



DEKA's Luke Arm

This work was sponsored by the Defense Advanced Research Projects Agency (DARPA) Biological Technologies Office (BTO) Hand Proprioception and Touch Interfaces (HAPTIX) program under the auspices of Dr. Doug Weber through the DARPA Contracts Management Office Contract No. HR0011-15-C-0125.

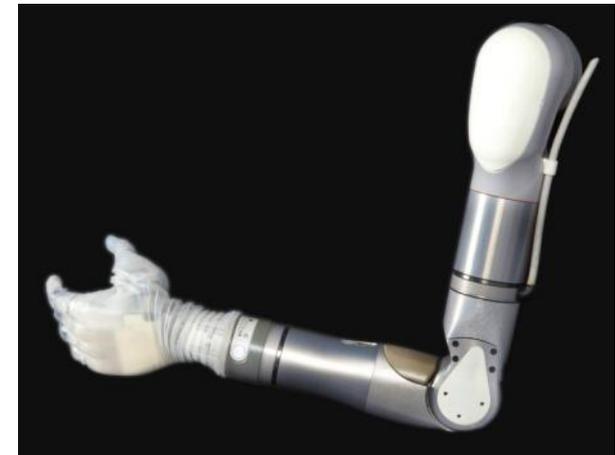
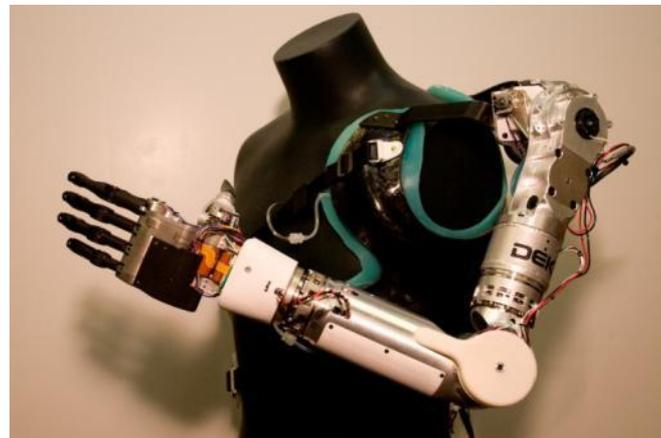
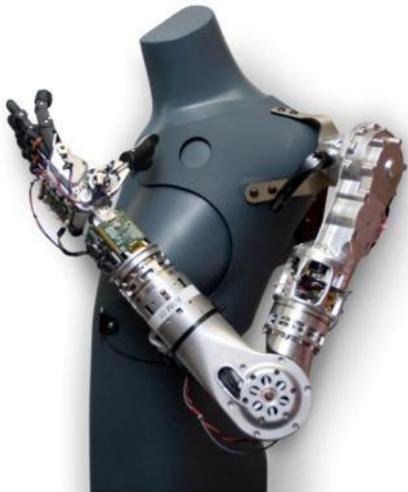
About DEKA Research & Development

- **Located in Manchester, NH**
- **Led by inventor Dean Kamen**
- **Active in medical, energy, and consumer markets**
- **Mission: Improve lives through technology & innovation**



Luke Arm History

- **Developed with the support of DARPA's Revolutionizing Prosthetics program**
- **Started in 2006**
- **Clinical testing in lab & at home**
- **FDA clearance in 2014**
- **Continued R&D in DARPA's HAPTIX program**



Interface Challenges During Development



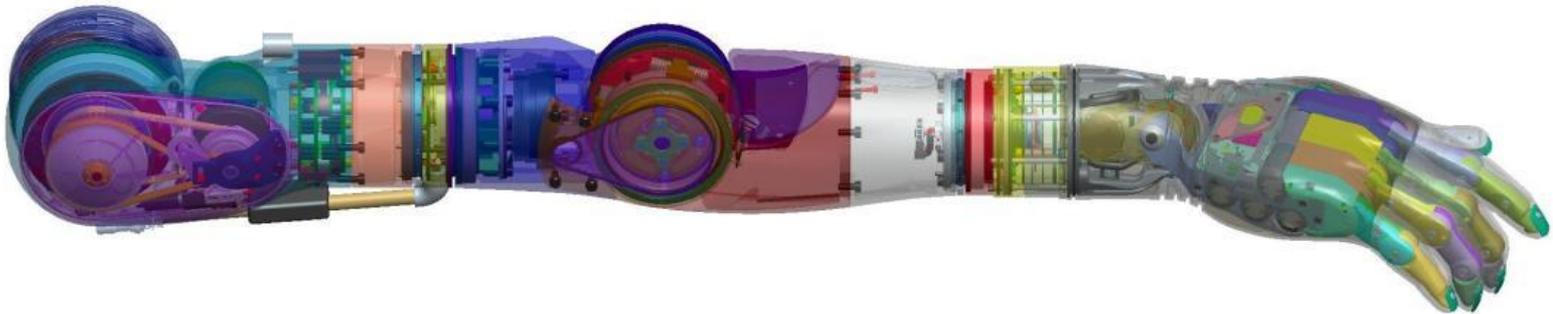
Socket Interface

- **Interface prosthetic arm to the residual limb**
- **Consulted industry professionals**
- **Existing methods didn't meet the needs**
- **Developed new mechanical interface**
- **Improved socket fit, comfort, and stability**



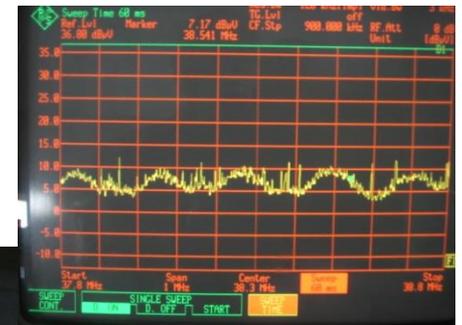
Electrical & Software Interface

- **Developed a joint-to-joint communication system**
- **Make coordinated movements**
- **Allow connection of EMG electrodes or other analog input devices**
- **Add or remove controllable joints**
- **Allows for BCI control**
- **Define API specification**



Regulatory Challenges

- **Novel technology may mean no predicate device**
- **Consider the effects of a de novo submission on the overall project**
- **Availability of test subjects**
- **Human factors/usability**
- **EMC compliance**



The Complete BCI System

- **System includes sensors, effectors, and interface software**
- **Develop interface specification & test method**
- **Allow for regulatory approval of each part separately**

