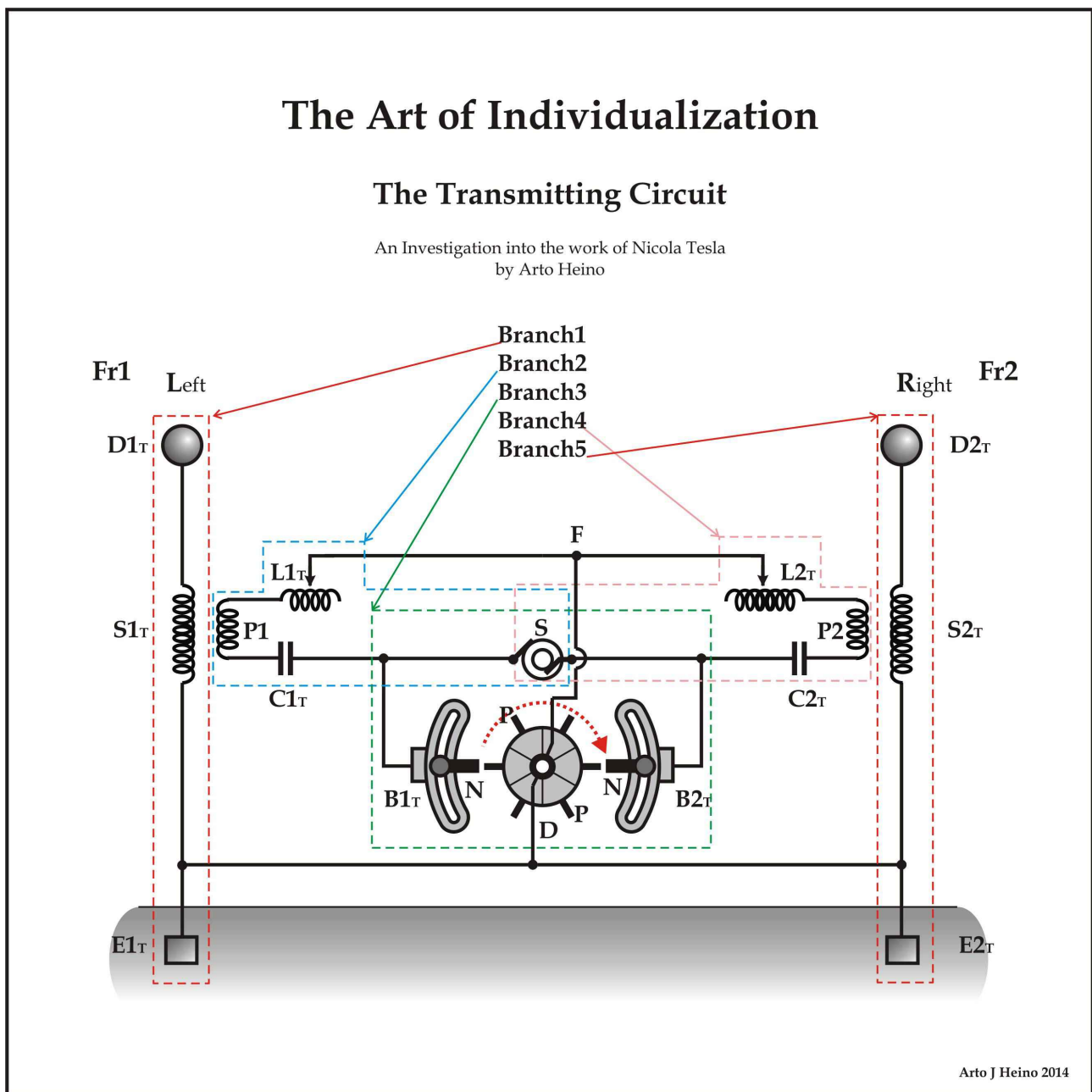
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Figure 1

In Figure. 1, S1ᴛ and S2ᴛ are two coils connected to elevated terminals D1ᴛ and D2ᴛ, respectively, and the opposite end to an earth-plate E1ᴛ and E2ᴛ. These two coils, conductors, or systems D1ᴛ+S1ᴛ+E1ᴛ and D2ᴛ+D2ᴛ+E2ᴛ have different periods of vibration, and, their lengths should be such that the points of maximum pressure developed therein coincide with the elevated terminals D1ᴛ and D2ᴛ, refer to the quarter wave resonance methods used by Tesla.

The two systems have electrical oscillations impressed, conveniently by energising them through primaries P1 and P2, placed in proximity to them. Adjustable inductances L1ᴛ and L2ᴛ are preferably included in the primary circuits chiefly for the purpose of tuning the primary oscillations. In the drawings the primaries P1 and P2 are in inductive

proximity to the coils S1$_T$ and S2$_T$ and are also joined in series through the inductances L1$_T$ and L2$_T$, conductor F, condensers C1$_T$ and C2$_T$, brush-holders B1$_T$ and B2$_T$, and a toothed disk D, which is also connected to the conductor F also to the ground-plate E1$_T$+E2$_T$, as shown, two independent primary circuits being thus formed.

The condensers C1$_T$ and C2$_T$ and the inductances L1$_T$ and L2$_T$ are so adjusted that each primary is in close resonance with its secondary system. The brush-holders B1$_T$ and B2$_T$ are capable independently of angular and also of lateral adjustment, so that any desired order of succession or any difference of time interval between the discharges occurring in the two primary circuits may be obtained. The condensers being energised from a suitable source S, preferably of high potential, and the disk D being rotated, its projections or teeth P+P, coming at periodically-recurring intervals in very close proximity to or in contact with conducting rods or brushes N+N, it will cause the condensers to be discharged in rapid succession through their respective circuits. In this manner the two secondary systems D1$_T$+S1$_T$+E1$_T$ and D2$_T$+S2$_T$+E2$_T$ are set in vibration and oscillate freely, each at its proper rate, for a certain period of time at every discharge.

There are 5 basic branches:

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1  D1T, S1T, E1T      = Branch1 (OC)
2  S, C1T, P1, L1T    = Branch2 (AC, OC, IC)
3  S, B1T, D, B2T     = Branch3 (DC, OC, IC)
4  S, C2T, P2, L2T    = Branch4 (AC, OC, IC)
5  D2T, S2T, E2T      = Branch5 (OC)
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There are 2 different frequencies that are being transmitted

Fr1
Fr2

There are 2 different sets of transmitting circuit branches

Fr1 = Branch1 = Secondary = $1/(2 \times \pi \times sqrt(S1_T \times D1_T))$ also = 299792548 / (S1L x 4)
    = Branch2 = Primary   = $1/(2 \times \pi \times sqrt((P1 + L1_T) \times C1_T))$
Fr2 = Branch4 = Secondary = $1/(2 \times \pi \times sqrt(S2_T \times D2_T))$ also = 299792548 / (S2L x 4)
    = Branch5 = Primary   = $1/(2 \times \pi \times sqrt((P2 + L2_T) \times C2_T))$

Transmitter Label nomenclature (based on Tesla patents)

B1$_T$ = Adjustable Brush/Rod Holder   B2$_T$ = Adjustable Brush/Rod Holder
C1$_T$ = High Voltage Capacitor   C2$_T$ = High Voltage Capacitor
D   = Rotating Break/Make Disk with 6 x P
D1$_T$ = One terminal Spherical Capacitor   D2$_T$ = One terminal Spherical Capacitor
E1$_T$ = Earth connection either a plate, spike, cable, pipe
E2$_T$ = Earth connection either a plate, spike, cable, pipe
F   = Conductor
L1$_T$ = Variable Inductor   L2$_T$ = Variable Inductor
N   = Conducting Rods or Brushes

P   = Pole projections Electrodes
P1   = Primary Coil   P2 = Primary Coil
S   = Direct Current Source (DC), batteries, generator
$S1_T$ = Secondary Coil $S2_T$ = Secondary Coil
S1L= Secondary Conductor Length   S2L= Secondary Conductor Length

Receiver
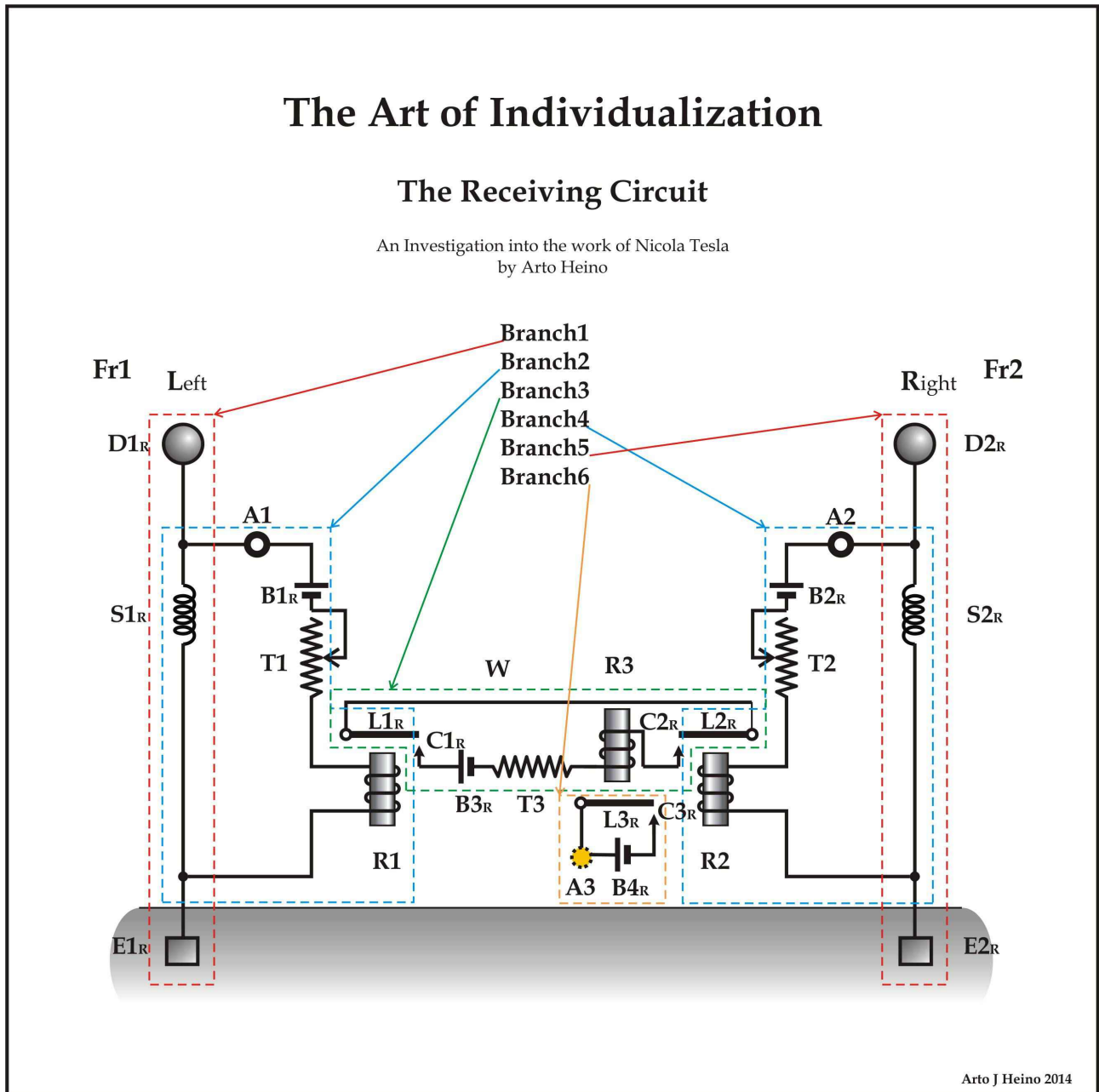
Figure 2

The two vibrations are impressed upon the ground through the plate $E1_T$+$E2_T$ and spread to a distance reaching the receiver, which has two similar circuits or systems $E1_R$+$S1_R$+$D1_R$ and $E2_R$+$S2_R$+$D2_R$ arranged and connected in the same manner and tuned to the systems at the transmission station, so that each responds exclusively to one of the two vibrations produced. The same rules of adjustment are observed with respect to the

receiving circuits, care being, furthermore, taken that the tuning is effected when all the apparatus is connected to the circuits and placed in position, as any change may more or less modify the vibration.

Each of the coils $S1_R$ and $S2_R$ is shunted by a local circuit containing, respectively, sensitive devices A1+A2, batteries $B1_R$+$B2_R$, adjustable resistances T1+T2, and sensitive relays R1+ R2, all joined in series, as shown. The sensitive devices A1+A2 may be any of the well-known devices of this kind, a coherer for example. The coherer needs to return to a normal sensitive state and may be secured by momentarily interrupting the battery circuit after each operation. The relays R1+R2 have armatures $L1_R$+$L2_R$, which are connected by a wire W and when attracted establish electrical contacts $C1_R$ and $C2_R$, thus closing a circuit containing a battery $B3_R$, and adjustable resistance T3, and a relay R3.

From the above description it will be readily seen that the relay R3 will be operated only when both contacts $C1_R$ and $C2_R$ are closed.

There are 6 separate branches:

1	$D1_R$, $S1_R$, $E1_R$	= Branch1 (AC, OC)
2	$B1_R$, A1, $S1_R$, R1, T1	= Branch2 (DC, IC)
3	$B3_R$, T3, R3, $C2_R$, $L2_R$, W, $L1_R$, $C1_R$	= Branch3 (DC, IC)
4	$B2_R$, A2, $S2_R$, R2, T2	= Branch4 (DC, IC)
5	$D2_R$, $S2_R$, $E2_R$	= Branch5 (AC, OC)
6	$B4_R$, A3, $L3_R$, $C3_R$	= Branch6 (DC, IC)

There are 2 different frequencies that have been transmitted

Fr1
Fr2

There are 2 different receiving frequencies

$F1 = 1/(2 \times p \times \sqrt{S1_R \times D1_R})$ also $F1 = 299792548 / (S1L \times 4)$
$F2 = 1/(2 \times p \times \sqrt{S2_R \times D2_R})$ also $F2 = 299792548 / (S2L \times 4)$

- When the receiving frequency Fr1 matches the LC frequency F1 thus Fr1 = F1

- It will develop a current in the circuit Branch1.

- The Coherer A1 will now be highly conducting due to the coherence of powdered metal by the resonant condition of the $D1_R$ and $S1_R$ and the radiation signal will make the powder conductive.

- The current then will then flow via the Branch2 and the electromagnetic relay R1 will now pull the Contact Switch $C1_R$.

- The same thing on the right circuit but with another frequency Fr2 and will the relay R2 now pull the Contact Switch $C2_R$.

- Then if both frequencies Fr1 and Fr2 are matches to the Branch1 and Branch5 frequencies then both switches C1R and C2R via Branch2 and Branch4, will be now be closed, thus completing the central circuit Branch3.
- Once Branch3 has closed, the circuit Branch6 will now trigger the A3 light via the closing of Contact Switch C3R.

Receiver Label nomenclature (based on Tesla patents)

A1 = Coherer   A2= Coherer
A3 = a light, a buzzer or a meter, or any contrivance that will indicate a closed circuit.
B1R = Battery   B2R= Battery   B3R = Battery   B4R = Battery
C1R = Relay Contact   C1R= Relay Contact   C1R = Relay Contact
D1R = One terminal Spherical Capacitor   D2R = One terminal Spherical Capacitor
E1R = Earth connection either a plate, spike, cable, pipe
E2R = Earth connection either a plate, spike, cable, pipe
L1R = Relay Armature   L2R = Relay Armature   L3R = Relay Armature
R1 = Relay Coil   R2 = Relay Coil   R3 = Relay Coil
S1R = Inductor   S2R = Inductor
S1L= Total Conductor Length of S1R   S2L= Total Conductor Length of S2R
T0 = Resistance   T1 = Variable Resistance   T2 = Variable Resistance
W = Conductor

Read these paragraphs carefully as all his ideas are open ended to the possibilities that he explores.

Quoting directly from the Tesla patent:

"The apparatus at the sending-station may be controlled in any suitable manner—as, for instance, by momentarily closing the circuit of the source S, two different electric vibrations being emitted simultaneously or in rapid succession, as may be desired, at each closure of the circuit. The two receiving-circuits at the distant station, each tuned to respond to the vibrations produced by one of the elements of the transmitter, affect the sensitive devices A1R and A2R and cause the relays R1 and R2 to be operated and contacts C1R and C2R to be closed, thus actuating the receiver or relay R3, which in turn establishes a contact C3R and brings into action a device A3 by means of a battery B4R, included in a local circuit, as shown, if through any extraneous disturbance only one of the circuits at the receiving-station is affected the relay R3 will fail to respond. In this way communication may be carried on with safety against interference and privacy and the messages may be secured."

"The receiving-station (shown in Fig. 2) is supposed to be one requiring no return message; but if the use of the system is such that this is necessary then the two stations will be similarly equipped and any well-known means, which it is not thought necessary to illustrate here, may be resorted to for enabling the apparatus at each station to be used in turn as transmitter and receiver. In like manner the operation of a receiver, as R3, may be made dependent, instead of upon two, upon more than two such transmitting systems

or circuits, and thus any desired degree of exclusiveness or privacy and safety against extraneous disturbances may be attained. The apparatus as illustrated in Figs. 1 and 2 permits, however, special results to be secured by the adjustment of the order of succession of the discharge of the primary circuits P1 and P2 or of the time interval between such discharges. To illustrate, the action of the relays R1 R2 may be regulated either by adjusting the weights of the levers L1$_R$ L2$_R$, or the strength of the batteries B1 B2, or the resistances T1 T2, or in other well-known ways, so that when a certain order of succession or time interval between the discharges of the primary circuits P1 and P2 exists at the sending-station the levers L1$_R$ and L2$_R$ will close the contacts C1$_R$ and C2$_R$ at the same instant, and thus operate the relay R3, but it will fail to produce this result when the order of succession of or the time interval between the discharges in the primary circuits is another one."

"By these or similar means additional safety against disturbances from other sources may be attained and, on the other hand, the possibility afforded of effecting the operation of signalling by varying the order of succession of the discharges of the two circuits. Instead of closing and opening the circuit of the source S, as before indicated, for the purpose of sending distinct signals it may be convenient to merely alter the period of either of the transmitting-circuits arbitrarily, as by varying the inductance of the primaries."

"Obviously there is no necessity for using transmitters with two or more distinct elements or circuits, as S1 and S2, since a succession of waves or impulses of different characteristics may be produced by an instrument having but one such circuit."

"Evidently, however, it is not necessary to employ two or more receiving-circuits; but a single circuit may be used also at the receiving-station constructed and arranged like the transmitting circuits or systems"

"at the sending will be driven in synchronism with those at the receiving stations as far as may be necessary to secure the desired result; but whatever the nature of the specific devices employed it will be seen that the fundamental idea in my invention is the operation of a receiver by the conjoint or resultant effect of two or more circuits each tuned to respond exclusively to waves, impulses, or vibrations of a certain kind or class produced either simultaneously or successively by a suitable transmitter."

Transceiver
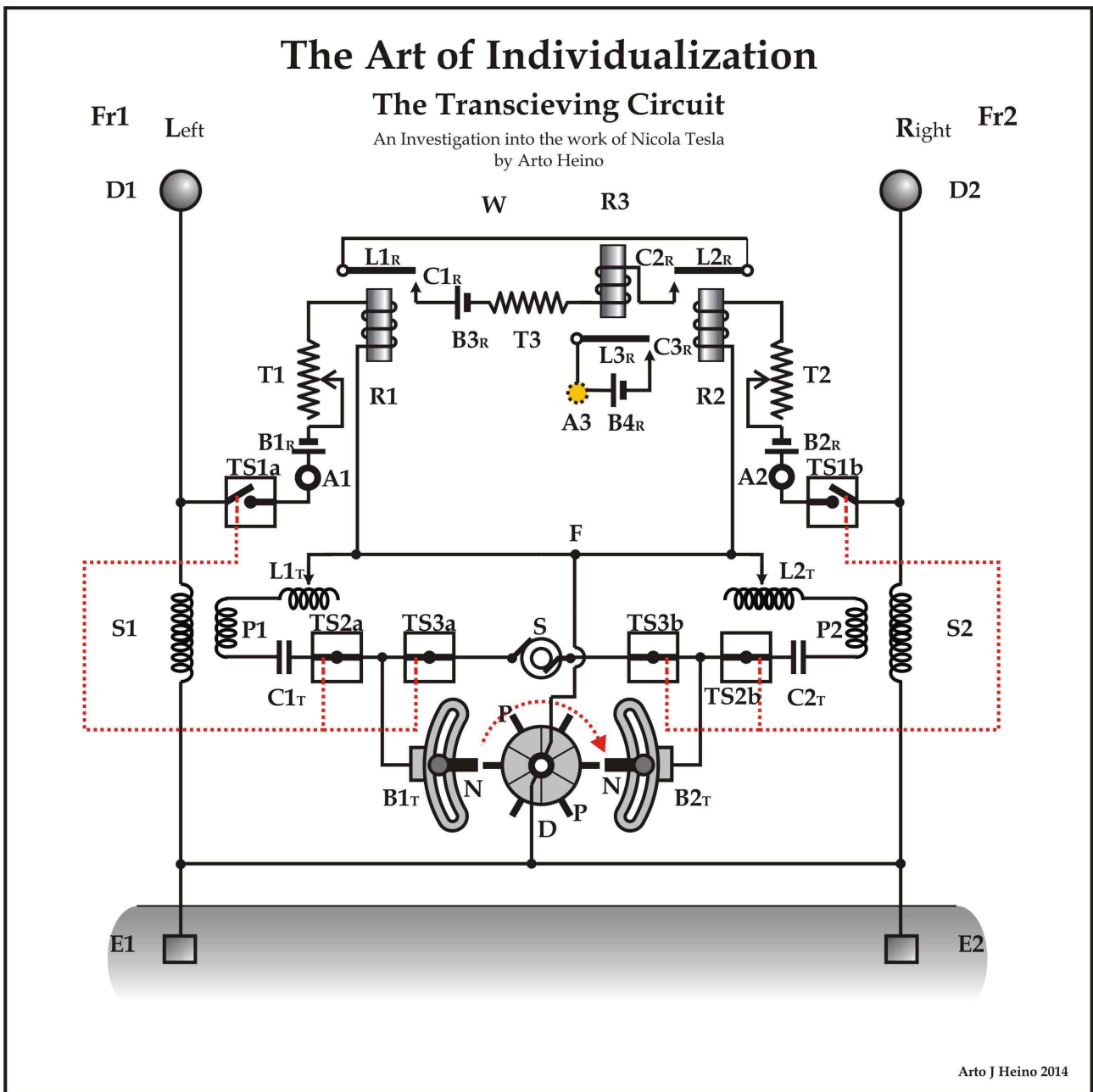
Figure 3

The combination of both designs are the best possible way to create a uniform system that could be built and expanded.

The Toggle switches work in a simple Transmit/Receive mode, where toggle switch group "a" is connected mechanically together as - TS1a is switched "OUT" when TS2a and TS3a are switch "IN". The "b" group either switch out simultaneously or manually with group "a".

Transceiver Label nomenclature (based on Tesla patents)

A1 = Coherer   A2= Coherer
A3 = a light, a buzzer or a meter, or any contrivance that will indicate a closed circuit.

$B1_R$ = Battery $\qquad$ $B2_R$= Battery $\qquad$ $B3_R$ = Battery $\qquad$ $B4_R$ = Battery

$B1_T$ = Adjustable Brush/Rod Holder $\qquad$ $B2_T$ = Adjustable Brush/Rod Holder

$C1_R$ = Relay Contact $\qquad$ $C1_R$= Relay Contact $\qquad$ $C1_R$ = Relay Contact

$C1_T$ = High Voltage Capacitor $\qquad$ $C2_T$ = High Voltage Capacitor

D   = Rotating Break/Make Disk with 6 x P

$D1_R$ = One terminal Spherical Capacitor $\qquad$ $D2_R$ = One terminal Spherical Capacitor

$D1_T$ = One terminal Spherical Capacitor $\qquad$ $D2_T$ = One terminal Spherical Capacitor

$E1_R$ = Earth connection either a plate, spike, cable, pipe

$E2_R$ = Earth connection either a plate, spike, cable, pipe

$E1_T$ = Earth connection either a plate, spike, cable, pipe

$E2_T$ = Earth connection either a plate, spike, cable, pipe

F   = Conductor

N   = Conducting Rods or Brushes

P   = Pole projections Electrodes

P1   = Primary Coil $\qquad$ P2 = Primary Coil

$L1_R$ = Relay Armature $\qquad$ $L2_R$ = Relay Armature $\qquad$ $L3_R$ = Relay Armature

$L1_T$ = Variable Inductor $\qquad$ $L2_T$ = Variable Inductor

R1 = Relay Coil $\qquad$ R2 = Relay Coil $\qquad$ R3 = Relay Coil

S   = Alternating Current Source (AC)

$S1_R$ = Inductor $\qquad$ $S2_R$ = Inductor

$S1_T$ = Secondary Coil $\qquad$ $S2_T$ = Secondary Coil

S1L= Total Conductor Length of $S1_R$ $\qquad$ S2L= Total Conductor Length of $S2_R$

T0 = Resistance $\qquad$ T1 = Variable Resistance $\qquad$ T2 = Variable Resistance

TS1a = Toggle switch TS1a = Toggle switch TS1a = Toggle switch TS1a = Toggle switch

W = Conductor

Here are some basic implications of the "Art of Individualisation", when brought to its expanded form, using frequencies starting from 216000 hz. (Tesla AOI). Here is an example of decoding 8 separate frequencies and only using 4 for transmission and reception.

First Grouping $\qquad$ = 35

Fr1	+	Fr2	+	Fr3	+	Fr4
Fr1	+	Fr2	+	Fr3	+	Fr5
Fr1	+	Fr2	+	Fr3	+	Fr6
Fr1	+	Fr2	+	Fr3	+	Fr7
Fr1	+	Fr2	+	Fr3	+	Fr8
Fr1	+	Fr2	+	Fr4	+	Fr5
Fr1	+	Fr2	+	Fr4	+	Fr6
Fr1	+	Fr2	+	Fr4	+	Fr7
Fr1	+	Fr2	+	Fr4	+	Fr8
Fr1	+	Fr2	+	Fr5	+	Fr6
Fr1	+	Fr2	+	Fr5	+	Fr7
Fr1	+	Fr2	+	Fr5	+	Fr8
Fr1	+	Fr2	+	Fr6	+	Fr7
Fr1	+	Fr2	+	Fr6	+	Fr8
Fr1	+	Fr2	+	Fr7	+	Fr8

Fr1	+	Fr3	+	Fr4	+	Fr5
Fr1	+	Fr3	+	Fr4	+	Fr6
Fr1	+	Fr3	+	Fr4	+	Fr7
Fr1	+	Fr3	+	Fr4	+	Fr8
Fr1	+	Fr3	+	Fr5	+	Fr6
Fr1	+	Fr3	+	Fr5	+	Fr7
Fr1	+	Fr3	+	Fr5	+	Fr8
Fr1	+	Fr3	+	Fr6	+	Fr7
Fr1	+	Fr3	+	Fr6	+	Fr8
Fr1	+	Fr3	+	Fr7	+	Fr8
Fr1	+	Fr4	+	Fr5	+	Fr6
Fr1	+	Fr4	+	Fr5	+	Fr7
Fr1	+	Fr4	+	Fr5	+	Fr8
Fr1	+	Fr4	+	Fr6	+	Fr7
Fr1	+	Fr4	+	Fr6	+	Fr8
Fr1	+	Fr4	+	Fr7	+	Fr8
Fr1	+	Fr5	+	Fr6	+	Fr7
Fr1	+	Fr5	+	Fr6	+	Fr8
Fr1	+	Fr5	+	Fr7	+	Fr8
Fr1	+	Fr6	+	Fr7	+	Fr8

Second Grouping = 20

Fr2	+	Fr3	+	Fr4	+	Fr5
Fr2	+	Fr3	+	Fr4	+	Fr6
Fr2	+	Fr3	+	Fr4	+	Fr7
Fr2	+	Fr3	+	Fr4	+	Fr8
Fr2	+	Fr3	+	Fr5	+	Fr6
Fr2	+	Fr3	+	Fr5	+	Fr7
Fr2	+	Fr3	+	Fr5	+	Fr8
Fr2	+	Fr3	+	Fr6	+	Fr7
Fr2	+	Fr3	+	Fr6	+	Fr8
Fr2	+	Fr3	+	Fr7	+	Fr8
Fr2	+	Fr4	+	Fr5	+	Fr6
Fr2	+	Fr4	+	Fr5	+	Fr7
Fr2	+	Fr4	+	Fr5	+	Fr8
Fr2	+	Fr4	+	Fr6	+	Fr7
Fr2	+	Fr4	+	Fr6	+	Fr8
Fr2	+	Fr4	+	Fr7	+	Fr8
Fr2	+	Fr5	+	Fr6	+	Fr7
Fr2	+	Fr5	+	Fr6	+	Fr8
Fr2	+	Fr5	+	Fr7	+	Fr8
Fr2	+	Fr6	+	Fr7	+	Fr8

Third Grouping = 10

Fr3	+	Fr4	+	Fr5	+	Fr6
Fr3	+	Fr4	+	Fr5	+	Fr7

Fr3	+	Fr4	+	Fr5	+	Fr8
Fr3	+	Fr4	+	Fr6	+	Fr7
Fr3	+	Fr4	+	Fr6	+	Fr8
Fr3	+	Fr4	+	Fr7	+	Fr8
Fr3	+	Fr5	+	Fr6	+	Fr7
Fr3	+	Fr5	+	Fr6	+	Fr8
Fr3	+	Fr5	+	Fr7	+	Fr8
Fr3	+	Fr6	+	Fr7	+	Fr8

Fourth Grouping   = 4

Fr4	+	Fr5	+	Fr6	+	Fr7
Fr4	+	Fr5	+	Fr6	+	Fr8
Fr4	+	Fr5	+	Fr7	+	Fr8
Fr4	+	Fr6	+	Fr7	+	Fr8

Fifth Grouping   = 1

| Fr5 | + | Fr6 | + | Fr7 | + | Fr8 |

Total unique groupings

35 + 20 + 10 + 4 + 1 = 70

Possible arrangements of coding
Transmission by 8 frequency TAOI-81code = 8 frequencies to 1 group code. = 8
Transmission by 8 frequency TAOI-82code = 8 frequencies to 2 group code. = 28
Transmission by 8 frequency TAOI-83code = 8 frequencies to 3 group code. = 56
Transmission by 8 frequency TAOI-84code = 8 frequencies to 4 group code. = 70
etc...

These types of coding has similarities to magic squares and the numeric combinations that build them.

Frequencies shifted to next block add 12000 Hz
this will leave each Frequency in the group to be separated by 1500 Hz

Example if the base of Fr1 = 216000 Hz and unique frequency is shifted by 1500 Hz
and the division between blocks is 18 sets

Block one

B1Fr1 = 216000 Hz Add 1500 Hz
B1Fr2 = 217500 Hz
B1Fr3 = 219000 Hz
B1Fr4 = 220500 Hz
B1Fr5 = 222000 Hz
B1Fr6 = 223500 Hz

B1Fr7 = 225000 Hz
B1Fr8 = 226500 Hz

Block Allocations are

B1Fr1 = 216000 Hz   Oct 0
B2Fr1 = 228000 Hz
B3Fr1 = 240000 Hz
B4Fr1 = 252000 Hz
B5Fr1 = 264000 Hz
B6Fr1 = 276000 Hz
B7Fr1 = 288000 Hz
B8Fr1 = 300000 Hz
B9Fr1 = 312000 Hz
B10Fr1 = 324000 Hz
B11Fr1 = 336000 Hz
B12Fr1 = 348000 Hz
B13Fr1 = 360000 Hz
B14Fr1 = 372000 Hz
B15Fr1 = 384000 Hz
B16Fr1 = 396000 Hz
B17Fr1 = 408000 Hz
B18Fr1 = 420000 Hz

The Next Octave and Harmonic Block

C1Fr1 = 432000 Hz   Oct 1
D1Fr1 = 648000 Hz   5th
E1Fr1 = 864000 Hz   Oct 2
F1Fr1 = 1080000 Hz   3rd
G1Fr1 = 1296000 Hz   5th
H1fr1 = 1512000 Hz b7th
etc...

So by making the transmission frequencies switch in or out by using a set of capacitors or inductors you can achieve 70 x 18 = 1260 unique channels in one octave with a separation of 1500 Hz between each frequency, using only a 4 frequency code from a possible 8 frequencies. These frequencies are arbitrary and was chosen due to the ease at which this can be established with hand wound and crude methods. I have given an example of creating the first group of frequencies by an inductor and capacitor combination and conductor length. The procedure is to establish the highest frequency and the lowest frequency so each increment is a subtraction or an addition of conductor length. The capacitors in the primary will increment to assure the the same frequency in the secondary quarter wave is established with the maximum potential at the top capacitive terminal. This will assure the ground location is at maximum current and the transmission through the earth can be established.

As there are 70 unique codes using only 4 of these frequencies, we could convert

this to a digital formats to create even more possible types of data streams including 64 bit sampling systems already in use. The possibilities are enormous, I will conclude with the allocation Block one and break down the coil/capacitance resonant structure that could be utilised on a theoretical Tesla Transceiver based on this design. The key is to create a system of codes that prepares the receiver for stream of codes after the initial start up encryption code. Code used here is the unique combinations of frequencies that make a parallel data stream, where each parallel group can be followed by different combination, set by the impulse speed of the disk D, and a possible automatic system can be devised, where each data set regulates and/or increments a coded wheel or any similar contrivance.

| Fr1 to Fr8 Frequency	$\lambda = C / Hz$ Wave Length	Resonant Inductor Wire Length
Hz	Mtrs	Mtrs
216000	1387.9280	346.9820
217500	1378.3561	344.5890
219000	1368.9153	342.2288
220500	1359.6030	339.9007
222000	1350.4165	337.6041
223500	1341.3533	335.3383
225000	1332.4109	333.1027
226500	1323.5870	330.8968

The key here is the resonant inductors S1 to S8 are both ¼ wave resonators and a Inductor/Capacitor LC resonant combination. This attribute of the Tesla resonator assures a low radiation emitter (radio dispersive or EM wave) and a good longitudinal ground conduction wave (Tesla Longitudinal wave).

Inductor Core Diameter	Inductor Core Len	Inductor Number of Turns	Inductance Coil Henry
Mtrs	Mtrs	n	H
0.28	0.900	392	0.011557
0.28	0.898	391	0.011521
0.28	0.896	390	0.011484
0.28	0.894	389	0.011448
0.28	0.892	388	0.011411
0.28	0.890	387	0.011375
0.28	0.888	386	0.011339
0.28	0.886	385	0.011302

Notice the same diameter and the 1 turn different, this makes it very simple to implement a design such as the one presented here.

Elevated Capacitor Ball Radius	Elevated Capacitor Capacitance	Self Capacitance Coil	Total Capacitance Pico Farads
Mtrs	pF	pF	pF
0.2794	31.1061	15.875	46.98
0.2752	30.6385	15.852	46.48
0.2710	30.1709	15.829	45.99
0.2669	29.7144	15.806	45.51
0.2628	29.2580	15.783	45.04
0.2589	28.8238	15.760	44.58
0.2551	28.4007	15.737	44.13
0.2513	27.9777	15.714	43.69

Here is the complete circuit for all 8 group code, you would need to switch the contacts $C1_R$ to $C8_R$ manually to implement the 4 group system, or any other types, plus the toggle switches TS2a to TS2h would also need to match the same system.
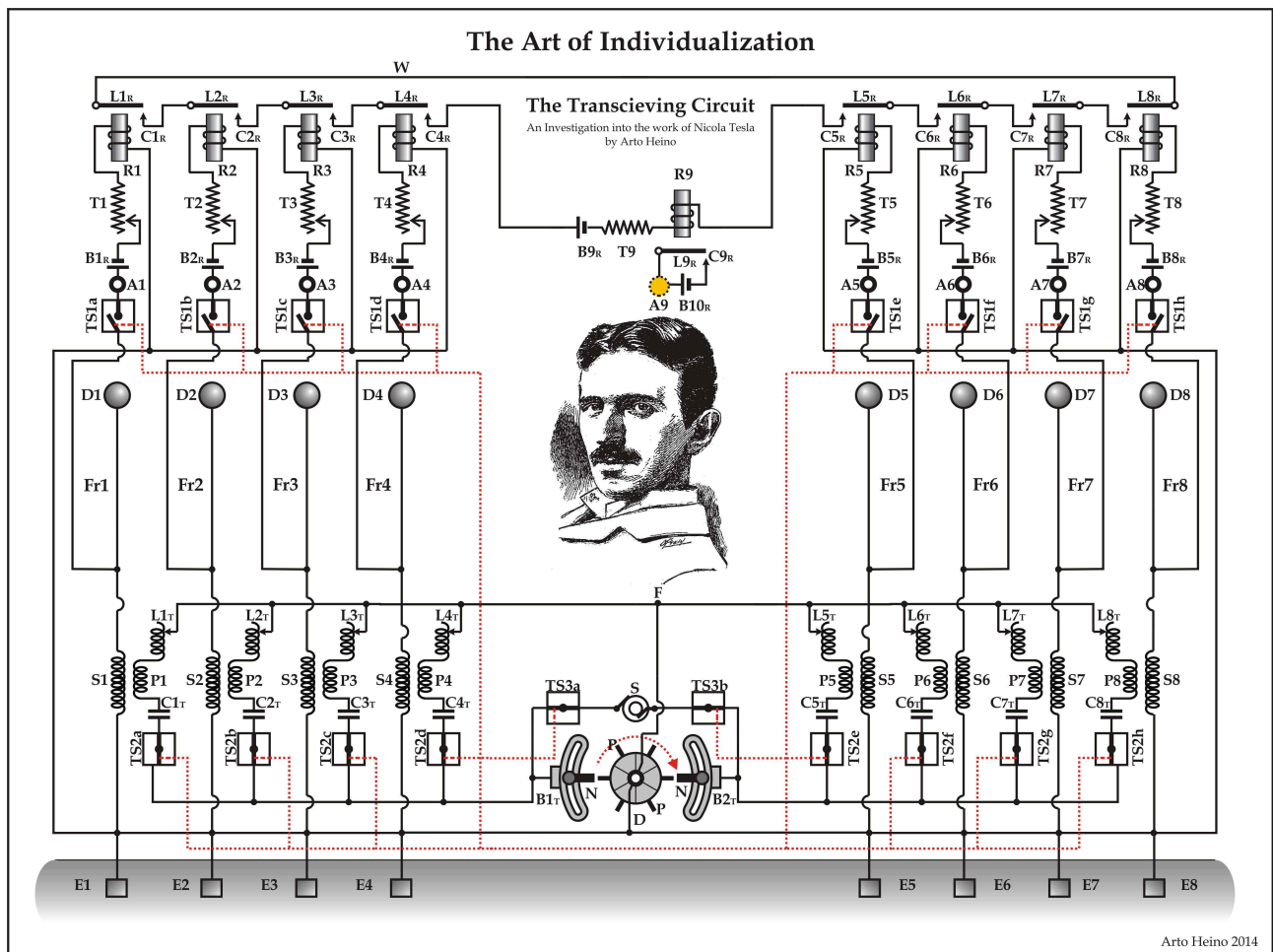
The switch board arrangement should be very flexible, allowing all the relays to switch manually or in groups. The heart of the system is the coding and decoding according to the type of messages sent. For speech you could implement the codes to fire a code which in turn runs a separate transmission with a carrier set by the codes to deliver AM type signals.

References:

"Method of Signaling"
Patent US723188 by Nikola Tesla, Filed June 14, 1901, Granted March 17. 1903

"System of Signaling"
Patent US725605 by Nikola Tesla, Filed July 14, 1900, Granted April 14, 1903

Picture of Tesla Drawn by M. Stein , Savannah Morning News, October 21. 1894.

All Artwork and schematics by Arto Juhani Heino, 2014