Calibration group

Mission statements:

- **Define** the **detector parameters** ("calibration constants") that must be determined to operate an undersea km^3 telescope at the desired accuracy.

- **Establish** the **precision** at which this parameters must be/ can be estimated.

- **Propose** the **systems** that may be used to reach this goal.

- **Study** **concrete solutions**, adapted to the selected final design, to implement these systems.

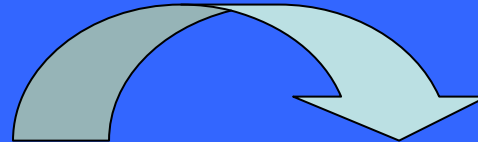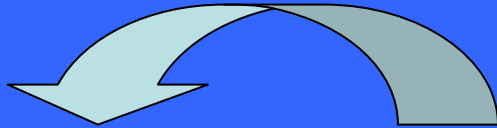# Calibration goals

Determine the necessary constants to allow the reconstruction of events in

space　　　　　**time**　　　　　**energy**
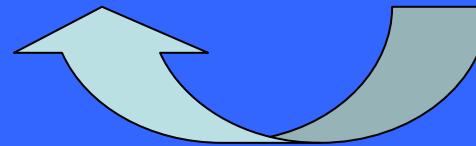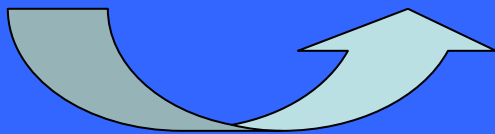
Position　　　Timing　　　Amplitude

All other constants (temperature, voltages) are used to determine these parameters

Positioning

Position calibration

Absolute

w.r.t. external objects

depends on site

- **GPS**
- **Moon?**
- **Local geological peculiarities?**
- **Other detectors?**

New ideas are most welcome

Relative

among inner components

depends on detector design

- **Semi-rigid/fixed parts: tiltmeters, compasses**

- **Moving parts: Non-luminous devices (sonic, other?)**

Time

Timing calibration

Absolute

Relative

w.r.t. to UTC

among inner components

Should not be a major problem
(in the msec range)
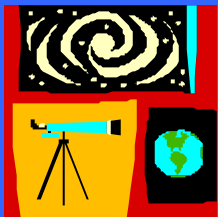
But several junction points
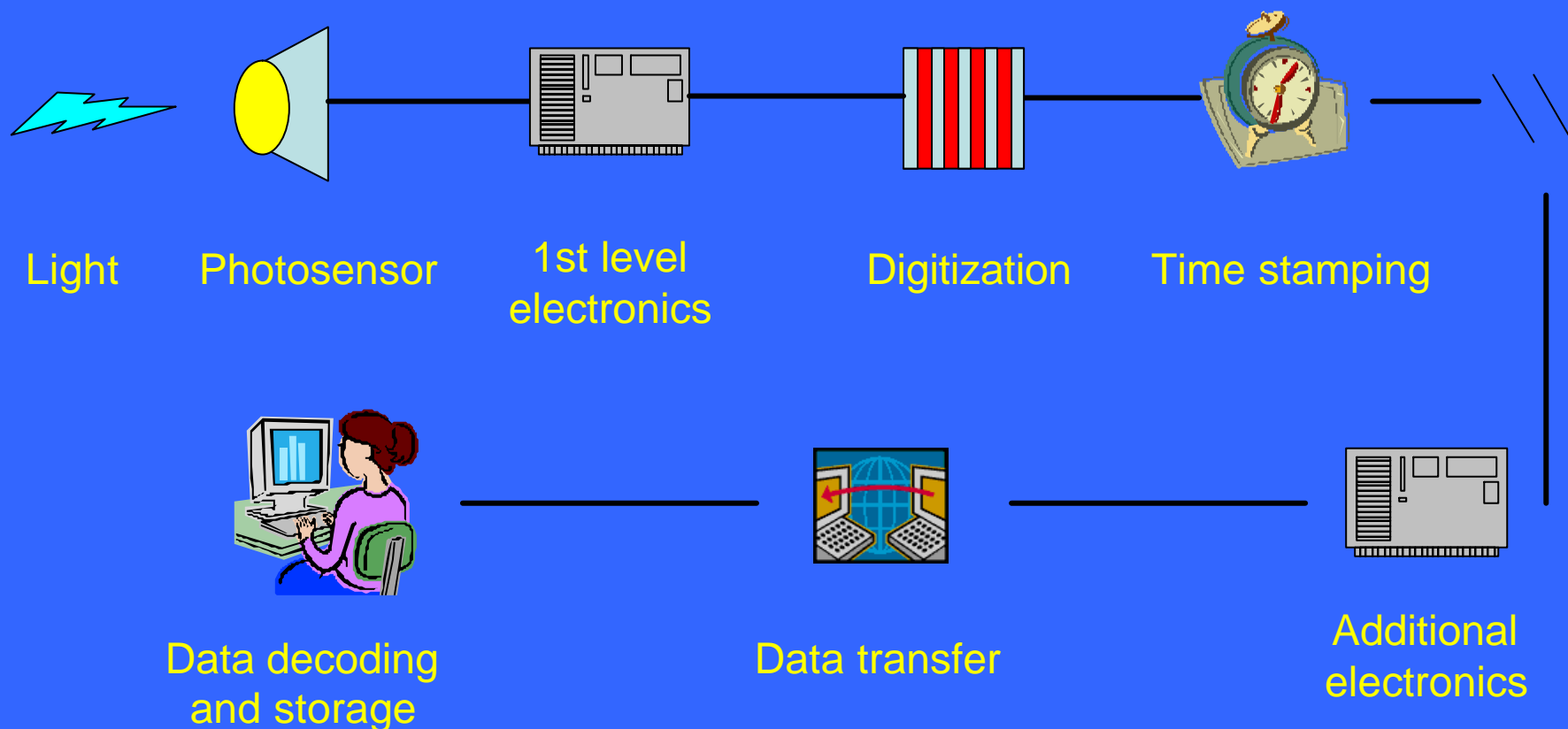would mean new problems in
relative calibration

extremely important

- Affects reconstruction efficiency
and angular resolution
–Limited by intrinsic processes:
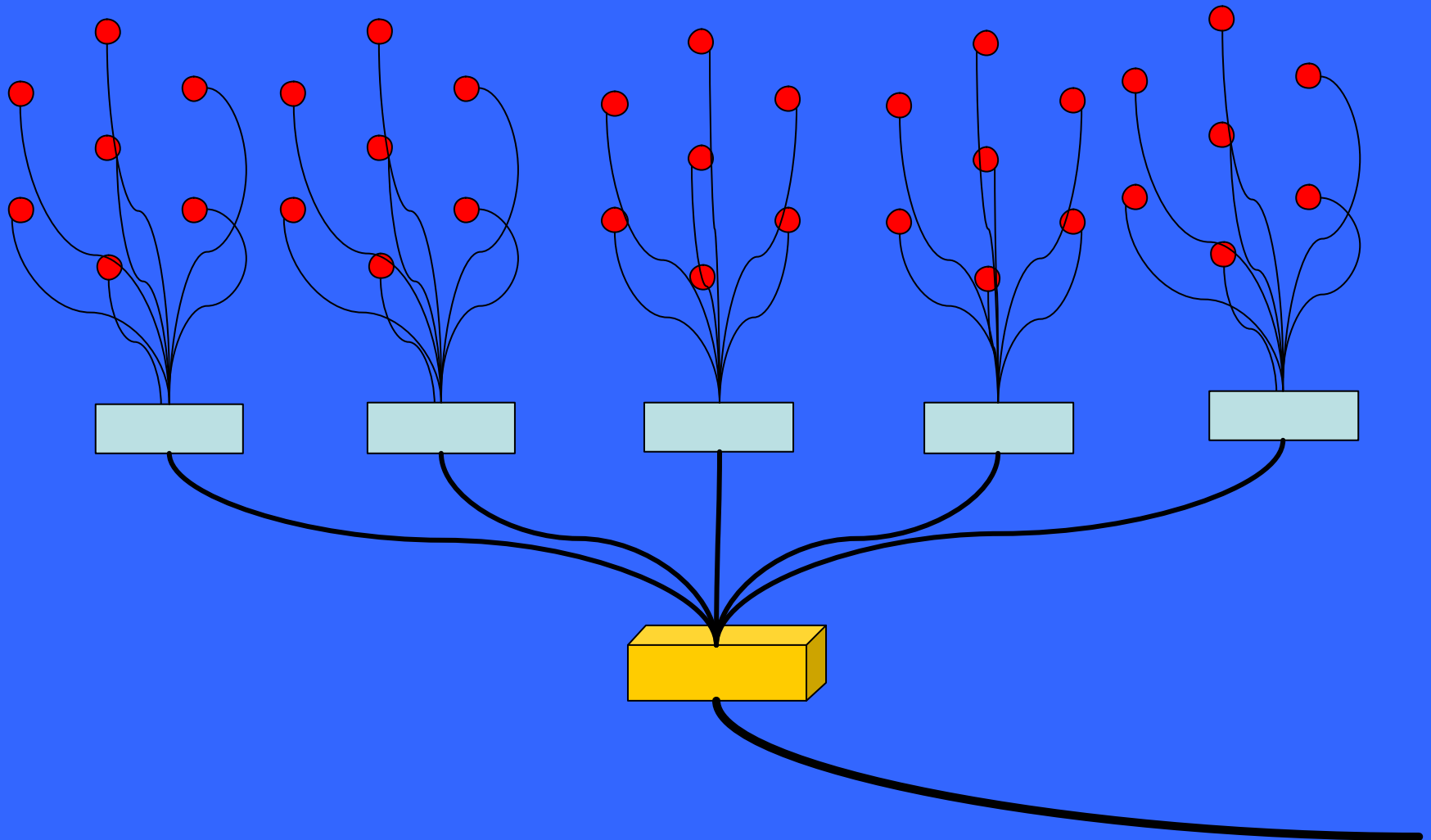photosensor time fluctuations,
medium time dispersion,
electronics.

Timing calibration

Light Photosensor 1st level electronics Digitization Time stamping

Data decoding and storage Data transfer Additional electronics

Each level can introduce **delays**, **jitters** and **shifts** with time

At which levels is convenient to have time calibration? **How?**

Timing calibration

Amplitude

- Photodetectors can be calibrated at the laboratory.

- For usual PMTs, gain can be easily monitored by ^{40}K or others.

- Transparency losses are more difficult to monitor.

- New devices may need different calibration.

R&D and preparatory work

- Study the scalability to km^3 of already used techniques and technologies.
  - Position: sonic devices at the km level?
  - Beacons: current light sources are adequate?
  - Clock: echo-based system is enough?
  - Accuracy of calibration of distant components (for horizontal tracks)
- Explore new ideas in all domains:
  - New light sources?
  - "Decoupled calibration array"?
  - New systems?
- ☞ List of topics

Responsibility sharing

Milestones and final goals should be set as soon as possible and tasks assigned to interested groups.