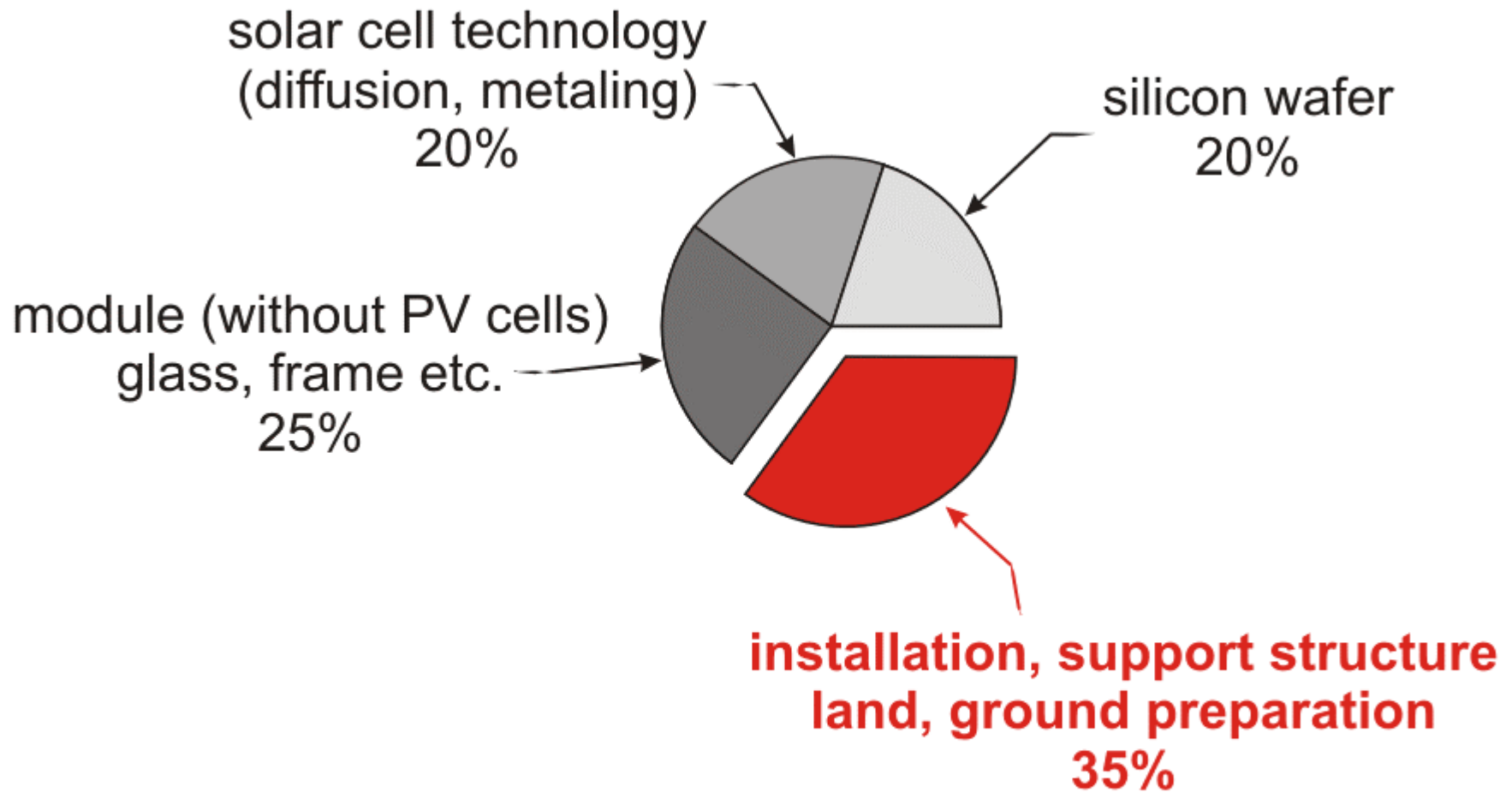


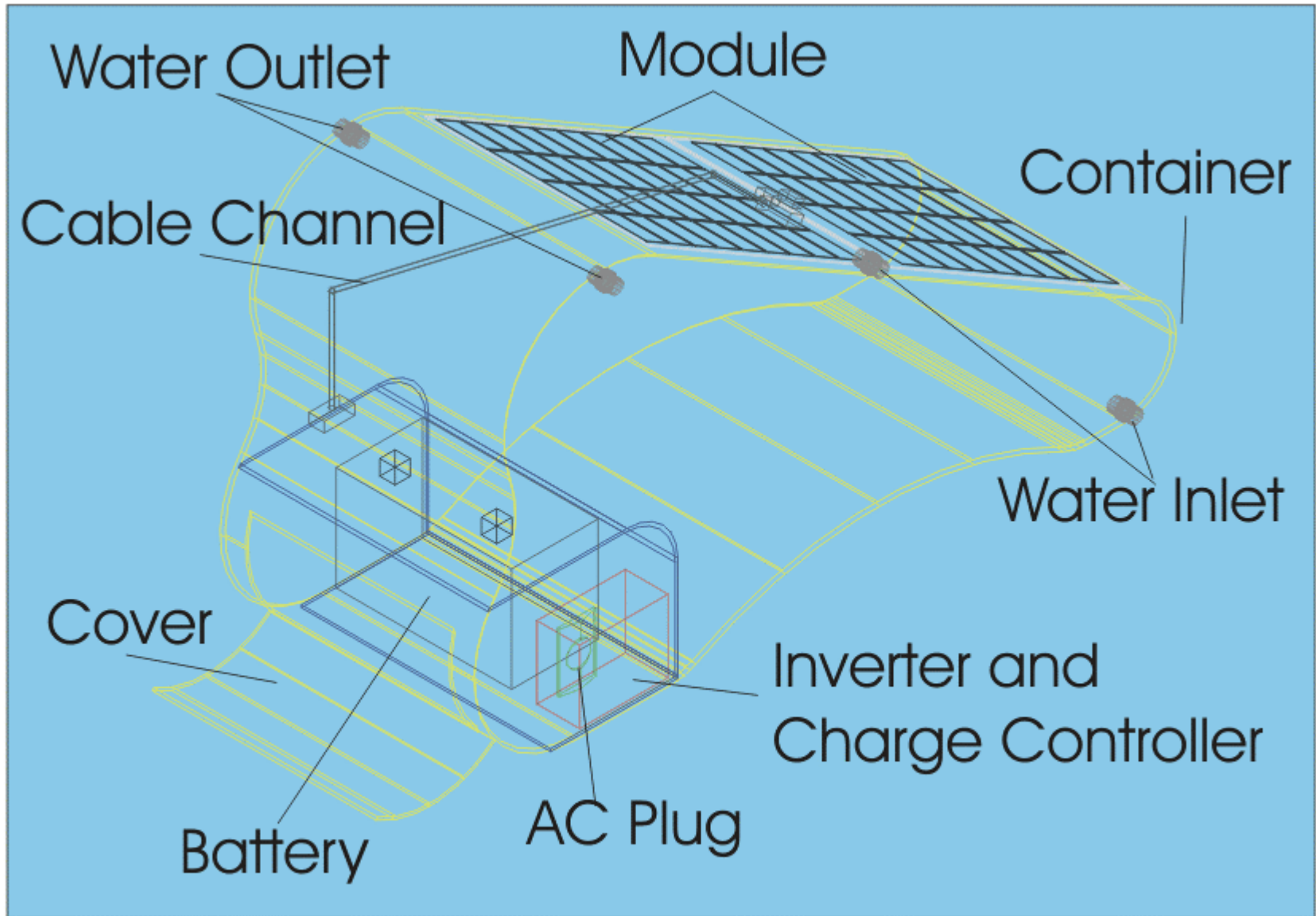


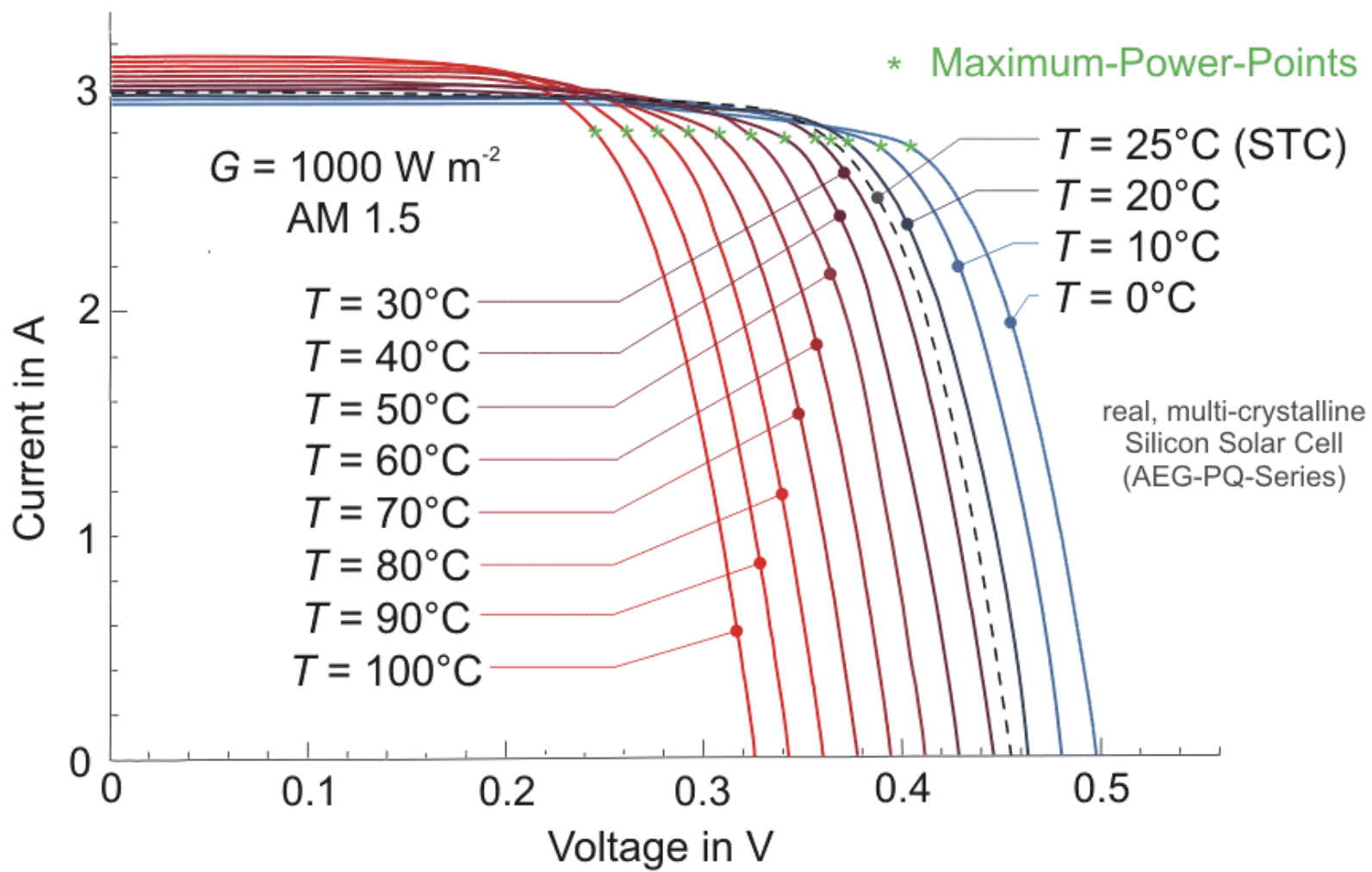
# All-in one SHS with Satellite monitoring

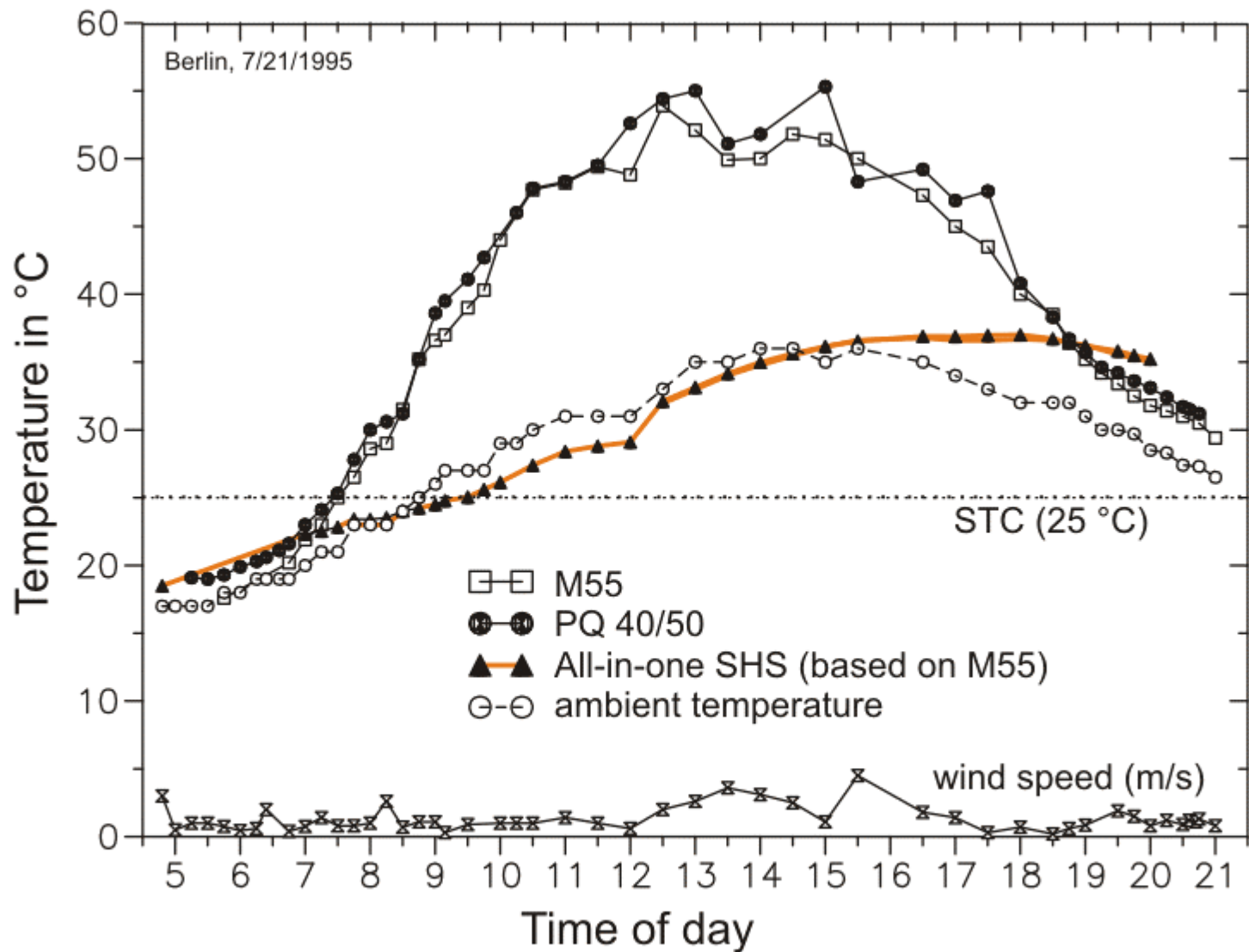
Stefan Krauter, Fabian Ochs, Thomas Depping  
Alternative Energy Labs  
UFRJ-COPPE  
Rio de Janeiro 21945-970  
[krauter@coe.ufrj.br](mailto:krauter@coe.ufrj.br)

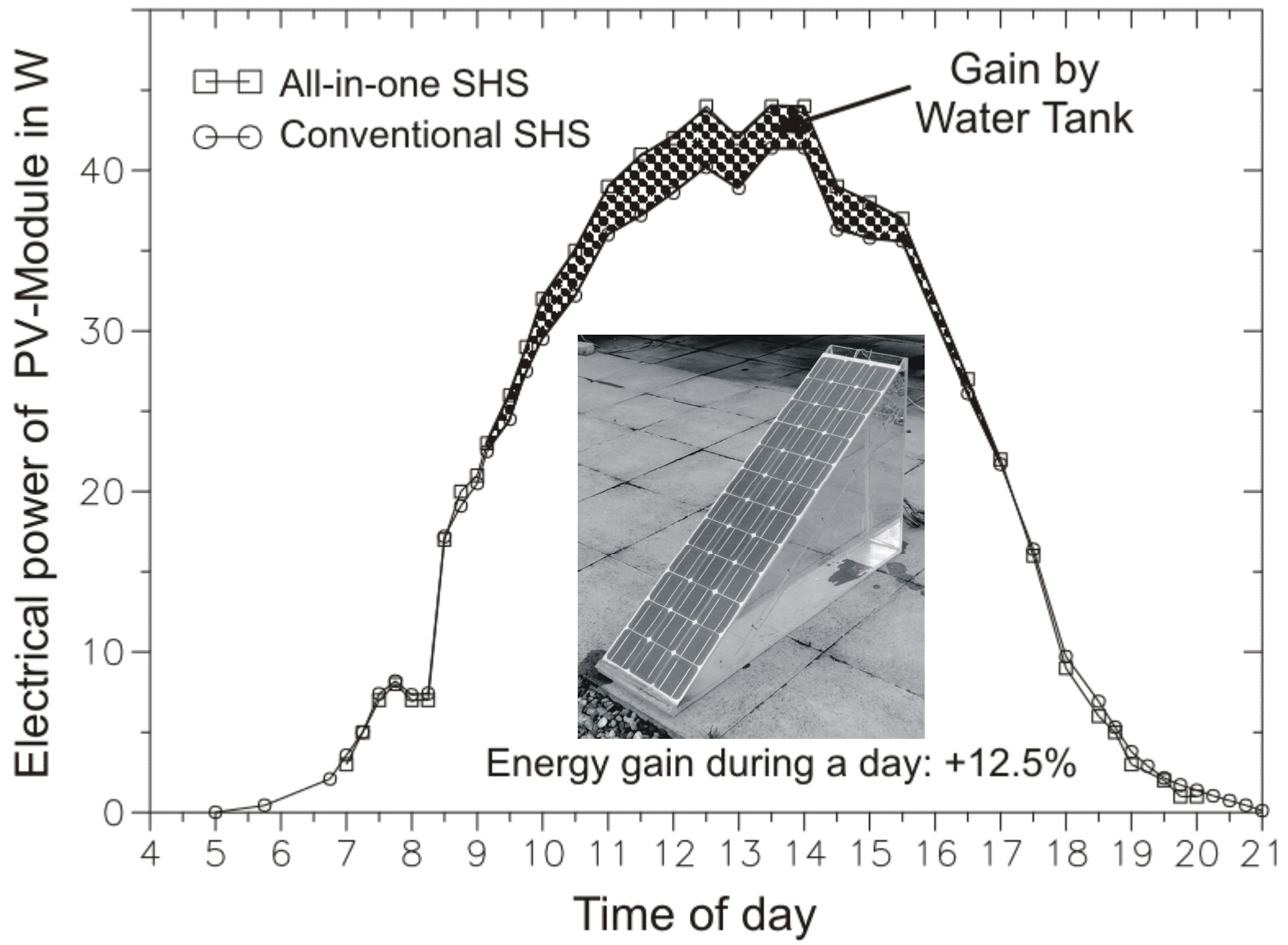


Goetzberger *et al.*

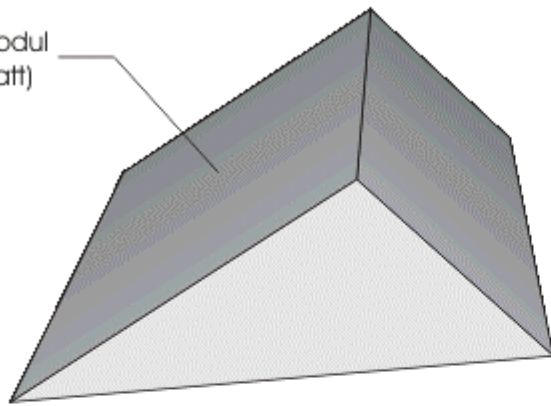






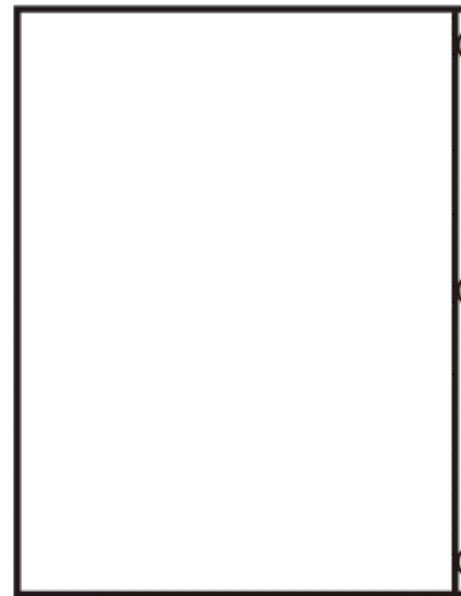


Solarmodul  
(100 Watt)



Hohlform aus weißem PE  
UV-stabilisiert, V = 350 l

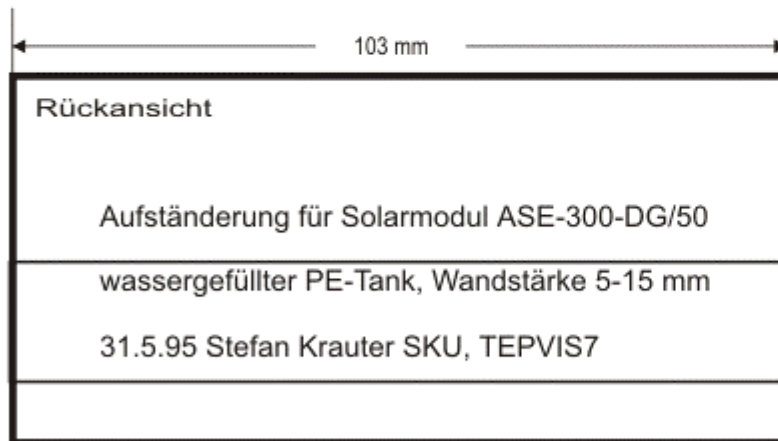
von oben



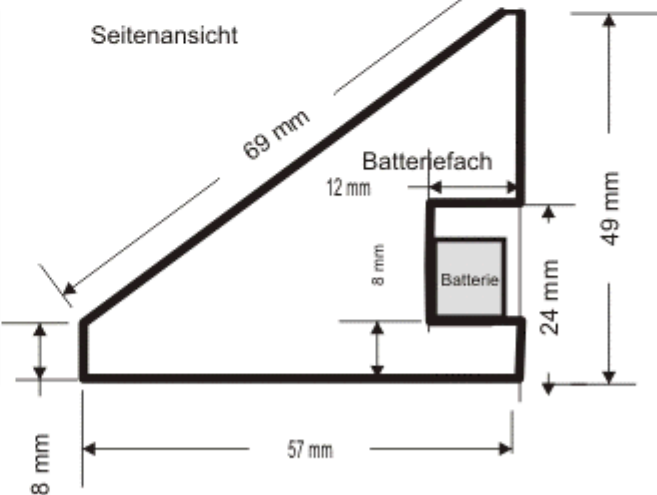
Füllöffnung

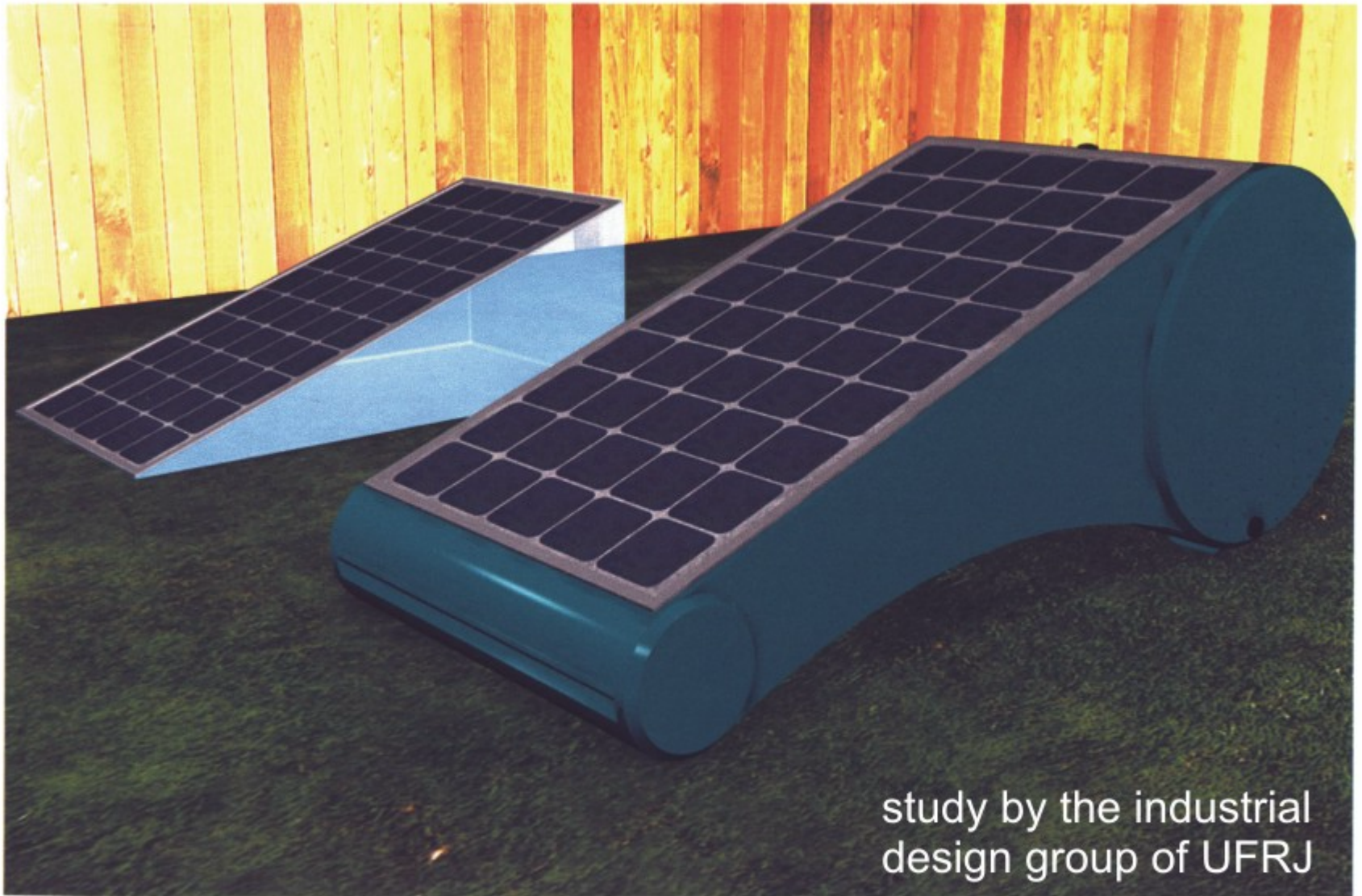
Kabelauslaß

Entlüftungsöffnung



Seitenansicht





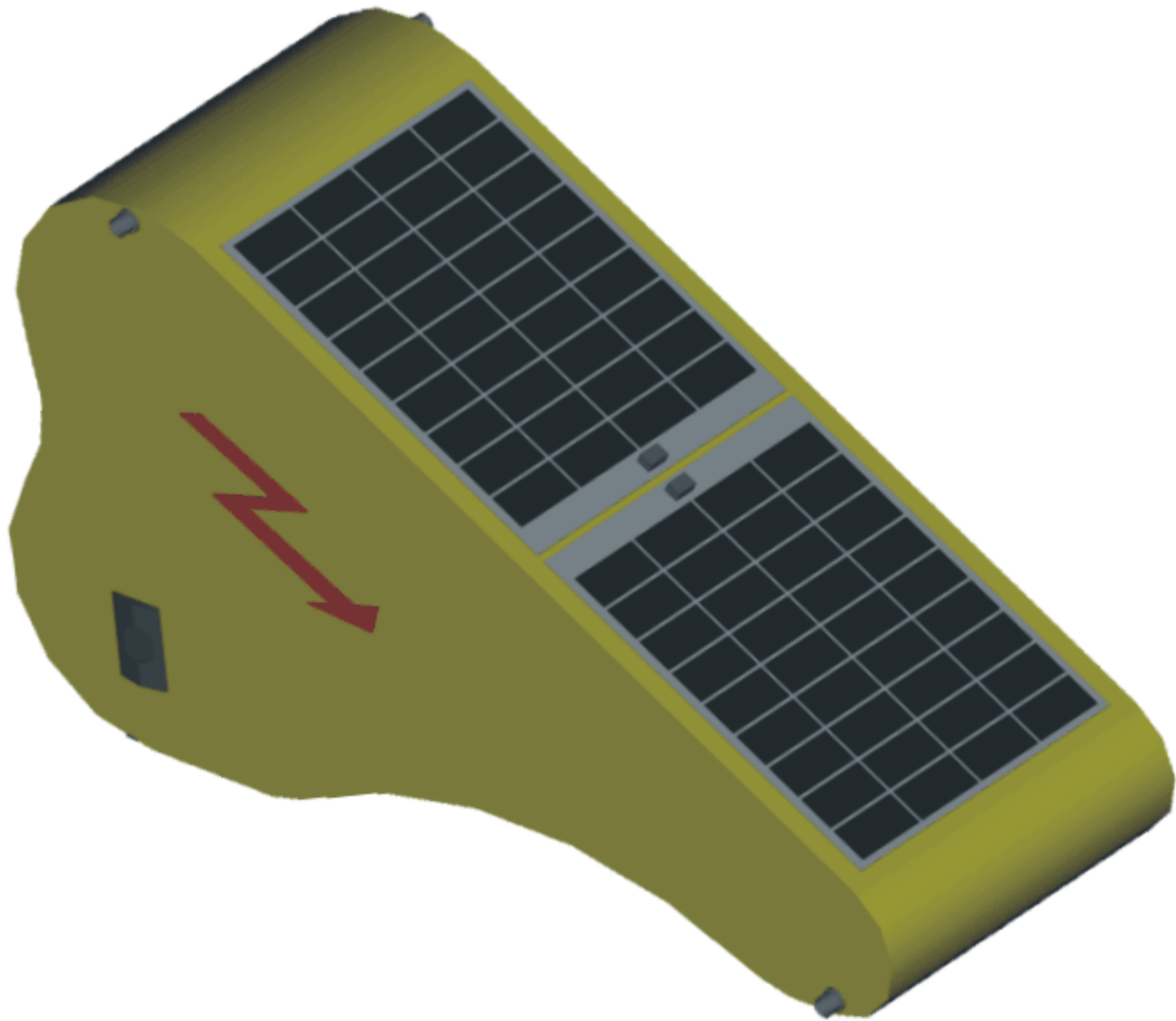
study by the industrial design group of UFRJ

Stefan  
Krauter

TEPVIS: from Proof-of-Principle towards Prototype

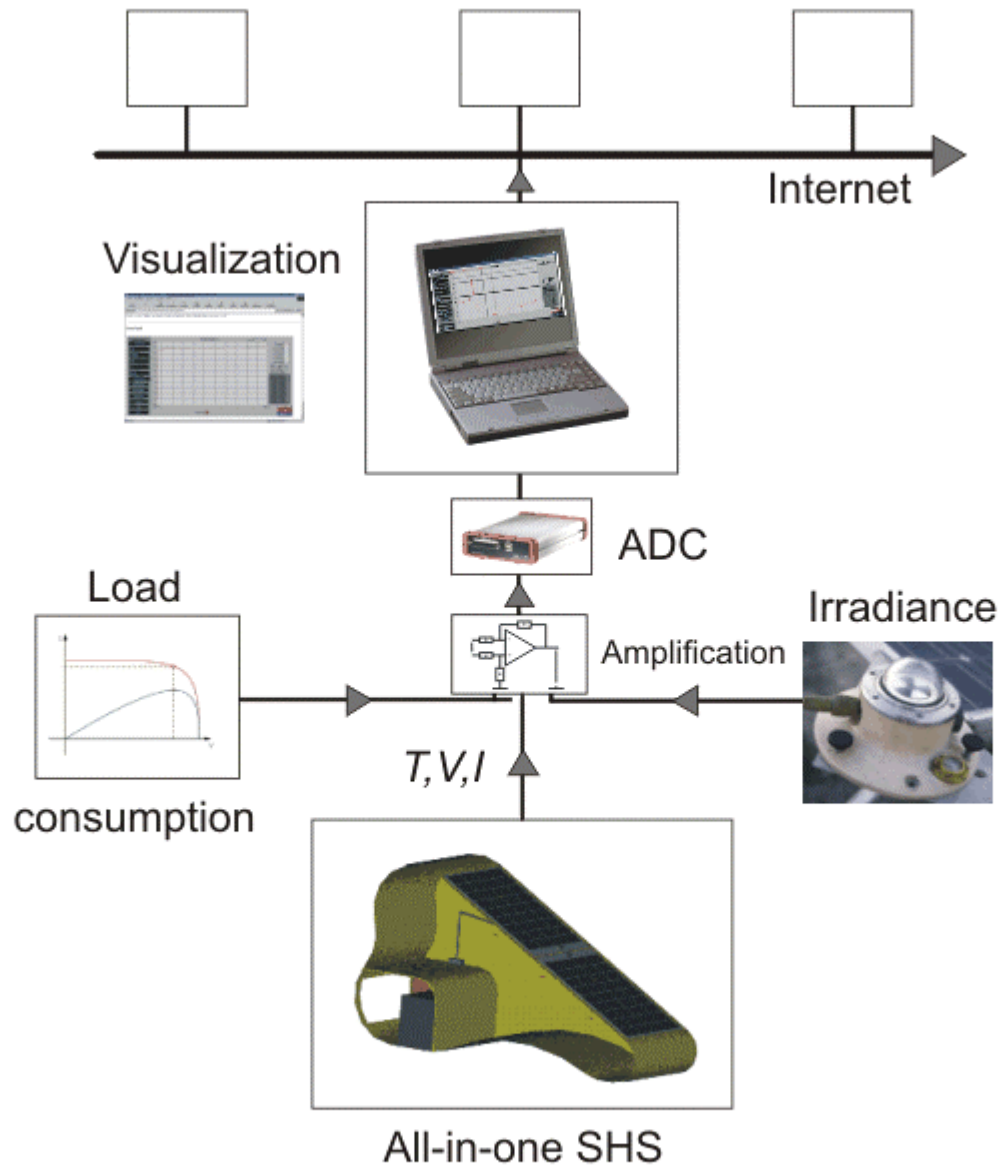
UFRJ  
COPPE





Enhanced Performance Ratio  
Low operation temperature  
9% more electrical yield  
  
increased reliability  
fixation obsolete  
no installation





### 5 kW<sub>p</sub> PV System in NE of Brazil

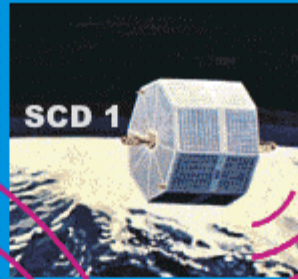
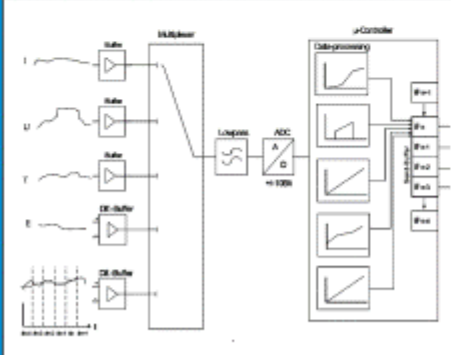


#### Sensing

- Irradiance
- 2x PV current
- Battery Voltage
- Balance of currents at battery
- AC power (true RMS)

#### Processing

- System efficiency
- Performance ratio



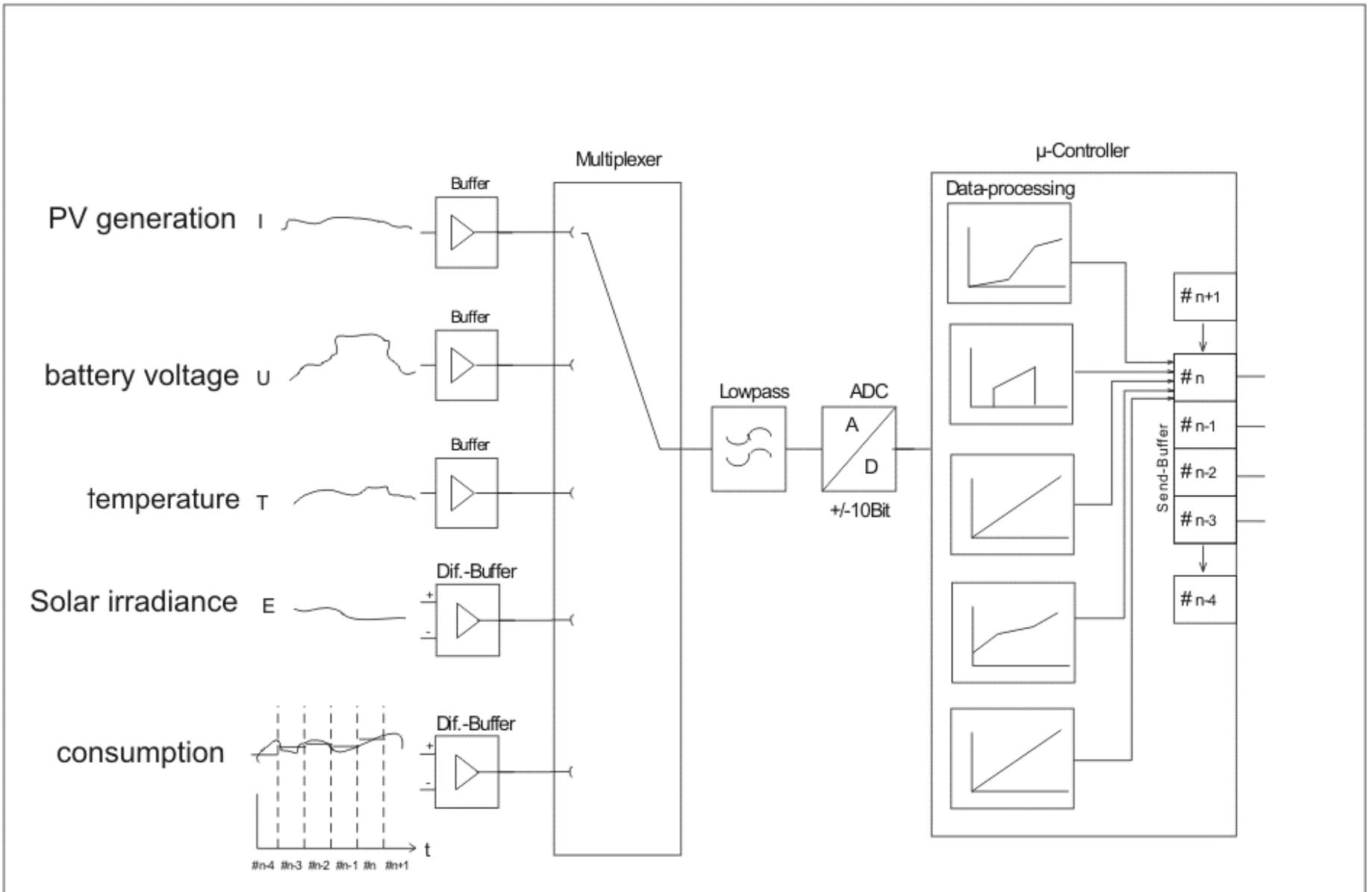
3500 km

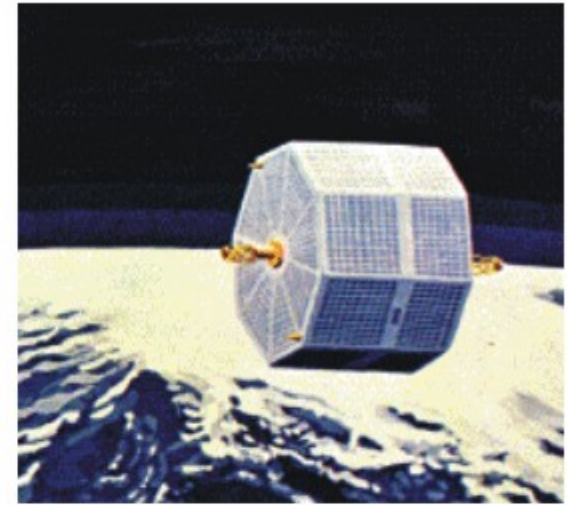
Data port

Gateway

Router  
São José dos Campos







**Stefan  
Krauter**

Brazilian satellites for data transmission

UFRJ  
COPPE

:

### Argos using Brazilian satellite

transmitter 1500 US\$

preprocessing board: 500 US\$

operational costs (max. 10 systems): 0 US\$

**total: 2 000 US\$**

### Orbcomm

transmitter 750 US\$

operational costs: 20 years x 12 months x 40 US\$

**total: 9 600 US\$**

## Argos vs. Orbcomm

availability	++	+
speed	-	+
interactivity	o	+
initial costs	--	-
operational costs	++	--

### Legend

- ++ very favorable
- + favorable
- o neutral
- less favorable
- bad



## Tasks in the near future

1. Development of software (present state)
2. Installation in 6.3 kW PV System in NE of Brazil
3. Test and improvement
4. Publication of measurements on website

The End