

# Unité de Projets ARTEMIS

Advanced Research & TEchniques  
for  
Multidimensional Imaging Systems

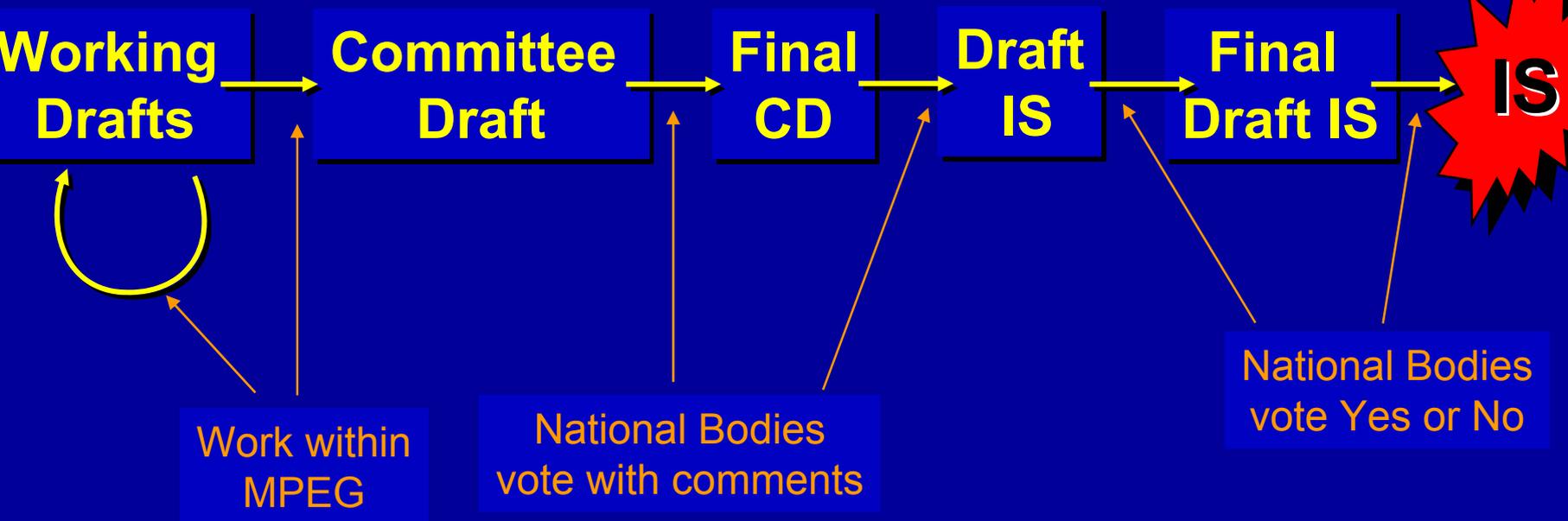


Françoise PRETEUX

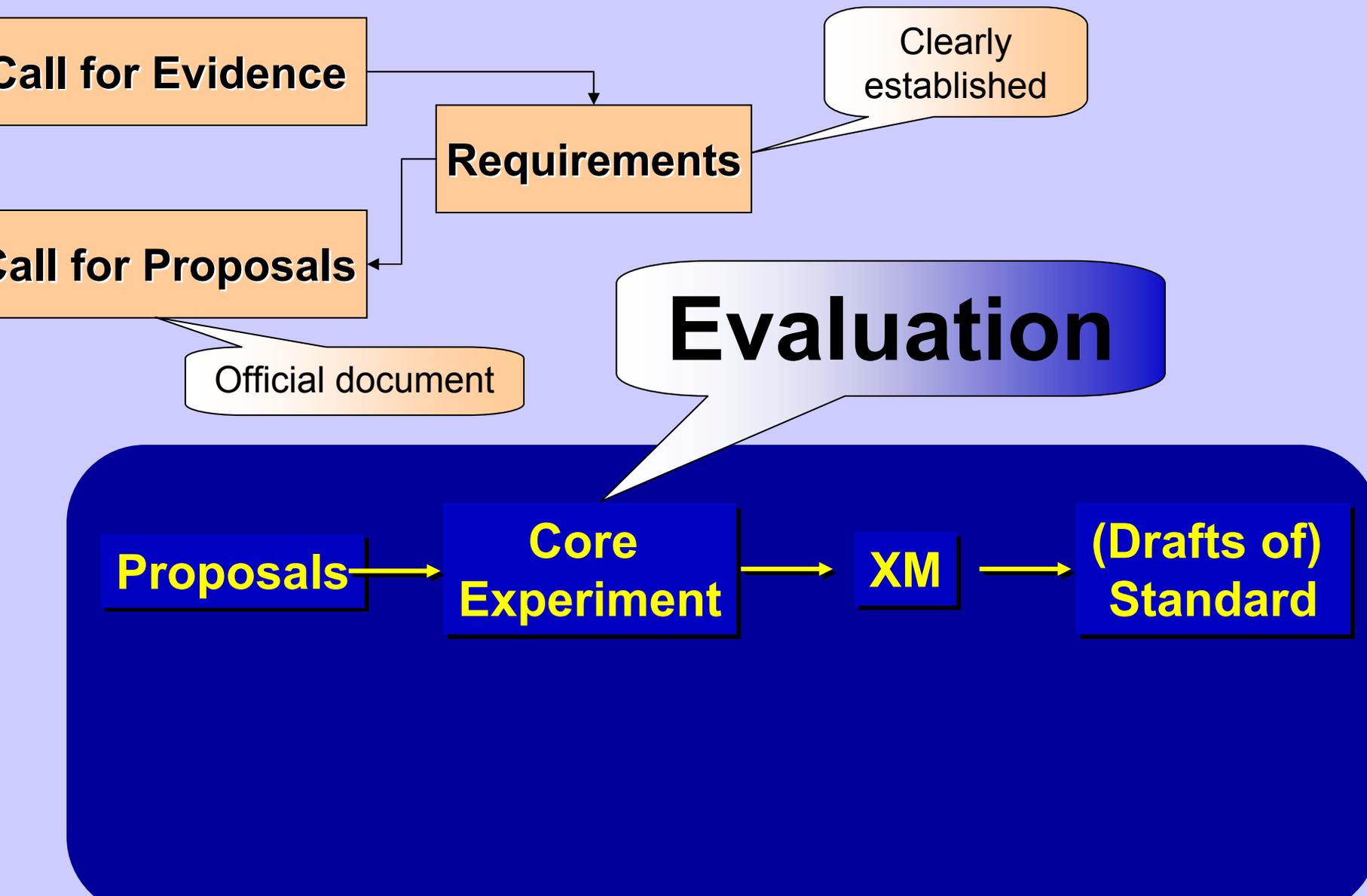


**Témoignage :**  
**système d'évaluation**  
**ISO/WG11**

# From proposals to standard



# A long way ...



# Definition of the Requirements

## **Goal:**

- **Establish a set of requirements that has to be fulfilled by the proposed technologies**

## **Participants:**

- **Open to interested parties**

# Call for proposal definition

## **Participants:**

**-The consortium based on the Requirements document**

# Core experiments definition

## **Participants:**

- **Contributors to the technology**
- **Independent reviewers**

## **Functionality of the algorithm**

## **Experimental conditions**

- **Test data**
- **Test conditions**
- **Evaluation of results**

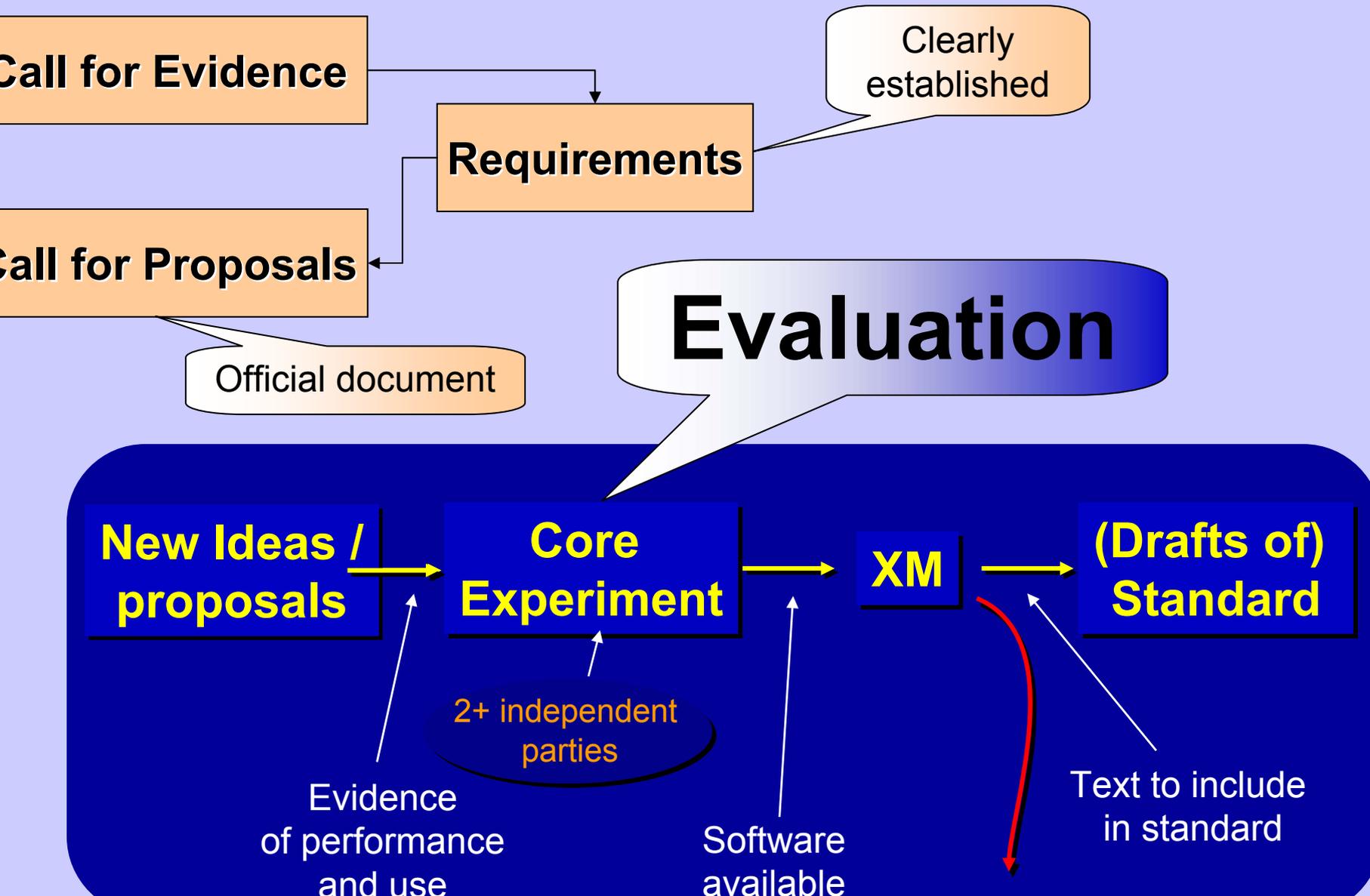
# Core experiments evaluation

**Fulfill the requirements in terms of functionalities**

**Evaluation of the complexity**

**Evaluation of the cost of integration within the framework**

# A long way ...



# Example of MPEG-7 :



Multimedia Content Description Interface

## Objectifs (N2861)

Extraction des  
caractéristiques

Fournir un standard de  
descriptions des contenus  
multimédias

Standard  
de descriptions

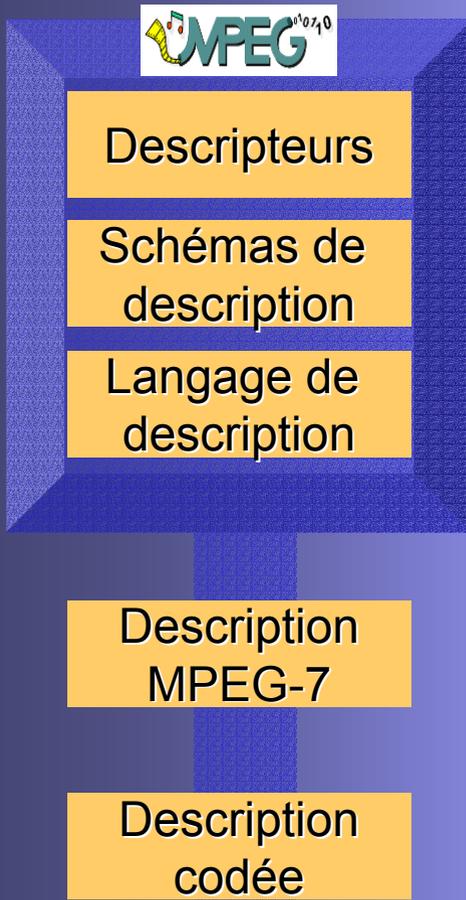


Supporter un large éventail  
d'applications potentielles

Moteur de  
recherche

Elaborer la norme  
ISO/IEC JTC1/SC29/WG11 - 15938

### Eléments normalisés à évaluer



- Un ensemble de descripteurs (D)**
  - D : représentation d'une primitive (couleur, forme, mouvement, texture ...) et spécification de sa syntaxe et sémantique
- Un ensemble de schémas de description (SD)**
  - SD : Structure et sémantique des relations entre les D ou SD le composant
- Un langage de description (DDL)**
  - Créer, exprimer, modifier des SD et D
- Les schémas de codage**
  - Assurer une efficacité de compression, résistance aux erreurs, accès aléatoire ...

## 1. Evaluation Criteria



- **Feature relevance**

The feature captures important characteristic(s) of the AV material.

- **Effectiveness**

Gives better retrieval accuracy (e.g. precision, recall rate) with respect to other descriptors for the same feature.

- **Application domain**

The Descriptor is applicable to a wide range of application domains.

- **Expression efficiency**

The Descriptor expresses the given feature(s) precisely, and completely.

- **Processing efficiency**

An efficient Descriptor value calculation method exists.

An efficient matching method (allowing rank ordering) associated with this Descriptor exists.

- **Scalability**

For a given application, the performance does not degrade with larger amount of data

- **Multi-level representation**

The Descriptor represents the features at multiple levels of abstraction.

## 2. Evaluation Procedure



### a) Evaluate feature relevance

**Goal:** Understand the feature, and assess how it captures important characteristic(s) of the AV material.

**How:** Paper evaluation, from all paper descriptions of all proposals addressing this feature.

**Who:** Experts

**Output:** Feature evaluation sheet, which includes represented features and their importance, with associated explanations.

## 2. Evaluation Procedure



### b) Evaluate the paper document

**Goal:** The goal of this step is to have an initial assessment of the proposal based on the documentation included (questionnaire, summary and detailed structured description). During this step, experts should prepare eventual questions to ask to the proposers at the next step, to clarify some points if needed.

**How:** Experts will review/analyze this information against requirements and evaluation criteria, first without being influenced by the participation of the proposers. A limited duration should be given to this step.

**Who:** Experts

**Output:** The proposal evaluation sheet, with a short summary of the proposal, and its first evaluation along the analyzed criteria.

## 2. Evaluation Procedure



### c) Hear presentation / see demonstration

**Goal:** To enhance the understanding of the proposal by the experts. The presentation shall demonstrate the appropriateness of the solution, and disclose the appropriate range of use. The demonstration will provide evidence of (some of) the functionalities claimed.

**Who:** experts and proposer(s) whose submission is evaluated.

**How:** Experts will interact with the proposer(s) through a presentation and possibly a demonstration. Both demonstration and presentation will each have a 10 minutes time limit.

**Output:** Updated (modified/completed) proposal evaluation sheet (criteria table and eventually summary of the proposal).

## 2. Evaluation Procedure



### d) Evaluate results of similarity based retrieval

**Goal:** To refine the evaluation of the effectiveness and expression efficiency of the Descriptor.

**Who:** Experts

**How:** Proposers will provide:

- Descriptor values for selected and relevant elements (e.g. image, shot) in the content set, following the items labeling provided by MPEG.
- A system/program for similarity based retrieval, which should be executable on a machine brought to the meeting by the proposer.
- The quality of similarity based retrieval using the proposed descriptor will be evaluated using the MPEG-7 test sets sample inputs provided on-site, or samples provided by the proposer.

**Output:** Updated proposal evaluation sheet (criteria table, effectiveness and expression efficiency criteria only).

## 2. Evaluation Procedure



### e) Produce a global evaluation conclusion

**Goal:** To summarize the results of the previous steps to allow the selection of technologies for inclusion in the XM1.0, or in Core Experiments.

**Who:** Experts.

**How:** Experts arrive at a consensus.

**Output:** Evaluation summary of the proposal evaluation sheet and evaluation conclusions sheet.

## 3. Form of proposing descriptors



- **When proposing a Descriptor, each proposer has to fill a dedicated form**

## 1. Evaluation criteria



- **Effectiveness of the DS in accomplishing its stated purpose.**

- **Application domain**

The DS is applicable for a wide range of applications. “Applicable” means directly usable or usable as a component of a larger DS.

- **Comprehensiveness**

The DS provides an off the shelf solution for a given application domain. For this application domain, it takes into account relevant Descriptors and relevant relations between the Descriptors.

- **Abstraction at Multiple Hierarchical Levels**

The DS can provide abstractions at multiple levels. An example is a hierarchical scheme where the base layer gives a coarse description and successive layers give more refined descriptions. The type of hierarchy used is appropriate for the purpose of the DS. Descriptors within the DS are amenable to being prioritized.

## 1. Evaluation criteria



- **Flexibility**

Part of the DS can be used effectively:

Ability to instantiate a part of a DS.

Ability to efficiently access a part of a DS.

Ability to accept additional Descriptors; existing Descriptors can be replaced with new Descriptors.

- **Extensibility**

The DS is easily extensible to other DSs (in a way similar to inheritance in Object-Oriented Programming).

- **Scalability**

For a given application, the performance does not degrade with larger amount of data.

Scalability across different applications (down or up).

- **Simplicity**

A minimal number of Descriptors and possible relationships are used to meet the needs of a particular application domain.

## 2. Evaluation procedure



**Same procedure as for Ds:**

- Evaluate the paper document,
- Hear presentation / see demonstration,
- Produce a global evaluation conclusion.

## 1. Evaluation criteria



- **Compression efficiency**
- **Complexity of the description encoding and decoding processes**
- **Lossless compression**  
Ability to losslessly compress descriptions instantiations.
- **Streaming capability**  
It is possible to multiplex and stream the coded description.
- **Error resilience**  
The coded description shall be robust against transmission errors.
- **Universality**  
Ability to be applied to a wide range of descriptions

## 2. Evaluation procedure



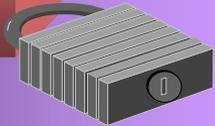
- **Review/analyze against requirements and evaluation criteria**
- **Demonstration using the encoded bitstreams**
- **Presentation of the proposed coding scheme and its possible extensibility and applicability**

# From MPEG to ROBIN

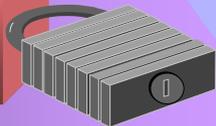


**A challenging  
way**

AV Data



AV Data



**□ Evaluation:  
a cooperative work**

↪ Requirements

↪ Procedures

↪ Criteria

↪ Data sets

↪ Platform and tools

↪ Coordination, Consensus

**for a large community ...**



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# Merci !