

水晶振動子を用いたワイドレンジ荷重センサによる マルチ生体信号計測



NAGOYA UNIVERSITY

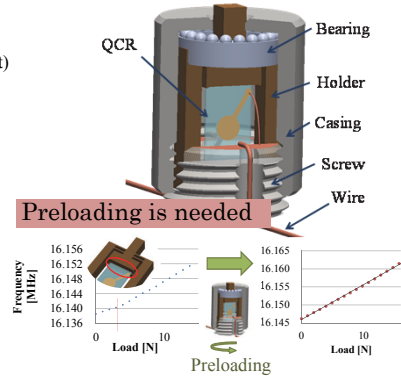
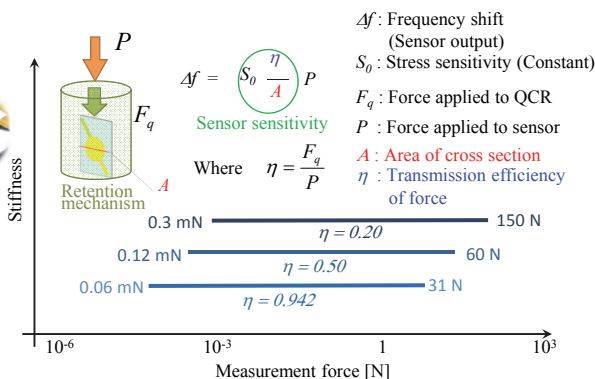
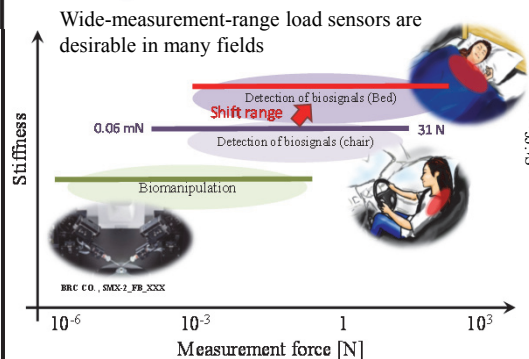
○学 室崎裕一 正 新井史人
名古屋大学大学院工学研究科マイクロ・ナノシステム工学専攻



10⁵力計測レンジによる呼吸と脈波の同時計測

Background

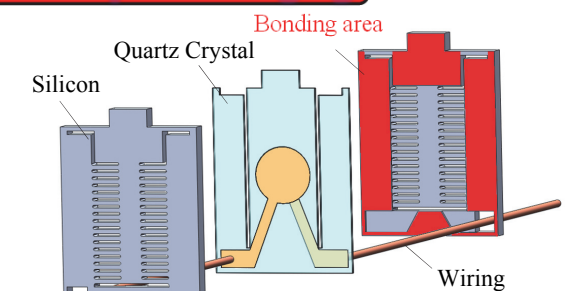
Wide-measurement-range load sensors are desirable in many fields



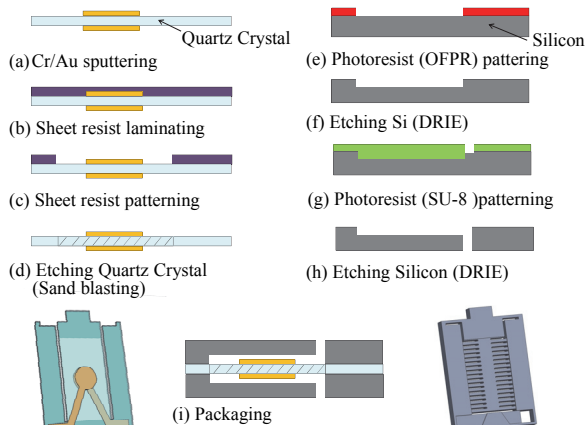
Compact sensor is desired

Miniaturization is difficult

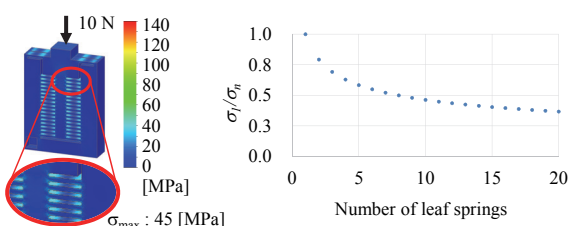
Concept: Packaging



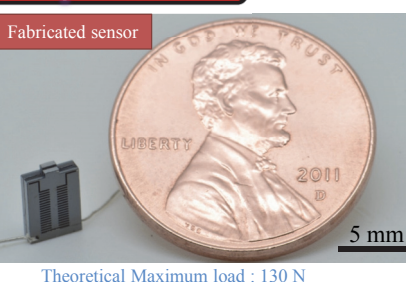
Parts breakdown of packaged force sensor



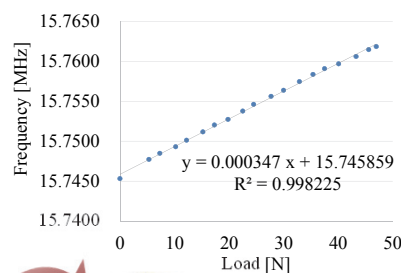
Fabrication process of force sensor



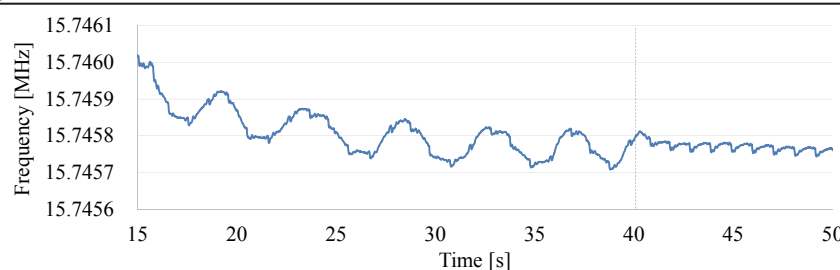
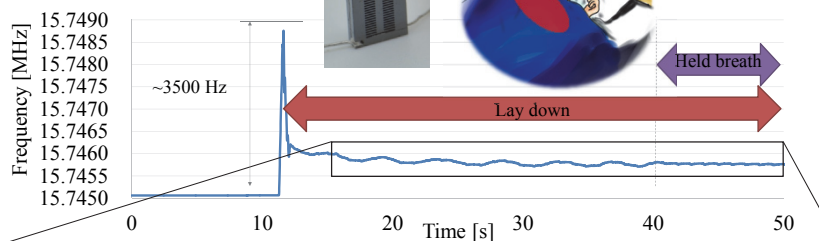
Experiment



Result of loading test



Detection of biosignals



Conclusions

- Sensor volume was reduced from 226 mm² to 24.6 mm² (Volume ratio 1/10)
- The sensitivity of fabricated sensor was 347 Hz/N (theoretical maximum load is 130 N).
- Multiple biological signals (respiration, heartbeat, and posture) were detected in the bed.

Reference

- Yuichi Murozaki, et al, "Multiple Biosignals Detection by Wide-range Load Sensor Using Quartz Crystal Resonator", 1P1-X03, Robomech2014

