Small or medium-scale focused research project (STREP) proposal ICT Call 3 FP7-ICT-2007-3

News Event Extraction & Description:

When is a news item news, and when does it change my world?

NEED

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Work programme topic addressed

Objective ICT-2007.4.4: Intelligent Content and Semantics

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Faced with the emergence of citizen-based media, traditional news agencies are being forced to fundamentally re-think their production and distribution workflow processes. In addition, traditional textbased products are losing market share for other media products, in particular video. At the same time, users have access to multiple news portals, which provide online access to different sources and services for commenting and debating on the news. These contain large amounts of unreliable and repeated information, leaving the user exploring on their own to try to build their own version of a news event from large amounts of potentially related information.

NEED will solve interoperability problems in established news workflows and offer interfaces providing access to heterogeneous sources of information, in multiple media types and in multiple languages, centred on a macro-view of news events. By developing knowledge models for news events, NEED will provide event-centric navigation interfaces. These models will be populated with annotations of news items, using semi-automatic text processing and multimedia content analysis. Scheduled and breaking news events will be detected, analyzed, described formally and linked to existing background knowledge available on the web.

For this open-knowledge approach to news workflow to work on an industrial scale in practice, all information components need to conform to open standards. Consortium members have close ties with different standards bodies to ensure that the real problems from existing communities are addressed within the project and that the solutions developed within the project can feed into the relevant standardisation activities. This will ensure broad uptake for establishing metadata workflows in the production and consumption chains throughout the news industry.

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Section 1: Scientific and/or technical quality, relevant to the topics addressed by the call

1.1 Concept and objectives

1.1.1 Motivation

Nearly every European citizen reads, watches or listens to the news, at home, while commuting to and from work, at work and even as part of their work. As voting citizens, we need to understand local, national and international politics to allow us to cast our vote. As company employees, we need to understand the state and development of local, national and international economies to enable us to understand our markets. As part of our leisure time, we want to know about our favourite sports teams, the lives of our soap idols or the most recent books available. Nowadays, this information is online, and hence easily accessible from anywhere.

Information is online and available, but through many different sources, including branded websites. Traditional news providers (e.g. journalists, news agencies, press and broadcasters) make use of the Web for distributing news. More recently, non-traditional news providers, often called citizen media or independent media, make use of Web technologies to publish alternative views and opinions of events. Professional users have access to continuous streams of incoming data from press agencies and archives of published news. Lay users have access to myriads of web sites, offering push and pull sources of news information and the means of contributing to the expanding collection of news data.

In existing news workflow processes, news items are typically *i*) produced by news agencies, independent journalists or citizen media, *ii*) consumed and enhanced by newspapers, magazines or broadcasters then finally *iii*) delivered to end users. News items are typically accompanied by a set of metadata and descriptions that facilitate their storage and retrieval. However, **much of the metadata is lost because of interoperability problems occurring along the workflow**. In addition, at the end user interface, opportunities for making use of the available metadata are often lost.

News web sites such as Le Monde¹, El Pais² or La Repubblica³ generally classify news in categories such as: *World, National, Politics, Business, Science and Technology, Sport, Entertainment* and *Health*, while other services such as Google News⁴ aggregate stories from multiple sources and offer personalised selections based on the user topics of interest. More advanced web sites such as SiloBreaker⁵ or Newstin⁶ provide more flexible access to news stories by *topic, person, organization* or *region*. These support the user's information need more closely, but just add more sources of individual news items, which leads to overly complex interfaces.

Current systems have a number of limitations that force the user to explore news information in an environment that contains **large amounts of irrelevant**, **unreliable and repeated information**, with **insufficient access to background knowledge**. In particular, current systems:

- mainly deal with textual news articles in a single language (mostly English), and do not process audiovisual content at the same level of detail;
- are unable to provide explicit relationships between different news on the same event to help the user form his/her own opinion on a particular topic, e.g. cannot automatically link a quote in a news article to the original statement in a video clip, or link a statement to the subsequent reactions;

¹ <u>http://www.lemonde.fr/</u>

² <u>http://www.elpais.com/</u>

³ http://www.repubblica.it/

⁴ http://news.google.com/

⁵ http://www.silobreaker.com/

⁶ http://www.newstin.com/

- are unable to handle the evolution of news events, e.g. do not link the first announcement of an explosion to its subsequent interpretation as a terrorist attack;
- are unable to provide a historic perspective of events, e.g. do not show the chain of events that led to the information the reader is focusing on, and do not highlight *editorial* news items summarizing events that took place years ago.

Consequently, users are overwhelmed by too many individual and disconnected pieces of information, and cannot situate news in a proper context. A news event is defined as a cluster of statistically related news items, but no ontological notion of event is supported. In contrast, the organization of news providers is centred on the notion of scheduled and breaking news events, but they currently lack the tools necessary to relate easily the news they produce to the events they manage on a daily basis.

Semantic processing of news information can improve the clustering and organization of individual news items – from heterogeneous sources, in multiple media types and in multiple languages – into meaningful events linked to appropriate background knowledge.

In this project, we will build the technological infrastructure to allow the aggregation of multiple, distributed information sources. Based on this, we will provide *event based* user interfaces driven by semantic metadata for searching and browsing multimedia news articles, independently of whether the news is expressed in text or audio/visual media.

1.1.2 Project Goals

Our goal is to create an environment that facilitates end-users in seeing meaningful connections among individual news items (stories, photos, graphics, videos) through underlying knowledge of the descriptions of the items, their relationships and related background knowledge.

Enabling access to repositories containing any kind of media requires a system that can produce, collect, maintain and distribute media assets as well as aggregations of metadata associated with them. We will create metadata models to improve metadata interoperability along the entire news production chain. The underlying research challenges cover the two ends of the news workflow spectrum: how to model and represent semantic multimedia metadata along the news workflow and the consequences of this modelling at the user interface. At the same time, we will investigate the requirements the interface imposes on the modelling.

We will target two groups of users:

- Journalists: who require highly functional interfaces for searching for particular news items (from many sources, in several languages, on different media), and
- Lay users: who require simpler interfaces for being kept up-to-date on events of the day/week/month/year.

The high-level goal is to deploy semantic metadata throughout the workflow in specific tools, while at the same time using the constraints of these tools to optimise the metadata provided all along the workflow. More specifically, we will deploy metadata to improve the detection of overlapping feeds of information to enable clustering into events the user is looking for. By coupling metadata with controlled vocabularies, these can be used for finding relations among items in different repositories. By linking the metadata with background knowledge available on the Web, such as Wikipedia⁷ or Britannica⁸ for information on people, events, countries and general topics, we will provide end users with access to contextual information to help with understanding individual news items. The controlled vocabularies and background knowledge will in turn be used to "power" interfaces for end users to gain higher-level access to the repositories' contents. We will create an environment where media assets can be enriched with information based on usage patterns. We will finally develop interface design guidelines, based on the available metadata, which are useful for different types of applications that manage multimedia assets.

⁷ <u>http://www.wikipedia.org/</u>

⁸ http://www.britannica.com/nations

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While we need to automatically extract metadata from textual and visual resources, we do not claim to make any progress in textual or visual processing. Our hypothesis is that sufficient amounts of metadata are already available, or can be extracted with existing techniques. The problem is that metadata is lost along the workflow due to interoperability problems and/or that metadata is not used in the end-user application.

Using general data modelling and processing techniques we will:

- ensure interoperability along the news workflow by integrating existing knowledge models such as the IPTC News Architecture (NAR) or the Core Ontology of Multimedia (COMM);
- find relations between news items coming from different sources, in different languages and on different media by using these models;
- cluster news items by using statistical analyses;
- rank the items of a cluster and find the representative of this cluster by analyzing the structure of the knowledge base.

In addition, we will use standard HCI methods (e.g. task analysis, user centred design) to ensure that the interface follows the maxims of conversation of Paul Grice⁹ by:

- rendering an event and its related news items;
- providing the context needed to interpret a news item by providing links to related background knowledge at an appropriate level of detail;
- providing appropriate levels of information granularity, for example, a global view linking to more detailed information.

1.1.3 Meeting the challenges of the call

NEED particularly addresses five of the themes outlined in the work programme:

Targeted outcomes of FP7-ICT-2007-4.4	Contribution of NEED	Project objectives
a) Advanced authoring environments for the creation of novel forms of interactive and expressive content enabling multimodal experimentation and non-linear story-telling. These environments will ease content sharing and remixing, also by non-expert users, by automatically tagging content with semantic metadata and by using open standards to store it in networked repositories supporting symbolic and similarity-based indexing and search capabilities, for all content types.	NEED will specifically design, implement, and evaluate novel interfaces for annotating, searching, browsing and presenting news events and related multimedia resources. Semi-automatic annotation interfaces for news will make use of existing web resources for suggesting and disambiguating metadata values.	 Deploy a knowledge infrastructure for news integration based on COMM and NAR Enrich news metadata automatically using multimedia analysis tool-kits and text processing techniques Detect and annotate news events
b) Collaborative automated workflow environments to manage the lifecycle of novel and legacy media and enterprise content assets, from the acquisition of reference materials to the versioning, packaging and repurposing of complex products, including their linguistic and cultural adaptation to target markets and user groups. Empirical results from the psychology of human perception and	NEED will solve interoperability problems in the current news production and consumption workflow, both at the metadata and at the interface levels.	 Integrate workflow between a news agency (AFP) and a news broadcaster (VRT) Evaluate the added value of the NEED technologies for journalists and lay

⁹ http://en.wikipedia.org/wiki/Paul_Grice#Conversational_Maxims

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attention will be used to identify salient multimedia segments and apply summarisation and encoding schemes that will improve content storage and transmission without affecting its perceptual properties			users
c) Architectures and technologies for personalised distribution, presentation and consumption of self-aware, adaptive content. Detecting and exploiting emergent ambient intelligence they will use features embedded in content objects and rendering equipment to enable dynamic device adaptation,	NEED will address multilingualism and offer personalized interfaces for presenting news content.	•	Create personalized interfaces rendering the news items belonging to an event in various languages, and using various media Provide real
immersive multimodal experiences and contextual support of user goals and linguistic preferences. Privacy preserving learning algorithms will analyse user interactions with devices and other users so as to update and effectively serve those goals and preferences.			showcases for journalists and lay users to demonstrate innovation and usability
d) Actions geared towards community building, intended to stimulate cross- disciplinary approaches and a more effective user/supplier dialogue, and other measures, including field validation and standards, aimed at a faster uptake of research results. Usability and technology assessment studies, economic analyses and roadmaps to chart the democratisation of personal and community based multimedia production and management tools.	A key contribution of NEED is that results will be developed in close cooperation with international standardisation bodies for web, multimedia and the news industry. Dissemination and standardization work will be in close cooperation with upcoming W3C activities and address spatio-temporal addressing of audiovisual content fragments on the Web, metadata integration and media-specific metadata vocabulary.	•	Provide solutions combining Web and Metadata standards from W3C, IPTC, EBU and ISO Support standardization of spatio-temporal addressing of audiovisual content fragments on the Web in close cooperation with W3C
e) Semantic foundations: probabilistic, temporal and modal modelling and approximate reasoning through objective-driven research moving beyond current formalisms. Theoretical results will be matched by robust and scalable reference implementations. Usability and performance will be tested through large scale ontology mediated Web integration of heterogeneous, evolving and noisy or inconsistent data sources ranging from distributed multimedia repositories to data streams originating	NEED will provide an ontology-based infrastructure for representing news events, linked with appropriate existing background knowledge and exposed itself as formalized semantic web data linked to other datasets for being reused by third party applications.	•	Expose knowledge base of identified events as linked data

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from ambient devices and sensors, supporting real time resolution of massive numbers of queries and the	
induction of scientific hypotheses or other forms of learning.	

1.2 Progress beyond the state-of-the-art

Given the context of news production and consumption and its particular workflow, and assuming news content is produced in the form of audiovisual material and/or text, setting up a news environment as suggested by the project goals, involves the following areas of expertise:

- *Multimedia News Metadata Representation*: the ontology infrastructure for representing multimedia and news metadata;
- *Knowledge Extraction from Multimedia News Content and Metadata*: the interpretation of the rich media, including the ability to recognize identical or modified copies, the intelligent analysis required for topic and event detection, and for establishing relationships between news items;
- Semantic Interaction with News Content: applications designed to make optimal use of available metadata, ontologies and background knowledge for providing semantic search interfaces and for generating multimedia news presentations.

We discuss the current state of the art regarding these three research pillars. We then review a number of commercial initiatives related to the project objectives and we finally present the EU projects related to **NEED**.

1.2.1 Multimedia News Metadata Representation

For easing the exchange of news, the International Press Telecommunication Council (IPTC) has developed the **News Architecture**¹⁰ (NAR), an XML-based language that provides a generic model for exchanging all kinds of newsworthy information and gives birth to a set of IPTC G2-Standards for news exchange. NewsML is a media-type agnostic news exchange format for general news and **NewsML-G2**¹¹ 2.0 is its latest version. NewsML-G2 provides exchange formats for various media including textual news, articles, photos, graphics, audio and video (the News Item); a flexible mechanism for packaging news in a structured way (the Package Item); information about concepts, used for values in controlled vocabularies (the Concept Item); a format to exchange full controlled vocabularies as a single file (the Knowledge Item); and a wrapper around items to transmit them by any electronic means (the News Message). **EventsML-G2**¹² aims to be a comprehensive, flexible and extensible standard for conveying event information in a news industry environment and may be used for receiving or publishing all (or a subset of) facts about an event from the event organizer, adding information regarding the coverage of an event by a news provider, and storing facts about knowledgeable events in archives.

Even though NAR provides a general framework, some **interoperability problems** still occur. News are about the world and their metadata use numerous specific controlled vocabularies such as the IPTC News Codes or other thesaurus coming from industry that provide controlled terms further used as values of the metadata in the News Architecture. All these resources, however, come in XML-based formats and with no machine processable semantics which make their integration really difficult.

From the media point of view, the pictures taken by a journalist come with their EXIF¹³ metadata. The **MPEG-7**¹⁴ standard, formally named "Multimedia Content Description Interface", can be used to describe the structure and semantics of the multimedia content. The flexibility of MPEG-7 is based on allowing descriptions to be associated with arbitrary multimedia segments, at any level of granularity, using different levels of abstraction. The downside of the breadth targeted by MPEG-7 is its complexity and ambiguity: MPEG-7 XML Schemas define 1182 elements, 417 attributes and 377 complex types, making the standard difficult to manage. Moreover, the use of XML Schema implies that a large part of the semantics remains implicit. For example, very different syntactic variations may be used in multimedia descriptions with the same intended semantics, while remaining valid MPEG-7 descriptions. Given that the standard does not provide a formal semantics for these descriptions, this syntax variability causes serious **interoperability issues** for multimedia processing and exchange [van Ossenbruggen *et al.*, 2004], [Troncy and Carrive, 2004], [Nack *et al.*, 2005].

¹⁰ <u>http://www.iptc.org/NAR/</u>

¹¹ http://www.iptc.org/G2-Standards/newsml-g2.php

¹² http://www.iptc.org/EventsML/

¹³ http://www.exif.org/

¹⁴ http://www.chiariglione.org/mpeg/standards/mpeg-7/mpeg-7.htm

The profiles introduced by MPEG-7 and their possible formalization [Troncy *et al.*, 2006] address only a subset of the whole standard. For alleviating the lack of formal semantics in MPEG-7, four multimedia ontologies represented in OWL and covering the whole standard have been proposed [Hunter, 2001], [Tsinaraki *et al.*, 2004], [Garcia and Celma, 2005], [Arndt *et al.*, 2007] and further compared [Troncy *et al.*, 2007]. The challenge is now how to reconcile multimedia ontologies with news ontologies and domain specific vocabularies for solving these interoperability issues along the news workflow.

These standards will be our starting point for designing a system that can produce, collect, maintain and distribute news media assets as well as aggregations of metadata associated with them. We will create knowledge models to improve metadata interoperability along the entire news chain production. Our approach will be to implement a knowledge infrastructure on top of: *i*) **COMM**¹⁵, a Core Ontology for MultiMedia compatible with existing (semantic) web technologies based on both the MPEG-7 standard and the DOLCE foundational ontology [Arndt *et al.*, 2007]; *ii*) an OWL ontology of the News Architecture complemented by an appropriate Events Ontology; and *iii*) a number of SKOS thesauri widely used in the news domain.

1.2.2 Knowledge Extraction from News Metadata

Integration of multimedia and semantic web technologies for describing, extracting and retrieving semantic information from multimedia has been identified as one of the most promising approaches to narrow down the semantic gap. Multimedia news processing starts with low-level features extraction and semantic concept detection in order to structure the content and perform quotes detection. Mining techniques on existing metadata and background knowledge can be further used to automatically detect and annotate *events*, which cluster several news items.

Shot boundary Detection in Audio Visual News data. Algorithms for shot boundary detection can broadly be classified into two major groups, depending on whether the operations are performed in the pixel domain, or whether they rely directly on compressed-domain features. Although most of the proposed techniques for the detection of gradual changes work on uncompressed video, compressed-domain algorithms are gaining importance. [Zang *et al.*, 1993] presented a compressed domain approach based on DC coefficients and motion vectors. As the H.264/AVC video coding standard performs significantly better than any prior standard in terms of coding efficiency, it can be expected that a significant amount of future video content will be encoded in this format. As this specification contains a number of new coding tools, several new shot boundary detection algorithm are introduced which anticipate on these new coding tools [Liu *et al.*, 2004], [Kim *et al.*, 2005], [Zeng and Gao, 2005].

Key frame extraction from Audio Visual News data. Key frames generally represent the content of one shot and are selected according to an analysis method that optimizes the semantic coverage of the video content. Based on these key frames, content analysis algorithms can extract semantic information. Many of the systems described in the literature use a constant number of key frames for each detected shot. Often, the first, middle, or last frame is selected as representative. Other algorithms adjust the number of key frames to the content of the shot. [Zhang *et al.*, 1993] propose to select the first frame of a new shot as key frame. Consecutive frames are then compared against this candidate key frame, applying a difference metric. When a frame significantly differs from the candidate, this frame is added to the set of key frames as well. Other techniques select the key frame by determining the location where frame differences are minimal. Motion information or frames closest to the cluster center are often used for this purpose [Wolf, 1996].

Extraction of semantic meaningful information from Content-Based Image Retrieval (CBIR). In typical CBIR systems, the visual contents of the image are extracted and described by multi-dimensional feature vectors. To retrieve images, example images or sketched figures are provided to the system. The system then changes these examples into its internal representation of feature vectors. The similarities/distances between the feature vectors of the query example or sketch and those of the images in the database are then calculated and retrieval is performed with the aid of an indexing scheme. Visual content can be very generally described with color [Faloutsos *et al.*, 1994], [Mehrotra *et al.*, 1997], [Rui *et*

¹⁵ <u>http://multimedia.semanticweb.org/COMM/</u>

FP7-ICT-2007-3 STREP proposal NEED al., 1998], [Smith and Chang, 1998], texture [Haralick, 1979], [Martens *et al.*, 2007], shape [Lowe, 1999], spatial relationship or domain specific like human faces [Viola and Jones, 2002].

Web and Text Mining techniques in blogs and news stories. The European Commission Joint Research Centre's language technology activities (JRC) in Web Mining have recently produced the NewsExplorer¹⁶. A number of text gathering (retrieval), analysis and visualisation tools have been developed with a focus on multilingual and multi-document information aggregation, and on tools to provide cross-lingual information access. These text analysis tools have been integrated with the news gathering engine Europe Media Monitor (EMM) to produce several complex, high-level applications. The current tool set consists of three main components with the following functionality: multilingual and cross-lingual retrieval of potentially user-relevant documents, analysis of documents and extraction of different information aspects from these documents plus language-neutral representation of this information where possible, and finally visualisation of all this content.

BLEWS is a framework from Microsoft Research that uses blogs to provide context for news articles. While typical news-aggregation sites cluster news stories according to topic, they leave the reader without information about which stories figure prominently in political discourse. BLEWS uses political blogs to categorize news stories according to their reception in the conservative and liberal blogospheres. BLEWS also offers a "see the view from the other side" functionality, enabling a reader to compare different views on the same story from different sides of the political spectrum. BLEWS achieves this goal by digesting and analyzing a real-time feed of political-blog posts provided by the Live Labs Social Media platform, adding both link analysis and text analysis of the blog posts [Gamon *et al.*, 2008].

Retrospective news event detection (RED) is defined as the discovery of previously unidentified events in historical news corpus. Although both the contents and time information of news articles are helpful to RED, most researches focus on the utilization of the contents of news articles. Few research works have been carried out on finding better usages of time information. In that sense, Microsoft Research is doing some explorations on both directions based on the following two characteristics of news articles. On the one hand, news articles are always aroused by events; on the other hand, similar articles reporting the same event often redundantly appear on many news sources [Li *et al.*, 2005].

We will build on these results to implement multimedia analysis tool-kits tailored to the news domain. **NEED** will reuse the current state of the art techniques in multimedia content analysis but will go beyond for processing textual resources and will develop novel techniques for detecting and annotating news events and finding relationships between news items.

1.2.3 Semantic Interaction with News Content

The presence of semantic annotations allows browsing interfaces to use them to tailor selections to be presented to the user. The presentation of news can be thus personalized and include some background knowledge so that the user can fully understand an event. One of the key issues is then the use of an appropriate time model for presenting temporal information at the right level of granularity.

The **TERQAS** (Time and Event Recognition for Question Answering Systems) project has provided TimeML¹⁷, a specification language for events and temporal expressions. Based on this language, the **TIDES** (Translingual Information Detection, Extraction, and Summarization) project has produced Temporal Annotation Guidelines¹⁸ which not only offers a way to mark inline dates but also "directions in time".

Microsoft Research has also analyzed timeline visualizations for displaying the results of queries on an index. Results of searches are presented with an overview and detailed timeline visualization. A summary view shows the distribution of search hits over time, and a detailed view allows for inspection of individual search results. In a user study, [Ringel *et al.*, 2003] explore the value of extending a basic time view by adding public landmarks (holidays and important news events) and personal landmarks (photos and

¹⁶ <u>http://press.jrc.it/NewsExplorer/home/en/latest.html</u>

¹⁷ http://timeml.org/site/index.html

¹⁸ http://fofoca.mitre.org/annotation_guidelines/timex2_annotation_guidelines.html

FP7-ICT-2007-3 STREP proposal NEED important calendar events) in hopes that this added context will help people in locating the target of their search.

In the cultural heritage domain, the **MuseumFinland** portal [Hyvönen *et al.*, 2005] allows users to explore using pre-specified facets (or characteristics) of artefacts, allowing them to select subsets, without being confronted with queries that return zero results. The **/facet** (pronounced "slashfacet") browser [Hildebrand *et al.*, 2006] provides similar end-user browsing techniques, but enables any Semantic Web collection to be browsable with the tools. The **CHIP** project [Aroyo *et al.*, 2007] takes the use of semantic annotations further and allows users not only to browse the collection, but give their opinion on each artwork and use their profile to refine the artworks chosen to be presented to them.

We will investigate the use of browsing technologies such as in use by CHIP and /facet during initial stages of the project. We will build on open source platforms, such as Cliopatria¹⁹ to provide exploration interfaces for semantically annotated multimedia news corpus. The research challenge will be to maximise the use of the semantic annotations available while retaining ease of use at the interface level for presenting a comprehensive view of an event together with related background knowledge.

1.2.4 Commercial Tools

A number of commercial tools and web sites provide more advanced and flexible access to news stories. However, they are often restricted to the textual media only while the vision of the project is to consider that news will be more and more multimedia. Furthermore, the added value of these tools is often to aggregate more sources or languages resulting in too much information and overly complex interfaces.

Autonomy Virage²⁰ is world leader in Rich Media Management software and Video Analytics that automatically captures, encodes and indexes television, video and audio content. By automatically generating a comprehensive range of metadata, including keyframes, face recognition, speaker information and a full transcript of the audio stream, Virage ensures that rich media is immediately fully searchable and accessible by any user. It uses Bayesian statistics in order to find out the context of an item. Although Virage is a renowned product within the broadcast world, their visual tools are not State-of-the-Art and their searching is purely text-based starting from the transcripts. We will provide a richer suite of contextual and content analysis techniques for enriching the semantic descriptions of news photos and videos. In particular, we will develop analysis algorithms beyond state-of-the-art for structuring videos and detecting a chosen set of semantic entities useful for event detection and organization.

SiloBreaker²¹ is an online search service for news and current events that delivers meaning and relevance beyond traditional search and aggregation engines, which is communicated via several exploratory information graphics. They support the user's information need more closely, but just add more sources of individual news items, which leads to overly complex interfaces. Throughout our knowledge infrastructure, we aim to develop interface design guidelines based on the real metadata requirements.

Twine²² applies semantic analysis techniques to multimedia content (notes, videos, photos and contacts) and creates tags for each resource. The tags match up to concepts that Twine's algorithms associate with each piece of content, regardless of whether that concept is specifically mentioned in the content being tagged. Twine promises to be the first mainstream semantic web application to hit the market but full-featured social bookmarking is information-dense so adding all the semantic features and recommendations from Twine turns its information architecture and user experience into huge challenges. Twine's user experience is confusing. It's hard to keep track of all the levels and types of information available and site navigation is dizzying while **NEED** promises to develop clear interfaces displaying the right amount of information to the user.

¹⁹ http://e-culture.multimedian.nl/software/ClioPatria.shtml

²⁰ http://www.virage.com/content/home/index.en.html

²¹ http://www.silobreaker.com/

²² http://www.twine.com/

Newstin²³ provides multilingual news access and allows searching, browsing or reading news by topics and not just by keywords. The topic structure allows switching languages and having foreign-language stories translated into a native tongue. The StarTreeNavigator is a novel way to find clustered items, but the hierarchy behind it is fixed and does not follow IPTC subject codes. The main limitation of Newstin is that the system deals only with textual news stories while we aim to smoothly integrate all media types and particularly video news.

NewsAtSeven²⁴ is an automatic system that builds personalized news shows. After selecting a news stories, the system finds relevant images, videos or external opinions and generates a virtual news bulletin read by an animated character while providing the original sources of the information. The avatar makes the presentation of the news very appealing. However, the system cannot link together several stories on the same topic (for example coming from several sources), nor present an event globally or provide contextual background knowledge for understanding the news.

ClearForest Gnosis²⁵ can extract particular information such as named entities from textual web resources and highlight them while browsing the web. The named entities extracted remain pure strings as they are not linked to any knowledge base while we want to enrich existing semantic web datasets and contribute to the linked data community. Furthermore, we will extract relationships between the entities.

YouTube has proposed the **Warp**²⁶ interface to display video clips under animated nucleus satellite graphs. The bubbles are linked together when they share the same subject or have some semantic proximity. Albeit this user interface looks nifty at first, it is difficult to understand why videos are linked together, and the interface looks sometimes very confusing if we get into a network that is very dense. The timeline view representation has been also largely studied in various contexts. **Google Experimental Labs**²⁷ proposes to see search results on a timeline. Google's technology extracts semantic concepts such as key dates, locations, and measurements to present the information along several dimensions.

None of the above websites and tools really solves the issue of the individual user being overwhelmed by too many individual and disconnected pieces of information. Some of them, however, present unique and renewed ways of presenting information to end-users. We will take these interface ideas to a higher level by really addressing all media (text, image, graphics and video) and by incorporating the temporal dimension of the news. We will provide the news event granularity the user is looking for with appropriate contextual information and background knowledge.

1.2.5 Related EU Projects

A number of EU projects funded under the Framework Programmes $FP6^{28}$ and $FP7^{29}$ are related to **NEED**. We show below how we will differentiate from these projects while building on their main results.

NEWS³⁰ developed an automated multi-lingual textual news classification and annotation engine that is able to categorize information (using the IPTC subject taxonomy) and extract named entities in English, Italian and Spanish. Temis now offers the same level of functionalities in 16 languages as a commercial tool, and this system will soon be in production in French and English as part of the AFP editorial system. Furthermore, the project never achieves to build an event extraction engine while we will use these annotations for inferring news events from content annotations. The NEWS project also provided a prototype ontology model applicable to the news domain [Fernández *et al.*, 2007], [Zap *et al.*, 2005]. We will build on the results of this work for creating a reference OWL description of the news domain, based on the

²³ <u>http://www.newstin.com</u>

²⁴ <u>http://www.newsatseven.com</u>

²⁵ https://addons.mozilla.org/en-US/firefox/addon/3999

²⁶ http://www.youtube.com/testtube

²⁷ http://www.google.com/experimental/

²⁸ http://cordis.europa.eu/ist/kct/fp6-projects-alpha.htm

²⁹ http://cordis.europa.eu/ist/kct/fp7_projects.htm and

http://cordis.europa.eu/fp7/ict/telearn-digicult/digicult-call1 en.html

³⁰ <u>http://www.news-project.com/</u>

FP7-ICT-2007-3 STREP proposal NEED NewsML-G2 IPTC standard. We will also tackle multiple types of media, in addition to text, as it is our belief that video will gradually become the dominant medium for news content.

Citizen Media³¹ enables lay users to consume, author and publish their content as part of a networked audiovisual system. The project focuses on automatic analysis of visual information and on scalability issues since the system has to be able to handle a massive amount of user-generated content in different formats in real time, and annotate and store this content in huge databases in order to better reuse all these pieces of user-generated content. We will build on the experiences with the interfaces developed for lay users but in addition will target professional users from news agencies and broadcasters as well as independent journalists. We will also emphasize the role of semantic metadata for solving interoperability problems and empowering end-user interfaces.

MESH³² aims to extract, compare and combine content from multiple multimedia news sources, automatically create advanced personalized multimedia summaries, syndicate summaries and content based on the extracted semantics, and provide end users with a multimedia mesh news navigation system. While the project has made progress across this broad set of goals, it focuses mainly on news distribution on mobiles. We concentrate, however, on the use of the underlying technological semantic infrastructure to reduce the amount of information exposed to the user in a simplified interface.

SEMEDIA³³ overall objective is to develop a collection of audiovisual search tools that are user driven, preserve metadata along the chain, and are generic enough to be applicable to different fields (e.g. broadcasting production, cinema postproduction or social web). We will also stress on the preservation of the metadata along the workflow and even solve the current interoperability problems using a knowledge infrastructure based on current standards and practices in the media industry. Given the specificity of the news domain and the existence of the IPTC subject codes, we will concentrate on the macro events detection problem together with the implementation of clustering and ranking algorithms for news items.

PENG³⁴ (Personalized News Content Programming) aims at providing news professionals with an interactive and personalized tool for multimedia news gathering and delivery. This was achieved by developing a flexible prototype for a personalized filtering, retrieval and composition of multimedia news. The personalization is obtained by "tuning" the contribution of the distinct content types and sources of information by associating a trust score to each information source. However, the hierarchical organization and categorization of the news remains fuzzy while we will find automatically relationships between news items coming from different sources, in different languages and on different media by using our knowledge infrastructure and multimedia analysis tool-kits. This will result in an intelligent and intuitive clustering and ranking of news items.

PAPYRUS³⁵ (Cultural and Historical Digital Libraries dynamically mined from News Archives) aims at creating a cross-discipline digital library engine that allows for drawing content from one domain and making it available and understandable to the users of another. PAPYRUS starts from the historical perspective (within existing digital libraries) and tries to relate that back with legacy content from News Providers. In that sense, the definition of an event pre-exists and even if it can be controversial, some facts are unambiguous (why it happened; what were the consequences; and how it may have been avoided). We will rather take the point of view of news providers for defining formally the notion of an event and will have to deal with the dynamicity of the news where events are not necessarily expected.

aceMedia³⁶ aims to create a framework for combining advances in knowledge, semantics and multimedia processing technologies. The main output of the project is the aceToolbox, a content analysis platform for low-level image feature extraction. However, the project has not considered complementary resources and

³¹ <u>http://www.ist-citizenmedia.org/</u>

³² <u>http://www.mesh-ip.eu/?Page=Project</u>

³³ http://www.semedia.org/

³⁴ http://www.peng-project.org/

³⁵ http://www.ict-papyrus.eu/

³⁶ http://www.acemedia.org/

existing background knowledge for adding semantic information, while it will be the primary focus of **NEED** to perform events detection and annotation.

The **K-Space**³⁷ Network of Excellence brings together the content analysis and Semantic Web communities and aims at narrowing the semantic gap with semantic inference for automatic annotation and retrieval of multimedia content. As a NoE, the focus is on research resource creation via multi-partner collaborative activities, including PhD and researchers exchange. A number of knowledge-based multimedia content analysis technologies have been made available on which we will build **NEED**. Specific examples include automatic and semi-automatic object segmentation and concept detectors.

None of the above projects addresses the problems of finding how different news items are related to each other and of establishing explicit relationships between different sources for the same event in order to help the user to form his/her own opinion. Moreover these projects never achieved to build an event extraction engine giving an overview of individual pieces of information and making sense of individual news items by providing links to background knowledge.

³⁷ <u>http://www.k-space.eu/</u>

1.3.1 Overall strategy of the work plan

NEED aims to create an environment that facilitates end-users in seeing meaningful connections among individual news items (stories, photos, graphics, videos) through underlying knowledge of the descriptions of the items, their relationships and related background knowledge, centred on the notion of scheduled or breaking news events.

NEED will address *metadata interoperability* along the multimedia news workflow by designing, leveraging and integrating relevant multimedia and news ontologies. The resulting knowledge infrastructure will be thus ontology-mediated and expressed in knowledge representation web-based standards (OWL, RDF, SKOS). Several initiatives have proposed a way to represent news events in a structured way. The latest is the new IPTC working draft EventsML-G2. This standard relies on the News Architecture (NAR), an IPTC framework for the management and description of news and associated information. NewsML-G2 is also based on this architecture and can be further linked with an event model. Both models make use of multiple (and sometimes overlapping) controlled vocabularies, maintained by different authorities. Finally, other work on bridging W3C and MPEG-7 related standards for the description of multimedia content has resulted in the development of a core ontology for multimedia (COMM) [Arndt *et al.*, 2007]. We will integrate these knowledge models in order to preserve the metadata along the global workflow of the multimedia news production and consumption chain.

Event detection is at the heart of the **NEED** project. Some events might be obvious (e.g. Tour de France, UEFA Cup, World War II) while others are definitely not (e.g. USA mortgage crisis, wedding of Carla Bruni) which make the automatic detection and semantic annotation of events a real research challenge. Our approach will rely on a suite of contextual and content analysis techniques: entities extracted and categorised from textual stories, visual cues and structuring detected by a multimedia analysis tool-kit, audio processing for quotes detection. Events detected will feed a knowledge base of events, represented using Semantic Web languages and exposed on the web as a semantic web repository linked to existing open datasets.

NEED will address *interface interoperability* along the multimedia news workflow by integrating the existing platforms used by AFP and VRT based on the knowledge infrastructure described above. Novel interfaces supporting semantic search and presentation from rich and heterogeneous news datasets will be designed and implemented, for example using a facetted browsing paradigm. These interfaces will support temporal media, multilingual and heterogeneous sources of news information. They will be evaluated using real data from news providers among both journalists and lay users.

NEED will actively participate in and contribute to various standardisation bodies such as W3C, IPTC, EBU and ISO, with the expectation of having significant impact on their development. Consortium partners are already participants and co-chair specific technical working groups. **NEED** aims thus to further develop multimedia news standards and provide and distribute reference implementations of them.

1.3.2 Structuring and timing of the work packages

The overall strategy of the project is broken into six work packages (WP), which in principle represent different aspects of the project and can be considered logical units of work. The tasks and deliverables of each work package have been defined so that the work packages are able to be run largely in parallel. The master plan identifies the milestones as specific points in time where a formal exchange of information between work packages is required and these exchanges have been identified as specific deliverables. Being able to formally manage the concurrency of individual work packages will substantially speed up the project.

The reasons behind the WP structure are the following:

• The **Project Management** is handled by the project coordinator CWI in a single work package **WP1**.

- Three work packages deal with the core research questions: WP2 designs a Knowledge Infrastructure for News Integration for solving interoperability issues in the current news workflow. WP3 provide tools for Event Detection and News Enrichment based on multimedia analysis techniques, natural language processing including entity recognition, and mining algorithms. WP4 generates Semantic Multimedia News Interfaces offering personalized access to multilingual and multimedia news corpora, linked to relevant and appropriate background knowledge in order to make sense of the news. Two of these work packages are lead by two major news providers while the two other research partners will participate significantly in the technical work. The WP4 will also evaluate the technologies developed in the project, conducting user studies among journalists and lay users.
- A **Standardisation Activities** work package **WP5** will immediately disseminate the technologies promoted by the project and ensure their uptake by the whole web and media industry. In liaison with an original Standardisation Advisory Board, it will allow the project members to have quick feedback with respect to the adoption of the technologies and inquiries towards future needs.
- **Dissemination, Evaluation and Exploitation** of the results are bundled in **WP6**, lead by the SME of the project which already foresees future products ready to enter the market.

The list of all work packages as well as their precise timing is given below in the Table 1.3a and in the Gantt charts in the Figure 1 to 6. The comprehensive description of each work package, tasks and sub-tasks, deliverables and milestones is given in the section 1.3.5.

Work package No	Work package title	Type of activity	Lead partic no.	Lead partic. short name	Person- months	Start month	End month
WP 1	Project Management	MGT	1	CWI	26	1	30
WP 2	Knowledge Infrastructure for News Integration	RTD	2	AFP	76	1	24
WP 3	Event Detection and News Enrichment	RTD	3	IBBT	87	1	30
WP 4	Semantic Multimedia News Interfaces	RTD	4	VRT	106	1	30
WP 5	Standardisation	RTD	1	CWI	67	1	30
WP 6	Project Dissemination, Evaluation and Exploitation	RTD	5	Temis	23	1	30
	TOTAL				385		

1.3.3 List of work packages

Tableau 1.3a – List of Work Packages

FP7-ICT-2007-3 08/04/08

STREP proposal

00/04/	00
Task Id	Task Name
WP1	Project Management
WP1.1	Overall Coordination & Communication with EU
WP1.1	Overall Coordination & Communication with EU
D1.2	Deliverable 1.2.x - Bi-annual activity Reports
	Deliverable 1.2.1
	Deliverable 1.2.2
	Deliverable 1.2.3
	Deliverable 1.2.4
D1.3	Financial Audit first half of Project
D1.4	Financial Audit second half of Project
WP1.2	Planning and Coordination of Project & Board Meetings
WP1.2	Planning and Coordination of Project & Board Meetings
D1.1	Deliverable 1.1.x - Agenda's & Minutes Project meeting
	Deliverable 1.1.1
	Deliverable 1.1.2
	Deliverable 1.1.3
	Deliverable 1.1.4
	Deliverable 1.1.5
	Deliverable 1.1.6
	Deliverable 1.1.7

dling of Legal, IPR and Ethical Matters

Handling of Legal, IPR and Ethical Matters

Status Report on legal & ethical Matters



Figure 1: Gantt chart of WP1

WP1.3

WP1.3

D1.5

F

Task Id	Task Name	arter		1:	st Quar	er		3rd Q	uarter		1st Qi	uarter		3rd Qu	arter		1st Qu	uarter
		Sep	Nov	J	Jan	lar N	lay	Jul	Sep	Nov	Jan	Mar	May	Jul	Sep	Nov	Jan	Mar
WP2	Knowledge Infrastructure for News Integration			*														
WP2.1	Specification of a News tology			Ť												_		
WP2.1.1	SOTA Events Model					^ ר	\FP											
D2.1	SOTA Event-Centric Models					- 💑	30-4											
WP2.1.2	Specification of the Events Ontology						, ,										AFP	
D2.2	Initial version of Events Ontology								•	30-9								
MS2.1	Initial Implementation of the Events Ontology								- 4	30-9								
D2.3	Final version of Events Ontology																31-1	2
MS2.2	Final Implementation of the Events Ontology															- 1	31-1	2
WP2.2	Ontology Alignment in Multimedia & News			÷												_	,	
WP2.2.1	Top-Level Ontology Alignment																CWI	
D2.4	Initial Report on Integrated Knowledge Architecture										4_ 31-1	2						
MS2.3	Initial Implementation of the Integrated Knowledge Architecture											2						
WP2.2.2	Domain-Level Ontology Alignment													:			cwi	
D2.4	Final Report on Integrated Knowledge Architecture																31-1	2
MS2.4	Final Implementation of the Integrated Knowledge Architecture															- X	31-1	2
WP2.3	Prototype Knowledge Base and Linked Data			÷												_		
WP2.3.1	Controlled Vocabularies & Thesaurus Integration																VRT	
D2.6	Initial Report on Thesaurus Integration & Linked Data										∲ _31-1	2		1				
D2.7	Final Report on Thesaurus Integration & Linked Data															1	31-1	2
WP2.3.2	Exposing Controlled Vocabularies & Linked Data																VRT	
MS2.5	Prototype Knowledge Base & Linked Data											•	31-3					
WP2.3.3	Annotation Interface for News Items										i.			-			cwi	
MS2.6	Annotation Interface for Multimedia News Items															•	31-1	2

Figure 2: Gantt chart of WP2

FP7-ICT-2007-3

JO/04/	Task Name	arter		1 et Or	arter		3rd O	larter		1et O	uarter		3rd O	uarter		1st Ou	arter		3rd Our
Taskid	Task Name	Sep	Nov	Jan	Mar	May	Jul	Sep	Nov	Jan	Ma	r May	Jul	Sep	Nov	Jan	Mar	May	Jul
WP3	Event Detection and News Enrichment			-															÷
WP3.1	Multimedia Content and Context Analysis																	-	÷.
WP3.1.1	Content Structuring and Annotation of News Video																		ввт
D3.1	SOTA Video Content Structuring						30-6												
D.3.3	Initial Report on Tools for Video Content Structuring	1									•	31-3							
WP3.1.2	Similarity Detection of Visual News Items											-							ІВВТ
D.3.4	Final Report on Tools for Video Content Structuring																		🐳 30-6
WP3.1.3	Audio and Speech processing for Quotes Detection	1																	Тіввт
D3.2	SOTA on Audio Processing and Quotes Detection					•	♦ 30-6												
MS3.1	Initial Implementation of Multimedia Context & Content Analysis Tools	1									_ Ļ	31-3							
MS3.2	Final Software Toolkits for Multimedia Context & Content Analysis																	4	i 30-6
WP3.2	Text Processing for Entity Extraction and Categorisation	1	1	÷—									-						÷ .
WP3.2.1	Entity Extraction												-						Temis
D3.5	SOTA on Entity Extraction & Categorisation					•	30-6												
WP3.2.2	Entity Categorisation and Evaluation	1																	Temis
MS3.3	Initial Implementation of Knowledge Extraction in Textual News										•	31-3							1
MS3.4	Final Software Module for Knowledge Extraction in Textual News	1																1	🗳 30-6
WP3.3	Event Detection and Annotation		1										-					-	÷.
WP3.3.1	SOTA on Event Detection	1					Tem	is											
D3.8	SOTA on Event Detection					•	30-6												
WP3.3.2	Specification of an Event Detection Framework						Ť												Temis
D.3.9	Initial Report on Event Detection Framework										•	31-3	-						
D.3.10	Final Report on on Event Detection Framework											-							30-6
WP3.3.3	Development of a Semantic Annotation Application																	- F	Temis
D.3.6	Initial Report on Semantic Annotators										•	31-3	-						
D.3.7	Final Report on Semantic Annotators																		30-6
MS3.5	Initial Implementation of Event Detection & Annotation Framework										4	31-3	-						
MS3.6	Final Implementation of Event Detection & Annotation Framework																	4	🌢 30-6
WP3.4	Event Management			÷—						-			-						÷ .
WP3.4.1	Infrastructure for News Events Management																		ввт
D3.11	Specification of News Events Knowledge Base					•	→ 30-6	-											
WP3.4.2	Mining Techniques for News Events Enrichment									-									IBBT
D.3.12	Initial Report on Mining Techniques										•	31-3							
D.3.13	Final Report on Mining Techniques																	1	30-6
MS3.7	Initial Prototype of the News Events Knowledge Base							•	30-9										
MS3.8	Final Prototype of the News Events Knowledge Base																	1	30-6

Figure 3: Gantt chart of WP3

Task Id	Task Name)r Dec	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter
WP4	Semantic Multimedia News Interface			i Apr may can	Tour Aug Dop			Apr may bun	our Mug cop		Sun ros mu	Popr may built	our Mag ou
WP4.1	Functional Requirements for User Interfaces			2 2 2									
WP4.1	Functional Requirements for User Interfaces					VRT							
D.4.1	Requirements for User Interfaces			♦ _1-5									
MS4.1	Mock-up Application for User Interfaces					30-9							
WP4.2	Search, Clustering and Access of News Content												
WP4.2	Search, Clustering and Access of News Content											1	IBBT
D4.2	Initial Report on Search, Clustering and Access of News Content							31-3					
D4.3	Final Report on Search, Clustering and Access of News Content											1	30-6
WP4.3	News Presentation and Personalisation											· · · · ·	
WP4.3	News Presentation and Personalisation											1	CWI
D4.4	Initial Report on Semantic Presentation and Personalisation							31-3					
D.4.5	Final Report on Semantic Presentation and Personalisation											1	30-6
MS4.2	Initial Implementation of Semantic Search and Presentation News Interfaces					30-9							
MS4.3	Version 2 of Semantic Search and Presentation News Interfaces							1	30-6			<u> </u>	
MS4.4	Final Implementation of Semantic Search and Presentation News Interfaces											Ļ	30-6
WP4.4	Technical and usability Validation				-								•
WP4.4.1	Evaluation Phase 1						AFP						
D4.6	Report on the first Evaluation of NEED Technologies						31-12						
WP4.4.2	Evaluation Phase 2					Γ							AFP
D4.7	Report on the Second Evaluation of NEED Technologies											1	30-6
MS4.5	User Studies of First Evaluation of NEED Technologies					լ, եթ.	31-12						
MS4.6	User Studies of Second Evaluation of NEED Technologies											L,	30-6

Figure 4: Gantt chart of WP4

Task Id	Task Name		1st Qu	st Quarter 3			arter		1st Quarter			3rd Quarter			1st Qu	arter		3rd Quarter	
		Nov	Jan	Mar	May	Jul	Sep	Nov	Jan	Mar	May	Jul	Sep	Nov	Jan	Mar	May	Jul	Sep
WP5	Standardisation																_	•	
WP5.1	Contribution to W3C standards																	CWI	
WP5.2	Contribution to ISO standards														-			IBBT	
WP5.3	Contribution to IPTC standards																	AFP	
WP5.3	Contribution to EBU standards											-						VRT	
D5.1	First Report on Standardisation Contributions						•	30-10	•										
D5.2	Second Report on Standardisation Contributions											1	31-8						
D5.3	Third Report on Standardisation Contributions																	\$ 30-6	
Figure	e 5: Gantt chart of WP5																		

FP7-ICT-2007-3	3
00/01/00	

0/04/0	/0																		
Task Id	Task Name	arter		1st Qu	uarter		3rd Qu	uarter		1st Q	uarter		3rd Q	uarter		1st Q	uarter		3rd
WP6	Project Dissemination Evaluation & Evaluation	Sep	Nov	Jan	Mar	May	Jul	Sep	Nov	Jan	Mar	May	Jul	Sep	Nov	Jan	Mar	May	Ju
WP6 1	Project Dissemination, Evaluation & Exploitation			1															Ľ.
WP6 1 1	The NEED Web site																		CW
D6 1	Project Web site fully functional			1-1															
WP6 1 2	Six-monthly Electronic Newsletter			<u> </u>															AF
D.6.2	NEED Electronic Newsletter					0			0			0			0			0	
	NEED Electronic Newsletter 1					_	1-6		~			Ý			~			Ý	
	NEED Electronic Newsletter 2					•			• 1	1-12									
	NEED Electronic Newsletter 3								•			•	1-6						
	NEED Electronic Newsletter 4														♦ 1	1-12			
	NEED Electronic Newsletter 5																	• 1	I-6
WP6.2	Project Evaluation			÷—															
WP6.2.1	Definition & Specification of a Quality Plan						Temi	s											
D6.3	Quality Plan					•	30-6												
WP6.2.1	Quality Control						*												Те
D6.4	First Version of the Quality Report										•	31-3							
D6.5	Final Version of the Quality Report																		(30
WP6.3	Project Exploitation															-			
WP6.3.1	Definition of a Marketing Plan												Tem	is					
D6.6	Marketing Plan												💐 30-6	6					
WP6.3.2	Package an "Events Detection" Skill Cartridge												*			-			Те
D6 7	Skill Cartridge "Events Detection"																		20

Figure 6: Gantt chart of WP6

1.3.4 List of Deliverables and Milestones

Del. no.	Deliverable name	WP no.	Nature	Dissemination level	Delivery date (proj. month)
D1.1.x	Agendas and official minutes of relevant project meetings	WP 1	R	СО	3x
D1.2.x	Six-monthly activity reports (scientific progress and project expenditures summary)	WP 1	R	СО	6х
D1.3	Financial audit reports for the first half of the project	WP 1	R	СО	15
D1.4	Financial audit reports for the second half of the project	WP 1	R	СО	30
D1.5	Status report on legal and ethical matters	WP 1	R	PU	30
D2.1	State of the Art Report on Event- Centric models	WP 2	R	PU	4
D2.2	Initial version of the Events Ontology	WP 2	Р	PU	9
D2.3	Final version of the Events Ontology	WP 2	Р	PU	24
D2.4	Initial Report on the Integrated Knowledge Architecture	WP 2	R	PU	12
D2.5	Final Report on the Integrated Knowledge Architecture	WP 2	R	PU	24
D2.6	Initial Report on Thesaurus Integration and Linked Data	WP 2	R	PU	12
D2.7	Final Report on Thesaurus Integration and Linked Data	WP 2	R	PU	24
D3.1	State of the Art Report on Video Content Structuring	WP 3	R	PU	6

D3.2	State of the Art Report on Audio Processing and Quotes Detection	WP 3	R	PU	6
D3.3	Initial Report on Tools for Structuring, Annotation and Organisation of Multimedia News Content	WP 3	R	PU	15
D3.4	Final Report on Tools for Structuring, Annotation and Organisation of Multimedia News Content	WP 3	R	PU	30
D3.5	State of the Art Report on Entity Extraction and Categorisation	WP 3	R	PU	6
D3.6	Initial Report on Semantic Annotators for News Items	WP 3	R	PU	15
D3.7	Final Report on Semantic Annotators for News Items	WP 3	R	PU	30
D3.8	State of the Art Report on "Event Detection"	WP 3	R	PU	6
D3.9	Initial Report on a Event Detection and Annotation Framework	WP 3	R	PU	15
D3.10	Final Report on a Event Detection and Annotation Framework	WP 3	R	PU	30
D3.11	Specification of the News Events Knowledge Base	WP 3	R	PU	6
D3.12	Initial Report on Mining Techniques for Enriching the News Events Knowledge Base	WP 3	R	PU	15
D3.13	Final Report on Mining Techniques for Enriching the News Events Knowledge Base	WP 3	R	PU	30
D4.1	Report on Requirements for NEED User Interfaces	WP 4	R	PU	4
D4.2	Initial Report on Search, Clustering and Access of News Content	WP 4	R	PU	15
D4.3	Final Report on Search, Clustering and Access of News Content	WP 4	R	PU	30
D4.4	Initial Report on Semantic Presentation and Personalization of Multimedia News	WP 4	R	PU	15
D4.5	Final Report on Semantic Presentation and Personalization of Multimedia News	WP 4	R	PU	30
D4.6	Report on the First Evaluation of NEED technologies	WP 4	R	PU	12
D4.7	Report on the Second Evaluation of NEED technologies	WP 4	R	PU	30

00/04/00					
D5.1	First Report on Standardisation Contributions	WP 5	R	PU	10
D5.2	Second Report on Standardisation Contributions	WP 5	R	PU	20
D5.3	Third Report on Standardisation Contributions	WP 5	R	PU	30
D6.1	Project web site fully functional	WP 6	0	PU	1
D6.2.x	Six-monthly electronic newsletter	WP 6	R	PU	бх
D6.3	Definition of the Quality Plan	WP6	R	СО	6
D6.4	First version of the Quality Report	WP6	R	RE	15
D6.5	Final version of the Quality Report	WP6	R	RE	30
D6.6	Definition of the Marketing Plan	WP6	R	СО	18
D6.7	Skill Cartridge "Events Detection"	WP6	Р	PU	30

Tableau 1.3b – List of Deliverables

Milestone number	Milestone name	Work package(s) involved	Expected date	Means of verification
MS2.1	Initial Implementation of the Events Ontology	WP 2	9	Ontology released and available on the web
MS2.2	Final Implementation of the Events Ontology	WP 2	24	Ontology released and available on the web
MS2.3	Initial Implementation of the Integrated Knowledge Architecture	WP 2	12	Ontologies aligned
MS2.4	Final Implementation of the Integrated Knowledge Architecture	WP 2	24	Ontologies aligned
MS2.5	Prototype Knowledge Base and Linked Data	WP 2	15	Knowledge base linked with existing open SW datasets
MS2.6	Annotation Interface for Multimedia News Items	WP 2	24	Software released
MS3.1	Initial Implementation of Multimedia Context and Content Analysis Tool-kits	WP 3	15	Set of tools released
MS3.2	Final Software Tool-kits for Multimedia Context and Content Analysis	WP 3	30	Set of tools released
MS3.3	Initial Implementation of Knowledge Extraction Techniques in Textual News Stories	WP 3	15	Set of tools released
MS3.4	Final Software Module for Knowledge Extraction in Textual News Stories	WP 3	30	Set of tools released
MS3.5	Initial Implementation of Event Detection and Annotation Framework	WP 3	15	Software released
MS3.6	Final Software Module for Event Detection and Annotation	WP 3	30	Software released
MS3.7	Initial Prototype of the News Events Knowledge Base	WP 3	9	Knowledge base exposed on the SW
MS3.8	Final Prototype of the News Events Knowledge Base	WP 3	30	Knowledge base exposed on the SW
MS4.1	Mock up for NEED User Interfaces	WP 4	6	Drawings of forthcoming NEED interfaces
MS4.2	Initial Implementation of Semantic Search and Presentation News Interfaces	WP 4	9	Software released
MS4.3	Second version of Semantic Search and Presentation News Interfaces	WP 4	18	Software released
MS4.4	Final Implementation of Semantic Search and Presentation News Interfaces	WP 4	30	Software released
MS4.5	User Studies of the First Evaluation of NEED technologies	WP 4	12	Software validated by a user group
MS4.6	User Studies of the Second Evaluation of NEED technologies	WP 4	30	Software validated by a user group

Tableau 1.3c - List of Milestones

1.3.5 Work package description

Work package number	WP1	WP1 Start date or starting event: M1							
Work package title	Project Manage	roject Management							
Activity type	MGT								
Participant number	1	2	3	4	5				
Participant short name	CWI	AFP	IBBT	VRT	Temis				
Person-months per	22	1	1	1	1				
participant									

Objectives

- To oversee the coordination of the project;
- To assign responsibilities clearly at activity and sub-activity level;
- To define clear lines of communication among the participants.

Description of work

The management activities are designed to guarantee that the project runs smoothly by ensuring that the goals are clearly defined and understood. The proposed management structure of the project will be functional immediately after the project kick-off meeting and the activities will be undertaken during the whole duration of the project:

WP1.1 Overall Coordination and Communication with the EU Commission (CWI, month 1-30)

It is the main activity and main task of the Management WP.

- Scientific quality: The progress of individual actions and achievements in the corresponding activities will be supervised by the WP leaders who report to the Project Steering Board (PSB). It will check and approve all deliverables before delivery to the EC.
- Financial: It will ensure that financial audits as required by the EU are being implemented in the project. Based on the accounting figures, future budgets will be planned and overspending will be limited.
- Project coordination and decision: The administration executive will ensure that relevant information on project progress and status is being exchanged among the members of the PSB. Using this information the PSB can quickly identify if changes are needed and efficiently decide what corrections or new actions should be implemented.

This activity will deliver six-monthly activity reports to the EC, containing scientific and technological progress, standardisation activities and financial expenditures for each partner.

All partners are involved in this task.

WP1.2 Planning and Coordination of Project and Boards Meetings (CWI, month 1-30)

It offers logistic support for the planning and coordination of all project and boards meetings, including the kick-off meeting for a successful project start. The project aims to have three technical meetings per year in order to ensure the scientific and technical progress of the project.

It prepares and provides the means for successful annual project reviews as required by the EC. The administration executive will ensure that the major annual deliverables are submitted on time to the reviewer. Logistic organization of the review will be provided.

CWI is involved in this task.

WP1.3 Handling of Legal, IPR and Ethical Matters (CWI, month 1-30)

It determines the way that partners behave with respect to each other according to the terms of the

Consortium Agreement (CA). It will deal with the liability of partners, partner withdrawal procedures, the settlement of disputes, the responsibilities of partners regarding accurate and timely reporting of difficulties, confidentiality, including the difference between foreground and background information, IPR, including arrangements for licensing.

All partners are involved in this task.

Deliverables

- Deliverable: D1.1.x (CWI, month 3x): Agendas and official minutes of relevant project meetings
- *Deliverable: D1.2.x* (CWI, month 6x): Six-monthly activity reports (scientific progress and project expenditures summary)
- Deliverable: D1.3 (CWI, month 15): Financial audit reports for the first half of the project
- Deliverable: D1.4 (CWI, month 30): Financial audit reports for the second half of the project
- Deliverable: D1.5 (CWI, month 30): Status report on legal and ethical matters

Work package number	WP2	WP2 Start date or starting event: M1							
Work package title	Knowledge Inf	Knowledge Infrastructure for News Integration							
Activity type	RTD	₹TD							
Participant number	1	2	3	4	5				
Participant short name	CWI	AFP	IBBT	VRT	Temis				
Person-months per	25	20	15	16	0				
participant									

Objectives

- Develop a formal ontology suitable for representing chains of news events;
- Provide an integrated knowledge infrastructure for multimedia news;
- Expose controlled vocabularies and thesaurus on the web as formalised linked data;
- Develop intelligent annotation interface for multimedia news.

Description of work

NEED will address *metadata interoperability* along the multimedia news workflow by designing, leveraging and integrating a number of multimedia and news ontologies. The resulting knowledge infrastructure will be thus ontology-mediated and expressed in knowledge representation web-based standards (OWL, RDF, SKOS).

Several initiatives have proposed a way to represent news events in a structured way. The latest is the new IPTC working draft named EventsML-G2. This standard relies on the News Architecture (NAR), an IPTC framework for the management and description of news and associated information. NewsML-G2 is also based on this architecture and can be further linked with an event model. Both models make use of multiple (and sometimes overlapping) controlled vocabularies, maintained by different authorities. Finally, other work on bridging W3C and MPEG-7 related standards for the description of multimedia content has been proposed, and has resulted in the core ontology for multimedia (COMM) [Arndt *et al.*, 2007].

There is now an urgent <u>need</u> to integrate these various knowledge models in order to optimize the global workflow of the multimedia news production and consumption chain. This work package will develop such a knowledge architecture. It is composed of three tasks and runs for the two first years of the project.

WP2.1 Specification of a News Event Ontology (AFP, month 1-24)

Several schemas for representing the notion of a (news) event have been proposed and IPTC is now working on the future version of EventsML, but it has not yet defined a formal model for the representation of chains of events. This task aims to produce a formal OWL ontology while being compatible with existing event-centric models. The design of this ontology will start from the core questions such as "what makes a news event?", "what is the signature of an event?", "what are its specific characteristics?" and "how are events chained?". The result of this task will finally be the reference implementation of the future EventsML-G2.

- WP2.1.1 Preparation of a State of the Art Report on Events Models (*AFP*, *month 1-4*)
- WP2.1.2 Specification of the Events Ontology (*AFP*, *month* 5-24)

CWI, AFP and IBBT are involved in this task.

WP2.2 Ontology Alignment in Multimedia and News (CWI, month 1-24)

News items are more and more multimedia-based and make use sometimes of user generated content provided by citizen journalists. Hence, AFP plans to double³⁸ its photo activity and multimedia products during the next 5 years. Describing both the multimedia aspects of the news items and its content requires an integrated knowledge infrastructure aligning ontologies such as NewsML, EventsML, COMM and other

³⁸ <u>http://www.lemonde.fr/actualite-medias/article/2008/03/20/pierre-louette-l-afp-n-a-pas-vocation-ontologiquement-a-etre-une-machine-a-cash_1025485_3236.html</u>

multimedia and events-based models, and dealing with lightweight annotations such as the tags accompanying user generated content. This task will provide this integrated knowledge infrastructure.

- WP2.2.1 Top-level Ontology Alignment: NAR, COMM and other multimedia ontologies (CWI, month 1-24)
- WP2.2.2 Domain-level Ontology Alignment: NewsML, EventsML and other events-based models (CWI, month 5-24)

CWI, AFP, IBBT and VRT are involved in this task.

WP2.3 Prototype Knowledge Base and Linked Data (VRT, month 1-24)

News items are described all along their workflow. Both journalists and documentalists make use of particular controlled vocabularies for providing this metadata description. These thesauri can be specific to a particular broadcaster (e.g. VRT), or maintained by a standardisation body (e.g. the IPTC NewsCodes³⁹), or coming from third-party industries (e.g., thesaurus indexing all companies). They are, however, often not represented in the same language and format, raising interoperability problems at the instance level. Furthermore, the values used in the metadata descriptions of the news items can often be linked to existing knowledge formalized on the web: Geonames⁴⁰ for information about geographical locations, IMDB for information about movies, WordNet⁴¹ for general terms, DBPedia⁴² for a selected part of Wikipedia formalised, etc. This task will address this issue of bridging together these various controlled vocabularies, performing alignment at the instance level. It will also expose the resulting formalized data on the web, participating thus in the global Linked Data⁴³ initiative. It will in turn provide intuitive manual annotation interface for journalists that will allow them to disambiguate on the fly metadata values in news item descriptions.

- WP2.3.1 Controlled Vocabularies and Thesaurus Integration (VRT, month 1-24)
- WP2.3.2 Exposing Controlled Vocabularies as Linked Data (VRT, month 5-24)
- WP2.3.3 Annotation Interface for News Items (CWI, month 5-24)

CWI, AFP, IBBT and VRT are involved in this task.

Deliverables

- Deliverable: D2.1 (AFP, month 4): State of the Art Report on Event-Centric models
- Deliverable: D2.2 (AFP, month 9): Initial version of the Events Ontology
- Deliverable: D2.3 (AFP, month 24): Final version of the Events Ontology
- Deliverable: D2.4 (CWI, month 12): Initial Report on the Integrated Knowledge Architecture
- Deliverable: D2.5 (CWI, month 24): Final Report on the Integrated Knowledge Architecture
- Deliverable: D2.6 (VRT, month 12): Initial Report on Thesaurus Integration and Linked Data
- Deliverable: D2.7 (VRT, month 24): Final Report on Thesaurus Integration and Linked Data

Milestones

- *Milestone: MS2.1* (AFP, month 9): Initial Implementation of the Events Ontology
- *Milestone: MS2.2* (AFP, month 24): Final Implementation of the Events Ontology

³⁹ <u>http://www.iptc.org/NewsCodes/</u>

⁴⁰ http://www.geonames.org/

⁴¹ http://www.w3.org/TR/wordnet-rdf/

⁴² http://dbpedia.org/

⁴³ http://linkeddata.org/

- *Milestone: MS2.3* (CWI, month 12): Initial Implementation of the Integrated Knowledge Architecture
- *Milestone: MS2.4* (CWI, month 24): Final Implementation of the Integrated Knowledge Architecture
- Milestone: MS2.5 (VRT, month 15): Prototype Knowledge Base and Linked Data
- Milestone: MS2.6 (VRT, month 24): Annotation Interface for Multimedia News Items

Work package number	WP3	WP3 Start date or starting event: M1							
Work package title	Event Detection	event Detection and News Enrichment							
Activity type	RTD	RTD							
Participant number	1	2	3	4	5				
Participant short name	CWI	AFP	IBBT	VRT	Temis				
Person-months per	0	7	30	10	40				
participant									

Objectives

- Develop a suite of contextual and content analysis techniques on multimedia news items;
- Advance the state of the art in knowledge extraction from textual news stories;
- Develop semantic algorithms for detecting and annotating news events;
- Provide a reference entry point for the semantic description of news events.

Description of work

This work package deals with the automatic analysis of multimedia news stories and entities extraction and categorisation in order to detect events and provide semantic description of them. It consists of four tasks that run for the entire duration of the project.

WP3.1 Multimedia Content and Context Analysis Tool-kits (IBBT, month 1-30)

This task will provide a suite of contextual and content analysis techniques for enriching the semantic descriptions of news photos and videos. In particular, we will develop analysis algorithms for structuring videos and detecting a chosen set of semantic entities useful for event detection and organisation. We will also process audio sources for detecting quotes in audio-visual news material.

IBBT, VRT and Temis are involved in this task.

• WP3.1.1 Content Structuring and Annotation of News Video (IBBT, month 1-30)

The identification of the temporal structure of a video is an essential task for video indexing, retrieval and presentation. The steps commonly taken for video analysis are to detect shot boundaries and to extract key frames that best represent the semantic content of each shot. Based on these key frames, content analysis algorithms can extract semantic information using feature extraction, machine learning and relevance feedback techniques (bottom-up approach) while being guided by the event and news topics ontologies developed in WP2 (top-down approach). These semantic entities will finally be used to annotate the news items and ease the news events categorisation.

• WP3.1.2 Similarity Detection of Visual News Items (*IBBT*, *month 1-30*)

In the news domain, larges amount of existing visual material are reused in the production of multimedia news items. Detecting this redundancy automatically will help to organize and classify individual multimedia news items into larger events. We will perform selected feature extraction and very precise matching of sequences of these features in order to detect visually similar content.

• WP3.1.3 Audio and Speech processing for Quotes Detection (*IBBT*, *month 1-30*)

Journalists often insert quotes of identified speakers while writing textual stories. Detecting these quotes automatically within news video and aligning them with the textual stories is thus fundamental. We will perform audio and speech processing to detect and recognise the language, the speaker and the quotes in audio and video news material. More specifically, the *quote detection* module will combine formal quotation marks or inverted comma, person or function names and connectors (e.g. "declare", "announce", "say"). The quotation of a movie, book or song title, together with the author, will probably be the closest false positive

that we could expect but the usage of the connector will help the disambiguation process. The development of this module will be based on existing use cases and technical specifications⁴⁴.

WP3.2 Text Processing for Entity Extraction and Categorisation (*Temis, month 1-30*)

This task aims to provide tools for extracting and categorising semantically entities from textual news items.

Temis is involved in this task.

• WP3.2.1 Entity Extraction (*Temis, month 1-30*)

Identifying entities such as the names of companies, associations, organizations, products figures, dates and places as well as the relationships between these entities (e.g. company-company, person-company, company-product, etc.) is key to indexing and presenting news stories. We will build on the knowledge extraction engine powered by Skill CartridgesTM, a hierarchy of knowledge components describing the information to extract for a given business, specific field or topic. We will customize this extraction engine and the sequence of the three linguistic analysis steps it performs to the news domain: corpus recognition (language identification), morpho-syntactic analysis (lemmatization) and knowledge extraction using dedicated rules.

• WP3.2.2 Entity Categorisation and Evaluation (*Temis, month 1-30*)

The entities extracted are semantically categorized following a semi-supervised learning approach. Entities already categorized according to the ontologies and controlled vocabularies developed in our knowledge infrastructure (WP2) undergo morpho-syntactic processing by the extraction engine, which associates a semantic descriptor to them (such as frequency of nouns or verbs, noun phrases). These entities are used as a basis for learning, and enable the categorisation engine to create the categorization model using an algorithm that combines the various semantic descriptors assigned to the same category. The categorizer engine can then assign all new entities to the various pre-defined categories based on similarity with the semantic descriptor. We will finally assess the correctness of this automatic categorisation.

WP3.3 Event Detection and Annotation (*Temis, month 1-30*)

Event detection is at the heart of the **NEED** project. It is a very complex task since some events might be obvious (e.g. Tour de France, UEFA Cup, World War II) while other are definitively not (e.g. USA mortgage crisis, wedding of Carla Bruni). Several parameters will be used to qualify an event: time, knowledge base of personalities, past and recurrent events, industry background, etc. Our approach for detecting events and semantically annotating them will rely on the entities extracted and categorised from textual stories as well as on the visual cues detected by our multimedia analysis tool-kit. We will develop semantic algorithms that gather individual pieces of news from different media and group them into contextualised (breaking or scheduled) events. Several scenarios will be put in place to validate the approach.

AFP, VRT and Temis are involved in this task.

- WP3.3.1 Preparation of a State of the Art Report on "Event Detection" (*Temis, month 1-6*)
- WP3.3.2 Specification of an Event Detection Framework (*Temis, month 6-30*)
- WP3.3.3 Development of a Semantic Annotator for Events (*Temis, month 6-30*)

WP3.4 Event Management (IBBT, month 1-30)

AFP and IBBT are involved in this task.

• WP3.4.1 Infrastructure for News Events Management (*IBBT*, *month 1-30*)

We will setup and maintain in real time a knowledge base containing past events, planned events (known in advance, e.g. Olympics Games), breaking events (unexpected but discovered by the task WP3.3) and recurring events (linked to their periodic instances, e.g. an explosion becoming after a few minutes/hours a terrorist attack, an oil leak becoming a major pollution disaster, an outstanding sports performance becoming a doping scandal, an official resigning before a scandal is revealed some days later). We will maintain in real time versioned information about these events. The knowledge base will also include importers, transformers and exporters as web services to peer knowledge bases.

⁴⁴ <u>http://en.wikipedia.org/wiki/Quotation_mark</u>

• WP3.4.2 Mining Techniques for News Events Enrichment (*IBBT*, *month 6-30*)

We will develop semantic algorithms that crawl web resources such as Wikipedia in order to enrich events semantically (e.g. find the named entities constituting the signature of an event, propose an adequate name for an event, find new relationships between events) within the knowledge base and expose it as linked data in the Semantic Web.

Deliverables

- Deliverable: D3.1 (IBBT, month 6): State of the Art Report on Video Content Structuring
- *Deliverable: D3.2* (IBBT, month 6): State of the Art Report on Audio Processing and Quotes Detection
- *Deliverable: D3.3* (IBBT, month 15): Initial Report on Tools for Structuring, Annotation and Organisation of Multimedia News Content
- *Deliverable: D3.4* (IBBT, month 30): Final Report on Tools for Structuring, Annotation and Organisation of Multimedia News Content
- *Deliverable: D3.5* (Temis, month 6): State of the Art Report on Entity Extraction and Categorisation
- Deliverable: D3.6 (Temis, month 15): Initial Report on Semantic Annotators for News Items
- Deliverable: D3.7 (Temis, month 30): Final Report on Semantic Annotators for News Items
- Deliverable: D3.8 (Temis, month 6): State of the Art Report on "Event Detection"
- Deliverable: D3.9 (Temis, month 15): Initial Report on a Event Detection and Annotation Framework
- *Deliverable: D3.10* (Temis, month 30): Final Report on a Event Detection and Annotation Framework
- Deliverable: D3.11 (IBBT, month 6): Specification of the News Events Knowledge Base
- *Deliverable: D3.12* (IBBT, month 15): Initial Report on Mining Techniques for Enriching the News Events Knowledge Base
- *Deliverable: D3.13* (IBBT, month 30): Final Report on a Mining Techniques for Enriching the News Events Knowledge Base

Milestones

- *Milestone: MS3.1* (IBBT, month 15): Initial Implementation of Multimedia Context and Content Analysis Tool-kits
- *Milestone: MS3.2* (IBBT, month 30): Final Software Tool-kits for Multimedia Context and Content Analysis
- *Milestone: MS3.3* (Temis, month 15): Initial Implementation of Knowledge Extraction Techniques in Textual News Stories
- *Milestone: MS3.4* (Temis, month 30): Final Software Module for Knowledge Extraction in Textual News Stories
- *Milestone: MS3.5* (Temis, month 15): Initial Implementation of Event Detection and Annotation Framework
- *Milestone: MS3.6* (Temis, month 30): Final Software Module for Event Detection and Annotation
- *Milestone: MS3.7* (IBBT, month 9): Initial Prototype of the News Events Knowledge Base

• Milestone: MS3.8 (IBBT, month 30): Final Prototype of the News Events Knowledge Base

Work package number	WP4	WP4 Start date or starting event: M1						
Work package title	Semantic Multi	emantic Multimedia News Interfaces						
Activity type	RTD	tD						
Participant number	1	2	3	4	5			
Participant short name	CWI	AFP	IBBT	VRT	Temis			
Person-months per	28	20	20	33	5			
participant								

Objectives

- Gather requirements for Semantic Multimedia News Interfaces
- Develop Semantic Search and Aggregation Techniques for News Content
- Develop Semantic Presentation and Personalisation Interfaces for News Content
- Evaluate all **NEED** technologies using real data from AFP and VRT

Description of work

NEED will address *interface interoperability* along the multimedia news workflow by integrating the existing platforms from AFP and VRT based on the knowledge infrastructure developed in WP2. We will design and develop novel interfaces supporting semantic search and presentation from rich and heterogeneous news datasets. We will extend the current state of the art⁴⁵ to support temporal media, multilingualism, multiple and heterogeneous sources of news information, combining both human annotation and automatic content analysis. We will finally evaluate all the technologies implemented and integrated in the project through two live experimentations of respectively three and six month of real data from AFP and VRT. This work package runs for the entire duration of the project and is composed of four tasks.

WP4.1 Requirements for NEED User Interfaces (VRT, month 1-9)

This task is dedicated to the formal and informal description of the user interactions with the system. Three types of users and classes of user interactions will be described:

- A Journalist creates a multimedia news items. This news item comes with basic metadata that will be further processed to be part of our knowledge infrastructure (WP2) and enriched with more semantic metadata (WP3). Interfaces should assist the journalist in finding relevant and related information and in editing the news item metadata.
- A news Editor creates new media assets, putting in an appropriate context individual news items and linking them together. The result of this process is usually a news report that can be distributed to an end-user or passed to other news editors for further processing. News bulletin are then packaged by the editor in the form of a section in a newspaper, a news update on television or radio, or a feed for online services. Interfaces between a press agency and a broadcaster need to be carefully designed to ensure interoperability.
- A news Consumer receives a news bulletin (passive mode) or accesses online services for searching particular facts, gathering information or being kept up to date of the latest news (active mode). Appropriate interfaces need to be designed for supporting the end-user in these tasks, giving him/her the appropriate level of information (the news event), contextualised with background knowledge but without overwhelming him/her by unnecessary information. We will consider the situation where the consumer becomes a participant in the news contribution and editing processes. We will investigate also the opportunities and the requirements of interactive television and online and portable devices.

Requirements for interfaces for the news provider, the editor and the consumer will be documented as formal UML compliant use case descriptions and graphically interpreted in the form of mock-up applications for

⁴⁵ <u>http://e-culture.multimedian.nl/news/iswc2006-press-release.html</u>

further development.

CWI, AFP and VRT are involved in this task.

WP4.2 Search, Clustering and Access of News Content (IBBT, month 5-30)

Following the requirements gathered from the user studies conducted in the task WP4.1, this task will develop the interfaces for the journalists and news editors for allowing semantic search of news. We will investigate how news broadcasters, news agencies and news aggregators present news information. Typical news search scenarios will be drawn to develop a search model, that would be further measured by the user satisfaction, a combination of a several metrics pertaining to issues such as the time spent on finding the correct information, how relevant the presented information is, and how contextual information can be accessed.

AFP, IBBT and VRT are involved in this task.

WP4.3 News Presentation and Personalisation (CWI, month 5-30)

Following the requirements gathered from the user studies conducted in the task WP4.1, this task will develop the interfaces for the end users for generating personalised presentation of news events. The underlying research questions are how to:

- Render an event, its related news items and their temporality;
- Provide the context needed to interpret a news item by providing links to related background knowledge at an appropriate level of detail;
- Provide appropriate levels of information granularity, for example, a global view linking to more detailed information.

CWI, AFP, and VRT are involved in this task.

WP4.4 Technical and Usability Validation (AFP, month 9-30)

This task involves the evaluation of all technologies developed in WP2, WP3 and WP4, i.e. the knowledge infrastructure for solving the interoperability issues in the news workflow, the multimedia analysis toolkits for the news event detection and annotation, and the various interfaces designed for the three categories of users foreseen in WP4.1. The different modules will be integrated as a processing chain that will take AFP and VRT batch data – textual stories, photo, info-graphics and video.

The evaluation will be split in two phases:

- Phase 1 evaluation (M9-M12): first evaluation of NEED technologies on three month of multimedia news;
- Phase 2 evaluation (M24-M30): second evaluation of NEED technologies on six month of multimedia news.

All partners are involved in this task.

Deliverables (brief description) and month of delivery

- Deliverable: D4.1 (VRT, month 4): Report on Requirements for NEED User Interfaces
- *Deliverable: D4.2* (IBBT, month 15): Initial Report on Search, Clustering and Access of News Content
- *Deliverable: D4.3* (IBBT, month 30): Final Report on Search, Clustering and Access of News Content
- *Deliverable: D4.4* (CWI, month 15): Initial Report on Semantic Presentation and Personalization of Multimedia News
- *Deliverable: D4.5* (CWI, month 30): Final Report on Semantic Presentation and Personalization of Multimedia News

- Deliverable: D4.6 (AFP, month 12): Report on the First Evaluation of NEED technologies
- Deliverable: D4.7 (AFP, month 30): Report on the Second Evaluation of NEED technologies

Milestones

- Milestone: MS4.1 (VRT, month 6): Mock up for NEED User Interfaces
- *Milestone: MS4.2* (CWI, month 9): Initial Implementation of Semantic Search and Presentation News Interfaces
- *Milestone: MS4.3* (CWI, month 18): Second version of Semantic Search and Presentation News Interfaces
- *Milestone: MS4.4* (CWI, month 30): Final Implementation of Semantic Search and Presentation News Interfaces
- Milestone: MS4.5 (AFP, month 12): User Studies of the First Evaluation of NEED technologies
- Milestone: MS4.6 (AFP, month 30): User Studies of the Second Evaluation of NEED technologies

Work package number	WP5	VP5 Start date or starting event: M1							
Work package title	Standardisation	andardisation							
Activity type	RTD								
Participant number	1	2	3	4	5				
Participant short name	CWI	AFP	IBBT	VRT	Temis				
Person-months per	23	16	16	12	0				
participant									

Objectives

- To address URI-based spatio-temporal fragment identification within W3C
- To develop an ontology for representing multimedia metadata on the web compatible with existing solutions within W3C
- To investigate copyright and access rights issues within ISO
- To provide a reference implementation of EventsML-G2 within IPTC
- To develop reference software implementation of NewsML-G2 within EBU

Description of work

NEED will actively participate in and contribute to various standardisation bodies with the expectation of having significant impact on their development. Practically, the consortium members are already participants and often co-chairing specific technical working groups within these standardisation bodies. **NEED** aims thus to further develop multimedia news standards and provide and distribute reference implementations of them. This work package runs for the entire duration of the project and consists of four tasks corresponding to the four standardisation bodies we have identified. We will also seek participation and liaison activities with other groups.

WP5.1 Contribution to W3C standards (CWI, month 1-30)

W3C has recently stated its strategy to make video a first class citizen on the web⁴⁶. A new Video Activity, following the Multimedia Semantics Incubator Group⁴⁷ co-chaired by CWI, will be launched soon encompassing several working groups.

Among others, the W3C Media Fragments Working Group⁴⁸ will address temporal and spatial media fragments on the web using Uniform Resource Identifiers (URI). URI-based addressing of spatio-temporal fragments of audiovisual news content on the web will be a key issue for **NEED**. Having global identifiers for clips would allow substantial benefits, including linking, bookmarking, caching and indexing the content. Furthermore, the W3C Media Annotations Working Group⁴⁹ will develop an ontology designed to facilitate cross-community data integration of information related to media objects on the Web. This ontology will be compatible with the knowledge infrastructure for multimedia news metadata we will develop in WP2.

NEED members will actively participate and co-chair these working groups.

CWI and IBBT are involved in this task.

WP5.2 Contribution to ISO standards (IBBT, month 1-30)

NEED will contribute significantly in the area of audiovisual metadata interoperability by bridging the ISO MPEG-7 standard with those developed within the W3C Semantic Web Activity. We will build on previous work in this area (COMM — A Core Ontology for Multimedia) and will continue our existing close cooperation with W3C to ensure global uptake and dissemination.

⁴⁶ http://www.w3.org/2007/08/video/

⁴⁷ http://www.w3.org/2005/Incubator/mmsem/

⁴⁸ http://www.w3.org/2008/01/media-fragments-wg.html

⁴⁹ http://www.w3.org/2008/01/media-annotations-wg.html

MPEG has recently developed a URI-based fragment identification mechanism for MPEG resources resulting in the creation of Part 17 of the MPEG-21 framework. However, this solution works only for MPEG encoded multimedia resources. We will bring this experience for developing a spatio-temporal addressing mechanism of audiovisual content fragments on the Web which is audio and video codec independent.

Standardization of copyright and access rights is fundamental in the multimedia news industry. IBBT coedits the MPEG-21 standard and will be able to build on this experience to pursue further development in liaison with other initiatives (e.g. the PLUS coalition⁵⁰).

CWI and IBBT are involved in this task.

WP5.3 Contribution to IPTC standards (AFP, month 1-30)

IPTC is the major standardization body for the news industry. AFP is one of its active members, co-chairing the Metadata Working Group and being the primary editor of the NAR architecture and the NewsML-G2 standard. **NEED** will influence the future development of the EventsML-G2 standard and provide its reference implementation.

CWI, AFP and VRT are involved in this task.

WP5.4 Contribution to EBU standards (VRT, month 1-30)

EBU is the European Consortium representing most of the broadcasters in Europe. VRT has an active role in multiple working groups that deal with news production technology or metadata-related issues. Particularly, **NEED** will participate in the P/MAG working group (Metadata Advisory Group), to identify potential ambiguities between available standards or uncovered parts and eventually initiate the development of a new standard. As part of the P/NEWSML focus group, we will be developing reference software for interpretation and production of NewsML-G2 messages. As part of the P/SCIAE project group, we will play an active role in the proliferation of technology to allow unsupervised feature extraction, including face detection and topic detection.

CWI, *AFP* and *VRT* are involved in this task.

Deliverables

- *Deliverable: D5.1* (CWI, month 10): First Report on Standardisation Contributions
- *Deliverable: D5.2* (CWI, month 20): Second Report on Standardisation Contributions
- Deliverable: D5.3 (CWI, month 30): Third Report on Standardisation Contributions

⁵⁰ <u>http://www.useplus.com/</u>

Work package number	WP6	VP6 Start date or starting event: M1						
Work package title	Project Dissem	roject Dissemination, Evaluation and Exploitation						
Activity type	RTD	TD						
Participant number	1	2	3	4	5			
Participant short name	CWI	AFP	IBBT	VRT	Temis			
Person-months per	5	5	1	4	8			
participant								

Objectives

- To disseminate the technical developments of the project across the broad research community and the professional media industry;
- To specify a framework for self-assessment of the project and to monitor its activities;
- To bring some key results of the project to the market and to exploit them commercially beyond the end of the project.

Description of work

This work package deals with the dissemination and promotion of the project results, the internal evaluation of the project based on a quality plan, and on the exploitation of the project resulting in a marketing plan and several products ready to enter the market. It consists of three tasks and runs for the entire duration of the project.

WP6.1 Project Dissemination (*AFP*, *month 1-30*)

An important tool of dissemination and promotion will be the **NEED** web site. Six-monthly Electronic Newsletters will act as an instrument for regular exchange of information with other related projects, the news industry and the research community at large. Finally, joint publications in international conferences (WWW, ISWC, CHI, ACM MM, SAMT, etc.) and journals will help to spread the scientific and technical results of the project among both the research community and media professionals.

All partners are involved in this task.

• WP6.1.1 The NEED web site (*CWI*, *month 1-30*)

The **NEED** web site will support delivery and spread of project promotional material such as information leaflets and electronic newsletter. The Web site will work as a portal, electronic archive or digital library of the community and store different types of documents: researchers' papers, public demonstrators, software, ontologies, etc. It will also include a wiki to support the collaborative work within the project.

• WP6.1.2 Six-monthly Electronic Newsletter (*AFP*, *month 1-30*)

The newsletter will report the main activities promoted and undertaken within the project and will be distributed to both the research community and the professional media industry.

WP6.2 Project Evaluation (Temis, month 1-30)

NEED will conduct internal and external project assessment based on effectiveness studies and peer-reviews.

All partners are involved in this task.

• WP6.2.1 Definition and Specification of a Quality Plan (*Temis, month 1-6*)

In order to evaluate the quality of the project, a Quality Plan will be defined. This plan will identify measures for assessment of the eventual level and degree of success in achieving the project objectives. This will form a framework for self-assessment of the project.

• WP6.2.2 Quality Control (*Temis, month 6-30*)

This task will monitor the project objectives based on the Quality Plan defined previously. One specific

activity will be devoted to periodically gathering evidence of the success (or otherwise) of the project activities. This evidence will be delivered to the Project Steering Board (PSB), so that it can feed back recommendations to shape the evolution of the network's activities. The quality assurance manager in charge of the validation is not part of the technical development team.

WP6.3 Project Exploitation (Temis, month 12-30)

Metadata creation and especially in the area of "events detection" is a key element for content provider and many large organisations dealing with external and internal information. One of many potential derivative products that will came out of the **NEED** project is a semantic component "Events detection" Skill Cartridges. This valuable component will be very attractive for the market. We will focus on the creation of an operational marketing plan as well as a specific packaging of this knowledge component in order to serve the market. Among several benefits the marketing plan will strengthen the following:

Productivity gains

Computer-aided indexing and categorization, Creation and management of business knowledge bases based on text mining and ontology management system, Assistance for Knowledge Management data maintenance.

Flexibility

Assisting content selection for the publishing process, Monitoring content repurposing and repackaging, Retrieving information easily using metadata, thesaurus, subject, association, etc. Creating better connections between related contents in publication.

Deployment

Non-intrusive solution, Open, multilingual and standard based technology, Interoperability: XML, J2EE, API, Web Services, Knowledge representation: OWL, Topic Maps, RDF, Integration with Content Management Systems, Search Engines, Authoring tools.

- WP6.2.1 Definition of a Marketing Plan (*Temis, month 12-18*)
- WP6.2.2 Package an "Events Detection" Skill Cartridge (*Temis, month 18-30*)

All partners are involved in this task.

Deliverables

- Deliverable: D6.1 (CWI, month 1): Project web site fully functional
- *Deliverable: D6.2x* (AFP, month 6x): Six-monthly electronic newsletter
- *Deliverable: D6.3* (Temis, month 6): Definition of the Quality Plan
- Deliverable: D6.4 (Temis, month 15): First version of the Quality Report
- Deliverable: D6.5 (Temis, month 30): Final version of the Quality Report
- Deliverable: D6.6 (Temis, month 18): Definition of the Marketing Plan
- Deliverable: D6.7 (Temis, month 30): Skill Cartridge "Events Detection"

Summary of effort

The **NEED** project duration is 30 months, with a total effort of 385 PMs.

The three technical work packages (WP2, WP3 and WP4) are well balanced in effort, the most important one focusing on two real live evaluations of the technologies developed throughout the project using AFP and VRT data. The important effort allocated in the standardisation work package (WP5) highlights the unique skills of this consortium and its determination to push forward some technologies for the benefit of all.

The overall allocation per partner is also well-balanced, while the WP leaders have been chosen on their knowledge and expertise in the field.

Partic.	Partic. short	WP1	WP2	WP3	WP4	WP5	WP6	Total
no.	name							person
								months
1	CWI	22	25	0	28	23	5	103
2	AFP	1	20	7	20	16	5	69
3	IBBT	1	15	30	20	16	1	83
4	VRT	1	16	10	33	12	4	76
5	Temis	1	0	40	5	0	8	54
Total		26	76	87	106	67	23	385

 Tableau 1.3d - Summary of effort



Figure 7: WP breakdown per activity

Section 2: Implementation

2.1 Management structure and procedures

The management structure of the project is kept relatively simple given the small size of the consortium, while ensuring timely delivery of the scientific and technical results. The overall project organisation encompasses administrative, scientific, technical and standardisation issues.

The consortium management of **NEED** is packaged as *WP1- Project Management* with the following objectives:

- To guarantee the successful project completion within the agreed time, costs and quality requirements.
- To ensure compliance with EC standards and procedures for project management and tracking.
- To create and maintain effective channels of communication among the consortium partners, and to co-ordinate with other EU funded projects and other interested parties.
- To provide administrative and technical coordination, including financial, legal, contractual, and ethical management of the consortium.
- To provide quality assurance within the lifecycle of the project by monitoring all activities progress.
- To maintain regular contact with the European Commission.

All of the consortium partners are fully committed and agree to work together with the utmost co-operation for the timely fulfilment of their responsibilities. We will encourage the mobility of scientific staffs (exchange of researchers and PhD students, and visiting scientists) in order to maximize the scientific cooperation and the technological integration among the consortium partners.

2.1.1 Management Structure

The management of the project is structured to address emerging issues swiftly and effectively. The key structures and roles in the project management structure are the following:

- The Project Steering Board (PSB)
- The Standardisation Advisory Board (SAB)
- The Work Package Leaders (WPL)
- The Project Coordinator (PC)
- The Project Office (PO)

The interaction between them is shown in the figure below:



Figure 8: Project management structure

NEED will be coordinated by a *Project Coordinator* (PC) responsible for both the administrative management and the scientific progress of the project. The PC will be the reference and unique interface with the European Commission. Each work package is managed by one of the partners who will appoint a *Work Package Leader* (WPL).

The *Project Steering Board* (PSB) consists of one representative per partner and is chaired by the Project Coordinator. Each member of the PSB will be able to make decisions as to the partner's particular technical interests and how to use the resources allocated for the project. They will have also the authority to make decisions on behalf of his or her company in terms of overall strategy and resources allocated to the project.

The PSB and the Project Coordinator will be assisted by the *Project Office* (PO) that is located at the coordinator, CWI. The Project Office will be primarily responsible for the administrative management, such as: taking care of payment delivery to the partners; controlling the financial reports from the individual groups; and obtaining audit certificates from each participant. It will also provide the infrastructure and maintain the collaborative working tools for internal communication, such as: mailing list, wiki, subversion and project document repositories.

Given the strong standardisation activity targeted by the project, a *Standardisation Advisory Board* (SAB) has been set up. This advisory board, external to the Project core members, is strongly linked to all research, development, integration and dissemination activities of the project. The mission of the SAB is to ensure that the output of the research becomes a valuable resource for industrial innovation. The SAB will give advices on strategic positioning of the project activities. One of its main roles is to actively encourage timely feedback from the industrial members belonging to each standardisation body.

2.1.2 Roles and Decision-making Bodies

The following roles will be assigned in the project:

- **Project Coordinator** (PC) is responsible for the whole project operation and communication with external bodies. The PC represents the project and the consortium, reports to the Commission, monitors overall consortium performance, administers project resources, promotes project visibility and promotes dissemination of project results. The PC is also responsible for auditing technical performance of the project, ensuring that the technical objectives are being met, and that required information is exchanged among the different work packages. The PC is appointed by the Project Steering Board (see below).
- *Work Package Leaders* (WP Leaders) are responsible for each work package, including the effective coordination and cooperation between tasks and across work packages. The WP Leaders will be appointed by the lead participant for the corresponding work package. Each lead participant has been carefully chosen given its strong interest and expertise in the work to be conducted:
 - o WP1 (Project Management): CWI,
 - o WP2 (Knowledge Infrastructure for News Integration): AFP,
 - WP3 (Events Detection and News Enrichment): IBBT,
 - WP4 (Semantic Multimedia News Interface): VRT,
 - WP5 (Standardisation): CWI and
 - WP6 (Project Dissemination, Evaluation and Exploitation): Temis.
- *Task Leaders* are in charge of the realization of specific tasks. They will activate the partners assigned to the task, report to WP Leaders regarding the progress of specific work, and provide the necessary input to other inter-dependent tasks.

Additionally, the following bodies will be involved in the management of the project:

- **Project Steering Board** (PSB) is the high-level representation and management body of the project, chaired by PM, and composed of one representative from each partner. This body is responsible for all formal decisions regarding the strategic directions of the project, such as relations with the European Commission, policies for promotion and exploitation of results, administrative arrangements. The PSB will meet at least three times per year.
- *Standardisation Advisory Board* (SAB) has been already set and is being consulted from the very outset of proposal building. The current members of the board are Ivan Herman (W3C), Michael Steidl (IPTC) and Jean Pierre Evain (EBU). Members of the project consortium are already involved in these standardisation bodies where its participants co-chair specific working groups.



Ivan Herman is the Semantic Web Activity⁵¹ Lead at W3C. He is a member of IW3C2 (International World Wide Web Conference Committee), the committee coordinating the yearly WWW conference series where he serves as a liaison for W3C, and of SWSA (Semantic Web Science Association), the committee responsible for the International Semantic Web Conferences series.

Michael Steidl is the Managing Director of IPTC, the consortium of the world's major news agencies, news publishers and news industry vendors. He is chief executive at the international association of news providers and news industry system vendors and he is co-chairing the special interest group regarding all photo metadata issues of IPTC, and responsible for the organisation of the yearly International Photo Metadata Conference⁵².





Jean-Pierre Evain is a Senior Engineer at EBU. He is the secretary of the EBU Project Group P/MAG – Metadata Advisory Group and the official liaison with IPTC. He was co-chair of the working group in charge of developing the TV-Anytime⁵³ Metadata Specification.

⁵¹ <u>http://www.w3.org/2001/sw</u>

⁵² http://www.phmdc.org/

⁵³ <u>http://www.tv-anytime.org/</u>

FP7-ICT-2007-3 08/04/08 **2.1.3 Procedures**

Reporting and Deliverables:

Internal Bi-Monthly Activity Reports (MAR) will be produced every two months by the WP Leaders, based on the information collected from the Task Leaders. These reports will describe the present status of developments, and indicate the specific technical work undertaken in the corresponding period. The PSB will analyse these reports and take the necessary actions. They will finally be used for producing the annual review reports, including possible recommendations made by the PSB.

External Six-Monthly Management Reports (MMR) will be produced every six months by each of the consortium partners, and delivered to the PC who will combine them into a unified MMR delivered to the European Commission. The PC will revise the reports in order to ensure their consistency and completeness. The reports will encompass all project activities executed by the partners in the corresponding period, such as research and development activities, internal meetings attendance, conference and workshops participation, deliverables, expenses, potential deviations from the project plan.

All the reports will be uploaded to a collaborative space allowing all partners to read and comment them. Project deliverables will be provided by the Task Leaders, revised by the WP Leaders, inspected by the PC to ensure their consistency and completeness, and delivered to the European Commission by the PC in the agreed format.

Meetings:

Even though partners have already established a collaborative and cohesive working relationship, they will meet regularly and at least three times per year to present and discuss the scientific and technical progress of the project. These consortium plenary meetings will also include a scientific talk, selected by the PSB and highlighting the research developed in the project, and will host the Project Steering Board meetings.

Additional technical meetings, requested by the Project Coordinator or the WP Leaders and covering particular technical aspects of the project can be organised on demand. **NEED** will encourage the mobility of scientific staff (exchange of researchers and PhD students, visiting scientists) and virtual meetings through videoconferencing to ensure maximum interaction and exchange between the partners.

Tools and Instruments:

The management structure will make extensive use of the following tools and instruments in order to facilitate the coordination of the project and enhance communication between partners:

- *Email reflectors* and *archived mailing lists* for communications within the whole project and within each work package or subsequent ad-hoc interest groups. Regular audio-conference and video-conference will be organised among the project partners.
- A *semantic wiki* coupled with a *tracker* will provide the collaborative working space for monitoring the project activities and action points and for storing the accumulated knowledge and key decisions. It will allow consortium partners to publish and share information, meetings agenda and minutes.
- A *version control software* will be used to maintain current and historical versions of files such as source code, web pages, and documentation developed in the project.
- The project *web site* will be the main dissemination tool for the project. It will act as a document repository and will be regularly updated to disseminate the findings, publications and software products of the project.

Consortium Agreement:

A Consortium Agreement (CA) following the template and best practices from existing projects will be agreed between all consortium participants.

Conflict Resolution and Decision Making Process:

Attempts will be made to resolve conflicts as soon as possible after they are identified. The WPL in cooperation with the PC will be responsible for resolving conflicts occurring under the work package s/he is leading. They will employ a problem solving approach in order to achieve consensus, striving for a win-win outcome for the conflicting parties.

If conflicts cannot be resolved at that level, the PSB will be asked to intervene and possibly vote. The consensus rule will predominate but a majority vote might occur if a decision cannot be reached. Veto rights

are in any case granted to every consortium partner, in which case resolution is deliberated in consultation with the commission.

Conflict resolution, voting and decision making processes will be clearly defined in the Consortium Agreement to be agreed and signed off by the PSB that will safeguard the smooth execution of the project.

Risk Assessment:

The **NEED** risk management plan will be produced on the basis of existing risk management practices. The plan will report risk identification, analysis and mitigation strategies for the project. Along these lines, the following table outlines the main risks identified in the context of the project, their possible impact and some proposed solutions and mitigation strategy. This contingency plan will be further elaborated during the first months of the project lifetime, and reviewed at the end of the first reporting period.

Risk	Measure	Corrective action
Risks stemming from the multidisciplinary nature of partners	Most of the partners of the project are experienced leaders in their field of research and industrial sector and have worked together before.	The project management will revise its structure if necessary and ensure smooth communication between technology providers, academia and users.
Co-ordination problems and disputes among partners	Communication flow strategy clearly established: main vehicle for information exchange within the project are working papers, project meetings, telephone conferences, e-mail and tool suites recording decisions and tracking issues. The decision and conflict resolution procedures are specified in the quality plan and agreed upon.	The PSB will analyse the situation, possibly with the help of external experts, and decide how to proceed after having reached an agreement through discussion, or democratic voting.
Legal controversies among partners	Usage of individual foreground technology and knowledge will be regulated at the beginning of the project, and included in the Consortium Agreement.	Confront the involved partners with the established procedures. If necessary, produce separate non-disclosure agreements.
Underestimation of effort needed to produce deliverables and complete activities	To ensure the successful completion of the activities and the validity of their results, each work package contains planning of work, validation and quality assurance activities. WP leaders are responsible for timely completion of activities – project and technical management ensure timely submission of deliverables.	The management structure will closely monitor resource and budget consumption in order to take corrective actions wherever necessary.
Technical risks related to shifts in standardization efforts or the appearance of a disruptive technology	The PSB reviews technical and research aspects of the project and controls technical activities and directions. It is in constantly liaison with the SAB for the development of new standards in the field.	The project consortium will be pro-active in standardizing and promoting new technologies.
Uptake of results	To ensure that the results of the project are accepted by the research and development community and deployed in the media industry, NEED includes strong industrial exploitation partners – AFP, VRT and Temis. It is in constant liaison with the SAB that reflects the current need of the market.	An exploitation plan will be set up at the beginning of the project and will be revised during the lifetime of the project.

Risk	Measure	Corrective action
	The project consortium combines technical and	Revise the scientific and
	user-oriented partners that will work in close	technological objectives
Focusing on technical	collaboration in each work package. We will	of the project using the
challenges instead of	establish a close loop of the resulting	results and lessons
addressing real user	applications to test users (AFP and VRT	learned after the two
needs	journalists and clients)	user evaluations
		scheduled at months 9-
		12 and 24-30.

Figure 9: Risks and corrective measures

It should be noted that in addition to this plan, the Project Management team will implement a comprehensive Risk Management procedure (including technical and non technical issues) to address any unexpected risk in the project. The latter will be clearly defined in the technical annex of the project.

2.2 Individual participants

2.2.1 Centrum voor Wiskunde en Informatica (CWI), Netherlands

Expertise:

The Semantic Media Interfaces⁵⁴ group at the Centre for Mathematics and Computer science (CWI) carries out research on improving models and tools for presenting multimedia information to end-users on a variety of platforms. CWI is the research institute for mathematics and computer science research in the Netherlands. CWI's mission is twofold: to perform frontier research in mathematics and computer science, and to transfer new knowledge in these fields to society in general and trade and industry in particular. CWI has always been very successful in securing considerable participation in European research programs and has extensive experience in managing these international collaborative research efforts. CWI is also strongly embedded in Dutch university research: about twenty of its senior researchers hold part-time positions as university professors and several projects are carried out in cooperation with university research groups. In addition, CWI has strong links to the World Wide Web consortium, and houses the Benelux office. CWI has a staff of 210 fte (full time equivalent), 160 of whom are scientific staff. CWI operates on an annual budget of EURO 13M.

Role in the project:

CWI will act both as coordinator and an expert in multimedia semantics in the **NEED** project. As project leader, CWI will be responsible for **WP1: Project Management**. Our group has already played a key role in W3C standardization activities in the area of semantic web and web-based multimedia, having co-chaired the SMIL⁵⁵ WG or more recently the Multimedia Semantics XG, and established official liaison with ISO and IPTC bodies. CWI will lead the **Standardisation Activities** in **WP5**, an important component of the project. In its technical role, CWI will contribute to the project mainly through its expertise in modelling multimedia ontologies, and in developing and evaluating end-user interface technology for semantic multimedia applications. We will thus focus on demonstrating added value of semantic technology to end users by developing and evaluating prototype interfaces to access, query and explore large and heterogeneous multimedia news repositories.

Key Persons:

Prof. Dr. Lynda Hardman is the head of the Semantic Media Interfaces group and part-time full professor at the Technical University of Eindhoven. She obtained her PhD from the University of Amsterdam in 1998, having graduated in Mathematics and Physics from Glasgow University in 1982. During her time in the software industry she was the development manager for Guide, the first hypertext authoring system for personal computers (1986). Her favourite chocolates are from Puccini, Amsterdam.

Dr. Jacco van Ossenbruggen is a senior researcher, having obtained his PhD from the Vrije Universiteit Amsterdam in 2001. He was a member of the W3C working group that developed the SMIL recommendation. He is currently active in the MultimediaN E-culture Project, which won the first prize at the Semantic Web Challenge at ISWC '06. His current research interests include multimedia on the Semantic Web and the exploration of heterogeneous media repositories.

Dr. Raphaël Troncy is a researcher, having obtained his PhD from the University of Grenoble (INRIA/INA) in 2004. He selected as an ERCIM Post-Doctorate Research Associate 2004-2006. Raphaël Troncy was co-chair of the W3C Incubator Group on Multimedia Semantics. He is an expert in audio visual metadata and in combining existing metadata standards (such as MPEG-7) with current Semantic Web technologies. He works closely with the IPTC standardization body on the relationship between the NewsML language family and Semantic Web technologies.

⁵⁴ <u>http://db.cwi.nl/projecten/thema.php4?themanr=6</u>

⁵⁵ http://www.w3.org/AudioVideo/

2.2.2 Agence France Press (AFP), France

Expertise:

AFP is the world's oldest established news agency, founded in 1835 by Charles-Louis Havas, the father of global journalism. AFP is today among the three leading worldwide news agencies. AFP's worldwide network spans 165 countries, 110 of which are home to bureaus, and 50 of which are covered by local correspondents. AFP counts more than 2,000 employees worldwide - 900 outside France - from more than 80 different nationalities. With years of experience at the heart of the news industry, AFP is able to cover breaking and general interest news from around the world, around the clock. The AFP brand guarantees editorial quality and reliability - a reputation built since the agency was founded in 1835.

AFP's diversity and dynamism is reflected in its products and services which are available in six main languages: French, English, German, Spanish, Portuguese and Arabic. They are also available in languages such as Chinese, Japanese and Russian, thanks to valuable partnerships with other agencies. Through its regionalized operations, AFP competes to bring you the latest economic and financial news, the best of sports, as well as culture, entertainment, science and technology... even offbeat items! Our guiding principle: speed and accuracy. In addition, the agency offers innovative multimedia products online: text, pictures, graphics, dynamic graphics and video. Today, thanks to its long service tradition, AFP's portfolio of clients includes the world's major media organizations, corporations, governments, and other international entities.

Role in the project:

AFP is one of the two news content providers of the project and will provide large corpus of textual news stories in French, English, Dutch and other languages, info-graphics, pictures and videos. AFP will also contribute their major experience in modelling the domain of news, as they are a key member and chair of the IPTC, and lead **WP2: Knowledge Infrastructure for News Integration**. AFP will finally actively participate in the two live evaluations conducted within the project, providing the technologies developed in **NEED** to AFP journalists and bringing back their feedback.

Key Persons:

Laurent Le Meur is technical manager of the Médialab at Agence France Presse. The AFP Médialab unit coordinates worldwide AFP New Media projects (multimedia products, wireless applications, etc.) and drives the development of several AFP online platforms. With strong expertise on XML, metadata industry standards and their use in the press industry, Laurent chairs the IPTC News Architecture Working Party and leads the XML development efforts inside AFP. Laurent is also expert in object oriented software development and image processing; he earned his French engineer diploma (Ph.D) at the ENS Physique Marseille.

Denis Teyssou is editorial manager of Agence France-Presse Médialab, AFP research and development unit, since June 2007. Denis has been a journalist covering all aspects of news for more than twenty years at AFP, mainly in Madrid, Spain, where he was news and online editor during his latest stay from 2000 till mid-2004. He has been involved in multimedia content managing system and taxonomy implementation in several languages at the Technical editor in chief department in Paris from 2004 till 2007, before joining Médialab. Denis, an open source computer geek, has earned a webmaster degree at the CNAM institute in Paris in 2006. He previously attended post-graduate studies in Information sciences in Bordeaux 3 university and earned two Paris XI university degrees in Astronomy and Astrophysics.

Bernard Apfeldorfer has been a journalist at AFP since 1972, having been graduated from the University of Strasbourg. Reporter in the region of Alsace, then in Paris, he was regional director in the West of France, then regional director in Central Africa. With a colleague, he created the first multimedia products of AFP: "AFP à la carte" (creation of a very selective wire per client) and "the Internet journal" (association of texts and photos in organized categories).

2.2.3 Interdisciplinair Instituut Voor Breedbandtechnologie (IBBT), Belgium

Expertise:

IBBT, the Interdisciplinary institute for BroadBand Technology, is a research institute founded by the Flemish Government, focusing on information & communication technology (ICT) in general, and applications of broadband technology in particular. The IBBT was founded as a virtual research centre (over 500 researchers), based on research teams from existing knowledge centers. Multimedia Lab⁵⁶ (MMLab) is a young research group within Ghent University (Faculty of Engineering), and a partner within IBBT. It accounts for about 25 researchers and it has a portfolio of basic research, applied research and contract-based research with industrial partners. MMLab is very active within MPEG and W3C standardization, via the submission of technical contributions, by chairing several ad-hoc groups, and through the editorship of several specifications. The main areas of expertise of MMLab are advanced video applications, including scalable video compression techniques; adaptation of multimedia with respect to varying usage environments; development of interactive Digital Television applications; Mobile applications which includes reduction of the impact of network losses and rendering of multimedia data on mobile terminals with limited resources. MMLab has been a partner in more than 30 research projects (FP5, FP6, IWT, FWO, IBBT and bilateral).

Role in the project:

IBBT will bring expertise in knowledge based multimedia content analysis, and particularly in semiautomatic annotation of multimedia content by inferring high level knowledge from low-level content analysis. IBBT will thus be the leader of **WP3: Event Detection and News Enrichment**. Its expertise in applying semantic web technologies in the news domain within the PISA⁵⁷ project will provide solid foundations for **NEED**. Finally, MMLab co-edits the MPEG-21 standard and will be the key interlocutor with ISO for the project.

Key Persons:

Prof. Rik Van de Walle received his degree in physics engineering (1994) and his PhD degree in engineering (1998) at Ghent University. The topic of his PhD was image processing. Rik Van de Walle became a post-doctoral research fellow at the University of Arizona (Tucson, USA) in 1998. By the end of 1998, he returned to Ghent University and obtained an appointment from the Fund for Scientific Research-Flanders (Belgium). In 2001, he became a professor (lecturer) at the Department of Electronics and Information Systems (Ghent University-IBBT, Belgium), where he founded the Multimedia Lab. Rik Van de Walle has been involved in the organization of and/or review of papers for several international conferences. In 2004, he was promoted to full professor at Ghent University, where he is responsible for the courses on multimedia technology and internet applications. He is also the supervisor of 10 to 20 Master theses per year.

Erik Mannens received his Master's degree in engineering (1992) at KAHO Ghent and his Master's degree in computer science (1995) at K.U. Leuven University. Before joining IBBT-MMLab in 2005 as project manager, he was a software engineering consultant and Java architect for over a decade. His major expertise is centered on broadcasting, iDTV and web development. Erik Mannens is involved in several projects as senior researcher and he is actively participating in W3C's semantic web standardization activities.

Davy Van Deursen is a researcher and Ph.D. candidate in computer science and engineering at the Multimedia Lab of Ghent, University in Belgium. He received his Master's degree in computer science from Ghent University in 2005. His research interests and areas of publication include video coding, media content adaptation, media content presentation, semantic web technologies, and mobile web publishing.

Dieter Van Rijsselbergen is a researcher and Ph.D. candidate in computer science and engineering at the Multimedia Lab of Ghent, University in Belgium. He received his Master's degree in computer science from Ghent University in 2005. His research interests and areas of publication include video coding, IT-based broadcasting and standardization, and GPU-driven signal processing.

⁵⁶ <u>http://multimedialab.elis.ugent.be/</u>

⁵⁷ http://projects.ibbt.be/pisa

2.2.4 Vlaamse Radio- en Televisieomroep (VRT), Belgium

Expertise:

The Vlaamse Radio-en Televisieomroep (VRT) (The Flemish Broadcasting Corporation) is an incorporated company of public right. Being public service broadcaster, as stated in its management contract, its core activities include that the VRT should proactively investigate new technological opportunities and has created an R&D department referred to as the VRT medialab⁵⁸. Being a small and independent team of 25 highly skilled subject matter experts and managing a turnover of 4.600 k€ per year, the VRT Medialab is agile and responsive. At the same time it is backed up by the VRT's proven track record of technological excellence and stable operational context and as such it easily integrates in large-scale international partnerships. Based on an overall vision of the media industry and the media value chain, the main objective of the VRT Medialab is developing reliable architectures that allow the entire media production community evolving towards an efficient realization and delivery of audiovisual material. Methods include basic and strategic research, implementation of Proof of Concepts and maximization of know-how via structural international cooperation.

Role in the project:

VRT is the second news content providers of the project and will provide large corpus of broadcast TV news. Being a customer of AFP, it reflects perfectly the current interoperability problems in the news workflow between news agencies and broadcasters. VRT will contribute its major experience in analyzing user requirements (they are key member of EBU) and in sketching novel interfaces powered by knowledge technologies, and lead **WP4: Semantic Multimedia News Interfaces**. We will finally host the two live evaluations conducted within the project.

Key Persons:

Maarten Verwaest has a Master in physics. Since his engagement at VRT in 1998, he has been in charge of various large-scale digitization and integration projects, including a file-based production environment, an interactive television trial and the realisation of an online news channel. Currently he occupies a position as senior expert and his core competences are focused on metadata-related topics such as knowledge management, multimedia semantics and application integration in general. He has been actively involved in multiple EBU working groups, including P/MAG (Metadata Advisory Group) that has standardized P/META and P/NEWSML that is coordinating a beta-programme about NEWSML-applications.

Dr. Robbie De Sutter received his Ph.D. degree from Ghent University, Belgium, in 2006. His research topics included video coding technologies, usage context modeling and negotiation, and content adaptation. As a researcher at VRT-medialab, he is currently investigating the creation, adaptation, integration, and exploitation of audiovisual descriptive metadata. He is project leader of the IBBT PISA project which researches and develops, in collaboration with several Belgian universities, technologies and architectures to enhance and to automate drama and news content production.

Dr. Herman Caeyers obtained a master degree in theoretical physics at the Catholic University Leuven in 1978, and a PhD degree in science at the Stanford University in California in 1985. In the period 78-85 he was assistant professor at the Faculty of Engineering of the University of Leuven. In 1985, Siemens Belgium asked him to manage the international METAL-project of machine translation. Five years later, he became the manager of the research division of artificial intelligence. Later on, he was responsible for all the international R&D projects in the domain of computational linguistics. In 1992, he moved to Sonivision Itep Technologies in Paris where he occupied the function of vice-president. In that time he was also appointed as advisor for the German and French government in the area of multilingual communication. End 1993, Herman Caeyers founded the company Lant, specialists in language technology. In 2000 Lant was taken into partnership with the Xplanation group. Since then, Herman Caeyers was CEO and managing director of Xplanation International. End 2003 his spirit of enterprise, drove him to wide his views and to combine new concepts and techniques in knowledge and information transfer with the achievements in the world of communication. He was appointed as change manager at IMEC, the Flemish research center for nanotechnology. In the same period he managed the Advanced Media project for the VRT. Since October 2005 he is building on a research group for the VRT, leading to the VRT-medialab of today.

⁵⁸ <u>http://medialab.vrt.be</u>

2.2.5 Temis SA, France

Expertise:

TEMIS is a leading provider of Text Analytics and Text Mining solutions, using concepts and meaning extraction, automatic classification and relationships representation to address the unstructured data management needs of corporations and governments in Europe and the United States. Worldwide, 1000 companies and governments have chosen to implement TEMIS solutions in various environments where information processing is critical such as Competitive Intelligence, Customer Relationship Management, Scientific Intelligence, IP management or Human Resources. TEMIS technology provides superior results, using its award-winning and patent protected linguistic technology as well its packaged Skill Cartridges® for domain-specific analysis. TEMIS linguistic technology is available today in 20 languages, including Chinese, Japanese, Korean and Arabic.

TEMIS recently introduced its first industry-specific edition of *Luxid*®, serving the global information needs of Governments and Corporations, which brings answers to the challenge of information discovery and knowledge extraction from unstructured data. Luxid® is a break-through solution that supports demanding activities such as Competitive Intelligence, Scientific Intelligence, Customer Sentiment Analysis, Reputation Management and Publishing. In 2007, TEMIS won the European Information and Communications Technology Prize with *Luxid*®⁵⁹, TEMIS Information Intelligence solution.

Role in the project:

TEMIS will bring in the project its internationally recognized experience in knowledge extraction and text processing, for enriching automatically news metadata by performing named entity extraction and at the end news event detection. TEMIS will also lead **WP 6: Project Dissemination, Evaluation and Exploitation** and particularly the commercial exploitation of the project results together with VRT and AFP.

Key Persons:

Christophe Aubry is the Vice-President Professional Services & Co-founder of TEMIS S.A. and is responsible for project management and delivery of applications toward TEMIS customers. Prior to joining TEMIS, Christophe Aubry was the project coordinator for the IBM solution "Technology Watch" where he was responsible for bringing this new product from the development stage to commercialization. With strong experience in using applied mathematics in technology, Christophe was able to develop this innovative Text Mining solution based on text analysis and computational statistics. Christophe holds a Master's degree in mathematical science from the University of Orléans, France.

Sylvie Guillemin-Lanne is a Project Manager and started working at TEMIS in 2000 as a Senior Linguistic Consultant. She developed the first version of the Competitive Intelligence Skill CartridgeTM. She is project manager for several customers' projects including EU and French Research Projects, including Homeland security. Sylvie has many years of experience as a computational linguist, previously for IBM where she took an active part in the specifications and development of a grammar checker and developed the French transfer components of an English/French translation machine. Sylvie holds a *DEA en Linguistique Informatique* (Paris VII, 1991).

Charles Huot is COO & Co-founder of TEMIS SA. He leads the group's expansion worldwide and provides guidance in achieving a balance between applying business and technology expertise to clients' needs. He is responsible for TEMIS' strategic development, which focuses on the development of long-term relationships with corporate customers. Before co-founding TEMIS, Charles spent 10 years with IBM, where he was instrumental in developing international sales for their pioneer Text Mining software. While at the University of Marseille, his academic studies focused on Competitive Intelligence strategies. Charles is a leading specialist in this field, holding regular seminars on competitive intelligence across Europe and the United States.

⁵⁹ <u>http://www.temis.com/index.php?id=201&selt=1&lg=en</u>

2.3 Consortium as a whole

2.3.1 Consortium Setup

The **NEED** Consortium is an interdisciplinary team of engineers and researchers in Computing Science and Web Science, journalists and professionals in the media industry. It comprises two leading research institutes (CWI, IBBT), two worldwide leaders in the production of news (AFP, VRT) and a key technology provider (Temis). This mixture of research and industry ensures a secure provisioning of news content, a concentration of the required know-how with regard to research and development and the best-possible options for uptake of the results throughout Europe and in the World.

Realizing the ambitious vision of **NEED** requires the participation of a major news agency provider (AFP) and a news agency consumer that provides broadcast news (VRT) to cover the entire news production workflow. Automatic processing of the multimedia news content requires an expert in image and video analysis (IBBT) and an international expert in textual news content analysis (Temis). Finally, the consortium needs an integrator that understands user needs and is expert in using semantic web technologies to describe multimedia news content (CWI).

NEED aims to have a clear impact in various standardisation bodies. The consortium partners (respectively CWI, AFP, VRT and IBBT) are already co-chairing specific technical working groups within respectively W3C, IPTC, EBU and ISO and will thus be able to disseminate largely the project results. Each WP leaders has been chosen given its knowledge and expertise in the field while at least two partners will be involved in each task, emphasizing the cooperation and integration among the partners.

Partner No.	Short Name	Country	Partner skills	Role in the project
1	CWI	The Netherlands	National research institute with long-record in multimedia semantics and housing the W3C Benelux office.	Project coordinator , expert in deploying semantic web-based middleware and interfaces for multimedia, leading the standardisation activities .
2	AFP	France	One of the three leading worldwide news agencies with content in six languages.	User and multimedia news content provider , leading the knowledge infrastructure for news integration.
3	IBBT	Belgium	Research institute expert in knowledge-based image and video analysis , interactive television and mobile applications.	Research and implementation of multimedia analysis toolkits, leading the event detection and news enrichment work package.
4	VRT	Belgium	The Flemish public service broadcaster with technological excellence for developing architectures for the entire media production industry.	User and content provider for broadcast news, leading the research and development of semantic multimedia news interfaces.
5	Temis	France	European leader in language processing , dealing with more than 20 languages.	Technology provider for knowledge extraction from text, event detection and annotation, leading the project dissemination and exploitation .

The following table summarises the skills contributed by each organisation along with the primary role every partner will undertake in the project:

Figure 10: Consortium as a whole

2.3.2 Sub-contracting

All partners foresee an amount of 3.500 Euros for subcontracting in the management costs. This is simply for the required audit certificates and obviously fully inline with common practice. Apart from that, no subcontracting is foreseen in NEED.

2.3.3 Involvement of Other Countries

There is no partner involved in the NEED proposal that is based outside of the EU Member states or associated countries.

2.4 Resources to be committed

Mobilisation of Resources:

The **NEED** consortium will mobilize the critical mass of resources (personnel, equipment, data, users and finance) necessary for the successful completion of all the objectives of the project. CWI will constantly, as the project co-ordinator, monitor and report the utilisation of the project's resources, providing the required support and contingency actions in cases of variations, following the procedures described in Section 2.1. Own funded resources from all partners have been secured to ensure the realisation of the project goals as planned. Academic and Research partners (CWI, IBBT) will contribute complementary effort from permanent staff employed, while commercial partners (AFP, VRT, Temis) have committed to complement personnel and activities from their own expenses as **NEED** is in line with their internal R&D and commercial objectives. Furthermore, AFP and VRT have committed to deliver to the project consortium both a very large corpus of multimedia news data and users for testing and evaluating the technologies developed during the project.

Personnel:

As it has been described in Sections 2.2 and 2.3, the **NEED** consortium has all the necessary expertise required in the project. The Consortium consists of two leading academic institutions and research centres (CWI, IBBT), two world renown news providers that complement each other and represent the whole news production chain (AFP, VRT), and an experienced technology provider (Temis). Highly qualified and experienced personnel from the participating organisations will be involved in the project and contribute to its successful completion. Indicative descriptions of the key people who will be involved in the project have been included with the partner profiles in Section 2.2. Finally, three key representatives of standardisation bodies (W3C, IPTC and EBU) have expressed their commitment to support the project and participate in the **NEED** dissemination activities within the Standardisation Advisory Board.

Other Costs:

The Consortium partners have to a large extent the required equipment to perform the intended tasks. However, an amount of $36.000 \in$ has been calculated to cover expense related to acquisition of equipment and consumables to support the research activities, the system development and the conducting of the trials. Several servers will be set up for exposing on the web the knowledge base of news events metadata constructed during the project. The travel expenses foreseen for participation in project and reviews meetings, dissemination and standardisation activities are almost $137.500 \in$ given the worldwide scope of the standardisation bodies. Finally, an amount of $10.500 \in$ has been reserved to cover the expenses for audit certificates, according to the FP7 financial regulations.

Financial Resources:

The precise financial information for the project is given in the A3 Forms. We provide below a number of graphical representations to better illustrate the main financial aspects of the project which are representative of the resources required for the realization of the **NEED** objectives and vision.

The graphic below shows the total budget for each activity type: RTD activities (including the travel costs), Demonstration activities (including the equipment costs) and Management activities (including audit costs).



Figure 11: Total budget per activity type

The graphic below represents the distribution of the total budget and the requested EU funding for each partner.



Figure 12: Total budget and requested EU contribution per partner

Section 3: Impact

3.1 Expected impacts listed in the work programme

Nearly every European citizen reads, watches or listens to the news. As voting citizens, we need to understand local, national and international politics to allow us to cast our vote. As company employees, we need to understand the state and development of local, national and international economies to enable us to understand our markets. As part of our leisure time, we want to know about our favourite sports teams, the lives of our soap idols or the most recent books available. In summary, today's globalised world demands well-informed citizens. Furthermore, **NEED** aims to process multilingual news content. It is thus a perfect project specifically tailored for a European Dimension.

The project is a consortium of world leading research groups, top news organisations with multinational coverage, and a company with multinational clients that provides the best technologies in Europe.

3.1.1 Relevance to the Objectives of ICT-2007.4.4: Intelligent Content and Semantics

NEED activities will make digital resources that embody creativity and semantics easier and more costeffective to produce, organize, search, personalise, distribute and (re)use, across the value chain.

Expected ICT-2007.4.4 impacts	How NEED addresses these expected impacts	
Creators will be able to design more participative and communicative forms of content.	NEED will provide technologies for searching any type of news from multiple sources linked with appropriate knowledge thus easing the creation and repurposing of news content.	
Publishers in creative industries, enterprises and professional sectors will increase their productivity with innovative content of greater complexity and ease of repurposing.	NEED will optimize the current news workflow by solving interoperability issues between news agencies and news editors such as broadcasters.NEED will provide semantic tools to journalists optimizing their search and annotation tasks and thus their productivity.	
Organisations will be able to automate the collection and distribution of digital content and machine-tractable knowledge and share them with partner organisations in trusted collaborative environments.	NEED will redistribute all the metadata created as linked semantic web datasets that could be further re-used by any third party applications. NEED will thus contribute to the open linked dataset community.	
Scientists will operate more efficiently by automating the link between data analysis, theory and experimental validation.	NEED will carefully associate the users for all the technologies developed, by gathering requirements at preliminary stage and by constantly evaluating the models and tools developed with user studies.	

Specific expected impacts for Objective ICT-2007.4.4: Intelligent Content and Semantics

NEED is consistent to the Big Challenges of the Strategic Research Agenda of the **NEM European Technology Platform**⁶⁰: It directly addresses Challenge 2 "to empower end-users by putting the user first", providing the end-user with personalized access to several sources of information and selected background knowledge.

⁶⁰ <u>http://www.nem-initiative.org/</u>

Through **NEED**, people will become better informed citizenship and will develop enhanced critical thinking.

3.1.2 Scientific Impact

Apart from the undisputable advantages the **NEED** technologies will offer to the news industry, there are also several innovations in the domain of web and computer science that will be produced as an outcome of the project. The development of **NEED** will require significant innovation, models and algorithms, to be used as a basis for further research as well as for the creation of new tools.

Firstly, the modelling of an event ontology, within a general news architecture, and combined with general multimedia ontologies for the representation of news information will constitute a major accomplishment. Ontologies have proven to be a very useful tool to provide semantics both in the context of the Semantic Web and for personal information management. They are, however, complex structures, poorly reused, rarely linked to existing knowledge already formalized and available on the web, and almost never evaluated. **NEED** will provide best practices guidelines in the knowledge engineering field for designing ontological models, bearing in mind a constant evaluation of them in end user interfaces.

Secondly, the research on context and content analysis on texts and multimedia resources, as well as knowledge extraction will contribute significantly not only for the news domain but for other domains. It is expected that the technologies developed for detecting events can be similarly applied for extracting and annotating patterns in technical fields.

Finally, all the metadata generated will be compatible with current semantic web formats and immediately exposed on the web, thus increasing the number of existing linked semantic web datasets for the benefit of all.

3.1.3 Contribution to Standards

NEED will be beneficial to the whole media sector: news agencies, independent journalists and broadcasters. As already stated, the technologies will be developed in close collaboration with the International Press Telecommunication Council⁶¹ (IPTC) gathering all news agencies in the world, and with the European Broadcaster Union⁶² (EBU). The later has set up a particular programme in the context of news production automation and **NEED** will deliver the reference software for this programme, and will act as consultant for the future Electronic Program Guides development.

NEED will finally be beneficial to the web at large, by contributing within the $W3C^{63}$ consortium to make video a first class citizen in the future web.

⁶¹ <u>http://www.iptc.org/</u>

⁶² http://www.ebu.ch/

⁶³ <u>http://www.w3.org/</u>

3.2 Dissemination and/or exploitation of project results, and management of intellectual property

3.2.1 Dissemination of Project Results

A structured dissemination plan will be followed during the project in order to support an effective exploitation of the project results. Dissemination activities will be conducted using the following four instruments:

Project web site and newsletters:

A number of deliverables and milestones has been planned to assure the effectiveness of the general dissemination activities:

- The project web site will contain researchers' papers, public demonstrators, software modules, ontologies, etc.
- Six-monthly electronic newsletters will report the main activities promoted and undertaken within the project and will be distributed to both the research community and the professional media industry.

Leading conferences and journals:

The scientific results of the project will result in articles to be submitted to international, high quality journals, conferences and workshops. Tutorials, workshops or special sessions will also be organised by the academic partners of the project. Relevant events targeted by **NEED** include but are not limited to: World Wide Web Conference (WWW), International Semantic Web Conference (ISWC), ACM Multimedia, ACM International Conference on Computer-Human Interaction (CHI), ACM International Conference on Information Retrieval (SIGIR), International Conference on Semantic and Digital Media Technologies (SAMT), International Conference on Knowledge Engineering and Knowledge Management (EKAW), International Conference on Image Processing (ICIP), International Workshop on Semantic Web User Interaction (SWUI), International Workshop on Content based Multimedia Indexing (CBMI), etc.

Standardisation bodies:

As already largely stated, **NEED** will invest significant efforts to contribute to existing and emerging standards. Consortium members are already participants and often co-chairing specific technical working groups within W3C, IPTC, EBU or ISO. **NEED** aims thus to further develop multimedia news standards and provide and distribute reference implementations of them.

Industrial exhibitions:

AFP will intend to disseminate practical implementation of **NEED** results within international media networks such as the international newspaper industry research association⁶⁴ (IFRA), the American and European network of news agencies⁶⁵ (Minds International) and the World Association of Newspapers⁶⁶ (WAN).

3.2.2 Exploitation of Project Results

Exploitation at AFP and VRT:

AFP and VRT will exploit the results of the project in their daily business activity. The metadata integration will improve the overall production chain: broadcasters will produce TV news more easily based on the intelligent processing of news stories from news agencies, while archivists will have, for free, rich descriptions of media assets and thus be able to search and reuse easily old news content.

News content production is characterized by a dynamic and flexible environment. Players on this market such as AFP and VRT have a prominent role since they are both early adopters of technologies that automate and accelerate parts of their production processes. As opposed to traditional workflows, where a news

⁶⁴ <u>http://www.ifra.com/</u>

⁶⁵ <u>http://www.minds-international.com/</u>

⁶⁶ http://www.wan-press.org/

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agency would provide raw material and a news editor would take care of the packaging and distribution to the consumer, we are now in a situation where these roles have become interchangeable. Using internet technology, news agencies have direct access to the end user and through the European Broadcasting Union (EBU), traditional broadcasters have in fact become part of a news agency network. The clear result of this is that news agencies, broadcasters or news publishers in general, as well as the end user are confronted with a massive increase of available information.

The designed infrastructure of **NEED** will provide journalists with extraction of concepts and metadata, suggestion of related or similar news, selection of multimedia objects (e.g. photos, videos or sounds) related to the news they are currently working on, in order to produce richer and more relevant content. It will also provide tools to link different media objects between them in a semi-automatic way, based on the metadata. Journalists will be thus guided for producing faster and better multimedia news content by optimizing their tasks such as searching for particular facts, gathering information on a given topic, finding quotes in a video, etc.

Exploitation at Temis:

Temis plans to have a new knowledge extraction module that will be market to several business such as Fortune 1000, Press, Information aggregator. The foreseen market for this component is in the range of several millions of Euros in the coming 4 years.

Metadata creation and especially in the area of "events detection" is a key element for content provider and many large organisations dealing with external and internal information. One out of many potential derivative products that will came out of the **NEED** project is a semantic component named "Events detection" Skill Cartridges. This valuable component will be very attractive for the market. We will focus on the creation of an operational marketing plan as well as a specific packaging of this knowledge component in order to serve the market. Among several benefits the marketing plan will strengthen gains in productivity (creation and management of dedicated knowledge bases using text mining and ontology management systems), flexibility (monitor content repurposing and repackaging, create associations between contents, ontologies and thesaurus-based information retrieval) and deployment (multilingual and standard-based technologies improving interoperability in knowledge aware environment).

3.2.3 Management of Knowledge and Intellectual Property

The project consortium clearly recognises that management of knowledge and IPR securing are fundamental for effective cooperation in RTD activities, avoiding information bottlenecks related to confidentiality or competitiveness and enhancing the exploitation potential of project results. Management of knowledge and IPR issues will be carefully integrated within the framework of the Consortium Agreement (CA). The Consortium agreement covers technological and commercial collaboration between partners, patenting of the technology developed (where applicable), and licensing of the technology to companies outside the consortium after an initial period of confidentiality. Background knowledge and existing intellectual property of the partners will therefore be identified at the start of the project, and its protection will be ensured according to the mutually agreed procedures. Foreground rights will be defined and regulated in the CA, whose preparation and planning will be discussed, and decided by all consortium partners.

The project consortium plans also to develop and promote several technologies within dedicated working groups set up by standardisation bodies such as W3C or IPTC. These have generally open patent policy and disclosure agreement from their members securing a prompt discovery of any IPR claims and a widespread use of the technologies developed.

Section 4: Ethical Issues

The **NEED** partners are aware of ethical and societal issues concerning privacy of users, trustworthy relationships in the whole value chain of multimedia news content creation, management, processing, distribution, and consumption, as well as accessibility.

4.1 Privacy and User Studies

In order to facilitate content processing according to user preferences and context of use, usage research teams will need to keep user data with the related metadata. For testing of developed techniques in realistic scenarios, the user model will keep a history of use for individual users and automatically learn the personal preferences from this. This could raise privacy issues. Individual data stored in digital format, even if anonymous, are subject to privacy regulations. In principle, this implies that data storage is to be restricted to what is necessary, that users have to be notified of this fact, that users have a right to inspect what is stored about them, and that their data is not to be transmitted to third parties and used for purposes other than those covered by the relationship the user has entered to the owner of the data.

Users who take part in user studies will be made aware that they are part of an experimental setting. They will be informed of this before the study, or afterwards if the experiment would be influenced by prior knowledge of the goals. When the same users are asked to take part in future studies their experimental results will be kept independently of their personal data to ensure anonymity.

Overall, **NEED** will observe European legal regulations concerning privacy and will particularly comply with Data Protection legislation⁶⁷ in the Member State where the research will be carried out regarding ICT research data that relates to volunteers.

European Legislation Framework on Project Related Topics	NEED compliance
Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications)	\checkmark
Directive 95/46/EC of the European Parliament and Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data	\checkmark

4.2 Trustworthiness

Trustworthiness is another important issue in the news industry. **NEED** will take the necessary measures to foster trust of users in the technology developed. The project will deal with the policy aspects of trust, and it will recommend and apply existing technology to achieve and ensure security and trustworthiness. Observing a line of prudent concern, **NEED** will make sure that by means of operational guidelines and procedures all user-specific information will reside in the users' terminal equipment and will only be exchanged to configure, perhaps dynamically, the communication link to be established. From a research point of view, **NEED** will also deal with provenance and trust issues by performing research on multimedia data authentication and copyright protection as described in the work plan (see the Activity WP2.2).

⁶⁷ National legislation transposing Directive 95/46/EC http://ec.europa.eu/justice_home/fsj/privacy/docs/95-46-ce/dir1995-46_part1_en.pdf

NEED partners are aware of accessibility issues generated when new technologies are introduced and therefore special care must be taken to avoid the creation of barriers that put people off the new technologies. For this reason, the project aims to benefit both the global media industry and the European non specialist citizen from accessing multimedia news information using the technology that is being developed. The reason for this is to establish at an early stage what is interesting to the user, what is helpful to the user, e.g. with different literacy skills and languages, and conversely what may be technologically interesting but either confusing or not addressing features that the user, i.e. viewer, listener, or traveller needs. This will provide feedback on the targeted user centred research and on the tools and techniques that are given attention. If this can be achieved, it will contribute to the success of the research and have wide societal implications.

We do not see, however, accessibility issues as addressing the needs of a small part of the population, but rather view them in the wider sense of providing appropriate interfaces for users in "interface challenged" situations, such as getting informed of the latest news while driving a car ("visually impaired") or while being frequently interrupted by children ("cognitively impaired"). Including knowledge about the expressivity of different modalities in which information is and can be expressed will contribute to enabling creating output presentations appropriate for different users. Many proposals have been made for minimum standards for access, and many organisations encourage content creators to follow these accessibility standards. One of the opportunities of **NEED** is to express the underlying semantics of these explicitly in terms of standard Semantic Web languages.

We will finally conform to W3C Accessibility guidelines⁶⁸ while publicising **NEED** research and development activities on the Web.

4.4 Gender Issues

NEED partners are aware of the gender issues in technical projects and will do their utmost to ensure adequate female participation at all levels of the project, given the scarcity of the resource and while maintaining quality norms. We will also ensure that the interfaces created in the project are tested by equal numbers of male and female users and will consider the potentially different communication needs of these users in creating the applications.

⁶⁸ <u>http://www.w3.org/WAI/</u>

	YES	PAGE
Informed Consent		
• Does the proposal involve children?		
• Does the proposal involve patients or persons not able to give consent?		
• Does the proposal involve adult healthy volunteers?		
• Does the proposal involve Human Genetic Material?		
• Does the proposal involve Human biological samples?		
• Does the proposal involve Human data collection?		
Research on Human embryo/foetus		
• Does the proposal involve Human Embryos?		
• Does the proposal involve Human Foetal Tissue / Cells?		
• Does the proposal involve Human Embryonic Stem Cells?		
Privacy		
• Does the proposal involve processing of genetic information or personal data (eg. health, sexual		
lifestyle, ethnicity, political opinion, religious or philosophical conviction)		
• Does the proposal involve tracking the location or observation of people?		
Research on Animals		
• Does the proposal involve research on animals?		
• Are those animals transgenic small laboratory animals?		
• Are those animals transgenic farm animals?		
• Are those animals cloned farm animals?		
• Are those animals non-human primates?		
Research Involving Developing Countries		
• Use of local resources (genetic, animal, plant etc)		
Impact on local community		
Dual Use		
• Research having direct military application		
• Research having the potential for terrorist abuse		
ICT Implants		
• Does the proposal involve clinical trials of ICT implants?		
I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	YES	

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