



**TWC/30/31**

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**INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS**

Geneva

**TECHNICAL WORKING PARTY ON AUTOMATION  
AND COMPUTER PROGRAMS**

**Thirtieth Session**

**Chisinau, Republic of Moldova, June 26 to 29, 2012**

AIM: MANAGEMENT OF IMAGE ANALYSIS – EXPERIENCE FROM FRANCE

*Document prepared by experts from France*

The Annex to this document contains a copy of a presentation on the management of image analysis that will be made at the Technical Working Party on Automation and Computer Programs (TWC) at its thirtieth session.

[Annex follows]

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# AIM

## Management of Image Analysis

### Experience from France

June 26 to June 29, 2012 (*Chisinau, Republic of Moldova*)

1

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## PROGRAM OF THE TALK

- ✿ GENERAL ARCHITECTURE OF AIM APPLICATION
- ✿ Major reasons which have justified the implementation of Image analysis solution like Aim
- ✿ MAIN FUNCTIONALITIES PROVIDED BY AIM APPLICATION
- ✿ DATA MODEL OF AIM

2

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## BEFORE TO START ....

This presentation is not a training course on how to use ImageJ or on particular method of image analysis but rather on a tool that we've developed using to manage different projects :

- dealing with image analysis
- With on the one hand **ImageJ**
- and on the other hand a **Database**.

This tool named AIM (A = Analysis , IM = IMage) pilot the backoffice to declare, display, store, launch, retrieve, ....

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## GENERAL ARCHITECTURE


The Aim application is based on the following architecture

A front office → Graphic Interface written with the development tool Windev to manage studies (Declare, Retrieve, Export, Calculate, Levels of agregation, ...)

A back office → Image analysis software with the freeware ImageJ to define processing applied on images  
Database software with Hyperfile or Oracle to store data provide by the graphic interface and Image analysis

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graph TD; subgraph Front_Office; GI[Graphic Interface (Windev)]; end; subgraph Back_Office; DB[Database (HyperFile/Oracle)]; IAS[Image analysis software (ImageJ)]; end; GI <--> DB; GI <--> IAS;
```

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## Main reasons


The main purpose of Aim is to centralized and shared image analysis at GEVES

Through this main goal :

- Centralized processing
- Ease processing
- Share our knowledge and experiences
- Standardize the results and controls
- Use benefits offer by database (Integrity, Access rights, Backup, Query, Link with other information system, ....)

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5 




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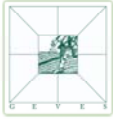
## MAIN FUNCTIONALITIES

Through differents examples we are going to show the use of AIM application :

- 1<sup>er</sup> – How to define and store macros Image-J
- 2<sup>nd</sup> – How to declare the framework of studies
- 3<sup>èm</sup> – How to launch processing on images
- 4<sup>èm</sup> – How to integrate measurement calculate by processing on images into database
- 5<sup>èm</sup> – How to define and calculate new variables dynamically
- 6<sup>èm</sup> – How to group/aggregate results (to the variety, to the replicate,...)

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6 



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## Main functionalities


### Example 1 : Assess how plant cover the ground

**Context** = The user has a list of images of several varieties and he wants to assess how each of these varieties cover the ground.

- Define a macro to separate the plant covering from the uncovered ground and measuring the ratio.
- Declare the framework of the study.
- Load images and launch analysis on each image.
- Open and store the file result.

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7



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## Main functionalities


### Example 3 : Assess attack disease on leaves

**Context** = The user has several varieties and he wants to assess the attack of disease on leaf in controlled environment. He scans one image per variety and on each image he's got several leaves.

- Define a macro to calculate the ratio between the area cover by disease and the area of leaf
- Define the framework of the study.
- Load images, select macros ImageJ and launch processing.
- Open the file result and integrate its content into database.
- Transform area from pixels to square millimeters

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8



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## Main functionalities

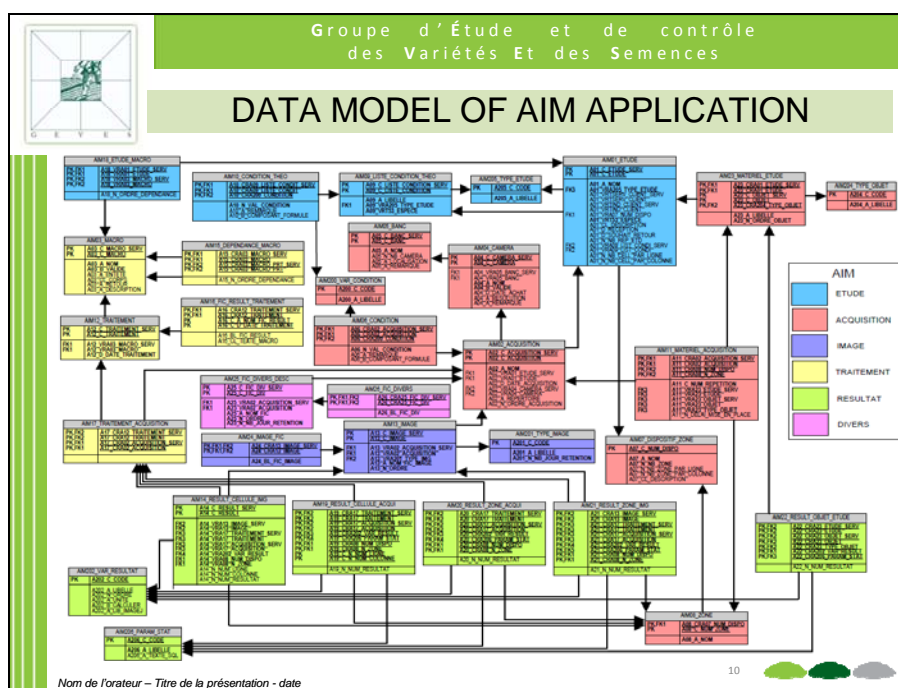
### Example 3 : Assesment of fineness of foliage

**Context** = The user has several varieties of carrot and he wants to assess the fineness of foliage. He scans one image per variety and on each image he's got several leaves

- Define a macro to calculate the ratio between area of leaves and perimeter of leaves.
- Define precisely the framework of the study.
- Load images, select macros ImageJ and launch processing.
- Open the file result and integrate its content into database.
- Define several grouping to get results for :
  - Each Replicate
  - Each Variety
  - .....

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9 



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