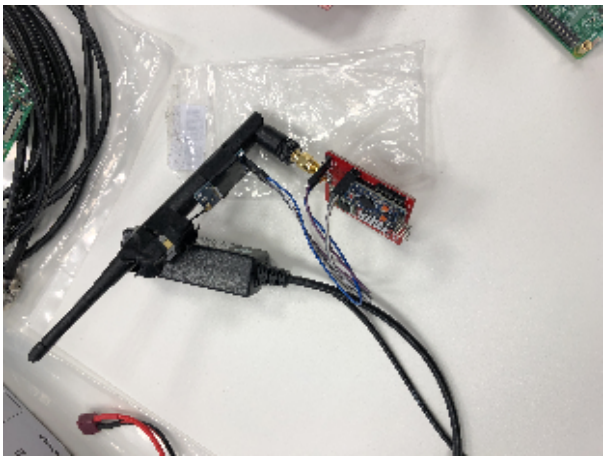
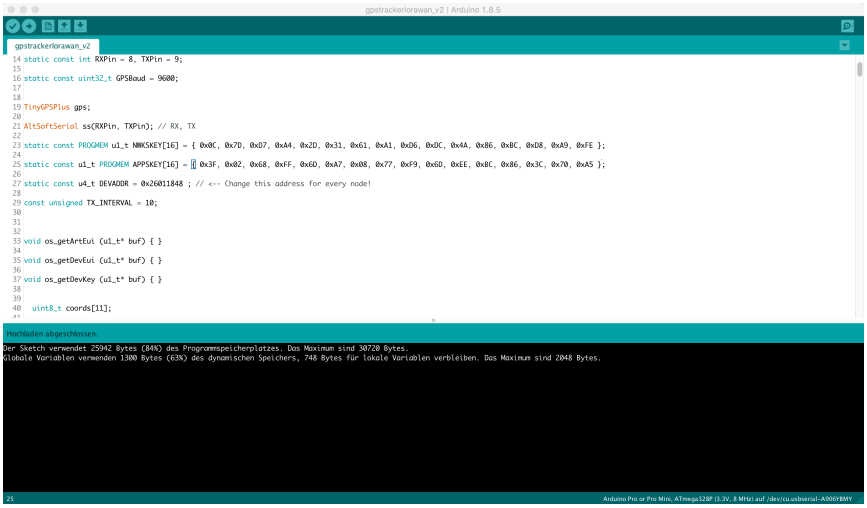
GPS-Tracker

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






```
#include <lmic.h>

#include <hal/hal.h>

#include <SPI.h>

#include <TinyGPS++.h>

#include <AltSoftSerial.h>

#define LPP_GPS 136


static const int RXPin = 8, TXPin = 9;

static const uint32_t GPSBaud = 9600;


TinyGPSPlus gps;

AltSoftSerial ss(RXPin, TXPin); // RX, TX

static const PROGMEM u1_t NWKSKEY[16] = { 0x0C, 0x7D, 0xD7, 0xA4, 0x2D, 0x31, 0x61, 0xA1, 0xD6, 0xDC, 0x4A,
0x86, 0xBC, 0xD8, 0xA9, 0xFE };
```

```
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;
    fhdopGPS = 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 = fhdopGPS;

  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;

}
```

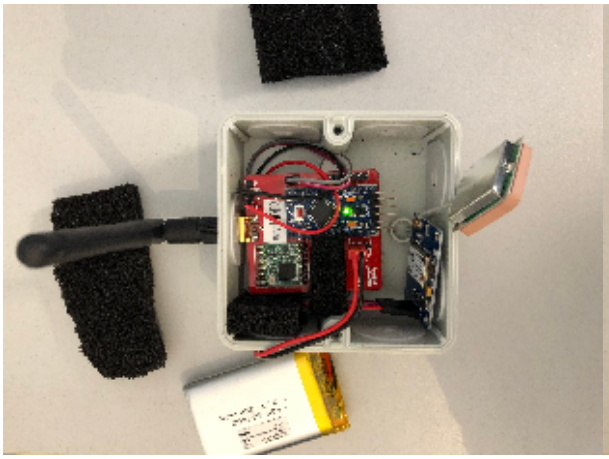
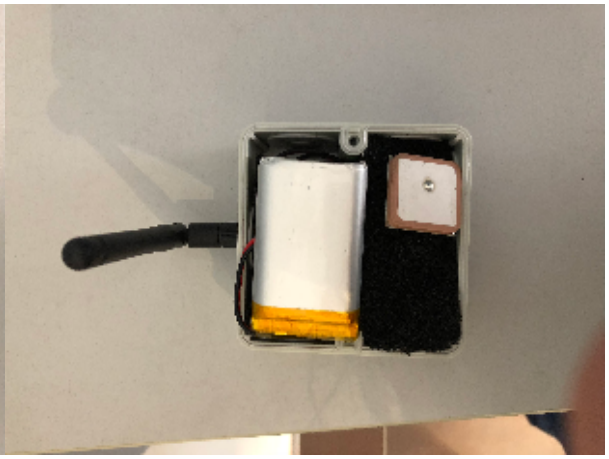
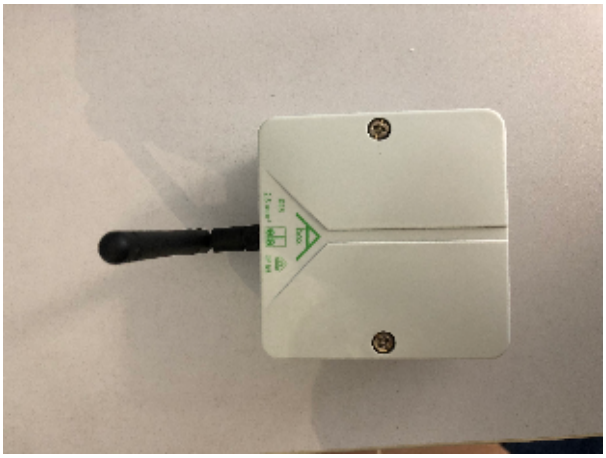
```
void do_send(osjob_t* j) {
  // Check if there is not a current TX/RX job running
  if (LMIC.opmode & OP_TXRXPEND) {
    Serial.println(F("OP_TXRXPEND, not sending"));
  } else {
    // Prepare upstream data transmission at the next possible time.
    get_coords();
    LMIC_setTxData2(1, (uint8_t*) 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