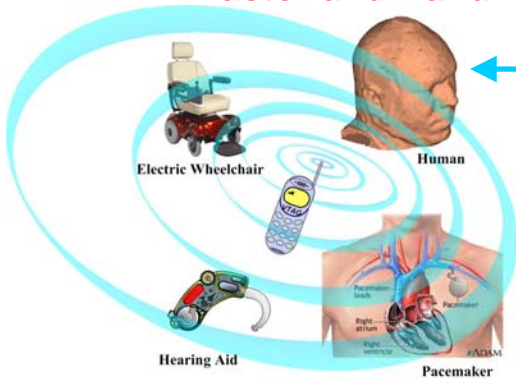


Fundamental Limits of Antennas – Quality Factor and Band Performance



- Reduce interference/Absorption
- Improved Efficiency
- Simpler Structure
- Wideband
- Gain

Operational and Performance Capabilities - Summary

Complete development of a new limit, correcting fundamental errors of energy velocity in last half-century

- Lower bound on antenna Quality factor (Q)
- Reduced interference to other systems
- Increased efficiency for given size
- Maximize bandwidth use
- Simpler antenna models for Communication systems
- Gain control by mode control

Technical Approach:

- Task 1: Complete the development of a new fundamental limit and Add higher-order modes for pattern/gain control
- Task 2: Estimate excess stored energy causing interference and added loss
- Task 3: Relate band performance to the limit as possible and develop fundamental pole-residue modeling relating the performance and antenna structure in a best estimate sense
- Task 4: Construct prototypes to demonstrate beam forming limitations of minimum Q antennas
- Task 5: Measure prototype performance in VTAG antenna chamber

Deliverables:

- New fundamental limits for multiple spherical modes
- Determine the minimum excess stored energy in an antenna system and a potential method for measuring Q
- Select prototype antennas and measurements

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