Get real!
Or: Some provocations on research

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Applications

- Get real about application requirements and assumptions for research
    - No more Poisson models, please
    - Stop the hype about millions of nodes
- Stop whining about application-specific but do generic research
- Check your assumptions
    - Have you thrown 1000 nodes from an aircraft?
- Characterize principle tradeoffs, don't optimize 5 %

- ***Res non verba***

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What is the silver-bullet definition for WSN?

- Mobility of nodes
  - Yes, no, with mobillizers, …
- Energy
  - Scare, plentiful
- Deployment
  - Random, planned, …
- Node resources
  - Computational power, memory,
- Communication principle
  - Radio of various ranges, other mediums
- Number of nodes
  - Three to thousands to tens of millions
- Accuracy/precision of sensors
- Actuators?
- …????

•What are the right dimensions,
•the right attributes for each dimension, right combinations?
•Which combinations map to **real** applications?

Does it matter?
How does it influence research?

Testbeds?

- What are the relevant testbeds to cover design space?

- Is it really useful to have multiple node designs with essentially the same characteristics?

- How many people are building their own node designs?
    - How do they differ?
    - Did you even talk to each other beforehand?

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- Buchmann: Better communication among this group is necessary
- Mattern: What to do to move work forward, what to ensure that we do right thing, have fun?
  - Keep a European workshop
  - Better collaboration, e.g., compatible/portable operating system
    - Careful about being too quick
    - Different feature set to existing paradigms necessary
  - Small-scale community building – how?
  - Industrial community building/evangelization/procelitization
  - Meetings with interested users, not only industrial – how? Look for strength in European application scenarios
  - Make an effort to involve PhD students/younger people; sooner than later
  - Influence funding agencies; raise awareness/necessity
  - Fairs, Cebit, etc.
  - Put together complementary strengths
- Ian/Thomas: Dont be afraid of American research; justify being distinct by adding value
  - "surface mining"? 5
- Topics

- Hype
  - Gap between
  - Zillions of sensor nodes deployed
  - Largest actual network: 800 nodes
- Promise
  - Great duck island example
  - Great idea
  - Great disappointment in practice
- Heavy knapsacks
  - Our researcher's background weighs heavily upon us
  - Background-centered research vs. WSN-centered research?
    - What does the later one mean in the first place?

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Get real about requirements & scenarios

- Who REALLY needs microscopically small devices?

- Batteries are not a serious cost factor – just use bigger ones

- Don't build sophisticated protocols for something that happens once every five years

- Don't ignore real-life requirements like delay

- WSN are not just tiny-nodes-dropped-from-aircraft
  - Samsung experiments with cell phones outfitted with sensors of various ilks – will turn cellular networks into sensor networks

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Some whining about application-specific…

- … or actually do something about it!
    - If you build a general-purpose architecture, run it through its paces
    - Use off-the-shelf hardware & software as comparison case
    - PROVE that application-specific will require something new – put TCP/IP on the nodes and TRY IT before you claim it will not work
- Proof that cost of standardization are in fact prohibitive
- Consider FINANCIAL COST and budget tradeoffs
    - If system becomes too complicated, larger batteries will simply be cheaper and thus better

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Stop making assumptions without testing

- Who has ever thrown thousands of nodes from an aircraft?
    - Are they really uniformly distributed?
- Don't use a unit-disk craft in simulation and expect any relationship with reality
- Don't use Poisson excitation models for earthquakes

- ***Res non verba***

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Stop doing research….

- … unless it answers fundamental questions
  - Principal behavior of WSN in many circumstances still not understood
  - But people fiddle around with 2% improvements at places which are far remote from reality anyway
  - ***Don't forget Galileo***

- If the only tool you have is multi-hopping, every problem looks like a sensor network
  - Sadly, you don't get PhDs out of application-specific work
  - So people keep on fuddling with fancy multi-hop stuff (which is often completely useless)

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