

**Concept Question 9-19:** What is the fundamental contribution of the superheterodyne receiver, and why is it significant?

To overcome the shortcomings of tuned-radio receivers (specifically, vulnerability to noise), **Edwin Armstrong** introduced the **heterodyne receiver** in 1918 by proposing the addition of a receiver stage to convert the carrier frequency of the AM signal  $f_c$  to a fixed lower frequency (now called the **intermediate frequency**  $f_{IF}$ ) before detection (demodulation). This conversion resulted in superior performance and higher-quality signal detection.