

### **Outline**

This proposal builds on the Usage Area Workshops and experience in the Socio-technic work-stream for future Flagship research.

The best way to address the User area is for experts from the user-areas to work with experts in designing a sound theoretical and practical approach based on science, ideas, experience gained across the whole canvass of User implementation and change in Society. We offer all this focussed entirely on the User experience. This focus will ensure technology and applications are driven by user requirements. It will be a partnership of equals. A common theme of the 2<sup>nd</sup> as the 1<sup>st</sup> EFII-PPP Workshops is the need for strong User involvement to get the EFII proposition working properly. This was seen as an imperative given the scale of impact on Society; the scale of disruptive change to be mastered; the common experience voiced that this is the Achilles Heel of much ICT driven change.

The S-GAIA Consortium is a group of experts from across the Stakeholder Community with a burning mission to build a new approach into the user area of implementing any UseCase. The output of a User Usecase is a comprehensive service to the UseCase Community to build and support an effective user environment which will ensure Users are engaged, empowered and enabled to successfully introduce disruptive change in their Society. S-GAIA will achieve this by using a new scientific approach to the use of ICT in a social-based context designed to provide a framework for many Actors and Stakeholders to collaborate to deliver a comprehensive User service. The approach is itself a rigorous Use case for Society across its ubiquitous use of ICT in all its organisations businesses governance and personal use.

World Society Modeller (S-GAIA) is itself part of a long term strategy in the socio-technic area. This cooperation with EFII is part of that strategy. For S-GAIA this is user "application pull", total societal involvement, specifically total societal interconnectedness. We could label this *society-power* but empowerment is less emotive. We should note that 'Services' and Society both start with the letter 'S'!

### **EFII 2<sup>nd</sup> Workshop – Our contribution and Responses**

The general line of questioning here concern whether the *Societal* dimension is receiving enough attention, whether societal focus as stated is appropriate, and what to do next? The presentations in the five areas of technology assisted support for Smart Living concentrate more on the technology of the solutions than the societal challenge of their implementation. The presentations in the 'Alternative Usage Areas' (EFII section 6) concluded that there needs to be an increased focus on the *social aspects of Internet usage*. The decision we came to is that we should all join forces to offer a further UseCase to the EFII Programme, called along the lines of "Smart Society". This idea has to be worked up before the opportunity of the forthcoming Call for proposals in July. The format of a proposal could combine the social agenda with a common underlying need of all the front-runners, namely *they all need to embrace the social dimension in any living experiment, trial, and roll-out*. Smart Society would be a service to all Usage Areas in their integration into Society.

The User UseCase does more than act as a common support for implementing technology and application 'pull'. It proposes we square the circle of technology driven potential and society driven application pull by building a specific societal framework within which any Future Internet initiative can be taken forward confidently in the knowledge *society will be a true partner*. The emphasis on holism user-driven markets and social benefit, innovation, new players *beyond ICT* requires us to create a centre of genuine societal excellence such that it can rise to 'one of the key challenges is to convince usage area actors to assume a responsible role'. Those Actors are Society, its organisations, people, citizens, and their aspirations. The steer from the EU places a strong focus on early experiments to construct a working social Internet framework with strong participation from the above constituency. Franco Accordino emphasised the EU perception of the UseCase Scenarios over Phase 1 & 2 of the forthcoming Call as an opportunity to engage Society, and for this

to be around a specifically designed and engineered Social Model. Dr Max Lemke in his session titled new Paradigms and Experimental Facilities discussed required features of the experiments: the high societal benefit is a given imperative. The key finding: a strong steer is that there is a history (brought into the open from the first workshop), of the difficulty of engaging 'society'; as his slide stated it:

- Difficult to get the relevant usage area stakeholders to commit: FI is just a means supporting their work
- Those who participated showed interest and endorsed the approach highlighting the important role of use area players
- ICT industry often represents the application stakeholders by proxy: not sufficient
- ICT and application experts often get their wires crossed: convergence needs more work.

We are into the all too familiar territory where the experts dedicated and well meaning are at risk of delivering advanced technology and then being left wondering why it takes so long to iron out the society interface, involvement, commitment and genuine ownership. That is why participants in Alternative Usage Area 6 propose to submit a proposal for a generic User UseCase that will be a service for all experiments to get the societal domain properly into the picture, based around serious research as to what such a societal involvement means and how it should be built and implemented as part of the EFII infrastructure. We will offer S-GAIA as a prototype *practical and rigorous* framework around which to build the User UseCase; Phase 3 will extend this in the FutureICT Flagship world. If Future Internet does not embrace the societal layer it will have lost an opportunity for possibly many years; this would matter to FutureICT's Internet needs. The societal focus will deliver perhaps the key enabler of user involvement, that is to engage empower and enable the social delivery by the users taking a commanding position in defining and building their model of Future internet functionality.

### **Research Centre Challenges for Usage Areas: the G23 Research group**

Jose Manuel Menendez of Polytechnic University of Madrid outlined the societal challenge of FI, set out in the presented Paper compiled from the G23 contributions. The vision of the Future Internet was clear (*italics and underlining by this report*):

"... it will be a socio-technical system ... it will couple ... physical environment ... *human behaviour* ... smart applications of *societal importance*.... [It will be] flexible ... able to dynamically adapt to the needs of 'ever changing' stakeholders ... spanning organisational and administrative boundaries ... businesses ... government ... and *in many cases* citizens ... coupled to the physical world through sensors ... interacting in multi-purpose ecosystems ... *emergent* applications. Context [is] technologically converging networks ...services ...content .. devices ... closer coupling of the digital and physical worlds ... "

It seems clear that the dimensions of a societal Internet are little understood yet, though it is clearly vital that they should be from the words I have italicised. Perhaps (unkindly) I have emphasised the qualification of 'citizens' (I prefer the word 'people') as involved 'in many cases'. In the vision of S-GAIA the involvement is total, what we term 'Everyone Everywhere Everything Every-Day'. The technology conspicuously omits any mention of the societal world (unless one assumes 'social' equates to any or all of the terms underlined. S-GAIA requires this new and fundamental functionality, consisting of a layer of evolutionary meta-modelling, expressing constant *emergence* in societal ecosystems. This will add to the Future Internet fundamental design the science of computational socio-geonomics. It will implement the societal dimension. Four functional requirements areas are identified:

1. "Emergent systems engineering...
2. "Operational risk management...
3. "Information into value ...
4. "Socionomic and user acceptance ...

These functional areas go part of the way; they conspicuously omit the overriding functional requirement of *society*. The G23 Research Agenda warns of the need to balance technology and commercial offerings with that of some kind of societal infrastructure. We propose that S-GAIA is such an infrastructure. It is a User based model of society designed and built to enable societal involvement on a scale not understood or achieved since ICT began to get involved in social systems.

### **Usage Area Sessions**

I have looked at the presentations (sample) and the Plenary Summaries (see below), to see what indications there are of both the significance of the 'User Area' and how to address it. The five areas comprise:

- **Session 1: Smart Cities/Utilities & Environment**: The wide range of innovative proposals for Smart Cities all lacked a coherent strategy starting with what it means to be a Smart City. That said there was a lot of stuff. An impression is that the User aspect was not really addressed in any new model or paradigm.
- **Session 2: Transport/Mobility/Logistics**: I liked the question "The complexity of a real ecosystem: how to involve everybody?"
- **Session 3: Content**: ... no representation of user community. New human interfaces; Keep the content application layer open for creators; Games = most demanding mass-application for computer hardware and they will be in the future. What does content *mean* (a meta-data question)?
- **Session 4: Smart energy / grids**: area spanning individuals up to wholesale supply and demand
- **Session 5: eHealth and Wellbeing**: Sector's role: human beings are the most important matter on earth (TP). Two tracks: technology track and people track. If they don't get together, there will be no real evidence for the user.

The common feature is that while all areas are different, none had any vision of how to bring about a societal level of involvement. There was some repetition of buzz-words such as 'living labs' but this remains a buzz-word until there is some definition and understanding of what 'living' means in this context and what 'labs' means in a societal context.

### **Session 6 - Alternative Usage Areas**

We were a diverse group and Didier Bourse (Alcatel-Lucent) captured the substance of this, over some 20+ presentations and their common themes. These have not led to twenty additional ideas for UseCases but an interesting mash-up of ideas common to any of the presentations and the main-session themes and the five thematic areas: this theme is that behind any and every FI Use case lies a *social/societal* environment. Whilst this is understood to the extent that every session will include, variously the need to involve 'users'; the need to trial the technologies (in all their layers) in the user environment; the importance of meeting customer focussed needs etc; the predominating emphasis was on the technology and not on the fundamental issues of the User area. These can be defined as *what different social model ought to accompany any vision of FI*. This can be encapsulated in a number of questions (but all with the overarching principle of 'in what way can FI enable a better about society not just what can FI deliver by way of improved technology for the way we do things now. Some interesting perceptions are emerging:

- We should question why FI-PPP does not seem to have grasped the nettle of fundamental change to the social paradigm and focuses on hard technology
- The most pervasive impact of the internet already is *social, even where information and content is involved*
- The Public Sector is the largest area affecting social life (and the most costly in resources and people
- *Society* itself is a valid and critical UseCase, but our label of Quality of Life (QoL) is seen as too vague; given the strong push for hard science such as ties in with the mooted areas in sessions 1-5, we have

suggested a practical focus of a 'User' UseCase. This will specifically address the focussed requirements for engaging with the *societal* aspects of implementing all chosen Pilot UseCases. It will enable a general model to be built and applied across the diverse UseCases and thus provide a rigorous approach, practical cross-UseCase synergies, and a single coherent model of a Society based Future Internet.

- The breadth of experience and focus in Alternative Usage Area presentations will be a validating aspect and is a coherent topic area as well as a service to all UseCases:
  - Public Sector: (the largest in EU; good models exist; simulation is the tool)
  - Society: (Culture and Content are pervasive; complexity & social virtual trial labs; understanding and cognition - different frames of reference)
  - Networks: (characteristics of social discourse responses & social complexity are a key dimension)
  - Business/organisation models: (new emerging models; integration of social actors; common social foundations; *process* models and technologies)
  - *Personal and societal* business sectors: (with SME's, the largest group in Europe; involving 'people' needs specific engagement models; ecosystems are the constellation-models; the critical dimension is the property of diversity inherent to individual behaviour, creativity, innovation and cooperation; but also pathologies need to be addressed)
  - Environment impacts: (every *change* initiative affects everything else; need for overarching governance and boundary management – not the same as programme management; complex societal/logistics 'chains' – more than supply-chains)
  - Understanding and embracing 'change': (the human in the loop; models of complex emergence; enablement, empowerment and engagement models; perspectives and priorities; knowledge and communication; involvement and commitment; the psychology of purposeful behaviour; problem-solving; taking solutions into decisions and *action* in society)
  - Social science and computational socio-geonomics: (building user outcomes on a rigorous scientific paradigm *from the start*; rationalisation across multiple Frames of Reference; reversing people adapting to technology; giving people 'tools and immersive experiences').

The messages from the first workshop regarding the needs of Users/Society should still resonate. Why go for anything else than a single EU and World sustainable approach? A coherent society focussed approach to UseCases will begin this wider focus. I liked the reference to pre-industrial 'enclosures'<sup>1</sup> as an example of defective because simplistic narrow-interest viewpoint. [www.Civilsocietiesnetworks.org](http://www.Civilsocietiesnetworks.org) should be a coordinating body perhaps. I liked the quotation from Tekniker IK4: "We are here to help them walk down that route confidently and successfully". S-GAIA can be said to be a practical supporting tool-set for this principle.

The messages in the Workshop Plenary Summary justify our proposed User Usecase:

- Every proposal emphasised the role of the user; only the Alternative Usage Areas defined the need and scope of a properly defined UseCase for this
- The Science of computational socio-geonomics, Meta-modelling technologies, and centrality of 'models as a service' underpin the correct dimensioning of the User and Society requirement

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<sup>1</sup> Oliver Goldsmith: "The Deserted Village"

"Ill fares the land to hastening ills a prey, Where wealth accumulates and men decay; Princes or Lords may flourish or may fade; A breath can make them as a breath hath made; But a bold peasantry – their countries pride; *When once destroyed can never be supplied.*

- The breadth of expertise across the social domain will bring the necessary inclusive focus and attention to the critical User aspect
- Modelling societal processes will reduce known barriers to user involvement and instead offer rigorous means of empowering, engaging and enablement of the User
- Framework approach will support each specific UseCase in creating their specific societal approach and institutions.
- We do not wish to appear critical, but note the focus on Architectures emphasised 'Business-Applications-Components'. The User UseCase will establish a rigorous practical and *re-usable* framework for the Pilot and then on-going expansion and refinement for further phases. In short, what an empowered Society does all the time if enabled and engaged.
- The Actors and Players in the User UseCase will continue to establish the paradigm of Societal involvement through both EFII and subsequently in the further ambitious plans for S-GAIA

One further dimension to the proposed contribution of the User UseCase consortium is to share experience and research concerning the fundamental model of what Future Internet means. Our proposal for the specific User UseCase is simply a microcosm for this important dimension to getting EFII right. The overarching framework is shown after the Alternative UseCase scenario summaries in Figure 15 (a & b). It shows the large macro and the micro User Architecture perspectives. We offer the S-GAIA vision as a starter for ten in this work. We look forward to partnering with the whole Future Internet Community and taking this out to Society for whom we are all a service. We will design and build this User partnership with all Stakeholders it will be their implementation. The set of reports from Usage Area 6 indicate the scope of artefacts we will look at to generate a comprehensive model for User engagement. They will all constitute a *Living lab* for this crucial domain of Future Internet.

### **Perspective From The World Society Modeller (S-Gaia) Consortium**

We end this flyer for a new and radical User UseCase by a brief summary of the wider framework of research that lies behind this proposal. World Society Modeller (S-GAIA) is a proposed federated partner in the socio-technic Flagship called FuturICT.

World Society Modeller (S-GAIA) is a toolset for society to engage with the challenges it faces, the opportunities it embraces, and its 'systems', taking this as the combination of technology and social science expressed in all its organisations, formal and informal. It is a means to introduce new technology and it is the means to engage with the full potential of operational systems as these evolve and mature. It is a 'living' tools-set in exactly the same way that very single 'system' is – whether it works well or badly. It is society's tool for optimising both these aspects of successful societal systems. It achieves this by a new scientific paradigm of ICT: it processes the complex adaptive system that is *Society* in our fast changing world.

S-GAIA is a Flagship Proposal submitted to FET as part of the FuturICT socio-technical work-stream. The proposal is for a ubiquitous toolset to be available to everyone, everywhere, every day, to handle social engagement meaningfully within the overall context of society, its individuals, groups, businesses, enterprises, professional and governmental institutions (including the Future Internet(s) of People, Things and Services (IoPTS) etc. The paradigm of S-GAIA is that the above social context is a complex system of interacting entities. The processing of these is an essential requirement of the future internet. There is probably no data that exists outside of a social context and that context defines its *meaning and use*. The science behind this applied research is complexity science, computational socio-geonomics, and meta-modelling across the systems of the world. The applied ICT social-complexity platform is called Metaloger.

The EFII Website under its banner "Europe must act" emphasises the dimension of EFII as a *societal* challenge. The perspective of S-GAIA is to define this not primarily as an information issue, but one of how

society conceives of information, instantiates it within the social context in all its dimensions, and then applies it to support new social meaning, decision, and action, i.e. *purposeful behaviour*. We wish to introduce this perspective to EFII with a view to defining how it can become a core new layer of Internet functionality, protocol and technological realisation. Potentially S-GAIA would envisage Future Internet as its primary societal delivery platform and infrastructure, and require a corresponding commitment from EFII to process 'society' as a complex adaptive system. S-GAIA is about user "application pull", total societal involvement, specifically total societal interconnectedness. The S-GAIA Consortium foresees a fundamental cooperation with the EFII to develop the global infrastructure for delivery of the S-GAIA World Society Modeller toolset. Figure 15 – EFII and S-GAIA Schematic Architecture depicts the relation between WWW and the Smart Society. This shows what can be termed *the reflexive loop*. This adds to the crude *sense-respond paradigm* an essentially human capability to, firstly think about what we do, and secondly to plan for the future. Both are the key underlying imperatives of society, business, government, and everyone concerned for a better future, the well-being of society and our world ecology. Computational socio-geonomics is the vehicle for bringing intelligent ICT into S-GAIA, so as to lever the extent, speed, and intelligence of the sense-respond loop. By incorporating complex structures of making-sense, involving cognition, knowledge, culture and purpose, the affordances for socially intelligent behaviour and action are enhanced to the utmost possible degree. In cybernetic terms, the ability to steer and control our pathway to a better world becomes enabled in an optimum control-loop; criteria for 'optimality' is the Holy Grail. The model for User UseCase includes:

- (1) User-driven social engagement via hierarchies of active (meta) models of purposeful decision and action, i.e. modelled society, themselves a complex adaptive system
- (2) Innovative Internet functionality and technologies to process ubiquitous inter-connected evolutionary models of society-in-use
- (3) close cooperation on the whole system of transport of social driven data (but not the specific user material, models, live data etc). In our vision the Metaloger infrastructure for processing socially enacted data would be part of every organisation, enterprise, and individuals systems repertoire
- (4) The core requirement of Metaloger is to process the complex dynamics of the social interactions. These are potentially exponential which itself requires meaningful management
- (5) The outcome is an interconnected social world applying, in a practical way, the new science of computational socio-geonomics.
- (6) Metaloger is a simulation/experimentation environment for broad large scale testing of the platform to be developed in your use area? This will be applied to test all new services and applications cutting across use areas (services and application mash-up) and building a new services and application ecosystem around the prototype implementations of the platform
- (7) The experiment will involve Metaloger plug-ins to any or all enterprise systems to enable complex interactions across disparate systems to be brought into focus. They will reveal: opportunities, threats, and governance implications arising from patterns of complex dynamics. These will be at every level of individual and enterprise social behaviour up to that of the global world ecology. Society must support the new paradigm of global interaction.
- (8) The society models would probably be a layer of coordination *above* that of e.g. IoS, i.e. the directing functionality for most of the *socially driven* Internet
- (9) There are huge implications for the handling, storage, retention and invocation of data; essentially data exists in multiple forms according to the specific social enactment at a point in time and across space. Those abstract dimensions are examples of an entire system of abstract values causing *social dynamics*.
- (10) The S-GAIA Consortium envisages deep and total involvement to develop the vision of a ubiquitous society toolset, and its realisation, and then support EFII in trialling/testing/implementing the socio-technical solution. All candidate User Areas would need a partnership approach to attain a workable, viable, and society empowering result
- (11) S-GAIA is already cooperating with the Event Processing Technical Society (EPTS) an initiative working on definition of standards for complex event processing.

Our approach does not end with the Pilots. We envisage the EFII becoming a partner in S-GAIA Consortium (the modality to be worked out). We consider the draft manifesto of S-GAIA fits with that of EFII:

1. The whole ethos of S-GAIA is one of openness empowerment, engagement and a new kind of society *engineering* taking that word in its fundamental sense as *the science of transforming power into work*. S-GAIA seeks societies approval to re-engineering its approach to our world ecology
2. Our vision is that this will transform society and herald a new Kondratiev shift called the *social ecology world*
3. The new paradigm of *socially enacted information* will liberate and involve society in being part of the new world ecology
4. Everyone, all our institutions, applications, and purposes in life will cooperate to manage the total global dynamics of this world through involvement with and purposeful sharing of responsibility in this quest – essential to the survival of mankind.
5. The global dimension is *Governance*. This is the top level of all social dynamics, part of the overall complex adaptive system we call *society*.

We look forward to this cooperation and working together. We see this as a federation of interested parties along a similar model to society, EFII, and Flagship research generally. The next steps are to assemble a consortium of experts across the User UseCase paradigm to compile a specification that we can put forward in a UseCase proposal . We will generate a key practical approach of benefit to all Future User Internet innovation.

The following diagrams from our Workshop Presentation are key. They are part of the S-GAIA White Paper which is freely available on the EFII web-site, or from the Author of this Paper:

- **The Scientific and practical framework for a comprehensive Society simulator**
- **Living Labs: the meso-level view of the world of BUSINESS COMPLEX EVENT PROCESSING**
- **EFII and S-GAIA the micro view of a generic User Schematic Architecture**
- **Transition: a global federated effort: *starting now*.**

### Summary

The User UseCase will create a Living Labs simulator of the full life-cycle of Future Internet innovation. It will be a huge Community of Practice. To call it a Global Enterprise Resource Management System is to emphasise that Society is the largest enterprise across the world and is key to EFII innovation. Society will play the leading role in getting the EFII proposition to fruition, working with Technologists and Applications developers to deliver a *usable* as well as profitable Future Internet. To do so Society must be enabled, empowered and engaged. We propose a rigorous framework colloquially called TADPOLES, addressing the key dimensions of a successful User experience. TADPOLES will mean the 'technology, applications, data, processes, organisation, locations and facilities, services' all mash-up into a winning experience and result. It will be entirely proven by advanced modelling, simulation and evolution of the requisite real-life artefacts. Each UseCase will gain the benefit of a single, comprehensive re-usable framework and method. Why dissipate effort and experience by each doing his own thing? We advocate a social model that will accelerate results, and overcome problems along the way because all partners, stakeholders and Actors are empowered engaged and enabled in the joint quest to deliver and adopt the power and potential of EFII. It ensures the model of the delivered experience evolves from a partnership between all Stakeholders to ensure it is fit for purpose. We hope to build a strong consortium to realise this vital part of the Future Internet Initiative.

Author: John Sutcliffe-Braithwaite:

Associate Research Fellow, IMSS Laboratory, University of Reading. Email: john.sutcli@btconnect.com

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