

## Judicial Management By Digital Libraries Semantics



# D.6.3

## Demonstration to Italian Pilot



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# **1 Introduction**

## **1.1 Deliverable objectives**

This document describes all the demonstration activities performed during the JUMAS project focused on the Italian Pilot site. A first objective of this deliverable relates to the description of the set of activities for localizing of the Italian prototype, tuning the physical layout and collecting audio/video material. A second goal is to provide a description of the demonstration tools used during the demonstration activities. The last objective relates to the description of the demonstration activities performed for the Italian pilot.

## **1.2 Audience of the deliverable**

This deliverable is aimed at both an external and internal audience of interested users. In particular, this deliverable is targeted to all JUMAS consortium members and to potential end users. While most of the deliverable contents are focused on general audiences, a specific section is dedicated to system administrators.

## **1.3 Structure of the deliverable**

This deliverable describes the demonstration setup that has been implemented for the Italian pilot, which ranges from the physical configuration of the JUMAS system, to the courtroom infrastructure to the collection of audio video materials. The outline of the deliverable is the following. In section 2 the demonstration setup is described. In section 3 the tools used during the demonstration activities are presented with the detailed description concerning the JUMAS Portal and the Jumas Process Manager. The last section is devoted to describe the main targets of the Italian demonstration with the corresponding main outcomes.

## 2 Demonstration set up

### 2.1 Localization of the Italian prototype

The localization of the Italian prototypes of the JUMAS system has comprised four main activities:

1. **Localization of the JUMAS portal.** The media container representing the JUMAS portal was originally defined for the English language. In order to customize this container for the Italian Pilot, all the text available into the media container used to present the contents to the end user have been translated and refined according to the Italian requirements. Therefore, the portal's local resources (resx files) and database dictionary table has been configured for the Italian language.

From the end user point of view, in order to enable the Italian language, an image representing the national flag on the portal's master page has been provided. (see Figure 1)

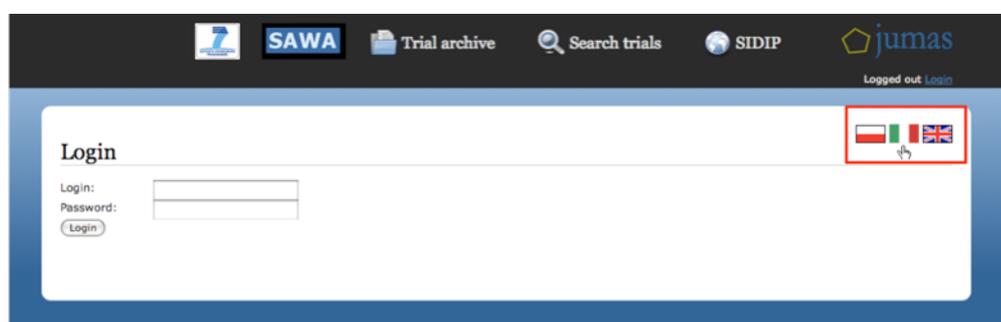


Figure 1: Jumas Portal for the Italian Site

By clicking the Italian flag image-link the corresponding user-id culture (UICulture) updates the Portal Language Configuration Table presented in Figure 2.

Key: varchar(100)	Languagecode: varchar(5)	Value: varchar(100)
-------------------	--------------------------	---------------------

Figure 2: Jumas portal language configuration table

This event will affect all the text available comprised into the media container used to describe the corresponding contents.

2. **Localization of the JUMAS components.** The multimedia analysis components developed for the JUMAS project have been tuned for covering the Italian test case. In particular, all the language-dependent functionalities offered by the JUMAS system have been adapted according to the characteristics of the Italian debates. A set of models has been trained and embedded into the developed components. In particular, the following components have been developed according to the Italian characteristics, i.e. the models have been trained using the Italian training example: ontology,

information extraction, tag-recommendation, emotion recognition, automatic speech transcription and deception detection.

3. **Localization of the Jumas Process Configurator (JPC).** The Jumas Process Configurator, as described in deliverable D5.1 and D5.2, is a standalone application that manages the execution of processes, ranging from the upload of the multimedia material on the JUMAS portal to the invocation of multimedia analysis functionalities as speech recognition, video annotation, etc... This component, designed for system administrators, has been customized for the Italian Pilot. In particular, the JPC has been configured according to the local requirements:
  - a. Setting of local and remote paths on the Jumas Process Manager: (1) local path for multimedia library folder [C:\medialib], for identifying the folder containing the multimedia file to be uploaded on the portal or processed by the analysis components; (2) remote path for IIS streaming [149.132.178.208/streaming\_path], for storing the media contents to be shown as streaming; (3) local path for temporary directory for streaming [C:\media\_streaming\_lib\_tmp], for supporting the conversion of avi files into a streaming format.
  - b. Setting of the Database Connection: setting of remote path [149.132.178.220] and credentials for connecting to the current in use court management system (SIDIP).
  - c. Setting of the Jumas Portal: (1) setting of the Internet address for the Italian Jumas Portal [https://149.132.178.220:81/JumasPortalit/] and (2) selection of the IIS streaming quality, i.e. 448x256 with a bitrate of 688.
  - d. Selection and localization of Tasks Patterns into the Jumas Process Configurator: a Task Pattern for the Italian site has been created for invoking the multimedia analysis functionalities customized for the Italian site. Each file property corresponding to a service listed into the task pattern, which allows the execution of a multimedia analysis service, has been configured according to Italian Pilot. An example of file property, which relates to the Template Filling functionality, localized for the Italian site is depicted in Figure 3.

```
language=ITA  
xmlDBPropsAndQueries=./input/db-prop-and-queries.xml  
crfConfig=./crfConfig_ITA.properties  
mappingLabels=./mappingLabels_ITA.properties
```

**Figure 3: Example of file property localized for the Italian case**

4. **Filling up the Italian Jumas Portal.** Several multimedia contents have been acquired at the Court of Naples, Italy. All these contents, described in section 2.2.2, have been uploaded on the Italian Jumas Portal in order to demonstrate the potentiality of the developed system. The acquired audio/video material has been uploaded on the Jumas Portal by using the SIDIP system and the localized Jumas Process Configurator described above.

Once the record for a given trial has been created by using the SIDIP functionalities, the corresponding folder was available into the Jumas Process Configurator. This allowed us to upload the media files and invoke the functionalities for populating the Portal with multimedia and semantic information.

The media sessions, media channels and media files for the acquired material at the Tribunal of Naples have been managed with the JPC for making available the multimedia and semantic contents on the JUMAS portal for the demonstration phase. This management included the creation of media sessions, the definition of media channels and the upload of media files.

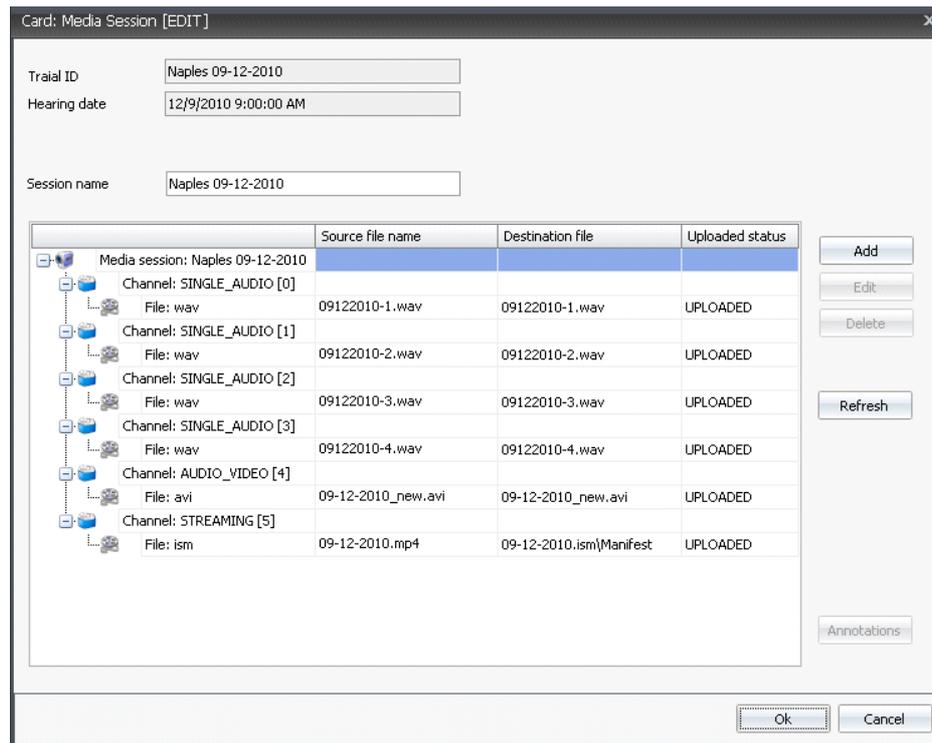


Figure 4: Management of media contents for filling up the Jumas Portal

## 2.2 Tuning of the physical layout

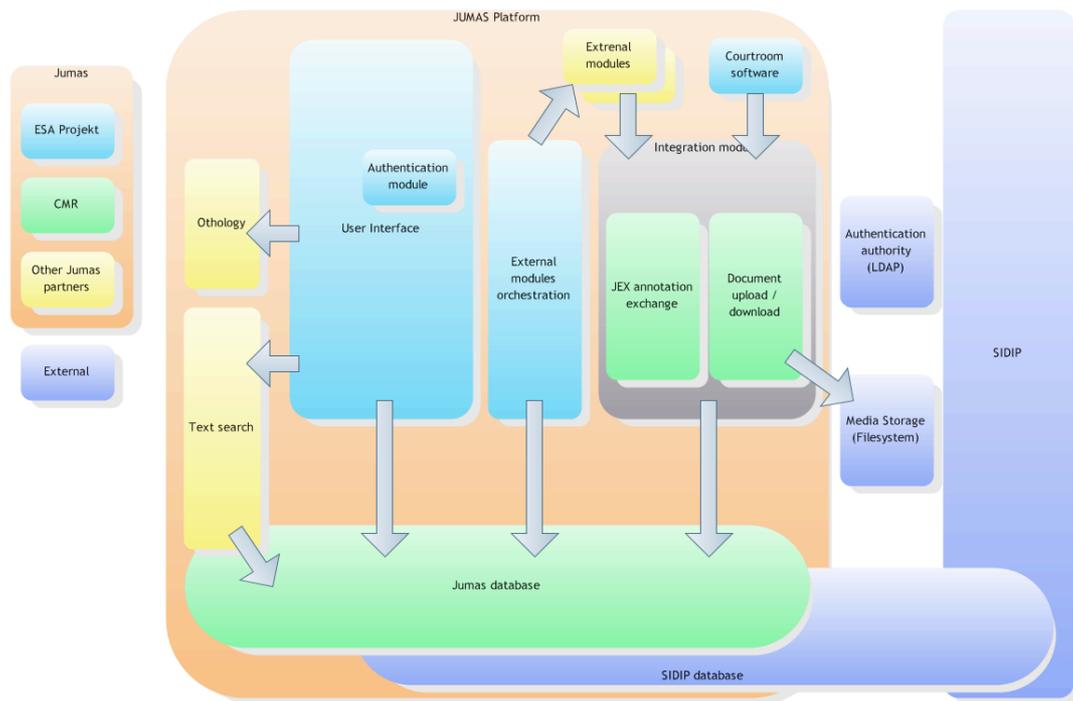
### 2.2.1 JUMAS-SIDIP integration and security constraints

The Jumas system has been designed in order to cooperate with the Court Management System (CMS) currently in use at several Courts in Italy and made available by the Italian Ministry of Justice.

The Jumas system shares the physical database with SIDIP: same schema and same instance. The integration with SIDIP has been done at the database level: the entities of the Jumas database which concern CMS data have been substituted with database views on SIDIP schema. In this way, changes performed in SIDIP are immediately available to JUMAS.

The authentication for the JUMAS portal is performed by using the User Interface available on the Jumas Portal instead of using the LDAP application protocol provided by SIDIP. A pluggable component behind the User Interface abstracts the authentication from LDAP. Note that all authorization information are stored in the database.

The JUMAS-SIDIP integration is depicted in Figure 5.



**Figure 5: JUMAS-SIDIP integration**

Since it was not possible to perform the JUMAS-SIDIP integration within the premises of the Court of Naples, due to the current security requirements, a working lab-integration has been performed. A set of virtual machines, which comprises SIDIP and JUMAS, has been installed on local machines of CMR.

The following configuration has been adopted in order to deliver the JUMAS demonstrator for the Italian Pilot.

JUMAS PORTAL	
<p><i>Physical Machine</i></p> <p>Operating System: Microsoft Windows Vista Business 32 bit, Service Pack 2</p> <p>Processor: Intel Core2 Quad CPU Q9400, 2.67GHz</p> <p>RAM: 4.00 GB</p> <p>Firewall: Windows Firewall</p> <p>Antivirus: Symantec Antivirus Corporate Edition</p>	<p><i>Virtual Machine</i></p> <p>Name: VM-Jumas-Portal</p> <p>Operating System: Microsoft Windows Server 2008</p> <p>Firewall: windows firewall</p> <p>Antivirus: Avira Antivir</p> <p>Services provided and corresponding ports:</p> <ul style="list-style-type: none"> <li>• Application Server (Jboss): 80</li> <li>• Internet Information Services (IIS): 80</li> <li>• Internet Information Services (IIS): 443</li> <li>• Remote Desktop (RD): 3389</li> <li>• Oracle DB</li> </ul> <p>Expected network traffic: between 50 MB/Day and 20 GB/Day according to the courtroom activity</p>

JUMAS UBUNTU	
<p><i>Physical Machine</i></p> <p>Operating System: Microsoft Windows XP Business 32 bit, Service Pack 3            Processor: Intel Core2 Duo CPU E6850, 2.99GHz            RAM: 3.00 GB            Firewall: Windows Firewall            Antivirus: Symantec Antivirus Corporate Edition</p>	<p><i>Virtual Machine</i></p> <p>Name: VM-Jumas-Ubuntu            Operating System: Ubuntu            Firewall: -            Antivirus: -            Services provided and corresponding ports:</p> <ul style="list-style-type: none"> <li>• Application Server (Jboss): 1547</li> <li>• File Transfer Service (FTP): 5521</li> <li>• Secure Shell (SSH): 5522</li> <li>• Remote software control (VNC): 6346</li> </ul> <p>Expected network traffic: between 50 MB/Day and 20 GB/Day according to the courtroom activity</p>
JUMAS PROCESS MANAGER	
<p><i>Physical Machine</i></p> <p>Operating System: Microsoft Windows Vista Business 32 bit, Service Pack 2            Processor: Intel Core2 Quad CPU Q9400, 2.67GHz            RAM: 4.00 GB            Firewall: Windows Firewall            Antivirus: Symantec Antivirus Corporate Edition</p>	<p><i>Virtual Machine</i></p> <p>Name: VM-Jumas-XP            Operating System: Microsoft Windows XP Professional            Firewall: windows firewall            Antivirus: Avira Antivir            Services provided and corresponding ports:</p> <p>Expected network traffic: between 50 MB/Day and 20 GB/Day according to the courtroom size and activity</p>

The JUMAS Portal and all the communication for uploading multimedia data and accessing and consulting the JUMAS database exploits the HTTPS protocol, as required by the Italian Ministry of Justice.

Hypotheses of court infrastructure for future JUMAS installation can be defined according to the Court dimension.

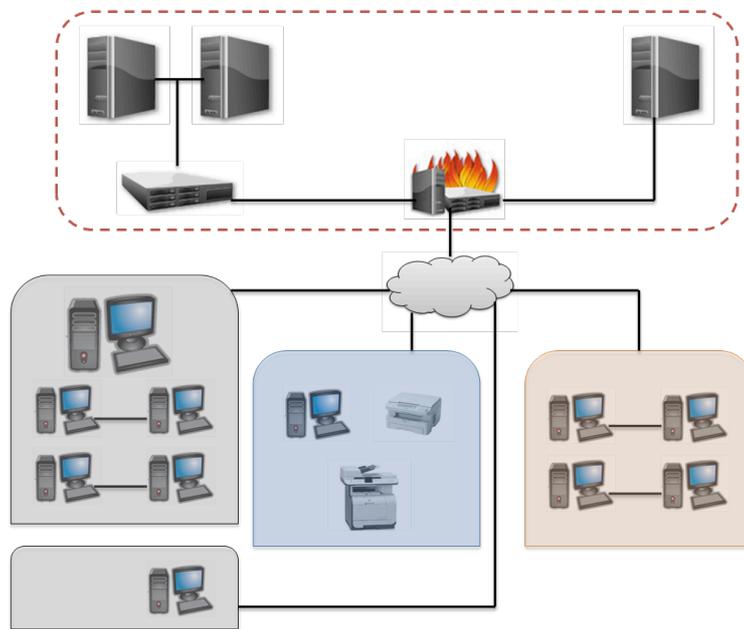
Let us to start to by considering that, during an Italian legal year, an approximate number of 150 hearings per court, with an average duration of 4 hours, could be held. Consider also that approximately 40% of these trials are related to audio recordings, 20% to audio and video and the other 40% has no recordings (additional data such as textual sources, e.g. minutes in .doc and .pdf format, images or other digital material are available).

According to this Italian scenario a 4 audio channel registration with 16 kHz, 192 kbps and 32 bit recording settings needs a storage space of about 8,7 MB/min while audio/video (recorded with 640x480 resolution and 29 bitframe) needs a storage of 39 MB/min.

A scalability hypothesis is described as follows:

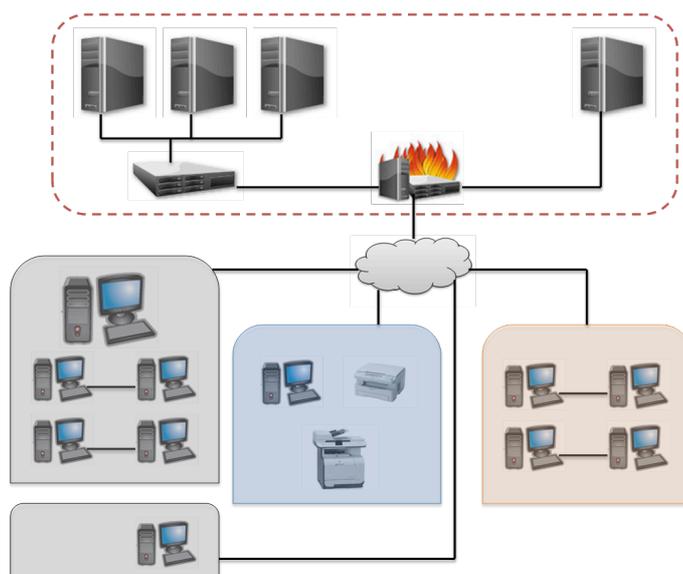
- *Small Courts*. A law court of small dimension (1-5 courtrooms) requires a total amount of space of 2.9 TB, estimated by considering 1200 hours of audio recordings (stored in 0.6 TB), 600 hours of audio/video (stored in 1.4 TB) and other documents (stored in 0.85 TB).
- Vertical scalability:

- Data Base: 2-3 CPU at 3,2 GHz, RAM 4 to 32 GB
- Audio Server: 2 CPU at 3,2 GHz, RAM 4 to 8 GB
- Video Server: 2 CPU at 3,2 GHz, RAM 2 to 8 GB



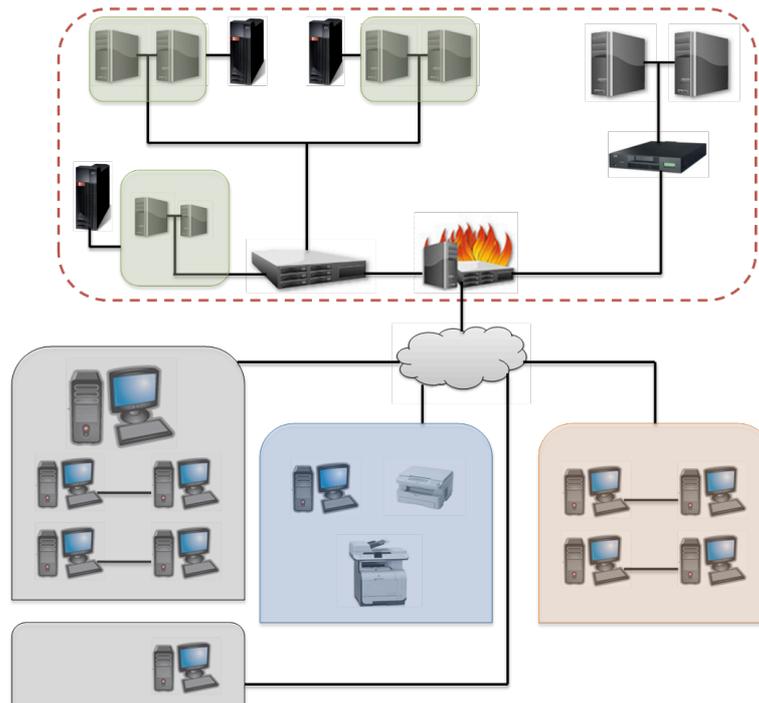
**Figure 6: Infrastructure hypothesis for small courts**

- *Medium Courts*. Considering a medium law court of about 10 courtrooms. The total requested data amount per year is 5.7 TB, estimated by considering 2400 hours of audio stored in 1.2 TB, 1200 hours of audio/video stored in 2.8 TB and the other documents stored in 1.7 TB.
  - Vertical scalability:
    - Data Base: 3 to 4 CPU at 3,2 GHz, RAM 8 to 32 GB
    - AS: 2 to 8 nodes, 1 to 2 CPU at 3.2 GHz, RAM 4 to 8 GB
    - VS: 2 to 8 nodes, 1 to 2 CPU at 3.2 GHz, RAM 2.5 to 8 GB



**Figure 7: Infrastructure hypothesis for medium courts**

- *Large Courts*. Consider a large/metropolitan law court dimension with about 30 courtrooms. The total requested data amount per a legal year is 17.2 TB, estimated by considering an hypothesis of 7200 hours of audio recordings stored in 3.7 TB, 3600 hours of audio/video in 8.4 TB and 5 TB for other documents.
  - Vertical scalability:
    - o DB cluster: 4 to 10 nodes, 3 to 4 CPU at 3,2 GHz, RAM 8 to 32 GB
    - o AS-Infra cluster: 4 to 10 nodes, 2 to 4 CPU at 3,2 GHz, RAM 8 to 12 GB
    - o AS-MT: 4 to 10 nodes, 2 to 4 CPU at 3,2 GHz, RAM 3 to 12 GB
    - o VS: 4 to 10 nodes, 2 to 4 CPU at 3,2 GHz, RAM 3 to 12 GB



**Figure 8: Infrastructure hypothesis for large courts**

### 2.2.2 Setting up the courtroom infrastructure for audio-video acquisition

The activities for acquiring the audio-video material for the Italian Jumas demonstrator has been performed at the Court of Naples, in collaboration with CISIA (Coordinamenti Interdistrettuali per i Sistemi Informativi Automatizzati).

After a preliminary infrastructure analysis of several Courts in Italy, the Italian Ministry of Justice has proposed the Court of Naples as a proper site with adequate tools for audio and video acquisition.

In particular, thanks to the hardware infrastructure already installed and compatible with the JUMAS prerequisite, courtroom 116 at the Assise Court of Naples has been selected as pilot site. The hardware infrastructure comprised a rack with recording software and a Sony camera SNC-RZ50P. An overview of courtroom 116 infrastructure is reported in the table Table 1.

Court room equipment	
Equipment	Description
Rack	Switch for connecting the network infrastructure Software for acquiring audio and video material UPS
Mixer	BiAmp Nexia CS
Switch	HP Switch 6108
Workstation (with rack option)	HP XW4400 2.67GHz 2GB 250GB (with serial port on board) Windows XP PRO SP2 with additional network card
Audio acquisition card	MAudio Delta 1010
Video acquisition card	Pinnacle movie board 500
Camera	Sony SNC RZ50

**Table 1: Tribunal of Naples - Courtroom 116 infrastructure**

The acquisition of single channel audio tracks has been performed by exploiting the freeware Audacity software (one channel for each actor, i.e. judge, witness, prosecutor and lawyer), while the High Quality video track has been recorded by using the Sony Shot Manager software.

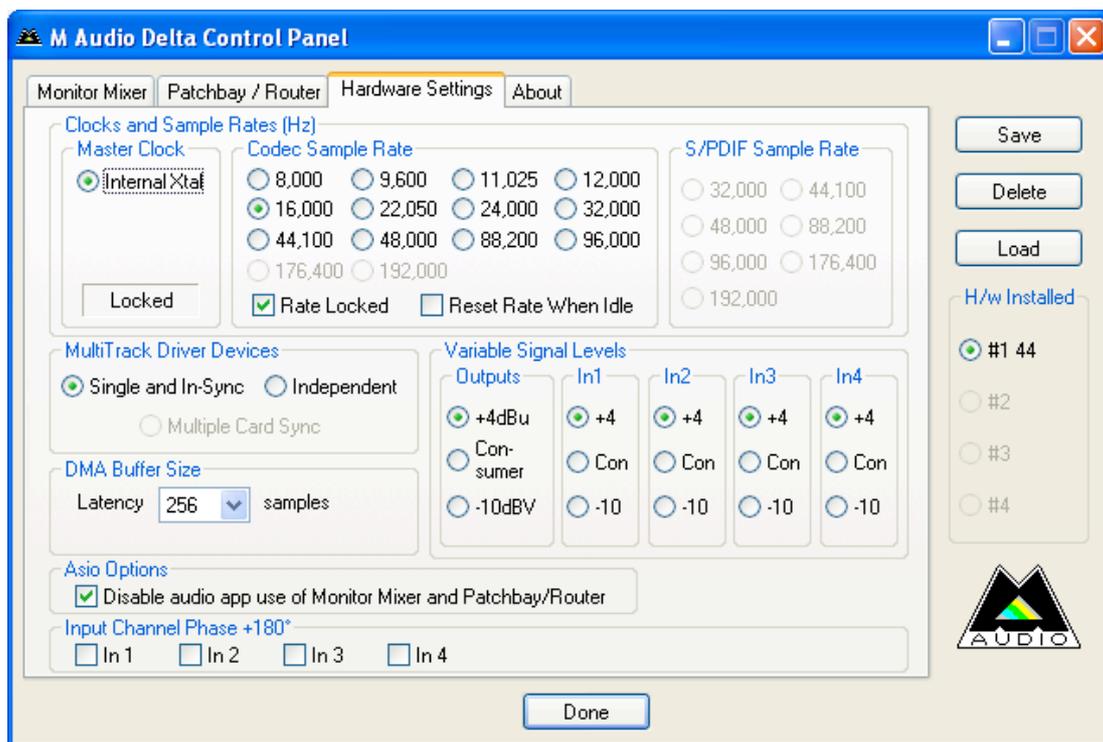
During the initial audio/video recording activities several adjustments to the hardware and software infrastructure into the courtroom 116 has been performed according to the following questions:

- 1) single channel acquisition: a single track that comprised the four channels was initially recorded, implying potential low performance of ASR and emotion recognition functionalities;
- 2) saturated channels: the channel related to the judge was saturated, with an acquisition gain too high;
- 3) sampling frequency: the recording used a sampling frequency of 44.1 kHz, while it was sufficient for ASR and emotion recognition to have a 16 kHz sampling;
- 4) cross-channel feedbacks: high cross-channel feedbacks for audio tracks were due to the option "automatic gain control" (AGC) of the audio board;
- 5) noise filters: several segments of the audio recording were characterized by a low intensity;
- 6) camera switch: the switch of the camera for recording the video signal of a currently "active" speaker was tuned by the Nexia mixer with no filters, introducing then continuous and useless switches;
- 7) Low video quality: the camera preset was configured to acquire videos with a 288x352 resolution and 10 bitframe.

After a preliminary recording phase, the following constraints have been introduced:

- Video acquisition
  - Disabling of the automatic switch of the camera in order to avoid continuous scene changes. Despite the best focus of the camera is the “witness area”, for the video acquisition the “lawyer area” has been chosen. This because no witnesses were present into the courtroom thanks to the video-conference facilities available into the courtroom 116;
  - Setting good quality video recordings: a 640x480 resolution with 29 bitframe has been set;
- Audio acquisition:
  - Acquisition of 4 different tracks, one for each channels corresponding to judge, witness, prosecutor and lawyer.
  - Setting good quality audio recordings: a 16KHz, 192 Kbps and 32 bit float recording has been set;
  - Filter disabling: noise filters, automatic gain control and cross-channels feedback have been tuned

Three screenshots of the MAudio Delta board and the Nexia mixer control panel are reported to show the current status of the recording system.



**Figure 9: MAudio Delta board configuration**

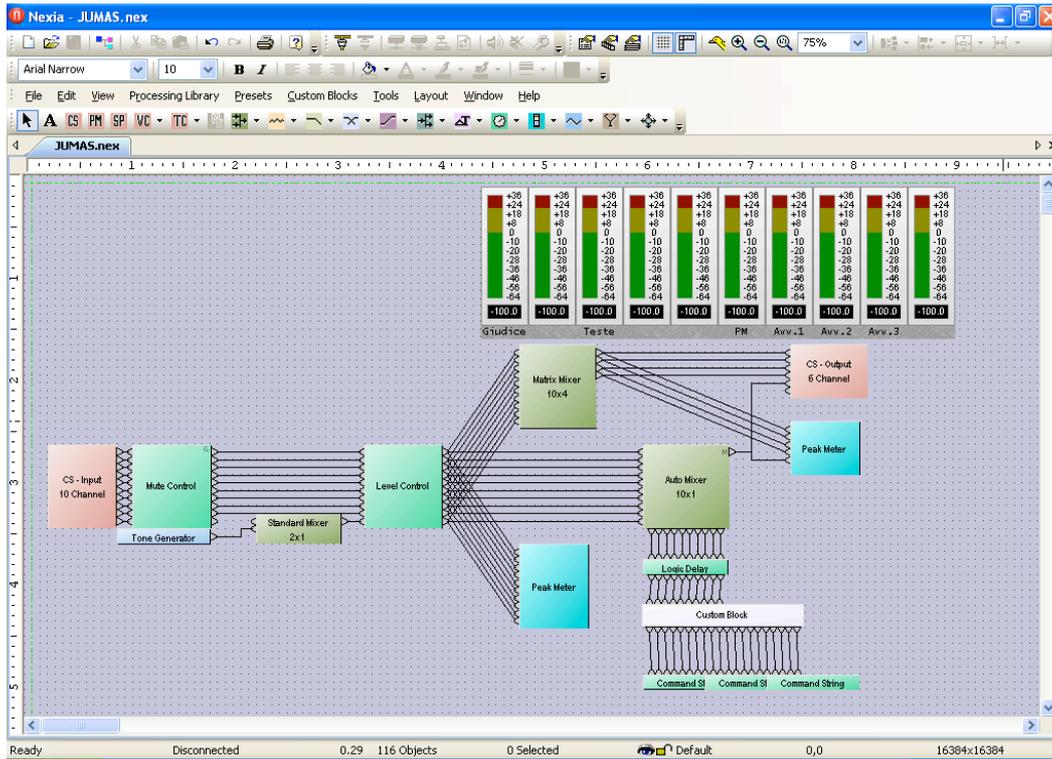


Figure 10: Nexia mixer configuration

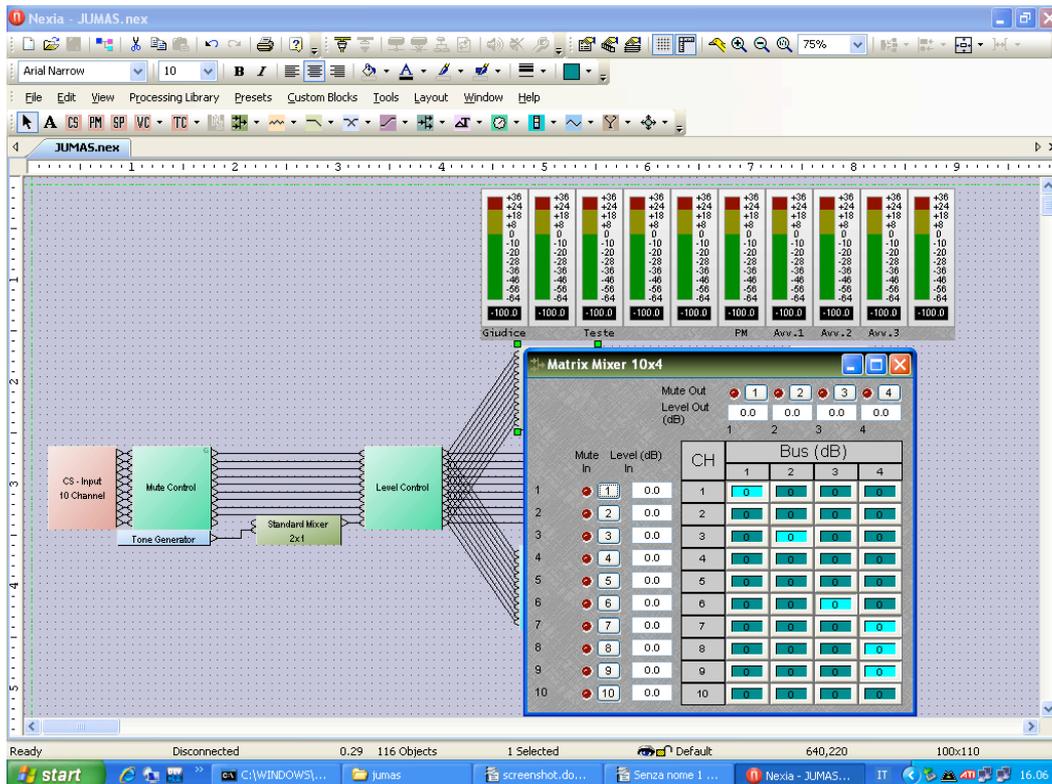


Figure 11: Nexia mixer configuration

## 2.2 Collection of audio-video material

The collection of audio-video material has required a formal authorization by the President of Court of Naples to allow CMR to opportunely tune the hardware and

software infrastructure available into the courtroom and to perform a live recording of trials.

Given the formal authorization for collecting analyzing audio-video material of penal trials, the recording of multimedia sessions has been performed. Since November, 11<sup>th</sup> until January, 13<sup>th</sup> a set of 24 hearings have been recorded.

The duration of the collected hearings ranges from 15 minutes to 5 hours, with an average duration of 2.5 hours. The acquired material relates to 45 hours of recordings, with a space requirement of 120 GB.

All the collected material has been uploaded on the JUMAS system by exploiting the SIDIP system and the Jumas Process Configurator. Once the media material were available into the JUMAS system, the following tasks have been invoked for each media session: (automatic speech recognition, body motion, stand-up/sit-down, face tracking, emotion recognition, template filling, (offline) multimedia summarization, deception detection.

## **3 Demonstration tools**

### ***3.1 JUMAS portal: user manual for law professionals***

The Jumas Portal is a web application that allows user to search and browse trials and documents related to them, and to watch audio and video content with text annotations related to the recordings. The Jumas Portal provides the materials as audio-video stream.

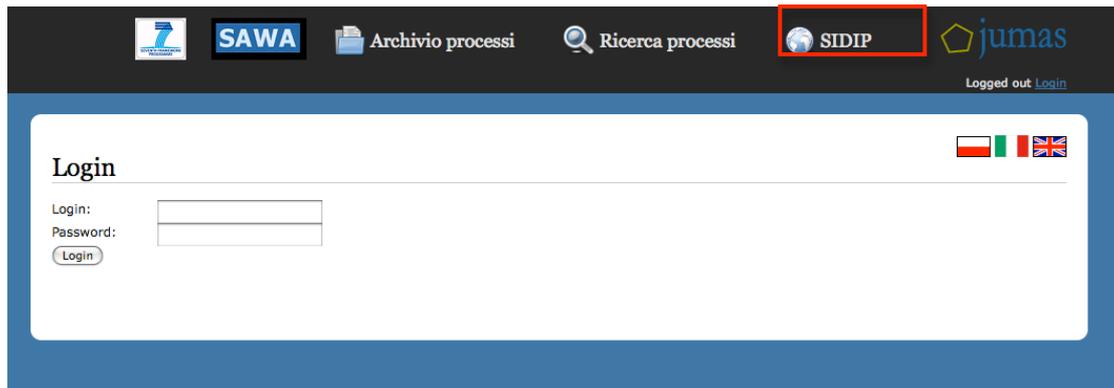
The latest version of the Italian Jumas Portal is available at the following address

<https://149.132.178.220/JumasPortalit/>

#### **3.1.1 Login on the JUMAS Portal and Link to the SIDIP system**

In order to log in as demo-user (role: court clerk) the following credentials need to be specified:

- Login: cancelor-it
- Password: cancelor-it

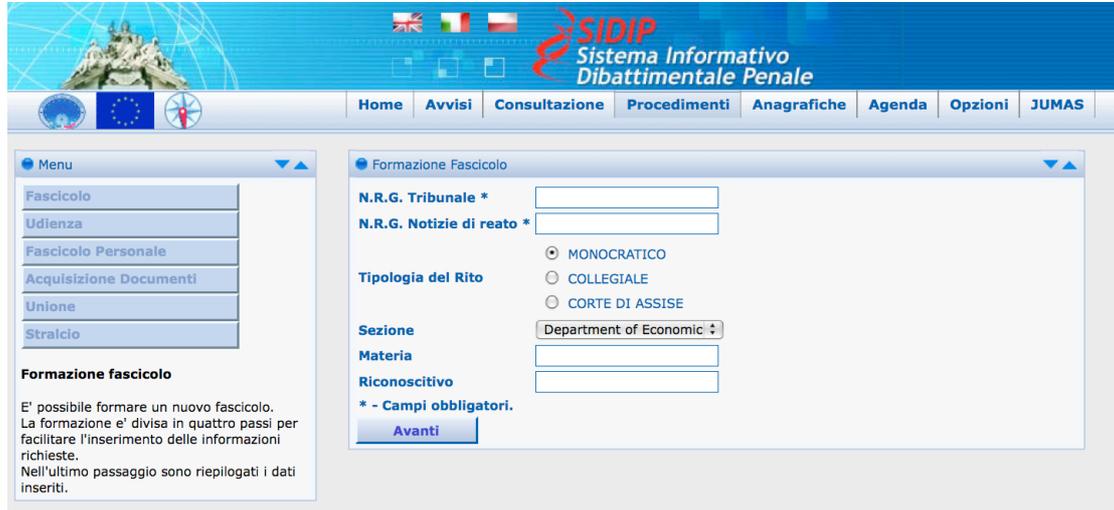


**Figure 12: JUMAS log in interface**

Once logged in the Trial Archive page is presented to the user (a quick start guide close the country flags is also available as user manual).

At the home page, as well as in all pages of the Jumas portal, a link to the SIDIP system is available.

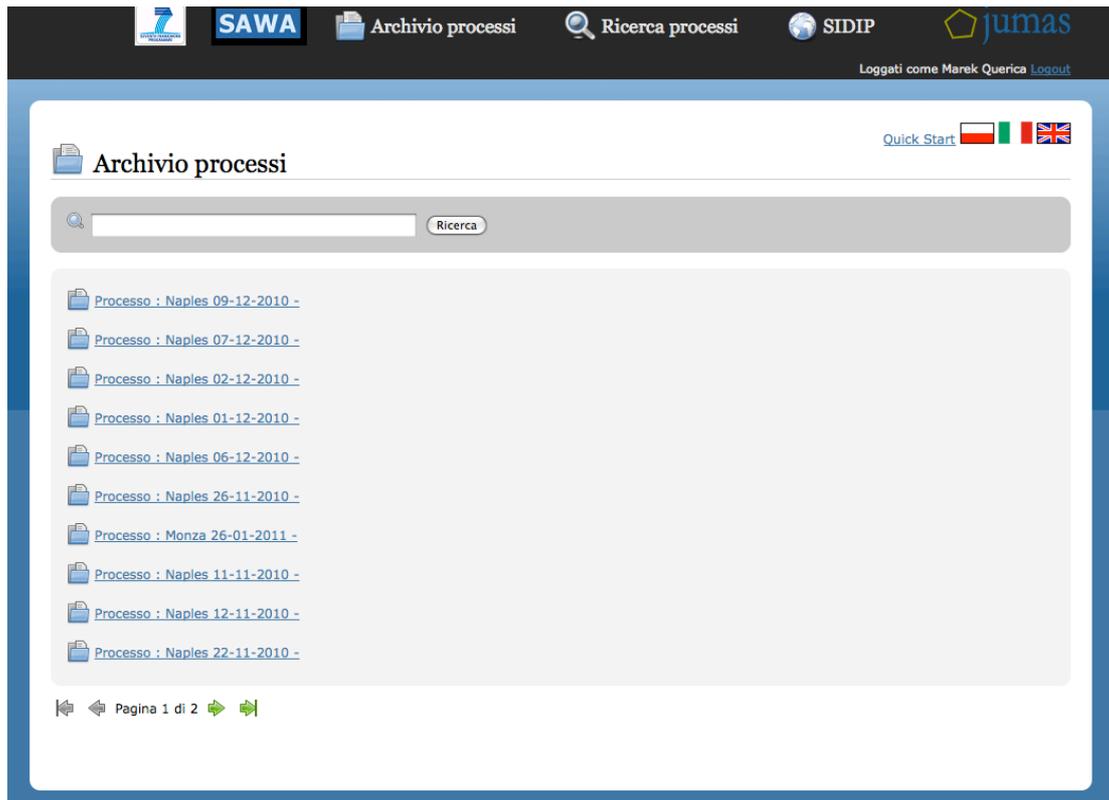
The JUMAS system exploits the existing court management system deployed for the Italian Ministry of Justice, i.e. SIDIP (Sistema Informativo Dibattimentale Penale). By clicking on the corresponding link (highlighted into the red frame) the SIDIP corresponding web page is presented to the user. Here, all the functionalities provided by SIDIP can be exploited to create the registry of each trial that the user would to enrich and consult by using the JUMAS system. A simple example of the SIDIP web page presented to the user is depicted in Figure 13.



**Figure 13: SIDIP interface for trial creation**

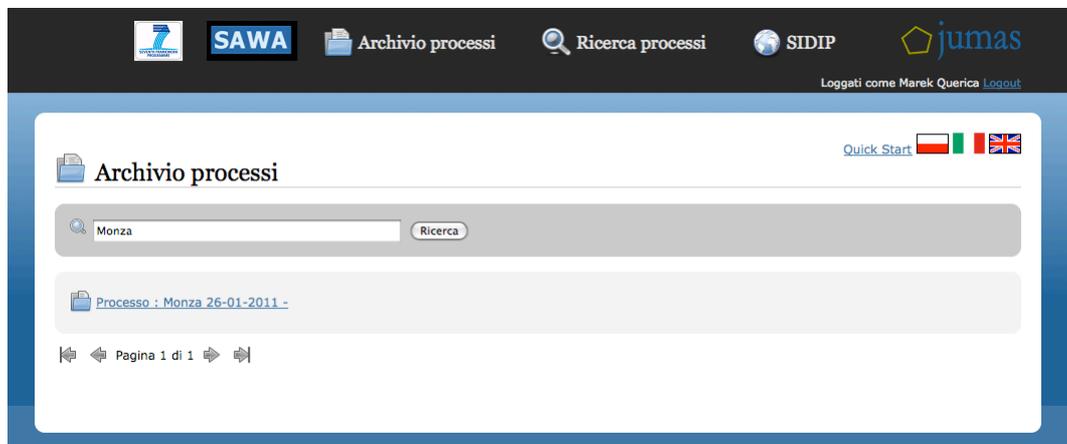
### 3.1.2 Trial Archive

After a user is logged in, the trial archive is presented. User can browse only trials that he is authorised to. To get the detailed information about a given trial, and to consult all the related textual and multimedia documents, the user should click on the corresponding trial item on the presented list.



**Figure 14: Trial archive**

In this section of the portal a first functionality is provided to the end user: search those trials into the list that match a given query.



**Figure 15: Search over the trial list**

### 3.1.3 Trial Details

Once a user has selected one trial from the trial list, the corresponding details are presented. The page is divided into two tabs. The first one presents information retrieved from the SIDIP system, while the second one provides an overview of the trial as a synthetic storyboard.

#### Details

This tab shows the main data of a trial that has been previously introduced by using the SIDIP system: court name, registry number, section, the trial matter, some short

description and the list of people involved in this trial (judge, prosecutor, court clerk, lawyers..).

The screenshot shows the 'Dettagli processo' (Trial details) page in the SAWA system. The page is titled 'Dettagli processo' and has two tabs: 'Dettagli' (selected) and 'Storyboard'. The 'Dettagli' tab displays the following information:

Tribunale:	<b>Procura di Naples</b>	Giudice:	<b>Marco Bianchi</b>
N.R.G.:	<b>Naples 11-11-2010</b>	Pubblico Ministero:	<b>Luca Rossi</b>
Sezione:	<b>Department of Economic</b>	Cancelliere:	<b>Marek Querica</b>
Materia:		Avvocato:	
Descrizione:		Imputato:	
		Data prima udienza:	<b>11/11/2010</b>

Below the metadata, there is a folder view for the trial: 'Processo : Naples 11-11-2010 -'. The folder contains the following items:

- Udienze
- Atti pre-dibattimentali
  - Decreto che dispone il giudizio
  - Seguito atti da Gip/Gup
  - Lista testi
  - Nomine Revoche Rinunce Difensori
  - Produzioni fuori udienza

**Figure 16: Trial details**

At the bottom of this tab a trial folder is presented. It contains a list of hearings and a list of documents related to the selected trial.

### **Storyboard**

The storyboard tab presents two different summaries. The first one – “Multimedia Summary” (Sommario Multimediale) – is a result of a Multimedia Summarization module. It is automatically generate with no parameters required to the user.

The second one – “User annotations” (Annotazioni Utente) – is a storyboard derived by considering the list of annotations manually produced by the end user.

To watch a clip user has to select the corresponding thumbnail by a click. The clip will start from the selected clip start time and it will be played until the end.


Loggati come Marek Querica Logout

Quick Start 

## Dettagli processo

Dettagli **Storyboard**

Sommario multimediale online

Produrre

Sommario multimediale

 Info: Naples 12-11-2010 First Session Ora: 00:38-00:44	 Info: Naples 12-11-2010 First Session Ora: 01:06-01:13	 Info: Naples 12-11-2010 First Session Ora: 01:43-01:55	 Info: Naples 12-11-2010 First Session Ora: 02:01-02:08	 Info: Naples 12-11-2010 First Session Ora: 03:45-03:52	 Info: Naples 12-11-2010 First Session Ora: 03:59-04:16
 Info: Naples 12-11-2010 First Session Ora: 04:24-04:36	 Info: Naples 12-11-2010 First Session Ora: 05:12-05:25	 Info: Naples 12-11-2010 First Session Ora: 05:43-05:46	 Info: Naples 12-11-2010 First Session Ora: 06:51-06:53	 Info: Naples 12-11-2010 First Session Ora: 08:57-09:22	 Info: Naples 12-11-2010 First Session Ora: 12:28-12:39

**Figure 17: Multimedia summary automatically generated**

Annotazioni utente

 Info: Naples 12-11-2010 First Session Ora: 04:17-04:33 Testo: Deposito sentenza d'appello	 Info: Naples 12-11-2010 First Session Ora: 17:14-17:31 Testo: Esame verbale 2009	 Info: Naples 12-11-2010 First Session Ora: 28:41-29:00 Testo: Nessuna deposizione su Morel...
---	--	---

**Figure 18: Multimedia summary obtained by considering user-generated tags**

At the upper section an online multimedia summary is provided as functionalities. The end user can provide one or more keywords (or a given concept) to search into the corresponding trial and create a summary that matches the submitted query. The generated summary will be therefore query-dependent.

Quick Start 

## Dettagli processo

Dettagli **Storyboard**

Sommario multimediale online

"medico legale" imputato Produrre

 Info: Naples 09-12-2010 Ora: 05:31-05:35	 Info: Naples 09-12-2010 Ora: 06:16-06:25	 Info: Naples 09-12-2010 Ora: 12:49-13:00	 Info: Naples 09-12-2010 Ora: 13:04-13:10
--	--	--	--

**Figure 19: query-based multimedia summary**

### 3.1.4 Hearing movie

When a user browses “Trial details” page s/he can choose to consult a particular movie by clicking on a given hearing. The corresponding audio-video streaming page will be displayed.

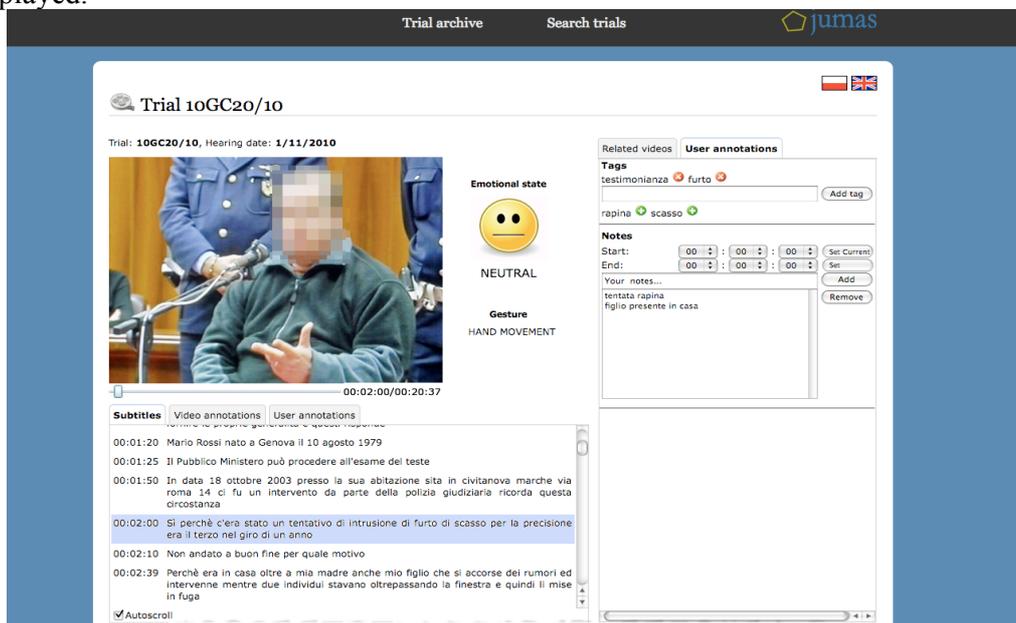


Figure 20: Hearing movie shown on the JUMAS portal

### Movie

User can play, pause and scroll through the presented movie. To control the audio-video material a typical user interface is used. While movie is being played the results of emotional state and gestures recognitions are presented on the screen.

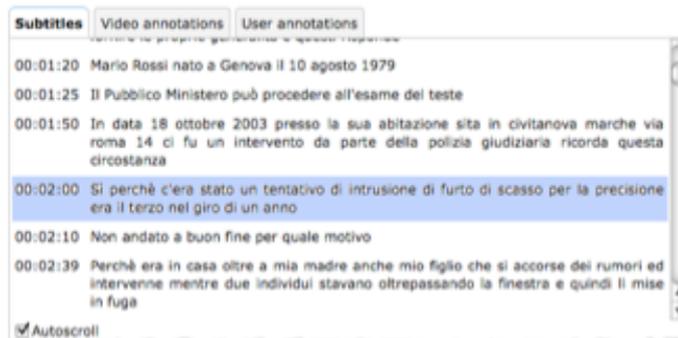


Figure 21: Movie details

### Annotations

At the bottom part of the page a list of annotations is presented. The annotations are divided into three groups. The first one is “Subtitles” (Trascrizione), that is a result of Automatic Speech Recognition module. The second one is “Automatic annotations” which presents all annotations provided by the video analysis modules. The third group presents annotations manually introduced by a user.

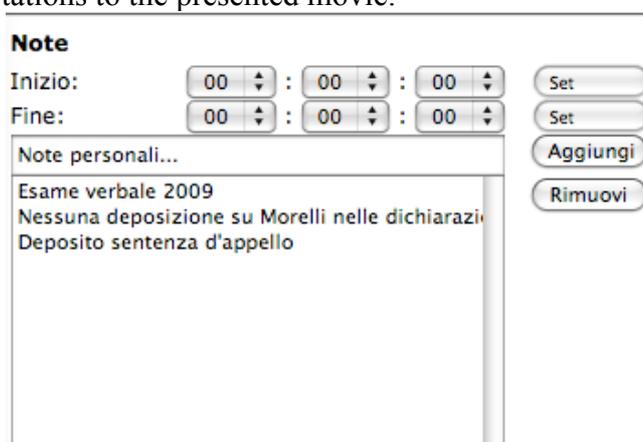
Clicking on each annotation moves a movie to the related time period.



**Figure 22: Transcription automatically generated**

### User Generated Annotations

On the right site of the page a user annotation control is presented. It allows user to add his own annotations to the presented movie.



**Figure 23: Box for user tags and annotations**

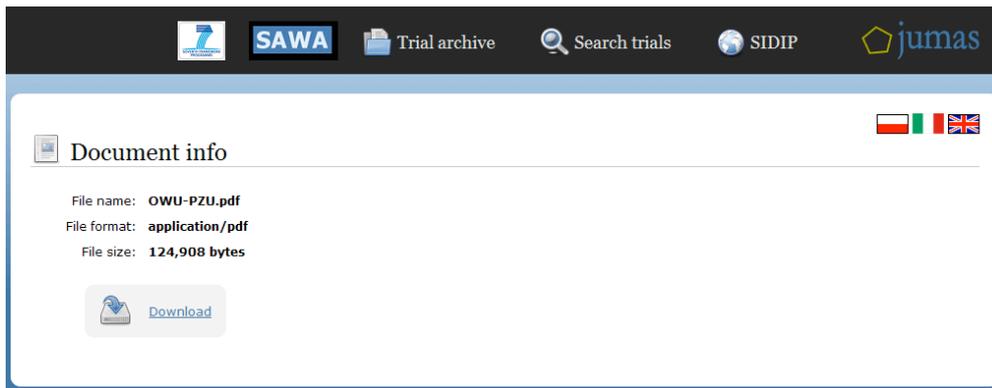
In order to add annotations to a given trial the user has to specify Start and End time with the corresponding annotations. The introduced annotations can be retrieved into the corresponding tab “User Annotations” (Annotazioni utente) available close to “subtitles” and “automatic annotations” tabs.



**Figure 24: User annotation tab**

### 3.1.5 Document download

While browsing trial folders on the trial details page the end user can choose a document to download. A download document page will be displayed with some basic document information.



**Figure 25: Document download page**

To get this document user should click the download link.

### 3.1.6 Search Trials

The search trial page enables user to easily find trials and related documents. User should provide a set of textual keywords and optionally choose some narrow search options (Limita ricerca a).



**Figure 26: Search trial page**

If the user selects the option “narrow search”, the corresponding frame is presented. Here the end user can specify where to limit its search: transcription, user annotations and metadata. In this scenario, also the possibility to exploit the query expansion modules (suggestion of related videos and ontology) is provided. If the end user checks the corresponding box, the submitted query will be augmented by the considered functionalities.

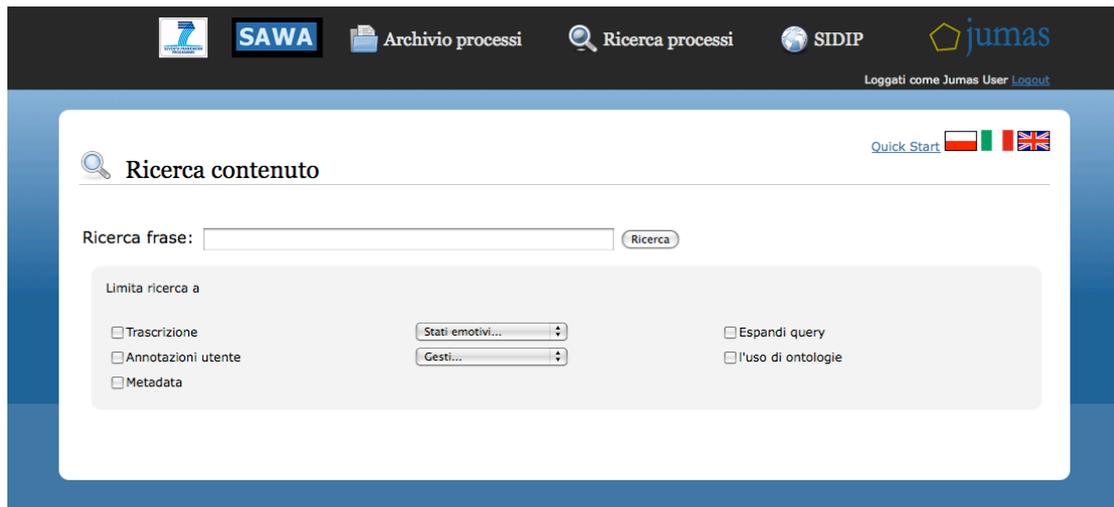


Figure 27: Advanced search

### 3.2 JUMAS Process Manager: user manual for system administrators

The Jumas Process Manager is an administrator tool for managing the JUMAS related components. The main window is composed by three main panels:

- SISIP trials – SIDIP trials' structure
- Media Sessions – Media sessions for selected hearings
- Uploading – list of currently uploading media files

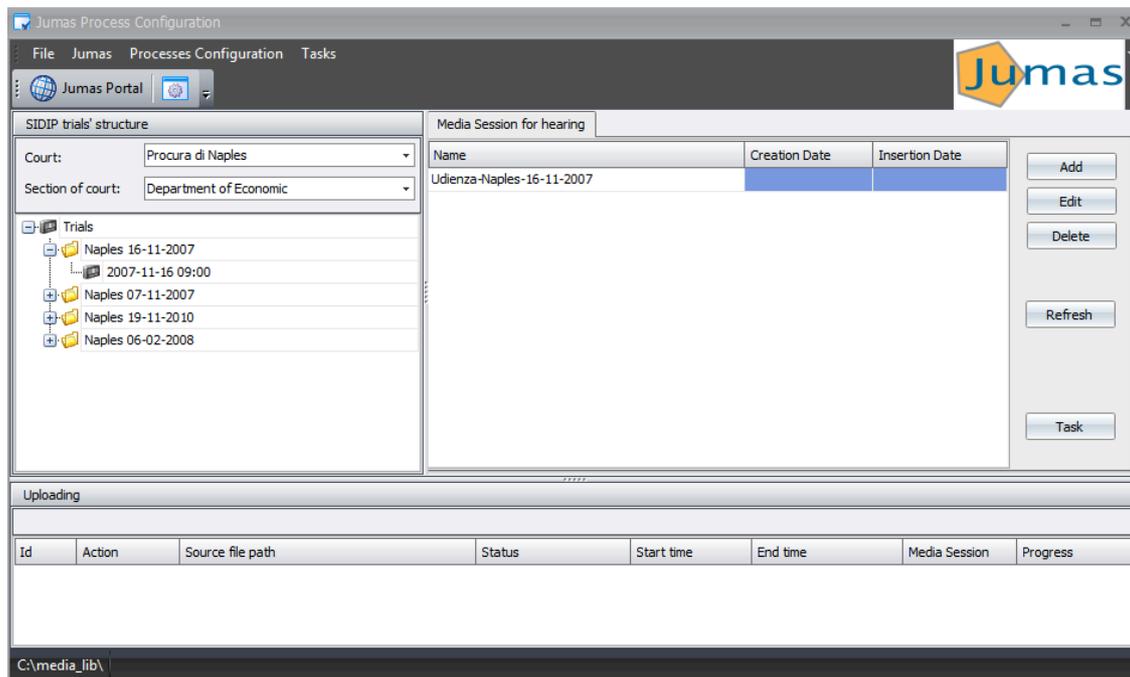


Figure 28: JPM main interface

#### 3.2.1 JPC configuration

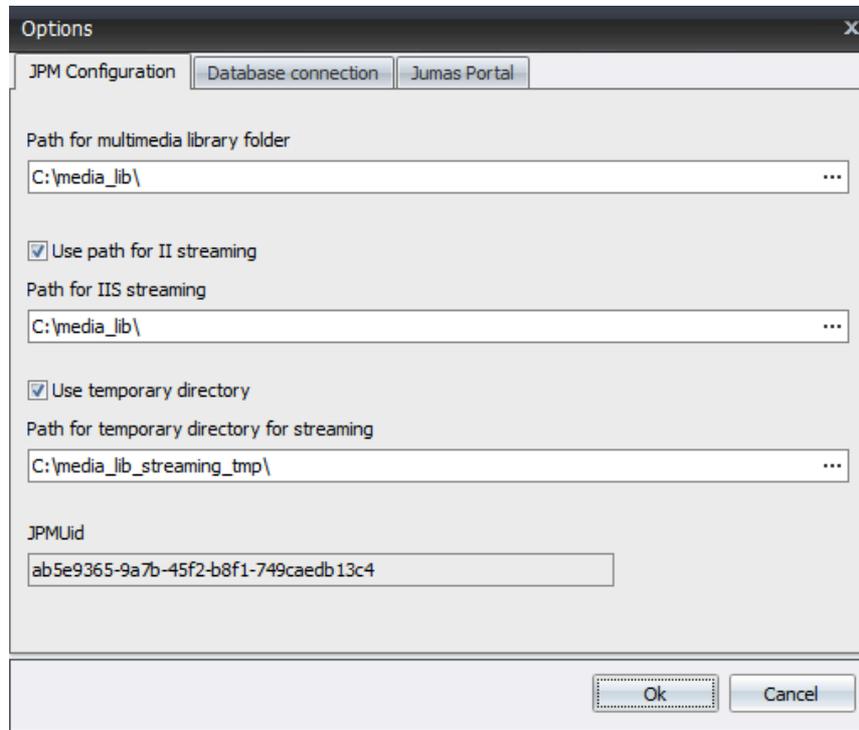
Under *Main menu\Jumas\Options* the system administrator (SA) can find the option window with 3 tabs: *JPM configuration*, *Database connection*, *Jumas portal*.

##### JPM configuration tab

On the *JPM configuration* tab SA can set destination directory for uploaded media files (*Path for multimedia library folder*).

If *Use path for IIS streaming* option is checked then video files prepared for IIS streaming are uploaded to directory specified in *Path for IIS streaming*, otherwise they are uploaded to the directory specified in *Path for multimedia library folder*.

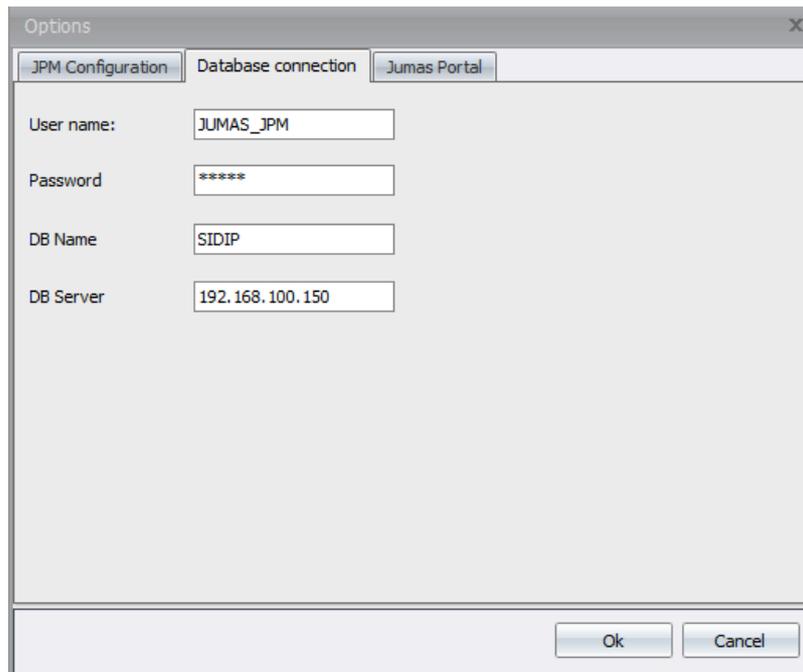
If *Use temporary directory option* is checked then results of video encoding for IIS streaming will be stored in a directory specified in *Path for temporary directory for streaming*. When the encoding is completed the streaming files are moved to the destination directory.



**Figure 29: JPM configuration**

### **Database connection tab**

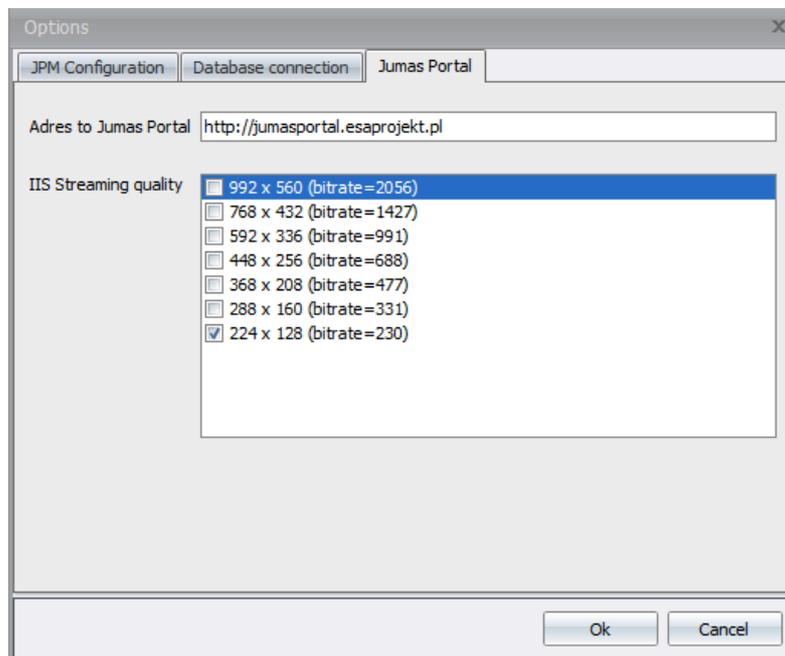
In the *Database connection* tab SA can specify the database connection string parameters related to the supporting CMS (SIDIP): user name, password, DB name and DB server.



**Figure 30: Database connection**

### Jumas Portal tab

The Jumas Portal tab allows SA can select the video streaming quality for the showing the audio-video stream on the Jumas portal.



**Figure 31: Jumas portal tab**

### 3.2.1 Process Configuration

Under Main menu\Process configuration there are two options: *Jumas Processes* and *Work groups of Jumas processes*.

## Jumas Processes

In this area SA can configure a list of processes (ASR, Emotion Recognition etc.) that will be responsible for analyzing media files and generating annotations.

To add a new process SA has to specify at last:

- *Module name* – name of the process
- *Module tag* – short name of the process
- *Multimedia format* – input file format for the module.

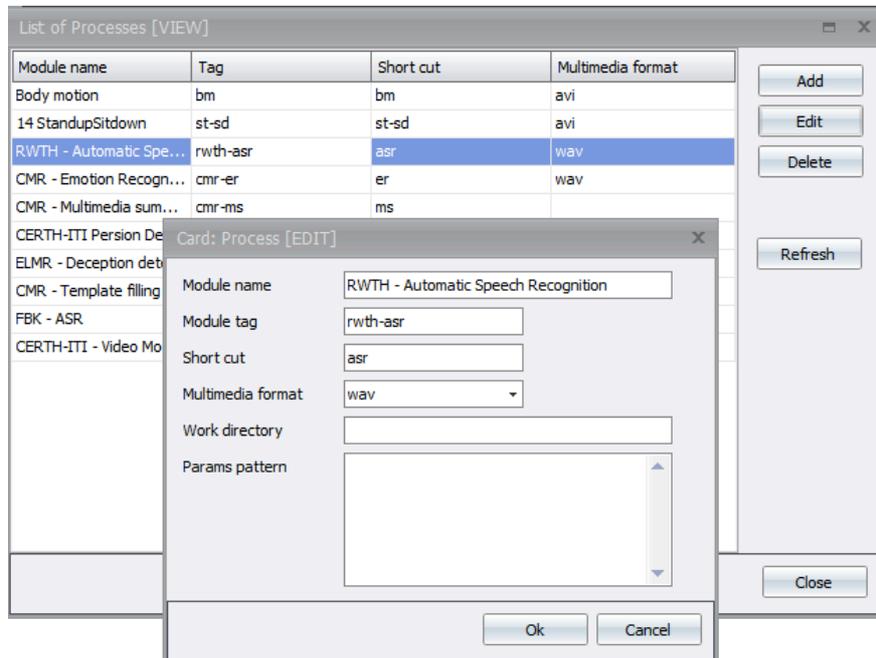


Figure 32: Process editor

## Work groups

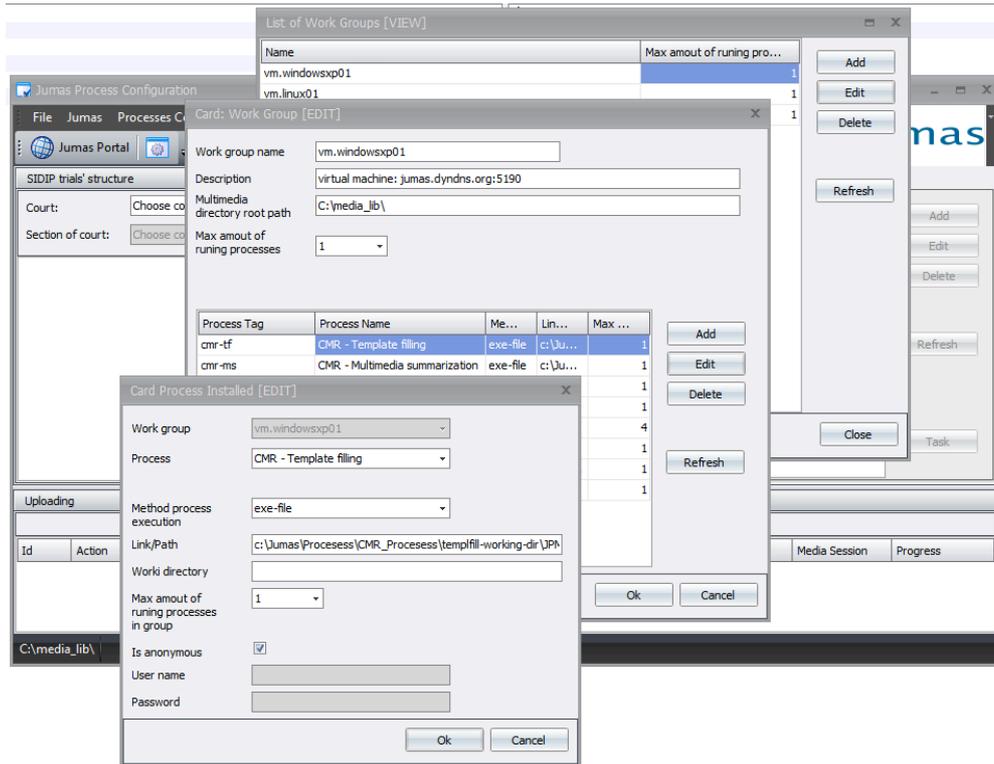
The work group section is devoted to to configure which Jumas Processes work on which computer. A work group represents a computer or en operating system where a given Process (ASR, Emotion recognition,...) is installed.

To add a work group SA has to specify at last:

- Work group name
- Multimedia directory root path – directory where the process can find the media files to be processed
- Maximum amount of running processes – maximum number of processes that can be simultaneously executed in the work group.

To add a Process for a work group SA has to specify at last:

- Method process execution – choose on of: exe-file, http-post
- Link/Path – address of the web service if http-post method were specified or path to the executable file (exe-file method).
- Maximum amount of running processes admitted into the group

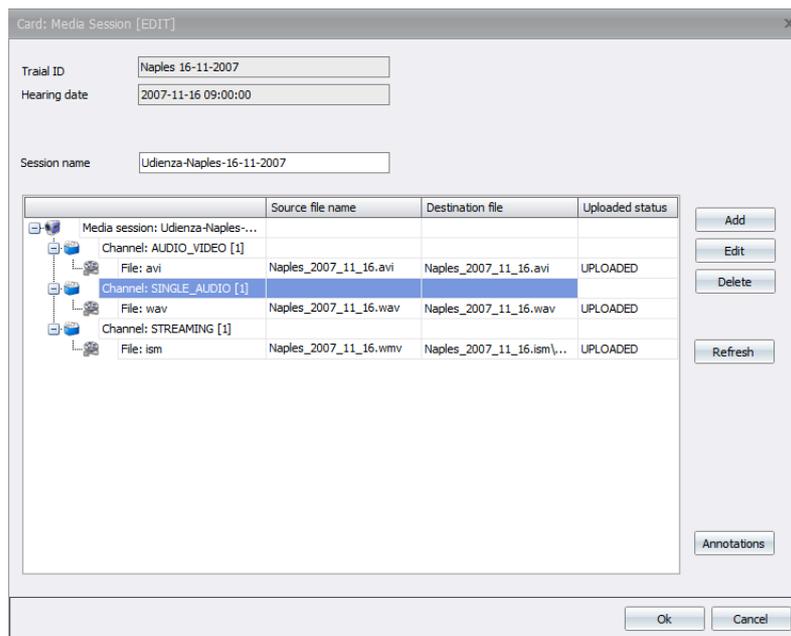


**Figure 33: Definition of processes**

## Media Sessions

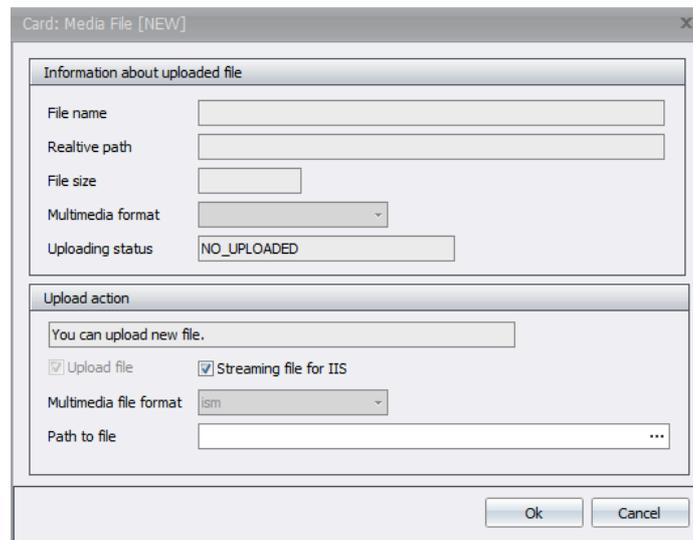
To associate media files to the corresponding trial, a new Media session need to be created. For the Media session SA should define media channels, which enclose the audio and video sources. We can distinguish three main types of channels:

- SINGLE\_AUDIO – create this channel to upload audio file for a trial.
- AUDIO\_VIDEO – create this channel to upload video (audio-video) file
- STREAMING – create this channel to prepare streaming for Jumas Portal



**Figure 34: Media session**

To create a streaming channel for the Jumas Portal *Streaming file for IIS* option needs to be selected.



**Figure 35: Upload of streaming file**

## Taks

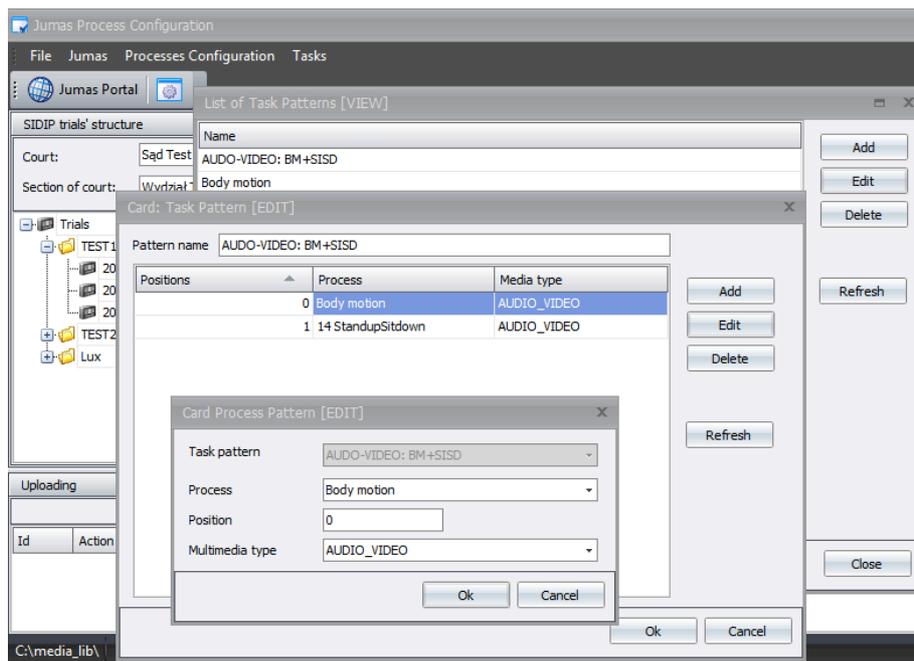
Under *Main menu\Tasks* SA can find two options: Task Patterns and Tasks.

- **Task Patterns**

In a *Task pattern* option SA can configure a list of Jumas Processes that could be executed for all the media sessions. Task pattern can be used to create Task for a particular media session (see next chapter).

To add new Jumas Process to the task pattern you have to specify:

- Jumas Process
- Position - determines the order of execution of the process in the task. If two processes have the same position it is mean that can be executed simultaneously
- Multimedia type – refers to the channel type required by the Process

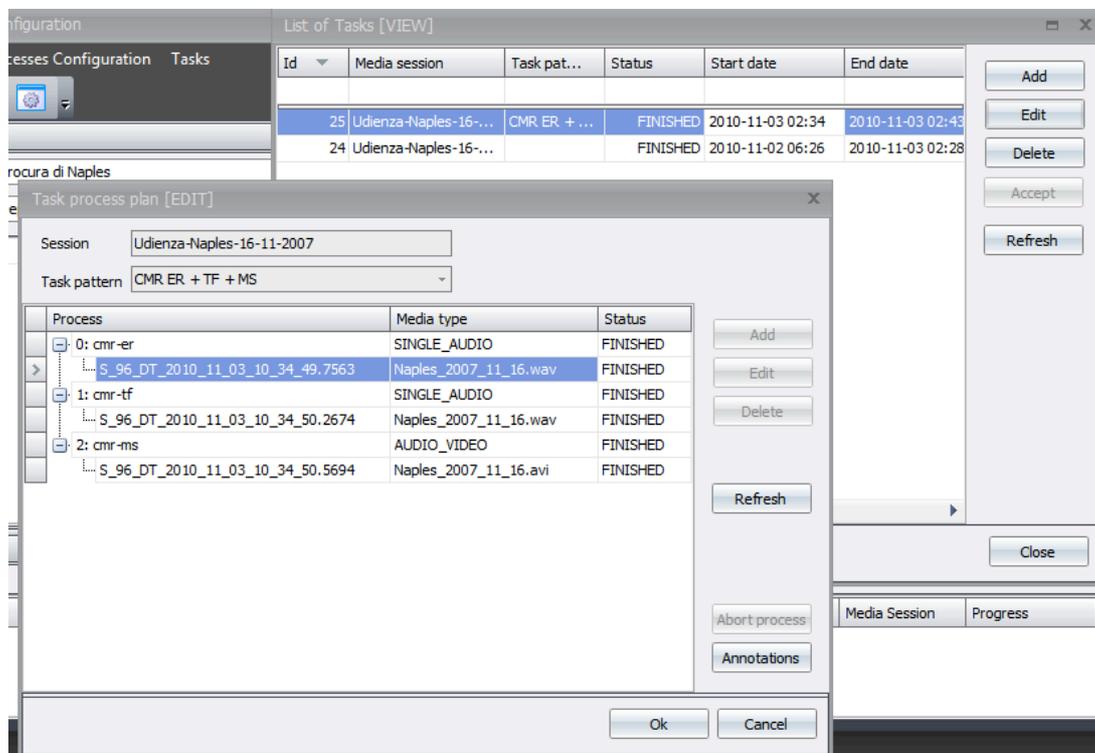


**Figure 36: Configuration of task patterns**

- **Tasks**

In order to run a Jumas Process for a given Media session the following steps need to be performed:

1. Create an empty task - *Task* button in the *Media session* panel (JPC - main window)
2. Define Jumas Processes to be executed – there are two ways to do it:
  - a. Choose previously created task pattern
  - b. Add processes manually - the same way as when creating task pattern
3. Accept task – select the created task in *List of tasks* window and press the *Accept* button. A new *productionTokens* will be generated and the corresponding process will be queued for execution.
4. Check if JumasProcessExecutor service (windows service) is running



**Figure 37: Jumas process executor**

### 3.2.1 Jumas Process Executor

The Jumas Process Executor (JPE) is a window service responsible for executing tasks created in the Jumas Process Configurator. The DB name of the CMS with the corresponding remote path is specified.

## JPE configuration file

```
<?xml version="1.0" encoding="utf-8" ?>
<configuration>
  <configSections>
    <section name="log4net" type="log4net.Config.Log4NetConfigurationSectionHandler, log4net"/>
  </configSections>
  <appSettings>
    <add key="MonitorWaitTime" value="5" />
    <add key="DbName" value="SIDIP" />
    <add key="DbServer" value="149.132.178.220" />
    <add key="DbUser" value="jumas_jpm" />
    <add key="DbPassword" value="jumas" />
    <add key="WorkGroupName" value="vm.windowsxp01" />
  </appSettings>
  <log4net>
    <appender name="FileAppender" type="log4net.Appender.RollingFileAppender">
      <file value=".log\log.txt"/>
      <param name="AppendToFile" value="true" />
      <param name="RollingStyle" value="Date" />
      <param name="DatePattern" value="yyyy.MM.dd" />
      <param name="StaticLogFileName" value="true" />
      <appendToFile value="true"/>
      <layout type="log4net.Layout.PatternLayout">
        <conversionPattern value="%date [%thread] %-5level %logger.%method() #%%line - %message%newline"/>
      </layout>
    </appender>
    <appender name="ConsoleAppender" type="log4net.Appender.ConsoleAppender" >
      <layout type="log4net.Layout.PatternLayout">
        <conversionPattern value="%date %-5level %logger.%method() #%%line:%%newline%%message%newline"/>
      </layout>
    </appender>
  </log4net>
  <root>
    <level value="DEBUG"/>
    <appender-ref ref="FileAppender"/>
    <appender-ref ref="ConsoleAppender"/>
  </root>
</log4net>
</configuration>
```

## 4 Demonstration activities

### 4.1 Italian Pilot Demonstration

The JUMAS project and the related JUMAS system was presented to the several audiences in Italy. We can distinguish the demonstration activities according to three main targets: Criminal Justice, Public administration and IPR management.

#### 4.1.1 Target 1 – Criminal Justice

##### A. Italian Ministry of Justice

Several important meetings, focused on demonstrating the JUMAS system, have been organized in collaboration with the Italian Ministry of Justice.

- ***Tribunal of Naples – June 2010, 29<sup>th</sup>-30<sup>th</sup>***: this meeting had been organized on demand of Polish Ministry of Justice willing to see SIDIP audio-video system installed in the Court of Naples, whose infrastructures are the same as used by JUMAS prototype. During these two days Polish Delegation visited Judiciary offices of Court of Naples and met Public Authorities. They also had the opportunity to participate as spectators to a trial, seeing how audio video registration works and having the opportunity to test on field JUMAS potentialities. The attendants of these meetings are listed below:
  - Dott. Czaja, Under-Secretary of State of Polish Ministry of Justice – PMJ

- Dott. Walejko, Assistant PMJ Department chief
- Dott. Szymanski, Informative Systems Responsible of PMJ
- Dott. Zalesińska, Informative Systems Responsible of University of Wrocław
- Dott. Dunal for Esaprojekt
- Dott. Intraivaia, Manager of CISIA Milan and JUMAS Project Responsible for IMJ
- Dott. Mozzillo, Manager of CISIA Naples
- Dott. Caprio, Technical Expert – CISIA Naples
- Dott. Mungo, Judge and Referent for Informative System of Naples Court District - Civil Field
- Dott. Di Stefano - Judge and Referent for Informative System of Naples Court District – Crime Field
- Dott. Dovere – Judge of Criminal Court of Naples
- **Tribunal of Naples - January 2011, 31<sup>st</sup>**: during this meeting the final prototype of JUMAS has been shown in order to (1) collect a set of feedback from those people involved into the user requirement phase at the beginning of the project and (2) discuss the potential exploitation of JUMAS from several judicial point of views.
  - Dott. Intraivaia, Manager of CISIA Milan and JUMAS Project Responsible for IMJ
  - Dott. Rolleri, Manager of Special Office for management and maintaining of the judicial complex in Naples
  - Dott. Mozzillo, Manager of CISIA Naples
  - Dott. Daneri, CISIA of Genova
  - Dott. Caprio, Technical Expert – CISIA Naples
  - Dott. Mungo, Judge and Referent for Informative System of Naples Court District - Civil Field
  - Dott. Di Stefano - Judge and Referent for Informative System of Naples Court District – Crime Field
  - Mrs. Ruggiero, Project assistant for the Manager of CISIA Naples
  - Prof. Archetti, Prof. Messina and Dott. Fersini for CMR

### **B. Law Faculty at the University of Milano-Bicocca**

The meeting at the Law Faculty of the University of Milano-Bicocca was held at the Department of “Sistemi giuridici ed economici”. The JUMAS system has been presented by CMR (Prof. Archetti and Dott. Fersini) to the following list of attendants:

- Giulio Ubertis, coordinator of the doctorate in criminal procedure
- Roberta Casiraghi, professor at the doctorate in criminal procedure
- Francesca Zaccheo, professor at the doctorate in criminal procedure
- Fabio Cassina, professor at the doctorate in criminal procedure
- Silvia Bozzelli, professor at the doctorate in criminal procedure

The meeting was focused on two main aspects: (1) the demonstration of JUMAS to understand its potential impact to the next generation of court management systems for coordinating judges, prosecutors and law enforcement folders; (2) an open discussion about the applicability hypothesis of each research components.

As far is concerned with the first issue, it has been stressed the importance of a coordinated management of all judicial folders, which at least in Italy are 4: Pre-debate, Prosecutor, Judge and Integrative Investigations Folder. They could be potentially merged within the proceedings upon approval of the judge and opportunely consulted according to the specific authorization policies.

It has been also stressed the importance of cross retrieval between different cases as well the possibility of segmenting the debate in maxi-processes. A substantial part of the discussion has been devoted to the issue of privacy, in particular of the user generated annotation. The user-generated annotation should be managed directly by the owner in order to allow other users to access the produced information.

Moreover, the issue about the role of system administrator has been discussed: the system administrator has a privileged position: specific material must be made available only to specific functions and by tracking the performed tasks.

Concerning the open discussion about the applicability of the developed research components, several opinions have been captured: (1) the WER reached by JUMAS, while not being acceptable in the line of replacing a human transcription, can anyway be useful to support a quicker grasp of spoken trials; (2) the multimedia summarization and template filling have been represent a direct valuable contribution of the project: multimedia summarization is perceived as a tool for training people while template filling can contribute to discover potential relationships among different trials.

Although some components may contribute to help in assessing the value of a proof, they cannot be exploited to derive of the entity of the punishment. For instance, the information automatically extracted by emotion recognition and deception detection cannot be used into the Italian system: they propose subjective information that is automatically extracted by computer-based approach.

A Jumas seminar and a session hands on of the doctoral students of “procedura penale” has been also scheduled.

### **C. Other meetings**

- Tribunal of Milan: during this meeting the potential exploitation of JUMAS as innovative tool for several judicial areas has been discussed.
  - Dott. Castelli, responsible for innovation
  - Prof. Archetti, Prof. Messina and Dott. Fersini for CMR
- Tribunal of Monza: during this meeting, the potential exploitation of JUMAS has been highlighted for the investigative phase. The possibility to store, semantically analyze and retrieve the material acquired during the pre-trial stages represents a fundamental contribution for Prosecutors. The attendants of these meetings are listed below:
  - Dott. Airò (Judge)
  - Dott. Mapelli (Prosecutor)
  - Dott. Aiello (Prosecutor)
  - Dott. Trentini (Prosecutor)
  - Dott. Fersini for CMR

Considering the above mentioned meetings, we report here the main observations captured during the demonstration sessions:

1. The necessity to improve the automatic transcription functionality as fundamental information source for judicial users. The transcription, although it is not required to have an 100% accuracy, it's fundamental to obtain a good value transcription that could be used as for example to copy and paste portions of a debate for subsequent hearings. Moreover, most of the end user interest about transcription is mainly focused to witnesses, encouraging then refinements of ASR models.
2. For two functionalities enclosed into the JUMAS system there is an open discussion about their exploitability: emotion recognition and deception detection. For emotion recognition and deception detection the current Italian legislation does not admit the use of affective states
3. The JUMAS portal has been perceived as a straightforward tool for supporting common daily activity, as for example retrieval of transcriptions, consultation of the multimedia streaming and user annotations of relevant contents.
4. A judicial sector that lends naturally to the exploitation of JUMAS is the "labor" process, for which the organizational structure is relatively simple (in Milan 20 Magistrates vs 120 for the criminal sector) and the adoption of JUMAS as a personal productivity tool could be easier.
5. A potential experimental validation could be framed within the activities of EXPO 2015 to be held in Milan.
6. It has been highlighted the possibility to cooperate with a Tribunal in Southern Italy in order to generalize "good practices" and to link the JUMAS results with the PON (Programma Operativo Nazionale) initiatives.
7. Environmental recordings, wired taps and recordings law enforcement interviews acquired during the investigative phase could be analyzed by using the JUMAS functionalities for extracting relevant semantic information. The extracted information could have a confirmatory power but also drive towards the formulation of alternative hypothesis.
8. JUMAS could be adopted as a productivity tool to introduce a set of basic functionalities, which are not relevant from a research point of view but significant for the operation of the system. An example is represented by the possibility of copy and paste part of the transcriptions for preparing the next hearings.
9. JUMAS could be used to stress the relation among different processes and therefore as learning tool exhibiting to young magistrates how a similar topic has been dealt with in different processes.
10. The tags associated to a video content, automatically suggested by the system or manually provided by the end-user, represent useful and appropriate information for the corresponding media stream. This functionality is appreciated for helping the end user to find and retrieve relevant cases and for cooperation/sharing purposes.

11. JUMAS has been suggested to be exploited and customized for several potential exploitation concerned with the judicial domain:
- a. E-learning platform for prosecutors and judges
  - b. Analysis and visualization platform for the investigative/pre-trial phase
  - c. Cooperation platform according to specific groups: judges, prosecutors, lawyers and law enforcement

In particular it has been stressed the potential impact of JUMAS with respect to cooperation issue, according to the Treaty of Lisbon. Referring to Article 2 of the Treaty of Lisbon, JUMAS may be exploited in several judicial contexts for reacting implementing the EU recommendations about cooperation issues:

- JUDICIAL COOPERATION IN CIVIL MATTERS (chapter 3, pag. 62)
  - i. cooperation in the taking of evidence;
  - ii. effective access to justice;;
  - iii. support for the training of the judiciary and judicial staff
- JUDICIAL COOPERATION IN CRIMINAL MATTERS (chapter 4, pag. 63)
  - iv. support the training of the judiciary and judicial staff;
  - v. facilitate cooperation between judicial or equivalent authorities of the Member States in relation to proceedings in criminal matters and the enforcement of decisions.
- POLICE COOPERATION (chapter 5, pag. 67)
  - i. the collection, storage, processing, analysis and exchange of relevant information;
  - ii. support for the training of staff, and cooperation on the exchange of staff, on equipment and on research into crime-detection;

#### 4.1.2 Target 2 – Public administration

FORUM PA is a company that promotes meetings and correlations between government, business and citizens about key issues of innovation.

FORUM PA has established over the years a unique opportunity for interaction and exchange between public and private innovation. The growth process of the country has found in the central and local government leading candidates for innovation. FORUM PA is an active node of the Italian network of innovation, planning and managing initiatives and projects that create opportunities to connect, exchange and compare between different fundamental “vital energy” of the country and the central local government. Among its activities FORUM PA organizes a key exhibition held every year at the “Fiera di Roma”: the XXI edition was held 17 to 20 May 2010.

#### DIMENSION of FORUM PA 2010

**GOVERNMENT participation:** 125 political e institutional leader, among which 2 Ministres, 2 Presidents e 17 Regional Councilors, 4 Mayors e 1 Provincial President of Metropolitan Areas.

**VISITORS:** 41.944 (improvement of 15% with respect to the previous year) among which 44% from public sector.

**EXHIBITOR:** 370

**CONVENTIONS:** 110

**MASTERS:** 283 modules at the stands

**OFFICINE PA:** 301 edizioni (workshop presso gli stand)

**MASTER PARTICIPANTS:** 12.963

**WEB SITE:** more than 290.000 unique virtual visitors (+110%), with more than 450.000 visit (+93%) e 1.5 million of visited pages.

**NEWSLETTER:** 70.000 readers

**MEDIA:** 400 journalists, 330 articles on National newspapers, 20 articles on newsweekly,

During FORUM PA 2010 the JUMAS project has been presented. In particular, a video-demo about the JUMAS rationale and the first prototype has been given. The contents of the demo have been defined according to the essence of the project. The following storyboard has been outlined for then deriving a 5 minutes JUMAS video promo:

===== THE CRIMINAL FOLDER YESTERDAY =====

1. TEXT: The current justice management
2. VIDEO: images of Court of Naples and paper folders
3. TEXT: the manual transcription of hearings avoid to capture the context of declarations
4. TEXT: test, audio and video are stored separately, only manual search is available

===== NOVEL TECHNOLOGOES FOR THE NEW JUDICIAL FOLDER =====

5. VIDEO: images of a consultation phase on a huge hearing
6. TEXT: JUMAS: The evolution: from the paper folder to the multimedia folder
7. TEXT: integration of text, audio and video
8. TEXT: innovative functionalities:
9. TEXT: automatic speech transcription
10. VIDEO: images of FBK speech transcription
11. TEXT: recognition people, gesture and movements
12. VIDEO: images of CERTH and SZTAKI gesture recognition
13. TEXT: emotion recognition
14. VIDEO: images of emoticon on the JUMAS portal
15. TEXT: automatic multimedia summarization
16. VIDEO: images of searchable and clickable story-board
17. TEXT: possibility for the end user to annotate his/her relevant contents
18. VIDEO: images of EML user generated annotations

===== THE JUMAS PORTAL =====

19. TEXT: images about the web interface
20. VIDEO: images about the JUMAS portal
21. TEXT: JUMAS allows the end user to perform complex retrieval task, with a direct and easy interface
22. VIDEO: images about SZTAKI retrieval
23. TEXT. Benefits: rich contents, more flexibility, support for contents searching
24. TESTO: the contents presented provide integrated information which is meaningful for the end user. Integrated contents make accessible the judicial folder and highlight embedded hidden semantics.

The video, created for an Italian audience, is currently available on Youtube.com at <http://www.youtube.com/watch?v=J83DP-wsxEc> with the following credentials:

- Login: jumasproject
- Password: jUmAs53CmR

#### **4.1.2 Target 3 – IPR management**

Concerning the Intellectual Property Rights, JUMAS was demonstrated to two different units: (1) the IPR office at the University of Milano-Bicocca, which processes the applications coming from all the departments, and (2) a leading patent law firm in Milano (Studio Rapisardi).

The focus of the demonstration has been on patents rather than utility models or copyrights. The patenting processing has a unique complexity: many actors, usually in many countries, make for a challenging yet potentially very fruitful application of JUMAS.

Let's start considering the sheer size of the patent system: over 7 million of patents have been issued only in US. In 2009 alone, 485.312 patent applications were filed with the USPTO (United States Patent and Trademark Office). In addition, there are over 40 different patent issuing authorities across the world, including the European Patent Office, Japanese and German Patent offices. Some of the online databases used to access legal information include the USPTO for patents, copyrights and trademarks, Hein Online, LexisNexis and WestLaw for other IP related legal information.

In this context, some functionalities of the JUMAS system have been perceived as a tool for supporting the patent application process.

Most patent applications have at least two components, including a written description of the invention and at least one "embodiment" thereof, and a set of "claims," which defines exactly what the applicant regards as the particular features of the invention. These claims are used to distinguish the invention from the existing prior art, and are compared by the patent office to the prior art before issuing a patent. Patent applications in most jurisdictions also usually include (and may be required to include) a drawing or set of drawings, to facilitate the understanding of the invention. Search and examination is the principal part of the prosecution of a patent application leading to grant. A search is conducted by the patent office for any prior art that is relevant to the application in question and the results of that search are notified to the applicant in a search report. Generally the examiner conducting the search indicates in what aspect the documents cited are relevant (novelty, inventive step, background) and to what claims they are relevant. The materials searched vary depending on the patent office conducting the search, but principally cover all published patent applications and technical publications. The patent office can provide a preliminary, non-binding, opinion on patentability, to indicate to the applicant its views on the patentability and let the applicant decide how to proceed at an early stage. If we consider that many patent applications included several owners, possibly in different countries, the management of IPR application become a challenging task. In this

context there are a plenty of institutions such as WIPO (World Intellectual Property Organization), organizations/institutions that represent the owner of the application, patent law firms and consultant that need to share textual document, images and eventually videos related to the considered patent application. A sharing platform as JUMAS, opportunely configure and tuned according to this test case, could provide several functionalities to support the IPR management.

The main components that could be extracted and customized to match the IPR management requirements are: (1) the web portal, for synchronizing and showing the text of a patent with the corresponding image; (2) the user generated annotations, to create feedbacks about the evaluation process; (3) summarization, to abstract the contents of existing patents for retrieval purposes; (4) the information retrieval engine, for finding two or more related patents on the base of semantic similarity, similar/related claims or similar related semantic annotation provided by the main actors involved into the patent application cycle.

Specifically concerning with Studio Rapisardi, which is a leading intellectual property law firm in Milan that has always invested heavily in Information Systems and Knowledge Management developing, a proprietary system tailored to IPR law procedures and its own business model has been presented. The system is based on AS400, Lotus for the document management and Board for the financial information. According to this scenario the research functionality of Studio Rapisardi existing system could be linked by the semantic extraction module of JUMAS to improve the value of the search engine, notably in fields like life sciences where there is a large and quickly growing body of heterogeneous literature. Another area which has been briefly touched upon is the use of Jumas for expanding the retrieval functionalities with a set of domain ontologies.

## 4.2 The JUMAS questionnaire

In order to effectively assess the impact of the JUMAS system after the demonstration phase, a user questionnaire has been provided to the end users. A presentation letter has been prepared in order to introduce the demonstration and validation questionnaire to judicial users and to ask for their contribution. The main results of the demonstration phase are summarised in Deliverable D6.2.

Dear Law professional,

the JUMAS Project has been financed by the Commission of the European Communities in the framework of the Information Society Technologies R&D Programme. The JUMAS Consortium is composed by several European Organisations, including Ministries of Justice, private Companies, Universities and Research Institutes, sited in Italy, Germany, Greece, Hungary and Poland.

The main goal is to propose an IT-based solution focused on EU criminal Law Courts to improve the overall effectiveness of daily Court activities, such as recording a deposition, sharing an information, retrieving a document, examining an evidence, consulting a folder, etc. The project aims at developing an integrated system for the acquisition of audio/video depositions within courtrooms, the archiving of heterogeneous multimedia documents, the information retrieval and the synchronised audio/video/text consultation. Supporting such a system with applications based on Web technologies will guarantee the dissemination of information to authorised users (according to access rights), in real-time and through a user-friendly interface.

The Project Consortium is now validating the JUMAS from an end-user point of view. We are now disseminating this questionnaire to a selected group of Law professionals. You were personally chosen because we believe that your professional experience and skills will guarantee a useful and significant contribution for evaluating the effectiveness of the Project.

We kindly ask you to connect to the JUMAS portal

<http://JUMASportal.esaprojekt.com:81/JUMASPortalit/>

with the following credentials

username: \_\_\_\_\_  
password: \_\_\_\_\_

for evaluating the developed system.

You can input your comments by filling in and returning us the enclosed questionnaire, which is split in 3 main sections:

1. Section 1: Questions about the overall JUMAS system
2. Section 2: Questions about functionalities
3. Section 3: User Comments

We believe that only through a significant users' feedback we could evaluate and improve an IT system that really provides solutions for your needs.

We are looking forward to any comments and observations.

Thank you for your time and co-operation.

The JUMAS Consortium.