

COST

Domain Committee "Information and Communication
Technologies"

COST Action IC0601

Start Date 24/04/2007

Sonic Interaction Design

MONITORING PROGRESS REPORT

Reporting Period: from July 2009 to June 2010

This Report is presented to the relevant Domain Committee.
It contains three parts:

- I. Management Report** prepared by the COST Office/Grant Holder
- II. Scientific Report** prepared by the Chair of the Management Committee of the Action
- III. Previous versions of the Scientific Report;** i.e., part II of past reporting periods

The report is a "cumulative" report, i.e. it is updated annually and covers the entire period of the Action.

Confidentiality: the documents will be made available to the public via the COST Action web page except for chapter *II.D. Self evaluation*.

Based on the monitoring results, the COST Office will decide on the following year's budget allocation.

Executive summary (max.250 words):

At the end of the third year of the Action IC0601, Sonic Interaction Design (SID) has been established as a new interdisciplinary field. With a worldwide perspective, the Action is steering most of the research, production, and dissemination initiatives in such field. Thematic workshops have allowed experimentation in under-explored territories, such as SID for theatre.

Training Schools are contributing to creating a critical mass of young researchers that tackle new directions in sound technology, design, perception or art.

A large number of Short-Term Scientific Missions have been providing valuable results in creative experimentation, interactive sonification, evaluation of designs, and development of technologies.

The network of over a hundred SID researchers is spinning off new scientific and artistic projects that are attracting additional funds from European and National institutions.

I. Management Report prepared by the COST Office/Grant Holder



I.A. COST Action Fact Sheet

- **COST Action** IC0601 – SID – Sonic Interaction Design
- **Domain** Information and Communication Technologies

- **Action details:**

CSO Approval: 20/11/2006

End date: 23/04/2011

Entry into force: 28/03/2007

Extension: (day/month/year)

- **Objectives**

Sonic Interaction Design is the exploitation of sound as one of the principal channels conveying information, meaning, and aesthetic/emotional qualities in interactive contexts. The Action pro-actively contributes to the creation and consolidation of new design theories, tools, and practices in this innovative and interdisciplinary domain. While being advanced through a few sparse projects, this field relies on the COST – SID Action to strengthen the links between scientists, artists, and designers in the European Research Area. The COST – SID platform stands on four legs: (i) perception, cognition, and emotion; (ii) design; (iii) interactive art; (iv) information display and exploration. These are each supported by the research and development of the requisite new interactive technologies. Due to the breadth of its application spectrum, the COST – SID Action has the potential of affecting everyday life through physical and virtual interactive objects, as today there is the possibility to design and actively control their acoustic response so that it conveys an intended aesthetic, informational, or emotional content. Keywords: Interaction Design, Auditory Display and Sonification, Sound and Music Computing, Sound Modelling, Sound Perception and Cognition.

- **Parties:**

Austria (14/03/2007)	Iceland (20/04/2009)	Portugal (10/10/2007)
Belgium (28/03/2007)	Ireland (23/04/2008)	Spain (28/03/2007)
Denmark (14/03/2007)	Israel (28/11/2007)	Sweden (17/04/2007)
Finland (30/03/2007)	Italy (20/04/2007)	Switzerland (04/04/2007)
France (17/04/2007)	Netherlands (12/09/2007)	United Kingdom (21/03/2007)
Germany (14/03/2007)	Norway (28/03/2007)	Total: 17

- **Intentions to accept:** none

Other participants: McGill University (CA), Sonic Communications Research Group (AU).

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- **Working Groups**

- **WG 1: Perceptual, cognitive, and emotional study of sonic interactions**

Roberto Bresin (WG chair, KTH Stockholm), Dik J. Hermes (TUE Eindhoven), Bruno Giordano (IRCAM Paris), Rolf Inge Godøy (University of Oslo), Fabien Gouyon (INESC Porto), Guillaume Lemâitre (IRCAM Paris), Stephen McAdams (McGill, Montreal), Cornelius Pöpel (FH Ansbach), Rafael Ramirez (UPF Barcelona), Patrick Susini (IRCAM Paris).

- **WG2: Product sound design**

Álvaro Barbosa (UCP Porto), Flemming Christensen (Aalborg University Copenhagen), Andrew Diey (Radium Audio Ltd London), Cumhur Erkut (TKK Acoustics Espoo), Mikael Fernström (University of Limerick), Sandra Pauletto (The University of York), Davide Rocchesso (IUAV Venice), Stefania Serafin (WG chair, Aalborg University Copenhagen), Vesa Välimäki (TKK Acoustics Espoo), Michal Rinott (HIT Holon), Andrea Valle (University of Turin), Daniel Hug (University of the Arts Zurich).

- **WG3: Interactive art and music**

Daniel Arfib (LIG Grenoble), Aki Asgeirsson (Iceland Academy of the Arts), Frauke Behrendt (WG chair, University of Sussex), Nicola Bernardini (Conservatorio Pollini di Padova), Alain Crevoisier (CETT - Yverdon-les Bains), Gerhard Eckel (IEM Graz), Jean Julien Filatriau (Université Catholique de Louvain), Karmen Franinovic (University of the Arts Zurich), Björn Hellström (Konstfack Stockholm), Jian Kang (University of Sheffield), Loïc Kessous (Université Pierre et Marie Curie ISIR-UPMC Paris), Trond Lossius (BEK Bergen), Kjartan Olafsson (Iceland Academy of the Arts), Tapio Takala (TKK Acoustics Espoo).

- **WG4: Sonification**

Thomas Hermann (WG chair - Neuroinformatics Group Faculty of Technology, Bielefeld University, <http://sonification.de/thermann/index.shtml>), Yon Visell (McGill University Montreal, <http://www.cim.mcgill.ca/~yon>), Eoin Brazil (ICHEC Dublin, <http://richie.idc.ul.ie/eoin/>), Roderick Murray-Smith (University of Glasgow), John Williamson (University of Glasgow), Nicolas Misdariis (IRCAM Paris), Matthias Rath (Deutsche Telekom, Berlin), Stephen Barrass, (Sonic Communications Research Group University of Canberra - by agreement with Australian Academy of Science), Simon Shelley (TUE Eindhoven).



I.B. Management Committee member list

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Professor Yon VISELL	Canada	yon@cim.mcgill.ca

I.C. Overview activities and expenditure

2009/2010 Budget

Total Action Budget: **124.000,00**
Remaining Action Commitment at 01/05/10: **0,00**

Meetings

Meetings	Date	Place		Cost	Total Spent
WG3 meeting	22/07	PT		5.342,41	
WG2 meeting	23/07	PT		5.906,27	
MC meeting + WS + WGs	16/11	IL		16.767,08	
WG3 meeting	04/03	FR		4.152,95	
TS 2102 Caserta	15/03	IT		409,50	
MC meeting + WS + WGs	07/04	SE		14.795,18	
WG1 meeting	17/05	FR		3.200,00	
WG2 meeting	17/05	FI		3.170,96	
SID Book preparation meeting	10/06	NO		1.200,00	54.586,64

STSM

Beneficiary	Date	Place		Cost	Total Spent
11 STSMs	Various dates and places			20.455,00	20.455,00

Workshops

Title	Date		Place	Cost	Total Spent
	From	To			
SMC 2009	18/07/09	21/07/09	PT	3.000,00	
SSID	16/11/09	16/11/09	IL	3.000,00	
Ison2010	07/04/10	07/04/10	SE	3.000,00	9.000,00

Dissemination

Beneficiary	Date			Cost	Total Spent
BEK Norway	06/2010			5.000,00	
Sussex Univ.	06/2010			5.000,00	10.000,00

Schools

Title	Date	Place		Cost	Total Spent
1 Training School	07/09	PT		13.784,36	13.784,36

Others

Title	Date	Place		Cost	Total Spent
Secretarial support				16.174,00	16.174,00

Total spent at May 1st, 2010.

124.000,00

2008/2009 Budget

Total Action Budget: 120.000,00

Meetings

Meeting Type	Date	Place	Cost	Total
12 Meetings	Various dates and places		60.158,35	
				60.158,35

STSMs

Beneficiary	Date	Place	Cost	Total
20 STSMs	Various dates and places		33.025,00	33.025,00

Workshops

Title	Date		Place	Cost	Total
	From	To			
SID session	03/09	03/09	Espoo, FI	3.000,00	
SID Meet.support	15/09	15/09	Jvaskyla, FI	1.000,00	
SID Workshop	02/04	02/04	York, GB	3.000,00	7.000,00

General Support Grants

Beneficiary	Date	Cost	Total
--	--		0

Schools

Title	Date	Place	Cost	Total
--	--	--		0

Dissemination

Title	Date	Place	Cost	Total
--	--	--		0

Others

Total
Secretarial Support
15.027,50

Total spent at June 30th, 2009.

115.210,85

2007/2008 Budget

Total Action Budget:

155.000,00

Meetings

Meetings	Date	Place		Cost	Total Spent
11 Meetings	--	--		50.441,53	50.441,53

STSM

Beneficiary	Date	Place		Cost	Total Spent
25 STSMs	--	--		43.797,00	43.797,00

Workshops

Title	Date	Place		Cost	Total Spent
4 Workshops	--	--	--	13.094,60	13.094,60

General Support Grants

Beneficiary	Date			Cost	Total Spent
--					0

Schools

Title	Date	Place		Cost	Total Spent
1 Training School					9.408,98

Others

Title	Date	Place		Cost	Total Spent
Secretarial support				17.511,32	17.511,32

Total spent at June 30th, 2008.

134.253,43

II. Scientific Report

II.A. Innovative networking

The Action is pursuing a pervasive networking strategy involving various communities in science, design, art, and business. In its third year (from June 2009), the Action achieved this by organising an inspirational session at the Sound and Music Computing Conference (SID at SMC, Porto – Annex 13) and a Training School attached to the same conference (TS, Porto – Annex 12).

A MC Meeting was organised as a satellite event of the Interactive Sonification Workshop in Stockholm, where a seminar on voice functions was organised, and exchanges with COST Action TD0804 on Soundscape initiated (MC Stockholm – Annex 14).

Courses on Sonic Interaction Design (SID) were held at IC0601 institutions TKK, ZHDK, KTH, Medialogy, UCP, and BEK (Annex 9). Several other institutions (Conservatory of Trieste, NABA, etc.) were spurred by the Action IC0601 in creating workshops, conferences, and masterclasses in SID. Chris Salter, author of MIT Press book “Entangled”, lectured about Sonic Interaction Design at the Club Transmediale festival in Berlin (<http://www.clubtransmediale.de/ctm-festival/day-program/day-schedule/03/lecture-sonic-interaction-design-some-recent-projects.html>).

The Action continued to pursue a creative mixture of research and teaching by organizing the Workshop on Sketching SID in Holon, Israel (Annex 15), where the theme of rapid and effective production of sonic interactions was explored by design students and professionals together with IC0601 researchers. In particular, the conscious use of voice in the early stage of the design process proved to be very promising for future research initiatives. With this workshop, together with the previous York workshop on SID and theatre, the Action has established a stream of exchanges with areas of the performing arts and the humanities.

In the area of sonification for bio-medicine and motor science, WG4 organised a stream of activities that included a research retreat (WG meeting, June 2009) and special-purpose STSMs (e.g.: N. Schaffert). Results were presented at the Interactive Sonification workshop in Stockholm (Annex 16).

In the third year, relations with professionals and practitioners were consolidated. In particular, at the Holon Workshop there was the active participation of well-known professionals working in design and in music conduction. The preparation of the Training School to be held in Helsinki in August 2010, spurred by an extended STSM, is involving industrial partners such as Nokia, PowerKiss, (<http://www.powerkiss.com>) and Hipui (<http://www.hipui.com>).

The Austrian MC delegate G. Eckel developed a sound installation (BEK and Lydgalleriet production) for the Rom 8 gallery of Bergen National Academy of the Arts as part of the Borealis Contemporary Music Festival 2010. The author had an artist residency at USF in Bergen in preparation for the workshop, and he had the possibility to present his work in the framework of SID.

STSM recipient Suguru Goto opened the 53rd International Festival of Contemporary Music of La Biennale in Venice. Luiz Naveda (<http://www.ipem.ugent.be/?q=user/19>), after the results of his STSM, won the Best Paper award at the Brazilian Symposium on Computer Music and published an article in the Journal of New Music Research.

Several research projects have established relations with IC0601 (Annex 11):

EC RTD projects ongoing (or recently finished):

- **SAME** – Sound And Music for Everyone Everyday Everywhere Everyway. Started on January 2008, it involves three IC0601 Institutions (KTH, UPF, TKK). The company Nokia is a partner in SAME and also contributed to IC0601 activities.
- **BrainTuning** – Tuning the brain for music. Project ended on July 31, 2009, it involved one IC0601 institution (KTH) and other cooperating partners interested in the neural determinants of emotions induced by sound and music.
- **SATIN** – Sound And Tangible Interfaces for Novel product design. Project ended

on October 1, 2009, it involves IC0601 Institution TUE. The SATIN Coordinator invited the IC0601 Chair to lecture at the Summer School on Virtual Prototyping (September 2010).

- **NIW** – Natural Interactive Walking, FET-Open project started on October 2008. The Canadian partner and some SID researchers are involved in the project about embedding haptic and audio feedback in shoes and floors.
- **CLOSED** – Closing the Loop Of Sound Evaluation and Design. Project ended on June 30, 2009, it involved two IC0601 Institutions (IRCAM, ZHDK) and the IC0601 Chairman.

EC RTD project proposals:

- **SkAt** – Sketching Auditorily, FET-Open proposal on using vocal imitations to sketch sounds. Project involving two IC0601 institutions and one COST 2103 Institution. Approved with high scores (4.5/5, 4/5, 4/5). Not retained for funding. Resubmission is being considered.
- **AIS** – Acoustically Interactive Swarms, ICT proposal on robot-robot and robot-human interaction mediated by sound. One COST IC0601 Institution is involved in the area of sound design. Other areas are auditory scene analysis, swarm robotics, distributed intelligence, and language evolution.

National Programme ongoing projects:

- **INSIDE** - Intuitive Sonic Interaction Design for Education and Entertainment. IC0601-companion project coordinated by Swiss delegate A. Crevoisier and funded by the Swiss Federal Government. Started on January 2009.
- **CITEC** - The IC0601 institution Bielefeld University participates to the German Cluster of Excellence in Cognitive Interaction Technology (**CITEC**). IC0601 Vice-chairman leads the Ambient Intelligence Group. Among the projects: Auditory Closed-Loop Interaction, for sonification-based auditory biofeedback in the context of physiotherapy and dance/sports; SciSon - Sonification in the Natural Sciences and Cognitive Interaction, to bring sonification techniques to practical application in the sciences.
- **Schema-SID** - Synthesis, Control, and Hierarchical Event Modeling Algorithms for Sonic Interaction Design (Academy of Finland 2007 – 2012). It can be considered a IC0601 spinoff initiated by WG2 member C. Erkut.
- **TTT project** – Funded by the French National Research Agency (2007-2009). SID-related musical experiments for the project are run at the IC0601 institution Laboratoire d'Informatique de Grenoble.
- **Sensing Music-Related Actions** – Funded by the Research Council of Norway (2008-2011) and hosted by the University of Oslo. The focus is on fundamental issues of sonic interaction as well as on methods and technologies for enhancing knowledge of sound-action relations.

National Programme proposals:

- **SAMT** – Sound-Action Material Toolbox. Application for IC0601-companion project coordinated by Swiss delegate K. Franinovic, aimed at developing prototypes and guidelines that can be applied to teach SID at the university level. Funding is sought from the Swiss Federal Government.

Impact on academic programmes (Annex 9):

- In 2010, TKK joined the Helsinki School of Economics and University of Art and Design to become the Aalto University. IC0601 has been especially well represented in the experimental, multidisciplinary, and problem-based platforms (Factories). Some contact teaching modules are being tested at the Design Factory as S-89.3490 Special Assignment in Acoustics And Audio Signal Processing (Sonic Interaction Design), organised by C. Erkut.
- At Interaction Design BA program at ZHdK, several courses in the SID domain

- have taken place: Sound Design Studio (in collaboration with Volkswagen, Winter 2009, D. Hug and J. Späth); Embodied Interaction Advanced Studio (Winter 2009, K. Franinovic and M. Rheiner); Embodied Interaction Basics Studio (Winter 2009-2010, K. Franinovic, R. Perret and D. Hug); Auditory Displays (Spring 2010, D. Hug); Sonic Interaction Design theory seminar (Fall 2009, D. Hug).
- At KTH, R. Bresin has been teaching a class on "Sound in interaction" in the DT2140 Multimodal interfaces course and a class on "Sound synthesis and sounding objects" in the DT2213 Musical Communication and Music Technology course.
 - A master thesis on sound and interaction was selected together with other 8 projects for representing students activities at KTH, Stockholm, in year 2010. The project is a voice-based music sequencer for mobile phones (R. Bresin, supervisor). The blog documenting the project (<http://insidan.kth.se/bloggar/mobilkompositor/>) was the most followed and visited in the whole contest, with a total of 10,672 visits during February 2010. The thesis project will be completed by the end of June 2010, and it will be presented at NOKIA Research in Helsinki. The project has received a large media coverage in Sweden.
 - Aalborg University Copenhagen offers, as part of its curricula in Medialogy, a bachelor semester in "Interaction Design, Sound, and Sensors" and a master class in "Interactive sound design".
 - A Masterclass on Physical Computing for Sonic Interaction Design was held by IC0601 Chair D. Rocchesso at the Conservatory of Trieste, Italy, on may 4-6, 2010.
 - A seminar and a full-day lecture on Sonic Interaction Design were held by IC0601 Chair D. Rocchesso at the PhD Program of the School of Arts of the Portuguese Catholic University, Porto, on June 18-19, 2010.

Objective 1 of the MoU has been achieved through many inter-disciplinary networking initiatives (see also section II.B). The Action has made considerable progress toward objective 2. Through many exchanges (also with other COST Actions), the Action is effectively raising a shared appreciation of SID. In the second half of the Action this objective is being further pursued by means of artistic productions, exhibition, and other forms of dissemination. Objective 3 is being addressed through the work of WGs, which have been proposing platforms for experimentation that are now being exploited in research. Objective 4, as testified by the network of European and National projects and proposals that IC0601 is linked with, is being successfully achieved.

II.B. Inter-disciplinary networking

IC0601 participated to 3rd COST 2102 International Training School on "Toward Autonomous, Adaptive, and Context-Aware Multimodal Interfaces: Theoretical and Practical Issues", held in Caserta on March 15-19, 2010. IC0601 Chair D. Rocchesso lectured on Sketching and Prototyping Sonic Interaction Design.

Cooperation with Action COST 2103 has continued by inviting its delegate S. Ternström to give a lecture, together with Christine Ericsson at the IC0601 Meeting in Stockholm, on April 8, 2010. The lecture was on voice and voice functions and it was particularly appreciated after the two SID Workshops on Theatre and on Sketching that outlined the importance of the human voice as the most immediately accessible tool for sonic sketching and prototyping.

Multidisciplinarity is inherent in IC0601, and this is well represented in the papers selected for the special issue of the Int. J. of Human-Computer Studies, which are contributions of researchers active in the fields of music, interfaces, multimedia, perception and cognition. The issue was published in volume 67 of the journal and appeared in november 2009. Most of the issue contributors were involved in IC0601 initiatives.

Several papers have been submitted as joint works to the 2010 conferences on Designing Interactive Systems (DIS), Sound and Music Computing (SMC), Haptic-Audio Interaction

Design (HAID), Digital Audio Effects (DAFx), Auditory Display (ICAD).

A key issue in IC0601 is that of evaluation of sonic interaction designs. While the disciplinary approaches (psychophysics, usability, introspection, etc.) prove to be limited for real-world cases, an inter-disciplinary approach may provide solid answers. The IC0601 WGs, being different in their interests and disciplinary compositions, have been called to provide directions and guidelines, which are integrating those provided by other sources. Examples of evaluation can be found in the results of STSMs held in the third year (Annex 3). For instance, the aesthetic dimension of sonic interaction has been considered in the STSMs of S. Delle Monache and N. Schaffert. The effectiveness of sonically-augmented walking has been investigated in the STSMs of B. Moens and L. Turchet.

WG1 has been designing a new experiment for defining innovative methods for both the description of sound (analysis) and the design of sound (synthesis) in interaction. For this experiment, Oslo University (R.I. Godøy) has developed a new gesture interface (a squeezable device equipped with a number of sensors). For the description of sound in interaction, users will use the new gesture interface for mimicking sounds in selected databases as if they were controlling the sound. Users will also use gestures for mimicking emotions which are represented by the sounds. As a result, mappings between control and sound features will be learned. For the design of sound in interaction, users will use the gesture interface for sketching sounds and to match a given target sound in selected databases. They will have to learn the mapping between gesture and timbre features. The learning curve for doing this task will be studied.

An effective form of inter-disciplinary networking is the book being edited by K. Franinovic and S. Serafin. The title will be "Sonic interaction Design: Fresh Perspectives on Interactive Sound". MIT Press has received the first draft of the contributed chapters and is now examining the possibility to publish the book as part of its series on new media, game studies, and design. Authors have been chosen by the editors both within and without the pool of IC0601 researchers. This extends the influence of the Action on disciplines such as, for example, technology and society studies.

II.C. New networking

Jian Kang, Chair of COST Action TD0804 on Soundscape, was appointed suppleant for UK in IC0601 and joined WG3.

55 researchers have participated to Action activities as invited experts (10 in the reported period). 57 researchers have accomplished Short-Term Scientific Missions (12 in the reported period). 21 students and 12 tutors/teachers participated to the Training School in Porto. By adding the participants of the first Training School, the total number of individual participants involved in Action work is 186 (17% of female and 23% of Early Stage Researchers).

The Action has working reciprocal agreements with non-COST institutions in Australia and Canada. To continue the fruitful collaboration with S. Barrass of the University of Canberra, a Reciprocal STSM (RSTSM) was funded under the Australia/COST reciprocal agreement to support ESR Nina Schaffert in her campaign of experiments in Australia. So far 8 Short-Term Scientific Missions have been targeted to the non-COST institution McGill University in Montreal (3 in reported period).

The German delegate F. Behrendt returned to Europe after one year spent as visiting assistant professor at the Rhode Island School of Design. She spread the SID network to the US through several initiatives that merge teaching and research.

Some blogs maintained by IC0601 participants are: mobilesound.wordpress.com/ by F. Behrendt; <http://www.trondlossius.no/> by T. Lossius; urbansync.wordpress.com/ by STSM recipient S. Baumann, on social and urban sound; <http://audiobranding.ning.com> of the International Community for Audio Branding, co-founded by WG2 member D. Hug.

III. Previous versions of the Scientific Report

2008/2009

II.A. Innovative networking

The Action, instead of creating a niche for Sonic Interaction Design (SID) in the scientific community, has implemented a pervasive networking strategy that touches different communities in science, design, art, and business. In the second year, starting from June 2008, this has been realised by organising special sessions at the International Conferences on Auditory Display (ICAD at IRCAM, Paris – Annex 7) and on Digital Audio Effects (DAFx'08 at TKK, Helsinki – Annex 8). At ICAD, three IC0601 MC delegates co-organised two Workshops, six MC or WG members chaired six different conference sessions, and one session was co-organised by IC0601 together with the EU Project CLOSED. Still at ICAD 2008, the paper by IC0601 delegate M. Rinott won the “Best Use of Sound in a Presentation” award. At DAFx'08, sonic interaction design was introduced among the conference themes, and the IC0601 Action was presented.

Courses on Sonic Interaction Design have been activated at IC0601 institutions TKK, ZHDK, IUAV, and BEK (Annex 9). An interesting mixture of research and teaching has been expressed by the Workshop on SID and its relations to film and theatre in York (Annex 10), where a short script was sonically interpreted by sound specialists, and teachers and students of the local school of theatre produced short pieces and provided a diverse range of experiences of sonic interaction. Initiatives such as this are very likely to produce a better social understanding of SID, thus opening new areas of influence.

In the second year of the Action, special emphasis has been put on relations with industries and professionals. Representatives of Nokia (FI), Moving Brands (GB), and Audio Consulting Group (DE) participated to the MC Meeting on September 2008, providing insights and practical demonstrations of sonic interaction design for mobile devices, for commercial installations, and for branding. The professional sectors of games, film and theatre, which all share a strong narrative dimension, were targeted by the York Workshop (Annex 10), with representatives of Media Mill (GB), National Film and TV School (GB), and professional playwrights, directors, composers, and sound designers. A long-term relation has been established with Deutsche Telekom Laboratories that have a representative who is doing research in tight connection with IC0601 institutions and is a member of WG4.

Several research projects have established relations with IC0601 (Annex 11):

EC RTD projects ongoing:

- **SAME** – Sound And Music for Everyone Everyday Everywhere Everyway. Started on January 2008, it involves three IC0601 Institutions (KTH, UPF, TKK). The company Nokia is a partner in SAME and also contributed to IC0601 activities.
- **BrainTuning** – Tuning the brain for music. Project ending on July 31, 2009, it involves one IC0601 institution (KTH) and other “closed friends” interested in the neural determinants of emotions induced by sound and music.
- **CLOSED** – Closing the Loop Of Sound Evaluation and Design. Project ending on June 30, 2009, it involves two IC0601 Institutions (IRCAM, ZHDK) and the IC0601 Chairman. Various exchanges between CLOSED and IC0601 have occurred. The final event of CLOSED will be organised in Porto (PT) and attached to the IC0601 SID Summer School (Annex 12).
- **SATIN** – Sound And Tangible Interfaces for Novel product design. Project ending on October 1, 2009, it involves IC0601 Institution TUE. Project results were presented at the SID Workshop in York.

EC RTD projects recently started:

- **NIW** – Natural Interactive Walking, FET-Open project started on October 2008. The Canadian partner, as well as some SID researchers, are involved in the project about embedding haptic and audio feedback in shoes and floors.

EC RTD project proposals:

- **SkAt** – Sketching Auditorily, FET-Open proposal on using vocal imitations to sketch sounds. Project involving two IC0601 institutions and one COST-2103 Institution;
- **AIRS** – Acoustic Interaction with and within a Robotic Society, ICT proposal on robot-robot and robot-human interaction mediated by sound. One COST IC0601 Institution is involved in the area of sound design. Other areas are auditory scene analysis, swarm robotics, distributed intelligence, and language

- evolution.
- **ITSE** – Interactive Therapeutic Sensory Environment, ICT proposal on environments for disabled children. One COST IC0601 Institution is involved in the area of sound design.

National Programme ongoing projects:

- **INSIDE** - Intuitive Sonic Interaction Design for Education and Entertainment. IC0601-companion project coordinated by Swiss delegate A. Crevoisier and funded by the Swiss Federal Government. Started on January 2009.
- **CITEC** - The IC0601 institution Bielefeld University participates to the German Cluster of Excellence in Cognitive Interaction Technology (**CITEC**). IC0601 Vice-chairman leads the Ambient Intelligence Group. Among the projects: Auditory Closed-Loop Interaction, for sonification-based auditory biofeedback in the context of physiotherapy and dance/sports; SciSon - Sonification in the Natural Sciences and Cognitive Interaction, to bring sonification techniques to practical application in the sciences.
- **Schema-SID** - Synthesis, Control, and Hierarchical Event Modeling Algorithms for Sonic Interaction Design (Academy of Finland 2007 – 2012). It can be considered a IC0601 spinoff initiated by WG2 member C. Erkut.
- **TTT project** – Funded by the French National Research Agency (2007-2009). SID-related musical experiments for the project are run at the IC0601 institution Laboratoire d'Informatique de Grenoble.
- **Sensing Music-Related Actions** – Funded by the Research Council of Norway (2008-2011) and hosted by the IC0601 institution University of Oslo. The focus is on fundamental issues of sonic interaction as well as on methods and technologies for enhancing our knowledge of sound-action relations.

National Programme proposals:

- **CoFee** – Continuous Feedback. Application to the Italian Ministry of Research for a project to study interfaces that provide ad-hoc designed continuous feedback to user gestures. IC0601 Chair is local coordinator and the institution of WG3-member Federico Avanzini is project coordinator.

Impact on academic programmes (Annex 9):

- A seminar course on SID topics was organised in Fall 2008 at TKK. It included: voice prototyping (I. Ekman), physical prototyping (K. Tahiroglu), sonic interaction design (C. Erkut and I. Ekman), and acoustic display (D. Hug). Other invited experts were M. E. Altinsoy (audio-haptics), H. Penttinen (Helsinki mobile phone orchestra), M. Gröhn (interactive sonification), J. Pallasmaa (architecture as lived experience), and A. Pirhonen (use scenarios).
- A three-weeks workshop on sound design for interactive commodities was held in Fall 2008 at ZHDK (D. Hug).
- A one-week workshop with S. Barras on reactive sounding objects was held at IUAV in spring 2009.
- The IC0601 institutions IRCAM and University of Oslo, together with Bergen Center for Electronic Art (BEK) organised two one-week workshops, one held in Bergen and one to be held in Oslo, providing an introduction to IRCAM FTM libraries for artists, musicians, and researchers. The first workshop hosted students from Norway, UK, Germany, and USA.

Objective 1 of the MoU is being achieved through the many inter-disciplinary networking initiatives (see also section II.B). The Action has started to address objective 2, and will focus the second half of its duration toward raising a shared appreciation of SID through artistic production, exhibition, and other forms of dissemination. Objective 3 is being addressed through the work of WGs, which are proposing and testing platforms for experimentation, such as the Tracked Handheld Speaker of WG2, the ATM framework of WG1, or the Spinotron interaction device. Objective 4, as testified by the network of European and National projects and proposals that IC0601 is linked with, is being successfully achieved.

II.B. Inter-disciplinary networking

IC0601 is participating to the COST 298 Conference in Copenhagen (13-15 May 2009) with four presentations by MC delegates (R. Bresin, K. Franinovic, T. Hermann, S. Serafin) that give a broad view of SID and highlight its importance for the broadband society.

Connections with the science of human voice have been pursued with COST 2103 delegate S. Ternström for preparation of the proposal SkAt, and will be further exploited in the third year with other initiatives.

Multidisciplinarity is inherent in IC0601, and this is well represented in the papers selected for the special issue of the Int. J. of Human-Computer Studies, which are contributions of researchers active in the fields of music, interfaces, multimedia, perception and cognition. The final table of contents will be available in June 2009 and the issue will be published in the winter 2009. Most of the issue contributors were involved in IC0601 initiatives.

Several papers have been submitted as joint works of IC0601 researchers to the next Sound

and Music Computing (SMC) Conference in Porto (July 2009). A selection of submitted titles include *"The Spinotron: assessing the influence of sound in continuous sonic interactions"*, *"The Flops glass: a device to study emotional reactions arising from sonic interactions"*, *"Rhetoric for sound-mediated Interaction: a case study"*, *"Does a « natural » sonic feedback affect perceived usability and emotion in the context of use of an ATM?"*, *"Auditory representations as landmarks in the sound design space"*. The SMC conference, together with the IC0601-supported Summer School (Annex 12), will give the opportunity to merge the contributions of various disciplines and to compare the results of several ongoing research projects around their common interest in sound. A number of the instructors and lecturers for the SMC summer school are also IC0601 researchers.

A key issue in IC0601 is that of evaluation of sonic interaction designs. While the disciplinary approaches (psychophysics, usability, introspection, etc.) prove to be limited for real-world cases, an inter-disciplinary approach may provide solid answers. The IC0601 WGs, being different in their interests and disciplinary compositions, have been called to provide directions and guidelines, which should integrate those provided by other sources (e.g., the CLOSED project). Several examples of evaluation can be already found in the results of STSMs, such as the one by M. Rath on comparing the Ballancer and Spinotron experimental devices, or the one by J. Gampe on testing virtual sound and embodied interaction for scenic sound (Annex 3).

An effective form of inter-disciplinary networking is the book being edited by K. Franinovic and S. Serafin. The title will be "Sonic interaction Design: Fresh Perspectives on Interactive Sound". MIT Press has agreed to publish the book as part of its series on new media, game studies, and design. Authors have been chosen by the editors both within and without the pool of IC0601 researchers. This extends the influence of the Action on disciplines such as, for example, technology and society studies.

II.C. New networking

Iceland signed the MoU. V. Välimäki has been officially replaced for this year by C. Erkut as a delegate for Finland. R. Ramirez has joined the Action as a new delegate for Spain. The following non-MC members have been included as permanent participants of Working Groups: WG 1: B. Giordano, G. Lemaitre, S. McAdams, C. Pöpel; WG 2: C. Erkut, D. Hug, A. Valle; WG3: F. Avanzini, A. Asgeirsson, K. Olafsson; WG 4: J. Williamson, N. Misdariis, M. Rath, S. Barrass, S. Shelley.

45 persons have participated to Action activities as invited experts (18 in the reported period). 38 persons have accomplished Short-Term Scientific Missions (13 in the reported period). 25 persons have participated as students at the first Training School. Including MC members and additional WG members, the total number of individual participants involved in the Action work is 131 (18% of female and 20% of Early Stage Researchers).

Reciprocal agreements have been established with non-COST institutions in Australia and Canada. Particularly intense in this year has been the exchange with S. Barrass of the University of Canberra, who has been having long research visits at two COST institutions (IRCAM and IUAV) and participated to the MC meeting and Workshop at York. 5 Short-Term Scientific Missions have been targeted to the non-COST institution McGill University in Montreal. As product of a SID STSM to McGill, an intensive cooperation between the Centre for Intelligent Machine and the Ambient Intelligence group at Bielefeld University has started, involving student exchanges, invited talks, intended research projects.

The German delegate F. Behrendt, as a one-year visiting assistant professor at the Rhode Island School of Design, is spreading the SID network to the US through several initiatives that merge teaching and research. Her popular blog mobilesound.wordpress.com/ continuously comments on SID-related activities. Another blog that has given large visibility to IC0601 is urbansync.wordpress.com/ by S. Baumann, who published a diary of his 21 days in STSM in Porto (Annex 3). His research project Urban Sync has become a reference for the next IC0601 TS in Porto and for the field of sound ethnography. A representative of the brand communication company Anemono (DE) and WG2 member D. Hug started the International Community for Audio Branding (<http://audiobranding.ning.com>).

The fact that IC0601 is providing an umbrella for several research projects and professional initiatives has been demonstrated by how the projects NIW and CLOSED were jointly

exhibited at the European Future Technologies Conference in Prague (<http://ontherooftopsofparis.wordpress.com/2009/04/24/fet-open-in-prague/>).

2007/2008

II.A. Results achieved during the period 24/04/2007 to 30/06/2008

Progress

The Action IC-0601 on Sonic Interaction Design (SID) was kicked off in Brussels on April 24th, 2007. A budget was assigned to the Action in September, and the grant transferred in November, 2007. SID activities were started as contributions to the Summer School on Sound and Music Computing at KTH – Stockholm on July 2-6, 2007 (Annex 1), and to the International Computer Music Conference in Copenhagen on August 27-31, 2007 (Annex 2). Being at the early stage, the SID Action took these opportunities to promote the forthcoming activities. These initiatives were successful, as confirmed by the high number of applications raised by the first call for Short-Term Scientific Missions (STSM). The presence of several SID delegates at the Summer School at KTH gave the opportunity to organize the Meetings of WG 2 and WG 3. These were particularly important to start collecting outstanding examples of sonic interaction designs in industrial products and in artistic productions. The Meeting of WG 4 took place in Glasgow on August 2nd, where many ideas for future activities, including the first Training School, were launched.

The second MC Meeting as well as meetings of all WGs were held in Paris on October 22nd, 2007. At that time, the web infrastructure was already available to the community and started to be populated with useful contents. Important decisions were made in that meeting, including the organisation of the first Training School on Biomedical Data Sonification, the organisation of a SID Workshop at the CHI 2008 Conference, the appointment of two editors for the SID Book, and the launch of the first call for STSMs.

By the end of 2007, despite the short notice, the MC approved 19 STSMs, mostly filed by PhD students and young researchers (Annex 3). A second round of 6 STSMs were collected and approved in February, 2008. In order to have a prompt start in the second year, a third call for STSMs has been published on May 1st, 2008.

The Training School on Biomedical Data Sonification was held in Bielefeld on February 20-22nd, 2008, with a densely packed programme of courses and presentations, discussions and hands-on sessions (Annex 4). Most of the 31 attendees (including 6 lecturers) contributed precious materials in the form of posters, presentations, and examples.

A cluster of activities took place in Florence, on April 5-6th, 2008. A one-day MC Meeting was organised as a combination of scientific presentations/discussions and Action management issues. This formula proved to be engaging for the participants and will be followed in the next meetings. That meeting gave the opportunity to exploit the new co-operation between COST and the Australian Academy of Science. WG 1 and the appointed SID Book editors organised separate meetings attached to the MC Meeting. In particular, WG 1 planned the collection of a shared sound corpus and measurement goals in such a way that different laboratories can perform experiments and compare different methods. On April 6th, a SID Workshop (Annex 5) took place as part of the ACM CHI Conference, the most important annual event of the human-computer interaction community. Twelve presentations and nineteen participants were selected for the workshop and accompanied by intense discussions and exchanges. As a spin-off of the workshop, a call for papers for a special issue on Sonic Interaction Design was published in the International Journal of Human-Computer Studies (IJHCS, Annex 6). The target publication date is October, 2009.

The Third Meeting of WG 4 took place in Berlin on April 24th 2008, where several future activities were discussed. These included the further development of the Sonic Interaction Atlas based upon feedback from its presentation at the CHI Workshop on Sonic Interaction Design. A number of invited experts gave presentations with regard to their work and where it complemented WG4 and the wider Cost SID action.

Another important event will take place in Paris on June 27, 2008. A session at the International Conference on Auditory Display will be jointly organised by the IC0601 Action and the NEST project CLOSED, with a strong emphasis on the evaluation of sound in

interaction.

Impact and involvement of non-COST participants

The SID activities of the first year have contributed to all deliverables (A to E) described in the MoU. The scientific impact of SID can already be measured. For example, the call for papers in the International Journal of Human-Computer Studies is an important result. The technological and industrial impact of SID will be more visible in the future, as soon as professionals and companies become more involved. Individuals of important industrial institutions, such as FIAT Ricerche, Deutsche Telekom Laboratories (DTL), and Benetton Fabbrica, have already contacted the Action or WG chairs to get involved in SID activities. One WG meeting has already been hosted by one such institutions (DTL – Berlin). It is evident that SID is engaging the most relevant forces in Sonic Interaction Design research, not only in the Europe Research Area, but also with strong connections with North-America (McGill University) and Australia (University of Canberra).

STSMs

The response to our calls for STSMs has been very large (25 approved STSMs in the first SID year) and this tool proved to be the key instrument to get early-stage scientists involved. Scientific publications are naturally emerging as by-products of the STSMs. As a requirement for applicants, it was requested that a poster and a set of slides would accompany the report of each mission. The amount and quality of materials collected in the web site after four months of missions are already quite impressive (Annex 3).

Synergetic activities

New research projects have already been launched between SID affiliates (e.g., the FP7 NIW project currently under negotiation, the Swiss project INSIDE, etc.), and the dialogue between disciplines (psychology, design, computer science, music, etc.) is already being facilitated by SID activities. These results match the objectives 1 and 4 of the Memorandum of Understanding (MoU). Objective 3 of the MoU is being addressed through the work of WGs, and objective 2 will become more important in the next years, when a large public will be involved through exhibitions, artistic productions, and media releases.

With respect to the Action's work-plan, the first year has smoothly fulfilled the objectives. One general aim was to embed IC0601 activities within established conferences and forums. This strategic choice allowed to rapidly enlarge the community of people interested in Sonic Interaction Design. Many early-stage researchers have been involved through STSMs, the Training School, workshops and special sessions. All these instruments have been exploited to establish long-term multilateral research relations. The setup and organisation of the WG activities took some time and efforts, but now the WGs are ready to address the six tasks described in the MoU.

II.B. Dissemination of results

Action related Publications and Reports

- D. Rocchesso, S. Serafin, F. Behrendt, N. Bernardini, R. Bresin, G. Eckel, K. Franinovic, T. Hermann, S. Pauletto, P. Susini, Y. Visell: [Sonic Interaction Design: sound, information and experience, ACM CHI](#), extended abstracts on Human Factors in Computing Systems, pp. 3969-3972, 2008.
- D. Rocchesso, S. Serafin, F. Behrendt, N. Bernardini, R. Bresin, G. Eckel, K. Franinovic, T. Hermann, S. Pauletto, P. Susini, Y. Visell: [Sonic Interaction Design: Sound, Information and Experience, Proceedings of the CHI 2008 Workshop organized by the COST Action IC0601](#), ISBN 978-88-903413-0-4. IUAV University of Venice, 2008.
- K. Franinovic, L. Gaye, F. Behrendt: [Exploring Sonic Interaction with Artifacts in Everyday Contexts](#), Workshop proposal for the International Conference on Auditory Display, June 24-27, 2008.

Conferences and Workshops

- Sessions on [Sound and Music Computing in Europe at the Summer School on Sound and Music Computing](#), Stockholm, July 6th, 2007

[VEMUS - Virtual European Music School](#), Anders Askenfelt.
[CLOSED - Closing the Loop of Sound Evaluation and Design](#), Pietro Polotti.
[BrainTuning - Tuning the Brain for Music](#), Roberto Bresin.
[EmCAP - Emergent Cognition through Active Perception](#), Hendrik Purwins.
[TAI-CHI - Tangible Acoustic Interfaces for Computer-Human Interaction](#), Gualtiero Volpe.
[Mobile Life](#), Lalya Gaye.
[A SMC Roadmap](#), Nicola Bernardini.
[COST IC0601 Action SID - Sonic Interaction Design](#), Nicola Bernardini.
 Sound Quality: A Consultant Perspective, Romain Haettel, [ÅF-Ingemansson AB](#)

- II. Sessions at [International Computer Music Conference](#), Copenhagen, August 29th, 2007

[PHYSMISM: Re-Introducing physical modelling for electronic musical exploration](#), Steven Gelineck, Niels Böttcher, Stefania Serafin.
[Stirring, shaking, and mixing: musicalizing everyday actions](#), Juraj Kojs.
[GAMELUNCH: A physics-based sonic dining table](#), Stefano Delle Monache, Pietro Polotti, Stefano Papetti, Davide Rocchesso.
[Combining DJ scratching, tangible interfaces and a physics-based model of friction sounds](#), Kjetil F. Hansen, Marcos Alonso, Smilen Dimitrov.

- III. [CHI Workshop on Sonic Interaction Design, Firenze, April 6th, 2008:](#)

Workshop opening (D. Rocchesso) [Designing Continuous Multisensory Interaction](#)
 D. Hug [Towards a Hermeneutics and Typology of Sound for Interactive Commodities](#)
 R. Nordahl, S. Serafin and O. Timcenko [Contextualisation and evaluation of novel sonic interfaces using problem based learning](#)
 R. Bresin et al. [Auditory feedback through continuous control of crumpling sound synthesis](#)
 R. Nordahl [Sonic Interaction Design to enhance presence and motion in virtual environments](#)
 T. Hermann et al. [Sonification for Sonic Interaction Design](#)
 C. L. Salter [Dramaturgies of sound: Interactive Sound Design in live performance](#)
 C. Erkut, J.-J. Filatriau, R. Lehembre, and I. Ekman [Sonic Interaction Design with Physiological Interfaces in a Workshop Setting](#)
 A. Crevoiser [Future-instruments.net : Towards the Creation of Hybrid Electronic-Acoustic Musical Instruments](#)
 G. Wakefield et al. [The Allobrain: an Interactive Stereographic, 3D Audio Immersive Environment](#)
 A. Minard, P. Susini, N. Misdariis, G. Lemaitre et al. [Environmental sound description: a meta-analysis of timbre perception](#)
 S. Ronkainen [User Interface Sound Design for Handhelds – Case:](#)

[Internet Tablet](#)

Web site

At the address <http://www.cost-sid.org/> there is a [trac](#) enhanced wiki and issue tracking system. Working Group leaders are responsible for posting information about the WG activities. The chair is responsible for publishing information about meetings (including minutes), short-term scientific missions (including calls and reports), training schools, workshops and other initiatives. The documents relevant for the Action are shared via a [subversion](#) versioning system, thus allowing cooperative editing and version tracking.

Scientific and Technical Cooperation

Looking at the activities organized at the Summer School in Sound and Music Computing (Annex 1) and at the International Computer Music Conference (Annex 2), it is clear that the IC0601 Action started within a tight network of contacts and exchanges that involves EU projects of the sixth Framework Programme (such as CLOSED, BrainTuning, EmCAP, TAI-CHI, S2S²). New opportunities for cooperation are emerging with projects of the seventh Framework Programme, some of these already started (e.g., SAME), others under negotiation (e.g., NIW), others submitted or in preparation.

Transfer of results

Contacts with researchers and practitioners of the industry have been established at the initiatives organised by IC0601 (see, e.g., people from [Ingemansson](#) and Nokia in Annex 2 and Annex 5) or they emerged naturally (e.g., from Deutsche Telekom Laboratories, Fabrica-Benetton and FIAT-Ricerche).

Contacts in the ERA

Through the contacts with several EU projects and actions, the IC0601 Action has relations with the programmes [NEST](#), [FET Open](#), [ICT Challenge 2](#).

List of Annexes available at

<http://www.cost-sid.org/browser/action/doc/reports/2010:>

1. Copy of web page of the Summer School in Sound and Music Computing, 2007.
2. Copy of table of contents of proceedings of International Computer Music Conference, 2007.
3. Collection of posters of finished STSMs (updated).
4. Copy of web page of the Training School on Biomedical Data Sonification, 2008.
5. Proceedings of the CHI 2008 Workshop on Sonic Interaction Design.
6. Call for papers of the IJHCS.
7. Copy of web page of the ICAD08 program.
8. Copy of web page of the DAFx'08 program.
9. Courses on Sonic Interaction Design (updated).
10. Copy of web page of the 2009 SID Workshop on Sonic Interaction Design and its Relationship with Film and Theatre Sound Design and Scientific Report.
11. IC0601-related Projects (updated).
12. Copy of web page of the SID Summer School "Interacting with Sound of Porto".
13. Copy of web page of SID session at SMC 2009 Conference.
14. Copy of web page of the SID Seminar on "Voice and voice functions" at the MC Meeting in Stockholm.
15. Copy of web page of Workshop on Sketching SID in Holon, Israel.
16. Copy of web page of the Interactive Sonification workshop in Stockholm.