

Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)**Submission Title:** Aloha to the Web**Date Submitted:** July 18, 2011**Source:** Norm Abramson**Contact:** Norm Abramson**Voice:** e-mail: norm@hawaii.edu**Re:**

Abstract: In June 1971 the first two way wireless transmission of data packets within a computer network was put into operation in the ALOHA Network at the Manoa campus of the University of Hawaii in Honolulu. The ALOHA protocol developed in that project has since formed the basis of almost all wireless and many wired random access MAC protocols. Ethernet, WiFi, a wide variety of CSMA based protocols, DOCSIS and four generations of cellular standards trace the origins of their MAC protocols back to the ALOHA Network.

Purpose: To focus activities during the meeting

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ALOHA To The WEB

IEEE
802

San Francisco
July 18, 2011

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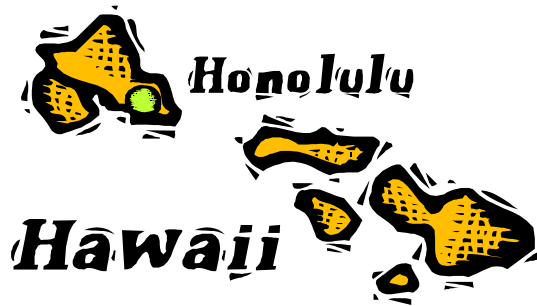


SUMMARY

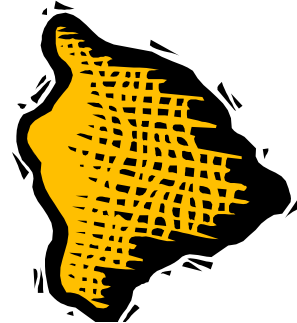
1. The history of ALOHA
2. ALOHA applications
3. The ALOHA channel
4. Current issues in ALOHA



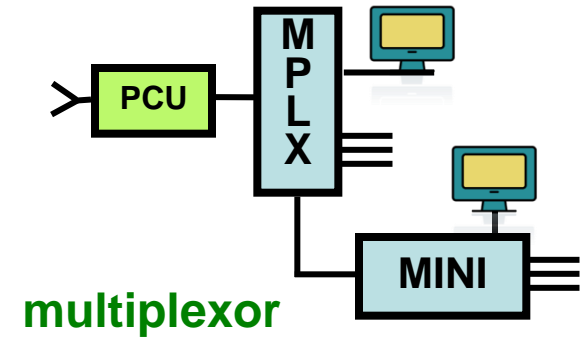
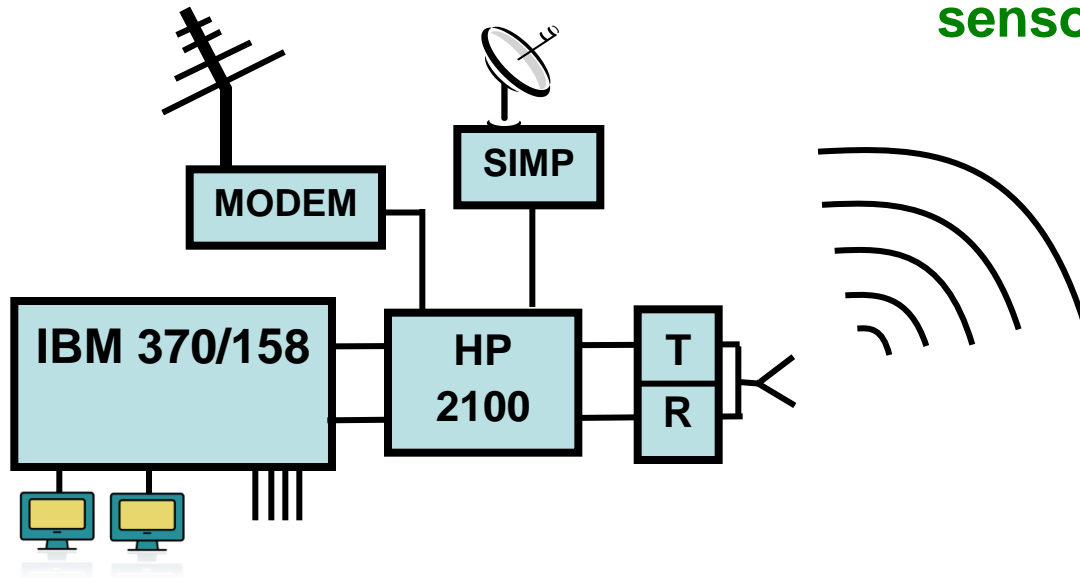
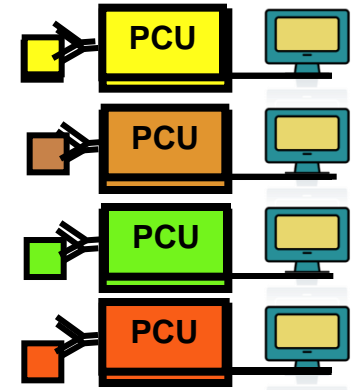
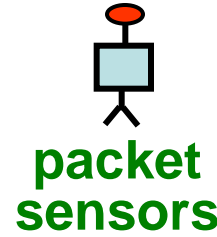
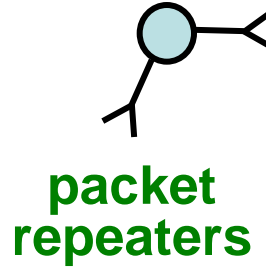
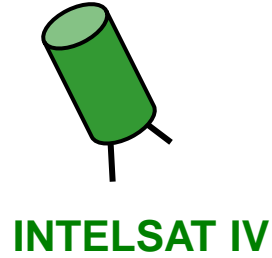
THE HISTORY OF ALOHA



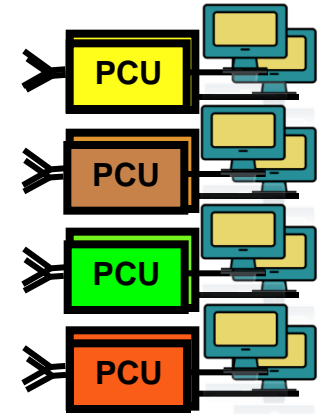
1968



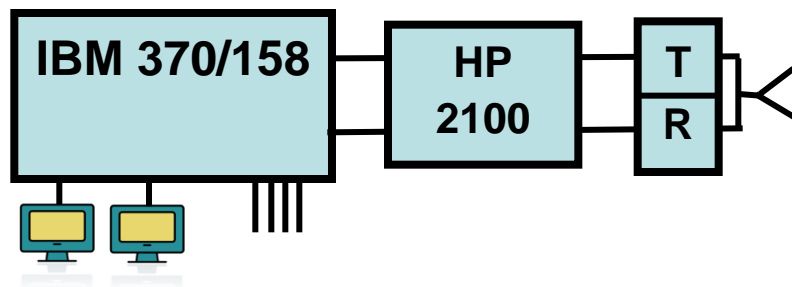
THE ALOHANET



THE ALOHANET



terminals



1970

SUMMARY

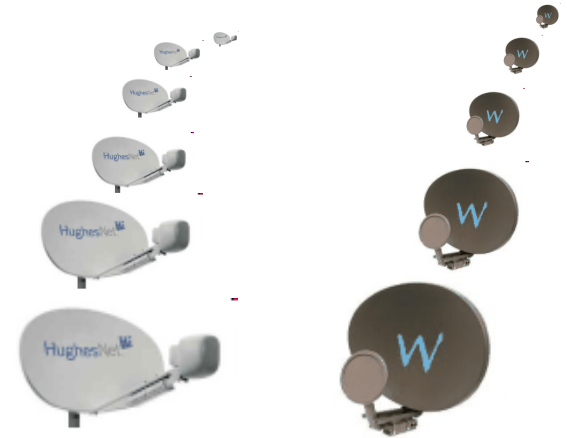
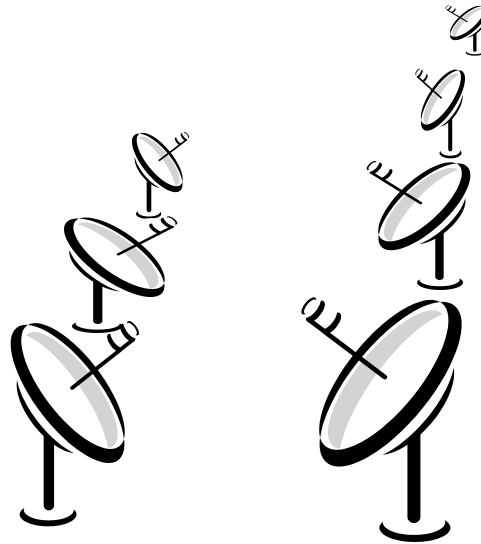
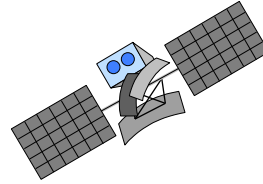
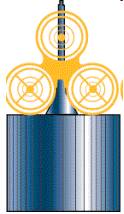
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ALOHA APPLICATIONS

- **satellite networks**
- **Ethernet / DOCSIS**
- **WiFi**
- **wireless mobile**

SATELLITE ALOHA



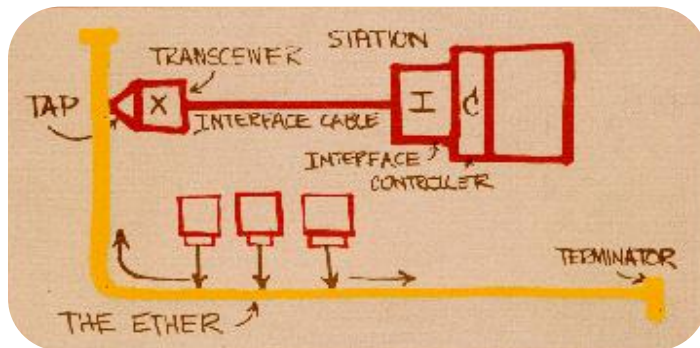
**Marisat
1976**

**private networks
1980's**

**Internet access
2000's**

ETHERNET

- **Alto ALOHA Network – Metcalfe ‘73**
- **CSMA/CD – Kleinrock / Tobagi ‘75**
- **Standards – IEEE 802.3 ‘83**



1973



1983 - 2011

WiFi

- unlicensed bands (Marcus / US) '85
- CSMA/CA – Kleinrock / Tobagi '75
- standards – IEEE 802.11 '97

1995



EtherNet or ALOHAnet ?

WiFi (Applications)



ALOHA in WIRELESS MOBILE

1980's

1G



1990's

2G



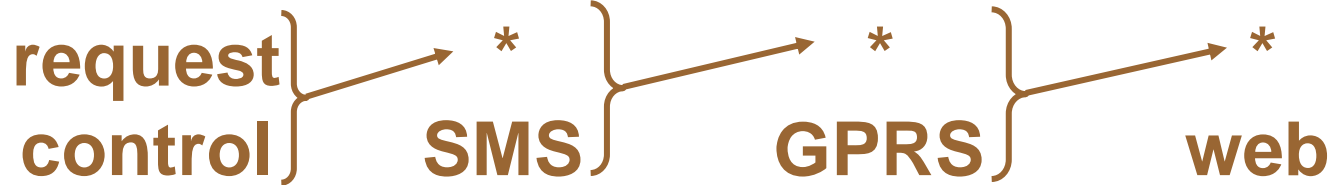
2000's

3G



2010's

4G ...

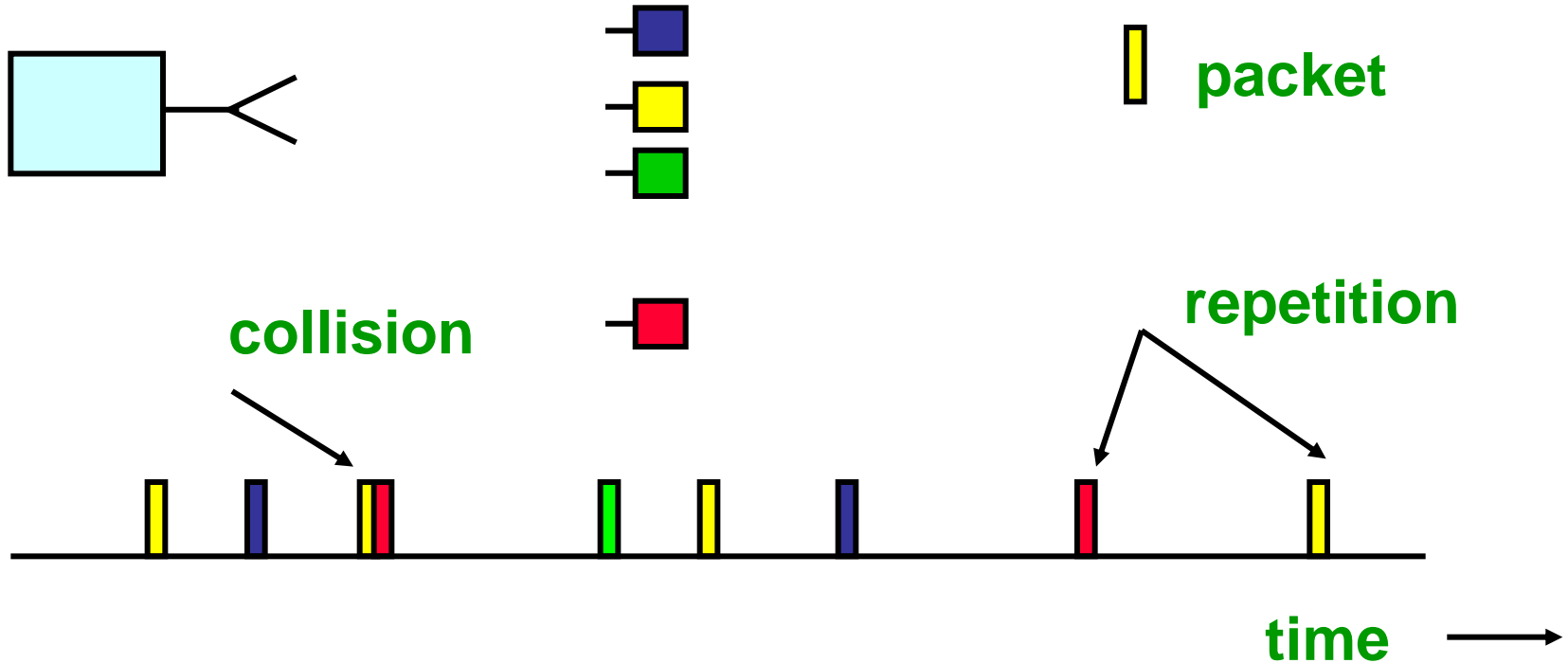


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THE ALOHA CHANNEL



$$\text{maximum throughput} = \frac{1}{2e} = 0.186$$

ALOHA FLAVORS

- unslotted ALOHA
- slotted ALOHA
- reservation ALOHA
- CSMA
- spread ALOHA

SUMMARY

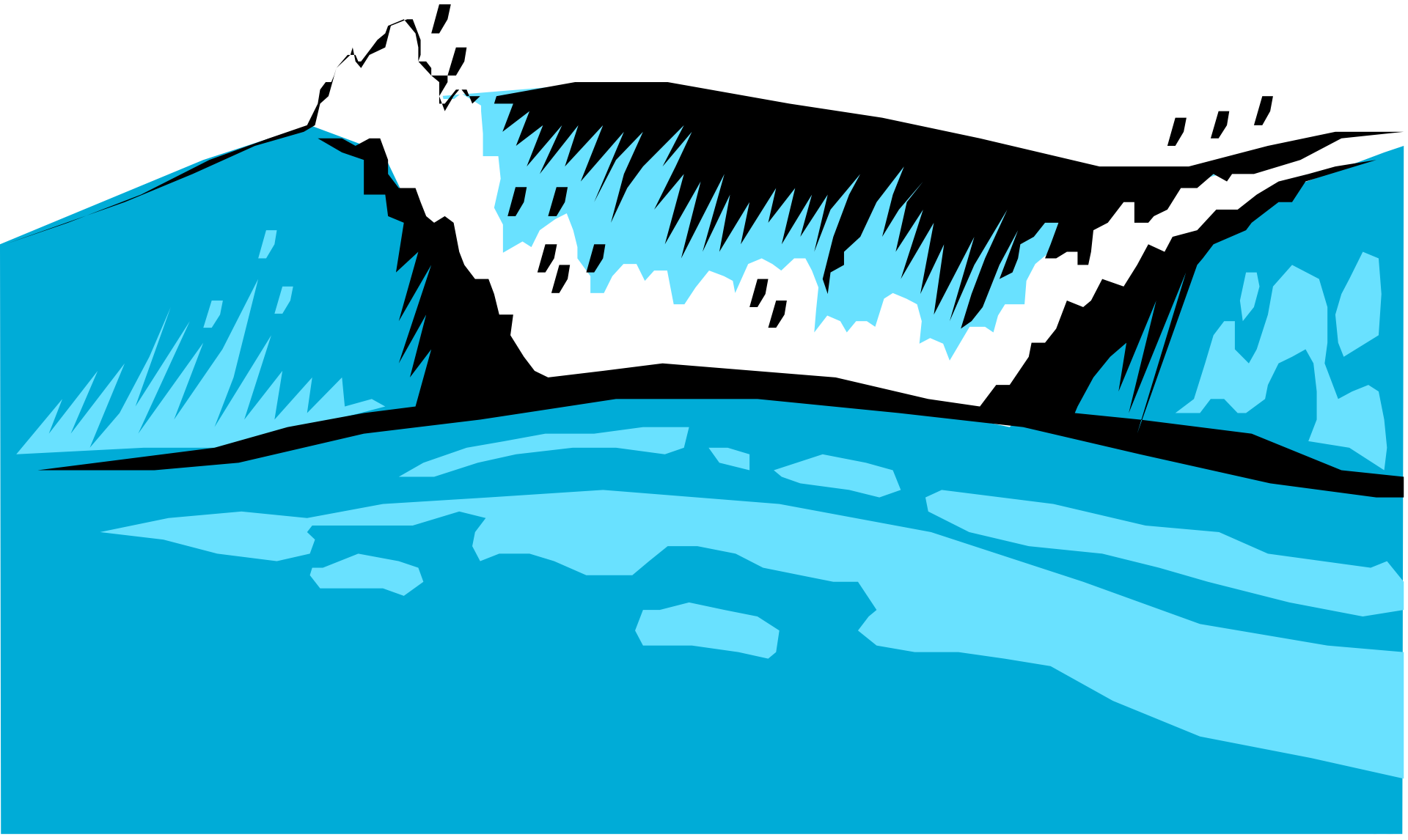
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CURRENT ISSUES in ALOHA

- to slot or not to slot ?
- spread ALOHA – CDMA w/o CD
- WiFi – EtherNet or ALOHANet ?
- bursty traffic – charging by the byte
- throughput and protocol overhead

THE END



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- N. Abramson, *The ALOHANet – Surfing for Wireless Data*, IEEE Communications Magazine, December, 2009, Vol. 47, No. 12, pp. 21-25.