Schedule Report

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January 8, 2015

Contents

Original Plan

Plan A

Read other three piece of paper on localization based on OFDM modulation, and do some research on the phase differences between the sub-carriers in the OFDM symbol. I think this method is good because it based on the frequency property of the OFDM signal. I want to find out whether ideas occurred in this respect.

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Plan B

Website test for bugs.

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Contents

Rate of Progress 50%

- *Accomplishment* 1
  OFDM ranging system

Zadoff-chu sequence(low PAPR, better auto-correlation and cross-correlation function)

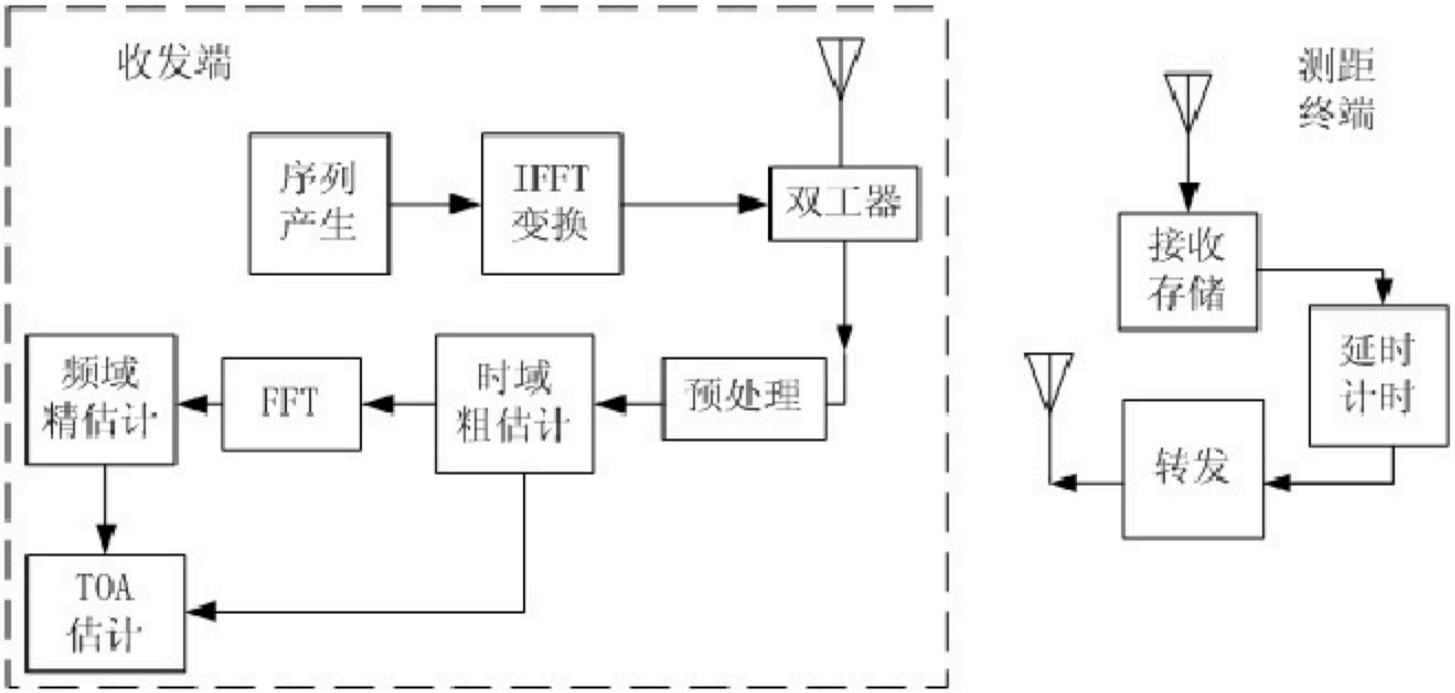


图 3.1 OFDM 测距系统原理框图

Contents

Rate of Progress 50%

- *Accomplishment* 2

Rate of Progress 50%

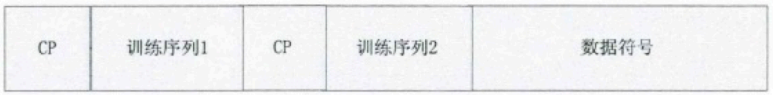
- *Accomplishment 2*
  - 

图3.9 加入PN序列的OFDM符号结构图

Rate of Progress 50%

- *Accomplishment 2*

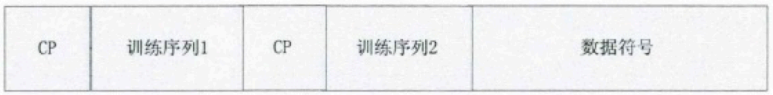


图3.9 加入PN序列的OFDM符号结构图

- Acquisition is achieved in two separate steps through the use of a two-symbol training sequence, which will usually be placed at the start of the frame. First the symbol/frame timing is found by searching for a symbol in which the first half is identical to the second half in the time domain(*It can be achieved by transmitting a pseudonoise (PN) sequence on the even frequencies, while zeros are used on the odd frequencies.*). Then the carrier frequency offset is partially corrected, and a correlation with a second symbol is performed to find the carrier frequency offset.

Rate of Progress 50%

- *research point*
  the estimation process covers coarse estimation and fine estimation. In the coarse estimation, smaller period PN sequence to achieve the larger estimation range. In the fine estimation, larger period PN sequence and name the average value of the several estimation values as the final estimation value to achieve the higher estimation accuracy.

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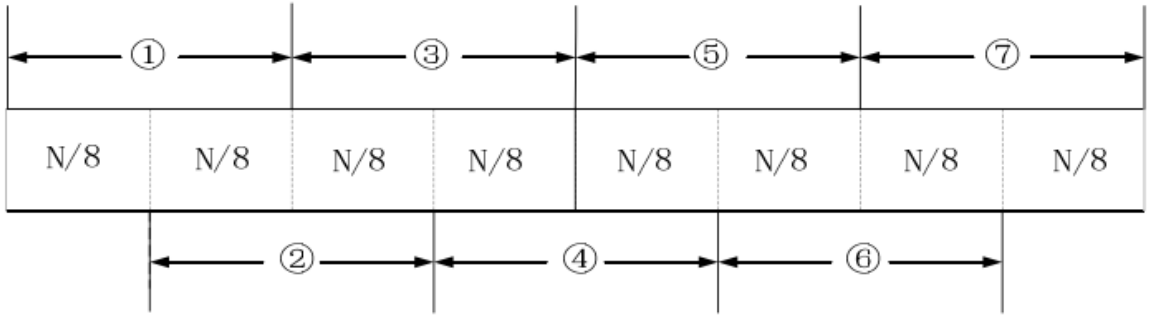
- *implementation method*



Rate of Progress 50%

- *phase differences between sub-carriers*

  Assumed that the OFDM signal carrier frequency offset of all the transmission paths is identical through time-varying Rayleigh channels. Then the received OFDM signal is

$$r_k(n) = C_k e^{j\frac{2\pi\varepsilon n T_s}{N_s}} \cdot s_i(n) + n_k \quad ,\text{where} \quad n \in [-N_g, N-1]$$

$$r_k(n+N) = C_k e^{j\frac{2\pi\varepsilon (n+N) T_s}{N_s}} \cdot s_i(n+N) = C_k e^{j\frac{2\pi\varepsilon n T_s}{N_s}} \cdot e^{j\frac{2\pi\varepsilon N T_s}{N_s}} \cdot s_i(n+N)$$

$$\text{as, } n \in [-N_g, -1] \text{ ,the } s_i(n) = s_i(n+N) \text{ ,then}$$

$$r_k(n+N) = C_k e^{j\frac{2\pi\varepsilon n T_s}{N_s}} \cdot e^{j\frac{2\pi\varepsilon N T_s}{N_s}} \cdot s_i(n)$$

  according to the equation, we can get the phase difference ε.

Contents

Goal

1. Research on the carrier frequency offset estimation based on Schmidl method (algorithm optimisation).

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2. Study the MAC layer protocol in the UWB system / SC and OFDM in the 60G. Then take 60G pulse system into account. ...

Acknowledgement

Hello! UWB Lab!