

To whom it may concern

**Supporting Letter for Thomas Haug for the NAE Draper Prize - Stephen Temple
CBE, MSc, CEng, FIET**

I have known Thomas Haug since 1984 and worked very closely with him and many others on the GSM project. I have no hesitation in supporting his nomination for the NAE Draper Prize.

I have written a book on the Political History of GSM and set up the Web site WWW.GSMHistory.Com, which is now the top Google ranking web site on the history of GSM or GSM History. On the Web site I have addressed the question many people ask "Who created GSM". This Web page may be treated as a supporting document to this letter. It shows two things. First, there was no single inventor of GSM (as everyone knows) but second, Thomas Haug has been central to the success of GSM and better represents the spirit of that success than any other person.

First, what is the significance of GSM?

GSM (Global Systems for Mobile Communication) is a triple achievement:

- (1) There would not be over 6 billion mobiles world wide today without GSM.
- (2) For anyone to go to one of over 200 countries, get off the plane and their mobile phone works automatically with any of 800 different networks would not have happened without GSM.
- (3) The importance of the mobile phone in driving economic growth in some of the world's poorest countries (eg in Africa) would not have happened without GSM.

Among the reasons for this triple success were the re-orientation of national approaches to a common technical approach, presumption of international roaming, an all embracing technical standard ie an Intelligent Network sitting over the radio air interface and the SIM-card.

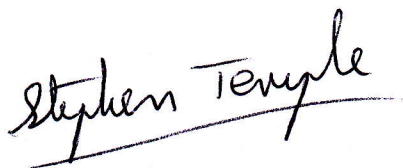
Nobody believed in 1982 (or as late as 1986) that European countries were capable of the high degree of co-operation necessary to pull-off a common digital mobile standard. Thomas Haug's leadership of GSM over this critical period was a unique and indispensable success factor.

The social and economic impact of GSM is well documented. But its industrial impact has also been enormous. In creating "global mobility" it marginalised mobile satellite systems. It was the platform that allowed SMS to emerge that was to sweep away the paging industry. It crushed Telepoint (cordless telephone) based public mobility. This was all a necessary condition for the massive global economies of scale that was to make the mobile the most widely used electronic device on the planet.

Less well known is that GSM, led by Thomas, also established an enduring culture of underlying co-operation in an otherwise cut throat competitive world – a force that has allowed 3G and LTE to emerge globally to the benefit of consumers everywhere.

It is my strong belief that if all those who played a key role in GSM in the 1980's were to assemble today and vote on a single person to be honoured for the achievements of GSM, there would only be one candidate, he would get 100% of the vote and his name is Thomas Haug.

Yours faithfully

A handwritten signature in black ink that reads "Stephen Temple". The signature is written in a cursive style with a horizontal line underneath the name.

Stephen Temple CBE

Supporting Letter for Thomas Haug for the NAE Draper Prize

As a former CEO of the telecom operator TELIA I came across the emerging Nordic Mobile Telephone System (NMT) already on my first day at office in 1977. It was a mind-boggling concept aiming at making any telephone (fixed or radio-based) automatically addressable from any mobile terminal.

Car-based radiophones wasn't that new a concept. It was introduced already in 1946 in St.Louis and the first (semi) automatic network was launched in Sweden back in 1956. The Bell Lab concept of cellular (dividing a city network into a number of smaller cells) promised further progress, as a reuse of limited spectrum could enable dramatically raised capacities, and hence far more users. It was a natural ambition in many countries to go from sounds to things -as the pace of progress in the area of microprocessors permitted. The enabling of seamless " handover" when a user was moving from one cell to the next (using a different frequency) was a non-trivial issue. It required new levels of computerized intelligence at reasonable prices.

However the ambitions of the NMT Group inceptioned in 1969 went even further. In a longer perspective it was not considered good enough to enable calls FROM a mobile. There was also a user requirement to be able place a call from any fixed or mobile phone TO a mobile, irrespective of its geographical whereabouts. Also outside its " home city" and even its " home country". NMT was thus the first international mobile network.

The rest is history. NMT proved an immediate success. Users were no longer confined to a specific local area, but could move freely and be reached also at other locations. Not only within the country of Sweden – but this new freedom of use was extended to cover all of the four Nordic countries. Already the next year (1982) representatives from 13 countries were gathered in Stockholm to discuss to the next generation (GSM) bound to cover not only Europe – but eventually more than 200 countries and billions (rather than millions) of users.

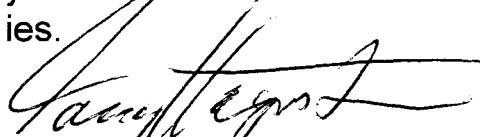
Now – what about the personal contributions of Thomas Haug ? There are clearly good reasons to credit the collective foresight-ness of the " Founding Fathers" from the four Nordic countries

back in 1969. However, Thomas was there from the very start. Originally as secretary to the NMT Group –but later appointed its Chairman. In 1973 he presented his thesis at KTH (the Royal Institute of Technology) on the very issue on the interaction between wireless vs. fixed networks- potentially enabling new dimensions of freedom to users.

In 1987 IVA (the Royal Swedish Academy of Engineering Sciences) awarded Thomas Haug and (the late) Östen Mäkitalo its Gold Medals for their individual contributions. Thereby, also rewarding the productive long-term cooperation between the two men – with quite different backgrounds from the separate worlds of wireless vs. fixed networks. It was noted that NMT was already the largest cellular network in the world. By 1990 the network had reached its first million users in the Nordic Region alone. (Comprising around 25 millions population).

From 1982 Thomas Haug had already went on to chair the technical development of the successful GSM- standards, based on the experiences from the NMT network. From the early 90-ies GSM was replacing NMT and deployed in a rapidly increasing number of countries bound to provide global reach.

Summing up: Even there is obviously a large number of others to credit for the success of NMT/ GSM –the Thomas Haug contributions stand out as exceptional. Ranging from the very early years of the 1970-ies to the deployment of GSM in the early 1990-ies.



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- From the perspective of a (professional) user already NMT enabled radical and positive changes. A separate market for terminals - open for international competition. Not to mention the new degrees of freedom of use. You could move freely not only within your home country - but also in other Nordic countries - and during the 1980-ies in an increasing number of other countries.

- From the perspective of a Regulator GSM (as the follow-up of NMT) provided even more "Degrees of Freedom". Not only as a matter of more (and rapidly increasing) number of countries - but the SIM-card enabled also further degrees of freedom e.g. by facilitating number portability. You could keep your handset (and telephone number) also when having switched to another competing network operator. The success of this market opening paved the way for infrastructure competition, not only in mobiles but also in the area of fixed networks.

Since the early 1980's Swedish enterprises fast adopted the new mobile technology NMT with, from start, vast area coverage and roaming opportunities with Nordic operators and later also in other countries such as the Netherlands and Switzerland. Even if different kinds of mobile telephony systems were launched also in other countries they were based on different national and proprietary standards. Someone who travelled across the US would probably remember how you picked up a new rented handset at the arrival airport, having returned the former one by FedEx before take-off to the next city. The advantage of being possible to be reached with one number only as well as getting only one bill was appreciated. The open NMT standard also paved way for separate and competitive supply of handsets. Businesses applauded.

Nevertheless professional users soon urged for more, i.e. competitive provision of services. Business interests were actively arguing for the case through the Swedish Association of Professional Telecom Users NTK and also by INTUG – the European professional user organization. Whether such development was foreseen by the initiating Nordic monopolists is

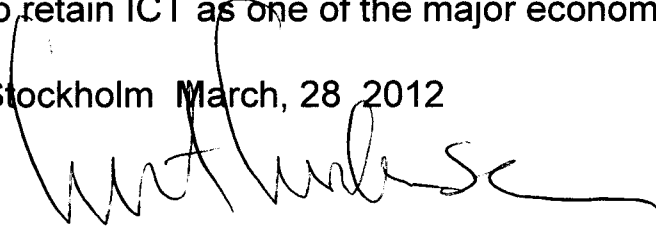
not clear – but the journey forward had started. In parallel with going digital with similar open standards for GSM.

The migration from NMT 900 to GSM ran smoothly presumably because of falling consumer GSM handset prices in combination with the superior GSM functionality. A choice between not only two but 3-4 competing networks became available in many countries. Since then further spectrum has been released on several occasions for the GSM-based 3G and 4G/LTE in addition to the narrowband 2G networks. In spite of recent spectrum auctions without any technology restrictions the GSM family dominates totally.

To-day's booming data and speech mobility of course owes much to SW and HW technological break-throughs over the last 20-30 years, but the NMT/GSM fundamentals are virtually unchanged. Fundamentals that are also proven to be scalable.

Although Thomas Haug and the late Östen Mäkitalo jointly started developing international mobile and mobile-to-fixed standards in a Nordic monopolistic environment, they clearly saw the potential of competition enhancing price performance and functionality contrary to the then generally highly segmented systems and –at best – domestic markets. These standards have in turn changed, broadened and sharpened the suppliers and operators businesses to retain ICT as one of the major economic sectors in the world.

Stockholm March, 28 2012

A handwritten signature in black ink, appearing to read 'Curt Andersson', with a long horizontal stroke extending to the right.

Curt A. Andersson

Member of the Royal Swedish Academy of Engineering Sciences,
Division of Information Technology

Former Deputy Director of the Swedish Post & Telecom Regulator
PTS and Former Member of the ITU Council

Former Executive of the Swedish Association of Professional
Telecom Users

28 March, 2012

Supporting Letter for Thomas Haug for the NAE Draper Prize

I met Thomas Haug in October 1981 in Stockholm, at the time of the opening of the first NMT network. Later I worked in the GSM group under his leadership and, in 1992 took over from him the chairmanship of the GSM technical committee, then affiliated to the European Telecommunication Standards Institute (ETSI). I remember that, after the first meeting I chaired, the report sent to the US headquarters of a large American company by its European representative said in substance : “there is a new chairman but we have not noticed any change”. I understood it meant that I had acted in the same way Thomas Haug had done in the past. I took this as a compliment of which I was proud.

The way Thomas managed the work of the GSM group was characterised by two main features :

- his vision of the global future of mobile communications, with harmonised standards enabling an unlimited mobility of users as well as an active competition between equipment suppliers and operators;
- his ability to manage a cooperative effort, in a manner such that no participant was excluded from the decision making process.

Having followed in his footsteps at the time GSM established itself as a world leader, I have closely observed how these features of Thomas’s leadership have given GSM all that was required later for its global adoption.

Firstly the GSM group produced a set of specifications for a complete telecommunication network and not only a radio subsystem. This was important as it considerably eased the adoption of GSM, particularly in less developed countries, and clearly came from the NMT experience embodied in Thomas’s vision of the future.

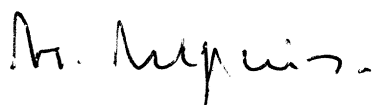
His policy to take into consideration all proposals or just opinions expressed by any participant led to many discussions, sometime passionate, and often lengthy. This was not wasted time. To illustrate this I can mention two instances in which decisions having emerged from such discussions later proved to have been essential to the success of GSM.

The first one is the selection of the radio technology in which we succeeded to integrate proposals from many different sources. It took place in 1987, exactly twenty five years ago. As a result, the GSM radio interface is indeed not based on TDMA only, as was the case for most of its competitors, but on FHTDMA (Frequency Hopped Time Division Multiple Access). The main merit of this technology appeared ten years later when GSM networks became heavily loaded, as it facilitated the addition of small cells micro-cells and pico-cells in areas of intense traffic. It eventually gave GSM performances equivalent to those of more sophisticated technologies like CDMA.

The second one is the definition of the work methodology used to produce and manage the detailed specifications. There were proposals to let some experts draft the detailed specifications autonomously, presenting only the main options to the approval of the committee. After several late evening meetings chaired by Thomas we decided that, on the contrary, all specifications, and even minor corrections or amendments to the specifications, would be approved in the committee, thus enabling all participants to have a complete view of the work. This resulted into more openness and a higher quality of the GSM specifications, as well as a better ability to make them evolve to meet new market requirements or adapt to new technologies.

Regarding this last point one can observe that a similar work methodology is still in use in the 3GPP (Third Generation Partnership Project), the continuator of the GSM group, now in charge of the 3G and 4G standards. One can thus say that the excellence of the work done under Thomas Haug's leadership until 1992 has not only largely contributed to the success of GSM worldwide, but is also still influencing the work on the next generations, thus contributing to the global convergence of mobile communications standards which apparently will be 100% complete in the 4G era.

Naturally all this required the work of several hundreds of contributors throughout Europe. All were inspired and guided by Thomas Haug and will feel honoured if he is awarded the prize.

A handwritten signature in black ink, appearing to read 'Mr. Dupuis'.

Philippe Dupuis
Senior Member, Société des Electriciens et Electroniciens

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27 March 2012

To whom it may concern

I was the project manager of Deutsche Telekom for their next generation mobile communication network from 1984 to 1992. I have known Thomas Haug since 1984 when France Telecom and we decided as first countries to base our future network on the emerging GSM standard. I have worked very closely with Thomas Haug until he retired from GSM standardisation in 1991. I became his second successor as Chairman of Technical Committee responsible for GSM and UMTS from 1996 to 2000. Since I know Thomas so long time and estimate his contributions to GSM so highly, it is a pleasure for me to support his nomination for the NAE Draper Prize.

Thomas has influenced in the second half of 1982 the formation of the standardisation group GSM and its first strategy paper. Already this first strategy paper contained the idea, that the GSM standard should be a standard for a complete system (as opposed to the existing radio interface standards in analogue systems). Until 1984 Thomas led the group GSM through a working period where the basic common understanding of the nature of GSM as a new digital high quality and high security mobile communication system was developed. A high level of cooperation and trust between the delegations from all over Western Europe was built in this period.

On this basis a work phase followed in which the basic parameters of the system were defined until 1987. This included of course the often discussed radio decision. But also decisions on the services which would be supported by the new system, the network architecture, the security architecture, principles for non-voice services and speech coding were taken. Thomas chaired the committee in this phase by providing direction and creating consensus. He managed this in a very gentle but efficient manner.

And he did not stop here. He stayed on and managed the process of detailed specification work. This led to an explosion of subgroups up to 45 and the participation of all major manufacturers. The work resulted in a first set of technical specifications which were used by 10 network operators to procure in 1988 GSM systems. Thereafter the technical specifications for the service opening in 18 European countries in 1991/3 were produced. These technical specifications contained more than 5000 pages. This phase required an even more systematic approach to management of the large scope and the many participants and subgroups.

Besides the management of his technical committee Thomas held close contact with all relevant external bodies: the newly established organisation of the GSM operators (the GSM MoU Group), the association of the manufacturers (ETEL) and the European Commission. He managed also the transition of his committee from CEPT to the newly created ETSI.

Thomas was for 10 years Chairman of the GSM Group (1982 to 1992). He chaired 32 regular Plenary meetings and two additional Plenary meetings. He started and chaired the Security subgroup from 1985 to 1988. He has great merits for the timely creation of a complete GSM system standard.

The GSM standard was the only completed standard for a digital mobile communication system, which was complete and field proven, when the world needed new digital systems. GSM took the world by storm. It was adopted after its success in Europe all over the world in more than 200 countries and more than 90 % of the world market was acquired. Today, five out of seven human beings in the world use GSM phones. More information can be found in the book F. Hillebrand (editor) "GSM and UMTS, the creation of global mobile communication", published by Wiley or on the website www.gsm-history.org.

Since the success of GSM is enabled by the excellent quality, interoperability, completeness and stability of the GSM standard, Thomas Haug deserves recognition for his contribution to this success. And hence I would like to support his nomination to the NAE Draper Prize.

Best regards

A handwritten signature in cursive script, reading "Friedrich Hillebrand". The signature is written in dark ink on a white background.