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Space weather and consequences for technical systems

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The electrical telegraph, invented in the mid-19th century, was a revolution for human communications. The telegraph was also the first electrical technology to encounter the effects of space weather on its operations. Since that era, space weather — processes originating at the sun and disturbing Earth's environment — have affected the design, implementation, and operation of many engineered systems on Earth and in space. As the nature and complexities of such systems change, these systems can become more susceptible to the effects of space weather. This talk will briefly describe aspects of the historical development of understanding of space weather on technical systems. The talk will describe some contemporary research, including by the currently flying Van Allen Probes mission, that is directed toward understanding and forecasting of space weather, and the design against, and mitigation of, space weather consequences.