

## **Component and Material Selection and Justification**

### **I. Stiffness sensor**

Required specifications and characteristics:

- Small sensing area for spatial resolution
  - 5 mm
- Sensing area can be pushed onto soft surfaces for effective contact
- Mountable onto balloon or expanding surface (flexible)
- Sensitivity is sufficient in detecting differences between tissue (i.e. at least 20 kPa resolution)

	<b>Sensitivity</b>	<b>Flexibility</b>	<b>Small sensing area</b>	<b>Effective contact on soft surfaces</b>
<b>MPL115A2 (Barometer)</b>	X (.15kPa)	X	√	X
<b>MPL3115A2</b>	√ (1.5 Pa)	X	√	X
<b>Interlink 402 (FSR)</b>	√ (0.1 N)	√	X	√
<b>Interlink 400 (FSR)</b>	√ (0.2 N)	√	√	√
<b>Interlink 408 (FSR)</b>				

### **II. Balloon material**

Required specifications and characteristics:

- Constant expansion longitudinally (along the urethra)
- Durable material to reduce risk of bursting in vivo
- Size (for spring break functional prototype, final one will be much smaller)

	<b>Expands beyond diameter of 4 cm</b>	<b>Expands longitudinally</b>	<b>Durability</b>
<b>Standard Party Balloon</b>	X	X	X

<b>Condom</b>	√	√	√
<b>Party Balloon (for balloon animals)</b>	√	√	~
<b>Medical Grade balloon</b>		√	√

### III. Surgical tool tracking sensing mechanism

Required specifications and characteristics:

- Sensing can be performed through a thickness of tissue
- Sensor should yield analog reading
- Signal not distorted (e.g. by dispersion) when passing through the tissue
- Sensitivity should be able to achieve the spatial resolution
- Mountable onto balloon or expanding surface; receiver must be mountable to surgical tool

	<b>Not attenuated or dispersed by tissue</b>	<b>Analog reading</b>	<b>Sensitivity</b>	<b>Resistant to Noise</b>
<b>Wire Coil (EM)</b>	X	√	X	XX
<b>AX01838HS (IR sensor)</b>	/	X	/	X
<b>US5881LUA (Hall effect sensor)</b>	√	√	√	√