Spectrum Regulation Then and Now

Bob Lucky
Telcordia Technologies
The Ships

• Frankfurt
  – first to hear signals from Titanic
  – 200 miles away
  – a Telefunken ship
  – “What is the matter?”
  – “You’re a fool, keep out.”

• Californian
  – only 10 miles away
  – wireless operator retires to his bunk at 11:30pm after long day
  – misses Titanic’s signals, and ignores flares
The Ships

• Carpathia
  – operator Cottam relays messages from Cape Cod to Titanic
  – “I say OM do you know there is a batch of messages coming through for you from MCC?”
  – “Come at once it’s CQD, OM.”
  – “Shall I tell my captain? Do you require assistance?”
  – “Yes come quick.”
  – after rescue maintains radio silence on tragedy

• Olympic
  – sister ship from White Star Lines
  – relays messages
The Ships

• Titanic
  – overworked operators handle telegrams from passengers
  – get warnings of ice that they forward to other ships, but not their own bridge
  – send off first SOS, new international standard
  – maintain transmissions until 10 minutes before sinking at 2:20am
The Coverup

- Bogus message: “All passengers of liner Titanic safely transferred to this ship and S.S. Parisian. Sea calm. Titanic being towed by Allen Liner Virginian to port.”
- From Marconi to Carpathia: “Marconi Company taking good care of you -- keep your mouth shut -- hold your story -- you will get big money -- now clear.”
- Carpathia ignores messages from President Taft
- Meanwhile, Titanic is reinsured and stock rises
Spectrum Regulation?

Larry Lessig, Harvard Law School, 1998

“I predict that within three years some court in the U.S. will rule that spectrum regulation is unconstitutional.”
Unlimited Capacity?

- Moore’s Law for processing
- adaptive antennas
- space-to-space communications
- shrinking cells
- higher frequencies
- packet relay
- software defined radio
Spectrum Regulation Paradigm Breakers

- Ultra Wideband
- Cognitive Radio
- Plenty, rather than scarcity
The Noise Floor

• Is it rising?
• Does it matter if it’s rising?
• How can you tell?
• Intentional, Unintentional, and Incidental Radiators
How to Regulate?

- Conventional spectrum allocation
- etiquette
- chaos