

GPS-Tracker

Gebaut nach der Anleitung von TTN <https://www.thethingsnetwork.org/labs/story/lorawan-gsp-tracker>



```
gpsrackerlorawan_v2 | Arduino 1.8.6

gpsrackerlorawan_v2
14 static const int RXPin = 8, TXPin = 9;
15
16 static const uint32_t GPSBaud = 9600;
17
18
19 TinyGPSPlus gps;
20
21 AltSoftSerial ss(RXPin, TXPin); // RX, TX
22
23 static const PROGMEM u1_t NWKSKEY[16] = { 0x0C, 0x7D, 0xD7, 0xA4, 0x2D, 0x31, 0x61, 0xA1, 0xD6, 0xDC, 0x4A, 0x86, 0xBC, 0xD8, 0xA9, 0xFE };
24
25 static const u1_t PROGMEM APPSKEY[16] = { 0x3F, 0x82, 0x68, 0xFF, 0x6D, 0xA7, 0xB8, 0x77, 0xF9, 0x6D, 0xE1, 0x8C, 0x86, 0x3C, 0x70, 0xA5 };
26
27 static const u1_t DEVADDR = 0x2B011848; // <-- Change this address for every node!
28
29 const unsigned TX_INTERVAL = 10;
30
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33 void os_getArtEui (u1_t* buf) { }
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35 void os_getDevEui (u1_t* buf) { }
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37 void os_getDevKey (u1_t* buf) { }
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40 uint8_t coords[11];
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static const u1_t PROGMEM APPSKEY[16] = { 0x3F, 0x02, 0x68, 0xFF, 0x6D, 0xA7, 0x08, 0x77, 0xF9, 0x6D, 0xEE,
0xBC, 0x86, 0x3C, 0x70, 0xA5 };

static const u4_t DEVADDR = 0x26011848 ; // <-- Change this address for every node!

const unsigned TX_INTERVAL = 10;

void os_getArtEui (u1_t* buf) { }
void os_getDevEui (u1_t* buf) { }
void os_getDevKey (u1_t* buf) { }

uint8_t coords[11];

static osjob_t sendjob;
static osjob_t initjob;

uint8_t cursor = 0;
uint8_t channel;

// Pin mapping

const lmic_pinmap lmic_pins = {
.nss = 10,
.rxtx = LMIC_UNUSED_PIN,
.rst = LMIC_UNUSED_PIN,
.dio = {4, 5, 7},
};

void get_coords () {
bool newData = false;
unsigned long chars;
unsigned short sentences, failed;
float flat,flon,faltitudeGPS,fhdopGPS;
unsigned long age;

// For one second we parse GPS data and report some key values
for (unsigned long start = millis(); millis() - start < 1000;) {
while (ss.available()) {
char c = ss.read();

Serial.write(c); // uncomment this line if you want to see the GPS data flowing

if (gps.encode(c)) { // Did a new valid sentence come in?
newData = true;
}
}
}

```

```

    }
}

if ( newData ) {
    flat=gps.location.lat();
    flon=gps.location.lng();
    if (gps.altitude.isValid())
        faltitudeGPS = gps.altitude.meters();
    else
        faltitudeGPS=0;
    fhdpGPS = gps.hdop.value();
}

//gps.stats(&chars, &sentences, &failed);

int32_t lat = flat * 10000;
int32_t lon = flon * 10000;
int16_t altitudeGPS = faltitudeGPS * 100;
int8_t hdopGPS = fhdpGPS;

channel = 0x01;
coords[0] = channel;
coords[1] = LPP_GPS;

coords[2] = lat >> 16;
coords[3] = lat >> 8;
coords[4] = lat;

coords[5] = lon >> 16;
coords[6] = lon >> 8;
coords[7] = lon;

coords[8] = altitudeGPS;
coords[9] = altitudeGPS >> 8;
coords[10] = hdopGPS;

}

```

```

void do_send(osjob_t* j) {

    // Check if there is not a current TX/RX job running
    if (LMIC.opmode & OP_TXRXPEND) {

        Serial.println(F("OP_TXRXPEND, not sending"));
    } else {

        // Prepare upstream data transmission at the next possible time.

        get_coords();

        LMIC_setTxData2(1, (uint8_t*) coords, sizeof(coords), 0);

        Serial.println(F("Packet queued"));
    }
}

// Next TX is scheduled after TX_COMPLETE event.

void onEvent (ev_t ev) {

    Serial.print(os_getTime());

    Serial.print(": ");

    switch(ev) {

        case EV_SCAN_TIMEOUT:

            Serial.println(F("EV_SCAN_TIMEOUT"));

            break;

        case EV_BEACON_FOUND:

            Serial.println(F("EV_BEACON_FOUND"));

            break;

        case EV_BEACON_MISSED:

            Serial.println(F("EV_BEACON_MISSED"));

            break;

        case EV_BEACON_TRACKED:

            Serial.println(F("EV_BEACON_TRACKED"));

            break;

        case EV_JOINING:

            Serial.println(F("EV_JOINING"));

            break;

        case EV_JOINED:

            Serial.println(F("EV_JOINED"));

            // Disable link check validation (automatically enabled

```

```

    // during join, but not supported by TTN at this time).

    LMIC_setLinkCheckMode(0);

    break;

case EV_RFU1:

    Serial.println(F("EV_RFU1"));

    break;

case EV_JOIN_FAILED:

    Serial.println(F("EV_JOIN_FAILED"));

    break;

case EV_REJOIN_FAILED:

    Serial.println(F("EV_REJOIN_FAILED"));

    break;

    break;

case EV_TXCOMPLETE:

    Serial.println(F("EV_TXCOMPLETE (includes waiting for RX windows)"));

    if (LMIC.txrxFlags & TXRX_ACK)

        Serial.println(F("Received ack"));

    if (LMIC.dataLen) {

        Serial.println(F("Received "));

        Serial.println(LMIC.dataLen);

        Serial.println(F(" bytes of payload"));

    }

    // Schedule next transmission

    os_setTimedCallback(&sendjob, os_getTime()+sec2osticks(TX_INTERVAL), do_send);

    break;

case EV_LOST_TSYNC:

    Serial.println(F("EV_LOST_TSYNC"));

    break;

case EV_RESET:

    Serial.println(F("EV_RESET"));

    break;

case EV_RXCOMPLETE:

    // data received in ping slot

    Serial.println(F("EV_RXCOMPLETE"));

    break;

case EV_LINK_DEAD:

```

```

        Serial.println(F("EV_LINK_DEAD"));

        break;

    case EV_LINK_ALIVE:

        Serial.println(F("EV_LINK_ALIVE"));

        break;

    default:

        Serial.println(F("Unknown event"));

        break;

    }
}

void setup()
{
    Serial.begin(115200);

    Serial.println(F("Starting"));

    ss.begin(GPSBaud);

    // LMIC init
    os_init();

    // Reset the MAC state. Session and pending data transfers will be discarded.
    LMIC_reset();

    // Set static session parameters. Instead of dynamically establishing a session
    // by joining the network, precomputed session parameters are be provided.

    #ifdef PROGMEM

    // On AVR, these values are stored in flash and only copied to RAM
    // once. Copy them to a temporary buffer here, LMIC_setSession will
    // copy them into a buffer of its own again.

    uint8_t appskey[sizeof(APPSKEY)];
    uint8_t nwkskey[sizeof(NWKSKEY)];

    memcpy_P(appskey, APPSKEY, sizeof(APPSKEY));
    memcpy_P(nwkskey, NWKSKEY, sizeof(NWKSKEY));

    LMIC_setSession (0x1, DEVADDR, nwkskey, appskey);

    #else

    // If not running an AVR with PROGMEM, just use the arrays directly
    LMIC_setSession (0x1, DEVADDR, NWKSKEY, APPSKEY);

```

```

#endif

#if defined(CFG_eu868)

// Set up the channels used by the Things Network, which corresponds
// to the defaults of most gateways. Without this, only three base
// channels from the LoRaWAN specification are used, which certainly
// works, so it is good for debugging, but can overload those
// frequencies, so be sure to configure the full frequency range of
// your network here (unless your network autoconfigures them).

// Setting up channels should happen after LMIC_setSession, as that
// configures the minimal channel set.

// NA-US channels 0-71 are configured automatically

LMIC_setupChannel(0, 868100000, DR_RANGE_MAP(DR_SF12, DR_SF7),  BAND_CENTI);      // g-band
LMIC_setupChannel(1, 868300000, DR_RANGE_MAP(DR_SF12, DR_SF7B), BAND_CENTI);      // g-band
LMIC_setupChannel(2, 868500000, DR_RANGE_MAP(DR_SF12, DR_SF7),  BAND_CENTI);      // g-band
// LMIC_setupChannel(3, 867100000, DR_RANGE_MAP(DR_SF12, DR_SF7),  BAND_CENTI);      // g-band
// LMIC_setupChannel(4, 867300000, DR_RANGE_MAP(DR_SF12, DR_SF7),  BAND_CENTI);      // g-band
// LMIC_setupChannel(5, 867500000, DR_RANGE_MAP(DR_SF12, DR_SF7),  BAND_CENTI);      // g-band
// LMIC_setupChannel(6, 867700000, DR_RANGE_MAP(DR_SF12, DR_SF7),  BAND_CENTI);      // g-band
// LMIC_setupChannel(7, 867900000, DR_RANGE_MAP(DR_SF12, DR_SF7),  BAND_CENTI);      // g-band
// LMIC_setupChannel(8, 868800000, DR_RANGE_MAP(DR_FSK,  DR_FSK),   BAND_MILLI);      // g2-band

// TTN defines an additional channel at 869.525Mhz using SF9 for class B
// devices' ping slots. LMIC does not have an easy way to define set this
// frequency and support for class B is spotty and untested, so this
// frequency is not configured here.

#elif defined(CFG_us915)

// NA-US channels 0-71 are configured automatically
// but only one group of 8 should (a subband) should be active
// TTN recommends the second sub band, 1 in a zero based count.

// https://github.com/TheThingsNetwork/gateway-conf/blob/master/US-global\_conf.json

LMIC_selectSubBand(1);

#endif

// Disable link check validation
LMIC_setLinkCheckMode(0);

// TTN uses SF9 for its RX2 window.

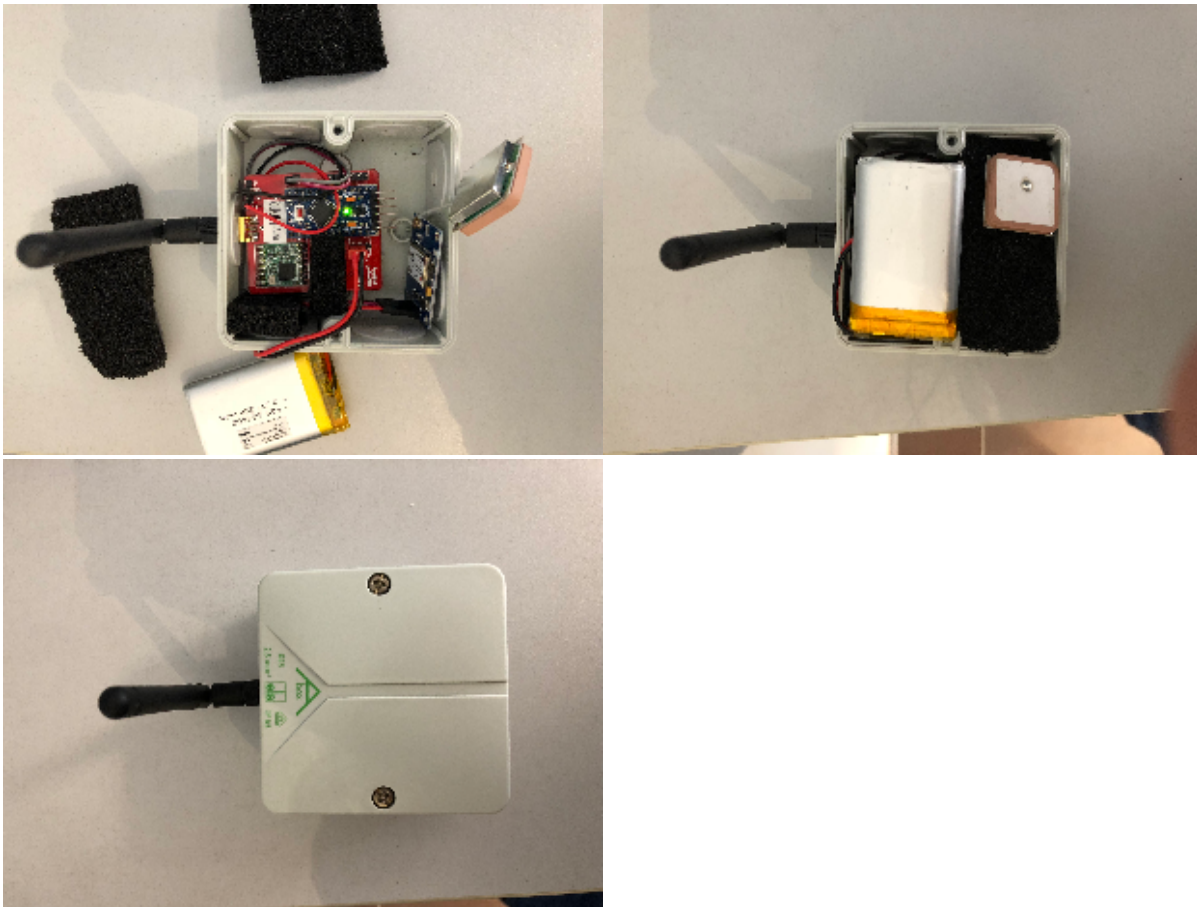
```

```
LMIC.dn2Dr = DR_SF9;

// Set data rate and transmit power for uplink (note: txpow seems to be ignored by the library)
LMIC_setDrTxpow(DR_SF7,14);

// Start job
do_send(&sendjob);
}

void loop() {
  os_runloop_once();
}
```



<https://www.thethingsnetwork.org/labs/story/build-the-cheapest-possible-node-yourself>