Sun-Tracking Solar Panel Project

Networked Embedded Systems 2014

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Outline

- Goal statement
- Functional specification
- Hardware components
- Work plan
- Milestones

Goal statement

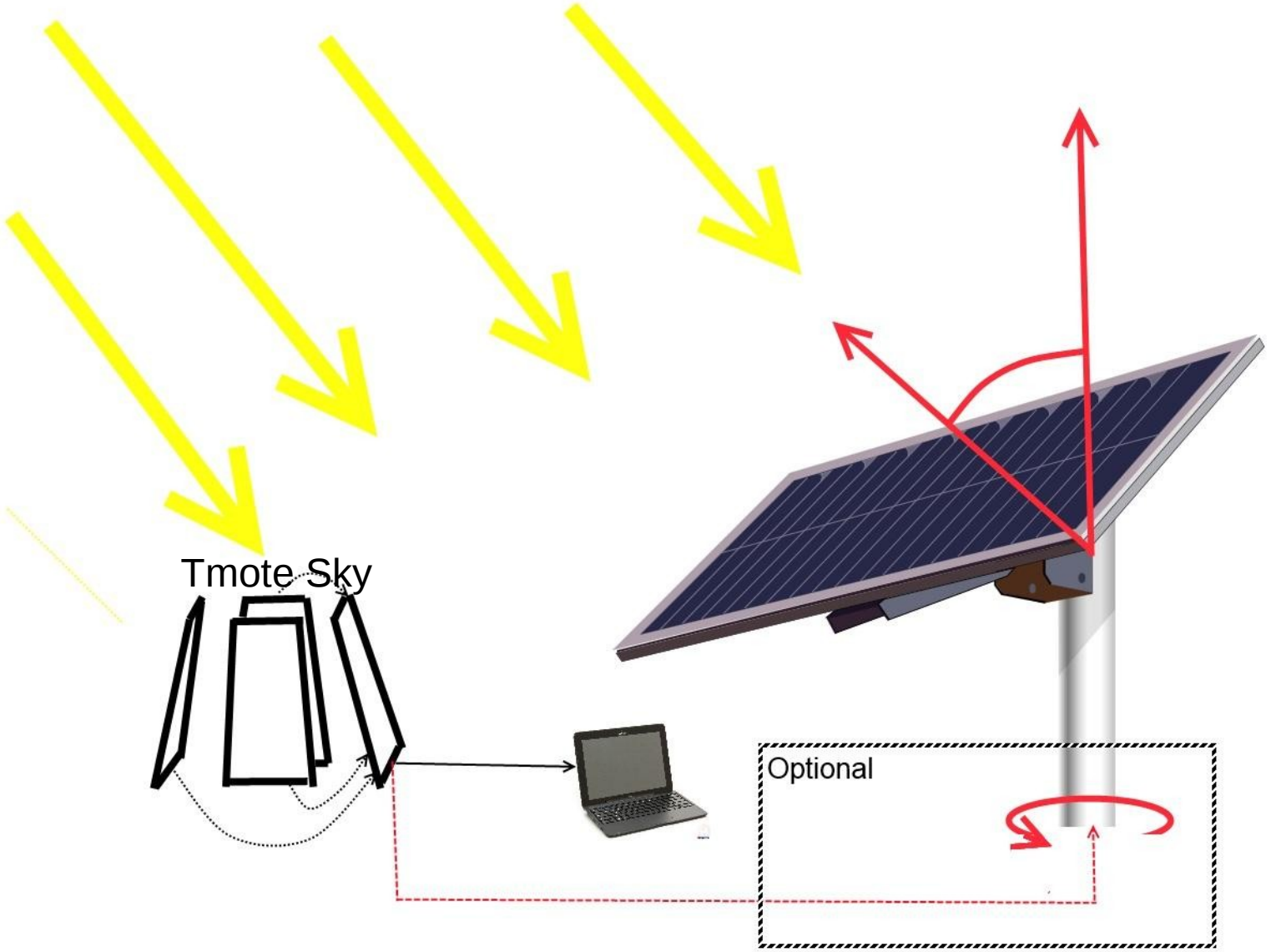
The goal of the project is to determine the position of the sun, to maximize the energy gain of the solar panel. Optionally, beside determining the light intensity, the air humidity and the temperature will be measured. Finally, the evaluated data will be displayed on the screen or optionally sent to a step-motor.
The number of the sensor nodes should be made variable.

Functional specification

- Sensor nodes: measuring of the light intensity, temperature and air humidity.
  Communication with the actuator node / PC.

- Actuator node: Setting up of sensor network (number, position)
  Polling of data, processing of data, giving the sun position.
  Control of the step-motor or displaying of the angle on the PC.

Hardware components



Hardware components

We use 4 (at least) tmote Sky boards to measure the light intensity in different directions. The boards communicate via integrated ZigBee (IEEE 802.15.4). One of the boards also acts as master node, receives all data and computes the directions to adjust a solar panel towards the sun. The angle will then be sent to a computer and shown to the user.

Optional: The angle is sent to a fifth node which then moves a servo motor.

Work plan

May

Mon	Tue	Wed	Thu	Fri
19	20	21	22	23 Milestone1
26	27	28 Milestone2	29 Milestone3	30

June

Mon	Tue	Wed	Thu	Fri
2	3	4 Milestone4	5	6
9	10	11	12	13 Intermediate Presentations
16	17	18	19	20
23	24	25 Milestone5	26 Milestone6	27
30				

July

Mon	Tue	Wed	Thu	Fri
	1	2	3	4
7	8	9 Milestone7	10	11
14	15	16	17	18 Final Presentations

Milestones

1. Milestone: Setting up the tool-chain
2. Milestone: detailed functional diagramm
3. Milestone: getting and evaluating the date of a single node
4. Milestone: communicating node-to-node
5. Milestone: actuator node
6. Milestone: algorithm for sun position calculation
7. Milestone: connection with PC

Resposibilities

Nico: actuation, connection with PC
Pawel: sensors, algorithm
Johannes: communication