STARTPAGE

HUMAN RESOURCES AND MOBILITY (HRM)
ACTIVITY

MARIE CURIE ACTIONS
Research Training Networks (RTNs)

European Virtual Anthropology Network
EVAN

Proposal No. 019564-2

Amended Version 1 of
Annex I
(Change of UNBX to UNTO by 1st of September 2006)

PART A: CONTRACT DETAILS AND OBJECTIVES

1. Full Title: European Virtual Anthropology Network
Short Title: [EVAN]

2. Proposal Number: 019564-2
Contract Number: _____

3. Duration of the project: 48 Months

4. Contractors and Place(s) of Implementing the Project:

The Co-ordinator and other Contractors listed below shall be collectively responsible for execution of work defined in this Annex. The Co-ordinator and other Contractors are referred to jointly as “the Consortium”:

The Co-ordinator
1. Universität Wien, Department für Anthropologie [UNVI] established in Vienna, Austria.

Other Contractors
2. Medizinische Universität Innsbruck, Universitätsklinik für Radiodiagnostik, Radiologie 2 [UHIN] established in Innsbruck, Austria;
3. University of York, Hull York Medical School [YORK] established in York, UK;
4. Consejo Superior de Investigaciones Científicas, Museo Nacional de Ciencas Naturales, Dept. of Paleobiology [CSIC] established in Madrid, Spain;
5. Université Bordeaux 1, UMR 5199 – PACEA, [UNTO] established in Bordeaux, France[1]; until 31st of August 2006.
6. Senckenbergische Naturforschende Gesellschaft, Abteilung Paläoanthropologie und Quartärpaläontologie [RISE] established in Frankfurt/Main, Germany;
7. Aikaterini Karagianni & Sia E.E. (dHAL Software) [DHAL] established in Kifissia, Greece;
8. Max-Planck Institute for Evolutionary Anthropology, Department of Human Evolution [MPEA] established in Leipzig, Germany;
9. z-werkzeugbau-gmbh, z-werkzeugbau Prototyping [ZUMT] established in Dornbirn, Austria;
10. Breuckmann GmbH [BREU] established in Meersburg, Germany;
11. Gruner + Jahr AG & Co. KG, GEO [GEO] established in Hamburg, Germany;
12. Cybula Limited [CYBU] established in York, UK;
13. Commissariat à l’Energie Atomique, DSV/DRM (Département de Recherche Médicale) [ATOM] established in Orsay, France;
14. Stiftung Neanderthal Museum, Neanderthal Museum (representing also TNT-The Neanderthal Tools) [NEMU] established in Mettmann, Germany.
15. University of Hull, HIVE (Hull Immersive Visualization Environment) [HULL] established in Hull, UK
16. By 1st of September 2006 : Université Paul Sabatier (Toulouse 3), established in Toulouse, FR.

5. Project Overview:

5.1. Overall Objectives

Diverse European groups have major expertise in new methods of anatomical imaging, 3D digitisation, display, modelling, programming, and most importantly, leading edge expertise in the quantitative analysis of anatomical variability. Through this network we will bring together these separate domains of expertise in a powerful and internationally unique way to provide the best possible multi-centre training facilities and programme, which will in turn lead to the promotion of Europe as the major centre for these activities.

5.2. Overall Approach and Methodology

This project is both multidisciplinary and intersectorial. Virtual Anthropology (VA) and Geometric Morphometrics (GMM) are already interdisciplines; both arose by modifying core ideas of geometric statistics in response to very specific needs of data representations in classic anthropometrics and medical imaging. The extensions proposed will bring together partners from diverse fields such as physical anthropology, medicine, mathematics, physics, computer science, software development, economics, or museum curation to incorporate know-how into targets such as electronic preparation and virtual fragment assembly, medical diagnosis tools,

[1] The Contractor Université de Bordeaux 1 represents also the following member(s) of that is now renamed to UMR 5199 (previously UMR 5809)– PACEA (de la Préhistoire à l’Acturl: Culture, Environment et Anthropologie), Laboratoire d’Anthropologie referred to in Article 9 of the contract (Special clauses) as member (s)

surface scanning technology, immersive virtual technologies, facial recognition systems, professional software production, or Rapid Prototyping, thereby precipitating a lively transfer of knowledge and collaboration between the academic, clinical, industrial and private & public research sector. European hard- and software industries will be able to take advantage of these new resources proposed for anatomical analysis and representations. Moreover, large investments have been made at the European level to collect data, and many institutions hold a tremendous amount of data in their archives. Our network intends to train researchers to make more effective use of those data resources. **Europe needs more people trained to get information out, not just to put it in.** The EVAN research and teaching infrastructure will support e-learning of hominoid anatomy, human variability, hominid evolution, and biometrical methods at universities and higher educational levels. The integrated network information pool, consisting of tools, biometric data, and references, embodies a valuable resource of European expertise. At the same time, this information pool can be seen as a vehicle to raise public awareness in many of our research fields. **We expect to generate a substantial public response** to network research topics such as medical applications (e.g., craniofacial surgery) or change of skull form through the course of human evolution.

PART B: IMPLEMENTATION

1. Description of the joint Research/Training Project

1.1. Research

Providing a short overview on the scientific fundaments of our Research Training Network is essential to understand the idea of EVAN. Basically, our research activities can be divided into two connected Task Areas, each lead by representatives of the particular subareas (s. also Table 1.)

- Task Area A is dedicated to generate methods, tools and data,
- Task Area B to generate applications in biology, medicine and industry and to organise distribution of results and dissemination to a wider public.

1.1.1. Task Area A. Methods, Tools & Data

1.1.1.1. Task A1. Methodological integration and extension

Task A1a. A toolbox for Geometric Morphometrics.

Central to our endeavours is the need to analyse data on human variability in time and space, and central to the analysis is a contemporary toolkit of analytical and statistical methodologies collectively known as the geometric morphometric method. For applications to whole-body variability, studies of growth and disease, and form-function correlation, there is an urgent need that we allow other coordinate systems than the usual Cartesian. We will explore higher-dimensional equivalents of random walk models, which make no such assumptions. Likewise, data may be missing, fragmentary, or arising from curves or surfaces rather than separate points. Our statistical models will take all these complications into account. The tools we propose will support very flexible examination of anatomical variation and mobilise it for application from normal growth through human origins, from clinical medicine through forensics to the industrial and commercial context of individual forms and the associated decisions and purchases.

Task A1b. Toolboxes for Virtual Anthropology and Rapid Prototyping.

Toolboxes will be assembled according to the highest modern standards of object-oriented programming with a "dashboard" for overseeing system development and weekly or even daily reports of incompatibilities of data types or display actions.

- **Additional visual entities:** We will make it possible to add much additional information, including original image colour (on curving surfaces), directional information at smaller scales, thickness measurements between parallel surfaces, and metadata such as age, dating, geographical position, material property etc.
- **Mixing 2D and 3D data resources:** Fusion of volume and surface data which allows a thorough representation of a digitised object’s external and internal features, for example combining micro-CT volumes with textured surface scans in a resolution in the micrometer range.

- **Additional representations of deformation:** The basic formal rendering of deformation, the thin-plate spline grid, is difficult to draw in three dimensions. We will add a feature for surface-bound deformation visualisation (for instance, components within and perpendicular to the surface).
- **Large-scale to small-scale:** While VA currently includes rudimentary capabilities for the variability of landmark-based data representations (Procrustes scatters, relative warps), it does not handle the visualisation of variability in deformations per se, such as the separation into large-scale versus small-scale features. Part of our development will deal with this problem.
- **New display technologies:** EVAN will undertake a major effort to extend all these tools to stereoscopic immersive environments, particularly at HIVE at Hull and MPI Leipzig.
- The **toolbox for Rapid Prototyping** will emerge by fusing current techniques of prototype description (surface-based, Cartesian) with the tools of multiscale quantification and visualization just reviewed. GMM supplies a descriptive statistics for RP just as it supplies an analytic statistics for the objects examined via VA.

Task A1c. Extended methods for size-shape analysis.

Most of the applications to be reviewed under B1 share a concern for both "geometric" (proportional) scaling, i.e. angles and ratios, and "allometric" scaling (regressions of shape on size, such as is produced by regionally varying growth rates or selection gradients). Moreover, the existing methods have to be adapted to integrate additional information into the geometric analysis of form:

- surfaces & volume data matching
- refined missing data estimation
- thickness distribution between parallel surfaces
- new surface/deformation models for surface data
- integration of categorial and continuous data,
- GMM for scarce-landmark objects (teeth, endocast)
- integration of histological data into geometric analysis
- new approaches for parameterisation of 3D structures for statistical shape analysis
- automatic inference of models from a population (cortical folding patterns, fiber bundles),
- graph theory for shape analysis

Task A1d. Methodological publications.

Five of the partners have their own traditions of specifically methodological publications. EVAN will strenuously pursue joint publications that apply the tools of one partner to an example data set of another partner (e.g., applying size-shape analysis, developed for primate cranial evolution at UNVI, to patterns of dental growth observed and analysed at CSIC, or patterns of brain growth observed and analysed at ATOM). In this way the methodological publications will have arisen "from the network", not from the individual network sites, and will thus represent network added value in their own right.

1.1.1.2. Task A2. Data archiving

Task A2a. Standards for data acquisition, formats, and annotations.

- Standard procedures and minimum quality standards for CT, micro-CT and MRT data acquisition of fossilised and non-fossil specimens
- Standards for the morphometric mark-up of anatomical data resources and prototypes properly underlie extended geometric descriptions.
- For semilandmarks on curves and surfaces, standards will deal with spacing of originally acquired points (from digitisers or from solid images), re-spacing to homologous placement, smoothing, and BREU’s standards for material surfaces.
- Parameter catalogue for dental wear pattern and functional analysis

- Standards for annotating cortical folds and fiber bundles

Task A2b. Archive

It is the understanding of all partners that all sites will be engaged in primary data gathering and sharing data wherever possible. All kinds of measured 2D, 3D and 4D data (surface scans, landmark data, CT-, mCT- and MR-scans, photographs, motion tracking, histology, etc.) will be collected in two archives:

- one for modern humans and other extant primates,
- the other for fossil hominoids.

The latter will be in close relation with an already existing initiative (digital@rchive of fossil hominids) and also with the NESPOS (TNT) data base (EU funded RTD). Our network will complement this EU action perfectly in a) educating young researchers to profit from the collected data, b) help to continue the archive over the year 2006 (termination of TNT) into the future, and c) build upon the existing experience of data base compilation. Access rights for different sections of the archive will be provided for network partners and other scientific organisation and the broader public according to their needs and agreements with copyright holders (for extant primates, we envision a broad accessibility, in the case of fossil specimens, it will be depending on the policy of the curating institutions).

1.1.2. Task Area B. Applications in Biology, Medicine &Industry, and ToK

1.1.2.1. Task B1. Specific domains of investigation

B1a. and B1b., reference standards of variability and advances in diagnosis and identification, are complementary: diagnosis is detection of variability beyond what is deemed normal, and identification is inseparable from a description of the variability within the new class being delimited from its peers.

Task B1a. Biological reference standards of variability

The limits of morphological variation of Homo sapiens and its ancestors are not well characterised. Fossil specimens are scarce, CT scans of normal children are scarce, and specimens with certain diseases are scarce. In paleoanthropology, distinctions between species are problematic, even the characterisation of our own species; in pediatrics, the limits of normal are likewise often obscure.

Using trends and pattern analysis, we will provide statistical summaries (cranial reference models) and practical advice for scientists, clinicians and industry on normal variation, on normal growth trends, on common variant anatomies, and on the evolution of *Homo*. Some of these investigations will extend current knowledge of the timing of development by considering the aspects of integration across cranial structures; others will study evolutionary aspects of the same integrative processes. Other investigations will involve human specialisations of dental development and dental wear patterns, geometrical characteristics and development of the brain (folding patterns), size, position and variants of cerebral and cardiac vascular structures, and numerically based reconstruction of the face.

Table 1: EVAN Tasklist

EVAN
Tasks

Task Area A. Methods, Tools & Data

Led by UNVI, HYMS, NEMU

Task No.	Task	Contrib. Partners	Description
A1	**Methodological integration and extension**		
A1a.	Toolbox for Geometric Morphometrics	1, 3, 6, 8, 12, 13, 15	
		1	Input from existing routines (data conversion, procustes superimposition, tangent projection, principal component analysis, partial least square, multivariate regression, permutation tests) and new developments (integration of categorial and continuous data, surface and volume matching, missing data, etc.)
		3, 12, 15	data conversion routines, toolbox modules for procustes superimposition, tangent projection, principal component analysis, partial least square, multivariate regression, permutation tests, output to SAS, edgewarp link
		6	functional occlusal surface analysis in dentistry and orthodontics from jaw movement and HR surface
		8	deformation visualisation in Amira/AmiraVR
		13	embedding geometric morphometrics toolbox into brainVISA framework
A1b.	Toolboxes for Virtual Anthropology & Rapid Prototyping	1, 8, 9, 13, 14, 16	
		1	virtual endocasts, filtering algorithms for segmentation, data conversion, e-assembly additional visual entities, large-scale to small-scale visualisation
		8	integration of Amira/AmiraVR into toolbox
		9	surface and volume data conversion for rapid prototyping
		13	brain/VISA for analysis of cortical folding patterns and fibre bundles
		14	non-contact surface topography profilometer
		16	semiautomatic count of perikymata and assessment of variability
A1c.	Extended methods for size-shape analysis	1, 4, 8, 13	
		1	surfaces & volumes, missing data estimation, thickness distribution between parallel surfaces, new surface/deformation models for surface data, integration of categorial and continuous data, GMM for scarce-landmark objects (teeth, endocast)
		4	integration of histological data into geometric analysis
		8	New approaches for parameterisation of 3D structures for statistical shape analysis, surface analysis
		13	automatic inference of models from a population (cortical folding patterns, fibre bundles), 3D moment invariants for shape analysis, graph theory for shape analysis
A1d.	Methodological publications	1, 2, 4, 6, 8, 13, 16	
		1	statistical properties of semilandmarks, EM algorithm on incomplete landmark data, surface/deformation models, differential weighting of features within covariance matrix
		2	imaging prot., validation of image matching and fusion, validation of GMM tools in lung and brain imaging
		4	variables related to velocity of bone formation
		6	applied GMM for tooth crown and dental wear analysis incl. parameter catalogue
		8	Volumetric analysis of teeth architecture

		13	
		16	evidence-based medicine and bayesian tools for simulation and re-sampling
A2	**Data archiving**		
A2a.	Standards for data acquisition, formats & annotation	1-4, 6-8, 10, 12-16	
		1	CT and microCT of recent and fossilised bones, annotation of volume data
		2	standardized CT and MRI acquisition
		3, 15	standards for data input to the EVAN toolbox
		4	semi-automatic data capture from surface bone histology
		6	parameter catalogue for dental wear pattern and functional analysis, standards for surface data processing form point cloud data to virtual models
		7	standards for 2D cephalometric radiographs
		8	CT and surface scans of modern human and non-human primate crania and postcrania
		10	semi-automatic surface data capture from the human head, standards for 3D soft tissue landmarks
		12	very high performance pattern matching, statistical methods
		13	standards for annotating cortical folds and fibre bundles
		14	standards of NESPOS and large data bases
		16	CT and microCT of hominid skulls, perikymata assessment
A2b.	Archive	1-4, 6-16 data input, 1+14 building	
		1	CT of extant primates, microCT of hominid teeth
		2	multimodal lung and brain image data sets
		3, 15	CT and MR data of extant primates
		4	CT data of modern humans
		6	surface and CT data of cercopithecines, hominoids and fossil hominids
		7	lateral and frontal cephalometric radiographs
		8	CT and surface data of modern human and non-human primates
		10	surface data of the human head including texture
		11	advertising of the archive
		12	data base search engine
		13	MR data covering all stages of human life (fetus, baby, child, adult, old adults
		14	adapting private space for EVAN in NESPOS, organisation of EVAN data base
		16	CT data of modern humans and chimpanzees

Task Area B. Applications in Biology, Medicine & Industry, and ToK

Led by MPEA, ATOM, BREU

Task No.	**Task**	**Contrib. Partners**	**Description**
B1	**Specific domains of investigations**		
B1a.	Biological reference standards of variability	1, 4, 6, 7, 8, 10, 13, 14, 16	
		1	characterization of growth in extant hominoids, cranial morphometry of Australopithecines and early modern humans, enamel & bone thickness topography of fossil and modern hominids, cranial reference models for Plio-/Pleistocene hominids, morphometry of vertebrate endocranial cavity
		4	mapping bone tissue types of facial skeleton, combining bone remodelling and geometric data (facial growth and population variability)
		6	changing dental wear pattern in Pleistocene homo and paleoecological inference
		7	Relationship between craniofacial skeleton and overlying soft tissue shape.
		8	phylogenetic relationships of mid-late pleistocene humans, temporal bone features, variation in catarrhines, femoral head size and mechanical stress, brain development secondary altriciality, vocal tracts
		10	maturation and aging patterns of Caucasian faces

		13	evolution of brain folding patterns from endocasts
		14	dental growth sequences in Neanderthals and modern humans: local or global delays/advances in dental development
		16	craniofacial growth trajectories in humans and two chimp species, craniofacial and dental variability in Australian aboriginals
B1b.	Advances in diagnosis and identification	1, 2, 6, 7, 13, 16	
		1	quantitative age and sex determination from cranial form
		2	applying GMM for lung and brain diagnosis (e.g. quantification of brainshift)
		6	extend. concept of dental wear and functional analysis of dysfunction for prosthetics and orthodontics
		7	software for full 3D functional models of the craniofacial complex
		13	geometric biomarkers for psychiatric disorders (autism, schizophrenia) from folding patterns and fibre bundle patterns
		16	forensic applications for dental developmental stages, quantitative age & sex assessment from crania
B1c.	Reconstruction of body parts	1, 7, 8, 16	
		1	data-guided geometrical & statistical reconstruction of specimens, compute-based anat.reconstruction
		7	extrapolation of partial patient or forensic data to full 3D functional model of the craniofacial complex
		8	reconstruction of fossil hominids using FEM, interactive reconstruction methods using VR
		16	assessment of number of individuals from fragmentary dental remains, age assessment
B1d.	Applied Rapid Prototyping	1, 9	
		1	use of rapid prototyping technology for uncastable (fragile) specimens
		9	rapid prototyping models as master copy for larger productions
B2	**Resources for Transfer of Knowledge**		
B2a.	e-Learning platforms for methods & applications	1-4, 6-16	
		1	tutorial for VA and GMM
		2	web platform "image fusion and applied GMM"
		3, 15	tutorial for using the EVAN toolbox
		4	tutorial for bone paleohistology analysis
		6, 16	tutorial for wear pattern and occlusal surface analysis
		7	educational software for demonstration of anatomical variability of craniofacial shape
		8	tutorial for using new GMM toolbox
		9	tutorial for rapid prototyping technology
		10	tutorial for somatometric 3D data acquisition
		11	advertising and journalistic support for the e-learning platforms
		13	tutorial for applying morphometrics to the cortical folding patterns
		14	NEMU website for public dissemination of results
B2b.	Exhibitions and other efforts toward public awareness	1-4, 6-16	
		1	web-platform for information and exchange in VA and GMM
		2	open days, FDM models as teaching aids
		3, 15	open day "Virtual Anthropology in an immersive environment" at HIVE
		4	exhibition human evolution
		6	temporary exhibition at Senckenberg Museum, publication platform in the Senckenberg journals
		8	exhibition "Roots - Wurzeln der Menschheit" 2006, "Paleosite de Saint-Césaire"
		9, 1	stereolithographic models as teaching aids
		11	reporting to the broad public about EVAN research
		14	exhibition "Close encounters – Neanderthals"
		16	Human Evolution and Virtual Anthropology (Musée National de Préhistoire in Les Eyzies, 2009)

Task B1b. Advances in diagnosis and identification

Insights into the interdependence of form, development and function among different regions of the organism are essential for assessment of growth patterns in normal populations of humans, earlier *Homo*, and apes, and also impact improvements of medical diagnosis, therapy, prosthetics, and bionics. The extensions to VA and GMM we propose to combine will make possible the visualisation of far greater resources of comparative information that underlie this vast range of clinical and scientific purposes.

Projects will compare individuals with normative data from populations. Other medical/industrial applications include diagnostic tools for elastic matching of soft tissue (lungs, liver) and certain psychiatric diseases (schizophrenia, autism, fetal alcohol syndrome), virtual and physical modelling of cerebral and cardiac vascular pathologies, orthodontic software tools, standards for best-fit production of stock and custom-made implants and prostheses integrating rapid prototyping, greater functionality for dental prosthetics, biometrical identification by unique aspects of facial proportion, multi-feature age and sex assessment including statistically based reconstruction of missing facial, cranial and dental features in forensics, surgical planning based on anatomical reference models, and studies on the consequences of malnutrition with implications for public health. All these data sources rely on the same methodological core and can be analysed with the same tools. Applications publications will arise from these two task sub-areas in combination with the new tools that they involve, as described under A1d.

Task B1c. Reconstruction of body parts

Reconstruction of body parts arises in our network in two entirely different contexts (fossil reconstruction, and reconstructive surgery) that share the underlying GMM tools about information that is missing (effaced) versus information that is estimable (by symmetry, by proportionality) and also the underlying VA tools for rigid repositioning of pieces, regional deformations with finite support, and other familiar techniques of forensics and prosthetics. Reconstruction is one of the primary venues within which we think the methodological syntheses of Task Area A will be conveyed outward from our own laboratories to the larger world of the European industries of biological form.

Task B1d. Applied Rapid Prototyping

Applied rapid prototyping will be used in close collaboration with the manufacturer to produce models for a variety of cases, from the fossil specimen to the clinical case. We want to further advance RP models to be applicable for uncastable (fragile) specimens and to use RP models as master copy for larger productions, for instance for teaching aids in schools. We will apply GMM descriptions to all the topics common in RP, including scaled series, simplification of form, multiscale feature specification, and the other tools proposed under Task Area A.

1.1.2.2. Task B2. Resources for Transfer of Knowledge

In an interdisciplinary setting such as ours, ToK is both partner-to-partner and RTN-to-public. Partner-to-partner ToK activities are properly centred on the training programme and the collaborations they make possible. The following two task subareas are aimed beyond publications, at the broader public

Task B2a. e-Learning platforms for methods and applications

Among our partners are several (e.g., NEMU) who have mounted effective public websites or outreach software, and another (GEO) that has widely acknowledged expertise in the matter of informative diagrams and diagram series accompanying didactic texts. EVAN will integrate activities in this realm with its training programs in order to focus ToK more intensely than is possible with ordinary websites. Trainees will write and test modules (not full courses) that are focused as to topic and data resources. All e-learning modules will incorporate links to the other public sites of all partners, to the VA publications of UNVI, and the like. Topics suited for e-learning will be selected from those that touch on the network's activities after consultation with content-area experts. These might include, to consider a variety of examples, free play with thin-plate splines (a GMM tool), comparative skeletal anatomy of the living apes (biological variability), or dynamics of brain growth in health and in malnutrition (a clinical application). Through these activities RTN fellows will gain valuable experience in e-learning technologies while ensuring a sound basic understanding.

Task B2b. Exhibitions and other efforts toward public awareness

Two museum exhibitions will be organised, rapid prototyping models will be tested as teaching aids for hominid evolution in schools and universities, and public dissemination events (e.g., “Science Meets Public”) will be organised. By the demonstration of Rapid Prototyping models, we expect to generate a substantial public response to network research topics such as medical applications of biometrical methods or form change through

the course of human evolution. Grasping models and talking to the scientists will evoke greater understanding of how the European community will benefit from our project and why it had to be undertaken at an European level. GEO itself serves as an excellent platform in at least German-, French- and Spanish speaking countries for informing the broader non-academic audience and taxpayers what could be achieved with EU funds. The close connections of GEO to German TV channels as well as the general appeal of EVAN related research to electronic media in other countries will be used to advertise the achievements of EVAN and to raise public awareness of topics in physical anthropology, medicine, computer science, and mathematics. Beside those core topics of EVAN, the mentioned dissemination activities will also promote general public interest in anthropological, archaeological and medical science, and particularly in the question “where we come from”. A good deal of EVAN research is devoted to biological variability and the search for biological links between us and our extant and extinct relatives, an issue that naturally evokes attention in all humans.

1.2. Training and Transfer of Knowledge (ToK)

The main purposes of our proposed network are a) the training-through-research, including Ph.D. studies of young researchers under the supervision of experienced scientists, clinicians and developers who share common interests in quantitative morphology and state-of-the-art imaging and analysing techniques. **66.2% of the budget are devoted to these expenses**. The network as a whole undertakes to provide a minimum of **[524] person-months of Early Stage and Experienced Researchers** whose appointment will be financed by the contract. Quantitative progress on this, with reference to the table contained in Part C and in conformance with relevant contractual provisions, will be regularly monitored at the consortium level.

1.2.1. Planned person months

Over the period of 48 months of the project, it is planned to recruit

- **18 Early Stage Researchers (356 person months) and**
- **14 Experienced researchers (168 person months).**

All ER will be employed with a fixed contract as well as the majority of the ESR. Only four ESR (22.2%) will get a stipend (s. justification below). The individual mixture of early-stage and experienced researchers for each team has been designed on the basis of their training capabilities and the intended contribution to the project objectives. **The overall mixture for the whole network (67.9 % ESR : 32.1 % ER)** reflects the network training and dissemination priorities. Early stage researchers are preferred where the nature and duration of a task allows opportunities for Ph.D. studies, whereas the participation of experienced researchers is requested for other tasks that demand more previous knowledge to be transferred, for the effective interaction typical of interdisciplinary and intersectorial RTNs (particularly building the toolbox), and for mentoring ESR, proposal writing, start-up enterprises, and when experience is needed for short periods.

The distribution of ESR and ER months over the course of the 48 months of the planned project is given in Table 2 below. Each trainee will get an individual **EVAN fellow ID** indicating the partner site (1 to 15), the status (ESR, ER) and serial number at the site (e.g., 16/ESR2 denotes the second early stage researcher at UNTO). This ID is printed in the Table 2.

Fixed amount stipends could be avoided in most partner sites. They will be only applied in two cases: 1) According to their own regulations, at MPEA all Ph.D. students are hired on the basis of stipends. To avoid conflicts (different payments) with the other staff, it was decided to apply the same rules also for the EVAN fellows. 2) UNVI has developed and applied most of the GMM and VA tools within the last years and will continue this work during EVAN. There are several tasks necessary to accompany the implementation of these tools in the toolbox and to include additional features that can be understood as parts of a Ph.D.s thesis but cannot stand alone as such. Two short term ESRs will therefore undertake this work on a stipend basis and continue their thesis at other sites.

Table 2: Distribution of ESRs and ERs over the project.

No.	Acro	Train		Month 1	2	3	4	5	6	7	8	9	10	11	12	2006	13	14	15	16	17	18	19	20	21	22	23	24	2007	Month 25	26	27	28	29	30	31	32	33	34	35	36	2008	37	38	39	40	41	42	43	44	45	46	47	48	2009	Month
1	UNVI	ESR*	45										1/ESR1								1/ESR2																				1/ESR3																	
		ER	28				1/ER1																																																				
2	UHIN	ESR	36										2/ESR1																																																	
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3	YORK	ESR	0																																																							
		ER	24		3/ER1																																																					
4	CSIC	ESR	24																				4/ESR1																																					
		ER	24														4/ER1																																									
5	UNBX	ESR	0								Terminated 08/2006																																																			
		ER	0								Terminated 08/2006																																																	
6	RISE	ESR	36							6/ESR1																																																	
		ER	12																											6/ER1																													
7	DHAL	ESR	12																							7/ESR1																															
		ER	0																																																						
8	MPEA	ESR**	72									8/ESR1																																															
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9	ZUMT	ESR	12											9/ESR1																																					9/ESR2													
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11	GEO	ESR	0																																																						
		ER	0																																																						
12	CYBU	ESR	18																	12/ESR1																																					12/ESR2													
		ER	0																																																						
13	ATOM	ESR	36							13/ESR1																																																			
		ER	12							13/ER1																																																		13/ER2			
14	NEMU	ESR	24	14/ESR1																																																							
		ER	0																																																						
15	HULL	ESR	0																																																						
		ER	24																						15/ER2																																			
														15/ER1																																														
16	UNTO	ESR	17									Start 09/2006					16/ESR1																																														
		ER	12									Start 09/2006					16/ER1																																														
												Start 09/2006											16/ER2																																								

ESR
ER

ESR* - including 40% stipends, equivalent to 36 month fixed contract
ESR** - including 100% stipends, equivalent to 36 month fixed contract
EVAN fellow ID: indicates the partner site (1-15), the status (ESR, ER), and serial number of the fellow at the site (1, 2, ...)
Example: 5/ESR2 stands for the second ESR at site 5 UNBX

1.2.2. Network resources for training

The project objectives set out in the scientific part are extensively interrelated and cannot be undertaken in single organisations or in a single national context. The research and training activities will necessarily cover many different areas. The following list provides an overview of the offered training possibilities and specialities at the individual sites:

Individual training activities at the partner sites:

1. Fellows at UNVI will be trained in:
biometrical methods and in new developments of advanced morphometrics and biostatistics (surface & volume data, missing data, deformations, integration of categorical data with geometrical data, extensions to semilandmarks), characterisation of growth in living humans, paleoanthropology, age and sex determination, data-guided reconstruction of specimens, and electronic preparation.
Add. regular teaching: ♦Introduction to Morphometric Methods for Three-Dimensional Data ♦Where numbers come from ♦Applied Shape Analysis using Geometric Morphometrics ♦Virtual Anthropology - Introduction to digital 3D-methods ♦Applied statistics for biologists ♦Training in Virtual Anthropology I+II: Measurement and analysis; Techniques for multivariate analysis

2. Fellows at UHIN will be trained in:
Medical image data acquisition, segmentation, analysis and visualization, functional image analysis, image registration, image fusion and fusion with other physiological data (e.g. electrophysiological signals), biosystems analysis, especially modelling and computer simulation studies, fluid dynamics in vessels, 3D reconstructions, preoperative planning, postoperative quality control, implementation of GMM methods in cardiac, brain and lung imaging
Add. regular teaching: ♦Medical imaging methods for biologists and anthropologists ♦Image-guided diagnosis and therapy ♦Physics of CT: Ultrasound, Medical Imaging and Image Processing ♦Data Fusion of Multimodal Images ♦Biomechanics and biofluid mechanics ♦Modelling and simulation in medicine ♦Biosystems analysis

3. Fellows at YORK will be trained in:
Applications of GMM to Palaeoanthropology and medicine, 3D reconstruction, anatomy model building and skeletal biomechanics and imaging.
Add. regular teaching: ♦Avanced level course in Human and Primate Evolution ♦Human morphology and Anatomy

4. Fellows at CSIC will be trained in:
Methods and tools in histology of bone surfaces, paleohistological image analysis, light and electron microscopy, high resolution cast preparation, standard morphometrics, principles in craniofacial biology (growth and development), evolutionary anatomy, paleoanthropology.
Add. regular teaching: ♦Doctorate courses on Evolution and Paleoanthropology at universities UCM; UAM, Granada, Sevilla

5/16. Fellows at UNBX/UNTO will be trained in:
biometrical methods (cephalometry based on cranial nerves, dental age assessment and quality estimation, clinical applications), quantification of variability in cranial growth and development in living humans and chimpanzees, biostatistical methods and analysis, electronic preparation.
Add. regular teaching: ♦Human Osteology ♦Paleoanthropology ♦Methods (statistics, medical imaging, morphometry, age and sex determination) ♦Comparative Anatomy

6. Fellows at RISE will be trained in:
Functional morphology and evolution of mammalian dentitions, quantification of occlusal patterns, functional 3D-analysis of occlusion and jaw movement in living humans and fossil hominids, 3D-surface data acquisition, processing and analysing, paleoanthropology and paleoecology, physical preparation of specimens and high resolution molding techniques

7. Fellows at dHAL will be trained in:
orthodontics (growth and development, diagnostic methods, treatment planning and prediction, surgical treatment prediction) and development of software for diagnostic, research and educational purposes MS-Windows operating system) under special consideration of user-friendly intuitive interfaces. dHAL has close ties to the University of Athens where trainees can gain a better understanding of the clinical needs for the toolbox.
Add. regular teaching: ♦Orthodontics for undergraduate and postgraduate Dental Students ♦Introductory course in Dental Informatics

8. Fellows at MPEA will be trained in:
Human and primate evolution, genetics and primate ecology and behaviour; Evolution of brain and life history; Application of advanced morphometrics methods (semilandmarks, surface and volume analysis, data

reconstruction, integration of categorical data with geometrical data) to problems in paleoanthropology; Dental histology; Reconstruction of specimens
Add. regular teaching: ♦Human Paleontology and Prehistoric Archaeology ♦Comparative Primatology ♦Evolutionary Genomics / Ancient DNA ♦Molecular Anthropology

9. Fellows at ZUMT will be trained in:
Rapid prototyping, Sterolithography, design appraisal, reproducible models, fit and function tests, application of models in the medical field (e.g. craniofacial surgery), plastics engineering, mould making for series production, vakuum casting, professional exhibition configuration and layout

10. Fellows at BREU will be trained in:
optical 3D-metrology, acquisition and visualisation of 3D surface data and its advantages and limitations, determination of landmarks and biometrical measures from surface scans of the human face and body, software development, dissemination of R&D results into commercial applications and products.

11. Fellows at GEO will be trained in:
Courses (three or five days) will focus on writing and presenting skills necessary for the communication with the broad, non-expert public and especially with journalists (e.g. at press conferences). For this goal GEO can make use of established connections with two journalistic training institutions: the prestigeous “Gruner + Jahr Journalistenschule" and the “Deutsche Akademie für Publizistik" (both with their headquarters in Hamburg). Additionally a course in TV publishing can be organized in cooperation with ARTE, one of Europes finest TV channels, and the leading German public channel ARD.– fundamental skills not taught at any University to any researcher.
Add. regular teaching: ♦Journalism courses

12. Fellows at CYBU will be trained in:
methods and methodology of programming in a commercial environment, own methods for very high performance pattern matching, statistical methods, project management, robust code development, and coding-team integration. AURA technology's for use in archival, and searching of very large complex data sets.
Add. regular teaching: ♦Cybula offers regular training courses for the use of AURA software for image analysis and recognition tasks and other compny-related technologies

13. Fellows at ATOM will be trained in:
Brain neuro-imaging, standard and advanced methods for morphometry of structural images of the human brain, use of MR diffusion imaging to study brain connectivity, characterisation of the cortical folding process from foetus to adult stages, inference of landmark models, computer vision, image analysis, machine learning for automatic diagnosis, software development.
Add. regular teaching: ♦Brain Imaging (acquisitions, analysis, neurosciences)

14. Fellows at NEMU will be trained in:
Use of NESPOS and its standard tools, data standardisation problems, data input to the archive, administration of large public data base, realisation of exhibitions for a broad public, dissemination of results at a website (Neanderthal Museum), dissemination of tool boxes, analysis dental sequences, count and packing of Retzius lines and perikymata, paleoanthropology

15. Fellows at HULL will be trained in:
Visualization and haptic interaction, virtual environments, geometric modelling, surface scanning and volumetric capture, image analysis,
Add. regular teaching: ♦Visualisation and Virtual Environments ♦Computer Games Development

1.2.3. Measures for training and transfer of knowledge

EVAN will provide training on the local level as well as on a network-wide basis.

1.2.3.1. Local, facility-specific, measures open for all fellows of the network:

- **Regular teaching programme: Ten** of the network partners **offer** EVAN related courses **in their regular programme** (s. list above). Fellows will be directed towards these courses by their advisory board and will be treated with priority for access to the course if space is limited. Taking courses at other institutions will greatly benefit the exchange between units and guarantee that fellows are educated by the best specialists in the field. Here we provide a list of courses established currently at these partner units:

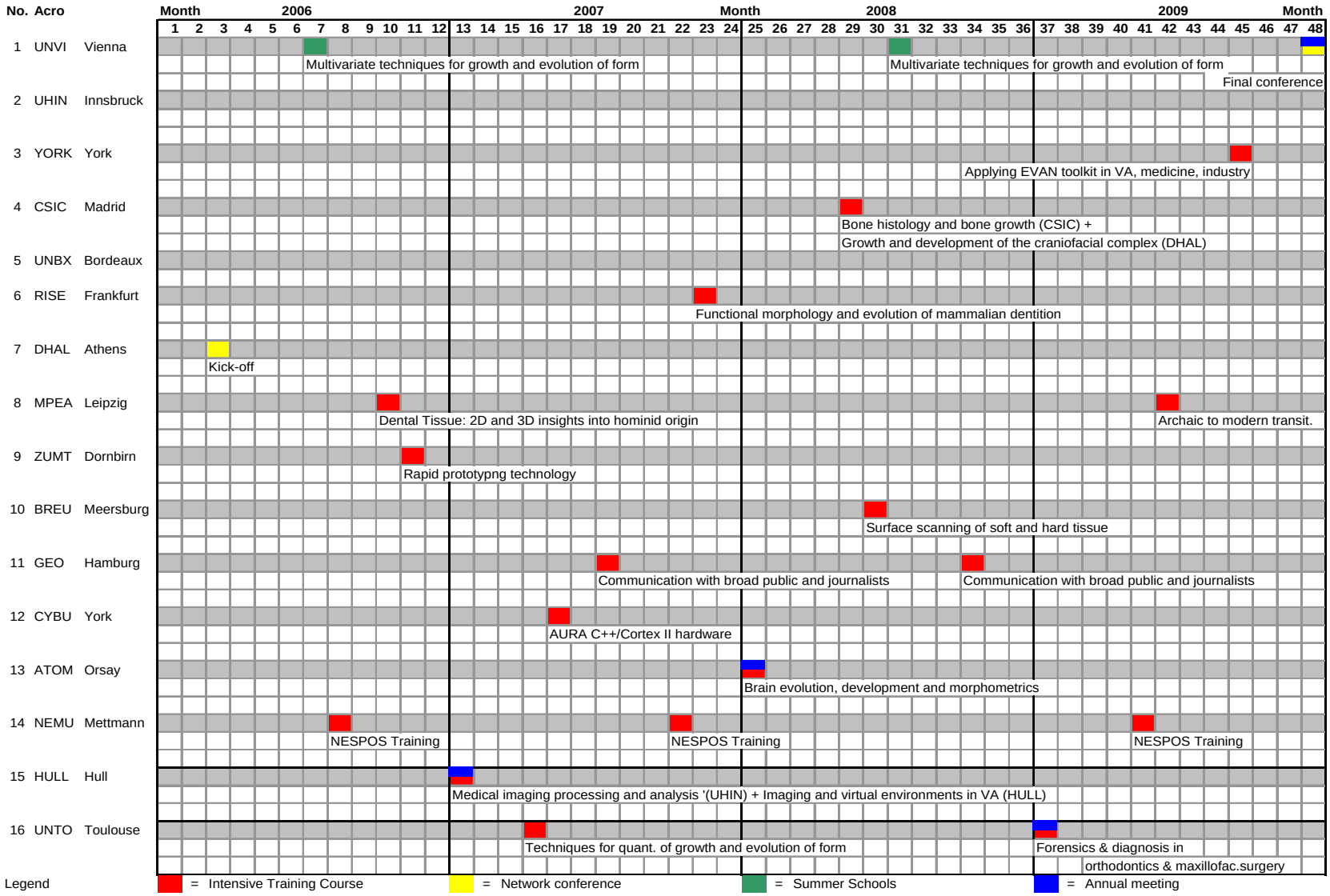
- **Secondments and visits:** Secondments and visits to other network partners, participation in joint research tasks, exchange of information, data and samples. Normal practice during visits and secondments is for the researcher to be appointed by the sending institute, which also pays his/her travel and subsistence expenses (e.g. accommodation). In particular, fellows will be encouraged to visit *industrial partners* directly within the network or associated to the network to ensure that training and ToK activities take place intersectorially in addition to the network wide measures (s. below) and the planned integration of individual fellows at the SMEs.
- **Complementary training:** courses and tutorials in scientific matters and personal development, organisation of meetings, awareness of ethical, intellectual property rights and gender issues, practice in communication and language, management skills, contacts and visits to collaborating institutions outside the network, participation in external conferences, etc. Experienced researchers will help supervise early-stage researchers.
- **ToK between partners:** Fellows will hold lab courses and seminars in their primary institution about topics they learned in the partner institutions during their visits and secondments. Such visits to other network partners will also be undertaken by the host's staff which will broaden their knowledge and increase the exchange of information, data and samples.
- **Open seminars:** aimed particularly at undergraduates in the host facility where fellows disseminate knowledge generated in ongoing network research immediately to the students at the facility (integration of research and teaching).
- **ToK to the general public:** Fellows will be encouraged to present their research to the general public through media (e.g. GEO), open days and public talks. Fellows will also be involved into the establishment of e-learning facilities and the explanation of models (e.g., stereolithographies for teaching aids in schools) and displays that facilitate the public understanding of network research topics (e.g., demonstrating models for plastic surgery, change of skull morphology during human evolution).

1.2.3.2. Network-wide measures

EVAN will particularly emphasise the collaboration between different sectors and advance the ToK between research and industrial groups on a broader basis. These network-wide measures will also offer frequent opportunities for the young researchers to meet and to organise their own networking events.

- **Intensive training courses (workshops):** Topics of central interest to the network will be organised by different partners, whenever possible by the individual experienced researchers. They are oriented towards the intensive training of methods and technologies use of specialised equipment, carrying out experiments, direct contact with industrial operating procedures, direct training by industrial staff, information management, preparation of presentations, publishing, exchange of information.
- **Meeting of interest:** this kind of meeting is a small and intense get-together of network fellows and staff collaborating on a specific topic that needs discussion and exchange for the further proceeding. They will be organised spontaneously by fellows, preferably experienced researchers whenever necessary (no schedule provided). Being small in nature these meetings will exploit as far as possible video-conferencing technologies.
- **Summer schools:** organized in the first and third year by UNVI to teach the fundamental core technology of the network for biometric analysis. It will be hold twice as a) we expect a rotation of fellows over time, and b) there is a *significant need at the European level* to disseminate this knowledge.
- **Network conferences:** organised for the whole staff of the network at the beginning and at the end of the project phase, the second with public participation.
- An **E-learning environment** (e.g. Blackboard) will be used to ensure that the network is bound together in a common, virtual, 'home'. This will provide among other things a single shared site to exchange information, advertise events, discuss topics of interest, locate and readily communicate with fellows and staff, hold relevant teaching and learning materials (e.g. network conference presentations, study notes etc), and provide advice and support.

Table 3: Timeline for network activities.



1.2.4. Career Development Plan and organisation

In the process of designing the individual curriculum of the 18 ESR and 14 ER trainees, we will aim for a bottom-up approach and encourage fellows to formulate their needs for training activities under the guideline to exploit the offered possibilities of EVAN at a maximum. For each trainee, a Career Development Plan will be formulated, with input from the trainee and an individual advisory board (s. also Management structure) including supervisors from those units that are most involved in the training. They will also check the fellow's previous knowledge, will suggest courses from across the network and set out necessary training activities and expected achievements and milestones. Training will be supervised by the network's Training Administrator, who will oversee the training contents and procedures within the network and take measures to ensure homogeneous criteria and standardised training format including periodic follow-up meetings and direct involvement of the host institution to support the young researcher's personal program. Other important career objectives will be encouraged by announcing and rewarding the efforts and achievements of the young researchers in various attractive ways. We will encourage and promote contacts of the fellows with medical facilities, and particularly with industrial partners from the beginning. Training plans will be adapted to the differing needs of early-stage and experienced researchers. Basic training (theoretical and practical) will be provided for the early-stage researcher at multiple sites. Those for whom this appointment is their first job will be treated with special care. This committee will also monitor the needs of experienced fellows and respond where possible by advising and supporting them by taking up relevant opportunities within the wider network and beyond. For both groups, our main thrust will be: Learning by doing. Training in complementary skills will be offered to both groups: communication skills, English and host country's language, basics of economics, documentation and information search, project management and enterprise skills, intellectual property and gender issues, ethics in science, etc.

Our aim is that fellows also start effective networking among themselves. EVAN offers many network-wide measures (17 intensive training courses, 2 summer schools, 2 conferences) to meet each other and strengthen contacts with other researchers and fellows. During these meetings, fellows will have time to organise their own get-togethers and exchange their experience made at the individual research sites. The EVAN website will support the communication and networking of the young researchers effectively.

1.2.5. Planned recruitment of early-stage and experienced researchers

Open positions for early-stage and experienced researchers within the network will be advertised via web sites (Cordis, Nexus, EVAN website, NESPOS, other partner web-pages), via announcements in journals, and via personal contacts at universities, research institutions and companies. Target groups arise from all fields involved in the network, mainly *anthropology, bioengineering, medicine, mathematics, physics, and computer sciences*. The selection of candidate fellows will be guided by their ability and openness to benefit from the offered research and training opportunities.

Criteria are previous knowledge, willingness to collaborate within a new and multidisciplinary environment and to adapt to foreign ambience and additional skills. We will express a strong preference for trainees from *Less Favoured Regions and from Candidate or Associated Countries*. Moreover, all partners of EVAN are fully committed to the *promotion of gender equality* in accordance with the Commission's strategy in research (s. under B.2.5.3.).

The researchers within the individual advisory board of a trainee (outlined above) and the Coordinator will discuss the qualifications of aspirants. The final decision for a particular fellow will be made by the scientist in charge of the unit where this fellow is employed in accordance with the Coordinator. In the case of disagreements, the Training Administrator and the Gender Board can be called in to assist in the process of recruitment.

2. Management

2.1. Proposed management and organisational structure

The University of Vienna (UNVI) will act as the main contractor of the European Commission. UNVI will close a Consortial Agreement with all other partner organisations within the network. The Scientist in Charge (SIC) of UNVI (Gerhard W. Weber) will act as Coordinator of the Consortium. The Steering Committee of EVAN will take responsibility for the general policy, decisions related to financial and legal affairs (including intellectual property rights and ethics), training and research, public awareness and equal opportunity policy. It will also oversee internal communications to guarantee a dynamic network community maximising knowledge transfer between sectors, mobility of fellows and interdisciplinarity of training and research. The general design of the EVAN management structure is given below.

The details of the EVAN management will be outlined in the Consortium Agreement. The agreement will provide the legal basis for the relationship and responsibilities between the participants for the duration of work, beyond those established by the EC contract. In the following paragraphs, the basic principles shall be described (s. also Fig. 1.). Guideline for the project management is that all partners in EVAN will act in a cooperative team work. Therefore, a flat hierarchy will be implemented. Facing the narrow budget for management, the other guideline is to be cost-saving.

The Coordinator (CO) will act as chairman of the Steering Committee and be responsible for the operational business management of the whole network and for the communication with the EC and the responsible Commission Project Officer (CPO). He will oversee the progress of the project in total and guide its general lines of action. The CO will also integrate communications from other EU and international projects and will oversee the establishment of the network infrastructure. He will be supported by an administrative assistant, who will be available as contact person for all administrative and other questions, for instance concerning network infrastructure (website, etc.).

To ensure a high level of commitment to the operation of the network, all SICs (or their representatives) of the partners will be participating in the Steering Committee. These plenary meetings of the management will be held yearly (s. Table 3.). To implement an active participation of the Young Researchers in the decision making processes, network fellows will appoint two representatives (one ESR and one ER) who will be invited to these administrative meetings to act as informants and to represent the concerns of the network's young researchers. To save costs, the meetings will take place at the occasion of planned network activities (s. Table 3.) and also deal with the final preparation of the necessary yearly reports.

Taking into consideration the two main aspects of EVAN, i.e., training and research, the CO will nominate two additional administrators, a Training Administrator (TR, José Braga) and a Task Administrator (TA, Fred L. Bookstein).

The TR will supervise the training procedures and its contents and report to the CO. He will also oversee the individual career plans, the organisation of network activities (e.g., intensive courses, summer schools, conferences), the availability of infrastructure for trainees, reward the efforts and achievements of the young researchers (e.g., election of the researcher of the year), etc. As outlined above, an individual advisory board for each fellow will set out necessary training activities and expected achievements and milestones together with the fellow. The TR can be contacted for advice by the fellows and SICs. The TR also takes care that SICs will send the required annual reports on training activities in time to the CO.

The TA will oversee all scientific and other operational matters and the dissemination of results within the network. He will initiate and control network scientific publications and announcements, edit annual and final reports and help to stimulate public awareness. He will take care that SICs report their progress and urgent concerns to the CO every six months, or more often in case of major breakthroughs or problems (e.g., intellectual property rights). These written reports will be the basis for the CO's periodic reports and his own publications and announcements.

Network-wide concerns will be discussed at the yearly meeting of the Steering Committee. Decisions will be made upon mutual agreements. In cases of dissension, the CO will take a final decision.

A Gender Board (GB) will assist the CO. It will oversee all gender-related issues relevant to the network. The GB will elect a spokesperson acting as representative who will report to the CO who will take action. A main concern of the GB will be the equality of chances in recruitment of young researchers. The GB will be integrated in the recruitment process, i.e. receive the necessary information on applicants and the justification for the choice of a particular aspirant. In the case of disagreements, the Coordinator, the Training Administrator and the Gender Board can be called to assist in the process of recruitment. In general, network fellows and applicants for a trainee position can contact the GB for gender related issues at any time.

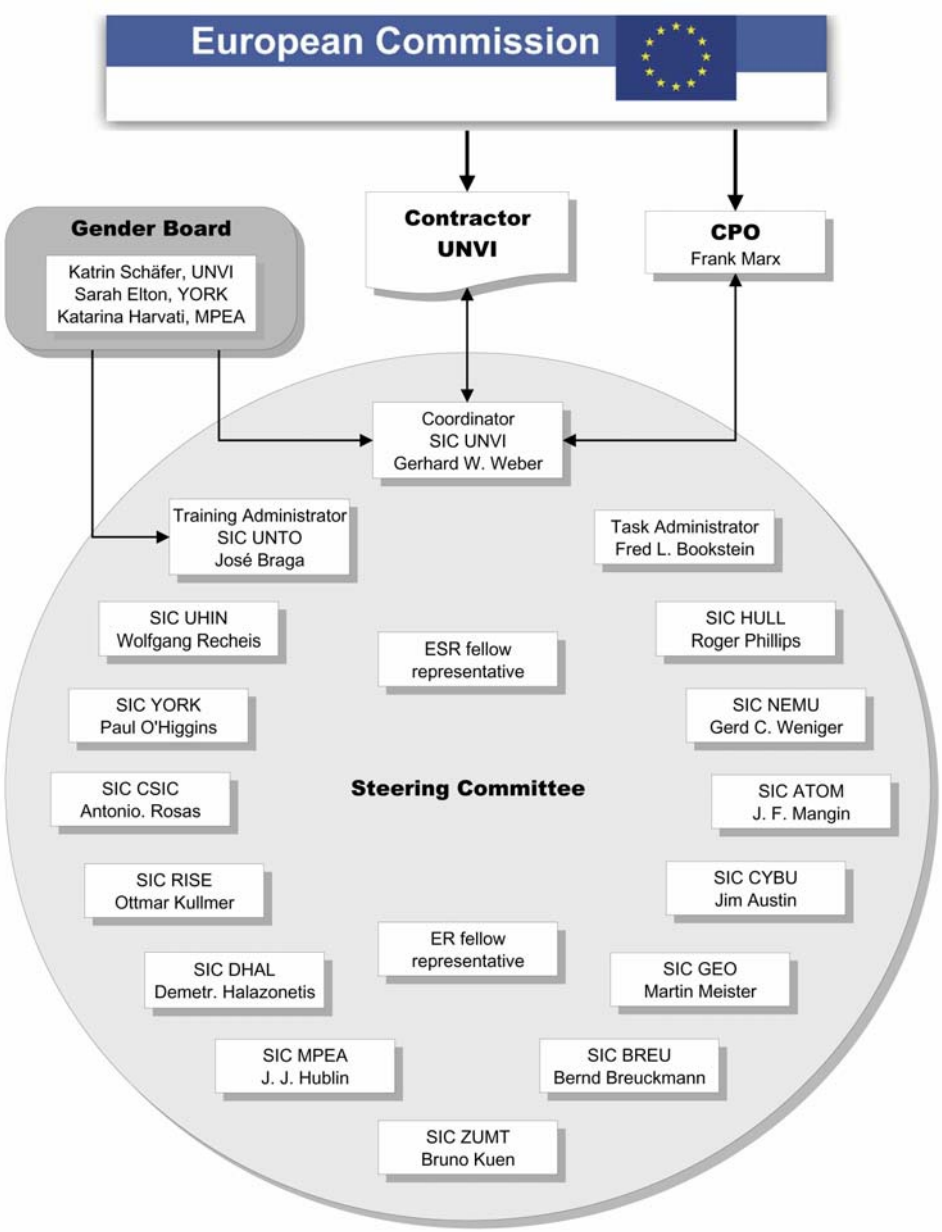


Figure 1: EVAN management structure

Beside the above mentioned measures to ensure effective dissemination inside and outside the network, a web-site will be installed prior to the start of the project at UNVI. It will provide basic information on Virtual Anthropology in general and EVAN in particular for the broader public and media, and serve as a starting platform for e-learning applications. Partners will be provided with editing and access rights at different levels so that documents and data for internal use will be accessible under conditions of appropriate security. The TR and TA will collect reports from partner institutions in appropriate intervals. After editing, these summaries will be posted on the EVAN website for the network participants, associated partners, and the public to guarantee a permanent update of the project's progress.

To keep costs and development time at a minimum, EVAN will use a private space in the established NESPOS data base for research data (mainly surface and volume data of specimens). NEMU as a partner of TNT will take care that adequate disk space for this purpose of network internal exchange is available.

Within the first year of the project, the Commission Project Officer will be invited to attend one of the EVAN meetings (e.g., summer school at UNVI) to build contacts and to help in adjusting the line of actions to the principles of the EC, all well before a mid term review is done.

2.2. Reporting periods:

EVAN is designed to run over 48 months. It will be divided into four reporting periods as follows:

P1: from month 1 to 12

P2: from month 13 to 24
P3: from month 25 to 36
P4: from month 37 to 48

It is essential that reports and audits from all partner sites are provided in time. Each SIC is responsible for her/his institution in this respect. The TR and TA will take care for the duly submission of documents to the CO who will himself take care for a timely processing to the EC. Audits will take place every year.

2.3 Financial management

The financial management strategy of the network is based on the successful execution of tasks and compliance with the declared milestones. Payments will be advanced at the project start or after the first payment of the EC is received, for the first 18 months of work. After this first funding period, further financial allocations will take into account the reports, the work to date and the deliverables achieved. Thus, individual budgets (including allocated person months in A4a) will be subject to update and reallocation should milestones, especially training milestones, not be met or should other partners justify a strong need for additional funding. Reallocation will be the decision of the CO after consultation with the Steering Committee, and the Commission, if applicable.

Budgets A to E are dedicated to the expenses related to the appointed ESRs and ERs. A to D are fixed amounts and depending on the personal situation of the employee (family status, travel distance). Budget E is provided mostly for the travel of fellows based on real costs (basis 400 € per month), and all partners are called to fully exploit this item to guarantee a lively involvement of the young fellows. Those partners who have requested fellows from the very beginning of the project (month 1 to 6) are aware that they have to take care for an intermediate financing of the costs in the case of delayed payments.

Budgets F, H and I are essentially the only resources for the implementation of network and dissemination activities. Some of those are very important for the network and its fellows, for instance the shared data and tool archive providing the resources for our research, but also for Europe to make a sustainable development of the integrated research fields possible. Adjusted rates for F to I that are depending on the planned fellow person months, needed travel, other implementation costs, and peculiarities of the institution will be distributed. Shares are provided in form A5a.

Budgets F(1) and F(2) will be divided according to the individual needs and involvement at partner sites. F(1) is dedicated to the participation of non-appointed researchers from the network teams in the networking and ToK activites, for instance, travel of researchers to workshops and conferences, secondments of researchers for the exchange and collaboration with partner sites, the invitation of external experts, and the travel of the Coordinator and the Training and Task Administrator. F(2) will partly contribute to cover additional costs of intensive training courses, summer schools and conferences, EVAN’s contributions to existing or planned exhibitions which are mainly financed by other parties, to the construction and maintenance of the EVAN website, contribute to data acquisition expenses (e.g., CT-scans), expenses for consumables, and cover minor services and supplies such as data base adaptation, data base administration or license renewals.

Budget G (management-related expenses) will be allocated to the partners according to the involvement in network activities. The management expenses of the CO are allocated for the employment of the above mentioned administrative assistant for the period of the project. As compensation for their additional commitment and costs, the TR and the TA will be provided with an additional share of the management budget for their coordinating work. As outlined in the financial guidelines for the FP 6, the mandatory audits are reimbursed via budget G. According to general experience, the costs for audit certificates can be estimated to be around 62,000.00 €. Audits are planned yearly to permit uninterrupted EC payments. The audit budget is related to the sum of the planned expenses for the partner less the management costs itself (thus budgets A to F plus H and I) because audits for smaller individual budgets will be cheaper than for larger ones. Should audit costs be more costly, the extra costs shall be paid from the individual overheads.

Budget H (overheads) are distributed to the partners depending on the planned fellow person months and special needs of the individual institution (e.g., payment to the host institution). Disposable budget H is devoted to the implementation of planned network and dissemination activities. To keep flexibility for these activities (not all of them can be anticipated at the moment) or needed reallocation, UNVI will keep about half of the H budget for further disposal.

Budget I – a small fraction of F – will be devoted to essential European dissemination and infrastructural activities. Two kinds of expenses that are a vital part of the project can be anticipated for assignment in budget I: The production of 3D models of anatomical structures and the use of the existing NESPOS data base. Stereolithographic and FDM models allow a better understanding of three-dimensional relationships of structures, can cast very fragile or hidden objects and will also generate public interest, for instance by using

them as teaching aids in schools or public days. Two of our partners, ZUMT and UHIN, produce such models and fellows will learn the process. To contribute to the production costs, both partners will receive a share of budget I. As outlined in the proposal, a major synergy for EVAN is to use TNT's data base platform NESPOS and thereby saving own development costs and keep this EU action alive over the next four years. The operators of NESPOS will receive a fee for the large private space (one Terabyte) that our archive will use which will run as share of budget I through NEMU who is partner of TNT. In exchange, each partner site (14) will receive its administrative access to NESPOS as well as each fellow receives own access (32).

The EC contribution for EVAN will cover the most desired costs for the training of young researchers, and additionally some of the other related expenses. However, **the project must be understood as a co-financing** of a well elaborated European endeavour. Thus, all partners are called to exploit other possibilities for funding, especially national resources, to contribute further to the project. Moreover, national programmes have to be exploited by every partner to cover such expenses not eligible for funding according to the financial guidelines of the FP 6 (Annex II, Article II.19.2.), e.g., VAT.

2.4. Intellectual property rights

Issues of intellectual property arise with respect to two kinds of information: Software and data. Intellectual Property Rights will be explicitly dealt with in the Consortium Agreement signed by all partners. In this agreement, special attention will be paid to pre-existing knowledge and its protection, which is a vital interest for the SME partners and also for the research institutions within the network. Basically, software developed under this RTN will be copyright by the scientist/trainee/host institution that developed it and will be shared only within the network unless other understandings are put in place (e.g. for the intended commercialisation of network products through the integrated SMEs). Software (e.g., Edgewarp) donated to the network from outside will likewise not inherit any automatic right of downloading or reposting. Regarding data bases and similar structures such as parameter vectors based on data, the EU directive of 1996 will apply. Copyright in the original data is retained by the originators, who must permit inclusion in the data base and who must approve of permission that we grant to copy the data base; copyright in the arrangement of the data base is allocated to the scientist or the team who is building it. The network will require that permission for suitable access by network partners, associates, and the public be granted in the course of implementing these data bases. Copyright in any software that incorporates knowledge from the database or from other network partners must be shared with the originators of that knowledge.

2.5. List of Deliverables and Milestones

Reporting Period	*Start Date (months)*	*Subject*	*Responsible*	*Comments*
1	3	Kick-off meeting	DHAL	Administrative meeting
1	7	Summer school	UNVI	Multivariate techniques for growth and evolution of form
1	8	Intensive Training Course	NEMU	NESPOS Training
1	9	Exhibition	MPEA	Roots - Wurzeln der Menschheit
1	10	Intensive Training Course	MPEA	Dental Tissue: 2D and 3D insights into hominid origin
1	11	Intensive Training Course	ZUMT	Rapid prototypng technology
2	13	Intensive Training Course	UHIN + HULL	Medical imaging processing & analysis + Imaging and virtual environments in VA
2	13	Annual meeting	HULL	Meeting of the Steering Committee
2	13	Periodic Activity Report	ALL	Reporting Period P1 (1-12)
2	16	Intensive Training Course	UNTO	Techniques for quantification of growth and evolution of form
2	17	Intensive Training Course	CYBU	AURA C++/Cortex II hardware
2	19	Intensive Training Course	GEO	Communication with broad public and journalists
2	22	Intensive Training Course	NEMU	NESPOS Training
2	23	Intensive Training Course	RISE	Functional morphology and evolution of mammalian dentition
2	24	Exhibition	RISE	3D imaging in Anthropology, temporary exhibition at Senckenberg Museum
3	25	Intensive Training Course	ATOM	Brain evolution, development and morphometrics
3	25	Annual meeting	ATOM	Meeting of the Steering Committee
3	25	Periodic Activity Report	ALL	Reporting Period P2 (13-24)
3	25	Mid Term Review	ALL	Mid Term Review Period
3	29	Intensive Training Course	CSIC + DHAL	Bone histology & growth + Growth & development of the craniofacial complex
3	30	Intensive Training Course	BREU	Surface scanning of soft and hard tissue
3	31	Summer school	UNVI	Multivariate techniques for growth and evolution of form
3	34	Intensive Training Course	GEO	Communication with broad public and journalists
4	37	Intensive Training Course	UNTO	Forensics & diagnosis in orthodontics & maxillofac.surgery
4	37	Annual meeting	UNTO	Meeting of the Steering Committee
4	37	Periodic Activity Report	ALL	Reporting Period P3 (25-36)
4	41	Intensive Training Course	NEMU	NESPOS Training
4	42	Intensive Training Course	MPEA	Archaic to modern transition
4	44	Exhibition	UNTO	Human Evolution and Virtual Anthropology (Musée National de Préhistoire Les Eyzies)
4	45	Intensive Training Course	YORK	Applying EVAN toolkit in VA, medicine, industry
4	48	Final conference	UNVI	Summary meeting, final administrative meeting
4	48	Final Activity Report	ALL	Final report

3. Indicators of Progress and Success

3.1 Quantitative Indicators of progress and success to be used to monitor the project

3.1.1 Research Activities

In reporting on progress with the implementation of its research plan the network will provide information and data on the following:

- organisation of or participation in and presentations to external specialist workshops and conferences (number; dates, places, title of event)
- specialist exchange among network teams (number, nature, when, where, who)
- individual and joint publications, directly related to the work undertaken within the contract (number, references)
- patents or patent applications directly related to the contract (number, references)
- development of new scientific and/or industrial collaborations (number, references)
- scientific awards and prizes obtained from the work directly related to the contract (number, details)
- interest expressed in the networks' dedicated Website (number of hits; number of participants to the scientific forum, if any)
- visit of Senior Researchers from inside and/or outside the network (number, name, place and time of visit)
- contacts with relevant users groups whether academic or industrial/commercial (number, name)

3.1.2 Training / Transfer of Knowledge (ToK) Activities

In reporting on progress with the implementation of its training and ToK Plan the network will provide information and data on the following:

- the rate of recruitment of ESR and ER for each participant and for the network as a whole (ratio person-months filled/offered)
- the nature and justification for adjustments, if any, to the original overall number of person-months of ESR and ER as well as to the breakdown of this overall number among the participants
- the time and duration of each individual appointment
- the number, names and level of involvement of senior researchers directly associated with the tutoring/supervision of the recruited ESR or ER, at each participant
- the number of ESR that are expected to present their PhD thesis and when
- the number and place of the short visits and secondments, placement in company premises undertaken by each individual ESR or ER either within or outside of the network
- number of visits of the ESR and ER to their home scientific community
- attendance at network meetings by the ESR and ER (number, names, place, date)
- participation in and presentations to workshops and conferences by ESR and ER (number, names, place, date)
- organisation of training events (e.g. schools, training workshop/seminar, hands-on training session on specialised instrument/techniques) at individual participant sites (number, attendees' names, place, date)
- organisation of network-wide training events (number, attendees' names, place, date)
- participation in training events organised outside the network (number, attendees' names, place, date)
- number of internet tutorial and computer based training courses developed/used
- number, place, purpose of any meeting (e.g. workshop) organised by the ESR or ER themselves

3.2 Qualitative Indicators of progress and success to be used to monitor the project

3.2.1 Research Activities

In reporting on progress with the implementation of its research plan the network will provide information and data on the following:

- general progress with research activities programmed at individual, participant team and network level
- highlights on more particularly innovative developments (novel concepts, approaches, methods and / or products)
- citation index for individual and joint publications directly related to the work undertaken within the contract
- expected scientific / technological breakthroughs
- overall progress and possible problems encountered with individual work packages and/or network-wide research activities
- nature and justification for adjustments, if any, to the original research work plan and/or timetable
- progress on cross interaction among disciplines represented within the network
- progress on cross interaction between academic and industrial partners
- progress regarding interaction with industrial/commercial/economic interests outside the network
- access to / use of state-of-the-art infrastructure and facilities
- highlights on wider societal and/or ethical components of the project, such as public outreach activities
- highlights on the scientific community recognition of the network research contribution (awards, invitation to conferences, …)

3.2.2 Training / Transfer of Knowledge Activities

In reporting on progress with the implementation of its training plan and ToK the network will provide information and data on the following:

- general progress with training and ToK activities programmed at individual, participant team and network level (type of guidance, supervision, coaching or mentoring in place to support ESR and ER)
- highlights on the development of more particularly innovative approaches to training and ToK (e.g. specific training packages of network-wide relevance)
- highlights on the exploitation of the "complementarities" between network participants with respect to training and ToK
- nature and justification for adjustments, if any, to the original training / ToK plan and/or timetable (e.g. opportunities for new collaborations regarding training activities)
- career development plans as elaborated by the ESR and ER involved in the project
- career development opportunities/prospects for ESR and ER involved in the project
- achievements regarding the acquisition of complementary skills such as communication, language skills, computer skills, project management, ethics, team building, etc.
- achievements regarding the training/ToK on specialised instruments/equipment's
- level of satisfaction of the trainees (e.g. as expressed in response to questionnaires)

3.2.3 Management

In reporting on progress with its management the network will provide information and data on the following:

- effectiveness of the "internal" communication and decision making between the co-ordinator, team leaders, supervisors, down to the ESR and ER, including feedback processes
- effectiveness of the communication between the network and the Commission Services (frequency, efficiency, timely feedback's), particularly regarding the conformance with contractual provisions and the implementation of contingency plans where needed
- effectiveness of network communication with industrial and other stakeholders (anticipation of outcomes and possible end-users interests, contact preparation, follow-up and contractual agreement where appropriate)
- network self-assessment through benchmarking activities (exchange of best practices among participants and/or development of ad hoc performance indicators regarding cost management, staff selection, measurement of research/training/ToK outputs, young researchers’ involvement, etc.)
- overall quality and efficiency of the "external" communication strategy of the network (Cordis; personal, team and network web sites updates; newsletters; etc.)
- effectiveness of the recruitment strategy of the network in terms of equal opportunities (including gender balance) and open competition at international level
- development of any specific planning and management tool(s) and databases
- management of intellectual property and commercialisation of network research output

PART C: Overall Indicative Periodic Project Deliverables (CPF A4b)

Contract Preparation Forms

EUROPEAN COMMISSION

6th Framework Programme on Research, Technological Development and Demonstration

Marie Curie Actions :
Research Training Networks (RTN)

A4b

Proposal Number1	19564	Proposal Acronym[2]	EVAN

Overall Indicative Periodic Project Deliverables by Participant

Participant No	Early Stage Researchers			Experienced Researchers (4-10 years)		
	Full-time Person Months	Indicative number of researchers	Type B fellowship (%)	Full-time Person Months	Indicative number of researchers	Type B fellowship (%)
1	45	3	40%	28	1	0%
2	36	2	0%	12	2	0%
3	0	0	0%	24	2	0%
4	24	1	0%	24	1	0%
5	0	0	0%	0	0	0%
6	36	1	0%	12	1	0%
7	12	1	0%	0	0	0%
8	72	2	100%	20	1	0%
9	12	2	0%	0	0	0%
10	24	1	0%	0	0	0%
11	0	0	0%	0	0	0%
12	18	2	0%	0	0	0%
13	36	1	0%	12	2	0%
14	24	1	0%	0	0	0%
15	0	0	0%	24	2	0%
16	17	1	0%	12	2	0%
Sub-Total	356	18		168	14	

Part D: Overall Maximum Community Contribution (CPF A5b)

Contract Preparation Forms

EUROPEAN COMMISSION

6th Framework Programme on Research, Technological Development and Demonstration

Marie Curie Actions :
Research Training Networks(RTN)

A5b

Proposal Number1	019564-2	Proposal Acronym[2]	EVAN

Overall Maximum Community Contribution

Year	Eligible expenses for the activities carried out by the researchers					Eligible expenses related to the activities of the host organisations				Maximum EC contribution
	A	Transnational Mobility		D	E	F	G	H	I	
	Monthly Living Allowance	B Travel Allowance	C Mobility Allowance	Career Exploratory Allowance	Participation expenses of the eligible researchers	Research/ training/transfer of knowledge	Management and Audit Certification	Overheads	Other types of eligible expenses	
	Costs (in euros)	Costs (in euros)	Costs (in euros)	Costs (in euros)	Costs (in euros)	Costs (in euros)	Costs (in euros)	Costs (in euros)	Costs (in euros)	(in euros)
1	252241,56	8750,00	59411,90	20000,00	31200,00	134506,00	54048,00	69055,00	11750,00	640962,46
2	594030,45	15250,00	148836,55	14000,00	82000,00	146881,00	64153,00	71433,00	11750,00	1148334,00
3	459394,45	15250,00	118160,40	8000,00	66800,00	150305,00	60417,00	70645,00	11750,00	960721,85
4	201708,33	7750,00	53539,60	0,00	29600,00	123448,00	52186,00	67626,00	11750,00	547607,93
5	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
6	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Total	1507374,80	47000,00	379948,45	42000,00	209600,00	555140,00	230804,00	278759,00	47000,00	3297626,25

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[2] The amount for funding is rounded to **€ 3.297.626,00**

ENDPAGE

HUMAN RESOURCES AND MOBILITY (HRM)
ACTIVITY

MARIE CURIE ACTIONS
Research Training Networks (RTNs)

European Virtual Anthropology Network
EVAN

Proposal No. 019564-2

Amended Version 1 of
Annex I
(Change of UNBX to UNTO by 1st of September 2006)