"The unknown history of the Internet"

Engineering the worldwide WiWiW project

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***Abstract* — This paper reports on a large-scale project to document the origins of the ARPANET, Packet Radio Net, SATnet, Ethernet, the NSFnet and most recently the Internet. The main objective is to create and collect, source material and preserve it for the future. Traditional oral history interviews are used along with new research methods and tools, such as distributed editing, or "collective memory experiments."**

The paper addresses the challenges in contemporary history through the multidecade WiWiW.org program: "Who is Who in the Internet World: a perpetual archive devoted to Internet pioneers worldwide," which involves a series of new techniques applied to oral history developed during a period of more than 16 years. In a very practical way the tools, tips, and tricks behind this international and multicultural project are presented.

WiWiW is an International, Highly Multilingual, Not for Profit, Volunteering Based Project with support from the Internet Society (ISOC), private donors, and an extensive network of contacts (more than 6,000 active so far). Its main goal is to create a "perpetual archive" with first-hand materials based on primary-sourced oral histories, together with additional documents and resources gathered in conducting them. This project has conducted 250+ personal interviews with a wide range of leading figures of the Internet world.

***Index Terms* — Access Protocols, Audio systems, Computer Networks, History, Internet, Multimedia databases, Networks, Technological innovation.**

I. FOREWORD

In this project, *Andreu Veà* blazes a trail for historians to follow. The history and pre-history of the Internet's creation and evolution will occupy the attention of serious scholars and historians for many years in the future. I am convinced that *Dr. Veà*'s contribution will represent an important landmark in the field. Understanding the history and rationale for the evolution of infrastructure, fills a critical need for planning. One needs to know why things work or do not work and *Dr. Veà* provides an extraordinary menu of specifics from which many lessons may be drawn. I hope you will find this work as interesting and useful as I have.

Vint Cerf Internet Pioneer, Google Chief Internet Evangelist

II. THE NEEDS

For first time in history, history is recorded (in a digital audio format) directly from its main characters. It's now or never.

There is a group of individuals that have made history through their roles in the creation of the Internet and in the new Internet industry. They have a chance now to make history again by inspiring the next generation of inventors.

We have now a unique opportunity to preserve the technological ideas and achievements that have transformed the world in only 20 years. This shift has happened so rapidly that we have both the luxury of perspective and the time to individually record the personal experiences of those involved.

However, many of the pioneers are now in their 70s and 80s, so we can't wait much longer if we want first-hand accounts.

III. OUR APPROACH

We are collecting the stories of the Internet pioneers on digital audio format to preserve it for future generations. Wouldn't it be great to hear Thomas Edison or Alexander Graham Bell's voices today, personally explaining and detailing their inventions?

We are Designing and Creating a huge timeline-sorted, open-source repository to make it possible to browse for information about the people who most contributed to the Internet (and the ARPA and NSF nets). In every single country, the same method, and the same questions are used: their voices, Text, Videos, and Old Pictures and Artifacts are archived and sorted.

A. Our Goals Are:

1) To Collect all knowledge about the ARPAnet, NSFnet and the Internet: its beginnings, early deployments, protocol design, main milestones, and pioneers, through live interviews recorded and transcribed and a collection of old and new picture and digital resources.

2) To reach maximum Dissemination of the Pre-History, Internet History, the involved Organizations and the different access technologies.

3) To Fix Concepts: Breaking the Myths, with systematic interviews of key people, compiling important documentation, and even creating a description of terms (which became a dictionary in 2002, with more than 22,000 units sold).

To achieve these goals, the interviews must be:

- Quick to Access
- Easy to Understand
- Methodologically Proven
- Equally Structured
- From Primary Sources
- All DIGIT-All (Text, Photos, Audio, Graphics, Video)

B. Candidate Selection and Interviewing Methodology

The interviewing process is based on a multi-step methodology (a 15-step flow chart from initial contact through archived interview, see figure) refined over a decade. The very large scale of this interviewing project has resulted in a number of innovations, essentially a distributed network of scholars that assists in transcribing and editing the oral histories, archiving the results, and coordinating an international flow of work.

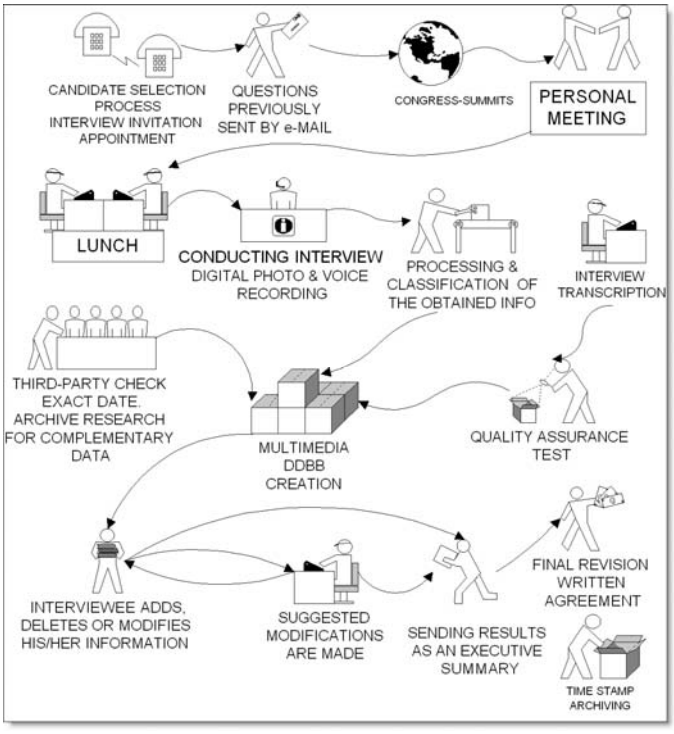
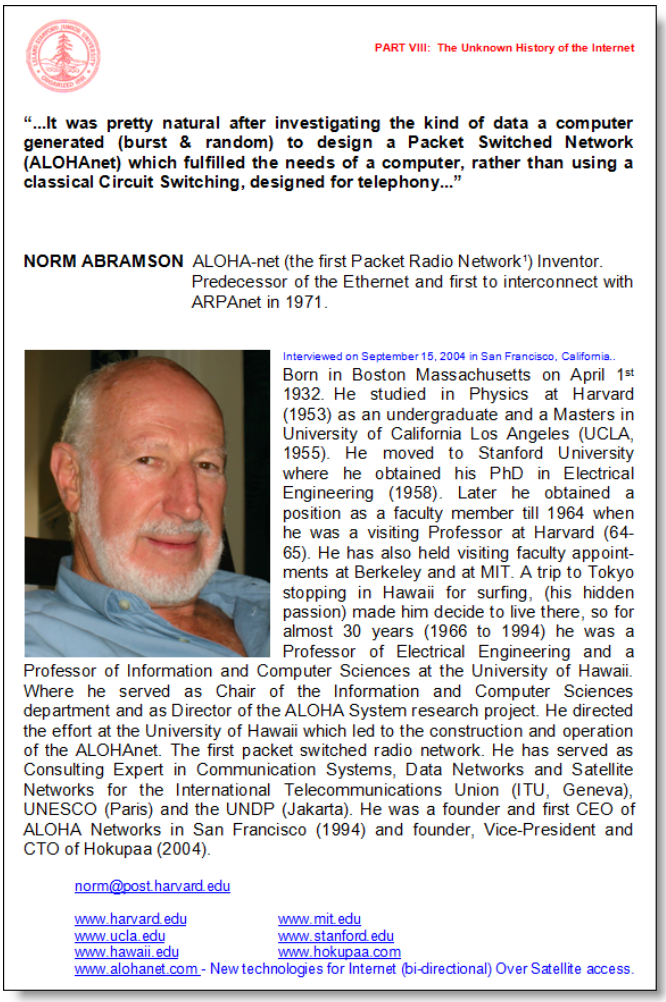


Figure 1. WiWiW interviewing methodology (1994-2010).

Once the potential candidate has been selected among many others using an improved "snow-ball" method (the candidate must be quoted at least twice by other recognized pioneers to be interviewed), we try to find him through our social network of pioneers. We always establish indirect contact, having others introduce us to our candidate. That increases the acceptance rate up to an astonishing 98 percent, so we have never used cold-petition methods. Patience and perseverance along the years makes the output of this process to be rather different than what could be achieved by a journalist (or by a one-day expert).

Once the candidate has accepted (this phase in some rare cases has taken more than six months) we talk a little bit about the questions which are sent by email in advance. Then we agree to meet at some location (many times taking advantage of the fact that we both travel to a common meeting or summit).


PART VIII: The Unknown History of the Internet

"...It was pretty natural after investigating the kind of data a computer generated (burst & random) to design a Packet Switched Network (ALOHAnet) which fulfilled the needs of a computer, rather than using a classical Circuit Switching, designed for telephony..."

NORM ABRAMSON ALOHA-net (the first Packet Radio Network[1]) Inventor. Predecessor of the Ethernet and first to interconnect with ARPAnet in 1971.

Figure 2. Look of an interview cover, with the pioneer's short Bio

The methodology includes spending some time together to get acquainted (for instance, having lunch or dinner together) before the interview and explaining the WiWiW project to the interviewee so they can have a better perspective on the scope of the program and answer the questions in more depth. We always use the same questionnaire, but depending on the interviewee we may ask some supplementary questions that later on help us to create and edit the final document.

Our main publishing platform object is the "interview," which is a complex document organized by a database with 64 different variables or fields per record (interviewee data, workflow data, body of answers, time stamps, et al). We have created a systematic and methodical process to give rapid access to the set of interviews (see annex).

C. *Recording Tricks*

We wanted to be all digit-all, so since the early beginning of the interviews (in 1994) we have been using digital voice recorders, which have increased in quality and voice compression and decreased in price and size. One of the issues we had was the very big files we were creating, after recording more than three hours. These files (in .WAVE format) were impossible to share through the Internet. So we had to do some market and systems research until we found a proprietary format (.DSS digital sound system) which was able to compress almost 60 times more than regular .MP3 format.

Figure 3. Interview Results: Highly Multimedia documents.

MP3 normally delivers 1 MByte per minute of music (stored songs use to be 3 to 6MB in size). So thanks to this new recording hardware and software we could achieve 1MB per hour of recorded-voice rates. This allowed us to have contributors within developing countries, where bandwidth and Internet quality is still an issue.

Our interviews are always personal with the interviewee, but in some rare exceptions we have interviewed people through Voice over the Internet: in this case the free tool we have chosen for our free-software toolkit has been: *Skype™* . In order to be able to record, it has to be combined with non-free applications such as *Pamela-for-Skype Pro-Edition* or *Virtual Cables*, which allow the user to record the incoming and the outgoing (speaker and microphone) voice signals, something that can't be done with the plain recorder that most Operating Systems include.

As this per-user licensing fee wasn't working correctly in our volunteer-based scheme, we finally found a simple solution: adding a new user to the interviewer/interviewee audio conference; in this way it's possible to record (in the same audio stream) both voices, not just one of the participants.

D. *Final Processes and Tools*

Once the interview is concluded, we start different processes of archiving and classifying the information obtained. All the pictures are reviewed, dated, renamed, and stored, and the audio file (in ultra-compressed .DSS format) is sent to the assigned transcriber (depending on the interview language). Then the interviewer manuscript notes are scanned and archived also.

Once the transcription is ready, it always needs a third-party check, to verify exact dates and the names of other pioneers quoted, and in some cases to research complementary data.

Interview results are reviewed by the interviewee and his former colleagues who made direct comments on the text. We'll see some samples of the result of this technique at the end of this paper.

With all these collected materials we create a Multimedia DataBase, containing full transcribed text, scanned documents, original audio files, photos taken during the meeting, scanned pictures provided by the interviewee, the edited version of the interview, and also the different documents sent by third-party pioneers or colleagues.

Once the interview is free of typos and transcription errors and milestone dates are verified, it's sent to the interviewee, asking him to add whatever he likes to the document body and even to delete or modify something he dislikes or thinks is too personal to be published (this has happened in only one case).

All suggested modifications are introduced to the final interview, which is re-sent to the interviewee for a final revision and written agreement.

The overall multi-step process can take days or years depending on the interviewee and the number of reviewers. The shortest took less than a week and the longest up to six years !!!

At the very end of the process, once we all consider the interview as closed we start a time stamp archiving process (allowed by the PDF file format) embedding a time-stamp to the document.

Internal blogs help coordinate efforts. And we also use an internal wiki to add comments during the editing process and other free collaborative tools, such as Google Docs, to be able to have our core-team meeting minutes delivered to everybody at the end of our online meetings.

We have also developed a custom cloud application which, combined with one of the best CMS (Content Management Systems), helps us to deal with and pre-process all the unstructured information collected.

E. Archiving Issues:

As we stated earlier, we are also designing and creating an online archive to make these materials permanently and publicly accessible. Along with the oral history interviews, we are also collecting archival materials such as handwritten comments, historic documents, photographs, videos and artifacts. Digital certification of the archived documents ensures authenticity. We are presently creating an open-source repository to make it possible to browse for information about the various people, from many countries of the world, who contributed to the Internet.

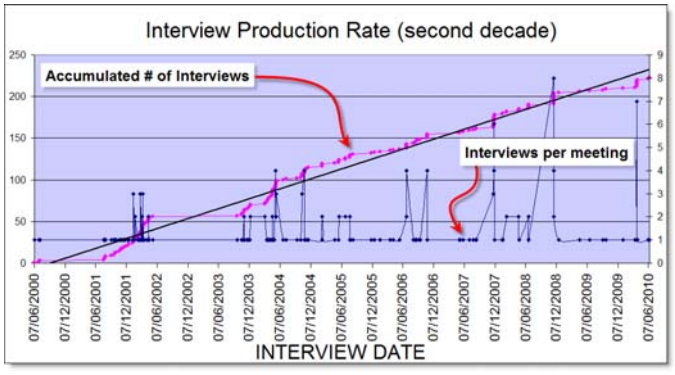


Figure 4. Interview production rate during the second decade of the WiWiW program. Note the sustained high linearity.

F. Open Protocols Used:

Since day one our goal has been to create a system built to last. That means that our documents must be able to be read, decoded, or accessed 50 years from now, an important issue, since protocols, operating systems, hardware and software evolve quickly. This is still an unsolved problem, and quoting Dr. Vint Cerf [2]: "this is not just a problem for the historians and archeologists of the far future, it is already a current problem for many users of digital technology. Most of the information of the space programs from 1960's (50 years ago) is "lost" or let's say non-readable due to format changes or missing players for that kind of tape or disk. These are all real problems today and will grow increasingly serious as time continues its inexorable march into the future." One of the best features of the Internet protocol system (RFC's or Request For Comments series) is that they keep the same simple (ASCII) format since their first document (RFC #1) on April the 7th 1969. That's why they have endured for more than forty years and can be now found online.

At the WiWiW program, we are aiming for simplicity, but an ASCII (or plain text) format is not able to support images or scanned graphics. That's why we switched to a more advanced format, the PDF. The Portable Document Format is an open standard for document exchange, created by Adobe Systems Inc. in 1993 and used for representing documents in a manner independent of the application software, hardware, and operating system.

Each PDF file encapsulates a complete description of a fixed-layout document that includes the text, fonts, images, and vector graphics. Even though this PDF file format has changed nine times (and continues to evolve, as new versions of Adobe Acrobat are released) it is by far the best option to store our data. We did not use the latest version, but one of the first and most simple (PDF 1.1 corresponding to the Acrobat 2.0 released in 1994). But since then a new standard for archiving in corporate, government, and library environments has appeared: PDF/A (as ISO 19005-1:2005, an ISO standard published on October 1, 2005; work done in ISO TC171). According to its definition PDF/A: "is a file format for the long-term archiving of electronic documents. It is based on the PDF Reference Version 1.4 from Adobe (implemented in Adobe Acrobat 5 and latest versions)."

G. Why we chose this PDF 1.4 (PDF/A-1) file format for long-term preservation to store our documents?

Because PDF/A-1 identifies a "profile" for electronic documents that ensures that the documents can be reproduced the exact same way in years to come. A key element to this reproducibility is the requirement for PDF/A documents to be 100 percent self-contained.

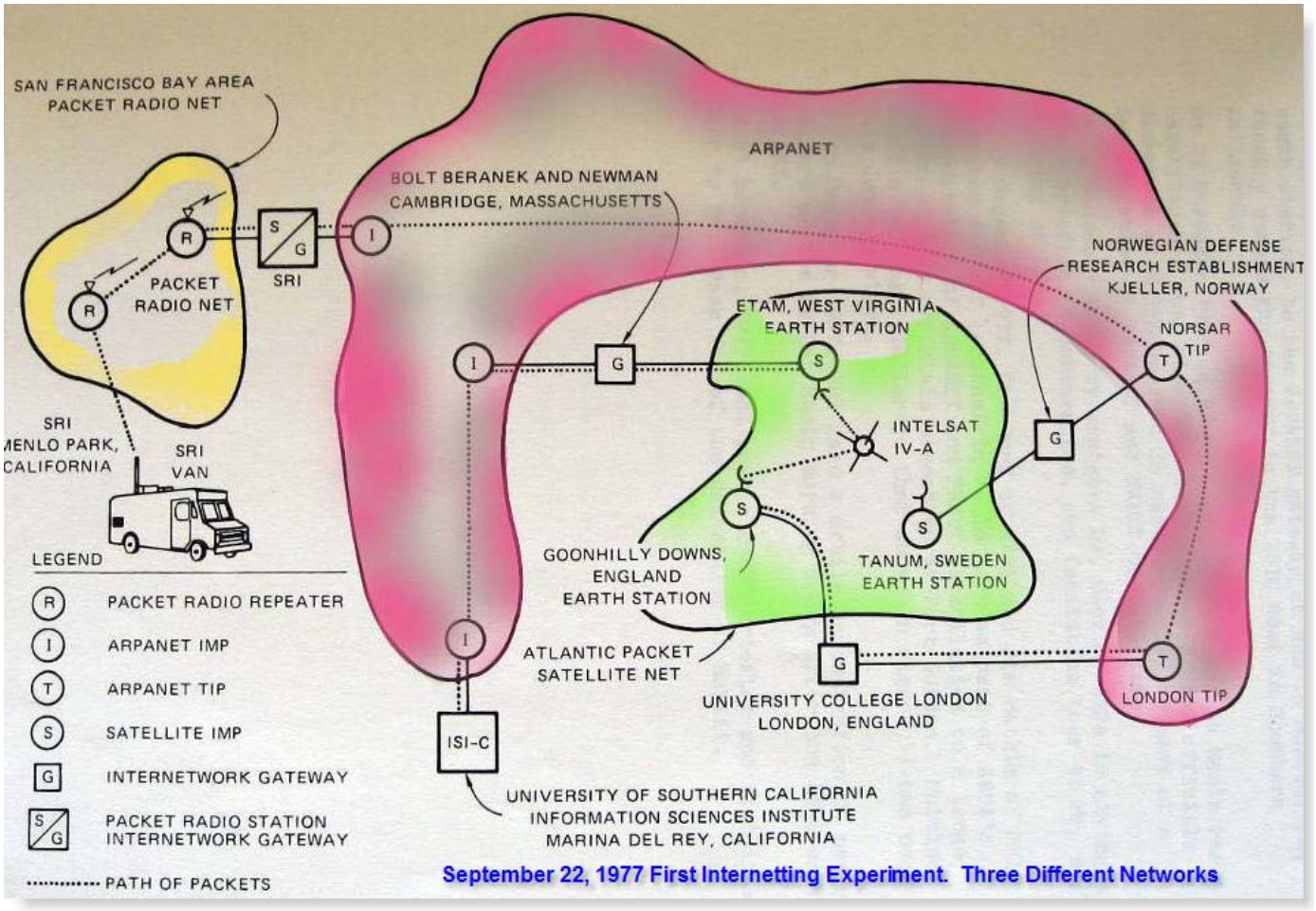


Figure 5. Scanned from original map of the first Internetting experiment.Courtesy:Don Nielson. SRI International.Menlo Park (CA)

All of the information necessary for displaying the document in the same manner every time it is viewed, is embedded in the file. This includes all content (text, raster images and vector graphics), fonts, and color information. A PDF/A-1 document is not permitted to rely on information from external sources such as font programs or external hyperlinks). This way we could have the picture embedding and multimedia features that ASCII doesn't have, using a format that is now open, and has multivendor readers.

IV. Other Internet History Projects

The basic story of the Internet is reasonably well known (e.g. from Abbate's *Inventing the Internet* [MIT 1999] as well as Hafter and Lyon's *Where Wizards Stay Up Late* [Simon & Schuster 1996]).

So a new publication that would only provide a bit more information on the core figures would have less impact and permanent value than a publication providing satisfying detail on the much larger community of Internet pioneers—and this is precisely our proposition's bigger strength.

What substantially increases the value of our work is that the list of completed interviewees always compares favorably with other samples of Internet pioneers. It includes most of the 49 individuals indexed in Janet Abbate's Inventing the Internet, the most respected academic study of the topic.

V. Some Interesting Selected Samples

Below we have selected some excerpts that clearly illustrate how important is for future historians to leave a recorded register of pioneers' memories. These recollections are always "triangulated" (finding independent confirmation of the information, using contemporary documents, emails, published sources, or other oral histories).

A. Excerpt 1: on the "nuclear war myth" origins of the ARPANET taken from the conversations with Larry Roberts (ARPAnet architect) on March 31st 2004.

30-03-2010 ARPANET Pioneers “collective memory experiment” organized by WiWiW.org at the BBN HQ in Arlington (Virginia, USA)
LEFT 2 RIGHT:Andreu Veà, Barry Wessler,Craig Partridge,Charley Herzfeld,Bernie Cosell,Larry Landweber,Al Blue,Les Earnest,Heidi Heiden Steve Wolff, Peter Sevcik, Bob Kahn,Steve Lukasik, Noel Chiappa, Dave Walden, Vint Cerf, Doug Gale, Alex McKenzie & Carl Sunshine.

[LR]: Paul Baran (on March 7 1964 published his first paper on Secure Packetized Voice: "On Distributed Communications Networks", IEEE Transactions on Systems). "It is from this paper that the rumor was started that the Internet was created by the military to withstand nuclear war. This is totally false. Even though this RAND work was based on this premise, the ARPANET stemmed from the MIT work of Licklider, Kleinrock and Roberts, and had no relation to Baran's work. The ARPANET program as proposed to Congress by Roberts was to explore computer resource sharing and packet switched communications and had nothing to do with nuclear war or survivability. Reliability, however was one of the key network issues that dictated packet switching."

B. Excerpt 2: on the origins of the ARPANET taken from my conversations with Bob Taylor (who hired Larry Roberts and was his direct boss at the ARPA IPTO Information Processing Techniques Office) November 26th 2003.

[BT]: "You mentioned another point here that touches on the people who write books. There are lots of magazine articles and books that claim that the ARPAnet was built to help the military. Time magazine (a number of years ago), published two articles about a year apart, that made this claim. I ignored the first article but after I read the second a year later I wrote them a letter wherein I wrote that the ARPAnet was not built out of military motivations. ”The ARPAnet was built: --and I gave the sentence that I gave you-- to enable people with access to interactive computing to share common interests” In the letter I said “How do I know this? Because I’m the person who made that decision: to build the ARPAnet.” They didn’t print my letter in Time magazine. They wrote back to me thanking me for my letter but assuring me that their sources were correct. Their sources came from lots of other books, all of them wrong on this point". Vinton Cerf added this when he read Taylor's assertion:

[VC]: "Actually the usual disagreement is about whether the ARPANET was designed to survive a nuclear attack. It was not. The reason this is misunderstood is that Paul Baran’s work WAS designed to achieve that goal for what was in effect a packet-switched voice network. That system was never formally built – as Paul himself can explain. But the packet switching concept did endow the network with some resilient, self-healing properties. The motivation to build it was resource sharing, as Bob Taylor asserts, but I think it also

had the secondary justification that the computer resource sharing and communication applications of the network would enhance the technology of military command and control."

C. Excerpt 3: on the origins of the ARPANET. We can see a complete different point of view from Charley Herzfeld former ARPA Director, (Bob Taylor's direct boss, who helped to hire Larry Roberts for ARPA), interviewed on June 23rd 2005.

[CH]: "At the time ARPA had a budget of US$ 300 million, which is comparable to what it is now, about 3 billion. There's this famous story that Bob Taylor tells and tells correctly that he came to see me for a million dollars to start the ARPAnet, and 20 minutes later he had the million dollars, but he leaves out the fact that I have been studying the problem with him and with JCR Licklider for three years, and I was persuaded. It was not hard to get the million dollars because I was kind of waiting for him to ask for it. I simply took the money from some other projects and move it; when you got so much money it is easy to do that, and ARPA is one of the few places where you can do something like that.

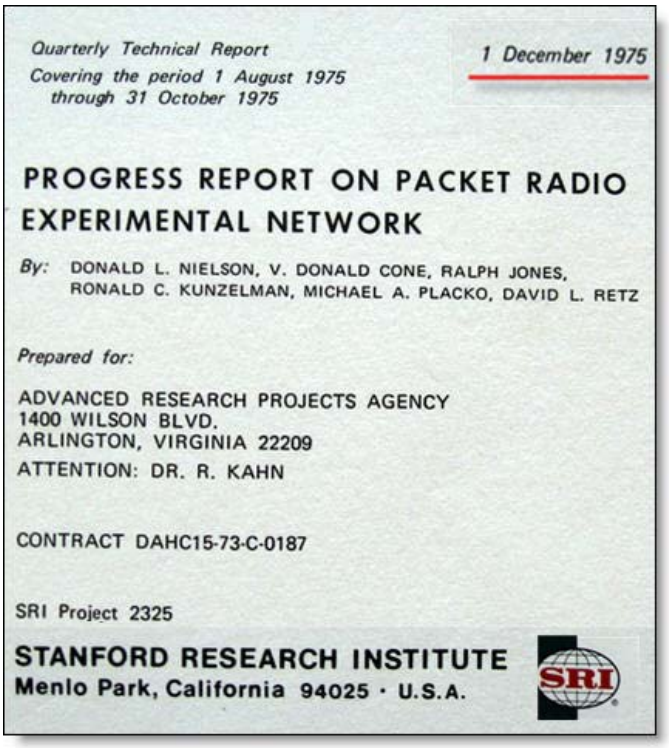
I had a rule that I would always have money for something new because I have a secret list of things I was willing to stop; I did not tell anybody. So, when Bob Taylor wanted his million dollars, I just knew where to get it; he was amazed that I was so quick because what he doesn't realized is that I have always been steps ahead in that game. He did well and we worked well together and I supported him, so I am not the father of the ARPAnet but I am the godfather. I pushed Bob a lot; he had two offices which was his usual office, then he had a secret room that he and I knew about it and nobody else. There are computer terminals in that room, not allowed in Pentagon because computers are supposed to be in basement. One day he took me in that office and showed me four terminals connected to computers in different places, and he had communication terminals running in each one to talk to the people at the computer but the communication terminal does not work across computers, so I told him "that's ridiculous, fix it!". For me the idea of having all these single lines is absurd because it is inconvenient, not to mention that the communication lines were expensive leased lines that have to be on all the time."

D. Excerpt 4: on the origins of the internetting experiment and the Packet Radio Net: PRNET. From Don Nielson's view on August 29th 2006.

[DN]: "Though packet radio evolved first as a separate, stand-alone network, there appeared in the mind of Bob Kahn, the notion of integrating the PRNET with at least the ARPANET. Different networks had different computers and terminals attached to them and it was becoming an operational and maintenance nightmare. It was first Bob Taylor and then Larry Roberts that asked why do we have all of these? They also saw the need for a common computer network and ways to simplify the connections to it. That conceptually led to the ARPAnet.

I also remember Bob Kahn having the notion that one might throw a bunch of packet-radio-augmented chips together and they would organize themselves into a computer. While the notion of the digital radio itself may go back to Larry Roberts, its development as a packet network was the instigation of Bob Kahn, who by that time was leading the ARPA's IPTO.

That PRNET group of contractors convinced ARPA, that is, Bob Kahn, that it could build the network. But his role at ARPA was expanding and he then asked Vint Cerf of Stanford to join him. Vint then became the program manager at ARPA for packet radio. Thus, we built this digital network in such a way that, as Bob envisioned, you could throw all the resources out of an airplane and they could all parachute down and self organize into a functional network."



Quarterly Technical Report
Covering the period 1 August 1975 through 31 October 1975

1 December 1975

PROGRESS REPORT ON PACKET RADIO EXPERIMENTAL NETWORK

By: DONALD L. NIELSON, V. DONALD CONE, RALPH JONES, RONALD C. KUNZELMAN, MICHAEL A. PLACKO, DAVID L. RETZ

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VI. Benefits Per Costs And Conclusions

This work has contributed to debunk many of the myths that still exist around the origins of the Internet and its founders. Audio, T ext, Videos, and Old Pictures and Artifacts are archived and sorted creating a multimedia database, built to last.

We are still collecting unknown stories, important old e-mails which marked a milestone, group pictures, anecdotal situations, and, most importantly, your financial support to boost this project to preserve our collective Internet story.

Even though we have not finished the field work, we have already achieved the goal of creating a set of materials with

enduring value. In addition, we have spent considerable time and effort exploring, evaluating, and devising effective tools and practices for archiving these produced materials.

We have successfully conducted and completed interviews with several persons believed to be elusive or difficult or uncooperative. The existing set of interviews include the core Internet pioneers; using the classic method of “snowballing” to good effect, asking each interview subject for the "most important" people and following up with an interview request when an individual is identified by at least two of the interviewees.

The new interviewing method used at this program is well defined. As quoted in the work of Charles Babbage Institute director Tom Misa's audit report[3] on WiWiW to ISOC: "There are several different 'styles' of conducting oral histories—with different purposes at hand, and with different audiences in mind. Andreu’s method seems to be midway between two poles: the free-form 'reminiscence' that is often favored in the technical community itself, which provided a chance for interviewees to 'tell stories' and 'get the memories' on tape; contrasted with the 'research grade' oral histories favored in the academic history community that require extensive preparations and extremely detailed questions. Andreu certainly gives the Internet pioneers a chance to 'tell their stories,' while also asking informed follow-up questions. I believe he has struck a reasonable balance."

The fact of following a very strict methodology since the beginning has led to produce a very coherent set of materials. Which can be read by author, by topic or even following the answers given to one question (What do you think about the future of the internet?) by all the interviewees.

Not having a pressure to publish, and basing our growth on volunteers from all around the world, has benefited us on being able to maintain production costs as low as possible. Being the average cost per interview lower than US$ 2,500.

Acknowledgement

The author wishes to acknowledge the long-term unconditional assistance and support of Dr. Vint Cerf, who has helped to secure private and public funds for this project, helping to reach many of the goals achieved, and always been ready to comment or enrich most of the materials produced. We would also like to mention financial support from the Internet Society and institutional support from CIDEM (Barcelona, Catalonia), Fundación CTIC (Asturias), and redIRIS (Madrid) and other private donors such as Don Nielson, Dick Karp, John & Mary Gill among others. And publicly express my gratitude to the myriad of volunteers who have devoted their time and passion sharing their knowledge to boost this project.

References

[1] Andreu Veà's Ph.D. thesis dissertation. "History, Society, Technology and Network Development. An exposé of the most unknown face of the Internet," September 12th, 2002. 4 vol. 1016 pages. Foreword by Vint Cerf. Full text publicly published on TDX (Theses and Dissertations Online) at http://www.tdr.cesca.es/TDX/TDX_URL/TESIS/AVAILABLE/TDX-1104104-101718/Index.htm

[2] Cerf, Vint. Quote from the discourse on his public acceptance of the Honoris Causa Ph.D. by the University of Zaragoza 2010. 200pags.Spanish & English Edition. ISBN 84.927-748-0-7

[3] Dr. Tom Misa's audit on WiWiW's work for the Internet Society. Charles Babbage Institute. Center for the History of Information Technology. University of Minnesota, College of Science & Engineering. August 2007. Unpublished document.

[4] Andreu Veà "The unknown history of the Internet trough its personages". November 2005. Prologue by Vint Cerf ISBN: 84-609-5566-4. 312 pages. Edited by www.fundacionctic.org

[5] A. Veà "Internet closer. Dictionary of acronyms and terms of the Net".December 1999. Prologue by Vint Cerf. ISBN: 84-931.351-1-9. 223 pages.

[6] A. Veà "Manual Pràctic Internet a l'Empresa" May 2002. Prolog.by E.Benhamou (3Com CEO)ISBN: 84-922538-7-8. 280 p

[7] Veà, A. ”Qui és qui a Internet? Recull inèdit de fets i anècdotes” ISBN 84-393-6876-3. 173 pages. October 2005. Prolg by the IT Minister. Edited by Government of Catalonia (CIDEM) Spain.

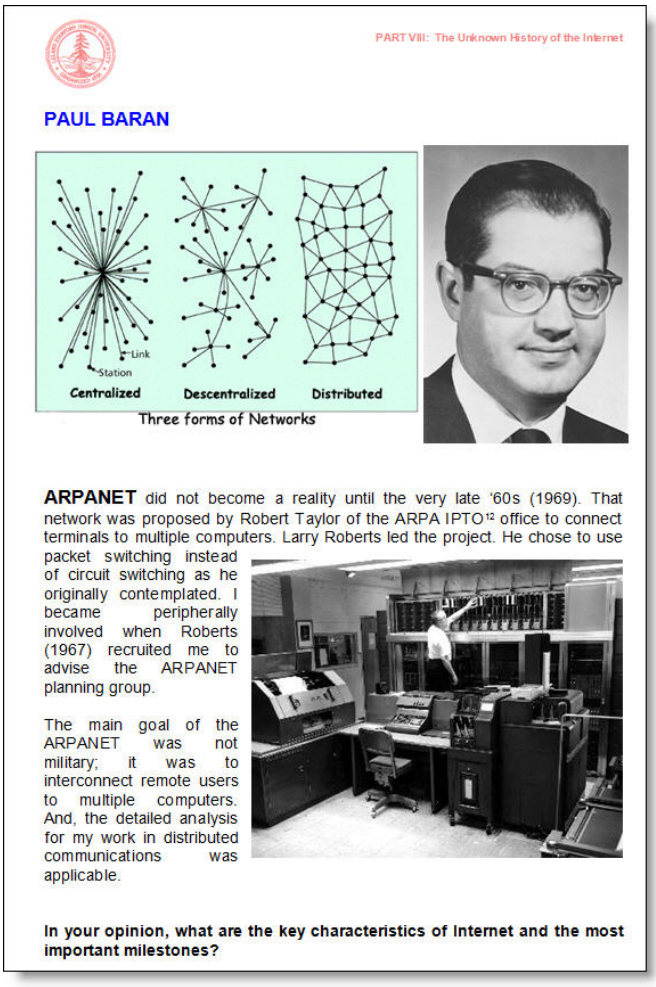

Figure 8. Original old pictures are collected and archived.

ANNEX 1; Analyzing the Interviewing Methodology & an interview we have modeled it as a set of 64 different *Variables* or fields per record.We have created a systematic & methodical process to give rapid access to the interview set

VARIABLE NAME	VAR-TYPE	COMMENTS
CONTACTED	Boolean	
INTERVIEWED	Boolean	
TRANSCRIBED	Boolean	
CLEAN	Boolean	
NUMBER-OF-PAGES	INTEGER	
REVISED-BY-INTERVIEWEE	Boolean	
ACKNOWLEDGE-2-PUBLISH	INTEGER	0=Not submitted, 1=ACK, 2=Not-ACK
INFORMATION CHECKED	INTEGER	"Editor's Seal" depending if the info has been checked or not.Depending on DEPTH
INTERVIEW-INDEX-NUMBER	INTEGER	Three DIGITS 000 to 999
INTERVIEW-CATEGORY-GROUP	TEXT	THREE GROUPS: (1)ORIGINS - (2) WORLD - (3) INNOVATING-USERS
INTERVIEW-CATEGORY	TEXT	Multichoice up to maximum 30 different categories (Groupped in three levels)
INTERVIEW-DEPTH-LEVEL	INTEGER	**0=Low**:Internet-Collected-Info**1=Med**:Electronic-Interview**2=High**:Personally Met
INTERVIEW-FIRST-CONTACTED-DATE	DATE	Day we receive interviewee's first answer
INTERVIEW-PLACE-CITY	TEXT	Name of the City where we conduct the interview.
INTERVIEW-PLACE-COUNTRY	TEXT	Name of the Country
INTERVIEW-DATE	DATE	
INTERVIEW-SENT-TO-REVIEW	DATE	
INTERVIEW-RECEIVED-COMMENTS-DATE	DATE	
REFERRER-PERSON-1	TEXT	Person who is backing (endorsing) the Personage (Minimum of two)
REFERRER-PERSON-2	TEXT	Person who is backing (endorsing) the Personage (AVAL)
REFERRER-PERSON-3	TEXT	Third Person-Institution who believe that is a real Internet Personage
INTERVIEWEE-NAME	TEXT	
INTERVIEWEE-SURNAME	TEXT	
INTERVIEWEE-TITLE	TEXT	
INTERVIEWEE-ORGANIZATION	TEXT	List of Companies/Organizations/Universities, where the Interviewee has worked
INTERVIEWEE-eMAIL	EMAIL	
INTERVIEWEE-CONTRIB-COUNTRY	TEXT	Country where the interviewee has mainly worked and contributed
INTERVIEWEE-MAIN-QUOTE	TEXT	First sentence of the interview
INTERVIEWEE-SECONDARY-QUOTE	TEXT	
INTERVIEWEE-SHORT-DESCRIPTION	TEXT	Presented Right after title
INTERVIEWEE-DAY-of-DEATH	DATE	Date he/she passed away
INTERVIEWEE-BIRTH-DAY	DATE	
INTERVIEWEE-BIRTH-PLACE-CITY	TEXT	
INTERVIEWEE-BIRTH-PLACE-COUNTRY	TEXT	
INTERVIEWEE-SHORT-BIOGRAPHY	MEMO	
INTERVIEWEE-RELATED-LINK-NUM{L}	LINK	Where L={1,8} Meaning }Up to 8 different links per person
INTERVIEWEE-(8*10)-HEAD-PHOTO	IMG-OBJ	HEAD, First plane picture. ASPECT RATIO = 8*10 ; 50% area = head.
QUESTION-N-9-ANSWER	MEMO	9.- NEW FUTURE QUESTION (What would you change if you repeat your contrib)?
QUESTION-N-8-ANSWER	MEMO	8.- Do you remember when you had your first contact with a computer?
QUESTION-N-7-ANSWER	MEMO	7.- What was your first contact/experience with Internet or ARPANET?
QUESTION-N-6-ANSWER	MEMO	6.- In your opinion, what are the key characteristics of Internet?
QUESTION-N-5-ANSWER	MEMO	5.- What do you consider the most important milestones in the net developm?
QUESTION-N-4-ANSWER	MEMO	4.- How did you contribute to the development of the Internet?
QUESTION-N-3-ANSWER	MEMO	3.- Who are some key people in the development of Internet, leaders-trendsetters?
QUESTION-N-2-ANSWER	MEMO	2.- Two anecdotal situations
QUESTION-N-1-ANSWER	MEMO	1.- What do you think about the future of Internet?
QUESTION-N-0-ANSWER	MEMO	0.- Do you see any technological trends?
READING-REFERENCES-#{R}	MEMO	R={1,8} Maximum of 8 Book or Article References Allowed
AUTHOR-SELECTED-PAPERS	PDF	Selection of published Articles and papers where the interviewee is the protagonist or the au
INTERVIEW-FIRST-PUBLICATION-DATE	DATE	
INTERVIEW-LAST-COMMENTED-DATE	DATE	Last update done to the interview
INTERVIEW-AUTHOR	TEXT	By Default this field is only AVB, but let's plan the future.
INTERVIEWEE-AUTHOR-PHOTO	IMG-OBJ	Picture together Interviewee and the author of the interview.
INTERVIEWEE-SUPPLIED-PICTURE-N{k}	IMG-OBJ	Where k = {1,8} Any Interviewee has supplied more than 8 pictures
PHOTO-CREDITS-N{k}	TEXT	Be very careful before publishing any unaccredited picture
RELATED PIONEERS	LINK	Links to his other contemporary pioneers.
INTERVIEWEE-VOICE-SAMPLE	SOUND-O	All Sound Format Files, will be converted to WMA Files

ANNEX 2 : Interviewing Order List (Updated: July 2010)

NAME	SURNAME	ORGANIZATION
Paul	Baran	RAND Corporation
Richard	Karp	Catapult Communications
Yogen	Dalal	Mayfield fund
Paul	Vixie	Internet Software Consortium
Suzanne	Woolf	USC-ISI
Judy	Estrin	Packet Design
Leonard	Kleinrock	UCLA Queuing Theory
Robert	Taylor	ARPA, hired Roberts
Bill	Joy	Berkeley Free BSD, SUN
Severo	Ornstein	BBN
Douglas C	Engelbart	Bootstrap.com
Paul	Mockapetris	ISI,@Home,UrbanMedia,Nominum
Roland F	Bryan	UCSB ARPANET 3rd Node
Truett	Thach	BBN, First IMP Installation
Daniel C.	Lynch	INTEROP
David	Boggs	Co-Inventa Ethernet
Mike	Roberts	ICANN, Internet2
Tim	Howes	LDAP co-inventor+K26
Marshall T	Rose	POP3, X500, SNMP (Co-creator)
Larry	Roberts	ARPAnet & Caspian Networks
Paul	Kunz	SLAC STF 1st Web USA
Bob	Braden	ISI / USC Peer of Postel. UCLA NCP
Vint	Cerf	IBM, ARPA,MCI,CNRI,MCI,Google,ISOC,ICANN
Tony	Li	Juniper Procket (Router Designer)
Robert	Metcalfe	3Com (Ethernet)
David D.	Clark	MIT
Lyman	Chapin	IAB Chair, ICANN Dtor
Ray	Tomlinson	BBN (eMail-creator)
Scott	Bradner	IETF (Harvard)
Frank	Heart	BBN (Dtor Grup)
Milo	Medin	Redwood City
Bob	Bressler	BBN (Early days, NET,3Com,Sun)
Fred	Baker	Fellow CISCO Systems QoS Chief IETF
Steve	Bellovin	USE-net Creator
David W	Maher	PIR Chairman BoD
Hartmut	Glaser	CGI Brasil
Stephen	Crocker	NCP & First RFC
Bob	Kahn	CNRI
George	Sadowsky	Networking for Developing Countries
Kees	Neggers	SURF-Net Netherlands
Brian	Carpenter	CERN & IBM
Elisabeth	Feinler	NIC ARPANET (SRI)
Norm	Abramson	ALOHANET (Hawaii)
Chiiming	Kao	GPRS
Edward	Weldon	ALOHANET (Hawaii)
Tom	Gaarder	ALOHANET (Hawaii)
Wesley	Peterson	ALOHANET (Hawaii)
John Perry	Barlow	Electronic Frontier Foundation
Larry	Press	Workshops on Developing Countries ISOC
Bob	Aiken	CISCO (Academic Research)
Tim	O'reilly	O'reilly Editions
Billy	Brackenridg	VoIP and audio pioneer
Gordon	Bell	Computer Science Legend
Peter	Thiel	Founder PayPal
Jeff	Pulver	Voice over Internet
Ken	Fockler	CANADA President Ca*net 91-97
Larry	Landweber	Univ de Michigan, NSF
Stephen	Wolff	NSF (Late 80's Jennis Dennings+Gordon Bell)
Charley	Herzfeld	ARPA Director (Bob Taylor's Boss)
Michael	Nelson	White House + FCC + IBM Inet Dtor
Keith	McCloghrie	SNMP co-creator (CISCO)
Horacio	Cadiz	Philippines first ISP
Joel	Disini	Admin of .PH
Che-Hoo	Cheng	Admin of .HK and .ASIA Founder
Pindar	Wong	ISOC BoT and former ICANN BoT
Danny	Cohen	SunMicrosystems (VoIP over ARPAnet)
John	Shoch	PARC (Ethernet)
Franklin	Kuo	ALOHANET (Hawaii) SRI, NSFnet first architect
Paal	Spilling	First international ARPAnet node at Kjeller Norway
Andrew	Hinchley	NPL London
John	Hennesy	Stanford Provost, Sun.
Ron	Crane	Ethernet 3Com Pioneer
Virginia	Strazisar	BBN first Gateway
Mitch	Kapor	Lotus 123 designer
Juan	Quemada	DIT UPM, Spain
Demi	Getschko	Professor Escola Politécnica U.São Paulo
Jimmy	Wales	Creador WikiPedia
Michael	Stanton	Pontificia Univ. Católica do Rio Janeiro
John	Klensin	Chair IAB, SMTP ATT Fellow
Victor	Ciza	Burundi (ICANN) Former Minister
Patricio	Poblete	Chile NIC Director
Mouhamet	Diop	Senegal (former ICANN BoD)
Antonio	Tavares	Brasil Comite Gestor do Internet (CGI) BoD.
Jordi	Palet	IP v6 evangelist, Spain
Oscar	Sala	Brasil Pioneer
Glenn	Ricart	ISOC FIX-Creator Connect Brasil,Argentina Chile
Sally	Floyd	RFC-2309 Aplicó Internet Teoria Colas d Kleinrock
Don	Nielson	Packet Radio SRI testing the TCP/IP
Martin	Hellman	Inventor of the PKS (Diffy/Hellman Algorithms)
Peter	Lothberg	M-BONE (LOS ALTOS)
Roger	Scantlebury	Nat Physical Lab NPL of London (Davies' team)
Derek	Barber	NPL Davies Deputy Director European Inf.Network
Peter	Wilkinson	NPL Davies' team
Keith	Bartlett	NPL Davies' team
Jon	Crowcroft	Cambridge UK
Peter	Kirstein	University College of London
Jaume	Salvat	CEO STA. And .Andorra's AD initiator
Javier	Ribas	LandWell, Spain.
Mike	Lawrie	South Africa Internet Pioneer (South Africa)
Jesus	Sanz	CIEMAT, RedIRIS
María	Bolado	RedIRIS 20 años (Spanish Academic Net)
Angel	Camacho	UNICAN First Spanish WebServer
Gustavo A	Rodríguez	CICA Sevilla, Spain
Douglas E	V.Houweling	Internet 2
Dennis	Jennings	NSFnet Starter, (Ireland)
Dave J.	Farber	CSNet Distinguished Prof(Carnegie Mellon)
Dave	Mills	NSFnet Fuzzballs and NTP
Yakov	Rekhter	Juniper NY, BGP and NSFnet
Kennet	Wilson	NSFnet. Nobel Physics 1982
John W.D.	Connolly	NSF Director (Hired Dennings)
John A.	Armstrong	IBM Research Director
Eric M.	Aupperle	MERIT Network Inc. President
Charles N.	Brownstein	NSF Director
Tracy	LaQuey-P	Internet Companion, NSFnet Directory
William L.	Schrader	PSInet Founder
Jordan	Becker	IBM Research, ANS, AOL
Stephen J.	Lukasik	ARPA Director
Howard	Frank	2nd ARPAnet Private Contractor
David	Russell	COL. Ret. ARPA IPTO former Dtor
John	Cioffi	Father of the ADSL Patented by Stanford
Bob	Gray	VoIP Information Theorist. EE Stanford.
Hubert	Zimmermann	OSI ISO International Leader, Paris, France
Louis Henri	Pouzin	Cyclade Cigale, DATAGRAM inventor France
Farouk	Kamoun	Univ of Manouba. Cluster Routing Tunisia
Khaled	Sellami	IRSIT Tunisia (Africa)
Nii	Kuaynor	Ghana (Africa)
Ole	Jacobsen	SRI Interop Cisco
Kamel	Saadaoui	Tunisian Implementer IRSIT andATI
Ben	Fuller PhD	NAMIBIAn Internet Pioneer with Eberhard LISSE
Hans Peter	Dittler	ISOC-GE Standardizing Protocols X.25 Ethernet
Edgardo	Krell	NIC Chile UCLA-1976 Kleinrock-Introd UNIX Chile
Juan	Riera	DIT UPM Catedrático, Spain
Miguel Angel	García Martínez	UAM Madrid, Spain
Carlos	Blanquez	FUNDESCO (Now in Telefonica), Spain
Julio	Berrocal	DIT UPM Catedrático, Spain
Fernando	Fournon	Presidente Ejecutivo Telefonica I+D, Madrid
Iñaki	Martínez	FUNDESCO (Now Consulting Sys Eng CISCO)
Martí	Griera i Fisa	UAB Comunications Manager, Barcelona
Josep Mª	Blasco	UB EARN LISTSERV, Barcelona
Felipe	García	FUNDESCO, Spain
Antonio	Sola Venteo	UIB IT Center Director (Mallorca, Spain)
Gustavo A	Rodriguez	Dtor Comunic Univ Sevilla, Spain
Lluís F.	Cuadra	UB Servei d'Informàtica, Barcelona
Kevin D.	Mitnick	Best known Hacker
Robert	Caillau	CERN, web co-creator
Tomás	De Miguel	DIT UPM Catedrático, DG RedIRIS
Steve	Kent	Chief Scientist BBN, Cambridge.
Alex	Corenthin	SENEGAL Pioneer
Ermanno	Pietrosemoli	Venezuela Pioneer
Peter	Sevcik	DDN Starter (BBN)
Al	Blue	ARPA IPTO early Staff
Craig	Partridge	BBN MX Records
Dave	Walden	BBN IMP 7 IMP Dev Early Team (Soft)
Heidi	Heiden	DDN Program Director
Noel	Chiappa	MIT Multi-Protocol Router
Bernie	Cosell	BBN 7 IMP Dev Early Team (Soft)
Barry	Wessler	ARPA IPTO early (1967) Staff RFP bid
Alex	McKenzie	1967 joined BBN. NOC Docum Specs
Les	Earnest	ARPA Contractor from STF.FINGER invent
Charley	Kline	Connected 1st ARPANET NODE @UCLA
Dave J.	Crocker	MCI, helped at UCLA. Mail Handler (MH)