

Viral Triggers



Location

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Communicators

- Positioning
- Location intended systems
 - LORAN
 - GPS (US)
 - GLONASS (Russia)
 - GALILEO (EU)
 - Biedou (China)
- Data-transmission intended systems
 - Wi-Fi
 - GSM

Frameworks

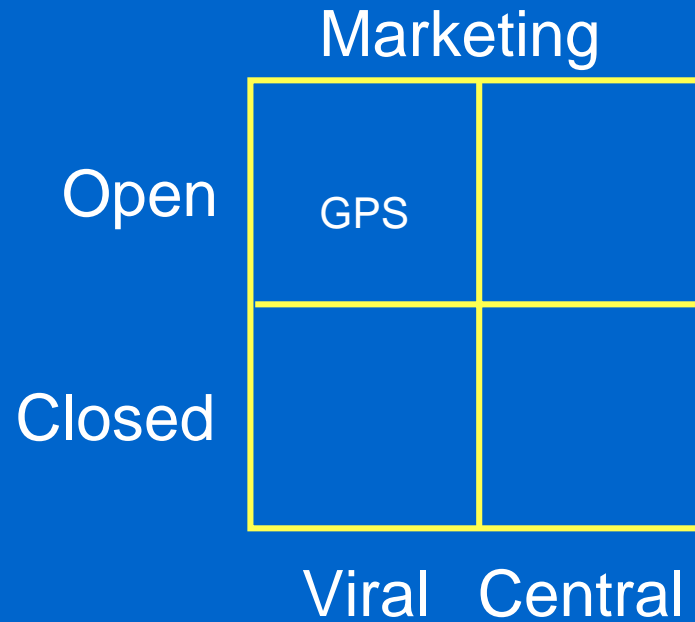
Architecture

Open		
Closed		GPS
	Viral	Central

Interfaces

Open		
Closed	GPS	
	Viral	Central

Frameworks



Positioning Pre-history

- 1940
 - MIT's RadLab develops LORAN. First sites are deployed along the North Atlantic, used during WW II by allied forces.
- 1960
 - TRANSIT (NAVSAT), the first satellite navigation system
- 1967
 - TIMATION satellites begin to be launched.
 - November - First Soviet navigation satellite, TSYKLON.
- 1973
 - NAVSTAR program begins, by incorporating Navy TIMATION system and Air Force System 621B 3-d navigation system.
- 1974
 - August - Secretary of Defense a program based on GPS. Air Force will be the program manager.
- 1978
 - February 22 - NAVSTAR I satellite launched.
- 1982
 - October 12 - GLONASS satellites begin to be launched.

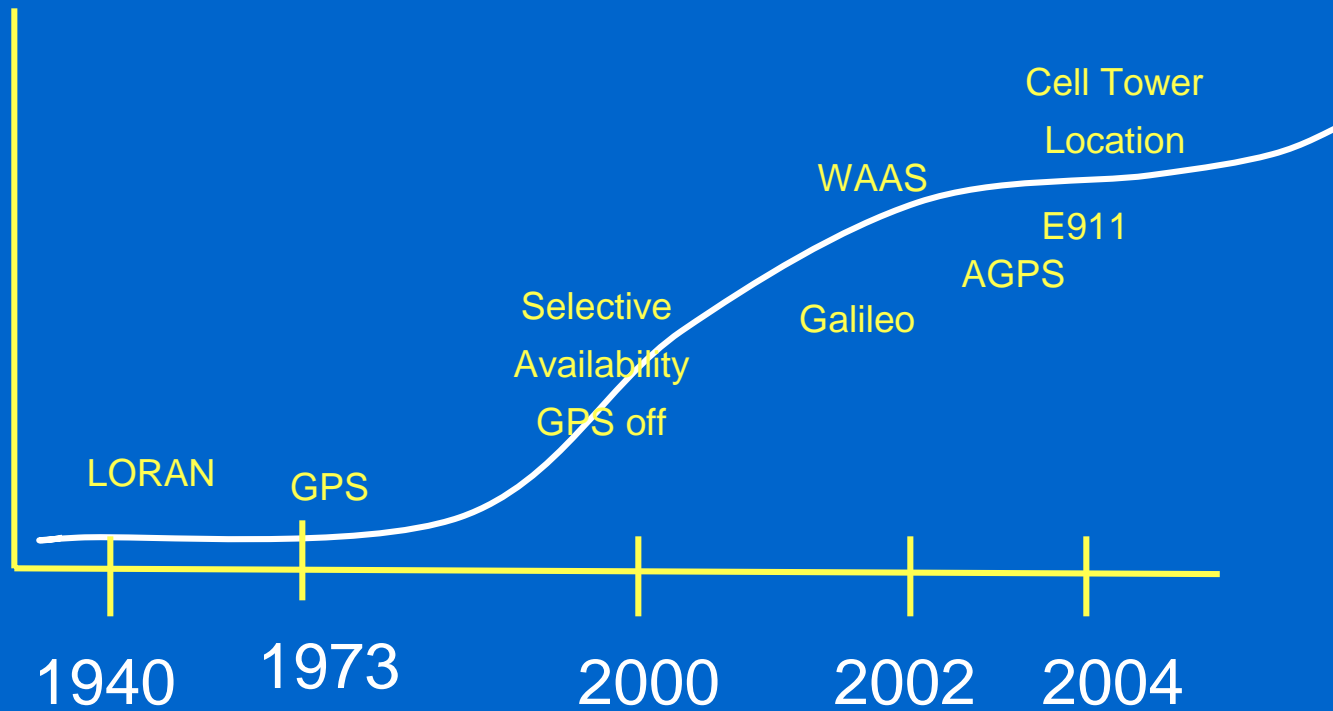
Positioning Fits and Starts

- 1983
 - U.S. DoD news release announces NAVSTAR, with two accuracy levels, Standard Positioning Service with 100m maximum horizontal error. Precise Positioning Service to be limited to military users only.
 - E-911 Begins in Minneapolis
- 1985
 - Second phase of GLONASS deployment begins. NAVSTAR 11. Last of the Block I satellites launched.
- 1993
 - July 9 - U.S. Federal Aviation Administration approves use of GPS by civil operators.
 - September 24 - GLONASS program officially placed.
 - December 8 - NAVSTAR system has achieved Initial Operational Capacity (IOC).
- 1994
 - February 17 - FAA announces that GPS is now operational and is an integrated part of US air traffic control system.
 - July 17 - **NAVSTAR officially reaches full operational capability.**
- 1995
 - GLONASS constellation fully operational.
- 1996
 - Differential GPS provides accuracy of 10m.

Real Beginning

- 2000
 - May 1 - **US announced that Selective Availability would be turned off.** However, for military purposes, "Selective Deniability" may still be used.
 - Oct 30 - Beidou navigation system is launched by China.
 - Oct – E911 begins to deploy
- 2001
 - Google and Vodafone announce location based services
- 2002
 - Due to economic situation in Russia, only 8 satellites in the GLONASS work, making the system unusable.
 - Jan 17 – After 9/11 Terrorist Attack, US discourages positioning systems.
 - May 26 - EU announces the Galileo program for civilian use, realizing the need of an independent positioning system.
- 2003
 - July – **WAAS becomes operational (~7m precision)**
 - September - China joins the Galileo project.
 - Location based on wireless networks (GSM, Wi-Fi).
- 2004
 - July – **First A-GPS enabled chip announced by Fujitsu**
 - Dec 26 - GLONASS-M satellites launched.
- 2005
 - A-GPS testings going on.

Growth, Absolute



Issues

Spectrum Implications

Legitimization

Disruptions

Impediments

Profitability

