Heartbeat

The MVPI periodically sends a heartbeat with status data to show the application is still working correctly. For the zephyr port, a minimalist version of the heartbeat is sent as a proof of concept. This heartbeat is defined under heartbeat.c and initialized in modem.c to be sent to the serial interface. The heartbeat we're sending is as follows:

```
typedef struct
{
    uint8_t version;
    uint8_t counter;
    uint8_t uplinks;
    uint8_t ACKs;
} __attribute__((__packed__)) heartbeat_file_t;
```

- Version : version of the heartbeat file
- counter : count of times the heartbeat is sent in total
- uplinks : count of times the heartbeat is sent without response from the modem
- ACKs : count of times the modem sends an ACK response

When the modem sends an ACK response indicating the success of the transfer, the uplinks counter gets reset and the ACKs count gets incremented.

To send the heartbeat over the serial interface, a payload header gets added to the heartbeat to describe the ALP operations needed for the modem to send the heartbeat over LoRa. The heartbeat payload is as follows:

```
typedef struct
{
    uint8_t request_tag[2];
    uint8_t indirect_forward[2];
    uint8_t header[4];
    heartbeat_file_t heartbeat_file;
} heartbeat_payload_t;

```