

Spectrum Regulation Then and Now

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Performance from Experience

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



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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



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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



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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



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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.”



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Unlimited Capacity?

- Moore's Law for processing
- adaptive antennas
- space-to-space communications
- shrinking cells
- higher frequencies
- packet relay
- software defined radio



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Spectrum Regulation Paradigm Breakers

- Ultra Wideband
- Cognitive Radio
- Plenty, rather than scarcity



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The Noise Floor

- Is it rising?
- Does it matter if it's rising?
- How can you tell?
- Intentional, Unintentional, and Incidental Radiators



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How to Regulate?

- Conventional spectrum allocation
- etiquette
- chaos



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