CONTROLA 2015 DayTwo

Real-Time Communication Using Zigbee

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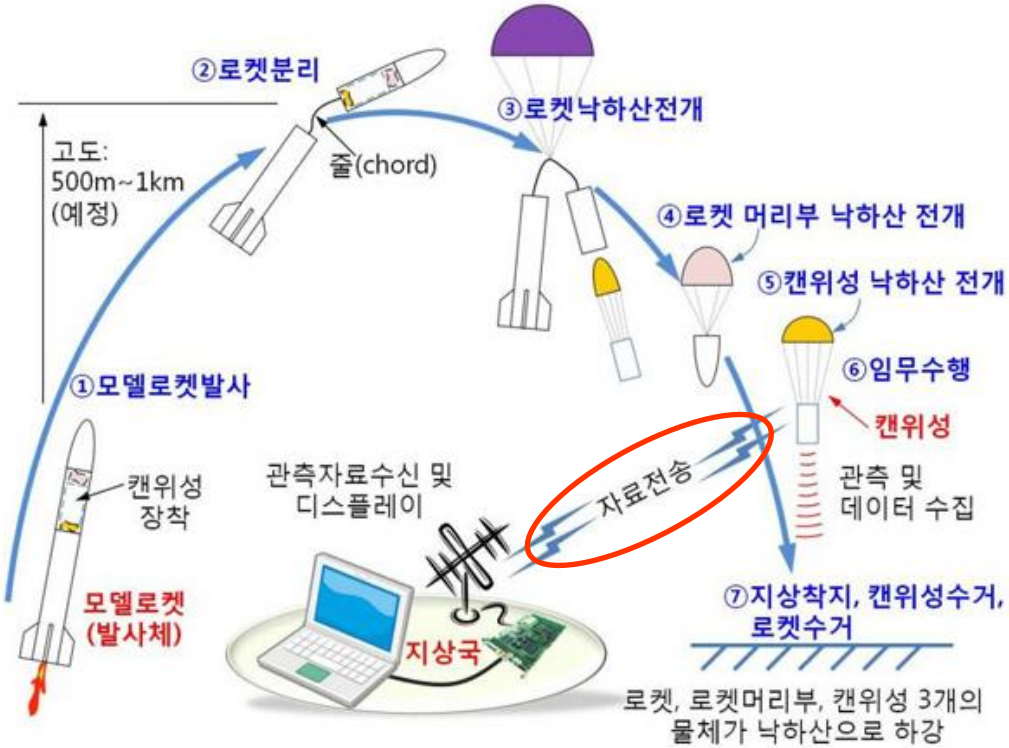
Intro. – CanSat 이란?

- 로버트 트윅(Robert Twiggs) 교수에 의해 제안된 교육용 위성모사 프로그램에서 사용한 위성
- 위성의 역할을 모사한 구조계, 전력계, 데이터처리계, 통신계, 탑재체 등의 기능을 캔 내에 구현한 위성



Intro. – Recall 'DayOne'

COM10@115200,8,n,1 × | COM9@115200,8,n,1

```
0> Mode TX
1> Mode RX
2> I/O Test
0 is selected

TX is selected
appTransmitter() is called
basicRfInit(&basicRfConfig) Success!
halRfSetTxPower() done
basicRfReceiveOff() done
appConfigTimer() done
txPacket done
transmit start ...
before basicRfSendPacket()
pktSetSeqNum(): 0x00000000
transmit start ...
before basicRfSendPacket()
pktSetSeqNum(): 0x00000001
transmit start ...
before basicRfSendPacket()
pktSetSeqNum(): 0x00000002
transmit start ...
before basicRfSendPacket()
pktSetSeqNum(): 0x00000003
transmit start ...
before basicRfSendPacket()
pktSetSeqNum(): 0x00000004
transmit start ...
before basicRfSendPacket()
pktSetSeqNum(): 0x00000005
transmit start ...
before basicRfSendPacket()
pktSetSeqNum(): 0x00000006
transmit start ...
```

COM10@115200,8,n,1 × | COM9@115200,8,n,1

```
> COM Port     : COM10
> Baud Rate    : 115200
> Data Bits    : 8
> Parity       : None
> Stop Bits    : 1
> Flow Control : None

Connected to COM10.

PER Test start ...
halRfInit() Success!
Press menu key
0> Mode TX
1> Mode RX
2> I/O Test
1 is selected

RX is selected
appReceiver() is called
halRfSetGain() done
basicRfInit(&basicRfConfig) Success!
basicRfReceiveOn() done
Waiting Packet ...
```

Token2Shell Test

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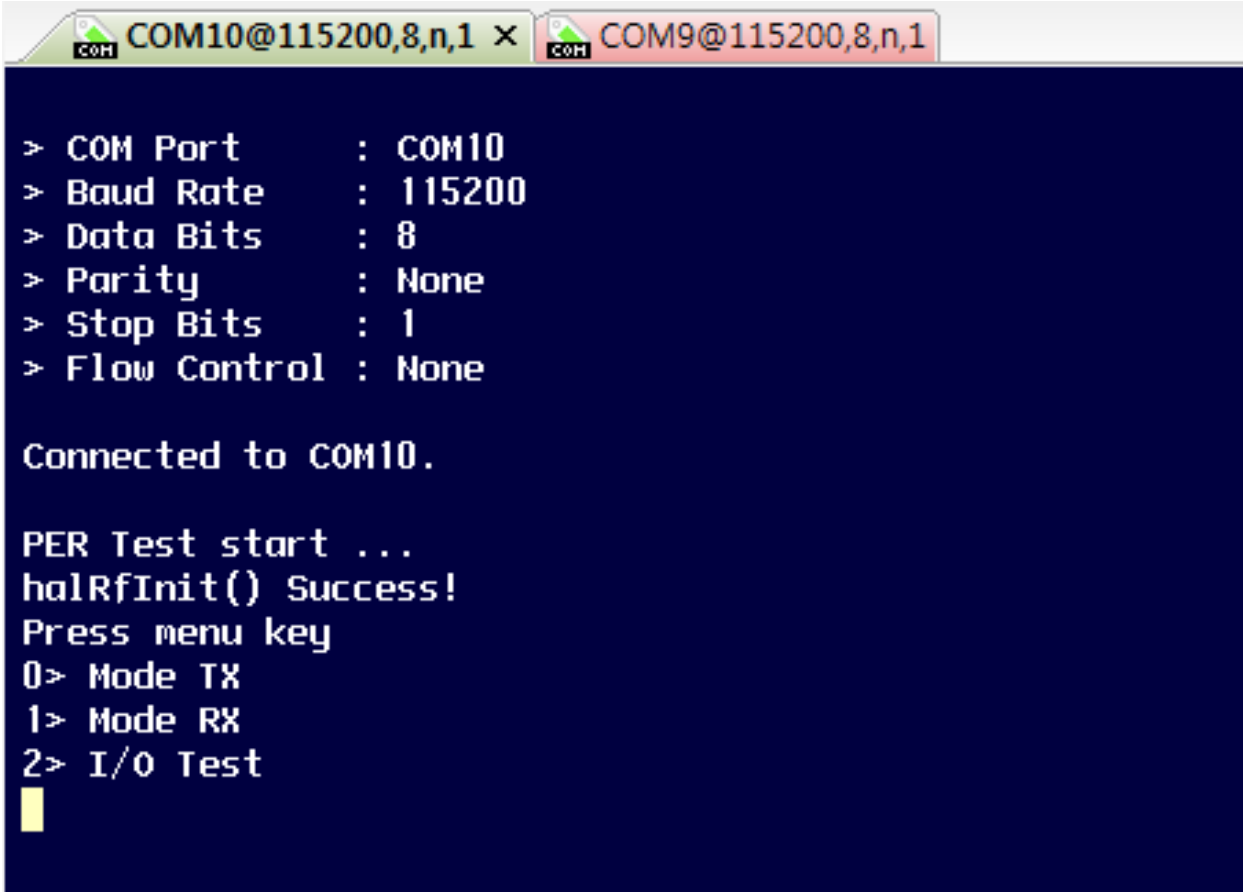
- Token2Shell 이라는 하이퍼터미널 프로그램을 사용하여 통신 테스트를 진행



Token2Shell Test

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- Token2Shell 이라는 하이퍼터미널 프로그램을 사용하여 통신 테스트를 진행

*COM10@115200,8,n,1

```
1> Mode RX
2> I/O Test
1 is selected

RX is selected
appReceiver() is called
halRfSetGain() done
basicRfInit(&basicRfConfig) Success!
basicRfReceiveOn() done
Waiting Packet ...
Rx segNumber: 0x00000000
PER: 0x00000000 /1000
RSSI: 0x00000000 dBm
Recv'd: 0x00000001
Waiting Packet ...
Rx segNumber: 0x00000001
PER: 0x00000000 /1000
RSSI: 0x0000FFFF dBm
Recv'd: 0x00000002
Waiting Packet ...
Rx segNumber: 0x00000002
PER: 0x00000000 /1000
RSSI: 0x0000FFFF dBm
Recv'd: 0x00000003
Waiting Packet ...
Rx segNumber: 0x00000003
PER: 0x00000000 /1000
RSSI: 0x0000FFFE dBm
Recv'd: 0x00000004
Waiting Packet ...
Rx segNumber: 0x00000004
```

*COM12@115200,8,n,1

```
1> Mode RX
2> I/O Test
0 is selected

TX is selected
appTransmitter() is called
basicRfInit(&basicRfConfig) Success!
halRfSetTxPower() done
basicRfReceiveOff() done
appConfigTimer() done
txPacket done
transmit start ...
before basicRfSendPacket()
pktSetSeqNum(): 0x00000000
transmit start ...
before basicRfSendPacket()
pktSetSeqNum(): 0x00000001
transmit start ...
before basicRfSendPacket()
pktSetSeqNum(): 0x00000002
transmit start ...
before basicRfSendPacket()
pktSetSeqNum(): 0x00000003
transmit start ...
before basicRfSendPacket()
pktSetSeqNum(): 0x00000004
transmit start ...
before basicRfSendPacket()
pktSetSeqNum(): 0x00000005
transmit start ...
before basicRfSendPacket()
```

Distance Measurement

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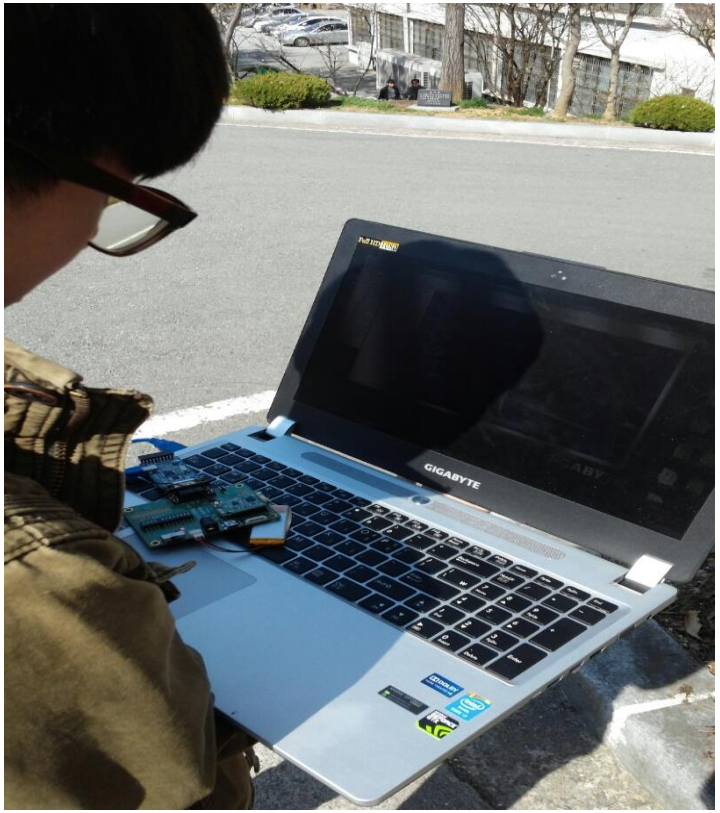
- **통신 거리 측정 – 내장안테나**
  - ✓ 선박해양공학관 앞 공터에서 신호를 보냄(Tx)
  - ✓ 다른 한대는 PC에 연결된 상태로 신호를 받으며 이동(Rx)



Distance Measurement

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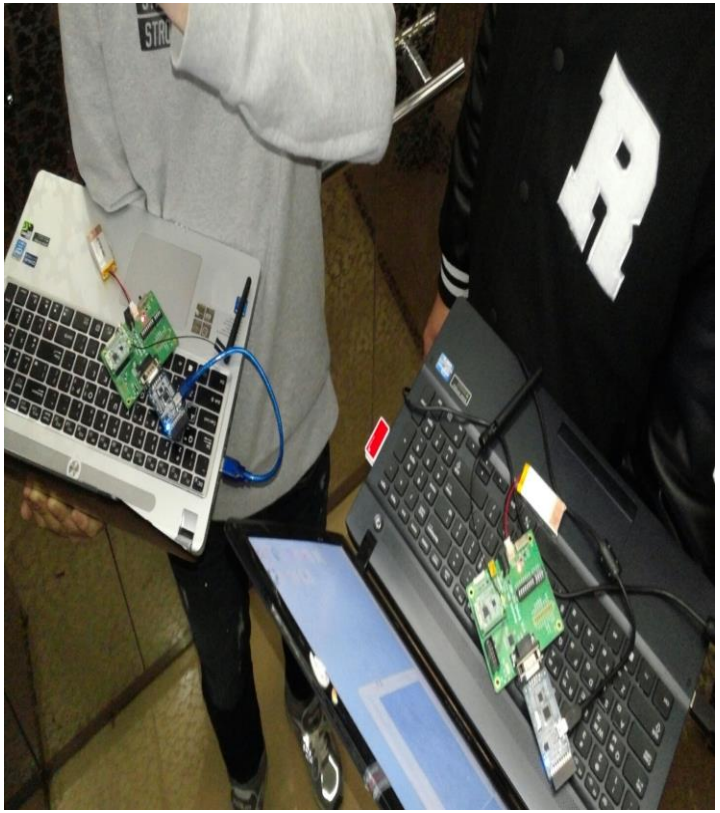
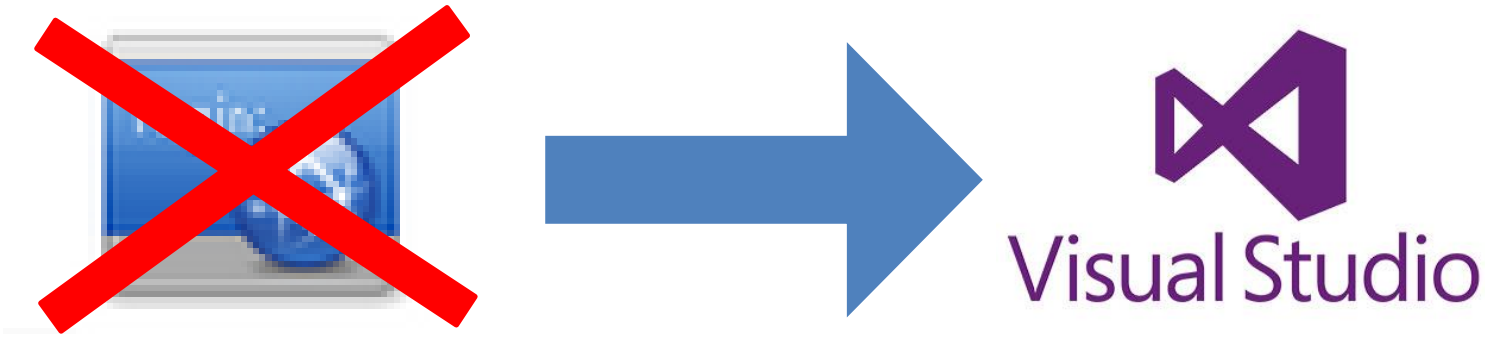
- **통신 거리 측정 – 외장안테나**
  - ✓ 항공우주공학관 옥상에서 신호를 보냄(Tx)
  - ✓ 다른 한대는 PC에 연결된 상태로 신호를 받으며 이동(Rx)



Serial Communication



- **Token2Shell 을 사용하지 않고 C#을 이용하여 Serial 통신 프로그램을 만들어야 함**
  - ✓ Web창에서 Token2Shell 을 열수 없기 때문에!

Serial Communication

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- C#을 이용하여 만든 Serial 통신 프로그램

Serial Communication

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COM10@115200,8,n,1 × | COM9@115200,8,n,1

```
> COM Port      : COM10
> Baud Rate     : 115200
> Data Bits     : 8
> Parity        : None
> Stop Bits     : 1
> Flow Control  : None

Connected to COM10.

PER Test start ...
halRfInit() Success!
Press menu key
0> Mode TX
1> Mode RX
2> I/O Test
```

Serial Communication

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```c
while(1)
{
    Uart_Send_String(g_UartSerialDev, "Press menu key₩n");
    Uart_Send_String(g_UartSerialDev, "0> Mode TX₩n");
    Uart_Send_String(g_UartSerialDev, "1> Mode RX₩n");
    Uart_Send_String(g_UartSerialDev, "2> I/O Test₩n");
    rxChar = Uart_Receive_Char(g_UartSerialDev);
    Uart_Send_String(g_UartSerialDev, " is selected₩n₩n");

    if('0' == rxChar)
    {
        appMode = MODE_TX;
        Uart_Send_String(g_UartSerialDev, "TX is selected₩n");
        break;
    }
    else if('1' == rxChar)
    {
        appMode = MODE_RX;
        Uart_Send_String(g_UartSerialDev, "RX is selected₩n");
        break;
    }
    else if('2' == rxChar)
    {
        appMode = MODE_IO_TEST;
        Uart_Send_String(g_UartSerialDev, "IO TEST is selected₩n");
        break;
    }
    else
        continue;
}
```

```c
Uart_Send_String(g_UartSerialDev, "1> Mode RX₩n");
rxChar = 1;

appMode = MODE_RX;
Uart_Send_String(g_UartSerialDev, "RX is selected₩n");
```

Serial Communication

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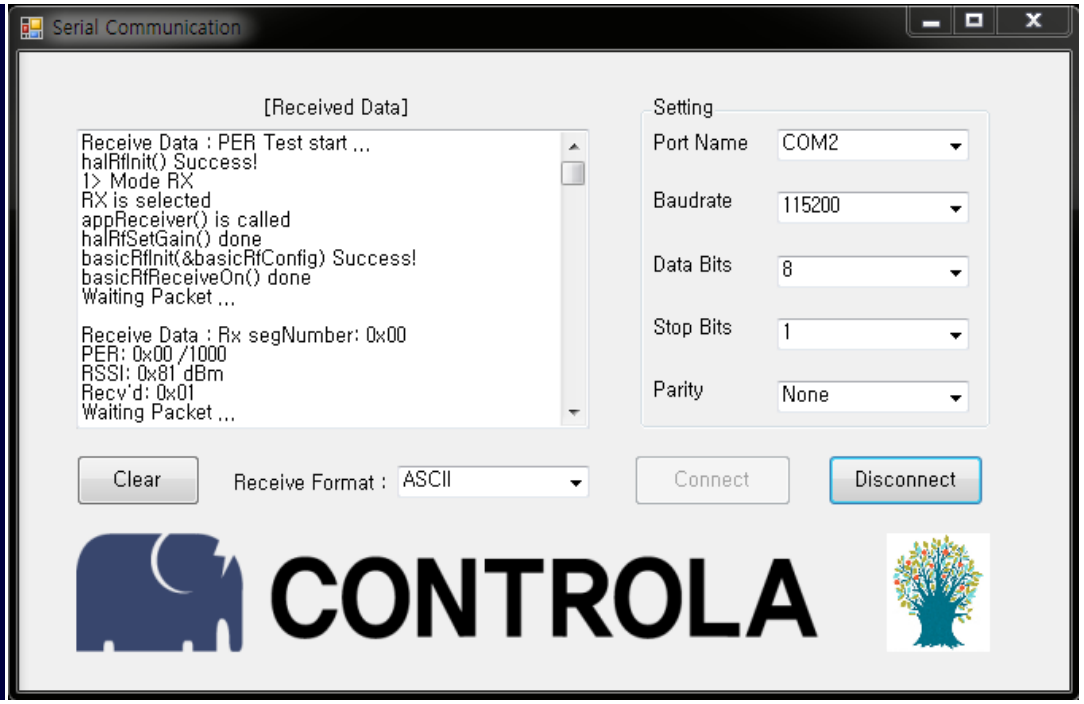
- Serial 통신 프로그램 테스트

```
Connected to COM14.

PER Test start ...
halRfInit() Success!
Press menu key
0> Mode TX
1> Mode RX
2> I/O Test
0 is selected

TX is selected
appTransmitter() is called
basicRfInit(&basicRfConfig) Success!
halRfSetTxPower() done
basicRfReceiveOff() done
appConfigTimer() done
txPacket done
0x00
0x01
0x02
0x03
0x04
0x05
0x06
0x07
0x08
0x09
0x0A
0x0B
```



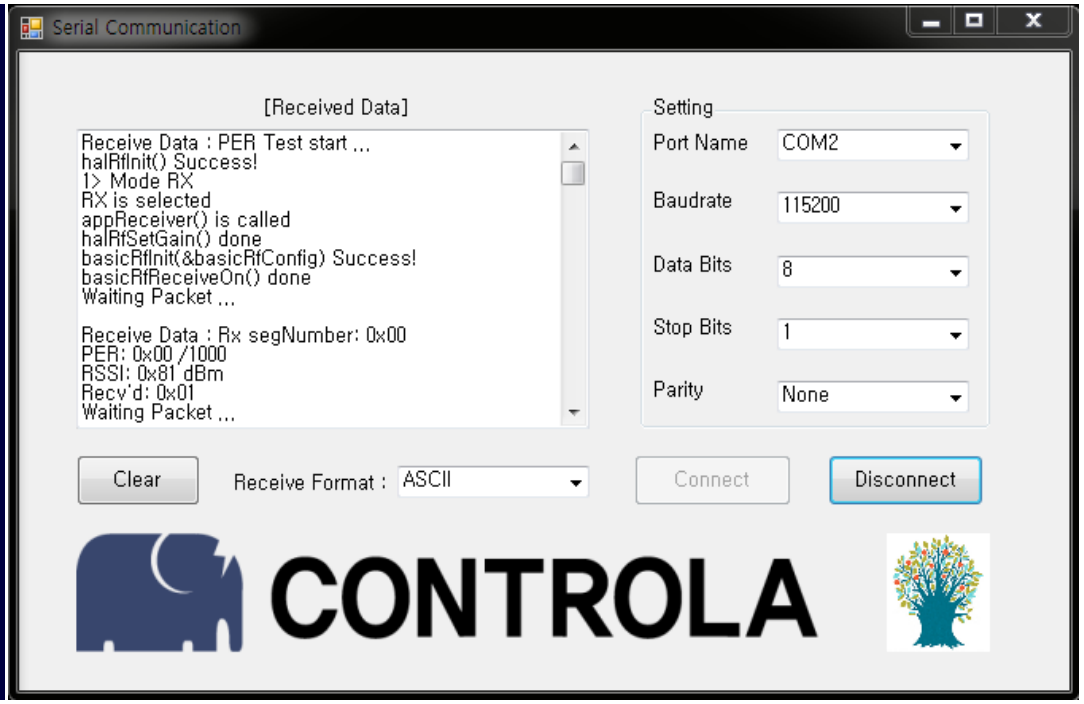
Test

- **Test**

```
Connected to COM14.

PER Test start ...
halRfInit() Success!
Press menu key
0> Mode TX
1> Mode RX
2> I/O Test
0 is selected

TX is selected
appTransmitter() is called
basicRfInit(&basicRfConfig) Success!
halRfSetTxPower() done
basicRfReceiveOff() done
appConfigTimer() done
txPacket done
0x00
0x01
0x02
0x03
0x04
0x05
0x06
0x07
0x08
0x09
0x0A
0x0B
```



Future Plan

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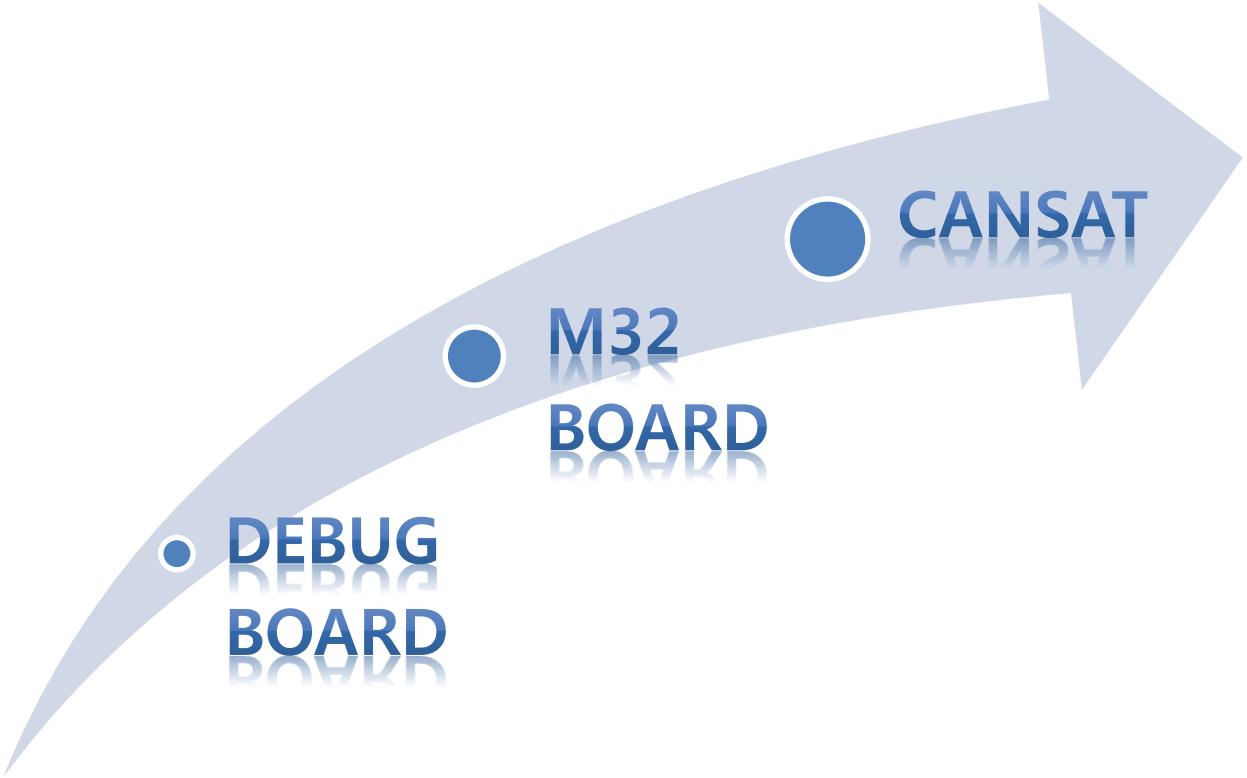

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Thank you