Minutes of the ISO/IEC JTC1/SC21/WG7/E-LOTOS meeting
Grenoble, 9-11 December 1996

0. **Attendance list**

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1. Appointment of secretary

J. Sincennes volunteers.

2. **Discussion of Agenda**

Agenda accepted.

Details about the next meeting are still undecided. It is likely to happen between June and July 1997 as a WG7 plenary.

3. **Presentation by M. Sifakis : Introduction - Timed Systems**

Main difficulty : composition of specifications of time systems.

RMK : Related papers will be made available from M. Sifakis and/or H. Garavel.

4. **List of Input Documents**

GR1 - An E-LOTOS specification of the ODP Trader, Spanish Experts
GR2 - On the Definition of Modular E-LOTOS, French Experts
GR3 - A Proposal for Co-routines & Suspend/Resume, French Experts
GR4 - Formal Support for ODP and Teleservices, French Experts
GR5 - Position Statement regarding E-LOTOS Progression of Work, French Experts
GR6 - Introduction of a Suspend/Resume operator in E-LOTOS, Belgium Experts

5. **Presentation of the Input Documents**

a. GR1 - An E-LOTOS Specification of the ODP Trader, Spanish Experts
b. GR2 - On the Definition of Modular E-LOTOS, French/Romanian Experts
c. GR3 - A Proposal for Co-routines & Suspend/Resume, French/Romanian Experts
d. GR4 - Formal Support for ODP and Teleservices, French Experts
e. GR6 - Introduction of a Suspend/Resume operator in E-LOTOS, Belgium Expert
f. GR5 - Position Statement regarding E-LOTOS Progression of Work, French/Romanian Experts

6. **Discussions**

MODULES

It is agreed that the basis of modularity may be conceptualised with the instructions : « export SIGNATURE » and « import MODULE, include OBJECTS, exclude OBJECTS».

There is a general agreement on the desired modules characteristics:

a) module has by default a complete exportation signature
b) importation of modules supports multiple views
c) nested definitions of modules are not allowed
d) generic modules will have a light syntax
e) actualisation will have a light syntax
f) renaming will exist in module actualisation and «duplication»
g) sharing in generic operations is discarded

It is agreed that the CD will incorporate modularity based on GR2.

RMK : prefixing

DATA TYPES

Equality :

	on names	on structures
duplication	built-in	renaming (new) operator
alias	?	built-in (e.g. T ≡ T' iff T⊆T' AND T ⊇T')

A choice needs to be made on a subset of characteristics of the language ; a solution providing all features simultaneously not seeming to exist :

SET #1	SET #2
no overloading	overloading
dot notation	flat names
sub-typing (global)	sub-typing (static)
anonymous records	extensible unions
alias	
structural equality	

Set#1 is generally (but not unanimously) preferred . French and Romanian experts express a strong concern about the decision of having general sub-typing which will require run-time type checking and will result in complexity and loss of performance for implementations.

SUGG : have guarded patterns « P when E1 := E2 »

REVISION OF THE DOCUMENT

A working plenary should be held around June-July of 1997. Thus, February should be a target date for the submission of a CD to ballot. A CD should be produced as soon as possible.

It is generally acknowledged that the objectives set in Kansas City meeting have not all been met , although a very good part of them have, not to say most of them.
(detailed discussion is postponed until the end of the meeting since it is foreseen that many of the highlighted topics are likely to be tackled before the end any way.)
N1 : lack of integration == lack of convergence in KC, plus the lack of time for better co-ordination and collaboration
N2 : structure of document is not aligned w.r.t. the format planned in KC
N3 : extra syntactic sugar in core is meant for help, suggestions of enhancements

The user and core level languages should be unified and duplication eliminated.

The composition of the CD should describe the following steps :

BNF L0 (E-LOTOS)
Module + S.S.
L1
Syntactic Sugar (loops, if-then-else, raise, in-out parameters, expressions, field selection)
Static Semantics Check L2 (Core Language + Special Operators)
Static Semantics Sugar (|| over values, function call with positional args., write-many variables)
Dynamic Semantics L3 (Core Language)
Core Semantics + op. + ...
L4 (LTS)
Predefined Types + Tutorial

PRODUCTION OF THE CD

The format of the next document may be one of:

a) PDA (amendment to current standard)
b) CD8807 (disintegrates the older version)
c) CDxxxx (complements)
d) CDxxxx (supersedes)

After consultation with SC21 secretariat, it was decided to go with option '**b**'.

All the following documents will be sent immediately to the editors (quemada@dit.upm.es, glucero@dit.upm.es) whom will integrate them into a first version of the Committee Draft:

1. User Language (French/Romanian experts)
2. Core Language (Belgium/Great Britain experts)
3. Suspend/Resume (Belgium experts)
4. Modules (French/Romanian experts)
5. BNF of concrete syntax (French/Romanian experts)
6. Specification of ODP Trader (Spanish experts)

There are opened issues for building the CD :

1. flattening of module
2. semantics for :
    a - the general parallel operator
    b - the parallel operator over values
    c - function calls with positional arguments
    d - time non-determinism
    e - write-many or write-once

The abstract syntax to be included in the CD will be that corresponding to the union of the User and Core Languages.

The structure of the CD should be :

1. Introduction & Tutorial
2. Lexical Structure
3. BNF of concrete and abstract syntax
4. Base Language
    a) overview
    b) for all operators
        i- explanation

ii- syntax sugar translation
iii- static semantics
iv- static semantics translation
v- dynamic semantics

5. Module Language
   a) overview
   b) for all operations :
      i- explanation
      ii- static semantics
      iii- static semantics translation (flattening)

A. Annex : Upward Compatibility with LOTOS
B. Annex : Predefined Types
C. Annex : Examples (e.g. ODP Trader)

considering each	type of element of the language	be provided with :
	syntax sugar	translation to core
	static semantic sugar	static semantics + translation to core
	core	static semantics + dynamic semantics
	module (core)	static semantics + flattening

The deadline for having a first version the CD is end of December 1996.
The deadline for having the final version of the CD ready is end of January 1997.

SYNTAX

It is noted that syntactical matters (e.g. shrink (!) and query (?) symbols) should be cleaned up by making them uniform, possibly taking into account ISO8807.

It is agreed that ***channels*** (for declaring *gate types*) should be removed and declared using the existing ***type*** statement.

An effort should be made in order to obtain a coherent language with respect to keywords like «function» and «procedure».

SUSPEND/RESUME & CO-ROUTINES

There is a consensus that GR6 is appears to satisfy the requirements expected from a Suspend/Resume operator, in an elegant fashion and with a small number of semantic rules.

Relationship between the co-routine mechanism presented in GR3 and the generalised parallel operator should be further investigated. The same might apply to auto-interrupt/resume operation with value passing. GR3 might support a superset of the functionality of the TRAP construct. But there also appear to be time related discrepancies. Innovations introduced by GR3 should be further studied .

Since it is more mature, the suspend/resume operator (as presented in GR6) will be in incorporated in the CD. Nevertheless, the features of GR3 (e.g. co-routine) being of appeal as a potential added value to the language, they should be discussed again at a later time, after further investigating the differences and similarities with the existing constructs (e.g. co-routine implemented with generalised parallel operator). The time semantics of the co-routine should also be investigated.

WRITE-MANY VARIABLES

The possibility of adding write-many variables is revisited. The problem is discussed, along with necessary restrictions that were imposed in KC, namely mandatory initialisation of variables and variable assignment is made unavailable in parallel compositions. (top priority).

RMK : concerning multiply written variables : In particular, it is noted that the behaviour « local x in (g ?x ||| g ?x) ; g !x » would have to be restricted. It would also cause problems with associativity of the sequential operator : « (?x :=1 ; ?x :=x+1) ; ?x :=x » would not be equivalent to « ?x :=1 ; (?x :=x+1 ; ?x :=x) ».

NON-DETERMINISM

It is decided to adopt a left-to-right evaluation strategy of record expressions to avoid non-determinism in evaluation.

Time has become (without anticipation) non-deterministic : (?x := false [] ?x :=true) ;wait(1) ; P(x)
leads to a system that can only evolve in time ; time being the only possible transition, time resolves the non-determinism. Solving it may be postponed without too big an impact. A possible solution includes associating an internal event to assignments.

PARALLELISM

Parallelism over values will be allowed in the user language as static semantics sugar and translated into the core language.

In order to be able to translate expressions like « par x :T in B », it is decided to restrict T to finite types.

MISCELANY

RMK : what is the default value of < if E then B1 [else B2] > when the *else* part is absent ?

Q : is there an expansion theorem for E-LOTOS? What are the preserved (and lost) properties of E-LOTOS compared to LOTOS ?