

Research on Stealth Aircraft Control Circuit and Realization of Software Radio

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Abstract. From the study of the relationship between the periodic structure and electromagnetic characteristics of stealth materials, we studied the changes in the rotational rotation angle of the polarization plane of the electromagnetic waves, and proposed a hardware control circuit and software based on the circular polarization propagation method for detecting different paths of satellite electromagnetic waves in the ionosphere. The radio design can produce relatively narrow bandwidth and strong multi-path reflection interference caused by Faraday rotation effects. The simulation results show it can effectively increase the stealing performance of stealth aircraft, thus achieving the purpose of stealth

1. Preface

The absorption performance of the stealth aircraft has the loss mechanism of the magnetic dipole moment, which is used to detect the representative GPR satellite of the stealth aircraft. The key to detecting the wavelength of the target is to master the communication processes such as carrier, message and pseudorandom code. At present stealth aircraft can effectively shield the Beidou satellite signal transmission system in three frequency bands: B1 input frequency: 1561.098MHZ, B2 frequency: 1207.14MHZ, B3 1268.52MHZ, L input frequency: 1616MHZ, S frequency: 2492MHZ, US Air Force's F-14, F-15 and Russia's Soviet Union 57 in 1960s, the United States widely used microwave absorbing materials US Air Force's F-14, F-15 and Russia's Soviet Union 57 in 1960s, the United States widely used microwave absorbing materials, In order to achieve the purpose of anti stealth, the military frequency point of detecting satellite signal and 4G communication technology are combined, and the coherent accumulative and incoherent accumulating method is adopted to improve the signal power of the stealth aircraft, and the signal of the faint stealth aircraft can be processed. It has great inspiration for stealth aircraft how to achieve anti stealth. In order to achieve the purpose of anti stealth, the military frequency point of detecting satellite signal and 4G communication technology are combined, and the coherent accumulative and incoherent accumulating method is adopted to improve the signal power of the stealth aircraft, and the signal of the faint stealth aircraft can be processed. It has great inspiration for stealth aircraft how to achieve anti stealth.

In order to achieve the absorption effect, the stealth aircraft design the control circuit frequency caused by the deviation, so the carrier phase can reach irregular rotation, the instantaneous power between the positive subchannels is larger than the average power of the original signal, and the phase noise can cause the detection signal distortion.

On the basis of the above control circuit phase center deviation model, in order to prevent the 5G communication technology used to detect the faint signal from the stealth aircraft, the detection



principle is that the antenna with the Beidou satellite needs to expand the very wide band, effectively eliminate the phase noise, and get the time used to obtain the accurate location information of the target. Shorten. The generation of nanosecond signal source is the prerequisite for the study of high bandwidth than radar antenna technology. The input energy of the antenna can be effectively radiated out. The phase center can effectively expand the channel in time domain. The channel transmission model can achieve high speed transmission and spectrum conversion of electromagnetic wave. The frequency of the detection target is derived.

The absorption performance of the stealth aircraft is based on reducing the area of RCS, taking ARM+FPGA as the research idea, using ARM as the core processor to control the whole system, and using the software radio structure that can block the completion of the 5G communication.

2. Quantum properties of a circular polarized antenna darkroom in a stealth aircraft

The matching of the shape of the stealth aircraft and the internal control circuit conforms to the circular polarization antenna darkroom structure, the periodic structure of the invisible target material, the free particle in the square potential barrier, the energy in the limited area as a positive value (if $0 \leq x \leq a$), and the 0 outside the region.

$$V = V_0 \quad (0 \leq x \leq a)$$

$$V = 0 \quad (x < 0, x > a)$$

Although the propagation of electromagnetic waves in different ionospheric paths gradually decreases, the range of RCS can be effectively increased. The stealth target is found from the relationship between the matching impedance and the electromagnetic parameters of the material. Nonlinear scattering characteristics of stealth aircraft circular polarization antenna caused by electromagnetic wave polarization and rotation angle change^[1], The electromagnetic properties are obtained according to the Schrodinger equation.

$$\frac{d^2\Psi}{dx^2} + \frac{2m}{\hbar^2} E\Psi = E, \quad \frac{d^2\Psi}{dx^2} + \frac{2m}{\hbar^2} (H - V_0) \Psi = H$$

$$\text{Designated } \Psi = A \sin \frac{2\pi x}{\lambda} + \theta$$

We get the result of the quantizing of the energy level,

$$\text{Electric potential energy Electric potential energy: } E = \frac{(i - \theta)^2 \hbar^2}{4ma^2}$$

In where: $i=1, 2, 3, \dots, N$,

We consider the electron spin to produce a magnetic field H , $H = \exp(-\lambda^2) H_n(z)$

In where, $H_n(z)$ is hermite polynomials, Under electromagnetic radiation, the Bohr frequency condition is satisfied: $E_m^0 - E_n^0 = h$

The frequency of the detection of a satellite reconnaissance aircraft is from the angle of the Maxwell equation, which is not directly related to the frequency of the quantum properties of the circular polarized antenna, resulting in the target frequency is distortion obtained by the detection satellite.

3. Design of software radio for 5G communication

The input signal reflects the relationship between the periodic structure and the electromagnetic characteristics of the stealth target. The input signal reflects the relationship between the periodic structure and the electromagnetic characteristics of the stealth target, assuming that the input signal^[2]

$$\text{is: } x(t) = \frac{3\sigma^4 - 8\sigma^2 t^2 + t^4}{\sqrt{2\pi}\sigma^9} \exp\left(-\frac{t^2}{2\sigma^2}\right),$$

Power is : $p = \frac{dx}{dt}$, Signal bandwidth:is: $\tau = \frac{N}{2} \sigma \sim N \sigma$, DC component is: $p=1$

sampling frequency is: $f = \frac{-4f_0}{(2m-1)}, (m = 0,1,2,\dots,N)$

The input signal is transformed by Hilbert transform, and OFDM technology for multi carrier modulation^[3] :

$$y(t) = x(t) * h(t) + m(t)$$

Then the waveform is adjusted, and $m(t)$ is divided into three parts, tracking error function, $W(d)$, W is the weight, d is the distance, the deviation function $n(r)$ is captured, the number of n is t , the time is t , and the crosstalk between symbols is. $\delta(d)$, Coding must be quantum theory rules:

$$\langle \psi_1 | \psi_2 \rangle \langle 0|0 \rangle = 1$$

$$\langle \psi_1 | \psi_2 \rangle \langle 0|1 \rangle = 0$$

The output signal recognition results are consistent with fuzzy fuzzy reasoning

$$y_k = \frac{\sum_{i=1}^n A_i(x) w_{ik}}{\sum_{i=1}^m A_i(x)}$$

In where, w_{ik} is Weight, X is input, A_i is Artificial neural network type function^[4], The narrow bandwidth of the detection satellite signal and the multipath reflection anti-interference caused by the Fala spin effect are solved, which is embodies the quantum characteristics of the circular polarized antenna in the control circuit of the stealth aircraft. This is the design scheme of the stealth aircraft control circuit for 5G communications, and it is shown by the corresponding software chip radio workflow in Figure 1.

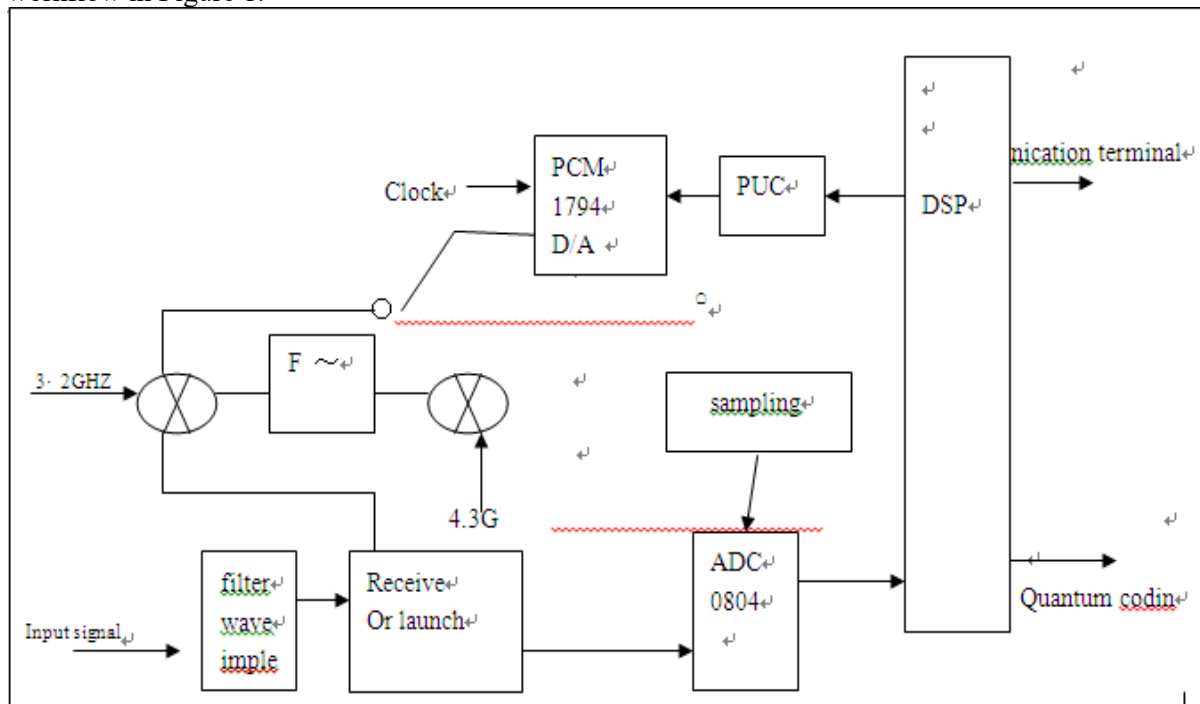


Fig. 1 Software Radio Working Flow Chart of Stealth Aircraft Control Circuit Chip for 5G Communication

4. Experimental simulation and stealth application verification

The principle of radio structure of 5G oriented control circuit chip software has been applied to the military joint tactical communication system. We choose a country X-20 to do the electromagnetic stealth test, The 1.2GMHZ bandwidth signal is received, and the intermediate frequency is deduced according to the sampling frequency formula. $f_0=1.6\text{GMHZ}$, The 64 channel channelized output is transformed by different extraction and interpolation, and the MATLAB software tool is used to complete the test of the ability of the base band chip to cause multipath reflection and strong interference^[5]. For example, figure 2

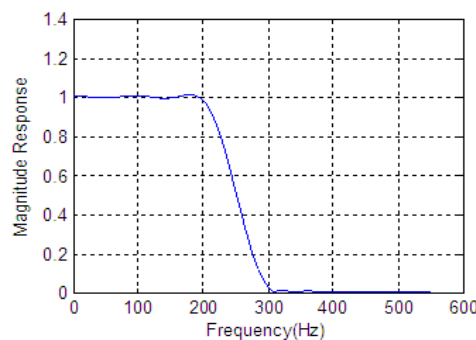


Figure 2 test of anti-jamming capability of baseband chip

The instantaneous feature extraction takes FPGA and uses the fuzzy neural network algorithm. After the quantum number, the output terminal gets the instantaneous phase center, instantaneous amplitude and instantaneous rate and many other parameters. For example, figure 3 it uses unknown quantum coding to detect stealth flight. Machine trace: but Figure 4, it uses quantum coding, due to the reduction of the radar RCS area, it meets the Bohr frequency condition, thus shielding the stealth material frequency and other parameters.

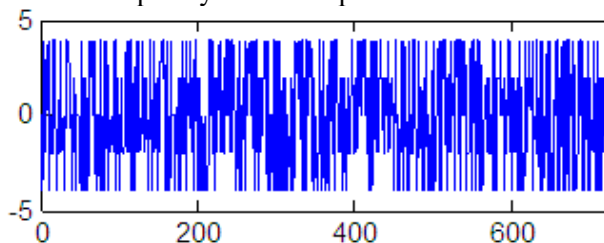


figure 3 it uses unknown quantum coding

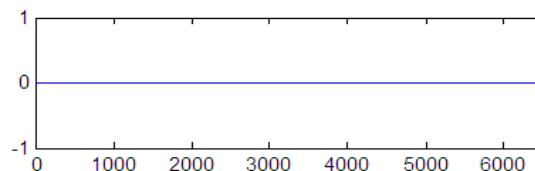


Figure 4: use quantum coding

The output signal shields the characteristics of the original input signal. To illustrate how to solve the difficult problem of multipath interference, waveform adjustment has wide adaptability. The output signal shields the characteristics of the original input signal. To illustrate how to solve the difficult problem of multipath interference, waveform adjustment has wide adaptability.

5 summary

From the perspective of the relationship between Bragg diffraction control, broadband stealth mechanism and electromagnetic wave, which is determined by the periodic structure of stealth material, the quantum properties of the circularly polarized antenna of the stealth aircraft control circuit are studied in depth. The stealth target signal source has ultra-wideband characteristics and is encoded. Complied with the quantum theory of operation rules, the output signal satisfies the characteristics of fuzzy neural network recognition, the carrier modulation OFDM technology, the design of the software radio for the control circuit chip of the 5G communication principle, and the frequency coverage exceeds the millimeter-wave frequency band, resulting in the detection satellite ,

Examples of Beidou and GPS received signals have produced tracking errors, capturing deviations and crosstalk between symbols.

The key of the stealth aircraft control circuit lies in its frequency control scheme, which is applied to the military tactical communication system. The instantaneous feature extraction of the radar detection includes the instantaneous phase center of the stealth material, the instantaneous amplitude and the instantaneous speed, and other parameters, which are proved by simulation experiments. Set the parameters from these control circuits. The adaptability of the waveform adjustment to solve the difficult problem of multi-path interference is solved. The Bohr characteristic satisfies the quantum characteristic condition of the circular-polarized antenna dark-room structure. The detection satellite full-wave analysis method can not calculate the equivalent electromagnetic parameters corresponding to the actual parameters of the stealth aircraft, so that it can not measure the weak signal of the stealth aircraft, and proves the correctness of the stealth application design scheme of the stealth aircraft.

Acknowledgments

I'm an Air Force instructor, too. Thanks for the strong support of the Air Force 95275, They provided the experimental instruments and equipment required for the paper. This paper is subject to the scientific research project: who and the network security protocol of the universal compound semiconductor electronic device for the integrated information network of heaven and earth

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