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SIMO project

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What is SIMO?

- SIMO
  - SIMulation and Optimization project
  - 1.10. 2004 – 31.9.2007
- General aim is to develope moduls for forest planning system as open source software
- Everything the project produces is freely dowloadable from http://honeybee.helsinki.fi/mmvar/SIMO/
- The modules are intended for the use of
  - researchers in forest planning
  - forestry organizations
  - IT companies

for developing new products and new methods

Involved parties

- UPM-Kymmene forest
  - Coordinator of the project forestry director Jyrki Kangas
- Tornator oy
- Metsämannut oy
- Metsähallitus
- Forestry Development Centre Tapio
- Forestry Centres

Funding

- Funding of the project comes
  - almost 3/4 directly from the forestry organizations
  - 1/4 from the funds of Helsinki University
- The forestry organizations get 50% of their funding from TEKES

People involved

- Leader of the project has been professor Timo Tokola
- Annika Kangas will continue when Timo leaves to Joensuu
- Researchers
  - Jussi Rasinmäki
  - Jouni Kalliovirta and
  - Antti Mäkinen
- ”Senior adviser”
  - Timo Pekkonen
- and four graduate students

The sub-tasks of the project

1. Data model
   - how the data is described in the system
2. Simulator
   - the growth and yield models
   - information of forest development
3. New generation optimization methods
   - meta-heuristics
   - linear programming (at least interface with JLP)
4. Quality control
   - quality of measured data
   - quality of data calculated with the system
     - depending on age of data etc.

Specific aims (1)

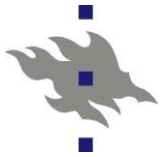
- The planning system should be
  - Flexible with respect to the data sets it uses
    - system can utilise stand inventory data, sample plot data, remote sensing data or a combination of all these
  - Flexible with respect to the models it uses
    - both treewise or standwise growth prediction models can be used, even for the same task
    - old models can be calibrated or adjusted to regional conditions

Specific aims (2)

- The planning system should be
  - Adaptable to the planning problem, for instance
    - number of alternatives per stand can be defined by user
      - small number for long-term problems
      - large number for short-term problems
    - all parameters like prices, interest rate and costs can be modified by the user
    - the length of each period can be chosen freely
      - e.g. 1-year periods or 5-year periods or a combination of them

Specific aims (3)

- The planning system should be
  - Extendable to future needs
    - new models can be introduced to the system by users (for instance for Russian or Baltic areas)
    - whole new simulation chains can be introduced by the user (when the model chains are different in different countries)
    - new variables and new data levels can be introduced by the user
      - variables concerning biomass, timber quality, etc.
      - sub-compartments



To accomplish all this...

- The program logic needs to be separated from those parts that need to be modified by users
- Information of
  - forest development
  - growth and yield models
  - forest operations etc.

  should be in text files
- The solution is based on
  - forestry knowledge is described with XML files
  - program itself is independent of forestry knowledge
  - and so modifications can be done without reprogramming