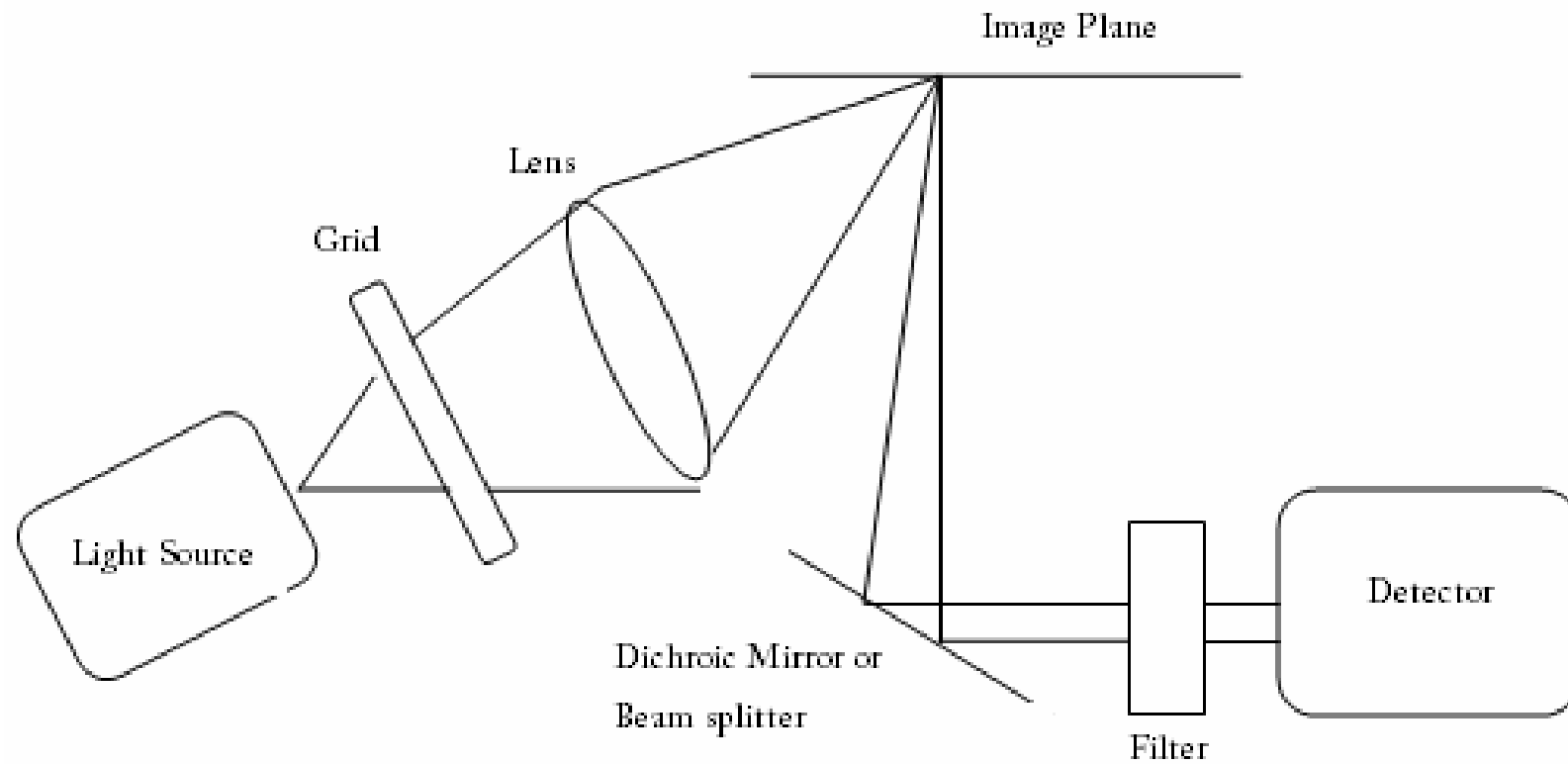


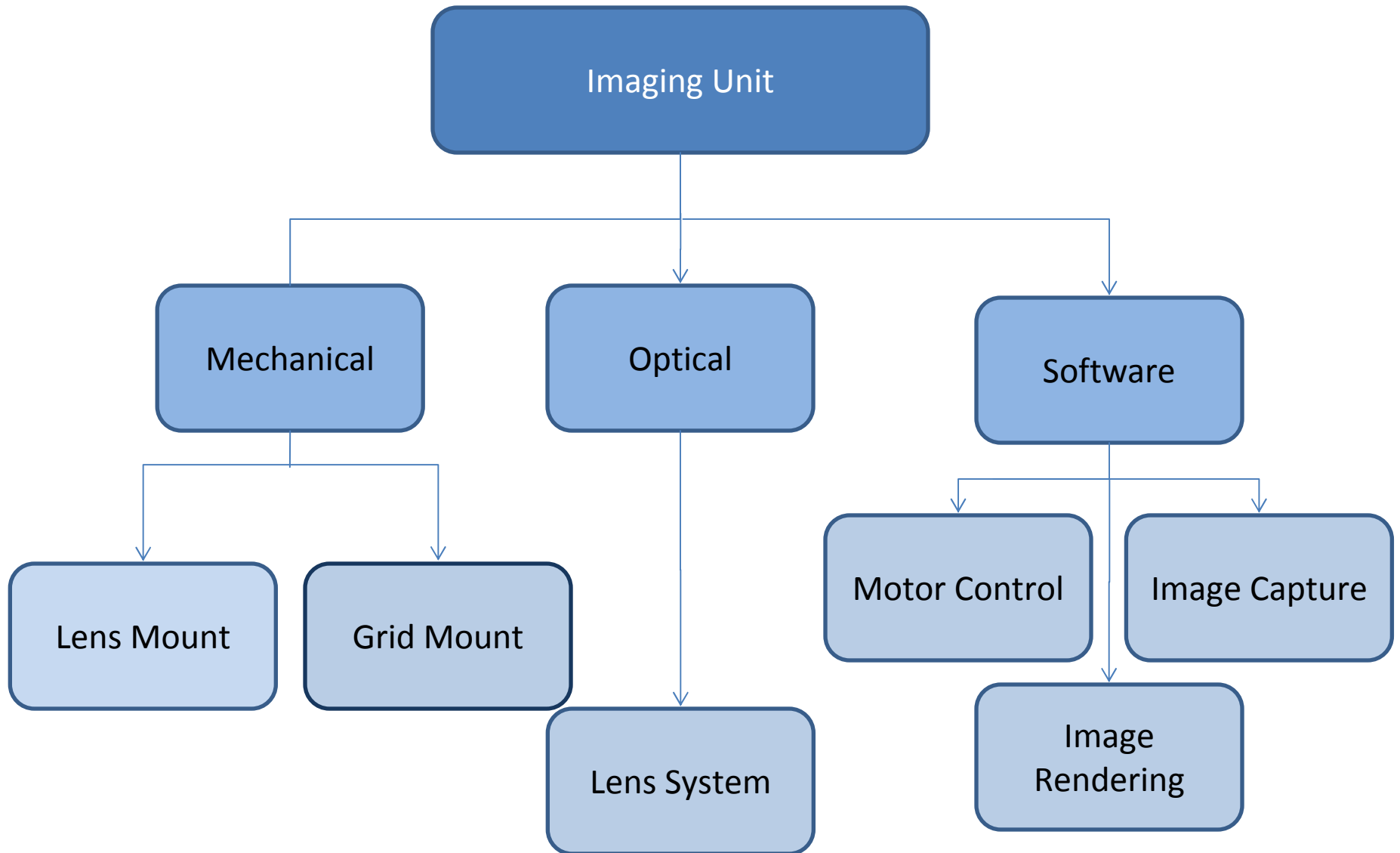
Molecular Imaging System








General Layout



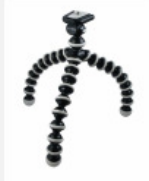




Subsystem Breakdown



Linear Motion

Criteria	Triple Rail Slider 	Double Rail Slider 	Single Geometric Slider 	Pinned Geometric Slider 	Optics Rail 
Cost (Low is +)	0	0	+	0	-
Rigidity	+	+	-	-	+
Flexibility	-	-	-	-	-
Ease of Implementation	+	+	+	+	+
Standard Parts	-	-	0	+	+
Repeatability	0	0	0	+	+
Adjustable	+	+	+	-	+
Total -	2	2	2	3	2
Total +	3	3	3	3	5
Sum	1	1	1	0	3

Criteria	Flexible Tubing 	Wire 	Tripod 	Pulley System 	Suspension 
Cost (Low is +)	0	+	-	+	-
Rigidity	-	-	-	-	0
Flexibility	+	+	+	0	-
Ease of Implementation	+	+	0	-	-
Standard Parts	+	+	+	+	-
Repeatability	-	-	-	0	0
Adjustable	+	+	+	0	-
Total -	2	2	3	3	5
Total +	4	5	3	2	0
Sum	2	3	0	0	-5

Lens and OptiGrid Mounts



Part from www.opto-mechanics.co.uk

Pros: Standard part with pre-threaded holes

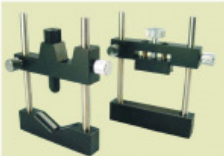
Cons: Only fits certain size lenses, slider rods can not pass through directly



Part from www.opto-mechanics.co.uk

Pros: Standard part that holds any size lenses, has mounting holes

Cons: Heavy



Part from www.opto-mechanics.co.uk

Pros: Standard part that holds any size lenses

Cons: Bulky and cumbersome to mount



Pros: Standard part, inexpensive

Cons: Flimsy, must find ring to fit lens



Custom Part for a double rail

Pros: Works well on double rail, customizable, easy to secure with thumb screw

Cons: Custom part, only first one lens size

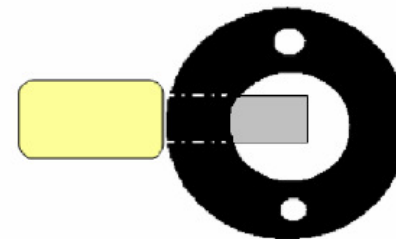


Custom Part for a triple rail

Pros: Works well on triple rail, customizable, easy to secure with thumb screw

Cons: Custom part, only first one lens size

Custom Part

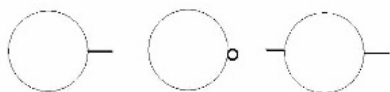
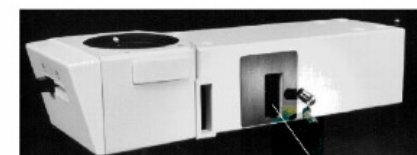


Part from www.opto-mechanics.co.uk

Pros: Standard part that holds any size lenses, has mounting holes

Cons: Heavy and large

OptiGrid holder by QiOptic



Pros: Standard part that holds any size lenses, has mounting holes, small

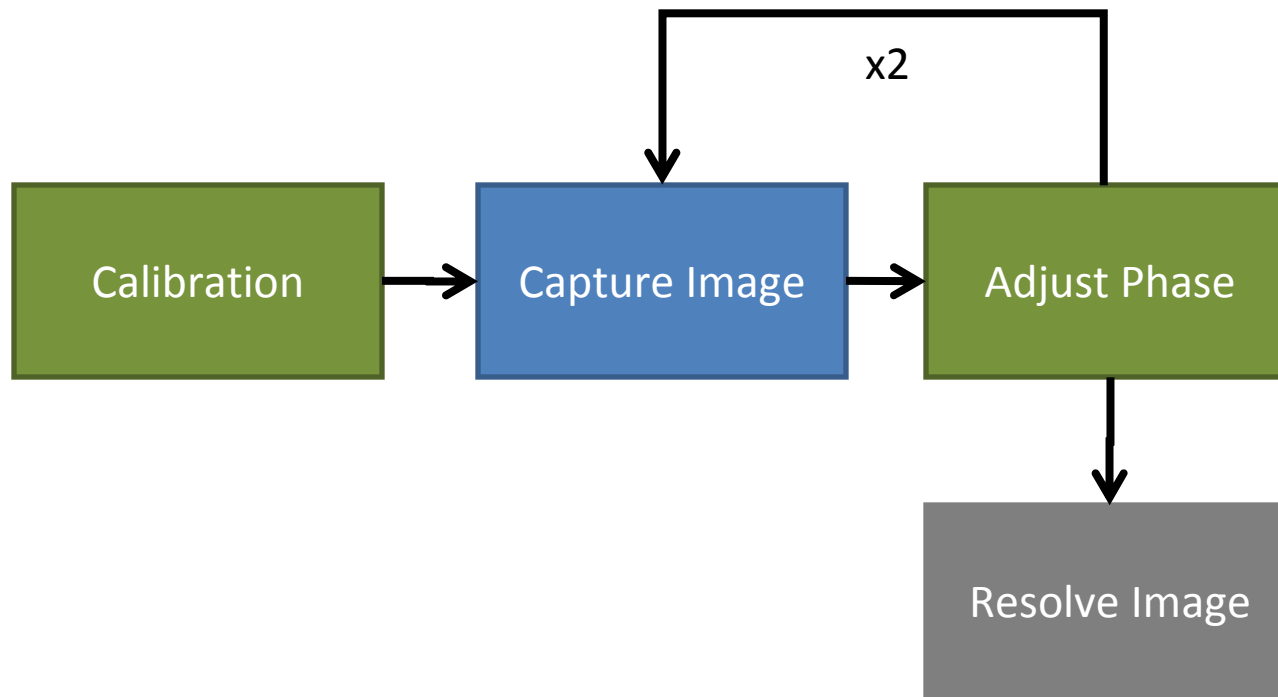
Cons: Must find and buy lenses that come in ring

Mechanical Risk Assessment

Risk Item	Level	Owner	Status and/or Contingency Plans	Decision Date
Optigrd may not work for this application	2	All	Under investigation, if it does not work the program will be dramatically altered and we will have to find new grid or alternative method. We might get a printed transparency	
Hardware does not fit into box, focal length is too large	3	Patricia, Aaron & Dien	This relies on the optics involved. We will not know until the optics design is complete.	
Resolution of image is unacceptable	3	All	We may be able to use different lenses for a better image.	
Method of depth resolution may not work	1	All	We are trying to find a way to test the method.	
Can not find a suitable phantom	4	All	Working with Heather in the medical department to develop one.	

1 = High Risk

Software Flow



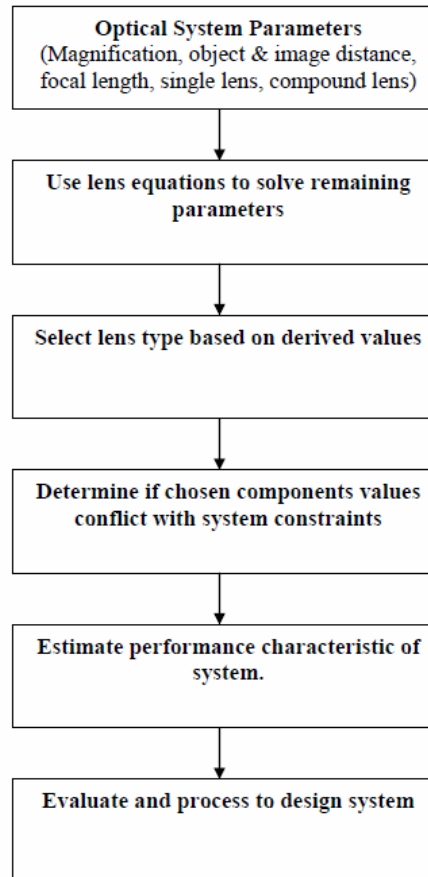
■ Motor Software ■ Camera Software ■ Image Software

Software Risk Assessment

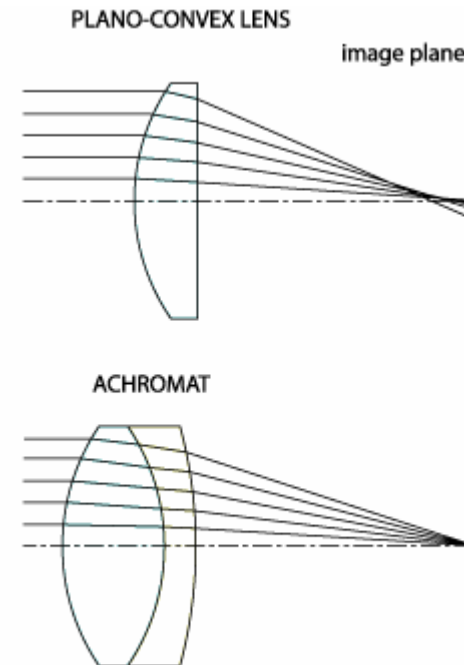
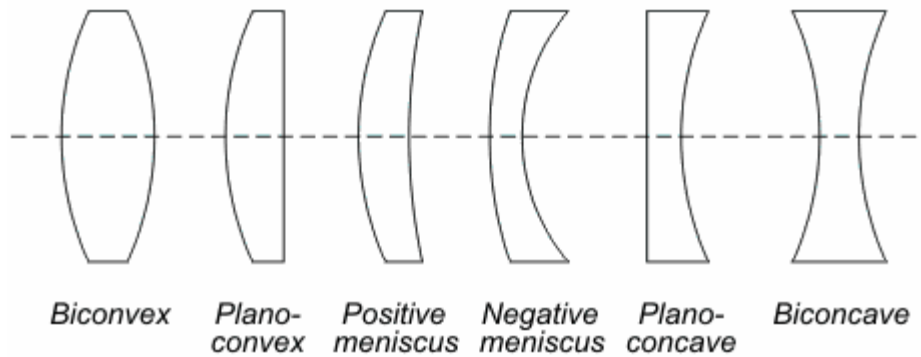
Risk Item	Level	Owner	Status and/or Contingency Plans	Decision Date
Protocol Mode in Kodak Software working with Optigrig Motor Control	4	Brandon, Ben	Develop alternate process with or without direct integration	
Optigrig not working with system	1	Brandon, Ben	Possible use of new motor control, or other existing platform	
Kodak image analysis software not sufficient to implement structured illumination algorithm	3	Brandon, Ben	Use of other image analysis software and possibly MATLAB. The objective is put a process together. It does not necessarily need integration.	
Algorithm needed to analyze filtered images to reconstruct depth information is too complex	2	Brandon, Ben	Proof of concept that depth information is in fact extractable from filtered image	

1 = High Risk

Lens Selection Process



Types of Lenses



Calculations for Desired Distances

image distance (s) (cm)	object distance (s') (cm)	focal length (cm)	Magnification
7	5	2.92	0.7
7	6	3.23	0.9
7	7	3.50	1.0
7	8	3.73	1.1
7	9	3.94	1.3
7	10	4.12	1.4
7	11	4.28	1.6
7	12	4.42	1.7
7	13	4.55	1.9
7	14	4.67	2.0
7	15	4.77	2.1
7	16	4.87	2.3
7	17	4.96	2.4
7	18	5.04	2.6
7	19	5.12	2.7
7	20	5.19	2.9
7	21	5.25	3.0
7	22	5.31	3.1
7	23	5.37	3.3
7	24	5.42	3.4
7	25	5.47	3.6

