Modeling and Simulation Dictionary: The Aim, the Approach, the Status, and the Future of the Work

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The Aim and Scope of the Work:

The French-English M&S Dictionary preparation is an **MSNet project** and is jointly done by the members: LSIS (France) and OC-MISS (Canada) of the M&SNet.

Brief History:

- The first list of simulation terms was:
  It was published as a self-test (a challenge) for the simulationists to check their knowledge of simulation concepts.
- Ören also published on “English-Turkish M&S Terms”.
- At the start of this joint project, in 2004, there were about 3000 English terms; with some French and Turkish equivalents.
• We **aim** to have:
  • A **comprehensive and systematic inventory** of the M&S terms in English; hence, in this version, definitions are not part of the project.
  • The **French** equivalents and
  • The **Turkish** equivalents.

• The dictionary is on Excel; hence by the filtering ability, we can easily check (and correct) inconsistent usages.
• Currently, it has over 4000 English terms; and over 3000 agreed French equivalents.
As an example of the:

- **comprehensive and systematic inventory** of the M&S terms in English, consider, the following example:

  - There are over 100 types of “variable” listed in the dictionary.

  - To ease managing terms common to a concept, an **inverted** representation is used.
<table>
<thead>
<tr>
<th>variable</th>
<th>variable, Boolean</th>
<th>variable, decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>variable, across</td>
<td>variable, bounded</td>
<td>variable, dependent</td>
</tr>
<tr>
<td>variable, action</td>
<td>variable, change detectable</td>
<td>variable, descriptive</td>
</tr>
<tr>
<td>variable, activation</td>
<td>variable, class</td>
<td>variable, deterministic</td>
</tr>
<tr>
<td>variable, algebraic</td>
<td>variable, constrained</td>
<td>variable, discrete</td>
</tr>
<tr>
<td>variable, allocated</td>
<td>variable, continuous</td>
<td>variable, discrete-change</td>
</tr>
<tr>
<td>variable, antithetic</td>
<td>variable, continuous-change</td>
<td>variable, discrete-time</td>
</tr>
<tr>
<td>variable, arbitrary</td>
<td>variable, continuous-time</td>
<td>variable, discriminant</td>
</tr>
<tr>
<td>variable, argument</td>
<td>variable, control</td>
<td>variable, dual</td>
</tr>
<tr>
<td>variable, artificial</td>
<td>variable, controllable</td>
<td>variable, dummy</td>
</tr>
<tr>
<td>variable, attached</td>
<td>variable, controllable input</td>
<td>variable, endogenous</td>
</tr>
<tr>
<td>variable, auxiliary</td>
<td>variable, controlled</td>
<td>variable, essential</td>
</tr>
<tr>
<td>variable, behavior</td>
<td>variable, coordination</td>
<td>variable, exogenous</td>
</tr>
<tr>
<td>variable, binary</td>
<td>variable, correlated</td>
<td>variable, external</td>
</tr>
</tbody>
</table>
variable, flow  
variable, formal  
variable, free  
variable, fuzzy  
variable, Gaussian  
variable, global  
variable, goal  
variable, holistic  
variable, independent  
variable, input  
variable, instance  
variable, instantiated  
variable, instrumentable  
variable, instrumental  
variable, instrumented  
variable, integration  
variable, interest  
variable, internal  
variable, interpolated  
variable, irrelevant  
variable, key  
variable, lag  
variable, lagged  
variable, latent  
variable, lead  
variable, level  
variable, linguistic  
variable, local  
variable, logical  
variable, mediating  
variable, monitored  
variable, nonnumerical  
variable, nonobservable  
variable, numerical  
variable, observable  
variable, observational  
variable, output  
variable, qualified  
variable, qualitative  
variable, quantified  
variable, quantitative  
variable, random
variable, rate
variable, relevant
variable, run control
variable, simple
variable, slack
variable, state
variable, statistical
variable, stochastic
variable, subscripted
variable, temporal
variable, temporary
variable, through
variable, time
variable, transition
variable, typed
variable, uncontrollable
variable, unqualified
variable, yoked

There are many other inverted terms.
For example:

Data          over 50 entries
Model         over 500 terms
Simulation    over 200 terms
The Approach

• **The approach is Cartesian**: René Descartes: “Discours de la méthode pour bien conduire sa raison, et chercher la vérité dans les sciences” (1637).

(However, when needed we can also be pragmatic. Remember for a camera, infinity is about after 20 meters.)

• The **first** was to never accept anything as true which I could not accept as obviously true; that is to say, to carefully avoid impulsiveness and prejudice, and to include nothing in my conclusions but whatever was so clearly presented to my mind that I could have no reason to doubt it.
• The **first rule:**

• Hence, in **this orchestrated effort**, if you see me in doubt, (it is scientific doubt) and it is not your ability, but my own lack of understanding which obliges me to doubt.

• Furthermore, I avoid the trap of single-vision understanding which may lead to dogmatic understanding.

(More on several **types of understanding**:

• The second was to divide each of the problems I was examining in as many parts as I could, as many as should be necessary to solve them.

• The third, to develop my thoughts in order, beginning with the simplest and easiest to understand matters, in order to reach by degrees, little by little, to the most complex knowledge, assuming an orderliness among them which did not at all naturally seem to follow one from the other.
• And the **last** resolution was to make my enumerations so complete and my reviews so general that I could be assured that I had not omitted anything.

• I published (since 1971) several taxonomies of M&S
  [http://www.site.uottawa.ca/~oren/pubsList/taxonomies.htm](http://www.site.uottawa.ca/~oren/pubsList/taxonomies.htm)

• Furthermore, I am working on a “Body of Knowledge of M&S; and for this project, I am reviewing several M&S taxonomies and preparing updated taxonomies.

  And your contributions will be vital to the success of the work.
The Status of the Work & What Needs to be Done:

English Terms:

• Over 4000 terms exist in the Excel file
• Terms need to be revised for:
  • relevance  (some terms have to be eliminated)
  • completeness  (some terms have to be added)
  • correctness

French Equivalents:

Turkish Equivalents:
French Equivalents:

- Over 3000 (agreed on) equivalent French terms exist
- French terms need to be revised for:
  - correctness
  - consistency
- For remaining terms, French equivalents need to be suggested and agreed on
- For all French nouns, gender needs to be included
- At the end, one more review would be highly desirable
Turkish Equivalents:

• Large number of terms have equivalent Turkish terms.
• The remaining will be finalized by Ören
The Future of the Work: *Phase 2, Phase 3, Phase 4*

**Phase 1:** (Current version) is to finalize and publish a hard copy of French/English/Turkish terms.

(Hopefully, this Summer)
Phase 2: Hopefully, the next version (to be finished in 2006) will also include Spanish and Italian terms.
• This phase can also be a joint M&SNet project.
• I believe that French terms will facilitate finding the Spanish and Italian terms.
• From Italian side, the Director of MISS Genoa Center (and Director of the MISS), Prof. Dr. A. Bruzzone, promised that he will join forces for this project.
• From Spanish side, already about 1000 terms exist (Ören) and needs to be entered in the Excel table.
• Prof. Dr. C. Frydman has already started such a study.
• I hope that our Spanish colleagues at MSDS will join us in this phase of the project.
Phase 3: Our dictionary project can be as ambitious as we would like it to be.

- After having five languages, we may suggest NATO to adopt it and have their back-up (as a funded research project) to enrich it with other languages of NATO (member and friend) countries.
  (For about five years (1996-2001, when I was in Turkey), I was active in several NATO M&S groups).

- NATO has two major organizations involved with M&S:
  - NMSG - NATO Modelling and Simulation Group
  - SAS - NATO Studies, Analysis and Simulation Panel

- In this phase, we can port our dictionary to a database system such as Access.
Phase 4: The **definitions** in English can be developed (if we find funding for this phase of the project).

- There are several mostly military dictionaries in English; however, consistency and correctness should be assured.

- After this phase, since the English definitions will be available, starting with the first 5 languages (and hopefully, including other NATO languages), the English definitions can be translated into other languages.
Now, let’s consider what do next!
Reviewing the French/English dictionary:

- The **vital importance** of the review to enhance the quality of the dictionary.

- Given the time frame we can work together now (~ 90’) and realizing the impracticality of reviewing the current work as a group of 25 – 30 participants in such a short time, we have to find an effective way of **coordinating** and **orchestrating** our work.
I suggest the following agenda:
(open to your suggestions / recommendations)

1. Ören shows the dictionary file and points out how we can update it and do the version control.

2. With a show of hands we learn who would like to actively contribute to the project.

3. For those who promise to be active, we collect names and e-mail addresses.

4. Tuncer Ören works together with Lucille Torres to distribute the French-English terms through e-mails.
I suggest the following agenda:

(open to your suggestions / recommendations)

5. Ören and Lucille Torres revise, with a group at LSIS, the comments received and update the dictionary file.

6. The updated file is disseminated (with changes clearly indicated) for another round of reviews.

(Remember what Descartes advises!)
Together we can do it! Thank you for your contribution!
**Post meeting note:**

As of May 20, 2005, the following 15 colleagues from France graciously accepted to continue or to start contributing especially on the French terms of the M&S Dictionary:

Table 1: Colleagues from LSIS:

http://www.lsis.org/index.php

Table 2: Colleagues from other research laboratories:
Table 1: Colleagues from LSIS:
http://www.lsis.org/index.php

<table>
<thead>
<tr>
<th>Lucile</th>
<th>Torres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jean</td>
<td>Caussanel</td>
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<tr>
<td>Alain</td>
<td>Ferrarini</td>
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<td>Claudia</td>
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<td>Aziz</td>
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<td>Tranvouez</td>
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<td>Hamri Maamar</td>
<td>El-Amine</td>
</tr>
<tr>
<td>Gregory</td>
<td>Zacharewicz</td>
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</table>
Table 2: Colleagues from other research laboratories:

<table>
<thead>
<tr>
<th>Name</th>
<th>First Name</th>
<th>Laboratory</th>
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</thead>
<tbody>
<tr>
<td>Frederic</td>
<td>Amblard</td>
<td>IRIT</td>
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<tr>
<td>Jean-Pierre</td>
<td>Belaud</td>
<td>INPT-ENSIACET-LGC</td>
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<tr>
<td>Olivier</td>
<td>Dalle</td>
<td>INRIA/I3S</td>
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<tr>
<td>Raphael</td>
<td>Duboz</td>
<td>IRD</td>
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<tr>
<td>David</td>
<td>Hill</td>
<td>ISIMA</td>
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<tr>
<td>Jean-Marc</td>
<td>Le Lann</td>
<td>INPT-ENSIACET-LGC</td>
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<tr>
<td>Pierre</td>
<td>Siron</td>
<td>ONERA</td>
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