

Metaverse Roadmap

Pathways to the 3D Web
A Cross-Industry Public Foresight Project

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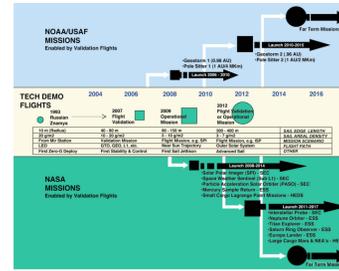
Overview

A roadmap is a collaborative foresight process that produces a broad set of plans and strategies to reach a future goal.

Roadmap Definition

Roadmaps include simple forecasts, scenarios, strategy and plans, but go beyond such tools in three ways:

1. They emerge in a collaboration network of multidisciplinary and competing experts,
2. They emphasize uncertainties and challenges as much as probable and preferred futures, and
3. They have long-term time horizons (five to fifteen years is common) by comparison to traditional forecasts and plans.



NASA/NOAA's 15 year Solar Sail Development roadmap.



ASF is developing a roadmapping competency in industries and technologies that are experiencing rapidly accelerating rates of improvement, have potential for great social and economic impact, and are understudied relative to their potential. The emerging metaverse (3D web social spaces, economies, and technologies) is a prime candidate for collaborative foresight activity at the present time.

The metaverse roadmap is designed to be regularly updated and critiqued by a diverse community of leaders and experts at biennial summits, in a Wisdom of Crowds model. ASF's MVR listserves, online forum, and workshops at select technology, business, and social foresight conferences will also solicit input beyond the founding summit this May, and prior to the next summit in 2008.

In areas where future uncertainties exist, we will seek clarifying data for the map. When controversies persist in the face of best available data, we will represent competing forecasts and their assumptions in Schools of Thought format. We'll also seek to identify data and outcomes that would resolve current uncertainties and controversies in the future. **Enabling and inhibiting factors** relevant to MVR development include:

Science and Technology

3D collaboration and management tools, groupware, product lifecycle management
3D design and animation tools, CAD, avatars
3D manufacturing, CAM, fabrication
3D operating systems and application spaces
3G and 4G networks, internet 2
Artificial life, evolutionary computing
Conversational interface, NLP, voice rec, translation, text-to-speech
Databases, semantic web, data mining
DRM and patent law
Display devices, HD, OLED
Geospatial web, GIS, augmented reality
Industrial and process automation, robotics
IP television, VOD, PVRs, home media centers, video game consoles
Interoperability, standards
Open source, P2P
Molecular modeling, drug design
Security, secure digital identity, micropayments
Semiconductors, memory
Sensor networks, transparency, RFID, EPC
Synthetic worlds, video games, MMOGs
Virtual reality, haptics
VoIP telephony, video conferencing
Wearable, Wireless

Economic and Social

Accounting (financial and cost), finance (public, private, micro)
Adoption curves, commoditization thresholds
Business automation, supply chain mgmt, ERP, SFA, CRM, e-Commerce
Demographics, immigration
Developmental convergences (positive and negative)
DRM and patent law
Economic forecasts and indicators
Failure scenarios, risk management
Game design and culture
Government regulation, taxation, subsidy, policy
Globalization, outsourcing, insourcing, HR strategy
IPTV and telecommunications regulation
Learning/experience curves, market growth curves
Management strategy, business models
Marketing (personalized and mass), advertising analytics, SEO
Organizational learning and innovation
Polling, group democracy
Social networks, reputation systems, online community
Social preferences, culture, fashion
Tech support networks, education
Tipping, inflection, and saturation points
User created content, profiles, metatagging, collaboration strategy

Metaverse Roadmap Thesis

The emerging "metaverse sector" of the global economy is resources, products, and services managed through 2D and 3D virtual and augmented reality environments.

As the density of our network accelerates on a planet with finite surface area, and as our online and physical environments become increasingly intelligent, automated, networked, and transparent, major new developmental emergences must occur.

We are in the early years of an unprecedented transformation in our relationship to information technology. As visual-spatial and linguistic (right brain and left brain) creatures, we use complex visual-spatial and language interfaces to interact with each other. Soon our 2D+ (geospatial, augmented reality, etc.) and 3D online worlds will become as visually and data rich as the physical world. We are also gaining the ability to talk to our computers (as well as type) in increasingly natural human language. These developments will produce profound new individual and collective abilities, as well as new risks to be mitigated.

Classic economic theory charts development from resources, to products, to services sectors over time. "Structural change" occurs when GDP (or for the world, GWP) or employment in one sector grows to exceed another.

We contend the metaverse sector, growing from today's mostly 2D and early 3D digital media (including film, games, geospatial web, television, and wireless), will encompass and redefine each traditional economic sector in coming decades, the way each has done in its own historical emergence. Providing plausible indicators and examples of metaverse sector development is a major goal of our roadmap.

Affected Economic Sectors

Resources Sector

- Agriculture
- Mining, Forestry, Fishing

Services Sector

- Government and Law
- Military, Security, First Responders
- Health, Medicine
- Education, Entertainment, Media
- Banking, Finance, Insurance
- Transportation, Travel, Tourism
- Retail, Wholesale
- Ngos, Nonprofit, Philanthropy, Development
- Science, R&D

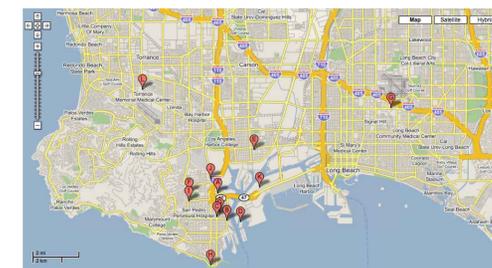
Products Sector

- Energy
- Construction, Architecture
- Manufacturing, Business and Consumer Products

Metaverse/Attention/IT Sector

Encompassing all of the above into an attention-mediated intelligent 3D virtual and augmented reality management environment, via the following industries:

- Information Technology and Computer Science
 - Applications, Automation (Industrial And Process)
 - Databases, Architectures
 - Hardware And Physical Infrastructure
 - Languages, Protocols, Standards
 - Machine Learning, Artificial Intelligence
 - Natural Language Processing, Cui, Linguistic Interface
 - Virtualization, Cyberspace, Visual Interface
- Networking, Communication
- Sensors, Haptics, Transparency
- Effectors, Robotics, Fabrication



Example of a geospatial web: Google Map for computer repair services in San Pedro, CA.



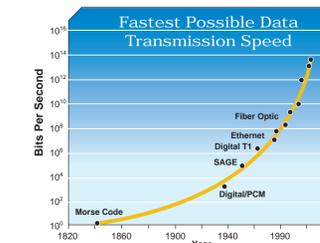
Quantitative and Qualitative Input

The roadmap will emerge in a dynamic group foresight process that includes both quantitative and qualitative input.

Quantitative Data and Trends

Examples of quantitative input include statistical data, forecasts, and trends, including technical capacity growth trends enabling metaverse development.

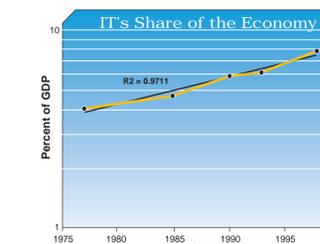
Historical growth in IT capacity and IT-related economics can help us understand when disruptive new emergences are likely to occur.



Log curve of fastest wired data transmission speed. Average doubling time from 1940-1980 was 3 years (24% annual growth), and from 1980-2000, 1 year (72% annual growth).

Doubling Time:
1940 - 1980 36 Months
1980 - 2000 12 Months

Graph courtesy Ray Kurzweil



Log curve of U.S. Dept. of Commerce statistics for growth in IT's share of the U.S. economy, 1975-2000. Current doubling time, 23 years (3% annual growth).

Source: U.S. Department of Commerce

Qualitative Assessments

Examples of qualitative input include subjective assessments, rankings, forecasts, and scenarios. Below is a qualitative forecast in one economic sector, telecom. Many such inputs will be evaluated in the MVR.

Avatar-Mediated Communication in 2016

As broadband and VoIP gain market share, allowing next generation IP-enabled communications platforms (IM, chat, email, telephony, conferencing, television) to begin to arrive, we forecast users will increasingly associate personal avatars with their public personas, and use them to mediate contact with the world.

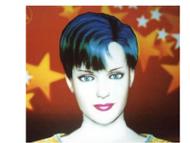
Avatars are more friendly, personalized, and interactive relative to static images or linear narratives (slides, movies), and will become increasingly useful as they are able to encode personal interests of the user, and direct inquiries to the user's data (avatar-as-search-interface). Automation will accelerate this transition via personal database and email mining advances. Tomorrow's keyword and interest mining will improve context-specific search, social networking, education and training, personality modeling, and other online activities.

Given trends in automated knowledge discovery, knowledge management, and natural language processing, within ten years a caller should be able to have a primitive yet useful natural conversation with an avatar and gain significant personal information about the represented individual. This will include simple information about the user's background, interests, present location, availability status, and future plans, as well as the ability to schedule meetings with trusted parties, answer FAQs, manage e-commerce, and perform other simple transactions.



Phil the avatar in Apple's Knowledge Navigator ad, 1987.

Consistent with trends toward an increasingly visually and verbally automated, user-centric, and accelerated "Metaverse/Attention Economy," we can expect avatars to become first-pass communication screeners, with social network access, product, and service delivery increasingly qualified by simple human-to-avatar and trusted avatar-to-avatar "conversations." Semi-asynchronous avatar-mediated chat may even become the preferred first communication layer for those seeking greater creativity, novelty, productivity, privacy, or security.



Ananova, world's first virtual newscaster, 2000.

Metaverse Roadmap Summit

May 5-6, 2006
SRI International
Menlo Park, CA



Acceleration Studies Foundation

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